crude extracts, are reported for other gene-enzyme systems, such as α-GPDH (Bewley and Lucchesi 1977) and alkaline phosphatase (Schneidermann 1967; Wallis and Fox 1968).

Experiments are in progress to detect post-translational modifiers, if any; as a preliminary test, we mixed crude extract of larvae or adults to pupal extracts in vitro: upon electrophoresis, the components migrated independently and formed bands of dissimilar mobility. No modifiers seemed to be present; however, these observations do not provide a definite answer, because we cannot be sure that our homogenization procedure simulates adequately the in vivo situation.

In any case, the determination of these isozymes throughout development seems to be very complex and the Mendelian models proposed for adult and embryo G6PD do not apply to our populations. These experiments emphasize how dangerous it is to generalize structural models to whole species on the basis of electrophoretic observations. G6PD gene enzyme system throughout development reveals a remarkable polymorphism of regulatory origin mainly (Steele et al. 1969; Komma 1968; Giesel 1976; Pieragostini 1978; Fadda et al. 1979); in our opinion, such systems deserve to be studied in further detail because they can draw more attention to the importance and the evolutionary significance of regulatory variation in respect to structural one.

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Fleuriet, A. University of Clermont-Ferrand II, France. Analysis of a polymorphism quite common in French natural populations of Drosophila melanogaster.

From a survey made since 1969, it has been established that French natural populations of Drosophila melanogaster are polymorphic for two features. First of all, 10 to 20% of the flies are infected by a Rhabdovirus called "sigma". It has been known for years that this virus is not contagious but transmitted from fly to fly only through gametes and is responsible for CO_2 sensitivity of infected flies. This situation is presently arousing more interest since the discovery that some pathogenous viruses of vertebrates are transmitted transovarially in their insect vectors. When experimental populations of flies are raised in cages, the sigma virus usually infects most of the individuals. Further experiments are now being performed to explain the discrepancy between natural and experimental populations.

A second feature, very constant at least in French populations, is a polymorphism for two alleles of a gene for resistance to the sigma virus: $ref(2)P^o$ and $ref(2)P^p$. The respective frequencies of these two alleles are very similar among all the populations studied and they are quite the same in experimental populations, whether the sigma virus is present or not. The strong selective forces working on this equilibrium are now being analyzed.

From a few other observations, it seems that these two features may, at least, exist in populations of flies living in other countries.

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Fontdevila, A.*, W.T. Starmer, W.B. Heed and J.S. Russell. *Universidad de Santiago, Santiago de Compostela, Spain, and University of Arizona, Tucson, Arizona. Differential mating activity in two coexisting species of Drosophila.

Ecologists have disclosed many cases of character displacement as a means to avoid species competition (see Margalef 1974 for a revision). This seems particularly true among closely related species occurring together and less so when species are genetically different. However, under certain conditions where convergence of non-related species is favored by natural selection, character displacement may be established. The present work provides a new example of behavioral character displacement between two coexisting desert species which are very similar in morphology, but not closely related phylogenetically.

D. nigrospiracula inhabits the Sonoran Desert, which extends in the USA through southern Arizona and in Mexico through Baja California and Sonora. Its biology is well understood (Fellows and Heed 1972). For example, it is known to be an oligophagous species feeding on several cacti, but utilizes the Saguaro cactus (Carnegiea gigantea) in the region of Tucson, Arizona, where this study was done. Occupying the same distribution area, there is a species (Drosophila mettleri) that resembles D. nigrospiracula very closely. Both species differ externally in male genitalia and in the pattern of bristles on their frons, being almost equal in size, shape and morphology. Most interesting are their breeding niche differences; D. nigrospiracula larvae feed upon the necrotic tissue of the cactus, while D. mettleri larvae feed upon the soil flooded with the juices of the necrotic tissue. Adults of both species feed upon liquid exudates at the cactus surface. This is the second case of such a fine separation in breeding sites between two species of Drosophila. Kaneshiro et al. (1973) have described a similar situation in two Hawaiian Drosophila which are closely related.

These desert species of Drosophila can be very abundant on the Saguaro cacti and provide the unique opportunity of collecting in their natural habitat a sufficient number of mating pairs to make up a workable sample to study. During two consecutive days we aspirated a total of 321 mating pairs, of which 277 were D. nigrospiracula matings and the remainder matings of the other species. A mating pair was aspirated as soon as actual copulation started, the time was recorded and each pair was kept in an individual vial for later species identification.

The results of investigating mating activity throughout the day are shown in Fig. 1. At this time of the year (November) D. nigrospiracula shows a bimodal distribution of mating activity with one peak at about 11 a.m. and a second peak at about 4 p.m. Obviously, those periods correspond to two moments of the day when the temperature is optimal (approximately 16°C) for activity of flies. On the other hand, D. mettleri shows also a maximum of mating activity in the morning at about the same time as D. nigrospiracula, but its period of activity does not extend into the afternoon. In several days of sampling for this and other experiments we never observed a mating of D. mettleri later than 1:40 p.m. (local MST), and even this was an extreme case since matings usually stop at about noon for this species.

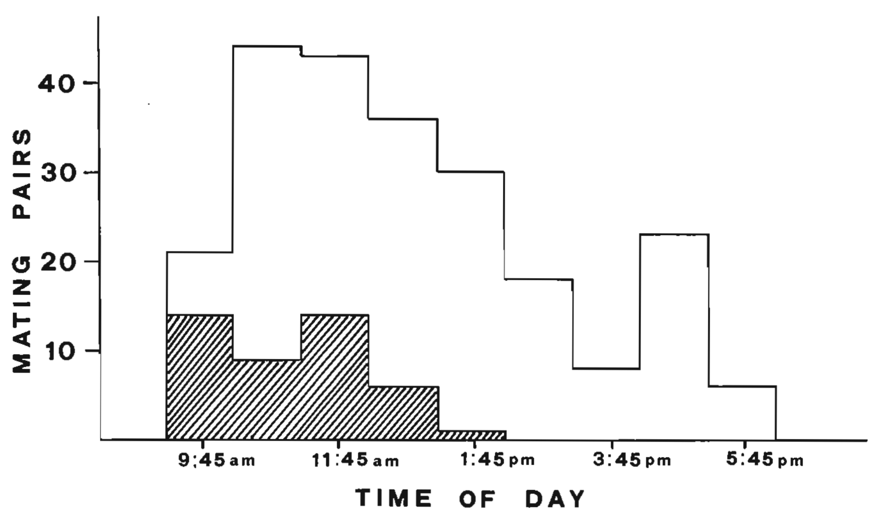

Fig. 1. Distribution of numbers of mating pairs observed throughout the day in D. nigrospiracula (blank) and D. mettleri (crossed).

We have grouped the data in two classes corresponding to numbers of matings collected before and after 2 p.m. and performed a G-test for independence. As expected, this test is highly significant ($p < 0.001$), which demonstrates that mating occurrence before and after 2 p.m. is dependent on species.

We do not know the physiological reasons which determine niche separation in mating behavior. Light may play an interesting role in inducing differential mating among species, since temperature appears to be similar at both peaks of maximum activity of D. nigrospiracula. The interesting thing is that this difference in behavior reduces the probability of interspecific courtships and this may be relevant to avoid reproductive interference between species. Under severe desert conditions species must adapt to exploit the few available niches. Obviously, mating time is reduced to a short period of the day during most of the year. (S.

Johnston has done extensive research on these desert species and has reported to us that mating always stopped when temperature rose above 25°C or when humidity fell below 25%, usually at 10 a.m.) November is a rather mild month and provides the right temperature conditions for prolonged mating activity. Yet we have seen that D. mettleri does not use afternoon time efficiently. Apparently this would reduce the reproductive potential of this species but since numbers of D. mettleri are high, although not as high as of D. nigrospiracula, this may be irrelevant. As we mentioned above, both species have a very similar morphology, but the more we study their ecology, the more distinct we find they are. This suggests that most of their differentiation has occurred at the level of behavior, and morphology only plays a role on the characters involved directly with sexual isolation. More investigation is needed to know the adaptive (or non-adaptive) meaning of the differential mating activity reported here. However, as far as we know, this is the first time that such differential behavior has been described from a natural population of Drosophila.

We gratefully acknowledge the field assistance of R. Mangan, M. Jefferson, D. Vacek and D. Jurgenson.

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Gamo, S., M. Ogaki and E. Nakashima-Tanaka. University of Osaka Prefecture, Japan. Anesthetics resistance in D. melanogaster.

We reported that ether resistance of Eth strain at 24 hours age of adult flies was completely dominant over sensitivity and that maternal or cytoplasmic effects were negligible. The locus of the major gene(s) for the ether resistance is around 61 on the third chromosome, and the minor genes are on both the X and the fourth chromosomes (Ogaki et al. 1967).

We have investigated effects of chloroform and halothane on the Eth and the bw;st;sv^n strains. Mortality of the Eth strain was 1.3% in females and 1.7% in males, and that of the bw;st;sv^n strain was 82% in females and 90% in males in 30 seconds treatment with chloroform. The LT_{50} (50% lethal time) of the Eth strain for halothane treatment was 7 minutes in females and 9.5 minutes in males; that of the bw;st;sv^n strain was 3.5 minutes in females and 3 minutes in males. Thus, it can be said that a cross-resistance to ether, chloroform and halothane is found in the Eth strain. Reciprocal crosses between the Eth and bw;st;sv^n strains showed that the resistance to chloroform, as well as to ether, was completely dominant over sensitivity and that maternal or cytoplasmic effects were negligible. But the resistance to halothane was an intermediate trait with no maternal or cytoplasmic factors. A major gene with respect to chloroform resistance is located on the X chromosome, and a minor gene(s) on the second chromosome. However, the major gene(s) for halothane resistance is located on the right end of the third chromosome, which may be different from the major gene of ether resistance, and minor genes are on the X and second chromosomes. Therefore, resistances to ether, chloroform and halothane may be controlled by different genes.

Gausz, J., A.A.M. Awad and H. Gyurkovics. Biological Research Center of the Hungarian Academy of Sciences, Szeged, Hungary. New deficiencies for the kar locus of D. melanogaster.

The heat-shock inducible puff regions of 87A and 87C on the right of the 3rd chromosome have a special importance in studying gene regulation. A detailed genetic analysis of these loci is going on in our laboratory. As a rather limited number of deficiencies were only available for these loci (Ish-Horowicz 1977; Costa 1977), we screened for new deficiencies in the region. Males homozygous for bw eye color mutation on the 2nd chromosome were irradiated with 4000 r X-rays (150 kV, 0.5 mm Al-filter, 1000 rads/minute). After irradiation the flies were immediately mated en mass to virgin females homozygous for bw on the 2nd and cu and kar on the 3rd chromosome. The interaction of bw and kar results in a very characteristic light brown eye color, making it possible to distinguish the putative deficiencies and point mutations from the wild type progeny. After scoring 63,000