Bortolozzi, J.* and L.E. Magalhães.
Faculdade de Ciências Médicas e Biológicas de Botucatu, Botucatu-SP., Brazil. Gene frequency and population size.

Thoday (1963) has suggested that fluctuation in population size may have pronounced genetic consequences in a population of Drosophila melanogaster. He found a significant correlation between the gene frequency of the mutant white (w, 1-1.5) and population size; as the number of flies increased, selection favored the w gene and vice-versa.

The following experiment was conducted to re-examine the results obtained by Thoday. We used three populations maintained in cages (about 2000 cc) similar to those used by Bennett (1956) with some modifications (Magalhães, Bortolozzi and Sene, 1968). Two stocks of D. mel-

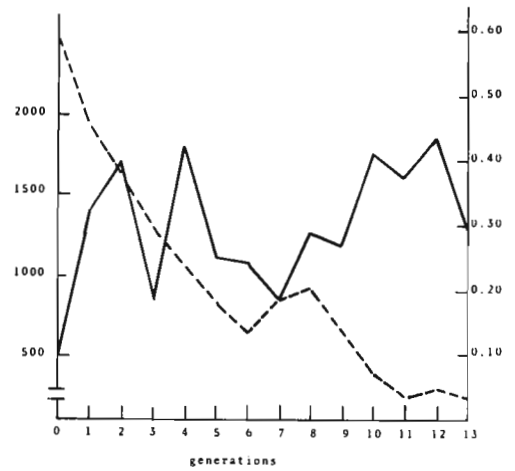

Figure 1A

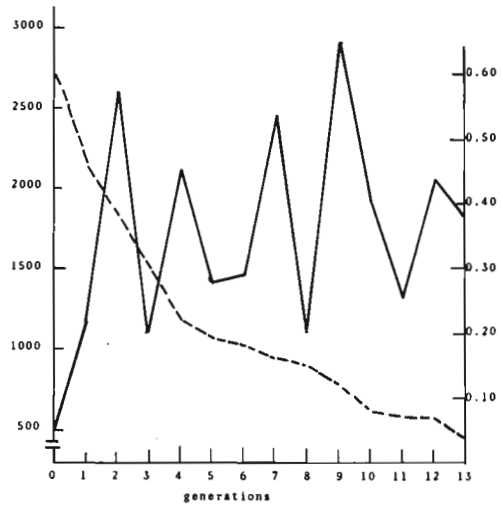

Figure 1B

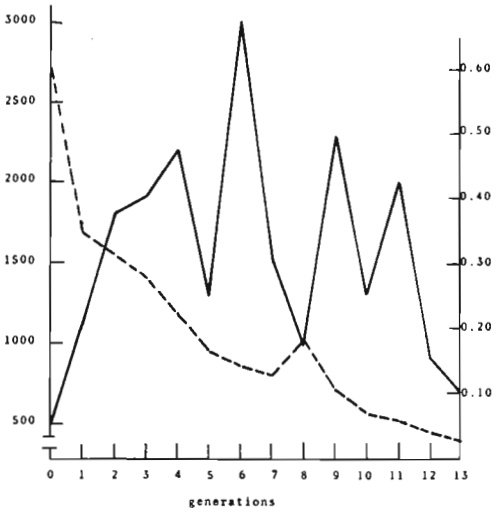

Figure 1C

Figure 1. Population size (————) and mean frequency (-------) of the mutant w in each generation of the cages A (Fig. 1A), B (Fig. 1B) and C (Fig. 1C).

anogaster used in the present experiments had identical genetic backgrounds, except that one stock contained w and the other its wild-type allele. The populations were maintained for 13 generations in such a way that there was no overlapping in generations.

The gene frequency of w (q), in each sex for each generation was estimated by the maximum likelihood method (Cotterman, 1954). The mean gene frequency was calculated using the formula

$$\bar{q} = 2/3\ q(♀) + 1/3\ q(♂)$$

In each population studied, the frequency of the w gene decreased independently of the population size fluctuations. Figure 1, for cages A, B and C, respectively, show clearly that there is no correlation between gene frequency and population size. These results are contradictive to the results of Thoday, but are in agreement with the observations of Thompson (1961). The reason for the contradiction is unknown. One possibility based upon the fact that Thoday used a higher population density than was used in this experiment, is that in a crowded condition the w mutant allele may be favored. We are currently testing this possibility.

References: Bennett, J.H. 1956, DIS 30:159; Cotterman, C.W. 1954, in Statistic and Mathematics in Biology, Ed. by O. Kempthorne et al., pp. 449-465; Magalhães, L.E., J. Bortolozzi and F.M. Sene 1968, Ciência e Cultura 20:197; Thoday, J.M. 1963, Amer. Nat. 97:409-412; Thompson, J.A. 1961, Genetics 46:1435-1442.

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Fattig, W.D. and J.R. Moody. University of Alabama, Birmingham. Recovery of conditional male fertility mutants located on three chromosomes of D. melanogaster.

We have isolated four conditional male fertility mutants located on the Y-chromosome, five located on the 3rd chromosome, and ten putative ones on the X-chromosome. All are characterized by failure to reproduce at 27°C, but are fertile at 22°C. Microscopic analysis of the testes of several of these mutants reveals an absence or reduction of motile sperm at 27°. No conditional morphological variation was observed in electron microscope studies of testes of one of the Y-chromosome mutants. Introduction of males of one of the Y-chromosome strains into population cages containing wild type flies, followed by temperature shift, resulted in a decrease in population fertility. The reduction in fertility was inversely related to the interval of time between introduction of the defective males and temperature shift. Such studies indicate the feasibility of this approach to the biological control of insect pests.

Our data indicate that genes affecting male fertility are widely distributed throughout the genome of Drosophila, and may mutate to conditional states which are useful in studies of the genetic control of fertility.

PERSONAL AND LABORATORY NEWS

Maloglowkin-Cohen, Ch., is now visiting scientist at the Department of Biology, Instituto de Biociências da Universidade de São Paulo, Brasil.

John Sparrow is now at the Department of Biology, University of York, England, after completing a postdoctoral at the University of Virginia, Charlottesville.

V.G. Vaidya was awarded Fellowship of Alexander von Hunboldt Foundation to work at the Genetics Institute of Freie Universität Berlin for five months (15 Sept. 1973 - 15 Feb. 1974).

R.M. Kothari has moved to the Department of Microbiology, Indiana University, Bloomington and is continuing his work on biochemical genetics.

Part of the population genetics group from the Biology Department of the University of Chicago has moved to the Museum of Comparative Zoology, Harvard University, Cambridge, Mass. 02138. Movers include: A. Gupta, R. Lande, R.C. Lewontin and R. Singh.

Günther Meyer, of the Max-Planck Institut für Biologie, Abteilung Beerman, is a Horgitt Research Fellow with S.J. Counce and Montrose Moses in the Department of Anatomy at Duke University from July 1, 1974 to January 1, 1975.