are separable from those of sterility. One possibility is that ν_6 carries a P factor (presumed to be a movable, multicopy genetic element [Engels 1980]) which lacks its usual sterility function but retains its other capabilities.

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Falk, R. The Hebrew University, Jerusalem, Israel, and University of Oregon, Eugene, Oregon. Somatic mosaics produced by a loss of a centric fragment.

Developmental analysis in Drosophila depends heavily on the ability to induce genetically labeled clones at predetermined times during embryonic and larval development. Such clones have been produced mainly through chromosome nondisjunction and loss and through induced mitotic recombination events. Here we report on still another method to obtain marked clones, namely by nondisjunction of free chromosome fragments with appropriate markers.

Novitski and Puro (1978) derived a small free ring chromosome from the second autosome, bearing the dominant bristle morphology mutant Bl: Dp(2;f)Bl. Flies with two wild type alleles on their chromosomes and with the mutant allele on the ring are Bl in phenotype. The spontaneous loss of the ring during development can be observed by the appearance of non-Bl bristles on the thorax and the head. We followed seven macrochetae on the dorsal side of the head, the two major humeral bristles and 13 macrochetae on the thorax (including two sternopleurals). 213 out of 1070 scored flies had non-Bl spots (19.9%); of these 193 had one spot, 18 had two spots and 2 had three spots each. This is in good agreement with the expectation of random distribution of independently originating spots ($X^2_{(3)}=0.86$). The size of the spots ranged from those of single bristles to one comprising half the thorax and head:

No. of bristles	No. of flies	No. of bristles	No. of flies
1	131	10	2
2	52	11	1
3	16	:	
4	9	13	2
5	6	14	1
6	7	15	3 (half thorax)
7	2 (half head)	:	
:		22	1 (half body)

Only 6 single non-Bl bristles were found in 715 flies of two different Bl/+ laboratory stocks. The frequency of spots can be increased by taking flies with spots as parents for the next generation. Of 114 progeny of such mosaic flies 33 had one spot and 4 had two spots each (32.5%). Thus the non-Bl spots in the free-ring stock appear to be due to genuine fragment losses rather than to variations in the expression or the penetrance of the mutant character.

The distribution of spots of all sizes indicates that fragment loss may occur at any time during development, being merely a function of the number of cells at each stage that undergo cell division, starting with few large clones induced at early stages of embryogenesis to many small ones shortly before puparium formation. However, the distribution of the spots may depend also on the presence of borderlines for developing clones and on the denseness of the bristle pattern at each site. Thus of the 10 large clones comprising most of the mesothorax only one included also the head disc, while 8 included also the humeral disc; two of these included both left and right humeral discs. These clones were obviously established even before the imaginal disc borders were determined, some even before the midline was laid down (note that the humeral focus is nearer to the midline on the blastoderm fate map than are the mesothoracic foci). In two flies an anterior dorso-central bristle was included in half-thorax clones of the "other side". It could be that these clones too were established before midline determination. Only three of the small clones crossed disc border lines (one 3-bristle spot crossed from head, through humerals to mesothorax). It is possible that these were also large early clones that extended mainly to the inside of the animal.

The scutum-scutellum separation occurs quite late in larval development (Garcia-Bellido 1975) and indeed, of 43 scutellar clones, 15 included only one bristle, 14 included both bristles and another 14 extended into the scutum.

There is no distinct pattern of spot distribution within the head and thorax (besides contingency); spots partially overlap in all possible directions, thus confirming the absence of cellular determination within the disc until late in development (Sturtevant 1929). However, a nonrandom rate of cell division at the late larval development is indicated by the distribution of single bristle spots: Of the 131 single bristle spots, 37 affected the anterior and posterior verticals on the head, 11 the posterior humerals, 13 the anterior notopleurals and 15 the posterior dorso-centrals. The same bristles were also frequently involved in larger spots (though they were not the most frequently involved ones in these spots). The remaining 17 bristles were affected 55 times in single bristle spots. This would indicate a higher rate of cell division at the posterior zones of all three imaginal discs as well as at the antero-lateral zone of the mesothorax at late larval development.

In summary, the loss of a small free chromosome fragment, carrying genes of interest, could become a useful tool in developmental genetics of Drosophila. The random loss of such a fragment throughout development may prove useful for the study of the kinetics of determination and of cell multiplication.

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Fogleman, J. and W. Heed. University of Arizona, Tucson, Arizona. A comparison of the yeast flora in the larval substrates of D. nigrospiracula and D. mettleri.

Two cactiphilic Drosophila of the Sonoran Desert, nigrospiracula and mettleri, exhibit a larval niche separation (Heed 1977). D. nigrospiracula breeds mainly in the necrotic tissue of cardon (Pachycereus pringlei) on the Baja peninsula and saguaro (Carnegiea gigantea) on mainland Mexico. D. mettleri breeds in the soil saturated with the fermenting juices of these cacti. The niche separation certainly acts to eliminate interspecific larval competition. The mechanism through which the niche separation is maintained has yet to be fully elucidated, but laboratory experiments have shown that nigrospiracula larvae are more adapted to relatively "fresh" cactus substrates (Mangan 1978). Previous studies (Heed et al. 1976; Starmer et al. 1976) have analyzed the yeast flora associated with cactiphilic Drosophila and their host plants. They reported little overall difference between saguaro and soaked soils with one yeast, Pichia membranaefaciens, being predominant in both. They speculated that competition for this yeast could be one of the factors that led to the spatial isolation of the larvae. Since then, it has been shown that their isolates designated P. membranaefasciens were really several new species of yeast distinct from

Table 1. Comparison of Larval Substrates

Parameter	Cactus Rots	Soaked Soils	Significant Difference?
Log Average Concentration*			
Pichia opuntiae (var. thermotolerans)	7.860	7.920	no
Pichia cactophila	7.282	7.669	no
Pichia heedii	7.099	7.528	no
Pichia amethionina (var. pachycereana)	6.797	6.744	no
Candida sonorensis	3.163	7.406	P<0.1
Cryptococcus cereanus	2.219	6.053	--
Candida ingens	4.902	5.423	--
Candida species "K"	--	6.125	--
Pichia species "M"	--	5.247	--
Avg. Freq. of Isolation	0.65	0.60	no
Log Avg. Concentration (All Yeasts)	7.198	7.341	no
Shannon-Weaver Diversity Index (H´)	0.433	0.630	--
(previous estimate)	(0.590)	(0.568)	--
Evenness (J´)	0.512	0.660	--
Avg. Number of Yeast Species Per Sample ± SE	4.57±0.48	5.43±0.57	no
(previous measurement)	(1.88±0.33)	(2.00±0.38)	no
Average % (Wt./Wt.) Moisture ± SE	82.3±1.3	13.5±1.0	P<<0.001

*Average of seven samples collected over a 10-month period.