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Drosophila husbandry and extension of lifespan mean and lifespan range.

Some modifications of routine culture conditions and careful operational procedures with small samples of Drosophila adults yield marked effects on mean and individual longevity, demonstrated by % surviving to 100 or more days (Table 1). The populations of the first seven listed groups are the unirradiated samples of seven radiobiological test series, with exposed and unexposed populations cultured similarly during any one investigation. (B. P. Sonnenblick and L. P. Gartner, Radiation Res. 31:612-13, 1967). Test 8 was an independent trial. The data then do not represent a pointed attempt to determine singularly optimal culture conditions, merely an attempt to reduce obvious hazards.

Table 1. Lifespan mean and % surviving to 100 or more days (Canton-S adults, D. melanogaster)

| Test No. | $\bar{n}$ | Temp. °C. Average | Mean Lifespan of $\bar{n}$ (Days) | No. Surviving to 100 or More Days | % Surviving 100 or More Days |
|---|---|---|---|---|---|
| 1. | 91 | 21.5 ± .5 | 44 | 0 | 0 |
| 2. | 160 | 20.0 ± .5 | 46 | 0 | 0 |
| 3. | 125 | 18.5 ± .5 | 49 | 2 | 1.6 |
| 4. | 66 | 19 ± .5 | 64 | 2 | 3.0 |
| 5. | 74 | 19 ± .5 | 68 | 4 | 5.4 |
| 6. | 73 | 19 ± .5 | 77 | 15 | 20.5 |
| 7. | 50 | 19 ± .5 | 68 | 4 | 8.0 |
| 8. | 100 | 19 ± .5 | 81 | 23 | 23.0 |

Young Canton-S adults of D. melanogaster, mass bred after earlier pair inbreeding, were used. Temperature fluctuations must be kept minimal and averages are noted in the Table. Standard errors of the mean were prepared for samples by sex and were generally about three and a fraction days; with increasing radiation exposure the S.E. diminished markedly due to a saturation effect of the stress. Tests 4-8, with culture modifications, are compared with Tests 1-3 which were performed some years ago. Most determined efforts at care occurred in Tests 6-8, with 4 and 5 representing our earliest experience with these methods.

Modifications in preparation of standard media include absence of live yeast from surface of vials, no use of benzoyl benzoate, lessened water content of media, placing of cellucotton and preparation of cotton plugs so that adults cannot penetrate either. One etherization only was employed, five pair of flies per vial instead of two, as formerly, were used, and fresh food was supplied weekly with care taken in the passage of organisms to new vials. Vials were examined daily when possible. Relative humidity was low in the first three tests but maintained at 60-65% in later ones.

Whether any, or which, of these factors, acting singly or in concert with deliberately employed, small heterogeneous populations, account for the longevity results evident in the Table we cannot tell. The survivors to 100 or more days were 33 females and 9 males (of 223 individuals) in the last three tests. How would other strains respond to such arbitrarily selected conditions of culture and physical environment? We may note that a strain containing attached-X females and ring-X males, with mutant genotypes, reared simultaneously with Canton + individuals in the same incubator, and as described above for tests 6-8, consistently had 6% of the populations in the three trials (female-male ratio of 2.5:1) living over 100 days, with some of both sexes surviving more than 120 days.

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Allelic and non-allelic complementation in Drosophila metzii.

Complex isozyme patterns of octanol dehydrogenase have been observed using 1-octanol as substrate, with agar gel electrophoresis, in strains of D. metzii. True breeding lines 1Tr17e and 58B8, extracted from the Trinidad and Barro Colorado Island, Canal Zone, strains respectively, show a single strongly staining isozyme band at position # 3 with occasional faint bands at positions # 4 and 5 (designated pattern # 3; see Fig. 1a). Hybrids between these lines show the same pattern. In contrast, zymograms of lines 1Tr17h4d and 1T9g, extracted from the Trinidad and Turrialba strains, respectively, show strong staining at position # 6 with faint bands sometimes at positions # 4