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NOTES ON THE TYPES OF GNATHOCLITA VORAX (STOLL) (TETTIGONIIDAE, PTEROPHYLLINAE)

ORTHOPTEROLOGICAL NOTES VI ¹⁾

by

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With 1 plate, 15 text-figures, and 1 table

A remark of one of my colleagues that the ♀ of *Gnathoclitia vorax* (Stoll) is still unknown, urged me to find out whether this was true, as I remembered to have seen both ♂ and ♀ specimens in the collections of the Rijksmuseum van Natuurlijke Historie, Leiden, and of the Naturhistorisches Museum, Vienna. Furthermore, Beier (1960: 240) remarked recently of *G. vorax* that the type is lost ("Typus verschollen"). Fortunately I can state now that the male type of Stoll's *Gryllus Acheta vorax* is still present, though slightly damaged. In the Leiden collection there are, apart from this type, more specimens of the species, one ♂ and one ♀; both bear a label in the handwriting of W. de Haan, who from 1822 to 1846 was curator of the invertebrate collections of the museum.

De Haan was the first to give a description of the female of *G. vorax*; unfortunately, however, this description is only partially valid as De Haan's specimen appears to have been repaired to give it a better appearance. This often was done in the old cabinets of natural curiosities like those which formed the beginning of the Leiden Museum. Although we cannot get any certainty on this point, I presume that the reparation was done before De Haan studied the specimens. In 1861, de Saussure (1861: 129) already noted something wrong with De Haan's diagnosis. Later authors either copied the old data or described fresh specimens. These last-mentioned descriptions differ from De Haan's data.

I had the opportunity to study some recently caught specimens, as well

1) Orth. Notes IV, Zool. Verh., 45: 1-70, figs. 1-12 (1960).

Orth. Notes V, Zool. Meded., 39: 249-256, figs. 1-5 (1964).

as modern literature, and from these sources I will try to elucidate De Haan's diagnosis.

I want to express my thanks to Dr. D. C. Geijskes, Leiden, and to the directors of the Zoological Museum at Amsterdam, and the Rijksmuseum van Natuurlijke Historie at Leiden, for allowing me to study specimens of their collections. Dr. F. M. H. Willemse, Eygelshoven, was kind enough to permit me to use a photograph made by him of this species for the present paper; this photograph has been published previously by his father, Mr. C. Willemse (1950) in a paper which is not easily accessible. Furthermore I owe information on historical data to my colleague Dr. L. B. Holt-huis.

***Gnathoclita vorax* (Stoll, 1813)**

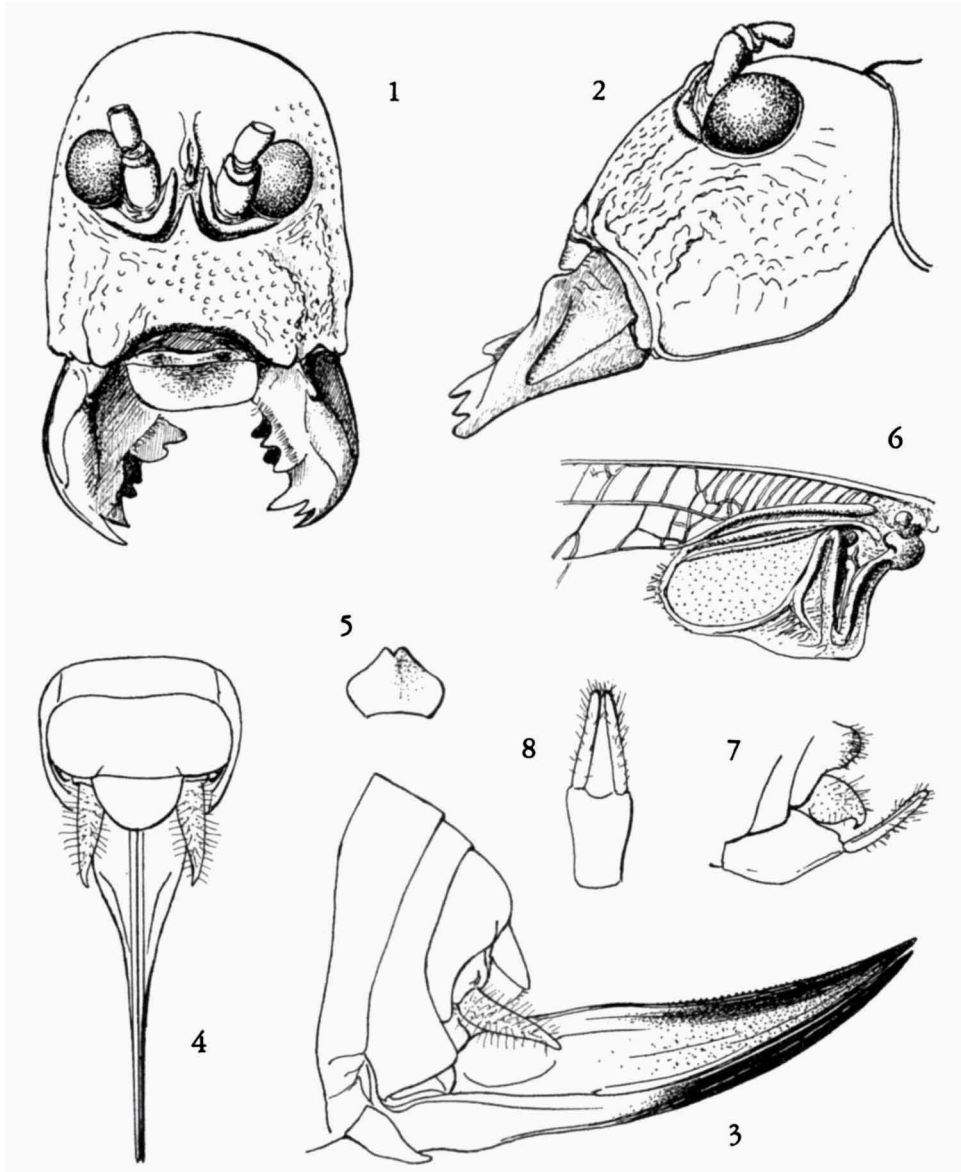
(figs. 1-15, pl. 1)

- 1813 *Gryllus Acheta vorax* Stoll, Spectres, etc.: 8, pl. 4c figs. 19, 20. (♂)
 1839 *Anostostoma vorax*; Serville, Ins. Orth.: 389, pl. 8 fig. 3. (♂)
 1842 *Locusta (Gnathoclita) vorax*; De Haan, in: Temminck, Verh., Orth.: 208. (♂ and ♀)
 1861 *Gnathoclita vorax*; Saussure, Rev. zool., Paris, (2) 13: 130.
 1895 *Gnathoclita vorax*; Brunner von Wattenwyl, Mon. Pseudoph.: 179, pl. 7 fig. 82. (♂)
 1906 *Gnathoclita Vorax*; Kirby, Syn. Cat. Orth., 2: 330.
 1921 *Gnathoclita vorax*; Carl, Rev. Suisse Zool., 28: 307.
 1950 *Gnathoclita vorax*; Willemse, C., Año Libert. Gral. San Martin, Arthr., 1: 244, figs. 1-2. (♂)
 1956 „roofsprinkhaan met formidabele kaken”, Kielich, in Panorama, 43 (7): 41, fig.
 1960 *Gnathoclita vorax*; Beier, Tierreich, 74: 240, fig. 146. (♂)
 1963 *Gnathoclita vorax*; Beier, Orth. Cat. 5: 182.

The type specimen of *Gryllus Acheta vorax*, a ♂, described by Stoll in 1813, formed part of the collection of Mr. Joan Raye van Breukelerwaert¹⁾. It came into possession of the Rijksmuseum van Natuurlijke Historie, when, in July 1827, the collection was publicly auctioned. On page 77 of the auction catalogue of the Raye van Breukelerwaert collection is listed under no. 379 a lot indicated as “Monstrosa, Vorax, Campestris Achatina, etc. 9 ex.” With other lots it was placed under the heading “Genus Gryllus, Locusta, Acheta”. In De Haan's copy of this catalogue, now in the library of the Rijksmuseum van Natuurlijke Historie, there is a pencil note in the margin with this lot, indicating that lot no. 379 was bought for one and a half Dutch guilders.

In 1842 De Haan gave a new description of the species, in which he referred to: “Specimina Stollii” and “. . . in utroque sexu”. From this I infer

1) This collection was built up during the 18th century. In 1778 Voet described Coleoptera from it, and in 1787-1815 Stoll described a number of Orthoptera.



Figs. 1-8. *Gnathoclitia vorax* (Stoll). 1, ♀ mentioned by De Haan, head, incomplete; 2, do., head, lateral view; 3-5, do., abdominal appendages, 3, lateral view, 4, dorsal view, 5, subgenital plate; 6, 2nd ♂ of old series, basal part of left tegmen; 7-8, ♂ from Lucie River, abdominal appendages, lateral and ventral views, respectively. 1-8, X 5.

that there were more than one specimen (and at least a ♂ and a ♀) present in Mr. Raye van Breukelerwaert's collection.

Serville's paper is of no interest in this study as he only placed *vorax* in his genus *Anostostoma* (Stenopelmatidae) because of the big mouthparts. His figure is a poor copy of Stoll's.

De Haan's (1842) description of the legs of his specimens runs as follows:

"Tibiarum foramen maris utrinque rimaeforme, feminae non distinguendum. Femora antica et media maris 4-spinulosa, femina inermia; postica infra medium dilatata, ultra medium in utroque sexu quadrispinosa, in feminis longiora. Tibiae anticae maris quadriseriatim spinosae, spinis brevibus, fortibus; feminae infra biseriatim spinulosae; posticae spinis quadriseriatim. Tarsi dilatati maris 4-articulati, articulo primo et secundo longitudine aequali; feminae 3-articulati, articulo postremo valde producto plantula magna instructo, in maribus vix distinguenda . . ."

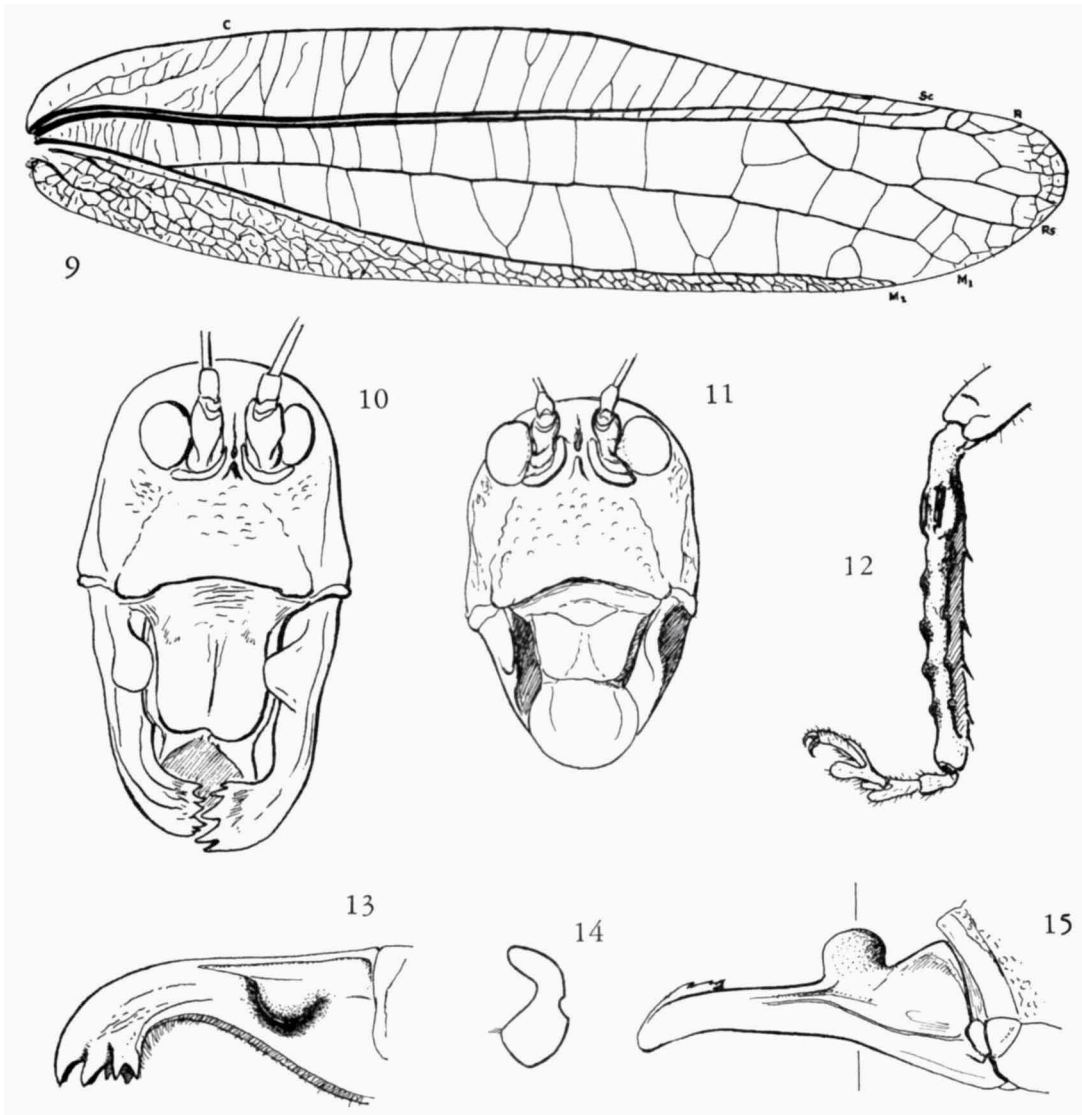
De Saussure (1861) criticized De Haan's description of the armament of the legs as being incorrect, and indicated that they were equal in both sexes.

Later Brunner von Wattenwyl (1895: 179, fig. 82) gave a brief description of the male, as well as a fine figure. A more extensive description, also of a ♂ specimen, is found in C. Willemse's paper of 1950.

The first to give more information on the female is Beier (1960: 241). As Beier's records agree in general with De Saussure's brief information, and are based on a number of specimens in the Vienna Museum, which I could see in 1966, it was rather easy to see that the legs of the "♀ type specimen" did not belong to that specimen, and not even to the species. Though I have not yet been able to find out to which species they do belong, it is clear that the description of the legs of the ♀ in De Haan's paper should be ignored.

Generally, authors dealing with the species, figure the ♂ which, indeed, is a strange creature. When preparing the figures for this paper I first drew details of De Haan's ♀ and then some details of other available specimens.

In a paper in the little known South American periodical "Año del Libertador Gral. San Martín", section Arthropoda, 2, C. Willemse (1950) published an illustrated account of a male collected by Dr. D. C. Geijskes in Surinam. I obtained permission from Dr. F. M. H. Willemse, son of Mr. C. Willemse, to take some data from that paper, and to use the original of his photograph already published in that paper. The same photograph also appeared in a weekly in the Netherlands (Kielich, 1956). The specimen



Figs. 9-15. *Gnathoclitia vorax* (Stoll). 9, De Haan's ♀ specimen, right tegmen; 10, ♂ from Brazil, face; 11, ♀ from Surinam, Lucie River, face; 12, ♀ from Brazil, anterior tibia and foot; 13-15, 2nd ♂ of old series, right mandible, 13 and 15, dorsal and lateral views, respectively, 14, transverse section as indicated. 9, × 3; 10-15, × 5.

was caught by Dr. D. C. Geijskes, who placed a second ♂ specimen at my disposal for this study.

The specimens under consideration are mentioned here:

Leiden Museum

America: 1 ♂ (holotype), 1 ♂ and 1 ♀.

Zoological Museum, Amsterdam

Surinam: Lucie River area, vii. 1926, 1 ♂ and 1 ♀.

Brazil: Rondonia, Rio Jacunda, v. 1964, leg. E. N. Bom, 1 ♀.

Collection Geijskes, in Leiden Museum

Surinam: Upper Nickerie River, v. 1964, leg. R. van Aarde, 1 ♂.

Collection Willemse, in Natuurhistorisch Museum, Maastricht

Surinam: Bakhuis Mts. (N. Pt.), Line vi, Km 17.3, 3rd camp, 31.xii.1943,
1 ♂ (the details of this specimen in the table were taken from Willemse's
paper).

Vienna Museum

Surinam and British Guiana: Beier's description was made from a number
of specimens in the Vienna collections; I took the data from his paper
(1960: 241).

A study of all specimens available and the comparison of the various
details discussed by former authors, especially the armament of the legs,
provided data that are given in the table on p. 295. From that table it shows
clearly that the Leiden ♀ differs from other ♀ specimens studied in the
number of thorns on the legs. The characters of this aberrant female are
also found in De Haan's (1842) description of the species.

The first thing that struck me when examining the front legs of this ♀
was the absence of auditive organs on the tibiae, not even traces of foramina
were present. This is very strange in a species where the ♂ possesses a very
distinct stridulation apparatus (fig. 6). Further these anterior legs show a
set of spines very different from that found in the ♂. When some time
afterwards I could study another ♀ specimen, and Beier's data, I observed
that the differences from the ♂ in the armament of the legs were almost
negligeable, and that, like in the male, the ♀ possesses two rows of some-
what swollen thorns on the frontal face of the tibiae (fig. 12). Though in
my opinion these differences are sufficient to make it likely that the body
and the legs of De Haan's specimen do not belong together, the thin rows
of small black, hairlike thorns near the base of the ventral surface of the
anterior tibiae, a character so far not found in any species of the genus, nor
in those of related genera, really convinced me that something was wrong
here. On closer investigation under strong magnification, I found that the

<i>Gnathoclitia vorax</i> (Stoll)	♂, type specimen, Stoll, "America" (Leiden Museum)	♂, (remains of 2nd specimen) "America" (Leiden Museum)	♂, Surinam, Upper Nickerie River (collection Geyskes)	♂, Surinam Exped., Lucie River area (Amsterdam Museum)	♂, Brazil, Rio Jacunda (Kondonia) (Amsterdam Museum)	♂, Surinam, Bakhuis Mts. (collection Willemse)	♂, details given by C. Brunner von Wattenwyl, 1895	♂, details given by M. Beier, 1960	♀, mentioned by De Haan, "America" (Leiden Museum)	♀, Surinam Exped., Lucie River area (Amsterdam Museum)	♀, details given by M. Beier, 1960
measurements in mm.											
3-4 means left 3, right 4											
inc. = incomplete											
miss. = missing											
l = left r = right											
ext. = external margin											
int. = internal margin											
Total length (frons to tegminal tip when closed)	57½	55	56	55	59	58	—	—	62½	62	—
length body	—	—	—	—	—	39	40	39/42	—	—	58
length tegmina	43	41	41	41	43	42	39	39/42	47½	57½	48
breadth tegmina	10	10	8½	10	10½	9	10	—	11	10	—
length wings	39	38	36½	37½	38	40	—	—	45	43½	—
length prothorax	8½	8½	8½	8	8	9	8	8/9	10	9	9
breadth prothorax	8½	9	9	9	8½	8½	—	—	9	9	—
length head (vertex to mandibular tip)	22½	20	18	20	19	20	—	—	16	16	—
breadth head near mandibular basis	12	11	11	12	12	11½	—	—	10	10	—
length antennae	inc. ¹⁾	inc.	inc.	79	inc.	miss.	—	—	inc.	65	—
length anterior femora dorsal surface smooth	17	miss.	16	16	15	16½	15½	14½/16½	13½	16	16
ventral thorns, int.	4-3	—	3-4	4-4	3-3	4-4	4-4	3/4	—	3-4	3-3
length anterior tibiae dorsal inflations ext.	15	—	15	16	15	15	—	—	14½	16	—
dorsal inflations int.	4-4	—	4-4	4-4	4-4	4-4	3-4	3/4	—	4-4	4-4
ventral thorns ext.	4-4	—	4-4	4-4	4-4	4-4	4-3	3/4	—	4-5	4-4
ventral thorns int.	7-6	—	7-7	7-7	5-6	6-6	—	—	7-7	7-7	—
length middle femora dorsal surface smooth	17	inc.	16	15½	15	15	—	—	13½ ²⁾	15½	—
ventral thorns ext. in apical half	0-3	4-3	4-3	3-4	3-3	3-3	4-4	3-3	—	2-3	3-3
length middle tibiae dorsal thorns int.	17½	miss.	16	16	15	15	—	—	14	16	—
ventral thorns ext.	0-3	—	4-3	2-2	1-1	2-2	—	—	—	1-2	—
ventral thorns int.	7-9	—	7-7	7-9	7-8	8-8	—	—	7-7 ³⁾	8-7	—
length posterior femora ventral thorns ext.	2-9	—	6-7	6-6	6-6	7-7	—	—	8-7 ³⁾	6-7	—
length posterior femora ventral thorns ext.	26	26	25	26	24½	26	25	24½/26	28	27	27
length posterior tibiae dorsal thorns ext.	5-4	5-4	5-4	4-5	4-4	5-5	5-5	4/5	5-4	6-6	4/5
dorsal thorns int.	26	26	25½	26	25	25	—	—	28	29	—
ventral thorns ext.	3-3	3	3-3	3-4	3-3	4-3	—	—	3	4-2	—
ventral thorns int.	8-6	9	8-6	9-8	9-10	8-8	—	—	9	6-7	—
length ovipositor	6-7	5	6-7	7-8	10-10	10-11	—	—	8	7-9	—
	6-7	7	6-7	7-8	7-6	6-7	—	—	7	6-4	—

1) sec. Stoll: 6''

2) ♀ middle tarsi 4-jointed.

3) in apical part.

legs had been glued to the body, possibly not in the first place to repair the specimen but to give it a better show in the collection! The other legs, too, appeared to have been glued to the body. Therefore I cannot be certain that they are genuine, the more so as De Haan mentioned a difference in the tarsi of the ♂ and the ♀ of the species: 4-jointed in the ♂, and 3-jointed in the ♀. From a study of fresh material it is clear that this again is not in accordance with reality. So we must accept the fact that all legs in the old ♀ specimen belong to a different species from another group of Tettigoniids. Perhaps it will be possible later on to find out from which species these legs were taken to carry out the "restoration". An additional mistake is the use of intermediate legs to replace the anterior ones, but in those days, nearly two centuries ago, much less was known about these interesting insects, so that this slip is understandable.

When studying the data of the table, and comparing them for the various specimens, the number of thorns on the left middle leg of the ♂ type specimen appeared very different from all other ♂ middle legs. As these data are not given by De Haan I fear that this character also has escaped attention for two centuries. This leg, too, appears to have been restored, but the other legs are genuine.

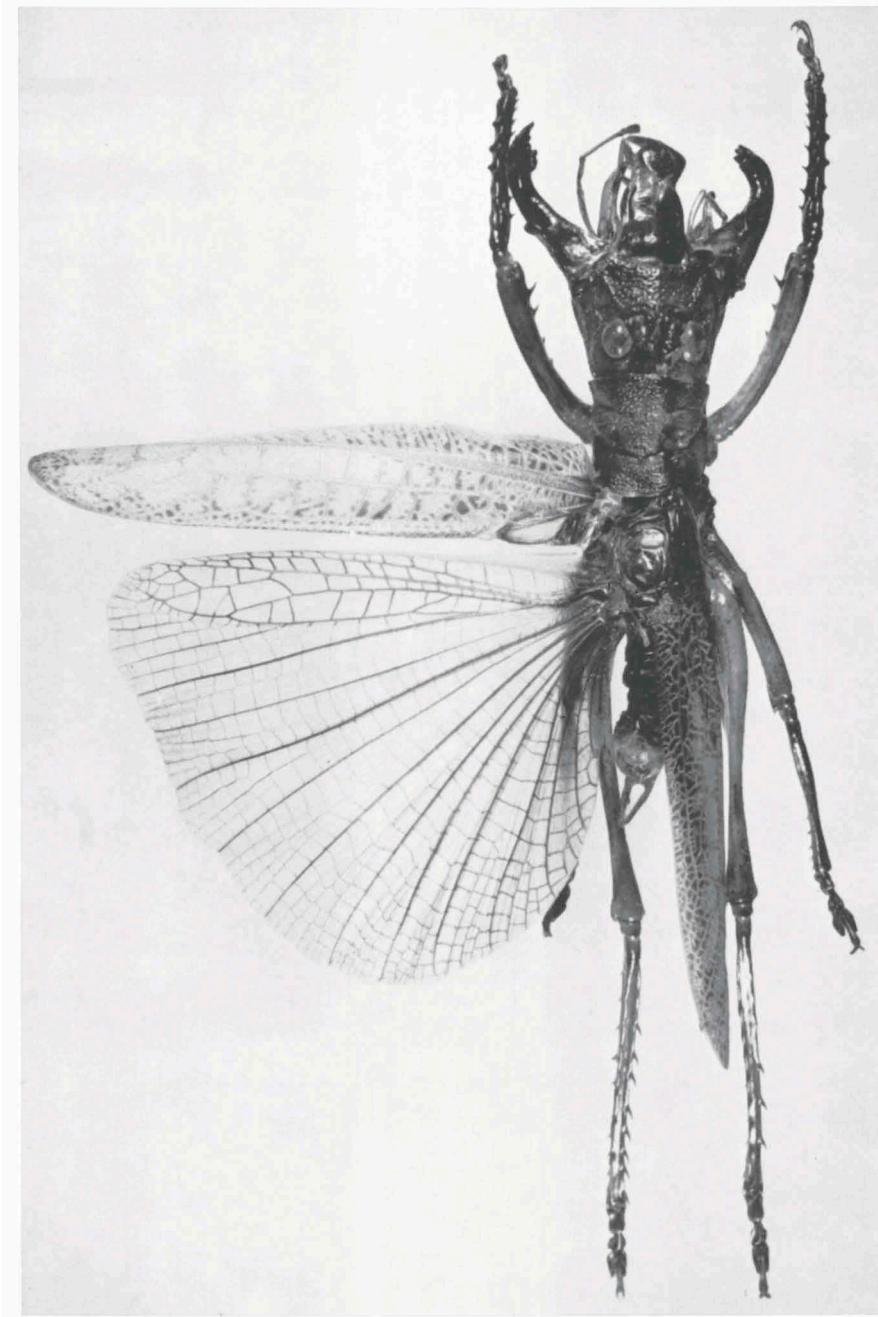
Stoll, Brunner von Wattenwyl, and Willemse only described the ♂ of this species, but Beier (1960: 241) gave a very good description of ♀ specimens, which apart from the legs, fits De Haan's ♀ specimen very well, even in the details. From Beier's (1960) description I quote here a few lines, especially as I took the pains to make a few figures of details of our specimens:

"... Männliches Endtergit behaart, depress, hinten flach trapezförmig ausgeschnitten. Cerci des Männchens mit dicker Basis und dünnem Apikalteil, rübenförmig, mit kleinem Enddörnchen. Männliche Subgenitalplatte kurz, distal kaum verschmälert, terminal sehr flach ausgeschnitten, die Styli mässig lang, mediodistal ein wenig ausgehöhlt. Weibliche Subgenitalplatte ziemlich breit dreieckig, terminal gebuchtet ausgeschnitten. Ovipositor kurz, kaum aufgebogen, allmählich zugespitzt..."

I have figured the head (figs. 1 and 2), the right tegmen (fig. 9), and the abdominal end (figs. 3-5) of the mentioned ♀ specimen, as well as the head of two "modern" specimens (figs. 10, 11) and an anterior leg (fig. 12). Further I figured the abdominal end of a male (figs. 7, 8). Fig. 6 represents the stridulation organ of the 2nd ♂ specimen from Raye van Breukelerwaert's collection. The remaining figures 13-15 show the jaws of the same specimen, fig. 14 represents a transverse section through a jaw about in the middle. In figs. 1 and 2 the labium is missing like in the specimen now.

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Gnathoclista vorax (Stoll), ♂ from: Surinam, Bakhuis Mts.

Phot. Dr. F. M. H. Willemse