Timofeeff-Ressovsky, N.W., H. Boehm and G. Gottschewski. Studies of population-structure in Drosophila.

For theoretical considerations on the gene-dynamics in free-living populations and on micro-evolutionary processes, we need some knowledge of the real distribution in time and space of the individuals within different parts of the distribution-area of the species. The following simple method of studying the population-structure in Drosophila can be used: A ground about 5 - 15 hectars large is divided into equal squares (on the map!) and in the center of each square (15 - 25 m apart) a bottle with well-fermentating food is placed. The squares and respective bottles are serially numbered on a map. The Drosophila flies are counted and registered (according to species and square) 2 - 4 times a day for a period of 3 - 4 days. Such registrations should be repeated every 3 - 4 weeks during the whole season. The result will show the actual distribution of individuals of different species in time and space throughout the season. From time to time countings should be made during 24 hours, day and night, every 2-3 hours; they will show the activity-curve of the flies for 24 hours. Any meteorological, phytosociological, and ecological data should be collected and used in the evaluation of the results. The results so far obtained at three places in this country show that: (1) D. melanogaster builds small but dense populations more or less far apart from each other, and does not occur in between; the obscura group of species, as well as such species like transversa or phalerata, are distributed much more regularly throughout the suitable biotops; the distribution of funebris is more like that of melanogaster, but shows more dissipation around the single dense populations (2) The distribution of caught individuals throughout 24 hours shows two marked peaks in the morning (8 - 10^h) and in the evening (18^h), and "dead" periods in the night (0-4^h) and at noon (13 - 14^h) (3) The first flies appearing in spring are those of the obscura group, which then occur regularly throughout the whole season; funebris appears in larger quantities in May-June, and melanogaster, transversa, and phalerata - later, in July (4) The flies of the obscura group show high activity several hours after rainfalls; melanogaster disappears (is not caught in the food bottles) in cooler days and weeks.

Tiniakoff, G. G. The "Bar and "aristapedia" mutations in D. funebris.

The dominant sex-linked "Bar" mutation has been obtained in F^1 from X-rayed males with the "mottled" mutation which represents a reciprocal translocation between the Y and the IV chromosomes (See schemat. cytolog. maps in the work of G. G. Tiniakoff in the Russian Biological Journal, vol. V, 1936, p.754). The phenotype of the bar mutation, similarly to that of D. melanogaster, is expressed in a greatly reduced (see Fig. 1), striated eye. The expression is much stronger in males than in females, but a few facets remaining sometimes in the former. Bar males are less viable and fertile as compared with females. According to preliminary data, only about 17 per cent of bar males are obtained from a cross of bar females to normal males. When crossing bar females to bar males, the strain obtained shows poor development, no homozygous bar females being, as it seems, produced. A cross of bar males to normal females gives offspring where all females are bar and all males normal. It was shown cytologically, that this bar strain represented an insertion of a rather large section of the median part of the X-chromosome into the 2 chromosome (See cytolog. maps of G. G. Tiniakoff). The dominant autosomal "aristapedia" mutation was obtained in F^1 by means of X-raying normal males from the "Polivanov" strain of the Moscow district.

The phenotype of the "aristapedia" mutation consists in a gigantic growth of these segments of the antenna on which aristae are disposed. In flies with the above character well expressed, antennae are transformed into legs with a division into segments proper to them (Fog. 2). Large bristles, characteristic of legs, are sometimes seen to grow between the segments (see the extreme right Fig. 2). On the ends of those atavistic legs, well marked aristae are occasionally present. The head of flies with the aristapedia mutation is somewhat elongated, while the eyes are always reduced, flattened, resembling in form the "lobe" mutation in D. melanogaster. The manifestation of that character is found to be more pronounced in females than in males. Cytologically this strain has not yet been investigated. Among 120,000 F^1 flies examined, resulting from X-raying males of diverse strains, the bar mutation was obtained only once and the aristapedia mutation only twice, the latter character occuring in both cases in males. The second male did not produce any offspring. As far as we know, the bar mutation and the atavistic mutant aristapedia character in Drosophila is a very rare phenomenon and our cases in D. funebris seem to be described for the first time. The recessive aristapedia character in D. melanogaster was also described in the Institute of Experimental Biology by Balkashina in 1928.

Fig. 1

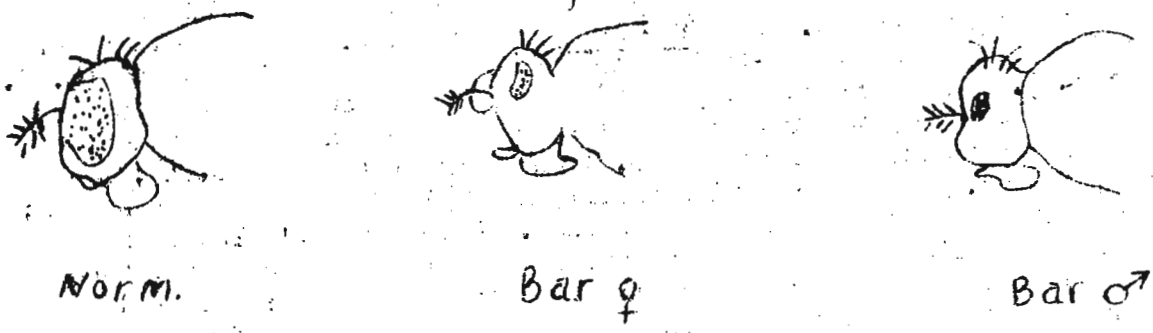
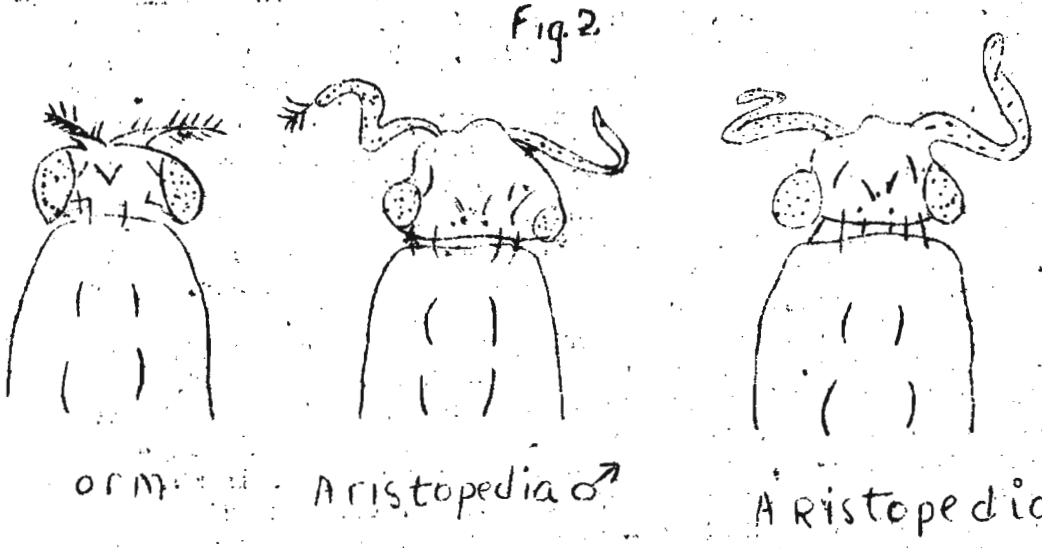


Fig. 2



Varshaver, N. B. Mutation rate of y, ac, sc, w and sn in D. simulans.

Normal D. simulans males were X-rayed (dosage 4000 r) and mated to y w females with attached X-chromosomes. The following frequency of mutation was detected in the loci y, ac, sc, w and sn. Among 94,762 studied F^1 males there were found: 11 yellow (0.116%), 0 achaete, 10 scute (0.0105%), 26 w (0.0274%), 1 mottled