Grant, S. and E. Rapport. University of Toronto, Canada. The effect of lactamide on the mutant eyeless^2.

Kaji (1954-1959) demonstrated that several organic compounds, especially lactamide, increased eye facet number in the mutant Bar. To determine if this effect was specific to the Bar mutant we tested the effect of lactamide on eyeless^2 (ey^2), a fourth chromosome, recessive mutant which also reduces eye facet number.

Table 1. The effect of lactamide on facet number in ey^2/ey^2 flies.

percent lactamide	sex	no. of eyes	average number	± std. deviation
0	♂	36	248.02	27.65
0	♀	32	261.43	32.58
2	♂	23	212.06	23.14
2	♀	28	233.79	28.49
3	♂	17	207.26	16.92
3	♀	24	211.40	26.25
4	♂	25	197.89	29.17
4	♀	25	209.18	29.98
5	♂	28	185.33	21.72
5	♀	30	201.16	16.16

We transferred 60 hour larvae from a yeast-seeded cream of wheat-molasses medium to a similar medium containing 0 to 5% lactamide by weight. After 30 hours of treatment larvae were removed to vials containing a yeast-seeded agar-sucrose medium to complete development. Facet number was determined using a compound microscope equipped with a grid ocular. Under conditions in which Bar eyed flies showed up to a four-fold increase in facet number (data not shown) ey^2 had reduced facet numbers (approximately a 20% reduction).

We suggest that a unitary hypothesis can account for the disparate effects of lactamide on the two different mutants. If lactamide (as well as the other compounds used by Kaji) caused a reduction of protein synthesis, the concomitant reduction in the synthesis of lysozyme could result in less cell death in the Bar mutant (Michinomae and Kaji 1973, DIS). In the ey^2 stock, however, the reduction in protein synthesis could retard eye development even more than normal. This hypothesis is now being tested.

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Gunawan, B. and J.S.F. Barker. University of Sydney, N.S.W., Australia. Adult viability of D. buzzatii in stress environments.

D. buzzatii (a species of the mulleri subgroup of the repleta group) is known to breed and feed in rotting cladodes of a number of species of the cactus genus Opuntia, and is apparently specific to the cactus niche (Barker and Mulley 1976). In Australia, Opuntia species (mainly O. inermis) occur as isolated patches, usually in open schlerophyll forest or largely treeless grazing areas. During the day in summer, adult flies are not found in cladode rots, where temperatures as high as 44°C have been recorded. However, adults can sometimes be located on the underside of fallen cladodes, so that during the day they presumably take refuge in the plant litter on the ground where the temperature will be lower, but where relative humidity often will also be low. Normally, they become active during summer afternoons when the temperature drops to about 24-26°C. On some occasions, however, when summer collections were being made, the temperature at sunset was at least 32°C, and flies started coming to bait buckets from just prior to sunset. They remained quite active until dark when the temperature was still at least 29°C.

The temperature below which flies are active clearly depends on other factors, one of which would appear to be light intensity. Apparently D. buzzatii will be active and feeding in early morning and in the evening, practically regardless of temperature. Thus during summer, while their behavior and activity patterns will act to reduce temperature and/or dessication stress, they will be exposed to such stresses for a large proportion of each day. Also, if adults do migrate between Opuntia patches, they would be exposed not only to these stresses, but also to a nutritional stress resulting from lack of access to cactus-specific yeasts.

Response to such stresses has been measured as days to 50% mortality at 25±0.5°C and 65-70% relative humidity in 3 x 1 inch glass vials with polyurethane foam stoppers for three stress treatments: (a) empty vials; (b) agar + sucrose - 7 ml of 0.15% w/v agar and 0.4% w/v sucrose medium; (c) paper + sucrose - a 20 x 13 cm piece of absorbent paper (Kleenex tissue) pressed into the bottom of the vial and 2.5 ml saturated sucrose solution added and absorbed by the paper. Additional treatments imposed were: sex - males only, females only, males and females in 1:1 ratio; density - 10, 20 or 30 flies per vial.

This 3 x 3 x 3 factorial was set up with 2 replicates. The flies used were progeny of a sample taken from a stock population cage which derived from 96 females captured at Yarrawonga, N.S.W. (locality 5 of Barker and Mulley 1976). These progeny emerged during a 12 hour period, and were aged for 3 days in well-yeasted vials before allocation to treatment vials. Mortality in each vial was recorded daily.

Analysis of variance of days to 50% mortality (i.e., from 3 days of age) showed a significant effect only for stress treatment ($P<0.001$). The means, which were significantly different from each other, and the maximum number of days survived, were: (a) empty vials - 3.8 days, 8 days; (b) agar + sucrose - 14.9 days, 23 days; (c) paper + sucrose - 18.6 days, 25 days. The significantly longer average survival in the paper + sucrose treatment, as compared with agar + sucrose, was presumably due to an initial higher humidity.

For comparison, in other experiments using medium containing dead yeast, but for a different strain of D. buzzatii, mean age at 50% mortality was 34.7 days, and maximum survival was to 90 days of age.

Clearly, D. buzzatii shows high tolerance to these environmental stress treatments (see also Parsons and McDonald 1978), which would be adaptive in their natural habitat, and the results do not preclude the possibility of survival for many days in a non-cactus environment, such as during migration from one cactus patch to another. It is hoped that current field studies will determine whether such migration does occur.

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References: Barker, J.S.F. and J.C. Mulley 1976, Evolution 30:213-233; Parsons, P.A. and J. McDonald 1978, Experientia 34:1445-1446.

Hardy, R.W. University of California, San Diego. Crystal aggregates in the primary spermatocytes of XO males in D. melanogaster.

In another note in this issue we describe a small region in the middle of the Y chromosome which when missing results in formation of the crystal aggregates in the primary spermatocyte described by Meyer et al. (1961) in XO males. These aggregates are seen in live preparations with phase contrast optics. In the present note we locate a gene on the X chromosome which determines the shape of the aggregates.

Crystal aggregates occur in either of two forms, needle-shaped or star-shaped (Meyer et al., 1961). Aggregates are found in both nucleus and cytoplasm but the latter are larger and more easily seen. They persist through the meiotic divisions and can also be found in developing spermatids. Their exact molecular composition is not known, but they seem to contain both protein and lipid (Cox et al., 1976).

Meyer et al. (1961) reported that in XO males whose X chromosome is FM4, the needle-shaped crystal aggregates normally found are replaced by star-shaped ones. Additionally, Cox et al. (1976) report the occurrence of star-shaped aggregates in spermatocytes of both FM4/0 and FM6/0 males and further suggest that the change in morphology may be due to a specific inversion (In(1)3C;4E-F which is superimposed on $In(1)sc^8$ + In(1)d1-49 in both of these chromosomes).