Zuitin, A.I. A Third Chromosome Balancer

The lines carrying numerous mutant genes in the third chromosome may be balanced by means of the chromosome ru h D (Fiodorova), carry- in the inversion which almost completely suppresses crossing over (to be described in one of the following issues of C.R. Ac. Sc. U.S.S.R.). The stock is: ru h D inv/ru h us; Cy sp/L2.

Muller, H.J. Labor-saving Method of Starting Homozygous or Balanced Stocks of Sex-fertile Sex-linked Genes

(1) Balancer stock "Patroclinous" ("Pat")

P1 CLB, se v/se v lx f bb/Y-9 (non-disjunction)

X dl-49, 1z8/Y-

Eggs: CLB, se v (half carry Y) se v lx f bb (half carry Y). CLB se v/se v lx f bb (non-disjunction) Y (non-dis.)

Sperm: 128 dl-49 Y

F1 CLB, se v/lx f bb/Y (1/2 carry Y) CLB se v/Y (1/2 YY) (dics) se v lx f bb/dl-49, 1z8 Y ("""); se v lx f bb/Y (""");

CLB, se v/se v lx f bb/dl-49, 1z8 Y (dics) CLB, se v/se v lx f bb/Y (dics)

To perpetuate, breed se v B 9 (need not be virgin) by dl-49, 1z8 brothers or fathers (selection needed to retain se v lx f bb).

(2) Let "a" represent sex-linked gene or combination of genes.

Then:

P1 CLB, se v/se v lx f bb/Y Y X a/Y (1/2 carry Y) CLB se v/Y (1/2 YY) (dics) se v lx f bb/Y (1/2 YY) (dics)

CLB, se v/se v lx f bb/Y (3X Y, sterile) Y/Y (non-dics)

To form stock of "a", breed B (not sc or v) Y 9 (need not be virgin) by any brothers or fathers: CLB, se v/a Y (1/2 carry Y) X a/Y.

If "a" has good viability and fertility when homozygous, this stock will automatically become a/c/Y Y X a/Y (Y) 9 after a few generations; otherwise, it will remain balanced and this will then be the more desirable condition to have it in. If presence of supernumerary Y in stock is undesirable, a stock of "Patroclinous" should be used in which the Y is marked by Cy owing to a translocation between Y and a chromosome 2 containing Cy. In this case only the non-Cy B F1 Y are used for brooding. This stock is called "Curly Pat".

Muller, H.J. Balancing of Duplication by Deficiency or Lothals and Vice Versa -(Bridges, Muller)

Example: P, y v/se 111

111 Y X y/dcl-24/Y (dcl-24 is deleted-X = duplication covering locus of 111, y and se). F1 sc1/111/dcl-24/Y Y X Y 9
Sporn: $s^0l^1/l^1/d^1-2^4 : s^0l^1/l^1/y : s^0l^1/l^1 : d^1-2^4$

Eggs


Fertile $F_2\varnothing$ brood with fertile $F_2\varnothing$ give same classes as before; hence stock is now self-perpetuating.

**Muller, H.J.** Detection of Visible arising in X of $\varnothing$:

Mutations

| P1 |  \( Y/Y \) \( X \) \( X/Y \) \( \varnothing \) (donor) |
|---|---|---|---|---|
| P1 |  \( Y/X \) \( \varnothing \) \( (3X, \text{sterile}) \) \( Y/Y \) \( \varnothing \) \( X/Y \) \( \varnothing \) \( (\text{examine}) \) \( Y/Y \) (died) |

**Key:**

- B = Bar eye; C = inversion preventing crossing-over;
- n = new mutant, lethal, or visible; v = v f and car are recessive markers.

| P1 | \( s^0 \) \( v \) \( f \) \( \varnothing \) \( \text{car} \) \( \text{ClB} \), \( s^0 \) \( v \) \( \varnothing \) \( X \) \( X/Y \) \( \varnothing \) (donor) |
|---|---|---|---|---|---|
| F1 | \( \text{ClB} \), \( s^0 \) \( v \) \( n \) \( ? \) \( \varnothing \) \( x \) \( s^0 \) \( v \) \( f \) \( \text{car}^2 \) (brood in individual cultures) |
| F2 | \( \text{ClB} \), \( s^0 \) \( v \) \( Y \) \( \varnothing \) \( (\text{diec}) \) \( \text{ClB} \), \( s^0 \) \( v \) \( Y \) \( \varnothing \) \( (\text{diec}) \) |

Let "n" represent possible newly arisen mutant sex (lethal or visible). No crossing-over in P1 because of inversion. If there is no "n" in given culture, \( \varnothing \) will appear \( \varnothing \). If there is a visible "n", all "c" will manifest it. If there is a lethal "n", no "c" will hatch (except occasional non-disjunctional \( s^0 v \) \( f \) \( \text{car} \) \( ? \)). This is determinable without etherization. If "n" proves to be present in a culture, make mass culture of F3 \( n^?/s^0 v \) \( f \) \( \text{car}^2 \) \( \text{X brothers (visible)}, \text{or, if} "n" \text{is lethal} X \text{sc v f car}^2 \text{X} \text{other way provides stock of} "n" \text{and count of} F_3 \text{car}^2 \text{shows locus of} "n".

5. Vissibles arising in X of \( \varnothing \) are directly evident in sons.

4. Lethals arising in X of \( \varnothing \)

- \( 1z \) = lozenge-spectacled eye, sterile in homozygous \( \varnothing \).
- \( d^1-2^4 \) = inversion, preventing crossing-over to left of garnet.

| P1 | \( 1z^? \) \( \varnothing \) \( \text{donor} \) \( X \) \( d^1-2^4 \), \( 1z^8 B/Y \) \( \varnothing \) |
|---|---|---|---|---|---|
| Obtain virgin \( F_2 \), \( \varnothing \) \( \varnothing \) and brood in individual \( \varnothing \) cultures to \( d^1-2^4, B/Y \varnothing \) (cross by brothers would yield some \( \varnothing \) \( F_2 \), \( \varnothing \) \( \varnothing \) by non-disjunction.) \( J^? \) \( \varnothing \) is present, no \( \varnothing \) \( \varnothing \) \( \varnothing \) appear; determinable without etherization. (\( J^? \) is to right of garnet; \( \varnothing \) a few \( \varnothing \) \( \varnothing \) \( \varnothing \) appear). |
| F1 | \( 1/d^1-2^4 \), \( 1z^8 B \) \( \varnothing \) \( X \) \( d^1-2^4, 1z^8 B/Y \varnothing \) \( \varnothing \) |
| F2 | \( d^1-2^4, 1z^8 B \) \( \varnothing \) \( 1/Y \varnothing \) \( (\text{diec}) \) \( d^1-2^4, 1z^8 B/d^1-2^4, 1z^8 B/1/Y \varnothing \) \( \text{B} \) \( \varnothing \) \( (1z^8 B \) \( \varnothing \) \( \text{sterile} \) \( \text{X} \) \( d^1-2^4 \), \( 1z^8 B/Y \varnothing \) |

If \( J^? \) is present, \( F_2 \) provides balanced stock of it unless to right of garnet.

5. Detection of mutations in autosomes same as method for getting homozygous stock. Method there given may be split for use with 2 alone or 3 alone.