ON THE GENUS *TOXODERA* SERV., WITH A DESCRIPTION OF *TOXODERA MACULATA* OUWENS, FROM JAVA (Orth., Mantodea).

By

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In 1913, the late Major P. A. OUWENS, in "De Tropische Natuur", 2, p. 122, published a short article entitled: "Eenige weinig bekende Mantis of roofsprinkhanen van Java". In this paper the author enumerates the chief characters of the highly aberrant Mantid genus *Toxodera* (= *Toxodera* + *Paratoxodera* of the present paper), followed by some explanatory remarks on the four different insects united on a coloured plate which accompanies Mr. OUWENS's paper.

Although OUWENS was not an expert in entomology, nor even had any special knowledge of certain orders or groups of insects, he had what we may call the gift of drawing one's attention to something peculiar in nature, occasionally pointing out some of the numerous unusual and striking features that a student is liable to meet sooner or later when engaged in the study of tropical insects, and other animals.

Now, on the above mentioned plate, the reader will find beautiful coloured drawings of 4 *Toxoderinae*, designated by OUWENS by the following names:

Fig. 1. *Toxodera denticulata* AUD. SERV.
— 2. — *gigas* OUWENS.
— 3. — *cornicollis*.
— 4. — *maculata* OUWENS.

These drawings, executed by a native Museum artist, are very excellent, being in fact the best reproductions of these strange-looking insects that have ever been published. Whilst going over the rich material of *Toxoderinae* as represented in the Buitenzorg Museum collection, I found it quite easy to correctly determine the "plastotypes" discussed by OUWENS, and although the animals themselves, with the sole exception of *Paratoxodera cornicollis*, have been completely destroyed and must be considered as lost, these water-colour drawings are easily interpreted:

Fig. 1 is the type of *Toxodera integrifolia* WERNER, described by that author in Treubia, 6, 1925, p. 485 - 486. A photograph of OUWENS's specimen is reproduced on pl. 24 fig. 3 of the said paper. The specimen is lost.

Fig. 2 is a young individual (larva) of *Toxodera denticulata* SERV., as was pointed out already by WERNER in the above mentioned paper (l.c. p. 486). This example is likewise destroyed.

Fig. 3 is a specimen of *Paratoxodera cornicollis* WOOD-MASON, which is still in the collection of the Buitenzorg Museum.

Fig. 4, lastly, is *Toxodera maculata* OUWENS, the principal object of this paper. As will be shown in the next pages, this is a good species which needs elucidation, for the type is no more in existance.

In "De Tropische Natuur" 12, 1923, H. H. KARNY published an article entitled: "Over een merkwaardigen bidsprinkhaan", in which OUWENS's opinion is critisized, and *T. gigas* as well as our *T. maculata* are both referred to *denticulata*. With regard to *T. gigas*, KARNY was right, but his arguments in favour of considering *maculata* as an individual aberration of *denticulata* are neither justified nor sound. His remarks: ".....Het is dus ten eenenmale onmogelijk om alleen naar aanleiding van een kleurkenmerk een aparte soort op te stellen, en daar *maculata* overigens in alle eigenschappen met *denticulata* overeenkomt, houden wij ook haar voor identiek met deze soort" (loc. cit. p. 67) have now proved to be entirely wrong, for *T. maculata* is easily distinguished from *denticulata* by a number of characters.

The error is perpetuated in Prof. WERNER's "Vierter Beitrag zur Mantodeenfauna von Niederländisch-Indien" (Treubia, 6, 1925), where *Toxodera maculata* is also placed as a synonym of *denticulata* SERV., but the author abstained from giving his own opinion on the subject. The photograph on pl. 24 fig. 3 (right insect) of WERNER's "Beitrag" is clearly *maculata* and not *denticulata*, as will appear from the following notes. This photograph in all probability was taken from OUWENS's type specimen.

Lastly, in BEIER's recent catalogue of the *Toxoderinae* (Gen. Ins., 198, 1934), *T. maculata* is again mentioned as a synonym of *denticulata* without further comments, but this is obviously based on WERNER's authority.

A few years ago I was fortunate enough to receive a living specimen of the true *Toxodera maculata* OUWENS, from near Tjibadak, West Java. The insect arrived in good condition and was kept alive in a large cage for twelve days in succession. Immediately after its arrival an abundant supply of food, consisting of all kinds of small insects, was brought into the cage, but the Mantid remained quite inert and unconscious of any movement around it; the last day before its death it fell to the bottom of the cage and, in an unguarded moment, was attacked by a number of small red ants, which, unfortunately, devoured part of the anal segments of the abdomen before the specimen was saved.

It is obvious that OUWENS's "description" of this rare insect is extremely poor and insignificant:

> "Fig. 4 is de afbeelding van *Toxodera maculata*, zoo door mij genoemd, omdat zij zich van *Toxodera cornicollis* niet alleen door het gemis van hoorntjes op den prothorax en het gebogen zijn van dit lichaamsdeel onderscheidt, maar ook omdat de bovenvleugels van deze soort sterk gevlekt zijn."

From this description alone *maculata* would never have been recognized as a distinct species, the more so as OUWENS did not compare it with *T. denticulata,* but the fine drawing of his animal is abundantly sufficient to distinguish *maculata* at once from the other known species of *Toxodera.*

For the reception of *T. cornicollis,* to which *maculata* bears a very striking resemblance, WOOD-MASON erected the genus *Paratoxodera.* However, on account of the curved pronotum and the strongly developed cerci, which are distinctly excavated at tip, *maculata* should be placed in the genus *Toxodera.*

The following is a re-description of the second specimen known.

Toxodera maculata OUWENS.

1913. OUWENS, De Trop. Natuur, 2, p. 123, pl. fig. 4. — „Java".
1923. KARNY, Idem, 12, p. 67. — Notes (*T. denticulata* SERV., *pars*!)
1925. WERNER, Treubia, 6, p. 486, pl. 24 fig. 3 (right insect). — Java (*T. denticulata* SERV., *pars*!)
1934. BEIER, in WYTSMAN, Genera Insect., fasc. 198, p. 8 (*T. denticulata* SERV. *pars*!)

Material examined: — One specimen (sex?), W. Java, Tjibadak, 800 m alt., Sinagar Est., March 17, 1931 (alive), Mrs. ERMELING misit. — The specimen is the p l e s i o t y p e, in Mus. Buitenzorg.

H e a d small trigonal, broader than deep; labrum, palpi and clypeus pale straw-coloured, frons and vertex blackish-brown. Labrum smooth, clypeus with two transverse ridges in front and one median, trapezoidal tubercle placed behind. Frons with a transverse median tubercle, which is hollowed out and bitubercular when seen from behind. Vertex elevated, trapezoidal, ocelli placed in a triangle at margin. Occiput rounded behind, brownish-yellow in colour, with four rather deep longitudinal depressions above. Eyes produced, acutely mammiform, more obliquely placed than in *T. pluto* with the points directed more

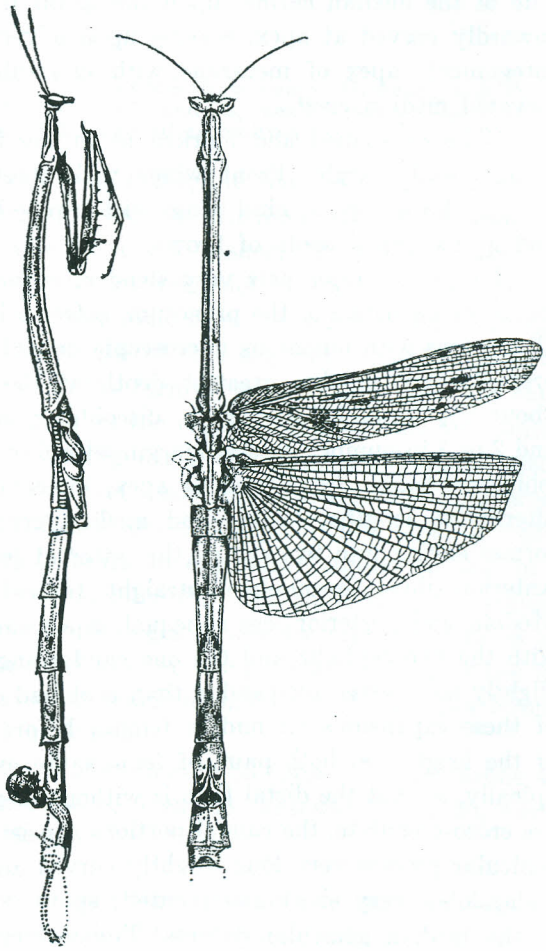

Fig. 1. — *Toxodera maculata* OUWENS. (Slightly reduced).

upwards, but very much shorter and less pointed than in *T. denticulata*. Antennae pale yellow (incomplete), simple.

Pronotum very long and slender, three times longer than the anterior femora; prozone 6½ times shorter than the metazone; supra-coxal dilatation moderate. Prozone dirty yellowish, straight in profile view, widened apically; lateral margins provided with numerous small denticles of equal size. Dorsal surface convex, with a fine median longitudinal ridge over the entire length, on each side of which runs a second, slightly thicker ridge, terminating before the end of the prozone; the distal third with a second pair of incomplete ridges, one on each side of the median carina and ending before the middle of the prozone. Metazone pointed-triangular in cross-section, acutely ridged dorsally, very slightly bent in profile view; median and lateral carinae with microscopic denticles along their entire length, lacking any tubercles; surface rather smooth, with very irregularly placed microscopic denticles; basal sixth dirty yellow, then fading to brownish towards the middle, and finally greyish-yellow in colour. A fine, black, undulated line, about 5 mm in length, is placed on either side of the median carina, upon the distal fifth of the metazone; this line is inwardly curved at apex, ceasing upon a very low tubercular swelling of the integument; apex of metazone with two tubercles, one on each side of the elevated median crest.

Wings shaped and marked as in the figure; membrane hyaline except along costal margin. Front wings with three groups of very distinct, dark mummy-brown spots; hind wings with a pale brown streak along costal margin and a few apical spots of brown.

Legs: Anterior pair very slender; coxae slightly less than one-third the length of metazone of the pronotum, extreme base with two short spines below, all margins with numerous microscopic denticles; femora slightly arcuate, compressed, very slender, greatest depth at the proximal fourth and contained about 6½ times in the length, discoidal spines placed at the greatest depth and 2 or 3 in number, lateral margin with 6 or 7 regularly placed spines, diminishing in length from base to apex, internal margin with 13 spines of two alternating lengths; lateral and median genicular lobes well developed, the former ending into two spines, the latter at least three times longer, spiniform. Anterior tibiae (incomplete) straight, (apical claws wanting; tarsi wanting). Median and posterior legs subequal in size and very similar in form; femora with the two cephalic and the one caudal angle bearing foliaceous expansions, slightly more extensive caudad than cephalad on middle femora; greatest width of these expansions on middle femora before, on posterior femora at middle of the length; on both pairs of femora the expansions are suddenly narrowed apically, so that the distal fifth is without them; the margins of the expansions are eroso-crenulate, the caudal portions consisting of two distinct parts; median genicular process very long, slightly curved and acutely spiniform, lateral genicular lobes very short and pointed; spurs extremely slender, equal in length to the median genicular process. Tibiae very slender, sub-setiform, unspined

except the terminal setae, which are unequal in length; middle tibia almost straight, posterior tibia distinctly curved. Metatarsi slightly less than a third of the length of tibiae. Colour pale brownish-yellow, marked with dark blackish-brown on the femora, as is shown in fig 1.

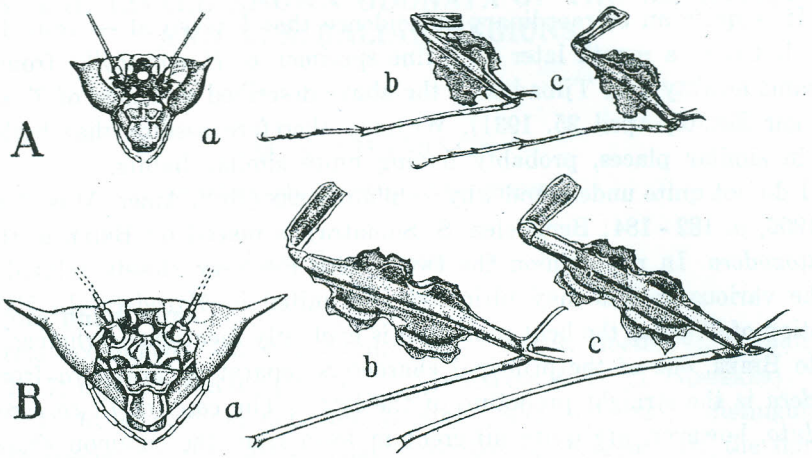

Fig. 2. — Structural details of A, *Toxodera maculata* OUWENS, and B, *T. denticulata* SERV. a, frontal view of head; b, median leg; c, posterior leg. (Tarsi of *T. denticulata* omitted).

Abdomen elongate, subequal in width, the five proximal segments distinctly longitudinal; apical margin of the five proximal sternites rounded and only very little produced at middle, each with a short distal median keel; 1 - 2 tergite with very small triangular median tonguelet at apex, third tergite with two small and narrow foliaceous blades bent over the dorsum and reaching as far cephalad as one-fourth of the length of this segment; fourth tergite with a high foliaceous structure placed in the form of an inverted V on the caudal section and about two-thirds as high as the segment is long; the two sides of this structure unite on their converging edges and bear a foliaceous median lappet which is strongly turned over and whose upper margin is much eroded, bearing slender filaments at apex. Remainder of segments only partly preserved. In OUWENS's figure the fifth tergite bears an appendage similar to that of the fourth segment but much smaller and narrower; the sixth to ninth segments are transverse and small, without appendages. The subgenital opercule is produced and spoon-shaped and the cerci are very long, about as long as the fifth segment, lanceolate-foliaceous, greatest width at middle with the apex strongly excised, the tips being unequal in length.

Length: body (incomplete) 115; pronotum 53 (prozone 7, metazone 46); front wing, costal margin 47; hind wing, idem 43; anterior femur 20, median femur 11.2, posterior femur 11.5 mm.

From our sketches of the head and the posterior two pairs of legs, it is obvious that *maculata* OUWENS is abundantly distinct from *denticulata*, with which it is not very closely related. As stated before, *T. maculata* bears a

striking superficial resemblance to *Paratoxodera cornicollis,* from which it differs, apart from the generic characters, by the much less pointed eyes, the absence of apical foliaceous processes of the first to third abdominal sternites, the different wing-markings and the entirely different configuration of the mid and hind femora.

It is quite an extraordinary coincidence that I received — from the same lady, but only a month later — a fine specimen of *P. cornicollis* from exactly the same locality near Tjibadak as the above described specimen of *T. maculata* (Sinagar Estate, April 25, 1931). We may therefore assume that both species live in similar places, probably having quite similar habits.

I do not quite understand why *T. pluto* REHN (Bull. Amer. Mus. Nat. Hist., 26, 1909, p. 182 - 184; Benkoelen, S. Sumatra) is placed by BEIER in the genus *Paratoxodera.* In my opinion the two genera are very closely related and all of the various species may ultimately be united in *Toxodera.* In REHN's description of *T. pluto* the bent pronotum is explicitly mentioned, whereas, according to BEIER, one of the principal characters separating *Toxodera* from *Paratoxodera* is the straight pronotum of the latter. The cerci of *P. cornicollis* and *T. pluto,* however, are quite different in form from the common shape found in such species as *T. denticulata, integrifolia* and *maculata.* I am inclined to consider the shape and length of the cerci in the *Toxoderinae* as of specific importance, rather than to ascribe generic value to the structure of these organs.