

Pontos de Vista

CAN ONE CONSIDER THE POPULATION OF DROSOPHILA PSEUDOOBSCURA FROM BOGOTÁ A SEMISPECIES?

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It is well established that *Drosophila pseudoobscura* and *D. persimilis* are morphologically alike and considered siblings, but they exhibit significant genetic differences. *D. pseudoobscura* is distributed over western North and Central America from Southern British Columbia to Guatemala, and from the Pacific Coast to the Rocky Mountains and Central plateaus of Texas and Mexico. The range of *D. persimilis* is completely included within that of *D. pseudoobscura*, being confined to higher and more humid localities in California, Oregon, Washington and British Columbia. There is also a documented temporal overlap in the distribution of the two species. A cross between them produces sterile F1 males and fertile F1 females. Backcross progeny, obtained from the cross between such F1 females and males of either parental species have poor viability and most are sterile (LANCEFELD, 1929; DOBZHANSKY, 1936; LEWONTIN, 1974; GUPTA, 1978).

On the other hand, Prof. Alice S. Hunter in 1960/62 found a new population of *D. pseudoobscura* far from its actual distribution area, namely at Bogotá, Colombia at an elevation between 2200 and 3280 m. Such a population of flies is separated from the main body of the species range by a gap of about 3000 Km (DOBZHANSKY *et al.*, 1963). A study of strains from Bogotá showed that in chromosomal polymorphism they resembled most of the populations from Guatemala, but lacked some of the chromosomal variants that are not uncommon in Guatemala. The Bogotá population of flies is also remarkable by having the lightest genetic load of any populations of the species (DOBZHANSKY *et al.*, 1963). PRAKASH (1972) found no ethological isolation between Bogotá and USA flies, and that they mate at random in the laboratory (DOBZHANSKY, 1974).

AYALA and DOBZHANSKY (1974) made an electrophoretic survey of 44 loci in natural populations of *D. pseudoobscura* from USA and from Bogotá. They observed that on the average about 19 allelic substitutions for every 100 loci have occurred in these two separate evolutionary lineages of flies. Also, in two amongst the 44 analyzed loci, the differentiation between these two geographically isolated populations is almost complete. The protein polymorphism of the Bogotá population differs considerably from that of the North American population. For example, SINGH *et al.* (1976) showed that at the Xdh locus, 3/4 of the Bogotá lines carry alleles unique to that population. Bogotá is isolated from the source of new alleles that diffuse by means of long distance migration through the main body of the species' range, and, as a result, the population from this locality has accumulated a different set of molecular polymorphisms (JONES *et al.*, 1981).

AYALA and DOBZHANSKY (1974) pointed out that the chromosomal pool of the Bogotá flies is a depauperate variant of the Guatemala population. Bogotá flies differ from most populations of *D. pseudoobscura* in the configuration of the Y-chromosome in spermatogonial metaphase preparations, but resemble those of the Guatemala populations. Based on the cytological findings, it was concluded that the flies moved from USA to Bogotá, not through man (presumably with fruits or vegetables), but by passive transport, winds or hurricanes, perhaps many thousands or even millions of years ago, from the geographically nearest source which is Guatemala (DOBZHANSKY, 1973).

It is important to note that a cross of Bogotá females x USA males yields sterile

F1 males, while reciprocal cross produces fertile progeny (PRAKASH, 1972; ODON and GUPTA, 1984). PRAKASH (1972) concluded that unilateral sterility of hybrid males has arisen despite "the absence of apparent genetic differentiation" and represents a first stage in species divergence. However, DOBZHANSKY (1974) found a more complex situation in the backcross individuals. He observed the presence of one or more genes determining the sterility **vs** fertility in both limbs of the X-chromosome, of the second, and of the third chromosomes. Moreover, while in the F1 hybrid sterility or fertility are all-or-none phenomena, in the backcross males the sterility is a threshold character. Some males with identical chromosomal constitution are fertile and others sterile. However, it is yet to be discovered whether this is caused by environmental variations, by gene modifiers, or by a combination of both.

Based on the incipient reproductive isolation, karyotypic and allozymic differences between the populations of **D. pseudoobscura** from USA and from Bogotá, AYALA and DOBZHANSKY (1974) classified the flies from Bogotá as a subspecies of **D. pseudoobscura** (**D. pseudoobscura bogotana**). However, MAYR (1970) defined subspecies as an aggregate of phenotypically similar populations of a species inhabiting a geographic subdivision of the range of the species and differing taxonomically from other populations of the species. In other words, a subspecies is a collective category because every subspecies consists of many local populations all of which are genetically and phenotypically slightly different from each other, and should be named only if they differ 'taxonomically', that is, by diagnostic morphological characters (see, for details, MAYR, 1970: 210-211).

All the evidences presented here show that **D. pseudoobscura** from Bogotá, Colombia, forms a population that is partially reproductively isolated from the main area of its distribution, containing characteristics of both species and subspecies, and thus should be considered a semispecies of **D. pseudoobscura** (for such a conceptions, see LORKOVIC, 1953 **apud** MAYR, 1970: 73). It is important to note that such a characterization is not based on taxonomy (where a professional taxonomist classifies a group of organisms, normally dead, at species status), but on a partial reproductive and geographic isolation, and the presence of some of the characteristics of species and some of the subspecies.

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