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GENERIC CHARACTERS OF THE SOUTH AMERICAN CORDULIIDAE,

WITH DESCRIPTIONS OF THE SPECIES FOUND IN THE GUYANAS

Notes on Odonata of Surinam XI

by

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This study contains the results of an examination of the Corduliidae found in the Guyanas. It is based on a critical study of the data as published mostly in the older literature and on the identification of the material brought together in Surinam in the years 1940 to

1965 by Mr. J. BELLE and myself, beside some specimens picked up in French- and in (Br.) Guyana. Comparison of three types in the SELYS collection in the Brussels Museum, of one in the FRASER collection in the British Museum (Nat. Hist.) in London and of one kindly received from the Museum in Berlin was necessary to eliminate further confusion. It now became clear that, so far as the material goes, one genus (here described as new) belonging to the Gomphomacromiinae and two genera of the Corduliinae inhabit the Guyanas. Among these the female allotype of *Paracordulia sericea* Selys is described and of the genus *Aeschnosoma* the male allotype of *Ae. elegans* Selys and *Ae. auripennis* as a new species in the female sex only, whereas the larva of *Ae. forcipula* Selys and of *Ae. auripennis* n. sp. are described for the first time.

It is a well known fact that the Corduliidae are poorly represented in South America, in contrast with North America and the Old World, where they are represented by numerous genera and a great number of species. In his well known work on the Odonata in *Biol. Centr. Am.* (1892–1908), CALVERT states the practical absence of this group in the present fauna. RIS (1918) arrives to the same conclusion in his study on the Odonata of the South American Cordilleras, when he says that the Corduliidae in that region are very poorly represented in comparison with the other families. COWLEY (1934) mentions that among 700 specimens of dragonflies, received from Perú, there was but one Corduline. In our collection of about 20,000 specimens of Odonata from Surinam, the total number of Corduliidae imagines amounts to no more than 50, that is 0.2%.

In spite of their meagre representation, the neotropical species are not well studied. This may be partly due to their scarcity in collections as a result of their rare occurrence in the field. We have to keep in mind that most of the species are very swift flyers, inhabiting mountain streams and rivers in often hardly penetrable jungle. However, some species as *Rialla villosa* (Rambur) and *Gomphomacromia paradoxa* Brauer seem to be not uncommon in the Andean area. In the Guyanas *Aeschnosoma forcipula* Selys is the more common species, inhabiting slowly running creeks in the savanna lowlands.

Biological data on the neotropical Corduliidae are very scarce too. Of *Rialla villosa* the larva was described by NEEDHAM (1943) while in the present contribution those of two species of *Aeschnosoma* are dealt with, but none of the others are known in their earlier stages.

Concerning their distribution it may be noted that the Gomphomacromiinae are more limited to the western Andean region and the Corduliinae to the eastern Brazilian and Guyanean lowlands. However, in both groups exceptions occur.

By working out the systematic position of the species, it proved that the indication of the genera is weak and incomplete. The classification of SELYS (1871, 1882) is out of time as well as that given by MARTIN (1907), who has followed SELYS for the greater part. On the other hand his monograph of the family is still useful for the identification of many species, in spite of its imperfection and inaccuracy. The renewed classification of the family by WILLIAMSON (1908) shows a division into five groups, based on the phylogenetic development of the wing venation as worked out by NEEDHAM (1903). At the same time NEEDHAM (1908) draws special attention to the development of the anal loop in the hind wing. He gives a key to the genera of the Corduliinae sl. of the world, arranged under two subfamilies: Macromiinae and Corduliinae s. str., a division already proposed by SELYS (1871). TILLYARD & FRASER (1940) distinguish in their new classification of the Order Odonata eight subfamilies and FRASER (1957) in his renewed addition six. Among these the neotropical genera are comprised in two subfamilies: Gomphomacromiinae and Corduliinae.

The classification of the neotropical Corduliidae has never found special attention. Although in this respect the notes of COWLEY (1934) are helpful, the scattered descriptions of new species form the only addition to our knowledge. Under these circumstances there was no clear insight in the present genera nor in their definition. In the following it is attempted to give a practical key for the identification of the genera with a description of their characteristics. The available material was not yet adequate to give a general revision of all the members of this family known to occur in the neotropical region.

I am much indebted to the following persons and institutions: Dr. M. A. LIEFTINCK (Mus. Leiden) for the inspection of the type of *Gomphomacromia dubitalis* Fraser during his stay in London in October 1967, for his critical notes and his help beyond praise with the literature; Drs. J. BELLE (Arnhem) for allowing me to study his collection of Surinam *Aeschnosoma*-specimens and larvae; the Netherlands Foundation for the Advancement of Tropical Research (WOTRO) in The Hague for the grant to start this study; Dr. K. K. GÜNTHER (Mus. Berlin) for sending the type of *Aeschnosoma rustica* Selys; the Direction of the Brussels Museum for the permission to examine the types in the SELYS collection; Dr. P. J. DARLINGTON Jr. (Harvard University, Cambridge, Mass.) for sending the type of *Dorocordulia errans* Calv.; Dr. L. L. PECHUMAN (Cornell University, Ithaca, N.Y.) for the loan of a *Dorocordulia* female specimen from the NEEDHAM collection. To all of them my sincere thanks.

KEY TO SUBFAMILIES AND GENERA OF NEOTROPICAL CORDULIIDAE

1a. Triangles and subtriangles free; triangle of hind wing slightly distal to the arculus (not retracted); sectors of arculus connected at origin for some distance in hind wing; more than one cell between distal end of anal loop and hind margin of wing . . . . . Gomphomacromiinae 2

1b. Triangles in fore wing crossed or free, subtriangle made up of 2 or 3 cells; triangle of hind wing at arculus or just proximad; sectors of arculus separated or connected at origin; mostly one cell between end of anal loop and hind margin of wing . . . . . Corduliinae 4

2a. Two rows of cells throughout in discoidal field of fore wing; veins M_3 and M_4 of forewing parallel sided or but slightly divergent at the wing margin; anal loop elongate, sometimes truncated at the apical end, reaching level of middle fork of M or more distal, bisector distinct; anal area in hind wing with 3–4 rows of cells. Appendix inferior of male oval triangular, apex truncated, tip often bifid; male abd. segm. 8 in some species with a protuberance beneath; female vulvar scale not or slightly prolonged, shorter than 9th segment . . . . . *Neocordulia* Selys

2b. One row of cells in discoidal field of fore wings, widened at the end into 3–4 cellrows. Anal loop abbreviated, not or hardly passing level of triangle, bisector not distinct; anal area in hind wing with 2 rows of cells. 3

3a. Male appendix inferior quadrangular; no middorsal spine on abd. segm. 10; female vulvar scale on segm. 8 extremely prolonged, split into two lobes, passing end of abdomen . . . . . *Gomphomacromia* Brauer

3b. Male appendix inferior triangular; abd. segm. 10 bearing a very robust cone-like middorsal spine; abd. segm. 8 with a small conical protuberance beneath (female not known) . . . . . *Lauromacromia* g.n.

4a. No supra-triangular cross-veins; triangles crossed or free; one cubital cross-vein in fore- and one or sometimes two cross-veins in hind wing; M_3 and M_4 not undulate. 5

4b. Supra-triangular cross-veins present; all triangles and subtriangles crossed in two or in three cells; two or more cubital cross-veins in both wing pairs; M_3 and M_4 undulate 7

5a. Triangle in fore and in hind wing crossed; sectors of arculus separated at origin in both wing pairs; discoidal field in fore wing parallel-sided or but slightly narrowed to the end, two rows of cells in the proximal, three rows in the distal part; nodus at halfway length of fore wing, 7–9 antenodal cross-veins in fore wing and 5–6 in hind wing; one cubital cross-vein in fore wing and one or two in hind wing; anal loop elongate, apical end slightly truncated, two cells in first row of anal loop; three rows of cells in anal area; membranule long and dark. Female vulvar scale large triangular, split at tip to half its length . . . . . *Rialla* Navás

5b. Triangle in hind wing free; two rows of cells in discoidal field of fore wing; one cubital cross-vein in both wing pairs; anal loop elongate, slightly truncated at distal end, the heel at level of middle fork of M; anal area with two or three rows of cells. Membranule of normal size, not extremely long 6

6a. Triangle in fore and in hind wing free; sectors of arculus in hind wing not connected at origin; nodus in fore wing a little distal of mid-length 7–8 antenodals in fore wing and 5 in hind wing; two cells in first row of anal loop; 2–3 rows of cells in anal area

of hind wing. Male appendages sup. not or a little longer than abd. segm. 9 + 10, subcylindrical, apex blunt or pointed, underside with or without basal tooth; app. inf. almost as long as app. sup. or shorter, triangular, tip rounded. Female vulvar scale prolonged in maximum to halfway segm. 9, rounded, excavated in medium . . . . . *Dorocordulia* Needham

6b. Triangle in fore wing crossed, in hind wing free; sectors of arculus in hind wing connected for some distance; nodus in fore wing at 3/5 length of wing; 10–11 antenodals in fore wing and 6–7 in hind wing; apical end of anal loop slightly truncated, three cells in first row; two rows of cells in anal area of hind wing. Male app. sup. much longer than app. inf., tips bluntly rounded, curved inward. Female vulvar scale prolonged to halfway segm. 9, triangular, tip pointed. . *Paracordulia* Martin

7. Nodus in fore wing in distal half of wing length; 11–20 antenodal cross-veins and 5–11 postnodal cross-veins in fore wing, 7–14 and 8–14 in hind wing; between M_1 and M_2 in fore wing two rows of cells starting under stigma or more distad, in hind wing half-way between nodus and pterostigma; sectors of arculus connected at origin, especially in hind wing; cubital cross-veins 3–6 in fore wing and 2–4 in hind wing; discoidal field in fore wing widened at the end against wing margin; anal loop elongate, apical end truncated, reaching level of middle fork of M, first row with 2–3 cells; anal area in hind wing with 2–4 rows of cells. Male appendix inf. triangular, simple, tip pointed. App. sup. long, as long as app. inf. or twice as long, tips bluntly rounded. Female vulvar scale not prolonged, small . . . . . *Aeschnosoma* Selys

Genus **Neocordulia** Selys

Neocordulia SELYS, 1882. Comptes-rendus Soc. Entom. Belg. *26*: 98.
Neocordulia, MARTIN, 1907. Cordulines Cat. Coll. Zool. Selys Longchamps *17*: 48.

Diagnosis: Metallic green species of moderate size (abd. 34–39 mm), marked with yellow-brown spots and stripes. Eyes narrowly

or for some distance connected on top; occipital triangle large. — Synthorax of normal size, with metallic green reflections. — Wings large, hind wings 34–38 mm long and 11–13 mm wide, hyaline with small yellow basal spots, venation with a dense net-work of cross-veins, pterostigma long, approximately 4–5 times as long as broad. Nodus at mid-length of fore wing and some less in hind wing. Veins M_3 and M_4 in fore wing parallel sided, but slightly divergent at the wing margin. Discoidal field in fore wing with two rows of cells throughout. Triangles and subtriangle free, triangle in hind wing distal from arculus; sectors of arculus fused at base. Cubital cross-veins one in fore wing and two in hind wing. Anal loop long, reaching to level of middle fork of M or more distad, consisting of two rows of cells, divided by a distinct midrib, sometimes a little widened at the distal end. Two or three cells between end of anal loop and wing margin; anal area with three or four cell-rows. Anal triangle in male well developed, 2-celled, hind angle of anal area not curved inward. Membranule short. — Abdomen somewhat swollen on the first two segments and in the males more or less dilated in the last four segments. Male appendices sup. short truncated, bluntly pointed, shorter to nearly twice as long as app. inferior, the last one broad triangular, apex truncated and often bifid. Male abd. segm. 8 in some species with a protuberance beneath (*N. setifera* Hagen). Male genitalia on segm. 2 with protruding lamina anterior and hamulus. Female genitalia: vulvar scale slightly prolonged but shorter than 9th segment, broad, in its middle divided to the base by a narrow triangular excavation (*N. batesi* Selys).

Type-species: *N. androgynis* Selys. – Five species known.

Distribution: Brazil (Minas Gerais, Rio de Janeiro, Upper Amazon), Ecuador, Costa Rica.

Genus **Gomphomacromia** Brauer

Gomphomacromia Brauer, 1864. Verh. zool. bot. Ges. Wien *14*: 163 (generic char. and descr. type-species *G. paradoxa*)

Gomphomacromia, Brauer, 1866. Reise d. Novara, Neur.: 80–83 (idem in ext., Tab. II fig. 5 habitus and app.♂ *G. paradoxa*).

Gomphomacromia, Selys, 1871. Bull. Acad. Belg. (*2*) *31*: 309 (gen char. in comb. w. 3 sp. *Neocordulia*).

Gomphomacromia, SELYS, 1882. Comptes-rendus Soc. Ent. Belg.: 1–8 (gen char. based on *G. paradoxa* and *G.fallax*).

Gomphomacromia, MARTIN, 1907. Cordulines Cat. Coll. Zool. Selys L. *17*: 48, 55, 56, fig. 73 (wings ♂ *G. paradoxa*).

Gomphomacromia, RIS, 1918. Arch. f. Naturgesch. *82*: 174–176, fig. 111 (♀ genitalia *G. paradoxa*), fig. 112, 113 (wings ♂♀ *G. paradoxa*), fig. 114 (app.♂ lat. *G. fallax*), fig. 115 (genitalia ♀ lat. *G. fallax*), fig. 116 (wings ♂), fig. 117 (wings ♀ *G. fallax*).

Diagnosis: Small to moderate large species (abd. 24–33, hd. w. 24–29 mm) of dark bronze colour with not much metallic reflection, dotted and striped with yellow markings. — Eyes dorsally connected along a short distance, occipital triangle large. Synthorax very small, legs short, claws with a strong tooth to near the distal end. — Wings clear or partly orange tinged. Nodus at mid-length of fore wing and a little more proximad in hind wing. Pterostigma short and thick, about three times as long as wide. Wings with relatively large cells and with few cross-veins, except at the distal ends and along the hind margins. Veins M_3 and M_4 in fore wing divergent to the outer wing margin. Discoidal field in fore and in hind wing partly with one row of rectangular cells; triangles and subtriangle in fore wing free; triangle in hind wing not retracted to arculus; sectors of arculus connected at origin, especially in hind wing. One cubital cross-vein in fore wing and two in hind wing. Anal loop short, consisting of two rows of cells, not widened at the distal end, lacking a distinct midrib. Anal area with two or three cells between end of anal loop and hind margin of wing. Anal triangle of male long, 2-celled, anal end-hook of wing sharply angled. Membranule short. — Abdomen cylindrical, in males the first two segments slightly swollen, auricles on segm. 2 well developed as knob-like rounded processes; genitalia not protuberant; last abd. segments in male more or less depressed, appendices sup. short, bluntly pointed, hardly surpassing the rectangular appendix inferior of which the distal points are dentate. Female with extremely prolonged vulvar scale, split into two lobes, surpassing end of abdomen.

Type-species: *G. paradoxa* Brauer. – There are five or six species known, dependent on the interpretation of a from of *G. paradoxa* to specific rank. A key to the species is given by COWLEY (1934) which omits *G. etcheverryi* Fraser, published in 1957. Concerning *G. dubitalis* Fraser, see under *Lauromacromia* in this study.

Distribution: Chile, N.W. Argentine, Perú, Bolivia, W. Brazil, Ecuador, México.

Genus **Lauromacromia** gen. nov.

The species *Gomphomacromia dubitalis* Fraser (1939) from French Guyana, was placed by this author under that genus on account of the venation, but "the general facies differs from that of other species belonging to the genus and the anal appendages are rather typical of those found in Macromia". By the small process beneath abd. segm. 8, it shows a relation with *Neocordulia*. It is on account of this combination of characteristics that the species can not stand in *Gomphomacromia* s. str. and therefore the new name *Lauromacromia* is here introduced for it.

Diagnosis: Venation rather open; all triangles entire, triangle in hind wing with basal side slightly distal to the level of arculus; subtriangle in fore wing irregularly 4-sided, free. In discoidal field of fore wing one row of cells to level of nodus, the end of the field dilated, 3–4 cells wide. Sectors of arculus united for a short distance in fore wing, much longer in hind wing; arculus slightly proximal to second subnodal cross-vein. Cubital cross-vein one in fore wing, at level of first antenodal cross-vein, two in hind wing (inclusive ti, which is not coincidental with proximal side of t). Anal loop abbreviated, 7–8 celled, no midrib. Anal area with 2 rows of cells; anal triangle 2-celled. — A small conical tuberance at ventrum of abd. segm. 8. Abd. segm. 10 with a very robust cone-like middorsal spine. Anal appendages very short and robustly built, subcylindrical, as long as segm. 10, the superiores slightly longer, app. inferior long triangular.

Type-species: *Gomphomacromia dubitalis* Fraser. – The only known species.

Distribution: French Guyana.

Lauromacromia dubitalis (Fraser)

(Fig. 1–2)

Gomphomacromia dubitalis FRASER, 1939. Proc. Roy ent. Soc. Lond. *Ser. B 8* (5): 91–95, fig. 1a, b (app.♂).

DESCRIPTION (after FRASER, with some additional notes)

Head: labium, labrum, clypeus and frons dark reddish brown, the latter with a very deep median fissure dividing the upper surface of face into two triangular facets, the middle ocellus lying deeply sunk at the posterior part of the fissure. Eyes dark brown but probably emerald green during life; occiput small, dark brown.

Prothorax and thorax dark olivaceous brown with a poorly marked metallic green reflection on dorsum and a more brilliant metallic bluish-green reflection on the sides. The latter marked with two narrow oblique, citron-yellow stripes, one on the mesepimeron passing spiracle, the other short, elongate-oval, on the lateroventral border of the metepimeron. Legs blackish or dark reddish brown; all tibiae keeled: I apical 40%, II about 40%, III 95%. Wings slightly infuscated; for venation see under genus. Pterostigma short, dark reddish brown.

Abdomen blackish-brown marked with citron-yellow as follows: segm. 2 with the auricles, a pair of narrow postjugal spots and a spot at the apex of lobe; segm. 3–7 with paired crescentic antejugal spots on dorsum, which become progessively smaller from segments 4 to 6 but enlarge again on segm. 7, where they are almost confluent over dorsum of segment; remaining segments unmarked. Segm. 8 with a small conical protuberance beneath, situated at its basal third (similar to, but smaller than protuberance found in *Neocordulia androgynis* Selys). Segm. 10 with a very robust conelike, middorsal spine prolonged basally as a keel-like ridge, which is bordered at each side by a deep depression, Anal appendages as long as segm. 10, the superiores slightly the longer, these very short and robustly built, subcylindrical but with a lateral keel-like expansion on the outer side for the basal two thirds; tapering to a point which is turned out rather abruptly. Seen in profile, they are very broad at base and then taper gradually to near the apex and very abruptly so at the point where the lateral expansion ends. Inferior appendage narrowly triangular, minutely emarginate at apex, which is rather strongly curved upwards. Genitalia second segm.: lobus anterior very small, hamulus protuberant, esp. lobus post., not bent inward or outward; genital lobe large, surmounting hamulus, top pointed. Auricles small, rounded, shiny.

Abd. + app. 36.5 mm; hind wing 32 mm; pterostigma fore wing 1.6 mm.

Distribution: French Guyana, St. Laurent du Maroni, one male holotype, in coll. K. MORTON, now in the Br. Museum (N.H.) London.

Genus **Rialla** Navás

Rialla NAVÁS, 1915. Ent. Mitt. *4*: 146–153, Fig. 2 (venation; type-species *R. membranata* Navás).

Rialla, COWLEY, 1934. Stylops *3* (4): 94 (note).

Anticordulia NEEDHAM, 1943. Field Mus. N. Hist. Zool. *24*: 367–368 (type-species *A. villosa* (Rambur)).

Diagnosis: Nodus in fore wing at slightly more than half the wing-length, in hind wing a little before mid-length. Arculus between antenodals 1 and 2 in both wing pairs; sectors of arculus separated at base in fore and in hind wing; arculus at proximal side of triangle in hind wing. Triangle in fore and in hind wing crossed in two cells; subtriangle three-celled in fore wing, free if present in hind wing. Discoidal field in fore wing starting with 2 cell-rows, followed by 3 rows to near the end; against hind margin not or but slightly narrowed. One cubital cross-vein in both wing pairs. Anal loop elongate, reaching to level of middle fork of M, with two cells in the proximal row and with midrib. Three rows of cells in anal area. Membranule very long, dark coloured. — Female vulvar scale elongate triangular, distal 2/3 divided by an open parallel-sided slit.

Type-species: *Cordulia villosa* Rambur. – The only known species of this genus.

Distribution: Chile.

According to NEEDHAM (l.c.) the larva shows more resemblance to *Neurocordulia* and *Epitheca* than to *Somatochlora*, but is distinctly different. It has a broadly depressed oval abdomen with dorsal hooks and small lateral spines on abd. segm. 4–9, the last ones incurved.

The description and figure of the wings given by NAVAS under *Rialla* n.g. *membranata* n.sp., is in accordance with the species formerly known as *Cordulia villosa* Rambur. The collecting place: ' Chile, S. Felipe", suggests the same conclusion.

Genus **Dorocordulia** Needham

Dorocordulia NEEDHAM, 1901. N. York State Museum, Bull. *47*: 504–506 (gen. charact. and key to N. Am. species).

Dorocordulia, MARTIN, 1907. Cat. Coll. Zool. Selys Lonchamps *17*: 10, 35 (key and descr. sp.).

Dorocordulia, MUTTKOWSKI, 1908. Bull. Wis. N.H. Soc. (*2*) *6*: 103 (short diagn. and key).

Dorocordulia, GARMAN, 1927. Odon. Connecticut State Geol. a. N. Hist. Survey, Bull. *39*: 237–240 (short diagn., key and descr. N. Am. sp.).
Dorocordulia, NEEDHAM & HEYWOOD, 1929. Handb. dragonfl. N. Am.: 198–199 (short ecol. note).
Dorocordulia, NEEDHAM & WESTFALL, 1955. Manual dragonfl. N. Am. (Anisoptera): 416–420 (short diagn. and descr. N. Am. sp.).

Diagnosis: Moderate sized delicate metallic green species, speckled with yellow markings; wings clear with small diffuse yellow basal spots, or wings tinged with darker tips. — Triangle in fore and hind wings free, subtriangle in fore wing crossed, subtriangle in hind wing wanting; not more than two rows of cells in discoidal field of fore wing, sometimes with a few single cells beyond triangle; M_4 and Cu_1 in fore wing convergent to the end; M_3 and M_4 not undulate. Sectors of arculus separated in fore and hind wings; triangle in hind wing retracted at, or just proximal to arculus. Nodus a little distal of mid-length in fore wing and just proximal of it in hind wing; 7 antenodal cross-veins and 6 postnodals in fore wing, 5 antenodals and 7 postnodals in hind wing; one, seldom two cross-veins under stigma; one acc. bridge cross-vein in both wing pairs. Anal loop elongate, slightly truncated at distal end, two cells in first row; 2–3 rows of cells in anal area; anal triangle in male short, two-celled; hind corner of wing distinctly angled. — Legs long, black, tibial keels in males: I distal 30%, II distal 0–10%, III distal 90%, distal end of keels flattened, spoon-shaped, upturned. — Abdomen slightly swollen at base and more or less depressed in the last four segments. Male app. sup. short, about as long as segm. 9 + 10, blunt, distal part swollen, tip rounded or pointed, under side with or without basal dent and excavation. App. inf. long triangular, tip rounded, nearly as long as app. sup. or shorter. Genitalia segm. 2: lam. ant. small, not visible in profile, hamules low, rounded, genital lobe prominent, tip pointed.

Type-species: *Cordulia libera* Selys. – Three species known.

Distribution: Northeastern U.S. and Canada (two species) and South America (Brazil) one species.

The nymphs of the two North American species were described by NEEDHAM (1901) and by GARMAN (1927).

The position of the South American species *D. errans* Calvert (1909) is somewhat doubtful. It is known from the male holotype only, which according to the locality-label was found in Chapada (Mato Grosso) Brazil. CALVERT himself was not sure about the South American appearance, remarking: ' It is surprising, however, to find what appears to be a *Dorocordulia* in southern Brazil, as the genus has not hitherto been known south of Maryland. There is therefore, ground for suspecting that the locality-label may have been misplaced, but in any event the species appears to be undescribed previously". The reason why I draw attention to this question is, that since its publication in 1909, no other specimen of this species was ever found either in North America or in South America. As large parts of tropical South America are still unexplored, the surmise arises that the locality-label was not misplaced. Furthermore NEEDHAM (1908) gives in figure 30 the wings of a male of an undescribed species of *Neocordulia* from Brazil, which however belongs to *Dorocordulia*. Wether it represents *D. errans* Calv. cannot be decided without inspection of the specimen, but I think it does. The same applies to a photograph in Pl. XLII fig. 1 of the same publication of the wings of a female *Neocordulia androgynis*, which according to CALVERT ' is not that of *Neocordulia* at all, but of something close to *Dorocordulia*". Of this specimen no locality is mentioned.

I had the opportunity to study this female of NEEDHAM and CALVERT's male type of *errans* (Pl. Ia) and arrived at the conclusion that they belong to the same species. Unfortunately the head and abdomen of the female are missing. In wing-venation both specimens differ from the two North American species of *Dorocordulia* (*libera* Selys and *lepida* Hagen), while the male genitalia and legs differ in the following respects:

South American	North American
Two rows of cells throughout in discoidal field of fore wing to nearly the end.	One row of cells in the proximal part of it, or at least a few singular cells present.
Anal loop long elongate, distal	Anal loop shorter, distal end

end not or slightly truncated; two cells between this end and wing margin (one in the male of NEEDHAM fig. 30).	truncated; one cell between this end and wing margin.
Length of proximal side of anal triangle in male about 1/4 of distal side.	Length proximal side 1/2 of distal side in anal triangle.
At the end of male anal triangle a small but distinct excavation in hind margin of wing.	Not such an excavation.
Basal spot in male anal triangle very faintly yellowish; in female the end of wings from 2–3 cells proximad of stigma, dark brown.	Basal spot in male more distinct, esp. in *libera*; in female the end of the wings uncoloured.
Male appendices sup. without basal tooth, apex rounded	App. sup. with basal tooth, apex more or less acute.
Male genitalia 2nd segment: hamulus higher than genital lobe distal end long pointed, tip recurved externally.	Hamulus lower than lobus, distal end not prolonged, not pointed.
No tibial keel on middle leg of male.	A very short tibial keel present on middle leg of male at the distal end.

In spite of these differences which may be for the most part of specific rank, it seems not yet justified to split up the two groups into two genera, the more so as today our material of the south american species is too limited and incomplete.

After this was written, a reprint of the publication of SANTOS (1968) was received, in which the description of an immature male specimen of this species is given. This male was found inside a house at the Experimental Fishery Station at Pirassununga, Est. de São Paulo, Brazil, 6.X.1943 by Dr. O. SCHUBART. The specimen is now in the collection of Odonata in the Museu Nacional in Rio de Janeiro under no. 15.681.

The description agrees quite well with that of the holotype. In the following translation, the differences in the type are placed in brackets. Abd. 26 (30) mm; hind wing 27 (29) mm; pterostigma 2 mm. Antenodals $\frac{8\ (7–8)}{5}$, postnodals $\frac{5\ (6)}{6–7\ (7–8)}$; t and supratriangle free, ht 2 celled, in hind wing t connected with arculus. Sectors

of arculus separated. Rspl. with 5 (6–7) cells, Mspl just indicated. No accessory bridge cross veins. Discoidal field in fore wing with two rows of cells, narrowed at the end; in hind wing with one or two cells at triangle, followed by several series towards the hind margin of wing. One cubital crossvein. Anal loop long, (slightly) dilated at the end, with two rows of cells, basal row 6 (8) cells long, distal row 5–7 (7) cells; two and one half or three (two) cells in first row at the anal point of triangle. Two rows of cells between A_2 and hind margin.

Head with a furrow in the dorso-median part of frons. No keel on middle tibia, a complete keel on hind tibia and a short one at the distal end of fore tibia.

Genus **Paracordulia** Martin

Paracordulia MARTIN, 1907. Cordulines Cat. Coll. Zool. Selys L. *17*: 33.

Diagnosis: Nodus in fore wing in distal half of wing length, in hind wing in proximal half. Discoidal field in fore wing narrowed at the end; subtriangle in fore wing three-celled; triangle in fore wing crossed in two cells, in hind wing free; proximal side of triangle in hind wing at arculus or just proximad. One cubital cross-vein in both wing pairs (no subtriangle in hind wing). Anal loop elongate with three cells in the proximal row and with the heel at the level of the middle fork of M. Anal area with two rows of cells, anal triangle of male two-celled.

Type-species: *Cordulia sericea* Selys. – The only known species of the genus.

Distribution: Brazil (Pará), Surinam.

Paracordulia is closely related to *Procordulia* Martin of the Old World (Indo-Australian and Pacific), from which it differs by the more distal position of the nodus in the fore wing, the more numerous antenodal cross-veins in fore wing and the longer anal loop, having three cells in the proximal row.

P. sericea Selys may be briefly characterized as follows: In fore wing 10–11 antenodal cross-veins and 6 postnodal cross-veins; male abdomen black, pale lateral spots present on the last three segments app. sup. twice curved, no basal external tooth. Female abdomen brown, no paler spots; vulvar lamina long triangular.

The position of *Libellula tomentosa* Fabr. interpreted by HAGEN (1861) and SELYS (1871) as a species of *Cordulia*, placed by MARTIN (1907) under *Paracordulia*, could be cleared up recently by studying the type in Copenhagen. It proved to be not a Corduline but a Libelluline, of which further details will be published elsewhere.

Paracordulia sericea (Selys)

(Fig. 3–5)

Cordulia sericea SELYS, 1871. Synopsis d. Cordulines: (28)–(29).
Paracordulia sericea, MARTIN, 1907. Cordulines Cat. Coll. Zool. Selys L. *17*: 33–34, fig. 37 (left wings ♂), fig. 38 (aa.♂).

DESCRIPTION

Male. Mouthparts yellow, labrum orange coloured, ante- and postclypeus olivaceus brown, frons along the mid-frontal line orange yellow, otherwise metallic blue-green shining. Vertex bluish shining, dark, two-pointed on top. Occipital triangle dark brown and hairy, rear of head light brown.

Synthorax in front and on the sides metallic green shining, otherwise brownish. Legs dark brown, first and second femora lighter, tarsus black, claws with a distinct tooth at ⅔ of their length. Length of tibial keels (after ST. QUENTIN, 1938): I 23%, II 4%.

Wings hyaline, stigma black, short, 2 mm long; membranule blackish to dark brown, as long as anal triangle.

Abdomen stoutly built, the first two segments somewhat swollen, the third slightly constricted, the remaining segments a little wider, dark brown to black coloured, especially the five basal segments metallic copper shining, the last three segments with pale spots, on segm. 8 and 9 postlateral spots, on segm. 10 a pair of baso-lateral spots. Appendices dark brown, seen from dorsal side twice curved, the end points rounded; app. inf. triangular, reaching to the second curve of the superiores. Genitalia second segm.: lam. ant. small, hamulus with a rectangular slender endpoint parallel to the ventral carina of the genital fossa, endpoint curved inward, genital lobe narrow, long pointed.

Total length 45–46 mm; abd. + app. 32–33 mm; app. 3.5–4 mm; hind wing 31–34 mm; pterostigma 2 mm; fore wing 32–34 mm; hind femur 8 mm.

The species was described by SELYS from three males collected by BATES in November at Pará (probably in the mouth of the Amazon River, south of the island Marajo). I have studied these males of which the following remarks on the wing venation can be made.

Antenodal cross-veins and those of the second series in fore wings 10–11, in hind wings 6–7; postnodals in fore wings 6–7, in hind wings 7–9; number of cross-veins beyond stigma 3–4 in fore wings and 3 in hind wings; number of cross-veins under stigma one in fore wings and 1–2 in hind wings; number of acc. bridge crossveins 2–3 in fore wings and 1–3 in hinds wings. Sectors of arculus separated in fore wing and connected for a short distance in hind wing. One cross-vein in triangle of fore wings and none in those of hind wings; subtriangle in front wings 3-celled. Cubital cross-veins one in all wings. Discoidal space in fore wing starting with 3 cells against triangle, followed by 2 rows of cells four cells long, then 3 rows of cells including Mspl 5 cells long, ending in 2 rows of cells in the narrowed distal part, ending against the hind margin in 2–3 rows of cells. Anal loop in hind wing long, elongate, reaching with its heel to the level of fork of M, containing 17–19 cells in total, with 2–3 cells in first row. One or two cells under anal loop to hind margin. Anal triangle 2-celled. Membranule blackish to dark brown.

There is a doubtful note on a female by BATES and mentioned by SELYS (1871), indicating that the wings are brownish near the nodus; front (of thorax?) and abdomen reddish. Vulvar scale with a broad base but distal part ending in a long fine point. BATES however was not sure that this specimen belonged to this species or to a *Gompho-macromia* (?) as he did not note the wing venation.

In the interior of Surinam I once collected a female Corduline belonging by its wing venation to *Paracordulia* and very probably to the species *sericea* Selys. This was compared with the male type and paratypes in the SELYS collection in the Brussels Museum and it agrees in so many respects that there can hardly be any doubt concerning its identity. It corresponds with the following description;

Female (allotype). Mouthparts and face reddish brown, frons darker, upper part slightly blue-green metallic shining. Vertex dark brown with two reddish points on top. Occipital triangle dark brown, rear of head paler brown.

Synthorax metallic green shining, underside brown. Legs dark brown, femora of first and second pair lighter; tarsus black, claws with a distinct tooth on the underside at $\frac{3}{4}$ of their length.

Wings uniform dull tinged, a yellow streak in the costal and cubital space in both wing pairs. Pterostigma black, small, not covering one cell, 2 mm long in fore and hind wings. Membranule dark brown, as long as the first two anal cells. Venation: antenodal cross-veins 12–13 in fore wing and 7 in hind wing. Subcostal cross-veins (2nd series) 12–13 in f.w. and 7–8 in hd.w.; postnodals 6 in f.w. and 8 in hd.w.; cross-veins beyond stigma 4 in all wings. Acc. bridge cross-veins 2 in all wings. In fore wing triangle two-celled, subtriangle three-celled, in hind wing triangle free, subtriangle wanting; proximal side of triangle starting just proximal to arculus. Discodal space beginning with three cells against the triangle, then two rows of cells and later three rows, distal end narrowed. Median space free, no supratriangular cross-veins. One cubital cross-vein in all the wings. Anal loop very long, the heel reaching to

level of middle fork of M, three cells in the first upper row, 17–19 cells in total. Anal field with three rows of cells between anal loop and hind margin.

Abdomen brown, the first three segments swollen, the remaining segments tapering to the end, the last four segments darker at dorsum, 9 and 10 almost black, as are the long stalked appendices. Vulvar scale triangular with base broad and punctulated, the narrow black tip pointed; ventrum of segm. 9 rounded at the end, passing segm. 10.

Total length 50 mm; abd. + app. 37 mm; app. nearly 4 mm; hind wing and fore wing both 36 mm; pterostigma hd.w. 2 mm, f.w. 2.2 mm.

SURINAM: 1 ♀ (allotype) Coppename River near Kroetoe Mt., bush creek 23.XI.1943 D. C. Geijskes leg. (Mus. Leiden). Fieldnote; flies very swift near over the ground and the water, was later (2 hr p. m.) dipping eggs on the watersurface in the middle of the creek in a shadowed place, where it could be netted.

Genus **Aeschnosoma** Selys

Aeschnosoma Selys, 1871. Syn. Cordulines: 84–85.

Diagnosis: Dark brown to light brown species of moderate size and slender stature, with some metallic blue reflection on top of head, of synthorax and sometimes on abdomen. — In fore wing nodus in the distal half of wing length; 1–2 accessory bridge cross-veins in fore wing and one in hind wing. Triangles crossed in both wing pairs, proximal side of triangle in hind wing at arculus or just distad, subtriangle in fore wing mostly 3-celled; supratriangles crossed. Between M_1 and M_2 in fore wing two rows of cells starting under stigma or more distal, in hind wing midway between nodus and pterostigma. Cubital cross-veins 3–6 in fore wing and 2–4 in hind wing. Discoidal field in fore wing starting with three cells against triangle, followed by 2 rows of cells a few cells long, apical end against hind margin widely enlarged. Anal loop elongate, extending to level of middle fork of M, in first row 2–3 cells. Anal triangle of male 2-celled. Anal field in hind wing with 2–4 rows of cells. — Male genitalia and appendices differently shaped; female subgenital plate large, distal end rounded, vulvar scale small, appendices short, simple and pointed.

Type-species: *Aeschnosoma elegans* Selys. – Four species known.

Distribution: Northeastern Brazil, Lower and Upper Amazon into Perú, Bahia and the Guyanas.

KEY TO SPECIES OF *Aeschnosoma*

1a. Synthorax with yellow side stripes, legs dark brown to black. Wings hyaline or smooth light-brown tinged; anal area in hind wing with 2–3 rows of cells; in anal loop mostly less than 30 cells 2

1b. Synthorax uniformly brown, without yellow side stripes, legs light-brown. In both wing pairs (of female) a golden yellow basal spot extending to, or including triangle in hind wing; anal area with four rows of post-loop cells; in anal loop about 30 (28–32) cells (male unknown) . . . . . *auripennis* n. sp.

2a. Synthorax with four yellow stripes; 14–18 antenodal cross-veins in fore wing and two cubital cross-veins in hind wing. Male appendices superiores twice as long as appendix inferior. Hind wing (♂ ♀) 34–38 mm, abd. + app. 35–40 mm . . . . . *forcipula* Selys

2b. Synthorax with three yellow stripes (no mesepisternal), more than 16 or less than 14 antenodal cross-veins in fore wing and two or more cubital cross-veins in hind wing 3

3a. Smaller species, abdomen and hind wing about 27 mm long, 11 antenodal cross-veins in fore wing, two cubital cross-veins in hind wing, 16 cells in anal loop. Last three abd. segments in male depressed (female unknown) . . . . . *rustica* Selys

3b. Larger species, abd. 44–46 mm, hind wing 41–44 mm, 16–20 antenodals in fore wing and 3–4 cubital cross-veins in hind in anal loop 24–36 cells. Last three abd. segments in male not depressed, male app. superiores about as long as app. inferior . . . . . *elegans* Selys

Aeschnosoma elegans Selys

(Fig. 7, 11, 14–16, 20–23; Pl. Ib)

Aeschnosoma elegans Selys, 1871. Synopsis d. Cordulines: 85–86 (holotype ♀).
Aeschnosoma elegans, Hagen, 1875. Synopsis Odonata America. Proc. Bost. Soc. N. Hist. *18*: 63 (no descr.).
Aeschnosoma elegans, Kirby, 1890. Cat. Neur. Odon.: 53 (no descr.).
Aeschnosoma elegans, Martin, 1907. Cordulines Cat. Coll. Selys L. *17*: 59 (short diagn. ♀).

Description

Male (allotype). Head black except labium and clypeus, which are yellow. Midlobe and inner margin of side lobes of labium dark brown. Labrum black, anteclypeus olive brown, postclypeus yellow. Frons black, metallic blueshining on top, in the middle divided by a deep wide groove into two lobes, on each of these a yellow spot just under antenna. Antenna black, the first two segments short, the joints of flagellum long. Vertex swollen, bluish-black, hardly divided into two points on top. Occipital triangle and rear of head pitch-black.

Prothorax pale brown, hind margin darker. Synthorax dark brown with copper reflection on dorsum and green reflection at the sides. There are three yellow side stripes, one along humeral suture, one in the median over stigma, one on metepimeron. Between bases of wings at dorsum a yellow spot at the fore and one at the hind wings. Ventrum yellowish, two darker stripes at ventrum of metepimeron, metaventrum totally dull brown. Legs long, hind femur 9 mm, dark brown to black, underside of fore femur yellowish at base. A keel on hind tibiae and along the distal half of fore tibiae. Innerside of hind femur with two rows of equal short sharp-pointed spines. Claws of moderate length, straight, inner tooth at distal third.

Wings brownish tinged, veins black, pterostigma dark brown. Membranule blackish. Venation: antenodal cross-veins 19 in fore wings, 12–14 in hind wings; subcostals (2nd row) 18 in fore wings and 12–13 in hind wings; postnodals 10 in fore wings and 12–14 in hind wings. Cross-veins beyond pterostigma 5 in fore wings and 5–6 in hind wings; cross-veins under stigma 3 in fore wings and 2 in hind wings. Accessory bridge cross-veins 2 in fore wings, one in hind wings. Supratriangular cross-veins 3–4 in fore wings, 2–3 in hind wings. Cubital cross-veins 4–5 in fore wings, 4 in hind wings. Arculus in fore wing just proximal to second nodal cross-vein, in hind wing at second nodal cross-vein. Proximal side of triangle in hind wing at arculus. Between M_1–M_2 in fore wings 2 rows of cells starting at distal end of pterostigma, in hind wing proximal to stigma about mid-way nodus and stigma. Subtriangle in fore wing 3-celled, triangle with 3 cells in fore wing and with 3–4 cells in hind wing. Discoidal field starting with 3 cells against triangle and two rows of cells 5–6 cells long. Rspl with one row of cells in fore wing 12–13 cells long, in hind wing 13 cells. Mspl one row, in fore wing 8–10 cells long, in hind wing 6–8 cells. Distal end of discoidal field enlarged to 11 cells at hind margin in fore wing, to 14–16 cells in hind wing. Anal loop elongate, heel reaching to level of middle fork of M, 2–3 cells in first row, 28–30 cells in total. Between anal loop and hind margin one row of cells.

Anal field in hind wing with two rows of cells between anal loop and hind margin. Anal triangle very long and narrow, 2-celled.

Abdomen long, black, first two segments a little swollen, other segments stalked. Segm. 1 and 2 with a lateral yellow spot, a middorsal yellow spot on segm. 2 and an antero-lateral spot reaching to the small rounded auricle. Segm. 3 with an antero-dorsal, a lateral and a medio-dorsal spot. Segm. 4–6 with a small yellow antero-dorsal spot only; segm. 7–10 unspotted, black. Appendices as long as the last two abd. segments, basal half slightly convergent to the middle, distal half a little curved outward, the rounded tips bent inward. App. inf. long triangular, tip turned up, reaching to nearly the end of app. superiores. Genitalia second segm.: lamina anterior low, more or less divided into two lobes, bearing on top a bundle of stiff black hairs; hamulus black, high, triangular, tip rounded; genital lobe quadrangular with rounded end margin, surpassing the hamulus.

Total length 60 mm; abd. + app. 45 mm; app. 3 mm; hind wing 43 mm; pterostigma 2.5 mm; fore wing 44 mm; pterostigma 2.5 mm.

Four other males vary in size as follows: total length 59–62 mm; abd. + app. 44–46 mm; hind wing 41–44 mm, pterostigma 2.5 mm; fore wing 43–45 mm, pterostigma 2.5–2.7 mm. Variation in venation in fore and hind wings resp. in males of Nassau Mts, Wilhelmina Mts and (Br.) Guyana: antenodals 16–20/11–14, subcostals 18–21/12–14, postnodals 9–11/12–14, poststigmals 4–5/4–6, substigmals 2–3/2, acc. bridge cross-veins 2/1, cubitals 4–6/3–4, supratriangles 3–5/2–3, number of cells in ti 3/, in t 3/3–4, in anal loop 24–30 cells.

Female (adult). As male but vertex red-brown (black in male), hind femur 8 mm long; abd. segm. 2 and 3 with the yellow spots a little larger, segm. 2 with antero-dorsal, lateral and postlateral spots and a median spot at dorsum. Segm. 3 with a long antero-basal spot and a small dorso-median spot. Segm. 4–7 with a small antero-dorsal spot, segm. 8–10 black, unspotted. Appendices straight, tips bluntly rounded, as long as segm. 10+ half of segm. 9. Subgenital plate strongly keeled, hind margin straight, not curved, reaching to the middle of segm. 10. Valvula vulvae divided into three small lobes, the median the largest.

Wings smooth dark brown tinged, no yellow basal spots, pterostigma dark reddish brown, membranule dull brown. Wingvenation in fore and hind wings: antenodals 20/13–14; subcostals (sec.row) 19–20/13–14; postnodals 11/13–14; poststigmals 5/4–5; substigmals 2/3; acc. bridge cross-veins 2/1; cubitals 4–5/4; supratriangles 4–5/2–3; number of cells in ti 3; in t 3/4; in anal loop 35–36.

Total length 65 mm; abd. + app. 49 mm; app. 2.3 mm; hind wing 46 mm, pterostigma 3 mm; fore wing 47 mm, pterostigma 3 mm.

Material examined

BRAZIL: 1 ♀ (holotype) Para at Altar do Chao (near Santarem) Oct. 30 Bates leg. (Mus. Brussels).

SURINAME: 2 ♂ (allotype) Nassau Mts. bush-creek 2 km from Marowine Riv. 17.II.1949 D.C.G.; 1 ♀ idem 21.III.1949 ovipositing in pools between stones and gravel at one p.m. (clouded wheather) D.C.G.; 2 ♂ idem 22.II.1949 D.C.G.; 1 ♂ Wilhelmina Mts. 17 km N of Lucie River near Camp 3 along large mountain creek in afternoon 16.VII.1963 S. Ligorie leg. (all in Mus.

Leiden); (Br). Guyana: 1 ♂ Oko River 24.VI.1936 Neal A. Weber leg. (Zool. Mus. Univ. Mich. Ann Arbor).

This species was known from the female holotype only, described by SELYS (1871). The type, a young specimen, was compared with my adult female from Surinam and they proved to be identical, although the last one is a little larger. The measurements of the holotype are: total length 60 mm; abd. + app. 45 mm; app. 2.5 mm; hind wing 41 mm, pterostigma 2.7 mm; fore wing 42 mm, pterostigma 3 mm. Length hind femur 7 mm. The venation shows in fore and in hind wing: antenodals 17–18/11–12; subcostals 18–19/11–12; postnodals 9/10–11; poststigmals 5/5; substigmals 2/2; acc bridge cross-veins 2/1; supratriangles 4/2; cubitals 4/3–4; number of cells in ti 3/; in t 2/4; in anal loop 28–29. The end of the right appendix (the left one is broken) is more pointed than in the Surinam female and the subgenital plate more triangular.

Aeschnosoma forcipula Selys

(Fig. 8, 12, 17–19, 24–25, 28–32)

Cordulia forcipula HAGEN, 1861. Synopsis Neur. N. Am.: 315 (no description).
Aeschnosoma forcipula, SELYS, 1871. Syn. d. Cordulines. Acad. Roy Sc. Belg.: 86–87 (description ♂♀).
Aeschnosoma forcipula, HAGEN, 1875. Syn. Odonata Am. Boston Soc. Nat. Hist. *18*: 63 (no description).
Aeschnosoma forcipula, KIRBY, 1890. Synon. Cat. Neur. Odon.: 53 (no description).
Aeschnosoma forcipula, MARTIN, 1907. Cordulines Cat. Coll Selys L. *17*: 59 (short diagn. ♂♀).
Aeschnosoma peruviana COWLEY, 1934. Stylops *3* (4): 93–94 (descr. ♀), Figs. 1 and 2 (design thorax and form of last abd. segm.).
Aeschnosoma peruviana, CALVERT, 1948. Zoologica N.Y. Zool. Soc. *33* (2): 71–72, Pl. II figs. 39–41, 43 (♂ genitalia, wings).

DESCRIPTION

Male. Face brown, labium yellow, labrum orange coloured, ante- and postclypeus dark olivaceous, frons reddish brown, in the median a deep sulcus, dividing its upper part into two lobes, upper side and vertex dark brown metallic blue shining. Antennae black, occipital triangle dark brown, rear of head pale brown, upper margin against the eyes darker. Eyes (in life) emerald-green in the upper half, greyish-green in the lower part.

Prothorax light cream coloured. Synthorax chocolate brown, dorsum and to a lesser extent the sides with a metallic blue reflection; no antehumeral stripes, four yellow stripes, one along the humeral mesepisternal suture, a narrow and incomplete one at lower half to 3/4 mesepimeron, a complete broad stripe crossing the spiral and a wide stripe in the middle of metepimeron. Ventrum yellow, one or two brown stripes across metasternum. At dorsum two yellow spots between the bases of fore and hind wings. Legs long, dark brown, coxae, trochanters and base of femora paler;

inner side of hind femur beset with a row of very short sharp dents; hind tibiae and upper third or fourth of fore tibiae with a keel; claws large, a small tooth on the under side at about mid-length.

Wings hyaline to light brownish tinged, veins and pterostigma black, membranule dark brown. Venation in fore and hind wings: antenodals 14–18/10; subcostals (2nd series) 16/10; postnodals 8/11; poststigmals 5/5; substigmals 1–2/2; acc.bridge cross-veins 2/1; supratriangulars 3/1; cubitals 3/2; number of cells in ti 3/; in t 3/2; t in hind wing at arculus, arculus at second nodal cross-vein in hind wing and proximal to second nodal cross-vein in fore wing. Rspl 11/11 cells long, Mspl 9/7 cells long. Discoidal field in fore wing enlarged to 9–10 cells at hind margin and in hind wing to 12–13 cells. Anal loop elongate, extending to level of middle fork of M, 3 cells in first row and 18–23 cells in total. One row of cells between anal loop and hind margin, two, sometimes three rows in anal field. Anal triangle small, 2-celled.

Abdomen with the first two segments slightly swollen, segm. 3 and 4 somewhat constricted, segm. 7 and 8 a little dilated; dark brown to black, first segment light brown, second segment on dorsum with two large basal yellow spots, these on the sides confluent with a large yellow lateral spot. Segm. 3–8 with two small anterodorsal spots separated by the black middorsal carina. Segm. 9 black, segm. 10 with two small yellow spots more laterally. Appendices black, tips of superiores light brown. Ventrum dark brown with a distinct yellow stripe along the ventral carina, especially on segm. 8, where from both sides of the ventral carina a row of stiff hairs are grasping into one another. Appendices superiores extremely long and slender, basal halves converging, distal halves slightly curved outward, tips bent inward, bluntly pointed. A strong sharp pointed dent is present on the inner margin of the basal half and a small notch on dorsum as well as on ventral side of the curved distal half, the last one partly visible in profile view. Appendix inferior triangular, flat at base, long pointed at the end, tip turned upward, reaching to half-way superiores. Both appendices beset with long stiff hairs, especially the under side of the curved end of superiores. Genitalia on second segment: lamina anterior low, beset on top with a fringe of long brown hairs: hamulus quadrangular, as high as lobus, inner lobe rounded, outer lobe small, bidented; genital lobe triangular, sharp pointed, top recurved outward. Penis long and slender with two side lobes at the basal third, the curved tips directed foreward.

Female. Face orange reddish brown, labium yellow, clypeus darker olive, frons orange coloured, vertex slightly metallic shining purple, occipital triangle leather brown, rear of head light brown.

Synthorax dark reddish brown with four yellow side stripes as in male. Legs dark brown, under side of fore femora yellow, middle and hind femora paler.

Wings hyaline with a trace of golden streaks in costal and cubital spaces to first cross-vein; veins and pterostigma dark brown, membranule dull grey brown, in hind wing 2 cells long. Venation in fore and hind wings: antenodals 15/17; subcostals (2nd series) 16/11; postnodals 7–8/10–11; poststigmals 4/4; substigmals 2/2; acc. bridge cross-v. 2/1; supratriangulars 3/1–2; cubitals 3/2; number of cells in ti 3/; in t 3/2; anal loop 3 cells in first row and 18–22 cells in total, heel reaching to level of middle fork of M, one cell-row between anal loop and hind margin, two cell-rows, sometimes with a few cells of a third row, in anal area between anal loop and hind margin. Between M_1 and M_2 double cell-row starting in fore wing at distal end of pterostigma, in hind wing mid-way between nodus and pterostigma.

Abdomen first two segments slightly swollen, remaining segments slender, tapering to the end, the last two segments a little depressed, light brown to dark brown in the last three segments, the foregoing segments with a darker end-ring. Segm. 1 pale yellowish, the fringed dorsal hind margin brown. Segm. 2–8 with two small antero- dorsal yellow spots and two larger side spots, basal spots largest on segm. 8. Appendices black, simple, a little curved outward, tips bluntly pointed. Subgenital plate simply rounded with mid-keel in distal half, passing end of segm. 9, at base on each side a long black spine. Vulvar lamina at the end margin of segm. 8, with moderately thickened rounded margins.

Total length ♂ 47–51 mm; ♀ 47.5–52 mm; abdomen + app.♂ 35–38 mm; ♀ 36–40 mm; app. ♂ 4 mm, ♀ 1.5–2 mm; hind wing ♂ 33–36 mm, pter. 2 mm, ♀ 35–38 mm, pter. 2 mm; fore wing ♂ 34–37 mm, pter 2 mm, ♀ 36–39 mm, pter. 2–2.2 mm.

Material examined

SURINAM: 1 ♀ Zanderij, upper Coropina Creek 1.I.1952 D.C.G.; 1 ♀ idem, reared 10.XII.1953 D.C.G.; 1 ♂ idem, 20.XII.1953 D.C.G.; 1 ♂ idem 26.XII. 1955 J. Belle; 3 ♀ idem 7.I.1956 J.B.; 1 ♂ idem 14.X.1956 J.B.; 1 ♂ 1 ♀ idem 4.I.1957 J.B.; 3 ♂ idem 13.I.1957 J.B.; 1 ♂ idem 24.I.1957 J.B.; 1 ♂ idem 15.I.1961 D.C.G.; 1 ♀ Republiek in shrubs along road to Vier Kinderen 27.XII.1939 D.C.G.; 1 ♂ idem Coropina-Creek 20.III.1955 D.C.G.; 1 ♂ Tibiti bushcreek in savanna 18.I.1949 D.C.G.; 1 ♂ idem swampcreek in forest 10.I.1949 D.C.G.; 1 ♀ Mapane Camp 8, 11.XII.1953 D.C.G.; 1 ♂ Wilhelmina Mts. Camp 3, 26.VIII.1963 P. H. Pijpers (all in Mus. Leiden); 1 ♀ Zanderij Pontji-Creek 31.I.1957 J. Belle; 2 ♂ idem 8.III.1958 J.B.; 1 ♂ idem 31.XII. 1958 J.B.; 1 ♂ idem 3.I.1959 J.B.; 3 ♂ idem 31.I.1959 J.B.; 1 ♀ (reared) idem 9.II.1959 J.B.; 1 ♀ idem 21.II.1959 J.B.; 1 ♂ idem 17.XI.1962 J.B.; 1 ♂ idem 24.XI.1962 J.B.; 2 ♂ 1 ♀ idem 6.I.1963 J.B.; 1 ♂ idem 30.V.1963 J.B.; 1 ♂ idem 28.VII.1963 J.B.; 1 ♂ idem 21.VI.1964 J.B.; 1 ♀ idem 27.V.1965 J.B.; 1 ♂ Dauwdropkamp 16.XII.1957 J.B.; 1 ♂ idem 31.XII. 1958 J.B.; 1 ♀ idem 28.XI.1959 J.B.; 1 ♂ Sabakoe-Creek 8.XII.1963 J.B.; 1 ♂ Distr. Marowijne, Mooi Wane 2.IV.1964 J.B. (all in coll. Belle).

BRAZIL: 15 ♂ 4 ♀ Pará, Obidos, Ourem (near Belém), Sulinam (Surinam?) (all in Brussels Mus.).

Distribution: Brazil, Pará, Amazonas, Perú, Surinam, Fr. Guyana (see also under larvae), (Br.) Guyana.

Aeschnosoma peruviana COWLEY (1934) belongs in my opinion to *Ae. forcipula* Selys. He remarks of it: "The species is nearest to *A. forcipula* but differs from the latter in the yellow spots on the thorax and second abdominal segments (not mentioned in SELYS (1871) description of *forcipula*), the longer anal appendages, and the possession of an extra cubito-anal cross-vein in the hind-wing". All these differences fall within the variation of the 15 *forcipula* females I could examine. After the recent death of Mr. COWLEY, it was not

possible to examine his type, but his description and figures agree with my material in all respects. The locality Rioja in Perú on the Rio Mayo, a tributary of the Rio Huallaga, is a part of the upper Amazon River and fits in the distribution of *forficula*, which is Amazonian for the greater part. The notes made by CALVERT (1948) on this species of an imperfect male from Kartabo (Guyana) confirms my opinion.

Aeschnosoma forcipula is the more common species of this genus. In Surinam it occurs on bush creeks in the savanna region with clear brown humus water, especially in the last and the first months of the year (small rainy season). Flying swiftly in an irregular way one or two feet high above the water surface, the males suddenly "stay" in the air when looking at the hunter, giving him a chance to net the specimen. The males are conspicuous by the emerald-green eyes and the yellow spots on the abdomen, but are otherwise invisible in the dark environment. The females are conspicuous by their yellow brown colour. During oviposition in the afternoon, the females rapidly strike the end of the abdomen several times in the middle of the flowing creek to and fro in irregular flight.

Aeschnosoma rustica Selys

(Fig. 6, 9–10, 13; Pl. IIb)

Cordulia rustica HAGEN, 1861. Syn. Neur. N. Am.: 315 (no description).
Aeschnosoma rustica, SELYS, 1871. Syn. d. Cordulines. Acad. Roy. Sc. Belg.: (87)–(88) (descr. ♂).
Aeschnosoma rustica, HAGEN, 1875. Syn. Odonata of Am. Boston Soc. Nat. Hist. *18*: 63 (no description).
Aeschnosoma rustica, KIRBY, 1890. Syn. Catal. Neur. Odon.: 53 (no description).
Aeschnosoma rustica, MARTIN, 1907. Cordulines Cat. Coll. Zool. Selys L. *17*: 59 (short diagn.), fig. 75 (right wings holotype) pl. II fig. 10 (err. 11) (coloured drawing of habitus).
Aeschnosoma rustica, COWLEY, 1934. Stylops *3* (4): 92 (in key to species).

This species is known from the male holotype only. It was described by SELYS (1871) and has been figured by MARTIN (1907), but the venation in his figure 75 is incomplete (no postnodals and cross-veins between R_1–M_1 in fore wing and no cubital cross-vein anterior

to subtriangle in hind wing), while the habitus figure on plate II is out of proportion concerning the form of abdomen, provided with slender appendices, although SELYS already noted the absence of them in the holotype. COWLEY (1934) has followed the description of SELYS and MARTIN in his key to the species of *Aeschnosoma* and gives the diagnosis as published by SELYS. The following notes and figures are based on a reëxamination of the holotype.

DESCRIPTION

Male (holotype). A short stoutly built species, lacking labium and abd. segm. 10 with the appendices. Face brown, clypeus lighter, frons on top and vertex with a faint blue reflection, both beset with short stiff hairs. Vertex swollen, hardly divided into two lobes. Antennae black (flagellum broken). Occipital triangle brown, on top with stiff hairs, at the back with a fringe of long fair hairs, forming the upper part of a row of such a fringe of hairs at the black rear of head behind the eyes.

Prothorax light brown, hind margin small, equally rounded. Synthorax at dorsum and at two side stripes dark brown with metallic blue reflection; humeral, mesepimeral and metepimeral stripes yellow, ventrum light brown. Legs black, except under side of fore femora (for the most part) and basal half of middle femora. Tibial keel present on the whole of hind tibia, along the apical two-thirds of middle tibia and nearly one-third at the fore tibia. Inner side of hind femur provided with two rows of short triangular spines of equal length, the tips directed distally.

Veins and pterostigma in wings black, membranule dark brown. Antenodals in fore and hind wings 11/7; subcostals (2nd series) 11–12/7; postnodals 5/8; poststigmals 3–4/3–4; substigmals 1/1; acc. bridge crossveins 1–2/1; supratriangulars 3/1; number of cells in t 3/2; subtriangle 3/0; cubital cross-veins 3/1; double row of cells between M_1–M_2 in fore wing starting under stigma, in hind wing about midway between nodus and stigma. One row of cells in Rspl an Mspl. In discoidal field 3 cells against triangle in fore wing and a row of double cells 3 cells long, followed by a row of four cells 3 cells long, the end enlarged to 8–9 cells at the hind margin. In hind wing the same with a row of two to three cells 2 cells long, then three rows under Mspl 3 cells long and enlarged to 11 cells at the margin. Anal loop long, heel to level of middle fork of M, with two to three cells in the proximal row and 16 cells in total. One cell under anal loop to hind margin and three rows of cells in maximum in anal field. Anal triangle 2-celled.

Abdomen short and stoutly built, segm. 2 and 3 slightly swollen, no constriction at segm. 3, the segments 7–9 depressed. Colour: dark brown, lighter basal spots visible on segm. 3–9, those on segm. 6 small, on segm. 7 enlarged. Under side of segm. 7 dilated and thickened in the apical inner part of the ventral carina, armed with a row of stiff hairs from small to long ones. Genitalia on second segm.: lamina anterior very low, consisting of a proximal triangular ridge and two black stalks, diverging to the outer base of hamuli; hamulus with an extremely high and rounded inner lobe, on top with a brush of long hairs, and a much lower rounded outer lobe, bearing a recurved hook at the end; genital lobe minute, finely pointed, the tip directed backward. Penis short and thick, not well visible. Auricles minute, simply rounded.

Total length 38 mm; abd. (segm. 1–9) 25 mm (not 30 as given by SELYS), appendices wanting; hind wing 28 mm, pterostigma 2 mm; fore wing a little more than 28 mm, pterostigma 2 mm, hind femur 6.5 mm.

Location: Brazil, Bahia.

Material examined.

BRAZIL: 1 ♂ (holotype) Bahia, Sello col. (Mus. Berlin).

MARTIN (1907) records also one male from Surinam (in coll. SELYS) but it was not there when I inspected this collection on July 27, 1967. This is in accordance with the original description of SELYS fo the specimen from Bahia.

Aeschnosoma auripennis spec. nov.

(Fig. 26–27; Pl. IIa)

DESCRIPTION

Female (holotype). Mouthparts yellow, labrum orange coloured, clypeus olive, anteclypeus a little darker, frons and vertex dull brown, slightly bluish shining. Vertex prominent with two points; occipital triangle dark brown, rear of head pale brown.

Synthorax smooth brown, no yellow side stripes present. Legs uniformly brown, tarsus darker; length of hind femur 9 mm.

Wings smooth yellowishly tinged, at wing bases a large golden spot to end of triangle in hind wing and diffusely ending at triangle in fore wing; pterostigma leather brown, membranule dark grey, extending to fourth anal cell in hind wing. Venation in fore and hind wings; antenodal cross-veins 16–17/11; subcostals (2nd series) 16/11–12; postnodals 9–10/10–11; poststigmals 3/3; substigmals 2/1; between M_1 and M_2 two rows of cells beginning 2 cells before pterostigma in fore wing and 3–4 cells in hind wing; acc-bridge cross-veins 2/1; cubitals 3/2; supratriangulars 3/1; number of cells in ti 3/; in t 3/3; discoidal field with 3 cells against distal side of t and two rows of cells 7–8 cells long in fore wing, 4 cells long in hind wing, enlarged at hind margin to 9–10 cells in fore wing and to 12–13 cells in hind wing. Rspl 8–10/11 in one row; Mspl 6–7/7 in one row. Anal loop elongate, heel at level of middle fork of M, with 3 cells in first row and 30–31 cells in total. One row of cells between end of anal loop and hind margin. Anal field in hind wing with 4 rows of cells between anal loop and hind margin.

Abdomen slightly swollen in the first two segments, otherwise tapering to the end, last 3 segments somewhat depressed. Colour: smooth dark brown, a black stripe at middorsal carina of segm. 8, a larger middorsal black spot on segm. 9 and one at hind margin of segm. 10. Bases of segm. 9 and 10 reddish brown. Appendices black, simple, short and straight, a little longer than abd. segm. 10, end tips pointed. Subgenital plate of segm. 9 large and flat, with a fine yellow midventral stripe on the hardly visible keel, end margin rounded in a flat curve, just surpassing hind margin of segm. 9. Valvula vulvae on ventral hind margin of segm. 8 sclerotized to a semicircular dark brown plate with two small outstanding lobes around the centre.

Total length 49 mm; abdomen incl. app. 37 mm; appendices 1.5 mm; hind wing 41 mm, pterostigma 2.1 mm; fore wing 43 mm, pterostigma 2.3 mm.

This holotype female was taken along the upper Coropina-creek near Zanderij in SURINAM, 6.II.1946 D.C.G., when it was resting at midday on the under side of a palm leaf in savanna forest. The type is in the collection of the Leiden Museum. Five female paratypes of this species are present in the collection of Mr. J. BELLE (Arnhem, The Netherlands) all collected by himself in Surinam. Four of these are found also in the upper courses of the savanna creeks near Zanderij and one is from Ricanau bauxite mine near Moengo in Eastern Surinam.

They all agree very well with the type specimen but have the abdomen more reddish brown with the last three segments darkened, while in two specimens the wing tips are a little smoky. One female has the wings brown tinged, especially around the veins and the pterostigma dark brown, but the golden basal spots are as described for the type. There is some variation in the number of cells in the triangles, viz: 3.3/3.3 (twice); 4.3/3.2; 3.3/2.2; 3.2/2.2. The number of cells in the anal loop in hind wings varies as follows: 30.32; 31.32; 31.28; 31.29; 29–29. In all the hind wings four rows of cells are present in the anal field between anal loop and hind margin.

One of the females from Zanderij was reared by Mr. BELLE from an adult larva (Dauwdropkamp 19.II.1959). Otherwise the paratypes were collected: 1 ♀ Zanderij, Dauwdropkamp 30.XII. 1959 J.B.; 1 ♀ Zanderij, Troelinde Creek 8.I.1959 J.B.; 1 ♀ Zanderij Gallery forest 28.IV.1957 J.B.; 1 ♀ Moengo, Ricanau Bauxite Mine 6.X. 1956 J.B.

Total length 50–52 mm; abd. + app. 37–39 mm; hind wing 40–42 mm; fore wing 42–43 mm.

The females are so characteristic by wing venation and genitalia, differing in this respect from those of *elegans* and *forcipula* that I do not hesitate to name this species, in spite of the fact that the male is not yet known. The venation in the male of *A. rustica*, of which the female is unknown, deviates in such a way from the other species of *Aeschnosoma* that these females can not belong to that species.

LARVAE OF AESCHNOSOMA

Hitherto the larvae of the species of *Aeschnosoma* have not been described. Here they are represented by two of them, viz. *Ae. forcipula* Selys and *Ae. auripennis* sp. nov. Of both species some larvae and numerous exuviae were picked up from the savanna-creeks near Zanderij, or in some other places in Surinam. In three cases the species were reared from ult. larvae by Mr. J. BELLE and myself, by which their identity is now confirmed. They are much alike, having in common a pair of extremely long lateral spines on abd. segm. 9, suggesting long cerci. Otherwise their body is very spiny, covered especially on the sides of the abdomen with hooked

setae. It is likely that by means of these setae small particles from the bottom of the creeks are easely fastened, in this way resulting in a kind of camouflage in their environment as it occurs commonly in many other species of dragonfly larvae.

The two species of larvae under consideration, may be distinguished as follows:

a. Abd. segm. 8 with lateral spines straight and directed backward to base of those on segm. 9. Between antennae one row of curved setae in two groups of four or five. Mask with 10 mental setae and about 20 strong short setae along outer margin of prementum; lateral lobe with 7 setae and with about 12 crenulations along outer margin . . . . . *forcipula* Selys
b. Abd. segm. 8 with lateral spines much shorter, directed laterocaudad, not reaching level of lateral spines on segm. 9. Between antennae two groups each of about seven curved setae. Mask with 9 mental setae and no more than 10 curved setae on outer margin in distal half of prementum; lateral lobe with 8 setae and 9 crenulations on outer margin . . . . . *auripennis* sp. n.

Larva of *Aeschnosoma forcipula* Selys

(Fig. 28–33, 37)

DESCRIPTION

Head wider than long, widest accross the eyes, these rounded at the outer margin but pointed inward to the median at dorsum of head. Between the bases of antennae a sharp ridge, armed backward with about 10 short triangular setae, arranged in two groups of four or five. Occiput rounded, back nearly straight, slightly concave; at the hind corners on each side a process with 5 short claw-like dents and more proximad to the eyes also two rows of such dents. Antennae seven-jointed, scapus shorter than pedicellus, the following joints of flagellum of about equal length. Their length in mm is: 0.9, 1.4, 2, 1.9, 1.9, 1.8, 1.9.

Mouth parts: labrum simple, shoe-like, corners rounded, outer margin nearly straight, hardly concave, fringed with long hairs. Mandible right side: outer row with 5 dents, inner row with 2 smaller and one bigger round knob. Left mandible with 4 dents on upper margin and with two knobs on inner part, the biggest one with two "kernels" at the upper side. Maxillae: seven large dents on top of inner lobe followed by a row of 9 or 10 larger spines and some long hairs; outer lobe (palpus) pointed at the end, outer side beset with many long bristle-like hairs. Left and right maxilla of the same structure. Labium (mask) with prementum rectangular, inner

side with 10 setae each side (the five marginal setae the longest); side margins of prementum each with about 20 short claw-like spines from base to 3/4 of its length; at its distal end, just under base of lateral lobe, there is a large triangular dent. Median lobe of prementum high and prominent, the steep sides beset with low crenulations along the margins, intermitted by small spines, of which there are two on top. Lateral lobe broad triangular, 7 long setae along inner side of lateral margin, a relatively short movable hook and on the outer margin 12–13 crenulations about twice as high as wide, on top of each one, two or three spines. Inner margin with a number of long flat setae (about 17) fastened in the thickened margin. At base of lobe one bigger and two smaller setae.

Prothorax: hind margin finely fringed with a row of short hairs. The same is present along the upper and side margins of synthorax, which is otherwise beset with short spine- like hairs, except for two intermediate spaces before the middle and the hind coxae respectively. Wingpads with rows of short setae over the main veins, tops reaching backward to bases of abd. segm. 6. Legs long stalked, femora faintly marked by two darker rings, on the margins rows of short spines, these more numerous on hind tibia than on middle and fore tibia; tarsus on the underside of the three joints a double row of simple setae (on the second joint of fore leg some trident setae). Claws long and simple. Length of the different parts in mm is:

	I	II	III
Femur	3.8	6.3	7.6
Tibia	5.5	6.8	8.–
Tarsus	2.4	3.–	3.5
Total length	11.7	16.1	19.1

Abdomen longer (11.4 mm) than wide (8 mm), widest on segm. 7. Dorso-lateral side of abdominal segments 1–8 provided with a number of strong claw-like curved setae, arranged more or less in three rows, covering the transverse distance of the segments from 1/5–1/4 in the first five segments, to 1/2 in maximum on segm. 7 and to 1/3 on segm. 8. On the lateral margins of segm. 9 only a few of such setae and none on segm. 10. Side spines on segm. 8 as long as this segment, reaching caudad to 3/4 length of segm. 9; side spines on segm. 9 extremely long, about 4–5 times as long as this segment, directed caudad and a little curved inward, the tops pointed, the sides and dorsum covered with spines and hairs. Segm. 10 very short and concentrated on the dorso-distal end of segm. 9. Appendices short triangular, pointed; cerci a little shorter than epiproct and this one somewhat shorter than paraprocts. No dorsal hooks in the median line, the distal margin of the segments bearing a dense row of fine short hairs. Underside of abdomen flat, the side lobes and the median ventral area spiny and hairy, as on dorsum. Described after one exuvium found in a small savanna-creek at Zanderij, Surinam, crossing path to Hannover 9.IV.1957 D.C.G.

Total length 27 mm, max. width of head across eyes 6 mm, max. width of abdomen (segm. 7) 8 mm, length abd. + app. 11.4 mm, length side spines abd. segm. 9, 7.7 mm

Material examined

SURINAM: 34 exuviae (in coll. Geijskes now in Mus. Leiden) and 26 exuviae in coll. J. Belle (Arnhem) from the following localities: 1 ex. Upper Coropina-Creek, Zanderij 4.IV.1942 D.C.G.; 2 ex. idem 29.X.1949 D.C.G.; 1 ex. idem 6.II.1946 D.C.G.; 1 ex. idem 30.IV.1951 D.C.G.; 1 ex. idem 20.I.1957 D.C.G.;

3 ex. idem 27.VIII.1961 D.C.G.; 2 ex. Troelinde-Creek Zanderij near Railroad 14.I.1943 D.C.G.; 2 ex. sav.-creek crossing road to Hannover near Zanderij 13.XI.1949 D.C.G.; 1 ex. Pontji-Creek Zanderij 8.I.1947 D.C.G.; 1 ex. idem 4.I.1959 D.C.G.; 1 ex. Coropina-Creek Republiek 25.III.1963 D.C.G.; 1ex. Sabakoe-Creek near Zanderij 29.III.1963 D.C.G.; 1 ex. Carolina-Creek 7.IV. 1962 D.C.G.; 1 ex. sav.-creek near Matta 9.III.1954 D.C.G.; 6 ex. Table Mt., Walmsley-Creek (600 m) 5.XI.1943 D.C.G.; 1 ex. Kappelsavanna, in creek crossing trail to upper Saramacca River 14.III.1958 D.C.G.; — 2 ex. Pontji-Creek, Zanderij 31.XII.1958 J.B.; 1 ex. idem 21. II.1959 J.B.; 1 ex. idem 24.XII.1961 J.B.; 1 ex. idem 6.I.1962 J.B.; 1 ex. idem 15.IV.1962 J.B.; 1 ex. idem 9.V.1962 J.B.; 1 ex. idem 27.X.1962 J.B.; 3 ex. idem 17.XI.1962 J.B.; 1 ex. idem 10.III.1963 J.B.; 2ex. idem 28.IV.1963 J.B.; 1 ex. idem 17.XII, 1963 J.B.; 1 ex. Dauwdrop-Camp 29.VIII.1958 J.B.; 1 ex. Bosbivak 26.XI. 1961 J.B.; 4 ex. idem 29.XII.1963 J.B.; 2 ex. Troelinde-Creek Zanderij 22.IV.1962 J.B.; 2 ex. Marowijne Distr., Mooi Wane- Creek 2/3.I.1964 J.B. (all in coll. J. Belle).

FRENCH GUYANA: 1 ex. Balata-Creek, Rochambeau, 7.XII.1954 D.C.G. (Mus. Leiden).

BRAZIL: Manaus 14.XI.1915 1 ex. Exp. Roman (Mus. Leiden).

On account of these data of the collected exuviae in Surinam, there seems to be a top in the period of November to January, with a smaller one in April. This means that most of the imagines appear after the main dry season (Sep.-Nov.) which is in accordance with the number of the collected imagines. It suggests a breeding period of about nine to ten months, including the main rainy season from May to August.

Larva of *Aeschnosoma auripennis* sp.n.

(Fig. 34–36, 38)

DESCRIPTION (after one exuvia from upper Coropina-Creek, 30.IV.1951).

In general very similar to the larva of *Ae.forcipula*. Beyond the ridge between the bases of the antennae there are claw-like curved setae in two bundles of 7 large setae and a few smaller ones. Length of joints of antennae are: scapus 0.30 mm, pedicellus 0.45 mm, flagellum 0.64 mm, 0.54 mm, 0.60 mm, 0.57 mm, 0.47 mm.

Mouth parts: labrum and maxilla as in *forcipula*, in left mandible five dents in the outer row (four in *forcipula*) i.e. the first side dent more distinct; labium mental setae at each side nine (sometimes with an additional smaller one), side margin of prementum with 7–9 curved setae in the basal half; lateral lobe with 8 long setae and a moderately long movable hook, 9 crenulations on the distal margin, these lower than in *forcipula*, each provided with one to four spine-like setae. Along inner margin of lateral lobe a number of such spine-like setae in its distal half, three small setae at base of lobe and some short spines at the external (outer) corner.

Wing pads reaching caudad to base of abd. segm. 7, margins and veins dentated. Middle and hind legs very long (longer than in *forcipula*), femora more curved, dark

brown, basal third paler. Setae on tarsal joints simple, those at distal end of fore tibiae trident, claws longer than in *forcipula*. Length of the different parts in mm is:

	I	II	III
Femur	5.3	7.1	8.4
Tibia	6.5	9.–	10.6
Tarsus	2.3	2.5	3.–
Total length	14.1	18.6	22.–

Side spines on abd. segm. 8 hook-like, curved upward and directed laterocaudad, top reaching level of basal third of segm. 9. Side spine on abd. segm. 9 very long, but shorter than in *forcipula*, about 3 times as long as segm. 9, slightly curved inward and more hairy to the end. Appendices of segm. 10 shorter and broader, cerci thicker than in *forcipula*, tips pointed.

Measurements: total length 24 mm, max. width of head across eyes 6 mm, max. width of abdomen (segm. 7) 6.5 mm, length abd. + app. 10 mm, length side spines segm. 9, 6 mm.

Material examined

SURINAM: 1 ex. upper Coropina-Creek, Zanderij 30.IV.1951 D.C.G. (Mus. Leiden); 1 ex. Troelinde-Creek 14.X.1962 J.B.; 2 ex. Dauwdrop-Camp 29.VIII.1958 J.B.; 4 ex. idem 25.X.1958 J.B.; 1 ex. idem 19.II.1959 (♀ reared) J.B. (in coll. Belle).

The scanty material shows a development as pointed out for *Ae. forcipula*, with a maximum of exuviae in October.

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EXPLANATION OF FIGURES

Fig. 1–2. *Lauromacromia dubitalis* (Fraser). – 1. Male genitalia and auricle on 2nd abd. segm. from left side of holotype from St. Laurent du Maroni, French Guyana (Free hand sketch by Dr. M. A. LIEFTINCK, Oct. 1967). – 2. Abd. segm. 10 and anal appendices in dorsal and lateral view of holotype (After FRASER 1939).

Fig. 3–5. *Paracordulia sericea* (Selys). – 3. Female genitalia from ventral side of allotype from Coppename, Surinam. – 4. The same in left side view. – 5. Male genitalia on 2nd abd. segm. seen from left side of paratype from Pará, Brazil.

Fig. 6. *Aeschnosoma rustica* Selys. – Right wing pair of male holotype from Bahia, Brazil.

Fig. 7. *Aeschnosoma elegans* Selys. – Male genitalia and auricle on 2nd abd. segm. from right side of allotype from Nassau Mts., Surinam.

Fig. 8. *Aeschnosoma forcipula* Selys. – Male genitalia and auricle on 2nd abd. segm. of specimen from Zanderij, Surinam.

Fig. 9–10. *Aeschnosoma rustica* Selys. – 9. Male genitalia and auricle on 2nd abd. segm. of holotype from Bahia, Brazil; la lamina anterioris, ha hamulus, li lobus interioris, le lobus exterioris, lg lobus genitalis, au auriculus. – 10. Male genitalia of holotype in ventral view; indication of details as in foregoing.

Fig. 11. *Aeschnosoma elegans* Selys. – Underside of abd. segm. VII and VIII of male allotype from Nassau Mts., Surinam.

Fig. 12. *Aeschnosoma forcipula* Selys. – Underside of abd. segm. VII and VIII of male from Zanderij, Surinam.

Fig. 13. *Aeschnosoma rustica* Selys. – Underside of abd. segm. VII of male holotype from Bahia, Brazil.

Fig. 14–16. *Aeschnosoma elegans* Selys. – 14. Male appendices in dorsal view of allotype from Nassau Mts., Surinam. – 15. The same in left lateral view. – 16. The same in ventral view.

Fig. 17–19. *Aeschnosoma forcipula* Selys. – 17. Male appendices in dorsal view of a male from Zanderij, Surinam. – 18. The same in left lateral view. – The same in ventral view.

Fig. 20–23. *Aeschnosoma elegans* Selys. – 20. Last abd. segments with appendices in dorsal view of female holotype from Pará, Brazil – 21. The same in ventral view. – 22. The same of a female from Nassau Mts., Surinam. – 23. The same specimen in left ventral view.

Fig. 24–25. *Aeschnosoma forcipula* Selys. – 24. Genitalia and appendices in ventral view of a female from Zanderij, Surinam. – 25. The same in left lateral view.

Fig. 26–27. *Aeschnosoma auripennis* n. sp. – 26. Genitalia and appendices of female holotype from Zanderij, Surinam. – 27. The same in left lateral view.

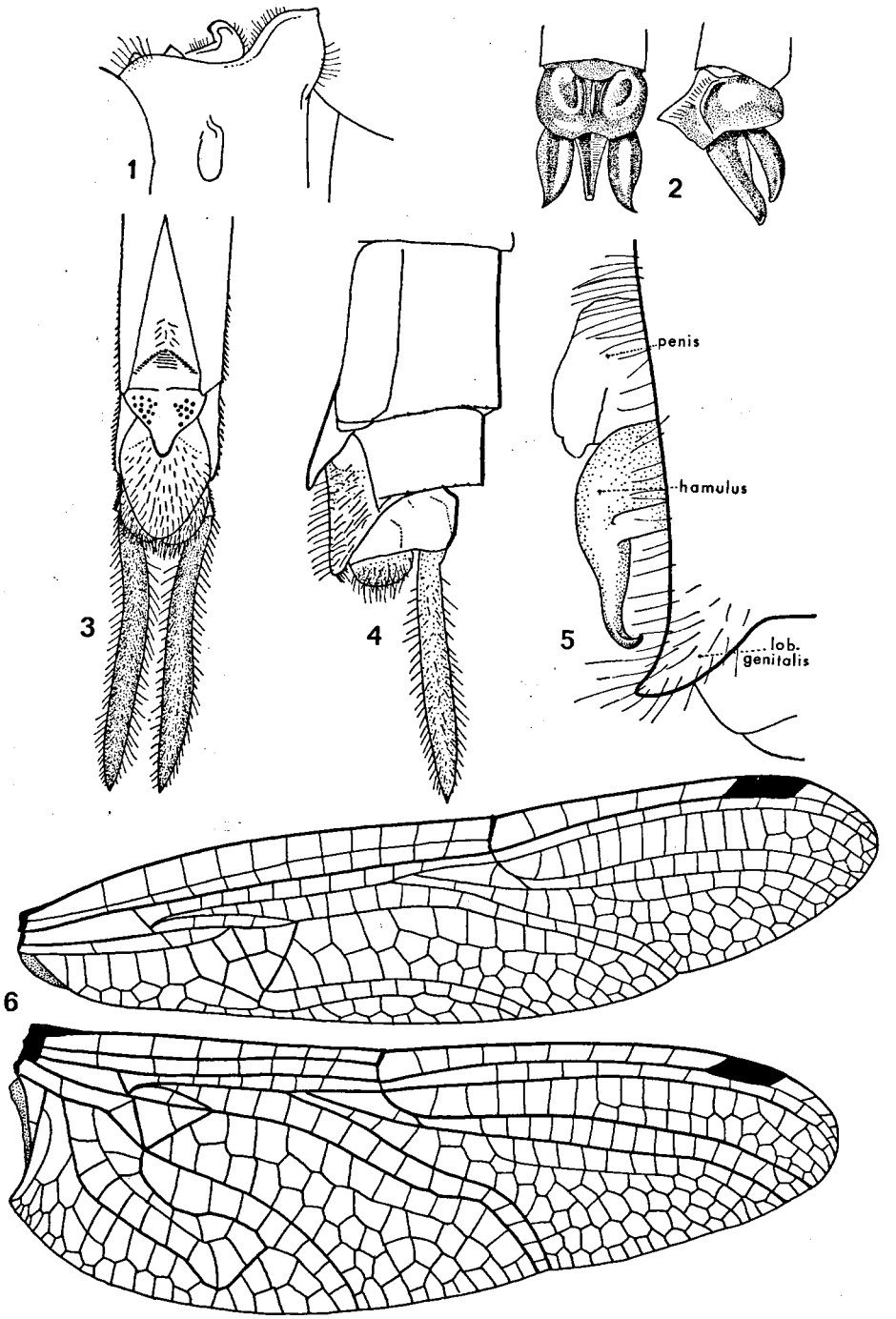
Fig. 28–32. *Aeschnosoma forcipula* Selys. – 28. Habitus of larva (exuvia) in dorsal view from Zanderij, Surinam. – 29. The same, L. antenna. – 30. The same, L. mandible, inner side. – 31. The same R. mandible, inner side. – 32. The same, R. maxilla, ventral side.

Fig. 33. *Aeschnosoma forcipula* Selys. – Vertex of larva (exuvia) from Zanderij, Surinam.

Fig. 34–36. *Aeschnosoma auripennis* sp. n. – 34. Vertex of larva (exuvia) from Zanderij, Surinam. – 35. The same, R. antenna. – 36. The same, lateral spines on abd. segm. VIII and IX, right side.

Fig. 37. *Aeschnosoma forcipula* Selys. – Right half of prementum and side lobe of larva (exuvia) from Zanderij, Surinam.

Fig. 38. *Aeschnosoma auripennis* sp. n. – Right half of prementum and side lobe of larva (exuvia) from Zanderij, Surinam.



Figs. 1–6: Explanation on p. 35.

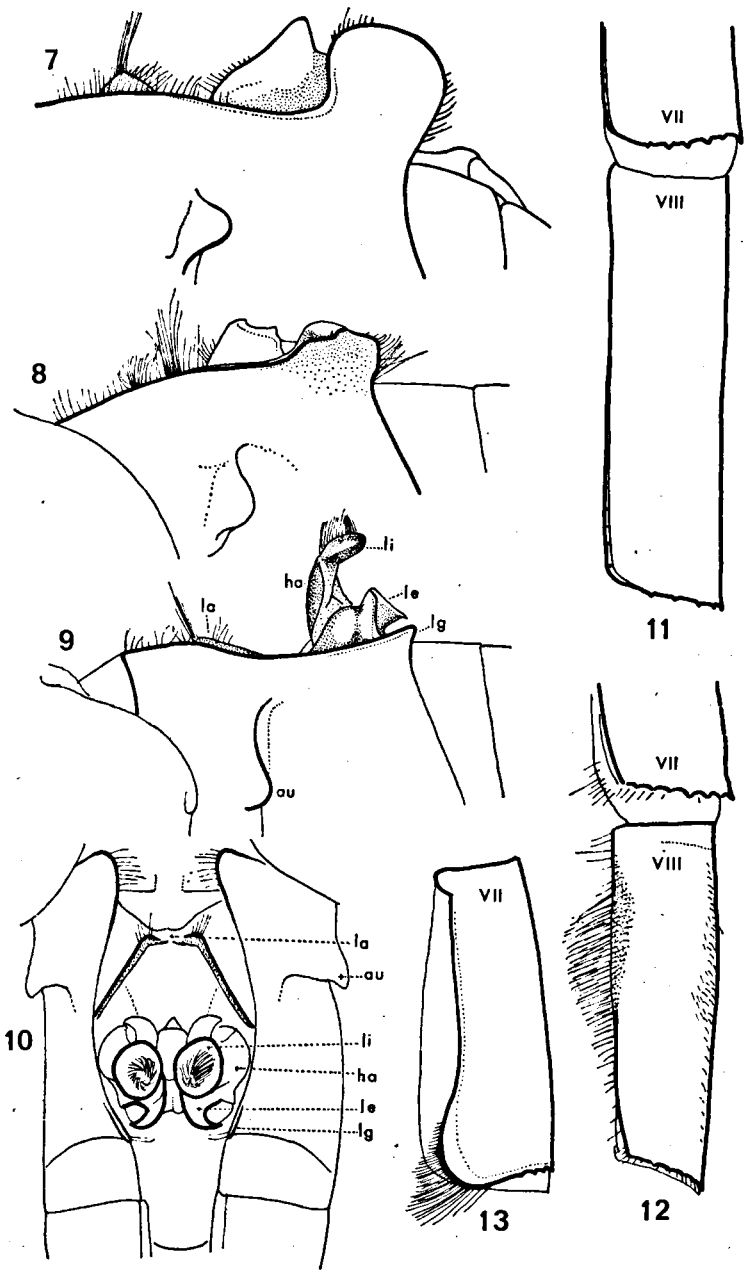


Fig. 7–13: Explanation on p. 35.

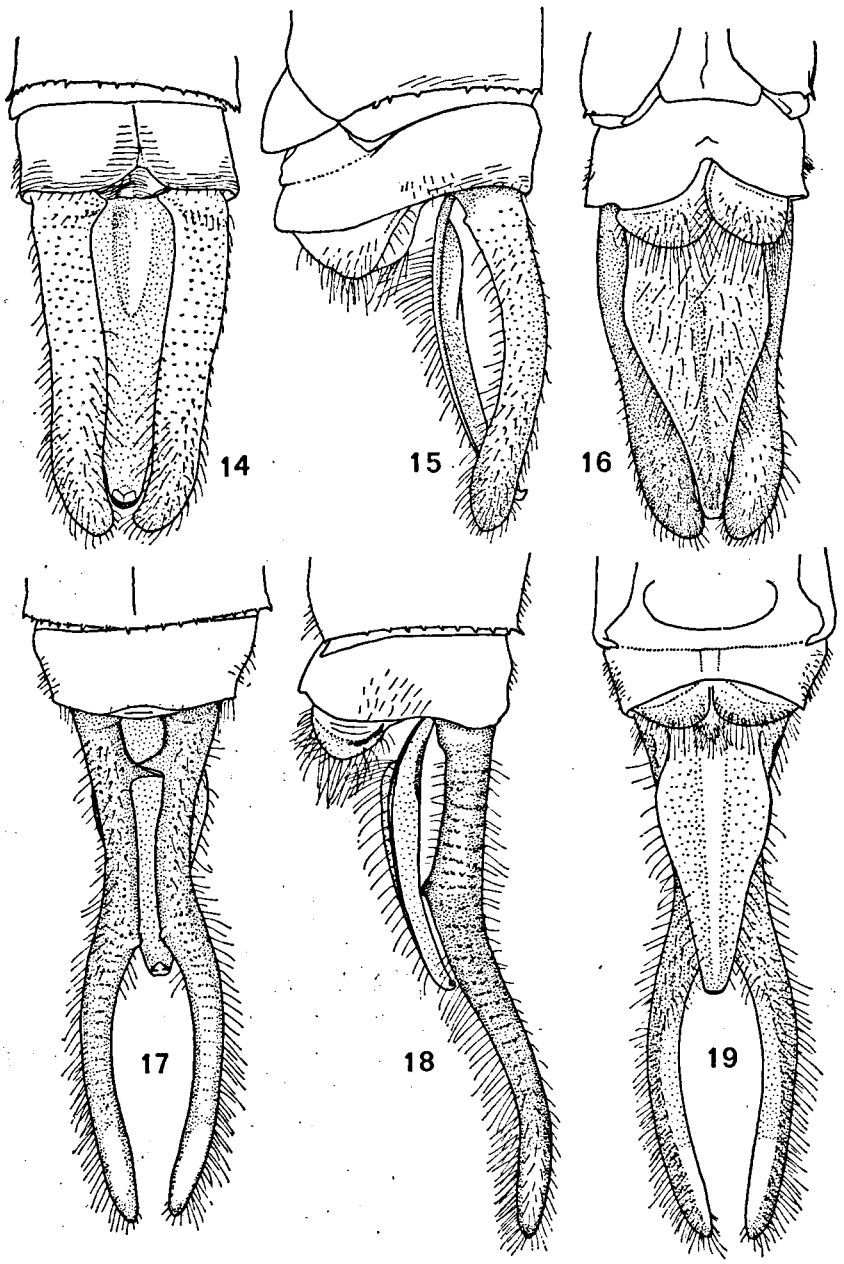


Fig. 14–19: Explanation on p. 35.

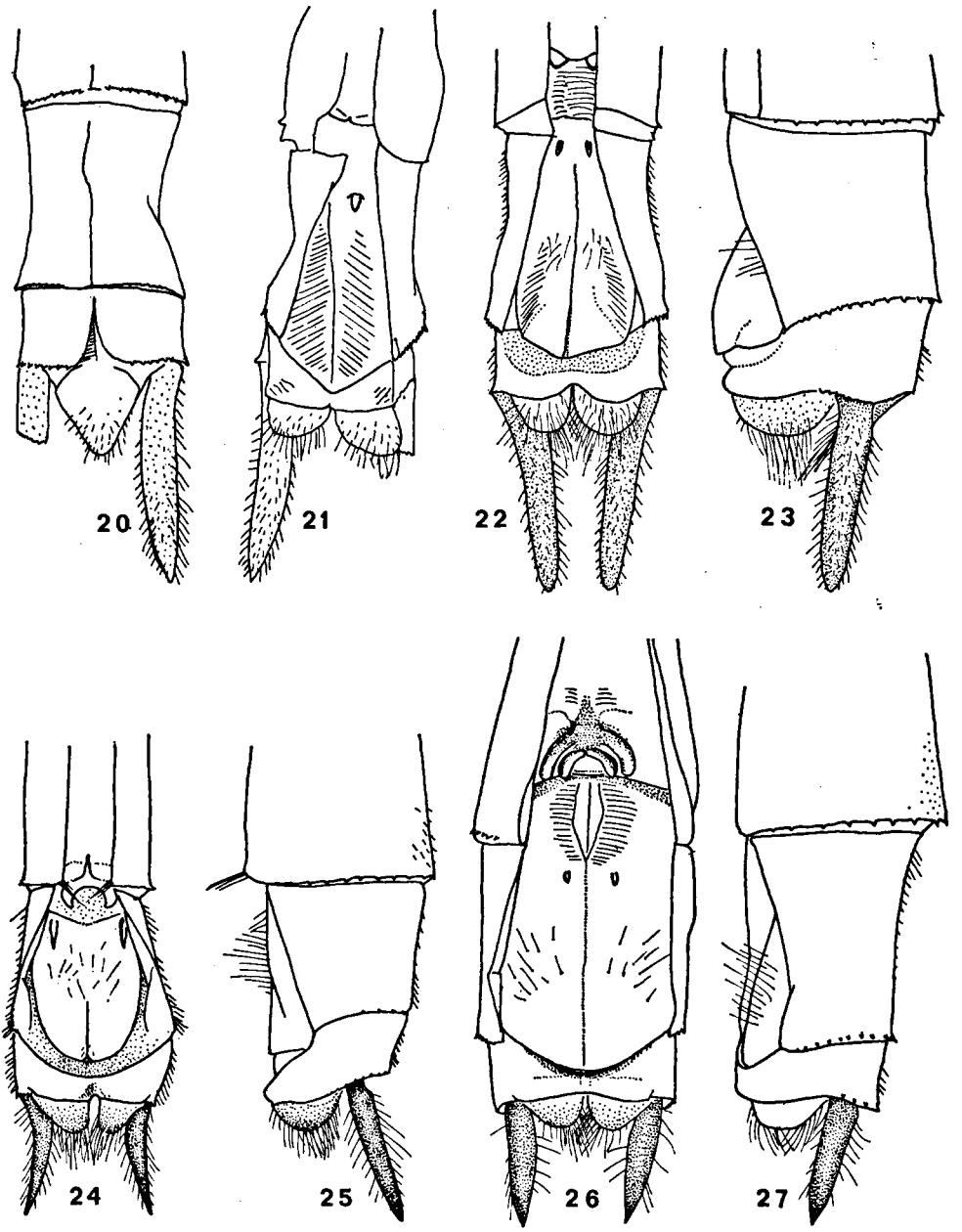


Fig. 20–27: Explanation on p. 35.

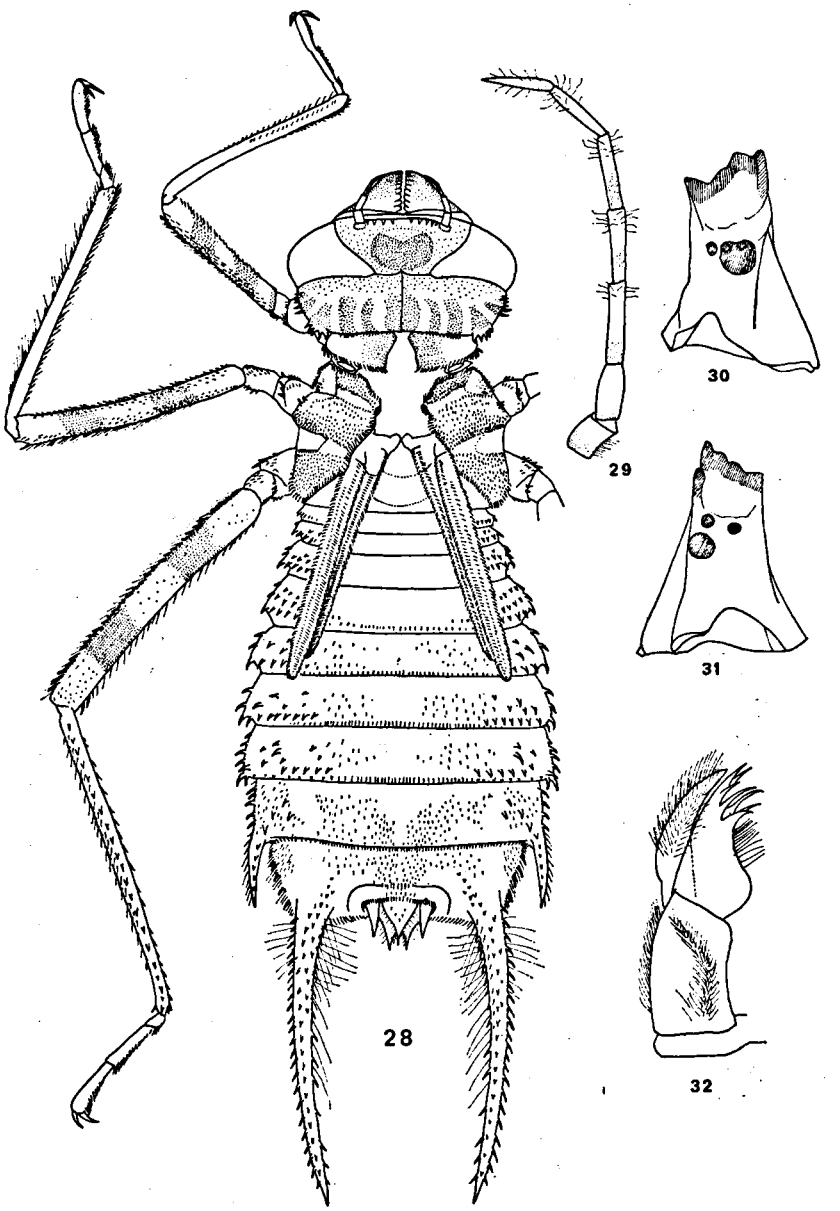


Fig. 28–32: Explanation on p. 36.

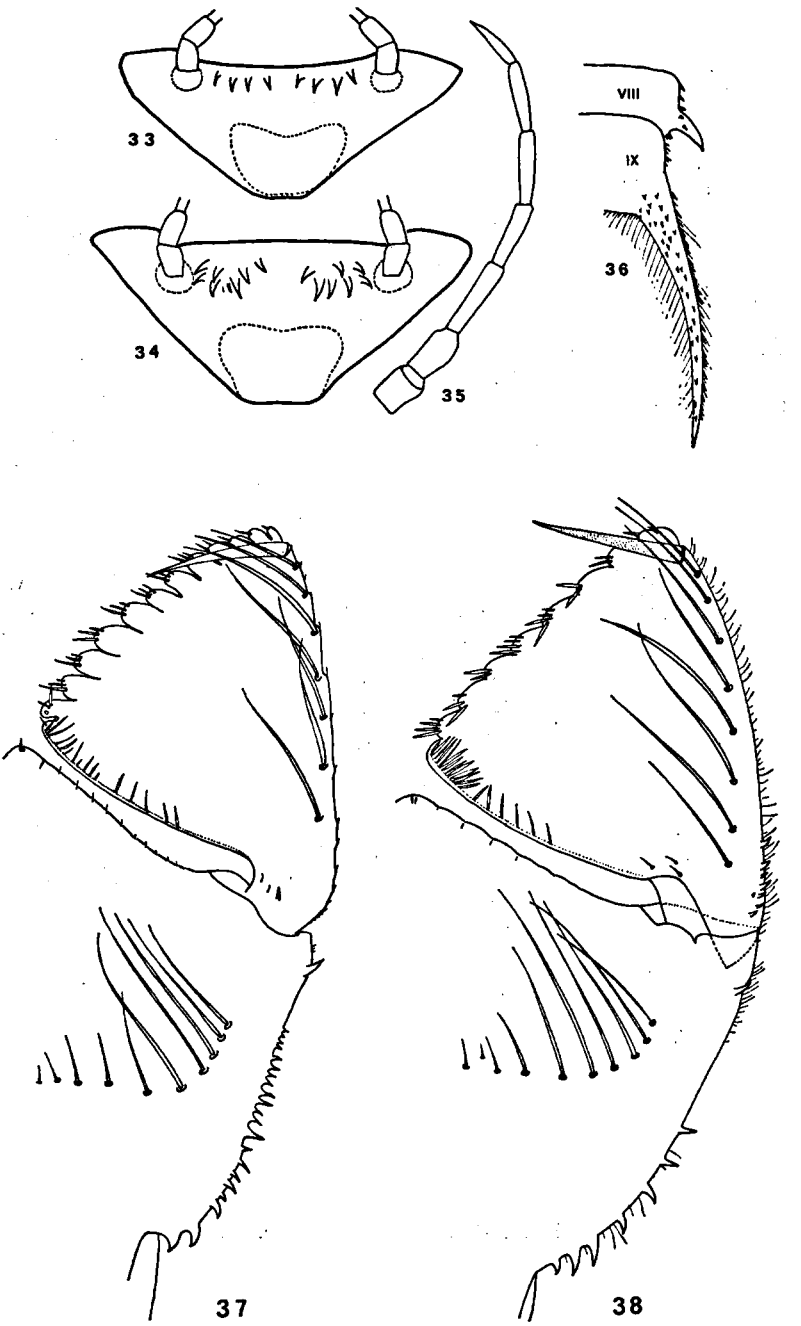
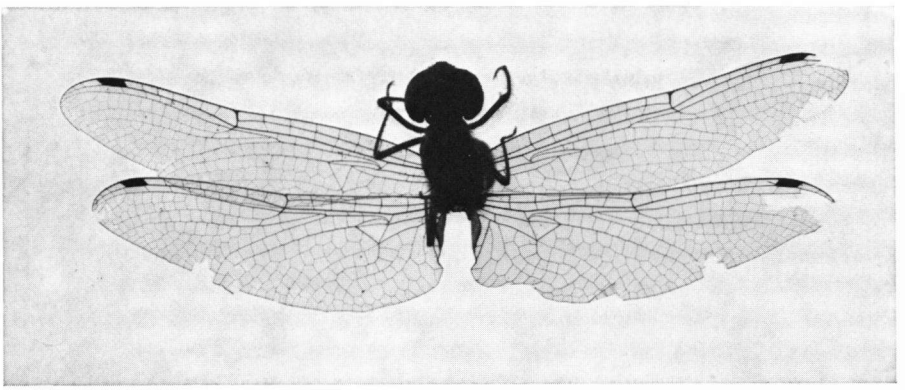
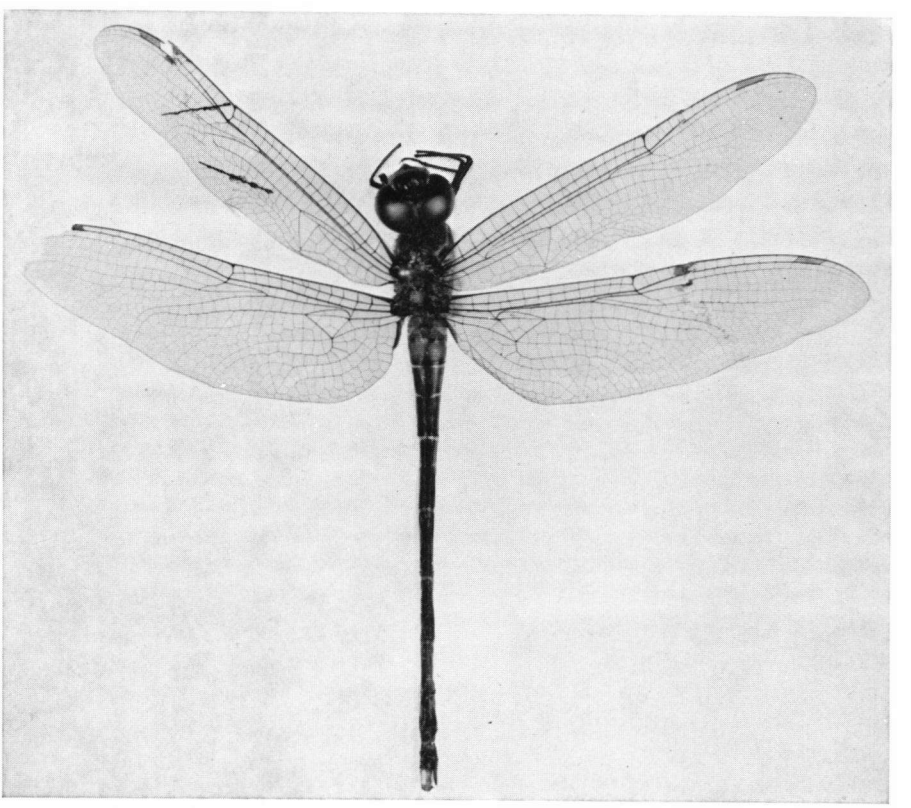


Fig. 33–38: Explanation on p. 36.

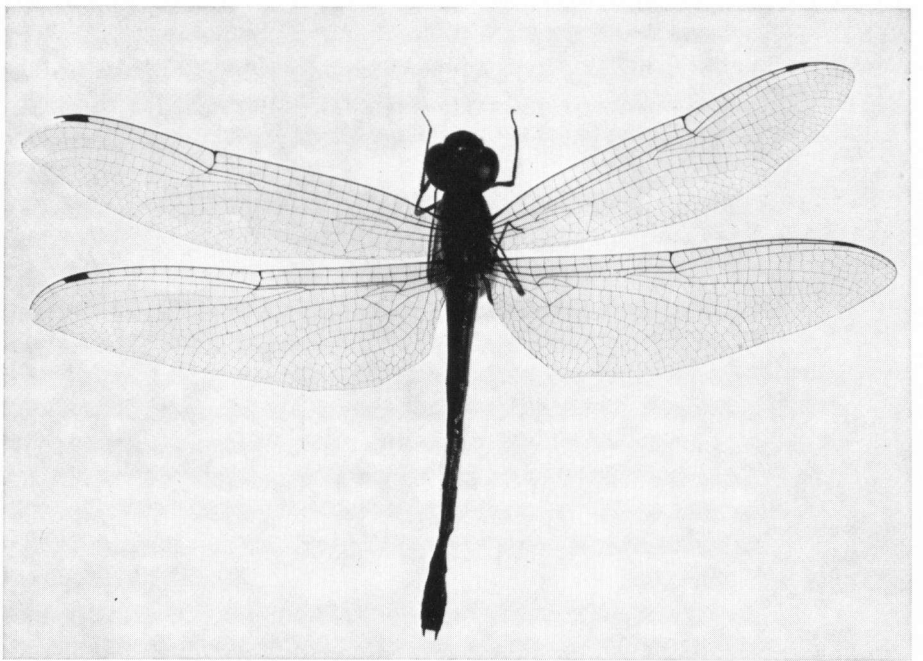


Ia. *Dorocordulia errans* Calvert, ♂ holotype from Chapada, Brazil. – Head replaced by that of some Libelluline; abdomen broken, not missing (Mus. Comp. Zool., Cambridge, Mass.).

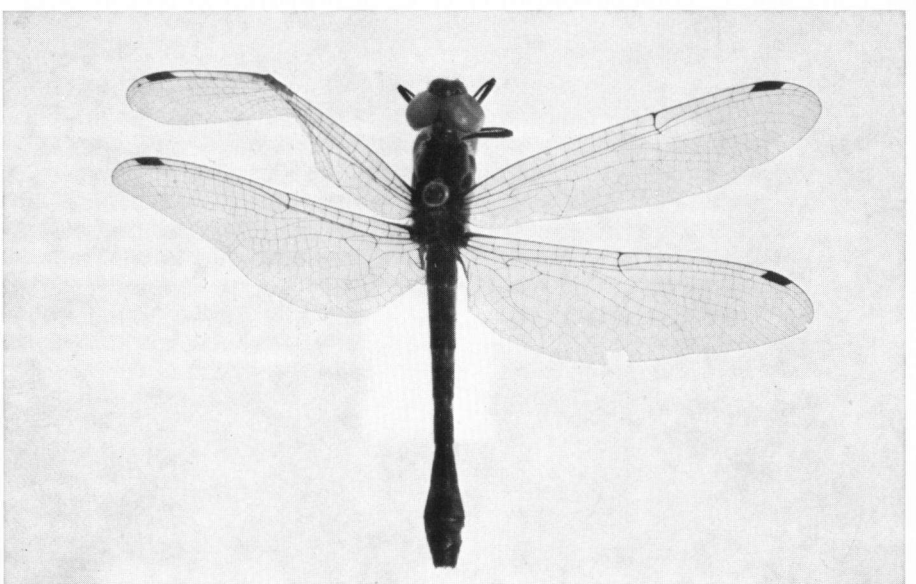


Ib. *Aeschnosoma elegans* Selys, ♀ holotype from Pará, Brazil (Mus. Brussels).

PLATE II



IIa. *Aeschnosoma auripennis* sp. n., ♀ holotype from Zanderij, Surinam (Mus. Leiden).



IIb. *Aeschnosoma rustica* Selys, ♂ holotype from Bahia, Brazil (Mus. Berlin).