extrapolated that at higher ethanol concentrations SSE would survive better than FFE.

The overall conclusion is, that by keeping the strains on ethanol supplemented food, both the SSE and the FFE strains have increased their tolerance to ethanol significantly. The mechanism of this adaptation remains unclear because no consistent relations between ADH-activity and survival were found. It is clear, however, that the adaptation has not been realized in the same way for the S and the F strains. Furthermore, adaptation for the SSE strain has been relatively better than for the FFE strain.

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Knoppien, P. University of Groningen, The Netherlands. No evidence for rare male mating advantage in Drosophila melanogaster for strains raised at different temperatures.

Rare male mating advantage, which can be defined as frequency-dependent male sexual fitness with an advantage for the rare type, has become a widely discussed phenomenon (Bryant et al. 1980; Spiess 1982). There is some evidence that the rare male effect can occur among strains which only differ phenotypically (Dal Molin 1979; Grant et al. 1980). It has been shown that the rare male effect can be induced by different raising temperatures in Drosophila pseudoobscura (Ehrman 1966) and in Drosophila persimilis (Spiess 1968). In this paper it will be asked whether rare male mating advantage also occurs in Drosophila melanogaster for strains which differ only in raising temperature. The relevance for rare male mating advantage of a difference in male mating success, which was found between the strains, will be discussed.

All flies used were homozygous Fast for the alcohol dehydrogenase-locus, and derived from the Groningen base population (VanDelden et al. 1978). The flies for the mating experiments were raised as larvae and stored either at 20°C or at 29°C. Parents of these flies laid eggs in bottles, for 5 days at 20°C, or for 3 days at 29°C; each bottle contained 15 pairs. Composition of the food and methods for collecting and storing virgin flies are described by Pot et al. (1980). For each run of an experiment 50 pairs were used at a particular ratio of types (type is here defined as a group of flies raised at a particular temperature). Type frequency was varied simultaneously for both sexes. All mating experiments were done at 25°C, and lasted 30 minutes. Copulating pairs were removed from the mating chamber, while the type of each individual was recorded (see Pot et al. 1980 for further details). Flies were marked either with a minimal amount of red or green fluorescent dust for identification alternating the color between runs. To minimize possible effects of day to day variation in mating success on the frequency-dependent effect, experiments were conducted for all three ratios at the same day, varying the sequence in which the runs were done. Six runs were performed for each ratio at successive days. Virgin flies were six days old in three of these days and 12 days old in the other three days.

Differences in mating success were determined according to a method proposed by Pot et al. (1980). Following this method a mating chance ratio r was defined as follows. Let a be any given male of type A, any given male of type B, present in the mating chamber at a given moment.

$$\text{Then } r = \frac{P(a \text{ is the next male to mate})}{P(b \text{ is the next male to mate})} .$$

For statistical tests to determine whether r differs from unity, and to test whether r differs from one experiment to another, we refer to Pot et al. (1980).

The results are summarized in Table 1. For females no difference in mating success was detectable between flies raised at low and high temperature ($P>0.1$). On the contrary males raised at low temperature have a significant higher mating success than males raised at high temperature ($P<0.001$). It is suggested that this is the case because low raising temperature enhances size in Drosophila melanogaster. Large size generally enhances mating success for Drosophila species (Ewing 1961; Ehrman 1966). Differences between r-values were tested for each combination of ratios in order to detect any possible frequency-dependent effect. None of these tests gave significant results, nor for males nor for females.

It is suggested by some authors that differences in mating success between strains can give rise to a rare male effect (Bryant et al. 1980; Ewing 1978). According to Bryant et al.

Table 1. Differences in mating success for Drosophila melanogaster flies raised at 20°C (A) and 29°C (B), depending on frequency.

Frequency of type A	# Runs	Matings (♀ x ♂) AxA	AxB	BxA	BxB	r♀	r♂
0.1	6	3	12	26	142	0.82±0.22	3.16±0.66
0.5	6	63	15	59	42	0.77±0.12	3.77±0.62
0.9	6	152	6	19	1	0.98±0.23	3.56±1.39

(1980) this is due to the fact that when males of the more successful strain are rare, they have to compete with only a few other successful males, which would imply one-sided rare male mating advantage in favor of the more successful strain. In a model applying truncation selection (Ewing 1978), it is predicted that rare male mating advantage will occur when strains differ in mating success. In accordance with this prediction rare male mating advantage was found for the strains used by Ewing (1978) when they differed in size, and consequenty in mating success, whether size differences were genotypically or phenotypically determined. It is shown in this paper as well as by the results of Pot et al. (1980), who found no rare male effect for alcoholdehydrogenase variants of Drosophila melanogaster, which differed considerably in mating success, that even a large difference in mating success does not necessarily imply rare male mating advantage.

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Use of zeste suppression in a chromosome carrying a white duplication to facilitate the scoring of Minute mutations.

In 1977, Huang published a report on the induction of Minute mutations by MMS and MNNG. He stated that the method, requiring only one generation, would be a favourable alternative to the sex-linked recessive lethal test, for routine testing of chemical compounds. It seems a tedious, job, however, to score objectively small numbers of Minute mutations among large numbers of flies. The study of Persson (1976) showing that several Minutes act as suppressors of zeste in a particular duplication of white suggests the possibility of scoring Minute mutations as eye colour changes. Based on this, we attempted an experiment in which, after treatment with the chemical mutagen methyl methanesulfonate (MMS), F_1 flies were scored for eye colour changes, and afterwards checked for a Minute phenotype.

It appeared to be critical which duplication of white was used. It was observed in a pilot experiment that, among several duplication stocks obtained from the Umea stock center, the "Dp(1:1)w^{rG}, y ac z" (Persson used this indication in his original paper) and the (probably identical) "Dp(1:1)3C1, y ac z" (no. 91) did not show any z suppression effect with several 2nd and 3rd chromosome Minutes, whereas "Dp(1:1)3A6-3C2, y ac z" (no. 90) and "Dp(1:1)3A6-3C2, y^2 ac z" (no. 23) did. For the mutation experiment chromosome no. 90 was selected.

The test scheme used was as follows: Berlin-K male flies were treated with 1 mM MMS for 24 hours, and subsequently mated with virgin females heterozygous for the white duplication chromosome no. 90 and the Basc chromosome. In both the treatment and the control group 20 culture bottles were set up each containing 5 treated males and 10 females. y ac Males (carrying the duplication chromosome) were scored for non-zeste eyes. A normal sex-linked recessive lethal test was run concurrently.