

A New Symmorphic Sibling Species of *Drosophila* (Diptera) from the Island of Maui, Hawaii¹

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ABSTRACT: *Drosophila affinisdisjuncta* Hardy n. sp. (Diptera) is morphologically indistinguishable from its sibling *D. disjuncta* Hardy and is described as a new species based upon genetic differences.

By cytogenetic and cross-mating studies it has been demonstrated that populations of *Drosophila*, which have been previously treated as *disjuncta* Hardy (1965:245), from the mountains of West Maui represent a biologically distinct species. *Drosophila disjuncta* appears to be restricted to the slopes of Haleakala, East Maui. Specimens from East and West Maui are indistinguishable morphologically, but the chromosomes show a number of fixed differences, and cross-mating experiments demonstrate that hybrid males are sterile. The species are characterized by the following chromosomal differences; *D. disjuncta* has a metaphase karyotype consisting of five pairs of rod-shaped and one pair of dot-like chromosomes. In contrast, the metaphase karyotype of *D. affinisdisjuncta* shows three pairs of large, V-shaped chromosomes, one pair of large and one pair of small J-shaped chromosomes and a pair of dot-like chromosomes. This difference between the karyotypes of the species is due to the presence of large heterochromatic blocks on each of the autosomes as well as on the X chromosome. Further details are presented in this journal in the following article, "Cytogenetic Relationships of *Drosophila affinisdisjuncta* Hardy" by V. Baimai and J. N. Ahearn.

The biosystematic and evolutionary studies of the picture-winged *Drosophila* in Hawaii have advanced to the point where it is clearly evident that most of the morphologically distinct species of this large species group have been described (ca. 120 species). It is also evident that almost without exception these flies have speciated by islands and in the case of East and West Maui the two mountains serve as biological islands. The team research studies involving genetics, cross-mating, ecology, behavior, biochemical and systematic studies are now dealing with all degrees of the process of speciation, and a number of cases of morphologically indistinguishable species are now being investigated. In the past these have been referred to as "siblings" but this term has been used so loosely in the literature that it is of questionable value. George C. Steyskal (1972) has recently discussed this question and has pointed out that the term "sibling" is used wholly as a morphological concept, whereas from the actual meaning of the word it should refer to closely related (sister) species and should be primarily of phylogenetic significance. Steyskal further points out that many of the Hawaiian species may with all propriety be termed sibling species even though they may show striking morphological differences.

Steyskal proposed that the term "aphanic species" be used for those species which are morphologically nearly or completely indistinguishable. McCafferty and Chandler (1974) have further emphasized the desirability of restricting the use of sibling "in order to adhere to its inherent genealogical denotation and to gain additional precision in its systematic usage." They discuss the shortcomings of the term "aphanic," which would negate its usefulness, and propose the terms symmorphic and allomorphic. Symmorphic is defined as, "any set of species that are not obviously distinguishable from each other on a morphological basis, regardless of phylogenetic relationship." Allomorphic species then would be defined as, "species which are obviously distinguishable from each other on a morphological basis, regardless of phylogenetic relationship."

Because of the advanced status of our knowledge of the Hawaiian *Drosophila* we need more precise terminology in dealing with sibling species. As research projects are completed dealing with morphologically indistinguishable species, names of the new taxa will be needed so that the results can be published. Reference to these as symmorphic sibling species will be most useful and will clarify the previous confusion which has existed. At least in dealing with Hawaiian *Drosophila*, the symmorphic siblings are always allopatric while sympatric sibling species always exhibit distinct, secondary sexual, morphological characters. We see no need to use the term "allomorphic" in reference to our fauna; it is automatically implied that all sibling species which are not symmorphic would be distinguishable by morphological characters.

Holotype male, allotype female and 50 paratypes, 25 males and 25 females from laboratory stock #S36G1. Original female collected Kaulalewelewe, Trail to Puu Kukui, W. Maui, 3000 ft, 26-28 September, 1973 (H. L. Carson).

Type allotype and some paratypes deposited in the B. P. Bishop Museum. Other paratypes in the collections of the U. S. National Museum, British Museum (Natural History) and the University of Hawaii.

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