JAPANESE DROSOPHILIDAE (DIPT.): A REVIEW

BY E. B. BASDEN

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'SYSTEMATIC STUDY OF DROSOPHILIDAE AND ALLIED FAMILIES OF JAPAN.' By T. Okada. $10\frac{1}{2} \times 7\frac{1}{2}$ in., 183 pp., 83 text-figures. Tokyo (Gihodo Co. Ltd.). 1956. Price £2. 3*s*. ($6.00) (£1 12*s*. 3*d*. ($4.50) from the author, Department of Biology, Tokyo Metropolitan University, Setagaya-ku, Tokyo).

The last full account of Japanese flies of the genus *Drosophila* Fln. was by Kikkawa & Peng in 1938, when 27 species were recorded, 11 being new to science. Dr. Okada in this new work goes further and treats the whole family, presenting 105 species, 38 being described for the first time, in 12 genera (another genus *Acletoxenus* may also occur—p. 38) and increasing the number of *Drosophila* to 62, of which 18 are described as new and 5 others are to be described elsewhere. Thus 34 new species of *Drosophila* have been reported from Japan over the last 18 years. Besides the Drosophilidae, 1 species of Cryptochaetidae, 1 of Aulacigastridae, and 2 of Diastatidae (*Diastata*), all previously known, are recorded.

This book brings yet another country up-to-date in the nearly world-wide study of *Drosophila*. The genetic fashion as regards *Drosophila* is still confined to the genus though showing signs of developing to other genera of the family, in the wake at last of the systematist, who earlier was spurred to a study of the genus because of the genetic interest of one species, *D. melanogaster* Mg. Dr. Okada writes as a systematist and not as a geneticist. The *Drosophila* systematist should be careful, however, not to excuse his studies just because the group is of interest to the geneticist. It does so happen that most of this work has been done recently by the staffs of genetic institutions, who no doubt feel obliged to utilise this excuse, but it must be emphasised that the systematics of *Drosophila* is no more genetics than is the systematics of any other group, in spite of the inclusion of such *Drosophila* papers in some genetic journals.

Dr. Okada's book is of particular interest as it supplies some means of comparing the western and eastern Drosophilid faunas of the Palaearctic region, though the comparison cannot be complete until the North African species are known. Of the 105 Japanese species, only 28 (27 per cent., about one fifth of the European total) have been recorded from Europe. The latter represent 11 well-recognised genera (9 according to Okada, who does not grant *Phortica* and *Parascaptomyza* generic status). Some of these 28, however, do not appear to be the same as their European namesakes. A few examples will suffice.

No European species of *Stegana* known to me has an arista as figured (p. 17) for *St. coleoptrata* (Scop.). The third antennal joint of *Phortica variegata* (Fln.) (p. 21) should be shorter and the cross-veins of the wing lightly shaded. *Leucophenga maculata* (Duf.) (p. 32), which has about 6 acrostichal rows in the male but 10-12 in the female, has the 3rd and 4th wing-veins parallel, not converging. Zetterstedt's type specimen of *Microdrosophila* (*Drosophila*) *congesta* (p. 41) has a wholly yellow abdomen (that of the Japanese species is black), the stronger costal fringe extends only six-sevenths to the 3rd vein (not all the way), and the head bristles are much stronger and longer than figured. There should be no black patches on the pleura of *Mycodrosophila poecilogastra* (Lw.) (p. 51). The secondary clasper of *Parascaptomyza* (*Scaptomyza*) *disticha* (Duda) (p. 68) has one massive tooth (lacking in the Japanese figure) and the phallic organs are of different proportion or shape from those shown. *Scaptomyza apicalis* Hardy (p. 69) is entirely different from the Japanese species given that name, and one wonders how even the generic name was used for the latter. *Sc. graminum*

(Fln.) (p. 73), has the ovipositor guide and anal plate distinctively different from the Japanese figures, and the species does *not* belong to the *montana*-group but to its own *graminum*-group, as it has short apical scutellars. (Wheeler's (1952) *graminum*-group belongs to *Parascaptomyza* not to *Scaptomyza* and will have to be re-named as it does not refer to the real *Sc. graminum*.) *Drosophila trivittata* Strobl as known to me should doubtfully be included in *Hirtodrosophila (p. 80) according to Duda's definition and* Okada's key as it has well-developed preapicals on all tibiae ; also the cheeks are much broader than described by Okada. Two further examples of doubtful identity can be given. Characteristic spines on the inside of the hind tibia of European male *Amiota alboguttata* (Wahl.) are not mentioned (p. 19) for the Japanese specimens given this name ; and since it is not stated to the contrary (p. 75) one must imply that the female wing of *'Scaptomyza unipunctum* (Zett.)' as well as that of the male, has the dark spot, which is not the case in European females. In *Drosophila bifasciata* Pom. (p. 102) the end of the genital arch is drawn too pointed, but in this instance we do know that the European and Japanese populations *are* conspecific.

Similar doubts apply to others of the 28 species, discrepancies being mentioned in a few cases by Okada himself. Some of the different forms may be geographic races or subspecies, but breeding, *i.e.* experimental systematics, will determine this, and one hopes this can be done.

It is obvious that the two faunas cannot be compared safely at species level, but only between species-groups or genera. Using Okada's interpretation, 9 of the 12 genera are represented in both areas, the more tropical genera *Dettopsomyia, Liodrosophila,* and *Hypselothyrea* being unknown in Europe but having 1 or 2 representatives each in Japan ; whereas two European genera, *Cacoxenus* and *Gitona,* are not found in Japan. The tropical character of the Japanese fauna is also emphasised by the much larger number of species of *Leucophenga* and *Mycodrosophila,* and of the Drosophila sub-genus *Hirtodrosophila,* and of the *melanogaster*-group of s.g. *Sophophora.* It is significant also that specimens of the two species of *Microdrosophila* in Japan are much more commonly met with than the two species (s.g. *Incisurifrons*) in Europe, where they are excessively rare. Species-groups of *Drosophila (s. str.)* not yet recognised from Europe are *bizonata, grandis, subtilis, melanica,* and *robusta.*

On the other hand the more temperate *obscura*-group (*Drosophila* s.g. *Sophophora*) can boast 8 species in Europe to 3 in Japan, and the *Amiota-Stegana* complex and the genus *Scaptomyza* have the more representatives in Europe. The *fenestrarum*-group, with 3 European species, does not occur in Japan, and neither does the northerly occurring *Drosophila transversa* Fln. of the *quinaria*-group. Endemic species also occur in both areas, Okada claiming 55, but the exact numbers cannot be ascertained as long as species-confusion exists.

Attention can be drawn at this point to the incorrect use of the name *D. pallida* Zett. (p. 137) for *D. cameraria* Hal. According to Zetterstedt's types, which are in very poor condition, *pallida* is a *Parascaptomyza.* Another small criticism is the author's use (pp. 77, 87) of 'sp. like *histrio*' for a *Drosophila* in a subgenus remote from the real *histrio* Mg.

Regarding the Diastatidae, one assumes this to be a preliminary account as only two species, both *Diastata,* are given. In Europe there are a dozen or so species in the family.

Although the book has perhaps been somewhat hastily written, Dr. Okada has packed a great deal into the 183 pages. With the older species reliance has been placed mainly on recent authorities instead of on original descriptions or original specimens. Only a study of the last, where still in existence, can give a reliable foundation for the systematist, and the sooner this is appreciated by Drosophilists the better. We are arriving at the stage

where it is more important to confirm what is the old than to describe the new.

A stimulating approach to identification of species in the book is by four separate keys. The first is by the usual external characters, then for males by the periphallic organs and, separately, by the phallic organs, and lastly by egg-guides of females. The keys could probably have been combined, but their separate presentation does draw attention to a more detailed study of the genitalia and ovipositor-guides, which study is a valuable feature of the book. It would have been useful if as well as dissected details, a figure of the complete genitalia of some one species, with each part named, had been included, for not everybody knows where to locate such easily overlooked parts as the decasternum and the ejaculatory apodeme. The latter is the Samenpumpen-Sklerit of Nater (1951) whose work is not mentioned by Okada.

Most species are described or redescribed adequately, including the internal abdominal structure. The descriptions are accompanied by clear figures of head, wing, egg-guides, and parts of internal and external genitalia of both sexes, and sometimes egg, thorax and abdomen. Japanese records and the wider distribution of each species are added, together with occasional notes on biology. There are many discrepancies between the descriptions and the text-figures of cheek width. For instance, the cheek of *Leucophenga ornatipennis* (de Meij.) (p. 137), is described as one-third the greatest diameter of the eye, whereas the figure shows it about one-twentieth; of *D. nokogiri* sp.n. (p. 85) as two-thirds when it is about one-twentieth by the figure; etc. In this connection the author should have mentioned where he measured the cheek, for this varies with different workers.

There are many spelling mistakes (a long but incomplete errata page is included), but the present writer is too thankful to have the book in English to complain of this. It is inexcusable, however, that no index is present even though a list, not alphabetical, of species is given, and it would be a great help in the keys if the page reference to each genus, subgenus, and species had been given.

There is a historical review of Japanese species (Part II), the earliest Japanese reference being 1906; and an analysis of the systematic relationship of genera, subgenera, and families according to their phallic formula (Part IV and p. 2). The phallic organs are the most intimate taxonomic character of a species, so it is common sense to consider these, and it is to Dr. Okada's credit that he does so. Whether one character of one sex can decide this relationship reliably can be proved only by further studies of other characters, similar to the work of Sturtevant for *Drosophila*. Okada now presents a broader picture and finds for example that *Drosophila* is more akin to *Chymomyza* than to *Scaptomyza*. Part V is a table, with short discussions, of all Japanese species, showing their distribution in Japan and throughout the world, and their collecting or feeding habits. The open ring, indicating presence in an area, is missing from the European column for *Mycodrosophila poecilogastra* (Lw.), *Scaptomyza unipunctum* (Ztt.), *Drosophila rufifrons* Lw., and *D. alpina* Burla; and is wrongly included for *D. virilis* Sturt. A bibliography of seven pages completes the book, though the reference to Cordeiro, 1952 (p. 164) is not listed.

The type is small but clear, and even smaller in the keys, and the paper is rather thin. A few headings are inconveniently given at the bottom of the page (e.g., pp. 13, 69, 89, 95, 139) instead of being carried to the top of the next. The binding is strong, in good boards.

Dr. Okada is to be congratulated for pushing ahead with this very useful monograph. In spite of the defects pointed out here it is a most stimulating account of Drosophilidae. It is also apparent that the most neglected part of *Drosophila* researches will soon be remedied, for the author says (p. 1) that the early stages will be studied elsewhere.

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