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Observations and Comments on the *Trypetidae* (Dipt.) of Formosa.

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(With 1 Text-Figure.)

No published work on any group of organisms can be said to be without value, but to assess this and to gauge the importance is not always easy. To some extent a person moderately well acquainted with the group can estimate something of what has been done, yet to appreciate it fully it is necessary to use it in the examination of material of the fauna with which it deals.

In making a study, therefore, of Dr. Shiraki's work on the *Trypetidae* of the Japanese Empire, it is with great pleasure that I have to thank Dr. Walther Horn, Director of the Deutsches Entomologisches Institut for sending me numerous specimens of unnamed Formosan *Trypetidae* for identification and study, together with a series of specimens from material determined by Dr. Hendel.

It would seem that criticism is inevitable in systematic work, but such as I offer here is made in a friendly spirit, without personal ill-feeling, and in the interest of the study of this important family of flies. Shiraki records rather more than 110 species from Formosa; I have seen specimens of about fifty, and it is on these that the remarks are mainly based. The material was all collected by H. Sauter in Formosa, hence only the specific locality and the date are given under each species.

The Types of all new species are in the collection of the Deutsches Entomologisches Institut, Berlin-Dahlem.

The Systematic Study of the *Trypetidae* of the Japanese Empire presented by Dr. Tokuichi Shiraki deals with extreme outposts of two of the major zoo-geographical regions of the world, the oriental region in Formosa and the palaeartic in Japan proper; the subject is thus rather more difficult than usual. As a whole the Study will be of much use to all workers, especially those unable to get material from the region concerned. It brings together data and information not otherwise available except with some trouble. It is not clear just what the author intended when he undertook the work, apart from what is indicated in the title. In a work of such a scope it might reasonably be expected that some advance in the treatment of the group would be found; one discovers however, that it is little more than an illustrated, descriptive catalogue of the Trypetid fauna of the Japanese Empire, but that it could be regarded as a monograph. A more direct comparison of the Formosan genera and species in particular with those of the rest of the oriental region would have been an advantage; the difficulty of doing so is perhaps due to the restricted fauna studied, but it may also have required a revision of the group in the whole oriental region. In any case, the careful description of species, even if some that are regarded as new prove to be synonyms, is always of value.

The handicap of writing in a language foreign to the author will be appreciated, and he is to be complimented on his use of English. Rather obscure statements do occur, and it is to be regretted that there are errors and mis-statements that could have been eliminated by more careful editing. Lastly, the author does not seem to have made himself as well acquainted with the literature of the family as would seem desirable. Among other things, a named variety of a species included by him is omitted, as is any reference to an important statement about a certain widely spread species.

In the following pages references to authors (other than Shiraki) are given by name followed by the year and page as detailed in the bibliography at the end. References to Shiraki's work are made generally by page only in brackets [] throughout, so that it is not necessary to quote in full, nor to repeat earlier references given by him.

Questions of anatomical terminology are always troublesome. The broader outlines of structure presented by the *Trypetidae* must be studied from a view-point of the muscoid flies in general, and Townsend's Manual of Myiology (1934) is the most recent contribution on the subject. A smaller group will have to some extent more or less restricted or specialised terms, regarding which in the *Trypetidae*, there seems to be fairly general agreement. One question that is unsettled is the number of segments in the preabdomen, that is, the anterior portion of the ab-

domen not modified in the formation of the genitalia (Metcalf, 1921, p. 178). In the *Trypetidae* the number is usually accepted as five in the male and six in the female, although certain workers seem to consider that there is a hidden or atrophied first segment between the thorax and abdomen (Costantino, 1930, p. 256).

On the thorax, that portion between the scutellum and the abdomen offers difficulties. According to Townsend (1934, p. 178) it would be the median plate of the post-scutellum, and he proposes the term infra-scutellum for the upper, crescentic, convex portion, and basiscutellum for the lower, more quadrate portion. The use of the term „mesophragma“ for any external sclerite is incorrect, as a phragma is an internal partition (Smith, 1906). When the term mesophragma is used, usually the upper part of the plate seems indicated, although I have applied it erroneously to the lower, calling the upper portion the post-scutellum in a too restricted sense.

The lower part has been more generally named the metanotum, but there is much confusion (cf. Costantino, 1930, p. 250). According to Townsend the whole of what he considers the postscutellum is a portion of the mesothorax. As, therefore, metanotum or a similar term seems undesirable at present, Townsend's names supply terms of a more indeterminate meaning, at least as far as the segmental portion is concerned. How far they will be accepted remains to be seen: Curran, in his latest book on the North American *Diptera* (1934, p. 488) refers to it, but seems to prefer to retain „metanotum“ in the older sense.

It is not intended to make a detailed study of anatomical terminology here, but a few points in Shiraki's paper should be mentioned.

An unfortunate error in the notation of the drawings of the wings [page 8, fig. 12] may be noted. They should be corrected as follows:

Cubitus cell (cu), anal or third basal cell. This is marked „An“ in the figure, but should be „Cu“.

Cubitus 1 cell. (Cu 1): this is the third, not second, posterior cell. It is marked „Cu“ but should be „Cu. 1“.

Anal (An) or axillary cell. This is not the third posterior cell; it is marked „Cu“ but should be „An“.

In considering the terms applied to the parts of the head, it may be noted that „eye-margins“ seems to be used for what are usually called „cheeks“, and „cheeks“ is used for „genae“. Apart from any possible anatomical differences due to their relative positions before and below the eyes, it seems desirable to refer to them as cheeks (before) and genae (below) — in English there is the common term „cheek by jowl“ and in German „Wangen und Backen“ is used.

Classification.

In the following pages it is not proposed to discuss the possible synonymy of the various species. As has been indicated, this would be done better when the rest of the oriental and Australian *Trypetidae* can be more fully studied as well. As regards the general classification of the group, one cannot say that any adequate and acceptable division into sub-families has yet been made, and it could perhaps best be done only after a consideration of the *Trypetidae* of the world. Shiraki seems to have followed Hendel in restricting the number of sub-families, while a larger number might prove easier to handle and to demarcate.

Adraminae [see p. 34].

In view of the number of species considered, it is to be regretted that Shiraki makes no mention of the *Adraminae*. Hendel (1927, p. 17) places them as a tribe of the *Dacinae*, but later seems to regard them as a sub-family. Bezzi (1924, p. 73) also treated them as a sub-family, but in rather too restricted a sense, as some of the genera he placed in the *Ceratitinae* really belong here. The *Adraminae* certainly form a distinct group, both on larval and on adult characters, but a more detailed comparison of both oriental and African species is desirable.

The *Adraminae* may be considered quite as well-defined as the *Dacinae* (Hendel, 1927, p. 17): while in the latter the dilated second basal cell and the long point to the anal cell are very characteristic, in the *Adraminae* the second basal cell is not conspicuously enlarged, nor is the point of the anal cell particularly long, also the first three veins are not so crowded together. The elongate abdomen and the spined femora are to be noted, although the latter are not so constant. At the same time, although the *Adraminae* may thus be distinguished from the *Dacinae*, further comparison with certain genera included by Bezzi in the *Ceratitinae* should be done.

It is not possible to compare larval characters as so few of the species have been reared. But as far as is known, they seem to show characters, particularly the appearance of the anterior spiracles, that indicate both their relationship to one another, and their distinctiveness from other groups. Species of *Adrama* infest tea seed: the larval habits, while apparently not identical with those of *Munromyia nudiseta* Bez. in South Africa, are very similar; neither can be regarded as fruit infesting in the manner of larvae of most *Dacinae* and *Ceratitinae*, but rather as seed borers. The curious, branched, anterior spiracles of *Adrama determinata* (Walk) are figured by Leeftmans (1915, Pl. II) and those of *M. nudiseta* by myself (Munro, 1924, p. 14). Further, species of other African genera, such as *Coelopacidia* and *Stenotrypeta*, placed by

Bezzi in the *Ceratitinae*, but since included in the *Adraminae* by Hendel, have larvae that possess anterior spiracles quite like those of *Adrama* and of *Munromyia*. The larvae, as I have recorded (1932, p. 27) are borers in the stems of plants.

It may be noted that while the genus *Matsumurania* Shir. may differ from other *Adraminae* in the possession of a humeral bristle, at least one species of *Dacinae*, *Dacus xanthodes* Broun, also has one as noted by Malloch (1931, p. 260).

Of the genus *Meracanthomyia* Hend. one species, *M. antennata* Hend. has been described from Africa.

Adrama austeni Hend. [44].

A ♀, Maruyama, iv. 1914, agrees with Hendel's description as well as with Shiraki's of *A. apicalis* [44] except that the fourth and fifth segments of the abdomen are not black (only slightly blackish, and this may be due to discoloration) and there is no black mark on the hind femora. It would be interesting to know if, in a series of specimens, there is any gradation between those with the fourth and fifth segments black and those in which the abdomen is entirely reddish-brown, that is, whether *austeni* and *apicalis* may not be extremes of one species.

Dacinae [35].

The *Dacinae* form a compact group of much interest in the oriental, Australian and African regions, including as it does numerous species of great economic importance. The sub-divisions already made, regarded either as genera or as sub-genera, are unsatisfactory, and the tables published by various workers, as Bezzi, Hendel, Malloch, Tryon and Shiraki, deal mainly with the species occurring in sub-regions.

In his tables for the genera of the *Dacinae*, Shiraki states for *Chaetodacus* „anterior supra-alar bristles not developed“. This might be taken to mean that they are not present, but probably the author implies that they are not as strong as in *Zeugodacus*. The word „developed“ has a rather comparative significance, and for this reason should be used with care.

In the tables for *Chaetodacus* [53] and for *Zeugodacus* [79] the hind cross-vein should be referred to as „m. cu“ not as „m“.

It is not intended to make a detailed analysis of all the genera here. It may be noted, however, that the use of characters occurring in one sex only is always unsatisfactory, whatever supplementary value they may, and undoubtedly do, possess. The distinctions given for the genera *Parazeugodacus* and *Paratridacus* are to the point.

Chaetodacus parvulus (Hend.) [54].

I have examined a ♂ from Kanshirei; it is labelled „Typus, *Dacus parvulus* H. det Hendel“. A few minor differences from Shiraki's description may be noted. The spots on the face are round, not oblong; there is a distinct tubercle on the middle of the face, clearly seen in side view; the lateral yellow stripes on the dorsum of the thorax are as wide as the third antennal joint and the hypopleural spot is double; the tarsi are barely brownish, and there is no brown ring at the outer end of the femora.

Chaetodacus ferrugineus (F.) var. *dorsalis* Hend. [61].

There are several specimens from various localities: Toa Tsui Kutsu, Banshoryo (Shisha), Hokuto, Tainan and Gebiet des Shisha-stammes.

It is possible that some of this series may belong to the variety *okinawanus* Shir. However, without more adequate material, one cannot be quite sure. An examination of the palpi (which is usually difficult as they are so often retracted within the mouth cavity) shows that some specimens have it distinctly broad and concave above, while in others it appears to be rather narrower and straighter, as is apparently the case in a pair from the type locality and in a paratype. How far there is any gradual variation between the shapes could only be judged after dissection and mounting of a series of palpi — apparent differences in the shape may even be due to the conditions under which the specimens dried after pinning.

Chaetodacus diaphorus (Hend.) [69].

A ♀ from Koshun is the actual specimen on which Hendel first described the species and it is labelled „Species β“. When Hendel named the species he did not indicate the type but it would seem that the type (holotype) ♂ must be a specimen, probably labelled „Typus“, in the Hungarian National Museum, where Shiraki states the types are. Probably the Koshun specimen in the Deutsches Entomologisches Institut has no status as a type.

Chaetodacus cilifer (Hend.) [71].

I have seen a cotype from Kushun and a pair from Kankau.

Chaetodacus cucurbitae (Coq.) [73].

There is a typical series from various localities, Paroe, Suihenkyaku, Kankau, Kanshizei and Chipun.

Zengodacus caudatus (F.) [88].

In considering this species it seems curious that it is not possible to discover from published accounts what the length, or the relative

length, of the base of the ovipositor is; in fact, it almost seems that it is not possible to recognise the species at all definitely! For the most part nothing is said about the base of the ovipositor; Tryon (1927, p. 205) says it is „stout“ and his figure (1927, Pl. XXIII, Fig. 9) shows what seems to be a short one. Unfortunately Shiraki makes conflicting statements: in his table of the species of *Zeugodacus* [p. 80] he says it is „much longer than the three preceding (except the sixth) tergites together“, but on p. 89 he states it is „about as long as the fourth and fifth tergites together!“ To my regret I have so far seen only one specimen that I can reasonably accept as this species. This is a ♀ from Formosa sent to me on loan by Dr. Horn. It is determined as *Dacus caudatus* F., but has not one of Hendel's labels although it is probably from a series of specimens determined by him. The base of the ovipositor in this is longer than that of the specimens of *nubilus*, and is conspicuous in a dorsal view. It is elongate legging-shaped, and the total length about one-tenth less than that of the third, fourth and fifth tergites together; when seen in a dorsal view, the amount projecting is about one-fifth less than the three tergites.

Zeugodacus depressus Shir. [90].

In regard to this species too there is a lack of agreement in Shiraki's statements as to the length of the base of the ovipositor. In the table of the species of *Zeugodacus* [p. 80] it is stated to be „about as long as the three preceding (except the sixth) tergites together, while on p. 91 is said „distinctly shorter than the fourth and fifth together“.

Zeugodacus nubilus (Hend.) [91].

A few specimens from Kankau, Anping, Toa Tsui Kutsu and Hoozan.

It may be noted that the so-called „sub-apical“ band on the wing is much reduced; it is much less than in *caudatus* and is little more than a cloud on the end of the fifth vein and the lower end of the lower cross-vein. Measurements on three ♀♀ (one determined by Hendel) show that the base of the ovipositor is about as long as the fourth and fifth tergites together, but the portion seen projecting from above is a little longer than the fifth tergite.

Zeugodacus lipsanus (Hend.) [101].

There are two teneral specimens from Kankau, v. 1912, and the ♀ from Koshun on which Hendel originally described the species — it is labelled „*Dacus spec. α*“, and the same remarks apply to it as have been made about *Chaetodacus diaphorus*.

Trypetinae [p. 121].

In the tables for the genera of this sub family, rather extensive use is made of the propleural bristles. Their use, however, seems rather unsatisfactory as they are often difficult to see, and to distinguish with certainty from hairs, or bristle-like hairs. Whether or not much is to be gained by their use is open to question, but at any rate Shiraki's attempt is not without its value. As far as my experience goes, I have only seen one genus, *Acidia* Rob. Desv. in which the propleural bristles can be said to be really well-developed, and which can thus serve as a basis for comparison. Otherwise, some idea as to their presence can be gauged by comparing such bristles or bristle-like hairs as may be on the propleura, with the scapular bristles, themselves very variable. Confusion due to the use, or abuse, of these bristles is shown in the case of the genus *Myiolia* [p. 125] which is placed under the major caption „44. Propleural bristles distinct“, while below this is found „99. Prothorax without bristle row“, this last statement being confirmed on p. 247, „chiefly distinguished from the latter (*Acidia*) by no propleural bristle“.

On page 126 it appears that the names *Ptilona* v. d. Wulp and *Euphranta* Lw. should change places.

Chelyophora Rond. 1875 [*Acroceratitis* Hend. p. 133].

One regrets that Shiraki has made no comment on the possibility of *Acroceratitis* Hend., as well as *Stictaspis* Bez. being synonyms of *Chelyophora* Rond. as indicated by Erdelci (1920, p. 355), especially in view of other oriental species, as *striata* Frogg. and *separata* Bez. However, as I have said in a recent paper on some Indian Trypetidae (Munro, 1935 b, p. 16) the synonymy with *Chelyophora*, supported by the fact that Bezzi says Hendel has examined the genotype, may be accepted for the present.

Chelyophora plumosa (Hend.) [134].

There are several specimens from Taihoku, Toa Tsui Kntsu and Kankau. They have been compared with a paratype labelled „Typus, *Acroceratitis plumosa* Hend. det. Hendel“.

This species is apparently very like *C. separata* (Bez.). There seem to be differences in the wing-pattern, but in the absence of material, a detailed comparison is not possible from Bezzi's description alone.

Paratrirhithrum nitobei Shir. [138].

This seems to be very like species of *Trirhithromyia* Hend. in Africa (Hendel, 1931, p. 3; Munro, 1935 a, p. 29) and is interesting as a representative of the *Ceratitidis* McL. s. l. group in the Orient. The sudden, wide opening of the sub-marginal cell is very distinctive.

Taeniostola connecta Hend. [143].

A ♀ from Toa Tsui Kutsu, V. 1914, has the apical band on the wing-pattern not united to the one before it.

Acrotaeniostola sexvittata Hend. [145].

Four specimens from Maruyama, VI. 1914, and one from Okaseki (Taihoku), vi 1914. They agree closely with Hendel's description. In one there is an additional, small, inferior orbital bristle on one side of the frons, and in another the bar across the end of the fourth vein is irregularly connected above with the other two.

Paragastrozona japonica (Miy.) var. *miyakii* (Bez.) [154].

This variety (Bezzi, 1926, p. 265) appears to have been overlooked by Shiraki. It is not possible to say much about it as Bezzi's description is very short. The types are probably in the Bezzi collection now in Milan, Italy.

Carpophthorella magnifica Hend. [157].

The species of *Carpophthorella* are very like those of the African *Carpophthoromyia* Aust. in general appearance, but the former differ particularly in the much stronger chaetotaxy of the head, and in the more numerous inferior orbital bristles. In *Carpophthorella magnifica* there is a faint fuscous bar across the top of the hyaline inverted-V of the wing-pattern; the base of the ovipositor is very broadly legging-shaped, the apex wide and rounded, not rather sharply narrowed towards the end as in *Carpophthoromyia dimidiata* Bez.

Pseudospheniscus connexus Hend. [166].

This species was very briefly described by Hendel, and is re-described in more detail by Shiraki. One specimen, a ♂, Kankau (Koshun), v. 1912, agrees with the latter description only it is more uniformly black, especially the abdomen, which is not fusco-testaceous, while the scutellum is very slightly brownish.

Pseudospheniscus superfluctus (End.) [168].

I have seen a named specimen of this species from Koshun, III. 1908.

Pseudospheniscus fossatus (F.) [169].

A ♀ from Maruyama, v. 1914, compared with a named specimen from Kankau.

(Fortsetzung im nächsten Heft).