Pla, C., J.B.Toral and A.Fontdevila. Universidad Autonoma, Bellaterra (Barcelona), Espana. Genetic analysis of five morphological mutants recovered from a natural population of Drosophila buzzatti.

On October 1981, more than 300 adults of Drosophila buzzatti were collected at Calablanca, a country farm located at the outskirts of Sitges, about 45 Km south of Barcelona (Spain). This collection was performed at a row of Opuntia ficus-indica stands either using banana traps or aspirating the adults directly from the cactus rots. Thirty inseminated females of this collection were placed individually in vials and each offspring was investigated for its hidden morphological variability following the method of Spencer (1947). Accordingly, eight sib-pairs were established from each isofemale F_1 progeny. The analyses of their F_2 offspring unveiled the presence of five recessive eye color mutants, although test crosses showed that two of them were alleles of the same locus. Chromosomal assignment of the four independent mutants was performed by conventional linkage analyses using the offspring of crosses with marked strains. The tester strains used were homozygous for the following allozyme markers: M12 (Estβ, chromosome 2); S (ADH, chromosome 3) and M16 (PGM, chromosome 4) (Pla et al. 1984). Results of this analysis and considerations of reported data on chromosomal and mutant homologies (Stone 1955; Linsley & Grell 1968; Zouros 1976) substantiate the following tentative names, symbols and chromosome locations for the analyzed mutants: vermilion - v (X); mahogany - ma (2); scarlet - st (4) and brown -bw (5).

These are the first morphological mutants ever described in D.buzzatti. The low frequency of mutants in the studied sample (only four mutants out of thirty isofemale lines) may be explained in terms of the dynamics of natural populations of D.buzzatti and other cactiphilic species. Spencer (1940, 1941, 1944) has found obvious differences in frequency of occurrence of visible mutations between two natural populations of D.immigrans and D.hydei. The different degree of genetic variability for each of both populations of these species has been interpreted in terms of the reduction of crossbreeding as a consequence of a sharp population reduction during winter periods, which produces bottlenecks every year. In our particular case, the population of Calablanca is maintained by the rotting fruits and pads of not more than a few dozens of O.ficus-indica pads. The abundance of these natural substrates is seasonal, being high when there is an adequate combination of temperature and humidity. These optimal conditions occur only at few occasions, as we know by our collecting experience during several years. Consequently, population size experiments dramatic bottlenecks followed by expansions, which results in a low effective population size. This increases the frequency of homozygous and the effect of homoselection, producing a low equilibrium mutation-selection for morphological characters.

References: Linsley,D.L. & E.H.Grell 1968, Carn.Inst.Wash.Publ. 627; Pla,C., J.B.Toral, H.Naveira & A.Fontdevila 1984, submitted to Experientia; Spencer, W.P. 1940, Ohio J.Sci. 40:345-361; ____ 1941, Ohio J.Sci. 41:190-200; ____ 1944, Genetics 29:520-536; ____ 1947, Avd.in Genet. 1:359-402; Stone,W.S. 1955, Symp.Quant.Biol. 20:256-270; Zouros,E. 1976, Genetics 83:169-179.

Poole, J.H. and L.K.Dixon. University of Colorado at Denver, Colorado USNA. Drosophila peroxidases: I. Three major isozymes observed.

The response of peroxidase (PO) activity to pH was measured in homogenates of Drosophila melanogaster, and the correlations among variant forms of PO was determined.

Preparation of extract. A water soluble extract of Drosophila homogenate was prepared as follows. Flies were killed by placing in the freezer in pre-chilled bottles (-15°C) for 9 minutes (this was found to be the minimum time sufficient to kill all flies). A sample of 200-500 imagoes of mixed age and sex was weighed, and homogenized in distilled water (0.100 ml/mg tissue) with a motorized teflon-glass rotary tissue grinder (20 pulses per extraction at 10 second intervals). Use of pre-chilled (2°C) water for the extraction was sufficient to prevent frictional heating of the homogenate above 35°C. Homogenate was centrifuged at 2400 rpm for 20 minutes. All assays were performed on the supernatant solution.

A series of stock buffers was prepared covering pH 4.0-11.0 in increments of 0.1 pH unit, using phosphate-tris-borate (30 mM each) in the range pH 5.5-11.0, and phosphate-tris-phthalate (30 mM each) in the range pH 4.0-6.0. Then 0.20 ml Drosophila extract was mixed with 0.60 ml of each buffer and the resultant pH measured. These samples were adjusted to each