Gerald Braver

DROSOPHILA

Information Service

39

June 1964

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DROSOPHILA WORKERS

and arranged by
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DROSOPHILA INFORMATION SERVICE

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I. Herskowitz

344 pp., 3305 references, 1957 through 1962
$4.95 hard cover edition
Mc Graw Hill Book Company

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The selected papers of

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Indiana University Press, Bloomington, 1962
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GENETICS AND EVOLUTION

The selected papers of

A. H. Sturtevant

W. H. Freeman and Co., San Francisco 1961
334 pp., 40 illustrations, 113 tables; $7.50

PHILADELPHIA, PENNSYLVANIA: THE INSTITUTE FOR CANCER RESEARCH

Wild Stocks

a1 + Amherst 3 (homoz. Singh, 1939)
a2 + Canton-S
a3 + Canton-S, A (iso, 1952)
a4 + Crimea
a5 + Florida-9
a6 + Lausanne-S
a7 + Oregon R
a8 + Oregon-R (iso, 6/62)
a9 + Oregon-R-C
a10 + Oregon-R-S
a11 + Samarkand
a12 + Seto, Japan
a13 + Swedish-b-6
a14 + Swedish-C
a15 + Urbana-S
a16 + Wageningen

Chromosome 1 (X)

b1 $ac^3\ w^a$ .Dp($sc^{V1}_4\ y^+$) & y f:=
b2 amx/In49 $m^2\ g$
b3 $amx_{55}\ lz^g$ v & y f:=
b4 amx^{55}
b5 Ax
b6 B
b7 B $Bx^r\ car_W$ & y f:=
b8 $B_{263\text{-}20}\ car_{su_W}$ -f & y w f:=
b9 $B^{M2}\ f^{B27}/sc^7$ InAM car
b10 $B^{M2}\ f^{B27}$/Cl B (mosaic in f/f^{27})
b11 Bg B/InAM
b12 bi $ct^6\ g^2$
b13 bo
b14 br
b15 br w^e ec rb t^4/FM1, $y^{31d}\ sc^8\ w^a\ lz^s$ B
b16 Bx_2
b17 Bx_3
b18 Bx^J
b19 Bx^+
b20 car
b21 car bb
b22 cm
b23 cm ct^6
b24 cm $ct^6\ sn^3$ & y w f:=
b25 Co
b26 Co & y_{J4} w f.=
b27 Co & y^{J4} cv v f bb) .
b28 $Co_{55}\ rst^2$ & y w bb.=
b29 cs^{55}_6 & y w bb.=
b30 ct^6 v dy g f/InA99 sn^{33f}
b31 ct^n oc/$y^{31d}\ sc^8_i$ B In49 $lz^s\ w^a$
b32 ct⁻ oc ptg; $\underline{ct^1}$ ♂ & ct⁻ oc ptg/y sc^8 B In49 lz^s v sc^8 (ct^1)
b33 cv f
b34 cx_{tg}
b35 cx^{tg} t/FM1, $y^{31d}\ sc^8\ w^a\ lz^s$ B
b36 Df(X)259-4/FM4, $y^{31d}\ sc^8$ dm B
b37 Df(X)260-1/FM4, $y^{31d}\ sc^8$ dm B
b38 Df(X)g^1 f B/InAM
b39 Df(X)ma-1/y w In49 lz
b40 Df(X)svr, Dp(X;f)101 (Dp. het. or hom.)
b41 dor/ClB
b42 dow/y Hw In49 $m^2\ g^4$
b43 dm & y f:=
b44 Dp(X;f)3 = Del(X)3/$lJ1^{259}$ y w Y^L . Y^S & y.=
b45 Dp(X;f)18 = Del(X)18/$lJ1^{259}$ y w Y^L . Y^S & y v f.=
b46 Dp(X;f)52 = Del(X)52/$lJ1^{259}$ y w Y^L . Y^S & y.=
b47 Dp(X;f)101 In(X)sc^8, Df(0+ac)$w^a\ sc^8$; Dp (X;f)101
b48 Dp(X;f)107 In(X)sc^8, Df(0+ac)$w^a\ sc^8$; Dp (X;f)107
b49 Dp(X;f)118 In(X)sc^8, Df(0+ac)$w^a\ sc^8$; Dp (X;f)118
b50 Dp(X;f)112 = Del(X)112/$lJ1^{259}$ y w Y^L . Y^S & y v f.=
b51 Dp(X;f)122 = Del(X)122/$lJ1^{259}$ y w Y^L . Y^S & y v f.=
b52 Dp(X;f)135 In(X)sc^8, Df(0+ac)$w^a\ sc^8$; Dp (X;f)135
b53 Dp(X;f)164 = Del(X)164/$lJ1^{259}$ y w Y^L . Y^S & y v f.=
b54 Dp(X;f)1492 = Del(X)1492/sc^{53k}
b55 Dp(X;f)1514 = Del(X)1514/sc^{53k}
b56 Dp(X;f)X^{c2}_9 Dp(X;f)X^{c2}_9/y l(X)7/y l(X)7
b57 Dp(X;f)z_9 Dp(X;f)z; Df(X)sc^{J4R} & y f:=
b58 Dp(X;X)112 y f, Dp(X;X)112 (homozygous stock)
b59 Dp(X;X) B^S (TMG), $sc^{8L}_4\ X^{c2R}\cdot B^S/\ X^{D/B^S}\ Y^L$. Y^S
b60 Dp(X;X) B^S (TMG), $y\ sc^4\ m\ f$; B^S/sc^7 InAM
b61 Dp(X;Y^L)sc^{S1} $sc^{S1}\cdot Y^L/y\ Y^S$;y f;=; cp bw; (e/+)
b62 Dp(X;3)51 = T(X;3)51/$lJ1^{259}$ y w Y^L . Y^S & y v f.=
b63 Dp(X;3)126_{J4} v f; Dp(X;3)126/Payne, Dfd ca
b64 Dp(X;3)sc^{J4}_{49a7} Dp(X;3)sc^{J4}/Df(X)sc^8, w^a
b65 Dp(X;3)w (Spotter)
b66 Dp(X;3)sc^{J4}/$lJ1^{259}$ y w Y^L . Y^S & y v f.= (no free Y-?)
b67 Dp(X:4)174 = T(X;4)174/$lJ1^{259}$ y w Y^L . Y^S & y v f.=
b68 Dp(X;4)w^{51c20}/w^{m4} car rst^3
b69 dy
b70 ec

b71 ec ct^6 v g^3/ClB
b72 ec dx
b73 ec dx/y su-Hw Hw_8^2 In49 m^2 g^4
b74 Ext/FM6, y^{31d} sc^8 dm B
b75 f
b76 f B car su^W-f & y f:=
b77 f B odsy car
b78 f B_3odsy f^{+ih} & y f:=
b79 f B_i^3 & y f:=
b80 f B^1 (Luce 436.1) & y f:=
b81 f BB & y f:=
b82 f BB/InAM
b83 f BB^{36b} & y f:=
b84 f B^1B^i & y f:=
b85 f fu & y f:=
b86 f fu/ClB
b87 $f_5$od car
b88 f_5 odsy f^{+ih} & y w f:=
b89 f^{su^W-f}
b90 f^{36a}
b91 f^{36a} odsy f^{+ih} & f•=
b92 f^{257-5}/InAM (Demerec)
b93 f^x car & y f:=
b94 fa
b95 fa fa^{no} sn^3
b96 fa N^{j24a}/y Hw In49 m^2
b97 fa N^{j24c} sn^3/y Hw In49 m^2
b98 fa rb
b99 fa fa^{no}spl sn^3
b100 fa^{no}
b101 fa^{no} spl
b102 flp
b103 (Triploid) FM4, y_+^{31d} sc^8 dm B/y^2 sc w^a ec.=
b104 (Triploid) FM4, y_+ w dm f/$lJ1^{259}$ y.=
b105 (Triploid) FM4, y_+ w dm f/$lJ1^{259}$ y w^a_{0f}ec.=
b106 (Triploid) FM6, y^{31d} sc^8 dm B/In49 v f.=
b107 f_2
b108 g_2
b109 g_2 pl/FM3, y^{31d} sc^8 dm B l
b110 g_{im}ty & y_{S1}f:=
b111 g_x/y sc B InS
b112 g^2Inh & y_{31d}f:=
b113 gg_3/FM6, y^{31d} sc^8 dm B
b114 gg^3
b115 gt bb^{11}/ClB
b116 gt v_a
b117 gt w_a
b118 $gt_{49c}w$ (Oregon-R)
b119 Hw_3/Fm1, y^{31d} sc^8 w^a lz^s B
b120 if^3
b121 InAB & y f:=
b122 In49 B^{M1}
b123 In49 Fl v g & y w f:=
b124 In49 lz^s & y_{x2}f:=
b125 In49 m v sn^{x2} g/y Cl B
b126 In49 ptg oc & y_{ns}f:=
b127 In49 ptg oc ct^{ns} & y f:=
b128 In49 ptg oc ct^{ns}/y ClB
b129 In49 sn^{x2} & y f:=
b130 In49 ty-l
b131 In49 ty-l bb^1 & y v f car.=
b132 In49 v g & y f:=
b133 In49 $v_{0f}sn^{x2}$ B & y f:=
b134 In49 y^{c2}
b135 $In(X^{c2})w^{vc}$/y Hw In49 m^2 g^4 f^5 (ring stabilized)
b136 kz
b137 l(X)7/FM6, y^{34} sc^8 dm B
b138 lh_1B car bb & y f:=
b139 lz_1 & y f:=
b140 lz_3/y Hw In49 m^2 g^4
b141 lz_3 & y f:=
b142 lz_{34k}m & y w f:=
b143 lz_{37h} & y f:=
b144 lz_{48f}
b145 lz_{BS} &$_{46f}$y f:=
b146 lz^4 lz^{ras} v & y f:=
b147 m
b148 m f_{36a}car & y w f:=
b149 m_Df
b150 m^{31d}/FM3, y^{S1} sc^8 dm B l
b151 M(1)n/y sc^{S1} B In49 sn^{x2} v sc^8
b152 M(1)o f/InAM
b153 M(1)Sp/InAM
b154 ma-l^{bz}
b155 ma-l & y f:=
b156 N^8/y Hw In49 m^2 g^4
b157 N^{107}/y Hw In49 m^2 g^4
b158 N_{264-10}/FM6, y^{31d} sc^8 dm B
b159 N_{264-39}/y w dim (Y's extra)
b160 N_{264-40} ^{ch}/FM4, y^{31d} sc^8 dm B
b161 $N_{264-105}$/y Hw In49 m^2 g^4
b162 N (dm)/y Hw In49 m^2 g^4
b163 na & y f:=
b164 nd
b165 nd rb
b166 ny f/FM1, y^{31d} sc^8 w^a lz^s $_8$B;(ri)
b167 oc ptg_3Tu/sc^{S1} fu^+ In49 sc^8
b168 oc ptg^3.Dp(sc^{S1} y^+)/ClB
b169 od
b170 od Dp(f^{+ih}) & y_8f:=
b171 pa/FM4, y^{31d} sc^8 dm B
b172 peb v
b173 pn
b174 ("bleached") pn w rb cm ct^6 sn^3 ras^2 v dy g^2 f car & y f:=

b175 pn$_2$Inh l/y Hw In49 m^2 g^4
b176 pn^2
b177 ptg^2
b178 Qn(1)w, (w)5 & y f:=
b179 r^9 & y f:=
b180 r^{39k} f B/InAM
b181 ras$_2$dy
b182 ras$_2$
b183 ras$_3$ m
b184 ras^4 m/ClB
b185 rb
b186 rb$_{S1}$cx
b187 rb^{S1}
b188 rg^2
b189 rst$_2$/FM1, y^{31d} sc^8 w^a lz^s B
b190 rst$_2$/y Hw In49 m^2 g^4
b191 rst$_3$,In & y f:=
b192 rst$_3$,In
b193 rst$_{3+2}$,In m v & y f:=
b194 rst$_{3+17}$, v f & y f:=; bw
b195 rst$_{3+88}$, v
b196 rst$_{3+125}$, v f & y f:=
b197 rst$_{3+204}$, v f & y f:=; bw
b198 rst^{3}, v f
b199 rux/FM6, y^{31d} sc^8 dm B
b200 rux^2
b201 s
b202 sbr & y f:=
b203 sc
b204 sc ch$_9$
b205 sc ct^6 car & y f:=
b206 sc cv v eg
b207 sc cv v f
b208 sc cv v f B$_6$& y f:=
b209 sc ec cv ct^6 v g^2 f/FM3, y^{31d} sc^8 dm B l
b210 sc ec cv ptg & y v f car.=
b211 sc In49 sn^{x2}car/sc oc ptg sd car
b212 sc In49 v B^{M1}
b213 sc oc$_3$ptg sd$_2$car/y$_2$In49 sn^{x2}.B^S (select B ♀)
b214 sc pn$_3$ g^2 Bx^2 = (g^2 reverted)
b215 sc t^2 v f Tu car & y f:=
b216 sc w BB^L, In.Y^S & y f:=
b217 sc z ec ct^6
b218 sc z w^{17G2} ec ct^6
b219 Sc(Scotched eye)/y sc^{S1} g In49 m sc^8 (select Sc ♀)
b220 scp t
b221 sd;$_2$(se)
b222 shf^2
b223 Sh$_3$/FM1, y^{31d} sc^8 w^a lz^s B
b224 sn$_3$
b225 sn$_3$ lz^{46f24} ras^4 v & y f:=
b226 sn$_4$ v B^{M1} & y w f:=
b227 sn$_{34e}$
b228 sn
b229 sn^{36a} ♂ & w^{bf}/w^{bf3} M(1)36f). ♀
b230 sn$^{36a}_c$ & y f:=
b231 sn^{36a}/y In49 m^2 g^4
b232 sp-w
b233 spl
b234 spl cho^2
b235 spl rb$_{S2}$cx & y f:=
b236 spl rb^{S2}
b237 sta & y f:=
b238 sta/FM3, y^{31d} sc^8 dm B l
b239 sta pn/sc^{S1} B In49 oc ptg
b240 su^2-s v
b241 su$^2_3$-s w^a cv t
b242 su^{S2}-s cv v f & y f:=
b243 su^{S2}-v-pr v & f B.=
b244 su$^{S2}_x$-v-pr v & y f:=
b245 Su^x-dx dx
b246 su-w^a w^a
b247 svr
b248 svr su-w^a w^a
b249 svr w$^a_{poi}$
b250 svr^{poi}
b251 sw
b252 sx vb^2 sy/InAM
b253 sy
b254 t$_2$
b255 t$^2_3$ v f
b256 t^3
b257 Tu & y f:=
b258 tw/FM1, y^{31d} sc^8 w^a lz^s B
b259 un$_4$Bx^2 & y f:=
b260 un
b261 v
b262 v B^{M1} (tan-like)
b263 v f Bx$^{r49k}_w$ car & y f:=
b264 v f su^{3N}-f
b265 v f car^{12}
b266 v$_2$r
b267 v$^{fw}_{36f}$
b268 v^{+M2}
b269 v$^+$(rev.v) B^{M2+}
b270 v$^+$(rev.v) B^{M2+} (rev. B, rein.) f^{B15} (mosaic)
b271 v$^+$(rev.v) f^x Dp(f^{+ih})
b272 vb
b273 vs
b274 w
b275 w ec
b276 w In49 lz^s & y f:=
b277 w m f
b278 w^a=apr
b279 w^a f^3 odsy f^{+ih} & y f:=
b280 w$^a_2$spl
b281 w

b282 w_{a3}
b283 w_{a4}
b284 w_{bf}
b285 w_{bf2}
b286 w_{bl}
b287 w_{Bwx}
b288 w_{ch}
b289 w_{co} wy
b290 w_{co} sn^{2}
b291 w_{col}
b292 w_{cp}
b293 w_{e}
b294 w_{e}
b295 w_{e2}sn/ClB
b296 w_{ec3}
b297 w_{h} (écru)
b298 w_{i}
b299 w_{m4} f^{3} bb^{N}
b300 w_{m4}(3C1-2&20)
b301 w_{m4}(Oregon-R autosomes; Y's extra)
b302 w_{m4w} ^{mMc}v w
b303 w_{m4w} $^{Su-V}$(Y extra)
b304 w_{mMc} & y$_{m4}$f:=
b305 w_{mMc} f w
b306 w_{mR7aH1}
b307 w_{sat}
b308 w_{t} fw
b309 wy
b310 X_{c1}
b311 X_{c2} y & y f:=
b312 X_{c2} cv v f/ClB
b313 X_{c2} ec f & y f:= (ring OK 1963)
b314 X_{c2} t^{2}
b315 X_{c2} y B & y f:= (ring OK 1963)
b316 X_{c2} y f & y w f:= (ring OK 1963)
b317 X_{c2} y v & y f:= (ring OK 1963)
b318 X_{c3} y v f^{3N} & y$_{8}$f:=$_{a}$ (ring OK 1963)
(tm-ac)- sc^{8} w InS B y f:=/sc^{8}.Y (ring from tandem X.X)
b319 y
b320 y Aa f:= ♀(+) & B ♂
b321 y ac dvr$^{(+)}$ v bb^{M1}
b322 y ac pn In49 v B^{M1}
b323 ("tester-1") y ac pn w rb wy^{2} g^{2} & y f:=; sc^{19i}/Cy
b324 y ac sc pn & y f:=
b325 y ac sc pn w.Dp(sc^{V1} y^{+}) & y f:=
b326 ("maple") y ac sc pn w rb cm ct^{6} ras^{2} v g^{2} f car & y f:=; sc^{19i}/Cy,InL lt
b327 y ac sc pn w spl rb cx & y f:=; (sc^{19i}(b pr)/)
b328 y ac sc v & y$_{S1}$f:=
b329 y ac t^{2}.Dp(sc^{+} y^{+} ac^{+}) & y f:=
b330 y ac v
b331 y ac v f su^{W}-f
b332 (y ac)$^{-51}$ f (from y f:=) & y f:=
b333 y ac^{-53} sc/y Hw In49 m^{2} g^{4}
b334 y ac^{-53} sc B car.Dp(ac^{+} y^{+}-tm)^{53} & y f:=
b335 y B & y f:=
b336 y bb^{1158} & y$_{2}$w.=
b337 y bb^{1452} & y^{a} su-w^{a} w^{a} bb.=
b338 y car bb-, In/InAM
b339 y ct$_{6}$ & y f:=
b340 y ct$_{6}$ dvr^{2} v$_{3}$f & y f:=
b341 y ct$_{6}$ f & ac^{3} w^{a} ct f.=
b342 y ct$_{6}$ f car & y f:=
b343 y ct$_{6}$ f$_{2}$.Dp(y^{+} sc^{V1}) & y f:=
b344 y ct$_{6}$ t$^{268-42}$ y f car
b345 y ct$_{K}$/FM4, y^{31d} sc^{8} dm B
b346 y ct^{K}
b347 y cv
b348 y cv v f
b349 y cv v$_{+}$f car
b350 y.Dp(y^{+} sc^{V1}) & y f:=
b351 y f B f$_{2}$ ^{In}& y f:=
b352 y fa$_{n}$ wy^{2} g^{4}
b353 y fa$_{51g}$ In49
b354 y fw^{8} & y f:=
b355 y Hw & RM, sc^{a} B w^{a} sc^{S1}.= (new tag)
b356 y Hw In49 B^{M1}$_{2}$ & y$_{e}$f:=
b357 y Hw In49 m^{4} g/w^{a} sn
b358 y In49 B^{M1} & y f:=
b359 y In49 f car & y f:=
b360 y In49 sn^{x2} B^{M1}$_{1}$ & y f:=
b361 y In49 sn^{x2} bb^{1} & y f:=
b362 y In49 v f & y f:=
b363 y In49 v f car & y f:=
b364 y In49 v Fl g & y w f:=
b365 y In49 v ptg oc Fl car B^{M1} & y f:=
b366 y In49 v ptg oc g^{2} & y f:=
b367 y l^{451}/FM6, y^{31d} sc^{8} dm B
b368 y lml w In49 f.Y^{S}/sc^{S1} B InS
b369 y N$^{264-6}$/y w dm(=N^{6})
b370 y N$^{264-84}$/FM6, y^{31d} sc^{8} dm B
b371 y N$^{264-103}$/y Hw In49 m^{2} g^{4}
b372 y oc & y f:=
b373 y pn
b374 y pn w cm ct^{6} sn^{3} oc ras^{2} v dy g^{2} f od car sw/y sc^{S1} B In49 v
b375 y pn$_{54c}$ spl
b376 y pn$_{54c}$ w$_{a}$spl
b377 y pn^{54c} w
b378 ("tester 3") y rb cm ras^{2} g^{2} & y f:=; sc^{19i}/Cy
b379 y rst^{3}, In car bb
b380 y sc
b381 y sc In49 v g.Dp(sc^{V1} y^{+})

b382 y sc In49 v g f
b383 y sc lz^{g} v f & y f:=
b384 y sc$_2$ v g & y f:=
b385 y sl$_2$ bb^{-}, In/FM4, y^{31d} sc^{8} dm B
b386 y sl$_2$ bb^{-}, In/InAM
b387 y sn$_3$ oc & y f:=
b388 y sn$_3$ bb
b389 y t^{2} v f
b390 y v & y f:=
b391 y v
b392 y v car bb^{-}, In/y InAM
b393 y v f^{x} B & y w f:=
b394 y v f^{x} car
b395 y v f^{x} car su^{w}-f (with y f:= in $)
b396 y v f^{x} Dp(f^{+1h}) & y f:=
b397 y w
b398 y w B & y f:=
b399 y w bb
b400 y w Co & y f:=
b401 y w f
b402 y w f.Dp(sc^{S1} y^{+})
b403 y w In49 f
b404 y w m f & y f:=
b405 y w sn$_3$
b406 y w sn$_3$ B & y f:=
b407 y w sn$_3$ f^{36a} & y f:=
b408 y w sn$_3$ f^{36a}
b409 y w spl
b410 y w t^{2} v f & y f:=
b411 y w$^{-258-11}$ l/y Hw In49 m^{2} g^{4}
b412 y w$^{-258-11}$ t^{2} v f/y sc^{S1} B InS
b413 y w$^{-258-42}$/y Hw In49 m$_2$ g^{4}
b414 y w$^{-258-45}$/FM4, a y^{31d} sc^{8} dm$_S$B
b415 ("doubler") y w^{a} (l?) .Dp(B^{S})/sc^{S1} In49 v
b416 y$_2$
b417 y$_2$ ch$_2$^{2}
b418 y$_2$ Co^{2} In49 B^{M1}
b419 y$_2$ cv y f
b420 y$_2$ dvr^{2} v
b421 y$_2$ ec cv v$_s$ f car
b422 y$_2$ In49 lz^{s} & y f:=
b423 y$_2$ oc ptg B^{M2} & y f:=
b424 y$_2$ sc w$_a$ ec
b425 y$_2$ su-w$_a$
b426 y$_2$ su-w$_a$ w$_a$
b427 y$_2$ su-w$_a$ w$_a$ f^{54C} & y w In49 bb).
b428 y$_2$ su-w$_a$ w$_a$ y w bb
b429 y$_2$ su-w$_a$ w$_a$ spl
b430 y$_2$ su-w$_a$ w$_a$spl cv
b431 y$_2$ su-w$_a$ w$_{a2}$
b432 y$_2$ su-w$_a$ w$_{a4}$
b433 y$_2$ su-w$_a$ w$_{bf}$
b434 y$_2$ su-w$_a$ w$_{bl}$
b435 y$_2$ su-w$_a$ w$_{co}$
b436 y$_2$ su-w$_a$ w$_h$
b437 y$_2$ su-w$_a$ w$_{sat}$
b438 y$_2$ su-w$_a$ w$_a$
b439 y$_2$ su-w^{2} w^{a}
b440 y$_2$ v
b441 y$_2$ v f car
b442 y$_2$ v f car su-f & y f:=
b443 y$_2$ v$_{bz}$ ma-l^{a}
b444 y^{2} w^{a}
b445 ("tester-2") y^{2} w^{a} cm wy^{2} g^{2} car & y f:=; sc^{191}/Cy
b446 y$_2$ w$_a$^{2} ct^{a} f .Dp(y^{+} sc^{S1})/ClB
b447 y$_2$ w$_a$ ct$_6$ mw f/y sc^{S1} B InS
b448 y$_2$ w$_a$ ct$_6$
b449 y$_2$ w$_a$ ct^{6} lz v f & y f:=
b450 y$_2$ w$_a$ cv m f ♂ & y Aa f:= ♀
b451 y$_2$ w$_a$ InS$_{S1}$B
b452 y$_2$ w$_a$ rb^{5}
b453 y$_2$ w$_a$ sn^{3} B & y Aa f:=
b454 y$_2$ w$_a$ spl
b455 y$_2$ w$_a$ v
b456 y$_2$ w$_{cf}$w
b457 y$_2$ w^{2}
b458 y$_{2s}$ wy^{2} g^{2} (g^{2} partly reverted?)
b459 y$_{2s}$ ^{34e}
b460 y$_{3d}$ fw
b461 y$_{3d}$ & br ec.=
b462 y$_{3P}$ & y f:=
b463 y$_4$, In B
b464 y$_4$, In
b465 y$_4$, In cv v f
b466 y$_4$, In w^{a}
b467 y^{18cH1}
b468 y$_{34c}$
b469 y$_{62a}$
b470 y$_{264-47}$ sc cv & y f:=
b471 y$_{bg}$ ^{6}/y Hw In49 m^{2} g^{4}
b472 y$_{td}$ ct^{6} car
b473 y$_{v2}$
b474 y^{11E4} z w

Scute Alleles

(listed alphabetically according to scutes, regardless of position of scute in linear order)

c1 sc$_2$^{2}
c2 sc$_{3-1}$ pn & y f:=
c3 sc^{3B} w & y f:=
c4 sc^{4}
c5 y sc$_4$
c6 y sc$_4$ B f InS & y f:=
c7 y sc$_4$ B InS & y f:=
c8 y sc^{41b} B v/y w In49 lz^{s}

c9 y sc^{4} InS w^{a}; S sc^{19i} Bl/Cy L^{4} sp
c10 sc^{5} bb^{sc5}; (lt or ltd?)
c11 y sc^{5}
c12 y sc^{5} w$^{-258-48}$ spl;Dp(1;3)w^{Vco};y f:=
c13 sc^{6} car
c14 sc^{7} w^{a}
c15 sc^{7}
c16 sc^{7} InAM car/Df(1)B$^{263-20}$
c17 sc^{7} oc ptg g,Inh & y f:=
c18 sc^{8} w^{a}
c19 sc^{8}
c20 sc^{8} w^{a}
c21 sc^{8} B
c22 sc^{8} B f^{x} v & y f:=
c23 (w^{r}-reddish) sc^{8} B InS w^{r} & y f:=
c24 sc^{8} bb w^{a}
c25 sc^{8} car f In49 v & y f:=
c26 sc^{8} f In49 v & y f:=
c27 sc^{8} f v cv & y f:=
c28 (w^{r}-reddish) sc^{8} InS w^{r}
c29 sc^{8} Tu w^{a} & y f:=
c30 y^{31d} sc^{8} w^{a} B270
c31 (y ac) (dappled) sc^{8} B w^{a}/w In49 lz^{s} bb
c32 y^{S1} sc^{8}
c33 y^{S1} sc^{8} B f In49 v
c34 y^{S1} sc^{8} B f In49 v w^{a} & y f:=
c35 y^{S1} sc^{8} B In49
c36 y^{S1} sc^{8} f^{3}InS w^{a} & y f:=
c37 y^{S1} sc^{8} f^{3} sd ♂ & y w f:= ♀
c38 y^{OX} sc^{8} sn$^{5.1}$ w
c39 y^{9} sc^{8} sn^{w} w & y f:=
c40 sc^{9} Bx f t w^{a}
c41 sc^{10}In$_{a}$Bx f t w^{a}/w In49 lz^{s}
c42 sc$^{10-1}$ w
c43 sc^{19-}/y Hw
c44 sc^{19-}/lJ1 sc^{J1}; fes sc^{19i} b pr/Cy dp^{txI} pr cn$_{2}$
c45 sc^{19-} ♂ &$_{2}$y f:=; fes sc^{19i} b pr/Cy dp^{txI} pr cn$_{2}$
c46 sc^{28} w^{a}
c47 sc^{29} w^{a}
c48 sc^{45} 1/y sc^{S1} B In49 v
c49 sc$^{260-14}$
c50 sc$^{260-15}$/y Hw In49 m^{2} g^{4}
c51 sc$^{260-22}$
c52 sc^{C}/y sc^{S1} B InS
c53 y sc^{D1}
c54 y sc^{D2}
c55 sc^{H},TX4$_{J1}$ & y f:=
c56 lJ1 sc^{J1}/Del(sc^{7})2 & y f:=
c57 lJ1 sc^{J1}/Del(X)24
c58 lJ1 sc^{J1}/Del(X^{c})Ag (Pontecorvo)
c59 lJ1 sc^{J1} car.Dp(ac^{+} y^{+}-tm)^{53} & y f:=
c60 w^{m5L}; sc^{J4} R ♂ & y w f:= (w^{m5L}/) ♀
c61 sc^{L3} B & y f:=
c62 sc^{L6},TX4 (spoon-like)
c63 sc^{Mc}
c64 sc^{L8},TX3/y Hw In49 m^{2} g^{4}
c65 sc^{S1} car m w^{a}/y w In49 lz^{s}
c66 sc^{S1} B In49 oc ptg & y f:=
c67 ("plex")$_{6}$sc^{S1} car$_{2}$f In49 y/y ac sc pn w rb cm ct^{3} sn^{2} ras^{2} v dy g^{2} f car
c68 sc^{S1} f In49 v w & y f:=
c69 y sc^{S1} B f In49 v$_{x2}$ & y f:=
c70 y sc^{S1} B In49 sn^{x2} ♂ & y f:= ♀
c71 y sc^{S2} B InS ♂ & y f:= ♀
c72 sc^{V1},T(1;2)/Cy
c73 sc^{V2},Inp v/y sc^{S1} B f In49 v
c74 sc^{8},Inh

Combinations of scute or similar inversions

d1 y sc^{4} sc^{8}
d2 y sc^{4} bb sc^{8} (Y's extra)
d3 y sc^{4} In49 sn^{x2} sc^{8} & y f:=
d4 y sc^{4} B In49$_{s}$lz^{s} v sc^{S1}/sc oc ptg sd car
d5 y sc^{4} InS sc^{S1} (extra Y in ♀)
d6 y sc^{8} InS sc^{S1}/ClB
d7 y$_{S1}$sc^{4} B InS w^{a} sc^{8} & y f:=; sc^{19i}/Cy cn^{2}
d8 y^{S1} sc^{8} B InS$_{3P}$sc^{S1}/w sn^{5s} bb
d9 y^{31d} sc^{8} Ins y^{+} ; Cy/Scd
d10 FM6, y sc^{8} dm^{4}B & y pn.=
d11 y sc—(rein. sc$^{8-4}$) w^{a} InS B & y f:= ; sc^{19i}/Cy lt$_{8-4}$cn^{2}
d12 y sc—(rein. sc$^{8-4}$) w^{a} InS bb & y f:= ; sc^{19i}/Cy lt cn^{2}
d13 sc—^{17aH3}f car. sc^{V1} ; Cy/sc^{19i} ♂ & y f:= ; Cy/sc^{L8} ♀
d14 sc^{L8} sc^{8} & y$_{g}$f:=
d15 sc^{S1} g^{8} v lz^{s} sc^{8} & y f:=

sc^{S1}-sc^{8} (d16-d58)

d16 sc^{S1} At In49 sc^{8}
d17 sc^{S1} At In49 v w^{a} sc^{8} & y f:=
d18 sc^{S1} B g In49 m$_{s}$sc^{8} & y f:=
d19 sc^{S1} B In49 lz^{s} sc^{8}/y ac sc pn w v g f
d20 ("Binsc") sc^{S1} B In49 sc^{8}
d21 ("Binsc") sc^{S1} B In49 sc^{8} & y f:=
d22 ("new Binsc", 1962) sc^{S1} B In49$_{x2}$sc^{8} & y f:=
d23 ("Binsn ♂") sc^{S1} B In49 sn^{x2} sc^{8} & y f:=
d24 ("Binsn") sc^{S1} B In49$_{a}$sn^{x2} sc^{8}/oc ptg Tu
d25 ("Basc") sc^{S1} B InS w^{a} sc^{8}
d26 sc^{S1} bb^{+} B In49 oc ptg sc^{8} & y w f:=
d27 sc^{S1} bb^{1} B In49 oc ptg sc^{8} & y f:=
d28 sc^{S1} car B In49 y sc^{8} & y f:=
d29 sc^{S1} car m w^{a} sc^{8}/w In49 lz^{s}

d30 sc^{S1} f In49 v $w^{a}{}_{8}sc^{8}$ & y f:=
d31 sc^{S1} In49 m_{S1} w sc^{8}/y sn v
d32 ("Insc") sc^{S1} In49 sc^{8}_{x2}
d33 ("Insn") sc^{S1} In49 sn^{8}_{x2} sc^{8} & y f:=
d34 sc^{S1} In49 v sc^{8} &$_{8}$sc v f.=
d35 y sc^{S1} At In49 sc^{8}_{S1}/oc ptg
d36 ("Binscty") y sc^{S1} B In49 ct^{8}_{ns} sc^{8}
d37 ("Binscy") y sc^{S1} B In49 sc^{8} & y f:=
d38 ("new Binscy") $y_{8}sc^{S1}$ B In49 sc^{8}
d39 y sc^{S1} B In49 sc^{8}_{S1}l/oc ptg (H. Byer's l, c-9-c4, in sc^{8} ...sc chromosome)
d40 y sc^{S1} B In49 sc^{8} l/y v car bb— (H. Byer's l_{S1}, c-9-c4, in sc^{8}_{ns} ..sc chromosome)
d41 y sc^{S1} B In49 ct^{8}_{x2} w sc^{8} & y f:=
d42 y sc^{S1} B In49 sn^{8}_{x2} v sc^{8} & y f:=
d43 y sc^{S1} B In49 sn^{8}_{x2} w sc^{8} & y f:=
d44 ("Binscty-v") y sc^{S1} B In49 v ct^{8}_{ns} sc^{8}
d45 y sc^{S1} B In49 v sc^{8} &$_{8}$y w f:=
d46 y sc^{S1} B In49 v $w^{a}{}_{8}sc^{8}$ & y f:=
d47 y sc^{S1} B In49 w sc^{8} & y f:=
d48 ("Brinscy") y sc^{S1} B r_{M} In49 sc^{8} &$_{8}$y f:=
d49 ("winscyBx") y sc^{S1} Bx In49 w sc^{8}
d50 y sc^{S1} car odsy f sc^{8}
d51 y sc^{S1} f In49 sc^{8} & y f:=
d52 y sc^{S1} f In49 v sc^{8} &$_{8}$y f:=
d53 y sc^{S1} f In49 y w^{a} sc^{8} &$_{8}$y f:=
d54 ("Inscy") y sc^{S1}_{ns} In49$_{8}sc^{8}$
d55 y sc^{S1} In49 ct^{8}_{ns} w sc^{8} & y f:=
d56 y sc^{S1} In49 v sc^{8}_{S1}
d57 ("winscy") y sc^{S1} In49 w sc^{8}
d58 y sc^{S1}_{8} sc^{8}
d59 sc^{S1}_{V2} f InS y^{3P}_{3P} & y f:=
d60 sc^{8} B y^{3P}
d61 (y ac)— y^{3P} sc^{8} (iso, 1952)
d62 (y ac sc)— y^{3P} InS sc^{S1} & y f:= ; Cy/sc^{19i}

Translocations of X and 4

e1 T(X;4) $(1B3^{+})$, sc^{8} B w^{a}
e2 T(X;4)w^{m5}(3C2) & y f:=
e3 T(X;4)w_{m5}(3C2)/ey^{D}
e4 T(X;4)w_{m5}(3C2), v f bb/w^{m5} ClB
e5 T(X;4)$w_{m258-18}$(3C4), y/ci
e6 T(X;4)$w_{m258-18}$(3C4), y/y Hw In49 m^{2} g^{4}
e7 T(X;4)w_{8a}(3C4), y/y w^{31d} dim
e8 T(X;4)N_{8a}(3C5-6&7)/FM6, y^{31d} sc^{8} dm B
e9 T(X;4)N^{m5}_{R} $w_{m258-21}$/ci ey
e10 T(X;4)$w_{m258-21}$(3E5&6)/y^{2} w^{a} Cc; ci ey^{R}
e11 T(X;4)w^{s}_{lz} $w_{m258-21}^{a}$(3E5&6)/y^{31d} sc^{8} B In49
e12 T(X;4)w^{a}, y w^{a}/FM4, y^{31d} sc^{8} dm B
e13 T(X;4)(4C3) & y f:=
e14 T(X;4)A17(8A2) & y f:=
e15 T(X;4)A17(8A2), y cv & y f:=
e16 T(X;4)(9A1) & y f:=
e17 T(X;4)"W13" (9B&20)/ClB
e18 T(X;4)"W13"(9B&20), car
e19 T(X;4)"W13"(9B&20), sc v^{m} g/ClB
e20 T(X;4)"W13"(9B&20), y w & y f:=
e21 T(X;4)"Sidky a"(13B8-9) & y_{8}f:=
e22 T(X;4)11(15A), y l^{11} car/sc^{8}.Y
e23 T(X;4)B^{S}(16A1) & y f:=
e24 T(X;4)B^{S}(16A1) & y w f:=
e25 T(X;4)B^{S}(16A1) car & y f:=
e26 T(X;4)B^{S}(16A1), y^{S}_{2} cv $v_{L}B^{S}$ car & y f:=
e27 T(X;4)B^{S}(16A1) $_{2}Y^{S}$/$sc^{8}_{a}Y^{L}$ & y w f:=
e28 T(X;4)A7, y w/y^{2} su-w^{a} w^{a} bb
e29 T(X;4)A13(18C5)
e30 T(X;4)A19
e31 T(X;4)A20 & y f:=
e32 T(X;4)e15
e33 T(X;4)h4
e34 T(X;4)h6
e35 T(X;4)w^{m5}; T(X;3)sc^{J4R}(ClB)
e36 Ts(X;4)w^{m5},9A,$_{S}w^{m5}$/FM4, y^{31d} w dm B
e37 Ts(X;4)w^{m5} v B^{S}/FM4, y^{31d} w dm f

Altered Y's, sometimes with mutants in X and/or autosomes

The presence of Y^{S} and/or Y^{L} attachments on X.Y chromosomes is uncertain unless they have been freshly tested or are accompanied by markers (bb^{+} for Y^{S} and y^{+} sc^{8} for Y^{L}) that can be followed.

f1 y^{+} Y^{S} .X InEN y.Y^{L} y^{+} &y^{2} su-w^{a} w^{a} bb.= (no free Y)
f2 Y^{S}.DpR y X^{+} bb.Y^{L} & y^{2} su-w^{a} w^{a} bb.= (no free Y)
f3 Y^{S}.X InEn B f v y.Y^{L} y^{+} & y v bb.= (no free Y)
f4 Y^{S}.X InEN B y.Y^{L} & y^{2} su-w^{a} w^{a} bb.=(no free Y)
f5 Y^{S}.X InEn B y.Y^{L} sc^{8} y^{+} & y^{2} su-w^{a} w^{a} bb.=; S fes Sp b/(l^{+}?) InCyL b (no free Y)
f6 Y^{S}.X InEN car f In49 v y.Y^{L} & y^{2} su-w^{a} w^{a} bb.=(no free Y)
f7 Y^{S}.X InEN In26 B f v.Y^{L} sc^{8} y^{+} & y^{2} su-w^{a} w^{a} bb.=(no free Y)
f8 ("snoc")$_{n}$ Y^{S}.X InEN ptg oc sn^{5}.Y^{L} sc^{n} ct^{1} oc ptg car & y In49 sn^{x2}). (no free Y)
f9 ("snoct")$_{n}$ Y^{S}.X InEN ptg oc sn^{5}.Y^{L} sc^{n} ct^{1} oc ptg car & y ct^{1},In In49 sn^{x2}). (no free Y)

f10 Y^S.X InEn v cv y.Y^L y^+ & y^2 su-w^a w^a bb.= (no free Y)

f11 Y^S.X $InEN_2$ v ptg oc sn^5 w y.Y^L sc^8 y^+ & y sc t^2 v f car.= (no free Y)

f12 Y^S.X InEN v y.Y^L($sc^{8?}$y) (no free Y)

f13 Y^S.X InEN v y.Y^L($sc^{8?}$y) & sc ct^n oc ptg car $y\ In49\ sn^{x2}$; b pr

f14 Y^S.X InEN v y.Y^L($sc^{8?}$y) & sc ct^n oc ptg car $y\ In49\ sn^{x2}$; vg bw^+

f15 Y^S.X InEN v y.Y^L sc^8 y^+/v ; bw^{VA}/L^2 l (no free Y)

f16 Y^S.X InEN y.Y^L & y^2 su-w^a w^a bb.= (no free Y)

f17 Y^S.X InEN y.Y^L sc^8 y^+ (no free Y)

f18 Y^S.X InEN y.Y^L sc y^+ & y^2 su-w^a w^a bb.= (no free Y)

f19 Y^S.X $y\ In49\ v\ f\ car.Y^L$ (no free Y)

f20 Y^+/y w $N^{264\text{-}84}$ sn/FM3, y^{31d} sc^8 dm bb^B l ♀ & dm sn ♂

f21 Y^{bb} Su-Var 5/w^{m4}

f22 Y^{bb}/v

f23 Y^{-bb}/w_{m4} sn bb & y v f.=

f24 Y^{-bb}/w^w

f25 Y^{-bb}/y^{eg}

f26 $Y^{Su\text{-}Var}$/w^{m4} & y w bb.=

f27 Y:bw^+ ; net bw crs (iso, 1955)

f28 Y:bw^+/y v ; bw

f29 Y:bw^+/y v ♂ & sc^8.Y/y v ; bw (Select)

f30 Y:bw /y v ♂ & sc^8.Y/y v ♀ ; S S cn bw/dp^{txl} Cy cn bw (Select)

f31 ("MYR") Y^c:bw^+/X^{c2}; bw (ring-Y OK, 1963)

f32 ("MYR") Y^c:bw /X y f ; bw (rings OK, 1957)

f33 Y ma-l #2/y^2 v ma-l

f34 Y.w^+/y w^a

f35 $lJ1^+$.Y/lJ1 sc^{J1} (extra Y in ♀)

f36 $lJ1^+$.Y/lJ1 sc^{J1} oc ptg B^{M1} & y f:=

f37 $lJ1^+$.Y/lJ1 sc^{J1} oc ptg B^{M1} & y sc^{S1} B $In49\ sn^{x2}$ v sc^8 l-1/lJ1 sc^{J1} oc ptg B^{M1}

f38 $lJ1^+$.Y/lJ1 sc^{J1} oc ptg B^{M1} & y sc^{S1} B $In49\ sn^{x2}$ v sc^8 l-2/lJ1 sc^{J1} oc ptg B^{M1}

f39 $lJ1^+$.Y/lJ1 $sc^{J1(+)}$ & $y\ f:=$

f40 ("MaxY") $lJ1^+$.Y/lJ1 $sc^{J1(+)}$ In49 ptg oc B^{M1}/y gc^{S1} car odsy f g^2 dy v ras^2 sn^3 ct^6 cm rb ec w pn^1 sc^8

f41 ("Maxy-v") $lJ1^+$.Y/lJ1 $sc^{J1(+)}$ $In49^2$ v ptg oc B^{M1}/y sc^{S1} car odsy f g^2 dy v ras^2 sn^3 ct^6 cm rb ec w pn l sc^8

f42 sc^8.Y/ac^3

f43 sc^8.Y/In(1H)59(3-4), y l^{59} & y w.=

f44 sc^8.Y/In(1H)132(4E), y l^{132} & y w.=

f45 sc^8.Y/In(1H)227(1F), y l^{227} & y w.=

f46 sc^8.Y/In(1H)231(1C-D), y l^{231} & y w.=

f47 sc^8.Y/In49 ptg oc B^{M1} & y f:=

f48 sc^8.Y/In(X^{c2})w^{vc} f & y f:=

f49 sc^8.Y/lJ1 sc^{J1} & y f:=

f50 sc^8.Y/lJ1 sc^{J1} In49 v B^{M1} & y f:=

f51 sc^8.Y/l (y ac)– B In49 sn^{x2} sc^8 & y f:= (from X-r. oogonia $24)

f52 ("Max-Tu") sc^8.Y/l (y ac)– Tu_3 B_6 In49 sn^{x2} sc^8/y ac pn w rb cm sn^3 ct^6 oc ras^2 v dy g^2 f od car sw

f53 sc^8.Y/oc ptg & y f:= (iso, 1956)

f54 sc^8.Y/sc w B.Y^S & y f:= ; Cy,In/S Sp ab^2

f55 sc^{8ltd}.Y/sc^{ltd} w ct f.Y^S & y f:= ; Cy,In/S Sp

f56 sc^{8ab}.Y/$sc^{V1\text{-}3}$ v ♂ & sc^8.Y/y f:= ♀ ; sc^{19i}/Cy

f57 sc^8.Y/X^{c2} t^2 & y f:=

f58 sc^8.Y/X^{c2} y f & y f:= (ring OK, 1963)

f59 sc^8.Y/X^{c2} y v & y f;= (ring OK, 1963)

f60 sc^8.Y/y ac sc B.Dp(sc^{S1} ac^+ y^+) & y N f^w:= (N with w^+)

f61 sc^8.Y/y ac^{-53} sc oc ptg & y f:=

f62 sc^8.Y/y ac sc & y f:=

f63 sc^8.Y/y B & y f:=

f64 sc^8.Y/y bb^{13a}_{174} & y w.=

f65 sc^8.Y/y bb^{13a}_{1456} & RM, y w

f66 sc^8.Y/y bb & y^2 su-w^a w^a bb.=

f67 ("multi-♂") sc^8.Y/y In49 B & y f:= ; bw^D

f68 sc^8.Y/y In49 B^{M1}

f69 sc^8.Y/y In49 v f

f70 sc^8.Y/y In49 v f B.Y^L ♂ & y f:= ♀

f71 sc^8.Y/y In49 v Fl g & y f:=

f72 sc^8.Y/y In49 v Fl g & y In49 v Fl g/pn,Inh

f73 sc^8.Y/y sc w In49 v g f

f74 sc^8.Y/y sc^4 w In49 v g f & y f:=

f75 sc^8.Y/y sc^4 B f InS & y f:=

f76 sc^8.Y/y sc^4 B f InS w^a & y f:=

f77 sc^8.Y/y sc^4 B InS & y f^r:=

f78 sc^8.Y/y sc^4 B InS w^a sc^8 & y f:=

f79 sc^8.Y/y sc^4 f InS w^a & y f:=

f80 sc^8.Y/y sc^8 w sc^8 (sc^8.Y in ♂ & ♀)

f81 sc^8.Y/y sc^{S1} B In49 sc^8 & y f:=

f82 ("Multipare D") sc^8.Y/y sc^{S1}_R B_n InS/y Hw $In49\ m^2\ g^4$; (ci gyl_{ey} sv^n)

f83 sc^8.Y/y sc– (rein. $sc^{8\text{-}4}$) B.Dp(sc^{S1} ac^+ y^+) & y f:=

f84 sc^8.Y/y v & y f:=

f85 $sc^{8}.Y/y_{2}w^{m4}$

f86 $sc^{8}.Y/y_{S1}w^{a}\ sn^{5}$ B & y N^{M} f:= (N with w)

f87 $sc^{8}.Y/y\ sc^{8}$ B f_{3} In49 v

f88 $B_{S}.Y/T(3;X)ry^{35}$ D^{3} & y f:=

f89 $B_{S}.Y/Ti(3;X)05$, D & y f:=

f90 $y^{31d}.Y.B_{S}/Y^{S}$ y cv v^{+}f & y w f.=

f91 $sc^{8}.Y.B_{S}$/Oregon-R-X^{+} & y f:=

f92 $sc^{8}.Y.B_{S}$/Urbana-S-X^{+} & y f;=

f93 $sc^{8}.Y.B_{S}$/lJ1 y & y ct^{6} f.=

f94 $sc^{8}.Y.B_{S}/sc^{8}$ B In49 w & y f:= ; (ho ed cl/+)

f95 $sc^{8}.Y.B_{S}/sc^{8}$ In49 w ; (ho) ed cl

f96 $sc^{8}.Y.B_{S}/sc^{S1}$ B In49 sc^{8} (new) & y f:=

f97 $sc^{8}.Y.B_{S}/y\ w_{m4}\ ras^{2}$

f98 $sc^{8}.Y.B_{S}/y\ w_{m4}$; dp

f99 $sc^{8}.Y.B_{S}/y_{2}w^{6}$; (ho) ed cl

f100 $sc^{8}.Y.B_{S}/y_{2}\ ct_{2}$ & y f:=

f101 $sc^{8}.Y.B_{S}/y_{2}\ sd^{2}$ & y f:=

f102 $sc^{8}.Y.B_{S}/y_{2}\ w_{i}$ & y f:=

f103 $sc^{8}.Y.B_{S}/y_{2}\ w_{i}\ ct^{6}$ & y f:=

f104 $sc^{8}.Y.B^{+}/y\ w^{3}\ ct$ f & y f:= ♀

f105 $sc^{8}.Y:bw^{+}/ac^{3}$; bw

f106 $sc^{8}.Y:bw^{+}/ac^{3}$; cn bw

f107 $sc^{8}.Y:bw^{+}/sc^{8}$ B In49 w ; bw

f108 $sc^{8}.Y.w^{+}/y$ w

f109 $Y^{L}/f.Y^{S}$ & sc^{2} v f.=

f110 $Y^{L}/f.Y^{S}$ & $y^{2}\ wy^{2}\ g^{2}$ f.=

f111 $Y^{L}.ac^{+}\ y^{+}$ (sc^{8}EN c.o. Y B-2)/$X.Y^{S}$, y w & y v^{+}f.=

f112 $Y^{L}.bb^{+}\ ac^{+}\ y^{+}$ (sc^{8}EN c.o. Y T-O)/y $w.Y^{S}$ & y f:=

f113 $Y^{L}.bb^{+}\ sc^{S1}\ ac^{+}\ y^{+}$ (sc^{S1} c.o. Y EY80) /$X.Y^{S}$ y w & y v f.=

f114 $y^{+}Y^{L}.(FR-2)/Y^{S}.X$ InEN B $y.Y^{L}$ & RA, y ...sc^{8}

f115 Y^{Lc}/InEN2 f_{S}ptg oc $y^{+}.Y^{S}$ & Y^{Lc}/y ct^{6} f.=

f116 Y^{Lc}/InEN2.Y^{S} & y ct^{6} f.=(InEN2 from X^{c2} opened)

f117 ("Y^{Lc} snocty") Y^{Lc}/oc ptg.Y ♂ & Y^{Lc}/y ct^{n} oc ptg car y ct^{1},In In49 sn^{x2}) ♀

f118 Y^{Lc}/oc ptg.Y^{S} & y v f.= ; S Sp ab^{2} ltd/Cy,Ins cn^{2}

f119 ("Y^{Lc} snocty ; bw") Y^{Lc}/oc ptg.Y^{S} ♂ & Y^{Lc}/y ct^{n} oc ptg car y ct^{1},In In49 sn^{x2}) ♀ ; bw

f120 Y^{Lc}/w oc ptg.Y^{S} ♂ & $Y^{Lc}/y^{2}\ X^{+}.w^{a}$ InS B sc^{8} ♀ (tandem X.X. giving rings)

f121 Y^{Lc}/y In49 v Fl g $f.Y^{S}$ & y ct^{6} f.=

Sterilizer ("sz") stocks (f122-131)

f122 ("sz w") $Y^{Lc}_{Lc}/w.Y^{S}_{S}$

f123 ("sz +") $Y^{Lc}_{Lc}/X.Y^{S}_{S}$

f124 ("sz bw") $Y^{Lc}_{Lc}/X.Y^{S}_{S}$; bw

f125 ("sz bw e") $Y^{Lc}_{Lc}/X.Y^{S}_{S}$; bw ; e

f126 ("sz c") $Y^{Lc}_{Lc}/X.Y^{S}_{S}$ & y v f.= ; c

f127 ("sz e") $Y^{Lc}_{Lc}/X.Y^{S}_{S}$ & y v f.= ; e

f128 ("sz lz f") $Y^{Lc}_{Lc}/lz^{3}f.Y^{S}_{S}$ & y v f.=

f129 ("sz lz m f") $Y^{Lc}_{Lc}/lz^{3}m\ f.Y^{S}_{S}$ & y v f.=

f130 ("sz m f") $Y^{Lc}_{Lc}/m\ f.Y^{S}_{S}$ & y v f.=

f131 ("sz y w") $Y^{Lc}_{Lc}/y_{S}w.Y^{S}_{S}$ & y ct^{6} f.=

f132 Y^{Lc}_{Lc}/y In49 v $f.Y^{S}_{S}$ & y sc t^{2} v f car.=

f133 Y^{Lc}_{Lc}/y v.Y^{S}_{S} ; bw $^{VA}/_{3}L^{2}_{a}1$

f134 Y^{Lc}_{Lc}/y v B.Y^{S}_{S} & $ac^{3}\ w_{Lc}\ ct^{6}$ f.=

f135 (new,"fac1", 1959) Y^{Lc}_{Lc}/y_{S}sn oc $ptg.Y^{S}_{S}$ & Y^{Lc}_{Lc}/y^{2} oc ptg B^{M1}/sc^{S1} In49 sn^{x2} sc^{8}

f136 ("jynd") $Y^{Lc}_{Lc}/y\ sp^{5}$ oc ptg v.Y^{S}_{S} ♂ & Y^{Lc}_{Lc}/sc^{J1} pn w $rb_{cm}\ ct^{6}$ oc ras^{2} v dy g^{2} f od car sw/y sc^{S1}_{S} B In49 sn^{x2} sc^{8} ♀

f137 $Y^{Lc}_{Lc}/y_{2}w\ sn^{5}$ oc $ptg.Y^{S}_{S}$ & y v f.=

f138 Y^{Lc}_{Lc}/y oc $ptg_{J1}\ fu_{S}.Y^{S}_{S}$ & $Y^{Lc}_{Lc}/y\ w^{a}$.=

f139 $sc.Y^{L}_{L}/lJ1\ sc^{S1}_{S}y$ In49 v $f.Y^{S}_{S}$ & $sc.Y^{L}_{L}/y$ f:=

f140 $sc.Y^{L}_{L}/oc\ ptg.Y^{S}_{S}$ & $sc.Y^{L}_{L}/y$ f:= ; Cy, Ins cn^{2}/S Sp ab^{2}_{S} ltd

f141 $sc.Y^{L}_{L}/sc$ w B.Y^{S}_{S} & y f:= ; Cy,In/S Sp ab^{2} ltd

f142 $sc.Y^{L}_{L}/sc$ w BB^{L}_{6},In.Y^{S}_{S} & y f:=

f143 $sc.Y^{L}_{L}/sc_{2}w\ ct^{6}$ f.Y^{S}_{S} & y f:= ; Cy,In/S Sp ab^{2} ltd

f144 $sc.Y^{L}_{L}/y$ ac sc ct^{6} f.Y^{S}_{S}

f145 $sc.Y^{L}_{L}/y$ In49 v $f.Y^{S}_{S}$

f146 $sc.Y^{L}_{L}/y$ In49 v $f.Y^{S}_{S}$;e

f147 $sc.Y^{L}_{L}/y\ sc^{8}$(rein.sc^{8}).Y^{S}_{S} & y f:=

f148 $sc.Y^{L}_{L}/y_{2}Y^{S}_{S}$ & y_{S}f:= ; cn bw ; (e)

f149 $sc.Y^{L}_{L}/y_{2}\ v\ f.Y^{S}_{S}$ & y_{S}w f.=

f150 $sc.Y^{L}_{L}/y^{2}\ w^{a}\ ct^{6}$ f.Y^{S}_{S} ♂ & $sc.Y^{L}_{L}/y^{2}\ X^{+}.sc^{8}$ w^{a} InS B ♀ (tandem X.X giving rings)

f151 $y^{3}.Y^{L}_{L}/sc_{V1-}w$ oc $f.Y^{S}_{S}$ & y f:=

f152 $y^{3}.Y^{L}_{L}/sc_{V1-}$ oc $lz^{3}.Y^{S}_{S}$ & y f:=

f153 $y^{3}.Y^{L}_{L}/sc^{6}\ w.Y^{S}_{S}$ & y f:=

f154 $y^{3}.Y^{L}_{L}/y\ ct^{6}$ oc $lz_{2}.Y^{S}_{S}$ & y f:=

f155 ("plond") $y^{3}.Y^{L}_{L}/y^{2}$ oc $lz^{3}.Y^{S}_{S}$ ♂ & $y^{3}.Y^{L}_{L}/y_{2}$ ac sc $pn_{S1}w$ $rb_{cm}\ ct^{6}\ sn^{s}$ oc ras v m g^{2} f_{2}car/sc^{8} B In49 lz^{3} sc^{8} ♀

f156 Y^{S}_{S}/g^{2} $B.Y^{L}_{L}$ & y f:= (Stern) (dp^{T})

f157 $Y^{S}_{S}/y_{S}ct^{6}$ f.Y^{L}_{L} & y f:=

f158 $Y^{S}_{S}.Y^{+}$#2/y v $f.Y^{L}_{L}$ & y f:=

f159 $Y"/y^{+}\ sc^{8}$ car f v cv y EN.Y^{L}_{L} & y.=

f160 Y"/y cy v f car. Y^{L} $_{S}$ & y.=

f161 sc ^{V1} .Y^{S} $_{J1}$/lJ1 sc ^{J1} y ^{S} In49 v f B.Y^{L} & lJ1 sc ^{J1} y ^{S} In49 v f B.Y^{L} $_{S1}$/y sc ^{V1} InEn ptg $_{S}$ oc.Y^{L}

f162 sc ^{V1} .Y^{S} $_{J1}$/lJ1 sc ^{J1} y ^{S} In49 v f B.Y^{L} $_{m4}$ ♂ & lJ1 sc ^{J1} y ^{S} In49 v f B.Y^{L}/y w ptg oc ♀

f163 sc ^{V1} .Y^{S}/lJ1 sc ^{J1} y ^{S} In49 v f B.Y^{L} & y f:=

f164 sc $_{V1}$.Y^{S}/y ct ^{6} f.Y^{L} & y f:=

f165 sc $_{V1}$.Y^{S}/y In 49 v B.Y^{L} & y f:=

f166 sc $_{V1}$.Y^{S}/y In49 v f B.Y^{L} & y f:=

f167 sc $_{V1}$.Y^{S}/y In49 v ptg oc f B.Y^{L} & y f:=

f168 sc $_{V1}$.Y^{S}/y In49 v $_{+}Y^{L}$ & y f:=

f169 sc ^{S} .Y^{L}/y v f bb .Y^{L} & y f:=

f170 T(X;$B^{S}Y^{L}$)3C #107/FM4, y^{31d} w dm f

f171 T(X;$B^{S}Y^{L}$)3C #111/FM4, y^{31d} w dm f

f172 T(X;$B^{S}Y^{L}$)3C #114/FM4, y^{31d} w dm f

f173 T(X;$B^{S}Y^{L}$)3C #128/FM4, y^{31d} w dm f

f174 T(X;$B^{S}Y^{L}$)3C #140 (homozygous)

f175 T(X;$B^{S}Y^{L}$)3C #164/FM4, y^{31d} w dm f

f176 T(X;$B^{S}Y^{L}$)3D #104/sc^{8}.Y & y f:=

f177 T(X;$B^{S}Y^{L}$)5D #108/FM4, y^{31d} w dm f

f178 T(X;$B^{S}Y^{L}$)6E #149/FM4, w dm f

f179 T(X;$B^{S}Y^{L}$)7D #102 & RM, y

f180 T(X;$B^{S}Y^{L}$)7D #156/FM4, y^{31d} w dm f

f181 T(X;$B^{S}Y^{L}$)11A #129/FM4, y^{31d} w dm f

f182 T(X;$B^{S}Y^{L}$)12A + T(1;3)3F;69C #143/FM4, y^{31d} w dm f

f183 T(X;$B^{S}Y^{L}$)13A #152 & y f:=

f184 T(X;$B^{S}Y^{L}$)13E #142/FM4, y^{31d} w dm f

f185 T(X;$B^{S}Y^{L}$)14A #240/FM4, y^{31d} w dm f

f186 T(X;$B^{S}Y^{L}$)15A #112/FM4, y^{31d} w dm f

f187 T(X;$B^{S}Y^{L}$)15D #125/FM4, y^{31d} w dm f

f188 T(X;$B^{S}Y^{L}$)16A #106/FM4, y^{31d} w dm f

f189 T(X;$B^{S}Y^{L}$)16E #118 & y f:=

f190 T(X;$B^{S}Y^{S}$)3F #150/FM4, y^{31d} w dm f

f191 T(X;$B^{S}Y^{S}$)6E #131/FM4, y^{31d} w dm f

f192 T(X;$B^{S}Y^{S}$)7B #155/FM4, y^{31d} w dm f

f193 T(X;$B^{S}Y^{S}$)8F #115/FM4, y^{31d} dm f

f194 T(X;$B^{S}Y^{S}$)8F #147/FM4, y^{31d} w dm f

f195 T(X;$B^{S}Y^{S}$)11B #145/FM4, y^{31d} w dm f

f196 T(X;$B^{S}Y^{S}$)12E + T(1;3)19E;62A #134/FM4, y^{31d} w^{S} dm f

f197 T(X;$B^{S}Y^{S}$)14D + T(1;4)9C:101 #116/FM4, y^{31d} w dm f

f198 T(X;$B^{S}Y^{S}$)19E #101/FM4, y^{31d} w dm f

f199 T(X;$B^{S}Y^{S}$)19E #133 & y f:=

f200 T(X;$B^{S}Y^{S}$)19E #141/FM4, y^{31d} w dm f

f201 T(X;$B^{S}Y^{S}$)19F #103/FM4, y^{31d} w dm f

f202 T(X;$B^{S}Y^{S}$)19F #105 & y f:=

f203 T(X;$B^{S}Y^{S}$)19F #119/FM4, y^{31d} w dm f

f204 T(X;$B^{S}Y^{S}$)19F #132/FM4, y^{31d} w dm f

f205 T(X;$B^{S}Y^{S}$)19F #137/FM4, y^{31d} w dm f

f206 T(X;$B^{S}Y^{S}$)19F #151

f207 T(X;$B^{S}Y^{L}$)20A #122

f208 T(X;$_{+}Y^{L}$)3E #10 & y f:=

f209 T(X;$_{+}Y^{L}$)4C #16/FM6, y^{31d} dm B

f210 T(X;$_{+}Y^{L}$)11A #4 & y f:=

f211 T(X;$_{+}Y^{L}$)11A #20/FM4, w dm f

f212 T(X;$_{+}Y^{L}$)11D + T(X;3)14F;72 #5/FM6, y^{31d} dm B

f213 T(X;$_{+}Y^{L}$)16F #1/FM6, y^{31d} dm B

f214 T(X;$_{+}Y^{S}$)3E #3/FM6, y^{31d} dm B

f215 T(X;$_{+}Y$)5E,11F,19F #2/FM6, y^{31d} dm B (free Y?)

f216 T(X;$_{+}Y^{S}$)11D #6/FM6, y^{31d} dm B

f217 T(X;$_{+}Y$)19F #14/FM6, y^{31d} dm B

f218 T(Y;X)1E, y sc $^{+}$/y sc & y f:= ; cn bw

f219 T(Y:X)2E/v car l (Stern #64) & y f:= ; cn bw

f220 T(X;2;$_{+}Y^{L}$)7B;39 #17/FM6, y^{31d} dm B

f221 T(X;2H?;$B^{S}Y^{L}$)3C #109/FM4, y^{31d} w dm f

f222 T(X;3;$B^{S}Y^{L}$)10A;97A #154/FM4, w dm f

f223 T(X;3;$B^{S}Y^{L}$)15E;74 #144/FM4, w dm f

f224 T(X;3;$B^{S}Y^{S}$)17A;94 #161/FM4, w dm f

f225 T(X;3;$B^{S}Y$)19F;85 #127/FM4, y^{31d} $_{S}$ w dm f

f226 T(XY^{L}.Y^{S};4)B^{S}(16A1), X^{D}, B^{S} Y^{L}.Y^{S} & y v bb.= (no free Y)

f227 T(Y;3)(II4Aa^{3}) l/ru h D InsCXF ca (T(Y;3) in ♀ and ♂)$_{VDe3}$

f228 T(Y;3)Su-Var 3; Cy/bw ; ru h st ca

f229 Tp4:Y (2 Y:4's in both ♂ and ♀) (Transpos. Edmondson)

f230 Tp4:Y/Basc & y.= ; ci ey^{R}

f231 Tp4:Y/Cat/Cat ♂ & Cat/M4 ♀ (unselected)

f232 Tp4:Y/ci^{D}

f233 Tp4:Y/ey^{D} or Cat ♂ & ey^{D}/Cat ♀

f234 Tp4:Y/X & y f:=

Attached X.Y chromosomes (f235-265)

f235 X.Y^{S}(P-8b), sc^{8} EN, y^{+} f y · Y^{S} & y_{S} v f.=

✓ f236 $B^{S}Y^{S}$X.(FR-1,3a^{R}), $B^{S}Y^{S}$ y cv v f ·/Y^{Lc} & y v f.=

f237 (FR-1,3a^{R}), $y^{+}Y^{S}$$_{R}$X y cv v f · & y f:=

✓ f238 y^{31d} Y^{S}X.(FR-1,3a^{R}), y^{31d} Y^{S} y cv v f · & y f:=

f239 Y^{S}X.(P-o), InEN, Y^{S} y · & y w.=

f240 Y^{S}X.(FR-1), Y^{S} y cv $v_{+}f$ · & y f;=

f241 Y^{S}X.(FR-1^{L}, Inp(1) sc^{V1R}), Y^{S} y cv v f · y^{+}/Y^{Lc}

✓ f242 Y^{S}X.(FR-1), Y^{S} y m f car ·/Y^{Lc} & y y f.=

f243 X.Y^{L}(k-7), sc^{8} InEN y^{+} f v cv y · Y^{L} & y.=/Y"

f244 $X.Y^{L}$(k-7), sc^{8} InEN (Rein.), y^{+} y f · Y^{L} & y.=

f245 $X.Y^{L}$(P-8b), sc^{8} InEN, y^{+} f y · Y^{L}/Y" & y.=

f246 $X.Y^{L}$(C-2), y cv v f car bb · Y^{L} & RA, (ND-27) v f/Y"

f247 $X.Y^{L}$(C-2), y w bb · Y^{L} & y.=/Y"

f248 $X.Y^{L}$(A-2), y w · Y^{L}/Y" & y.=

f249 $X.Y^{L}$(U-8e), y w · Y^{L}/Y" & y.=

f250 $Y^{S}X.Y^{L}$(FR-1^{L}_{a},C-2^{R}_{a}), Y^{S} y bb · Y^{L} & y_{2} su-w w^{L}_{a} bb.=(no free Y)

f251 $Y^{S}XY^{L}$.(FR-1^{L}_{a},12^{4}_{a}-13^{R}_{a}), Y^{S} y cv v bb Y^{L} · & RA, y su-w w^{L}_{a} M-5/

f252 $Y^{S}X.Y^{L}$(FR-1^{L}_{2},U-$8d^{R}_{a}$), Y^{S} y w cv v f · Y^{L} & y su-w w^{L}_{a} bb^{R}_{a}= (no free Y)

f253 $Y^{S}X(Y^{L}.)$(FR-1^{L}_{2},3^{4}_{a}-18^{R}_{a}), Y^{S} y (Y^{L} · bb)/ RA, y su-w_{2} w^{L}_{a} M-5

f254 $Y^{S}X(Y^{L}.)$ (FR-1^{L}_{2},11^{4}_{a}-$2b^{R}_{a}$ #1), Y^{S} y (Y^{L} · bb) & y_{2} su-w w^{L}_{a} bb.=(no free Y)

f255 $XY^{S}.Y^{L}$ y^{+}_{2} (Parker), y^{2} su-w^{a}_{a} w^{L}_{a} Y^{S} · Y^{L} y & y v bb.= (no free Y)

f256 $XY^{S}.Y^{L}$ (110-8 Parker), y^{2} su-w^{a}_{a} w^{L}_{a} Y^{S} · Y^{L} y & y v bb.= (no free Y)

f257 $XY^{S}.Y^{L}$ (115-9 Parker), y^{2} su-w^{a}_{a} w^{L}_{a} Y^{S} · Y^{L} y & y v bb.= (no free Y)

f258 $XY^{S}.Y^{L}$ (129-16 Parker), y^{2} su-w^{a}_{a} w^{L}_{a} Y^{S} · Y^{L} y & y v bb.= (no free Y)

f259 $X.Y^{L}.Y^{S}$ (Parker), y^{2} su-w^{a}_{a} w^{L}_{a} Y^{S} · Y^{L} & y.=

f260 $XY^{L}.Y^{S}$ (2-10T13 Parker), y^{2} su-w^{a}_{a} w^{L}_{a} Y^{S} · Y^{L} & y.=

f261 $XY^{L}.Y^{S}$ (2-10T15 Parker), y^{2} su-w^{a}_{a} w^{L}_{a} Y^{S} · Y^{L} & y.=

f262 $XY^{L}.Y^{S}$ (112-17 Parker), y^{2} su-w^{a}_{a} w^{L}_{a} Y^{S} · Y^{L} & y v bb.= (no free Y)

f263 $XY^{L}.Y^{S}$ (129-11 Parker), y^{2} su-w^{a}_{a} w^{L}_{a} Y^{S} · Y^{L}

f264 $XY^{L}.Y^{S}$ (10809 Parker), y^{2} su-w^{a}_{a} w^{L}_{a} Y^{S} · Y^{L} & y v bb.= (no free Y)

f265 $Y^{S}XY^{S}.Y^{L}$(FR-1^{L}_{2},115-9^{R}_{a}), Y^{S} y cv Y^{L} · y & y_{2} su-w w^{L}_{a} bb.= (no free Y)

Chromosome 2*

*S^{2} and/or Cy are to be understood always to be accompanied by InCyL and cn^{2} by InCyR even where not so designated. When cn_{2} is present InCyR is absent. Ins following S^{2} or Cy after a comma refers to both of these inversions, but InL only to the left-arm one. If either of these inversions is designated in a chromosome without the other, the latter should be understood to be absent. InMis designates the long pericentric inversion of Mislove.

g1 a px or

g2 a px sp

g3 ab_{2}

g4 ab_{2}/S^{2} Ins(CyL,CyR) lc cn^{2}

g5 $ab_{2}/T(Y;2)E^{4}$

g6 ab_{2} cn_{2} Pm^{1}/Cy pr Bl cn^{2} L^{4} sp^{2}

g7 ab_{2} ix^{2} bw sp^{4}/Cy, dp^{Th} Bl L^{4} sp^{2}

g8 ab_{2} InCyR L^{4} sp^{2}/b InsNS mr^{4}

g9 ab ms ta crs/Cy pr Bl_{2} cn^{2} L^{4} sp^{2}

g10 abr/SM5, al^{2} Cy lt^{v} sp^{2}

g11 ad

g12 al

g13 al b c sp

g14 al b cn sp (iso)

g15 al dp b bw l(2)ax/SM5, al^{2} Cy lt^{v} sp^{2}

g16 al dp b pr

g17 al dp b pr Bl c px sp/SM1, al^{2} Cy^{rev}_{v} sp^{2}

g18 al dp b pr blt bw/SM5, al^{2} Cy lt^{v} sp^{2}

g19 ("apl") al dp b pr c px sp

g20 ("twelvepl") al_{+} dp b pr cn_{2} vg_{2} c a px bw mr sp_{2}/S^{2} Cy lt^{3} pr Bl cn^{2}_{2} L^{4} sp^{2}

g21 al_{2} Cy ab^{5lg} pr_{2} Bl cn^{2} L^{4} sp^{2}/S Sp cn bw sp

g22 al_{2} Cy pr Bl cn_{2} InCyR c vg $sp^{2}/$InsNS px sp

g23 al_{2} Cy pr Bl cn^{2}_{4} L^{4} bw $sp^{2}_{3}/$InsNS px sp_{4} ^{2}

g24 al_{2} Cy,InL lt^{3}/b pr Bl lt^{3} cn^{2} InCyR L^{4} sp^{2}

g25 al_{2} InCyL En_{txI} S InCyR sp^{2}_{4} (homozygous)

g26 al_{2} InMis dp_{txI} Cy cn^{2} L^{4} sp^{2}/S Sp_{2}U,InLR bw

g27 al^{2} InMis dp^{txI} Cy pr Bl cn^{2} L^{4} sp^{2}/S Sp U, InLR bw

g28 Alu

g29 an/SM5, al^{2} Cy lt^{v} sp^{2}

g30 ang

g31 ant^{4}; (ro)

g32 ap_{4}/dp^{txI} Cy,InsO pr cn^{2}

g33 ap_{4}/Rvd,In2LR

g34 ap^{2}/SM5, al^{2} Cy lt^{v} sp^{2}

g35 arch chl/SM5, al^{2} Cy lt^{v} sp^{2}

g36 ast ho

g37 ast ho ed dp_{ov1} cl

g38 ast_{4} ho ed dp^{ov1} cl/Cy Bl L

g39 ast_{4} dp cl

g40 ast^{4} dp cl sp

g41 b

g42 b α

g43 b cn bw

g44 b cn β

g45 b cn vg_{s}^{-B}/InsNS px sp

g46 b el rd^{5} pr cn

g47 b gp

g48 b Go/Gla

g49 b j
g50 b l(2)Bld pr c px sp/SM5, al^{2} Cy lt^{v} sp^{2}
g51 b lt bw
g52 b lt l cn mi sp/b bw^{VDel}
g53 b lt wxt bw
g54 b nub pr
g55 b pr
g56 b pr Bl tk/S^{2} Cy cn^{2} L^{4} sp^{2}
g57 b pr c px sp
g58 b pr tk
g59 b pr tk/T(Y;2)G
g60 b sf
g61 b vg
g62 b vg^{-B}/S^{2} Cy Bl$_{2}$cn^{2} L^{4} sp^{2}
g63 Bl/Cy, bw^{45a} sp^{2} or
g64 Bl/esc
g65 Bl/In(2LR)dp$^{"VA"}$
g66 Bl bw^{3} T(2;3)/Cy,InL L^{2}
g67 Bl L^{2}/Cy, dp^{2}
g68 Bl stw^{48}/In(2LR)dp
g69 Bl stw^{v} blt tuf/SM5, al^{2} Cy lt^{v} sp^{2}
g70 Bla/SM5, al^{2} Cy lt^{v} sp^{2}
g71 blo
g72 blt
g73 bran
g74 brj$_{2}$
g75 bs^{2}
g76 bw (iso 2, 1959)
g77 bw ba
g78 bw sp (iso, 1954)
g79 bw$_{2b}$sp Px^{-2}/SM1, al Cy sp^{2}
g80 bw$_{4}$
g81 bw$_{59}$
g82 bw$_{75}$
g83 bw$_{81}$
g84 bw^{-5}
g85 bw^{-5}/Cy cn^{2} L^{4} sp^{2}
g86 bw^{-5}/Cy, dp^{2}
g87 bw$_{D}^{-5}$ sp^{2}/Xa
g88 bw$_{V4}$
g89 bw$_{V5}$/SM1,al^{2} Cy sp^{2}
g90 bw$_{V5}$/Cy
g91 bw$_{VDel}$/SM5, al^{2} Cy lt^{v} sp^{2}
g92 bw$_{VDe2}$/b lt l cn mi sp
g93 bw$_{VDe2L}$/Rev$_{R}$ l
g94 bw$_{VDe4}$ Cy/Gla
g95 bw^{v}/SM5, al^{2} Cy lt^{v} sp^{2}
g96 c
g97 c bw
g98 c px bw^{D} sp
g99 c wt px
g100 cg c/U,InLR
g101 ch
g102 chl
g103 chl en/SM5, al^{2} Cy$_{2b}$lt^{v} sp^{2}
g104 chl l(2)bw bw^{2} mr/SM5, al^{2} Cy lt^{v} sp^{2}
g105 chy
g106 ck/SM5, al^{2} Cy lt^{v} sp^{2}
g107 cl$_{2}$
g108 cl^{2} px/T(Y;2)E
g109 cn (iso,2)
g110 cn bw
g111 cn bw sp
g112 cn px,InLR crs/S^{2} dp^{txI} Cy pr Bl cn^{2} L^{4} sp^{2}
g113 cn$_{2}$sp (iso, 1954)
g114 cn$_{3}$ InCyR cg sp^{2}/InsNS px sp
g115 cn$_{3}$/T(Y;2)C$_{5}$
g116 cn$_{35k}$cg bw^{-5} mr/Cy cn^{2} L^{4} sp^{2}
g117 cn
g118 Coi
g119 cq
g120 cr-u/Cy; (w$^{e}_{2}$)
g121 Cy Stw^{DC} sp^{2}/ds$_{33k}$ Pm^{1}(Lobe?)
g122 Cy(no Ins) ed/ds$^{v}_{33k}$ Pm^{2}
g123 d/SM5, al^{2}Cy lt$_{2}$sp^{2}
g124 da/SM1, al^{2} Cy sp^{2}
g125 Df(2)42 en/al^{2} Cy lt^{3} L^{4} sp^{2}
g126 Df(2)al/Cy, En-S
g127 Df(2)Px/Df(2)P;Dp(2;3)P/In(3R)Mo, sr; w^{e}
g128 Df(2)rl^{10a} lt cn/Cy$_{2}$
g129 Df(2)rl^{10b} lt cn/al^{2} Cy lt^{3} L^{4} sp^{2}
g130 dke$_{2}$c
g131 dil^{2} hv bw sp/SM5, al^{2} Cy lt^{v} sp^{2}
g132 dp
g133 dp b cn sp/al^{2} Cy pr Bl cn^{2} L^{4} sp^{2}
g134 dp b L^{4} Pm^{1}/IndpT23 b
g135 dp bw^{-5} mr/al^{2} InMis Cy cn^{2} sp^{2}
g136 dp$_{cm2}$cn bw
g137 dp$_{D}$ cl
g138 dp$_{lm}$/SM1, al^{2} Cy sp^{2}
g139 dp$_{Nov}$/Cy Bl L
g140 dp$_{o}$
g141 dp$_{o2}$
g142 dp$_{o2}$ lv1
g143 dp$_{02}$ dp$_{v2}$ b/Cy Bl L
g144 dp$_{o3}$ dp
g145 dp$_{obm}$ta sp/Cy pr Bl cn^{2} L^{4} sp^{2} (iso 2)
g146 dp$_{obm}$/Cy$_{v2}$Bl L
g147 dp$_{ols}$ dp
g148 dp^{v2}/Cy Bl L
g149 dp$_{olv1}$/Cy Bl L
g150 dp$_{olvbm}$/Cy Bl L
g151 dp$_{Rf}$/SM5, al^{2} Cy lt^{v} sp^{2}

g152 dp^{T} ab^{2} pr Bl rnT23 InNSR mr/al^{2} Cy cn^{2} L^{4} sp^{2}
g153 dp^{T} Sp ab^{2} cn bw sp/S^{2} ls Cy pr cn^{2}
g154 $dp^{T^{bw}}$ Sp cn bw sp/S^{2} (ls^{+}) Cy,InL cn
g155 $dp^{T^{bw}}$ Sp cn^{2} InNSR$_{2}$mr/S^{2} ls Cy pr Bl cn^{2} L^{4} bw sp^{2}
g156 dp_{tx} b/Cy,Ins cn^{2}
g157 dp_{tx} b/SM5, al^{2} Cy lt^{v} sp^{2}
g158 dp_{tx} Sp ab^{2}/S^{2} ls Cy,InCyL
g159 dp_{tx} Sp b/S^{2} ls, InCyL
g160 dp_{tx} Sp b/S^{2} ls, InCyL b
g161 dp_{tx} Sp cn/S^{2} Cy,InCyL cn
g162 dp_{tx} Sp cn_{2}bw/S^{2} Cy,InCyL cn bw
g163 dp_{txI} Sp cn^{2}/S^{2} Cy_{4} cn^{2} (homoz. InCyR)
g164 dp_{txI} Cy Bl cn^{2} L^{4} sp^{2}/InsNS px sp
g165 dp_{txI} Cy,Ins04 pr cn_{2}/InsNS px sp
g166 dp_{v} Cy,Ins06 pr cn^{2}/InsNS px sp
g167 dp_{v1}; vo-3 (2;3)
g168 dp_{v2}/SM5, al^{2} Cy lt^{v} sp^{2}
g169 dp_{w1}
g170 dp_{w2}/dp^{lv1} Cy,InCyL
g171 $dp^{}$/ed dp cl
g172 Dp(2;f)1/sp Pin^{2}/Px^{4}
g173 Dp(2;2)S, (S ast) (S ast^{4}) net dp cl/Cy, En-S
g174 ds dp
g175 ds ft_{v} dp^{v2} $_{2}$ l(2)M b pr/SM5, al^{2} Cy lt^{v} sp^{2}
g176 $ds_{}$ S G b pr/Cy, al^{2} lt^{3} L^{4} sp^{2}
g177 ds_{W}^{38k}/Cy(2L), dp^{2} b pr
g178 $ds^{}$/In(2L)Cy-t, Su-S sp^{2} pr
g179 dsr
g180 dw-24F cl/SM5, al^{2} Cy lt^{v} sp^{2}
g181 ed dp cl
g182 ed dp_{lv1} cl bw
g183 ed dp_{ols} cl/Cy Bl L
g184 ed dp_{ov1} cl/Cy Bl L
g185 ed dp_{o2} cl
g186 ed dp_{v2} cl
g187 ed dp_{2} cl
g188 ed Su^{2}-dx
g189 el
g190 ex
g191 ex ds S^{X} ast^{X}/SM1, al^{2} Cy_{v} sp^{2}
g192 fes Alu lt/SM5, al^{2} Cy lt_{4} sp^{2}
g193 fes dp^{tx} Sp/al^{2} Cy lt^{3} (L^{4}) sp^{2}
g194 fes IndpT23 b sp/al^{2}_{txI} Cy cn^{3} L^{4} sp^{2}
g195 fes ms cn sp/net $dp^{}$ Cy b pr Bl lt^{3} cn^{2} L^{4} sp^{2} (iso, 1957)
g196 fes pr rnT23/al^{2} Cy b cn^{2} L^{4} sp^{2}
g197 fj l(2)Su-H/SM5, al^{2} Cy lt^{v} sp^{2}
g198 fj wt/SM5, al^{2} Cy lt^{v} sp^{2}
g199 fr^{2}/Cy, sp^{2}
g200 fr^{2} wt/SM5, al^{2} Cy lt^{v} sp^{2}
g201 Freckled/Cy sp
g202 $ft_{}$
g203 G^{rv}/SM5, al^{2} Cy lt^{v} sp^{2}
g204 Gla,InLR/S^{2} Cy cn^{2} bw sp
g205 hk
g206 hk pr
g207 ho
g208 ho dp
g209 hv/SM5, al^{2} Cy lt^{v} sp^{2}
g210 Hx
g211 hy/SM5, al^{2} Cy lt^{v} sp^{2}
g212 In(2)41.59,bw^{D}/Cy_{3}
g213 In(2L)Cy, al^{2} ast^{2} b pr (Cy not present)
g214 In(2L)Cy, b pr cn^{2} In(2R)Cy
g215 In(2L)t, esc c sp/SM5, al^{2} Cy_{1} lt^{v} sp^{2}
g216 In(2L)t, lt l L^{4} sp^{2}/ds^{33k} Pm^{2}
g217 In(2LR)lt^{mr}/SM3, al_{2} Cy lt^{v} sp_{2}
g218 In(2LR)lt^{m3}/SM5, al^{2} Cy_{2} lt^{v} sp_{2}
g219 In(2LR)102, ds^{w}/SM1, al^{2} Cy sp^{3}
g220 InNSL InNSR/al^{2} Cy,InL lt^{3} L^{2}
g221 j
g222 j-l ab^{2} InNSR mr/S^{2} dp^{txI} Cy cn^{2} bw sp
g223 J Bl/In(2L)NS
g224 J^{34e}
g225 kn
g226 l(2)a bs^{3},In(2L)t/ds^{33k} Pm^{1}
g227 l(2)ay b c sp/SM5, al^{2} Cy lt^{v} sp^{2}
g228 l(2)gl cn bw/SM5, al^{2} Cy lt^{v} sp^{2}
g229 l(2)gl cn bw/al^{2} Cy lt^{3} L^{4} sp^{2}
g230 l(2)H L^{2}/SM5, al^{2} Cy lt^{v} sp^{2}
g231 l(2)mat/SM5, al^{2} Cy lt^{v} sp^{2}
g232 l(2)me/SM1, al^{2} Cy sp^{2}
g233 l(2)39a px slt sp/SM5, al^{2} Cy lt^{v} sp^{2}
g234 L_{2}
g235 L_{4}
g236 L_{5}
g237 L_{G}
g238 L_{K}
g239 L_{r}
g240 L^{si}
g241 L^{2}
g242 ll
g243 lm/Cy_{1} S^{2} dp^{2} En-S ^{4} ^{2}
g244 ls $dp^{}_{T}$/al^{2} Cy cn^{2} L^{4} sp^{2}
g245 ls $dp^{}_{T}$ $_{2}$Sp$_{4}$ms ta cn crs/S^{2} Cy lt^{3} pr^{+} Bl cn^{2} L^{4} sp^{2}
g246 lt/T(Y;2)A
g247 lt bw

g248 lt bw Amherst
g249 lt std/SM1, al^2 Cy sp^2
g250 lt$_3$ stw^3
g251 lt^3 Dp(2;2)41 L^4 sp^2 In(2R)Cy/ds^{33k} Pm^1
g252 ltd
g253 lw
g254 lys rc; ss$_2$(2;3)
g255 M(2)33a/al$_2$ InMis Cy cn^2 sp^2
g256 M(2)33a/Pm^2
g257 M(2)173/SM5, al^2 Cy lt^v sp^2
g258 M(2)B/In(2L)t$_2$ l(2)B$_2$
g259 M(2)B/SM1, al^2 Cy sp^2
g260 M(2)B/SM5, al^2 Cy lt sp^2
g261 M(2)l$_2$/ds^{33k} Pm^1
g262 M(2)l^2/SM1, al^2 Cy sp^2
g263 M(2)S2/Cy, En-S
g264 M(2)S3/SM1, al^2 Cy sp^2
g265 M(2)S3;Dp(2;2)a$_2$ Cy, En-S
g266 M(2)S4/SM1, al^2 Cy sp^2
g267 M(2)S5/al^2 Cy lt^v sp^2
g268 M(2)S6/SM5, al^2 Cy lt^v sp^2
g269 M(2)S7/SM5, al^2 Cy lt^v sp^2
g270 M(2)S8/Cy, al^2 lt^3 Dp(2;2)41 L^4 sp^2
g271 M(2)S8/SM1, al^2 Cy sp^2
g272 M(2)S9/SM5, al^2 Cy lt^v sp^2
g273 M(2)S10/Cy cn^2 L^4 sp^2
g274 M(2)S10/Ins(2L+2R)Cy, Cy pr Dp(2:2)41^2
g275 M(2)S10/SM1, al^2 V34 Cy sp^2
g276 M(2)S11/Cy, bw^2
g277 M(2)S11/SM5, al^2 Cy lt^v sp^2
g278 M(2)z/SM5, al^2 Cy lt^v sp^2
g279 M(2)z Sk$_2$b/Cy(2L)dp^2 b pr
g280 mn/Cy$_2$cn^2 L^4 sp^2
g281 mr bs$_2$/Cy, sp^2
g282 mr$_2$bs^2/ds^{33k} Pm^1
g283 mr^2/Bld, In(2R)Cy$_2$ L^4 sp^2 (iso, 1955)
g284 ms bw/Cy pr$_{txI}$ Bl cn^2 L^4 sp^2 (iso, 1955)
g285 ms cn$_2$bw/dp^{txI} Cy pr Bl lt^3 cn^2 L^4 sp^2
g286 ms cn rm/Cy$_{txI}$ cn^2 L^4 sp^2
g287 ms cn$_2$sp/dp^{txI} Cy pr Bl lt^3 cn^2 L^4 sp^2
g288 msf/SM5, al^2 Cy lt^v sp^2
g289 net
g290 net al$_2$ ex ds$_2$S ast shv ho rub/SM1, al^2 Cy sp^2
g291 net b cn$_2$crs/dp^{txI} Cy pr Bl lt^3 cn^2 L^4 sp^2 (iso, 1955)
g292 net bw crs/dp^{txI} Cy pr Bl lt^3 cn^2 L^4 sp^2 (iso, a955)
g293 net$_4$ bw mr crs/al^2, InMis dp^{txI} Cy Bl cn^2 L^4 sp^2 (iso, 1956)
g294 net bw sp
g295 net dp b pr cn/dp^{txI} Cy pr Bl cn^2 L^4 sp^2
g296 net ed Su$_{S2}$-dx
g297 net$_2$ ta vg^2 sp/dp^{txI} Cy pr Bl cn^2 L^4 sp
g298 nub
g299 nw^2/Cy-RNS
g300 pd
g301 pd ll^2 sp
g302 Pfd/SM5, al^2 Cy lt^v sp^2
g303 pi/SM5, al^2 Cy lt^v sp^2
g304 pi l(2)301/SM5, al^2 Cy lt^v sp^2
g305 Pin
g306 pk$_1$cn
g307 Pm$_2$/T(Y;2)G
g308 Pm$_2$/mi
g309 Pm^2/mi sp^2
g310 po$_2$vg
g311 po^2
g312 pr
g313 pr cn/T(Y;2)C
g314 pr$_{bw}$ cn ix/SM5, al^2 Cy lt^v sp^2
g315 pr^{bw}
g316 pu$_2$
g317 Pu^2/SM1, al^2 Cy sp^2
g318 puf
g319 pw-c/SM5, al^2 Cy lt^v sp^2
g320 px
g321 px bl (old Berlin stock of Goldschmidt) bl=bs?
g322 px bw mr sp/ds^{33k} Pm^1
g323 px bw sp/T(Y;2)J
g324 px$_{-2}$ slt sp
g325 Px$_{-2}$/Cy cn^2 L^4 sp^2
g326 Px^{-2}, bw sp/SM1, al^2 Cy sp^2
g327 pys
g328 Q
g329 Qn(2;2)S, (+ast)5, al ho/Cy, S^2 En-S
g330 rc pr
g331 rd/SM5, al^2 Cy lt^v sp^2
g332 rdo$_2$
g333 rdo^2 pr
g334 rh
g335 rk cn bw (iso 2)
g336 rl
g337 rnT23/Cy Bl cn^2 L^4 sp^2
g338 rub
g339 Ruf/ds^{33k} Pm^1
g340 S/Cy, En-S
g341 S dp^1/al^2 Cy cn^2 L^4 sp^2
g342 S fes Alu lt/al^2 Cy cn^2 L^4 sp^2

g343 S fes Sp b/Cy b lt^3 cn^2 L^4 sp^2
g344 S fes Sp^{txI} ms ta cn mr_2 crs/al_2^2 In,Mis dp Cy_4pr Bl cn L^4 sp_2
g345 S Sp ab^2 ap_2InNSR px sp/al^2 Cy Bl cn L^4 sp
g346 S Sp Bl bw^D/Cy cn^2 lc
g347 S Sp Bl L^{rm} Px^2/dp^{txI} Cy, Ins0 pr cn^2
g348 S Sp Bl L^{rm} bw_D/dp^{txI} Cy, Ins0 pr cn_2
g349 S Sp Bl Pfd bw^2/dp^{txI} Cy, Ins0 pr cn
g350 S Sp cn bw/dp^{txI} Cy cn bw
g351 S Sp crs/al^2 Cy pr Bl L^4 sp^2
g352 S Sp InNSR mr/dp^{txI} Cy pr Bl cn^2 L^4 sp
g353 S Sp (ls?) cn/dp^{txI} Cy cn
g354 S Sp (ls ?) cn bw sp/dp^{txI} Cy,InL cn bw sp
g355 S Sp ms ta cn crs_4/al_2^2InMis dp^{txI} Cy pr Bl cn^2 L^4 sp_{txI}
g356 S Sp ms ta cn crs/dp^{txI} Cy,Ins0 pr cn^2
g357 S Sp pr Bl rnT23 InNSR mr/dp^{txI} Cy pr cn^2
g358 S Sp pr cn^2 InCyR/dp^{txI} Cy pr cn^2
g359 S_2sp rnT23/dp^{txI} Cy pr Bl_1cn L^4 sp^2
g360 S_2 ab^{51b} In^3CyL/dp b_2 L^4 Pm^1
g361 S^2 Cy lt^3 pr Bl cn L^4 sp^2/InNSL InNSR px sp
g362 S_R^2 dp^{txI},InCyL/ls Sp b
g363 S^1/ds^{33k} Pm^1
g364 sca
g365 sca l(2)C/SM5, al^2 Cy lt^v sp^2
g366 sf^2
g367 shr bw^{2b} abb sp/SM5, al^2 Cy lt^v sp^2
g368 shv
g369 shv ho
g370 sm px/SM5, al^2 Cy lt^v sp^2
g371 sm px pd/SM5, al^2 Cy lt^v sp^2
g372 so_2
g373 so_2^2 b cn
g374 sp^2_{fg} bs^2
g375 spd^{fg}
g376 Sp/In(2L)t, l(2)R_v sp^2
g377 Sp/SM5, al^2 Cy lt^v sp^2
g378 Sp bur^4 cn InNSR px sp/Cy pr Bl cn^2 L^4 bw sp
g379 Sp J/In(2L)Cy-t, $Su\text{-}S_v$ dp^2 pr
g380 Sp J/SM5, al^2 Cy lt_2 sp^2
g381 Sp J L^2 Pin/SM5, al^2 Cy_2 lt^v sp^2
g382 Sp lys d/SM1, al^2 Cy sp^2
g383 Sp lys rc J/SM1, al^2 Cy sp^2
g384 Sp ms_2cn mr crs/Cy pr Bl cn^2 L^4 sp^2
g385 Sp rc^2/Cy Bl L
g386 spd gt-4/Gla,InLR
g387 sple
g388 spt
g389 std/SM5, al^2 Cy lt^v sp^2
g390 stw_2
g391 stw_3
g392 stw_3
g393 stw_5/T(Y;2)B
g394 stw_{48}
g395 stw blt tuf
g396 T(Y;2)B/b
g397 ta cn bw/al^2 Cy pr Bl cn^2 L^4 sp^2
g398 ta cn bw sp/Cy pr Bl cn^2 L^4 sp^2
g399 Tft/SM1, al^2 Cy sp^2
g400 tkd/SM5, al^2 Cy lt^v sp^2
g401 tkv
g402 toothed (cut-like in 2R)
g403 tri vg^{No2}/SM5, al^2 Cy lt^v sp^2
g404 tuf ltd
g405 U/cg c
g406 Uf
g407 vg (iso 2,3)
g408 vg_B bw
g409 vg_C/SM5, al^2 Cy lt^v sp^2
g410 vg_C/Rvd,In2LR
g411 vg_D/SM5, al^2 Cy lt^v sp^2
g412 vg_D/SM5, al^2 Cy lt^v sp^2
g413 vg_{ni} sp^2/Cy cn^2 L^4 sp^2
g414 vg_{np}
g415 vg_{nw}
g416 vg_{nw} Hia/SM5, al^2 Cy lt^v sp^2
g417 vg_{nw} Hia/T(2;3)S^M Cy
g418 vg^U/Roi, bw_2sp or
g419 vst/SM5, al^2 Cy lt^v sp^2
g420 whd
g421 wt

Chromosome 3
(containing genes of 2 in a few cases)

h1 a-3
h2 aa h
h3 abd
h4 app^{hg}
h5 as
h6 bar-3(Ives)
h7 Bd^G/In(3R)C, l(3)a
h8 bf/In(3R)C, Sb e l
h9 bp/TM1, Me ri
h10 bul
h11 bv_3
h12 bx_{34e}^3 Cbx Ubx bxd pbx/Xa
h13 bx^D
h14 bx=Ubx
h15 C_3G (Pasadena)
h16 ca^3

h17 ca bv
h18 ca_2K-pn
h19 $ca^{572jIIIa3}$/Me,Ins ri Sb^1
h20 ca^{nd}/M(3)1 Ubx^{130} e^s
h21 ca^{nd}/TM3, Sb Ser
h22 Cbx
h23 cd
h24 cmp ca/In(3R)C, e
h25 Cor/ru h D InsCXF
h26 cp
h27 cp in ri p^p
h28 cu
h29 cu kar
h30 cur
h31 cv-c
h32 cv-c sbd^2
h33 cv-d
h34 D/Gl
h35 D InsCXF/Tri
h36 D_3tra/InLP Dfd InRP ca
h37 D^3 H/InsP
h38 D^3 Sb ca^2/Payne
h39 det
h40 Df(3)sbd^{105}/Xa
h41 Df(3R)ry/In(3LR)Ubx^{130}, Ubx^{130} e^s
h42 Dfd/In(3LR)Cx
h43 Dfd^r
h44 Dl_2H e^s cd/In(3R)spr, spr
h45 Dl^3_5/In(3R)C, e
h46 Dl^3_{14}/In(3R)C, l(3)a
h47 Dl^x/Payne
h48 drb
h49 dwh/Payne, Dfd ca
h50 e
h51 e_4P^i/ru h D InsCXF e
h52 e_{11}wo ro
h53 e^s
h54 e^s
h55 eg/In(3LR)Cx
h56 eg^2/In(3LR)Cx
h57 eyg
h58 fz
h59 gl_2 e^4
h60 gl_3
h61 gl^{60j9}
h62 Gl bx^D/InsLVM
h63 Gl Sb H/Payne
h64 gs
h65 h
h66 h ri
h67 h ri ca (iso, 1953)
h68 $h_2$ri e^s (iso, 1957)
h69 h^2
h70 H/In(3R)hp, hp
h71 H_2Pr/In(3R)C, e
h72 H^3/Xa
h73 H^3_r/In3R)C, Sb e l(3)e
h74 Hn_{r3}h ri/ru h D Sb InsCXF
h75 Hn^r sr
h76 in
h77 In(3L)$p^{mot-36e}$/R
h78 In(3L)P, In(3R)P18, Mé Ubx e^4/In(3LR)Cx^1
h79 In(3LR)4833.10, bx^{34e}/TM1, Mé ri sbd
h80 In(3R)$Antp^B$/TM1, Mé ri
h81 In(3R)Dl^B,st Dl^B_{Xp1}/In(3R)P^W, st l(3) W ca
h82 In(3R)Hu, Hu Sb^1/Payne
h83 In(3R)Mo, sr/Xa, ca
h84 In(3R)P^{FLA} (homozygous)
h85 jv
h86 jv Hn^r h
h87 jvl_2
h88 kar^2
h89 Ki
h90 l(3)ac e^s M(3)w/LVM
h91 l(3)36d10/In(3LR)Cx, D
h92 l(3)tr Sb/In(3LR)Ubx^{130}, Ubx^{130} e^s
h93 l(3)tr Ubx/TM1, Mé ri Sb^1
h94 ld
h95 Ly/D^3
h96 Ly Sb/LVM
h97 M(3)1/In(3R)C, l(3)e
h98 M(3)36e/In(3R)C, l(3)a
h99 M(3)40130/Payne, Dfd ca
h100 M(3)B/In(3R)C, e l(3)e
h101 $M(3)B^2$/In(3R)C, Sb e l(3)e
h102 M(3)S31/T(2;3)Mé
h103 M(3)S32/T(2;3)Mé
h104 M(3)S34/T(2;3)Mé
h105 M(3)S36/T(2;3)Mé
h106 M(3)S37/Mé
h107 M(3)w/In(3R)C, e l(3)e
h108 M(3)y/Mé
h109 ma
h110 ma fl
h111 ma ry/TM1, Mé ri
h112 mah
h113 Mc/Xa
h114 Mé,InL bx^D/ru h D InsCXF Sb
h115 Mé,InL InRC e l3e/ru h D InsCXF Sb e^s
h116 Mé,InL Sb/ru_1h D InsCXF
h117 Mé,Ins ri Sb_1/D^3 st ri InRC e l3e
h118 Mé,Ins ri Sb^1/ru h D InsCXF ca
h119 Mio
h120
h121
h122

h123 N-X/Xa
h124 obt
h125 p_p
h126 p^p
h127 p^p bx sr e^s
h128 p^p cu
h129 p^p Ki
h130 pb/In(3LR)Cx
h131 pbx/Xa
h132 Pc/TM1, Mé ri
h133 Pr/In(3R) C, $_+e^+$
h134 Pr_KDr/TM3, y^+ ac^+ ri p^p sep bx^{34e} e^s
h135 Pr^K Dp/InPL InPR (Krivshenko)
h136 Pt/Xa, ca
h137 pyd
h138 R Ly/In(3L)P, gm
h139 ra
h140 red (Malpighians)
h141 red (Malpighians) e
h142 ri
h143 ri bod e^s/Mé, In(3R)C, Sb e l(3)e
h144 ri e_p
h145 ri p^p
h146 ri p^p Ina (/ru h D InsCXF ca)
h147 ri p^p Inc l/ru h D InsCXF ca
h148 ri sbd e^2
h149 ro
h150 ro_2Bd ca/In(3R), l(3)a
h151 rs
h152 rsd
h153 ru
h154 ru h
h155 ru h e^s
h156 ru h ri
h157 ru h ri p^p Inb
h158 ("threepl") ru h st p^p ss e^s
h159 ("rucuca") ru h th st cu sr e^s ca
h160 ("ruPrica") ru h th st cu sr e^s Pr ca/T(2;3)Mé
h161 ("rupes") ru h th st p^p cu sr e^s
h162 ru h th st p^p H e^s ro/C(3)x, M(3)x e^x $C(3)x_s$= In(3L+3R)P
h163 ru st C3G e^s (iso, 3) (b sp)
h164 ru st C3G sr e^s
h165 ru_gtra p/ru h D InsCXF e
h166 ru^g jv se by
h167 ry_2
h168 ry^2
h169 Sb/In_D(3LR)Ubx^{101}
h170 Sb bx^D/Xa
h171 Sb H/In(3R)C, cd
h172 Sb Ubx/Xa
h173 Sb^{Spi}/In(3LR)Cx
h174 sbd^2 bx^3
h175 se
h176 se h
h177 se rt^2 th/Mé,InL
h178 se ss
h179 se ss k e^s ro
h180 se^{51j}
h181 ("separated arms of 3" Dubinin) T3L.4L; 4R.3R/1 InLP Dfd InRP 1
h182 sep,InLR ri p^p
h183 sep,InLR ri p^p Sb/Mé,InL Dfd InRC e l3e
h184 sep,InLR ri p^p Sb/Mé,InL InRC e l3e
h185 Ser/In(3R)C, e l(3)e
h186 snb
h187 sr
h188 sr gl
h189 ss
h190 ss bx
h191 ss bx Su^2-ss
h192 ss bxd k e^s/Xa
h193 ss ca (iso, 1953)
h194 ss e^s (iso, 1953)
h195 ss_a
h196 ss^A In3/Sb bx^D
h197 ss_a-40a
h198 ss^a-B
h199 st
h200 st c3G ca/TM1, Mé ri Sb^1 (sp^2)
h201 st in ri p^p
h202 st Ki_2p^p
h203 st ry^2 sr^r e^s
h204 st Sb^s e^s rv ca
h205 st sr H^2 ca/In(3R)P^W, st l(3)W ca
h206 st^{54i} ri p^p
h207 st^{sp}
h208 su-ve ru ve bv (h? th?)
h209 su-ve ru ve h th
h210 (sp^2;) su^2-Hw bx bxd/Mé,Ins ri Sb^1
h211 th
h212 th cu sr e^s ro ca
h213 th st cp
h214 th st pb p^p/In(3LR)Cx
h215 th st pb p^p kar su^2-Hw jvl ss bx sr gl/TM1, Mé ri Sb^1
h216 $Tp(3)bxd^{107}$, bx bxd^{107} sr e^s/bx^{34e} Mc
h217 Tp(3R)Vno/H^2
h218 tra/T(2;3)Mé
h219 tt wo
h220 tx
h221 Ubx e^4/Payne, Dfd ca (Ubx=bx^D)
h222 ve

h223 ve bv (iso, 1957)
h224 ve ca (iso, 1953)
h225 ve h th
h226 ve R/In(3L)P, gm^{s}
h227 ve R D^{3} bx^{d} (e ?) Pr ca/InLP Dfd InRP ca
h228 ve R D^{3} Sb^{Spi} Bd^{G}/InsP
h229 ve st (iso, 3)
h230 ve st sbd
h231 W
h232 W Sb/InsCXF
h233 wk/Payne, Dfd ca
h234 wo
h235 Xa/In(3LR)Ubx^{130}, Ubx^{130}
h236 Xa/In(3LR)Ubx^{130}, Ubx^{130} e^{s}
h237 Xa ca/e^{s} cd ro cmp ca

Chromosome 4

i1 ar/ey^{D}
i2 bt
i3 bt^{D} ey^{R} sv^{n}
i4 bt^{2}/ci^{D} Cat
i5 Ce^{R}/dpa
i6 ci ey^{R} sv^{n}
i7 ci ey sv
i8 ci gvl bt^{R} sv^{n}
i9 ci gvl ey Cat sv
i10 ci gvl spa Cat/ci^{D}
i11 ci^{361}
i12 ci^{D}_{W}/4-sim
i13 ci
i14 ey^{2}
i15 ey^{4}
i16 ey^{D}/ci^{D}
i17 ey
i18 gvl
i19 gvl ey^{R} sv^{n}
i20 gvl ey sv
i21 l(4)AM-1/ci^{D} (Hochman)
i22 l(4)PT-1/ci^{D} (Hochman)
i23 l(4)PT-2/ci^{D} (Hochman)
i24 l(4)PT-3/ci^{D} (Hochman)
i25 l(4)SLC-1/ci^{D} (Hochman)
i26 l(4)ST-1/ci^{D} (Hochman)
i27 l(4)ST-2/ci^{D} (Hochman)
i28 l(4)ST-3/ci^{D} (Hochman)
i29 l(4)ST-4/ci^{D} (Hochman)
i30 M(4)/ey^{D}
i31 spa^{Cat}/ci^{D}
i32 spa^{pol}/ci^{D}
i33 spa
i34 sv^{35a}
i35 sv^{de}_{n}/ey^{D}
i36 sv
i37 Tp4:Y(Edmondson)/4-sim ♂ & 4-sim ♀

Multiple Chromosomes

X,2 (j1-43)

j1 Bld,TX2 InCyR/sc^{2} pn ; II^{+}
j2 Bld, TX2 InCyR/ClB
j3 bx^{3} dx^{st} ; ed Su^{2}-dx
j4 dx^{st}_{x} ; Su-dx
j5 ep^{56e}-S ; S/Cy
j6 f & y f:= ; cn bw
j7 gt v ; vg
j8 gt^{D} v ; b
j9 lz/In49 m^{2} g^{4} ; Cy/Pm
j10 m f^{36a}_{8} ; vg bw
j11 sc^{3} f In49 v ; bw^{VA}/L^{2} l (iso Y,X,2)
j12 sn^{3} ; ed dp cl
j13 sy ; tet
j14 T(X;2)459, y l^{459}/FM6, y^{31d} sc^{8} dm B^{3}
j15 T(X;2)lt/Cy (carries eq., possibly su^{3}-s)
j16 T(X;2H)25(20), y l^{25}/FM6
j17 T(X;2LH)150(16-17), y l^{150}/FM6
j18 T(X;2LH)219(10A), y l^{219}/FM6
j19 T(X;2RH)75(20), y l^{75}/FM6
j20 T(X;2RH)135(18-19), y l^{135}/FM6
j21 v_{m4} ; bw
j22 w_{m4} ; En-Var 5/Cy
j23 w_{m4} ; En-Var 7/Cy
j24 w_{m4} ; En-Var 8/Cy
j25 w ; En-Var 8^{46g}/Cy
j26 X.Y InEN v y ; S dp cn/dp^{tx} Cy cn (no free Y)$_{tx}$
j27 y ; S Sp cn/dp^{191}_{2} Cy cn
j28 y ac ; sc^{VA}/S^{2}_{2} Cy
j29 y f:= ; bw^{VA}/L^{2} l_{2}
j30 y f:= ; Cy,Ins cn^{2}/Gla,InLR
j31 y f:= ; dp_{tx}
j32 y f:= ; dp Sp cn bw/S^{2} Cy cn bw
j33 y f:= ; net bw sp^{rm} D^{D}/dp^{txI} Cy,InsO pr cn$_{2}$
j34 y f:= ; S Sp Bl L^{2} bw^{S1}/dp^{txI} Cy,InsO pr cn
j35 y Hw_{4} In49 m g/y sc^{S1} v^{34k} B InS ; net bw sp
j36 y sc^{8} sc^{8} ; Cy bw^{5}/ds rl (Y's extra)
j37 ("scute twevepl") y sc^{5} ; al dp sc^{191} b pr cn_{2} vg_{4} c a_{2}px bw mr sp/al^{2} Cy pr Bl cn^{2} L^{4} sp^{2}
j38 y sc^{S1} B In49 ct^{8}_{8} sc^{8} ; dp
j39 y sc^{S1} B In49 sc^{8}_{8} ; dp_{h}
j40 y sc^{S1} $In49_{2}$ v sc^{4} ; dp b bw/dp^{txI} Cy pr Bl cn^{2} L^{4} sp^{2}

j41 $y_2 v\ f^{x\ +ih}$: f^{+} ; bw^{VA}/L^2 l
j42 $y_{2\ 44d}^{t}$; cn bw
j43 $y\ w_{m4}$; Cy/+ (Y's extra)

X,3 (j44-85)

j44 en-bx, In(1) ; bx^3 +/+ pbx
j45 In49 ptg oc ct^{ns} & y f:= ; $ri\ p^p$
j46 In49 v ct^{ns} ; ru_i h D InsCXF/Mé, Ins
j47 In49 Fl v g ; ct^{i}/ru h D InsCXF e
j48 oc T(X;3) & y f:=
j49 sc w B^{S3} .Y ^{S} & y f:= (B^{S3} Del.- Inser, into 3)
j50 ("Tam X3sn") sn T(X;3), red ♂ & y f:=
j51 sn^3 ; Mw/l InLP InRP l
j52 T(X;3) D^3 Sb & y w f:=
j53 ("Tam X3") T(X;3), red ♂ & y f:= ♀
j54 T(X;3)283-3/w^e sn
j55 T(X;3)B^{581}/InAM
j56 T(X;3)"Del 143" ru e^s ca/CxF, ru h ca
j57 T(X;3)05, D & y f:=
j58 T(X;3) ras ^{V} & y f:=
j59 T(X;3)v_{Vco} v/FM6, y^{31d} sc^8 dm B
j60 T(X;3)w^{36d}, v f/ClB
j61 T(X;3H)361(20), y l^{361}/FM6
j62 T(X;3H)453(12D), y l^{453}/FM6
j63 T(X;3H)463(20), y l^{463}/FM6
j64 T(X;3LH)163(17A-B), y l^{163}/FM6
j65 T(X;3LH)455(3C), y l^{455}/FM6
j66 T(X;3RH)3(3-4), y l^3/FM6
j67 T(X;3RH)129(18B), y l^{129}/FM6
j68 Ti(3;X)05 & y f:= ; TM3/Tp(3R)Vno
j69 Ti(3;X)ry^{35}, cu ry_2^{35} kar/Xa
j70 v_a ; bw^{VDel}/SM1, al^2 Cy sp
j71 w_{m4} ♂ & y v f.= ♀ ; tra/D InsCXF
j72 w_{m4} ; En-Var 12/Cx,D
j73 w_{c2} ; En-Var 13/Cx,D
j74 X_{c2}, y B & y f:= ; e^{11}
j75 X, y v & y f:= ; e^{11}
j76 ("Tam tester 1") y f:= ; D^3 Sb/InLP Dfd InRP ca
j77 y f:= ; e^{11}
j78 y f:= ; ru h D InsCXF/InLP Dfd InRP
j79 y f:= ; ru h D InsCXF/Mé, Ins ri Sb^1
j80 y f:= ; su-ve ru ve bv (h? th?)
j81 y Hw In49 m g/y sc^{S1} B InS ; ru bv
j82 ("Tam tester 2") y sn^{S1} oc ♂ & Y^{+}/y sc^{x2}_{J1} B In49 l sn^{8} sc^{1}/lJ1 sc oc ptg ♀ ; ru h D InsCXF/Mé, Ins ri Sb
j83 y w ; red (Malpighians)
j84 $y_2 w$; $_2$red e_{bf}
j85 y en-bx w^{1}/FMA3, y^2 ; Sb^{r2} ss bx^{34e}/ TM1, Mé ri Sb

X,4 (j86-89)

j86 w^{a56} ; spa ^{Cat}/ci^D
j87 y f:= ; spa
j88 y f:= ; spa ^{Cat}/ci^D
j89 y sc ^{S1} InS sc^8 & y.= ; ci ey^R

2,3 (j90-197)

j90 al b cn sp/al^2 Cy Bl cn^2 L^4 sp^2 ; ru
j91 al dp b Bl c px sp/Cy ; D/C(3)X
j92 "apl"/Cy sp ; ru h Ins_2CXF ca/Sb InRMo
j93 al T(2;3)101 sp^2/Cy L^4 sp^2
j94 al T(2;3)108 c sp^2/Cy, al^2 lt^3 L^4 sp^2
j95 al T(2;3)B sp^2/Cy, L^4 sp^2
j96 b ; e^{11}
j97 b ; p^p
j98 Bl bw^D ; Su-283/Xa
j99 Bl T(2;3)A ; ru h D TA ss e^s/Payne
j100 bw ; e
j101 bw ; ru h ri
j102 bw ; ru_1 h st D^3 ri InRC e l3e/Mé, Ins ri Sb
j103 bw ; ss
j104 bw ; st
j105 bw sp ; $_1$ru h D^1 ri InRC e l3e/Mé, Ins ri_4 Sb
j106 bw_D ; st
j107 bw_{VDe3} T(2;3)289/Cy ; In(3R)Mo, Sb sr
j108 bw_{VDe3} ; Ubx bxd/In(3LR)Cx
j109 bw_{VDe3} ; Ubx bxd/In(3R)C
j110 c ; e
j111 cn ; st
j112 cn bw ; ri e
j113 cn bw ; ru h th ri e^s
j114 cn crs/al^2 Cy lt^3 pr Bl cn^2 L^4 sp^2 ; e^s
j115 cn crs/Cy pr Bl cn^2 L^4 sp^2 ; ve (iso)
j116 cn ; ve (iso, 1960)
j117 Cy/ds^{33k} Pm^1 ; H/sr Mo, In(3R)
j118 Cy/Pm ; ru h D InsCXF ca/InLP Dfd InRP ca
j119 Cy/Pm ; st (iso X,2,3)
j120 De bw ; ro
j121 dp ; cp
j122 dp ; cu
j123 dp ; e^{11}
j124 dp ; e^s
j125 dp ; sbd^2 bx^3
j126 dp ; tx
j127 ("iser 2b") dp_2 b cn c P/al^2 Cy lt^3 pr Bl cn_i^2 L^4 sp^2 ; ru h D InsCXF/Dl H e P

j128 ("Pale e") dp b cn c P^{-}/Cy cn^{2} ; e P^{1}/e P^{1}

j129 ("Pale H") dp b cn c P^{-}/Cy cn^{2} ; p^{56} Dl H e p^{1}/p^{56} In3R l

j130 dp b Pm^{1}/Cy sp^{2} ; Sb/D InsCXF (ru h ca?)

j131 dp bw ; st p^{p}

j132 dp_{o3} cn bw/Cy Bl cn^{2} L^{4} sp^{2} ; h ri e^{s}

j133 dp cn bw ; ru h D^{3} ri^{1} In3RC e l3e/Mé,Ins ri Sb

j134 dp_{T} Sp cn/S_{2} Cy cn ; ri e

j135 dp^{T} Sp cn/S^{2} Cy cn ; ru h D^{3} ri^{1} InC e l3e/Mé,Ins ri Sb

j136 dp_{tx} Sp cn bw/S^{2} Cy cn bw ; ri e

j137 dp^{tx} Sp cn/S^{2} Cy cn ; ru h D InsCXF/Mé,Ins ri Sb^{1}

j138 dp^{tx} Sp cn/S^{2} Cy cn ; ru h D InsCXF Sb/Mé,InL InC e l3e

j139 dp^{tx} Sp cn/S^{2} Cy cn ; sep ri p^{p} Sb/Mé,InL InC e l3e

j140 dp^{tx} Sp ms ta cn crs/S^{2} Cy pr Bl cn^{2} L^{4} sp_{2}; e^{s}

j141 dp^{tx} Sp pr cn^{2}/S^{2} Cy cn ; Mé,InL InC e l3e/ru h CXF Sb

j142 dp^{txI} Cy,Ins0 pr cn^{2} T(2;3) Mé, Ins ri Sb^{1}/("twevepl") al dp b pr cn vg c a px bw mr sp ; ("rucuca") ru h th st cu sr e^{s} ca

j143 dp^{txI} Cy,Ins0 pr cn^{2} T(2;3) Mé, Ins ri Sb^{1}/("twelvepl") al dp b pr cn vg c a px bw mr sp^{p} ; ("threepl") ru h st p^{ss} e^{2}

j144 ("TIn") dp^{txI} Cy,Ins0 pr cn^{2} T(2;3) Mé,Ins ri Sb^{1}/S Sp cn ; ru h D^{3} st InRC e l3e

j145 dp_{v2}; vo^{v}

j146 dp^{tx} cn bw ; h ri e^{s} (iso, 7/57)

j147 ed dp cl ; tt wo

j148 ed dp cl ; tx

j149 fes ms cn sp^{s}/dp^{txI} Cy,Ins0 pr cn^{2} ; h ri e^{s}/Mé,Ins ri Sb^{1} (iso, 7/57)

j150 ("Pale Indp") IndpT23 b P^{-}.Dl H e P^{1}/dp b Pm^{1} ; Sb In3R

j151 InNSL InNSR mr^{3}/al^{2} Cy pr Bl lt^{3} cn^{2} L^{4} sp^{2} ; ri^{53j}

j152 lt bw ; st_{2} p^{p}

j153 M(2)33a/al^{2} Cy pr Bl cn^{2} L_{2}^{4} sp^{2} ; $_{3}ru$

j154 ("iser 2a") ms cn rm^{2} sp/al^{2} Cy lt^{3} pr Bl cn^{2} L^{4} sp^{2} ; ru h D InsCXF/ ve th l

j155 ms sp/Cy pr Bl cn^{2} L^{4} sp_{i}^{2} ; ri^{M} (iso)

j156 net bw mr crs ; Dl H e P^{1}/ru h D InsCXF (low iso, 7/57)

j157 net bw mr crs/dp^{txI} $_{1}$ Cy,Ins0 pr cn^{2} ; ve bv/Mé,Ins ri^{1} Sb

j158 net dp sp^{txI}/dp_{2} Cy,Ins0 pr cn^{2} ; Mé,Ins ri Sb ^{1}/ve bv

j159 p^{Gr}/SM1, al^{2} Cy sp^{2}

j160 px pd ; Prd H $Dp(2,3)F^{s}$/Prd

j161 ru h D T(2;3)B ss e^{s}/Payne

j162 ru h D T(2;3)C ss^{4} e^{s}/Payne

j163 ru h T(2;3)101 e^{s} ro ca/Payne, Dfd ca_{3}

j164 ("STin") S fes Sp ms^{txI} ta cn mr crs ; D^{3} ri InC e l(3)e/dp^{txI} $_{1}$ Cy,Ins0 pr cn^{2} T(2;3) Mé,Ins ri_{3} Sb^{1}

j165 S fes Sp T(2;3)B D^{3} ri Sb/Cy cn^{2} sp^{2} ; InsCXF

j166 S fes Sp T(2;3)01 ms cn mr crs D^{3} $_{2}st_{4}ri$ InC e l3e/al_{1}^{2} InMis Cy pr Bl cn^{2} L^{4} sp^{2} ; Mé,Ins ri Sb

j167 S fes Sp T(2;3)01 ms cn mr crs D^{3} st ri InC e_{1} l3e/dp^{txI} Cy,Ins0 pr cn^{2}; Mé,Ins ri Sb

j168 S Sp cn/dp^{txI} Cy cn ; Mé,InL InRC e l3e/ru h $_{D}^{txI}$ Sb InsCXF

j169 S Sp cn/dp_{txI} Cy cn ; h ri e_{3}^{s}

j170 S Sp cn/dp^{txI} Cy cn ; ru h D^{3} ri InRC e l3e/Mé,Ins ri Sb^{1}

j171 S Sp cn/dp_{txI} Cy cn ; ru h e^{11}

j172 S Sp cn/dp^{txI} Cy,Ins0 pr_{1} cn^{2} ; h ri D^{3} InC e l3e/Mé,Ins ri Sb

j173 S Sp cn/dp^{txI} Cy,Ins0 pr_{1} cn^{2} ; ru h D InsCXF ca/Mé,Ins ri Sb

j174 S Sp cn bw/dp^{txI} Cy cn bw_{1}; ru h D^{3} ri InRC e l3e/Mé,Ins ri Sb

j175 S Sp cn bw/dp^{txI} Cy cn bw ; h ri e^{s}

j176 ("iser 1") S Sp (crs)/Cy InL lt^{3} ; Mé,Ins ri Sb^{1}/Bd^{G}

j177 S Sp_{2} ms ta cn crs/dp^{txI} Cy pr Bl cn^{2} L^{4} sp^{2} ; e^{2}

j178 ("sifter O") S Sp P^{-} T(2;3), InsCXF/dp^{txI} Cy,Ins0 pr cn^{2} ; Dl H e P^{1}

j179 S Sp T(2;3)B/dp^{txI} $_{1}$ Cy,Ins0 pr cn^{2} ; Mé, Ins ri Sb

j180 S^{M} Cy ; $_{3}$C3G Sb Ubx/st C3G $_{105}$ca

j181 sbd^{2} bx^{3} pbx/T(2;3) Ubx

j182 sp ; ru h D InsCXF/Me,InL InRC e l3e

j183 Su-er tu bw; st er su-tu

j184 T(2;3)109 p^{p}/Payne, Dfd ca

j185 T(2;3)At, At/In(2R)Mo^{k}

j186 T(2;3)B cn bw D^{3} ri/dp^{txI} Cy,Ins0 pr cn^{2} ; Mé ri Ins Sb^{1}

j187 T(2;3)B cn bw In(C e l3e/al^{2} In,Mis Cy cn$_{2}$ L^{4} sp^{2} ; Mé,Ins ri Sb^{1}
j188 T(2;3)Dp-s; ho/Cy, En-S$_{2}$(hom. viable)
j189 T(2;3)lt^{L} (98C)/SM5, al^{V} Cy lt^{m7} sp^{2}
j190 T(2;3)S/Cy$_{2}$ En-S$_{4}$
j191 ta/Cy Bl cn^{2} L$_{2}$ sp^{2} ; ru ri (iso)
j192 ta sp/Cy Bl cn$_{2}$ L$_{4}$ sp$_{2}$; jv (iso)
j193 ta sp/Cy Bl cn^{2} L^{4} sp^{2} ; ru (iso)
j194 vg ; by$_{11}$
j195 vg ; e
j196 Xa/l(3)XaR

2,4 (j197-205)

j197 al dp T(2;4)d$_{2}$px sp/Cy, pr ; ey^{2}
j198 "apl" l/Cy cn$_{2}$ sp^{2} ; IV-sim/ci ey
j199 bw ; ci$^{D}_{2}$/IV-sim
j200 pr ; ey
j201 pr ; Mal
j202 T(2;4)a/Cy, pr ; ey^{2}
j203 T(2;4)d/Cy, pr
j204 T(2;4)ast^{V}/al^{2} Cy lt^{3} L^{4} sp^{2}
j205 T(2;4)b/Cy, pr ; ey^{2}

3,4 (j206-221)

j206 bv ; spa^{Cat}/ci^{D}
j207 D T(3;4)a/Mé
j208 e ; ey
j209 h th st T(3;4)e cu sr e^{s} ca/Payne, Dfd ca
j210 ri ; ci ey^{R}
j211 T(3;4)86D, bx^{34e} e^{4}
j212 T(3;4)89E, ss bs bxd/ey^{D}
j213 T(3;4)A2/ci^{D}
j214 T(3;4)A2/Mé, ca
j215 T(3;4)A12/Cx, D
j216 T(3;4)A13, ve ca/Mé, ca
j217 T(3;4)A28, ve ca (homozygous)
j218 T(3;4)c/Payne, Dfd ca
j219 T(3;4)e/ci^{D}
j220 T(3;4)f, h th st cu sr e^{s} ca/Payne, Dfd ca
j221 T(3;4)f/Mé

X,Y,2 (j222-224)

j222 Yst/w^{e} bb^{l}/w^{e} bb^{l}/ & w^{e} bb^{l}/Y^{+} ; InsNS px sp/l mr^{2} (Bridges)
j223 Y$^{bb}_{Lc}$ Su-Var 5/w^{m4} ; En-Var 8^{48g}/Cy
j224 Y^{Ls}/y sn^{5} oc ptg v.Y & y ct.= ; dp

X,Y,3 (j225-229)

j225 ("multi-♀") X.Y InEN y ; st (no free Y)
j226 X.Y InEN In49 y ; st (no free Y)
j227 X.Y y ; st (no free Y, no In)
j228 sc^{8}.Y/X.Y InEN y ; ru h D InsCXF/ ru tra p
j229 sc^{8}.Y:bw$^{+}_{i}$/X^{+} ; Mas/Mé,Ins ri Sb^{1} ♂ & Dl H e P^{1}/Mé,Ins ri Sb^{1} ♀

X,Y,4 (j230-233)

j230 sc^{8}.Y/X^{+} & y f:= ; ci gvl ey^{R} sv^{n}
j231 Tp4:Y/X.Y InEN In49 v y ; ci gvl ey^{R} sv^{n}
j232 Y^{Ls}.InEN y.Y^{L}: 4 ♂ & y.= ♀ ; ci ey^{R} (no free Y)
j233 Y^{S}.InEN y.Y^{L} sc^{8} y^{+} ; ci ey^{R} (no free Y)

X,2,3 (j234-248)

j234 In49 ct^{ns} ; b ; ri p^{p}
j235 ptg ; px pd ; su-pd
j236 T(X;2;3)220(14A;50A;75), y$_{i}$l^{220}/FM6
j237 ("Pale") w^{e} ; P^{1}/Cy ; P^{1}/P^{-}
j238 y f:= ; cn bw ; e
j239 y In49$_{3}$v ; bw ; e
j240 y w sn^{3} ; dp bw ; st p^{p}
j241 y w sn^{3} f^{36a} ; dp bw ; st p^{p}
j242 y sc^{S1} f In49 y sc^{8} ; bw ; e
j243 y sc^{S1} In49 sc^{8} ; bw ; st p^{p}
j244 y sc^{S1} In49 sc^{8} ; dp bw ; st p^{p}
j245 y$_{Si}$sc^{S1} In49 w sc^{8} ; dp ; e^{11}
j246 y^{Si} sc^{8} B$_{i}$f In49 v ; bw ; e$_{3}$p^{2}
j247 ("MI") y^{Si} sc^{8} InS y^{+} ; al^{2} Cy lt^{3} cn^{2} sp^{2}/dp b Pm^{1} ; ru h D InsCXF ca/Sb In3R
j248 T(X;2) + T(2;3)Dinty & y f:=

X,2,4 (j249-250)

j249 ("scar") sc t^{2} v f car ; Cy/bw ; ey
j250 w^{m4} ; T(2;4)Su-Var 2/Cy

Y,2,3 (j251-255)

j251 Y:bw^{+} ; Mé,T23/dp^{txI} Cy cn^{2} bw sp
j252 sc^{8}.Y:bw^{+} ; dp^{v2} cn bw ; h ri e^{s} (iso, 7/57)$_{+}$(Cy Bl cn^{2} L^{4} sp^{2})^{txI}
j253 sc^{8}.Y:bw$^{+}_{2}$; fes ms$_{s}$cn sp/dp^{txI} Cy,InsO pr cn^{2} ; h ri e^{s}/Mé,Ins ri Sb^{1} (iso, 7/57)$_{+}$
j254 sc^{8}.Y:bw$^{+}_{2}$; net bw mr crs/dp^{txI} Cy,InsO pr cn^{2} ; Mé,Ins ri Sb^{1} (iso, 7/57)$_{+}$(ve by)
j255 sc^{8}.Y:bw$^{+}_{2}$; net dp sp/dp^{txI} Cy,InsO pr cn^{2} ; ve bv/Mé,Ins ri Sb^{1}

2,3,4 (j256-258)

j256 bw ; e ; ci ey^{R}
j257 Cy/bw ; e ; ci^{D}/IV-sim
j258 T(2;3;4)295,bw^{+}/Cy ; H/+

X,Y,2,3 (j259-267)

j259 sc^{8}.Y/ st^{54i}Hw In49 B^{M1} & y f:= ; twl bw ;
j260 ("Multipare") sc$^{8}_{54i}$.Y/y sc In49 B^{M1} ; twl bw ; st

j261 sc^{8}.Y/y sc^{S1} In49 sc^{8} & y f:= ; dp bw ; st p^{p}

j262 ("Taxy") sc^{8}.Y/y sn oc ♂ & sc^{8}.Y/ y In49 sn^{x2} B^{M1}/y oc lz.Y^{S} ♀ ; ^{8}twl bw ; st^{54i}

j263 sc^{8}.Y/y w sn^{3} f^{36a} ; dp bw ; st p^{p}

j264 ("y ♀s cn bw e") Y^{Lc}/y ♀s.Y^{S}/y sc^{S1} B f In49 v sc^{8} ; cn bw ; e

j265 sc^{V1}.Y^{S}/y In49 v f.Y^{L} ; bw ; e

j266 X.Y InEN In49 y ; cn bw ; e (no free Y)

j267 X.Y InEN In49 y ; cn bw ; ro (no free Y)

X,2,3,4 (j268-272)

j268 sc^{S1} B InS w^{a} sc^{8} ; SM1, al^{2} Cy^{1} sp^{2}/dp ds^{33k} Pm^{30} ; C Sb/Ubx e^{s} ; spa^{pol}

j269 T(X;2;3;4)454, y l^{454}_{R}/FM6

j270 y ; bw ; e ; ci ey^{R}

j271 y f:= ; bw ; e ; ci ey^{R}

j272 y f:= ; bw ; e ; spa^{pol}

X,Y,2,3,4 (j273-274)

j273 Y^{S}. InEN In49 y.Y^{L} ; cn bw ; e ; ci ey (no free Y)

j274 Y^{S} . InEN In49 y.Y^{L} ♂ & "snocty" ♀ ; cn bw ; e ; ci ey^{R} (no free Y)

Miscellaneous stocks

m1 CO_2-sensitive (stable $)

m2 SD-5/cn bw (selected every generation)

m3 SD-72/cn bw (selected every generation)

Attached (compound) chromosomes (m4-m19)

m4 RA, InAB, y....sc^{8} & y^{+} ac^{+} Y^{L}/Y^{S}.X InEN B y.Y^{L}

m5 RA, lJ1....sc^{8} & y sc^{8}.Y/lJ1^{259} y w Y^{L}.Y^{S}

m6 RA, y....sc^{8} InEN.Y^{L} & y^{+} ac^{+}.Y^{L}/Y^{S}. InEN B y.Y^{L}

m7 RA.Y^{L}, +....sc^{8} InEN, y.Y^{L} y^{+} & y^{+} ac^{+}.Y^{L}/Y^{S}.X InEN B$_{4}$y.Y^{L}

m8 RM(TAX), In(1)y $,w^{a}$ y /y v f & Y^{S}.X InEN B_{S}y.Y^{L} (no free Y)

m9 RM, InEN Y^{S} & Y^{S}.X InEN car f In49 v y.Y^{L} (no free Y)

m10 RM, pn & Y^{S}.X y B.Y^{L}

m11 RM(13-0-15=XY$^{L}_{a}$.X), y^{2} su-w^{a}_{S} w^{a} bb Y^{L}/ y^{2} su-w^{a} w^{a} bb? bb^{+} & Y^{S}.X InEN B y.Y^{L}

m12 RM(15-DRP=XY$^{L}_{a}$.Y^{L}X), y^{2} su-w^{a}_{L} w^{a}_{+} bb? Y? bb^{+} & Y^{S}X InEN B f v y.Y^{L} y^{+}

m13 TM(Hw f), originally y Hw v f.y^{+} cv f y^{+}/X.Y, y B

m14 RM2L ; RM2R (attached 2L" & 2R")

m15 RM2L, b ; RM2R, cn

m16 RM3L ; RM3R (Rasmussen no. 26)

m17 RM3L, se h^{2} rs^{2} ; RM3R, sbd gl e^{s} (Rasmussen no.44)

m18 AF1, (ci ey^{R}/gvl sv^{n})

m19 AF2, ci ey^{R}/gvl sv^{n}

Non-autonomous sex-linked lethals (E. Novitski) (m20-m36)

m20 (alaful-1) y w spl sn/sc^{S1} bb^{+} B In49 oc ptg sc^{8}

m21 (gluful-1) y w spl sn bb/sc^{S1} bb^{+} B In49 oc ptg sc^{8}

m22 (gluful-2) y w spl sn bb/sc^{S1} bb^{+} B In49 oc ptg sc^{8}

m23 (gluful-3) y w spl sn bb/sc^{S1} bb^{+} B In49 oc ptg sc^{8}

m24 (gluful-4) y w spl sn/sc^{S1} bb^{+} B In49 oc ptg sc^{8}

m25 (glufulproless-1) y w spl sn bb/sc^{S1} bb^{+} B In49 oc ptg sc^{8}

m26 (glufultyrless-1) y w spl sn/sc^{S1} bb^{+} B In49 oc ptg sc^{8}

m27 (glufultyrless-2) y B/sc^{S1} bb^{+} B In49 oc ptg sc^{8} ; (bw/+) ; (st p^{p}/+)$_{S1}$

m28 (glufultyrless-3) y w spl sn bb/sc^{S1} bb^{+} B In49 oc ptg sc^{8}

m29 (glufultyroproless-1) y w spl sn bb/sc^{S1} bb^{+} B In49 oc ptg sc^{8}

m30 (glyful-1) y w spl sn bb/sc^{S1} bb^{+} B In49 oc ptg sc^{8}

m31 (phenyfultyrless-1) y w spl sn bb/sc^{S1} bb^{+} B In49 oc ptg sc^{8}

m32 (tyrless-1) y w spl sn bb/sc^{S1} bb^{+} B In49 oc ptg sc^{8}

m33 (tyrless-2) y w spl sn/sc^{S1} bb^{+} B In49 oc ptg sc^{8}

m34 (tyrproless-1) y w spl sn/sc^{S1} bb^{+} B In49 oc ptg sc^{8}

m35 (tyrproless-2) y w spl sn bb/sc^{S1} bb^{+} B In49 oc ptg sc^{8}

m36 (tyrproless-3) y w spl sn bb/sc^{S1} bb^{+} B In49 oc ptg sc^{8}

Non-lethal "tumorous" stocks (m37-m41)

m37 bw^{tu}_{50j}

m38 tu^{51m}

m39 tu

m40 tu^{h}

m41 vg tu

EAST LANSING, MICHIGAN: MICHIGAN STATE UNIVERSITY, DEPT. OF ZOOLOGY

Wild Stocks

Oregon-R
Urbana
Crimea
Samarkand
Swedish-B
Canton-S

Chromosome 1

w m f
w m
Basc m^D/FM^3
br
f
rb
w_a
w_e
w
y
cm
g
m

Chromosome 2

bw
dp
vg
cn bw
Cy/Pm; +/+
pk cn
SD
b pr

Chromosome 3

ca
st
se
e se
h th st cu sr e^s ca (ru lost)

Multichromosomal

b; se h (2;3)
bw; st (2;3)
v; bw (1;2)
w; bw; st (1;2;3)
bw; e (2;3)
Cy/Pm; H/In(3r)Mo, Sb, sr (2;3)

Attached -XY

Y^s w y · Y^L y^+/yw/0

Attached-X

y Hw sn^3/y w f:=

Closed - X

X^{cl},y/y w f:=

PASADENA, CALIFORNIA: CALIFORNIA INSTITUTE OF TECHNOLOGY

Note: The following stocks constitute additions to the list of stocks from this laboratory printed in DIS 37.

Chromosome 2

299b Frd/Cy, sp^2
419b Tg/Cy, sp^2

Chromosome 3

492b gl^{60j}
557b roe p^p

Chromosome 4

621b ci^{57g}

Multichromosomal Stocks

658b FMA3, y^2; al; st; spa^{pol} (1;2;3;4)

Inversions-X

773b In(1)y^{3P} B

Translocations-1;Y

789b T(1;Y)1E y sc/T(1;Y)1E, y sc^+/y f:=; cn bw
789c T(1;Y)1E v car l (Stern#64)/T(1;Y)2E/y f:=; cn bw

Biochemical Mutants (from E. Novitski)

y w spl sn (alaful-1)/M-5, bb^1
y w spl sn (gluful-1)/M-5, bb^1
y w spl sn bb (gluful-2)/M-5, bb^1
y w spl sn bb (gluful-3)/M-5, bb^1
y w spl sn (gluful-4)/M-5, bb^1
y w spl sn bb (glufulproless-1)/M-5, bb^1
y w spl sn (glufultyrless-1)/M-5, bb^1
y B (glufultyrless-2)/M-5, bb^1
y w spl sn bb (glufultyrless-3)/M-5, bb^1
y w spl sn bb (glyful-1)/M-5, bb^1
y w spl sn bb (glufultyrproless)/M-5, bb^1
y w spl sn bb (phenylfultyrless-1)/M-5, bb^1
y w spl_{S1} sn bb (tyrless-1)/Ins(1)dl-49, sc^{S1} oc ptg B
y w spl sn (tyrless-2)/M-5, bb^1
y w spl sn (tyrproless-1)/M-5, bb^1
y w spl sn bb (tyrproless-2)/M-5, bb^1
y w spl sn bb (tyrproless-3)/M-5, bb^1

AMHERST, MASSACHUSETTS: AMHERST COLLEGE

Corrections and additions to list of Stocks in DIS 34:10, 36:9 and 37:21.

1 Oregon-R: inbreeding, generation 415 on 63j29
4a Oregon-R: mass culture, extracted from $ #1 at generation 400
8 Samarkand 204-102: from $ #7, inbreeding, generation 102 on 63j29
8a Samarkand 204-100: mass culture, extracted from $ #8 at generation 100
93a b Bl vg bw/Cy, bw^{45a} sp^{2} or^{45a}
106 lost
135a sr Dl e^{61e5}/D Cx F
139a TM1/D
139b TM1/Gl
144a ras^{4} $m/y\ f;\ bw^{45a}$ sp^{2} or^{45a}/Cy, Bl
149a net sp^{2} or^{45a}; ru bv
159 lost

LEXINGTON, KENTUCKY: UNIVERSITY OF KENTUCKY

Wild Stocks

1 Lexington, Kentucky, wild type

COLD SPRING HARBOR, NEW YORK: CARNEGIE INSTITUTION OF WASHINGTON

Note: Stocks are maintained primarily for distribution to students and teachers interested in performing the experiments outlined in Drosophila Guide, by M. Demerec and B. P. Kaufmann, published by Carnegie Institution of Washington (7th edition, 1961; second printing, 1962).

Wild Stocks*

1 $Canton\text{-}S^{2}$
2 Oregon-R
3 $Oregon\text{-}R\text{-}EL^{2}$ (from East Lansing)
4 $Swedish\text{-}b^{8}$

*Superscript numerals refer to successive subcultures from a single pair whose F_1 progeny were examined cytologically to determine absence of gross chromosomal aberrations.

Chromosome 1

5 B
6 bi
7 ec ct^{6} v g^{3}
8 ec ct^{6} v g^{3}/ClB
9 f^{H}
10 fw^{H}/y
11 m
12 v
13 w
14 w m f
15 w_2 m f/ClB
16 y_2 w^{a} cv v f B
17 y_2 w^{a} spl
18 y w^{a} spl bi

Chromosome 2

19 bw
20 dp
21 c_2
22 L_5
23 L
24 vg

Chromosome 3

25 e^{p}
26 p^{p} by Sb^{Spi}/In(3R)C,l(3)a
27 se

28 se ss
29 st

Chromosome 4

30 ey^2

Multichromosomal

31 Ins(2LR)Cy/Pm^1, ds^{33k}; ^2H/In(3R)C, Sb^{130}
32 Ins(2LR)SM1, al^2 Cy sp^2/Pm^2, Ubx^{130} e^s/Sb
33 y f; bw; e; ci ey^R
34 y; bw; e; ci ey^R

Inversions

35 In(1)A99b
36 In(1)sc^{S1} B InS w^a sc^8
* In(1)C1B (8, 15)

37 In(1)rst^3, y rst^3 car bb
38 Ins(2LR)Cy/L; Pm
* Ins(2LR)SM1, al^2 Cy sp^2/Pm^2; Ubx^{130} e^s/Sb (32)
39 In(3L)pers
* p^p by Sb^{Spi}/In(3R)C, l(3)a (26)

Translocations

40 T(2;3)S^M Cy/vg^{nw}
41 Y^SX·Y^L, +/y^2 su-w^a w^a bb; Ore-R autosomes

Closed-X

42 X^{c2}

Attached-X

* fw^H/y_L(10)
* Y^SX·Y^L, +/y^2 su-w^a w^a bb; Ore-R autosomes (41)
* y f; bw; e; ci ey^R (33)

NEW HAVEN, CONNECTICUT: YALE UNIVERSITY
Department of Biology

The stock list remains essentially the same as that appearing in DIS 38:10, with the following additions and corrections.

Stock Additions:

Chromosome 1

31a g^2 pl/FM3, y^{31d} sc^8 dm B l

Translocation

160 T(Y;2)C/pr cn

Correction

144 Df(1)w^{m4L}, y rst^{3R}/y, Dp(1;3)49^{a7}

DETROIT, MICHIGAN: WAYNE STATE UNIVERSITY

Wild Stock

1 Oregon-R
2 Stephenville

Chromosome 1

101 Basc/f:=
102 B In(1)AB/y f:=
103 car
104 dm/y f:=
105 f B Bx/y f:=
106 y^{3d}/y f:=
107 y^{3d}/br ec tu-1
108 y ac w
109 y w^m
110 y w^a cv v m f car

Chromosome 2

201 bw
202 corr
203 cn bw
204 dp
205 L^2/Cy Sp^2
206 net b cn bw
207 corr b cn bw
208 vg

Chromosome 3

301 Gl Sb/LVM
302 h th st p^p cu sr e^s
303 Ly/D^3
304 Ly Sb/LVM
305 ru h th st cu sr e^s ca
306 se

Multichromosomal

401 y f:=; bw; e; ey^R
402 L^2/Cy Sp^2; Ly Sb/D^3
403 tu-1; tu-3

Translocations

501 T(1:3)Dinty/y f:=
502 T(1:3)05,D/y f:=

Attached X with no free Y

601 $Y^{S}X\cdot Y^{L}$, v f B/br ec tu-1 a^{a}
602 $Y^{S}X\cdot Y^{L}$, v f B/y^{2} su-w^{a} w^{a} bb

CHAPEL HILL, NORTH CAROLINA: UNIVERSITY OF NORTH CAROLINA

Delete from DIS 37:22 #84.

BERKELEY, CALIFORNIA: UNIVERSITY OF CALIFORNIA

Department of Zoology

Wild Stocks

1 Canton-S
3 Samarkand-inbred
5 +3
6 Oregon R-C

Chromosome 1

100 B^{1}
101 bb w^{e}/ClB (with floating Y)
102 br
103 br ec/y^{3d}
104 Bx^{3}
105 ec_{49c}/FM1, y^{31d} sc^{8}_{2} w^{a}_{4} lz^{s} B
110 Hw^{49c}/FM1, y^{31d} sc^{8}_{2} w^{a}_{4} lz^{s} B
111 In(1)dl 49, y Hw m g/y f:=
113 kz g^{2} B/y
115 Df(1)N^{8}/dl 49, y Hw m^{2} g^{4}
117 sd
118 $sple^{2}$
119 sx vb^{2} sy/FM4
121 v car
122 w_{bl}
124 w_{bl}
125 w_{cf} ec/FM4
126 w_{cf}
127 w^{cf}_{2}/FM4
128 $y_{ch}w^{cf}$/FM4
129 w_{ch} wy
130 w_{co} wy/FM4
131 w_{co} sn^{2}
132 w_{co}/FM4
140 y
141 y ac/y
142 y ac sn^{3}_{3} v
143 y ac sn^{3} B
144 y ac v^{a}_{8}
145 y ac sc^{8} w^{a}

150 y ac Dp $w^{a}(w^{a})2/y^{2}$ sc w^{561} ec
151 y f:=/y ac $Dp(w^{a})2$
155 y sc
156 y sc m f^{5}
157 y sc^{+}_{3}/ y ac^{+} sc^{+} . Y
159 y sn^{3}
160 y w
161 In(1)y In(1)w
165 y^{2} cv v f
168 y w f:-/w^{a} spl nd rb, Dp (1;2R) 5167
170 M-5/ y·sc^{8} Y
180 X^{c2} f car/ y f
181 y_{vc}w/ w^{vc}/w_{s}(ring)
183 w_{2}/y $w_{a}lz_{a}$ dl-49/sc^{8}·Y
184 y^{2} su-w^{a} w^{a} Y^{L}· Y^{s}/0 x y v bb/0
185 $X\cdot Y^{L}$, sc cv v f / y / Y^{s}
186 y w bb (bb?)/$X\cdot Y^{s}_{+}$, y w Y^{s}/ Y^{L} · bb^{+} ac^{+} y (sc^{+})

Chromosome 2

200 a px sp
201 al b_{3}c sp^{2}/In(2LR)Cy, al^{2} lt^{3} L^{4} sp^{2}
202 al b_{2}pr cn vg c sp^{2}/ Cy L^{4} sp^{2}
204 al dp b_{4}pr blt bw/ Cy al^{2} lt^{3} L^{2} sp^{2}
205 al dp b pr c px sp/ Cy pr
206 al dp b pr_{2}cn vg c a^{3} px bw mr_{2} sp^{4}/ S^{2}Cy lt^{3} pr^{+} Bl cn L^{4} sp^{2}
208 b
212 bw
214 c
215 cg c/U
216 cl
218 cn bw
220 In(2L)t esc c sp/ SM5, al^{2} Cy lt^{v} sp^{2}
225 $l(2)_{3}gl_{4}$cn bw/ Cy al^{2} lt^{3} L^{4} sp^{2}
226 L^{4}
228 pr cn ix/ SM5, al^{2} lt^{v} Cy sp^{2}
229 pr en
232 vg_{no}
233 vg

Chromosome 3

300 cp in ri p^{p}
301 cu
303 cv-c sbd^{2}
308 Gl Sb/ LVM
310 h
312 Ly/D^{3}
314 p^{p}
315 ru h st p^{p} ss e^{s}
316 ru h th st cu sr e^{s} ca
319 se
320 se h
321 se dn Sb/LVM
322 se Ly dn/LVM
323 ss_{a}
324 ss_{a-B}
325 ss
328 th st cp
329 th st Pc Scx p^{p} ss/TM1, Mé ri
340 In(3LR)TM; Mé/In(3LR)Ubx e^{s}
350 Pc/T(2,3),Mé

Chromosome 4

402 bt^{D} ey^{R} sv^{n}
403 bt^{D}/ci^{D}
404 ci
405 ci^{w} iso
408 ci_{2} ey^{R}
412 ey
420 M-4/ey^{D}
421 sv^{n}

Multichromosomal

510 w; vg
511 y f / X^{c2}_{3} t; en
512 y ac sn^{3}; stw^{3} en
513 M-5/y ac sn^{3}; en
514 sn^{3}; cn bw; ri
516 y f; bw; e; ci ey^{R}
517 y; D/tra red
518 y w f:=/y^{31d} sc^{8} f^{3n} y; Df(4), Dp y ac^{+}/ey^{D}
519 ec; sv^{n}
520 b; p^{p}
521 Cy/Pm; D/Sb
522 vg; se
530 se h; ci ey^{R}
550 3N $\frac{cm\ ct^{6}\ sn^{4}}{sc^{8}\ w^{a}\ lz^{s}\ B}$/FM1, y^{31d}
552 3N $\frac{y^{2}\ sc\ w^{a}\ ec}{cn/cn/cn}$/FM4 sc^{8} Y;

Translocations

603 T(1;2)Bld/ClB
606 T(1;2)sc^{19} sc^{19L} b pr/ Cy dp^{th} pr /y f:=; fes
607 Xa/Sb Ubx
608 T(2;3)Met/dp
609 T(2;3)Met/Sb

PHILADELPHIA, PENNSYLVANIA: UNIVERSITY OF PENNSYLVANIA

Deficiencies - X

1 Df(C1)$w^{258-45}_{m4L\ mJR}$ — $w^{258-45}_{m4L\ mJR}$/Ins(1) sc^{S1}, S, sc^{8}, sc^{S1} sc^{8} w^{a} B
2 Df(3C2)$w^{m51b19L\ w}_{mJR}$ — Ins(1) $w^{m4L\ w}_{mJR}$, w/Y/y w f:=
3 Df(3C2)$w^{mJL\ 3R}_{w}$ — Ins(1), w, homozygous
4 Df(3C3)w^{mJL}_{m4L} rst^{3R} — Ins(1) w^{mJL}_{m4L} rst^{3R}/y w
5 Df(3C2.3)w^{m5L}_{m4L} rst^{3R} — Ins(1) w^{m5L}_{m4L} rst^{3R} w/Ins(1)sc^{S1}, S, sc^{8}, sc^{S1} sc^{8} w^{a} B
6 Df(3C4)w^{w}_{m5L} — Ts(1;4) w^{w}_{m5L} $^{258-18R}_{258-18L\ 8aR}$, w^{m} Bx/y w
7 Df(3C5.6)$w^{w}_{258-18L}$ — Ts(1;4) $w^{w}_{258-18L}$ $^{N}_{8aR}$, y w^{m} N Bx/FM6, y^{31d} sc^{8} dm B
8 Df(bb)$w^{m4L\ w}_{m51b19R}$ — Ins(1) $w^{m4L\ w}_{m51b19R}$/Y/y w f:=

Duplications - X

9 Dp(1;1)3C2,$w^{mJL\ m4R}_{mJL\ m51b19R}$ — Ins(1) $w^{mJL\ m4R}_{mJL\ m51b19R}$, car f/Y/y w f:=
10 Dp(1;1)3C2,$w^{3L\ w}_{mJR}$ — Ins(1) $w^{3L\ w}_{mJR}$, car f/Y/y w f:=
11 Dp(1;1)3C3,$rst^{w}_{258-18L}$ — Ins(1) $rst^{w}_{258-18L}$, $^{y\ car\ v}_{m5R}$/Y/y w f:=
12 Dp(1;1)3C4,w^{w}_{8aL} — Ts(1;4) w^{w}_{8aL} $^{m5R}_{258-18R}$, y w^{m} Bx/Y/y w f:=
13 Dp(1;1)3C5.6,N^{w}_{60h21} — Ts(1;4) N^{w}_{60h21}, Bx/Y/y w f:=
14 Dp(1;1)$w^{258-18R}_{60h30}$ — Dp(1;1) w^{60h30}, y ac z/Y/y f:=
15 Dp(1;1)w^{59d15} — Dp(1;1) w^{59d15}, y ac z/Y/y f:=
16 Dp(1;1)$z^{m264-58a}$ — Dp(1;1) $z^{m264-58a}$/Y/y f:=
17 Dp(1;3)$w^{m264-58a}$ — w;Dp(1;3) $w^{m264-58a}$/+

Inversions

19 In(1)w^{m4}_{m51b19} — homozygous
20 In(1)w^{mJ} — homozygous
21 In(1)w^{mJ} — In(1) w^{mJ}, v f car/Y/y w f:=
22 In(3LR)264-100r1 — y w;Dp(1;3) $w^{m264-100a}$ In(3LR) r1/+
23 In(3L)264-100r8 — w;Dp(1;3) $w^{m264-100a}$ In(3L) r8/+
24 In(3LR)264-100r27 — y w;Dp(1;3) $w^{m264-100a}$ In(3LR) r27/+

Translocations

25 T(1;2)N^{264-66}_{264-58} — T(1;2) N^{264-66}_{264-58}, y w^{m} N/In(1)dl-49, y Hw m^{2}_{2} g^{4}_{4}
26 T(1;3)N^{264-58} — T(1;3) N^{264-58}, y w^{m} N/In(1)dl-49, y Hw m^{2} g^{4}
27 T(1;4)20G1 — T(1;4) 20G1, fa spl m^{m} B/Y/y w f:=
28 T(1;4)N^{8a}_{m5} — T(1;4) N^{8a}, w^{m} rst^{m} N/FM6, y^{31d} sc^{8} dm B
29 T(1;4)w^{m5} — homozygous

30 T(1;4)w$^{258-18}$ — T(1;4) w$^{258-18}$, y w^{m}/y w dm
31 Ts(1;4)20G1^{L} w^{m5R} — Ts(1;4) 20G1^{L} w^{m5R}, Bx/Y/y w f:=
32 Ts(1;4)w^{m5L} 20G1^{R} — Ts(1;4) w^{m5L} 20G1^{R} w^{m}/y w
33 T(2;3)264-100r20 — w:Dp(1;3) w$^{m264-100a}$ T(2;3) r20/Cy; Sb·

OAK RIDGE, TENNESSEE, BIOLOGY DIVISION, OAK RIDGE NATIONAL LABORATORY

Wild Stocks

a1 Canton-S
a2 Oregon-R
a3 Oregon-R-C
a4 Swedish-c
a5 Samarkand

Normal X Chromosome Stocks

b1 B/y f:=
b2 car bb
b3 Co/y w f
b4 cx^{tg} t/FM1, y^{31d} sc^{8} w^{a} lz^{s} B
b5 dow/FM6, y^{31d} sc^{8} dm B
b6 ec dx
b7 f
b8 f BB/y f:=
b9 f fu/ClB
b10 fa
b11 fa fa^{no} sn^{3}
b12 fa N^{j24a}/In(1)dl-49, y Hw m^{2}
b13 fa N^{j24c} sn^{3}/In(1)dl-49, y Hw m^{2}
b14 fa rb
b15 fa^{no}spl sn^{3}
b16 fa^{no}
b17 fa^{59} spl
b18 fu^{59}/y f:=
b19 l(1)J1 sc^{J1}/Del(1)24 (Muller)
b20 m f car/y w f:=
b21 ma-l$_{bz}$
b22 ma-l$_{2}$
b23 N$^{264-40}$/In(1)dl-49, y Hw m^{2} g^{4}
b24 N$^{264-109}$/In(1)dl-49, y Hw m^{2} g^{4}
b25 N^{Co}/In(1)dl-49, y Hw m^{2}
b26 nd
b27 nd rb
b28 ptg^{3} v m g^{2} sd f/y f:=
b29 pn
b30 ras$_{2}$dy
b31 rst^{2}/FM1, y^{31d} sc^{8} w^{a} lz^{s} B
b32 s
b33 sc cv v f B/y f:=
b34 sc ec cv ct^{6} v^{3} g/In(1)dl-49, y Hw m^{2} g^{4}
b35 sc ec cv ptg^{3} v/y v f car
b36 sc$_{3}$z ec ct
b37 sn^{3}
b38 sp-w
b39 spl
b40 spl cho^{2}
b41 spl dm/y f:=
b42 spl rb
b43 sw
b44 v
b45 v f su^{w}-f
b46 w$_{a}$
b47 w^{a}
b48 w^{a} fa
b49 w^{a} fa rb
b50 w^{a} fa spl
b51 w^{a} fa^{no} rb
b52 w^{a} fa^{no} spl
b53 w^{a} fa^{no} spl rb/y f:=
b54 w^{a} nd rb
b55 w^{a} spl
b56 w^{ch} spl rb
b57 w^{e} rb/y f:=
b58 w^{e} bb^{1}/y f:=/B^{S}Y
b59 w^{e} dy/y w f
b60 y
b61 y ac sc pn/y f:=
b62 y ac sc pn w rb cm ct^{6} sn^{3} ras^{2} v dy g^{2} f car/Ins(1)sc^{S1},dl-49, sc^{S1} v f car/B^{S}Y
b63 y B/y f:=
b64 y bb^{13a}/y w/y^{+}Y
b65 y bb^{174}/y w/y^{+}Y
b66 y bb^{1158}/y w/y^{+}Y
b67 y bb^{1452}/y w/y^{+}Y
b68 y bb^{1456}/y^{2} su-w^{a} w^{a} bb/y^{+}Y
b69 y cv v f
b70 y cv v f car
b71 y f^{36a}
b72 y l^{451}/FM6, y^{31d} sc^{8} dm B
b73 y Hw/Ins(1)sc^{S1L},S,sc^{8R}, sc^{S1+8} w^{a} B (RM)
b74 y N$^{264-47}$/In(1)dl-49, y Hw m^{2} g^{4}
b75 y N$^{264-103}$/In(1)dl-49, y Hw m^{2} g^{4}
b76 y N$^{264-107}$/In(1)dl-49, y Hw m^{2} g
b77 y w bb^{no}
b78 y w fa^{no}
b79 y w fa^{no} sn^{3}
b80 y w$_{a}$spl sn^{3}
b81 y w^{a}
b82 y w^{a} m f car
b83 y$_{2}$w^{a} spl rb
b84 y^{2} cho^{2}

b85 y^2 cv v f
b86 y_2 spl
b87 y_2 v_a ma-l^{bz}
b88 y_2 w_{cf} w/y f:=
b89 y^2 w

II Chromosome Stocks

c1 a px or
c2 al dp b pr c px sp
c3 al dp_{rev} b pr Bl c px sp/SM1, al^2 Cy sp^2
c4 b cn c bw
c5 b pr_2 c px sp
c6 Bl L^2/SM5, al^2 Cy lt^v sp^2
c7 bw_D
c8 bw^D
c9 cn bw
c10 d
c11 da/Ins(2L+2R)Cy, Cy_{txI}
c12 dp Sp lys rc pr/dp^{txI} Cy, Ins 0 pr cn^2
c13 lt stw^3
c14 lys
c15 lys rc_2
c16 lys_2 rc^2
c17 lys rc^2/dp^{txI} Cy, Ins 0 pr cn^2
c18 M(2)S10/Ins(2L+2R)Cy, Cy pr Dp(2;2)41^2_2
c19 net al ex ds S ast shv ho rub/SM1, al^2 ^DCy sp^2
c20 nw^D/Ins(2LR)Px^4
c21 Pin_{Yt}
c22 Pin^2/Ins(2L+2R)Cy_2 Cy
c23 Pu^2/SM1, al^2 Cy sp_2
c24 px sp Pin^2/SM1, al^2 Cy sp^2
c25 rc pr
c26 rc_2J/Ins(2L+2R)Cy, Cy Bl L
c27 sp^2 bs^2
c28 Sp J Pin/SM^5, al^2_2 Cy lt^v_2 sp^2
c29 Sp lys d/SM1, al^2 Cy sp^2
c30 Sp lys rc J/SM1, al^2 Cy sp^2
c31 Sp rc^2/Ins(2L+2R)Cy, Cy Bl L
c32 spd^{fg}
c33 stw^3 c
c34 Tft/SM1, al^2 Cy sp^2
c35 vg_U
c36 vg^+/In(2L)t + In(2R)Cy, Roi bw sp or

III Chromosome Stocks

d1 Bd^G_{34e}/In(3R)C, l(3)a
d2 bx^+
d3 ca
d4 ca K-pn
d5 ca^{nd}/In(3LR)Ubx^{130}, M(3)1 Ubx^{130} e^s
d6 ca^{nd}/TM3, Sb Ser
d7 cu kar
d8 cy-c sbd^2
d9 D^3 H/In(3L)P, Mé
d10 e_s
d11 e^s
d12 Gl Sb/LVM
d13 H^2/Tp(3R)Vno, Vno
d14 jvl
d15 p^p_p bx sr e^s
d16 p^p Ki
d17 Pr_K/In(3R)C, e
d18 Pr^K Dp/Ins(3L+3R)P
d19 R Ly/In(3L)P, gm
d20 red
d21 ru
d22 ru h th st cu sr e^s ca
d23 ru_2 h th st cu sr e^s Pr ca/TM1, Mé ri
d24 ry^2
d25 se
d26 se ss k e^s ro
d27 sr_a gl
d28 ss
d29 st
d30 st C3G ca/In(3LR)Ubx 130, Ubx^{130} e^s
d31 st in_2ri p^p
d32 st ry^2 sr e^s
d33 st_2 sbd e^s ro ca
d34 su^2-Hw bx bxd/TM1, Mé ri
d35 ve h th

PITTSBURGH, PENNSYLVANIA: UNIVERSITY OF PITTSBURGH

Department of Biological Sciences

See DIS 37: 28 for original list. The following changes should be made:

Wild Stocks Additions:

4 Amherst-3
5 Crimea
6 Florida-g
7 Lausanne-S
8 Seto, Japan
9 Swedish-b-6
10 Urbana
11 Wageningen-A

Chromosome 1

102 dor & y f:=(stock discarded)

Chromosome 2

210 Df 42/SM1, al^2 Cy sp^2(stock discarded)

Chromosome 3

303 through 309 M(3) (stocks discarded)
314 $ss^{a\text{-}46a}$(stock discarded)
317 ss^a(stock added)

Multichromosomal

503 stock discarded
504 stock discarded
505 stock discarded

Stocks added:

514 $ClB/_{49c}{}^{+}$;$_3Cy^{05}/Pm;{}_{}Ubx^{130}/Sb$
515 $Hw^{}_{49c}sn^3/FM6$; Cy^{05}/ Pm; Ubx^{130}/Sb

CO-isogenic stocks (background from stock 106)

900 $y;_{49c}Iso(2;3)1$
901 $Hw_{49c}sn^3/ClB$; Iso (2;3)1
902 Hw_3 sn^3/ClB; Iso (2;3)2
903 sn^3; Iso (2;3)2
904 y; Iso(2;3)2

LE MARS, IOWA: WESTMAR COLLEGE

Department of Biology

Wild Stocks

a1 Oregon-R

Chromosome 1 (X)

b1 B
b2 f
b3 lz^{61h}/y f:=
b4 v
b5 w_a
b6 w
b7 y
b8 y cv v f
b9 y cv v f car
b10 y sc cv v f car/y f:=
b11 y sc lz^g v f/y f:=
b12 y sc w^a ec

Altered Y Chromosomes

c1 B^S_+Y/y f ♂ B^S_+Y/y f:=
c2 y $^+Y/y$ w f ♂ y $^+Y/y$ w:=

Chromosome 2

d1 bw_{2b}
d2 bw_4
d3 bw_{59}
d4 bw_{60e}
d5 bw_{62l}
d6 bw_{75}
d7 bw_{81}
d8 bw_{Am}
d9 bw

d10 bw^{M58}
d11 bw^{Mi59}
d12 cn bw
d13 cn su-Pm/SM1, al^2 Cy sp^2
d14 px
d15 px bw sp
d16 sp
d17 vg_U
d18 vg_U/Ins(2L+2R)Roi, bw^{45a} sp^2 or^{45a}

Chromosome 4

f1 ci ey^R

Multichromosomal

g1 y v; bw (1;2)
g2 w; e (1;3)
g3 y; e (1;3)
g4 bw_{2b}; st (2;3)
g5 bw_4; st (2;3)
g6 bw_{59}; st (2;3)
g7 bw_{60e}; st (2;3)
g8 bw_{62l}; st (2;3)
g9 bw_{75}; st (2;3)
g10 bw_{81}; st (2;3)
g11 bw_{Am}; st (2;3)
g12 bw_{M58}; st (2;3)
g13 bw^{M58}; st (2;3)
g14 bw^{Mi59}; st (2;3)
g15 Cy2L/b^{55}; st (2;3)
g16 Cy2L, px bw_{59} sp_2; st (2;3)
g17 Cy2L, px bw_{75} sp_2; st (2;3)
g18 Cy2L, px bw^{75} sp^2; st (2;3)
g19 px; st (2;3)
g20 px bw_{59} sp_2; st (2;3)
g21 px bw_{75} sp_2; st (2;3)
g22 px bw_{81} sp_2; st (2;3)
g23 px bw_2 sp^2; st (2;3)
g24 px_2 sp^2; st (2;3)
g25 sp^2; st (2;3)
g26 vg; e(2;3)

Deficiencies

h1 Df(2)bw^5 sp^2/ T(2;3)Xa

Inversions

j1 In(1)dl-49, y w
j2 In(1)EN3, sn^3
j3 In(1)sc_8, sc^8 cv v f/y f:=
j4 In(1)sc^8, dl-49, sc^8 v f/y f:=
j5 In(1)S1L, y^2 w^a, In(1)S, B_{45a} $In(1)sc^{8R}$
j6 Ins(2L+2R)Cy, bw^{45a} sp^2 or^{45a}/B1
j7 Ins(2L+2R)Cy/In(2R)Pm^1; In(3LR)Dcx/Sb

ST. LOUIS, MISSOURI: WASHINGTON UNIVERSITY

Wild Stocks

Oregon-RC
Canton-S
Urbana-S
Austin
Espanola, N.M.

Chromosome 1

w
y ct^6 car f/y f

Chromosome 2

cn bw sp

Chromosome 3

D^3 Sb ca^2/ Payne
se ss l^s k ro

Chromosome 2,3

bw st

CLEVELAND, OHIO: WESTERN RESERVE UNIVERSITY

Chromosome 1

a1 B
a2 ec
a3 ec dx
a4 f BB/y f:=
a5 m
a6 sc cv v eq
a7 sc z ec ct^6
a8 sn^3
a9 v
a10 v f BB
a11 w
a12 y w spl sn^3

Chromosome 2

b1 al b pr stw c
b2
b3 b cn c bw
b4 b dp
b5 cl
b6 cn
b7 cn bw
b8 dp
b9 ho

b10 ltd
b11 net
b12 pr
b13 vg

Chromosome 3

c1 cd
c2 cu
c3 e
c4 e^s
c5 gl^3
c6 h
c7 jv
c8 jvl
c9 ri sbd e^2
c10 ru
c11 se
c12 ss
c13 st
c14 st sr e^s ro ca

Chromosome 4

d1 ci^{361}
d2 ci ey^R
d3 ey

Chromosomes 1 and 2

e1 y^2 v f; bw

Chromosomes 2 and 3

f1 bw; st
f2 cn bw; e
f3 cn; ma
f4 dp; cd
f5 dp; e
f6 ho; se
f7 net; gl^3
f8 Pm dp b/Cy sp^2; Sb/D CxF (ru h ca?)
f9 pr; st

Chromosomes 2 and 4

g1 pr; Mal

Chromosomes 1, 2, and 3

h1 v; bw; e

Chromosomes 2, 3, and 4

i1 cn bw; e; ey
i2 R-206 bw/cn bw; +/e; +ey recombinant from SD-205 below
i3 SD-205/cn bw; +/e; +/ey described in Am. Nat. 1961. 45:87-96

Chromosomes 1, 2, 3, and 4

j1 y; bw; e; ci ey^R

Others

k1 ++
k2 Canton-S

DeKALB, ILLINOIS: NORTHERN ILLINOIS UNIVERSITY

Stock list, melanogaster:

(Note: All of these stocks will be discarded six months after the appearance of this issue of DIS. Any investigator desiring a sample should make the request as far in advance of that date as possible.)

DDT Resistant:

HL1-tx (sib-selected)
HL1-Q (sib-selected)
HL2-P (sib-selected)
HL2-top (sib-selected)
TK-II (sib-selected)
TK-I (direct-selected)
122-Greenberg

R_S - Larval resistance - Sokal
pp - peripherally pupating - Sokal
C_1 & C_2 (Crow) - from Sokal
K_x (Crow) - from Sokal

DDT Sensitive:

LL2-P (two lines) (sib-selected)
Cage #1 duplicate (unselected, progenitor of HL & LL lines)
Selected Wing Venation Variants: 9 samples of extra & missing venation, selected from wild caught females or from "Oregon-R X Canton-S".

Wild Stocks

DeKalb, Illinois - 1961 (Montgomery Arboretum)
St. Petersberg, Florida - 1961
Madison, Wisconsin - 1956 (Truax Field)
Batavia, Illinois - 1959 (Monkman)
Augusta, Wisconsin - 1956 (Lake Eau Claire, Hill Island)

SALT LAKE CITY, UTAH: UNIVERSITY OF UTAH

Drosophila stocks being maintained:

l(1)7/dl-49 y Hw m^2 g^4
l(1)7 e l(1)/dl-49 y Hw
y lz^3 f
tu^h
w^e sn bl^t/dl-49 y Hw
y l(1)7/sc^{S1} B InS w^a sc^8
bw tu
st sr e^s ro ca; tu^{36a}
tu^g
tu^{48j}
aa tu^{36e}
se e^{11} tu^{49h}
tu^{wps}
bw st tu
f^{257-19}B/In(1)AM
w^{bf} f^{257-5}
tu^{50d}
vg mt^A bw
y B^{263-43}(homozygous)
vg bw tu
tu(2)49k; ma 49d
tu^{47}
tu^{50i}
tu^{50j}
tu^{51m}
tu^{bs}
tu^l
tu^{54e}
PW 293
PW 366
PW 472
PW 487
PW 510
PW 691
PW 851
PW 857
y^2 sc w^{aRM}/y^2 sc w^a ee
tu vg, y^2, ca
tu e
tu w
fu/sc^{S1} B Ins w^a sc^8
fu/ClB
Su-er tu bw; st er Su-tu
b(Su-er)$^+$bw; st er

BRAZIL

Pôrto Alegre: Universidade do Rio Grande do Sul

Chromosome 1

pn^2
w_e
w_{bl}
w_h
w
bo
cm
ras^2
v_2
g
car

Chromosome 2

cl
rdo
bri
pr
ltd
lt/T.(4;2)A
cn_2
sp
dke
bw
vg

L

pd
st/bw
vg/st

Chromosome 3

se_2
rs
st
p
ry
e

Brasilia: Universidade de Brasília

Instituto Central de Biologia

(same as stock list from Pôrto Alegre: Universidade do Rio Grande do Sul)

KOREA

Kwangju: Chunnam National University, Department of Biology

Wild Stocks

1 Oregon-S
2 Oregon-R
3 Najoo (Korea)
4 Kwangju (Korea)
5 Tolsan (Korea)

Chromosome 1

6 B
7 v
8 w

Chromosome 2

9 b
10 b vg
11 bw
12 Bl/Cy, bw^{45a} sp^{2} / or^{45a}_{v} sp^{2}
13 Bl L/SM5 al^{2} Cy lt sp
14 c
15 vg

Chromosome 3

16 h
17 ru
18 st

Chromosome 4

19 bt
20 ci
21 ci gvl bt
22 pol

Attached-X

23 br ec/y^{3d}

Inversions

24 Muller-5

Seoul: Yonsei University, Department of Biology

Wild Stocks

1 Canton-S (Isogenic)
2 Oregon-R (")
3 Oregon-R-C (")
4 Oregon-S (")
5 Samarkand (")
6 Seoul-1 (Korea)
7 Seoul-2 (")
8 Swedish-C
9 Suwon (Korea)

Inbred Wild Stocks

10 Damyang... 51 generations
11 Huksando.. 49 generations
12 Kwangju... 44 generations
13 Yonsei.... 50 generations

Chromosome 1

15 bi ct^{6} q^{2}
16 bo
17 br_{3}
18 Bx^{3}
19 cm
20 ec
21 ec dx
22 fa
23 rg
24 sc cv v f
25 sc_{3}cv v eq
26 sn^{3}
27 svr
28 t_{2}
29 t^{2} v f
30 v
31 w_{a}
32 w_{bf2}
33 w_{ch}
34 w_{co}
35 w_{col} sh^{2}
36 w_{e}
37 w bb^{1}/ClB
38 y
39 y ac v^{2}
40 y_{2}sc mf^{2}
41 y cv v f^{8}
42 M-5/y sc^{8} y

Chromosome 2

43 a px or
44 ab
45 al
46 al bc sp^{2}
47 al dp b pr blt bw/SM5, al Cy lt sp
48 al dp b pr c px sp/Cy, pr
49 al dp_{2}b pr Bl c px sp/SM1 al^{2} Cy sp^{2}
50 b
51 b lt wxt bw
52 b vg
53 bw
54 bw ba
55 Bl/Cy, bw^{45a} sp^{2} / or^{45a}_{v}
56 Bl L/SM5, $_{2}al^{2}$ Cy lt sp
57 c
58 c wt px
59 cl
60 cn bw
61 Cy/Pm
62 ex
63 ho
64 L_{4}
65 L
66 pd
67 pr
68 pr cn ox/SM5, al^{2} lt Cy sp^{2}
69 rh
70 so
71 vg
72 wt

Inbred Stocks

73 al b pr cn vg g sp^2/Ins (2LR)Cy, L^4 sp^2
74 al b g sp^2/Ins(2LR)Cy, al^2 lt^3 L^4 sp^2

Chromosome 3

75 aa h
76 bul
77 ca
78 cp in ri p^p
79 cu
80 cv c sbd^2
81 D/Gl
82 gl
83 Gl Sb/LVM
84 h
85 j v
86 p
87 Pc/TM1, Me ri
88 Pr Dr/TM3
89 ra
90 ro
91 ru
92 ru h st p^p ss e^s
93 ru h th st cu sr e^s ca
94 ru^g j v se by_{101}
95 Sb/In(3LR)Ubx
96 Sb/TM3, Ser ri p^p sep bx^{34e} e^s
97 se
98 se h
99 ss
100 st
101 th
102 th st cp

Inbred Stocks

103 TM3, Ser ri p^p sep bx^{34e} e^s/+

Chromosome 4

104 bt
105 ci
106 ci bvl bt
107 ey
108 ci gvl ey^R sv^n
109 pol
110 spa

Multichromosomal Stocks

111 br^3 dx^{st}; ed_2 Su_4dx (1;2)
112 lz^D/dl-49, m^2 g; Cy/Pm (1;2)
113 v;bw (1;2)
114 w;vg (1;2)
115 M-5;Cy/Pm;Sb/Ubx (1;2;3)
116 ptg; px pd; su-pd (1;2;3)
117 Hw/FM6;Gl/TM3,Ser Sb (1;3)
118 Hw^{49e}/FM6;Sb/TM3,Ser (1;3)
119 bw;st (2;3)
120 Cy/Pm;D/Sb (2;3)
121 Cy/Pm;Sb/Ubx (2;3)
122 vg;se (2;3)
123 lys rc; ss_R(2;3)
124 se h;ci ey^R (3;4)

Attached-X

125 br ec/y^{3d}
126 y/g^2 ty

Deficiencies

127 Df(3)sbd^{105}/Xa

Duplications

128 Dp(2;3)S

Inversions

130 Ins(1)sc_a^{S1L},S, sc^{8R},w^B
131 Vg^{nw} Hia_L/$SM5_2$, al^2 Cy lt^u sp^2
132 Vg^u/Roi, bw sp or (Inbred)
133 A/In(3R) hp hp

Translocations

134 T(1;2)Bld/ClB
135 T(2;3)Xa/Sb bx^D

Stocks selected for lethal mutation

136 38 second chromosomal lethals from two localities of Korea
137 50 third chromosomal lethals from two localities of Korea

Seoul: Chungang University, Department of Biology

Wild Stocks

1 Canton-S
2 Daekwanryeong (Korea)
3 Damyang (Korea)
4 Heuksando-1 (Korea)
5 Heuksando-2 (Korea)
6 Kwangju-1 (Korea)
7 Oregon-R
8 Oregon-R-C
9 Oregon-S
10 Samarkand
11 Seoul-1 (Korea)
12 Seoul-2 (Korea)
13 Seoul-3 (Korea)
14 Suwon (Korea)
15 Swedish-C
16 Yangdong (Korea)

Chromosome 1

17 B
18 bo
19 br
20 Bx^3
21 cm
22 ec
23 fa
24 rg
25 sc cv v eq
26 sc cv v f
27 t_2
28 t^2 v f
29 v
30 w

31 w^{a}_{bf2}
32 w_{ch}
33 w_{col}
34 w_{e}
35 $w^{bb^{1}}$/ClB
36 y
37 y ac v_{2}
38 y_{2} sc mf^{2}
39 y^{2} cv v f_{8}
40 Basc/y sc^{8} y_{3}
41 Basc/y ac sn^{3} cn

Chromosome 2

42 a px or
43 a px sp
44 ab
45 al
46 al bc sp^{2}
47 b
48 b lt wxt bw
49 b vg
50 bw
51 bw ba
52 Bl/Cy, bw^{45a} sp^{2} or^{45a}
53 c
54 c wt px
55 cl
56 cn bw
57 Cy/Pm
58 ex
59 ho
60 L_{4}
61 L
62 pd
63 pr
64 rh
65 so
66 vg
67 wt

Chromosome 3

68 aa h
69 bul
70 ca
71 cu
72 D/Gl
73 gl
74 h
75 jv
76 p
77 ra
78 ro
79 ru
80 se
81 se h
82 ss
83 st
84 th

Chromosome 4

85 bt
86 ci
87 ci gvl bt
88 ey

Multichromosomal

89 v ; bw (1;2)
90 w ; vg (1;2)
91 M-5, Cy/Pm ; Sb/Ubx (1;2:3)
92 Cy/Pm ; Sb/Ubx (2;3)
93 Cy/Pm ; D/Bd (2;3)
94 vg ; se (2;3)

Attached-X

95 br ec/y^{3d}
96 y/g^{2} ty

Duplications

97 Dp (2;3) S

Inversions

98 Vg^{nw}_{u} Hia/SM5, al^{2} Cy lt^{2} sp^{2}
99 Vg^{+}/Roi, bw sp or

Translocations

100 T (1;2) Bld/ClB^{D}
101 T (2;3) Xa/Sb bx^{D}

INDIA

Hyderabad: Osmania University, Radiation Genetics Project

Wild Stocks

a1 Oregon-K
a2 Hyderabad

X-chromosome

b1 B^{S1}
b2 sc^{S1}In-S w^{a} sc^{8}
b3 sc^{S1} In-S w^{a} sc^{8}
b4 ClB/ sc v f car
b5 w^{a}
b6 w^{bl}
b7 w_{co}
b8 w_{e}
b9 w_{h}
b10 w_{i}
b11 w_{sat}
b12 w
b13 y
b14 y sc^{S1} $In_{8}S$ sc^{8}
b15 f BB; sc^{8} (♂♂)
yf_{S1} = sc^{8} y (♀♀)
b16 y sc^{8} In-S sc^{8} rl
(rolled-up wing)
(Discarded)
b17 y ac sc^{4} pn w rb cm ct^{6}_{S1} sn^{3}
ras v^{a} m g^{8} f car/sc^{8} B
InS w^{a} sc^{8}
b18 w sn B
b19 y w sn

Chromosome 2

c1 al dp b pr c px/ Cy pr
c2 al dp b pr c px sp/ al^{2}
Cy lt^{3} L^{4} sp^{2}
c3 al dp b pr cn vg c a px
bw mr sp/ S^{2} Cy lt^{3} pr^{+}
Bl cn^{2} L^{4} sp^{2} (twelvepl)

c4 al S ast ho/ Cy, En-S
c5 b cn bw_2
c6 Cy/Bl L^2
c7 dp
c8 dp b
c9 bw
c10 dp b cn bw
c11 vg
c12 al dp b pr c px sp

Chromosome 3

d1 e
d2 Gl Sb D InCXF
d3 ru h th st cu sr e^s pr ca/TM 1 Mé ri
d4 ru h th st cu sr e^s ca (rucuca)
d5 st
d6 Ly/D^3
d7 Dl^3/In(3 R)C, e
d8 Sc (Scooped wing)

Chromosome 4

e1 ci ey
e2 ey

Multichromosomal

f1 bw; st
f2 Cy Bl_{S1} L^2/ D/LVM
f3 y sc_{S1} In49 sc^8 ; bw st
f4 y sc_{S1} In49 sc^8 ; Cy/ Bl L^2
f5 sc^{S1} B In-S w^a sc^8 ; l 45/ SM1 al^2 Cy sp_2
f6 sc^{S1} B In-S w^a sc^8 ; l 45/ SM1 al^2 Cy sp^2_{S1} ; e
f7 sc_{bb} & y := va_{bw}; e; ey
f8 y^2/v ; bw / Bl L^2
f9 SM 1 al^2 Cy sp^2/In(2LR) 102_{s} ds^w sp^2; In(3 LR; 3 RC) Sb e^s/Ubx 130^{e^s}
f10 dp; e
f11 y sc^{S1} In49 sc^8 ; dp ; e
f12 M-5; dp ; e

Closed X-chromosome

g1 X^{c2}/sc^{S1}

X chromosome with Y arm attached

h1 X. Y^S/Y^{LC}
h2 X. Y^S(Muller); y w . Y^S/ y v f/Y^{LC}

Attached X Chromosome

i1 sc_{S1}ec: cv ct_a v $f_8$car & y v f:=
i2 sc_{c2} B InS w^a sc^8 & y v f:=
i3 X $_{57}$v f & y :=
i4 lz^{J} & y :=
i5 sc w e cv ct & y v f :=

Attached XY Chromosome (no free Y)

j1 X Y^L·Y^S (113-117 Parker); y^2 su-w^a w^a Y^L·Y^S /$_a$y v bb/0
j2 y^2 su-w^a w^a Y^S . Y^L y^+ & y v bb.=

Altered Y with mutants in X and/or autosomes

k1 l $j1^+_{S1}$. Y/lj1 sc^{j1}(+) In49 ptg oc_3 B^{M1}_6/y sc^{S1} car odsy f g^2 dy v ras^2 sn^3 ct^6 cm rb ecc w pn l sc^8(Maxy)
k2 l $j1^+_{S1}$. Y/ lj1 $sc^{j1(+)}$ In49 v ptg oc B^{M1}_6/ y sc^{S1} car odsy f g^2 dy v ras^2 sn^3 ct^6 cm rb e c w pn 1 sc^8 (Maxy-v)
k3 sc^8.Y/l(y ac) Tu B In49 sn^{x2} sc^8/y ac pn w rb cm sn^3 ct^6 oc ras^2 v du g^2 f od car sw (Max-Tu)
k4 Y/oc_1ptg.y^S & y^{Lc}_{x2}/y ct^n oc ptg car y ct^1 In49 sn^{Lc} (Y^{Lc} snocty)
k5 Y^{Lc}/oc_1ptg Y^8 & y^{Lc}_{x2}/ y ct^n oc ptg car y ct^1 In49 $_2sn_i$; bw
k6 sc^8 Y. B^S/ y^2 w^a ct^6 & y f:=

Modified Y

l1 Y^{BS}
l2 y^+ Y^{BS}
l3 y 1259 w m f / sc^8.Y

Y^S Fragments

m1 Y^S / g^2 B· Y^L / y f :=

Sterilizer stocks ("sz")

n1 "sz" + (X·Y^S) Y^{Lc}
n2 "sz" ·y
n3 Y^{Lc} /y sn oc ptg ·$_8Y^{Lc}$/ y^2 oc ptg B^{M1}/ sc^{S1} In49 sn^{x2} sc^8. (New facl) 1959

Deficiencies and multiple inversions

o1 In S(1)sc^{S1L}, dl-49, sc^{S1R} y^{31d} d B f v
(Biny Oakridge)
o2 In S(1), sc^{4L}, S sc^{8R}, y sc^{4} B w^{a} sc^{8}

Autosomal lethals

1 - 100 Chemically induced autosomal lethals on II chromosome (+/Cy)

GREAT BRITAIN

Birmingham, England: University of Birmingham, Department of Genetics

Collected Stocks: 1 - 7

Massed after inbreeding: 8 - 14

Inbred for 15-600 generations: 15 - 40

Chromosome I

41 S
42 w$_a$ m B
43 w^{a} v
44 y v f

Chromosome 2

45 b cn vg
46 b pr vg
47 bw
48 c
49 Cy / al dp b pr c px sp
50 Cy/ Bl L^{2}
51 dp

Chromosome 3

52 cu
53 ru h th st sr e^{s} ca
54 st
55 st p^{p}

Chromosome 4

56 ey^{2}

Multichromosomal

57 v; bw
58 v; cn
59 vg; st p^{p}
60 vg; st p^{p}; ey^{2}
61 w; vg; e

Rearrangements

62 ClB/++
63 Basc 5/+
64 Mé Sb e/He
65 Cy L/Pm; H/Sb
66 Xa

Attached - X

67 y x ec ct s car

Keele, Staffordshire, England: Department of Biology, University of Keele

Chromosome 1

B
m
Muller-5
ras^{2}
v
w$_a$
w
w m B
y

Chromosome 2

bw
cn
Cy/+
dp b cn bw
vg
vg bw
dp

Chromosome 3

e
se
ve$_a$
ss

Chromosome 4

ci ey^{R}

Multichromosomal

bw;st bw;e bw;ve
dp;e cn;ve
vg;se cn;e dp;se

Attached-X

w♂ & y w f:= ♀

Edinburgh, Scotland: Poultry Research Centre

Wild Stocks

Oregon R (inbred)
Oregon S (inbred)
Oregon K (inbred)
Wild Edinburgh (inbred)
Nettlebed (inbred)
Crianlarich 10 (inbred)

Chromosome 2

Antennaless
tu^K

Chromosome 4

ey^K

Multichromosomal

Su-er tu bw; $st\ er^{su}\ su\text{-}tu$
Su-er tu bw; $+^{su}\ tu$
Su-er tu bw; TM3/Sb
tu^K; TM_K/Sb
ant^K; ey^K
tu^K; ey^K

Additional tumor strains (ex Milan)

tu (Sb/H); A_2
tu SO^c
tu B 3
Frd

Naples: University of Naples, Istituto di Biologia Generale e Genetica

Wild Stocks

Bisignano
Canton
Lecce
Oregon-R
Pavia
Roma
Sciolze

Chromosome 1

B
ClB/+
Basc
v
w_a
w_{bf}
w_{bl}
w_{co}
w
w^e
w_i
w_t
w
y

Chromosome 2

b
b cm vg
bw
cl
cn
cn bw
Cy/Pm
pr
pr en
vg

Chromosome 3

cd

Dfd/Cx, D
ry
Sb/+
Sb/In(3R)1(3)60f
se
sed
st

Multichromosomal

w; vg
Cy/Pm; D/Sb

Unanalyzed

Pm/1
undulated wings

Milano: Universita' di Milano - Istituto di Genetica

1 Berlin
2 Canton-S
3 Chieti-v
4 Crkwenica
5 Gaiano
6 Jaslo O.C.
7 Moltrasio
8 Oregon-R
9 Pavia
10 S. Maria
11 Suna
12 Urbana
13 Valdagno
14 Varese

Chromosome 1

15 cut v f car
16 fa^n
17 $N^{B\text{-}S}$
18 ptg^2
19 sc ec ct v g f
20 sd
21 v_a
22 w_{bl}
23 w^e
24 w
25 y w

Chromosome 2

26 a px sp
27 ab
28 b cn vg
29 blt_S
30 blt^S
31 bw ba
32 c wt px
33 cn
34 ft_2
35 ll^2
36 net
37 so_2
38 so^2_C b cn
39 So^C
40 spt

Chromosome 3

41 cp_3
42 gl^3
43 mwh
44 obt
45 ri-s se ss k e^s $_s$ro
46 ru b st p^p ss e^s
47 ru
48 ve

Multichromosomal

49 px^{43j} oo ; ru jv se st ca

Not localized

50 tg(formerly $abab^{49}$)

Inversions

Chromosome 1

51 ClB/+
52 l(1)7/dl 49 y Hw m^2 g^4
53 Basc
54 Basc/lozenge

Chromosome 2

55 Cy sp/Pm
56 Cy E-S/S
57 Cy pr_2/d b
58 Cy cn^2 bw sp/Gla In LR
59 Gla/spd gt-4

Chromosome 3

60 H/Sb sr In(3R)Mé
61 ltr/Sb sr In(3R)Mé
62 R Ly/In(3R)p,gm
63 Mé ca/ru cu ca

Multichromosomal

64 Cy L^4 sp/Pm ; H/Sb sr In(3R)Mé

65 y sc^{S1} $_p$In49 sc^8 ; bw; st p^p

Deficiencies

66 Df(2) Px^2 Df(2) Px, $_2$bw sp/SM1, al^2 Cy sp^2
67 Df(2) bw^5 Df(2) bw^5 sp^2/Xa
68 Minute (2) Bridges

Special Stocks

69 "sz +" Y^{Lc}/X·Y^S
70 "sz e" Y^{Lc}/X·Y^S & y v f.= $_e$
71 sc^8.Y/y_ab ♂ & f.= ♀
72 FMA 3/w^a v ; tra/In (3LR) Ubx

Stocks selected for tumor manifestation

73 tu A1
74 tu B1
75 tu B3
76 tu C1
77 tu C2
78 tu C3
79 tu C4
80 tu C5
81 tu D_C
82 tu So^C
83 tu Aspra

AUSTRALIA

Adelaide: South Australia, University of Adelaide, Department of Genetics

Wild

1 Canton-S

Chromosome 1

2 B
3 car
4 ct_2 v f
5 g^2
6 Basc
7 rb cx
8 sc cv f
9 sc cv v f
10 sd
11 v_{61j}
12 v
13 w_{a55b}
14 w_{sat}
15 w
16 w ct f
17 w m f
18 y
19 y $w_a$spl
20 y w^a sc ec
21 y/lz^{57j} $c2^{S1}$
22 X^S/sc^{LC}
23 X·Y^S/Y^{LC}

Chromosome 2

24 al
25 al dp b pr c px sp/Cy pr
26 b j
27 b vg
28 bw
29 cn
30 dp
31 fj wt/Xa
32 ho
33 vg

Chromosome 3

34 ca^4
35 e_4
36 e^{wg} ro
37 Ly/D^3
38 ss
39 ss e^4 ro

Chromosome 4

40 ci_2ey^R
41 ey^2

Multichromosomal

42 y; Cy/Pm ds^{33K};H/Sb (1;2;3)
43 Basc; Cy/Pm ds^{33K}; H/Sb (1;2;3)
44 v; bw (1;2)
45 y w; dp (1;2)
46 bw; e^4 (2;3)
47 bw; st_4 (2;3)
48 dp; e_4 (2;3)
49 vg; e^4 (2;3)

NEW ZEALAND

Dunnedin: University of Otago, Department of Botany

Wild Stocks

1 Oregon-R-C

Chromosome 1

2 B
3 f
4 m
5 m B
6 v
7 w
8 w_a m
9 w_a
10 w_a m
11 w_a m f
12 y sc m f
13 Basc
14 In(1)w^a f

Chromosome 2

15 al dp b pr c px sp
16 bw
17 bw vg
18 cn
19 cn dp
20 dp
21 vg

Chromosome 3

22 cp
23 cu
24 cu e
25 cu se
26 e
27 e se
28 e se cu
29 e^s
30 Gl Sb/LVM
31 ru h th st cu sr e^w ca
32 se
33 st

Multichromosomal

34 bw; st
35 Cy/Pm; D/Sb
36 vg; se

Translocations

37 T(1;2) Bld, Bld/ClB (carries In(2R) Cy)

GERMANY

Berlin-Buch: Deutsche Akademie der Wissenschaften zu Berlin Institut für experimentelle Krebsforschung, Genetische Abteilung Lindenberger Weg 70

Wild Stocks

1 normal (Berlin wild)
2 normal (England)

Chromosome 1

3 w
4 $w_{bf}sn^3$
5 w
6 w^e_{co}
7 w_{m4} sn^2
8 w^a
9 gt w^a
10 y_{303}
11 y^2
12 y w
13 y pn
14 y w bb
15 y fa wy^2 g^2
16 sc
17 sc rb cv
18 sc ec ct
19 spl
20 m
21 B
22 car bb Y; bb
23 v
24 cv
25 car

26 fa^{n}
27 ct
28 y y/w^{e}_{c}
29 y y/X
30 y w f/+
31 y w f/B
32 v/ClB
33 y_{e} w/ClB
34 w_{7} bb^{1}/ClB
35 l^{7}/dl-49, y Hw_{8} w lz^{s}
36 sc^{S1}_{S1} InS w^{a} sc^{8}
37 sc^{S1} B InS w^{a} sc^{8}
38 sc ec ct v g

Chromosome 2

39 j_{pp}
40 bw^{pp}
41 b_{2}cn vg
42 L^{2}/Cy
43 S Sp ab^{2} ltd/NS px sp
44 b pr vg
45 vg
46 bw cn
47 al dp

Chromosome 3

48 e^{11}
49 st
50 p^{p}
51 Dfd^{r-L}
52 ru h st Dfd p^{p} ss e^{s}
53 ri_{a}
54 ss^{a}
55 jv se

Chromosome 4

56 ey^{2}

Multichromosomal

57 Bld^{a} w/w; Cy
58 e^{11}; $_{11}$yg
59 w; e^{11}
60 cn; ss
61 v; bw
62 w; ss_{11}
63 $se\ e^{11}$ tu^{49h}
64 tu^{g}

DENMARK

Copenhagen: Institute of Genetics, Ø. Farimagsgade 2A, K.

Wild stocks

1 Oregon-R
2 Wisconsin-3
3 Wisconsin-4
4 Holte(Denmark)
5 Bøtø (Denmark)
6 Samsø (Denmark)

Chromosome 1

7 y v^{36f}
8 B
9 Basc
10 B v

Chromosome 2

11 bw
12 b cn vg
13 vg
14 Cy/Pm
15 cn

Chromosome 3

16 st
17 ru h st p^{p} ss e^{s}
18 ru h th st p^{p} cu sr^{s} e^{s}
19 ru h th st cu sr e^{s} ca
20 ro
21 e
22 e ro

Multichromosomal

23 cn bw; e
24 v; cn; st
25 B; st
26 B; cn
27 bw; st
28 v; bw
29 v; Cy/Pm
30 v; cn

JAPAN

Tokyo: Tokyo Metropolitan University

Wild Stocks

Oregon-R (isogenic-412)
Samarkand (isogenic-523)
44 Strains maintained by mass culture

Chromosome 1

101 B
103 bb Y^{bb}
104 ec ct^{6} $_{i}g^{2}$ bb^{1}/ClB
105 f B^{1} B^{i}/y f:=
107 m^{S1}
108 sc^{S1} B InS w^{a} sc^{8}
109 sd mc
110 v
111 w
112 w_{a} m
113 w_{a}
114 w^{a} m
115 w^{e}
116 y
117 y w m f
118 l(1)7/FH6, y^{31d} sc^{8} w^{a}

Chromosome 2

202 al_4 dp b pr c px sp/Cy pr(all)
203 $ap^{ }$/Cy
204 bw
206 cn
207 cn bw
208 conditioned lethal/Cy (Yoshida)
209 Cy
210 dp_x bw
211 dp^5
212 L^{52c} no
213 L^{50} $vg^{ }$
214 $l(2)^{ }$/Cy (Nozawa)
215 l(2)mat/SM5, al^2 lt^v Cy sp^2
216 l(2)me/SM1, al^2 Cy sp^2
217 M(2)S7/SM5, al^2 Cy lt^v sp^2
218 M(2)S11/Cy bw
219 S Sp ab^2 ltd/NS, px sp
221 vg_{ni}
222 vg_{nG}
223 vg_{no}
224 vg_{np}
225 vg_D
226 $vg^{ }$/SM5, al^2 Cy lt^v sp^2
227 vg^U_{nw}/Roi, bw sp or
228 $vg^{ }_2$Hia/SM5, al^2 Cy lt^v sp^2

Chromosome 3

301 Bd^{491}/Sb
302 Bxl/Payne, Dfd ca
303 cu_{491}
305 $Dl^{ }_{11}$/l(3)
306 $e^{ }$
307 Gl^{53b17}H/LVM
308 Sd/1(3) (domi. vg-)
309 se
310 st
311 ve
312 N-X/Xa
313 l(3)tr Sb/In(3LR)Ubx^{130}
314 ry_2
315 ry^2
316 ca
317 ru h th st cu sr e^s ca

Chromosome 4

402 ci^D/Cat
403 Scn/ey^D
404 $sv^{ }$

Multichromosomal

501 b; tx

Attached-XY

601 v f B $\overline{XY}/y^2$ su-w^a w^a bb

Deficiencies

701 Df(2)MS4/SM1, al^2 Cy sp^2
702 Df(2)MB/SM1, al^2 Cy sp^2
703 Df(2)vg^C/Rvd
704 Df(2)$vg^{ }_2$/SM5, al^2 Cy lt^v sp^2
705 Df(2)vg^B_2/SM5, al^2 Cy lt^v sp^2

CZECHOSLOVAKIA

Ceskoslovenská Akademie Ved: Ústav Experimentální Botaniky

odd. fysiologie a genetiky rostlin

Wild Stocks:

Amherst 3
Canton special
Contanton
Combee Hill
Crimea
Florida 9
Hikone R
Kings Norton
Moskva
Novosibirsk
Ockley
Oregon
Oregon R
Rothamsted
Samarkand
Seto-Japan
Suchumi
Swedish h-6
Wellington

Chromosome 1

y
w
f
y w
f BB
y w sn
w m B
y_a cv v f
w^a CxD/tra
y ac sc pn sn
sc w ec v ct

Chromosome 2

L^4
st bw
Bl cn
Cy/Bl
cn vg b
al dp b pr c px sp

Chromosome 3

cd
pe
st st^r e^s ro ca
st st^r es ro ca tu^{36r}
"rucuca" ru h th st cu sr e^s ca
"ruPrica" ru h th st cu sr e^s Pr ca
"rupes" ru h th st pr cu sr e^s
"rusca"

Testers

sc v ClB
ClB/w
Muller-5/w^a
Muller-5/y w^a

Inversions

In(1)B m cn y t

In(1)y t

In(1)dl-49 y fd

SWEDEN

Stockholm: University of Stockholm, Institute of Genetics

Wild Stocks

1 Algeria
2 Canton S
3 Djursholm 55
4 Florida
5 Karsnäs
6 Oregon
7 Stäket
8 Tunnelgatan
9 Örebro
10 Skaftö

Chromosome 1

11 B
18 cm ct^{6} sn^{3} ♂ y f:=♀
19 cv
20 cv$_{6}$sn
22 ct
23 ec ct v f
24 f
25 f B
32 Iw 47b H1/y sc^{8} f in 49V w^{a}
34 m
35 m f
38 pn
39 rb
40 sc$_{8}$
41 sc
42 sc cv
43 sc cv v f
44 sc$_{S1}$cv v car
47 sc$_{S1}$ B InS w$_{a}$ sc$_{8}$ (Muller 5)
48 sc$_{3}$ B InS w^{a} sc^{8} : y sc^{8}Y
49 sn^{3}
50 v
51 w
52 w cv
53 w cv$_{3}$sn^{3}
54 w$_{a}$sn^{3}
55 w^{a}
61 w$_{ec2}$
62 w$_{h}$
66 y$_{2}$
67 y$_{329}$eq : Df(Y)Y^{-bb}
68 y$_{4}$
70 y
71 y ac sc pn sn : sc^{8}Y
74 y ec ct^{6} v f
75 y f car
77 y Hw m g f Eb/sc^{S1} B InS w$_{a}$ sc^{8} ♀ sc^{S1} B InS w^{a} sc^{8} ♂
78 y Hw m g f car : sc^{8}Y ♂ y f:=: sc^{8}Y ♀
80 y sc$_{8}$
82 y sc$_{S1}$B f In$_{a}$49 y ♂ y f:=♀
85 y sc^{S1} InS w^{a} sc^{8}
86 y v f.= ♀ y w ♂
88 y v g f
89 y w sn^{3}
90 y w sn: sc^{8}Y
91 y w f Bx^{2}
92 y w spl sn

Chromosome 2

94 a px sp
95 a px or
96 al b c sp
99 al dp b pr$_{2}$cn vg c a px bw$_{2}$mr$_{4}$sp/S^{2} Cy lt^{3} pr^{4} Bl cn^{2} L^{4} sp^{2}
100 al^{2} Cy lt^{3} L^{4} sp^{2}/Pm
101 al S ast ho/Cy, E-S
104 b cn vg
105 b pr vg
106 Bl/In (2LR) dp
108 cn bw
110 Cy/Pm
111 dp b
118 px bw mr sp/ds^{33K}Pm
119 S^{2} Cy pr Bl cn^{2} L^{4} bw sp/ In NSL In NSR px sp
122 stw^{3}
123 vg

Chromosome 3

126 D^{3}/In P
133 ru h st p^{p} ss e^{s}
134 ru se h st p^{p} ss e^{s}
136 se ss k e^{s} ro
137 ss
138 st
139 st ss e^{11}
141 ss e^{11}

Chromosome 4

142 ey

Multichromosomal

144 cn bw : e^{11}
145 bw: st
148 sp : th^{bd}
149 T(1:2)B^{bd}/Cy ♀ M2e/Cy ♂

FRANCE

Lyon: Université de Lyon, Faculté des Sciences

Wild Strains:
Oregon R

Lyon
Champetières (inbred)

Algérie

Strasbourg (Bas-Rhin): Rue de l'Université

Wild Stocks

Ore-R-C

Chromosome 1

B
v
w
y

Chromosome 2

cn
b
Cy/Pm H/SbC

Chromosome 3

DcxF/Dfd
e
se

Chromosome 4

ey

Multichromosomal

vg; cn
w; e
y; e

FINLAND

Helsinki: Institute of Genetics

Note: Changes in the list in DIS 36 and DIS 37

Discarded or lost:

Chromosome 1

28 X^{c2} f B & y

Chromosome Y

33 f.Y^{S}/Y^{L}

ITALY

Roma: Istituto di Genetica

Wild Stocks

a1 Oregon-R
a2 Marzi
a3 Nazzano

Normal X Chromosome

b1 B
b2 car bb
b3 Basc
b4 pp
b5 r^{R}/y f:=
b6 sc cv v f B/y f:=
b7 sc z ec
b8 sw
b9 w_a
b10 w_{Bwx}
b11 w^{cf}
b12 w^{cp}
b13 w^{r}
b14 w^{cf}
b15 w_e/y f:=
b16 w^{e} dy/y w:=
b17 en w^{e}/y f:=
b18 y
b19 y^{b59}
b20 y ac sc pn/y f:=
b21 y cv v f car
b22 y cv_n v g_3/y f:=
b23 y fa^{col} sn_3
b24 y sc w^{3} spl f/In(1) rst^{3},rst^{3} f
b25 y w_a
b26 y_2w^{a} spl rb^{a}
b27 y_2 su-w^{a} w^{a} bb/y w spl rb
b28 y_2 v_{cf} ma-l
b29 y_{31d} w^{of} ^{a}
b30 y_{1259} v^{2} w^{a} f_a sin^{a}/y f:=$_8$
b31 $y^{}$/$y^{}$ su-w^{a} w^{a} bb/sc^{8} e. Y
b32 XX/O;X·Y

Chromosome 2

c1 b cn c bw
c2 Bl L^{2}/Cy
c3 Bl L^{2}/SM5, al^{2} Cy lt^{v} sp^{2}
c4 bw_D
c5 $bw^{}$
c6 cn bw
c7 Cy Bl L^{2}
c8 Sp J_2L^{2} Pin/SM5, al^{2} Cy lt^{v} sp^{2}

Chromosome 3

d1 ca K-pn
d2 Gl Sb/LVM
d3 H/Sb sr In(3R)Mé
d4 H^{2}/In(3R)Vno,Vno
d5 ru h th st cu sr e^{s} ca
d6 se ss k e^{s} ro
d7 st sbd e^{s} ro ca
d8 st C^{3G}_{s} ca/In(3LR)Ubx^{130}, e

Chromosome 4

e1 ci ey^{R}
e2 ey
e3 pol

Multichromosomal

f1 bw; st (2;3)
f2 lys re; ss (2;3)
f3 Cy/Pm; Sb/Ubx (2;3)
f4 sc cv v f B; ci ey^{R} (1;4)

f5 y f:=; ci ey^R (1;4)
f6 y; pol (1;4)
f7 y; sv^n (1;4)
f8 y; ru h th st p^p cu sr e^s (1;3)
f9 y^2 cho^2; lys re (1;2)
f10 y; bw; st (1;2;3)
f11 In(1)AM, y^2/Ins(1)FM6,y^{31d} dm B; Ins(2L+2R)Cy, Cy/Bl; In(3R)Vno, Vno/In(3LR)Ubx^{130}, Ubx^{130} e (1;2;3)

Triploid

g1 y^{1259}/FM4,w f/FM4, w f

Translocations

h1 T(1;4) B^S_{V4}(16 A1), y^2 cv B^S car/y f:=
h2 T(2;3) bw^{V4}, bw^{V4}/Cy

Inverted X Chromosomes

i1 In(1) dl-49, v^{Of} f
i2 In(1) dl-49, w lz
i3 In(1) dl-49, y Hw m^2_4/f^a_4 N^{22a}
i4 In(1) dl^L_{49}, y Hw m^{8R}_{448} g_4/Df(1)N^8
i5 In(1) sc^{8R}_7, sc^{8R}_8, y sc cv v f/y f:=
i6 In(1) sc^{8R}_8, AM^{8R}_8
i7 In(1) sc^{8R}_8, sc
i8 In(1) sc^{8R}_8, dl-49, y^{31d} w^a
i9 In(1) sc^{8R}_8, dl-49, y^{31d} w^{Of} f/y f:=
i10 In(1) w^{m4}_{m4L} w^{m4}/Df(Y) Y^{bb}
i11 In(1) w^{51b7}_{m4L}, rst^{3R}, y w rst^3/Dp(i;2R) w^{51b7}/y w f:=Y
i12 In(1) 481 (12E-F ; 14B), y bb^{1481}/ FM6, y^{31d} sc^8 dm B/sc^8. Y

Deficiencies and Duplications

l1 Df(1)N^8_{bb}
l2 Df(Y)Y^{264-39} w^{cf}/FM4, y^{31d} sc^8 dm B
l3 Df(1)N^{51b7}_{w}
l4 Dp(1;2) w^S
l5 Dp(1;1)B^S(RMG), y w^a·B^S/sc^{Si} dl-49, v

X Chromosomes with a Y arm attached

m1 X·Y^L_S(C-2), y cv v f car bb^-· Y^L
m2 X·Y^S(A-3), sc cv v · Y^S
m3 Y^SX·(FR-1), Y^S y cv v_Sf
m4 Y^SX·(P-7), In(1)EN, Y^S y f

Attached - XY

n1 $XY^{L\ S}_S$·Y^S_L(108-9 Parker), y^2_2 su-w^a_a w^a_a Y^L_S·Y^S_L
n2 $XY^{L\ S}_S$·Y^S_L(115-9 Parker), y^2_2 su-w^a_a w^a_a Y^S_L·Y^L_S y^+
n3 $XY^{L\ S}_S$·Y^S_L(110-8 Parker), y^2_2 su-w^a_a w^a_a Y^S_L·Y^L_S y^+
n4 $XY^{L\ S}_S$·Y^S_L(129-16 Parker), y^2_2 su-w^a_a w^a_a Y^S_L·Y^L_S y^+
n5 Y^SX·Y^L, Ins(1)EN, dl-49, Y^S car f v y · Y^L

Altered Y

p1 sc^8 $Y^{L\ +}_{S\ +}$:bw^+ (Y^L_2 bw^+·bb^+_a Y^S_a ac^+ y^+)
p2 Y B^S_S y^+_{+v}200/y^2_2 su-w^a_a w^a_a bb
p3 Y B^S_S y^+_+ 201/y^2_2 su-w^a_a w^a_a bb
p4 $Y^{Su\text{-}Var}_{Su\text{-}Var}$ (B^S $Y^{L\ +S\ +}_{S\ +}$ · bb Y^S y^+)
p5 $Y^{Su\text{-}Var}_{Su\text{-}Var}$
p6 $Y^{c\ +}_{+}$:bw^+ (Y^L bw^+ · bb^+ Y^S)
p7 Y^c:bw^+/X ; bw

JAPAN

Chiba-Shi: National Institute of Radiological Sciences, Genetics Division

Wild Stocks

001 Anagawa
002 Bikini-Atoll
003 Canton-S
004 Kurosuna
005 Masutomi
006 Miyazu
007 Oregon-K
008 Oregon-R
009 Samarkand
010 Tokyo

Chromosome 1

101 B
102 sc^{S1} B InS w^a sc^8 (Basc)
103 w
104 w m f
105 w^a
106 y
107 y w
108 y w m f

Chromosome 2

201 bw
202 cn bw
203 Cy/Pm
204 vg
205 cn-like(spont. from Bikini-Atoll Strains)

Chromosome 3

301 se

302 se ss
303 ss
304 st ss e^{11}
305 e^{11}

Chromosome 4

401 ci^{D}/Cat

Attached-X

501 $(g^{2}_{8}$ ty)/y:=
502 sc^{8}.Y/In(1)dl-49 y B & y f:=; bw^{D}
503 v f B XY & y^{2} su-w^{a} w^{a} bb
504 X^{c2} v & y:=

Multichromosomal

601 Cy/Pm; Sb/Ubx
602 Cy/Pm; Sb/Ubx e^{11}
603 sc^{S1} B InS w^{a} sc^{8}; Cy/Pm; Sb/Ubx
604 y sc^{8}·Y/In(1)dl-49 sc^{S1}; bw; st
605 y sc^{S1} In(1)dl-49 sc^{8}; bw; st

Mitaka, Tokyo: International Christian University

Wild Stocks

Tokyo

Chromosome 1

1 y, m, y w m f, w, w^{e}, w^{a} 3 cu, e
2 vg

Sapporo: Hokkaido University, Faculty of Science, Department of Zoology

Wild Stocks

Oregon-R
Sapporo (3 strains)
Otaru

Mutants

w
v
cn

se
w-B
Cy

KOREA

Seoul: Seoul National University

Wild Stocks

Canton-S
Oregon-R
Seoul-1 (Korea)

Chromosome 1

B
bi ct^{6} q^{2}
bo
br_{3}
Bx
cm
ec
fa
rg
sc_{3}cv v f
sn^{3}
t_{2}
t^{2} v f
v

v car
w_{a}
w_{ch}
w_{e}
w^{1} bb^{1}/ClB
y
y ac v
M-5/y sc^{8} y

Chromosome 2

a px or
a px sp
ab
al
al bc sp^{2}
al dp b pr c px sp/Cy, pr
b lt wxt bw
b vg
Bl/Cy, bw^{45a} sp^{2} or^{45a}
c

c wt px
cn bw
Cy/Pm
ex
ho
L_{4}
L
pd
pr
so
vg

Chromosome 3

aa h
bul
ca
cp in ri p^{p}
cu
cv-c sbd^{2}
gl
Gl Sb/LVM

h
jv
p
ro
ru
ru h st p^{p} ss e^{s}
ru h th st cu sr^{1} e^{s} ca
Sb/In(3LR) Ubx^{101}
se
se h
ss
st
th st cp

Chromosome 4

bt

ci
ci gbl
bt
ey
ci gvl ey^{R}/sv^{n}
spa

Multichromosomal

br^{3} dx^{st}; ed Su-dx (1;2)
$lz^{D}/dl49$, m^{2} g^{4}; Cy/Pm (1;2)
v; bw(1;2)
w; vg(1;2)
M-5, Cy/Pm Sb/Ubx (1;2;3)
ptg; px pd; su-pd (1;2;3)
bw; st(2;3)

Cy/Pm; D/Sb(2;3)
Cy/Pm Sb/Ubx (2;3)
lys rc; ss(2;3)
vg; se(2;3)^{R}
se h; ci ey^{R}(3;4)

Attached -X

br ec/y^{3d}
y/g^{2} ty

Deficiencies

Df(3) sbd^{105}/Xa

Duplications

Dp(2;3)S

Inversions

Muller-5
Ins(1)sc^{S1L}, S, sc^{8R} w^{a} B

ISRAEL

Jerusalem: Hebrew University of Jerusalem

Note: Corrections and additions to list of stocks in DIS 37:38

Corrections:

a33 y f:=/ B^{S}.Y.sc^{8}
a36 y ct^{n5} In49 B

melanotic tumor strain e^{144} $l56$ replaced by melanotic tumor q

Lost:

a17 spl_{L} cm_{S} ct^{6}
a28 $X{\cdot}Y^{L}/Y^{S}$ (Neuhaus)
M abc-1 X.Y InEN In49 y/+; cn bw; e

Additions:

Chromosome 1

cx ct y g f & y f:=
In rst^{3} (m v g f) & y f:=
spl t y f & y f:=
v f Bx^{3} bz ma-l (Glassman)
v $ma\text{-}l^{bz}$
y cx sn & y f:=

Chromosome 2

bri
fes ms cn bw/dp^{txI}_{txI} Cy05 pr cn^{2}
fes ms pr cn/dp^{txI} Cy05 pr cn^{2}
ltd

Chromosome 3

ry^{2}

Multichromosomal

SM-5/+; rucuca/ ru TM3 Sb Ser (Duarte)

Not Located

lz^{RJ63} (?)

extreme aristapedia

BELGIUM

Louvain: The University, Parc d'Arenberg. F.A. Janssens Laboratory for Genetics

Inbred Temperature Lines

1 line raised at 25° C for 84 generations (Abeele - Belgium).
3 lines raised at 18°-20° C for 82 generations (Gabarros - Spain).
2 lines raised at 25°-26° C for 190-200 generations.
4 lines raised at 18° C for 100-110 generations.
These two last items coming originally from Dept. of Botany and Plant Pathology, Pennsylvania, State University (see DIS 34)

Wild Stocks

Abeele (Belgium)
Canton-S
Gabarros (Spain)
Oregon
Swedish-B
Watou (Belgium)

Chromosome 1

B
Basc
w

Chromosome 2

bw
fes cn bw/cy
ho
sca
sp^2 bl^2
stw^{22}
vg

Chromosome 3

bv
ca
cp in ri p^p
e
jv
ri
ro
ro ve
ru h th st cu sr e^s ca (rucuca)
ve jv h H^n th st cu sr e^s ro ca (vecuroca)
ve jv h H^n

Multichromosomal

Basc; ri e
ri; stw^2
w; ri

CHILE

Santiago: Universidad de Chile, Instituto de Biología "Juan Noé"

Wild Stocks

1 Oregon R-c
2 Rapel
3 Santiago
4 Swedish free of inv.

Chromosome 1

5 B
6 my_{S1}
7 sc B InS w^a sc^8
8 v
9 w
10 wmf
11 y B
12 y

Chromosome 2

13 b
14 b vg
15 bw
16 dp
17 L^2
18 L^2/Cy
19 vg

Chromosome 3

20 e^{11}
21 se
22 st

Chromosome 4

23 ey^2

Multichromosomal

24 dp e^{11}
25 w vg

NEW MUTANTS

Report of G. H. Mickey

bu-w^{61j}: bubble wing 61j Mickey, 61j 10. 1 - ? Sex linked recessive which arose from wild type male treated with radio frequency. Uniform expression in both males and females. Not located. RK3. Still in stock.

Report of O. G. and M. J. Fahmy

coc: collapsed ocelli Fahmy, 1960. 1: ♀61.5±0.4. Induced by polyolsulphonate CB 2511. Ocelli small and flat, deflated due to lack of eye fluid. Anterior ocellar microchaetae frequently missing. Other slight alterations in body size and wing shape. Both sexes viable and fertile. RK2.

pph-61: polyphene-61 Fahmy, 1959. 1: 661.0±0.4. Induced by polyolsulphonate CB 2511. Smaller fly with slightly brighter eye colour. Slight alterations in shape of eyes and wings. Scutellars occasionally kinked. Both sexes viable, fertility of homozygous females reduced. RK3.

sab: straight abdomen Fahmy, 1958. 1: ♀58.9±0.6. Induced by polyolsulphonate CB 2511. Narrow long straight abdomen. Macrochaetae slightly finer. Males viable and fertile. RK3.

sby-61: small body-61 Fahmy, 1958. 1: 60.8± 0.4. Induced by gamma-radiation. Extremely small fly with paler body colour. Both sexes reduced viability and fertility. RK2.

sby-62: small body-62 Fahmy, 1960. 1: 662.0±0.2. Induced by S-mustard CB 1735. Body size slightly reduced. Macrochaetae finer. Both sexes viable, fertility of homozygous females reduced. RK3.

bk^{2}: buckled^{2} Fahmy, 1960. 1: 60.6± 0.1. Allele of buckled (DIS 33) with slightly different phenotype; induced by polyol sulphonate CB. 2628. Fly smaller with legs shortened and posterior pair frequently grossly deformed or absent. Shorter abnormally shaped wings, with varying amounts of the marginal vein frequently removed. Sex combs sometimes considerably enlarged. Macrochaetes stiffer, with an occasional extra scutellar bristle. Males viable and fertile RK2. Crossed to buckled-like F_1 females were wild type.

Report of N. Hendrix

De: Darkened eye Hendrix, 1963. Eye mutant dominant on the 2nd chromosome. Found in an irradiation experiment of x^{c2}ec f males. The eye facets are roughened with black spotted pigmentation varying from light spotting near the margin of the eye to heavy pigmentation covering one-half or more of the eye. Both eyes are generally equally affected. A bleached area sometimes appears adjacent to the pigmentation. Lethal when homozygous.

Report of H. M. Wallbrunn

syn: syndrome Wallbrunn, 61i21. 3-14.7±. From gamma irradiated ♂. Eye of male transluscent brown, eye of female slightly darker than wild. Wing of male held at right angles to body, curved down and partially under abdomen. Wing of female held at 45° to body and somewhat erect, with a slight bend at the distal end of the costal cell. Both sexes sterile. Viability very low.

rt^{W}: rotated Wallbrunn, 61i26. 3-37.4±. From gamma irradiated ♂. Abdomen twisted like a left-hand screw through 60°. No overlap of wild type. Viability about .45. Both sexes sterile.

gn: glisten Wallbrunn, 61i6. 3-67.3. From gamma irradiated ♂. Eye rough but of normal size, with irregular facets and hair causing glints. RK1

cld: cloudy Wallbrunn, 61j6. 2 between 96 and 101. From gamma irradiated ♂. Wings opaque due to fluid between upper and lower membranes; occasionally forms small blisters. Males completely sterile, females slightly fertile. Using L^{rm} and bw^{D} for mapping gave 96.1 and 100.7 respectively. May be a chromosome aberration.

Report of B. H. Judd

w^{-r}: white-deficiency recombinant 3A8-3C1 Judd, 1961. Publ. 1961 Genetics 46: 1687-1697. Regularly occurring male lethal deficiency associated with recombination in y^2 w^a sp1 ec/+, y^2 w^a sp1 ec/w^{bf} f^5, and y^2 $w^{r,dup}$ ec/+ females. Apparently results from a specific type of asymmetrical exchange brought about when 3A region of one chromosome pairs with 3C region of the homologue. Cytological examination shows deficiency for 3A8-3C1 with left break somewhat uncertain.

Genetic tests show deficiency for white but not for zeste. The 3A8-3C1 deficiency compounded with deficiency for 3C2,3 derived by crossing over from In(1) w^{m4}/In (1) rst^3 is viable and white in phenotype.

w^{crr}: white-carrot Judd, 1962. 1-1.5. Arose as a cluster of five w^{crr} males from a single female of constitution y^2 "w"/Oregon R. The "w" was derived from y^2 w^a sp1 ec/w^{bf} but it is believed that w^{crr} arose in the Oregon-R chromosome since none appeared with the y^2 marker. Carrot is reddish brown in color, lighter than w^{cf}, w^{bl}, and w^{sat}. It is more orange than w^{a2} and more red than w^{Bwx}. There is no sexual dimorphism. The testis sheath is a very light yellow. Carrot is not a suppressor of zeste. Recombination studies locate it left of w^a. Recombination with w^{bf} or w^{Bwx} has not been tested. RK1.

$w^{r,def}$: white-recombinant, deficiency Judd, 1961. 1-1.5. Publ. Judd 1961 Proc. Natl. Acad. Sci. 47: 545-550. An intralocus deficiency for the white-cherry site. Arose by recombination in attached-X chromosomes of constitution y sc z w^a ec sn^3/y^2 w^{bf} sp1 sn^3. Reciprocal exchange resulted in phenotypically yellow-2 white female. Testing of each strand showed that asymmetrical exchange had produced complementary deficiency and duplication carrying y sc z w^a sp1 sn^3 and y^2 w^{bf} ec sn^3 respectively. Deficiency reduces crossing over in y-w region and to some extent in the w-sp1 region as well. Acts as a suppressor of zeste. Crossover tests failed to show recombination between $w^{r,def}$ and w^1, w^a, or w^{Bwx}.

$w^{r,dup}$: white-recombinant, duplication Judd, 1961. 1-1.5. Publ. Judd 1961 Proc. Natl. Acad. Sci. 47: 545-550. An intralocus duplication for the white-cherry site. Arose by recombination in attached-X chromosomes of constitution y sc z w^a ec sn^3/y^2 w^{bf} sp1 sn^3. Reciprocal exchange resulted in phenotypically yellow-2 white female. Testing each strand showed that asymmetrical exchange had produced complementary duplication and deficiency carrying y^2 w^{bf} ec and y sc z w^a sp1 respectively. Duplication increases exchange in y-w and w-sp1 regions as well as within white locus. It acts as an enhancer of zeste such that z^+ $w^{r,dup}$/z w^+ is mutant (reddish brown mottled eye color).

w^{-r} N: white-Notch deficiency recombinant, 3C2-3C12, Judd 1961. Publ. Genetics 46: 1687-1697. Arose as male lethal white-Notch deficiency carrying y^2 from a female of constitution y^2 w^a sp1 ec/ y z w^{Bwx}. Cytological examination shows deficiency includes 3C2-3C12 with right break somewhat uncertain.

w^{-r}: white-deficiency recombinant, 3A3-3C1, Judd 1961. Publ. 1961 Genetics 46: 1687-1697. Regularly occurring male lethal deficiency, associated with recombination in y^2 w^a/w^a sp1 ec females. Apparently results from a specific type of asymmetrical exchange brought about when 3A region of y^2 w^a chromosome pairs with 3C region of w^a sp1 ec chromosome. Cytological examination shows deficiency for 3A3-3C1 inclusive. Genetic tests show deficiency for zeste and white. The 3A3-3C1 deficiency compounded with deficiency for 3C2,3 derived by crossing over from In (1) w^{m4}/In (1) rst^3 is viable and white in phenotype.

z^m: zeste-mottle Green, 54k5. Recombination tests show the change that resulted in a sc z^m male from the cross sc z ec ct/w^{bf} X sc z ec ct is located at the white locus not at zeste, and should now be designated as z w^{zm}. It is postulated that z^m arose from asymmetrical exchange which produced a duplication for a part of the white locus. Fine structure analysis shows the white locus change is located left of w^a (Judd, 1963, Proc. XI Int'l. Congr. Genet. 1:3-4). The white locus change in combination with z (i.e. z w^{zm} = z^m) causes mottling in male, while the genotype z^+ w^{zm} is wild type both as male and homozygous female. The combination z^+ w^{zm}/z w^{zm} is slightly mottled in phenotype.

The white locus change is unstable and mutates to the lighter mottled form, zeste-light, and to white. In turn, these forms are unstable and revert to zeste-mottle. In both cases, the zeste locus remains unchanged (i.e. the mutant z still is present).

z^l: zeste-light Becker arose as sc z^l male in sc z^m stock. Change is at white locus not at zeste (see z^m) and should be designated z w^{zl}. The white locus change when removed from z (i.e. z^+ w^{zl}) is wild type in phenotype. Instability at white locus results in mutations to zeste-mottle and white, both of which are also unstable. The white locus change is located left of w^a (Judd, 1963, Proc. XI Int'l. Congr. Genet. 1: 3-4).

Report of E. Falk

ss^A: spineless - aristapedia, dominant S. Rappaport, 1963. X-ray induced. Appeared during an experiment on induction of translocations in the male gonads of pupae. Dominant. Homozygotes - lethal. Penetrance high: 80% and when over Dichaete: 100%. Expressivity variable: usually addition of segments to antenna, in most cases distal to the arista. Arista always present. In a few cases - claws at end of antennae. Asymmetry pronounced. Rarely an "antenna like" organ on sternopleura. No detectable abnormality in bristles of thorax, in number and shape of leg segments, in claws and in sex comb. Localized to the 3rd chromosome and, by crossing over with rucuca, to the region between curled and stripe: recombination cu-ss^A 1.01%, ss^A-sr 4.05%; i.e., reduction of recombination in relevant region. Salivary gland chromosome analysis by N. Ben-Zeev revealed a small inversion in 3R with breakage points at 83F and 86C. There is good synapsis of the inverted region. Allelism test with spineless (from se ss k e^s ro stock) did not show any effect different from original ss^A flies. Thus, allelism to ss has not been proved directly. RK-2.

Report of T. R. F. Wright

Est 6^{F2}: Esterase 6^{F2} MacIntyre 63d. 3-36.8± . A codominant allele of Est 6^F and Est 6^S (DIS 37:53 and Wright, T.R.F., 1963, Genetics 48: 787-801). The form of Esterase 6 controlled by Est 6^{F2} has an electrophoretic mobility identical to the form produced by Est 6^F but is distinguishable from it on the basis of its stability to heat. If after electrophoresis starch strips are subjected to a temperature of 60° C for 10 minutes, Esterase 6^{F2} retains most of its activity in contrast to Esterase 6^F which is completely inactivated. Under these conditions the form of Esterase 6 controlled by Est 6^S is also heat stable.

Report of T. J. Lee

Bx^{59h}: $Beadex^{59h}$ Lee, 59h. Found spontaneously from Tancheon wild population. Preliminary linkage tests indicate probably Bx. RK4.

Report of C. W. Hinton

T(2;3)63 A selected series of two break translocations recovered from "bw;st" tests of irradiated (Co^{60}, ca. 3000r) Canton-S males, February, 1963. Presently balanced with SM5.

	Salivary breaks		Phenotypes	
Symbol	Second	Third	Heterozygotes	Homozygotes
T(2;3)63-1	49D/E	79B/C	wild	viable and fertile; eyes slightly roughened
T(2;3)63-2	27B/C	75C	wild	lethal
T(2;3)63-3	chromo-center	chromo-center	wild	lethal
T(2;3)63-6	59E/F	89E/F	wild	viable and fertile; stubble bristles; obliquely creased, ovate wings, often asymmetrical
T(2;3)63-7	41C	92D/E	wild	lethal
T(2;3)63-8	36E	86B	wild	lethal
T(2;3)63-9	34A/B	75C	wild	lethal
T(2;3)63-10	33/34	76D/E	wild	both sexes viable, but sterile; abdominal tergite pigmentation more intensive and extensive than wild type
T(2;3)63-13	24/25	94D/E	wild	viable and fertile; variegated eye color, pendant halteres
T(2;3)63-14	38A/B	69A/B	wild	lethal
T(2;3)63-15	41D	64A	variegated eye color, identical over SM5, bw and +	lethal
T(2;3)63-16	41C/D	93A/B	wild	robust and fertile; eyes slightly roughened
T(2;3)63-17	40C	96A/B	variegated eye color over SM5, but wild over bw and +	lethal
T(2;3)63-18	39B/C	80C	wild	viable and fertile; trough-like wing posture in 90%
T(2;3)63-19	24D/E	80C	wild	lethal
T(2;3)63-22	40B	84D	wild	lethal
T(2;3)63-23	chromo-center	chromo-center	wild	lethal

Report of E. C. Keller, Jr. and Edward Glassman

lxd: low xanthine dehydrogenase Keller and Glassman 61j12 3-33±. Spontaneous in several wild type inbred lines from the inbred series derived at The Pennsylvania State University from a single sampling near State College, Pa. Homozygous lxd has only about 25% of the xanthine dehydrogenase activity of the wild type, but no visible phenotypic expression is apparent. Wild type levels of the substrates and products of the enzyme are present.

In preliminary studies, lxd was localized between se (3-26) and Ly (3-40.5). In a cross of ru jv se lxd + / + + + Ly females to ru jv se lxd + males, flies exhibiting crossovers between se and Ly were assayed for their xanthine dehydrogenase levels; 26 of 65 ru jv se Ly chromosomes contained lxd, and 52 of 103 + + + + chromosomes contained lxd. Therefore, lxd was placed at locus 33±, about 0.55 of the distance between se and Ly.

Report of A. Schalet

ry: rosy 3-5A 35

3a Male from x-rayed cu kar male crossed to ry^2 female
4 " " " " " " " " " " "
5 " " " " " " " " " " "
6 " " " " " " " " " " "
7 " " " " " " " " " " "
8 " " " " " " " " " " "
9 " " " " " " " " " " "
10 Male from x-rayed l 52.52 Sb Ubx paternal chromosome crossed to cu kar ry^4 red e female. Lost.
11 Male " " " " " " " " " " " " " " " " "
12 Female " " " " " " " " " " " " " " " " "
13 Male " " " " " " " " " " " " " " " " "
14 Female " Ly M34 Dfd " " " " " " " " " " " "
15 Male " " " " " " " " " " " " " " " " "
16 Female from x-rayed +male crossed to cu kar ry^{27} chromosome
17 Male " " " " " " " " " "
18 Female " " " " " " " " " "
19 Female " " " " " " " " " "
20 Male from x-rayed +male crossed to cu kar ry^{27} chromosome
21 Male " " " " " " " " " "
22 Female " " " " " " " " " "
23 Male from x-rayed cu kar male crossed to ry^2 female
24 Male " " " " " " " " " " "
25 Male " " " " " " " " " " "
26 Female " " " " " " " " " " "

$Df(3)ry^{27}$ Male from x-rayed cu kar male crossed to ry^2 female. Deficient for semi-lethal locus to the left of ry, 4 functionally separable lethal groups to the right of ry, 152.52, and a lethal to the right of 152.52. Viable with kar^{31}.

$Df(3)ry^k$ rosy Kernaghan. From x-rayed cu kar male crossed In(3)MRS-I, M34 ry^2 Sb chromosome. Deficient for lethal locus to the left of kar^{31}, kar^{31}, semi-lethal locus to the left of ry, 4 separable lethals to the right of ry, 152.52. Viable with lethal to the right of 152.52. Cytological examination by Richmond shows loss of a section including 87 B-E.

28 Male from x-rayed cu kar male crossed to ry^2 female. Lethal with 152.52. Lost.

$Df(3)ry^{29}$ Female from x-rayed cu kar male crossed to ry^2 female. Deficient for kar^{31}, semi-lethal to the left of ry, 4 separable lethals to the right of ry, viable with lethal locus to the left of kar^{31} and 152.52. Lost

$Df(3)ry^{30}$ Female from x-rayed cu kar male crossed ry^2 female. Lethal with 152.52, ry^{35}, and ry^{36}. Lost.

$Df(3)ry^{31}$ Male from x-rayed cu kar male crossed to ry^2 female. Viable with 152.52, Lethal with ry^{35}, ry^{36}. Lost.

$Df(3)ry^{32}$ Male from x-rayed cu kar male crossed to ry^2 female. Lethal with 152.52, ry^{35}, ry^{36}. Lost

$Df(3)ry^{33}$ Female from x-rayed cu kar male crossed to ry^2 female. Deficient for kar^{31}, semi-lethal to the left of ry, 4 separable lethals to the right of ry. Viable with lethal to the left of kar^{31} and 152.52. Lost.

$Df(3)ry^{34}$ Female from x-rayed cu kar male crossed to ry^2 female. Viable with 152.52. Lethal with ry^{35}, ry^{36}. Lost.

$T(1;3)ry^{35}$ Female from x-rayed cu kar male crossed to ry^2 female. Genetic data indicates ry^{35} arose simultaneously with an apparently non-reciprocal insertion of a portion of 3R including loci of Sb and Ubx into X chromosome. Hyperploid males and

and females are fertile. No reduction in crossing in X from yellow to carnation. Cytological examination by Lindsley shows left break in 3R at 87C-E and right break at 91B-C. Portion of 3R inserted into base of X chromosome.

Df(3)ry^{36} Female from x-rayed cu kar male crossed to ry^{2} female. Deficient for kar^{31}, semi-lethal to the left of ry, Viable with lethal to the left of kar^{31} and all loci to the right of rosy included in ry^{27} deficiency.

37 Female from x-rayed cu kar male crossed to female carrying ry^{2}. Lost.

38 Female from x-rayed cu kar male crossed to female carrying ry^{2}. Lost.

40 Male from x-rayed cu kar male crossed to female carrying ry^{2}.

41 Female " " " " " " " " "

42 Female " " " " " " " " "

43 Female " " " " " " " " "

44 Male from x-rayed cu kar male crossed to female carrying ry^{2}.

45 Female " " " " " " " " "

46 Male from x-rayed cu kar male crossed to female carrying ry^{2}. Lost

47 Male " " " " " " " " " " "

48 Female " " " " " " " " "

49 Female " " " " " " " " "

50 Male " " " " " " " " "

Df(3)ry^{51} Female from x-rayed cu kar male crossed to female carrying ry^{2}. Deficient for lethal to left of kar^{31}, kar^{31}, semi-lethal to the left of ry,4 separable lethals to the right of ry, 152.52. Viable with lethal to the right of 152.52. Lost.

Df(3)ry^{52} Female from x-rayed cu kar male crossed to female carrying ry^{2}. Deficient for semi-lethal to left of ry, 4 separable lethals to the right of ry. Viable with kar^{31} and 152.52.

53 Male from x-rayed cu kar male crossed to female carrying ry^{2}.

54 Female from x-rayed cu kar male crossed to female carrying ry^{2}.

55 Female from x-rayed +male crossed to female carrying cu kar ry^{27}. Lost.

56 Male " " " " " " " " " "

57 Female " " " " " " " " " "

58 Male " " " " " " " " " "

59 Female " " " " " " " " " "

60 Female " " " " " " " " " "

61 Male from x-rayed +male crossed to female carrying In(3)MRS, M34 ry^{2} Sb.

62 Male " " " " " " " " " " " "

63 Male " " " " " " " " " " " "

64 Male " " " " " " " " " " " "

65 Male " " " " " " " " " " " "

Df(3)ry^{66} Male from x-rayed +male crossed to female carrying In(3)MRS, M34 ry^{2} Sb. Deficient for semi-lethal to the left of ry, 4 separable lethals to the right of ry and 152.52. Viable with kar^{31} and lethal locus to the right of 152.52. Lost.

67 Male from x-rayed +male crossed to female carrying In(3)MRS, M34 ry^{2} Sb. Lost.

68 Male " " " " " " " " " " " " "

69 Male from x-rayed +male crossed to female carrying cu kar ry^{27}. Lost.

Df(3)ry^{70} Male from x-rayed +male crossed to female carrying In(3)MRS, M34 ry^{2} Sb. Deficient for semi-lethal to the left of ry, 4 separable lethals to the right of ry. Viable with kar^{31} and 152.52. Lost.

71 Male from x-rayed +male crossed to female carrying cu kar ry^{27}. Lost.

72 Male " " " " " " " " " "

73 Female" " " " " " " " " ". Lost.

l (3)52.52: lethal (3) 52.52. From x-rayed cu kar male, arose simultaneously with $rosy^{26}$ in a single female. (Referred to as lethal 26 in Chovnick, Schalet, Kernaghan and Talsma, Amer. Nat. 1962). Found to be separable from ry^{26} and located at 52.52 in crosses involving many thousands of offspring.

s-1 (3): Un-named semi-lethal locus in chromosome 3 located between kar and ry. From x-rayed male carrying kar^2 chromosome. Four mutant alleles of independent origin with viability of from less than 1% to 20%. Surviving homozygotes are sterile. Each allele shows some general characteristics which vary from individual to individual. Extra thoracic and scutellar bristles, wings are inflated, turned somewhat upward and outward. Wings shorter and broader with gap in posterior crossvein or crossvein completely missing. All 4 alleles located between kar and rosy by crosses to rosy deficiencies and ry^{35} and ry^{54}. Three of the 4 alleles located to the left of ry^{23} by crossover tests. Crosses of 4 alleles inter se indicates complex functional relationship. Analysis incomplete.

l(3): Un-named lethal locus in chromosome 3 located immediately to the right of ry. From x-rayed male carrying kar^2 chromosome. Three mutants of independent origin, 2 lethals. One viable allele. Viable allele is homozygous sterile with survivors showing bristles of reduced size and number, abdominal tergites abnormal as in bobbed. All 3 alleles located immediately to the right of rosy because of lethality with ry^{35} and mutant appearance with ry^{54} (some bristles on head and thorax absent). All 3 alleles located to the right of ry^6 by crossover tests.

l(3): Three un-named lethal loci located between above lethal locus and 152.52 on basis of crosses to rosy deficiences and ry^{35} and ry^{54}. From x-rayed male carrying kar^2 chromosome. These 3 loci have not been ordered with respect to one another. One locus has one allele, the second locus 2 alleles of independent origin, and the third locus has 3 alleles of independent origin on the basis of inter se crosses.

l(3): An un-named lethal locus located to the right of 152.52 on the basis of crosses to rosy deficiencies. From x-rayed male carrying kar^2 chromosome. Five alleles of independent origin.

l(3): An un-named lethal locus located to the left of kar^{31} on the basis of crosses to rosy deficiencies. From x-rayed male carrying kar^2 chromosome. One allele.

kar^{31}: $karmoisin^3$ lethal From x-rayed Ly M34 Dfd/152.52 Sb Ubx Male crossed to cu kar ry^4 red e female. In Ly M34 Dfd chromosome, the kar^{31} when separated from lethal effects of Ly M34 Dfd proved to act as recessive lethal. Subsequent tests showed no disturbance of crossing over between kar and ry. Separation of lethal from kar not attempted.

Report of J. Puro

app^{61e}: $approximated^{61e}$ Puro 61e. From the first brood (0-3 days after treatment) of an X-rayed adult wild type male. Slightly more extreme than app. Homozygous viable and fertile. app^{61e}/app is app. Discarded.

ca^{601}: $claret^{601}$ Puro 601. From the sixth brood (13-14 days after treatment) of an X-rayed adult wild type male. Homozygous viable and fertile. ca^{601}/ca is ca. Discarded.

ca^{62b}: $claret^{62b}$ Puro 62b. From the first brood (0-3 days after treatment) of an X-rayed adult wild type male. Homozygous viable and fertile. ca^{62b}/ca is ca. Discarded.

dsx^{601}: $doublesex^{601}$ Puro 601. 3-48.5±. Found in F_3 of a control experiment for third chromosome recessive mutants. XX as well as XY flies homozygous for dsx^{601} have external characters of both sexes and hence are similar in appearance except for a slight difference in size. No sex combs but the most distal transverse bristle row of the metatarsus of the first leg has been shifted somewhat from the transverse position both in XX and XY flies. The last abdominal segments form rather well developed but rotated male-like terminalia

with female-like structures of 7th and 8th tergite inserted. Rudimentary gonads are usually a mass of undifferentiated tissue. Allelic with an intersex gene described by Hildreth and Lucchesi ("Genetics Today" Proc. XI Int. Congr. Genet. Vol. I, 171, 1963). Not allelic with tra; no interaction with ix in mutually heterozygous compounds. A localization test gave the following result: + dsx^{60l} +/W Sb x dsx^{60l}/TM1, Mé ri sbd^{1}. O=1279+1434; 1=12+13; 2=128+115; 1,2=1+3; N=2985; R1=1.0; R2=8.3. The salivary chromosomes apparently normal.

h^{62b}: hairy^{62b} Puro 62b. From the first brood (0-3 days after treatment) of an X-rayed adult wild-type male. Homozygous viable and fertile. h^{62b}/h is hairy. Discarded.

k^{D}: kidney-dominant Puro 60c11. Spontaneous in "thrike" (th st cp in ri p^{p} ss bxd k e^{s}) chromosome in mating Oregon-RS males and females heterozygous for "thrike" and TM1, Mé ri sbd^{1}. Heterozygous k^{D} reduces the size of the eyes at the anterior edge to a variable extent, in extreme case to about one third of the normal. k^{D}/k has even more extreme phenotype. Homozygous k^{D} is viable and fertile with eyes about the same size as k^{D}/k but occasionally completely eyeless on one or both sides. k^{D}/k^{D} usually has slightly deformed antennae with thickened aristae. A crossing-over test (352 flies) gave the locus 62.7±.

Report of C. W. Clancy

cd^{63a}: cardinal E. B. Clancy, 63a. Spontaneous in dor/FM-3 stock. Allelic to and similar in appearance to original cardinal.

e^{63d}: ebony C. W. Clancy, 63d. Spontaneous in stock of w^{sat} v; ptm (see below for meaning of symbol: ptm). Tested against ebony-sooty, and ebony-11; body color resembles e^{s}.

ptm: pteridine modifier C. W. Clancy, 47h. 3-? A third chromosome recessive located somewhere in the distal one-third of the right arm; salivary chromosomes appear to be normal. Found as several males and females with colorless eyes in an F_2 segregating for the compound, w^{sat}; st, which is yellow in eye color. Originally, thought to be a dark allele of the white series, indistinguishable from w^{sat} except by its visibly different interaction with st, cn, cd, and v, and was so described in an ONR status report in 1948. The autosomal mutant, ptm, appears to be a general modifier (regulator) of pteridine metabolism as revealed by comparative studies (fluorometry and colorimetry) involving most of the darker members of the white series, ptm itself (indistinguishable from wild type), and other eye color mutants. To date, the action of ptm with respect to the eye pigments has not been visibly detectable except in compounds of w^{sat}, or of w^{cf} (white-coffee, Nicoletti, DIS 34) with one of the genetic blocks to ommochrome formation such as vermilion, cinnabar, or scarlet.

r^{63c}: rudimentary C. W. Clancy, 63c. Spontaneous in w^{a} (apr) stock. Tested for allelism against r^{39k}, and r^{S} (Hadorn, DIS 36); no complementation with either; phenotype uniformly strong r. Females are conditionally sterile as first described for rudimentary by Lynch (1919).

se^{61c}: sepia C. W. Clancy, 61c. Spontaneous in w^{a} lz^{58d}/yf:= stock as several dark-eyed yf:= females.

STOCK LISTS

JAPAN

Tokyo Metropolitan University

D. ananassae

Wild stocks

1 Texas
2 TL_1
3 TL_3
4 TL_4
5 TL_{3-4}
6 TL_{3-11}
7 Barro Collorado, Panama 69 (Low elevation)
8 Barro Collorado, Panama 74 (Low elevation)
9 Turrialba, Costa Rica 101 (High elevation)
10 Turrialba, Costa Rica 104 (High elevation)
11 Turrialba, Costa Rica 125 (High elevation)
13 Christobal, Panama
15 Baton Rouge, Louisiana
17 Calcutta, India
18 $2L\text{-}A^H$
19 $2L\text{-}B^H$
20 $2L\text{-}A;\ 3L\text{-}A^H_M$
21 $2L\text{-}A;\ 3L\text{-}A^{C104}$
22 $3L\text{-}A^{C104}$

Mutants

25 st f
26 ru
27 pxd
28 $st\ f\ ru^2$
29 st se f
30 y f
31 b
33 bw-R
34 fu
35 j
36 px
37 S
38 se
39 sm
40 wy

D. bifasciata

Wild

1 Akkeshi (3 strains)
2 Asakawa (1)
3 Hakkoda (3)
4 Iwanai (1)
5 Kumotoriyama (4)
6 Meakan (1)
7 Nishikomagatake (2)
8 Nishitappu (6)
9 Nopporo (1)
10 Pavia (1)
11 Sounkyo (1)
12 Switzerland (1)
13 Tadeshina (1)
14 Taisetsusan (1)
15 Tsukubasan (1)

Mutants

Sex-linked

1 a
2 Ac
3 acp
4 eosin
5 f
6 g
7 y

Autosomal

1 ag
2 ar
3 ar ic
4 ar ob
5 arp
6 cn
7 cu
8 ic
9 ob
10 or
11 orr
12 ps yh
13 $ro\ ar^s$
14 ro ms
15 yh (7 strains)

Cytoplasmic

1 SR (8 Japanese strains)
2 SR (1 Italian strain)

D. virilis

Wild

7 local strains

Mutants

1	cd	4	v^4	7	st es
2	cn	5	w	8	si;b;t;cd;es
3	eb	6	y ap	9	w;cn

Other Species

Wild

1 D. albonicans (1 strain)
2 D. ambigua (1)
3 D. americana texana (1)
4 D. auraria
Race A (12)
Race B (1)
Race C (8)
5 D. buskii (6)
6 D. chinoi (2)
7 D. funebris (2)
8 D. helvetica (1)
9 D. hydei (1)
10 D. immigrans (2)
11 D. kikkawai (5)
12 D. lutea (10)
13 D. miranda (1)
14 D. obscura (1)
15 D. pseudoobscura (5)
16 D. pulchrella (1)
17 D. suzukii (1)
18 D. takahashii (6)
19 D. tristis (1)

Mutants

D. pseudoobscura (4 strains)

AUSTRALIA

Sydney, New South Wales: University of Sydney, Department of Animal Husbandry

D. ananassae

Wild Stocks

1 Baton Rouge, Louisiana
2 Christobal, Panama
3 Texas

Mutants

4 st f
5 st w
6 se
7 se cv
8 or

D. persimilis, D. pseudoobscura, D. simulans, D. montium, and D. nebulosa lists remain as in DIS 37.

BELGIUM

Louvain: The University, Parc d'Arenberg, F. A. Janssens Laboratory for Genetics

Wild Stocks

D. americana
D. subobscura (Belgium)
D. subobscura (Küssnacht) (Standard homozygous)
D. virilis

AUSTRIA

Vienna: University of Vienna, Department for General Biology

D. ananassae (Buenos Aires; Recife; Sumatra)

D. ambigua (Austria)

Mutants

Sex-linked: y or w
Autosomal: pn Bd cv dl bs ct

D. buzzatii (Ponza, Italy; La Laguna, Tenerife)
D. funebris (Lipari, Italy)
D. hydei (Austria)
D. repleta (Luxor, Egypt)
D. simulans (Lipari, Italy)
D. sp. (repleta-group) Las Palmas, Gran Canaria)

D. subobscura

A great number of wild strains from different places of Europe

Mutants

ct s th ma int otp pp fs ch cu Va/+ Ba/+

Zaprionus ghesquierei
Zaprionus sp.

Megaselia scalaris (Phoridae)

Wild stocks: Naples, Japan, Canarian Islands, Hawaii, Barcelona
Normal stocks: sex-determination from the I, II and III-Chromosome

Mutants

I Chromosome: oc Ab tw_2 sp.
II Chromosome: t vs Ex l^2 b
III Chromosome: y sa D Da bw si rh l^3

Puliciphora siymonni (Hawaii)

BRAZIL

Brasília, D.F.: Departamento de Genética, Instituto Central de Biologia, Universidade de Brasília

D. willistoni

30 wild strains from different regions of Brazil as listed in the Dept. de Genética of the Pôrto Alegre plus many others from Central Brasil
Wild strains from Central America

Mutants

Chromosome I	Chromosome II	Chromosome III
y	abb bw (analyser stock)	Delta p (In)/lethal e
w_h	SHkabbw (In)/lethal	Several other visible
w	(analyser stock)	mutants not localized
se	abbpx bw	in chromosome map
w^{e} lz	SHk abb bw Inv/em	
	wing, eye and others	
	mutants from natural	
	populations	

D. paulistorum

Several wild strains
white
yellow
yellow/white

D. simulans

30 mutants of wing, eye, bristles from natural population of R.G.S. not mapped.

Other species (wild strains from several localities in Brazil)

D. bocainensis
D. capricorni
D. cubana (formes D. tropicalis cubana Townsend 1954)
D. equinoxialis
D. immigrans
D. insularis
D. montium
D. nebulosa
D. polymorpha
D. prosaltans
D. tropicalis

BRAZIL

Pôrto Alegre: Universidade do Rio Grande, Departamento de Genética

D. willistoni

Wild strains

Brazil: Congaçarí do Tracuá, Serra do Navio (Amapá); Manaus, Tabatinga, Porto Velho (Amazonas); Belém, (Pará); Praia da Boa Viagem, Sacavém, (Maranhão); Maranguape (Ceará); Cassorongongo, Pitanga, Pedras de Una, (Bahia); Belo Horizonte (Minas Gerais); Guaraparí, (Espirito Santo); Itatiaia, Angra dos Reis, (Rio de Janeiro); Vila Atlântica, (São Paulo); Distrito Federal (Brasília); Paranaí, Apiaí Praia do Leste, Ilha das Cobras, (Paraná); Iperoba, Florianopolis, Tubarão, Posto Duque de Caxias, Xanxerê, (Santa Catarina); Col. São Pedro, Itapeva, Eldorado, (Rio Grande do Sul.)
USA: Florida
Honduras: Trinidad, Lancetilla
Mexico: San Domingo, Axtla
Bolivia: Quiriquá

Chromosome I	Chromosome II	Chromosome III
y	abb bw (analyser stock)	Delta p (In)/lethal e
w_h	SHkabbw (In)/lethal	Several other visible mutants not
w	(analyser stock)	localized in chromosome map
se	abbpx bw	
w^e lz	SHk abb bw Inv/em	
	wing, eye and others	
	mutants from natural	
	populations	

D. paulistorum: mutants

yellow
white
white/yellow

D. simulans

30 wing, eye and others mutants from natural populations not studied

Other Species

D. ananassae: Tabatinga (Amazonas); Brasilia
D. bocainensis: Serra do Navio (Amapá); Belém (Para); Pitanga (Bahia); Praia do Lente, Ilha das Cobras (Paraná), Jacu (Sta Catarina); Brasília
D. capricorni: Ilha das Cobras, (Paraná); Brasília
D. cubana: Tefé (Amazonas); Cuba; Trinidad
D. equinoxialis: Congaçarí do Tracuá, Sera do Navio, (Amapá); Içana, Tefé, Manaus, Tabatinga, Porto Velho, (Amazonas); Belém (Pará); Praia da Boa Viagem, Sacarem (Maranhão); Cassorongongo, Pitanga, Pedra de Una (Bahia); Guarapari (Espirito Santo); Belo Horizonte (Minas Gerais); Itatiaia, Angra dos Reis (Rio de Janeiro), Brasília; Paranaí, Apiaí, Praia do Leste (Paraná); Iperoba, Florianopolis, Tubarão, Posto Duque de Caxias, Xanxerê (Sta. Catarina); São Pedro, Itepeva (Rio Grande do Sul).
D. fumipennis: Pedras (Bahia); Paranaí (Paraná)
D. immigrans: Belo Horizonte (Minas Gerais)
D. insularis: Island St. Kitts, Guadalupe Island (from Prof. Dobzhansky)
D. kikkawai: Eldorado (Rio Grande do Sul)
D. melanogaster: Eldorado (Rio Grande do Sul); Brisbane (Australia)
D. montium: São Paulo
D. nebulosa: Lima, Tingo Maria (Peru); Natal (Rio Grande do Norte);São Luiz (Maranhão); Pitanga, Pedras (Bahia); Guarapari (Espiri to Santo); Angra dos Reis (Rio de Janeiro); Posto Duque de Caxias (Sta. Catarina); Eldorado (Rio Grande do Sul)
D. paulistorum: Congaçarí do Tracuá, Serra do Navio (Amapá); Manaus, Tabatinga, Porto Velho (Amazonas); Belém (Pará); Praia da Boa Viagem, Sacavém (Maranhão); Maranguapé (Ceará); Cassarongongo, Pitanga, Pedras de Una (Bahia); Sapé, Belo Horizonte (Minas Gerais); Guaraparí (Espírito Santo); Itatiais, Angra dos Reis (Rio de Janeiro); Brasília, Paranai, Apiai, Praia do Leste, Ilha das Cobras (Paraná); Iperoba, Florianopolis, Tubarão, Posto Duque de Caxias, Xanxerê (Sta. Catarina); São Pedro, Itapeve (Rio Grande do Sul) - Tarapoto, Tingo Maria (Peru); Bucaramanga (Colombia); Coroico (Bolivia); Trinidad, San Salvador
D. pararepleta: Pedras (Bahia); Brasilia, Itatiaia (Rio de Janeiro); Ilhas das Cobras (Paraná)
D. polymorpha: Boa Viagem (Maranhão); Jacú (Sta. Catarina); Itapeva, Pascoal (Rio Grande do Sul) Trinidad
D. prosaltans: Belém (Pará); Boa Viagem (Maranhão); Pitanga (Bahia); Guaraparí (Espírito Santo); Praia do Leste (Paraná); Jacu (Sta. Catarina); Brasília
D. repleta: Brasília
D. saltans: Pitanga (Bahia); Itatiaia (Rio de Janeiro)

D. simulans: Tabatinga (Amazonas); Porto Platon, Serra do Navio (Amapá); Boa Viagem (Maranhão); Pedras (Bahia); Brasília; Brisbane (Australia)
D. sturtevanti: Porto Platon (Amapá); Belém (Para); Sacarem (Maranhão); Praia do Leste, Ilhas das Cobras, Paranaí (Paraná)
D. tripunctata: Belo Horizonte (Minas Gerais)
D. tropicalis: Palma (Goias)

CHILE

Santiago: Instituto de Biología "Juan Noé" Cátedra de Biología Genética y Evolución Experimental

D. busckii: Chile (La Serena)
D. camaronensis: Chile (Azapa)
D. funebris: Chile (La Serena, Valdivia, Tierra del Fuego y Punta Arenas)
D. gasici: Chile (Arica), Argentine (San Luis), Bolivia (Cochabamba)
D. gaucha: Brazil (M. Capoes, C. de Jordan and Taimbas), Argentine (Cordoba)
D. hydei: Chile (Camarones, and El Tabo)
D. immigrans: Chile (El Tabo and Valdivia)
D. mercatorum: Chile (Arica)
D. mesophragmatica: Bolivia (La Paz), Peru (Machu-Picchu, Cuzco)
D. pavani: Chile (Copiapó, Vallenar, La Serena, El Tabo, Viña del Mar Olmué, Bellavista, Arrayán, Los Alpes, Colbum, Los Quenes, Chillán) Argentine, Mendoza)
D. serenensis: Chile (El Tabo)
D. simulans: Peru (Lima)
D. viracochi: Perú (Machu-Picchu), Colombia (Bogotá)
D. virilis: Chile (Santiago)

COLOMBIA

Bogotá: Universidad de los Andes, Departamento de Biología

These are species collected in Colombia.

D. ananassae
D. annulimana
D. bandeirantorum
D. brncici, new species
D. busckii
D. campestris
D. canalinea
D. capricorni
D. cardini
D. cardinoides
D. emarginata
D. equinoxialis
D. funebris
D. gasici
D. griseolineata
D. hydei
D. immigrans
D. kikkawai
D. mediostriata
D. melanogaster
D. mercatorum
D. nebulosa
D. paranaensis
D. paulistorum
D. polymorpha
D. prosaltans
D. pseudoobscura
D. repleta
D. simulans
D. sturtevanti
D. sucinea
D. tolteca
D. tropicalis
D. viracochi
D. virilis
D. willistoni

FRANCE

Lyon (Rhone): Laboratoire de Zoologie Expérimentale, Faculté des Sciences, 16, quai Claude Bernard

D. funebris
D. busckii

GREAT BRITAIN

Edinburgh, Scotland: Poultry Research Centre, Genetics Section

Drosophila pseudoobscura wiid
Drosophila phalerata wild

GREECE

Athens: College of Agriculture, Department of Genetics

D. ambigua (3 strains)
D. obscura (I strain)

INDIA

Chandigarh-3: Panjab University, Department of Zoology

Wild strains from Kulu, Chandigarh, Bombay and Srinagar

D. melanogaster
D. takahashii
D. Kikkawai
D. nepalensis
D. suzukii
D. malerkotliana
D. jambulina
D. punjabiensis
D. immigrans

ITALY

Milano: Università di Milano, Istituto di Genetica

D. simulans

Wild Stocks

1 Aspra
2 Morro Bay
3 Pavia

Stocks Selected for Tumor Manifestation

4 tu B1
5 tu Aspra

KOREA

Kwangju: Chunnam National University, Department of Biology

D. auraria: Type C - 3 strains
D. rufa
D. angularis
D. immigrans
D. bizonata
D. suzukii
D. bizonata
D. virilis
D. nigromaculata

Seoul: Chungang University, Department of Biology

D. auraria: Type A (15 wild strains)
Type B (3)
Type C (4)
D. busckii (3)
D. nigromaculata (2)
D. pseudoobscura
D. suzukii (5)
D. virilis (5)

FRANCE

Clermont-Ferrand: R. Hovasse Laboratoire de Zoologie, Faculté des Sciences, Puy de Dôme, 7 Avenue Verciugétorix

D. funebris

GERMANY

Berlin-Buch: Deutsche Akademie der Wissenschaften zu Berlin Institut für experimentelle Krebsforschung, Genetische Abteilung Lindenberger Weg 70

D. funebris
D. funebris st: autosomal
D. funebris wy: III
D. virilis

Tübingen: Max Planck-Institut für Biologie, Abt. Beermann

D. eohydei
D. miranda
D. neohydei
D. paulistorum
D. repleta
D. simulans
D. virilis

D. hydei

1 wild

Chromosome 1

2 vermilion (Spencer)
3 vermilion (Tübingen-1)
4 vermilion (Tübingen-2)
5 vermilion, scute, singed, yellow, miniature, cherry, bobbed
6 white
7 white, Light body
8 yellow (Tübingen-1

Chromosome 2

9 ebony-dunkel
10 peach eye

Chromosome 3

11 cinnabar

Chromosome 5

12 red eye, brown thorax

Multichromosomal

13 (1;5) bobbed; vestigial
14 (2;3) ebony; cinnabar
15 (2;5) ebony; vestigial
16 (2;3;5) ebony; cinnabar; vestigial
16 (2;3;5) scarlet; scabrous; javelin

Attached-X

17 w Lt/Y and +/Y

SPAIN

Barcelona: Universidad de Barcelona, Faculty of Sciences, Laboratory of Genetics

D. ambigua. Several Spanish stocks
D. busckii. Barcelona
D. buzzatii. Armentera (Spain)
D. funebris. Several Spanish stocks
D. hydei. Barcelona
D. immigrans. Barcelona
D. mercatorum mercatorum. Barcelona
D. mercatorum pararepleta. Jijuca (Brasil)
D. phalerata. Several Spanish stocks
D. repleta. Barcelona
D. simulans. Barcelona
D. subobscura. Several Spanish stocks. Mutant stocks
D. testacea. Barcelona
Parascaptomyza disticha. Barcelona

JAPAN

Sapporo: Hokkaido University, Faculty of Science, Department of Zoology

D. auraria: race A; Sapporo (3), Okoppe (1), Oshoro (1), Fuyushima (1)
D. lutea: Sapporo (1)
D. virilis: Sapporo (3), Okushiri (2), Tokyo (1), Higashi-takasu (1), Sukayu (1)
D. immigrans: Sapporo (1)
D. funebris: Sapporo (2), Akan (1), Ichinohashi (1), Chitose (1)
D. brachynephros: Sapporo (1)
D. unispina: Sapporo (1)
D. nigromaculata: Sapporo (2)
D. testacea: Naebutoro (1)
D. busckii: Sapporo (1)
D. histrioides: Sapporo (1)
D. histrio: Fuyushima (1)
D. sordidula: Sapporo (1), Nopporo (1)
D. lacertosa: Sapporo (1), Fuyushima (1), Nopporo (1)

AMHERST, MASSACHUSETTS: AMHERST COLLEGE

D. affinis: Amherst 1954
D. busckii: Amherst 1958
D. funebris: Amherst 1954
D. hydei: Amherst 1956
D. immigrans: Amherst 1962
D. melanica: Amherst 1952
D. robusta: Amherst 1960
D. simulans: Amherst 1961

BERKELEY, CALIFORNIA: UNIVERSITY OF CALIFORNIA
Department of Zoology

700 D. simulans wild
800 D. virilis Pasadena wild
801 scarlet
900 D. montium Abidiaw
910 D. affinis (Allen, Nebraska)
912 D. affinis (Kushla, Alabama)
920 D. ananassae (Cristobal, Panama)
950 Zaprionus vittiger

COLD SPRING HARBOR, NEW YORK: CARNEGIE INSTITUTION OF WASHINGTON

D. busckii: wild-type B
D. virilis: China-a

DeKALB, ILLINOIS: NORTHERN ILLINOIS UNIVERSITY

D. immigrans

several local strains

D. robusta

Carson's Steelville 13648
DeKalb - 1959 (Montgomery Arboretum)

D. virilis

multiple mutant marker

D. tripunctata

several local strains
Louisiana line - from Pavia Stock Center

EMPORIA, KANSAS: KANSAS STATE TEACHERS COLLEGE

D. virilis

Argentina
Brazil
Chile
Texmelucan

JOHNSON CITY, TENNESSEE: EAST TENNESSEE STATE UNIVERSITY
Department of Biology

D. virilis

Chromosome 3	Chromosome 5	Multichromosomal
gp_2^2	ru st mh	$y;_2tb$; px; st
gp^2 S	ru st mh B^3	gp^2; ru st mh
	B^3	S; ru st mh
	B^3 pe	$S;_2B^3$ pe
		gp^2 S; ru st mh

LEXINGTON, KENTUCKY: UNIVERSITY OF KENTUCKY
Department of Zoology

D. affinis: Lexington, Kentucky
D. putrida: Lexington, Kentucky
D. robusta: Lexington, Kentucky
D. busckii: Lexington, Kentucky
D. hydei: Lexington, Kentucky

LINCOLN, NEBRASKA: THE UNIVERSITY OF NEBRASKA
Zoology and Physiology Department

D. affinis: Florida, Louisiana, Minnesota, Nebraska, New York, North Carolina. Wild except for some virus-caused CO_2 sensitivity
D. algonquin: Michigan, Minnesota, Nebraska, Ohio, Pennsylvania
D. athabasca: Alaska, Colorado, Minnesota, North Carolina, Ohio, Pennsylvania
D. azteca: Mexico
D. narragansett: New York
D. tolteca: Bolivia

NEW YORK CITY 21: THE ROCKEFELLER INSTITUTE

D. paulistorum

Wild Strains, geographical

Centro-American race (7 strains)
Amazonian race (31 strains)
Andean-South Brazilian race (26 strains)
Orinocan race (19 strains)
Guianan race (2 strains)
Transitional race (8 strains)
Calypso - a new race - (3 strains)

For additional stocks, see DIS36:56, except for stocks of D. serrata, which are now kept at Columbia University, New York City.

NEW YORK 27, N.Y.: COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK
Department of Zoology

D. birchii

Wild: 3 strains

D. equinoxialis

Wild Strains
geographical

Brazil (3 strains)
British Guiana (2)
Mexico (1)
Puerto Rico (1)
Trinidad (2)
Venezuela (4)

Sex-ratio

Puerto Rico (1 strain)

D. paulistorum

Wild Strains
geographical by races

Amazonian race
British Guiana (3 strains)
Colombia (2)
Panama (1)
Trinidad (2)
Venezuela (2)
Andean-Brazilian race
Brazil (12 strains)
Colombia (3)
  Transitional strains
  Andean-Brazil (9 strains)
Calypso race
British Guiana (1 strain)
Trinidad (1)
Centro-American race
Panama (1 strain)
Guianan race
British Guiana (1 strain)
Orinocan race
British Guiana (4 strains)
Panama (2)
Venezuela (2)

D. persimilis

Wild: 3 strains

D. pseudoobscura

Wild: 3 strains

D. serrata

Wild: 3 strains

D. willistoni

Wild Strains
geographical

Brazil (4 strains)
Puerto Rico (1)

Sex-ratio

Brazil (1 strain)

RALEIGH, NORTH CAROLINA: NORTH CAROLINA STATE COLLEGE
Department of Genetics

D. arizonensis

Wild

Tucson, Arizona (10 strains)
Catalina Mountains (8,000 ft.), Arizona (1)
Patagonia, Arizona (6)
Magdalena, Sonora, Mexico (28)
Hermosillo, Sonora, Mexico (10)
Cornelio, Sonora, Mexico (1)
Desemboque, Sonora, Mexico (1)
Quaymas, Sonora, Mexico (3)

Mutant

white eye (w) x chromosome
yellow body (y) x chromosome
lobed eye (1) 3 chromosome
barr eye (b) autosome

D. mojavensis

Wild

Chocolate Mountains, California (1)
Cabo San Miquel, Baja Cal. Mexico (1)
Sonoita, Sonora, Mexico (1)
Magdalena, Sonora, Mexico (1)
Muleje, Baja, Cal., Mexico (1)
LaPaz, Baja, Cal., Mexico (1)

Mutant

white eye (w) transferred from D. arizonensis
scarlet eye (s) autosome

D. pseudoobscura

Bryce, Utah (8 isofemale strains)
Ferron, Utah (6)
Gunnison, Colorado (6)
Lemon Cave (9)
Mather, California (8)
Mono, California (7)
(74 inbred lines from the above strains)
(multiple-isofemale cage populations from each locality above)
Patagonia, Arizona (1) 1961
San Felipe, Baja, Cal., Mexico (1) 1961
Chiriaco Summit, California (2) 1961

Other Species

D. americana
D. texana
D. virilis
D. mulleri - Austin, Texas
D. mulleri G-207 (4th chromosome inversion)
D. ritae
D. hydei
D. persimilis
D. hamatofila
D. simulans

ST. LOUIS, MISSOURI: WASHINGTON UNIVERSITY

D. robusta

Notation of arrangements as in Carson, H. L. 1953, Genetics 38:168

Stocks homozygous for gene arrangement:

Stock designation	X	2	3	Origin
Standard	SS	SS	SS	New York
BF-5	11	3S	SS	Big Fish Lake, Minnesota
TA	32	11	S1	Lake Tsala Apopka, Florida
Crows Bluff-1	22	11	S1	Florida
ca ach	SS	SS	SS	---
st e-17	11	1S	SS	---
C-66 (RIC)	1S	3S	SS	Chadron, Nebraska

Polymorphic Stocks	X	2	3	Origin
A-1	SS	$2L_1$ 2L-1 $2R_1$ 2R-1	S1	Austin, Texas
Q2-35	XL XR_1 XR-1	2L-1 $_1$ 2L-8 2R	SS	Olivette, Missouri
R-2-S	SS	$2L_1$ 2L-3 $2R_1$ 2R-1	3R 3R-1	Steelville, Missouri
B-1	XL_1 XL-1 XR_1	3S	SS	Bridgewater, Vermont
E-11	S1	$2L_1$ 2L-R $2R_1$ 2R-1	S1	Eureka, Missouri
BF-4	11	3S	$3L_1 3R_1$ 3L-R	Big Fish Lake, Minnesota
Scarletoid net	1S	$2L_1$ 2L-1 2R	SS	---
Ring-3	has ring shaped third chromosome			---

Other Species

D. mangabeirai		
F_1	Frijoles, Panama Canal Zone	1960
B-1	Bucaramanga, Colombia	1962
D. colorata	Petoskey, Michigan	1956
D. lacertosa	UTL No. 2531.3 Sapporo Hokkaido, Japan	
D. carsoni	Bridgewater, Vermont	1957
D. americana	Standard, Meramec River, Missouri	
D. buzzatii	Trapani, Italy Israel	
D. paranaensis	El Real, Rep. of Panama	
D. mercatorum	R-1 Rochester, New York R-2 Rochester, New York L Lima, Peru S San Salvador, El Salvador	
D. repleta	Queensland, Australia; Loiza, Puerto Rico; Barcelona, Spain; 1574.1 Kilgore, Texas; Philadelphia, Penna; Costa Rica	
D. simulans	Florida	
D. melanica	Missouri	
D. melanura	Missouri	
D. paramelanica	Missouri	
D. micromelanica	Texas, Florida	
D. nigromelanica	Indiana	
D. euronotus	Missouri	
D. thoracis	Texas	

NORTHRIDGE, CALIFORNIA: SAN FERNANDO VALLEY STATE COLLEGE
Department of Biology

D. pseudoobscura

Stocks of homozygous gene arrangements, mostly of isogenic origin, all with mixed background

ST (Standard)	1	SC (Santa Cruz)	2
AR (Arrowhead)	1	CU (Cuernavaca)	3
CH (Chiricahua)	2	OA (Oaxaca)	1
TL (Tree Line)	3	VA (Vandeventer)	1
PP (Pikes Peak)	3	TM (Thomas Mountain)	1
PF (Pinyon Flat)	1 (Carries lethal, balanced with marked ST)		

Balanced lethal stocks of four arrangements from Bogota and Guatemala

BSC	4	(One homozygous for yellow body in the X)
BTL	5	
GCU	5	
GOA	1	

Marker stocks

X Chromosome

Pt w^{e}_{2}	ct se 11 sp tt (AR)
Pt mg^{2}	y sn v co sh
er (erect scutellar bristles)	Pt y sn v mbl

Chromosome 2

ga_{2} (garnet)	ubx
gl^{2} (red-eyed glass allele)	pcv (posterior cross vein broken)
upt gl	pcv ubx cd (cardinal) gl^{2} bv (brevis)
upt bx Ba gl (Inv.) lethal / lethal	
upt bx Ba gl (Inv.) lethal / Dl (Delta) ubx gl^{2} bv (brevis = short bristles)	

Chromosome 3 homozygous stocks

or (ST)	or pr (ST)	or pr spr (ST)
or (SC)	or pr (SC)	or pr spr (AR)
pr (ST)	or px (AR)	or pr cv (ST)
pr (AR)	or ru (TL)	or pr vg (AR)

Chromosome 3 balanced stocks

or Bl L pr spr (ST) / lethal (CU)	or Bl L Sc pr cv (ST) / lethal (CU)
or Bl L pr spr (AR) / lethal (CU)	or Bl L (SC) / lethal (CU)
or Bl L pr cv (ST) / lethal (CU)	or Bl L Sc (VA) / lethal (CU)
or Bl L pr cv (AR) / lethal (CU)	or Bl Sc_{D} ru pr cv (ST) / or L (SC)
	or Bl px^{D} (AR*) / or L (SC)

*carries undescribed radiation-induced inversions

Chromosome 4

tg^{c} (tangled allele)
inc j hk

Chromosomes 2 and 3

gl^{2}: or (SC)
gl: or pr (ST)
or Bl L (SC*) / lethal (CU)

*Translocation with Chromosome 2

Report of Selina Horn

tang: tangerine Third chromosome recessive. Found in second generation of brother-sister matings from wild-caught female collected in Arcadia, California in February of 1959. Eye color on emergence is somewhat similar to, but lighter than, vermillion. Darkens with age, approaching wild type, and in some stocks becomes brownish after one or two weeks. Ocelli are colorless. Larval Malpighian tubules pale yellow. Linkage studies place the mutant at about 111 (about 5 units to the right of pe). Viability good but apparently somewhat inferior to wild type.

sls: sonless Third chromosome recessive. Found in second generation of brother-sister matings from a wild-caught female collected in Arcadia, California in February of 1959. (Apparently on the same chromosome as ta, described above). Results in deficiency of males, especially at lower temperatures. Affects spermatogenesis in homozygous males. No effect in female or in heterozygous male. Approximate position of linkage map: 80.

Report of T. R. F. Wright

Est 6^F: Esterase 6^F MacIntyre 63b. 3-25.2±

Est 6^I: Esterase 6^I MacIntyre 62k. 3-25.2±

Est 6^S: Esterase 6^S MacIntyre 62k. 3-25.2±. The three alleles, Est 6^F, Est 6^I, and Est 6^S, are codominant alleles which control the production of three electrophoretically distinct forms of an esterase designated as "Esterase 6." The forms produced by Est 6^F migrates the fastest and has an electrophoretic mobility identical to that of Esterase 6^F in D. melanogaster (DIS 37:53 and Wright, T. R. F., 1963 Genetics 48: 787-801). Est 6^S controls the production of the slowest migrating form of Esterase 6 which has a mobility identical to Esterase 6^S in D. melanogaster. The electrophoretic mobility of the form controlled by Est 6^I is intermediate to that of Esterase 6^F and Esterase 6^S (to date a form homologous to Esterase 6^I has not been found in D. melanogaster). Individual zymograms of the three types of homozygotes always exhibit a single Esterase 6 band; each with its characteristic electrophoretic mobility. Zymograms of heterozygotes always exhibit two Esterase 6 bands: Est 6^F/Est 6^S - a fast band and a slow band, Est 6^F/Est 6^I - a fast band and an intermediate band, and Est 6^I/Est 6^S - an intermediate band and a slow band. In order to separate the intermediate form from the fast and the slow in heterozygotes, it is necessary to subject the gels to electrophoresis for a longer period of time than reported for the Esterase 6s of D. melanogaster. No morphological differences between the three types of homozygotes are apparent. All three alleles have been found in a wild population as well as in various laboratory stocks. The Esterase 6 locus in D. simulans is considered to be homologous to the Esterase 6 locus in D. melanogaster (Wright, T. R. F. and R. J. MacIntyre, 1963 Genetics 48 (12) In Press). RK1 even with single fly homogenates.

Whittinghill, M. Brood data on crossover recovery from pretested heated adult females. Inversion heterozygous females were individually testcrossed in seven successive broods the first five of which lasted three days each. On the eighth day of adult life, half the number of mothers were placed for 24 hours at 33°C. while each was in her third brood bottle culture. Testcrossed females were al Cy L^4 sp/dp pr stw px, with the latter from isogenic stock. Of 18 and 69 phenotypic crossovers from control and treatment families, respectively, only 6 and 11 failed to breed in subsequent progeny testing. Verified crossovers comprised 0.33±0.1% of control families and a similar 0.13±0.05% of the pretreatment broods. All posttreatment broods gave significantly more crossovers than the above and more than the contemporaneous control cultures. This last and smallest increase was 3.0±0.53% after the progeny testing of phenotypic crossovers. The peak of recovery, 7.5±1.24%, came in brood five, 4 to 7 days after the heating of the 8-day-old adults, but all broods following the crossover inducing treatment were somewhat above controls. Compared with inductions by X-rays (Whittinghill, Genetics 48:915 and unpublished) the heat-induced crossovers appeared at least one day earlier and possibly two or three days earlier than did viable X-ray induced crossovers. The partitioning of induction between gonial cells and early oocytes does not yet seem feasible. (Work supported in part by USPHS NIH research grant GM 9358.)

Hubbard, Wm. B. Toxicity of pyrimidines and related compounds to D. melanogaster. The toxic effects of uracil, uridine, 5-bromo uracil, cytosine, and thymine in the medium were determined at four concentrations each. Since each chemical was tested at a different time, each series had its own controls. For each chemical tested, agar-cornmeal-molasses medium of 0.01 M, 0.02 M, 0.04 M, and 0.08 M concentrations was prepared. The molar concentrations were based on total food volume.

Parents of the treated flies were from a balanced lethal stock which permitted a maximum ratio (flies/eggs) of 0.50. The parents used for each series were sibs, thus insuring a high degree of uniformity.

Eggs were laid on and developed on the medium containing the above concentrations. No yeast was added. Eggs were counted, resulting flies scored, and a ratio (flies/eggs) determined for each concentration. The following table indicates the ratios and standard errors.

	Control	0.01 M	0.02 M	0.04 M	0.08 M
Uracil	0.4110 ±.0288	0.3586 ±.0275	0.4184 ±.0288	0.4023 ±.0303	0.4000 ±.0298
Uridine	0.3773 ±.0268	*	0.3957 ±.0293	0.3754 ±.0279	0.1929** ±.0248
5-BU	0.4108 ±.0362	0.3585 ±.0466	0.4355 ±.0630	0.2787** ±.0574	0.3000 ±.0725
Cytosine	0.4197 ±.0242	0.4264 ±.0249	0.3920 ±.0245	0.3433** ±.0219	0.3441** ±.0236
Thymine No. 1	0.3444 ±.0501	0.3262 ±.0395	0.2182** ±.0394	0.0461** ±.0184	0.0549** ±.0239
Thymine No. 2	0.4151 ±.0391	0.3614 ±.0338	0.1472** ±.0252	0.0523** ±.0179	0.0341** ±.0127

*Data invalidated by overlap with F_2.

Each ratio was tested against the control by the standard error of a difference and a one-tailed confidence limit test. Uracil did not exhibit toxicity at the concentrations tested. The concentrations of each of the other chemicals which show significant toxicity are indicated above by double asterisks (**). Two series for thymine gave the same results, re-enforcing confidence in the results.

Butterworth, F. M. and R. C. King. The fat body of wild type and of various apterous mutant adults.

Two different types of adipose tissue (larval and imaginal) are found in the abdomens of Oregon-S females. Larval fat body arises from the dorso-lateral somatic mesoderm in the embryo (1) and is present during the larval and pupal period and during the first two days of adult life. The imaginal fat body arises from special imaginal discs during metamorphosis (2), increases in volume after eclosion, and is present until death. The adult fat body grows while the larval fat body degenerates. By the third day the larval fat body has disappeared.

The larval fat body cells remaining in the newly emerged adult are spherical. A typical cell is shown in Fig. 1. The nuclei contain banded, polytene chromosomes. Granules (composed of protein, phospholipid, and polysaccharide) and droplets (composed of unsaturated triglycerides) lie in a huge deposit of glycogen which, except for small islands of cytoplasm, fills the rest of the cell. Mitochondria are evenly distributed throughout the glycogen deposit and cytoplasm.

In the newly emerged adults the imaginal fat body cells are hexagonal prisms. Their cytoplasm contains a population of mitochondria, droplets of unsaturated triglycerides, and small deposits of glycogen. In the seven day old adult the imaginal fat body cells contain huge deposits of glycogen as well as droplets of unsaturated triglycerides. Typical imaginal fat body cells from recently emerged and seven day old wild-type adults are drawn in Figures 2 & 3, respectively. It would appear from Figures 2 & 3 that the 8-fold difference in volume between the two cells is accounted for mainly by the increase in glycogen and to a lesser extent lipid. The nuclei of both mature and immature imaginal fat body cells contain relatively thin chromosomes and are about half the diameter of the nuclei of larval fat body cells.

Females homozygous for anyone of three apterous alleles fall into two classes: those that are fertile and viable (exemplified by ap^{56f}), and those that are sterile and die two to three days after emergence (exemplified by ap^{4} and ap^{49j}). In females of genotype ap^{56f}/ap^{56f}, ap^{56f}/ap^{4}, and ap^{56f}/ap^{49j} (which are fertile and viable) the larval fat body breaks down at the proper time and the imaginal fat body develops normally. In females of genotype ap^{49j}/ap^{49j} and ap^{4}/ap^{4} (sterile and short-lived) the larval fat body shows no sign of degenerating, and the imaginal fat body maintaines an immature appearance until death.

References:

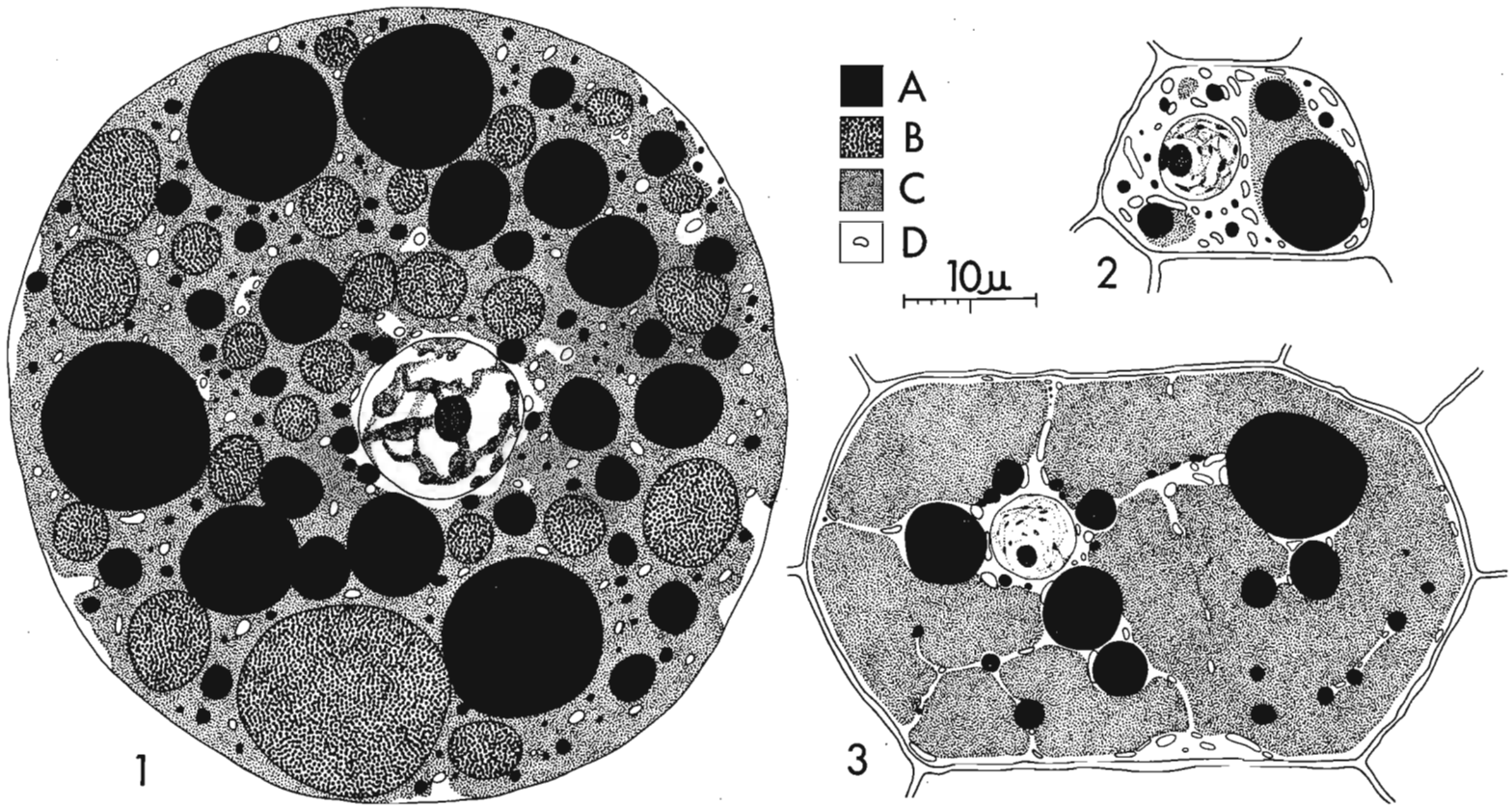
1. Poulson, D. F. 1950. The Biology of Drosophila, M. Demerec, ed., John Wiley and Sons, Inc., New York, pp. 168-274.
2. Bodenstein, D. Ibid. pp. 275-367.

Hanly, E. W. A quantitative assay for the oxidase activity associated with xanthine dehydrogenase.

An oxidase activity has been associated with the enzyme activity of xanthine dehydrogenase (Forrest, Hanly and Lagowski), and is assumed to be a result of only one of the subunits composing xanthine dehydrogenase. The above workers showed that this activity could not only use various pteridines as substrates, but also pyridoxal, converting it into pyridoxic acid. The pH optimum for dehydrogenase activity associated with this protein has been reported as 8.0.

It was noted that pyridoxal in a 0.1 M Tris buffer fluoresces yellow when irradiated with ultraviolet at 360 mμ, while pyridoxic acid is blue. These facts were used for assay by employing various filters in a Turner fluorometer model 110, adapted for microcuvettes. The emission peak of the UV lamp in this machine is 360 mμ. The primary filter is a Turner #110-811, peaking at 360 mμ, and the secondary filters, Turner #110-816, Turner #110-813, and Turner #110-814.

Crude enzyme preparations of two-day old adults were made by grinding flies in buffer, centrifuging at 40,000 X g for 30 min., mixing with Norite A charcoal (100mg/1gm flies), and centrifuging twice at 25,000 X g. All these procedures were carried out at 4°C. All reagents were used as solutions in 0.1 M Tris buffer at the appropriate pH.



A = unsaturated triglyceride, B = proteinaceous material containing carbohydrate and phospholipid, C = glycogen, and D = cytoplasm containing a mitochondrion (mitochondria are also imbedded in the glycogen deposits). The drawings were made from 2 μ sections of tissue fixed in buffered OsO_4, post-fixed in formalin and embedded in plastic.

Assay mixtures were as follows: 0.05 ml 0.01 M pyridoxal; 0.05 ml enzyme preparation; 0.2 ml Tris buffer. All enzyme preparations were diluted to contain approximately 5 mg protein/ml. before use. The fluorometer was set at a reading of 100% intensity with 0.02 ml 0.01 M pyridoxic acid in 0.28 ml 0.1 M Tris buffer at the appropriate pH. Activity of the assay mixture was measured as units of fluorescence change per minute per mg protein, and pH curves were plotted between 6.9 and 8.1 for both Oregon-R and lix preparations. Both wild type and lix showed pH optima at 7.3.

Ising, Gunnar. A recessive lethal in chromosome 2, which in single dose has an effect on the eye colour of white animals.

In 1962, when screening for triploids in a cross y w sn, se e x Muller-5, se e eight females with yellow eyes appeared in one bottle. In a few days the yellow colour changed to light brown. This effect was found to be caused by a recessive lethal with a position at about 60 in chromosome 2. The lethal is easily balanced against Cy. Population experiments are planned in order to test the viability of 1/+ animals compared to +/+ and w;1/+ animals compared to w;+/+.

Ising, Gunnar. Triploids balanced with lethals and with genes causing sterility in females.

Two balanced triploid stocks were constructed. One was derived from a triploid female y w sn/M-5 y, Y·sc^8 mated to an X-rayed y ct v f male. An allel of rudimentary (r) was induced by the treatment and was in the next generation transferred to the attached-X of the triploid. Females homozygous for this allele of r are sterile while males are fertile. A few stocks having different combinations of genes in the attached-X have been selected from the original triploid female, which was heterozygous for w,ct,sn,v,r,f. By using an X-ray induced lethal in the free Muller-5 chromosome no M-5 females will usually appear. The triploids are mated to males having the Y·sc^8 chromosome which also carries y$^+$ and 1_2^+; i.e., y sn r/M-5 1_2 x M-5 1_2/Y·sc^{8}y$^+$$1_2^+$.

Infrequent nondisjunction of attached-X and the free X will give triploid females having also the Y·sc^8 chromosome. In the next generation these triploids will give some M-5 1_2/Y·sc^8 females which are fertile. The best way to keep the stock free from such females is to have so many culture bottles that those bottles in which M-5 females appear may be discarded.

Another balanced triploid stock was found when studying the sex-chromosome:autosome segregation in the cross y w sn/M5 y x M5 1_2/Y·sc^8. One female gave neither y w sn/Y·sc^8 daughters nor y w sn/Y·sc^8 intersexes. The progeny consisting of 19 M5 y/M5 1_2 females, 1 M5 y/M5 1_2 intersex, 6 y w sn/M5 1_2 triploid females, 1 y w sn/M5 1_2 superfemale, 12 M5 y/Y·sc^8 males and 1 M5/OY male. Four tripoid sisters of the same constitution gave 24 M5 y/M5 1_2 females, 1 M5 y/M5 1_2 intersex, 17 y w sn/M5 1_2 tripoid females, 3 y w sn/M5 1_2 superfemales, 18 M5 y/Y·sc^8 males, 1 y w sn/OY intersex, 7 y w sn/Y·sc^8 intersexes and 56 y w sn/Y·sc^8 females. The stock is kept as y w sn 1_1/M5 1_2 x M5 1_2/Y·sc^8. The exact position of the lethal 1_1 is unknown.

Nafei, H. An unusual gynandromorph.

Among the offspring of a wild-type male and a Cy/Bl L^2 female there appeared a fly of the following phenotype: left eye normal, right eye L; bristles on the left normal, on the right Bl; left wing Cy, right wing normal; right foreleg with sex-comb, left foreleg without; abdominal coloration male; 2 ovaries, one of them rudimentary; some eggs were produced but did not hatch, presumably because they were not fertilized. The most probable origin of this fly is double fertilization by an X and a Y bearing spermatozoon of the female pronucleus and one polar body. Since dispermy is rare in melanogaster, its coincidence with development of a polar body into an additional pronucleus suggests that the former event facilitates the latter.

Garcia-Bellido, A. A "toxic effect" of yeast in furrowed.

Three alleles of the locus furrowed (fw I, 39,3 ±) show a characteristic syndrome: among other things we observe two pheno-effective lethal crises, during the imaginal hystogenese and just previous to or during eclosion of imagines. Escaper-imagines have the eyes furrowed and with less facets than in Oregon-R-controls, the bristles of head and thorax are thick and crumpled. The three alleles differ in penetrance and expressivity of the syndrome, in the sequence: $fw^{59} > fw^{60} > fw^{0} > +^{fw}$.

In all the three alleles, in a fresh medium the penetrance for lethality and the expressivity of the anomalous morphological traits in escaper-imagines is higher than in improverished cultures. The decisive factor lies in the yeast. The penetrance for fw^{59} in standard medium without fresh yeast is minimal. The addition of fresh or dead yeast, or of casein or casein hydrolysate, increases greatly the penetrance. Sugar or B vitamins do not have such a toxic effect.

Johnson, Roger C. A possible effect of X euchromatic inversions on segregation in two-Y males.

Two preliminary experiments testing the effect of hemizygous totally euchromatic X inversions on segregation in two-Y males have been carried out. Females of the composition y In49/y v/B^SY and y AM/y y$^+$/B^SY were mated with y v/y Y brothers. The segregation behavior of the y In49/B^SY/y Y and the y v/B^SY/y Y males from the former cross, and the y AM/B^SY/y Y and y v/B^SY/y Y from the latter was then followed. The results are shown below.

Constitution of male gametes

male genotype	X + y$^+$Y	B^SY	X + B^SY	y$^+$Y	X	y$^+$Y + B^SY	O	% recovery of markers
y AM/Y/Y N = 9833	21.7±0.4	23.1±0.4	20.3±0.4	23.5±0.4	6.8±0.3	4.3±0.2	0.3±0.1	X_+ = 48.8±0.5 y_S = 49.5±0.5 B^S = 47.7±0.5
y v/Y/Y N = 12,252	20.2±0.3	21.1±0.3	15.9±0.3	20.4±0.3	13.9±0.3	8.4±0.2	0.1±0.1	X_+ = 50.0±0.4 y_S = 49.0±0.4 B^S = 45.4±0.4
y IN49/Y/Y N = 7382	23.6±0.6	23.1±0.6	18.1±0.5	20.6±0.5	8.4±0.4	6.2±0.3	-	X_+ = 50.1±0.7 y_S = 51.2±0.7 B^S = 48.2±0.7
y v/Y/Y N = 4174	23.7±1.0	23.1±1.0	14.8±0.9	17.7±0.9	13.7±0.8	7.0±0.6	-	X_+ = 52.2±1.2 y_S = 48.4±1.2 B^S = 44.9±1.2

Definite differences appear to exist with regard to the recovery of the X and YY classes between both inversions and their respective controls. The recovery of X and YY classes from the AM males, i.e., 11.1% is depressed about 100% when compared with the recovery of the corresponding classes from the control, i.e., 22.3%. Furthermore, while X and YY classes are recovered with a frequency of 14.6% from the In49 male, the control shows a recovery rate of 20.7% for the corresponding classes, a difference of about 40%. Although the proximal breakpoint of the AM inversion lies to the right of B and hence inverts this region, it should be noted the In49 has its breakpoint to the left of B. Hence while a repositioning of B in the X may make some contribution to the effect (B being also present in Y) it cannot account for the effect observed in the In49 males. It should be noted that since by the nature of the crosses autosomes were presumably randomized, the difference between an inversion and its control is unlikely to be explained on the basis of differences in autosomal modifiers.

Ewing, Arthur W. Some attempts to partition variance in two behavioral characters.

Almost every behavioral character whose genetic basis has been examined appears to be multifactorially controlled. Thus it should be possible to apply the techniques of quantitative genetics to such characters and this has indeed been done to a limited extent (e.g. Broadhurst and Jinks, 1961). The following account describes an attempt to calculate repeatability and to separate the genetic and environmental components of variance for two behavioral characters in D. melanogaster. The methods used are those described by Falconer (1960). The characters were activity, measured by the number of 1 cm. squares crossed by a fly within a one minute period and the percentage of the element 'orientation' occurring during courtship. A full description of these characters and the methods used to measure them are given by Manning (1961) and Ewing (1961).

Repeatability

i. Activity. Ten male and ten female flies were tested, the measurements on each fly being carried out three times at intervals of thirty minutes. Males and females were tested on separate days. The variance estimates of the components along with the repeatabilities are given in table 1.

Table 1

Variance components		Females	Males
Total phenotypic	VP	825	1345
Within flies	VEs	205	177
Between flies	VG+VEg	620	1168
Repeatability		0.75	0.87

ii. Percentage orientation. Two unavoidably small samples of three and five males respectively were examined, each male courting three separate virgin females. The results are given in table 2.

Table 2

Variance components		Sample 1	Sample 2
Total phenotypic	VP	76	310.75
Within males	VEs	15	75.5
Between males	VG+VEg	61	235.25
Repeatability		0.80	0.76

The consistently high levels of repeatability for these two characters indicate: i. The experimental error in the measurement of the characters must be small. ii. The behavioral measures are valid ones, e.g. activity is probably the outcome of various interesting factors. The high repeatability means that these factors are not fluctuating independently. iii. As considerable care was taken to keep the environmental conditions constant during culture it is probable that VG is large compared with VEg.

Genetic and environmental components of variance

i. Activity. The activity of outbred flies was compared with that of the F_1 progeny of a cross between two highly inbred lines (over 60 generations of full sib. matings) derived from the outbred stock. The results are given in table 3.

Table 3

	Males		Females	
	F_1	Outbred	F_1	Outbred
Mean square entered	35.4	39.3	29.9	25.2
Range	2-87	2-88	0-76	4-55
Number of flies	30	30	34	35
Variance components	VG	VG+VE	VG	VG+VE
Variance estimate	554.5	501.8	319.6	138.9

In the case of the females the variance of the outbred flies is greater than that of the F_1s'. That, VE, by itself, is greater than VG+VE and this is clearly absurd. However I have repeated this experiment using different stocks with substantially the same result.

ii. Percentage orientation. For theoretical reasons it is not possible to carry out the same calculation for percentage orientation. However, I have some information that such an experiment, were it possible, would have given equally anomalous results. I crossed several inbred lines and examined the F_1 progeny in the hope of obtaining flies with low variability of courtship behavior for use in behavioral experiments. The results from two such crosses are given in table 4.

Table 4

	Mean percentage orientation	Variance	Number of courtships
Cross 1	65.1	216.5	15
Cross 2	66.5	37.0	11

As can be seen the variance in percentage orientation in one cross is over five times as great as in the other.

I do not know of any example reported in the literature where there has been such a large excess of variance in F_1 animals although Tryon (1940), Scott (1954) and Jakway (1959) have all reported examples in which the variances of behavioral characters were greater in the F_1 Progeny than in the parental strains. It is possible to modify the genotype in such a way as to change both activity (Manning, 1961) and percentage orientation (Ewing, 1961). This, along with the high levels of repeatability obtained suggests that considerable additive genetic variance for these characters exists in the populations used and thus it would seem that one of the assumptions underlying the quantitative method used is false, at least when applied to these two characters. However there is no reason to suppose that the genetic control of behavioral characters differs from that of morphological or physiological ones and it will therefore be interesting to investigate the causes of the results described above.

I am indebted to Dr. F. W. Robertson who supplied the stocks used in this work. Broadhurst, P.L. and Jinks, J.L. (1961) Psychol. Bull. 58:337-362. Ewing, A.W. (1961) J. Anim. Behav. 9:93-99. Falconer, D.S. (1960) 'Introduction to Quantitative Genetics,' Oliver and Boyd, Edinburgh and London. Jakway, J.S. (1959) J. Anim. Behav. 7:150-162. Manning, A. (1961) J. Anim. Behav. 9:82-92. Scott, J.P. (1954) J. Nat. Cancer Inst. 15:739-758. Tryon, R.C. (1940) 39th Yearbook Nat. Soc. Stud. Educ. Bloomington, III:111-119.

Anders, A. and F. Anders Dietary chloramphenicol and glutamic acid as a medium affecting large and distinct stainable salivery gland chromosomes of D. melanogaster.

In the course of our investigations about stimulating factors of nucleic acid synthesis (F. Anders, F. Drawert, K. Klinke und K. H. Reuther, Experientia 19:219, 1963) we have found that the salivery gland chromosomes of D. melanogaster get relatively large and exhibit unusual distinct details after staining with Acetic-Orcein, when low concentrations of chloramphenicol (for instance 20 mg/100g food) have been added to the live yeast medium. Excessive diet of glutamic acid (1.5g/100g food) has a similar but not identical effect. Combined additional feeding of chloramphenicol and glutamic acid has given best results.

Kirshenbaum, Gerald Fertility of modified B^{S3} males.

The B^{S3} deletion-insertion of Muller's carries a deletion of X from Bar to some unknown region of X-heterochromatin which is inserted into chromosome 3. Males with the B^{S3} deletion-insertion (Bloomington stocks)

were mated with y v f/0 females. F_1 females of the composition y v f/Y^+; B^{S3}/+ were then mated with X·Y/0 males and the y v f/0; B^{S3}/+ daughters mated with T(1;4)B^S males of the composition y X^D/IV, B^S car/y^+Y. The y X^D/IV, y^+Y; B^{S3}/+ sons were then mated with y v free-X females. These males were fully viable. In addition, two-Y males of the composition y X^D/IV, y^+Y/Y^+; B^{S3}/+ derived from the cross of y X^D/IV, B^S car/y^+Y males with y f:=/Y^+; B^{S3}/+ females also were fully viable. Surprisingly though, both males proved to be sterile. The y v free-X tester females were shown from other crosses to be fertile. The cause of sterility is being investigated.

Reddi, O. S. Interaction of chromosome breaks in the spermatozoa of Drosophila induced by X rays and fast neutrons.

Adult, 3-4 day old Oregon-K males were exposed to either X rays alone (3000r) or fast neutrons (800 rads from a Cascade Generator at the Tata Institute of Fundamental Research, Bombay. 300 keV deutrons bombarding Tritium (H^3) target produced 14 MeV fast neutrons, the beam of deutrons being 200 micro amp) or X rays followed by fast neutrons or fast neutrons followed by X rays. After irradiation each male was mated with 3 virgin females of a dual purpose stock y sc^{S1} In 49 sc^8;bw;st. After 3 days, all the males were discarded and the fertilized females were transferred to food bottles seeded heavily with yeast.

The F_1 males were used to screen the translocations involving Y:2:3 chromosomes and the F_1 females were used to detect sex-linked recessive lethals. Results obtained are tabulated below:

Table 1

Treatment	Sex-linked recessive lethals			Translocations		
	n	l	%	N	T	%
X rays (3000r)	860	56	6.51	950	57	6.00
fast neutrons (800 rads)	950	50	5.26	900	46	5.11
X rays + fast neutrons	980	107	10.90	920	140	15.21
fast neutrons + X rays	870	87	10.00	950	152	16.00

n = number of X chromosomes scored N = number of sons scored for translocation
l = number of lethals T = number of translocations

Results will be discussed elsewhere.

Reddi, O. S. Induction of large deletions in the spermatogonia of D. melanogaster with chloroethyl methane sulfonate (CB 1506).

Two to three day old males of D. melanogaster were treated with 0.1% of the above substance and were repeatedly mass mated with virgin females until the 15th day. Afterward males were mated with y v f (attached X) virgin females and the F_1 daughters were checked for covering of these markers, if any. The results obtained so far are given below:

Days sperm was sampled	Sex-linked recessive lethals	Translocations	Deletions
12-15 days	620/141 = 22.74%	960/3 = 0.31%	not checked
16-19 days	650/165 = 25.38%	1500/4 = 0.26%	1000/5=0.5%

The experiment is being continued so as to score at least 3000 F_1 daughters.

Levitan, Max. Spontaneous chromosome aberrations in D. robusta since October 1960. I. X-chromosome inversions among the first 559.

Over the past three years over 675 new chromosomal aberrations in D. robusta have been observed in this laboratory, most or all of them caused by an inherited maternal, apparently cytoplasmic, factor in one of our homokaryous stocks, ST_v (Levitan, 1962; Levitan and Schiller, 1963; Levitan, 1963). Herewith begins a fuller description of these aberrations, as promised in DIS 37:99, in relation to the more succinct summaries of them that have appeared or are in preparation by the author. The first group to be described, in installments, are the 559 aberrations that had been found at the time the manuscript of Levitan (1963) was written.

Organization and Classification

The practice of the laboratory has been to number the aberrations consecutively in the order observed. For this presentation, however, they will be organized by categories described below and numbered consecutively within each subgroup, with the original number mentioned immediately thereafter in the description. Thus "Ipa(XL)1. No. 10" means that the first X-left paracentric inversion was the tenth aberration in the original listing.

The tentative categories and their abbreviations, that will be used, are:

	Text Abbreviation
I. Deficiencies	Df (arm)
II. Paracentric inversions	Ipa (arm)
III. Pericentric inversions	Ipe (chromosome)
IV. Reciprocal translocations involving only two* breaks	T (arm:arm*)
V. Transposition	Tp (arm:arm)
VI. Multiple breaks and miscellaneous	M.B. (arms involved)

*Includes several in which there is only one chromosomal break but in which the nucleolus appears to act as though it were the "other arm" contributing a kinetochore, at least, for the chromosome piece distal to the break and a "cap" for the proximal piece.

Deficiencies unaccompanied by intercalation elsewhere in the genome have been very rare, so rare that the suspicion arises that the intercalation has been overlooked. Each case listed was restudied several times. Deficiencies that were found intercalated elsewhere are generally listed under "Transpositions", though a few appear under "Multiple breaks and miscellaneous".

Paracentric inversions are numbered separately for each arm, as are pericentric inversions for each chromosome. Two-break reciprocal translocations of each combination of arms are also numbered separately. A similar procedure is followed for the three-break transpositions, except that the first named arm is the deficient one (two breaks) and the second the intercalated one (one break), so that a different grouping is necessary even if the same two arms are involved. Tp (XR:2R), for example, shows that a piece of XR is intercalated into 2R, Tp (2R:XR), vice versa. The group order presented is based on the first arm named.

The Multiple break-miscellaneous category includes all aberrations with three or more breaks that do not fit into one of the other groups. Thus a combination of two different categories with at least one break in common, such as an inversion and translocation rearrangement (three breaks), would belong here, as would a truly random or reverse-tandem (included) para- and pericentric inversion combination. These aberrations are not organized within the category, being merely listed in order of discovery. It should be pointed out, however, that some instances of four breaks in the same cell would not be found here - because distinct aberrations with no breaks in common were produced: Ipa(XL)6 and Ipe(X)7 for example; likewise, Ipe(2)22 and T(Y:2L)7; also T(Y:2R)3 and T)2L:3L)11. Note also that Ipa(2R)13, Ipe(X)9 and Ipe(X)10, six breaks, all occurred in the same cells, and there were several similar cases.

It should be noted that some of the above symbolism and nomenclature differs from that of Bridges and Brehme (1944), but the author finds it useful to separate the clearly two-break reciprocal translocations from the more complex ones, and to consider all three-

break transpositions (not just those confined to a single chromosome) together. From the descriptions, it should be possible for anyone desiring to do so to reassign them to the pertinent Bridges and Brehme group.

"Newly Induced" or "Repeated"

Most aberrations were seen in the cells of a single larva, having been induced apparently in that zygote or one of its component germ cells, and was therefore not to be seen again once that individual was sacrificed for the smear. A few, however, appeared in several progeny of a cross, often in several crosses involving siblings, or possible siblings, from the same stock or experimental population. The descriptions distinguish between these aberrations by referring to those seen but once as "newly induced" and those seen in several cases as "repeated", following terminology used in Levitan and Schiller (1963). Many of the "repeated" aberrations exist in stock in the writer's laboratory and are available to interested investigators.

Breakpoint identification

Carson (1958) published an excellent map of the Standard gene arrangements. His subdividions of the chromosomes, numbered 1-34, are based on the breakpoints of the inversions known at that time, particularly the natural inversions described by Carson and Stalker (1947). Since the resulting subdivisions differ markedly in amount of euchromatin encompassed and some are not clearly demarcated, they have proved unsuitable for locating the growing number of breaks uncovered in this series. Because of the technical problems involved, the 1958 figure was also misleading as to the relative sizes of the chromosome arms, in contrast to Carson's earlier (Carson, 1955) excellent measured estimates of relative euchromatic length (given there as percentages of the total euchromatic genome). To remedy the situation I have subdivided each arm's euchromatin into units equal to 1% of the total euchromatin and have designated these units of each arm by successive capital letters from the centromere heterochromatin distalward. Figure 1 diagrams the relation of these subdivisions, shown above each arm, to the earlier ones, shown below it. The light area, "hc", refers to the centromeric heterochromatin.

The subdivisions were made by dividing the total length of each numbered section, on an enlargement of the Carson (1958) map, by the number of percentage units it contains in the 1955 measurement. Carson's region 8A on X-left, for example, contains 3.8% of the total euchromatin (Carson, 1955), so it was subdivided into 3.8 equal pieces, regions A, B, C, and 0.8 of D of X-left. Fractional pieces of adjacent numbered regions were combined to make whole units, but a reminder of the combination was retained by considering the fractions as subunits. Thus, region "D" was completed as follows: the next region 7, included 1.9% of the euchromatin; so 0.2 of a unit subdivision of it, or 0.2/1.9 of its map length, was added to complete "D", a full unit of it, or 1.0/1.9 of its map length was called "E", and the remainder, 0.7/1.9 of its length, became the proximal 0.7 of "F". The part of "D" that came from region 8A is called "D1", and the part belonging to region 7 is called "D2", in recognition of the fact that the separation between these subunits is the junction of 8A and 7, the proximal breakpoint of natural inversion XL-1. Similarly the next region of X, Carson's area "3-6" (which contains one of the undefined separations, that between 4 and 5) spans 8.4% of the total euchromatin, so it is divided into 8.4 parts, 8 unitary ones, G through N, plus the distal 0.3 of F (0.3/8.4 of the region's length) and 0.1 of "O" (0.1/8.4 of the region's length). F is thereby divided into "F1" and "F2", by the proximal break of XL-2, and "O" into "O1" and "O2", by the distal break of XL-1.

The net result is a division of the arms that reflect their relative lengths quite well, and a nomenclature that indicates approximate relative distances of breakpoints from the centromere, and from one another, on the Standard chromosome. For example, if a paracentric inversion on a Standard arm has a breakpoint in the distal part of region B and another in the proximal part of region G, these designations show that the proximal break is about 2% of the total euchromatin from the centromeric heterochromatin, the distal break about 6% from "hc", and the inverted segment includes about 4% of the euchromatin. Similarly a pericentric inversion with such breaks in B of one arm and G of the other includes about 9% of the total euchromatin.

This nomenclature is less meaningful when the aberration occurs on a non-Standard

arrangement within or overlapping one of the natural inversions. Then breakpoints which seem to be far apart when recorded on the Standard map may actually be very close together, and breaks that seem close in the Standard chromosome are really far apart on the non-Standard arrangement. This point is important because of the evidence that it is the paternal chromosomal contribution to the embryo that is affected by the maternal factor. In the majority of cases at least one of the paternal chromosomes broken has been a non-Standard arrangement.

In some instances inspection of separated homologues show which arrangement is involved, but in many cases it must be inferred from the evidence that the paternal chromosome is broken exclusively (Levitan, 1963). Which method is responsible for the conclusion is indicated in the description by a statement such as the following: 2R break, on 2R-1 (obs. or observed), is in the middle of region R; 3R break, on 3R-1 (inf. or inferred) is in proximal B.

Sex of the Larva

This has turned out to be a very significant item of data in the analyses of the breakpoints (Levitan, 1963) of newly-induced aberrations. Repeated aberrations have appeared in both sexes, except that most aberrations involving the Y have appeared only in males.

Cross or Experiment

The type of cross or experiment in which the aberration was encountered will be noted according to the following outline:

A. Female^{+} from stock ST_y (Levitan, 1962), any of its subdivisions (mass division of ST_y), or substrains (formed by pair mating ST_y) crossed to:
   1. A male from a natural population, identified by the common abbreviation of the state; thus "A1(O.)" means "ST_y female x Ohio male".
   2. A male from a non-inducer laboratory stock (several are listed by Levitan, 1962).
   3. A male from an artificial population developed from non-inducer stocks, e.g., those described in Levitan and Schiller, (1963).
   4. A male from the same substrain, to analyze it (Levitan and Schiller 1963).
   5. A male from another ST_y substrain (by error).

B. Female from an experimental population derived from ST_y stocks.
   1. Older female inseminated in the population.
   2. Despermed older female crossed to:
      a. A male from nature, as in A1 above.
      b. A stock male, as in A2 above.
   3. Newly eclosed female, crossed to:
      a. A male from nature, as in A1 or B2a above.
      b. A stock male, as in A2 or B2b above.

C. Female descended maternally from ST_y stock but karyotypically heterogeneous because of a previous outcross.
   1. Older female inseminated in the stock.
   2. Virgin female crossed to one sibling.
   3. Virgin female crossed to non-inducer laboratory stock male.

D. Female from an ostensibly non-inducer stock and with no apparent contact with ST_y flies, their eggs, or debris, crossed to:
   1. A male from nature.
   2. A male from the same stock.
   3. A male from a different laboratory non-inducer stock.
   4. A male from a cage developed from non-inducer lines.

*E. Female from an ostensibly non-inducer stock in an experiment attempting to transfer the inducing preopety, crossed to:
   1. A male from nature.
   2. A male from a non-inducer laboratory stock.
   3. A male from a non-inducer cage experiment.

*F. ST_y male, category being "opposite number" in every respect to "A" above.

*G. ST_y^y cage male, "opposite number" in every respect to "B" above.

*H. Non-inducer male, "opposite number" to "D" above.
*J. Non-inducer male, "opposite number" to "E" above.

‡In some of the earliest crosses, those producing aberrations described in Levitan (1962), more than one ST_y female was used per male.

*Categories E-J have thus far not produced any "newly induced" aberrations, new aberrations, if any, being of the "repeated" type.

These categories will be amended as new experimental procedures are attempted if they result in new aberrations.

If the same cross produced other new aberrations, this noted here.

Date

The last item shown is the year and month, using the Bridges and Brehme (1944) symbolism, when the larva containing the aberration was smeared. Note that the date the smear was made is given rather than the date the smear was read and the aberration found. The former date is closest to the actual production of the aberration, whereas the parafinned and frozen smear may have been read several months later. The chronological order differs occasionally from the numeral order, because a recent slide from a particularly interesting experiment may have been read ahead of an older but less interesting slide (such as one from a routine stock or substrain analysis).

Other Abbreviations

Besides those listed under "Organization" and the outline divisions and State names indicated under "Cross or Experiment", the following additional abbreviations are used:

dist. - distal, farthest from or away from the centromere area
dist'most - distalmost, that is, very close to the tip or where two sections meet
hc - chromocentric (centromeric) heterochromatin
inf. - inferred from an apparently proved generalization (Levitan, 1963)
jcn. - junction.
L - left (when it is integral part of an arm name)
Lt. - left (all other usages - so done to avoid confusion with the region "L" of the larger arms)
obs. - observed
prob. - probable, i.e. no definite inference possible
prox. - proximal, closest to or toward the centromere area
prox'most - proximalmost, that is, at the very beginning of a section
R. - right (when it is integral part of an arm name)
Rt. - right (all other usages - see "Lt." above)

References

Bridges, C. B. and K. S. Brehme. The Mutants of D. m. Carnegie Inst. Wash. Publ. 552.
Carson, H. L. 1955. J. Cell. Comp. Physl. 45:221.
Carson, H. L. 1958. Advances in Genetics, 9:1.
Carson, H. L. and H. D. Stalker. 1947. Evolution, 1:113-133.
Levitan, M. 1962. Proc. Nat. Acad. Sci. (Wash.), 48:930-7.
Levitan, M. 1963. Nature, 200:437-8.
Levitan, M. and R. Schiller, 1963. Genetics, 48:1231-8.

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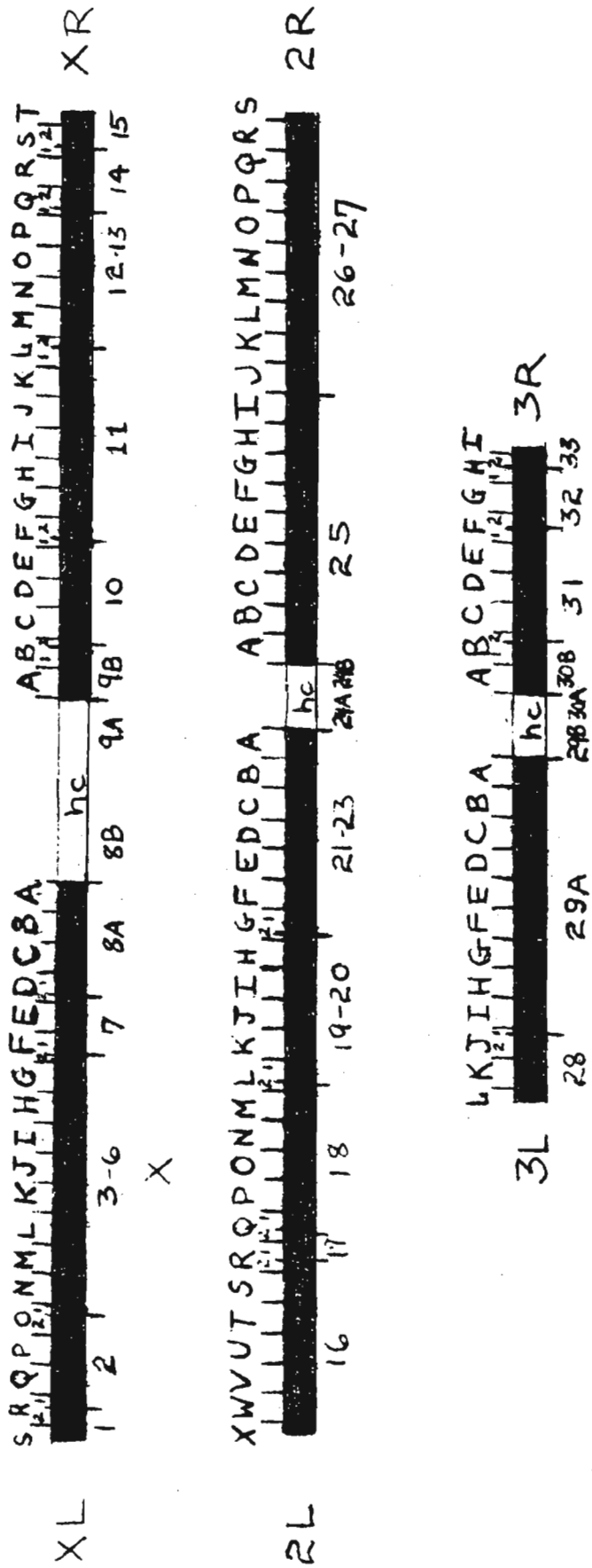


Fig. 1. D. robusta Standard chromosome diagram showing the correspondence between the proposed percentile (capital letter) divisions of each arm (see text) and the older numerical divisions based primarily on the natural inversions. The central heterochromatin of X should be perhaps a bit longer than shown.

Deficiencies

Df(XR) 1. No. 433. Newly induced. Both breaks in region S2 of XR-2(obs.) eliminating the prominent double doublet in middle of this section. Female larva. A1(N.C.) cross. 621.

Df(2R) 2. No. 43. Newly induced. Deficient are the 2 dark bands prox. to 2R-2^D, both breaks being in region R1 of 2R(obs.). Male larva. A4 cross. 62c.

Df(2R) 3. No. 398. Newly induced. Prox. break in dist'most I; dist. break in mid J of 2R(obs.). Male larva. A1(VA.) cross. 621.

Paracentric Inversions

Ipa(XL) 1. No. 10. Repeated. Possibly terminal; prox. break on XL(obs.) in prox'most 01 or just prox. to XL-1^D break; distal break, if present, in dist'most S. A3 and A1(0.) crosses. 61 g.

Ipa(XL) 2. No. 24. Repeated. Possibly terminal; prox. break in middle of clear area in middle third of M; dist. break, if present, in dist'most S. A3 cross. 61k.

Ipa(XL) 3. No. 102. Newly induced. Breaks on XL-3(obs.) effecting near reversal of XL-3; prox. break in the prominent triplet of mid N, just prox. to XL-3^B break, and separating its dist. 2 bands from the prox'most band; dist. break in N, barely dist. to XL-3^D. Female larva. A3 cross. 62f.

Ipa(XL) 4. No. 105. Newly induced. Breaks on XL-1(obs.): prox. break in A, 2 big bands dist. to hc; dist. break at jcn. of prox. and mid. thirds of N. Female larva. A3 cross. 62f.

Ipa(XL) 5. No. 131. Newly induced. Breaks on XL-3(inf.): prox. break in prox. C between the first two dark bands; dist. break in prox. part of dist. third of M. Female larva. Ae cross. 62f.

Ipa(XL) 6. No. 160. Newly induced. Breaks on XL(obs.): prox. break in hc; dist. break in dist'most D. Female larva. A4 cross; Ipe(X)7 in same cells. 62f.

Ipa(XL) 7. No. 200. Newly induced. Breaks on XL-3(inf.): prox. break in dist'most B; dist. break near tip of S. Female larva. A3 cross. 62f.

Ipa(XL) 8. No. 214. Newly induced. Breaks on XL-3(inf.): prox. break in prox. F1; dist. break in Q, at jcn of its prox. and mid thirds. Female larva. A3 cross. 62f.

Ipa(XL) 9. No. 253. Newly induced. Breaks on XL-3(inf.): prox. one in prox. B; dist. one in G, at jcn. of its prox. and middle thirds. Female larva. A3 cross. 62g.

Ipa(XL) 10. No. 268. Newly induced. Breaks on XL-1(inf.): prox. one in E, at jcn. of its prox. and mid thirds; dist. one in R1. Female larva. A3 cross. 62g.

Ipa(XL) 11. No. 336A. Newly induced. Breaks on XL-3(obs.): prox. one in I, just prox. to dark band in middle of its distal third; dist. one in mid N1. Female larva. Same A3 cross as T(XL:2R)7 and Tp(XR:4)1. 62h.

Ipa(XL) 12. No. 365. Repeated. Breaks on XL(obs.): prox. one in hc; dist. one in mid G. Several A1(N.C.) crosses. 62i.

Ipa(XL) 13. No. 396. Newly induced. Terminal?; breaks on XL-1(obs.); prox. one just prox. to first strong bands in E; dist. one in dist. S. Female larva. Same A1(N.C.) cross as T(XR:3L)10. 62j.

Ipa(XL) 14. No. 438. Newly induced. Breaks on XL-1(obs.): prox. one in hc; dist. one in G, just dist. to its prominent dark bands dist. to the bulb. Female larva. A1(N.C.) cross. 621.

Ipa(XL) 15. No. 444. Newly induced. Breaks on XL-1(obs.): prox. one in hc, dist. break in dist. F2. Female larva. A1(0.) cross. 621.

Ipa(XL) 16. No. 448. Newly induced. Breaks on XL(obs.): prox. one dist. to first band in prox'most C; dist. one just dist. to first prominent band of middle third of J. Female larva. Same A1 (Va.) cross as Ipe(3)7. 621.

Ipa(XL) 17. No. 484. Newly induced. Breaks on XL(obs.): prox. one in hc; dist. one in prox. third of I, just prox. to its last dark band. Female larva. B1 cross. 63c.

Ipa(XL) 18. No. 542. Repeated. Breaks on XL(obs.): prox. one in hc; dist. one in dist'most E. Same C1 cross as Ipe(2)51 and T(2R:3L)26. 63c.

Ipa(XR) 1. No. 20. Newly induced. Breaks on XR(obs.): prox. one in prox'most A; dist. one in L1 just prox. to its first dark band. Female larva. Same A1(O.) cross as T(XL:2R)1 and T(2L:3L)3; Ipa(XL)1 also present. 61j.

Ipa(XR) 2. No. 30. Newly induced. Breaks on XR(obs.): prox. one in prox. A; dist. one in middle of prox. third of M. Female larva. Same A4 cross as T(2R:3R)1, same cells as Ipe(X)3. 62a.

Ipa(XR) 3. No. 52. Newly induced. Breaks on XR(prob.): prox. one in prox'most G; dist. one in dist'most part of prox. third of K. Female larva. Same B2 cross as Ipa(2L)6, Ipa(2L)7, Ipa(3L)1, Ipa(2)4, T(XR:3L)4, and MB1. 62c.

Ipa(XR) 4. No. 63. Newly induced. Breaks on XR-2(obs.): prox. one in hc; dist. one between the bands of the dist'most group in G. Female larva. Same B2 cross as T(XL:2R)2 and T(2R:3L)4. 62c.

Ipa(XR) 5. No. 88. Newly induced. Breaks on XR-2(obs.): prox. one in region P, at jcn. of its prox. and middle thirds; dist. one in similar position of region R. Female larva. A3 cross. 62e.

Ipa(XR) 6. No. 165. Newly induced. Breaks on XR-2(inf.): prox. one in mid D, prox. to its last dark band; dist. break in mid L1, just dist. to first dark band there. Female larva. Same A3 cross as Ipa(2L)13, T(XL:3R)5, T(XR:2L)6, T(2L:3L)12, and T(2R:3L)10. 62f.

Ipa(XR) 7. No. 199. Newly induced. Breaks on XR-2(inf.): prox. one in prox'most hc; dist. break in prox'most part of middle third of J. Female larva. Same A3 cross as Ipa(XL)7, T(XL:3R)6, and MB7. 62f.

Ipa(XR) 8. No. 212. Newly induced. Breaks on XR-2(obs.): prox. one in dist. part of hc; dist. one at dist. end of clear area in mid N. Female larva. Same A3 cross as Ipa(2R)12, T(Y:2L)8, T(2R:3L)14, and T(2R:3R)8. 62f.

Ipa(XR) 9. No. 243. Newly induced. Breaks on XR-2(inf.): prox. one in dist. part of hc; dist. one at jcn. of mid and dist. thirds of G. Female larva. A3 cross. 62g.

Ipa(XR) 10. No. 250. Newly induced. Breaks on XR(obs.): prox. one just prox. to the dist'most dark band of E; dist. one in light area of dist'most P. Female larva. A3 cross. 62g.

Ipa(XR) 11. No. 330. Newly induced. Breaks on XR-2(inf.): prox. one in hc; dist. one in mid J. Female larva. A3 cross. 62h.

Ipa(XR) 12. No. 355. Newly induced. Breaks on XR(obs.): prox. one in dist. part of mid third of K; dist. one in mid M. Female larva. A3 cross. 62h.

Ipa(XR) 13. No. 413. Newly induced. Breaks on XR-1(obs.): prox. one in hc; dist. one in P, just dist. to jcn. of its mid and dist. thirds. Female larva. Same A1(O.) cross as Ipa(2L)39. 62k.

Ipa(XR) 14. No. 456. Newly induced. Breaks on XR-2(obs.): prox. one at jcn. of mid and dist. thirds of F2; dist. break in prox'most N. Female larva. Same A1(Va.) cross as Ipe(2)46. 621.

Ipa(XR) 15. No. 477. Newly induced. Breaks on XR(obs.): prox. one between the two dark bands in mid D; dist. break just dist. to first dark band in middle third of H. Female larva. B1 cross. 63b.

Ipa(XR) 16. No. 487. Prob. newly induced. Breaks on XR(obs.): prox. one in prox. hc; dist. one just dist. to first band of the broad group in mid C. Female larva. B1 cross. 63c.

Ipa(XR) 17. No. 520. Newly induced. Breaks on XR(obs.): prox. one in prox'most M; dist. one just dist. to first dark band of dist. third of region O. Female larva. Same B1 cross as Ipa(2L)53 and Ipa(2L)54. 63c.

Pericentric Inversions

Ipe(X) 1. No. 14. Newly induced. Lt. break on X1-1(obs.) just dist. to the prominent dark band in mid I; rt. break on XR-2(inf.) between the two dark bands in mid D. Female larva. A1(Va.) cross. 61h.

Ipe(X) 2. No. 27. Newly induced. Lt. break on prox'most XL(obs.) hc; rt. break on XR(obs.) in dist. I, just prox. to the dist'most band there. Female larva. Same C3 cross as T(XR:3L)1. 62a. Photo in Fig. 1, C and D, of Levitan (1962).

Ipe(X) 3. No. 31. Newly induced. Lt. break on XL(obs.) between the dist. prominent doublet in R2; rt. break on XR(obs.) at jcn. of mid and dist. thirds of C. Female larva. Same A4 cross as T(2R:3R)1, same cells as Ipa(XR)2. 62a.

Ipe(X) 4. No. 80. Newly induced. Lt. break on XL-3(inf.) just dist. to the dist'most dark band of I; rt. break on XR-2(inf.) in the dist'most clear area of R. Female larva. Same A3 cross as T(XL:3L)1 and T(2R:3R)2. 62d.

Ipe(X) 5. No. 146. Newly induced. Lt. break on XL-3(inf.) just dist. to the middle band in D; rt. break on XR-2(inf.) in middle of dist. third of region O. Female larva. A3 cross. 62f.

Ipe(X) 6. No. 149. Newly induced. Lt. break on XL-3(inf.) in prox. part of dist. third of H; rt. break on XR-2(inf.) in prox. C, just prox. to the prominent group of bands in the middle of this region. Female larva. Same A3 cross as Ipe(2)16. 62f.

Ipe(X) 7. No. 159. Newly induced. Lt. break on XL(obs.) in middle of dist. third of Q; rt. break on XR(obs.) in prox'most A. Female larva. A4 cross, same cells as Ipa(XL)6. 62f.

Ipe(X) 8. No. 224. Newly induced. Lt. break on XL-3(inf.) near mid P, just dist. to the first band of its dist. half; rt. break on XR-2(inf.) in prox'most D. Female larva. A3 cross. 62f.

Ipe(X) 9. No. 227. Newly induced. Lt. break on XL-3(inf.) in mid D, at or very near that of Ipe(X)5; rt. break on XR-2(inf.) just prox. to the last bands of A. Female larva. In same cells from an A3 cross as Ipe(X)10 and Ipa(2R)13. 62f.

Ipe(X) 10. No. 228. Newly induced. Included in Ipe(X)9: lt. break on XL-3(inf.) in prox'most N; rt. break on XR-2(inf.) in mid C, one band dist. to that of Ipe(X)6. Female larva. Ipa(2R)13 also in same cells. 62f.

Ipe(X) 11. No. 232. Newly induced. Lt. break on XL-3(obs.) in mid S; rt. break on XR-2(obs.) in R, between the two bands at jcn. of its mid and dist. thirds. Female larva. A3 cross. 62g.

Ipe(X) 12. No. 236. Newly induced. Lt. break on XL-3(inf.) in mid R2; rt. break on XR-2(inf.) in light area of prox. third of H. Female larva. A3 cross. 62g.

Ipe(X) 13. No. 237. Newly induced. Lt. break on XL-3(inf.) in mid D, one light band dist. to those of Ipe(X)5 and Ipe(X)9; rt. break of XR-2(inf.) in middle of dist. third of E. Female larva. A3 cross. 62g.

Ipe(X) 14. No. 254. Newly induced. Lt. break on XL-3(inf.) in prox'most part of middle third of M; rt. break on XR-2(inf.) in prox'most part of dist. third of J. Female larva. A3 cross. 62g.

Ipe(X) 15. No. 295. Newly induced. Lt. break on XL-3(inf.) in K, between the light bands at jcn. of its prox. and middle thirds; rt. break just prox. to the last light band in distal I. Female larva. In same A3 cross as Ipa(2L)28 and T(XL:2L)10, same cells as T(XR:2L)17. 62g.

Ipe(X) 16. No. 384. Newly induced. Lt. break on XL-1(obs.) in light area of mid C; rt. break on XR-2(obs.) in F2, at jcn. of its prox. and middle thirds. Female larva. A1(Va.) cross. 62j.

Ipe(X) 17. No. 388. Lt. break on XL-1(obs.) among the prominent dark bands of mid G; rt. break on XR-2(obs.) in region O, just prox. to a dark band at jcn. of mid and dist. thirds. Female larva. A1(Va.) cross. 62j.

Ipe(X) 18. No. 405. Newly induced. Lt. break on XL(obs.) in prox'most hc; rt. break in XR(obs.) in light area at mid O. Female larva. Same A1(N.C.) cross as Ipa(3L)5 and T(Y:2L)11, same cells as Tp(XR:2R)1. 62k.

Ipe(X) 19. No. 466. Newly induced. Lt. break on XL(obs.) in prox. third of A, just dist. to the first group of dark bands; rt. break on XR(obs.) in dist'most F2. Female larva. A5 cross. 63a.

Ipe(X) 20. No. 518. Newly induced. Lt. break on XL(obs.) in middle of distal third of L; rt. break on XR(obs.) in distal third of O, apparently at Ipe(X)17 break. Female larva. B1 cross. 63c.

Ipe(X) 21. No. 533. Newly induced?. Lt. break on XL-3(obs.) in I, between the dark bands in middle of its dist. third; rt. break on XR-2(obs.) just dist. to the medium dark bands in mid G. Female larva. C1 cross. 63c.

Lints, F. A. and M. M. Ringelé. A volumetric microrespirometer for Drosophila.

Based on earlier descriptions by Winterstein (1912,1913) and Tyler and Berg (1941) Scholander (1942,1950) described a type of microrespirometer, able to measure oxygen consumption varying between 10 mm^3 and 10 cm^3 an hour. The proposed system was described as follows: "The respiration chamber with CO_2 absorber is balanced against a compensating chamber through a manometer. As oxygen is used it is replaced from a measuring device so as to maintain balance with the compensating chamber. The oxygen consumed is read directly on the measuring device. The system offers considerable advantages. The oxygen consumption is read directly in volume units and is independent of the gas volume of the apparatus. The only calibrated part is the measuring device for the introduction of oxygen. Each respirometer is compensated and therefore relatively insensitive to external temperature and pressure changes. The oxygen tension does not drop in the respiration chamber which can therefore be kept small with a corresponding gain in sensitivity."

The regular use of Scholander's device is uneasy without some adjustments because: 1) the oxygen consumption of a Drosophila imago varies between 1.5 and 10 mm^3 an hour; 2) when closing the described system, balance is established by several accurate corrections of the piston; 3) when the closed system is plunged in a thermostatized bath new corrections are again necessary.

Technically these shortcomings can be erased 1) by reducing the volume of the animal and compensating chambers and of the oxygen cylinder, 2) by keeping the immersed system in contact with the atmosphere till balance has been achieved. Other adjustments needed for easier manipulation and consumption reading are also described.

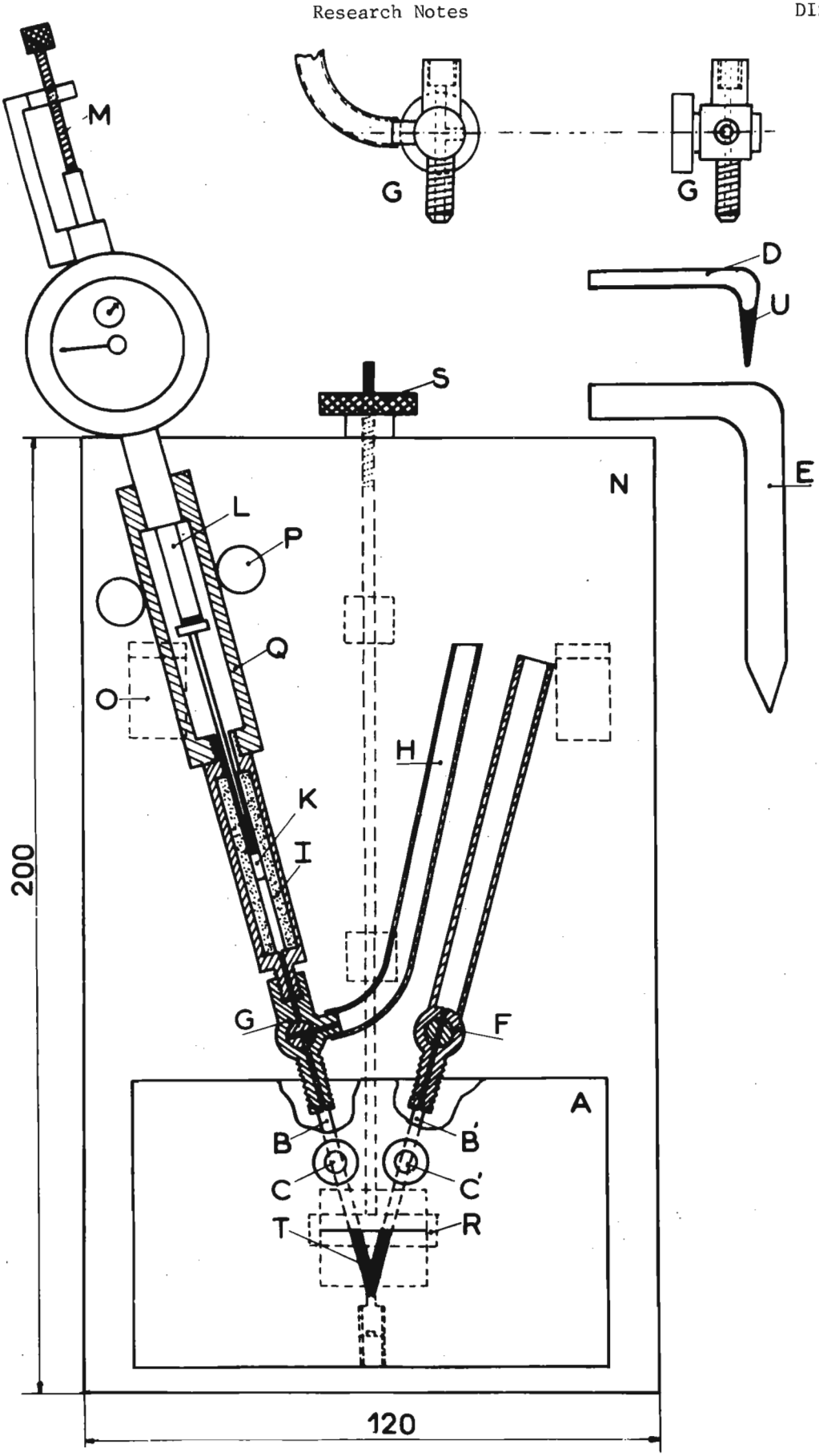
Description of the respirometer

A block of plexiglass (A) is drilled at an angle of 30° in order to accomodate two manometric branches (B-B'). The 0.3 cm^3 animal chamber (D) and the 4 cm^3 compensating chamber (E) communicate with the branches by means of two syringe needles pricked into the rubber closed openings (C-C'). A two-position cock (F) is screwed on the right-hand branch of the manometer, and is prolonged above the water level by a rigid plexiglass tube; when immersed the instrument communicates with free air by means of this cock; a second three-position cock (G) establishes communication between the left-hand manometer branch, either with open air by means of the flexible plastic tube (H), or with the oxygen filled glass cylinder (I). The two millimeters-diameter glass cylinder (I), is the only calibrated part of the instrument; it is closed by a copper piston (K) with a teflon head. Screw (M) moves the shaft (L) of the comparator which in turn moves the piston. The comparator has a 10 mm length; each millimeter is divided into 100 parts; One hundreth of a millimeter equals 0.0314 mm3 or 1u, when using a two millimeters-diameter syringe. The whole device is fixed on a suitable plexiglass plate (N) which is attached to the edge of the bath by means of two fittings (O). The weight of the syringe-comparator ensemble on the screwed part of the cock (G) is supported by two plexiglass rollers (P).

Operation

The animal chamber (D) containing the subject is pricked into opening (C) by means of a syringe needle. The O_2 filled syringe is fitted to the cock (G); the plastic tube (Q) is screwed to the plastic frame-work of the syringe, and the shaft of the comparator is then introduced. The apparatus is immersed with open cocks, as indicated on the complete drawing. Cocks are closed after fifteen to thirty minutes when balance has been established; cock (F) is closed one quarter of a turn; cock (G) is turned like in the upper right corner figure. After thirty to sixty minutes the manometer fluid is leveled by means of screw M; the movement of piston K, which is the measure of O_2 consumption, is read directly on the comparator. For each measurement a precise leveling is read on the horizontal line (R), adjustable by means of screw (S).

The carbon dioxide absorbant is a 1/10 solution of KOH (U). The manometric fluid is a non-colored solution of potassic soap. No joint must be greased, all parts being screwed; tightness is secured by fine rubber joints. The sensitivity of the ensemble is dependent upon the relative volumes of the animal chamber and of the compensating chamber; the greater the difference in volume between the branches, the greater the sensitivity.


M
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Accuracy, the opposite quality, which requires slight differences in chamber volumes, is, theoretically, 0.12 mm^3, the animal chamber volume being 0.3 cm^3, the compensating chamber volume being 4 cm^3, the temperature difference being 0.01°C, and this represents about 0.04 mm movement of the piston. Blank runs indicate a stability of 0.2 mm length of the piston per hour, i.e. about 0.60 mm^3, especially in the first hour. However, the respiration rate of Drosophila imagos being rather constant, the practice of the device permits one to discard easily that series of measures where one or more of these are discordant.

References

Scholander, P. F., Rev. Sc. Instr., 13:32 (1942); Scholander, P. F., Rev. Sc. Instr., 21: 378 (1950); Tyler, A. and Berg, W. A., Science, 94:397 (1941); Winterstein, H., Biochem. Zeits., 46:440 (1912); Winterstein, H., Zeits. Biol. Techn. Method., 3:246 (1913).

Van Valen, L. Variation in egg number in population cages.

The following data, collected several years ago for a purpose now obsolete, may be of use to others. Egg samples were taken periodically from lucite population cages (samples A-E from one, F-K from the other) containing polymorphic (AR-CH) D. pseudoobscura at 22°C. The collecting surface was the surface of an ordinary cream-of-wheat and molasses food cup from which the top crust had, as is customary, been removed; one drop of dilute Fleischmann's yeast suspension was placed on the surface. Eggs were collected until it seemed reasonably certain that enough for a chromosome sample (25 larvae from each of 6 days) had been obtained. The food cups lacked paper. The counts for at least the lower numbers (less than 100 or so) are close to the actual numbers as shown by counts of pupae and dissected larvae; checks were not made on the higher numbers. The first order autocorrelation is for the first 7 days of each sample and is based on an approximate formula given by Yule and Kendall (14th edition, equation 27.5) which permits values above 1 by sampling error.

Table 1. Egg number and autocorrelation

day	samples										
	A	B	C	D	E	F	G	H	I	J	K
1	41	30	36	73	142	26	105	516	7	177	168
2	63	87	46	92	314	391	161	192	9	289	322
3	144	164	16	146	433	105	126	153	5	356	248
4	195	76	48	146	421	74	40	233	92	272	305
5	128	173	27	104	426	89	103	427	115	205	481
6	149	62	16	126	429	53	138	614	40	216	445
7	98	11	127	72	107	16	71	485	35	318	486
8	72	5	99	76	268	23	146	901	79	-	991
9	115	50	177	-	191	72	62	-	169	-	-
10	67	77	181	-	133	83	87	-	32	-	-
11	49	43	181	-	105	149	-	-	98	-	-
12	-	-	332	-	-	-	-	-	343	-	-
r	1.02	0.84	0.35	1.04	1.04	0.46	0.92	0.82	0.81	0.97	0.96

Table 2. Statistics by days

day	$\bar{X} \pm s_{\bar{x}}$	C.V.
1	120 ± 44	120
2	179 ± 40	74
3	172 ± 39	75
4	173 ± 37	71
5	207 ± 48	77
6	208 ± 60	96
7	166 ± 54	108

Van Valen, L. An experiment in linkage. The effects of crossover suppression by a short inversion provide an instructive variation on a common linkage experiment in beginning genetics courses. The stock used is In(1)sc^{7}, sc^{7} m f, which I synthesized at Columbia in 1958. The students are told only that the stock is sc m f, the normal positions of which are easily accessible. The lack of correspondence of their results with the expected positions gives an opportunity for analysis not usually present in a linkage cross. The association of inversions with crossover suppression can be mentioned in the lecture before or after it is encountered in the lab; the hypothesis can be tested by salivary squashes of F_1 larvae.

In my cross to make up the stock, 1095 individuals gave 10% recombination between sc and m (as compared with the usual 34% or so), but gave the usual 20% recombination between m and f. The coincidence was 0.4. There is some real inter-bottle variation in recombination values, but this has not been analyzed. In 13% of 330 heterozygous females examined, there was a partial and variable dominance of sc^{7}, different scutellar and other bristles being removed asymmetrically. In homozygotes and hemizygotes for sc^{7}, the scutellars, ocellars, anterior orbitals, and postverticals were always removed, and the sternopleurals, anterior postalars, and medial orbitals were often removed or reduced.

Hanley, E. W. Lack of melanin formation in Drosophila embryo extract. Within recent years many investigators have tried with relatively little success to culture Drosophila cells in vitro for extended periods of time. It is, however, possible to grow various organs for limited periods of time, and to promote in vitro normal, adult morphology and pigmentation of eyes from imaginal discs.

Several media for culture of organs and cells derived from Drosophila have been presented (Gottschewski, G. H. M., DIS 33:179, 1959; Kuroda, Y., DIS 30:161, 1956; etc.). Some of these employ various tissue extracts from Drosophila and other organisms as supplements. Most of these extracts, however, apparently have very high tyrosinase activity, turning black very shortly after cell disruption due to melanin production. It is generally believed that several by-products or intermediates of melanin production, such as quinones, might be toxic to explanted tissues, and consequently, inhibition of tyrosinase activity is desired. Heat precipitation of the protein accomplishes this but detracts from the desirability of the extract as a supplement. Many workers have made use of phenylthiourea (PTC) as a specific inhibitor of tyrosinase activity. Unfortunately, Ogita (DIS 31:146, 1957) has reported toxic effects obtained from PTC. Perhaps a more desirable method has been found in this laboratory.

If extracts are made from Drosophila eggs (Drosophila embryo extracts) which are no more than six hours old, no melanin production is observed. (This, of course, does not eliminate the possibility of unpigmented toxic substances being formed.) Large quantities (10-20 gm) of eggs may be collected by any of several ways presented in recent issues of DIS. These can be washed free of yeast by decanting, and dechorionated with 1% Clorox solution if desired. They can then be ground in a mortar or in a glass homogenizer (preferably at a low temperature), using any desired amount of Drosophila Ringer's solution (or tissue culture medium), centrifuged at low speeds and the supernatant retained for use as a supplement. Embryo extracts might prove quite rich in necessary constituents.

Cordeiro, A. R. and H. Winge. The chromosomes of interspecific hybrids of the willistoni cryptic group of Drosophila. Burla et al (1949, Evolution 3:300) described the extreme similarity between four species of this group and their complete reproductive isolation even in laboratory conditions. The fifth member of this group, D. insularis Dobzhansky, et. al. (1957, Univ. Tex. Publ. 5721:40) produced hybrids with willistoni males and tropicalis males and larvae or pupae with equinoxialis and paulistorum males. Winge and Cordeiro (1960) and (1963, Heredity 18:215) and Winge (1963, Gen. Today 1 (8-24):138) described the

possibility of obtaining hybrids or at least larvae in 17 different interspecific crosses.

As a result of these intensive and careful intercrossings the subspecies D. tropicalis cubana Towsend (1954) was ranked at species level: D. cubana, the name D. tropicalis being restricted to the strains found in Palma, Goiás (Brazil).

We confirmed the observations of Dobzhansky (1957, Chromosoma 8:691) according to which insularis female x tropicalis male and insularis female x willistoni male hybrid salivary gland chromosomes show no pairing, and the X chromosomes, in the male larvae, exhibit a great increase of width due to "dosage compensation". The same phenomena we observed in the hybrid larvae of the following crosses: insularis (Guadalupe) fem. x paulistorum (S. Pedro Rio Grande do Sul) males; the insularis (Guadalupe) fem. x willistoni (S. Pedro) males; insularis (Guadalupe) fem. x cubana (Cuba, Trinidad or Tefé) males. With willistoni and paulistorum males from São Pedro R.G.S. some short chromosomal regions paired in few slides.

Contrary to insularis, the cubana females produced no hybrids with males of other species. However, the cubana males (Trinidad and Tefé) yielded, with all other five species, at least hybrid larvae, good enough for cytological studies. The degree of chro chromosome pairing is greater with tropicalis and completely lacking with willistoni and insularis. The X chromosome of the male larvae were clearly greater in diameter than the autosomes in these two last species. With paulistorum females, cubana exhibits interesting pairing at the free ends of the XR and IIR chromosomes, remaining unpaired the XL and IIL. The III chromosome varies from almost complete to a very loose pairing. With equinoxialis (Tefé, Amazonas) females the XR and IIR free ends show greater affinity also and the III and IIL appear completely unpaired.

The tropicalis (Palma) males did not give hybrids with cubana and only larvae or pupae with paulistorum races tested. Nevertheless, tropicalis males x willistoni (S. Pedro) showed good unpaired chromosomes with the enlargement of the X width. Some slides presented cells with the XR and IIR free ends nicely paired. With equinoxialis (Tefé) females and tropicalis males engendered unpaired chromosomes only.

It is noticeable that the excellence of tropicalis chromosomes influences the hybrids, that presents better banding and clear limits in their chromosomes. The chromosomal relations among willistoni, paulistorum and equinoxialis, show that willistoni x paulistorum in both reciprocal crosses yields many unpaired complements with the known phenomenon of X width increase; in spite of that, the best slides (about 10%) among hundreds, presented almost complete pairing. D. equinoxialis males x willistoni (S. Pedro) originated hybrids with unpaired chromosomes, the reciprocal cross was not obtained. Best results were attained between equinoxialis (Tefé) x paulistorum (S. Pedro) that gave paired XR and IIR and III chromosomes paired at the free ends only, the XL and IIL being unpaired.

In most hybrids nuclei form two masses of chromocenters in about 10% to 40% of the cells. In general, the degree of pairing is not related to homology of bands, since, in the same hybrid paired and unpaired complements are produced. Many factors that control pairing in the hybrids appear to be present in the strains tested.

Khishin, A. F. Recession. The effect of level of feeding on the frequency of X-ray induced sex linked lethal in D. melanogaster.

Newly hatched larvae were put on food with different levels of yeast: series (a) with 0.5% yeast, and series (b) with 10.0%. The emerging adult males were then irradiated with X-rays and tested for the recessive sex-linked lethal rate. Results suggest no difference between the two series (low yeast 5.5% and high yeast 5.8%, χ^2(1DF) = 0.08).

When, however, larvae raised on low or high-yeast food were X-rayed while actively feeding (about 50 hrs. from hatching), the difference in the rate of sex-linked lethals was more pronounced (low-yeast 1.1% and high yeast 1.8%, χ^2(1DF) = 2.12). If the difference in feeding is applied to the adults as soon as they emerge, by either adding to the food no yeast at all or 10% yeast, irradiation of the starved males gave a slightly, but not significantly higher mutation frequency (9.65% as against 8.55%, χ^2(1DF) = 0.7).

Slizynska, H. Location of crossveinless (cv, 13.7) on the salivary gland X-chromosome.

Gene cv is located in section 4F,5ABC of the salivary gland X-chromosome. A sex-linked lethal (locus 9.8 ± 1.3) was found to be a deficiency for 4F and 5A1,2. This deficiency does not include locus cv (df/cv is wild type); accordingly, the segment in which cv is located is shortened to 5ABC.

Slizynski, B. M. Addition to the characteristic of ft.

ft fat, 2L at 12.0 - additional characteristic: undernourished larvae develop vacuolae in the cells of the salivary glands (except the neck cells); this is accompanied by slight puff formation in the region 24 D/E and by some correlated changes in the morphology of 1A/B and 22, indicating interaction with loci located there.

Nafei, H. Lack of effect of the Cy inversions on the frequency of formaldehyde induced lethals on chromosome II of Drosophila melanogaster.

Formaldehyde food induces lethals in the early spermatocyte stage. In analogy with what has been found by Thompson for X-ray induced lethals in spermatocytes, it might therefore be suspected that heterogeneity for the Cy inversions would increase the frequency of formaldehyde induced lethals on the not inverted chromosome. This was not found to be the case in experiments in which newly hatched larvae were reared on food containing .18% formaldehyde. The inverted chromosome, kindly provided by Dr. Oster, carried a small pericentric inversion in addition to the 2 ordinary Cy inversions. In 3 experiments with homozygous wild-type (Ork) males involving 1368 second chromosomes, lethal frequencies ranged from 15.9 to 18.7%, with an average of 16.9%, while in one experiment with Cy males from a cross between Ork and Cy/Bl L^2 mutation frequency was 16.7%.

Gehring, W. "Phenocopies" produced by 5-fluorouracil.

A solution of 10 mg 5-fluorouracil (FU) + 20 mg thymidin per ml was injected into larvae 72 hours old (0,5 γ FU per larva). The treated flies hatched later than the controls and showed a variety of modifications. Most frequent were "phenocopies" of aristaphedia and Bar. Also some thorax modifications were observed. Similar effects have been obtained by nitrogen mustard (Bodenstein, J. Exp. Zool. 1949) and sodium metaborate (Sang and McDonald, J. of Genetics 1954, Goldschmidt and Piternick, J. Exp. Zool. 1957) treatment.

Browning, Luolin S. and Edgar Altenburg. An attempt to determine the proportion of fractionals among the mutations induced by ultraviolet.

Until recently the overlooking of gonadal lethal mosaicism has resulted in an underestimate of mutation rates, a circumstance which necessitates a redetermination of the rates in at least some instances. This need applies especially to mutation rates in Drosophila induced by treatment of post-meiotic stages of male germ cells with ultraviolet. For, in view of the fact that ultraviolet-induced mutations are often point mutations and thus resemble those spontaneously arising, and the further fact that a very high percent of the spontaneous ones are fractionals (about 80% as reported by Schalet), it could well be that a large percentage of the mutations induced by ultraviolet are fractionals, and that the resulting rate of gonadal mosaicism is correspondingly high.

We therefore treated adult males of Muller's Maxy stock with ultraviolet from a dermatological lamp (the dose being sufficiently high to kill over 50% of the flies), and examined the offspring both for fractional and whole-body visibles at the 13 Maxy loci, and also for fractional and whole-body lethals. The results were as follows: among 82,300 F_1 females, there were seven whole-body and ten fractional visibles at the combined 13 Maxy loci under study. Among 8,413 F_1 females, there were 46 whole-body lethals, or 0.6%; and among 100 F_1 females there was one gonadal lethal mosaic. It will be seen that in the case of both the visibles and lethals, the fractional rates exceed the whole-body. Unfortunately, the rates are very low (1 visible in 4,800 at the combined 13 Maxy loci, a rate which is fairly close to the spontaneous rate as reported by Schalet; and the above-mentioned 0.6% whole-body lethal rate as compared with about a 0.2% control rate). It is therefore possible that most of the fractionals are of spontaneous origin. The answer to the problem under investigation will require the induction of a fairly high mutation rate. This we hope to achieve with a new method of treatment. (Work supported by NIH Grant No. CA-05960.)

Browning, L. S. and E. Altenburg. The mutagenicity of DON (6-diazo-5-oxo-1-norleucine).

The alkylating agent DON (6-diazo-5-oxo-1-norleucine) decomposes to produce divalent carbon (which acts chemically somewhat like a free-radical). Moreover, it has anti-neoplastic activity, is a potent antibiotic and (according to Levenberg and others) interferes with the synthesis of purine nucleotides. It was therefore thought that it might be a strong mutagen. However, it was found to be only weakly mutagenic in Drosophila, as follows: Maxy males were injected intra-abdominally with a dose of the agent strong enough to kill all but about 10% of the flies within three days after they were injected. Among approximately 20,000 F_1 females examined for visibles (at the 13 Maxy loci) only one eye color mosaic (non-transmissible) was detected. The lethal rate was correspondingly low; namely, 12 lethals in approximately 3,000 P_2 - F_2 cultures, or about 0.4%. DON is highly toxic. It is possible that it is potentially a good mutagen, but that its toxicity prevents its employment in sufficient strength to allow its mutagenicity to come into play. (This work was supported by N.I.H. Grant No. CA-05961.)

Altenburg, E. and L. S. Browning. The induction of mutations in Drosophila by treatment of inseminated females.

The employment of ultraviolet for the study of mutagenesis in higher organisms has been hampered by the low penetrating power of this agent. Until recently two methods have been employed in the treatment of Drosophila; namely, (1) treatment of sperm cells through the body wall of adult males (with ultraviolet impinging on the compressed abdomen of the fly) and (2) treatment of the polar cap cells (the germ cells at the time that they form a cap of about 22 cells at one end of the developing egg, or about 70 minutes after fertilization). The polar cap cells are directly below the surface of the egg and are clearly visible through the thin, transparent vitelline membrane (after the egg has been dechorionated). This method therefore circumvents the penetration problem. However, it is extremely arduous (about 90% of the eggs are killed in being handled), and furthermore it entails a high statistical error, since mutagenic hits are multiplied in step with cell division in the germ track of the developing embryo. This process results in clusters of mutations, and unless the cluster size is kept down (by rearing only a few offspring per male parent that was treated in the polar cap stage of development), a few "lucky" hits or their absence can cause relatively large departures from the "expected" mutation rate.

We have been unable to achieve more than about a 1% induced rate in the sperm cells of Drosophila by treatment of the adult males even when the offspring were derived from male parents which received a dose high enough to be lethal in from three to four days after treatment, according to the method of Mackenzie and Muller. With the polar cap method we have been able to achieve a lethal rate of about six per cent.

More recently, we have been exploring the possible effectiveness of a third method;

namely, treatment of mature sperm within the everted vagina of inseminated females. The vagina is everted by means of pressure applied to the abdomen of the female, and the ultraviolet treatment is given within three minutes after the completion of mating, during which interval little or none of the sperm will have left the vagina for the storage organs, where it will no longer be accessible to ultraviolet. Only the first sperm to leave the vagina enter the storage organs and are used in fertilization; the rest are lost (according to Lefevre).

In the present experiments, sperm of Canton-S males were treated with ultraviolet in the everted vaginas of Basc females, as above described, the source of the ultraviolet being a photo-chemical lamp with a broad spectrum in the ultraviolet region. The resulting detected lethal rate was about 5% (9 lethals in 188 P_2 - F_2 cultures). This rate is almost as high as that which we have achieved by treatment of the polar cap with ultraviolet, as above mentioned, but it involves much less time and labor than the polar cap method, and is free of the cluster problem. It is hoped that with improvement in our technique (involving mostly speed in starting the treatment after the females are inseminated), the lethal rate achieved by the present method of treatment will be increased. (This work was supported by N.I.H. Grant No. CA-05960.)

Ratty, Frank J. Mutability of loci in a second chromosome duplication. This study was undertaken to determine the mutation rate of the w^+ and N^+ loci located in duplication (w) 51b7. The duplicated segment is located in the right arm of the second chromosome in region 52E or F and includes X chromosome material from 3C2 to 3D2. One day old y^+ w^a fa^{no} rb/Y;dpl (w) 51b7/ vg^+Pin^2;e^+/e^+ males were irradiated with 1000r and mated individually to three y w fa^{no} rb^+/y w fa^{no} rb^+;+/+;e/e females every two days for a period of fourteen days. The progeny were scored for changes in the duplication as well as mutations occurring at the ebony, yellow and apricot loci. Since non-virginity, non-disjunction and crossing over could result in phenotypic expressions similar to those produced by the loss of the duplication, the parental male X chromosome and second chromosome were marked with w^a and vg^+Pin^2 and the parental female third chromosome with ebony. The numbers of progeny tested and the frequencies of mutants recovered are presented in the following table:

		Days following irradiation							
Progeny observed		0-2	2-4	4-6	6-8	8-10	10-12	12-14	Total
Males	$Dp_U w^+ N_2^+$	3622	4159	4081	2875	2872	2007	3216	22832
	$vg^+ Pin^2$	3453	3646	3988	2780	2762	1891	2949	21469
Females	$Dp_U w^+ N_2^+$	3681	4093	4248	2990	2770	1912	3150	22844
	$vg^+ Pin^2$	2945	3023	3400	2500	2445	1711	2733	18757
Mutants recovered									
Mottled		1	1	4	3	3	1	1	14
Loss from dpl									
	w^+ N^+	4	2	1	0	2	0	1	10
	w^+	0	0	1	0	2	0	0	3
	N^+	0	0	1	0	0	0	0	1
ebony (e^+)		0	1	1	1	4	1	1	9
yellow (y^+)		0	0	1	0	0	0	0	1
apricot (w^a)		0	1	0	0	0	0	0	1

These data indicate that mottled phenotypes and the simultaneous loss of both w^+ and N^+ from the duplication occur more frequently than does the loss of any other single locus. A statistical comparison of these data using stevens 1942 tables indicates that the percent mutation at single loci does not fall within the confidence limits for mottled or the simultaneous loss of both loci from the duplication. If we assume that the latter category involves two hit events more frequently than do mutations at the other loci considered,

these values become even more significant. Previous work by Thompson and Novitski have also indicated a higher frequency of changes at points of non-homology involving autosomal inversions. Although the numbers of mutations in this experiment are small for each brood, the loss of both loci from the duplication occurs in early broods as well as those recovered later. Since mutations recovered during the first four days following irradiation probably did not occur in cells with synapsed chromosomes, the suggestion is made that some mechanism other than a purely mechanical model invoking stress at the points of non-homology might also contribute to a higher mutation rate. (These studies were supported by N.S.F. Grant 23639.)

Kaneko, A. Drosophilid flies attracted by several different fruits.

Some ecological observations involving preference of drosophilid flies to several different fruits were carried out at the Farm of Hokkaido University (F. U.) in the end of September, 1962, at the urban field in the east side of Sapporo City (E.S.) in the middle of June, July and August, 1962, and at the foot of Mt. Apoi in the Hidaka Mountain Group (A.H.) in the end of July, 1963. The fruits used were as follows: apple (a); banana (b); orange (o); melon (m); pear (p); grape (g). A few traps were prepared for each fruit. A total of 3110 flies belonging to 24 species of the genus Drosophila were obtained with the use of fermented-fruit-traps. The results were listed in the following table. It seems apparent that certain species were more attracted to certain kinds of fruits.

Table showing frequency-distribution of drosophilid flies attracted by different fruits

Places	E.S.				A.H.				F.U.						
Fruits	a	b	o	N	a	b	o	N	a	o	m	p	g	N	N
Species															
Parascaptomyza pallida	4	2	5	11	-	-	-	-	-	-	-	-	-	-	11
Scaptomyza apicalis	-	-	-	-	-	1	-	1	-	-	-	-	-	-	1
Drosophila alboralis	-	-	-	-	1	-	-	1	-	-	-	-	-	-	1
D. histrioides	-	4	-	4	-	-	-	-	-	1	1	-	1	3	7
D. busckii	3	1	-	4	-	-	-	-	7	1	14	7	1	30	34
D. coracina	-	-	-	-	2	14	2	18	-	-	-	-	-	-	18
D. bifasciata	2	7	1	10	12	19	4	35	-	-	-	-	1	1	46
D. suzukii	1	1	-	2	11	6	3	20	70	46	40	54	22	232	254
D. lutea	-	-	3	3	4	-	-	4	39	42	18	37	14	150	157
D. melanogaster	-	-	1	1	-	-	-	-	-	-	-	-	-	-	1
D. auraria race A	163	195	334	692	150	102	81	333	112	129	67	88	35	431	1456
race B	12	17	17	46	114	57	83	254	-	-	-	-	-	-	300
race C	6	6	4	16	5	2	1	8	-	-	-	-	-	-	24
D. brachynephros	65	19	19	103	-	-	-	-	25	6	12	34	13	90	193
D. unispina	4	-	-	4	-	1	-	1	-	-	-	-	-	-	5
D. nigromaculata	35	23	34	92	10	16	7	33	34	26	14	55	29	158	283
D. testacea	-	8	2	10	2	1	-	3	9	6	7	6	1	29	42
D. funebris	1	18	28	47	-	-	-	-	-	-	2	-	-	2	49
D. immigrans	-	1	2	3	-	-	-	-	10	26	22	21	12	91	94
D. histrio	3	-	6	9					-	-	-	-	1	1	10
D. virilis	2	3	7	12					-	-	-	-	-	-	12
D. ezoana	-	-	-	-	1	-	-	1	-	-	-	-	-	-	1
D. sordidula	-	-	-	-	-	-	-	-	-	1	-	-	-	1	1
D. lacertosa	-	-	-	-	52	31	19	102	-	-	-	6	-	6	108
D. moriwakii	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1
D. okadai	-	-	-	-	1	-	-	1	-	-	-	-	-	-	1
Total	301	305	463	1069	365	250	200	815	306	284	197	308	131	1226	3110

Makino, S., E. Momma, A. Kaneko, T. Tokumitsu, T. Shima and H. Takada.

Drosophilidae from Nopporo and Fuyushima in Hokkaido.

Collections were made in Nopporo, about ten miles distance apart from Sapporo, for three successive days in the last ten days of each month during a period from May to October, 1963, by the use of fermented fruits, and in Fuyushima, near Erimo Peninsula, Hokkaido, from July 30 to August 2, 1963, by net beside fermented fruits.

In Nopporo, a total of 3297 flies belonging to 22 species included in 4 genera were collected. Most of them were D. lacertosa (1942 specimens) and D. auraria race B (600). It is remarkable that three species (D. sordidula, D. moriwakii, D. okadai) of robusta group showed lower frequencies than in 1962. Leucophenga quinquemaculipennis, L. ornatipennis and D. quadrivittata were noted as new members of the Drosophila fauna in Nopporo forest zone.

In Fuyushima, main collections were at three stations on the foot of Mt. Apoi in Hidaka Mountain Group. A total of 1841 flies represented by 22 species included in 3 genera were obtained. Common species were D. auraria race B (549 specimens), D. auraria race A (361), D. bifasciata (187), D. lacertosa (157) and D. testacea (101). It was found that the flies of D. auraria race A were extremely abundant around the places of low altitude as well as of D. lacertosa, while D. auraria race B and D. brachynephros increased inversely around the places of high altitude. Remarkable is that the population size of each species shows variation with more or less different elevation.

Numerical data of Drosophila species collected in two localities of Hokkaido 1963

Localities / Species	Nopporo /	Total	Fuyushima /	Total	Total
Amiota variegata	2/3	5	-	-	5
L. quinquemaculipennis	1/0	1	-	-	1
L. ornatipennis	1/0	1	-	-	1
Parascaptomyza pallida	-	-	3/3	6	6
Scaptomyza apicalis	-	-	5/1	6	6
S. graminum	0/1	1	-	-	1
D. alboralis	0/1	1	1/0	1	2
D. quaudrivittata	1/0	1	-	-	1
D. histrioides	30/40	70	36/47	83	153
D. coracina	35/29	64	47/31	78	142
D. bifasciata	9/13	22	90/97	187	209
D. suzukii	5/2	7	5/21	26	33
D. lutea	2/1	3	1/3	4	7
D. nipponica	-	-	3/0	3	3
D. auraria race A	-	-	155/206	361	361
D. auraria race B	139/461	600	203/346	549	1149
D. auraria race C	-	-	4/4	8	8
D. brachynephros	4/5	9	40/46	86	95
D. unispina	1/4	5	11/9	20	25
D. nigromaculata	124/72	196	57/21	78	274
D. testacea	107/46	153	45/56	101	254
D. histrio	9/4	13	32/36	68	81
D. ezoana	2/1	3	1/2	3	6
D. sordidula	54/54	108	4/6	10	118
D. lacertosa	858/1084	1942	84/73	157	2099
D. moriwakii	28/19	47	-	-	47
D. okadai	29/17	45	1/3	4	49
D. sp.	-	-	1/1	2	2
Total	1440/1857	3297	829/1012	1841	5138

Peacock, W. J. and J. Erickson. An indicator of polarity in the spermatocyte?

During a study of the cytology of SD it was found that first division spermatocytes from the testes of early pupae frequently contained a mass of granular inclusions at one end of the cell (Figs. 1-4). In prophase the inclusions are spread throughout the cytoplasm but as the metaphase plate is formed there is a progressive aggregation until most are grouped at one end of the spindle. The "granules" also occurred in the connective, nutritive and spermatogonial cells but did not show any tendency towards a nonrandom distribution within these types of cells. They were also readily identifiable in testes of older pupae and adults but were absent from the meiotic cells in these preparations. Tests made over three generations of outcrossing showed the granules to be transmitted only by the females. The original females used were from a cn bw stock obtained from Madison. Examination of a cn bw stock from Berkeley proved the inclusions to be present but in reduced numbers, whereas a cn bw stock from Oak Ridge did not possess them at all, nor were they present in a number of other stocks examined. No attempt has been made to isolate or identify the granules but their size and characteristics suggest a bacterial nature.

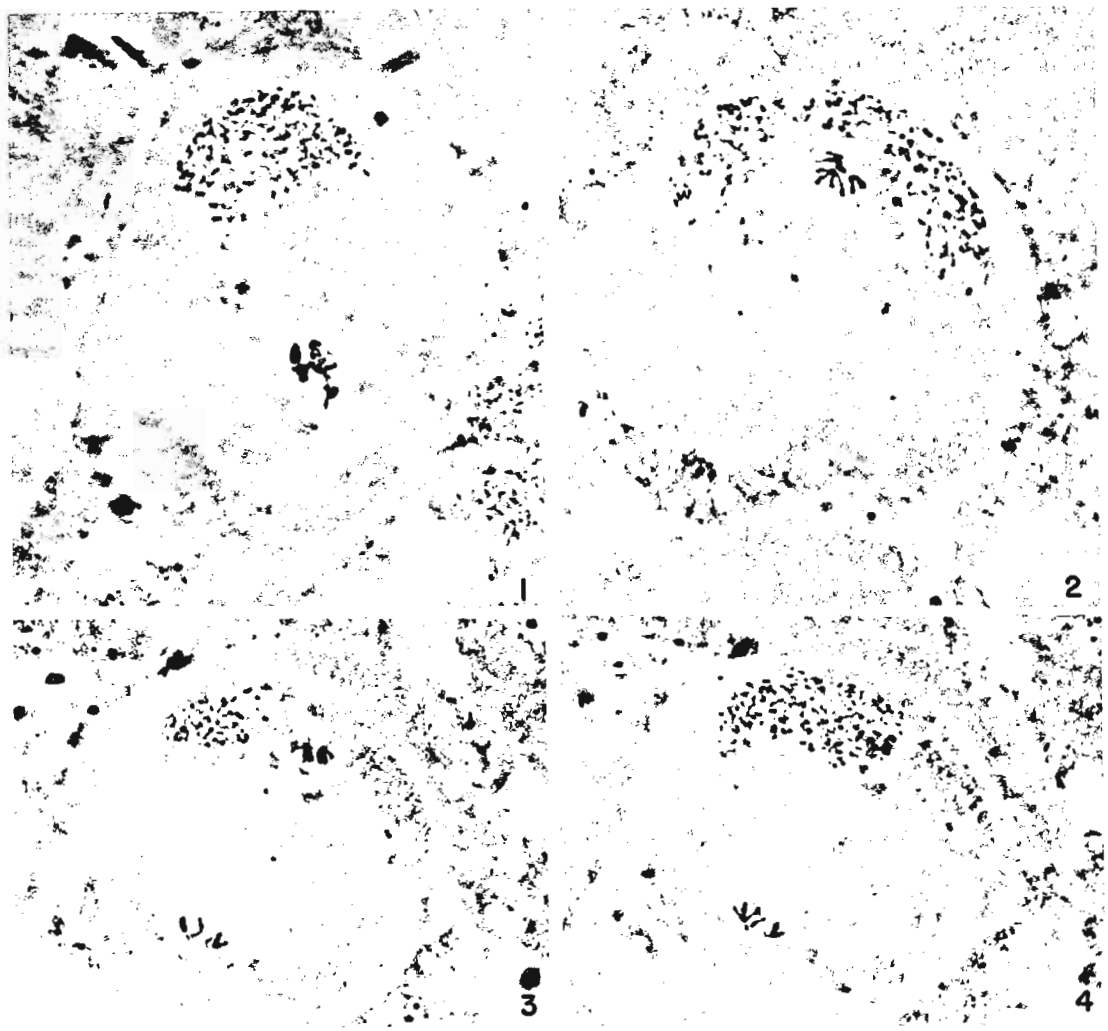


Fig. 1 Metaphase 1 with granules grouped at one pole
Fig. 2 Anaphase 1 with granules surrounding a polar group of chromosomes - other anaphase group out of focus
Figs. 3, 4 Anaphase 1 - two focal levels showing chromosomes and polarized granular inclusions

The fact that polarization of these bodies is restricted to meiotic cells is perhaps indicative of a response to an intracellular differentiation of some kind. An inequality of the poles of the primary spermatocyte has been suggested in explanation of some cases of meiotic drive (Novitski and I. Sandler, 1957 P.N.A.S. 43:318-324; Peacock and Erickson, in manuscript). Stocks are now being set up in which cytologically heteromorphic homologues known to exhibit meiotic drive are being incorporated into a "granule infected" cytoplasm. If the chromosomal and granule systems are responding to a cytoplasmic gradient then direct cytological verification will be possible.

Momma, E. Variability of sex-ratio in natural population of D. auraria.

A survey of ecological features of Drosophila in the University Botanical Garden, Sapporo, was made during a period from 1953 to 1962. The flies were collected periodically every month by the use of traps baited with fermenting banana. During ten successive years, 23,936 flies representing 40 species were obtained.

D. auraria was the most common species showing the rate of 39.2% (most of them were type A) of the total specimens. Sex-ratio (the number of males per hundred females) of this species was 92. The highest ratio (114) was observed in 1955, and the lowest one (82) in 1960 and 1962. The variability of the ratio seems to have no relation to their annual activities. D. auraria type A, however, generally showed seasonally high ratio in active period (95 in both July and August), and low ratio in inactive ones (59 in June, 74 in September and 65 in October). Type A shows a bimodally diurnal activity with two peaks in the morning and in the evening. Sex-ratio was higher in the morning (107) than in the evening (71). The largest difference of the ratio between the two peaks was found in August as 125 in the morning and 78 in the evening, and the smallest one in June as 63 and 61. The intermediate ratio (79) was observed in inactive time between the two peaks.

Tates, A. D. and B. Leigh. Differential radiosensitivity for lethals and XO males in the pupal testis.

To investigate the comparative sensitivities of pupal germ cell stages, a 960r irradiation dose was given to 96 hr, 72 hr, 48 hr, 24 hr and 0 hr pupae. They carried the X^{c2} y B chromosome. Immediately after eclosion the males were individually mated, for two one-day broods, with six females per male per brood.

Tests were then carried out for sex-linked lethals and XO males. It can be seen in table I that, on the first day, the peak for lethals occurred in progeny of pupae treated

Table I

Sex-linked lethals in X^{c2} y B

age of pupae in hours	1st. day		2nd. day		1st. and 2nd. day
	n chr.	% l.	n chr.	% l.	% l.
0	827	5.3	663	5.4	5.4
24	713	9.3	867	6.2	7.6
48	965	6.4	832	9.7	8.0
72	986	3.5	1001	5.4	4.4
96	1028	2.3	1035	2.4	2.4

at 24 hrs. On the second day the peak shifted to those which had been treated at 48 hrs. When the first and second day results are pooled, to simulate a two-day brood, it appears that the 48 hrs. pupae contain the most sensitive stage. Our results show that, in agreement with results obtained by Falk using translocations, the cells at the tip of the testis in 48 hr. pupae have passed the most sensitive stage.

Table II.

age of pupae in hours	1st. day total progeny	1st. day % XO males	2nd. day total progeny	2nd. day % XO males	1st. and 2nd. day % XO males
0	2374	6.7	1994	8.1	7.4
24	1817	2.6	2356	4.8	3.8
48	4142	2.7	3387	3.5	3.1
72	5728	1.5	6339	2.0	1.8
96	4466	1.5	8896	1.1	1.2

When the frequencies of XO males are considered (table II), it can be seen that the highest frequency occurred in the 0 hr pupae. This was found on both days, although the frequencies were higher on the second day. Peaks for the induction of sex-linked lethals and XO males thus occur in different stages of germ cell development and this is similar to what has been found when adult males are irradiated (Leigh, Sävhagen, Strangio).

Simultaneously with the irradiations, and at intervals afterwards, samples of the pupae have been prepared for electronmicroscopic examination. This will allow a precise identification of the stages sampled and the cytological changes which occur after irradiation.

References

Falk, R. (1962) Int. J. Rad. Biol. 4:437; Leigh, B. (1963) Proc. XIth Int. Congr. Genetics Vol. I, 5:39; Sävhagen, R. (1961) Hereditas 47:23; Strangio, V. A. (1962) Amer. Nat. 96:145.

Sävhagen, Ruth. Induced crossing-over and translocations in spermatogonia of Drosophila melanogaster.

0-1 day old males, heterogygous for 6 marker genes in the third chromosome were irradiated with 4400r of X-rays and then mated to virgin females. The males were kept with an excess of virgin females up to the 11th day after irradiation (a.i.). Every second day during this period the males were transferred to a new mating cage and new females were introduced. On the 11th day a.i. the males were individually mated for 3 days to females homozygous for the 6 marker genes. On the 14th day a.i. the males were transferred to new vials containing two types of females (females homozygous for the 6 marker genes, and cn bw, e^{11} females), the old females were allowed to oviposit for three 3-day periods. The second mating period consisted of four days and thus, on the 18th day a.i., the males were again transferred to females homozygous for the 6 marker genes and after three days the males were mated for four days to the above mentioned two types of females. Through this technique it was possible to study the occurrence of induced crossing over in all the mating periods, and at the same time in two periods the frequency of induced translocations was studied. The translocation tests were performed in such a way that among the offspring from each male, 10 F_1 males were tested for the occurrence of II-III translocations.

The results are presented in Tables 1-3.

Table 1 a.

Exp. I	Mating period in days after eclosion 11-13	14-17	18-20	21-24
Total ♂♂ tested	123	72	109	61
♂♂ without c.o.	70	57	87	47
♂♂ with c.o.	53	15	22	14
% ♂♂ with c.o.	43.1	20.8	20.2	23

Table 1 b.

Exp. II	Mating period in days after eclosion			
	11-13	14-17	18-20	21-24
Total ♂♂ tested	162	114	79	48
♂♂ without c.o.	118	93	69	43
♂♂ with c.o.	44	21	10	5
% ♂♂ with c.o.	27	18.4	12.7	10.4

From Tables 1a and 1b is seen that there is, with an increasing time from irradiation to mating, a decrease in the number of males which include crossovers among their offspring. Results which are in agreement with findings after irradiation of larval spermatogonia (Sävhagen, in press).

Table 2 a.

Mean number of crossovers per case	
Mating period	
11-13	2.0
14-17	7.2
18-20	11.4
21-24	7.8

Table 2 b.

Mean number of crossovers per case	
Mating period	
11-13	1.9
14-17	6.2
18-20	5.9
21-24	4.2

From Tables 2a and 2b it is seen that there is a complementary increase in the number of crossovers per case showing crossovers. A tendency which was also observed, even more pronounced after irradiation of larval spermatogonia.

Table 3

Rate of induced translocations

	Mating period after eclosion					
	14th-18th day			21st-24th day		
	Number of chromosomes tested	Number of translocations	Per cent	Number of chromosomes tested	Number of translocations	Per cent
Exp. I	494	3	0.61	290	-	-
Exp. II	565	3	0.53	450	-	-
Total	1058	6	0.57	740	-	-

The difference observed in the rate of induced translocations in the 14th-18th day a.i. compared to the 21st-24th day a.i. might indicate a difference in sensitivity between the spermatogonial cells or that a selection had taken place. However, in order to be able to draw some conclusions, more material is needed.

Sävhagen, Ruth and Monica Kemmer. Induced crossing over in larval spermatogonia of Drosophila melanogaster.

17 hour old Drosophila larvae were irradiated with 900r X-rays. The larvae were heterozygous for 6 III-chromosome genes. In this early stage of development the gonads contained only spermatogonia. If crossing over were induced in the III chromosome in any of these cells they could eventually appear among spermatozoa.

In order to test this the males were, after eclosion, mated to females homozygous for the 6 marker genes. Each male was mated singly to several females during a 3-day period and was then transferred to new females for a second, and also a third, 3-day mating period. In one experiment the males were mated in mass cultures for three 3-day periods and from the 10th day after eclosion they were mated singly to test females during three 3-day periods as in the previous experiment.

The results in these experiments are presented in Tables 1-3.

Table 1.

	Mating period in days after eclosion					
	1-3	4-6	7-9	10-12	13-15	16-18
Total ♂♂ tested	78	78	78	86	86	86
♂♂ without c.o.	47	59	70	74	80	81
♂♂ with c.o.	31	19	8	12	6	5
% ♂♂ with c.o.	39.7	24.4	10.5	14.0	7.0	5.8

As is seen from Table 1, there is with an increasing time from irradiation to mating a decrease in the number of males which include crossovers among their offspring.

Table 2.

Mean number of crossovers per case

Mating period	
1-3	2.2
4-6	3.4
7-9	3.2
10-12	5.7
13-15	11.1
16-18	14.8

Table 3.

Rate of crossovers per total offspring

Mating period	%
1-3	0.25
4-6	0.20
7-9	0.09
10-12	0.27
13-15	0.31
16-18	0.32

From Table 2 it is evident that there is a complementary increase in the number of crossovers per case showing crossovers.

The rate of crossovers among the total offspring showed no consistent decline with time, (Table 3.) Thus there is at present no evidence of a germinal selection.

The results are not in accordance with an opinion that the spermatogonia existing at the time of irradiation will contribute equally to the production of sperm. The decrease in the number of males showing crossovers among their offspring at the same time as the rate of crossovers per case increased rather suggests that there is an unequal contribution being more marked with increasing time from irradiation to mating.

Ramel, C. An interchromosomal effect of Cy on radiation induced nondisjunction in males.

The interchromosomal effect of inversions on recombination and chromosome segregation has only been demonstrated for Drosophila females, while investigations on males have failed to reveal a similar effect. However, when studying the influence of autosomal inversions on crossing over between X and Y in males (Ramel 1962), it was noted that fathers with autosomal inversions seemed to give a slightly higher frequency of maternal XO offspring than fathers without inversions. Such an interchromosomal effect in males would be of interest for many reasons and therefore a more thorough investigation of this point seemed justified.

In the experiments presented below the effect of In(2L + 2R) Cy on nondisjunction and loss of X and Y in males was studied. y w sn/y w sn females were mated to $y^{16}/sc^{8}Y$ males, with and without Cy. The following results were obtained:

	% + ♀♀ (XXY)	% y w sn ♂♂ (XO)	Total offspring
Without Cy	0.04	0.06	30060
With Cy	0.04	0.05	34766

The percentages of exceptional females and males are calculated in relation to the total number of offspring. As can be seen there is no indication whatever of an inter-

chromosomal effect by Cy.

The investigation was, however, extended to include not only spontaneous but also radiation induced exceptions. Males, $y^{16}/sc^{8}Y$, with and without Cy were X-irradiated with 1100r and mated to y w sn/y w sn females. For the first five or six days after irradiation, the females were changed twice and then discarded. Thereafter the males received new y w sn/y w sn females every day and these were allowed to oviposit in vials which were changed twice. Two experiments were made. In exp. 1, the males were 0-1 days old at the time of irradiation; in exp. 2 the corresponding age of the males was 3-4 days. A third, unfortunately too small, series was made with 0-1 day old y ec ct v f/$sc^{8}Y$ males. These males were treated in the same way as the males above and also mated in the same way to y w sn/y w sn females. The results of the three experiments are given in the tables below. Significant differences between the series with and without Cy are indicated: ^{x} P = 0.05-0.01; ^{xx},P = 0.01-0.001

Exp. 1. y w sn/y w sn x $y^{16}/sc^{8}Y$. The males irradiated at the age of 0.1 days.

	Without Cy			With Cy		
Mating period after irradiation	% + ♀♀ (XXY)	% y w sn ♂♂ (XO)	Total offspring	% + ♀♀ (XXY)	% y w sn ♂♂ (XO)	Total offspring
7th day	0.06	0.79	16142	0.02	0.79	15880
8th day	0.16	1.23	10474	0.19	1.31^{xx}	9264
9th day	0.38	1.86	3337	0.16^{x}		5609
10th day	0.13	0.44	12898	0.11	0.39	13259
11th day	0.19	0.23	13381	0.11	0.23	10218

Exp. 2. y w sn/y w sn x $y^{16}/sc^{8}Y$. The males irradiated at the age of 3-4 days.

	Without Cy			With Cy		
Mating period after irradiation	% + ♀♀ (XXY)	% y w sn ♂♂ (XO)	Total offspring	% + ♀♀ (XXY)	% y w sn ♂♂ (XO)	Total offspring
6th day	0.03	0.64	6583	0.05	0.59	8543
7th day	0.04	0.62	4992	0.11	0.67	2689
8th day	0.19	1.22	5896	0.06^{x}	0.81^{x}	6566
9th day	0.04	0.93	5047	0.09	0.62	6405
10th day	0.11	0.71	9140	0.03^{x}	0.48	6896
11th day	0.14	0.50	6243	0.05	0.46	7563

Exp. 3. y w sn/y w sn x y ec ct v f/$sc^{8}Y$. The males irradiated at the age of 0.1 days.

	Without Cy			With Cy		
Mating period after irradiation	% + ♀♀ (XXY)	% y w sn ♂♂ (XO)	Total offspring	% + ♀♀ (XXY)	% y w sn ♂♂ (XO)	Total offspring
6th day	0.02	0.67	5065	0.00	0.63	2705
7th day	0.06	1.43	3486	0.09	1.91	1098
8th day	0.11	1.46	5398	0.09	1.01	2287
9th day	0.12	0.60	3333	0.05	0.36	1950
10th day	0.21	0.32	4756	0.00	0.34	2043
11th day	0.10	0.22	5058	0.00	0.22	1348

Although no effect of Cy could be detected on spontaneous exceptions, the present data does indicate an effect on radiation-induced exceptions. At the time of the highest sensitivity, presumably corresponding to first meiosis (Sävhagen 1961), there is a significantly smaller number of exceptions with than without Cy in both the series with $y^{16}/sc^{8}Y$ males (exp. 1 and 2). It should be pointed out that there is no sign of this decrease with Cy being compensated by an increase at any other period. It thus seems

like Cy causes a real reduction of exceptions rather than a shift in the course of spermatogenesis.

Considering exp. 3 with y ec ct v f/sc^{8}Y males, the material is quite small and there are no statistical differences within the separate mating periods. The trend, however, is in accordance with the foregoing experiments and the total number of exceptional females is in fact significantly lower with than without Cy.

The effect of Cy is roughly of a similar magnitude on females as on male exceptions. This indicates that Cy exerts an influence on chromosome segregation, but there is no evidence of an effect on chromosome breakage, causing loss of the sex chromosomes.

The experimental results thus suggest the conclusion that, although only detectable in combination with radiation, there is an interchromosomal effect on Cy on the segregation of X and Y in males. Whatever the actual mechanism behind this effect may be, no illegitimate chromosome pairing like the one often found in females seems to be involved, because such a pairing should have the opposite effect on X-Y segregation.

Sonnenblick, B. P. and David Rockford. Mortality and life span of D. melanogaster (a wild-type and a mutant strain with a ring-X chromosome) exposed as young adults to X-rays or to high doses of cobalt-60 gamma-rays.

A) In a previous report, DIS 37:130, 1963, Sonnenblick and Grodis indicated that 4000r of X-rays to 1-day and 7-day old wild-type imagos did not significantly effect the mean life span of the exposed organisms, although the latter in both trials had averages slightly higher than the controls. A third test has been completed, with radiological factors the same as in the earlier report. Canton-S flies, 1-day old, were exposed to 1000r of X-rays (131 flies), to 4000r (133 flies), or to 0r (125 flies) and maintained as before at 64-65°F, the lowest temperature used in any of the three experiments. The controls in the present test had a mean life span for the combined sexes of 49.2 days, with the 1000r group averaging 48.3 days and those treated with 4000r averaging 47.1 days.

It is concluded, reviewing the three experiments, that a) a genetically significant dose of X-rays (4000r) has little influence on the longevity of adults of this strain treated and nurtured as described, and b) there is no "doubling" of longevity as noted several times by B. L. Strehler, a view modified in his recent volume (1962) "Time, Cells, and Aging."

B) At the University "gamma field", adults were exposed to the 100-Curie cobalt-60 source. The dose rate, determined several times, was 25r/min. For an exposure day of 22 hours (the source is below ground for 2 hours each day) the dose totals 33,000r(33kr). Initially, casual observations were made with available material which included the Canton stock and a b-250 strain, thanks to I. Oster, which was genotypically X^{C2} y B ♂ and y f:= ♀. The ring-X chromosome was demonstrated cytologically by Oster and Balaban (DIS 37:142-144, 1963) and examination has shown the persistence of the expected phenotypes in the sexes. The early observations following exposure of 1-day wild-type and b-250 adults indicated that a) both populations responded similarly to 33kr of gamma radiation, and b) an LD50 for the b-250 adults was not reached by six weeks after exposure, and c) a yellow & forked female, exposed to 33kr, survived for 109 days. These results were unexpected and a more systematic study was begun.

Imagos of the Canton and b-250 strains were exposed on the second day after eclosion to cobalt-60 gamma-rays (dose rate 25r/min) to the following doses: 33kr (to + flies only), 66kr (to both strains), 93kr (to both strains), and to 0r. Vials containing five pair of flies were maintained at 64±1°F with a relative humidity of 30% in the incubator, and media was changed six times during the 30-day test period, a period approximately 3/5 of the mean life span. Efforts were made to keep alive any fly trapped in media or cotton; a loss of only six flies ("escapees") was recorded from the approximately 400 imagos followed in this test. Regular observations recorded the loss of any male or female in the sample.

For the period under study, it appears that doses which are genetically disastrous (no larvae were ever noticed) have only a moderate influence on viability. This holds

for the 33kr and 66kr exposures. The data permit the following comments: a) 33kr to the + sample produces viability percentages almost identical with that of the + controls; b) with 66kr, the viability of the irradiated + group is 85% while that of its controls is 91%, but even after 66kr the viability of the treated mutant adults is equal to their own controls and as good as that of the comparative wild-type population; c) a dose of 93kr is an LD50/30 for the treated + adults, primarily due to loss of males, while this dose is an LD70/30 for the b-250 flies; d) loss of males is generally higher than that of females in the test groups; e) the most surprising result (and we are seeking further verification) is that in each of the comparable dose categories - 66kr, 93kr, and controls - the viability averages for the month after exposure favor the mutant b-250 members whose males presumably carry a ring-X chromosome as demonstrated by Oster and Balaban. Even if the ring-shape has been replaced by rod-X chromosomes, a comparison to stress is still being made between a wild-type strain and members of a strain with two mutant traits, and with apparently no detriment to the latter. This we have now seen twice.

Can the wide range in radiosensitivity between imaginal and preimaginal stages be explained solely by the fact that adult somatic cells are non-dividing cells? What are the oxygen tensions in embryonic, larval, pupal and adult tissues? Would a different dose rate (25r/min in our gamma-ray tests) produce different results with respect to the several genotypes? Recalling the studies of Oster, Muller and Ostertag on spontaneous and induced breakage of ring-X chromosomes as compared with rod-X chromosomes, the results are, to us, unexpected. More information utilizing varied genotypes is necessary in order to clarify, or to discard, some of the radiobiological considerations or conclusions expressed in this note. Additional studies are in progress. (Supported by the American Cancer Society, via a Rutgers University Institutional Grant, and the Newark Beth Israel Hospital Research Foundation).

Hunter, Alice S. High altitude Drosophila of Colombia.

With continued collections over several years at various sites in or near to Bogotá it is necessary to correct and revise the note published in DIS 34:86. These collections have been made in Bogotá and surroundings and in other parts of Colombia at altitudes ranging from 2,000-3,000 meters. The average temperature of the Bogotá area is 15°C all year round but the temperatures measured at the time of collections ranged from 9-26°C. The sites in which collections have been made vary from paramo through grass and farm regions to semi-tropical forests.

A list of the species and their average frequency in the total collection over a year at one of the sites follows: D. mesophragmatica - 45%, D. pseudoobscura - 20%, D. viracochi - 7%, D. gasici - 4%, D. brncici, new species - 4%, D. immigrans - 4%, D. melanogaster - simulans - 4%, D. bandeirantorum - 4%, D. hydei - 3%. Other species which have been collected in a frequency of 1% or less of the total collection are as follows: D. busckii, D. floricola, D. capricorni, D. tolteca, D. virilis, D. funebris, D. griseolineata. In addition several unidentified species of the tripunctata and the dreyfusi group have been found.

Collections at the high altitudes mentioned previously have also been made in the Sierra Nevada of Santa Marta and in the mountains near to Medellin, near to Manizales, near to Paipa, and near to Pasto. Other species in addition to those mentioned above which have been found in these sites are as follows: D. emarginata, D. kikkawai, D. helvetica-like, D. mercatorum, D. cardini, D. cardinoides, D. campestris, D. metzii, D. canalinea, D. guaramunu, D. annulimana, D. arassari-like.

del Solar, Eduardo. Effects of crowding on sexual activity in D. melanogaster.

Population density has been shown to affect several aspects of the physiology of the members of a group. In the course of a study on the effects of crowding on rate of development, fertility, viability and

others, the rate of mating in D. melanogaster was analyzed. With this objective the following experiments were performed: 1, 5, 10, 15, or 20 pairs of 1-day-old virgin male and female D. melanogaster (Oregon R-c) imagos were placed in an empty glass vial calibrated for a volume of 10cc. The mating behavior of the flies was observed over a period of 30 minutes at a constant temperature of 24°C and under a uniform light. The time elapsed before mating, and the number of matings were recorded for every group. Similar experiments were performed in vials with a capacity of 20 and 40cc.

Table 1 and Figure 1 indicate the results which can be summarized as follows:

1) The number of matings, when there are more than 10 pairs, is not affected within certain limits by the volume, but the number of matings for 1 and 5 pairs is significantly lower at 40cc than at 10cc or 20cc.

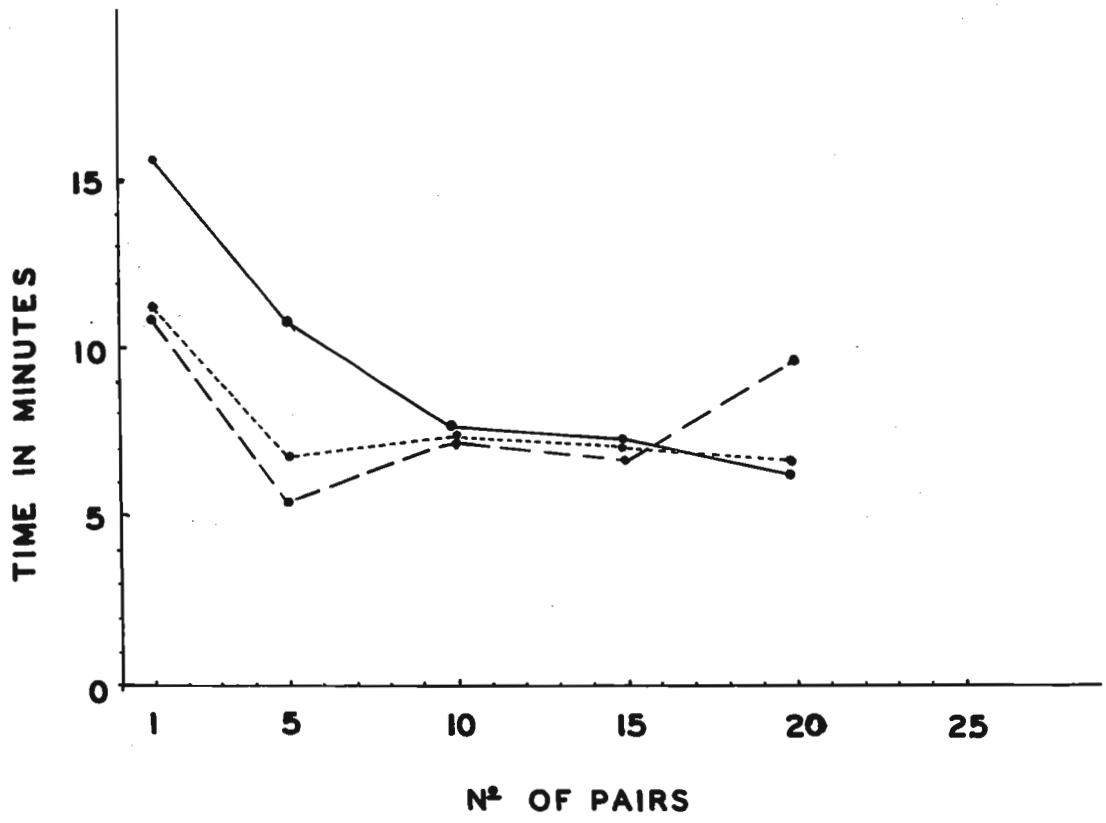
2) The time elapsed before mating, decreases linearly in relation to the increase in the number of flies, reaching an optimal mean time of around 6 minutes independently of the volume which can be either 10, 20, or 40cc.

3) As crowding increases over 15 pairs, the time before mating also increases, due to interference in courtship. This could be due to the fact that males apparently become "aggressive" against couples which are mating or courting.

Table 1

Number of pairs	10 cc % of mating	10 cc Mean time in minutes	20 cc % of mating	20 cc Mean time in minutes	40 cc % of mating	40 cc Mean time in minutes
1	69.0	10.84	61.0	11.19	55.0	15.50
5	71.1	5.32	68.0	6.95	47.2	10.78
10	61.6	7.70	68.8	7.74	73.0	7.84
15	70.3	6.72	70.3	7.02	68.6	7.16
20	63.3	9.60	63.8	6.50	65.0	6.10
	N = 500		N° = 500		N° = 500	

FIGURE 1



Rao, M. Sanjeeva. Induction of deletions and nondisjunction with 2-amino- 1,3,4-thiadiazole.

With a view to test the genetic damage of the above substance, Drosophila males of $Y^{+}Y^{BS}$ were injected with 0.2 micro cc of 0.1 and 0.2 molar solution. After 24 hrs. the treated males were mated with yellow females. The deletions on Y chromosome were detected in F_1 sons, whereas, nondisjunction is detected in F_1 daughters. The results are tabulated below:

Table 1. Deletions & nondisjunctions with 0.1 molar solution

Brood	No of males scored	No of deletions	%	No of daughters scored	No of nondisjunctions	%
A	2556	2	0.01	-	-	-
B	3185	10	0.31	-	-	-
C	2374	3	0.10	753	3	0.40
D	2263	6	0.26	1130	2	0.17
E	532	3	0.56	615	-	-
F	1024	2	0.02	856	-	-

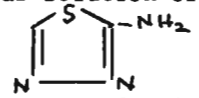
Table 2. Deletions & nondisjunctions with 0.2 molar solution

A	2550	8	0.31	3382	2	0.06
B	1884	5	0.27	2615	2	0.08
C	1640	7	0.42	2142	-	-
D	649	3	0.46	925	2	0.21
E	1065	6	0.56	1445	1	0.06
F	1083	7	0.64	1407	-	-

Table 3. Deletions & nondisjunctions in control

A	2036	5	0.24	3226	-	-
B	2367	2	0.089	2961	1	0.033
C	2142	2	0.09	3060	-	-
D	2762	4	0.14	2383	-	-
E	847	-	-	1188	-	-
F	490	1	0.20	735	-	-

Rao, M. Sanjeeva. The sensitivity of Drosophila testis to 2-amino-1,3,4-thiadiazole.

Adult Oregon-K males were injected with 0.2 U l of 0.1 and 0.2 molar solution of 2-amino-1,3,4-thiadiazole 

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The treated Oregon-K males 24 hours after injection were mated with three virgin females of a dual-purpose tester stock $Y\ Sc^{SI}\ In49\ Sc^{S}$;bw;st which allows the scoring of sex-linked recessive lethals and translocations. Induced sex-linked recessive lethals and translocations were studied in six broods of 3 days interval. The results are tabulated below.

From the results it is observed that 0.1 molar solution of 2-amino-1,3,4-thiadiozole is not at all mutagenic whereas 0.2 molar solution is a weak mutagen.

Brood	No scored		No lethals		%		No scored		No translocation		%	
	0.1 conc.	0.2 conc.	0.1 conc.	0.2 conc.	0.1 conc.	0.2 conc.	0.1 conc.	0.2 conc.	0.1 conc.	0.2 conc.	0.1 conc.	0.2 conc.
A	502	661	1	8	0.2	1.21	500	618	-	1	-	0.16
B	486	551	-	9	-	1.63	480	532	-	-	-	-
C	408	413	1	2	0.2	0.48	400	362	-	-	-	-
D	593	192	2	3	0.34	1.56	590	234	-	-	-	-
E	281	203	3	2	1.07	1.00	300	255	-	-	-	-
F	589	315	3	2	0.50	0.63	500	266	-	-	-	-

Miller, Dwight D. and Reena Roy. Further study of variation of the Y chromosome of D. affinis subgroup species.

Variation of the Y of D. affinis, algonquin athabasca, azteca and tolteca was further investigated in acetic orcein squash preparations of adult testes, both from stock bottle and wild specimens, extending the observations reported by Miller and Stone (1962). Our own collections were greatly augmented by contributions of Drs. Alice Hunter (Bogotá), Max Levitan (Philadelphia), H. D. Stalker (St. Louis), and M. R. Wheeler (Austin), to whom we are very grateful. Intraspecific variation in appearance of the Y has been seen in all these D. affinis subgroup species.

New material of D. affinis came from Florida, Iowa, Minnesota, Mississippi, Nebraska, North Carolina, Ohio, Pennsylvania, South Carolina, Virginia, and Wisconsin. The Y chromosome of this species continues to be extremely variable in appearance, the number of types being undetermined. A large J with a prominent secondary constriction in the short arm has been found to be the most common kind, though medium and short-J-shaped Y chromosomes are sometimes observed. Often the Y consists of three, four, or even five bead-like segments. None of the new D. affinis material showed a lack of Y chromosome, as had been reported in two Nebraska strains by Miller and Stone, giving no support to the idea the XO condition might be common in this species.

New D. algonquin material was obtained from Michigan, Minnesota, Nebraska, North Carolina, Ohio, and Pennsylvania. In addition to the medium-V type of Y reported by Miller and Stone, certain new sources of Y chromosome (Minnesota) showed the presence of a large J such as had been reported originally for this species by Sturtevant and Dobzhansky (1936).

New stocks and wild males of D. athabasca were derived from Colorado, Maine, Michigan, Minnesota, North Carolina, Ohio, and Pennsylvania. As reported earlier, three distinct Y chromosome types are common in this species: a large J (Type 1), a medium V (Type 2), and a large V (Type 3) combined with a large V-shaped X^1 and a rod-shaped X^2. All three kinds of Y have been found sometimes to manifest a prominent secondary constriction close to the spindle attachment. The new material makes possible an extension of the known geographical distributions of the types. Type 1 prevails in the west, from Alaska to Colorado, also occurs in Minnesota, Wisconsin and the northern peninsula of Michigan, and extends into the east in Quebec, Maine, and Pennsylvania (one male from Carbon County). Types 2 and 3 are both widespread and coexist in many places in the east, from Minnesota to New England to North Carolina. An additional type of Y (Type 4), a large V combined with a V-shaped X but not an X^2, was encountered in one wild male from Duluth, Minnesota.

A strain of D. azteca from Costa Rica had a large V-shaped Y, distinctly different from a more conventional J-shaped Y in a new strain from Mexico. (The collection of this species in Costa Rica by Dr. Alice Hunter represents a considerable southward extension of its known geographical range).

Reinvestigation of one Colombian strain of D. tolteca (Medellín) showed a J-shaped Y with a marked secondary constriction in its short arm and hence different from the simple J previously reported by Miller and Stone.

Elens, A. A. and J. M. Wattiaux. Direct observation of sexual isolation.

In a previous paper, one of us (Elens, 1958) described an apparatus devised for measuring the sexual isolation between different mutants of D. melanogaster. Afterwards his method was successfully applied to different strains of a quite distinct species, D. subobscura. It was slightly modified and may be summarized as follows:

1) One day before the observations, ♂♂ and ♀♀ of one strain are marked with a spot of plastic color dissolved in acetone.

2) The flies of both strains are introduced through a funnel into a little box for observation. This box is constructed of wood, square on the outside (15cm x 15cm), circular on the inside (diameter 9cm) with develled edges. Laterally it bears a little hole enabling the introduction of a funnel. It is covered by a thick glass and a checkered canvas is extended beneath (fig. 1 on facing page).

3) Copulating pairs do not generally move and are observed at time intervals less than the duration of copulation. Observations are recorded on a paper reproducing the same grid as the checkered canvas. Marked flies may be recorded as white circles and unmarked flies as black circles; ♂♂ are represented on the left and ♀♀ on the right (fig. 2 on facing page).

Explanation of figures: 1: the same copulating pair is twice observed; 2 and 3: copulating pairs once observed; 4: copulating pairs once observed.

Bibliography: Elens, A. A. 1958. Le rôle de l'hétérosis dans la compétition entre ebony et son allèle normal. Experientia, 14:274-278.

Springer, Robert. The courting of D. subobscura males under minimum light conditions.

Sexual inactivity of D. subobscura males in darkness or red light (Wallace and Dobzhansky, 1946) can be used as a characterestic of behaviour in genetic experiments since the various strains may differ in their light reactions.

Comparative investigations were carried out with the structural homozygous strain Küsnacht (K), inbred in laboratory for more than 15 years, and a 15-month old strain (P) from Ponza, Italy, which showed considerable structural polymorphism in all chromosomes. The cultivation temperature was 21.5° to 24.5°C. At the beginning of the tests the animals were at the average five days old. The cultures were exposed to the light of an eight-watt bulb at a distance of 2.5 meters for about 12 to 13 hours a day, and kept under control for 18 days. The results were as follows:

No. of cultures	Crossing	Offspring	No offspring
10	above 20 ♀P x above 20 ♂P	8	2
12	above 20 ♀K x above 20 ♂K	-	12
3	11 ♀K x 10 ♂P	3	-
3	10 ♀P x 10 ♂K	-	3
2	4 ♀P x 4 ♂P	2	-
10	2 ♀P x 2 ♂P	3	7
10	1 ♀P x 1 ♂P	5	5

Under given light conditions, Küsnacht males produced no offspring whereas at least one-third of the Ponza males copulated successfully.

The results confirmed the statements by Wallace and Dobzhansky (l.c.) that darkness prevents the courting of males but not the mating readiness of females. Further investigations are planned.

Literature: Wallace, B. and Th. Dobzhansky, Experiments on sexual isolation in Drosophila. VIII. Influence of light on the mating behaviour of D. subobscura, D. persimilis and D. pseudoobscura. N.A.S. Vol. 32, 1946.

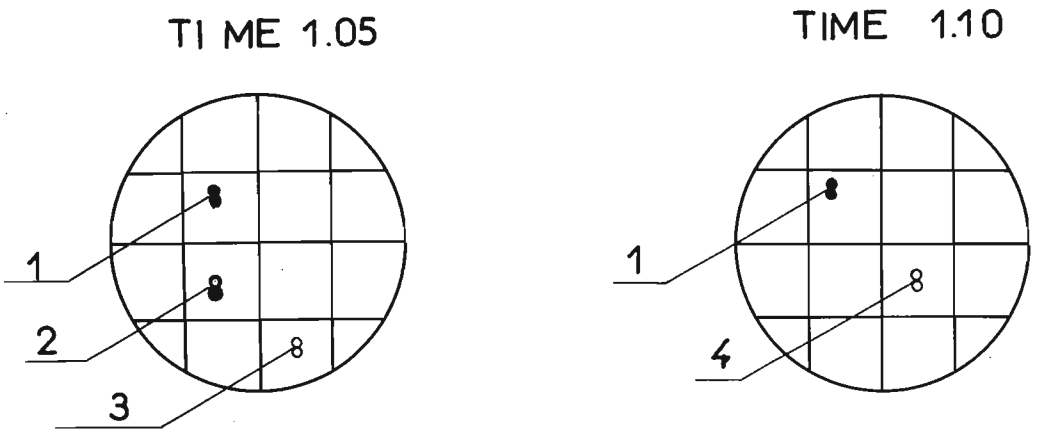

TI ME 1.05
1
2
3
8
TIME 1.10
1
8
4

FIG. 2

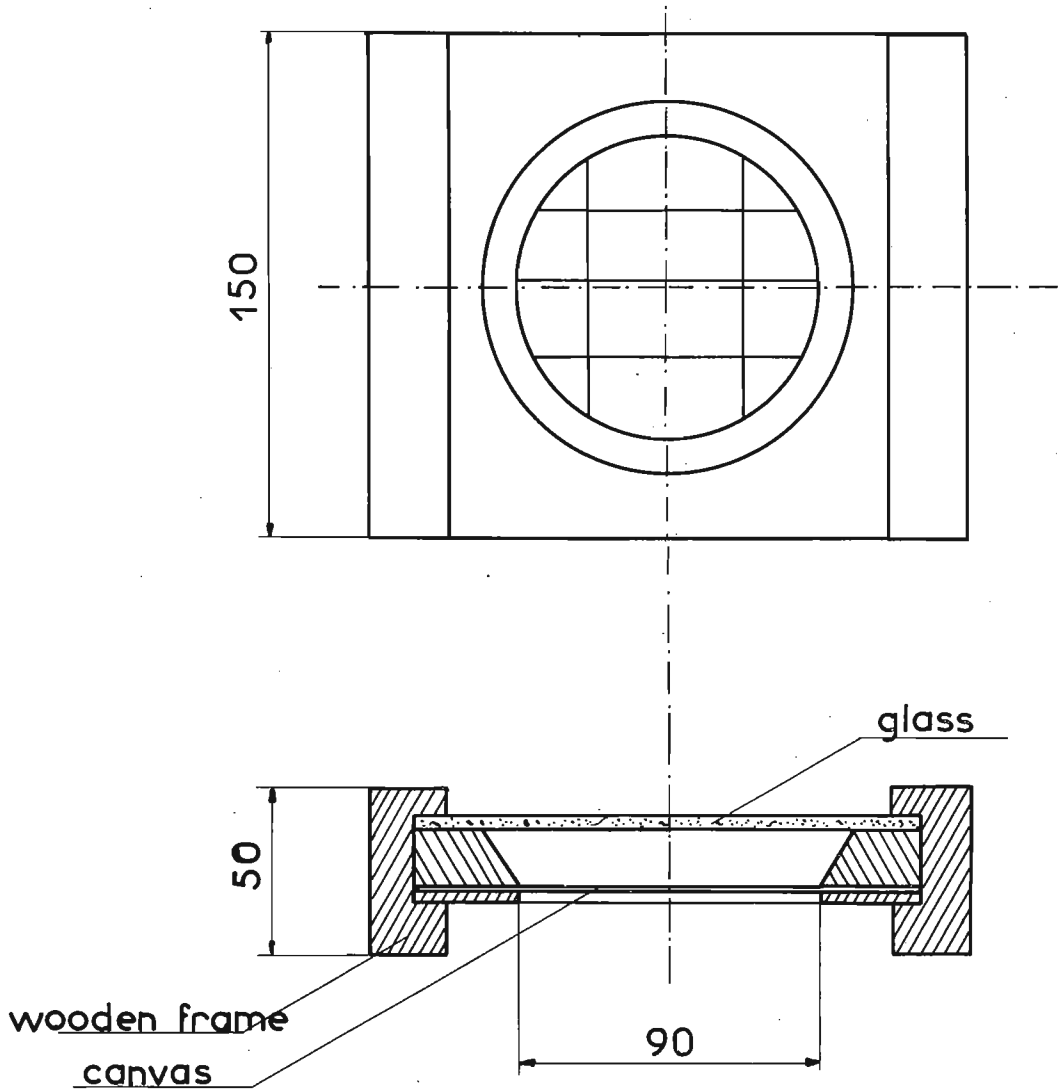

150
glass
50
wooden frame
canvas
90

FIG. 1

Hadorn, E., P. Remensberger, and H. Tobler. Is testicular differentiation dependent on metamorphosis?

Larval testes of Drosophila melanogaster were implanted and cultivated in the abdomins of adult flies. In this milieu the spermatogenesis proceeds at the same normal rate as in metamorphosing pupae and leads likewise to ripe sperms. On the other hand, in such implants, even after 16 days of culture in adults, no pteridines nor riboflavin could be found. Thus, the formation or the storing of these substances in the testicular coat depends on the process of metamorphosis, whereas spermatogenesis is neither dependent on metamorphosing hormones nor on the presence of testicular pteridines. In non-metamorphosing posterior parts of constricted larvae we also found an independent completion of spermatogenesis, the different stages being reached simultaneously with these in normal metamorphosing controls.

Hadorn, E. Results from permanent cultures of Drosophila cells in vivo.

Groups of larval cells from the male genital-imaginal disc of Drosophila melanogaster up to the present have been cultivated in the abdomen of adult females for fourteen months. In this milieu the implants exhibit a strong proliferating activity. The larval state of the implanted cells as well as their latent capacity for imaginal differentiation is permanently maintained. Fragments of the cultures which have been retransplanted into larval hosts differentiate, under the influence of the hormones of metamorphosis, normal adult organs. These include not only structures which are in accordance with the prospective significance of the original genital blastemas. In addition such implants form structures of foreign significance, such as parts of the adult head, wings and legs.

(cf. Hadorn, E.: Dev. Biol. 7, 1963 and Rev. Suisse de Zool. 71, 1964 in press).

Lefevre, G. and U.-B. Jonsson. Mutability of mature sperm following irradiation of virgin males and inseminated females.

Various investigators have reported that the mutability of mature sperm is higher when they are irradiated in inseminated females than when they are irradiated in males. (See, for example, Oster, I. I., 1961, J.C.C.P. Suppl. 1, pp. 203-207.) Our studies indicate that this is not so. In point of fact, the mutability of fully mature sperm irradiated in males has heretofore been seriously underestimated and confused with the mutability characteristic of late spermatid stages, which actually is quite low.

In our studies, virgin males of various ages were irradiated with 4000r and then mated as soon as possible thereafter with a succession of virgin females. Female F_1 progeny from each group of females were separately tested for sex-linked recessive lethal mutations. This procedure permitted the separation of sperm into groups of differing maturity in a way impossible in the usual mutation experiments. Tabulated below are the results of the first 3 matings after irradiation. (The experiments were actually continued in like fashion for 4 or 5 days after irradiation.)

Age of male irradiated	1st mating lethals/tests = %	2nd mating lethals/tests = %	3rd mating lethals/tests = %
2 hours	40/399 = 10%	- -	- -
3 days	166/1149 = 14.5	107/965 = 11.1	18/267 = 6.7
7 days	127/771 = 16.5	139/822 = 16.9	69/439 = 15.7

Inspection of the data shows that 7-day-old males produce a rather constant mutation frequency for three successive matings after irradiation. (The frequency drops during the next two days.) Three-day-old males show a high incidence only in their first mating after irradiation, and very young males (as well as late pupae) have a low frequency even in their first mating. These facts indicate that fully mature sperm have a high mutation rate, that old males have accumulated a much greater store of them than have younger males, and that freshly emerged males (and pupae) have few, if any, truly mature spermatozoa. These conclusions have been reinforced by an examination of reproductive organs dissected from males of different ages. The data do not, however, support the concept of recovery from the mutagenic effects of irradiation. There is a further suggestion, not entirely secure in the statistical sense, that the mutability of mature sperm increases showly with time. That is, an "old" mature sperm is more mutable than a recently matured one. (In this context, a sperm is presumed to be mature when it is motile.)

If these conclusions are correct, irradiation of females inseminated by males of different ages should give rather uniform mutation frequencies, perhaps increasing somewhat with the age of male. In order to test this, 3 and 7-day-old males were mated successively to virgin females, and immediately thereafter the females were exposed to 4000r. After irradiation, the females were subcultured five times over a period of two weeks. The results are tabulated below. Similar data are available for matings continued for two

sub-culture	age of male	1st mating lethals/tests = %	2nd mating lethals/tests = %	3rd mating lethals/tests = %	all
A	3 day	24/185 = 13.0	22/175 = 12.6	1/17 = 5.9	47/377 = 12.5
	7 day	5/54 = 9.3	6/38 = 15.8	2/26 = 7.7	13/118 = 11.0
B	3 day	37/362 = 10.2	29/245 = 11.8	3/16 = 18.8	69/623 = 11.1
	7 day	18/132 = 13.6	13/104 = 12.5	9/43 = 20.9	40/279 = 14.3
C	3 day	27/290 = 9.3	23/168 = 13.7	1/4 = 25.0	51/462 = 11.0
	7 day	24/254 = 9.4	30/202 = 14.8	9/60 = 15.0	63/516 = 12.2
D	3 day	6/50 = 12.0	9/80 = 11.3	0/5 = 0.0	15/135 = 11.1
	7 day	13/121 = 10.7	14/89 = 15.7	3/29 = 10.3	30/329 = 12.6
E	3 day	2/16 = 12.5	7/23 = 30.4	0/2 = 0.0	9/41 = 21.9
	7 day	0/9 = 0.0	1/10 = 10.0	2/16 = 12.5	3/35 = 8.6
all	3 day	96/903 = 10.6	90/691 = 13.0	5/44 = 11.4	
all	7 day	60/570 = 10.5	64/443 = 14.5	25/174 = 14.4	

more days. The mutation frequency remains constant after the first mating, which is consistently lower than any of the later matings of both young and old males.

These results demonstrate that the mutability of mature spermatozoa is not affected by the site of their irradiation (in the seminal vesicle of the male or in the ventral receptacle and spermathecae of the female). The suggestion remains that the mutability of mature sperm from old males is somewhat higher than that of mature sperm from young males. An unexpected result was the significantly lower mutation incidence found in the very first sperm transferred by a male, whether young or old. Perhaps the initially produced accessory gland secretion differs in chemical composition from that produced later, and provides some chemical protection from the mutagenic effects of irradiation. In the male, the accessory gland secretion meets the sperm only after irradiation when they are ejaculated at the time of copulation.

Studies are now in progress on an analysis of the mutability of the various spermatid stages. Contrary to general thought, late spermatids have a low mutability, and only early spermatids show the high mutability usually ascribed to spermatids without qualification.

Hannah-Alava, Aloha and Jaakko Puro, with the assistance of Pirkko Heinonen, Sirpa Roman and Leila Seppälä. The brood pattern of fecundity of D. melanogaster males mated singly and sequentially up to 24 days.

As the result of extensive use of the brood pattern, as a means of relating the temporal and spatial patterns of spermatogenesis in Drosophila males, the brood procedure has become more and more standardized with one notable exception, the number of females per male in each of the successive matings. Perhaps because of the expected, rather great and often unexplainable variance in fecundity of the males, even in carefully controlled experiments, the number of females available for mating has not usually been considered an important factor, consequently the number used by different investigators has varied from as many as ten per male in daily broods to as few as 2-3 per male in 3-4 day broods. However, in view of recent findings, e.g., Lefevre and Parker's (1963) report that effective male fertility may be a function of the number of females available for mating and Sobel's (1963) evidence that the expression of a clearcut period of sterility in successive broods from irradiated males may be dependent, to a degree, upon the number of females available for mating, it is now apparent that the female-male ratio per mating should be taken into consideration.

As most of the recent studies of male fecundity have been concerned primarily with the early broods, little has been reported either about the fecundity of old males per se, or the effect of differing numbers of females per brood upon the fecundity of males in the later broods. The brood procedures used in the three experiments - and summarized in the table so as to show the fecundity pattern of D. melanogaster males mated up to 24 days - differ primarily in the ratio of females to males in the early broods and the treatment of the females after transfer of the male. The results show that both have an effect upon fecundity, as expressed in terms of the number of offspring produced, throughout the reproductive life of the male. Although the data are not large enough to minimize the individual male differences or the random and as yet unexplained fluctuations (for example see broods 17 and 21 in Exp. 2 or broods 10 and 11 in Exp. 3), they do give considerable information on the brood patterns of normal (unirradiated) males and how they are influenced by the number of females available for mating.

The 35 males, in the three experiments, produced a total of 139,308 F_1 offspring or an average of 3980 flies per male. Even though the average number of offspring per day differed in the three experiments and there was considerable fluctuation from brood to brood in each of them, the brood pattern of fecundity is rather similar in that the highest number of offspring per male was in the first broods after which there was a progressive decrease in number with increasing age of the male. On the basis of the brood pattern, and since only the males alive have been considered, the reduction in number of offspring per male in the later broods could be due either to a characteristic sterility

pattern or to an actual decrease in fecundity of the males. Only two of the 35 males were excessively sterile, one for six days (broods 4-9) and one for nine days prior to his death on the 22nd day. Before the 8th day some males were sterile but only sporadically and for a single day; from the 8th to 15th day, an average of one male per day was dead and with the exception of sporadic single-brood sterility there were no striking differences in the performance of the males during this time; after the 15th day, however, the number of males dead at each transfer averaged about two, but in each case death was preceeded by a 2-4 day sterility period. Of the males surviving and producing offspring on the 24th day, two had a progressive decrease in number of offspring during the 21-24th days and two had exceptionally high numbers during at least one day of the 21-24 day broods. Thus with the exception of the very last broods the fecundity curves per male and per fertile male were found not to differ significantly except that the average number of offspring was higher for the fertile males.

In contrast the number of females available for mating in each brood as well as the number of times the females were subcultured had a profound effect on the number of

	Fecundity of males alive			Fecundity of fertile males (Exp. 3)					
	F_1 offspring per male					F_1 offspring per fertile ♀			
Bds. Days	Exp. 1	Exp. 2	Exp. 3	Males alive/ fert.	Females ave # fertile	Ave. per ♀	4-5♀♀ fertile	3♀♀ fertile	1-2♀♀ fertile
1		531.0	732.5	13/13	5.0	146.5	135.2	-	-
2		403.9	482.5	13/13	4.5	108.1	93.8	169.2	-
3	540.6	360.8	489.4	13/13	4.5	109.7	102.3	117.3	165.0
4		431.8	413.2	13/13	4.4	94.2	81.2	123.8	-
5	430.9	384.0	339.7	13/11	3.5	113.2	96.6	155.3	144.0
6		343.3	388.2	13/13	3.8	103.0	90.9	139.1	56.7
7	349.7	210.5	304.3	13/11	3.4	106.9	80.6	143.4	104.2
8	190.3	160.7	216.5	13/9	3.1	85.1	76.1	82.1	1.0
9	163.1	220.5	166.4	13/8	3.8	72.1	58.1	88.1	91.0
10	126.9	196.7	440.9	12/12	4.0	110.2	104.5	97.3	144.5
11	139.5	125.8	271.3	12/12	3.3	83.5	73.7	72.5	91.7
12	118.1	79.2	176.3	12/10	2.7	78.3	57.0	66.4	102.4
13	104.8	184.1	128.5	11/8	2.8	64.3	43.0	33.7	107.3
14	45.4	110.1	144.4	11/8	2.4	83.6	71.0	90.3	82.1
15	94.2	93.2	217.0	10/8	3.0	90.4	62.8	111.4	84.5
16	97.7	83.6	119.9	10/8	2.9	52.1	47.7	27.3	74.4
17	87.8	170.6	170.8	9/8	2.8	69.9	46.5	35.1	58.3
18	92.8	43.2	144.1	8/6	2.8	67.8	75.4	49.5	59.7
19	56.7	49.0	192.1	8/6	2.3	109.8	97.5	137.7	91.3
20	21.6	19.3	200.9	7/6	3.5	67.0	59.5	59.7	61.0
21	59.6	148.5	142.3	7/6	3.4	58.2	41.4	79.3	27.0
22	76.3	-	218.3	6/5	3.0	87.3	81.5	74.5	145.0
23	63.0	-	155.0	6/5	3.8	48.9	42.3	-	49.0
24	98.3	X	81.0	3/3	2.7	30.4	-	20.8	45.5

Parental genotypes: rucuca females (2-3 days of age at the time of mating) and ru h ca/ th st cp in ri p^p bx sr e^s males (24-48 hours of age at the time of initial mating).

Exp. 1. 7 females per male in the first three broods (1-3, 4-5 and 6-7 days) and 5 females per male per day in subsequent broods; the females were subcultured only in the first three broods; 11 males initially.

Exp. 2. 5 females per male per day; the females were subcultured once; 11 males initially.

Exp. 3. 5 females per male per day; the females were subcultured, individually, at the time the male was transferred and again after 2-3 days; 13 males initially. The offspring of the first 24 hours of each brood (that is prior to subculturing of the females) are not included in the last three columns of the table.

F_1 offspring subsequently recovered. The greatest effect of availability of females upon the number of offspring per male was in the earliest broods (1-7 days) as would be expected on the basis of other investigations. After the 12th day the pattern of fecundity was essentially the same regardless of the prior performance of the males. The lower average number of offspring per male during days 1-7, in Exp. 1, was due, at least in part, to the lack of an adequate number of females for utilization of the mature sperm available, since it is evident from the distribution of offspring among the five females in Exp. 3 that there had been multiple inseminations during the first day. There is also evidence that the reduced number of offspring in the first brood of Exp. 1 was due to loss of offspring as the result of crowding, but this cannot be the entire reason for the lower number of offspring during the 4-7 day broods. (In another experiment - to determine the number of offspring in sequential broods of wild-type males mated either to three or six females, heterozygous for a third-chromosome with ten mutant markers and a TM1,Mé chromosome, for eight 2-3 day broods - in which crowding was not a factor, the number of offspring per brood was consistently less in the three female per male matings than in the six female per male matings.) The results from the present experiments also suggest that the rate of production of mature sperm in the later broods may be related to the rate of utilization of the sperm in the early broods, since the fecundity of the males in Exp. 1 is consistently lower in all of the broods; however the difference in number of offspring in the three experiments could be a reflection of a more efficient recovery of offspring when the females have been subcultured several times.

It has been clearly shown by several investigators, e.g., Strömnaes and Kvelland (1962) and Lefevre and Jonsson (1962), that young males will mate with a relatively large number of females each day, but also that the number of sperm transferred decreases progressively with each successive mating. The results from Exp. 3 (in the last three columns of the table) point to the probability that fewer sperm are transferred with each successive mating of older males: the proportionately fewer number of offspring per female in broods with 4-5 fertile females as compared to broods with three fertile females is clearly evident during the first nine days of sequential matings, but also occurs in some of the later broods. This suggests, as would be expected, that depletion of the accessory gland fluid with successive matings is a characteristic of the old as well as the young males. However, other evidence points to the probability that availability of sufficient accessory gland fluid is not the most important factor playing a role in the reduced fecundity of the older males. Of an average of 4.9 females alive at the end of each mating period, an average of 4.0 were fertilized per day during the first ten days, but only an average 2.9 were fertilized during the 11-24th days. Nevertheless, 30% of the 11-24 day broods were from males with 4-5 fertile-female matings. Secondly, in the late broods especially, the males with 4-5 fertile matings produced a higher number of offspring per male than the males with fewer fertile matings even though the average number of offspring per fertile female was higher when fewer females had been fertilized:

	1-10 day broods			11-24 day broods		
	4-5♀♀ fertile	3♀♀ fertile	1-2♀♀ fertile	4-5♀♀ fertile	3♀♀ fertile	1-2♀♀ fertile
Ave. no. F_1 per ♂	461.1	341.2	170.7	269.9	202.1	154.4
Ave. no. F_1 per ♀	98.5	113.7	78.8	47.9	64.7	85.8

Finally, the average number of offspring per female decreased in successively later broods just as the average number of offspring per male decreased. Since it seems unlikely that the decrease in number of offspring in the broods of old males can be explained as a consequence of daily depletion of replenishment of accessory gland fluid, some other mechanism must be responsible. Whether it is a direct consequence of the physiological and/or physical changes associated with aging, or whether it is due to a progressive decrease in number of mature sperm available for insemination - perhaps as the result of a progressive slowing down of the spermatogenetic processes - cannot be decided from the results available at this time.

Gagné, Sarah Pullar. No suppressors or reversions found at m-dy locus.

The alleles miniature (m), m^{57i}, and dusky (dy), responsible for a shortened wing were X-irradiated in search of either a case of gene reversion or the appearance of a suppressor gene. At least 200,000 X-rayed flies were examined for each of these alleles. No mutation appeared. Both Johnston and Winchester (Am. Nat. 68:351, 1934) and Timofeeff-Ressovsky (Z.i.A.V. 71:322, 1936) have reported induced reversion of m in the past, at an average rate of 1/50,000.

Use of the Poisson distribution in this study shows that the probability of not finding any reversions among 200,000 chromosomes, if the actual rate is one or more out of 200,000, is 0.37. It seems doubtful the rate would be as low as 1/200,000 because all the other alleles previously studied in detail (about eight), as far as I can discover, revert at a much higher rate.

Why no reversion occurred of at least the m allele in this study is not clear. The most likely explanation is that the m allele of this study is different from that of previous experiments: The source may be different, and the stock never differentiated in name, such as m^1, m^2, etc., or conceivably the gene may have changed over the generations. A similar situation has been encountered by Green (Gen. 47:483) with the white-eosin locus, where a similar type of explanation was offered for not finding reversions.

The mating system consisted of crossing X-rayed homozygous mutant females with non-X-rayed mutant males. With only mutant genes in the system, any wild-type wing that appeared could be suspected of mutation. The marker gene garnet, 8.3 units to the right of m-dy, was also present on each mutant chromosome to help identify contamination.

Virgin females were collected every ten hours and irradiated in gelatin capsules within an additional ten hours in a G.E. Maxitron 300. About 25 females and 20 males per bottle were then mated, and all parents removed on the 8th day. Offspring were examined on the 19th day, and counted by means of weighing (flies placed in alcohol, dried overnight in oven, and weighed). Two cases of wild type flies did appear, but were both shown statistically to be the results of contamination. (See table on facing page.)

Table: Reversion Rates of Specific Alleles

Allele	Number of spontaneous mutations	X-ray rate	Dose	Average rate/r/ chromosome	Reference
m	0	2/39,923	3,975r	1.2×10^{-8}	Johnston et. al. 1934
		1/26,000	5,000	0.77×10^{-8}	Timofeeff-Ressovsky 1936
v	1	0/1,079,700	5,000	0	Lefevre and Green 1959
		0/112,311	4,200	0	Lefevre and Green 1959
		0/184,042	4,000	0	Green 1959
car	0	0/115,774	4,000	0	Green 1959
		0/1,079,700	5,000	0	Lefevre and Green 1959
		0/112,311	4,200	0	Lefevre and Green 1959
y^1	0	0/214,978	5,000	0	Green 1961
w^{apr}	(Green 1961)	2/100,394	5,000	0.40×10^{-8}	Green 1961
w^{bf}	(Green 1962)	2/190,230	5,000	0.21×10^{-8}	Green 1962
f^1	7/457,316	1/68,268	4,000	0.37×10^{-8}	Green 1959
sc^{3n}	0	12/199,678	5,000	1.2×10^{-8}	Green 1961
f^{3n}	14/298,698	38/115,774	4,000	8.2×10^{-8}	Green 1959

References: Green, M. M. 1959; Green, M. M. 1962; Johnston, Ola and Winchester, A. M., 1934; Lefevre, G., Jr. and Green, M. M. 1959, Gen. 44:769; Timofeeff-Ressovsky, N. W. and Delbruck, M. 1936, Z.i.A.V. 71:322-336.

Smith, Catharine A. M. Induced X-Y exchange and nondisjunction in $B^{S}Yy^{+}$ and $bw^{+}Y$ males.

The predominance of radiation induced X-Y exchange over nondisjunction in spermatocytes of y v/$B^{S}Yy^{+}$ males has been demonstrated by Zimmering and Wu (1963). Their results for the $B^{S}Yy^{+}$ have been confirmed, and preliminary data from $bw^{+}Y$ males suggest that the same may be the case for males carrying this type of Y chromosome. Males of the composition y v/bw^{+}Y;bw and y v/$B^{S}Yy^{+}$ were simultaneously irradiated in the prepupal stage and 12-24 hour adults brooded individually with three y sc^{S1} f In49 v sc^{8};bw females each day for four days. The exceptional female offspring allow unambiguous distinction between nondisjunction and exchange by simple inspection of F_1 females from the $B^{S}Yy^{+}$ males and by an additional generation of testing from the $bw^{+}Y$ males. The results are shown below:

y v/$B^{S}Yy^{+}$ ♂♂

	# of Regular ♀♀	# of Exchange ♀♀	# of N.D. ♀♀
Control:	1748	2 (0.11%)	1 (0.06%)
	1805	0 (0.00%)	0 (0.00%)
	841	3 (0.36%)	0 (0.00%)
	424	0 (0.00%)	1 (0.24%)
Irradiated:	750	5 (0.66%)	1 (0.13%)
	629	7 (1.10%)	0 (0.00%)
	272	5 (1.80%)	1 (0.36%)
	559	4 (0.71%)	0 (0.00%)

y v/bw^{+}Y ♂♂

Brood		Reg. ♀♀	Except. ♀♀	Except. ♀♀ tested	Exchange	Nondisj.
1	Cont.	809	1	1	0	1
	Irrad.	306	2	1	1	0
2	C	488	0	0	0	0
	I	66	0	0	0	0
3	C	552	1	1	1	0
	I	9	1	1	1	0
4	C	99	0	0	0	0
	I	0	0	0	0	0

While it is obvious that the number of exceptional females was indeed small in this experiment, it is nonetheless noteworthy that both exceptionals from the irradiated series proved to be exchanges and of the two from the control, one was an exchange. It is clear, at any rate, that the negligibly small number of exchanges as compared with nondisjunctionals reported by Sävhagen is at variance with the data from all three types of Y chromosomes tested; i.e., the $B^{S}Yy^{+}$, $bw^{+}Y$, and $y^{+}Y$ (see Wu, this issue).

Wu, Ching-kuei. X-ray induced X-Y exchange and nondisjunction in Drosophila spermatocytes.

Sävhagen (1961) and Strangio (1962) reported that X-ray induced X-Y nondisjunction greatly exceeds X-Y exchange. The reverse has been found in experiments by Zimmering and Wu (1963, 1964) from ♂♂ carrying the $B^{S}Yy^{+}$, the same kind of Y used by Strangio. Reasons for the discrepancy are given in Zimmering and Wu (1963). In the present experiment, the $y^{+}Y$, the same type used by Sävhagen, was retested to determine its radiation response with respect to nondisjunction and exchange. For this purpose, y In49 v f/$y^{+}Y$ ♂♂ were irradiated with 1000r as prepupae. After eclosion, individual males mated with four y w f ♀♀ for each of four days, and the phenotypically y^{+} females

tested to determine their origination from nondisjunction or exchange. The test was carried out in the following manner: the y^+ virgin daughters arising from the mating of the original y^+ exceptional females with their y w f/y $^+$Y brothers, were mated with y v/bw $^+$Y;bw ♂♂. These y^+ ♀♀ could be either y In49 v f/y w f/y $^+$Y or y In49 v f $^+$y/y w f. The XXY females should give about 50-60% y f females as a result of secondary nondisjunction as well as four classes of regular females, while exchange females should produce no y f females and only two classes of regular females. The results are shown below, where C = control and I = irradiated series.

Brood		Reg. ♀=y	Except. ♀=y^+	Except. tested	Nondisj.	exchange.
1	C	6581	1	1	1	0
	I	2957	10	10	5	5
2	C	4577	1	1	0	1
	I	1688	11	10	5	5
3	C	4425	1	1	1	0
	I	858	4	1	0	1
4	C	5092	1	-	-	-
	I	2310	3	3	1	2

The data suggest no appreciable excess of either nondisjunction or exchange. However, since some fraction (perhaps considerable) of exchange females would remain undetected following an exchange between X and the y^+ tip of Y which undoubtedly carries some X-derived heterochromatin from sc^8, the observed frequency of exchange could very well be an underestimate.

Lucchesi, John C. Differential interaction of deep orange with rosy and with maroon-like.

It has been proposed (Lucchesi, Proc. XI Int. Cong. Genetics) that a disturbance in folic acid metabolism may be the cause of the female-sterility exhibited by dor flies. A genetic test of this hypothesis has yielded the observations that dor;ry is a lethal combination whereas dor;bw is viable but sterile. These results suggested that the right biochemical pathway was being incorrectly manipulated.

An attempt was made to provide dor flies with a low level of xanthine dehydrogenase during their embryonic development by making use of the maternal effect of $ma\text{-}1^+$ on ma-1. Bx^3 ma-1/dor females were crossed to Balancer/Y males. A dozen dor Bx^3 sons were tested for the presence of ma-1; all were found to possess this mutant. Four of these chromosomes were used separately in the following crosses: (1) dor Bx^3 ma-1/Balancer females were crossed to dor Bx^3 ma-1/Y males, (2) dor Bx^3 ma-1/Bx^3 ma-1 females were crossed to dor Bx^3 ma-1/Y males. The first cross yielded dor Bx^3 ma-1 males and females which were maternally affected; the second cross yielded the same types but non-maternally affected, thereby indicating that dor ma-1 is a perfectly viable combination. When mass mated, these flies remained sterile.

In addition, dor flies were made homozygous for claret (ca), sepia (se) and cinnabar, brown (cn bw). Care was taken to maintain the dor chromosome against a suitable balancer and use was made of the Cy, D, and Sb balancers to follow the above recessive markers throughout the crosses. The combinations dor;ca and dor;se were found to be viable and sterile whereas dor;cn bw appears to be lethal. This latter result, surprising in light of the observation that dor;bw is viable, may find its explanation in the links which Forrest has suggested between the synthetic pathways of the pterins and the ommochromes (Forrest, oral communication, XI Int. Cong. Genetics).

A more direct attack to the problem is being considered. This would consist in determining the relative sensitivity of the above combinations and others to folic acid inhibitors, and in devising a practical method for folic acid assay in eggs and larvae.

Hoenigsberg, H. F., L. Granobles, J. G. de Navas, L. Castro and M. B. Szekessy. Lethals and semi-lethals from natural populations of Drosophila melanogaster.

The authors are studying the natural genetic load of tropical D. melanogaster. This is some of the data on the lethal and the semi-lethal frequency in the second chromosome of this species in Colombia. Several localities have been sampled for the second chromosome in the manner described by Wallace (1956). By using the Cy L/Pm technique, the authors are able to study the two kinds of heterozygotes: the Cy L/+ and the Pm/+ with the same and with different wild second chromosomes. In the F_3 all the genotypes are counted and separated in order to record their viability. The normal viability is that of the heterozygous random combinations of all the second chromosomes from one locality. All viability is relative to that normal viability: lethals are those chromosomes which produce from 0-5% of the normal viability and the semi-lethals are those chromosomes which produce from 5-50% of the normal viability. See below:

Table 1. Frequencies of lethals for wild second chromosomes of the indicated populations of Drosophila melanogaster.

	Homozygotes		Heterozygotes	
	chromosomes	% lethals	chromosomes	% lethals
Bogota	142	9.15	81	1.23
Altiplano I	144	15.27	142	0.70
Altiplano II	100	17.60	94	1.15
Medillin	100	4.28	94	0.00
Duitama	165	16.96	173	1.15
Caracolisito III	79	25.31	98	2.04
Caracolisito IV	169	24.26	183	1.09
Caracolisito V	100	16.00	94	2.40

Hoenigsberg, H. F. Selection for sexual isolation in Drosophila.

In this preliminary report it suffices to present data of 15 generations of selection against the wild phenotype. The work is based on the fact that crosses between mutants (ebony and dumpy) resulted in wild phenotypes. Such heterogamic crosses took place together with the homogamic ones in the same population-bottles. The homogamic crosses perpetuated the mutant condition, while the heterogamic preferences resulted in the wild phenotype. The wild individuals are killed as soon as they appear; this selection is done for the 8 days of duration of the counting. Every day for 8 days all the individuals are counted but while the wild individuals are eliminated the mutant progeny are kept in the same population-bottle for the length of the generation. Each population is renewed every 18 days with fresh medium using only 5 females and 5 males of each mutant in each bottle. There are 12 lines made of this 20 individuals: each line however, has a different origin. In other words there is no consanguinity among the lines used in this experiment. The 12 lines were made in identical conditions and kept at 24°C. At the end of the 15 generations Mr. Chejne tried the female and the male choice method on the individuals present in this generation and found that there were clear preferences for homogamy among the ebony and among the dumpy individuals. However, although these preferences are interesting for they were absent at the start of the experiment, they cannot be considered determining since they not always translated in copulatory discrimination. The totality of the experiments will appear elsewhere. It is interesting to observe the following table. While wilds constitute 52.5% of the total number of individuals in the twelve lines, dumpies were 27% and ebonies made up only 20% of the total. At the end of the 15th generation ebonies were 50%, wilds 32% and dumpies 17% of the total.

Table 1. The effect of artificial selection against the wild phenotype per generation.

	Generations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
+/+															
	1300	406	478	302	410	210	197	172	281	573	1143	767	464	622	675
♀$\bar{X}$	68.81	28.12	67.00	40.50	58.50	28.75	28.25	13.28	16.44	35.22	50.18	36.36	19.00	25.63	29.09
♂$\bar{X}$	49.36	22.62	52.50	35.00	44.00	23.75	21.00	11.28	14.77	28.44	53.72	33.36	23.18	30.90	32.27
%	52.46	44.03	52.99	42.17	44.46	33.76	38.84	17.42	25.24	31.83	44.57	32.01	28.51	26.61	32.87
dp/dp															
	688	317	302	117	384	166	139	169	257	707	674	443	227	616	348
♀$\bar{X}$	37.45	19.50	38.25	14.25	47.00	20.50	18.75	12.14	13.88	45.33	31.09	19.09	9.54	27.72	14.18
♂$\bar{X}$	25.09	20.12	37.25	15.00	49.00	21.00	16.00	12.00	14.66	33.22	30.18	21.18	11.09	28.27	17.45
%	27.76	34.38	33.48	16.34	41.64	26.68	20.35	17.12	23.09	39.27	26.28	18.48	13.95	26.35	17.35
e/e															
	490	199	122	297	128	246	347	646	575	520	747	1186	936	1099	1030
♀$\bar{X}$	25.54	15.00	11.25	38.25	17.25	30.25	42.25	44.57	33.55	29.55	33.72	51.36	41.81	49.09	44.90
♂$\bar{X}$	19.00	9.87	19.25	36.00	14.75	31.25	44.50	47.71	30.33	28.22	34.18	56.45	43.27	50.81	48.72
%	19.77	21.58	13.52	41.48	13.88	39.54	50.80	65.45	51.66	28.88	29.13	49.49	57.52	47.02	49.92

Hoenigsberg, H. F., A. J. Chejne and L. Castro. Interspecific differences in the red pigments of the eye of Drosophila.

Photometric analysis of the eye's red pigments of many races and species of the genus Drosophila serve to distinguish them. Before the main bulk of the experiments was done, the authors experimented on the cultural variation possible in such measurements. It was found that although intra-cultural variation exists, it is too small to be of significant importance in the studies. Furthermore, interracial affinities present evident photometric similarities. There are, however, some exceptions among the highland stocks. All individuals within a culture produce approximately equal amounts of red pigments. Crude extraction with an acidified (pH 2.00) alcohol solution was the procedure. The method was first used by Clancy (1942) and later by Ephrussi and Herold (1945). This solvent is stable. The flies are decapitated with a clean razor blade at room temperature and 5 days after emergence. Four milliliters of the solvent is prepared and 20 heads without proboscis and clypeus are placed in the solvent after they dry for 3 minutes. This way the problems of turbidity have been solved in the 24 hrs. of extraction. Some of the methods available in the literature require 8 days or more. When the pigments are extracted photometric readings are taken in the next 48 hrs.

Table 1

Optical densities of the U. V. spectrum and standard errors of the means of 3 replicas taken from red pigments extracted by the method explained in the text. These data correspond to females of the following species: 1) D. pseudoobscura 2) D. willistoni 3) D. nebulosa 4) D. melanogaster and 5) D. ananassae.

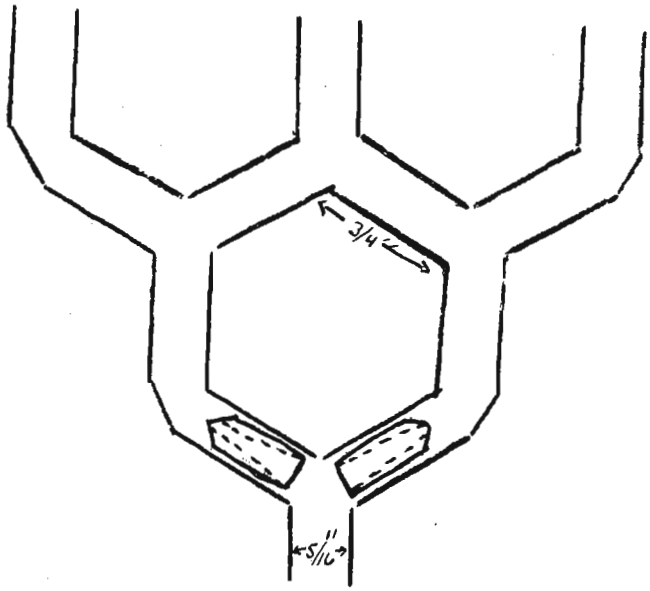
	Optical densities and standard errors				
	1	2	3	4	5
220	0.838 ± 0.0003	1.080 ± 0.0001	1.130 ± 0.0001	0.540 ± 0.0001	0.770 ± 0.0001
225	0.742 ± 0.0001	1.020 ± 0.0001	1.020 ± 0.0001	0.512 ± 0.0001	0.690 ± 0.0001
230	0.588 ± 0.0001	0.830 ± 0.0038	0.840 ± 0.0005	0.394 ± 0.0005	0.580 ± 0.0001
235	0.449 ± 0.0001	0.668 ± 0.0001	0.651 ± 0.0001	0.301 ± 0.0003	0.440 ± 0.0001
240	0.385 ± 0.0001	0.580 ± 0.0001	0.565 ± 0.0003	0.250 ± 0.0001	0.372 ± 0.0001
245	0.373 ± 0.0015	0.539 ± 0.0005	0.507 ± 0.0001	0.242 ± 0.0001	0.345 ± 0.0005
250	0.366 ± 0.0006	0.518 ± 0.0001	0.475 ± 0.0001	0.226 ± 0.0005	0.323 ± 0.0001
255	0.354 ± 0.0003	0.488 ± 0.0001	0.432 ± 0.0001	0.228 ± 0.0010	0.313 ± 0.0003
260	0.347 ± 0.0001	0.480 ± 0.0001	0.431 ± 0.0003	0.227 ± 0.0003	0.312 ± 0.0003
265	0.360 ± 0.0003	0.509 ± 0.0011	0.472 ± 0.0003	0.248 ± 0.0001	0.330 ± 0.0001
270	0.373 ± 0.0005	0.558 ± 0.0001	0.531 ± 0.0001	0.278 ± 0.0003	0.352 ± 0.0001
275	0.382 ± 0.0003	0.600 ± 0.0001	0.589 ± 0.0001	0.277 ± 0.0001	0.368 ± 0.0001
280	0.377 ± 0.0001	0.617 ± 0.0001	0.610 ± 0.0001	0.277 ± 0.0003	0.370 ± 0.0001
285	0.343 ± 0.0013	0.579 ± 0.0001	0.588 ± 0.0001	0.257 ± 0.0001	0.352 ± 0.0001
290	0.295 ± 0.0003	0.505 ± 0.0001	0.511 ± 0.0004	0.224 ± 0.0004	0.304 ± 0.0003
295	0.238 ± 0.0005	0.401 ± 0.0003	0.400 ± 0.0001	0.178 ± 0.0006	0.247 ± 0.0001
300	0.184 ± 0.0001	0.285 ± 0.0009	0.282 ± 0.0008	0.132 ± 0.0001	0.187 ± 0.0001
305	0.143 ± 0.0001	0.207 ± 0.0001	0.188 ± 0.0001	0.100 ± 0.0001	0.140 ± 0.0003
310	0.124 ± 0.0001	0.160 ± 0.0008	0.139 ± 0.0017	0.084 ± 0.0001	0.116 ± 0.0005
315	0.118 ± 0.0001	0.145 ± 0.0001	0.124 ± 0.0005	0.077 ± 0.0006	0.107 ± 0.0001
320	0.118 ± 0.0001	0.147 ± 0.0001	0.125 ± 0.0001	0.078 ± 0.0005	0.107 ± 0.0005

Hadler, Nortin. A mass screening maze for phototaxis.

Using a single Y-tube and the method of mass screening, Hirsch and Boudreau (1958) selected strains of D. m. for strong and weak phototaxis. Hirsch (1959) later developed a multiple unit classification maze for mass screening measurements of individual differences in geotaxis. This report describes an analogous maze for mass screening measurements of phototaxis that has been developed and operated for over a year. The photo-maze consists of 15 consecutive Y-units. The screening is accomplished as the flies make a series of dark-light choices in 15 consecutive Y-units to reach the terminal collecting tubes, each of which contains a plug of culture medium. Thus a sample of 200-400 flies can be introduced into the starting stem of the first Y and collected from the terminal tubes automatically scored in a frequency distribution on the basis of their 15 consecutive light-dark choices. Both arms of every Y-unit contain a plexiglass cone (see Hirsch, 1959) to discourage retracing. An N unit maze has $N(N + 1)/2$ Y-units, $N(N + 1)$ cones, and $(N + 1)$ collecting tubes.

The basic structural element of the maze is an equilateral black nylon hexagon of 3/4 in. side length and 5/16 in. thickness. These are glued, sides parallel, onto a sheet of black plexiglass to make alleys 5/16 in. wide. They form a pattern of Y-units (see Fig. 1). The cones are glued into position in the two arms of each Y-unit - a black plexiglass cone in each "dark" arm and a clear plexiglass cone in each "light" arm. A 1/8 in. thick sheet of clear plexiglass, which covers the maze and seals the alleys, is attached to bolts coming through the hexagons. It is painted black except for a clear space over the "light" arm of each Y-unit. (Colored plexiglass may be used for qualitative study of the effect of varying the wavelength of the transmitted light.) A blackened sheet of plywood supports the maze and the posts carrying a circular fluorescent light of 12 in. diameter suspended horizontally 26 in. above the plastic cover. Careful painting and gluing is necessary to avoid creating an odor or surface texture bias which might compete with the light source as the differential stimulus (for additional information see Hirsch, 1959).

To control for mechanical stimulation while introducing the animals into the apparatus, a sliding door blocks immediate access to the maze when the starting tube containing the flies is first attached. After sufficient time has elapsed to permit the effects of the mechanical stimulation, which accompanies transfer of the flies to the starting tube, to abate (usually 30 minutes), the door to the maze is carefully opened to avoid further mechanical stimulation. This entranceway consists of two 2x2x1 in. sections of clear plexiglass sheets glued to an intervening 1/4 in. sheet that is cut into three sections with a movable central section. A hole equal to the o.d. of the introductory test tube is drilled through the thicker outer sheets, and one equal to the i.d. of the tube is drilled through the movable section of the inner sheet. Through controlled experimentation it has been found that, in addition to mechanical stimulation, rearing conditions, age, temperature, humidity, light, and the effects of gravity must be controlled.



Two selection experiments are being run in two mazes now in operation. Using the mazes to screen a population for response to light, two-way selection pressure is being exerted by breeding from the photonegative and photopositive extremes of the distribution of phototactic performance. Four generations of selection have produced significantly divergent photonegative and photopositive strains (see Table 1). For the maze with the lower intensity light

Table 1

Selection Results

GENERATION	Positive Phototaxis								Negative Phototaxis							
	Maze 1				Maze 2				Maze 1				Maze 2			
	♀		♂		♀		♂		♀		♂		♀		♂	
	$\bar{X}$	σ^2	$\bar{X}$	σ^2	$\bar{X}$	σ^2	$\bar{X}$	σ^2	$\bar{X}$	σ^2	$\bar{X}$	σ^2	$\bar{X}$	σ^2	$\bar{X}$	σ^2
1.	6.58	5.35	6.84	7.79	7.92	7.83	7.83	7.94	7.62	4.95	8.42	4.94	8.18	6.16	8.99	7.73
2.	6.56	4.04	7.45	5.37	7.60	6.91	8.53	7.79	8.62	4.88	9.51	5.21	9.57	5.67	10.34	7.32
3.	5.75	7.03	5.48	5.37	6.73	7.26	7.75	6.68	8.53	6.09	9.32	6.99	10.30	4.85	10.15	5.54
4.	6.14	5.28	6.92	5.14	7.56	7.26	8.68	7.76	9.15	6.82	9.49	7.85	10.45	6.36	11.49	5.46

Unselected Wildtype

Maze 1				Maze 2			
♀		♂		♀		♂	
$\bar{X}$	σ^2	$\bar{X}$	σ^2	$\bar{X}$	σ^2	$\bar{X}$	σ^2
7.88	6.03	8.70	6.55	9.97	7.72	10.46	6.63

N = 200-400, ♂♂ and ♀♀ run together

source (Maze 1), the means of the fourth generation of selection have diverged out of the range that control data shown to be characteristic of the wild type foundation population.

This research was supported by a grant from the NSF-URP Program of the Yale University Department of Zoology and performed (in large part) in the laboratory of Jerry Hirsch at the Department of Psychology, University of Illinois, Urbana.

Hirsch, J. and Boudreau, J.C., 1958. Studies in experimental behavior genetics: I. The heritability of phototaxis in a population of Drosophila melanogaster. J. Comp. & Physiol. Psych. 51:647-651. Hirsch, J., 1959. Studies in experimental behavior genetics: II. Individual differences in geotaxis as a function of chromosome variations in synthesized Drosophila populations. J. Comp. & Physiol. Psych. 55:722-731.

Rubinsztain, Beatriz. A very simple technique for the bacteriological sterilization of Drosophila eggs.

A rapid method has been devised for washing large numbers of eggs for the purpose of obtaining stock of bacteriologically sterile flies. This method makes available a large number of sterile eggs with very little effort and time. Chemical and mechanical injury due to sterilization procedures is reduced to a minimum. Oregon R and Jybd stocks were used in these experiments.

Vials with cornmeal-molasses-agar standard medium seeded with dry yeast are prepared. The medium is then completely covered with a rectangular piece of fiberglass, a string threaded through its edges so it can be made into a sack. Around 25 males and 25 females are placed in each vial and left for 18-24 hours in the dark. After this period they are discarded. The fiberglass is then removed and the string pulled to form a small egg sack. The eggs are then decorionated by placing the sack in a 0.06% solution of hypochloride for 20 minutes. The sack is then rinsed three times in Ringer, left for an hour in 40% solution of "Espadol" (Chloroxyphenol 4.8%, Brassovora, Bs. As. Argentina) and again rinsed three times in sterile Ringer (in our experience "Espadol" was always satisfactory whereas "Roccal" 1:10.000 did not prevent contamination of the cultures.

Vials with standrad medium to which 1 ml. of folic acid (0.036 g/100 ml 20% alcohol) is added, are prepared and sterilized by autoclaving for 30 minutes at 15 lbs. Working under aseptic conditions the string is cut and the fiberglass transferred to a sterile vial.

As sterility tests, Thyoglycolate, Sabouraud-dextrose-agar, and Peptone-glucose-agar are used, one larva of each vial put in a tube with each of these media.

Following this technique a stock of sterile flies has been maintained in this laboratory for a whole year, a monthly control of sterility having been satisfactory.

Hollingsworth, M. J. Mailing preserved Drosophila.

Alcohol preserved specimens of Drosophila can be safely sent by letter post in envelopes if small thick walled specimen tubes are used which are protected by a layer of corrugated paper or cellulose wadding. They arrive as undamaged as tubes sent in cardboard drums, and at a fraction of the cost. It is quite likely that living flies could be satisfactorily sent in the same way.

Ives, P. T. A new Bl/Cy marker stock

Our recently synthesized stock of b Bl vg bw/Cy, bw^{45a} sp^{2} or ^{45a} is from a recombination of the b vg bw and Bl chromosomes of our regular stocks. This recombination seems to have eliminated a variable abnormal eye phenotype which appears in variable proportions of the flies of our Bl/Cy, bw^{45a} sp^{2} or ^{45a} stock. Up to at least 10% of the flies of the new stock, when grown in uncrowded conditions, are Bl homozygotes, readily distinguished from the heterozygotes by the presence of b and vg. They are apparently completely sterile. Homozygotes in the Bl/Cy, bw^{45a} sp^{2} or ^{45a} stock tend to have curled wings and are easily confused with the Bl/Cy

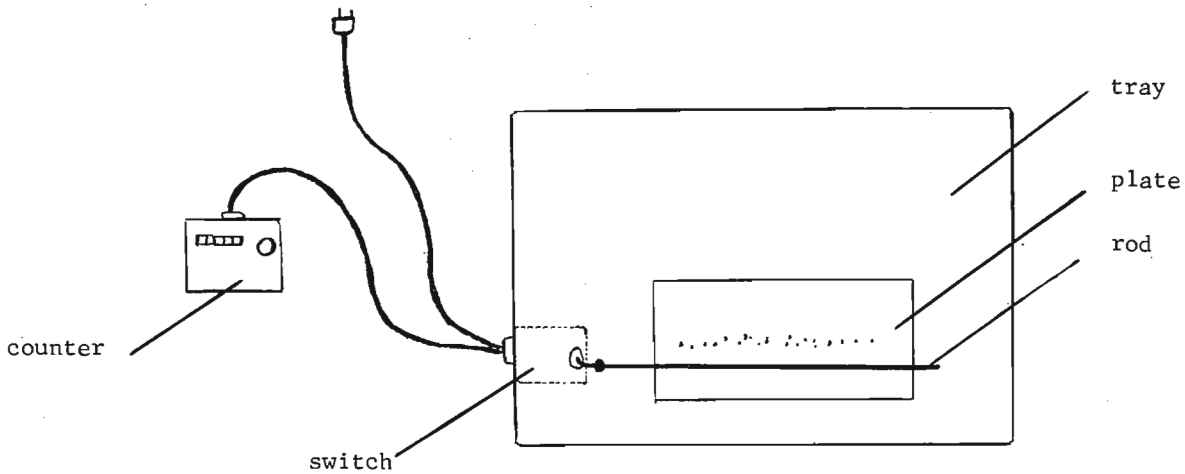
heterozygotes. The b Bl vg bw/Cy, bw^{45a} sp^{2} or ^{45a} flies appear to be more viable and to have a higher fecundity than those of the Bl/Cy, bw^{45a} sp^{2} or ^{45a} stock. The two bw alleles in the new stock react differently with some bw alleles (see Ives and Evans, DIS 25:107).

Mathew, C. A multi-purpose stock for simultaneous testing of translocations (both Y:2:3 and X:2:3) and recessive lethals on 1st, 2nd and 3rd chromosomes of Drosophila melanogaster.

The genotype is sc^{S1} In-S w^{a} sc^{8};Cy/Bl L^{2};Gl Sb/In(3LR) Cx,D. The F_1 ♀♀ from the cross of treated wild type males with ♀♀ of this stock are tested for sex-linked lethals. The F_1 ♂♂ are backcrossed to females of the above stock and the Cy;D progeny are inbred to test simultaneously for lethals on 2nd and 3rd chromosomes. Tests for translocations involving Y:2:3 or X:2:3 are carried out by crossing respectively the F_1 Cy;D ♂♂ or F_1 Cy;D ♀♀ to flies with recessive markers on the 2nd and 3rd chromosomes (e.g. bw; st) and examining the F_2 offspring for segregation of sex, Cy and D. Translocations involving the X can be maintained over XX ♀♀, while those involving Y or 2 and 3 can be maintained by back-crossing to the double recessive stock.

Falk, Raphael. A simple electric counter for Drosophila.

An electric counter manipulated by one finger or the back of the hand while both hands are busy under the dissecting microscope has faciliated the work and increased the accuracy of the counting in our laboratory. The switch of an electric counter is connected under a tray on the microscope base. The



switch is operated by pushing a rod located on the upper side of the tray and connected to the switch through a hole. The rod runs the length of the tray, parallel to the plate with the flies; it is somewhat elevated, so that the plate with the flies can be pushed under it. Thus the switch can be operated while the brush is being handled by one hand and the plate is being held in the other.

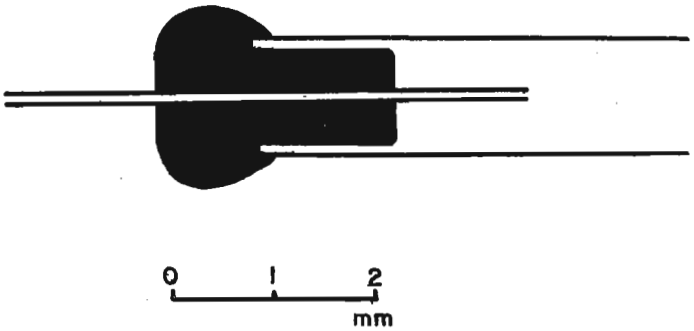
Rodman, T. C. Permanent salivary gland squashes.

The following is a rapid method for preparing permanently mounted salivary gland squashes. In addition to the low incidence of loss of specimens, this method has the advantage of requiring neither siliconed cover slips, albuminized slides nor a freezing medium.

The glands are extirpated in Ringer's solution and transferred on the tip of the

dissecting needle to a large drop of LAO (1 part of lactic acid to 3 parts of 3% orcein in 60% acetic acid) on a square cover slip. After 10 minutes the major portion of the drop of dye-fixative is removed with absorbent paper, care being taken not to disturb the glands. A round cover slip is placed over the square one and the squash made by pressing hard with the thumb. Neither cover slip should be moved in the process of squashing. The two adherent cover slips are then placed diagonally in a Columbia dish containing aceto-orcein. After 10 to 20 minutes, when the corner of the square slip is grasped by forceps and lifted, the round one slides off. Both cover slips are passed very quickly through graded alcohols to xylol and mounted on the same slide. Several hundred squashes have been reexamined after preparation by this method. No fading of stain or loss of puff or band detail has occurred.

Félix, R. and V. M. Salceda. A technique for microinjection in Drosophila. To inject small amounts of solutions containing marked precursors of DNA to Drosophila larvae we have designed an apparatus which is a modification from the description of A. M. Clark (Zeitschrift für Verebungslehre 94:115-120, 1963). The pipette is made with a Kimax melting point capillary tube (0.8 - 1.D. x 100mm) in which is inserted a small glass capillary, reduced in a microflame to a diameter



of 0.1 mm approx. A drop of wax is inserted to fix the two pieces as shown in the figure. The capillary is self-filling and always fills to the top, ensuring the incorporation of an accurate amount of liquid. The liquid is expelled from the capillary with the small pressure from a syringe and an attached piece of plastic tubing. For the calibration of each capillary we use the cavity of a broken thermometer calibrated with a syringe of 50 microliters. The liquid is passed from the capillary into the thermometer by means of the pressure from a rubber bulb. The volume of liquid for each capillary calibrated in this way depends on the length and diameter of it and oscillates between 0.010 to 0.090 microliters.

Mitchell, H. K. and Annamarie Mitchell. Mass culture and age selection in Drosophila. Studies of developmental enzymology in Drosophila have necessitated culturing of the organism on a large scale to provide gram quantities of material which is uniform in age within one or two hours. The following description presents a method that is satisfactory for larvae and excellent for pupae and adults.

Culture boxes are made from 3/16 in. lucite with dimensions of approximately 18 x 18 x 14 in. An area of about 12 x 18 in. is cut out and covered with nylon gauze to

provide ventilation, and a six inch armhole fitted with a cloth sleeve is provided for introducing and removing food trays. One box containing 15 to 30,000 flies of approximately the same age, maintained in a constant temperature and humidity room (25°C, 70%), provides an excellent egg supply for about three weeks. With two boxes alternating, a constant supply is easily maintained. Food is provided daily or as needed by introduction of an enameled metal or a plastic tray (12 x 5 x 2 in.) containing standard fly food (Lewis, E. B., DIS 34:117, 1960, quoted by permission of the author) to a depth of about 1/2 in. In addition fresh yeast is provided by pouring a thick suspension of Baker's yeast (20 g in 6 ml of water) in streaks on the surface of the solidified fly food. This is allowed to dry sufficiently so that it is not sticky before introduction into a culture box. Routinely fresh food is supplied a short time before egg collecting to stimulate laying and reduce egg retention.

For collecting eggs and rearing the animals it has been found especially convenient to use commercially available plastic bread boxes (12 x 5 x 5 in.) having polyethylene bottoms (2.5 in. high) and tight-fitting transparent plastic covers. Ventilation is provided in these by three 1.75 in. holes punched in the top with a hot metal pipe and covered on the inside by nylon gauze cemented to the cover with a solution of plastic scraps in amylacetate. After egg collections in the bottom trays inserted into the fly box, the trays are removed and the tops bound firmly in place with heavy rubber bands. These subcultures from short laying periods are maintained to any desired stage in a constant temperature and humidity room with addition of dilute yeast suspension after one or two days to maintain food and moisture. For collections of eggs, or larvae before they crawl out of the food, it is preferable to use 3% agar rather than fly food in the bread box trays. Nutrient is provided as 30g of fresh yeast suspended in 10 mls of 3% sucrose. The agar provides a smooth hard surface from which to wash eggs or larvae without contamination with food particles. It is useful also to roughen the surface of the yeast streaks on the agar with a spatula before egg collections since the flies seem to find the rough, pock-marked surface which results in an especially suitable place to deposit eggs. To collect eggs or larvae at any given time it is only necessary to add water, suspend the yeast and animals with a soft brush and filter through gauze (106μ mesh nylon* for eggs and small larvae). Washed animals are then placed on filter paper to remove excess moisture.

For collections of pupae excellent timing is attained by making use of flotation of prepupae in water (25°) at the time of air bubble formation (about 5 hours after puparium formation). Eggs are collected in trays with fly food and yeast as described previously and the bread box culture allowed to develop until 6 to 8 hours after the first puparium formation (ca 4.5 days). By this time nearly all of the larvae have crawled out of the food onto the inside of the box lid and a large proportion have formed prepupae. The box lid is then removed and immersed gently upside down in a pan of water at 25°C. Prepupae are then easily loosened with a brush or a finger. Those on the walls of the lower tray are also removed and the combined crop (10 to 15 g from one bread box) washed thoroughly with water at 25°C. A stainless steel kitchen strainer is convenient for this purpose. Resuspended prepupae are then washed through stainless steel gauze (10 mesh, 0.025 in. gauge*) to remove clumps and the latter are rubbed gently under water to separate the individual prepupae. Separated individual animals are then resuspended in a polyethylene beaker and after a few minutes those which float are decanted and discarded. The remaining prepupae with some larvae are decanted into a strainer and spread on filter paper to remove excess water. They are then placed on filter paper in a box and in the constant temperature room for further development. Fractions which float are taken at one to two-hour intervals and successive fractions represent uniform animals of the same developmental age, based on the time of air bubble formation and flotation time. The process of removal of prepupae from the original culture requires about 30 min. and each flotation about 10 min. Although immersion of prepupae in water for several hours will delay development and eventually cause death, the treatment as described has little or no effect. Further, after flotation the prepupae which are blotted dry on filter paper may be kept in the dry form in the constant temperature room for use at any subsequent stage of development. Weighed samples from successive collections can be used conveniently for studying changes that occur over any desired time range. Extensive obser-

vations on morphological changes, enzyme activities and induction of various phenocopies have demonstrated repeatedly a high degree of uniformity in fairly large samples (i.e. 10 g) prepared as described. Furthermore, such experiments have confirmed the necessity of control of age samples within, at most, an hour or two for studies of developmental enzymology. These data will be presented elsewhere.

It should be noted that although the plastic boxes described cannot be autoclaved, very little contamination of cultures has been encountered in over a year of use with only hot detergent and hot water washing. Contamination with mold has been encountered occasionally when the one pound yeast cakes used were stored over two weeks at 5°.

This work was supported under NSF grant GB-140.

*Nylon gauze was obtained from the Swiss Silk Bolting Cloth Mfg. Co., Ltd., Thal, Switzerland, and the stainless steel gauze was manufactured by the Ludlow-Saylor Wire Co., St. Louis, Missouri.

PERSONAL AND LABORATORY NEWS

Jack Bennett from Northern Illinois University in DeKalb, Illinois will have all of his stock lists discarded six months after the appearance of this issue of DIS.

Haruo Takada, formerly of the Zoological Institute, Faculty of Science, Hokkaido University, Sapporo, Japan, has joined the faculty of the Kushiro Women's College, Kushiro, Hokkaido, as Assistant Professor of Biology of its new Laboratory of Biology.

Sarah B. Pipkin from the Gorgas Memorial Laboratory, Panama, expects to return to the states Sept. 1, 1964, to work in the laboratory of Dr. Bentley Glass, Johns Hopkins University, Baltimore, Maryland.

Universidade de Brasília. A new Department of Genetics is being organized at the University of Brasília. Appointees are: A. R. Cordeiro, Newton Freire Maia and Warwick E. Kerr. This new center will develop Animal Population Genetics (laboratory and natural populations), Human Populations (1964) and Medical Genetics, (1965), Plant Genetics basic and applied (1965 or 1966) Molecular Genetics (1965). The first staff will start early in 1964 with Drosophila and other organisms (Jan. or Feb.): (A. R. Cordeiro, Helga Winge, Alberto José Centeno, Maria Luiza Reguly, Fernando Luiz Kratz, Nena Basilio Morales, Walter Zanette). Studies in hemoglobin haptoglobin, etc. will be started by Arno Schwants in connection with F. M. Salzano and C. V. Tondo from Pôrto Alegre, R. G. S. It is expected that W. E. Kerr and Newton Freire Maia will join this new Department in the near future. The D. Genetics of UNB will develop intense international cooperation according to an exchange program being elaborated to stimulate both Quantitative and Molecular Genetics.

MATERIALS REQUESTED OR AVAILABLE

Universidade de Brasília. A. R. Cordeiro, H. Winge, A. J. Centeno, M. L. Reguly, F. L. Kratz, Nena Basilio Morales, W. Zanette, would appreciate receiving past DIS issues and reprints of papers for use in this new Department starting January, 1964. They offer wild strains of Drosophila of "Central Brasil" and the ones listed in the Pôrto Alegre Laboratories.

Goldschmidt, Elisabeth Class demonstration of allelic complementation at the ma-1 locus and maternal effect of the ma-1 + gene.

In D. melanogaster intra-locus complementation can be observed at the morphological level in heterozygotes for different pseudoalleles at any one of a series of loci, such as fa-spl or m-dy. Complementation at the ma-1 locus which has been demonstrated at the enzymatic level (Glassman, 1960) may be preferable for class work. Heterozygous females of the constitution ma-1/ma-1^{bz} synthesize considerable quantities of the enzyme xanthine dehydrogenase (XD) which is virtually absent in either homozygous mutant. Although this effect is amenable to investigation with advanced enzymological and immunological techniques, its main features may be illustrated by one-dimensional chromatography of mutant flies, following Hadorn and Mitchell (1951).

One of the immediate products of XD activity is isoxanthopterine (IX). Neat separation of IX from bodies of female flies may be obtained by chromatography of Malphighian tubules. The M.t. of 8 females are applied to each start point of a sheet of filter paper. After development in (2:1) propanol : 5% ammonia solution in a darkened room the IX spot with its characteristic violet fluorescence will be seen under a U.V. lamp (360 mu), in chromatograms of M.t. derived from normal females and of ma-1/ma-1^{bz} heterozygotes, but not in those of either homozygous mutant type. Partial complementation of the amount of red pigment (drosopterine), the synthesis of which is also correlated with the XD level, can be demonstrated by chromatography of single female heads of the same four genotypes.

The maternal effect of ma-1^{+} females on the X.D. content of their mutant offspring may be shown by chromatography of testes of mutant males. The testes of two males applied to each start point yield large spots of IX. The maternally affected males should be obtained from the following crosses: 1) y ma-1^{+}:= x ma-1
2) y ma-1^{+}:=;ry/ry x ma-1;+/+
The latter cross demonstrates that ry/ry females although devoid of XD can exert a maternal effect on the production of the enzyme in their ma-1 sons.

For technical details and further references see: Glassman, E. Science 131:1810 (1960); Glassman, E. & Mc-Lean, J., P.N.A.S. 48:1712 (1962); Hadorn, E. & Mitchell, H. K. P.N.A.S. 37:650 (1951).

Research Note:

Kidd, K. K. Explanation of balancers.

ru TSS : TM3 Sb Ser with ru inserted. The original TM3 Sb Ser (V. Tinderholt, DIS 34: 53,54 and DIS 35:47) has been lost and only the form with roughoid also inserted onto the TM3 inversion still exists. This chromosome carries the recessive genes ru, ri, p^{p}, bx^{34e} and e^{s} (sep has not been checked but is probably present also) and the dominants Sb and Ser. The presence of y^{+} and ac^{+} is unchecked, but doubtful - they were possibly removed when ru was inserted. ru TSS has proved to be an excellent balancer, but ru would be expected to occasionally separate from the inversion, especially when used in combination with other inversions on the first and second chromosomes.

FM6 ct v : FM6 with ct and v inserted. This balancer contains all the mutants of FM6 (Grell and Lewis, DIS 30:71) plus cut and vermilion. Salivaries have not been examined, but it is believed that there is no change in the inversions of FM6 since this is also an effective balancer. The viability is much less than that of FM6. The insertion of ct and v into FM6 was originally accomplished by V. Tinderholt, but no records have been found giving either the method or an analysis.

DROSOPHILA BIBLIOGRAPHY

Irwin H. Herskowitz, Editor

D. = Drosophila D.m. = Drosophila melanogaster

Alexander, M. L. 1961. Genetic recovery mechanisms and fast neutron treatment of mature sperm treated in males and fertilized females of D.m. Genetics, 46:846.

1962. The response of pre-meiotic and post-meiotic germ cells of D. to dose fractionation and changes in partial pressures of gases. 2nd. Int. Congr. Rad. Res., 186.

1962. Detection and separation of spontaneous and induced translocations in mature and immature germ cells of D. Am. Nat., 96:309-315.

1962. The role of recovery mechanisms and oxygen effects upon changes in radiation sensitivity in sperm treated in mature males and fertilized females of D. Genetics, 47:1505-1518.

1963. The effect of dose fractionation in mature and immature germ cells of D. in atmospheres of argon and oxygen. Information Circular on Radiation Techniques and Their Application to Insect Pests. Int. Atomic Emer. Comm. WP/31/1:10-11.

1963. Oxygen effects and dose fractionation in the developing germ cells of D. virilis. Genetics Today, Proc. XI Int. Congr. Genet., 1:70-71.

Alexander, M. L. and Bergendahl, J. 1962. Biological damage in the mature sperm of D. virilis in oxygen and nitrogen with different dose intensities of gamma rays. Genetics, 47:71-84.

1962. Radiation sensitivity in sperm treated in males and inseminated females of D. with x-rays in nitrogen and air. Rad. Res., 16:572.

Auerbach, C. 1962. The production of visible mutations in D. by chloroethyl methanesulphonate (CB 1506). Genet. Res. Cambr., 3:461-466.

Barigozzi, C. 1963. Relationship between cytoplasm and chromosomes on the transmission of melanotic tumours in D. Symposium on biological organization at cellular and supercellular level. Acad. Press, Varenna, 73-89.

Barigozzi C., Halfer, C. and Sgorbati, G. 1962. Melanotic tumours of D.: a semi-mendelian character of episomic type. Heredity, 17:561-575.

Barigozzi, C. and Kravina, A. M. 1963. Induzione di tumori melanotici trasmissibili per mezzo di iniezione di estratto acellulare in D.m. Atti A.G.I. VIII, 205-212.

Barigozzi, C., Kravina, A. M. and Sari, G. M. 1963. A case of episome-like transmission in D.m. Genetics Today, Proc. XI Int. Congr. Genet. I:207.

Barker, J. S. F. 1963. The estimation of relative fitness of D. populations. II. Experimental evaluation of factors affecting fitness. Evolution 17:56-71.

1963. The estimation of relative fitness of D. populations. III. The fitness of certain strains of D.m. Evolution, 17:138-146.

Beermann, W., Hess, O. and Meyer, G. F. 1963. Structure and function of the Y heterochromatin in D. Proc. XVI Int. Congr. Zool., 4:283-288.

Belitz, H. J. 1963. Recessive lethals in the IV chromosome of D.m. (Abstr.) Genetics Today. Proc. XI Int. Congr. Genet., 1:72.

Bennett, J. 1961. A simplified method of D. culture for the classroom. Amer. Biol. Teacher, 23:79-82.

Bennett, J. H. 1962. Population genetics of sex ratio (SR) in D. pseudoobscura. Heredity, 17:525-531.

Berendes, H. D. 1963. The salivary gland chromosomes of D. hydei Sturtevant. Chromosoma 14, 195-206.

1963. Asynapsis in the salivary gland chromosomes of D. hydei.

1963. Functional structures in cytoplasm and chromosomes of D. hydei salivary gland cells. (Abstr.) Proc. XI Int. Congr. Genet.

Berendes, H. D. and de Bruyn, W. C. 1963. Submicroscopic structure of D. hydei salivary gland cells. Zeitschr. f. Zellf. 59:142-152.

Berendes, H. D. and Ross, K. F. A. 1963. Measurements of the total solid material in the bands and interbands of the polytene chromosomes in living cells of Chironomus. Chromosoma, 14:111-122.

Berseth, W. D. and Gardner, E. J. 1961. The behavior in laboratory populations of genes associated with tumorous head expression in D.m. Genetics, 46:1611-1617.

Bochnig, V. 1963. Alterations of viability characters in an irradiated population of D. (Abstr.) Genetics Today. Proc. XI Int. Congr. Genet., 1:75.

Bodmer, W. F. and Parson, P. A. 1962. Linkage and recombination in evolution. Advances in Genetics, 11:1-100.

Bregliano, J. C. 1963. Contribution à l'étude du virus héréditaire de la D. Cinétique de l'accumulation du virus infectieux dans une mouche stabilisée. C. R. Acad. Sc., 256:2942-2944.

Brown, E. H. and King, R. C. 1961. The occurrence of ovarian tumors in D.m. heterozygous for an unstable chromosome. Genetics, 46:854.

1962. Oogonial and spermatogonial differentiation within a mosaic gonad of D.m. Growth, 26:53-70.

1962. The ring canals of D. Amer. Zool., 2:509.

Brown, E. H. and King, R. C. 1964. Studies on the events resulting in the formation of an egg chamber in D.m. Growth, 28:41-81.

Brun, G. 1963. Etude d'une association du virus σ et de son hôte la Drosophile:l'état stabilisé. Thèse Paris.

Bull, A. L. 1963. An embryonic lethal with reversed polarity in D.m. (Abstr.) Proc. XI Int. Congr. Genet. I.10-11.

Burla, H. and Greuter, M. 1961. Orientierungsversuche mit D. obscura und D. subobscura (Diptera). XI Int. Kongr. f. Ent. Wien. 1:597-598.

Burnett, R. G. and King, R. C. 1962. Observations on a microsporidian parasite of D. willistoni Sturtevant. J. Insect Path., 4:104-112.

Carmody, G., Diaz Collazo, A., Dobzhansky, Th., Ehrman, L., Jaffrey, I.S., Kimball, S., Obrebski, S., Silagi, S., Tidwell, T. and Ullrich, R. 1962. Mating preferences and sexual isolation within and between the incipient species of D. paulistorum. Amer. Midland Natur., 68:67-82.

Carson, H. L. 1958. A study of experimental populations of D. Proc. Ent. Soc. Amer. No. Cent. Br., 13:22.

1961b. Rare parthenogenesis in D. robusta. Amer. Nat., 95:81-86.

1961c. Relative fitness of genetically open and experimental populations of D. robusta. Genetics, 46:553-567.

1961d. Heterosis and fitness in experimental populations of D.m. Evolution, 15:456-509.

1962a. Fixed heterozygosity in a parthenogenetic species of D. Univ. Texas Publ. No. 6205:55-62.

1962b. Selection for parthenogenesis in D. mercatorum. Genetics, 47:946.

1963b. Transitory increase in genetic load in irradiated laboratory populations of D.m. Proc. XIth Int. Cong. Genet., I:74.

Castiglioni, M. D. and Rezzonico, Raimondi G. 1963. Differenze genotipiche tra ceppi diversi di D.m. rivelate con la technica delle colture in vitro. Ist. Lomb. Sc. e Lett., 97:117-134.

1963. Genotypical differences between stocks of D.m. revealed from culturing in vitro. Experientia, 19:527.

Centeno, A. J., Reguly, M.L. and Cordeiro, A. R. 1963. Changes of reproductive performance of D. willistoni at two inbreeding levels. Genetics Today, I:5,61:75-76. (Summ.).

Chang, Tsueng-Hsing. 1962. Further observations on the relation between gas pressure and x-ray damage in D.m. Univ. Texas Publ. No. 6205:385-394.

Chen, P. S., Farinella-Ferruzza, N. and Oelhafen-Gandolla, M. 1963. Contents of DNA and RNA in the salivary glands of normal and lethal larvae of the mutant "lethal-meander" (lme) of D.m. Exp. Cell Res., 31:538-548.

Chovnick, A. 1961. The garnet locus in D.m. I. Pseudoallelism. Genetics, 46:493-507.

Chovnick, A., Schalet, A. and Kernaghan, R. P. 1961. Recombination at the rosy locus in D.m. (Abstr.) Rec. Genet. Soc. Amer., 30:68-69; and Genetics, 46:858-859.
1963. Genetic fine structure of the rosy cistron in D.m. Proc. XI. Int. Congr. Genet., 1:1.

Chovnick, T., Schalet, A., Kernaghan, and Talsma, J. 1962. The resolving power of genetic fine structure analysis in higher organisms as exemplified by D. Amer. Nat., 96: 281-296.

Clark, A. M. 1963. The sensitivity of the D. testis to the mutagenic action of heliotrine. Zeitschft. f. Vererbungsl., 94:115.
1963. The effects of chloramphenicol, streptomycin and penicillin on the X-ray induced mutation rate in D. Zeitschft. f. Vererbungsl., 94:121.

Cordeiro, A. R., Reguly, M. L. and Centeno, A. J. 1963. Restoration without selection of balanced genetic load by radiation of D. inbred strains. Genetics Today 1(5,62): 76 (Summ).

Counce, S. J. 1963. Developmental morphology of polar granules in D. Including observations on pole cell behàvior and distribution during embryogenesis. J. Morph., 112-146.

Counce, S. J. and Poulson, D. F. 1962. Developmental effects of the sex-ratio agent in embryos of D. willistoni. J. Exp. Zool., 151:17-32.

David, J. 1961. Influence de l'etat physiologique des arents sur les caractères des descendants. Etude chez D.m. Meig. Ann. de Genétique 3:41-118.
1962. Différence entre les besoins nutritionnels des larves et des imagos chez D.m. Meig. Ann. Nutrition Alimentation. 16:203-210.
1962. Influence de l'âge de la mère sur les dimensions des oeufs dans une souche vestigiale de D.m. Meig. Etude expérimentale du déterminisme physiologique de ces variations. Bull. Biol, Fr. Belg., 96:505-528.
1963. Influence de la fécondation de la femelle sur le nombre et la taille des oeufs pondus. Etude chez D.m. Meig. J. Insect Physio., 9:13-24.

Davis, G. 1963. Autosomal behavior in claret-nondisjunctional D. females. (Abstr.) Proc. XI Int. Congr. Genet., I:127-128.

Dickerman, R. C. 1963. The induction of dominant lethal mutations in x-irradiated D. virilis oocytes. Genetics, 48:311-319.

Di Pasquale, A. 1963. The "brown spots" character of D.m. and its mechanism of transmission and manifestation. Portugaliae Acta Biologica S. A., 2:169-210.

Di Pasquale, A. and Zambruni, L. 1963. La manifestazione del genotipo bsp/bsp provocata nelle femmine dall'accoppiamento. Atti A.G.I., 8:161-170.
1963. The "brown spots" (bsp) character of D.m. and its relation to copulation. Experientia, 19:360-365.
1963. "Brown spots" (bsp), a genetic character of D.m. which manifests only after copulation. Genetics Today. Proc. XI Int. Congr. Genet., I:177.

Doane, W. W. 1963. Carbohydrate metabolism studies in adipose mutants of D.m. Proc. XVI Int. Congr. Zoo., 2:202.

Dobzhansky, Th. 1961. Genetics. In: P. Gray's, "The Encyclopedia of the Biological Sciences": 428-433. Reinhold, New York.
1961. Man and natural selection. Amer. Scient., 49:285-299.
1961. On the dynamics of chromosomal polymorphism in D. Royal Entom. Soc. London. Symp. 1:30-42.
1961. Evolutie en erfelijkheid. 428 pp. Dutch transl. C.E.B.
1961. Human races. Amer. Jour. Human Genet., 13: 349-350.
1961. Adaptation in man and animals: A synthesis. Ann. New York Acad. Sci., 91:634-636.
1961. Taxonomy, molecular biology, and the peck order. Evolution, 15:263-264.
1961. A bogus "science" of race prejudice. Jour. Hered., 52:189-190.
1961. Principles of human genetics. Science, 133: 270-271.
1961. The ethical animal. Science, 133:323-324.
1961. Implications of evolution. Science, 133:752.
1961. Soviet Marxism and natural science. Science, 133:1762-1763.
1961. Genetics, the core science of biology. Science, 134:2091-2092.

Dobzhansky, Th. 1962. Genetics and equality. Science, 137:112-115.
1962. Genetics, society and evolution. Bull. New York Acad. Med., 38:451-459.
1962. Evolutionary biology and modern culture. Rockefeller Inst. Quart., 6:1-9.
1962. Problemy radiacionnoi genetiki (Review). Science, 137-276.
1962. Rigid vs. flexible chromosomal polymorphisms in D. Amer. Nat., 96:321-328.
1963. Biological evolution in island populations. 10th Pac. Sci. Congr. Man's place in the island ecosystem. F. R. Fosberg, Ed. Bishop Museum Press, Honolulu:65-74.
1963. Species in D. The Hooker Lecture. Proc. Linnean Soc. London, 174:1-12.
1963. Scientific explanation - Chance and antichance in organic evolution. In: B. Baumrin (Ed.) "Philosophy of Science", vol. 1, Interscience Publishers, New York and London:209-222.
1963. Heredity in man. In: Grolier's book of popular science, Grolier's, New York: 333-347.
1963. Mankind evolving - A rejoinder. Persp. Biol. Med., 6:275-276.
1963. Anthropology and the natural science - The problem of human evolution. Current Anthropology, 4:138, 146-148.
1963. Evolution - Organic and superorganic. Rockefeller Inst. Review 1 (2):1-9.
1963. Geographic and microgeographic races. (Comment of M. T. Newman's article). Current Anthropology, 4:196-197.
1963. The origin of races, C. S. Coon (Review). Scient. Amer., 208:169-172.

Dobzhansky, Th., and Drescher, W. 1962. Ein Beitrag zur genetischen Basis der Quanten-Evolution. In: G. Kurth (Ed.) "Evolution und Hominisation" Gustav Fischer, Stuttgart: 64-73.

Dobzhansky, Th., Hunter, A. S., Pavlovsky, O., Spassky, B. and Wallace, B. 1963. Genetics of natural populations. XXXI. Genetics of an isolated marginal population of D. pseudo-obscura. Genetics, 48:91-103.

Dobzhansky, Th. and Mather, W. B. 1961. The evolutionary status of D. serrata. Evolution, 15:461-467.

Dobzhansky, Th. and Pavlovsky, O. 1961. A further study of fitness of chromosomally polymorphic and monomorphic populations of D. pseudoobscura. Heredity, 16:169-179.

Dobzhansky, Th., Sinnott, E. W. and Dunn, L. C. 1961. Principios de genetica. 581 pp. Spanish transl. by a Prevosti Omega, Barcelona.

Dobzhansky, Th., and Spassky, B. 1962. Selection for geotaxis in monomorphic and polymorphic populations of D. pseudoobscura. Proc. Nat. Acad. Sci., 48:1704-1712.

Dobzhansky, Th., Spassky, B. and Tidwell, T. 1963. Genetics of natural populations. XXXII. Inbreeding and the mutational and balanced genetic loads in natural populations of D. pseudoobscura. Genetics, 48:3610 373.

Dobzhansky, Th. and Wallace, B. Människan och strålning-riskerna. 428 pp. Swedish transl. by Hans I. Cedin. Aluds/Bonniers. Stockholm.

Edwards, J. W. and Gardner, E. J. 1962. Heterozygote expression and genetic analysis of a new D.m. mutant exhibiting a structural eye abnormality. (Abstr.) Utah Acad. Sci. Arts and Letters, Proc., 39:190.
1962. Genetic analysis of a D.m. mutant phenotypically similar to the fourth chromosome eyeless mutants. (Abstr.) Genetics, 47:951.

Ehrman, L. 1961. The genetics of sexual isolation in D. paulistorum. Genetics, 46:1025-1038.
1962. The Transitional Races of D. paulistorum: a study of hybrid sterility. Proc. Nat. Acad. Sci., 48:157-159.
1962. A new type of hybrid sterility in D. paulistorum. Nature, 193:1208-1209.
1962. Hybrid sterility as an isolating mechanism in the genus D. Quarterly Review of Biology, 37:279-302.
1963. Apparent cytoplasmic sterility in D. paulistorum. Proc. Nat. Acad. Sci., 49: 155-157.
1963. Hybrid sterility restricted to a single generation. Amer. Nat., 97:403-405.

Erlenmeyer-Kimling, L. and Hirsch, J. 1961. Measurement of the relations between chromosomes and behavior. Science, 134:1068-1069.

Erlenmeyer-Kimling, L., Hirsch, J., and Weiss, J. M. 1962. Studies in experimental behavior genetics: III. Selection and hybridization analyses of individual differences in the sign of geotaxis. J. Comp. & Physiol. Psych., 55:722-731.

Fabergé, A. C. and Judd, B. H. 1961. Chromosome breaks by alpha particles. DIS, 35:79-80.

Falk, G. J. and King, R. C. 1963. Autoradiographic efficiency for tritium as a function of section thickness. Rad. Rsch., 20:466-470.

Falk, R. 1963. Interaction between scute and hairy. DIS 37:75.

Falk, R., Ben-Zeev, N. and Baker, S. 1963. Effects of irradiated chromosomes on viability in heterozygotes and hemizygotes. (Abstr.) Proc. XI Int. Congr. Genet., 1:74.

Falk, R. and Rahat, A. 1963. Dependence of viability effects caused by irradiation on the type of mating. Proc. Nat. Acad. Sci., Wash., 49(3):292-298.

Forrest, H. S. 1960. Aspects of the biosynthesis of pteridines. Proc. 17th Int. Congr. Pure and Applied Chem., 2:40.

1961. Pteridines. Structure and metabolism. Comparative Biochemistry, Vol. IV.

Forrest, H. S., Hanly, E. W., and Lagowski, J. M. 1961. Biochemical differences between the mutants maroon-like and rosy in D.m. Genetics, 46:1455-1463.

1961. 2,4-Dihydroxypteridine as an intermediate in the enzymically catalyzed oxidation of 4-hydroxypterdine. Biochem. Biophys. Acta, 50:596-598.

Forrest, H. S., and Nawa, Saburo. 1962. Structures of sepiapterin and isosepiapterin. Nature, 196:372-373.

Frydenberg, O. 1962. Estimation of some genetical and vital statistics parameters of Bennett populations of D.m. Hereditas, 48:83-104.

1962. The modification of polmorphism in some artificial populations of D.m. Hereditas, 48:423-441.

Frydenberg, O. and Sick, K. 1962. The selective value of a cinnabar mutant of D.m. in populations homozygous for an unsuppressible vermillion mutant. Hereditas, 48:313-323.

Fujii, S., Kanehisa, T. and Ohnishi, M. 1963. On the proteins of melanotic tumor in D. (a preliminary note). 35th Japanese Genet. Soc.

Futch, D. G. 1962. Hybridization studies within the cardini species group of the genus D. Univ. of Texas. Publ. No. 6205:539-554.

Gardner, E. J. and Hansen, A. M. 1962. Reconsideration of maternal effect transfer by injection in D.m. Genetics, 47:847-853.

Geer, B. W. 1961. The red eye pigment content of the D. affinis subgroup species. Am. Midland Nat., 66:431-438.

Geer, B. W. and Green, M. M. 1962. Genotype, phenotype and mating behavior of D.m. Am. Natur., 96:175-181.

Gersh, E. S. 1962. Cytological analysis of some stocks of D.m. derived by unequal crossing-over at or near the white locus. Genetics, 47:1393-1398.

Giavelli, S., Gallucci, E., Pozzi, L. and Sironi, G. 1962. Primi risultati dell'azione combinata dell'ossigenoe e della bassa temperatura sulle mutazioni indotte con raggi X in D. Atti A.G.I., 8:194-204.

Gibson, J. B. and Thoday, J. M. 1963. Isolation by disruptive selection. Proc. XI Int. Congr. Genet., I:159-160.

Gill, K. S. 1963. Developmental genetic studies on oogenesis in D.m. J. Exp. Zool., 152: 251-278.

Glass, B. 1962. Statement in the Hearings on "Radiation Standards, including Fallout" before the Subcommittee on Research, Development, and Radiation of the Joint Committee on Atomic Energy, Congress of the United States 87th Congress, June 4, 5, 6, and 7, 1962. pp. 333-349. U. S. Govt. Print. Office, Washington.

1963. Review of Selected Papers of A. H. Sturtevant: Genetics and Evolution (E. B. Lewis, ed.). Quart. Rev. Biol., 38:194-195.

Gloor, R. D. 1962. Untersuchungen uber die wirkung der letalfaktoren 1 52 und 1 8 von D.m. Rev. Suisse de Zool., 69:409-463.

Goldschmidt, E., Barak, E. Bernstein, N. and Falk, R. 1963. The restitution of radiation induced breaks in structural heterozygotes of D. (Abstr.) Proc. XI Int. Congr. Genet., 1:72.

Grell, E. H. 1961. The genetics and biochemistry of red fat cells in D.m. Genetics, 46:925-933.

1961. The tetrasomic for chromosome 4 in D.m. Genetics, 46:1177-1183.

1961. Variations in preferential segregation of chromosome two in triploid females of D.m. Genetics, 46:1267-1271.

1962. The dose effect of ma-1^{+} and ry^{+} on xanthine dehydrogenase activity in D.m. (Abstr.) Rec. Genet. Soc. Ameri., 31:87.

1962. The dose effect of ma-1^{+} and ry^{+} on xanthine dehydrogenase activity in D.m. Z. Verebungsl. 93:371-377.

1963. Nonrandom assortment of compound chromosomes with nonhomologous chromosomes in oocytes of D.m. (Abstr.) Proc. XI Int. Congr. Genet., I:9.

1963. Distributive pairing of compound chromosomes in females of D.m. Genetics, 48:1217-1229.

Grell, R. F. 1962. The role of distributive pairing in secondary nondisjunction. (Abstr.) Rec. Genet. Soc. Amer., 31:87-88.

1962. The chromosome. J. Tenn. Acad. Sci., 37:43-53.

1962. A new hypothesis on the sequence and nature of meiotic events in the female of D.m. Proc. Natl. Acad. Sci., U. S., 48:165-172.

1962. A new model for secondary nondisjunction: the role of distributive pairing. Genetics, 47:1737-1754.

1963. Factors affecting distributive pairing between nonhomologues in D.m. (Abstr.) Proc. XI Int. Congr. Genet., I:9.

Gunson, M. M. 1962. Cytological effects of X-rays in relation to dose-rate in D.m. Amer. Nat., 96:347-352.

Hadorn, E. 1963. Differenzierungsleistungen wiederholt fragmentierter teilstücke männlicher genitalscheiben von D.m. nach kultur in vivo. Devel. Biol., 7:617-629.

Hadorn, E. and Grassmann, A. 1962. D. und Pseudeucoila IV. Artspezifische unterschiede in der abwehrreaktion auf verschieden resistente wespenstämme. Arch. Jul. Klaus-Stiftung, 37:21-27.

Hadorn, E., Hanly, E. W. and Gandolla, M. 1962. Untersuchungen über prädetermination, biochemische pleiotropie, autonomie und polymorphismus bei der mutante maroon-like (ma-1) von D.m. Z. Vererb. lehre, 93:453-475.

Halfer, C. 1963. Diverso grado di compatibilità fra alcuni ceppi di D.m. saggiato col trapianto di ovari. Atti A.G.I., 8:371-279.

1963. Different degree of compatibility between several stocks of D.m., tested with ovary grafting. Genetics Today. Proc. XI Int. Congr. Genet., I:190.

Hannah-Alava, A. 1963. The rates of visible mutations in sequential broods of irradiated D.m. males. Proc. XI Int. Congr. Genet., 1:68.

Hansen, A. M. and Gardner, E. J. 1961. A new second chromosome eye mutant in D.m. expressed only at high temperatures. (Abstr.) Genetics, 46:869.

1961. A new eye mutation in D.m. expressed only at high temperatures. (Abstr.) Utah Acad. Sci. Arts and Letters, Proc., 38:120-121.

1962. A new eye phenotype in D.m. expressed only at temperatures above 25°C. Genetics 47:587-598.

1963. Ovary transplantation in the study of a maternal effect in D.m. Genetics, 48: 283-291.

Hartmann-Goldstein, I. and Sperlich, D. 1963. The viability of structural heterozygotes of D. subobscura at different temperatures. Genetics, 48:863-869.

Hawkes, N. R. and Gardner, E. J. 1963. Effect of monosodium glutamate on the compound eye of D. (Abstr.) Utah Acad. Aci. Arts and Letters. 40:112.

Herskowitz, I. H. and Norton, I. L. 1963. Increased incidence of malanotic tumors in two strains of D.m. following treatment with sodium fluoride. Genetics, 48:307-310.

Hess, O. 1963. Die mutation "scute-8" von D.m. als ein letalfaktor, dessen penetranz vom heterochromatin abhängt. Zool Anz., Suppl, 26:87-92.

Hess, O. and Meyer, G. F. 1963. Chromosomal differentiations of the lampbrush type formed by the Y chromosome in D. hydei and D. neohydei. J. Cell Biol., 16:527-539.

1963. Artspezifische funktionelle differenzierungen des Y-heterochromatins bei D., Arten der D. hydei subgruppe. Port. Acta Biol. (A)7:29-46.

Hexter, W. M. 1961. The classicality of the singed locus in D.m. (Abstr.) Genetics, 46: 870-871.

1963. Nonreciprocal events at the garnet locus in D.m. Proc. Nat. Acad. Sci. U. S., 50:372-379.

Hildreth, P. E. 1962. Quantitative aspects of mating behavior in D. Behavior, XIX:57-73.

Hildreth, P. E. and Becker, G. C. 1962. Genetic influences on mating behavior in D.m. Behaviour, XIX:219-238.

Hildreth, P. E. and Lucchesi, J. C. 1962. Low incidence of polyspermy in D.m. and D. virilis. (Abstr.) Rec. Genet. Soc. Amer. 31:81; and Genetics, 47:958-959.

1963. Fertilization in D. I. Evidence for the regular occurrence of monospermy. Devel. Bio., 6:262-278.

1963. A gene which transforms males and females into intersexes. (Abstr.) Proc. XI Intern. Congr. Genet., I:171.

Hirsch, J. 1959. Studies in experimental behavior genetics: II. Individual differences in geotaxis as a function of chromosome variations in synthesized D. populations. J. Comp. & Physiol. Psych., 52:304-308.

Hirsch, J. and Boudreau, J. C. 1958. Studies in experimental behavior genetics: I. The heritability of phototaxis in a population of Dm. J. Comp. and Physiol. Psych., 51:647-651.

Hirsch, J. and Erlenmeyer-Kimling, L. 1962. Studies in experimental behavior genetics: IV: Chromosome analyses for geotaxis. J. Comp. & Physiol. Psych., 55:732-739.

1961. Sign of taxis as a property of the genotype. Science, 134:835-836.

Ives, P. T. 1961. Further tests of mutation frequencies in successive sperm broods after 1kr of Y rays. (Abstr.) Rec. Genet. Soc. Amer., 30:83 and Genetics, 46:873.

1961. Some effects of Cobalt-60 Y radiation on premeiotic spermatogenic cells in D.m. (Abstr.) Amer. Zool., 1:361.

1962. The effect of development temperature on mutational response to Y rays in D. spermatogenesis. (Abstr.) Amer. Zool., 2:417.

1963. The spontaneous mutation rate pattern in ageing heterozygous ♂♂ of D.m. (Abstr.) Genetics, 48:895.

1963. Patterns of spontaneous and induced mutation rates during spermatogenesis in D.m. Genetics, 48:981-995.

Ives, P. T. and Fink, G. R. 1962. Comparison of translocation and crossover chromosomes produced by Y irradiation of D. males. (Abstr.) Rec. Genet. Soc. Amer., 31:94 and Genetics, 47:963.

Jacobs, M. E. and Brubaker, K. K. 1963. Beta-alanine utilization of ebony and non-ebony D.m. Science, 139:1282-1283.

Johnson, G. R. 1962. An estimation of the maximum mutation rate of a particular mutation detected in the natural populations of D.m. Utah Acad. Sci. Arts and Letters, Proc., 39:193-194.

Judd, B. H. 1961. Structural and functional relationships between the zeste and white loci of D.m. (Abstr.) Genetics, 46:874.

1961. Formation of duplication-deficiency products by asymmetrical exchange within a complex locus of D.m. Proc. Nat. Acad. Sci., 47:545-550.

1961. Analysis of products from regularly occurring asymmetrical exchange in D.m. Genetics, 46:1687-1697.

1962. An analysis of mutations confined to a small region of the X chromosome of D.m. (Abstr.) Science, 138:990-991.
1963. The genetic fine structure of the mutants z^m and z^1 in D.m. (Abstr.) Proc. XI Int. Congr. Genet., Vol. 1:3-4.

Kallstedt, T. R. and Bennett, J. 1962. Comparative effectiveness of DDT selection methods in D.m. Meigen. Trans. Ill. St. Acad. Sci. 55(2):124-129.

Kaplan, W. D., Gugler, H. D. and Kidd, K. K. 1963. The genetic effects of labeled DNA precursors. Proc. XI Int. Congr. Genet., I:66.

Kaplan, W. D., Tinderholt, Gugler, H. D. and Kidd, K. K. 1962. A non-random distribution of lethals induced by tritiated thymidine in D.m. 2nd. Int. Congr. Rad. Rsch. Abstracts of Papers:227.

Karlik, A. and Sperlich, D. 1962. Frequenz und alleliegrad autosomaler letalfaktoren einer inselpopulation von D.m. Z. Vererb, Lehre, 93:229-236.

Kelsall, P. 1963. Non-disjunction and maternal age in D.m. Genet. Res., Cambr., 4:284-289.

Kernaghan, R. P. and Chovnick, A. 1963. Studies on the genetic control of xanthine dehydrogenase in D.m. (Abstr.) L:45-46.

Khishin, A. F. 1963. Effects of storing X-rayed spermatozoa on the frequency of translocations and sex-linked lethals in D.m. Zeit. für Verebungslehre 94:280-284.

Kidwell, J. F. 1963. Sex and heterosis in D.m. Canad. Jour. Genet. and Cytol. 5:50-56.

King, R. C. 1962. Genetics. Oxford Univ. Press, 347 pp.
1963. Studies on early stages of insect oogenesis. Royal Ent. Soc. London, Symp. II, Insect Reprod., contribution 2.
1963. Hereditary ovarian tumours of D. In: Genetics Today. Proc. XI Int. Congr. Genet., I:169.

King, R. C. 1964. Studies on early stages of insect oogenesis. Royal Ent. Soc., Lond., Symp. II, Ins. Reprod. K. C. Highnam, ed., pp. 13-25.

King, R. C. and Koch, E. A. 1962. Chorion formation in D. Amer. Zool., 2:533.
1963. Studies on the ovarian follicle cells of D. Quar. J. Microscop. Sci., 104: 297-320.

King, R. C. and Koch, E. A. 1963. Studies on the ovarian follicle cells of D. Quart. J. Micr. Sci., 104:297-320.

King, R. C. and Mills, R. P. 1961. Nuclear cytoplasmic exchange during oogenesis in D. Amer. Zool., 1:456.
1962. Oogenesis in adult D. XI. Studies of some organelles of the nutrient stream in egg chambers of D.m. and D. willistoni. Growth, 26:235-253.

Koch, E. A. and King, R. C. 1961. The origin of the vitelline membrane of D.m. Amer. Zool., 1:367. 1962. Vitelline membrane formation in D. Amer. Zool., 2:534.

Koch, R. and Burla, H. 1962. Ausbreitungsleistungen von D. subobscura und D. obscura im laboratoriumsversuch. Rev. Suisse de Zool, 69:325-334.

Kunze-Mühl, E. 1961. Untersuchungen über die verteilung der bruchstellen naturlicher und strahleninduzierter chromosomendislokationen bei D. subobscura Coll. Chromosoma, 12: 286-309.

Kunze-Mühl, E. and Sperlich, D. 1962. Vergleichende untersuchungen über den chromosomalen strukturpolymorphismus in Insel-und Festland-populationen von D. subobscura. Z. Vererb.-Lehre, 93:237-248.

Kurokawa, H. 1962. Population genetics on three races of D. auraria Peng. I. Bristle number of sixth sternite in male. Jap. J. Genet., 37:510-517.
1963. Population genetics on three races of D. auraria Peng. II. Sexual isolation among strains within a race C. Jap. J. Genet., 38:1-5.

Lakovaara, S. T. 1963. a: On the functions of rl in D.m. DIS 37:96-97.
1963. b: On the effects of rolled (rl) in D.m. Proc. XI Int. Congr. Genet., 1:175.
1963. c: The effects of the rolled locus on the developments of the compound eye and the wing of D.m. Ann. Acad. Sci. Fenn. A. IV. 73:1-58.

Lee, T. J. 1962. Ecological studies of D. populations in Korea. Kor. Jour. Zool, Vol. V, No. 1:13-20.

Leigh, B. 1963. The induction of XO-males, by irradiation of D.m. males. Proc. XI Int. Congr. Genet., I:68-69.

Leuthold, W. 1962. Vorzugstemperatur, temperaturwahl und temperaturabhängigkeit der bewegungsaktivität bei D. subobscura und D. obscura. Vierteljahrsschrift Nat. Ges. Zurich, 107:147-154.

Levitan, M. 1961a. A complex X-chromosome linkage association. (Abstr.) Anat. Rec., 139:312.

1961b. Proof of an adaptive linkage association. Science, 134:1617-1619.

1962. Spontaneous chromosome aberrations in D. robusta. Proc. Nat. Acad. Sci. (Wash.), 48:930-937.

1963a. A maternal chromosome breakage factor which attacks paternal chromosomes exclusively. (Abstr.) Genetics, 48:898.

1963b. A maternal factor which breaks paternal chromosomes. Nature, 200:437-438.

Levitan, M. and Schiller, R. 1963. Further evidence that the chromosome breakage factor in D. robusta involves a maternal effect. Genetics, 48:1231-1238.

L'Heritier, Ph. and Plus, N. 1963. The relationship of the hereditary virus of D. to its host. In: Biological organization at the cellular and supercellular level, Acad. Press, 59-70.

Lindsley, D. L. 1963. General survey of genetic effects of chromosomal aberrations. In: Radiation-Induced Chromosome Aberrations. Ed. by Sheldon Wolff. New York: Columbia University Press, 273-289.

Lindsley, D. L., Edington, C. W. and Von Halle, E. S. 1963. The effect of gametic genotype on the radiation sensitivity of D. sperm. In: Repair from Genetic Radiation Damage and Differential Radiosensitivity in Germ Cells. Ed. by F. H. Sobels. New York: Pergamon Press, 63-76.

Lindsley, D. L. and Sandler, L. 1963. Construction of the compound-X chromosomes. In: D.m. by means of the Bar Stone duplication. Methodology in Basic Genetics. Ed. by Walter J. Burdette. San Francisco: Holden-Day, Inc., 390-403.

Lints, F. A. 1961. Diversity by inbreeding in D. Genetica, 32:177-199.

1961. Les théories de l'hétérosis. Inst. Interuniv. des Sciences nucléaires, 12: 21-59.

1962. Théories de l'hétérosis et relations karyocytoplasmiques. Acta Biotheoretica, 16:1-26.

1963. Size in relation to development time and egg-density in D.m. Nature, 197: 1128-1130.

1963. On the influence of the number of inbreeding generations on viability and size in D.m. Genetics Today, 1:161.

Lüers, H. 1962. Failure of mutagenic action of thalidomide in D. Lancet, II:1332.

Lüers, H. and Bochnig, V. 1963. Untersuchung zur Frage der Pra- oder Postadaptation bei der Entstehung der DDT-Resistenz. Zool Beigräge N. F. (Berlin), 8:15-22.

Lüers, H. and Röhrborn, G. 1963. The mutagenic activity of ethyleneimino derivatives with different numbers of reactive groups (Abstr.) Genetics Today. Proc. XI Int. Congr. Genet., 1:64.

Mainx, F. 1962. Ein neuer modus der genotypischen geschlechtsbestimmung. Biol. Zentralbl., 81:335-340.

Manning, A. 1963. Selection for mating speed in D.m. based on the behaviour of one sex. Anim. Behav., 11:116-120.

1961. The effects of artificial selection for mating speed in D.m. Anim. Behav., 11:82-92.

Marques, E. K., Winge, H., Napp, M. and Maciel, C. M. P. 1963. Persistence of lethals in irradiated natural populations of D. willistoni. Genetics Today 1(5,63):76-77.

Mather, W. B. 1961. D. pararubida: A new species of D. from New Guinea. Univ. Q'ld. Papers Dept. Zool. 1:251-255.
1961. Chromosomal Polymorphism in D. rubida Mather. Genetics, 46:799-810.
1962. Patterns of chromosomal evolution in the immigrans group of D. Evolution, 16:20-26.
1962. A Natural Translocation in D. Nature, 195:625.
1963. Patterns of chromosomal polymorphism in D. rubida. Amer. Nat., 892:59-64.
1963. Notes on the Inversions of D. rubida. DIS 37:104.
1963. Ecological and sexual variation in D. rubida inversion polymorphism. Heredity, 18:109-111.

Mather, W. B. and Dobzhanski, Th. 1961. Two new species of D. from New Guinea. Pacific Insects, 4(1): 245-249.

McFarquhar, A. M. and Robertson, F. W. 1963. The lack of evidence for coadaptation in crosses between geographical races of D. subobscura. Coll. Genet. Res., Cambr., 4:104-131.

Mead, C. 1962. The ribonucleic acids of D.m. Fed. Proc., 21:377.
1962. The relationship of a DNA-associated RNA with euchromatic and heterochromatic derived DNA of D.m. (Abstr.) Genetics, 47:970.

Médioni, J. 1958. Le comportement de D.m. Meig, dans un appareil à choix lumineux: étude comparative de souches sauvages de provenances géographiques diverses. Comptes rendus des séances de la Société de Biologie, 152:1004.
1959. Le phototropisme en lumière blanche de D.m. Meig.; étude comparative d'une race sauvage et des mutants "Bar" et "yellow." Comptes rendes des séances de la Société de Biologie, 153:670.
1961. Contribution à l'etude psycho-physiologique et génétique du phototropisme d'un Insecte: D.m. Meig. Thèses présentées a la faculté des Sciences de l'Université de Strasbourg.

Meyer, G. F. 1963. Die funktionsstrukturen des Y-chromosome in den spermatocytenkernen von D. hydei, D. neohydei, D. repleta und einigen andersen D., Arten. Chromosoma, 14:207-255.

Meyer, G. F. and Hess, O. 1962. Species specific functional structures of spermatocyte chromosomes in the genus D. Proc. V Int. Congr. Elect. Micr., 2:NN 12.
1963. Structure and function of the Y heterochromatin in D. Proc. XI Int. Congr., Genetics, 1:109.

Mickey, G. H. Crossing over in males of D. induced by radio frequency treatment. Genetics Today. Proc. XI Int. Congr. Genetics, I:72.

Mickey, G. H. 1962. Mitotic alterations in D. resulting from temperature shocks. Bios. 33:58-73.

Minamori, S., Sasaki, M. and Oshima, C. 1962. Local and seasonal variations of the frequency of deleterious genes. Zool. Mag. 71:394. (Abstr.) In Japanese.

Momma, E. 1962. Behavior of mitochondria in living cells during meiosis in D. virilis. Univ. of Texas Publ. No. 6205:375-384.

Moray, N. and Connolly, K. 1963. A possible case of genetic assimilation of behaviour. Nature, 199:358-360.

Moree, R. 1963. The relation between fitness components and equilibrium frequencies in an experimental population of D.m. (Abstr.) Proc. XI Int. Congr. Genet., I:162.

Moriwaki, D. and Kitagawa, O. 1963. "Yellowish" in D. bifasciata conceivable as an incipient species. Proc. XI Int. Congr. Genet., 1:162.

Moriwaki, D. and Tobari, I. 1960. The genetic effects of radiation on the longevity of progeny in D.m. J. Rad. Res., 1:14-22.
1963. Maternal effects and heterosis in D. ananassae. Genetics, 48:171-176.

Mourad, A. 1962. Effects of irradiation in genetically coadapted systems. Genetics, 47: 1647-1662.

Moyer, S. E., Comstock, R. E., and Iyama, Shin-ya. 1963. Selection for recombination frequency in the third chromosome of D. (Abstr.) Genetics, 48:903.

Mukherjee, A. S. 1963. Developmental genetics of the mutant "sexcombless" in D.m. (Abstr.) Proc. XI Intern. Congr. Genet., I:171.

Napp, M., Winge, H., Reguly, M. L. and Cordeiro, A. 1963. Lethals and the parameters of southern population of D. willistoni. Genetics Today, 1(9,59):163.

Nawa, S., and Forrest, H. S. 1962. Synthesis of the yellow pteridine, isosepiapterin. Nature, 196:169-170.

Nolte, D. J. 1962. Segregation of quantitative characters in D.m. Proc. 2nd. Congr. South African Genet. Soc. (Pretoria):101-104.

Nöthel, H. 1963. Der einflus von röntgenstrahlen auf vitalitätsmerkmale von D.m. Untersm chungen uber lebensdauer, fecundität und fertilität nach bestrahlung mit verschiedenen dosen. Thesis, Freie Universität Berlin.

1963. Different types of mortality including prolongation of female lifetime after X-raying D.m. imagines. (Abstr.) Genetics Today. Proc. XI Int. Congr. Genet., 1:72-63.

Nozawa, K. 1963. Competition between brown gene and its wild-type allele in D.m. II. Estimations of relative viability of brown homozygote and an analysis of changes in gene-frequency. Jap. Jour. Genet., 38:6-20.

Ogaki, M. and Tanaka, E. 1963. Inheritance of tolerance to gamma radiation in D.m. (Abstr.) Genetics, 48:904-905.

Ohanessian-Guillemain, A. 1963. Etudes de facteurs génétiques contrôlant les relations du virus σ et de la D. son hôte. (thèse) Ann. de Génét., 5:1-64.

Ohba, S. 1961. Analytical studies on the experimental populations of D. I. The effect of larval population density upon the preadult growth in D.m. and D. virilis with special reference to their nutritional conditions. Biol. J. Okayama Univ., 7:87-124.

Okada, T. 1960. The genus Microdrosophila Malloch from Japan. Kontyû, 28:211-222.

1961. Comparative morphology of the drosophilid flies. IX. Differentiation of the ejaculatory apodeme in view of systematic relationships. Zool. Mag., 70: 253-258. (In Japanese with English summary).

1961. Ibid. X. Differentiation of the ejaculatory apodeme in the genus D. Zool. Mag., 70:259-266. (In Japanese with English summary).

1961. A new species of Hirtodrosophila from South Korea (Diptera, Drosophilidae). Akitu, 10:20-22.

1962. Bleeding sap preference of the drosophilid flies. Jap. J. Appl. Ent. and Zool., 6:216-229.

1963. Caenogenetic differentiation of mouth hooks in Drosophilid larvae. Evolution, 17:84-98.

1963. Cladogenesis of Drosophilidae in relation to material compensation. Mushi, 37:79-100.

Oksala, T. 1963. The mode of interchromosomal effect of inversion heterozygosity on crossing-over frequency in D.m. Proc. XI Int. Congr. Genet., 1:125.

Olivieri, A. and Olivieri, G. 1963. Relazione dose-effetto nell'induzio ne dello scambio (crossing-over) con raggi X nel maschio di D.m. Ac. Naz. dei Lincei, 34:685-696.

Parsons, P. A. 1962. The initial increase of a new gene under positive assortative mating. Heredity, 17:267-276.

1963. Migration as a factor in natural selection. Genetica, 33:184-206.

Parsons, P. A. 1962. The initial increase of a new gene under positive assortative mating. Heredity, 17:267-276, Part 2.

1963. Congenital abnormalities and competition in man and other mammals at different maternal ages. Nature, 198:316-317.

Pipkin, S. B. 1962. Mesonotal color polymorphism in D. 1. Lebanonensis. Genetics, 47: 1275-1290.
1963. Mating success in the D. victoria species group, subgenus Pholadoris (Diptera, Drosophilidae). The Amer. Nat., 97:235-242.

Plus, N. 1963. Action de la 5-fluorodésoxyuridine sur la multiplication du virus σ de la D., B.B.A, 72: 92-105.
1962. Action de la 5-fluorodésoxyuridine et de la ribonucléase sur le rythme de ponte des D. C.R. Acad. Sc., 255:3247-3249.
1962. Comportement du virus σ de la D. en centrifugation à gradient de densité de saccharose. C. R. Acad. Sc., 255:3498-3500.

Poulson, D. F. 1962. Hereditary Infections. Yale Scientific Mag., 36:28-30.
1963. Cytoplasmic inheritance and hereditary infections in D. Appendix III In: Methodology in Basic Genetics, Burdett, W. J., ed., pp. 404-424.

Pozzi, L., Giavelli, S., Sironi, G. and Gallucci, E. 1963. Differential sensitivity of spermatogenic stages of D.m. to x-ray irradiation in O_2 and N_2. (Abstr.) 2nd. Int. Congr. Rad. Rsch.
1963. Differential sensitivity of spermatogenic stages of D.m. to X-irradiation to O_2 and N_2. Int. J. Rad. Biol., 6:380.

Prevosti, A. 1961. Genetics of quantitative traits in D. and microsystematics. Verhandl. XI Int. Kongr. f. Ent., Wien, 1:436-437.
1961. Variación con la altitud en caracteres cuantitativos de D. subobscura. Bol. Real Soc. Esp. Hist. Nat., 59:29-34.

Puro, J. 1963. The brood pattern of X-ray induced crossing-overs in D.m. males. Proc. XI Int. Congr. Genet., 1:69.

Rendel, J. M. 1962. Relationship between gene and phenotype. J. Theoret. Biol., 2:296-308.
1963. Correlation between the number of scutellar and abdominal bristles in D.m. Genet., 48:391-408.

Rezzonico, Raimondi G. and Ghini, C. M. 1963. Nuove osservazioni sulle cellule di D.m. coltivate in vitro. Atti A.G.I., 8:213-225.

Ritossa, F. 1962. A new puffing pattern induced by temperature shock and DNP in D. Experientia, 18:571.

Roberts, P. 1961. Bristle formation controlled by the achaete locus in genetic mosaics of D.m. Genetics, 46:1241-1243.
1962. Interchromosomal effects and the relation between crossing-over and nondisjunction. Genetics, 47:1691-1709.

Robertson, F. W. 1963. The ecological genetics of growth in D. 6. The genetic correlation between the duration of the larval period and body size in relation to larval diet. Genet. Res., Cambr. 4:74-92.

Sakaguchi, B. and Poulson, D. F. 1962. Transfer of the "sex-ratio" condition from D. willistoni to other species of D. Ann. Rept. Nat. Inst., Genetics, Misima, 12:18-19.
1962. Comparative analysis of transmissive efficiency and pathological effects of "sex-ratio" agents of different origin in D. Ann. Rept. Nat. Inst. Genetics, Misima, 12:19-21.
1963. Interspecific transfer of the "sex-ratio" condition from D. willistoni to D.m. Genetics, 48:841-861.

Sandler, L. and Lindsley, D. L. 1963. The meiotic behavior of tandem asrocentric compound-X chromosomes in D.m. Genetics, 48:1533-1543.

Sang, J. H. and Burnet, B. 1963. Physiological genetics of melanotic tumors in D.m. 1. The effects of nutrient balance on tumor penetrance in the tu^K strain. Genetics, 48:235-253.

1963. Dietary utilization of DNA and its derivatives by D.m. J. Insect Physiol., 9:533-562.
1963. Gene-environmental interactions and penetrance of melanotic tumor genes. Proc. XI Int. Congr. Genet. I:177-178.
Sang, J. H. and King, R. C. 1961. Nutritional requirements of axenically cultured D.m. adults. J. Exp. Biol., 38:793-810.
Sarkar, S. K. 1963. Detection of spontaneous translocation between Y chromosome and an autosome in D. ananassae. Proc. Zool. Soc., Calcutta, 16:1.
Sävhagen, R. 1963. Cell stages and differential sensitivity to irradiation in males of D.m. In: Sobels "Repair from Genetic Radiation," 343-357.
Schalet, A., Kernaghan, R. P. and Chovnick, A. 1963. On the phenotypic manifestation of mutations in the rosy region of D.m. (Abstr.) Proc. XI Int. Congr. Genet., 1:1.
Scharloo, W. 1961. Temperature and mutant expression. Experientia, 17:261.
1962. The influence of selection and temperature on a mutant character ($LLci^D$) in D.m.
1963. Mutant expression in inbred lines and crosses. Experientia, 19:405.
1963. Stabilizing selection and "Balanced combinations of polygenes." Nature, 200:293-294.
1963. Disruptive and stabilizing selection on a mutant character. (Abstr.) Proc. XI Int. Congr. Genet.
Schläpfer, Th. 1963. Der einfluss des adulten wirtsmilieux auf die entwicklung von larvalen augenantennen-imaginalscheiben von D.m. Roux' Archiv., 154:378-404.
Schmid, W. 1961. The differential susceptibility of sperm and spermatids to ionising radiations. Amer. Nat., 95:103-111.
1961. The effect of carbon monoxide as a respiratory inhibitor on the production of dominant lethal mutations by x-rays in D. Genetics, 46:663-670.
Schneider, I. 1963. In vitro culture of D. organs and tissues. Genetics, 48:908.
Schneider-Minder, A. 1962. Zytologische untersuchungen zur deutung der unterschiedlichen strahlenempfindlichkeit verschieden alter D. -Eier. Arch. Jul. Klaus-Stiftg., 37:38-43.
Schultz, J. 1963. The genetics of somatic cells. (Abstr.) Proc. XVI Int. Congr. Zool., 3:216-221.
Schwinck, Ilse, Studies on the aberrant function of the malpighian tubes in the D. mutant rosy. Proc. XIth Int. Cong. Genet., I:169.
Seecof, R. L. 1961. Gene dosage and enzyme activities in D.m. Genetics, 46:605-614.
Seecof, R. L. 1962. CO_2 sensitivity in D. as a latent virus infection. Cold Spring Harbor Symposium on Quantitative Biology 27:501-512.
1963. Interference with D. development caused by sigma virus infection. (Abstr.) Rec. Genet. Soc. Amer. 32.
Seto, F. 1961. A developmental study of recessive lethals from wild populations of D.m. Amer. Nat., 95:365-374.
Sheldon, B. L. 1963. Studies in artificial selection of quantitative characters. I. Selection for abdominal bristles in D.m. Aust. J. Biol. Sci., 16:490-515.
1963. Studies in artificial selection of quantitative characters. II. Selection for body weight in D.m. Aust. J. Biol. Sci., 16:516-541.
Slizynska, H. 1963. Origin of repeats in D. chromosomes. Genet. Res., Cambr. 4:154-157.
1963. Mutagenic effects of X-rays and formaldehyde food in spermatogenesis of D.m. Genet. Res., Cambr., 4:248-257.
Smith, K. D., Ursprung, H. and Wright, T. R. F. 1963. Xanthine dehydrogenase in D.: Detection of Isozymes. Science, 142:226-227.
Sobels, F. H. 1961. The role of oxygen in radiosensitization by cyanide in D. Int. Jour Rad. Biol, 3:328-329.
1961. Chemische Beeinflussung des rontgeninduzierten Mutationsprozesses bei D. Die Naturwissenschaften, 48:146-155.

1962. Abhandl. d. Deutschen Akad. der Wissenschaften Berlin "Radiation induced Mutagenisis", Gatersleben 1961, 115.
1962. Rates of forward and reverse mutation in D. after exposure to mustard gas and X-rays. Genetica, 33:31-44.
1962. Modification of premutational radiation damage in D. In: Strahlenwirkung und Milieu, ed. H. Fritz-Niggli, suppl. Strahlentherapie, Band 51, 197-212.
1963. Peroxides and the induction of mutations by X-rays, ultraviolet and formaldehyde. Rad. Res. suppl. 3, 171-183.
1963. Repair and differential radiosensitivity in developing germ cells of D. males. In: Sobels, Repair from genetic radiation damage, Pergam on Press, 109-204.

Sobels, F. H. and Tates, A. D. 1961. Recovery from premutational damage of X-irradiation in D. spermatogenesis. Proc. Conf. Biology Division, Oak Ridge National Laboratory on Repair from damage, J. Cellular and Comparative Physiology, suppl. I, 58:187-194.
1963. Int. J. Rad. Biol. 6, 379.

Sondhi, K. C. 1960. Selection for a character with a bounded distribution of phenotypes in D. subobscura J. Genet., 57:193-221.
1961. Developmental barriers in a selection experiment. Nature, (Lond.), 189:249-250.
1961. The evolution of a pattern in D. Heredity, 16:523.
1962. The evolution of a pattern. Evolution, 16:186-191.
1962. Patterns of gene pleiotropy in morphogenetic processes of D. Rec. Genet. Soc., 31:117, and Genetics, 47:986.
1962. Patterns of gene pleiotropy in morphogenetic processes. Science, 137:538-540.
1963. Gene controlled process in the genesis and evolution of animal patterns. Proceedings of the XVIth Int. Congr. Zoo., Washington, D. C. 2:216.
1963. The effect of hormonally induced changes during development and during adult life of D. Genetics Today, Proc. XI Int. Congr. Genet., 1:181.

Sperlich, D. 1961. Untersuchungen uber den chromosomalen polymorphismus einer population von D. subobscura auf den liparischen inseln. Z. Vererb.-Lehre, 92:74-84.

Sperlich, D. and Kunze-Mühl, E. 1963. Der chromosomale polymorphismus einer population von D. subobscura auf der insel ustica im vergleich mit andersen insel-und festlandstandorten. Z. Vererb.-Lehre, 94:94-100.

Spickett, S. G. 1963. Genetic and developmental studies of a quantitative character. Nature, 199:870-873.

Stern, C. 1962. The origin of the sternopleural sclerite in D. Am. Zool., 2:562.

Stern, C., Tokunaga, C., Grisseau, C. and Gottlieb, F. J. 1963. The cell lineage of the sternopleura in D.m.

Stone, W. S. 1962. The dominance of natural selection and the reality of superspecies (species group) in the evolution of D. Univ. Texas Publ. No. 6205: 507-538.

Stone, W. S., Wheeler, M. R., and Wilson, F. D. 1962. Genetic studies of irradiated natural populations of D. V. Summary and discussion of tests of populations collected in the Pacific Proving Ground from 1955-1959. Univ. Texas Publ. No. 6205:1-54.

Stone, W., Wilson, F. D., and Gerstenberg, V. L. 1963. Genetic studies of natural populations of D.: D. pseudoobscura, a large dominant population. Genetics, 48:1089-1106.

Strangio, V. A. 1962. Radiosensitivity during spermatogenesis in D.m. Amer. Nat., 96:145-149.

Takada, H. 1961. The male genitalia of D. populi Wheeler and Throckmorton (Diptera, Drosophilidae). Bull. Brooklyn Ent. Soc., 55:144-147.

Tantawy, A. O. 1963. Developmental homeostasis in X-rayed populations of D. pseudoobscura. Genetica, 33:222-243.
1963. Genetic variance in selected lines of D.m. and D. simulans at different temperatures. Proc. XVI Int. Congr. Zool., 2:314.

1963. Heritability of wing length in natural populations of D.m. and D. simulans. XI Int. Congr. Genet., I:167-168.

Tates, A. D. 1963. Modification of the X-ray induced rate of sex-linked lethals by nitrogen post-treatment and fractionation of the dose in D.m. Proc. XI Int. Congr. Genet., I:70.

Tates, A. D. and Sobels, F. H. 1961. Modification of genetic irradiation damage in D., by post-treatment with nitrogen and fractionation of the dose. Int. J. Rad. Biol, 3:553-554.

Thoday, J. M. 1963. Effects of disruptive selection with negative assortative mating. Genet. Rsch., 4: 318-319.

1963. Locating synthetic lethals. Amer. Nat., 97:353.

Throckmorton, L. H. 1962. The problem of phylogeny in the genus D. Univ. Texas Publ. No. 6205:207-344.

1962. The use of biochemical characteristics for the study of problems of taxonomy and evolution in the genus D. Univ. Texas Publ. No. 6205:415-488.

Throckmorton, L. H., and Magalhaes, L. E. 1962. Changes with evolution of pteridine accumulations in species of the saltans group of the genus D. Univ. Texas Publ. No. 6205:489-506.

Tobari, I. and Moriwaki, D. 1961. Relationship between Y chromosome and longevity in D.m., especially in term of the radiation effect. Jap. J. Genet., 36, Suppl.: 152-154.

Tobari, Y. N. 1962. Heterosis relating to a terminal inversion in artificial population of D. ananassae. Jap. J. Genet., 37:302-309.

Tokunaga, C. 1961. The differentiation of a secondary sex comb under the influence of the gene engrailed in D.m. Genetics, 46:157-176.

1962. Cell lineage and differentiation on the male foreleg of D.m. Devel. Biol., 4:489-516.

Torroja, E. 1962. Analisis de la espermatogenesis de D.m. y de sus alteraciones citogeneticas bajo la accion de los rayos X. (Thesis).

Ulrich, H. 1963. Partial irradiation of D. zygotes by X-rays. (Abstr.) Int. Journ. Rad. Biol., 6:381.

1963. X-ray induced "dominant lethals" in inseminated eggs of D. (a) Experiments in the stage between completion of meiosis and beginning of cleavage. (Abstr.) Proc. XI Int. Congr. Genet., 1:71.

Valencia, R. M. and Valencia, J. I. 1959. A comparative study of mutations induced in the germ cells of D. at different physiological stages. Proc. XXI Int. Congr. Physiol. Sci., 12.

1961. Mutations induced in different stages of developing germ cells of D. females. (Abstr.) Rad. Res., 513.

1962. Studies of the genetic effects of irradiation during the perifertilization stages of D.m. Proc. IV Inter-Amer. Symp. on the Peaceful Uses of Nuclear Energy.

Valencia, R. M., Valencia, J. I. and Kirschbaum, W. F. 1961. Mutations induced in recently fertilized eggs of D.m. (Abstr.) Rad. Res. Soc., 514.

Van Valen, L. and Ehrman, L. 1962. Reproductive isolation between D.m. and D. pseudoobscura. Evolution, 16:528.

von Borstel, R. C. 1961. Induction of nuclear damage by ionizing and ultra-violet radiation. In: Proc. 3rd Int. Congr. Photobiol. Ed. by B. Chr. Christensen and B. Buchmann. Amsterdam: Elsevier Publ. Co., 243-250.

1961. The genetic basis for X-radiation-induced mitotic inhibition. Rad. Rsch., 14:453.

1963. Cytogenetics and developmental genetics course - a postscript. Amer. Zool., 3:87-95.

von Borstel, R. C. and Buzzati-Traverso, A. A. 1962. On the role of lethal mutants in the control of population. In: Radioisotopes and Radiation in Entomology. Proc. Colloq. Radioisot. and Rad. in Ent. Trombay, India. Vienna: Int. Atomic Energ. Agency, 273-278.

Walker, I. 1962. Mutationsauslösung bei der schlupfwespe pseudeucoila bochei weld. Die mutante "antennaeless" (al). Xrchiv. Jul. Klaus stiftung, 37:28-38.

Ward, C. L. and Bird, M. A. 1963. Cytochrome oxidase activity in chromosome interchange stocks of the Oslo and Iso-Amherst strains of D.m. Genetics, 48:1435-1440.

Wasserman, M. 1962. Cytological studies of the repleta group of the genus D.: III. The mercatorum subgroup Univ. Texas Publ. No. 6205:56-63.

1962. Cytological studies of the repleta group of the genus D.: IV. The hydei subgroup. Univ. Texas Publ. No. 6205:73-84.

1962. Cytological studies of the repleta group of the genus D.: V. The mulleri subgroup. Univ. Texas Publ. No. 6205:85-118.

1962. Cytological studies of the repleta group of the genus D.: VI. The fasciola subgroup. Univ. Texas Publ. No. 6205:119-134.

Watson, W. A. F. 1962. The production of translocations in spermatogonial cells of D. by chloroethyl methanesulphonate (CB 1506). Genet. Res., Cambr., 3:467-471.

Wattiaux, J. M. 1962. Variation of bristle number in relation to speed of development in D.m. Nature, 194:706-707.

Wattiaux, J. M. and Heuts, M. J. 1963. Cycle variation of bristle number with parental age in D.m. Genetics Today, 1:168.

Welshons, W. J. 1963. Cytological contributions to mammalian genetics. Am Zool., 3: 15-22.

Welshons, W. J. and Von Halle, E. S. 1962. Pseudoallelism at the Notch locus in D. Genet., 47:743-760.

Welshons, W. J., Von Halle, E. S. and Scandlyn, B. J. 1963. Notch pseudoallels in D.m. (Abstr.) Proc. XI Int. Congr. Genet., I:1.

Wheeler, M. R. 1961. Some drosophilidae (diptera) from the Galapagos Islands. Annals of the Ent. Soc. of Amer., 54:750.

1961. New species of southwestern acalyptrate diptera. The Southwestern Naturalist, 6:86-91.

1963. A note on some fossil Drosophilidae (Diptera) from the amber of Chiapas, Mexico. Jour. Paleo., 37:123-124.

1963. D. melina, nom. nov. (Diptera). Proc. Ent. Soc. Wash., 64:246.

Wheeler, M. R., and Magalhaes, L. E. de. 1962. The alagitansbocainensis complex of the willistoni group of D. Univ. of Texas Publ. No. 6205:136-155.

Wheeler, M. R., and Takada, H. 1961. Diptera: Drosophilidae. In: Insects of Micronesia. Published by the Bishop Museum, Honolulu.

1963. A revision of the American species of Mycodrosophila (Diptera; Drosophilidae). Ann. Ent. Soc. Amer., 3:392-399.

Wheeler, M. R., Takada, H., and Brncic, D. 1962. The use of biochemical characteristics for the study of problems of taxonomy and evolution in the genus D. Univ. Texas Publ. No. 6205:395-414.

Wheeler, M. R., and Throckmorton, L. H. 1961. Notes on Alaskan Drosophilidae (Diptera), with the description of a new species. Bull. Brooklyn Ent. Soc., 55:134-143.

Williamson, D. L. 1963. Cohabitation of σ virus and sex-ratio spirochetes. Genetics, 48:915-916.

Winge, H. 1963. Levels of speciation and reproductive affinities in the willistoni cryptic group of D. Genetics Today, 1(8,24):138-139.

Winge, H. and Cordeiro, A. R. 1963. Experimental hybrids between D. willistoni Sturtevanti and D. paulistorum Dobzhansky and Pavan from southern marginal populations. Heredity, 18:215-222.

Winterfeld, G. 1963. Versuche über einen genetischen strahlenschutz durch chemikalien an D.m. Thesis, Freie Universität Berlin.

Wolff, S. 1962. The kinetics for two-break chromosome exchanges. Journ. Theoret. Biol., 3:304-314.

1963. The kinetics for two-break chromosome exchanges and the 3/2 power rule. In: Repair from Genetic Radiation Damage and Differential Radiosensitivity in Germ Cells. Ed. by F. H. Sobels. New York: Pergamon Press, 1-10.

Wright, T. R. F. 1963. The genetics of an esterase in D.m. Genetics, 48:787-801.

Würgler, F. E. 1963. The radiosensitivity of early developmental stages of D. (Abstr.) Int. Journ. Rad. Biol., 6:378-369.

1963. X-ray induced "dominant lethals" in inseminated eggs of D. (b) Experiments with different stages between insemination and end of second cleavage division. (Abstr.) Proc. XI Int. Congr. Genet., 1:71-72.

Würgler, F. E. 1963. X-ray induced "dominant lethals" in inseminated eggs of D. (Abstr.) 3rd. Scient. Assoc. Radiobiol. Euratom countr., Karlsruhe.

Würgler, F. E., Ulrich, H. and Schneider-Minder, A. 1963. Variation of radiosensitivity during meiosis and early cleavage in newly laid eggs of D.m. Repair from genetic radiation damage. Pergamon Press: 101-106.

Zambruni, L. 1963. La risposta del carattere "brown spots" di D.m. al trattamento con raggi X. Ist. Lomb. Sc. e Lett., 97:3-18.

Zimmering, S. 1962. Genetic evidence of X-ray induced exchanges occurring at a four strand stage in D. spermatocytes. J. Hered., 53:254-256.

1962. Temperature effects and segregation in D. males. (Abstr.) Genetics, 47: 997; Rec. Genet. Soc. Amer., 31:128.

1963. The effect of temperature on meiotic loss of the Y chromosome in the male D. Genetics, 48:133-138.

Zimmering, S. and Perlman, M. 1962. Modification of abnormal gametic ratios in D. III. Probable time of the A-type effect in Bar-Stone translocation males. Canad. Jour. Genet. and Cytol., 4:333-336.

Bibliography

In Press

Abro, A. Observations on the spermiogenesis of D.m. Acta Universitatis Bergensis. On the synchronous differentiation of spermatogenic cells in D.m. Acta Universitatis Bergensis.

Alexander, M. L., and Bergendahl, J. 1964. Dose rate effects in the developing germ cell of male D. Genetics, 49.

Barak, E. 1963. The frequency of chromosome breakage induced in structural heterozygotes. Bull. Res. Counc. Israel.

Brncic, D. , and Koref-Santibañez, S. 1963. Mating activity of homo and heterokaryotypes in D. pavani. Genetics.

Burisch, E. 1963. Beitrage zur genetik von Megaselia scalaris Loew (Phoridae). Z. Vererb.-Lehre, 94.

Burnet, B. and Sang, J. H. Physiological genetics of melanotic tumors in D.m. 2. The genetic basis of response to tumorigenic treatments in the tu^K and tu bw strains. Genetics.

Carson, H. L. 1964. Population size and genetic load in irradiated populations of D.m. Genetics.

Cordeior, A. R. 1963. D. wingei a new Brazilian species of the Dryfusi group. Rev. Bras. Biol.
1963. D. pagliolii a new species showing unusual chromatographic pattern of fluorescent substances. Rev. Bras. Biol.
Counce, S. J. and Hartman, N. M. Strain differences in egg structure in D. hydei. Amer. Zool. (Abstr.).
Dobzhansky, Th., Ehrman, L., Pavlovsky, O. and Spassky, B. The superspecies D. paulistorum. Proc. Nat. Acad. Sci.
Forrest, H. S., and Nawa, S. Recent work on the structures of isosepiapterin and the drosopterins and its relation to pteridine biosynthesis. Proc. of the Intern. Pteridine Symposium, Stuttgart, Germany, September, 1962.
Fourche, J. Un respiromètre électrolytique pour l'étude des pupes isolées chez la D.
Frydenberg, O. 1963. Population studies of a lethal mutant in D.m. I. Behaviour in populations with discrete generations. Hereditas, 49.
Geer, B. W. 1963. A ribonucleic acid-protein relationship in D. nutrition. J. Exptl. Zool.
Giavelli, S., and Parazzi, E. 1963. Effect of low temperature on radiosensitivity of D. pupae.
Gibson, J. B. and Thoday, J. M. Effects of disruptive selection. VIII. Imposed Quasi-Random mating. Heredity.
Gill, K. S. Epigenetics of the promorphology of the egg in D.m. J. Exp. Zool.
Hannah-Alava, A. and Puro, J. The brood pattern of fecundity of D.m. males mated singly and sequentially up to 24 days. DIS. 39.
Judd, B. H. 1964. The structure of intralocus duplication and deficiency chromosomes produced by recombination in D.m. with evidence for polarized pairing. Genetics.
Kidwell, J. F. 1963. Genotype and environment interaction with isogenic lines of D.m. Genetics, 48.
1963. A specific multi-locus complementary lethal system in D.m. Canad. Jour. Genet. and Cytol., 5.
Kikkawa, H. 1963. The genetic study on amylase in D. virilis. Ann. Rep. Sci. Works, Fac. Sci.
King, R. C. 1964. Further information concerning the envelopes surrounding dipteran eggs. Quart. J. Micr. Sci.
Koref-Santibañez, S. 1963. Reproductive isolation between the sibling species D. pavani Brncic and D. gaucha Jaeger and Salzano. Evolution.
Lints, F. A. De l'influence de la formule karyo-cytoplasmique et du milieu sur les relations entre longévité et vitesse de croissance chez D. Bull. Biol. France-Belgique.
Euhétérosis et luxuriance chez D.m. Z. für ind. Abst. und Vererbungslehre.
Lohrmann, R., and Forrest, H. S. 1964. Synthesis of some 8-substituted glucosylpteridines related to known naturally occurring materials. Journal of the Chemical Society.
Mather, W. B. 1963. The Races of D. rubida. Evolution.
Mead, C. 1964. A deoxyribonucleic acid-associated ribonucleic acid from D.m. J. Biol. Chem. 239.
Merrell, D. J. 1963. A note on overwintering in D.m. Proc. Minn. Acad. Sci. 30:110-111.
1963. Heterosis in D. Evolution.
Minamori, S. and Saito, Y. 1963. Local and seasonal variations of lethal frequencies in natural populations of D.m. Jap. Jour. Genet., 38:
Nicoletti, B., Canuti, N. and Arabia, L. Traslocazioni reciproche tra cromosoma X ed Y in D.m.: analisi genetica e citologica di un primo campione ottenuto adottando un nuovo schema.
Nicoletti, B., Olivieri, A. and Olivieri, G. Ulteriori dati sull'ef fetto di Raggi X ed Ultravioletti nel produrre letali recessivi in D.m.
Sulla sterilità indot ta dai raggi Ultravioletti in maschi di D.m. irradiati con la tecnica di Reuss.

Nigon, V. and Gillot, S. L'incorporation de la thymidine au cours de l'ovogenèse et du développement embryonnaire de la D. Exp. Cell Res.

Olivieri A. and Olivieri, G. Fenomeni di restituzione in spermato goni di D.m. attraverso l'induzione del crossing-over con raggi X.

Olivieri, A., Olivieri, G. and Pica, L. Sulla possibilità che la presenza del cromosoma Y condizioni in D.m. l'attività degli spermatozoi nei proces si di fecondazione.

Pipkin, S. B. New flower breeding species of D. (Diptera Drosophilidae). Proc. Ent. Soc. Washington.

Pontier, J. L'inertie statistique et ses applications. Analyse factorielle, régression. Biométrie-Praximétrie.

Redfield, H. Regional association of crossing over in non-homologous chromosomes and its variation with age. Genetics.

Rezzonico, Raimondi G. and Ghini, C. M. 1962. Cultures de tissus dans la D. Premier Colloque Int. sur la culture de tissus d'Invertebrés.

Rinehart, R. R. Some effects of nitric oxide and oxygen on dominant lethal production in X-irradiated D. virilis males. Genetics.

Ritossa, F. 1963. Experimental activation of specific loci in polytene chromosomes. Experimental Cell Rsch.

Ritossa, F. Behavior of RNA and DNA synthesis at the puff level in salivary gland chromosomes of D. Experimental activation of specific loci in polytene chromosomes of D.

Robertson, F. W. The ecological genetics of growth in D. 7. The role of canalization in the stability of growth relations. Genet. Res.

Rudkin, G. T. Studies on chromosomal protein. Structure and function of heterochromatin. Proc. XI Int. Congr. Genet.

Sang, J. H. Nutritional requirements of inbred lines and crosses of D.m. Genet. Res. Penetrance, expressivity and thresholds. J. Hered.

Sang, J. H. and Burnet, B. Environmental modification of the eyeless phenotype in D.m. Genetics.

Scharloo W. Mutant expression and canalization. Nature.

Scharloo, W. and Nieuwenhuiis, A. M. Temperature sensitive periods of the cubitus interruptus mutant in D.m. Genetica.

Seecof, R. L. 1964. Deleterious effects on D. development associated with the sigma virus infection. Virology, Jan.

Sondhi, K. C. The biological foundations of animal patterns. Quart. Rev. Bio.

Sperlich, D. and Karlick, A. 1963. Frequenz und alleliegrad autosomaler letalfaktoren in inselund festlandpopulationen von D.m. Verh. d.d. zool. Ges.

Stalker, H. D. 1963. Cytotaxonomy in the D. melanica species group. Proc. XIth Int. Cong. Genet., I:139.

1964. Chromosomal polymorphism in D. euronotus. Genetics.

Stern, C., and Mukherjee, A. S. 1964. Aspects of developmental genetics of the legs of D. Proc. Indian Acad. Sci., 34B.

Tantawy, A. O. Effects of temperature and X-ray irradiation on intrinsic growth rate in populations of D. pseudoobscura. Genetica, 33.

Trosko, J. Effect on genetic damage of posttreatments given X-rayed D. males.

Ulrich, H. and Würgler, F. E. 1963. Genetische und nichtgenetische strahleneffekte in D. -Eiern. Verhandl. Dt. Zool. Ges. in München.

Valencia, R. M. and Valencia, J. I. The radiosensitivity of mature germ cells and fertilized eggs in D.m. Proc. Symp. on Specific Topics in Radiobiology.

von Borstel, R. C. 1963. Effects of radiation on germ cells of insects: dominant lethals, gamete inactivation and gonial cell killing. Proc. Symp. on "Use and Application of Radioisotopes and Radiation in the Control of Plant and Animal Insect Pests". Athens, Greece, April 22-26, 1963.

Wattiaux, J. M. Mesure de l'isolement sexuel. Z. für ind. Abst. und Vererbungslehre.
Welch, R. M., and Resch, Kathleen. 1963. Application of naphthol yellow S cytophotometry in DNA and protein determinations on larval material of D.m. J. Histochem. and Cytochem.
Wheeler, M. R. Family Drosophilidae. In: Catalog of Nearctic Diptera. U. S. Dept. Agriculture Publ.
Fruitfly (D.). In: U.F.A. Handbook. The Care and Management of Laboratory Animals. Third edn. (London).
Notes on the extant types of Dr. O. Duda's Costa Rican Drosophilidae. Bull. Brooklyn Ent. Soc.
Wright, T. R. F. and MacIntyre, R. J. 1963. A homologous gene-enzyme system, Esterase 6, in D.m. and D. simulans. Genetics, 48:12.
Zimmering, S. and Wu, C. K. 1963. Radiation induced X-Y exchange and nondisjunction in spermatocytes of the immature testis of D. Genetics, 48.

The mechanics of printing demands that pages for DIS be prepared in multiples of eight. We therefore occasionally run out of material at the end of an issue with a few potential pages remaining in the final group of eight; this provides a minor opportunity for a bit of free-lancing, in which we indulge on the next page.

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E. N.

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The selected papers of H. J. Muller

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