Pascual, L. and R. de Frutos. University of Valencia, Spain. "In vitro puffs" after heat shocks at two different temperatures in **Drosophila subobscura.**

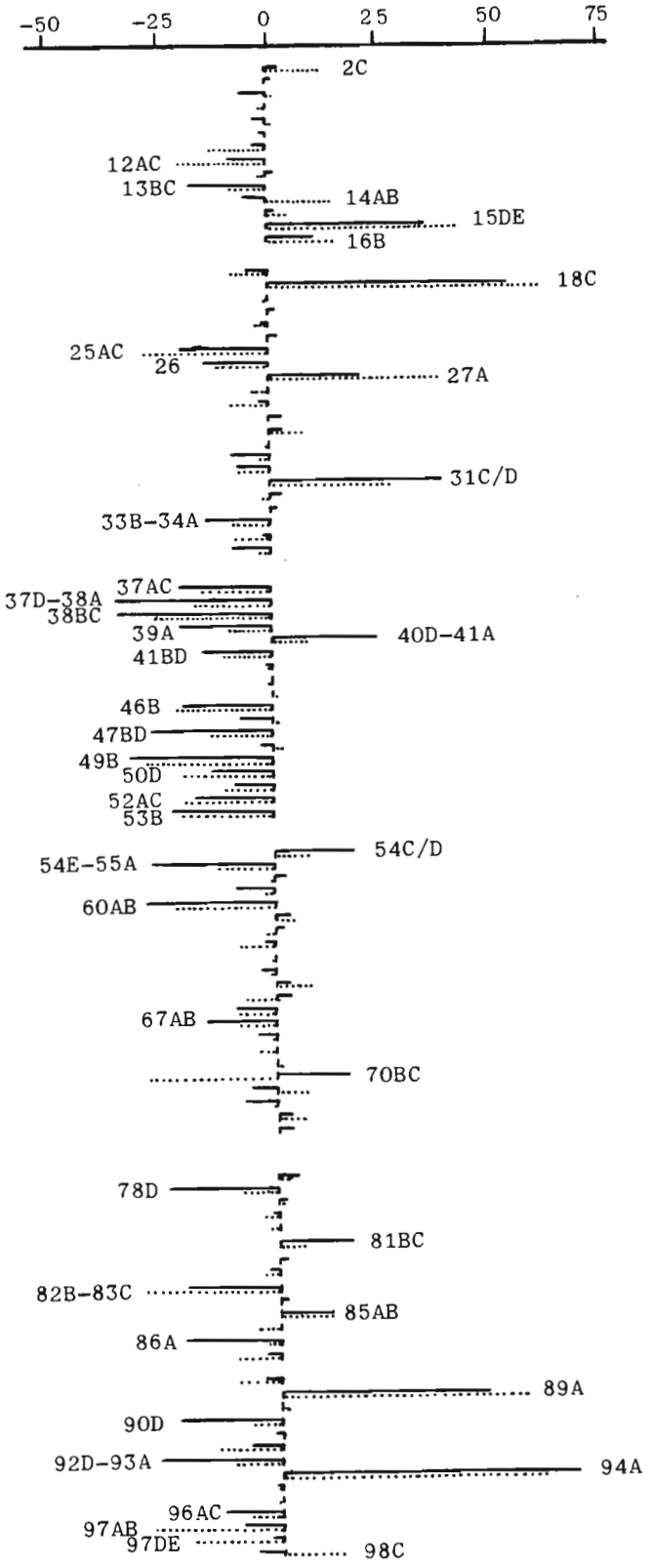

Figure 1. Increase or decrease of the genetic activity (puffing frequency in treated minus puffing frequency in control glands) after heat shock either at 31°C (continuous line) or 37°C (dotted line) referred to the control.

Heat shock has been used as a strong genetic activity inducer practically in every organism for some years (Ashburner et al. 1979; Schlesinger et al. 1982; Neidhardt et al. 1984).

When **D.subobscura** larvae, cultured at 19°C, are subjected to heat shock, the puffing pattern obtained depends, to a great extent, on the stringency of the treatment (Pascual et al., in prep.). "In vitro" heat shocks allow us to subject each gland from the same larva to different temperatures and so we can observe how the same "genetic material" responds to different treatments.

Figure 1 shows the changes (increase or decrease) of the genetic activity (frequency of puffing activity) when salivary glands are subjected to 31° or 37°C maintaining the contralateral ones at 19°C (20 min in Drosophila Ringer solution). A total of 15 loci increase their activity after heat shock: 2C, 14AB, 15DE, 16B, 18C, 27A, 31C/D, 40D-41A, 54C/D, 70BC, 81BC, 85AB, 89A, 94A and 98C. The remaining loci show either similar or less genetic activity than the control after treatment. This, in general, supports the results obtained after "in vivo" treatments (Pascual et al. 1983; Pascual et al., in prep.) although the loci 81BC and 70BC (only after heat shock at 31°C) increase their activity only after "in vitro" treatments.

There is a different response for the two heat shock temperatures. Some puffs are preferably active either after heat shock at 31°C (40D-41A, 54C/D, 70BC, 81BC) or 37°C (2C, 14AB, 27A, 98C).

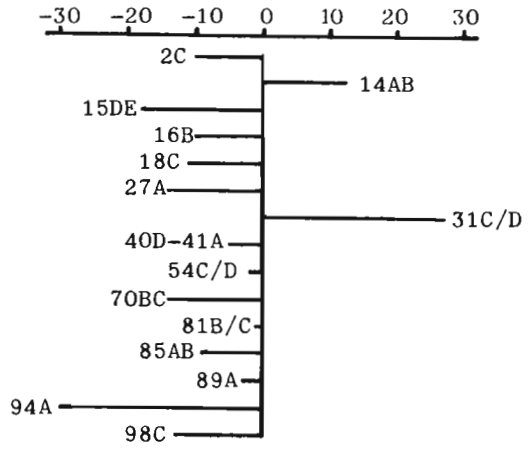

Figure 2. Increase or decrease of the genetic activity after heat shock at 37°C referred to that after heat shock at 31°C.

Moreover, there is a stronger decrease in the genetic activity of the non-induced puffs after shock at 31°C.

To observe the effect of both treatments on the same "genetic material", we can shock sister glands at 31° and 37°C, respectively. In Figure 2 we can see the result of this treatment on the 15 loci previously cited. Only loci 14AB and 31C/D are more active after heat shock at 37°C. The remaining loci show less activity in glands subjected to 37°C treatment.

References: Ashburner, M. & J.J. Bonner 1979, Cell 17:241-54; Pascual, L. & R. de Frutos 1984, DIS 60:158-59; Neidhardt, F.C., R.A. VanBogelen & V. Vaughn 1984, Ann. Rev. Genet. 18:295-329; Schlesinger, M.J., M. Ashburner & A. Tissieres 1982, Heat Shock from Bacteria to Man, Cold Spring Harbor, NY, 440 pp.

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Is abdomen pigmentation polymorphism in **D.erecta** selectively neutral?

Abdomen pigmentation polymorphism has been reported in many Drosophila species. In **D.erecta** there are only two morphs, light and dark. The fitnesses of the different genotypes at the abdomen pigmentation locus was investigated to test whether selection or neutrality is likely to be responsible for the maintenance of this polymorphism.

Material and Methods: Results of crossing in **D.erecta** were consistent with diallelism at the abdomen pigmentation locus, X linkage, dark dominant to light (which confirms results obtained by Ashburner & David, unpubl.). Gene expression is limited to females and is not influenced by temperature. Although no investigation of this polymorphism in nature (Africa) has been carried out, the ecology of the species could easily lead to loss of the polymorphism: population expansion occurs during the maturity of **Pandanus spp** fruits and lasts about two months. During the ten other months of the year, the population size is extremely small (Rio et al. 1983). The persistence of this polymorphism in the wild suggests that selection could be responsible for its continued existence. The light and dark homozygous strains used here were extacted from a population collected from the Ivory Coast and maintained since 1980 by serial transfer.

Population Cage Experiments: Eleven populations were studied at four temperatures (20, 22, 25 and 28°C). The starting gene frequency of the light allele was 0.10 (except at 20°C), 0.50 or 0.90. 1600 inseminated females formed the founding population for each cage. The technique described by Anxolabehere (1976) was used for maintaining the cages. Genotypes of dark flies were determined after test-crosses. The history of light allele frequency in the cages is shown in Figure 1. No frequency equilibrium was reached after 30 generations. Comparison with Hardy-Weinberg proportions displayed no larval or sexual selection. No difference in gene frequency was found between the sexes.

Developmental Time: The embryo duration of each genotype was estimated as the mean time between egg-laying and hatching, larvo-pupal duration as the mean time between hatching and emergence. Developmental durations of the genotypes were compared with t-tests, none of which were significant: we can conclude that developmental times of the genotypes are not different.

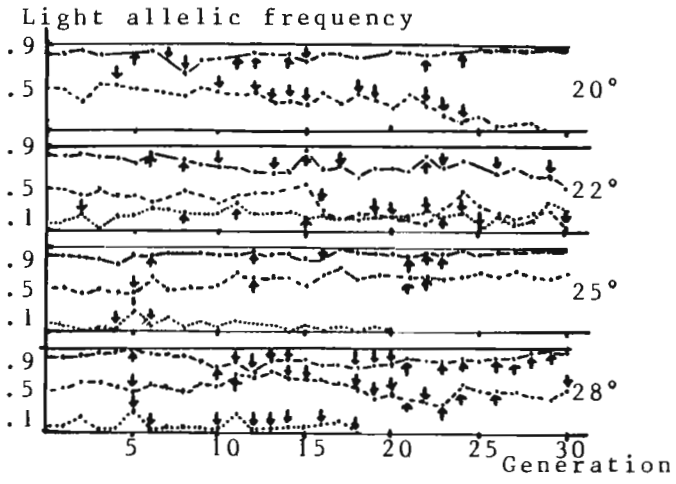

Figure 1. Gene frequency changes over generations in population cages at 20, 22, 25 or 28°C.

Sexual Selection: One hundred 5-day old virgin females were kept with 100 males for 1h45 in a bottle containing corn medium at 22°. Light allele frequency in both sexes was 0.10, 0.30, 0.50, 0.70, or 0.90. Females were then isolated in vials and the genotype of the mating male was inferred from the progeny. Replicates at each frequency were carried out until at least 500 matings had been scored. Comparison with random mating (tested with Chi-square) showed (Table 1) no sexual selection in males. In females the Chi-squares were significant for allelic frequencies of 0.50 and 0.70. Mating success estimated with a K coefficient (Petit 1958) indicated an advantage of light homozygous (C/C) over heterozygous (F/C) females. However, if two of the seven replicates are disregarded, the significant effect disappears: it is possible that the significant result is due to sampling error. The significant sexual advantage of homozygous dark (F/F) over F/C females when the allelic frequency was 0.90 may also have been caused