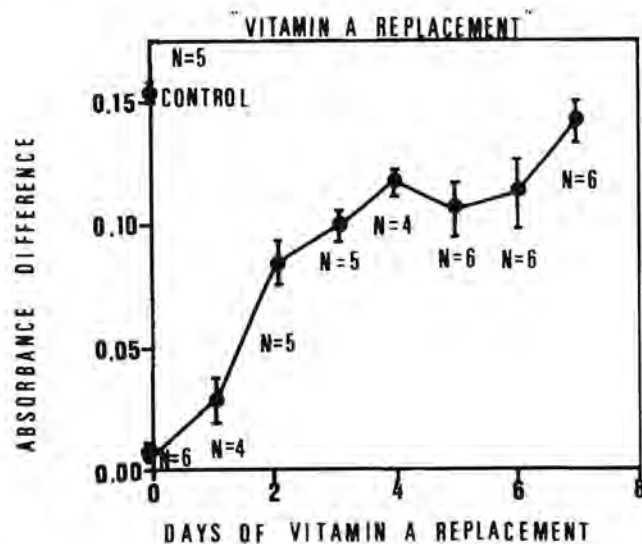




microvilli. This figure can be compared with the data for vitamin A deprived *Drosophila* (1030 ± 31) vs for control, i.e., vitamin A replete, *Drosophila* (4214 ± 163) (Harris et al. 1977). Most of the particles are thought to be rhodopsin molecules. Basically, our therapy brings the membrane particle count up to the control level by the end of a week of replacement.

It is important to emphasize that the adult, with its fully formed photoreceptors, can be fed vitamin A and can make visual pigment from it. In this context, it is useful to know that carrot juice, a convenient source of vitamin A, is effective. We expect that in the near future there will be a considerable number of papers on vitamin A metabolism in *Drosophila*. Yet to be answered with certainty are questions concerning the relative effectiveness of different forms of vitamin A based on their convertability to the visual pigment chromophore.

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Starmer, W.T. and J.S.F. Barker.* Syracuse University, Syracuse, New York; *University of New England, Armidale, Australia. The effects of larval density on the development of *D.buzzatii* in *Opuntia stricta* tissue.

It is well known that density is an important factor affecting larval development, viability and subsequent adult size. Mangan's (1982) studies on cactophilic *Drosophila* suggest that there may be nonlinear effects of larval density on these characters and that these effects are dependent on food quality and competitive interactions. We were particularly interested in the existence of an optimal density for larvae in the natural habitat and if an Allee effect (Allee 1931) were present. We have made preliminary studies on the effects of larval density on the growth of *D.buzzatii* in decaying *Opuntia stricta* cladodes. The experiments were conducted by seeding increasing numbers (1, 2, 8, 32 and 128) of 0-1 hour old, axenic, first instar larvae onto 5 gram pieces of *O.stricta* cladode tissue (previously homogenized, autoclaved and inoculated with the cactus yeasts *Pichia cactophila* and *Candida sonorensis*). The tests were run in 30 ml shell vials at 25°C with the above larval densities replicated 128, 64, 32, 8 and 4 times, respectively. Time from egg to adult emergence in days, adult thorax length in mm and percent emergence were observed. One of the 8 32-larvae vials was discarded due to contamination by mold.

with nothing to consume except for carrot juice (soaked in a Kimwipe) for vitamin A "replacement therapy." Plotted is absorbance difference, a measurement of the relative visual pigment level (see Stark et al. 1985), as a function of days of replacement. For comparison, a control level was measured from white-eyed flies reared on our normal medium with yellow corn meal. That diet supplies adequate vitamin A to *Drosophila* (Stark 1977; Stark et al. 1977). As a precaution we supplemented that "normal" diet with beta-carotene (Miller et al. 1984). Basically, the graph shows that our vitamin A replacement therapy is completely effective within one week.

In order to fully verify this finding, we freeze fractured *Drosophila* heads (from animals which had been maintained on carrot juice for 6 days) for transmission electron microscopy (see Stark & Carlson 1983 for methods). We found that such flies had 4308 ± 254 (SE based on 6 different measurements) P face particles per square micron in the rhabdomic

Table 1. The effect of larval density (per 5 grams of *Opuntia stricta* tissue) on percent emergence, development time and thorax size.

No. of larvae	No. of replicates	Percent emergence	Females		Males	
			Time Days $\pm$ SD	Size mm $\pm$ SD	Time Days $\pm$ SD	Size mm $\pm$ SD
1	128	82.8	15.14 $\pm$ 0.49	1.17 $\pm$ 0.008	15.55 $\pm$ 1.02	1.08 $\pm$ 0.008
2	64	92.2	15.24 $\pm$ 0.06	1.18 $\pm$ 0.008	15.63 $\pm$ 0.71	1.08 $\pm$ 0.008
8	32	80.9	17.14 $\pm$ 1.50	1.12 $\pm$ 0.009	17.33 $\pm$ 1.33	1.05 $\pm$ 0.008
32	8	41.1	22.96 $\pm$ 2.02	1.11 $\pm$ 0.007	23.05 $\pm$ 2.49	1.03 $\pm$ 0.007
128	4	2.9	27.67 $\pm$ 2.60	0.96 $\pm$ 0.015	28.33 $\pm$ 1.97	0.90 $\pm$ 0.013
r^2 for V vs D			0.90	0.86*	0.89*	0.99*
r^2 for SD of V vs D			0.71	0.88*	0.32	0.78*

*=significant $P < 0.05$; V vs D = Variable vs Density

the three variables is due to linear effects of density and there is no significant quadratic or cubic component. We also note that the variation (SD) in development time and thorax size increases as a function of density but that the r^2 is only significant for size (both sexes). We thus conclude that one to eight larvae per 5 grams is optimal under these conditions and that there is no evidence for an Allee effect in *D. buzzatii*.

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Stenveld, H. and R. Bijlsma. University of Groningen, Haren, Netherlands. Differences in male mating success in *D. melanogaster*.

In this respect especially factors concerning the mating process, such as mating preference and mating success, seem to be of significance (for a review, see Spiess 1982). It seems, therefore, worthwhile to study different aspects of the mating process. In this paper we want to present some data on male mating success when an excess of females is available. For the experiments we made use of the same fourth chromosome recessive mutant system as used by Bundgaard & Christiansen (1972). This system behaves as a one locus-two alleles system and three visually different genotypes can be distinguished: homozygous **cubitus interruptus shaven-naked** (civ), homozygous **sparkling poliart** (spa) and the **heterozygote** (het) which is wildtype (for a description of the mutants, see Lindsley & Grell 1967).

The tests were started by bringing together in one vial (without etherization) 4 virgin females of the same genotype with one virgin male. All flies used were 5 days old. The flies were left together for 1 hr. Thereafter, the male was, again without etherization, transferred to a new vial with 4 virgin females, of the same genotype as before, and after one more hour this procedure was repeated. During the three periods the flies were observed and the number of matings that occurred was noted down. This was done for all 9 possible male and female genotype combinations and each combination was replicated five times. The experiments were performed at 22°C.

Table 1 shows the total number of matings observed for each male-female combination during the three 1 hr periods. In most cases the number of matings observed per male in any one period was three or less, as might have been expected from a copulation duration time around 15-25 min in *D. melanogaster*. Only in one case four matings were observed in the same vial within 1 hr. This indicates that the number of virgins was not limiting. A contingency χ^2 for the distribution of the number of matings of the different combinations over the three periods turned out to be not significant: nor for the different combinations within each male genotype (spa: $\chi^2_4 = 2.06$, $0.75 > p > 0.50$; het: $\chi^2_4 = 5.68$, $0.25 > p > 0.10$, and civ: $\chi^2_4 = 4.93$, $0.50 > p > 0.25$) nor between the different male genotypes ($\chi^2_4 = 1.55$, $0.90 > p > 0.75$). Therefore, all data can be lumped together. The data show a strong decrease in the number of matings performed during the successive periods. This decrease, approximately 30% from one period to the next, is highly significant ($\chi^2_2 = 39.19$, $p < 0.001$). Nevertheless, the data show that the males are quite capable of performing a number of matings within a relatively short period and can even exceed six successive matings within three hr (some **het x spa** combinations).

Table 1 lists the percent emergence, time (days) and adult thorax length in mm. It is apparent that percent emergence and adult size decrease and development time increases as density increases. Inspection of Table 1 shows 2 larvae per vial to have the greatest viability (92.2%) but this does not differ significantly ($P > 0.05$) from either 1 larva or 8 larvae per vial treatments. Almost all of the variation in

Since the results of Prout (1971a, b) and Bundgaard & Christiansen (1972), it has become clear that also the adult component of selection, besides viability selection, is an important component of the total selection during the life cycle of *D. melanogaster*.