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A pericentric inversion screen.

The following screen was devised in the course of development of techniques for manipulating pericentric inversions (Genetics 99:75-97, 1981). The screen operates to recover pericentric inversions as translocations between free-armed chromosomes. Figure 1 illustrates the basic idea and diagrams a T(2;3)rn, D^3 Sb Ubx/ F(2L); F(2R); F(3L); F(3R) genotype and the euploid gametes which it produces. A male of this constitution produces the four euploid gametic types shown: (a) T(2;3), (b&c) half-translocation plus complementary free arms, and (d) F(2L); F(2R); F(3L); F(3R). A translocation between either the F(2L) or F(3L) and either the F(2R) or F(3R) will cause the (b&c) gametic types to be aneuploid and result in the lethality of zygotes produced by the fertilization of a euploid egg by either type of sperm. Thus T(2L;2R)'s or T(3L;3R)'s will cause D^3 to show pseudolinkage with Sb and Ubx [T(2L;3R)'s and T(3L;2R)'s will also cause this pseudolinkage, but these are easily screened out in later generations as behaving like T(2;3)'s].

By using Sb and Ubx as lethals, the screen can be simplified to the point that one need only look for cultures lacking D^3. The T(2;3)rn, D^3 Sb Ubx/free arms males can be mated to Sb/In(3R)Ubx^{80} (or other rearranged Ubx: the rearrangement prevents crossing over between Sb and Ubx): this prevents the (a&b) gametes from being recovered in surviving progeny, and the (c) gametic type--carrying D^3--will not be recovered if an appropriate translocation has been induced.

Three stocks have been built for this screen: (1) 2^PB238; F(2R)VH2; 3^PJ17; 3^PJ139--the free-armed stock. 2^P238 was derived from T(Y;2)B238 (Lindsley-Sandler) so that the short arm of 2^PB238 is capped with the tip of the X and variegates for y; 3^PJ17 and 3^PJ139 were also derived from Lindsley-Sandler translocations, and 3^PJ139 carries a variegating B^S.

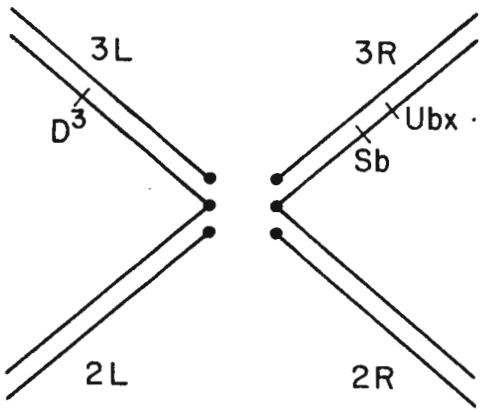
(2) T(2;3)rn, D^3 Sb Ubx/In(3LR)C190

(3) C(1)M4, y^2/shi^{ts}; or If; Sb/In(3R)Ubx^{80}. shi^{ts} is present to automate virgin collection; for collecting virgins, one need only to clear the cultures and put the bottles at 28°C.

The screening crosses are:

P_0 T(2;3)rn, D^3 Sb Ubx/In(3LR)C190 females x 2^PB238; F(2R)VH2; 3^PJ17; 3^PJ139 males (irradiated)

F_1 C(1)M4, y^2; or If; Sb/In(3R)Ubx^{80} females (5 to 10 per culture) x T(2;3)rn, D^3 Sb Ubx/free arms males (1 per culture)



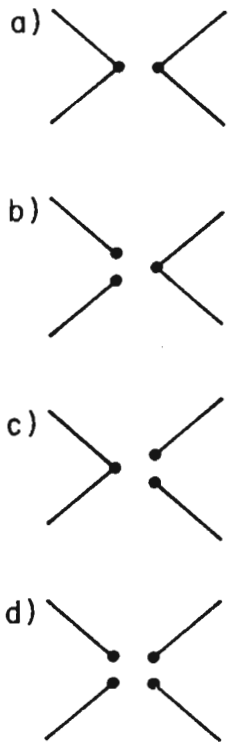


Figure 1. T(2;3)rn, D^3 Sb Ubx/2^PB238; F(2R)VH1; 3^PJ171 3^PJ139 and the four types of euploid gametes normally produced by this genotype:

a) T(2;3)rn, D^3 Sb Ubx

b) 2^PB238; 3^PJ17/2R.3R, Sb Ubx.

c) 2L.3L, D^3/F(2R)VH1; 3^PJ139.

d) 2^PB238; F(2R)VH1; 3^PJ17; 3^PJ139.

F_2 Look for cultures lacking D^3 (this can be done without etherization). From these cultures, test for the presence of a T(2L;3R) or T(3L;2R) by crossing or If; Sb/free arms males to structurally normal females and discard any cultures which show pseudo-linkage of If and Sb. Isolate stocks of the putative In(2LR)'s and In(3LR)'s and check for inversions cytologically.

A small scale test (about 300 F_1 males tested; 4000 r) yielded one In(2LR), five In(3LR)'s, and one translocation between 3L and the short arm of 3^PJ139. These are further described under New Mutants (this DIS). Techniques for freeing the inversions from the free arm complex are detailed in Genetics 99:75-97.

Engeln, H. Institut fur Genetik, Freie Universitat Berlin, FR Germany. Apparatus for measuring temperature preferences in Drosophila.

For measuring temperature preferences of adult Drosophila in short time experiments with many replicates a smaller and more simple apparatus as that one presented by Fogleman (1978) may be sufficient. Our thermal gradient field consists of a sheet of aluminum heated at one end by a heating flex and cooled by circulating water at the other end (Figure 1). Heating is controlled by a rheostat and a contact-thermomemter switching the flex on and off. Continuously circulating cold water is obtained by a small laboratory cooler. Different stable temperature gradients can be adjusted in this way. In Figure 2 temperature profiles are shown along the centre line and along the margins of the aluminum sheet.

Two cages, each consisting of three observation chambers, run parallel with the center line (Fig. 1). These chambers are made from transparent plexiglass without any bottom and put directly on the surface of the aluminum sheet. Each chamber is divided lengthwise into 10 fields by optical marks. To avoid influences of different degrees of relative humidity caused by the temperature gradient moistened filter paper is placed on the upper horizontal surface of the aluminum, so that about 100% relative humidity will be obtained everywhere in the chambers. For immediate anaesthetization of the tested flies carbon dioxide is conducted through pipes and little holes into each observation chamber (Fig. 1). All remaining parts of the aluminum sheet which are exposed to airflow are covered with styrofoam insulation.

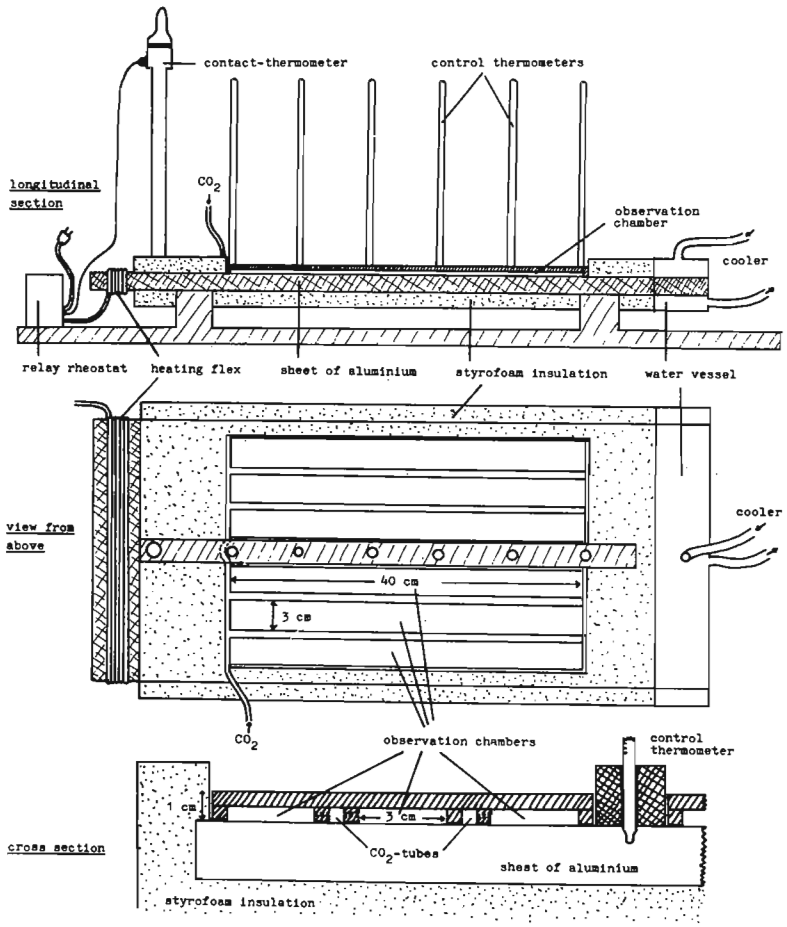


Fig. 1. Apparatus for measuring temperature preferences in Drosophila.