

Longfield 1945 7

The Odonata of South Angola

Results of the Missions Scientifiques Suisses 1928-29, 1932-33

by

CYNTHIA LONGFIELD F.R.E.S.

British Museum (Natural History)

Introduction

The descriptions of the new genera and species, are followed by an annotated list of all dragonflies collected by Dr. ALBERT MONARD during two expeditions to south Angola. The Odonata collected during the first expedition, from July 1928 to February 1929, were submitted to the late Dr. F. F. Ris of Rheinau for classification. The latter described 4 new species out of 27 identified and published the results in the *Revue Suisse de Zoologie* in 1931. Dr. MONARD returned to the same country as leader of a second expedition in April 1932 until October 1933, and after the death of Dr. Ris, he submitted the collection to me for determination, a task I completed in 1939. I regret the long delay in publication of these important results, partly due to the War. This collection was richer than the first in new species (9), 2 being new genera. Only 10 of these species had been taken on the first occasion, so the total list amounts to 77, including 2 new genera and 13 new species. This introduction is followed by geographical notes compiled by Dr. MONARD himself, at my request, and in them the type localities are marked with an asterisk (*). It will be seen, that the country is mostly high plateau land, with a fair amount of trees, and is generally very well watered. The types

were found on both sides of the divide, which is roughly identical with the Lobito Bay railway. This country seems to differ little from the adjacent Congo territory, and it is surprising to find such a high percentage of new species. All the other species are found in the Congo and have a central, south and east african distribution, rather than a west african. I have included in the list all the species determined by Dr. Ris and previously published (¹), in order to bring the results of these important collections into one paper.

I will also take this opportunity to point out, that the drawings of the genitalia for *Tritheimis arteriosa* BURM, and for *T. monardi* Ris have been interchanged on page 109 of the *Revue Suisse de Zoologie*, 1931. Fig. 4 is the correct drawing for *T. monardi* Ris.

Geographical Notes (¹)

The places in Angola in which the *Odonata* were captured by the two Swiss Scientific Missions, are (²):

* *St. Amaro*, 26 miles E. of Nova Lisboa (on Lobito Rly.). Well-watered and hilly country with mesophile forests. About 5,100 feet high. Stay in Sept. 1928.

* *Bimbi*, 74 miles N. of Nova Lisboa. Plateau 3,900 feet high surrounded with lofty mountains. More tropical in character than the other stations. Numerous rivulets flowing into the R. Kévé. Stay in Oct. 1932.

* *R. Chimporo*, to the W. of Kuvangu. A stagnant river transformed into a long marsh with green-scummed pools here and there. Stay in Nov. 1928.

* *Ebanga*, 20 miles N. E. of Ganda. Well-watered plateau with pools and rivers flowing into the Çatumbela. Partly cultivated or wooded with mesophile forests. Stays in Aug. 1928, Nov. and Dec. 1932.

Elendé, 33 miles E. of Ebanga. Same character as this station with mountains and rivers. Stay in Nov. 1932.

* *Kalukembé* (Caluquembé), 27 miles W. of Caconda. High-wooded plateau 5,100 feet in alt. with numerous rivers belonging to the Kunéné basin. A few hills. Stays in Aug. 1928, Dec.-Jan. 1932-33.

Kakindo (Caquindo), on the R. Kuvangu, 94 miles S. E. of Vila da Ponte. Small native village on a wooded high plateau, at a height of about 3,900 feet. Thin, rather xerophile forest, with Berlinias and Acacias. No other water than the river. Oct. 1928.

Kapelongo, on the R. Kunéné. Wooded country, but also

(¹) By Dr. ALBERT MONARD.

(²) The type localities are marked by an asterisk.

(¹) F. Ris — *Odonata aus Sud-Angola*, Rev. Suisse Zool., v. 38, 1931.

vast open spaces. No water but the river, except a few ponds marking its former course. Stay in May 1933.

* *Kuanda*, 14 miles S. E. of Nova Lisboa. High plateau with a few streams and a vast lake with dam, to supply electric power to the Railway Company. Farming. Thin primary or secondary forest. Stay in Aug. 1932.

R. Kului, a left bank tributary of the Kunéné, running its almost still course through a rather even and thinly cultivated country, covered with meso- or xerophile forests. Stay in June 1932 near the Vila da Ponte-Kapelongo road.

R. Kuvelai, in its upper course is made up of a series of pools; in its lower course, the river disappears, in the rainy season, into the sands of Kuanyama. Thinly inhabited, and almost uncultivated country, with xerophile forests. Stay in July 1932.

R. Kuvangu (Cubango), flowing into Lake Ngami. High plateau (about 4,500 feet in alt.) wooded with *Berlinias* and *Acacias*, cleared in many places. Primary or secondary forests. Several stays in Dec. 1928, April-May 1932, Feb.-March 1933, at the Catholic Mission of Cubango. The *Odonata* were taken either among the stones of the river waterfall, or in the diversion watering the plantation of the Mission, or in some stagnant river or pond of the neighbourhood.

* *Lunda*, an Angolan province where we stayed near Dala (on the R. Tjihumbwé, a tributary of the Kasai). Well-watered country with fine rivers and many streams flowing through vast marshy plains. Mostly thin mesophile forests. Stay in Sept. 1932.

Mukoti, mountain range 33 miles N. W. of Vila da Ponte, with permanent streams and torrents. Thin forest. Few inhabitants. Stay in May 1932.

* *Mupa*, on the Kuvelai. Aug. 1933.

Mbaté, a stream flowing lazily into the Kuvangu. Almost level and wooded country with vast pasture-land; thinly populated. Sept.-Oct. 1928.

Ndongo, old locality, 40 miles W. of Vila da Ponte. Wooded and flat country with stagnant streams of the Kului Kunéné watershed. Stay in April 1933.

Osi, a little stream flowing into the Kunéné (left bank) through a broad valley, the sides of which are covered with thin forests. No other water. Sept. 1933.

* *Sangévé*, Catholic Mission of Galange. Wooded country with many streams and temporary pools. Cultivated and rather much populated. Stay in Feb. 1933.

Tijitunda (erroneously named Tjikinda and Tjilundé in Dr. Ris' article), is a native place situated on the R. Kutatu, tributary of the Kuvangu. The river flows in a wide, flat-bottomed and swampy valley, bordered on one side by a cliff, and on the other by wooded hills. Jan. 1929.

A more complete study upon the Hydrography of South Angola has been published in *Archiv für Hydrobiologie* 1937, Bd. xxxii, p. 462. A map of our itineraries has been published in the *Arquivos do Museu Bocage* T. 6, 1935, opposite page 1.

merged with the pale blue rear to the head. Fig. 2. A. *Prothorax*: black dorsally, sky-blue laterally. *Thorax*: black dorsally extending to well below the humeral suture, and with a narrow bluish-green antehumeral stripe and an elongated mark of the same colour near the antealar sinus. The rest of the thorax, base of the legs and points between the wings, sky-blue; a small black mark at the base of the 1st and 2nd lateral sutures, Fig. 2. B. *Leg*: cream, a black line along the outer edge of the femur and tibia; spines and claws black. *Abdomen*: 1-7 segments black dorsally, sky-blue laterally; 8-10 sky-blue, the anterior half of 8 black dorsally, the projecting end of 10 black. Appendages pale blue,

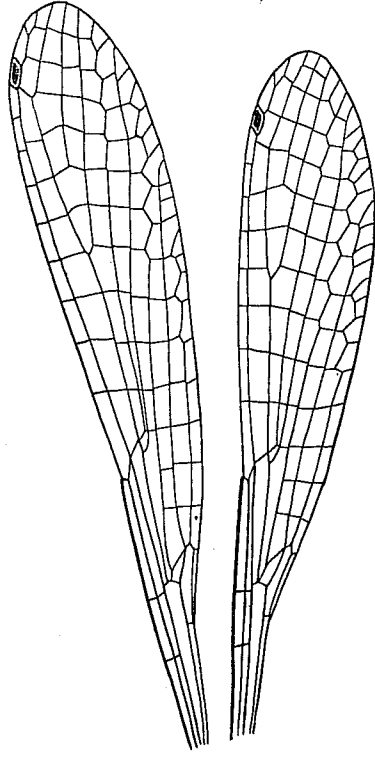


Fig. 1 — *Ischnuragrion rarum* gen. and sp. n. Drawings of type ♂ right fore and hind wings.

the inner hooks and spines black. Fig. 2. C, D and E. *Wings*: hyaline, venation dark brown. *Pt* black, entirely surrounded by a narrow border of cream.

2 ♂ paratypes from the type locality, show no variation. ♀ Allotype, Lunda, Sept. 1932. Length 24 mm. Abd. 19 mm. Hdw. 13 mm.

Very juvenile. *Head*: Labium, labrum, genae, clypeus, frons, base of antennae and occipital plate, cream. Postocular spots sky-blue, rear of head pale blue. Vertex and epicranium black-brown. *Prothorax* and *Thorax* marked as in male, but dark brown and cream in place of black and blue. *Leg*: cream, spines and claws black. *Abdomen*: 1-9 black dorsally, cream-yellow

ODONATA

ISCHNURAGRION gen. n.

This black and blue genus of the *Cœnagriidæ*, of very slender build and small size, should be placed between the genera *Aciagrion* and *Ischnura*.

Generic characters: Head narrow, with postocular spots present; posterior lobe of prothorax rounded and erect; thorax short and slim, the anterior border with a pair of ear-like projections in the male; abdomen of the male very slim, slightly widened at 1-2 and 9-10, segment 10 with two prominent tubercles on the dorso-apical edge. Female with a ventral apical spine on segment 8. Legs short; claws short but stout; the spines numbered and spaced as in *Ischnura*. Wings hyaline, resembling *Aciagrion* in venation and shape of quadrilateral, but more rounded at the tips; *Pt* the same in the fore and hindwings, diamond-shaped, the distal side somewhat oblique, and covering less than one cell; 8-9 *Pns* in forewing; *Arc* at or slightly distal to 2nd antenodal; *ab* taking origin at the point where *Ac* meets the wing border; *Ac* about midway between the two antenodals; quadrilateral very narrow, long and pointed, costal side less than half the length in the hindwing, only a third in the forewing. Fig. 1.

Ischnuragrion rarum sp. n. and genotype

Type ♂ Lunda, Sept. 1932. Length 25 mm. Abd. 20 mm. Hdw. 12 1/2 mm.

Head: Labium cream. Labrum sky-blue with a black line across the base and a black central spot. Genae and anteclypeus bluish-green; postclypeus black. Front half of frons, including base of antennae, bluish-green; the rest of the frons, vertex and epicranium black. The sky-blue eyespots and occipital plate are

laterally, a cream line dorsally on 9; all of 10 and anal appendages cream-yellow. *Wings*: hyaline, venation golden. *Pt.* cream.

Pseudagrion coelestis sp. n.

Type ♂ and paratype ♂, Mupa, August 1933. Length 32 1/2 mm. Abd. 26 mm. Hdw. 18 mm. An exceedingly blue insect, with very little black marking.

Head: almost entirely green-blue, with the labrum caerulean and the labium cream. Rear of head and eyes cream, or perhaps pale green or blue. The blue or green extends right across the bases of the antennae and both eyes. The area of the vertex and the eyespots seems to be the greenest, and there are the following black markings: 3 small spots on the post-clypeus, a triangular mark in the centre of the frons, another each side of the anterior ocellus, and a fine line partly surrounding the large postocular spots and broadening in front where it joins a wavy line running along behind the vertex, with a projection onto each posterior ocellus. *Prothorax*: blue and black. *Thorax*: green-blue dorsally, caerulean-blue laterally and ventrally, with a central black dorsal stripe; a narrower broken black humeral stripe, more in the form of two irregular patches broken in the centre; a small round black spot in the centre of the 1st lateral suture; a small oval black spot at the top of the 2nd lateral suture. Blue points between the wings. *Leg*: blue and cream with black spines and a black line on femur and tibia. *Abdomen*: most of 1-2 segments, all 8-9, sides of 3rd and 10th, and an anterior ring on 3-7, caerulean-blue, cream beneath. 1-2 segments marked with black as in Fig. 3. A. 3-7 segments greenish-grey dorsally, blacker on 7th and each segment with a black mushroom-shaped mark posteriorly. 10th black dorsally; anal appendages mostly cream with some black dorsally on the superiors. Fig. 3. B. and C. *Wings*: hyaline, venation dark. *Pt* cream.

In colouring and pattern it is near to *glaucescens* SELYS, with the head pattern as depicted for *basicornu* SCHMIDT from the Congo, but it differs considerably in the shape of the appendages.

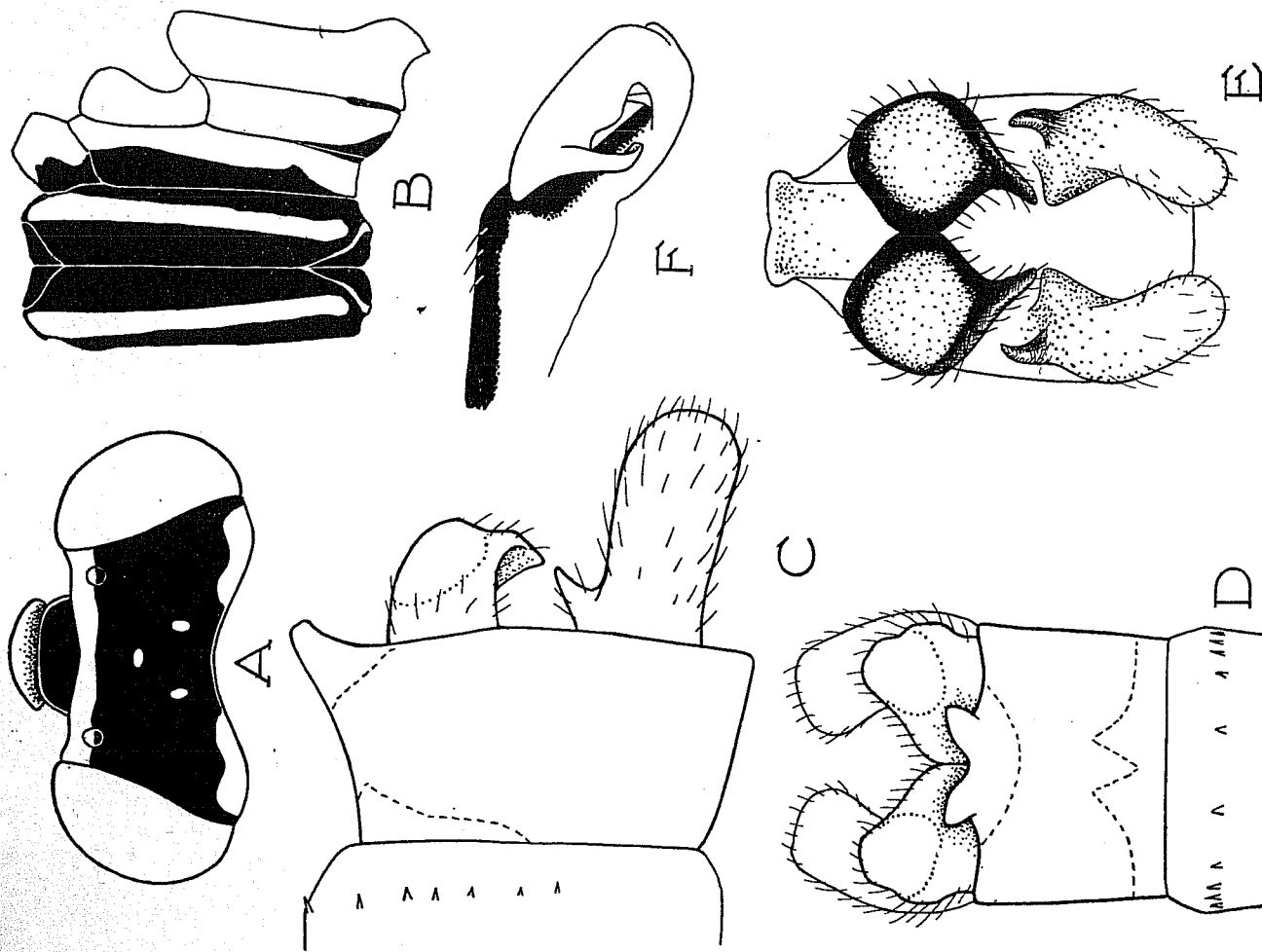


Fig. 2.—*Ischnuragrion rarum* gen. and sp. n. A. Pattern of type ♂ head. B. Pattern of type ♂ thorax. C. Anal appendages of type from the side. D. The same from above. E. The same from behind. F. ♂ penis.

Pseudagrion rufostigma sp. n.

Type ♂ and paratype ♂, Sangévé, Feb. 1933. Length 33 mm. Abd. 26 1/2 mm. Hdw. 11 1/2 mm.

Head: Labium and rear of eyes, cream; rear of head, black.

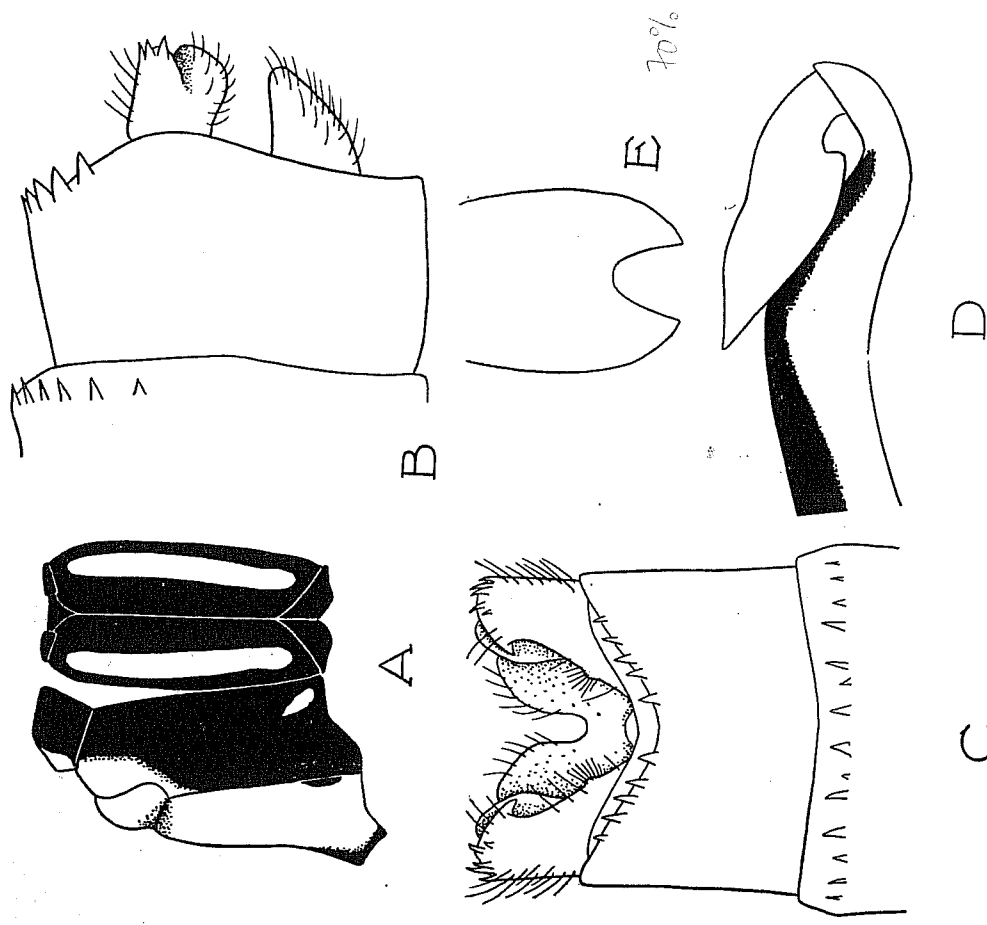


Fig. 4 — *Pseudagrion rufostigma* sp. n. A. Pattern of type ♂ thorax. B. Anal appendages of type ♂ from the side. C. The same from above. D. ♂ penis. E. Apex of penis from beneath showing excavated tip.

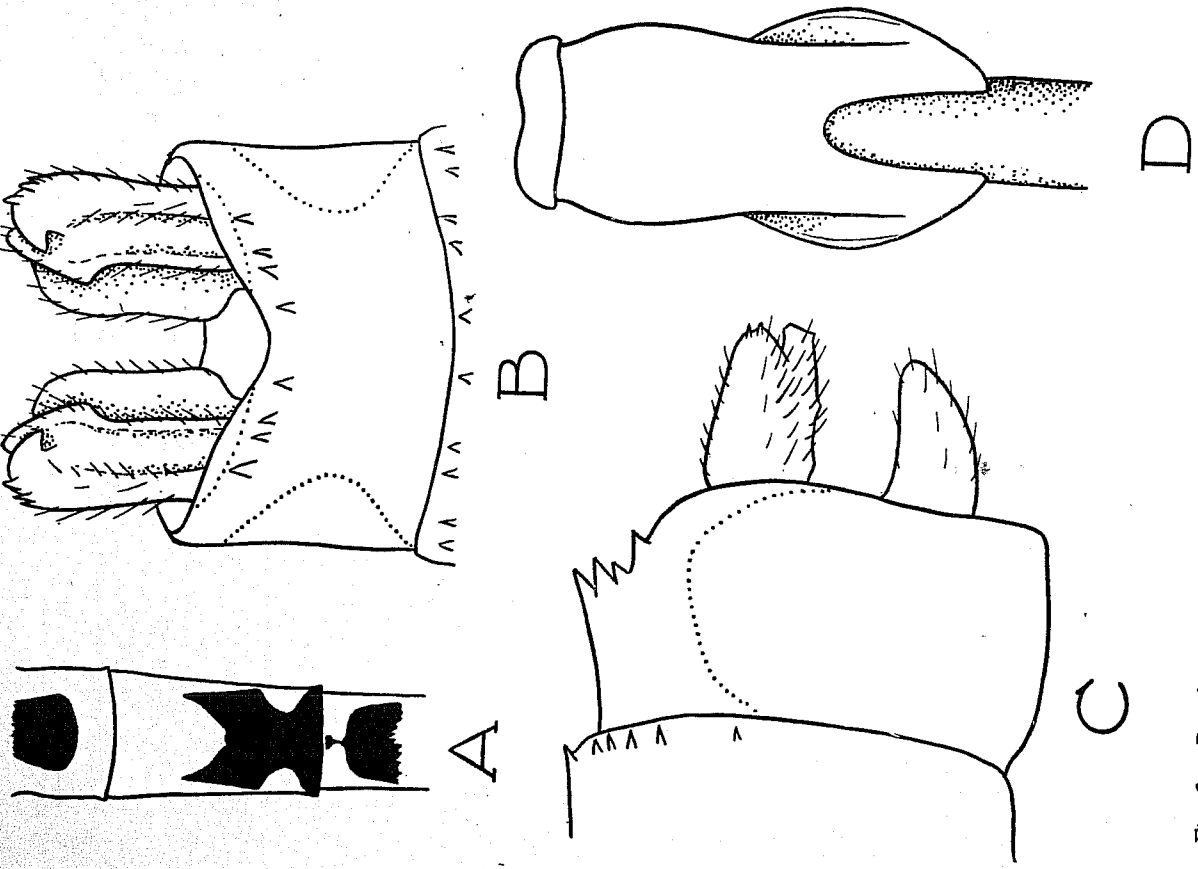


Fig. 3 — *Pseudagrion coelestis* sp. n. A. 1-2 segments of type ♂ abdomen. B. Anal appendages of type ♂ from above. C. The same from the side. D. ♂ penis.

Labrum, clypeus, genae, frons and front of head, brick-red, ending in an almost straight line in front of the vertex. There are 3 black marks on the postclypeus and an oval black spot on the frons. Scape and pedicel of the antennae red, distalia black. Vertex and rest of epicranium black, with 2 minute red spots on vertex, 2 exceedingly small red postocular spots and a narrow red edge to the occiput. *Prothorax*: black, cream beneath. *Thorax*: black almost to the 2nd lateral suture, with a vermilion-red antehumeral stripe. All the lower part of the synthorax greenish-cream, very pruinose. Fig. 4. A. *Leg*: greenish-cream, with most of femur black, a black line along tibia, and joints of tarsus, tips of claws and all spines, black. *Abdomen*: greenish-yellow laterally from 1-6 segments and beneath; dorsal surface of 3-7 a deep bottle-green, each segment almost encircled anteriorly with a narrow yellow ring. 1-2 and 8-10 segments appear as a matt black, rather pruinose, probably indicating some blue patterns beneath. I am inclined to think that seg. 1 has a blue edge to a black centre mark; seg. 2 quite a large blue patch in centre; seg. 8 a heart-shaped blue patch on the anterior half; seg. 9 an oval blue patch on the anterior third; seg. 10 all black. The whole forepart of the insect, comprising head, thorax and first 3 abdominal segments, is covered in long, fine, golden hair. *Wings*: hyaline, venation black. *Pt* red.

Of the red and black coloured African *Pseudagrion* it seems to most resemble the description of *punctum* RAMB. in Ris' posthumous paper, but the latter species is much larger and the drawing of the anal appendages gives a very different shape. Fig. 4. B. and *C. massaicum*, *acaciæ* and *sjöstedti*, have all a much greater extent of red both on head and thorax, also the appendages and penis are different. *mortoni* seems to be more a blue and golden-brown colour, even when adult.

Pseudagrion monardi sp. n.

Type ♂ and 5 ♂ paratypes, Ebanga, Nov. 1932. Length 44 mm. Abd. 35 mm. Hdw. 25 mm.

Head: Labium, labrum, anteclypeus, occiput and the pear-shaped postocular spots attached to it, orange. Genae and a prolongation between eye and base of antenna, seem a greener

yellow, perhaps quite green in life. Rear of head yellow-green. A spot either side of labrum, postclypeus, antenna and all the rest of epicranium, black. *Prothorax*: black, with two large greenish-yellow spots latero-dorsally and a green-yellow border. *Thorax*: black halfway to 1st lateral suture, with a broad yellow-green antehumeral stripe. Below emerald or blue-green, with two black lines as in Fig. 5. A. *Leg*: greenish-yellow, broadly black on the outer side of the femur, narrowly black on the tibia; spines and joints of tarsus, black; claws brown with black tips. *Abdomen*: black dorsally, with a bottle-green sheen, the sides of 1-3 segments, sky-blue, and an almost complete sky-blue ring at the anterior joint from 3-7. The 8-10 segments are badly discoloured (also in paratypes), but might possibly be largely blue in life, probably with some black dorsally, or even the 10th seg. entirely black dorsally. Anal appendages black, with the exception of a brown inner projection to the superiors. Fig. 5. B. and C. *Wings*: hyaline, venation black. *Pt* brown.

Allotype ♀, Ebanga, Nov. 1932. Length 39 mm. Abd. 31 ½ mm. Hdw. 12 mm.

Head: more orange than in male, with only the following black: 3 tiny spots at base of labrum; a narrow line at base of postclypeus; a crescent-shaped mark in centre of frons; a straight band across epicranium the width of the vertex; a curved line behind each postocular spot and the distalia of the antennae. *Prothorax*, *Thorax* and *Legs*: orange, shading to light buff beneath, with the following black: most of the prothorax dorsally with the exception of a twin centre orange spot; a broad centre stripe on thorax; a narrow humeral stripe; a fleck at dorsal end of both lateral sutures; a narrow line on femur and tibia; tarsal joints; spines and claws. *Abdomen*: the dorsal surface of each segment metallic bottle-green black; the entire sides and under surface, also every segmental joint, yellow-buff. Upper anal appendages partly brown. *Wings*: hyaline, venation yellow, with the exception of a black costa and radius as far as nodus. *Pt* yellow. There are no styles on the prothorax, but just where other species have them, the edge of the lobe curves upwards. This specimen I believe to be correctly classified as the female of this new species.

P. monardi is a large and slender species, the specimens here

described seeming to be fully mature. From my experience in the field, I do not think that orange markings on the head in the *Pseudagrion*, denote immaturity, as I have captured many orange-

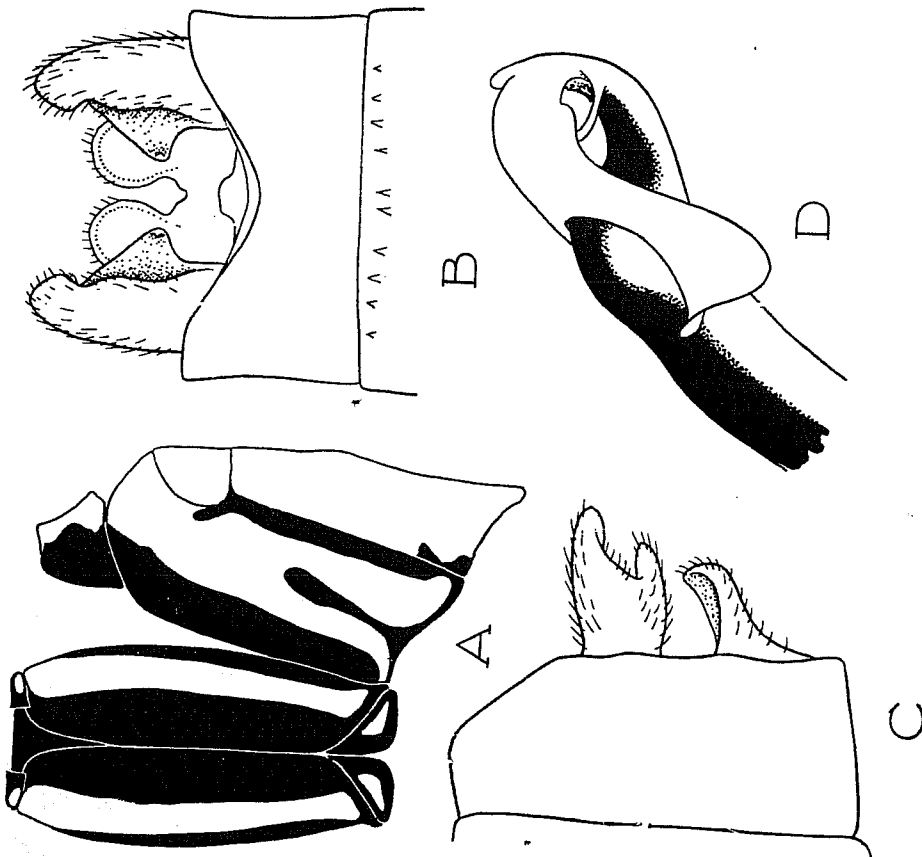


Fig. 5—*Pseudagrion monardi* sp. n. A. Pattern of type δ thorax. B. Anal appendages of type δ from above. C. The same from the side. D. δ penis.

headed specimens quite pruinose on thorax and abdomen. In my opinion, the bright green colour of many of the adults, begins by a deep cream in the teneral form, and passes through a clear yellow stage, to green later. I have not yet seen any orange

markings turning green. During many weeks collecting in one locality, while the dragonflies were emerging, I have had perfect opportunities for studying this question and I have especially watched for it. One type of green pigment, much seen in adult species of *Pseudagrion*, fades to a clear yellow almost instantaneously at death, and is impossible to tell in museum specimens from the natural yellow colouring of life. No hard and fast line can be drawn between certain shades of yellow, green and blue pigments in dragonflies, but one can easily recognise very definite differences in shades of pigments in different species, such as those I call emerald-green, blue-green or grass-green, and sky-blue, powder-blue or caerulean.

Agriocnemis angolense sp. n.

Type σ , Sangévé, Feb. 1933. Length 21 mm. Abd. 16 $\frac{1}{2}$ mm. Hdw. 10 mm.

Head: Labium and broad edging to labrum, cream. Rear of head, occiput, genae, sides of labrum, a streak either side on the front of the frons, and two conical postocular spots joined to the blue of the head near the eyes, sky-blue. Centre of labrum, clypeus and the rest of the epicranium, black. Pedicel of antenna, light brown. **Prothorax:** mostly black, with sky-blue on the sides and two small blue spots on the neck. **Thorax:** black to the 1st lateral suture, with the exception of a narrow blue antehumeral stripe. Sky-blue laterally, with a small black mark on the 2nd lateral suture beneath the wing. Cream beneath; sky-blue points between the wings. **Leg:** cream, with some blue on the trochanter and the following black: a stripe on the outer side of the femur widening at the joint; a faint line on the tibia; joints of tarsus; spines and tips to brown claws. **Abdomen:** black dorsally and sky-blue laterally from 1-7 segments, the blue almost forming a narrow ring at each joint. 8-10 segs. and appendages, orange-red with the following black: most of dorsal surface of 8th and a narrow patch anteriorly on 9th. **Wing:** hyaline, venation brown. **Pt** pale sandy and very oblique at outer edge.

Allotype f (homochrome), Sangévé, Feb. 1933. Length 21 $\frac{1}{2}$ mm. Abd. 17 mm. Hdw. 11 $\frac{1}{2}$ mm. Identical in colouring and pattern with the male.

Allotype ♀ (heterochrome), Sangévé, Feb. 1933. Measurements as for former. Mostly orange-red, with the thorax and abdomen beneath and the legs, cream. The following are pale blue: mandibles, labium, rear of head and lower third of thorax. Black markings are as follows: a centre spot on the labrum; an edging to the clypeus; a broad band across the epicranium from the antennae to the orange postocular spots; a broad stripe down the centre dorsum of the pro- and syn-thorax; a ring at each joint from 2-7 abdominal segments, the dorsal surface of 6-9, with a small patch on 10th.

23, ♂♂ paratypes (2 from Sangévé, 12 Kuandu, Aug., 9 Kalukembé, Dec.), and 5 homochrome ♀♀ paratypes (1 from Sangévé, 1 Kuandu, 3 Kalukembé), also 9 heterochrome ♀♀ paratypes (2 from Sangévé, 4 Kuandu, 3 Kalukembé).

This species is one of the *pygmaea-inversa* group by size and colouring, but is totally distinctive by the anal appendages of the male, Fig. 6. A, B, and C. The upper pair, so straight and obtuse, are far different to the curved and shaped ones of the *forcipata-victoria* group. In spite of CAMPION's remarks in 1924, I believe *forcipata* SJÖSTRÖM 1917 to be the same species as *forcipata* LE ROI 1915, but I have not seen the types. From the description I should say LE ROI's is only a more juvenile specimen. FRASER's *victoria* 1928 I think is possibly a smaller and even more adult specimen of *forcipata* LE ROI.

Chlorocypha croceus sp. n.

Type ♂, Bimbi, Oct. 1932. Length 26 mm. Abd. 16 ½ mm. Hdw. 20 mm.

Head: Base of labium yellow-brown, median and lateral lobes black, mandibles mahogany-brown. Labrum and centre of anteclypeus shiny-black, the sides golden-brown. Postclypeus, frons, vertex and epicranium deep velvety black, with short black hairs and marked with yellow as follows: 2 round spots in front of centre ocellus; a triangular patch on outer side of the rear ocelli and an oval spot behind the vertex; the occipital plate and a tiny isolated spot each end of it; and a fine line edging the brown eyes. Rear of head, black. *Prothorax:* velvety black, with two yellow patches on either side, forming a continuous band onto the shoulder.

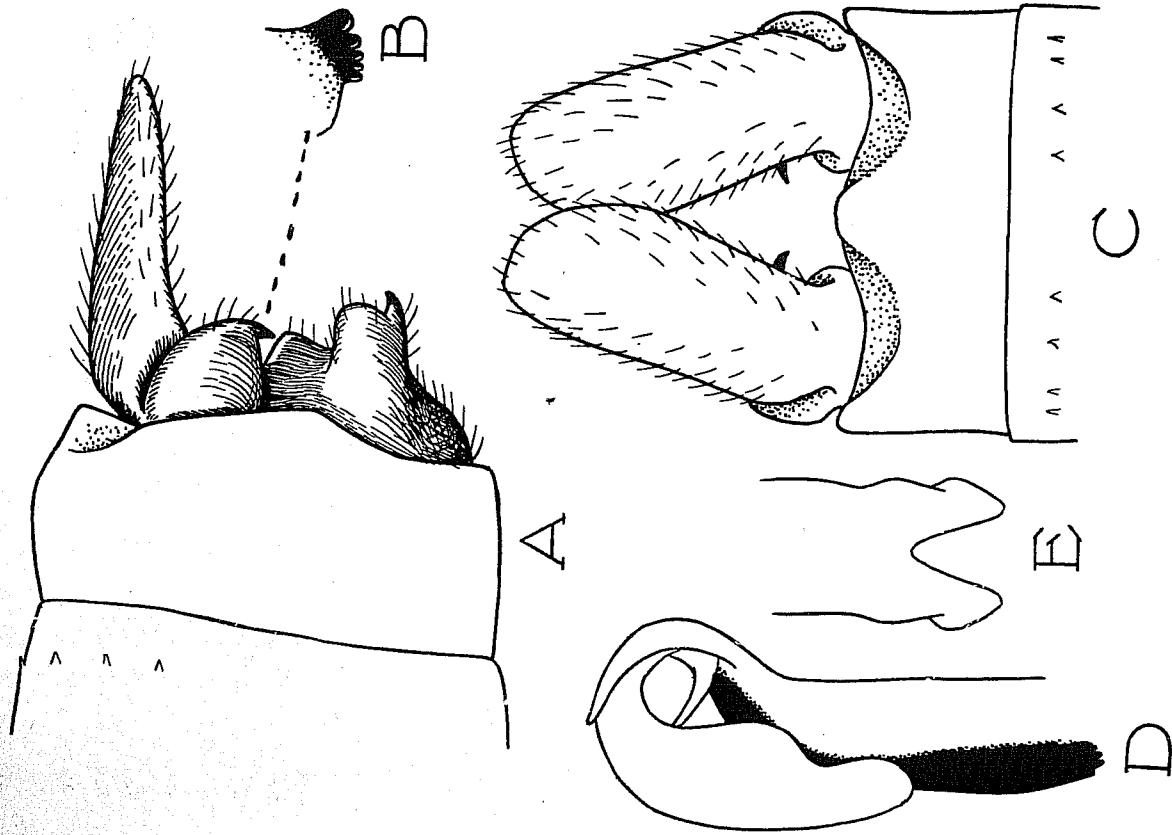


Fig. 6.—*Agrionemis angolensc* sp. n. A. Anal appendages of type ♂ from the side. B. Apex of down-turned tooth of anal appendage from behind. C. Anal appendages from above. D. ♂ penis. E. Apex of penis from beneath.

Thorax: velvety black, with some brown beneath, and marked in yellow as in Fig. 7. A. (These markings may be scarlet-red in life). The effect of the principal pale colouring laterally on

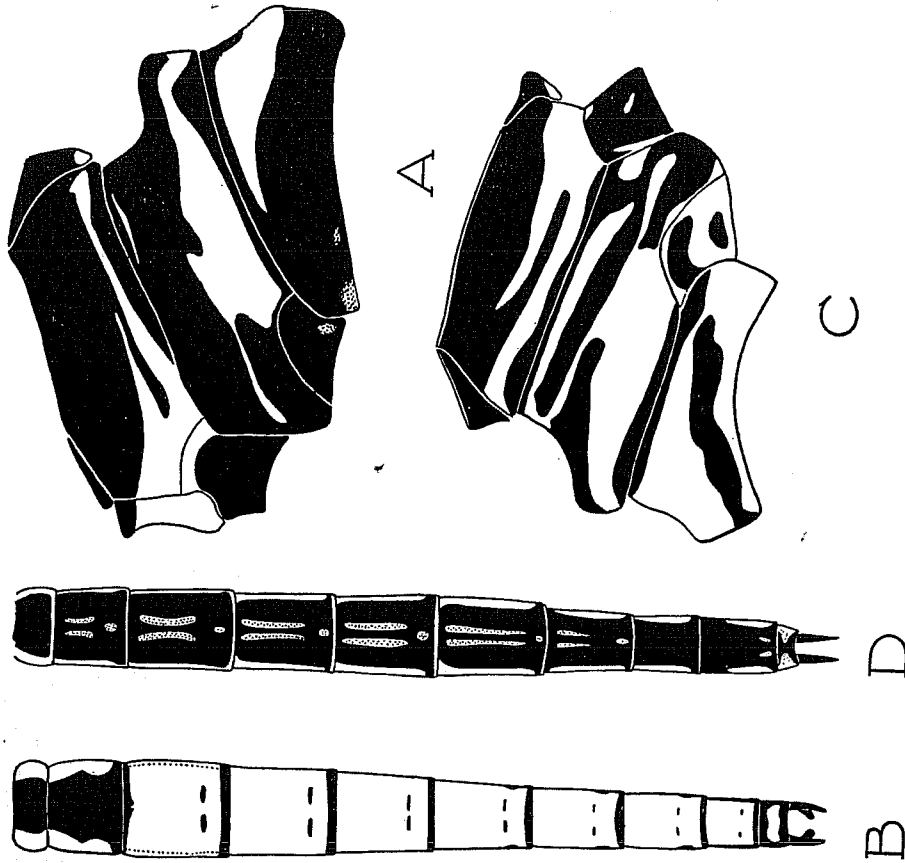


Fig. 7 — *Chlorocypha croceus* sp. n. A. Left lateral thoracic pattern of type ♂. B. Dorsal pattern of type ♂ abdomen. C. Right lateral thoracic pattern of allotype ♀. D. Dorsal pattern of allotype ♀ abdomen.

the thorax, is that of a broad elongated band just in front of the 2nd lateral suture, and a pointed wedge-shaped mark to the rear. **Leg:** black, a yellow line on the inner side of the tibia. **Abdomen:** caerulean-blue from 3rd to 10th segments, sides of 3rd narrowly

yellow. Dorsum of 1-2 black, with a broad yellow stripe laterally, or possibly pure green in life. Beneath entirely shiny black. Other black markings are as in Fig. 7. B. Anal appendages black. **Wings:** hyaline, tinged with chrome-yellow to distal end of quadrilateral and as far as the nodus between costa and radius. **Pt** light brown, pale sandy in the centre. **Arc** at or just distal to

3rd An.	Petioled to or just distal to 2nd An.	A.n.s.	A.n.s.
Pns	15 14	11 11	9 10
	12 13		

Allotype ♀, Bimbi, Oct. 1932. Length 25 ½ mm. Abd. 16 mm. Hdw. 22 ½ mm.

Head: Labium, labrum, genae and clypeus yellow, with the following black: tips of lobes of labium and bases of mandibles (tips of the latter, mahogany-brown); the furrow between the labrum and anteclypeus, broadening out at the centre of each; a broad line surrounding the postclypeus. Frons velvety black in the centre, with a long pear-shaped yellow patch on either side; pedicels of antennae yellow, other joints black. Both post-clypeus and frons covered with long fine dark brown hairs. Epicranium velvety black, with the following yellow markings: 2 round spots on vertex between the ocelli; vertex set within .5 oblong spots; occipital plate and a small isolated spot at either end; a fine line edging the brown eyes. Rear of head black. **Prothorax:** same as in the male. **Thorax:** more yellow than in the male and all yellow beneath. The dorsal carina is very narrowly yellow (this is also the case in juvenile males). The yellow pattern is shown in Fig. 7. C. **Leg:** yellow, with the following black: a few marks on the coxa; all the femur except for the inner edge; a narrow line on the outer edge of the tibia. **Abdomen:** black, with plentiful yellow markings as in Fig. 7. D. Anal appendages black. **Wings:** hyaline, with a bright chrome-yellow streak along each upper border, caused by the yellow sub-costa, radius and median, together with their cross-veins. The costa and the rest of the venation, black. **Pt** chrome-yellow between black veins. A.n.s

12	13
11	11

 Pns

16	17
15	15

 Fig. 8.

21 ♂ paratypes, 7 ♀ paratypes. The measurements vary

slightly in some, but by only 1 to 2 mm. Six of the paratypes were taken in Feb. at Sangévé, six in Sept. at Kuandu, the rest in Oct. at Bimbi.

This *Chlorocypha* most nearly resembles *dispar* BEAUVOIS, in size and shape, but is less black on the thorax, blue instead of

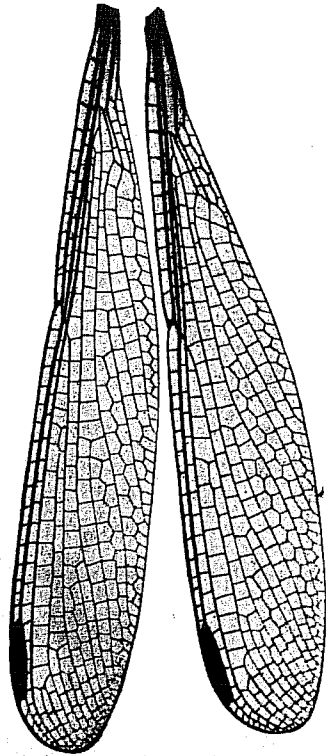


Fig. 8 — *Chlorocypha croceus* sp. n. Photograph of allotype ♀ left fore and hind wings.

red on the abdomen with the dorsal surface of 1-2 segs. black while the yellow upper wing borders of the female are very distinctive.

Umma femina sp. n.

Type ♀, Sangévé, Feb. 1933. Length 40 mm. Abd. 29 mm. Hdw. 26 1/2 mm.

Head: underside metallic golden-green, the labium yellow, with a shiny black centre; labrum black beneath, mandibles brown. Above, centre of labrum metallic emerald-green, sides yellow. Clypeus metallic emerald-green, with a yellow spot in the centre of the anteclypeus. Frons, epicranium and the enlarged pedicels of the antennae, metallic golden-green; distalia black. Eyes light brown. **Prothorax:** metallic golden-green. **Thorax:** metallic golden-green, with some touches of pruinose round the lower margins. Beneath very pruinose. Yellow markings as follows: at the leg bases; the outside edge of the metepimeron; and along the 2nd lateral suture. **Leg:** metallic golden-green, slightly pruinose at the joints, the tarsus black, claws dark brown.

Abdomen: metallic golden-green, emerald near the base, beneath pruinose. **Wings:** hyaline, but suffused with golden-green. All veins metallic green. *Pt* metallic aquamarine-blue, smaller than in *cincta*, covering 1-1 1/2 cells, 1/2 - 3/4 mm. long.

1 ♀ paratype, Bimbi, Oct. 1932. Length 37 1/2 mm. Abd. 28 mm. Hdw. 25 mm.

A very small and completely metallic golden-green *Umma*, distinct from *electa* and *distincta* by the minute size of the *Pt*, the green base to the antennae and the very, small dimensions.

MONARDIthemis gen. n.

A Libelluline dragonfly of rather small size, coloured black and greenish-yellow, becoming pruinose in the adult stage and with wings having a yellow patch at the centre of all four. Metallic-blue on frons and vertex.

Generic characters: Belonging to Ris' Libelluline Group 1, but with a regular closed anal loop of 10-15 cells (9 specimens). It seems to come between *Micromacromia* and *Neodythemis*. I have followed Dr. Ris' system in the generic description, to facilitate comparisons with the closely related genera of *Eothemis*, *Micromacromia*, *Neodythemis* and *Notiothemis*.

Head rather small with the eyes only shortly contiguous. Frons rounded, slightly grooved, falling away steeply in front but without a frontal ridge. Vertex large, rounded, with two small blunt tubercles. Lobe of the prothorax fairly large, erect, indented, with long hairs. Thorax short. Legs long and stout. ♂ fem. 3 with about 19 fairly regularly spaced spines in a row, the first dozen being very small and the rest getting gradually longer, with 1 long one at the end. Fem. 2 has about 9 closely spaced very short spines and 4 much longer, the end one the longest (13 in all). There are long and fairly fine spines on the tibiae. Claws strong. ♀ with rather less spines, but similarly sized as in the ♂. Abdomen rather narrow, cylindrical, the ♂ slightly club-shaped. Anal appendages short. ♂ accessory genitalia large, Fig. 10. B. and C.

Wings long, forewings rather narrow, hind wings moderately wide. *T* in forewing at the level of the *T* in hindwing. Sectors of the arculus joined for a long way. *Arc.* at the 2nd *An*

(*Anq*) or slightly distad. *Cu2* (*Cui*) at the corner of *T* in both wings. 9-12 *Ans* forewings, the last complete; 6-8 *Pns* forewings. Base of the *T* in the hindwing at or very slightly distad to the *Arc*. 1 *Ca* (*Cuq*) in forewing, 2 *Ca* in hindwing. 1-3 bridge veins. *t* crossed in both wings (with 2 exceptions in the forewings). *t'* (*ti*) forewing free (with 5 exceptions). *st* (*ht*) in hindwing free (with 4 exceptions, in 3 specimens with both *st* crossed). *R3* (*M2*) almost flat, but sharply downcurved at the extreme

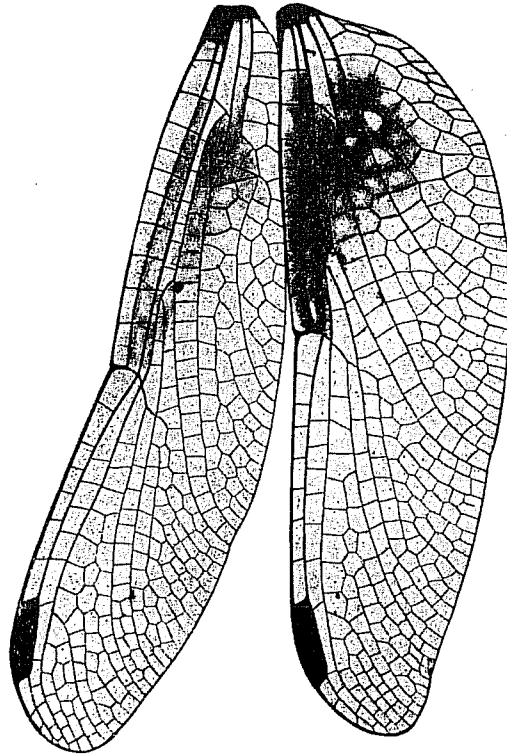


Fig. 9 — *Monardithemis flava* gen. and sp. n. Photograph of type ♂ left fore and hind wings.

end. Only 1 row of cells between *IR3* (*Rs*) and *Rspl*. 2 rows of post-trigonal cells (discoidal field) to beyond the inner end of the bridge (*B*). *Cu2* (*Cui*) in the forewing is curved and reaches to just beyond the nodus. In the anal field of the forewing 1 row of cells for only halfway to triangle. The anal field of the hindwing is broad and contains a closed loop with a short «foot» of 10-15 cells. Fig. 9.

Monardithemis closely resembles *Micromacromia* in the shape of the ♂ and ♀ genitalia, but differs considerably in the leg armature and the wing venation. In leg armature *Monardithemis* closely resembles *Neodythemis*, but in this genus the genitalia is

of a widely different form and the wing venation again shows several points of divergence.

Monardithemis flava sp. n. and genotype

Type ♂ Kalukembé, Dec. 1933. Length 33 ½ mm. Abd. 22 mm. Hdw. 24 ½ mm.

Head: Labium yellow, with a black spot at centre base and a black line up the centre lobe. Back of head black, with yellow and black in stripes behind the eyes. Labrum and genae yellow, with a narrow black line down centre of lip. Clypeus greenish-white, with 2 small brown marks on the postclypeus; the forepart of the frons of the same greenish colour. The top of the frons and the vertex is a brilliant metallic blue with a tiny yellow mark on either side of the latter. Antennae dark brown. Occiput shiny black. **Prothorax:** greenish-yellow, with a broad shiny black band on either side. **Thorax:** black dorsally, with a narrow yellow stripe on the dorsal carina. Four small yellow spots near the humeral suture, and a big yellow spot beneath the forewing. Laterally greenish-yellow with black pattern as in Fig. 10. A. Beneath greenish-yellow, a black stripe down the centre of the uro-sternite. **Leg:** greenish-yellow base and inner femur, black outer femur, tibia, tarsus, spines and claws. **Abdomen:** black, rather matt, with some yellow markings: a small dorsal triangle on 1st segment, the sides of 1-2 segments, the lower half laterally on 3rd segment and a trace beneath on 4-9 segments. Anal appendages black. **Wings:** hyaline, with bright saffron-yellow in the basal half of all four wings. In the forewing the yellow extends from the arculus to the nodus, but does not reach below the *IA*. In the hindwing it extends from the 1st ante-cubital to the nodus and almost to the end of the anal loop. Venation black, except for yellow antenodals and median cross-veins. *Pt* black, edged with yellow basad and distad, 3 ½ mm. long by ¾ mm. wide.

7 ♂ paratypes (4 Kalukembé Dec., 2 Ebanga Nov., 1 Bimbi Oct.). Some of the paratypes are quite pruinose on thorax and abdomen. One specimen is teneral, the black on the dorsal surface of the thorax has a deep blue sheen and the yellow centre stripe is quite wide. On the abdomen the yellow covers a greater

area than the black, and resembles the female, as described below.

♀ Allotype, Kalukembé Dec. 1933. Length 33 mm. Abd. 21 1/2 mm. Hdw. 26 mm.

Head, *prothorax* and *synthorax* as in the male, with the following small difference: no black fleck on the metepimerum. *Abdomen*: all greenish-yellow, with a broad black stripe dorsally on 3-5 segments, divided in two on the 1-2. The same double stripe on 6-8. A lateral black stripe from 2-7 segments. 9th black with a fine yellow line dorsally, 10th black laterally, yellow dorsally. The vulvar flaps on 8th segment yellow. Each joint black. Anal appendages black. Fig. 10. E. *Wings*: colouring as in male.

Orthetrum macrostigma sp. n.

Type ♂, Lunda, Sept. 1932. Length 41 1/2 mm. Abd. 28 mm. Hdw. 31 mm.

This species most resembles *guineense* and *abbotii*, but is differentiated by several characters besides the genitalia, Fig. 11. A. and B. From *guineense* it can be distinguished by the following: the wings are longer and narrower with closer venation; the *Pt* much larger and heavier, 4 mm long, by 1 mm wide; there are 2 rows of cells between the *Rs* and *Rspl*; the *Cu2* in forewing is longer and less curved; the colour pattern is simpler. From *abbotii* it is distinguished by larger size; longer wings, much more pointed at the tips; and flatter curved *Cu2* in forewing. The pattern in the juveniles is reduced to a dark brown line either side of the dorsal carina, another on either shoulder, and a short one at the dorsal end of the humeral and the 1st lateral sutures. A black stripe runs along either side of the abdomen from the base, bordering the carinae from the 3-10 segments, both laterally, and dorsally. The rest of the ground colour is yellowish-green. The upper anal appendages are black, the lower yellow. The legs are largely green, with a black line along the outer side of the femur; tibia, tarsus and claws black, except for a fine green line along the outer side of the former. Head green, yellow beneath, with a dark brown vertex and irregular line in front. Antenna black, with a yellow scape. *Wings*: Costa, sub-costal antenodals

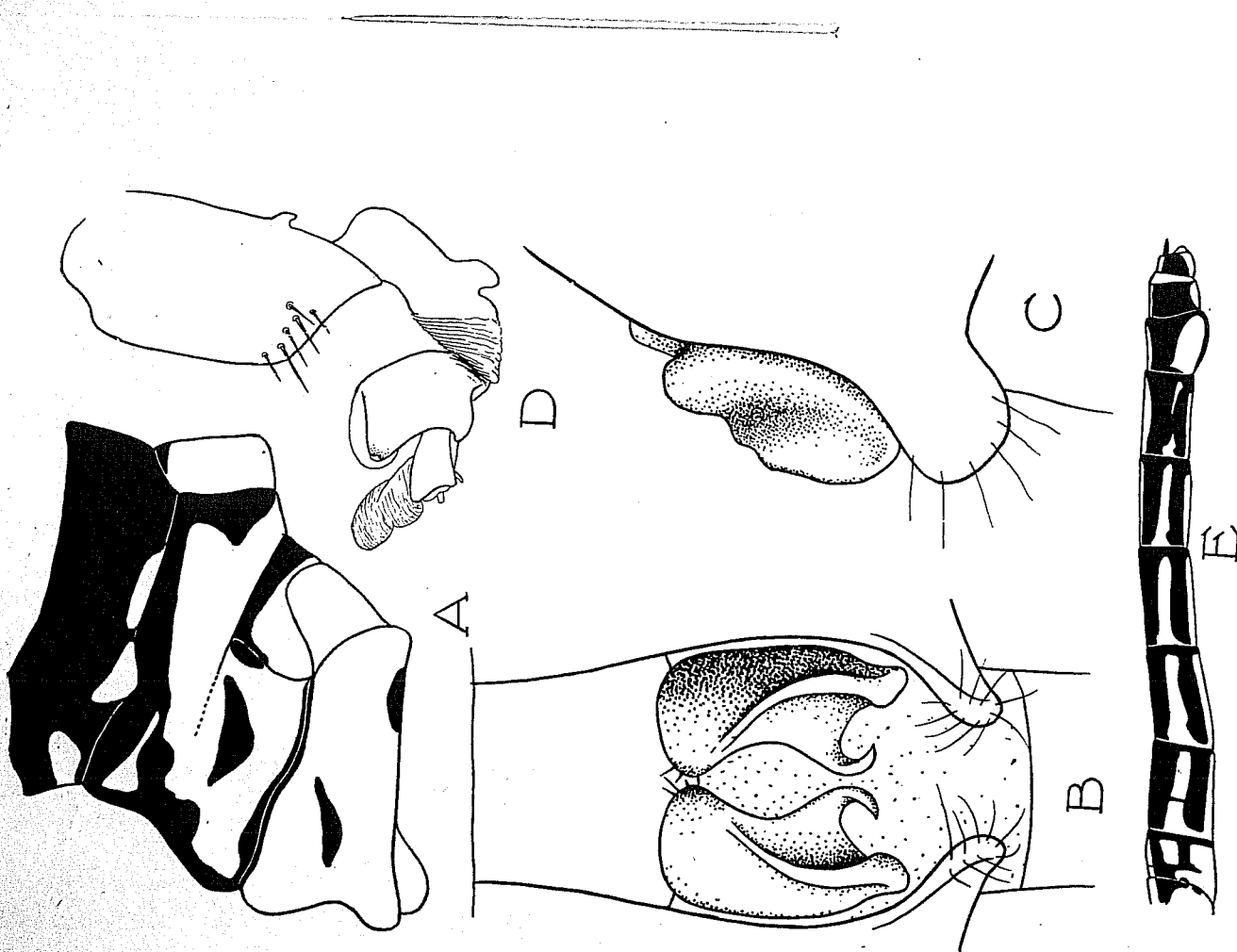


Fig. 10 — *Monardihemis flava* gen. and sp. n. A. Pattern of type ♂ thorax. B. Accessory genitalia of type ♂ from above. C. The same from the side. D. ♂ penis. E. Lateral pattern of allotype ♀ abdomen.

and cross-veins between the radius and median in the basal half of the wings, bright yellow. *Pt* yellow, with a heavy dark brown or black border. Membranule light grey. There is a bright saffron fleck at the extreme base of all 4 wings where they join the body.

<i>Ans</i>	14	14	<i>Pns</i>	10	10
	11	12		10	11

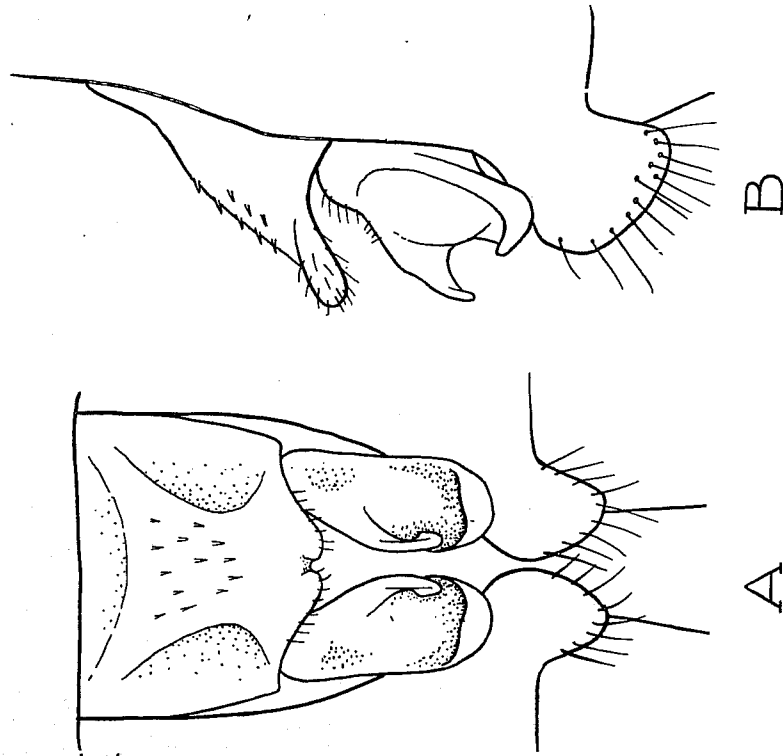


Fig. 11.—*Orthetrum macrostigma* sp. n. A. Accessory genitalia of type ♂ from above. B. The same from the side.

3 ♂ paratypes from Lunda, Sept. 1932, 1 ♂ paratype, Sangévé, Feb. 1933, and 1 juvenile ♂ paratype, Bimbi, Oct. 1932. Antenodals vary from 12 to 15 in the forewings, postnodals from 9 to 11 forewings.

Pruinosity begins early, one paratype shows a clear light blue from the 3rd abdominal segment. Another is pruinose over all the

thorax, abdomen (broken) and most of the legs. Three specimens, including the type, are dark indigo-blue on the thorax revealing no trace of pattern, the abdomen are entirely black with the exception of the dilated sides of the 2-3 segs., still showing some traces of green. The legs are almost all black. The frons has darkened on top to a bluish-grey.

The types, allotypes and a few paratypes, used for the illustrations, of the new species just described, are in the British Museum, London. The rest of the paratypes, together with the remainder of the collections, were returned to the Musée d'histoire Naturelle, La Chaux-de-Fonds, Suisse.

The genera and species, so far confined to the south of Angola, are as follows:

- Pseudagrion inconspicuum* Ris
- Pseudagrion monardi* LONGFIELD
- Pseudagrion rufostigma* LONGFIELD
- Pseudagrion caelestis* LONGFIELD
- Ischnuragrion rarum* LONGFIELD
- Enallagma minutum* Ris
- Agriocnemis angolense* LONGFIELD
- Chlorocypha croceus* LONGFIELD
- Umma femina* LONGFIELD
- Monardthemis flava* LONGFIELD
- Orthetrum macrostigma* LONGFIELD
- Æthiothemis mediofasciata* Ris
- Trithemis monardi* Ris

Annotated List of Angolan Odonata

- Lestes plagiatus* BURM. Sangévé, Kalukembé, Kuandu, Mukoti, May 1932 to Feb. 1933. 9 ♂♂ and 8 ♀♀.
- Lestes amicus* MARTIN. Mukoti. May 1932. 1 ♀.
- Disparoneura simba* MARTIN. Kalukembé, Ebanga, Sangévé, Lunda, Kuvangu, May 1932 to Feb. 1933. 7 ♂♂ and 4 ♀♀.
- Mesocnemis singularis* KARSCH. Kuvangu, May 1932. 1 ♀.
- Pseudagrion kersteni* GERST. Elendé, Kalukembé, Aug. 1928 and Nov. 1932. 3 ♂♂ and 1 ♀.
- Pseudagrion gerstaeckeri* KARSCH. Ebanga, Kuvangu, Kalukembé, Bimbi, May-Dec. 1932. 2 ♂♂ and 4 ♀♀.
- Pseudagrion salisburyense* Ris. Ebanga, Kuvangu, Kalukembé, Osi, Kului, May 1932 to Sept. 1933. 15 ♂♂ and 7 ♀♀.
- Pseudagrion angolense* SELYS. Ebanga, Kuandu, Bimbi, Kalukembé, Elendé, Osi, Kuvangu, Sangévé, Mukoti, May 1932 to Sept. 1933. 28 ♂♂ and 4 ♀♀.
- Pseudagrion inconspicuum* Ris. St. Amaro, Kuandu, Bimbi, Ebanga, Kalukembé, Sept. 1928. 2 ♂♂, Aug.-Dec. 1932. 20 ♂♂ and 6 ♀♀.
- Pseudagrion monardi* LONGFIELD. Ebanga, Nov. 1932. 6 ♂♂ and 1 ♀.
- Pseudagrion massaicum* SJÖSTEDT. Kapelongo, Kuvangu, Mupa, May 1932 to May 1933. 8 ♂♂ and 1 ♀.
- Pseudagrion acaciæ* FORST. Mupa, Aug. 1933. 1 ♂.
- Pseudagrion rufostigma* LONGFIELD. Sangévé, Feb. 1933. 2 ♂♂.
- Pseudagrion coelestis* LONGFIELD. Mupa, Aug. 1933. 2 ♂♂.
- Ceriatrion glabrum* BURM. Kuandu, Lunda, Kuvangu, Aug. 1932 to March 1933. 5 ♂♂ and 2 ♀♀.
- Ceriatrion suave* Ris Chimporo, Nov. 1928. 2 ♀♀.
- Aciagrion* sp. Chimporo, Oct. 1928. 1 ♂.
- Ischnuragrion rarum* LONGFIELD. Lunda, Sept. 1932. 3 ♂♂ and 1 ♀.
- Ischnura senegalensis* RAMB. Mupa, Aug. 1933. 1 ♂.
- Enallagma fractum* Ris. Kalukembé, Aug. 1928. 1 ♂
- Enallagma minutum* Ris. Chimporo, Nov. 1928. 1 ♂.
- Enallagma elongatum* MARTIN. Mukoti, May 1932. 1 ♂.
- Agriocnemis angolense* LONGFIELD. Sangévé, Kuandu, Kalukembé, Aug. and Dec. 1932, Feb. 1933. 24 ♂♂ and 16 ♀♀.
- Chlorocypha caligata* SELYS. Kuvangu, Bimbi, Ebanga, May-Nov. 1932. 6 ♂♂ and 8 ♀♀.
- Chlorocypha croceus* LONGFIELD. Kuandu, Bimbi, Sangévé, Sept. and Oct. 1932, Feb. 1933. 22 ♂♂ and 8 ♀♀.
- Phaon iridipennis* BURM. Kapelongo, May 1933. 1 ♂.
- Umma distincta* LONGFIELD. Lunda, Bimbi, Ebanga, Sept.-Nov. 1932. 3 ♂♂ and 2 ♀♀.
- Umma electa* LONGFIELD. Bimbi, Oct. 1932. 1 ♂ and 1 ♀.
- Umma femina* LONGFIELD. Bimbi, Sangévé, Oct. 1932, Feb. 1933. 2 ♀♀.
- Ictinus ferox* RAMB. Kakinodo, Oct. 1928. 1 ♂.
- Phyllogomphus selysi* ? SCHOUTEDEN. Bimbi, Oct. 1932, 1 ♂.
- Notogomphus prætorius* SELYS. Kalukembé, Dec. 1932. 1 ♀.
- Paragomphus cognatus* RAMB. Ebanga, Nov. 1932. 1 ♀.
- Paragomphus* sp. Ebanga, Nov. 1932. 1 ♀.
- Crenigomphus hartmanni* FÖRSTER. Kuvangu, May 1932. 1 ♀.
- Hemianax ephippiger* BURM. Ebanga, Nov. 1932. 1 ♀.
- Anax mauricianus* RAMB. Kalukembé, Dec. 1932. 1 ♀.
- Anax speratus* HAGEN. Bimbi, Kalukembé, Oct. and Dec. 1932. 1 ♂ and 1 ♀.
- Macromia picta* SELYS. Kapelongo, May 1933. 1 ♀.
- Monardthemis flava* LONGFIELD. Bimbi, Ebanga, Kalukembé, Oct.-Dec. 1932. 8 ♂♂ and 1 ♀.
- Orthetrum cafferum* BURM. Kalukembé, St. Amaro, Kuvangu, Kuandu, Bimbi, Elendé, Aug. and Sept. 1928, May-Dec. 1932, March and April, 1933. 22 ♂♂ and 5 ♀♀.
- Orthetrum microstigma* Ris. Lunda, Sept. 1932. 3 ♂♂ and 1 ♀.
- Orthetrum brachiale* BEAUVOIS. Ebanga, Nov. 1932. 1 ♂ and 1 ♀.

- Orthetrum chryso stigma* BURM. Kuvangu. May 1932. March 1933, 7 ♂♂ and 3 ♀♀.
- Orthetrum macro stigma* LONGFIELD. Lunda, Bimbi, Sangévé. Sept. and Oct. 1932. Feb. 1933. 6 ♂♂.
- Orthetrum guineense* RIS. Chimporo, Mukoti, Kuvangu, Lunda, Ebanga, Elendé, Sangévé. Nov. 1928. May-Nov. 1932. Feb. 1933. 13 ♂♂ and 5 ♀♀.
- Orthetrum abbotti* CALVERT. Ebanga, Kuvangu. Nov. 1932. March 1933. 2 ♂♂.
- Orthetrum farinosum* FÖRSTER. Chimporo, Kuvangu, Kalukembé, Sangévé. Nov. 1928. May and Dec. 1932. Feb. 1933. 6 ♂♂ and 4 ♀♀.
- Palpopleura lucia* form. *lucia* DRURY. Chimporo. Nov. 1928. 1 ♂.
- Palpopleura lucia* form. *portia* RAMB. Kalukembé. Aug. 1928. 1 ♂.
- Palpopleura jucunda* RAMB. Kalukembé. Aug. 1928. 1 ♀.
- Æthiothemis mediofasciata* RIS. Chimporo. Nov. 1928. 1 ♀.
- Hemistigma albipuncta* RAMB. Chimporo. Nov. 1928. 1 ♂.
- Porpax asperipes* KARSCH. (locality label missing) 1 ♂.
- Acisoma trifidum* KIRBY. Chimporo. Nov. 1928. 1 ♂.
- Acisoma panorpooides ascalaphoides* RAMB. Sangévé. Feb. 1933. 2 ♂♂.
- Diplacodes lefeburei* RAMB. Mukoti, Kuvangu. May 1932. 1 ♂ and 1 ♀.
- Diplacodes exilis* RIS. Chimporo. Nov. 1928. 1 ♀.
- Crocothemis erythræa* BRULLÉ. Mukoti, Kuvangu, Kului, Kuvelai, Lunda, Kalukembé, Sangévé, Ndongo. May-Dec. 1932. Feb. and May 1933. 8 ♂♂ and 11 ♀♀.
- Crocothemis sanguinolenta* RAMB. Kuandu, Kuvangu, Mukoti, Bimbi, Elendé, Ebanga. April-Nov. 1932. March 1933. 38 ♂♂ and 26 ♀♀.
- Brachythemis leucosticta* BURM. Tyitunda, Kuvelai, Kuandu, Kapelongo. Jan. 1929. July and Sept. 1932. May and Aug. 1933. 2 ♂♂ and 9 ♀♀.
- Brachythemis lacustris* KIRBY. Rio Mbalé, Kapelongo. Sept. 1928. May 1933. 1 ♂ and 1 ♀.
- Hetothemis dorsalis* RAMB. Kuvangu, Mukoti, Kuandu,

- Ebanga, Sangévé, Ndongo, Kapelongo, Osi. May-Nov. 1932. Feb-Sept. 1933. 12 ♂♂ and 14 ♀♀.
- Trithemis arteriosa* BURM. Rio Mbalé, Kakindo, Kuvangu, Kuvelai, Kului, Bimbi, Kalukembé, Sangévé, Kapelongo, Ndongo, Osi. Sept. and Oct. 1928. May-Dec. 1932. Feb-Sept. 1933. 69 ♂♂ and 31 ♀♀.
- Trithemis monardi* RIS. Chimporo, Sangévé. Nov. 1928. Feb. 1933, 15 ♂♂ and 2 ♀♀.
- Trithemis pluvialis* FÖRSTER. Mukoti, Kuvangu, Bimbi, Ebanga, Sangévé. May-Nov. 1932. Feb. and March 1933. 15 ♂♂ and 5 ♀♀.
- Trithemis kirbyi ardens* GERST. Kuvangu. May 1932. March 1933, 5 ♂♂ and 2 ♀♀.
- Trithemis stictica* BURM. Kuvangu, Mukoti, Kuandu, Lunda, Bimbi, Ebanga, Kalukembé, Sangévé. May-Dec. 1932. Feb. and March 1933. 33 ♂♂ and 3 ♀♀.
- Trithemis risi* [distanti Kirby] LONGFIELD. Kalukembé, Chimporo, Tyitunda, Mukoti, Kuandu, Ebanga. Aug-Nov. 1928. Jan. 1929. May-Dec. 1932. 8 ♂♂ and 8 ♀♀.
- Pseudomacromia natalensis* MARTIN. Kuvangu. March 1933. 1 ♂.
- Pseudomacromia flavicosta* SJÖSTEDT. Bimbi. Oct. 1932. 1 ♂.
- Olpogastra fuelleborni occidentalis* RIS. Kakindo. Oct. 1928. 1 ♀.
- Rhyothemis fenestrina* RAMB. Chimporo. Nov. 1928. 1 ♂ and 1 ♀.
- Rhyothemis mariposa* RIS. Chimporo. Nov. 1928. 1 ♂.
- Tramea basilaris* BURM. Villa da Ponte. Nov. 1928. 1 ♂.
- Urothemis edwardsi* SELYS. Chimporo, Tyitunda. Nov. 1928. Jan. 1929. 3 ♂♂ and 3 ♀♀.
- Pantala flavescens* FABR. Bimbi, Kalukembé, Sangévé, Kuvangu. Oct. and Dec. 1932. Feb.-March 1933. 3 ♂♂ and 2 ♀♀.

British Museum (Natural History) — London, 1945.
(Published September, 1947).