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**Autor:** Aléné, Désirée Chantal / Hoess, René / Burckhardt, Daniel

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## Ciriacreminae (Hemiptera: Psylloidea) from Gabon

DÉSIRÉE CHANTAL ALÉNÉ<sup>1,2</sup>, RENÉ HOESS<sup>1,3</sup> & DANIEL BURCKHARDT<sup>1,4</sup>

<sup>1</sup> Naturhistorisches Museum, Augustinergasse 2, CH-4001 Basel, Switzerland.

<sup>2</sup> Laboratory of Zoology, Faculty of Science, University of Yaounde 1, PO Box. 812, Yaounde, Cameroon. E-Mail: chantalalene@yahoo.fr

<sup>3</sup> Normannenstr. 35, CH-3018 Bern, Switzerland.

<sup>4</sup> daniel.burckhardt@unibas.ch

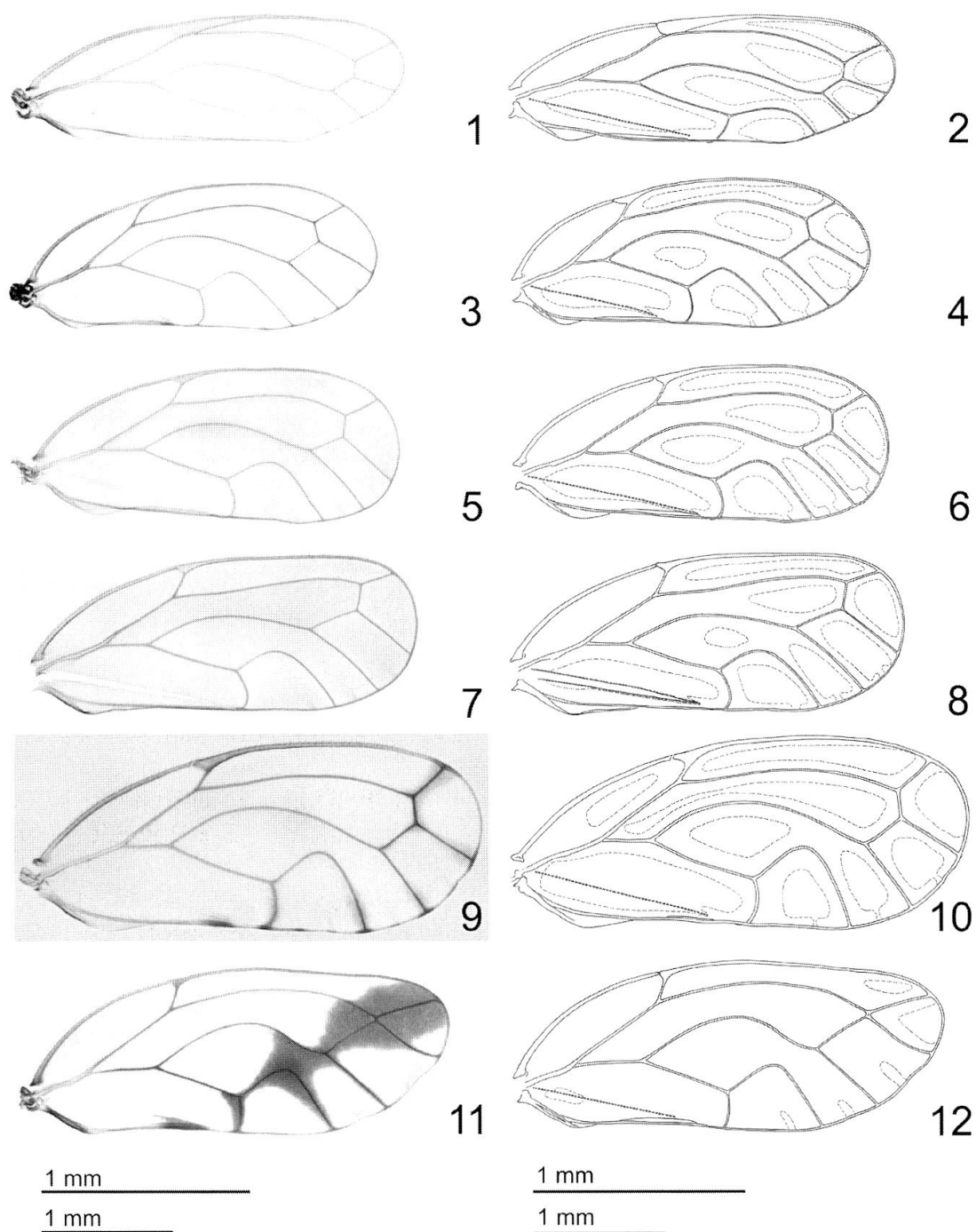
Psyllids of the Ciriacreminae genera *Ciriacremum* (13 spp.) and *Kleiniella* (4 spp.) are reported from Gabon for the first time. Six *Ciriacremum* species and two *Kleiniella* species are described as new, viz. *C. gabonense* n. sp., *C. hollisi* n. sp., *C. mateui* n. sp., *C. megophthalmus* n. sp., *C. ornatum* n. sp., *C. paulyi* n. sp., *K. ascicaudata* n. sp. and *K. homalicephala* n. sp. Larvae and host plant information are not available as nearly all the material was collected at light. Three *Ciriacremum* spp. are not formally described, owing to insufficient material.

Keywords: Psylloidea, Ciriacreminae, *Ciriacremum*, *Kleiniella*, taxonomy, new species, Gabon.

### INTRODUCTION

Psyllids or jumping plant-lice constitute, with about 3500 described species, a small group of phytophagous insects that may damage cultivated plants causing economic loss in agriculture and forestry (Hollis 1976, 2004; Burckhardt 1994). Generally they are host specific. Higher psyllid taxa are often associated with a single host plant taxon or several closely related taxa (Burckhardt 2005). The pantropical subfamily Ciriacreminae is restricted to various genera of Fabaceae (White & Hodkinson 1985). Three indigenous genera are currently known from lowland and montane forest and woodland areas of the Afrotropical region, viz. *Ciriacremum* Enderlein, *Kleiniella* Aulmann and *Palmapenna* Hollis, in addition to the introduced South American genus *Heteropsylla* Crawford (Hertel 2001). *Kleiniella* and *Palmapenna* are restricted to the Afrotropical region but *Ciriacremum* occurs also in Central and South America with at least three species: *Ciriacremum setosum* Crawford (Nicaragua and Guyana: Hodkinson & White 1981) and two undescribed species (Panama: Brown & Hodkinson 1988; Venezuela: unpublished MHNG data).

Hollis (1976) redefined *Ciriacremum* and *Kleiniella*, erected the genus *Palmapenna* and recognised 30 Afrotropical species, 21 of which were new. He later added a new *Kleiniella* species from Congo (Zaire) (Hollis 1984). He separated *Kleiniella* from *Ciriacremum* by the presence of long hairs on the forewing and antennal flagellar segments, the usually patterned forewing, the usually sessile pterostigma and the male subgenital plate always lacking hypovalves. He pointed out that *K. medleri* Hollis and *K. oblongata* (Vondráček) are intermediate between *Kleiniella* and *Ciriacremum* in that they share most characters with other *Kleiniella* spp. but have a pedunculate pterostigma and oval forewings characteristic for *Ciriacremum*. Similarly, *Ciriacremum funestum* Hollis has well-developed hypovalves



Figs 1–12. *Ciriacremum* spp. — to the left, forewing (pattern); to the right, forewing (areas with surface spinules surrounded by dashed line). — 1, 2 *C. gabonense*; 3, 4 *C. hollisi*; 5, 6 *C. mateui*; 7, 8 *C. megophthalmus*; 9, 10 *C. ornatum*; 11, 12 *C. paulyi*. — Scales below the corresponding column, upper ones for *C. ornatum*, lower ones for all other species.

which are present only in *Ciriacremum* but possesses the long setae on the forewing characteristic for *Kleiniella*.

Material has recently become available from Gabon, Central Africa, from where Hollis (1976) did not report any species. It comprises species belonging to *Ciriacremum* (13 spp.) and *Kleiniella* (4 spp.) as described in this paper, eight of

which are new. The material is of particular interest as some of the new species show previously unknown combinations of morphological features characteristic for *Ciriacremum* and *Kleiniella*. Most specimens were taken at light and larval material and host information is not available.

#### MATERIAL AND METHODS

Material recorded in this paper was collected at five localities in Gabon: Belinga (1°08'N 13°07'E), Makokou (0°34'N 12°52'E), Ntoun (0°22'N 9°47'E), Port-Gentil (0°43'N 8°47'E) and Réserve de la Lopé (0°10'S 11°35'E) as well as one in Congo: Dimonika (4°14'S 12°26'E). Most specimens were collected at different artificial light sources including light trap and UV light. A total of 864 individuals are included in this analysis.

Morphological terminology follows Hollis (1976) and Ossiannilsson (1992). Measurements were taken from slide mounted specimens. Material is deposited in the following institutions:

BMNH	Natural History Museum, London, UK
IRSNB	Institut Royal des Sciences naturelles de Belgique, Bruxelles, Belgium
MHNG	Muséum d'Histoire naturelle Genève, Switzerland
MNHN	Muséum national d'Histoire naturelle, Paris, France
NHMB	Naturhistorisches Museum Basel, Switzerland
SMNH	Swedish Museum of Natural History, Stockholm, Sweden

In addition to material listed in the respective section of each species treatment, the following material was examined:

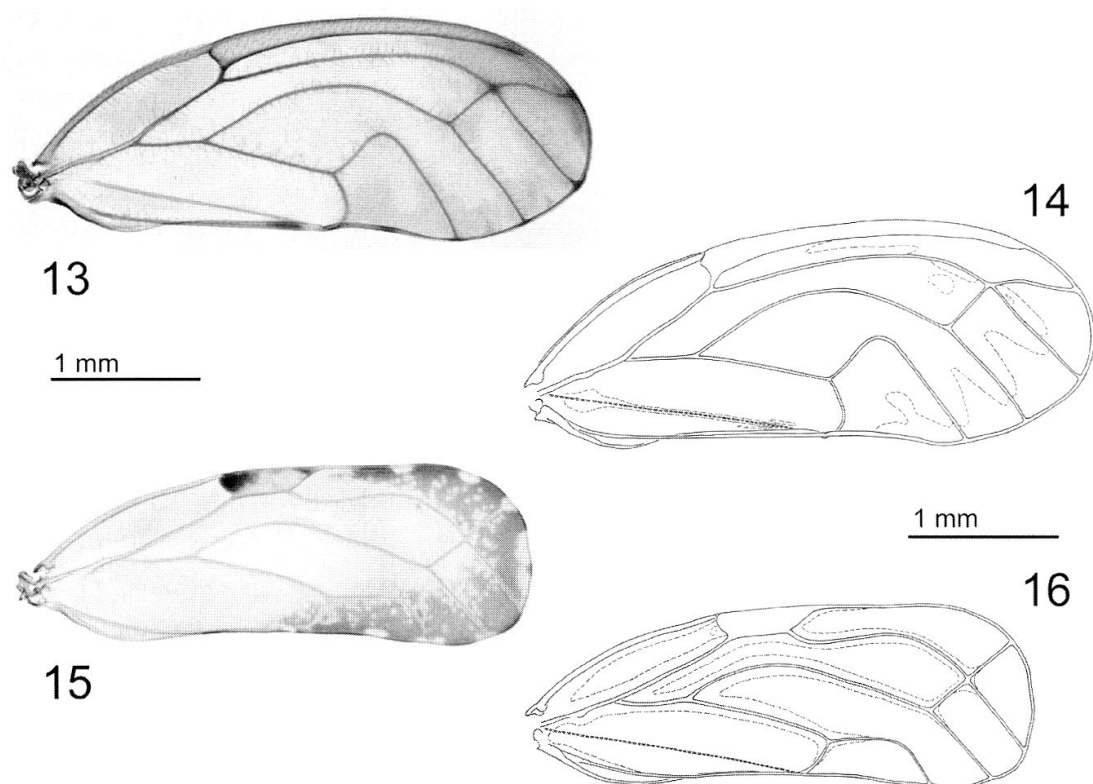
*Ciriacremum filiverpatum* Enderlein, 1910. **Tanzania:** 'Deutsch Ost Afrika' lectotype ♂ slide mounted, 1 ♂ paralectotype slide mounted, 2 ♀ ♀ paralectotypes in 70 % ethanol, SMNH.

#### KEY FOR THE IDENTIFICATION OF ADULT CIRIACREMINAE FROM GABON

- 1 Forewing with vein Rs in punctiform contact with  $M_{1+2}$  (Figs 11–16), or at most, with indistinct rm crossvein ..... 2
- Forewing with distinct rm crossvein between veins Rs and  $M_{1+2}$  (Figs 1–10) ..... *Ciriacremum* p.p. 6
- 2 Pterostigma of forewing sessile (Figs 15–16) ..... *Kleiniella* p.p. 3
- Pterostigma distinctly petiolate (Figs 11–14) ..... 5
- 3 Vertex and genal processes dorsally flat, lying in the same plane, genal processes longer than vertex (Fig. 26) ..... *Kleiniella homalicephala* n. sp.
- Vertex with raised tubercles, genal processes not in the same plane as vertex and shorter than the latter ..... 4
- 4 Forewing pattern consisting of a continuous apical band ..... *Kleiniella congoensis*
- Forewing pattern consisting of separate brown patches along apical margin ... *Kleiniella jassina*
- 5 Forewing pattern as in Fig. 13. Veins of forewing bearing long, conspicuous setae; pterostigma well developed, very long (Figs 13, 14). Metatibia with

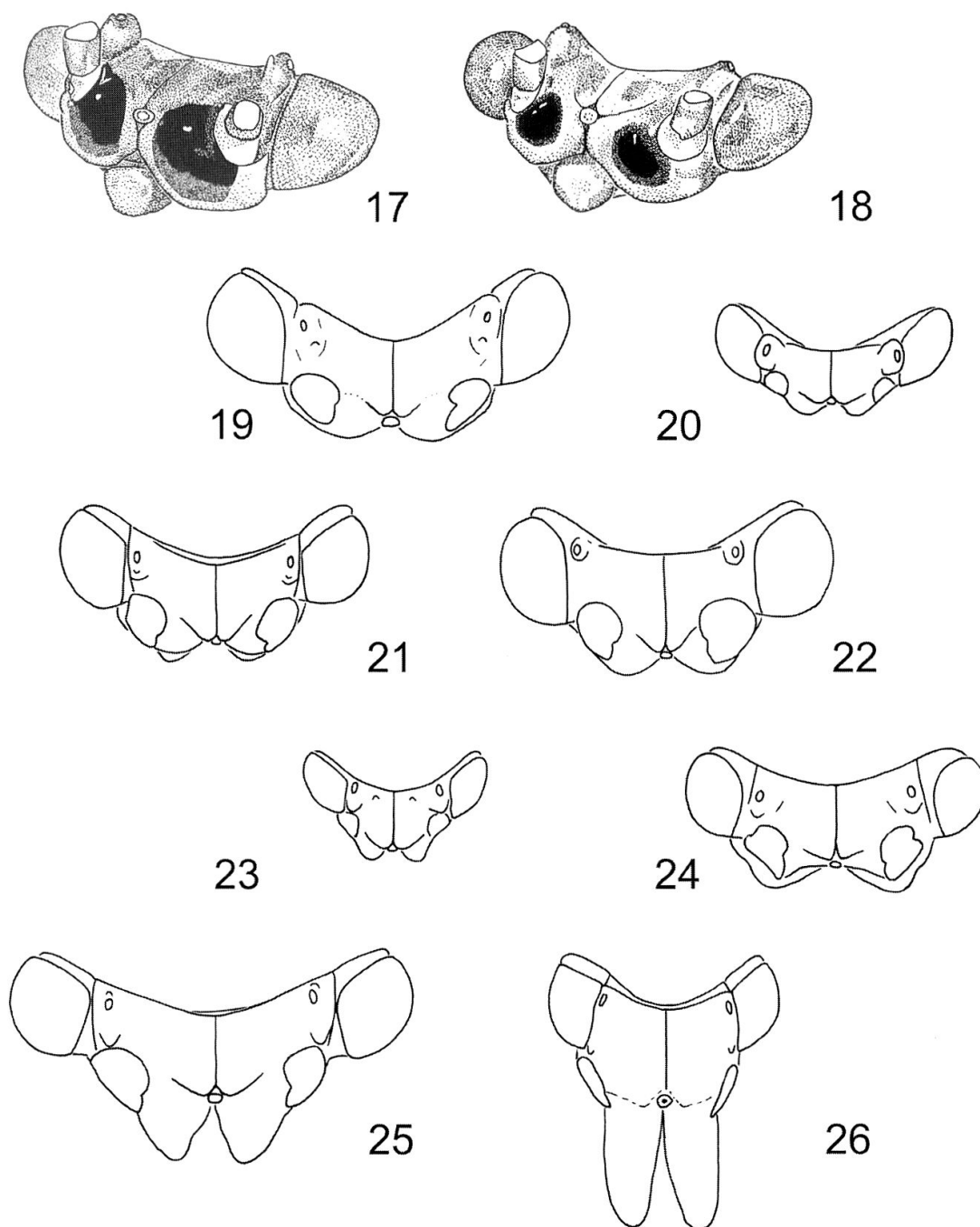


- grouped apical sclerotised spurs ..... *Kleiniella ascicaudata* n. sp.
- Forewing pattern as in Fig. 11. Veins of forewing bearing short, microscopical setae; pterostigma vestigial (Figs 11, 12). Metatibia with an open crown of evenly spaced apical sclerotised spurs ..... *Ciriacremum paulyi* n. sp.
- 6 Genal processes longer than half vertex length along mid-line ..... 7
- Genal processes shorter than half vertex length along mid-line (Figs 19–23) ..... 8
- 7 Apices of veins along apical margin of forewing with small but conspicuous dark spot. Male subgenital plate with very long hypovalves (much longer than parameres). Female terminalia long, proctiger longer than 1.5 times head width ..... *Ciriacremum tubacadium*
- Apices of veins along apical margin of forewing concolourous with remainder of veins. Male subgenital plate with only rudimentary hypovalves. Female terminalia short, proctiger about as long as head width ..... *Ciriacremum* sp. 1
- 8 Genal areas only weakly swollen and shiny black (Figs 17, 19). Male and female terminalia as in Figs 27, 28, 30, 52 ..... *Ciriacremum gabonense* n. sp.
- Genae distinctly produced into processes, not black; terminalia different .... 9
- 9 Larger species, forewing length ♂ > 2.6 mm, ♀ > 2.9 mm ..... 10
- Smaller species, forewing length ♂ < 2.5 mm, ♀ < 2.7 mm ..... 14
- 10 Anteoccipital lobe large, directed anteriad ..... 11
- Anteoccipital lobe small, more or less fused with ocellar tubercle (Figs 21, 22) ..... 13
- 11 Cell  $cu_1$  of forewing relatively high ( $a/b \approx \frac{3}{4}$ ), pterostigma short. Male proctiger with short apical process (about a fifth of basal portion); paramere with group of black peg setae in basal third of inner surface. Female proctiger with obliquely truncate apex ..... *Ciriacremum angolense*
- Cell  $cu_1$  of forewing relatively flat ( $a/b \approx \frac{1}{2}$  or less), pterostigma longer. Male proctiger with long apical process (about  $\frac{1}{3}$  to  $\frac{1}{2}$  of basal portion); paramere lacking group of black peg setae in basal third of inner surface. Female proctiger with blunt apex ..... 12
- 12 Vertex with macroscopical setae (setae as long as ocellar diameter). Pterostigma of forewing with relatively long petiole. Hypoalves much shorter than half paramere length; paramere relatively slender, narrowly rounded or subacute apically, with small tubercle in basal third along hind margin. Valvula dorsalis long and straight, valvula lateralis strongly sclerotised, acute apically ..... *Ciriacremum nigeriense*
- Vertex with microscopical setae (setae much shorter than ocellar diameter). Pterostigma of forewing with relatively short petiole. Hypoalves much longer than half paramere length; paramere relatively wide, truncate apically, with large digitiform process in basal third along hind margin. Valvula dorsalis short, cuneate, valvula lateralis only weakly sclerotised, narrowly rounded apically ..... *Ciriacremum nigripes*



Figs 13–16. *Kleiniella* spp. — to the left, forewing (pattern); to the right, forewing (areas with surface spinules surrounded by dashed line). — 13, 14 *K. ascicaudata*; 15, 16 *K. homalicephala*; — Scale to the corresponding column.

- 13 Antennal flagellomere 1 black, thickened, flagellomeres 2–4 dirty whitish, flagellomeres 5–8 dark brown to black. Abdomen conspicuously reddish. Male and female terminalia as in Figs 37–39, 55 ..... *Ciriacremum megophthalmus* n. sp.
- Antennal flagellomere 1 of same diameter as flagellomere 2, flagellomeres 1–5 yellow, flagellomeres 6–8 brown to black. Abdomen pale yellowish. Male and female terminalia as in Figs 34–36, 54 ..... *Ciriacremum mateui* n. sp.
- 14 Forewing with dark brown pattern consisting of narrow stripes along veins apically (Fig. 9). Terminalia as in Figs 40–42, 56; male paramere bifid, dorsal margin of female proctiger strongly sinuous .... *Ciriacremum ornatum* n. sp.
- Forewing membrane clear, lacking dark pattern (Fig. 3) or with yellow stripes along veins in apical part. Terminalia different ..... 15
- 15 Hypoalves much longer than paramere (Fig. 178 in Hollis 1976); paramere with one sclerotised apical tooth which is directed backwards (Fig. 179 in Hollis 1976). Female terminalia shorter than head width ..... *Ciriacremum* cf. *vondraceki*
- Hypoalves shorter than paramere (Fig. 31); paramere with a pair of inwards directed apical teeth (Fig. 32). Female terminalia (Fig. 53) longer than head width ..... 16



Figs 17–26. *Ciriacremum* spp., *Kleiniella* spp. — 17–18, head oblique frontal view; 19–26, head dorsal view (to scale). 17, 19 *C. gabonense*; 18 *C. filiverpatum*; 20 *C. hollisi*; 21 *C. mateui*; 22 *C. megophthalmus*; 23 *C. ornatum*; 24 *C. paulyi*; 25 *K. ascicaudata*; 26 *K. homalicephala*.

- 16 Body colour dark brown with lighter markings. Paramere, in profile, with large posterior lobe in apical two thirds (Fig. 32); aedeagus with small sclerotised end tube of ductus ejaculatorius (Fig. 33) ..... *Ciriacremum hollisi* n. sp.
- Body colour light (yellow in ethanol stored specimens). Paramere, in profile, with large posterior lobe in basal third; aedeagus with very large sclerotised end tube of ductus ejaculatorius ..... *Ciriacremum* sp. 2

*Ciriacremum angolense* Hollis, 1976

*Material examined.* **Gabon:** Makokou, 1–14.v.1971, at light (J. Mateu), 2 ♀♀ dry mounted, 1 ♂, 1 ♀ slide mounted, MHNG.

*Distribution.* Angola (Hollis 1976) and Gabon.

*Ciriacremum gabonense* n. sp. (Figs 1, 2, 17, 19, 27, 28, 30, 52)

*Material examined.* Holotype ♂, dry mounted, **Gabon:** Ntoun, vii.1985, at light (A. Pauly), IRSNB. Paratypes: **Gabon:** same data as holotype, 5 ♂♂, 6 ♀♀ dry mounted, 2 ♂♂, 2 ♀♀ slide mounted, 31 ♂♂, 69 ♀♀ conserved in 70 % ethanol, IRSNB, BMNH, NHMB, SMNH; same locality, viii.1985, light trap (A. Pauly), 1 ♀ conserved in 70 % ethanol, IRSNB; same locality, xii.1985, at light (A. Pauly), 2 ♂♂, 2 ♀♀ dry mounted, 72 ♂♂, 86 ♀♀ conserved in 70 % ethanol, IRSNB; same locality, i.1986, at UV light (A. Pauly), 5 ♂♂, 5 ♀♀ dry mounted, IRSNB, NHMB; same locality, i.1986, at light (A. Pauly), 3 ♂♂, 3 ♀♀ dry mounted, 2 ♂♂, 2 ♀♀ slide mounted, 13 ♂♂, 52 ♀♀ conserved in 70 % ethanol, IRSNB, NMHB. – **Congo:** Dimonika, 29.xii.1978 (C. Morin) 1 ♀ dry mounted, MNHN.

*Etymology.* The species is named after its provenance.

*Description.* Coloration: Body brown dorsally and pale yellow to ochreous ventrally. Vertex ochreous. Eyes greyish pink. Ocelli orange. Anteoccipital lobe yellow. Genae ochreous with large shiny black patch reaching vertex dorsally, antennal socket laterally (Fig. 17), median ocellus medially and clypeus ventrally. Antennae light in basal half, gradually darkening from brown to black apically. Pronotum dark brown anteriorly and laterally, posterior margin lighter. Mesopraescutum brown with posterior margin light. Mesoscutum brown with light antero-lateral corners. Mesoscutellum ochreous. Metascutellum pale yellow. Tegulae and pleurae yellowish. Wings hyaline (Fig. 1). Legs ochreous, apical segment of protarsus and mesotarsus dark brown. Abdomen in females darker than in males. Male terminalia lighter than abdomen, parameres ochreous with postero-apical margin black. Female terminalia ochreous.

*Structure:* Large species. Body with short, microscopical setosity and reticulation and some larger setae on pronotum, head, legs, abdominal sternites and terminalia. Head (Fig. 19) only weakly inclined from longitudinal body axis; vertex shiny and concave; anteoccipital lobes small, forming upwards directed tubercles in front of the lateral ocelli on the ocellar protuberance; genal processes evenly rounded, weakly protruding; compound eyes relatively large. Pronotum down curved anteriorly and laterally. Meracanthus relatively short and straight, apex turned ventrad. Metatibial basal spine well-developed; apical spurs arranged as 1+3+1. Forewing long and narrow; pterostigma sessile but elongated distally;  $cu_1$  low; spinule arrangement as in Fig. 2; hindwing with following numbers of costal setae: 4–6 on wing articulation, 2–5 on base of C+Sc and 3–6 before midway to hamulus on C+Sc. Male terminalia as in Fig. 27; proctiger with moderately long apical portion; paramere (Fig. 28) 1.5 times as wide as the proctiger (in lateral view), apex with inward and forward directed, sclerotized tooth, postero-apical edge angular, outer surface evenly covered in long setae, inner surface with an antero-basal group of long setae, scattered short apical setae and a postero-basal group of densely spaced thick setae; distal segment of aedeagus as in Fig. 30, subterminal ventral hook pointed, flanges directed distally, sclerotised end tube of ductus ejaculatorius rela-

tively short and sinuous; subgenital plate short, rounded posteriorly, hypovalves absent. Female terminalia (Fig. 52) long; dorsal margin of proctiger weakly sinuous, apex obliquely truncate, densely covered in peg setae in apical third and spaced, long setae in basal two thirds; circumanal ring long; subgenital plate pointed apically, covered in long setae ventrally and peg setae apically; valvula dorsalis cuneiform; valvula ventralis with apical tooth, valvula lateralis narrowly rounded apically.

Measurements and ratios in Tab. 1.

*Comments.* *C. gabonense* is morphologically similar to *C. filiverpatum* Enderlein. It differs in the darker body coloration, the more expanded black shiny patches on the genae (Figs 17, 18), the larger and more pointed anteoccipital lobe, a sessile rather than a petiolate pterostigma and the more angular and wider paramere (Figs 28, 29).

***Ciriacremum hollisi* n. sp.**

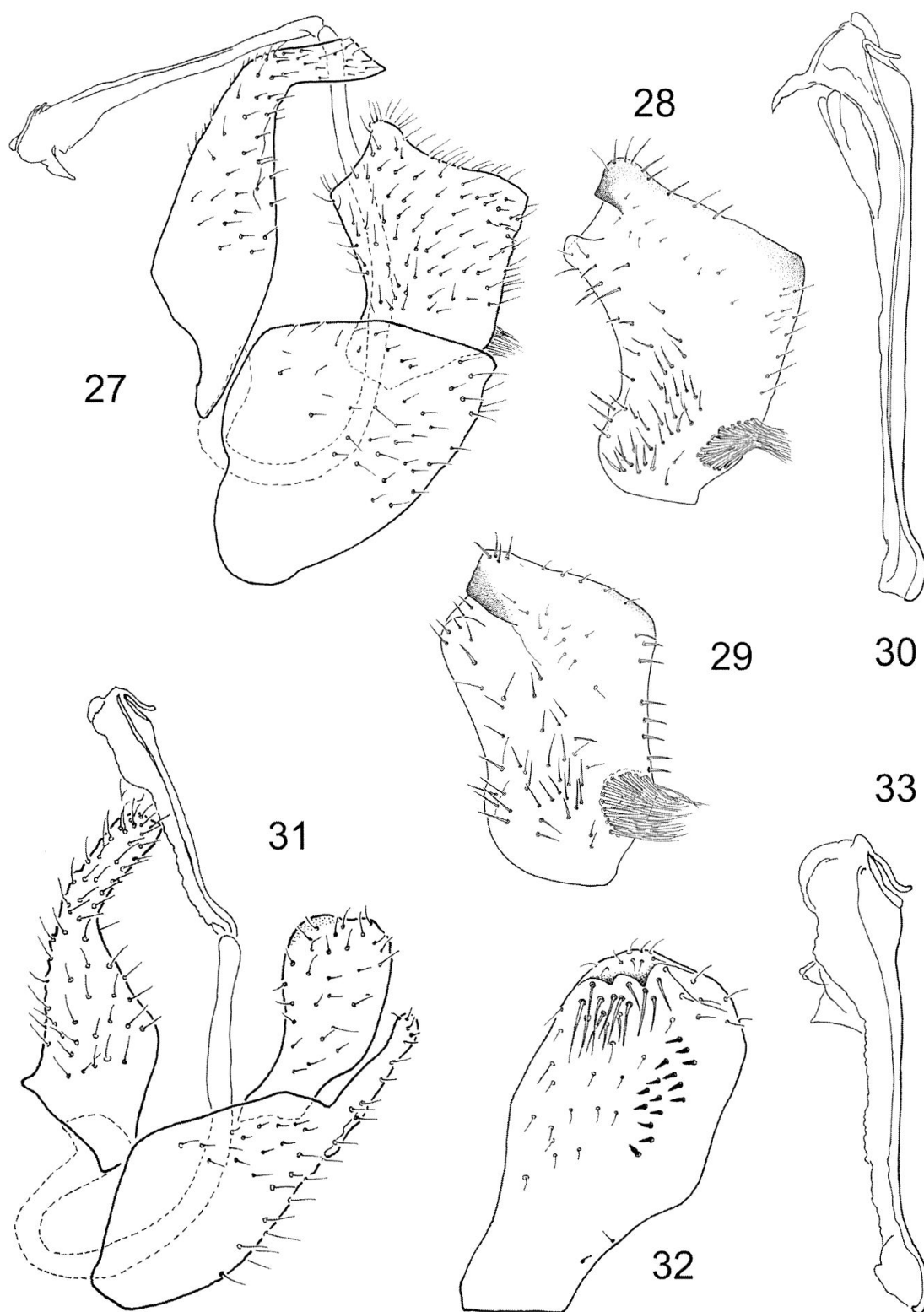
(Figs 3, 4, 20, 31–33, 53)

*Material examined.* Holotype ♂, dry mounted, **Gabon**: Makokou, 1–14.v.1971, at light (J. Mateu), MHNG. Paratypes: **Gabon**: same data as holotype, 10 ♂♂, 9 ♀♀ dry mounted, 2 ♂♂, 2 ♀♀ slide mounted, 46 ♂♂, 41 ♀♀ conserved in 70 % ethanol, MHNG, NHMB; Ntoun, vii.1985, at light (A. Pauly), 1 ♂, 1 ♀ dry mounted, 1 ♂ conserved in 70 % ethanol, IRSNB; same locality, viii.1985, light trap (A. Pauly), 1 ♂, 3 ♀♀ conserved in 70 % ethanol, IRSNB, NHMB; same locality, ix.1985, at light, after rain (A. Pauly), 1 ♂ conserved in 70 % ethanol, IRSNB; same locality, xii.1985, at light (A. Pauly), 1 ♂ dry mounted, 1 ♂ conserved in 70 % ethanol, IRSNB, NHMB; same locality, i.1986, light trap (A. Pauly), 3 ♂♂, 1 ♀ conserved in 70 % ethanol, IRSNB; same locality, xi.1986, light trap (A. Pauly), 5 ♂♂, 4 ♀♀, 1 adult without terminalia conserved in 70 % ethanol, IRSNB.

*Etymology.* The species is dedicated to David Hollis.

*Description.* Coloration: Body dark brown with longitudinal yellow stripes on head and thoracic tergites. Vertex dark brown with a pair of parallel median yellow stripes joining anteriorly the oblique lateral yellow stripes. Eyes dark reddish surrounded by semicircular yellow ring posteriorly. Ocelli yellow; protuberance bearing lateral ocelli dark brown with yellow basal semicircular margin sometimes joining lateral stripes of vertex. Anteoccipital lobe brown with basal yellow semicircular rim. Genae light brown. Antennae brown. Pronotum, mesopraescutum, mesoscutum dark brown with dirty yellow longitudinal stripes; mesoscutellum light brown with pale yellow margins; metascutellum yellowish. Tegulae brown. Pleurae dark brown to black. Forewing hyaline with infuscate claval apex (Fig. 3). Procoxa and mesocoxa black; metacoxa brown; femora dark brown to black; tibiae and tarsi brown. Abdomen brown dorsally and dark brown to black ventrally. Male terminalia brown; subgenital plate dark brown basally, brown apically. Female terminalia ochreous, dark brown in the middle.

Structure: Small species. Body with short, microscopical setosity and some scattered larger setae on head, legs, abdominal sternites and terminalia; surface finely microsculptured. Head (Fig. 20) only weakly inclined from longitudinal body axis; vertex with a longitudinal concavity on each side; anteoccipital lobes angular at the frontal edge of the ocellar protuberance; genal processes conical, short, blunt; compound eyes relatively small. Pronotum transversely ribbon-shaped with lateral



Figs 27–33. *Ciriacremum* spp. — to the left, male terminalia left lateral view; in the middle, right paramere inner face; to the right, distal segment of aedeagus left lateral view. — 27, 28, 30 *C. gabonense*; 29 *C. filiverpatum*; 31–33 *C. hollisi*.



edges weakly curved backwards; with two pits on either side, one close to the middle towards the posterior margin, the other more shallow one near the lateral edge. Meracanthus relatively short, straight, triangular. Metatibia with large basal spine and grouped apical spurs as 1+3+1. Forewing oblong-oval; pterostigma petiolate, short, wide basally;  $cu_1$  relatively high; spinule arrangement as in Fig. 4; hindwing with following numbers of costal setae: 1–2 on wing articulation, 3–5 on base of C+Sc and 1–2 before midway to hamulus on C+Sc. Male terminalia as in Fig. 31; proctiger with wide base and narrow, moderately long apical process; paramere (Fig. 32) club-shaped, outer surface covered in long setae, inner surface with long fine setae apically, short fine setae medially and a group of black pointed peg setae postero-medially, apex forming two sclerotized, inward directed teeth. Distal segment of aedeagus as in Fig. 33, lateral flanges triangular, sclerotised end tube of ductus ejaculatorius long, sinuous. Subgenital plate subglobular with hypovalves half as long as the parameres, blunt apically. Female terminalia moderately long (Fig. 53), dorsal margin of proctiger sinuous, apex obliquely truncate, covered in short stout setae apically, bearing two longitudinal rows of long setae dorsally, circumanal ring oval. Subgenital plate long, covered in densely spaced short setae apico-laterally and sparse long setae ventrally; valvula dorsalis cuneate, valvula ventralis subacute apically, valvula lateralis narrow, narrowly rounded apically.

Measurements and ratios in Tab. 1.

*Comments.* *C. hollisi* is closely related to *C. megafricanum* Hollis from which it differs in the slightly larger body dimensions, in the smaller, more petiolate pterostigma, in the more expanded spinule areas on the forewing, in the male proctiger with a longer apical process, in the male paramere which bears two apical inwards directed teeth rather than one, which widens continuously in basal third along hind margin rather than in an angle, and which bears a smaller group of peg setae on the inner surface compared to *C. megafricanum*, and in the larger apical dilatation of the apical portion of the aedeagus.

***Ciriacreum mateui* n. sp.**

(Figs 5, 6, 21, 34–36, 54)

*Material examined.* Holotype ♂, dry mounted, **Gabon**: Makokou, iv.1971, at light (J. Mateu), MHNG. Paratypes: **Gabon**: same data as holotype, 3 ♂♂, 5 ♀♀ dry mounted, 2 ♂♂, 2 ♀♀ slide mounted, 2 ♂♂, 4 ♀♀ conserved in 70 % ethanol, MHNG, NHMB; same locality, 1–14.v.1971, at light (J. Mateu), 1 ♀ dry mounted, MHNG.

*Etymology.* The species is dedicated to J. Mateu, the collector of the type material.

*Description.* Coloration: Body pale beige with some greyish parts on thorax. Eyes grey. Ocelli ochreous. Antennae ochreous, basal four flagellar segments with brown apex, remainder of flagellar segments brown. Mesopraescutum, mesoscutum and mesepisternum mostly grey. Forewing hyaline with beige venation becoming ochreous apically (Fig. 5). Legs beige, apical segment of protarsus darkened in males, rarely so in females. Female terminalia beige with ochreous posterior half.

Structure: Relatively large species. Body with short, microscopical setosity and reticulation and some larger setae on head, legs, abdominal sternites and terminalia. Head (Fig. 21) only weakly inclined from longitudinal body axis; vertex shiny with a concavity on either side; anteoccipital lobes forming minute tubercle



in front of the lateral ocelli on the ocellar protuberance; genal processes obtusely conical, relatively small; compound eyes relatively large. Pronotum down curved anteriorly and laterally with one lateral longitudinal concavity on each side. Mera-canthus pointed thumb-like in males, relatively long and triangular in females. Meta-tibial basal spine well-developed but short; apical spurs arranged as 1+3+1. Fore-wing ovoid, widest distally; pterostigma small with pronounced proximal end, strongly petiolate;  $cu_1$  relatively high; spinule arrangement as in Fig. 6; hindwing with following numbers of costal setae: 2–3 on wing articulation, 2–6 on base of C+Sc and 3–6 before midway to hamulus on C+Sc. Male terminalia as in Fig. 34; proctiger with moderately long apical portion; paramere (Fig. 35) bilobed with a larger anterior and a smaller posterior part, the latter is directed inward with a posterior group of short peg setae, the former is evenly covered with long hairs on outer surface and long thick setae on the inner surface; distal segment of aedeagus as in Fig. 36, apical dilatation short, semicircular, sclerotised end tube of ductus ejaculatorius short and almost straight; subgenital plate short, hypovalves simple, club-shaped  $\frac{3}{4}$  as long as the parameres. Female terminalia (Fig. 54) long; dorsal margin of proctiger with a concave bend in the middle, apex obliquely truncate, densely covered in peg setae in apical half, two dorsal longitudinal rows of long thin setae and few tiny setae towards the circumanal ring; circumanal ring long; subgenital plate pointed apically, apex directed dorsad, covered in long setae ventrally and peg setae apically; valvula dorsalis cuneiform; valvula ventralis subacute apically, valvula lateralis narrowly rounded apically.

Measurements and ratios in Tab. 1.

*Comments.* Based on the large subglobular eyes and the bilobed parameres *C. mateui* is closest related to *C. megophthalmus* sp. n. It differs from the latter in the pale body colour, in the first antennal flagellomere which has the same diameter as flagellomere 2 rather than being much thicker, in the longer apical process of the male proctiger and the longer hypovalves.

***Ciriacremum megophthalmus* n. sp.**

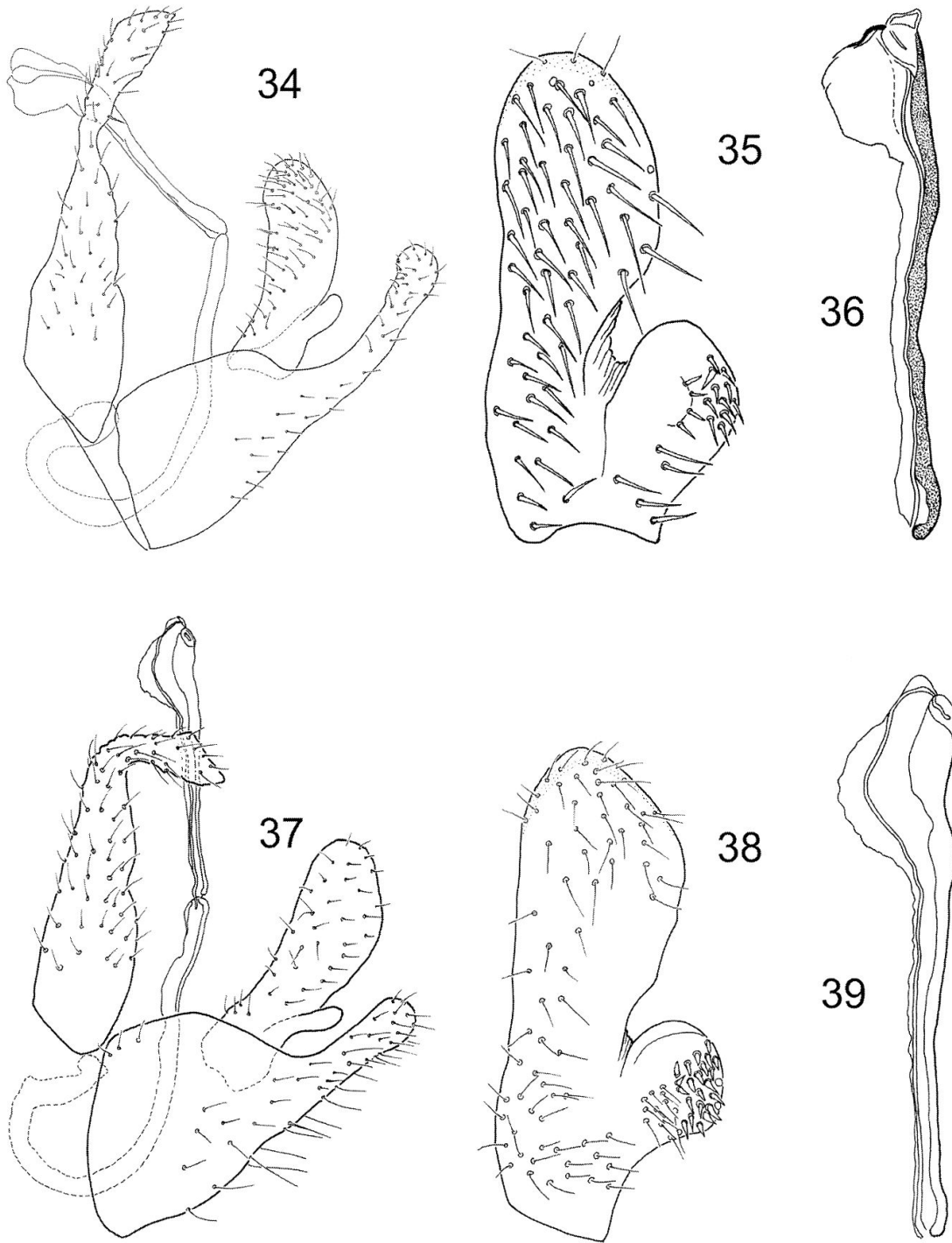
(Figs 7, 8, 22, 37–39, 55)

*Material examined.* Holotype ♂, dry mounted, **Gabon**: Makokou, 1–14.v.1971, at light (J. Mateu), MHNG). Paratypes: **Gabon**: same data as holotype, 2 ♂♂ dry mounted, 1 ♂, 1 ♀ slide mounted, MHNG, NHMB.

*Etymology.* The species name refers to the large eyes.

*Description.* Coloration: Vertex pale yellow gradually darkening posteriorly. Eyes dark brown. Ocelli yellow, raised tubercles brown. Genae pale yellow. Antenna: scape and pedicel light brown, flagellomere 1 black, flagellomeres 2–4 light brown, flagellomeres 5–8 dark brown. Pronotum pale yellow. Mesopraescutum dark brown with a yellow postero-lateral margin. Mesoscutum light brown. Mesoscutellum whitish to pale yellow postero-laterally, light brown medially. Metascutellum pale yellow. Tegulae light brown. Pleurae brown. Forewing hyaline (Fig. 7). Legs: coxae light brown; femora pale yellow; protibia and mesotibia black; metatibia pale yellow; protarsus and mesotarsus dark brown, metatarsus pale yellow. Abdomen red-orange dorsally, yellowish ventrally. Male terminalia: proctiger red-orange; subgenital plate yellow-orange; paramere red-orange. Female terminalia brown, subgenital plate darker ventrally.

Structure: Large species. Body with microscopical reticulation except on dor-



Figs 34–39. *Ciriactremum* spp. — to the left, male terminalia left lateral view; in the middle, right paramere inner face; to the right, distal segment of aedeagus left lateral view. — 34–36 *C. mateui*; 37–39 *C. megophthalmus*.

sal parts of head and thorax which are shiny, some short macroscopical setae on dorsum of thorax and on vertex and some larger setae on head, legs, abdominal sternites and terminalia. Head (Fig. 22) only weakly inclined from longitudinal body axis; vertex shiny with a single concavity; anteoccipital lobes minute situated on the small ocellar protuberance; genal processes obtusely conical, relatively small;

compound eyes large; first flagellomere distinctly wider than following ones. Pronotum down curved anteriorly and laterally. Meracanthus long, subtriangular. Metatibial basal spine well-developed but short; apical spurs arranged as 1+3+1. Forewing relatively long, subovoid; pterostigma as in *C. mateui*;  $cu_1$  relatively high; spinule arrangement as in Fig. 8; hindwing with following numbers of costal setae: 2–3 on wing articulation, 3–4 on base of C+Sc and 3–5 before midway to hamulus on C+Sc. Male terminalia as in Fig. 37; proctiger with moderately long apical portion; paramere bifid (Fig. 38), similar to *C. mateui*; distal segment of aedeagus as in Fig. 39, apical dilatation short, sclerotised end tube of ductus ejaculatorius relatively short and sinuous; subgenital plate short, hypovalves simple, club-shaped, half as long as parameres. Female terminalia (Fig. 55) long; dorsal margin of proctiger weakly sinuous, apex obliquely truncate, densely covered in peg setae in apical half and spaced, long setae behind the circumanal ring; circumanal ring long; subgenital plate pointed apically, covered in very long setae ventrally and shorter setae above; valvula dorsalis cuneiform, valvula ventralis subacute apically, valvula lateralis narrowly rounded apically.

Measurements and ratios in Tab. 1.

*Comments.* *C. megophthalmus* is closely related to *C. mateui* sp. n. (see comments there).

### *Ciriacremum nigeriense* Hollis, 1976

*Material examined.* **Gabon:** Makokou, iv.1971, at light (J. Mateu), 2 ♂♂, 3 ♀♀ dry mounted, 1 ♂, 1 ♀ slide mounted, MHNG, NHMB; Ntoun, viii.1985, light trap (A. Pauly), 1 ♀ conserved in 70 % ethanol, IRSNB; same locality, i.1986, light trap (A. Pauly), 3 ♂♂, 2 ♀♀ conserved in 70 % ethanol, IRSNB; same locality, xi.1986, light trap (A. Pauly), 2 ♂♂, 3 ♀♀ conserved in 70 % ethanol, IRSNB.

*Distribution.* Nigeria (Hollis 1976), Cameroon (NHMB data) and Gabon.

### *Ciriacremum nigripes* Hollis, 1976

*Material examined.* **Gabon:** Makokou, iv.1971, at light (J. Mateu), 2 ♂♂, 2 ♀♀ dry mounted, 2 ♂♂, 2 ♀♀ slide mounted, 5 ♀♀ conserved in 70 % ethanol, MHNG, NHMB; same locality, 1–14.v.1971, at light (J. Mateu), 1 ♂, 3 ♀♀ conserved in 70 % ethanol, MHNG; Ntoun, vii.1985, at light (A. Pauly), 1 ♂, 2 ♀♀ conserved in 70 % ethanol, IRSNB; same locality, viii.1985, light trap (A. Pauly) 6 ♂♂, 13 ♀♀ conserved in 70 % ethanol, IRSNB; same locality, ix.1985, at light (A. Pauly), 2 ♂♂, 2 ♀♀ dry mounted, IRSNB, NHMB; same locality, xii.1985, at light (A. Pauly), 1 ♂, 1 ♀ dry mounted, 3 ♂♂, 5 ♀♀ conserved in 70 % ethanol, IRSNB; same locality, i.1986, light trap (A. Pauly), 24 ♂♂, 33 ♀♀ conserved in 70 % ethanol, IRSNB; same locality, xi.1986, light trap (A. Pauly), 29 ♂♂, 50 ♀♀ conserved in 70 % ethanol, IRSNB; Port-Gentil, xi.1955 (F. Zielinski), 1 ♂, 1 ♀ dry mounted, MHNG.

*Distribution.* Nigeria (Hollis 1976), Cameroon (NHMB data) and Gabon.

### *Ciriacremum ornatum* n. sp.

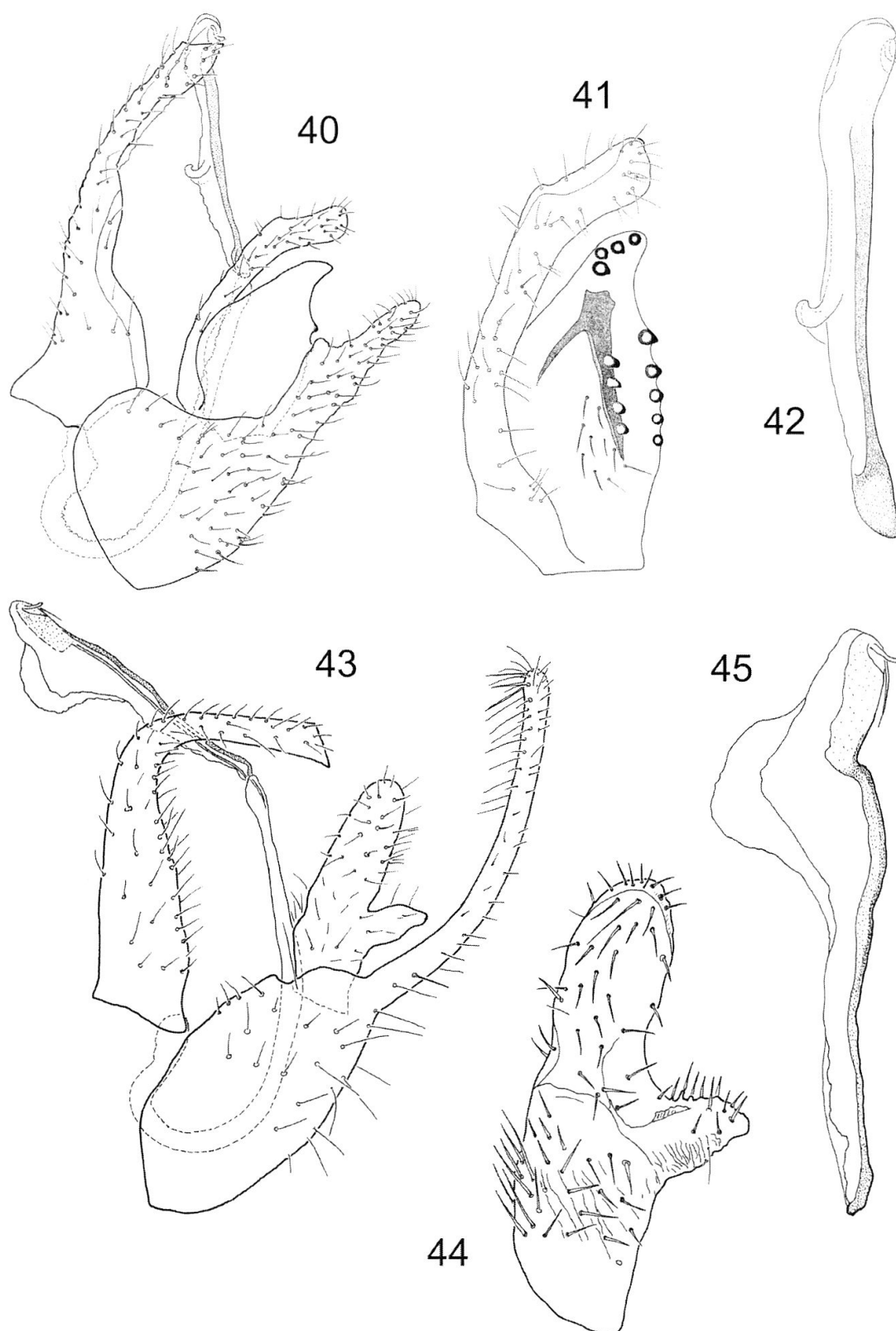
(Figs 9, 10, 23, 40–42, 56)

*Material examined.* Holotype ♂, dry mounted, **Gabon:** Makokou, 1–14.v.1971, at light (J. Mateu), MHNG. Paratypes: **Gabon:** same data as holotype, 1 ♂, 3 ♀♀ dry mounted, 1 ♂, 2 ♀♀ slide mounted, MHNG, NHMB.

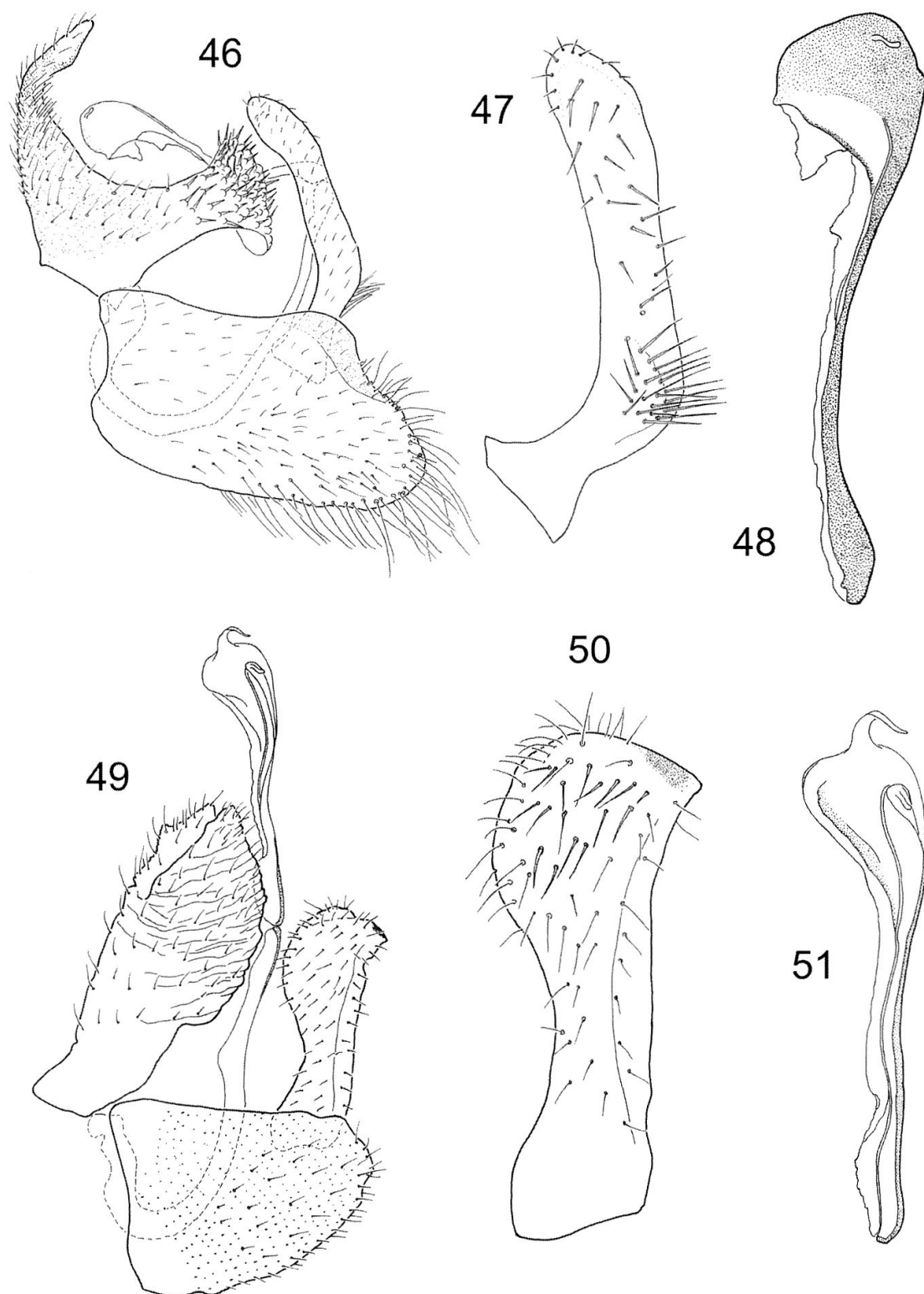
*Etymology.* The species name refers to the forewing pattern.

*Description.* Coloration: Body dark brown with beige pattern. Vertex beige with black median suture and narrow black area around the ocelli, lateral margins near antennae and longitudinal grooves on each side dark brown. Eyes dark brown surrounded by beige. Ocelli light to dark orange. Anteoccipital lobe beige. Genae beige, sometimes light ochreous below. Antennae ochreous at base, dark brown apically beginning at flagellomere 2. Pronotum with four black grooves. Mesopraescutum beige with two large dark brown spots which may be connected anteriorly. Mesoscutum beige with two to four medio-dorsal longitudinal dark brown stripes and two large dark brown medio-lateral spots. Mesoscutellum beige with two dark brown spots and posterior part sometimes ochreous. Metascutum beige laterally, dark brown medio-laterally. Metascutellum beige laterally, brown ochreous dorsally. Tegulae and parapteron beige. Pleura brown to black. Forewings (Fig. 9) hyaline with ochreous veins, veins darkened near apex and posterior margin of wing, black brown spots on marginal vein at ends of veins Rs to Cu<sub>1b</sub>, the same at the radular areas of m<sub>1</sub> and m<sub>2</sub>, two at cu<sub>1</sub> and one near anal break, the remainder of the marginal vein between M<sub>1+2</sub> and the anal break white, membrane infusate near anal break and near the apices of veins Rs to Cu<sub>1b</sub>, rm dark brown sometimes also membrane adjacent to it. Legs beige, femora mostly dark brown, tarsi sometimes darkened. Abdomen dark brown laterally, ochreous ventrally and dorsally with posterior margins of segments dark brown. Male terminalia brown, subgenital plate and proctiger ventrally sometimes beige. Anterior branch of paramere black. Female terminalia beige, a median transverse band and base of proctiger as well as base and centre of subgenital plate dark brown, apex of proctiger black.

Structure: Small species. Body with short, microscopical setosity and granulation and some larger setae on head, legs, abdominal sternites and terminalia. Head (Fig. 23) only weakly inclined from longitudinal body axis; vertex with a longitudinal concavity on either side; anteoccipital lobes forming angled protuberances in front of the lateral ocelli; genal processes rounded conical, distinctly protruding; compound eyes relatively small. Pronotum horizontally with two pits on either side, one longitudinal shallow close to the middle towards the posterior margin, the other one deeper near the lateral edge. Meracanthus short triangular. Metatibial basal spine well-developed but small; apical spurs arranged as 1+3+1. Forewing relatively short ovoid; pterostigma similar to that of *C. mateui*; cu<sub>1</sub> high; spinules arrangement as in Fig. 10, notably cell c+sc with spinules; hindwing with following numbers of costal setae: 1–3 on wing articulation, 3 on base of C+Sc and 2–3 before thirdway to hamulus on C+Sc. Male terminalia as in Fig. 40; proctiger with long apical portion, hind margin of basal part sinuous; paramere (Fig. 41) bifid with a long, narrow anterior branch and a broad shorter posterior part, the anterior branch evenly covered with spaced long setosity, convex anteriorly with a subterminal angle, the lanceolate posterior part is devoid of hairs on the outer surface but has a central group of long peg setae and three rows of strongly sclerotised teeth on the inner surface, one row of four teeth being apical, one row of five teeth being on the posterior margin and the third row of four teeth being placed on the posterior branch of a forked sclerotised ridge; distal segment of aedeagus as in Fig. 42, lateral flanges directed proximally but curved distally with rounded apices, sclerotised end tube of ductus ejaculatorius relatively short and curved; subgenital plate heart-shaped, hypovalves nearly as long as the parameres with a tooth-like projection midway on



Figs 40–45. *Ciriacreminum* spp. — to the left, male terminalia left lateral view; in the middle, right paramere inner face; to the right, distal segment of aedeagus left lateral view. — 40–42 *C. ornatum*; 43–45 *C. paulyi*.



Figs 46–51. *Kleiniella* spp. — to the left, male terminalia left lateral view; in the middle, right paramere inner face; to the right, distal segment of aedeagus left lateral view. — 46–48 *K. ascicaudata*; 49–51 *K. homalicephala*.



the anterior side. Female terminalia (Fig. 56) relatively long; dorsal margin of proctiger strongly sinuous, apex truncate, relatively densely covered in fine setae in apical half and spaced, long setae along the dorsal margin and posterior to the circum-anal ring; circumanal ring long; subgenital plate pointed apically, covered in long setae ventrally and in the middle and peg setae apically; valvula dorsalis cuneiform; valvula ventralis with apical tooth, valvula lateralis narrowly rounded apically.

Measurements and ratios in Tab. 1.

*Comments.* *C. ornatum* differs from other described *Ciriacremum* species in the patterned forewing and the bifid paramere, which bears strongly sclerotised teeth and a sclerotised ridge on the inner surface.

***Ciriacremum paulyi* n. sp.**

(Figs 11, 12, 24, 43–45, 57)

*Material examined.* Holotype ♂, slide mounted, **Gabon**: Ntoun, viii.1985, light trap (A. Pauly), IRSNB. Paratypes: **Gabon**: same data as holotype, 1 ♀ dry mounted, IRSNB; same locality, i.1986, at UV light (A. Pauly), 1 ♀ slide mounted, NHMB; Réserve de la Lopé, 20.iv.2000 (J. Pierre), 1 ♂ dry mounted, MNHN.

*Etymology.* The species is dedicated to A. Pauly, the collector of most of the type material.

*Description.* Coloration: Body dark brown. Vertex ochreous, gradually brownish close to ocellar tubercles. Eyes greyish. Ocelli yellow raised on brown tubercles. Genae ochreous. Antenna: scape and pedicel dark brown to black; flagellomere 1 dark brown with white band medially, flagellomeres 2–4 white basally, dark apically, flagellomeres 5–8 dark brown. Pronotum dark brown with posterior margin lighter. Mesopraescutum blackish. Mesoscutum dark brown. Mesoscutellum whitish to light brown. Metascutellum whitish. Tegulae and parapteron dark brown to black. Pleurae brown. Forewing hyaline with brown veins; pterostigma yellow; wing membrane bearing an infuscated dark brown pattern covering apical third of vein Rs, apical third of cell  $r_1$ , apical fourth of cell  $r_2$ , almost entire cell  $r_3$ , the basal two thirds of vein  $M_{1+2}$ , the entire vein  $M_{3+4}$ , the basal third of cell  $m_1$ , the middle of cell  $m_2$ , veins  $Cu_{1a}$  and  $Cu_{1b}$ , a dark brown spot on distal third of posterior part of cell  $cu_2$  and on distal third of vein  $A_2$  (Fig. 11). Hindwing transparent, bearing a light brown poorly defined spot around apex of vein A. Legs: procoxa and mesocoxa ochreous, metacoxa brown; profemur and mesofemur dark brown; tibiae and tarsi ochreous. Abdomen brown. Male terminalia: proctiger dark brown to black with a whitish apex; parameres dark brown to black; subgenital plate brown; hypovalves dark brown. Female terminalia dark brown basally, brown apically.

*Structure:* Relatively large species. Body with short, microscopical setosity and reticulation and some larger setae on head, legs, abdominal sternites and terminalia. Head (Fig. 24) only weakly inclined from longitudinal body axis; vertex shiny and with a single concavity; anteoccipital lobes forming small tubercles in front of lateral ocelli on ocellar protuberance; genal processes flat, conical; compound eyes medium sized. Pronotum down curved anteriorly and laterally. Metafemur with an inner ventral lobe apically. Meracanthus relatively short, triangular. Metatibial basal spine absent; apical sclerotised spurs 6–8, forming an evenly spaced open crown. Forewing long, parallelogram-shaped; pterostigma very small, hence with long petiole;  $cu_1$  high;  $rm$  cross vein very short or Rs in punctiform contact with  $M_{1+2}$ ; spinule arrangement as in Fig. 12, very reduced; hindwing with follo-



wing numbers of costal setae: 2 on wing articulation, 8–13 on base of C+Sc before midway to hamulus becoming more and more distant to one another; bearing a well-defined area around apex of vein A densely covered in surface spinules. Male terminalia as in Fig. 43; proctiger with long apical portion; paramere (Fig. 44) bilobed with a thumb-like projection midway on posterior margin, inner surface relatively evenly covered with long thick setae, bearing a ridge and some wrinkles on the projection and a few folds and some wrinkles on the stem; distal segment of aedeagus as in Fig. 45, dorsal margin sinuous, apical dilatation relatively large, narrow terminal filament bent backwards, sclerotised end tube of ductus ejaculatorius relatively short and curved; subgenital plate oval, the slender hypoalves almost as long as proctiger. Female terminalia (Fig. 57) very long; dorsal margin of proctiger weakly sinuous, apex obliquely truncate, sparsely covered in fine setae in apical half; circumanal ring relatively short; subgenital plate shorter than proctiger, pointed apically, covered in peg setae in apical three quarters laterally and in long setae ventrally; valvula dorsalis cuneiform; valvula ventralis subacute apically, valvula lateralis narrow, narrowly rounded apically.

Measurements and ratios in Tab. 1.

*Comments.* *C. paulyi* is intermediate between *Ciriacremum* and *Kleiniella*. It shares with members of *Kleiniella* the distinct forewing pattern, the ungrouped costal setae of the hindwing, the ungrouped metatibial spurs and a punctiform rm cross-vein in the forewing, and with those of *Ciriacremum* short setae on body, legs, along the forewing veins and on the antennae, the petiolate pterostigma and the presence of well-developed hypoalves. Based on the presence of hypoalves, the species is here attributed to *Ciriacremum*.

### *Ciriacremum tubacadium* Hollis, 1976

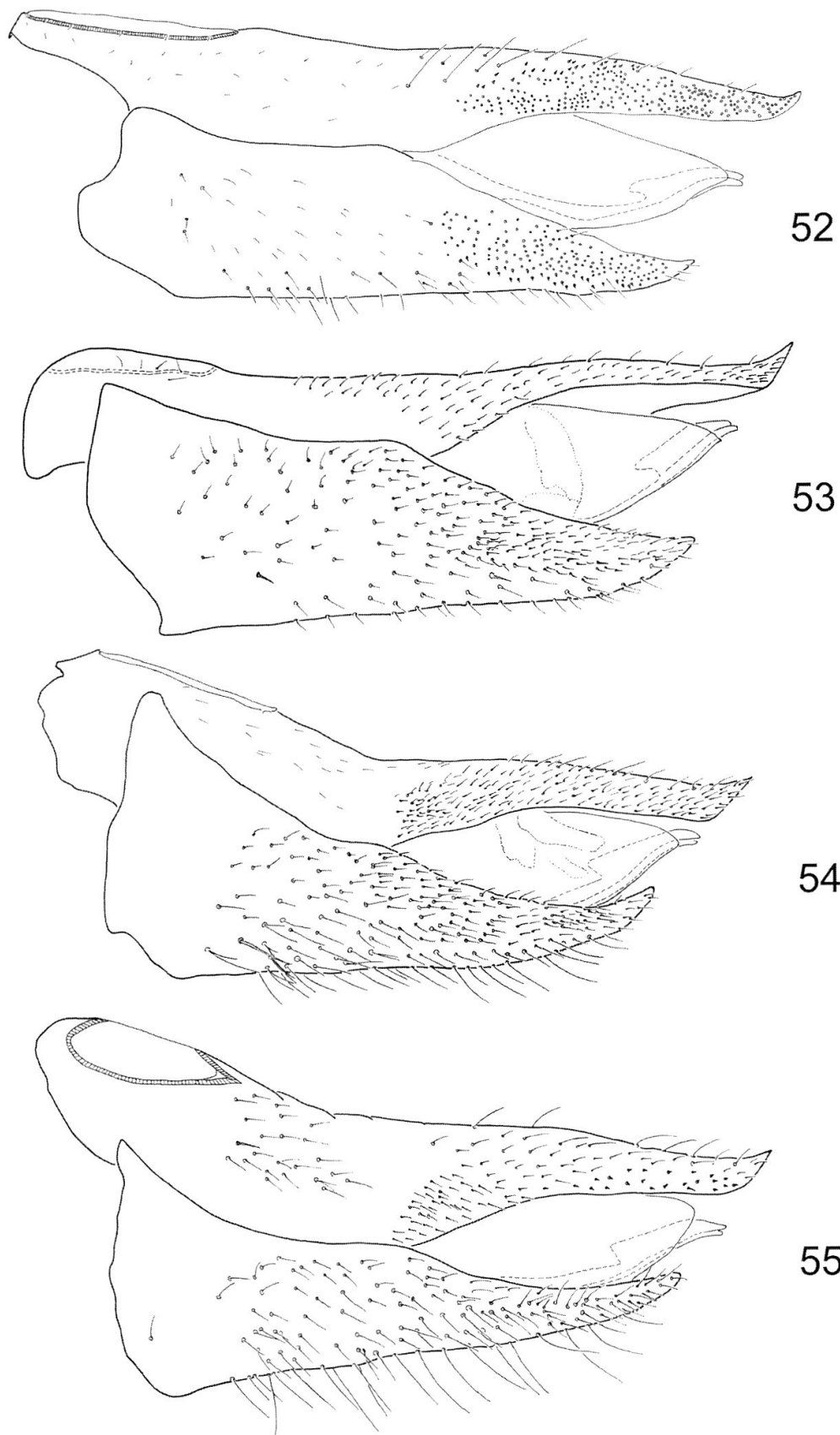
*Material examined.* **Gabon:** Makokou, iv.1971, at light (J. Mateu), 1 ♀ dry mounted, MHNG; Ntoun, vii.1985, at light (A. Pauly), 1 ♀ conserved in 70 % ethanol, IRSNB; same locality, ix.1985, at light (A. Pauly), 1 ♂, 1 ♀ dry mounted, IRSNB; same locality, ix.1985, at light, after rain (A. Pauly), 2 ♂♂ conserved in 70 % ethanol, IRSNB.

*Distribution.* Angola (Hollis 1976) and Gabon.

### *Ciriacremum* cf. *vondraceki* Hollis, 1976

*Ciriacremum* species 2 near *vondraceki*, from Nigeria; Hollis 1976: 80.

*Material examined.* **Gabon:** Makokou, iv.1971, at light (J. Mateu), 2 ♀♀ conserved in 70 % ethanol, MHNG; same locality, 1–14.v.1971, at light (J. Mateu), 2 ♂♂, 3 ♀♀ dry mounted, 1 ♂, 1 ♀ slide mounted, 2 ♀♀ conserved in 70 % ethanol, MHNG, NHMB; Belinga, 20.iii.1963 (H. Coiffait) 1 ♂, 1 ♀ conserved in 70 % ethanol, IRSNB; same locality, no date (H. Coiffait), 2 ♂♂ conserved in 70 % ethanol, IRSNB; Ntoun, vii.1985, at light (A. Pauly), 2 ♂♂, 2 ♀♀, 2 adults without abdomen conserved in 70 % ethanol, IRSNB; same locality, xii.1985, at light (A. Pauly), 1 ♂, 2 ♀♀ dry mounted, 1 ♂, 6 ♀♀ conserved in 70 % ethanol, IRSNB; same locality, i.1986, light trap (A. Pauly), 2 ♀♀ conserved in 70 % ethanol, IRSNB; same locality, xi.1986, light trap (A. Pauly), 5 ♀♀ conserved in 70 % ethanol, IRSNB.



Figs 52–55. *Ciriacremum* spp. — female terminalia left lateral view. — 52 *C. gabonense*; 53 *C. hollisi*; 54 *C. mateui*; 55 *C. megophthalmus*.

*Distribution.* Nigeria (Hollis 1976) and Gabon.

*Comments.* The distal portion of the aedeagus fits the drawing of *Ciriacremum* species 2 near *vondraceki*, from Nigeria by Hollis (1976). The paramere in the Gabon material is similar to that of *C. vondraceki* but differs in the larger posterior lobe and the peg setae on the inner surface which are clearly articulated. More material is required for formal description.

***Ciriacremum* sp. 1**

*Material examined.* **Gabon:** Makokou, iv.1971, at light (J. Mateu), 1 ♀ dry mounted, MHNG; same locality, 1–14.v.1971, at light (J. Mateu), 1 ♂ dry mounted, MHNG.

*Comments.* This species is well characterised by the long genal processes and the digitiform male paramere. More material is required for formal description.

***Ciriacremum* sp. 2**

*Material examined.* **Gabon:** Ntoun, viii.1985, light trap (A. Pauly), 1 ♂ slide mounted, NHMB; same locality, i.1986, light trap (A. Pauly), 1 ♂ conserved in 70 % ethanol, IRSNB; same locality, xi.1986, light trap (A. Pauly), 2 ♀ ♀ conserved in 70 % ethanol, IRSNB, NHMB.

*Comments.* The species resembles *C. vondraceki* with which it shares the large sclerotised end tube of the ductus ejaculatorius. It differs from *C. vondraceki* in the details of the paramere, which lacks sclerotised peg setae on the inner surface. It resembles *C. ornatum* in the wing pattern in the female (yellowish instead of black brown) but differs in the simple form of the paramere.

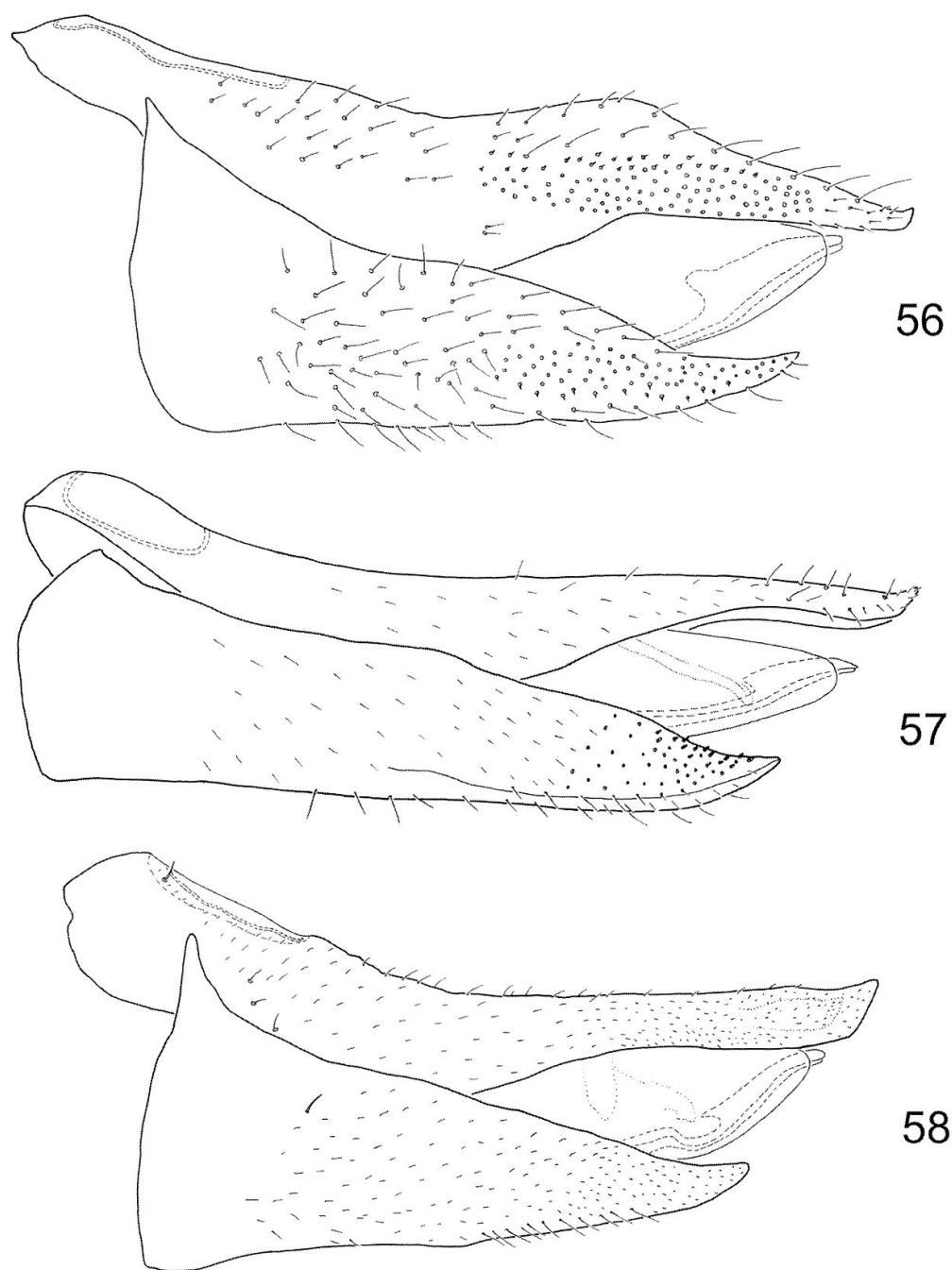
***Kleiniella ascicaudata* n. sp.**

(Figs 13, 14, 25, 46–48)

*Material examined.* Holotype ♂, dry mounted, **Gabon:** Makokou, iv.1971, at light (J. Mateu), MHNG. Paratype: Gabon: same locality, 1–14.v.1971, at light (J. Mateu), 1 ♂ slide mounted, NHMB.

*Etymology.* The species name refers to the axe-shaped expansions of the male proctiger.

*Description.* Coloration. Body greyish brown. Vertex brown with small darker areas mediad to the lateral ocelli. Eyes grey. Ocelli pale brown. Anteoccipital lobe beige. Genae ochreous, ventral half of genal processus shiny dark brown. Scape and pedicel brown, darker ventrally, flagellomeres 1–4 or 5 brown with dark apices, remainder dark brown or black. Pronotum pale greyish brown with a dark brown narrow suture separating it from the beige hind margin, small lateral grooves greyish brown. Mesopraescutum beige which turns gradually dark brown to mid anterior point. Mesoscutum greyish brown with a wide middorsal longitudinal beige stripe, lateral edges widely pale greyish brown, on each side a narrow dorso-lateral pale greyish brown stripe tapering anteriorly. Parapteron greyish brown, paler below, tegulae ochreous, pleura grey, beige and blackish. Forewing (Fig. 13) with infusate transparent membrane and beige (basal) to brown (apical) veins;  $R_1$ , base of  $R_s$ , connection of  $R_s$  and  $M_{1+2}$ , apices of  $R_s$  to  $Cu_{1a}$  and claval suture almost black, pterostigma greyish brown, a poorly defined dark brown spot beginning under end of pterostigma and ending at wing margin mid of  $r_3$ . Legs pale greyish brown, femora dark greyish, except below, ventral part of postcoxa beige. Abdomen



Figs 56–58. *Ciriacremum* spp., *Kleiniella* sp. — female terminalia left lateral view. — 56 *C. ornatum*; 57 *C. paulyi*; 58 *K. homalicephala*.

ochreous below, brown laterally, beige above. Proctiger antero-dorsally dark greyish brown, subgenital plate ochreous, becoming brown towards the apex. Parameres brown.

Structure: Very large species. Body with relatively long, macroscopical setosity and granulation. Head (Fig. 25) very broad only weakly inclined from longitudinal body axis; vertex with a concavity on either side; anteoccipital lobes conical in front of lateral ocelli not on the ocellar protuberance; genal processes relatively

large, conical; compound eyes relatively large. Pronotum horizontal, lateral edges turned backwards, on either side with shallow round pit near the lateral edge. Mera-canthus relatively short, pointed thumb-like. Metafemur with an inner lobe apically. Metatibial basal spine distinct but very small; apical spurs arranged as 1+3+1. Forewing elongate ovoid; veins with long setosity; pterostigma shortly petiolate and very long, longer than half wing length;  $cu_1$  very high; Rs in punctiform contact with  $M_{1+2}$ ; spinule arrangement as in Fig. 14, spinules mostly confined to the apical region; hindwing with following numbers of costal setae: 4 on wing articulation, 6–7 on base of C+Sc and after a short gap 5 before midway to hamulus on C+Sc. Male terminalia as in Fig. 46; proctiger largely covered with minute punctuation and relatively dense setosity with moderately long apical portion and long basal posterior expansions, these expansions are widened and curved inside distally, densely covered with thick setae on tubercles; paramere (Fig. 47) elongate, strongly bent in basal third, outer surface evenly covered with short setae, inner surface covered with long thick setae which form a dense group on a protuberance at level of basal bend; distal segment of aedeagus as in Fig. 48 with broadly rounded apex, subterminal ventral hook and flanges triangular and directed proximally, sclerotised end tube of ductus ejaculatorius relatively short and sinuous; subgenital plate very long, extended posteriorly, apex densely covered with long hairs, hypovalves absent. Female unknown.

Measurements and ratios in Tab. 1.

*Comments.* *K. ascicaudata* is similar to *K. medleri* Hollis in the presence of a petiolate pterostigma, the large posterior lobe on the male proctiger, the elongate paramere and the elongate male subgenital plate. It differs from the latter in the less extensive dark forewing pattern and details of the male terminalia: the posterior lobe of the male proctiger is strongly expanded posteriorly and the male subgenital plate is much longer.

### *Kleiniella congoensis* Hollis, 1976

*Material examined.* **Gabon:** Makokou, iv.1971, at light (J. Mateu) 4 ♂♂, 4 ♀♀ dry mounted, 1 ♂, 1 ♀ slide mounted, MHNG, NHMB; same locality, 1–14.v.1971, at light (J. Mateu), 1 ♂, 1 ♀ dry mounted, MHNG.

*Distribution.* Nigeria, Zaïre (Hollis 1976) and Gabon.

### *Kleiniella homalicephala* n. sp.

(Figs 15, 16, 26, 49–51, 58)

*Material examined.* **Gabon:** Holotype ♂, dry mounted, Makokou, 1–14.v.1971, at light (J. Mateu), MHNG. Paratypes: **Gabon:** same locality, iv.1971, at light (J. Mateu), 2 ♂♂, 3 ♀♀ dry mounted, MHNG, NHMB; same data as holotype, 1 ♂ dry mounted, 2 ♂♂, 2 ♀♀ slide mounted, MHNG, NHMB.

*Etymology.* The species name refers to the flat head.

*Description.* Coloration. Body pale greyish brown. Eyes dark. Genae pale greyish brown with ventral surface of the genal processes ochreous to brown, a brown rim below the antennal socket. Scape and pedicel pale greyish brown above, brown below, flagellum (maximum 3 segments present, other segments broken off) ochreous. Pronotum pale greyish brown, two lateral grooves on either side dark. Mesoscutum with beige lateral edges. Mesoscutellum and metathorax beige. Tegulae sometimes darker brown. Forewing (Fig. 15) semitransparent, ochreous includ-

	<i>Ciriacremum</i> gabonense	<i>Ciriacremum</i> hollisi	<i>Ciriacremum</i> mateui	<i>Ciriacremum</i> megophthalmus	<i>Ciriacremum</i> ornatum	<i>Ciriacremum</i> paulyi	<i>Kleiniella</i> ascicaudata	<i>Kleiniella</i> homallicecephal
no. specimens	8	4	4	2	3	2	1	4
(males/females)	(4/4)	(2/2)	(2/2)	(1/1)	(1/2)	(1/1)	(1/0)	(2/2)
HW	0.94-1.18	0.74-0.80	0.87-0.97	0.94-0.98	0.64-0.76	0.82-0.86	1.20	0.76-0.84
VL	0.17-0.22	0.12	0.22	0.33-0.36	0.16-0.17	0.17	0.22	0.22-0.25
GP	0.03-0.05	0.05	0.06	0.00-0.02	0.06-0.10	0.02	0.18	0.41-0.45
AL	4.99-5.89	3.11-3.48	no data	4.70-6.40	2.16	4.98-5.26	6.52	no data
F1	0.55-0.68	0.36-0.41	0.64-0.67	0.79-0.81	0.20-0.22	0.60-0.63	0.74	0.35-0.37
lurs	0.26-0.40	0.13-0.18	0.14-0.17	0.20-0.22	0.14-0.16	0.16	0.21	0.10-0.12
WL	2.88-3.72	2.34-2.69	2.78-3.12	2.96-3.07	1.86-2.18	2.96-3.27	3.78	3.33-3.88
WW	0.95-1.27	0.98-1.12	1.14-1.30	1.18-1.24	0.78-0.90	1.16-1.28	1.50	1.15-1.39
PT	0.66-0.96	0.25-0.30	0.34-0.40	0.25-0.33	0.20-0.22	0.22	2.17	0.69-0.75
rm	0.12-0.17	0.08-0.14	0.17-0.20	0.19	0.10-0.14	0.01-0.02	0	0.00-0.03
a	0.22-0.31	0.36-0.41	0.41-0.46	0.44-0.47	0.30-0.38	0.42-0.47	0.67	0.26-0.34
b	0.76-0.93	0.59-0.75	0.69-0.76	0.70-0.78	0.44-0.50	0.67-0.76	0.88	0.82-0.95
TL	0.84-0.96	0.58-0.60	0.73-0.82	0.90-0.93	0.47-0.51	0.77-0.80	1.08	0.92-1.00
MC	0.08-0.10	0.07-0.08	0.09-0.11	0.10	0.05-0.06	0.08	0.11	0.11-0.12
MP	0.46-0.51	0.36	0.40-0.50	0.46	0.24	0.48	0.49	0.52-0.54
PL	0.34-0.38	0.27-0.28	0.27-0.28	0.37	0.30	0.32	0.48	0.36-0.37
DL	0.42-0.46	0.29-0.32	0.32	0.38	0.28	0.39	0.42	0.42-0.44
FP	1.48-1.58	1.12-1.16	1.08-1.13	1.18	0.72-0.74	1.32	no data	1.32-1.54
CL	0.36-0.39	0.26	0.30	0.28	0.20	0.24	no data	0.26-0.28
SL	1.00-1.36	0.84-0.89	0.85-0.87	0.90	0.52-0.56	1.10	no data	1.00-1.14
GP/VL	0.14-0.27	0.40	0.28	0.00-0.06	0.39-0.59	0.12	0.83	1.81-2.03
lurs/F1	0.47-0.63	0.34-0.50	0.24-0.27	0.25-0.27	0.64-0.73	0.25-0.27	0.28	0.29-0.33
a/b	0.29-0.35	0.55-0.63	0.59-0.61	0.60-0.63	0.68-0.79	0.62-0.63	0.76	0.29-0.36
FP/HW	1.29-1.44	1.44-1.45	1.15-1.16	1.20	0.97	1.53	no data	1.71-1.83

Tab. 1: Measurements (in mm) and ratios of *Ciriacremum* spp. and *Kleiniella* spp. Abbreviations as follows: HW = head width; VL = vertex length; GP = genal process length; AL = antenna length; F1 = length of flagellomere 1; lurs = length of ultimate rostral segment; WL = forewing length; WW = forewing width; PT = length of pterostigma; rm = length of rm cross vein; a = perpendicular maximum distance between  $Cu_{1a}$  and line connecting apices of  $Cu_{1a}$  and  $Cu_{1b}$ ; b = distance between apices of  $Cu_{1a}$  and  $Cu_{1b}$ ; TL = metatibia length; MC = meracanthus length along axis from tip to dorsal basal edge; MP = male proctiger length; PL = paramere length; DL = length of distal segment of aedeagus; FP = female proctiger length; CL = circumanal ring length; SL = length of female subgenital plate.

ing venation, two dark brown spots at the proximal and distal edges of the pterostigma, a broad brown band along the wing margin from beyond the pterostigma to the anal break which contains pale speckles at its inner limit and whitish spots at the wing margin: two in  $r_1$ , two which are connected in  $r_3$ , one in  $cu_1$ , one each at ends of veins  $Rs$  to  $Cu_{1a}$ , one at anal break, the other parts of the marginal vein are darkened. Legs pale greyish brown with dark greyish mesofemur and postfemur, profemur with an ill-defined dark grey stripe along its dorsal surface. Abdomen pale ochreous with pale hind margins of the tergites. Proctiger pale greyish brown, subgenital plate beige. Paramere pale greyish brown with three longitudinal dark lines from its base, one at the antero-lateral edge, one at the postero-lateral edge and one short in between, postero-apical denticle almost black. Female terminalia dark ochreous with lateral and dorsal parts of base pale ochreous.



Structure: Very large species. Body with medium sized, macroscopical setosity and reticulation. Head (Fig. 26) relatively narrow, only weakly inclined from longitudinal body axis; vertex with a very shallow small concavity on either side; anteoccipital lobes small, triangular, directed anteriorly in front of the lateral ocelli; no ocellar protuberance; genal processes very long, flattened above, apex narrowly rounded; antennal sockets directed laterally; compound eyes relatively small, only weakly protruding. Pronotum horizontal with lateral edges curved down and back, on either side with two shallow pits near outer edge. Meracanthus relatively short, ventral margin sinuous, dorsal margin convex. Metafemur with an inner lobe apically. Metatibial basal spine well-developed; apical sclerotised spurs 6, forming an evenly spaced open crown. Forewing long and narrow, apical margin subrectangular; membrane semitransparent, along outer margin semicoriaceous, partly furrowed; pterostigma broadly sessile, Rs sinuous;  $cu_1$  low; rm cross vein very short or Rs in punctiform contact with  $M_{1+2}$ ; spinule arrangement as in Fig. 16, spinules covering most of the area but absent from the region around the veins especially near wing base; hindwing with following numbers of costal setae: 4–6 on wing articulation, 3–8 on base of C+Sc and after a short gap 4–6 before midway to hamulus on C+Sc. Male terminalia as in Fig. 49; proctiger with relatively short apical portion which is partly hidden by large subrhomboidal median posterior projections which are heavily wrinkled; paramere (Fig. 50) club-shaped with a postero-apical, strongly sclerotised tooth, outer and inner surfaces evenly covered with long, sometimes thick setae; distal segment of aedeagus as in Fig. 51, distal end broadly rounded with an apical membranous hook-shaped process, sclerotised end tube of ductus ejaculatorius relatively short and sinuous; subgenital plate elongate covered with scattered setae and evenly spaced punctuation, hypovalves absent. Female terminalia (Fig. 58) long; dorsal margin of proctiger concave, apex obliquely truncate, densely covered in minute peg setae, some larger setae near the base and dorsally; circumanal ring long; subgenital plate shorter than proctiger, pointed apically, covered in short thick setae in the distal  $\frac{4}{5}$ , with some longer setae ventrally in apical half; valvula dorsalis cuneiform; valvula ventralis subacute, valvula lateralis irregularly rounded apically.

Measurements and ratios in Tab. 1.

*Comments.* *K. homalicephala* is unique within *Kleiniella* for its flattened head and very long genal processes. The sessile pterostigma and lobed male proctiger in addition to the presences of long hairs on head, antennae, body, legs and forewing veins place the species clearly into *Kleiniella*.

### *Kleiniella jassina* (Enderlein, 1927)

*Material examined.* **Gabon:** Makokou, iv.1971, at light (J. Mateu) 8 ♂♂, 8 ♀♀ dry mounted, 2 ♂♂, 2 ♀♀ slide mounted, 6 ♂♂, 11 ♀♀ conserved in 70 % ethanol, MHNG, NHMB; same locality, 1–14.v.1971, at light (J. Mateu), 2 ♂♂, 1 ♀ dry mounted, MHNG; Ntoun, i.1986, light trap (A. Pauly), 1 ♀ conserved in 70 % ethanol, IRSNB.

*Distribution.* Angola, Cameroon, Zaïre (Hollis 1976) and Gabon.

## DISCUSSION AND CONCLUSION

Of the 17 species represented, six are previously described (Hollis 1976), eight



are described here as new and three are left undescribed owing to insufficient material. The high percentage of newly described species suggests that this is a fraction of those occurring in Gabon.

The collection is interesting as some species exhibit morphological features or combinations of characters that are so far unknown in the group. *C. mateui*, *C. megophthalmus* and *C. ornatum* have distinctly bifid parameres. *C. mateui* and *C. megophthalmus* bear subglobular eyes and a shallowly concave vertex. *C. megophthalmus* possesses a strongly thickened flagellomere 1. *C. ornatum*, *C. paulyi* and *Ciriacremum* sp. 2 have patterned forewings, particularly striking in *C. paulyi*. The last has also a forewing with Rs in punctiform contact with vein  $M_{1+2}$ . *K. homali-cephala* differs from other congeners in the strongly flattened head with very long genal processes. These new species make *Ciriacremum* and *Kleiniella* more difficult to diagnose and larval characters are required to redefine the genera making targeted field work necessary.

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