

# A review of continental Afrotropical *Ceriagrion* (Odonata, Coenagrionidae)

Klaas-Douwe B. DIJKSTRA

## ABSTRACT

DIJKSTRA K.-D.B. 2005. A review of continental Afrotropical *Ceriagrion* (Odonata, Coenagrionidae). *J. Afrotrop. Zool.* 2: 3-14.

The taxonomy of the *Ceriagrion* species of continental tropical Africa is discussed and a key provided. *C. annulatum* is not synonymous with *C. sanguinostigma*, but *Argiocnemis umbargae* is considered a junior synonym of *C. annulatum*, and *C. platystigma* with *C. sanguinostigma* of *C. varians*. The oriental genus *Argiocnemis* does not occur in Africa. The identities of *C. citrinum* and *C. ignitum* are clarified and the first records of *C. ignitum* and *C. mourae* since their descriptions are provided. The taxonomy of the complex of species including *C. hamoni*, *C. moorei*, *C. sakejii*, *C. suave* and possibly some Malagasy species remains unresolved, although at least *C. hamoni* and *C. moorei* are suspected to be conspecific with *C. suave*. The variability of *C. glabrum* is addressed in relation to the taxon *longispinum*.

K.-D.B. DIJKSTRA, Gortestraat 11, NL-2311 MS Leiden, The Netherlands (dijkstra@nmm.nl)

**Keywords:** Zygoptera, damselfly, taxonomy, synonyms, Africa, key

## INTRODUCTION

In tropical Africa, the genus *Ceriagrion* Selys, 1876 consists of at least fifteen superficially similar species, many of them widespread and common (Tables 1-2). *Ceriagrion glabrum*, for instance, may be the most successful of all Afrotropical Zygoptera. Other species remained (largely) unrecorded since their description, among them *C. citrinum*, *C. ignitum*, and *C. varians*, three of the first five species to be described. This fact alone and that all four great British odonatologists working in Africa, Fraser (1941a), Longfield (1952), Pinhey (1963), and Gambles (in Marshall & Gambles 1977) devoted papers to *Ceriagrion* is a demonstration of the taxonomic complexity and disorder in the genus. The paucity of black pigment is diagnostic of the genus, but excludes easy differentiation by body markings, while many species are very similar structurally. Obvious colour differences in the field may change deceptively in conserved specimens. It seemed timely, if not long overdue, to re-examine certain types and re-evaluate the identification of the species (Dijkstra 2003). Two major issues remain unresolved: a special challenge lies in the elucidation of female identification, for which characters of the mesostigmal region supply ample foothold. Furthermore, the probable synonymy of several species near *C. suave* has not yet crystallized, requiring further study of material.

## MATERIAL

The present paper is the result of a gradual build-up of data, obtained during numerous visits to collections, and not of a preconceived revision. Therefore, no full lists of specimens studied can be given. Most specimens in BMNH, ISNB, MRAC, NMKE and RMNH and many in other collections were studied. Examined primary types are indicated where relevant in the species texts and figure captions.

**Acronyms** BMNH: Natural History Museum, formerly British Museum (Natural History), London; ISNB: Institut Royal des Sciences Naturelles de Belgique, Brussels; MLUH: Martin-Luther-Universität, Wissenschaftsbereich Zoologie, Halle (Saale); MNHN: Muséum National d'Histoire Naturelle, Paris; MRAC: Musée Royal de l'Afrique Centrale, Tervuren; NMBZ: Natural History Museum of Zimbabwe, Bulawayo; NMKE National Museums of Kenya, Nairobi; NMW: Naturhistorisches Museum Wien, Vienna; RMNH: Nationaal Natuurhistorisch Museum Naturalis, formerly Rijksmuseum van Natuurlijke Historie, Leiden.

## KEY TO MATURE MALES OF CONTINENTAL TROPICAL AFRICAN *CERIAGRION*

Keys for up to twelve species were provided by Fraser (1941a), Schmidt (1951), and Pinhey (1963), and

diagnostic notes were provided by Marshall & Gamble (1977). A revised key to all definite species is given here. Colours apply to living mature males. **Abbreviations** Fw: forewing(s); Hw: hindwing(s); Pt: pterostigma; Px: postnodal cross-veins; S1: first abdominal segment; S2-3: second and third abdominal segments, etc.

1. Pt rhomboidal, its anterior border shorter than posterior, reddish or black (Figs 1b-c). Paraprocts without 'heel' (Figs. 3a, j, n). Apex of penis narrower, rounded and at most slightly widened at top, small horn-like cone on each side of its base (Figs 4g, k, 5a-b) . . . . . 2  
 - Pt elongate, its anterior border about as long as posterior, yellow, brown, or grey, sometimes tinged red (Fig. 1a). Paraprocts often with distinct 'heel' (cf. Fig. 3e). Apex of penis broad, top wide, often lobed and/or pointed, without basal cones (cf. 4a-f) . . . . . 4  
 2. (1) Pt black (Fig. 1b). Apex S10 with deep circular invagination, fortified with thick rim of black denticles (Fig. 2j). Head and thorax green to blue, becoming brown to blackish and partly whitish pruinose with age . . . . . *rubellocerinum*  
 - Pt reddish (Fig. 1c). Apex S10 with shallow semi-circular invagination, with or without black denticles (Figs 2a, n). Head and thorax orange-brown to red, at most dorsum of head becoming blackish with age . . . . . 3  
 3. (2) Apical invagination S10 on each side with clutter of 2-3 merged thick black denticles (Figs 2a, 3a). Cerci broad, often overlapping each other, with black tooth placed outward from internal angle (Fig. 2a). Colouration orange-red, dorsa of head and S3-7 often (partly) blackened . . . . . *annulatum*  
 - Apical invagination S10 on each side with row of many fine denticles, these often indiscernible or merged to thin black ridges (Figs 2n, 3n). Cerci narrow, well-separated, with black tooth placed on internal angle (Fig. 2n). Colouration red, head and abdomen never blackened . . . . . *varians*  
 4. (1) S10 with raised processes on both sides of apical invagination, each bearing several large black denticles (Figs 2e, 3e) . . . . . *glabrum*  
 - S10 without processes, sometimes border of apical invagination evenly set with denticles (cf. Figs 2b, 3b) . . . . . 5  
 5. (4) Cerci about 2x as long as paraprocts (Fig. 3g), with prominent internal tooth at midlength (Fig. 2g). Dorsum of S3-7 often (partly) blackened . . . . .  
 . . . . . *katamborae*  
 - Cerci at most slightly longer than paraprocts (cf. Fig. 3h), internal tooth or angle when present is small (cf. Fig. 2b). Abdomen at most darkened somewhat towards tip . . . . . 6

6. (5) Head and thorax bluish. Apical invagination S10 evenly set with prominent black denticles (Figs 2b, 3b). Paraprocts without 'heel' (Fig. 3b). Inner border of cerci strongly angled between midlength and base (Fig. 2b) . . . . . *bakeri*  
 - Head and thorax yellow to red or greenish. Apical invagination S10 at most with almost indiscernible denticles. Paraprocts often with prominent 'heel' (cf. Fig. 3l). Internal tooth or angle of cerci when present is smaller or nearer tip (cf. Figs 2f, i) . . . . . 7  
 7. (6) Penis with paddle-shaped lateral flaps (Figs 4b, j). Labrum often with transverse ridge-like fold (Fig. 6). Paraprocts reach well beyond tips of cerci (Figs 3c, m) . . . . . 8  
 - Penis without lateral flaps, but sometimes with finger-like lateral lobes (cf. Fig. 4e). Labrum without such fold. Paraprocts often reach only as far as tips of cerci (cf. Fig. 3l) . . . . . 9  
 8. (7) Abdomen yellow, synthorax green. Labral fold weak or absent. Cerci with large internal tooth (Fig. 2c) . . . . . *citrinum*  
 - Abdomen red, synthorax orange. Labral fold sharp (Fig. 6). Cerci with scarcely discernible internal tooth (Fig. 2m) . . . . . *tricronaticeps*  
 9. (7) Thorax and often head greenish, unlike reddish abdomen (Figs 7a, f). Penis with rounded apex (ventral view) and rounded lateral lobes (Figs 4c, l) . . . . . 10  
 - Head and thorax of similar colour as abdomen, yellow or brown to red (cf. Figs 7b-e). Penis usually with pointed apex and often with pointed, finger-like, lateral lobes (cf. Figs 4h-i) . . . . . 11  
 10. (9) Paraprocts reach well beyond tips of cerci (Fig. 3d). Cerci with small internal black tooth at about midlength (Fig. 2d). Penis with large lateral lobes (Fig. 4c). Labrum greenish blue (Fig. 7a). Wings usually clear . . . . . *corallinum*  
 - Paraprocts reach about as far as tips of cerci (Fig. 3o). Cerci without internal tooth (Fig. 2o). Penis with small lateral lobes (Fig. 4l). Labrum yellow (Fig. 7f). Wings often washed yellow . . . *whellani*  
 11. (9) Hw 14-17 mm. Paraprocts with long 'toe' that either points into cerci or surpasses them (Figs 3f, h) . . . . . 12  
 - Hw 17-23 mm. Paraprocts with short 'toe' that roughly points at cerci tips and reaches about as far as them (Figs 3i, k-l) . . . . . 13  
 12. (11) Paraprocts with very prominent 'heel', 'toe' points into cerci (Fig. 3h). Head and thorax brown-orange . . . . . *kordofanicum*  
 - Paraprocts with weak 'heel', 'toe' surpasses cerci (Fig. 3f). Head and thorax deep brown with dark red face . . . . . *ignitum*  
 13. (11) Paraprocts with scarcely developed, obtuse 'heel' (Fig. 3i). Inner border of cerci distinctly angled, approximately at midlength (Fig. 2i) . . . . . *mourae*

- Paraprocts with distinct, (rect-)angular 'heel' (Figs 3k-l). Inner border of cerci not angled, although sometimes with internal tooth near tip (Figs 2k-l) . . . . . 14
14. (13) Dorsa of head and thorax red, contrasting with creamish sides thorax. Paraprocts with angled 'heel' (Fig. 3k) . . . . . *sakejii*
- Head and thorax uniformly yellow to orange or brown. Paraprocts with blunt 'heel' (Fig. 3l) . *suave* (including suspected synonyms *hamoni* and *moorei*)

## NOTES ON SELECTED SPECIES

### *Ceriagrion annulatum* Fraser, 1955

New synonym: *Argiocnemis umbargae* Pinhey, 1970  
Figures 2a, 3a

### *Ceriagrion varians* (Martin, 1908)

New synonyms: *C. platystigma* Fraser, 1941;  
*C. sanguinostigma* Fraser, 1955  
Figures 1c, 2n, 3n, 4k, 5b, 7e

Together with *C. rubellocerinum* (with black Pt) the species with a red rhomboidal Pt form the distinct *varians* group within African *Ceriagrion*. Aside from Pt shape (Figs 1b-c) they are characterized by the simple apex of the penis, flanked at its base by a small horn-like cone on each side (Figs 4g, k, 5a-b). Features of the appendages are also similar (Figs 2-3a, j, n). Pinhey (1966) made *C. annulatum* a synonym of *C. sanguinostigma* but this is unconvincing, as the holotypes differ in colouration, denticulation of S10 apex and cerci shape (see key); Legrand & Lachaise (1980) recorded the two separately. The confusion may originate from a male without appendages in BMNH labelled 'C. sanguinostigma n.sp. det F.C. Fraser. ♂ Type. Probably a var. of *rubellocerinum* Fras.' with a note 'Unlikely to be type. Check Congo Mus', whose colouration matches *C. annulatum* rather than *C. sanguinostigma*. Pinhey (1970) described a 'remarkable new zygopteran' that 'on superficial examination [...] appeared to be a *Ceriagrion*' but placed *umbargae* in the Oriental genus *Argiocnemis* Selys, 1877 because of the absence of a sharp frontal crest and the rather distal position of the arculus. The crest is generally weaker in this group than in other *Ceriagrion*, while the position of the arculus varies. I have not seen the *A. umbargae* holotype, but it is well illustrated. The description and illustrations show that it is orange with blackened dorsum of head and S3-7, has a red rhomboidal Pt and simple penis with lateral cones. The apical invagination of S10 has a clump of two thick black denticles on each side. The cerci are broad, overlapping each other, with a black tooth on

the posterior border. These features are unusual within *Ceriagrion* and exactly as in the *C. annulatum* holotype (Figs 2-3a), of which I consider *A. umbargae* a junior synonym. Note that besides the type species *A. rubescens* Selys, 1877 (which ranges from India to Australia) the genus *Argiocnemis* only includes the Papuan *A. ensifera* Lieftinck, 1932 and *A. solitaria* (Selys 1872). Latter was originally described in *Argiocnemis* Selys, 1877 from the Mascarene island of Rodrigues. Only the holotype (ISNB) exists, a complete but teneral and rather nondescript female that appears like a large *Argiocnemis* (Hw 17.5 mm). Its generic placement remains dubious, and the genus *Argiocnemis* cannot be considered to occur in the Afrotropics.

Pinhey (1966) examined a specimen assumed to be the type of *C. varians* in MNHN and synonymized it with *C. rubellocerinum*, a conclusion shared by Marshall & Gambles (1977). Legrand & Couturier (1985) argued that Pinhey did not examine the specimen described by Martin (1908) and briefly diagnosed the lectotype, but only compared it with *C. rubellocerinum*. It scarcely differs from the *C. platystigma* lectotype, venation being paler and the cerci somewhat wider. Pinhey (1966) further believed *C. sanguinostigma* was the same as *C. annulatum* (see above), but the holotype agrees well with the *C. platystigma* and *C. varians* types, although the penis apex and the denticles on the apical border of S10 are slightly larger. Within the complex, the penis shape and the formation of S10 denticles seem to vary somewhat. Variation in the penis results from the rather soft and membranous apex, which folds or shrivels variably when dried. The three types originate from widely separate localities, but overall are rather similar in penis, S10 and appendages (Figs 2-3n, 4k, 5b). I consider the slight differences between them to fall within the variation of a single species, to be treated under the oldest name, *C. varians*.

Martin (1908) described *C. varians* from 'Guinée portugaise' (capital city Bissau), although the type label just reads 'Guinée', which could refer to Guinea (capital city Conakry). This would be the only record west of S Nigeria (a male from Warri in the western Niger Delta in BMNH). Fea visited many parts of western Africa and Martin received his material before it had been properly labelled (R. Poggi in litt. 4 May 2005). For instance, material of *Platycnemis congolensis* Martin, 1908 described from 'Guinée française' and 'Congo' probably originated in coastal Gabon. Martin's (1908) records of *Neurogomphus agilis* (Martin 1908) and *Prodasineura vittata* (Selys 1886) from 'Guinée portugaise' would also fit known ranges better if they are from Congo or Gabon.

***Ceriagrion citrinum* Champion, 1914**

Figures 2c, 3c, 4b

***Ceriagrion tricrenaticeps* Legrand, 1984**

Figures 2m, 3m, 4j

The *C. tricrenaticeps* male is easily identified by the transversely ridged labrum, recalling the frontal ridge typical of the genus (Fig. 6). Together with the angular border of ante- and postclypeus this gives the face the profile of a staircase with three steps. The species is known only from Liberia, Gabon, and NE Congo-Kinshasa (Legrand 1984, Lempert 1988), and I have been shown material from S Cameroon by T. Lieckweg. The labrum character may easily be overlooked, perhaps leading to the under-recording of this species. *C. citrinum* was only known with certainty from S Nigeria, but Tchibozo & Dijkstra (2004) found it commonly at some sites in adjacent Benin. The species resembles *C. tricrenaticeps* by the paddle-shaped lateral flaps of the penis (Figs 4b, j) and the shape of the appendages (Figs 2-3c, m). The latter differ somewhat, and the posterior border of the female's mesostigmal plates is straight, lacking the marked incursion of the black pit behind it, as illustrated by Legrand (1984). The traverse ridge-like fold in the labrum can also be present in *C. citrinum*, but its distinctness varies and appears to depend on the position of the labrum. Male colouration differs most obviously: head and thorax are greenish and the abdomen pale yellow, rather than orange and vermilion. Nonetheless, two Nigerian specimens of *C. citrinum* in BMNH have a distinctly orange tinge to the abdomen. Another has lost penis and appendages, but these were checked by Gambles and found to be 'absolutely typical'. This specimen is deeply orange, and has an orange wash over the thorax, rather like the colour of the abdomen.

***Ceriagrion corallinum* Champion, 1914**

Figures 2d, 3d, 4c, 7a

The synonymy of *C. corallinum* and *C. bidentatum* was suspected by Marshall & Gambles (1977) and confirmed by Legrand (1984). Having examined both primary types I concur with their views.

***Ceriagrion glabrum* (Burmeister, 1839)**

Figures 1a, 2e, 3e, 4d, 7b-c

All males that I have observed in Congo-Kinshasa (near Lokutu and Kinshasa) had bright yellow heads and thoraces in life (Fig. 7c). They were large (Hw 21-23 mm) and had yellow-washed wings and

dark brown Pt, agreeing with the subspecies *longispinum* described by Pinhey (1963) from NW Congo-Brazzaville and the Congolese slopes of the Ruwenzori. I have seen similar specimens from Ghana and W Uganda (Budongo, Mabira, Semliki). It seems that this ubiquitous species tends to differ somewhat in the Guineo-Congolian region from smaller, clear-winged and orange-bodied specimens with pale brown Pt in more open areas (Fig. 7b). Pinhey's subspecies had a somewhat longer apical hook to the paraprocts (hence its name), but this appears not to be a constant feature of the forest form.

***Ceriagrion ignitum* Champion, 1914**

Figures 2f, 3f, 4e, 7d

Known only from the type series consisting of the male holotype, female allotype, and one paratype of each sex collected in 1912-1913 near Accra. A third pair mentioned by Champion (1914) has not been found. Numerous egg-laying pairs were found on sheltered fishponds covered by *Salvinia* at Lokutu, central Congo-Kinshasa, and several at a disused swimming pool nearby (Dijkstra in prep.). Rediscovery in an anthropogenic habitat 2700 km east of the type locality comes as a surprise. The original description is rather deficient in diagnosing the species. It is notable in being the smallest (rivalled only by *C. kordofanicum*) and most deeply coloured African *Ceriagrion* (Fig. 7d). The Hw length ranges from 14 to 16 mm, the abdomen (with appendages) from 21 to 24.5 mm and there are 10 to 12 Fw Px. The head and thorax of the male are dark brown, with the face redder, and the abdomen is entirely deep crimson. The Pt is dark brown and venation blackish, darker than in similar species. The appendages are somewhat like those of *C. corallinum*, but more slender, especially the paraprocts lack a pronounced 'heel' and have a longer 'toe' clearly surpassing the cerci (Figs 2-3f). The mesostigmal region of the female is also similar to *C. corallinum* with linear black pits behind the mesostigmal plates. The apex of the penis is pointed with slender lateral extensions, very unlike the rounded apex and lateral lobes of *C. corallinum* (Fig. 4e). In the field *C. ignitum* is most easily identified by its tiny size and the dark brown head and thorax and deep red abdomen and face.

***Ceriagrion mourae* Pinhey, 1969**

Figures 2i, 3i

This species was described from a site 80 km west of Beira in Mozambique and not recorded since. Viola Clausnitzer collected two teneral males in the Rufiji

Delta, E Tanzania, more than 1500 km north of the type locality (6-11 May 2001). *C. mourae* is a rather nondescript species with penis and appendages recalling *C. bakeri*. It differs from that species by its all brownish colouration (may be reddish, but only the colours described for the holotype are known) and the absence of prominent black denticles along the apical invagination of S10. *C. mourae* appears to be confined to the coast of eastern African, while *C. bakeri* is a Guineo-Congolian species. The appendages of one of the Tanzanian males are illustrated (Figs 2-3i).

### *Ceriagrion suave* Ris, 1921

Suspected synonyms: *C. moorei* Longfield, 1952;  
*C. hamoni* Fraser, 1955  
Figures 2l, 3l, 4h-i

Marshall & Gambles (1977) outlined differences in the penis that should separate *C. suave* from *C. moorei* (Figs 4h-i). This distinction seems to rest on western material, but specimens from eastern Africa assigned to these species are uniform in the shape of this organ. It is intermediate in appearance, casting doubt on the character's reliability and raising the possibility of synonymy. The *C. moorei* holotype is West African, but that of *C. suave* is from Katanga. *C. hamoni*, known only from the type material from SW Burkina Faso may also be conspecific with *C. suave* and/or *C. moorei*, but I have not examined it. Martens *et al.* (2003) stressed the need for revision of these taxa, also in relation to the similar *C. sakejii*, which seems to differ slightly by appendages and colouration (see key). Examination of more material from western Africa, including the *C. hamoni* and *C. moorei* holotypes, in direct comparison to the *C. suave* holotype is required. The Malagasy species *C. auritum* Fraser, 1951 and *C. oblongulum* Schmidt, 1951 should also be included in further study of the complex.

### ACKNOWLEDGEMENTS

Viola Clausnitzer, Jochen Lempert, Tammo Lieckweg, Dennis Paulson, Roberto Poggi, and Séverin Tchiboza supplied specimens, records, and information. Eliane de Coninck, Jos De Becker, Dave Goodger, Jean Legrand, and Marc de Meyer were helpful during visits to BMNH, MNHN, and MRAC. The work in BMNH, ISNB, and MNHN was supported by the SYS-RESOURCE, ABC, and COLPARSYST infrastructures of the European Union IHP Programme. RMNH provided working facilities.

### REFERENCES

- BURMEISTER, H. 1839. *Handbuch der Entomologie*. Zweiter Band [2. Abtheilung, 2. Hälfte]. Enslin, Berlin. xii+757-1050.
- CAMPION, H. 1914. Three new species of *Ceriagrion* from West Africa (Order Odonata). *Annals and Magazine of Natural History* 8: 277-83.
- DIJKSTRA, K.-D.B. 2003. A review of the taxonomy of African Odonata: finding ways to better identification and biogeographic insight. *Cimbebasia* 18: 191-206.
- DIJKSTRA, K.-D.B. in prep. Dragonflies and Damselflies (Odonata) of Lokutu, Democratic Republic of Congo. *RAP Bulletin of Biological Assessment, Conservation International*.
- FRASER, F.C. 1941a. New African species of *Ceriagrion* (Odonata). *Proceedings of the Royal Entomological Society of London (B)* 10: 61-6.
- FRASER, F.C. 1941b. Results of the mission of P. Lepesmee, R. Paulian and A. Villiers in the Cameroons. Order Odonata. *Proceedings of the Royal Entomological Society of London (B)* 10: 35-42.
- FRASER, F.C. 1947. The Odonata of the Ivory Coast based on the mission of Dr. R. Paulian and P. Lepesme. *Transactions of the Royal Entomological Society of London* 98: 19-39.
- FRASER, F.C. 1951. Mission A. Villiers au Togo et au Dahomey V. Odonata and Neuroptera. *Bulletin de l'Institut française d'Afrique noire* 13: 1076-92.
- FRASER, F.C. 1955. Odonata Collected by J. Hamon in French West Africa. *Revue française d'Entomologie* 22: 237-43.
- GRÜNBERG, K. 1903. Zur Kenntniss der Odonatenfauna des ostafrikanischen Seengebiets. Ergebnisse der Nyassa-See- und Kinga-Gebirgs Expedition der Hermann und Elise beg. Heckmann-Wentzel-Stiftung. *Zoologische Jahrbücher* 18: 695-726.
- KIRBY, W.F. 1890. *A Synonymic Catalogue of Neuroptera Odonata, or Dragonflies. With an Appendix of Fossil Species*. London: Gurney & Jackson, 202.
- LEGRAND, J. 1982. Contribution à l'étude des odonates de Lamto, Côte d'Ivoire. *Revue française d'Entomologie (N.S.)* 4: 7-17.
- LEGRAND, J. 1984. Trois nouveaux Zygoptères forestiers du Gabon oriental et une synonymie nouvelle (Chlorocyphidae, Protoneuridae, Coenagrionidae). *Odonatologica* 13: 237-44.
- LEGRAND, J. & COUTURIER, G. 1985. Les Odonates de la forêt de Taï (Côte d'Ivoire). Premières approches: faunistique, répartition écologique et association d'espèces. *Revue d'Hydrobiologie tropicale* 18: 133-58.
- LEGRAND, J. & LACHAISE, M. 1980. Contribution 4 à la faune du Congo (Brazzaville) Mission A. Villiers et A. Descarpentries. *Bulletin de l'Institut fondamental d'Afrique noire (A)* 42: 586-93.
- LEMPERT, J. 1988. *Untersuchungen zur Fauna, Ökologie und zum Fortpflanzungsverhalten von Libellen (Odonata) an Gewässern des tropischen Regenwaldes in Liberia, Westafrika*. Bonn: Diplomarbeit, Friedrich-Wilhelms Universität, 1-238.
- LONGFIELD, C. 1952. Two new species of African *Ceriagrion* (Odonata), the type of *C. corallinum* and notes on the Genus. *Proceedings of the Royal Entomological Society of London* 21: 41-8.
- MARSHALL, A.G. & GAMBLES, R.M. 1977. Odonata from the Guinea savanna zone in Ghana. *Journal of Zoology, London* 183: 177-87.

- MARTENS, A., JÖDICKE, R. & SUHLING, F. 2003. An annotated checklist of the Odonata of Namibia. *Cimbebasia* 18: 139-60.
- MARTIN, R. 1908. Voyages de feu Leonardo Fea dans l'Afrique Occidentale: Odonates. *Annali del museo civico di storia naturale di Genova* 43: 649-67.
- PALISOT DE BEAUVOIS, A.M.F.J. 1805-1821. *Insectes recueillis en Afrique et en Amérique dans les royaumes d'Oware, à Saint-Dominique et dans les États Unis pendant les années 1781-1797*. Paris: Levrault, 1-267.
- PINHEY, E. 1961. Dragonflies (Odonata) of Central Africa. *Occasional Papers of the Rhodes-Livingstone Museum* 14: 1-97.
- PINHEY, E. 1962. A Descriptive Catalogue of the Odonata of the African Continent. *Publicações Culturais Companhia de Diamantes de Angola* 59: 11-322.
- PINHEY, E. 1963. Notes on Both Sexes of Some Tropical Species of *Ceriagrion* Selys (Odonata). *Annals and Magazine of Natural History* 13: 17-28.
- PINHEY, E. 1966. Notes on African Odonata, Particularly Type Material. *Revue de Zoologie et de Botanique Africaines* 73: 283-308.
- PINHEY, E. 1969. Two New Species of Zygoptera (Odonata). *Novos Taxa Entomologicos* 66: 3-7.
- PINHEY, E. 1970. A Remarkable New Zygopteran (Odonata) from Cameroons. *Arnoldia Rhodesia* 4(37): 1-3.
- RAMBUR, J.P. 1842. *Histoire naturelle des Insectes. Névroptères*. Paris: Roret, xvii+1-529 pp.+512 pls.
- RIS, F. 1921. The Odonata or Dragonflies of South Africa. *Annals of the South Africa Museum* 18: 245-445.
- RIS, F. 1924. Wissenschaftliche Ergebnisse der mit Unterstützung der Akademie der Wissenschaften in Wien aus der Erbschaft Treitl von F. Werner unternommen zoologischen Expedition nach dem Anglo-Ägyptischen Sudan (Kordofan) 1914. *Denkschriften der Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Klasse* 99: 275-82.
- SCHMIDT, E. 1951. Libellen aus Portugiesisch Guinea, mit Bemerkungen über andere aethiopische Odonaten. *Arquivos do Museu Bocage* 20: 125-200.
- SELYS-LONGCHAMPS, E. DE 1869a. Énumération des odonates de Madagascar et des îles Comores et Mascareignes. *Recherches sur la faune de Madagascar et des ses dépendances, d'après les découvertes de Francois P.L. Pollen et D.C. van Dam*. 5 J.K. Leiden: Steenhof, 21-5.
- SELYS-LONGCHAMPS, E. DE 1869b. Odonates des îles Seychelles. *Annales de la Société Entomologique de Belgique* 12: 95-9.
- SELYS-LONGCHAMPS, E. DE 1876. Synopsis des Agrionines, cinquième légion: *Agrion* (suite). Le genre *Agrion*. *Bulletins de l'Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique* (2) 42: 490-531, 952-91.
- TCHIBOZO, S. & DIJKSTRA, K.-D.B. 2004. Rapport d'inventaire préliminaire des libellules des zones humides du Sud-Bénin. *IDF-Report* 6: 1-6.

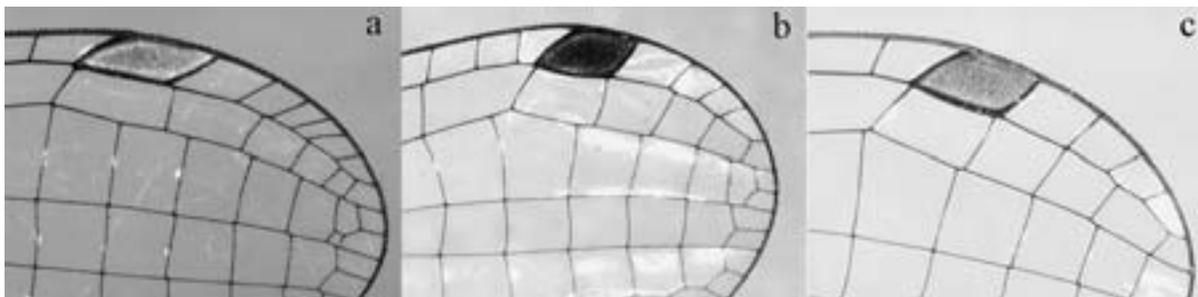
Table 1. Synonymic list of *Ceriagrion* species of continental tropical Africa

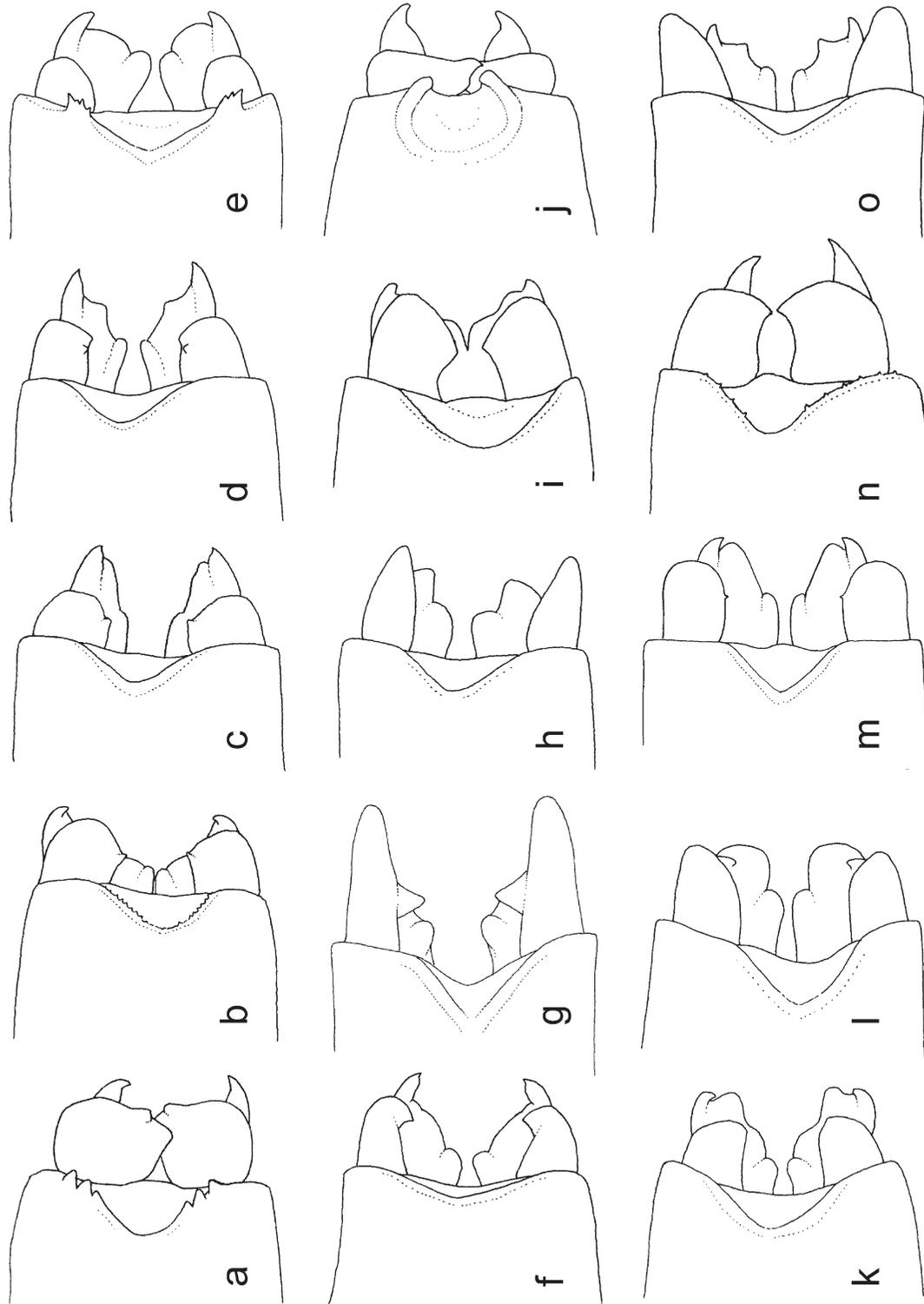
<i>C. annulatum</i> Fraser, 1955	<i>Ceriagrion annulatum</i> Fraser, 1955: 35 [type: Elisabethville (= Lubumbashi), Congo-Kinshasa; MRAC]. <i>Argiocnemis umbargae</i> Pinhey, 1970: 1 [type: Mbalmayo, Cameroon; NMBZ]; new synonymy.
<i>C. citrinum</i> Champion, 1914	<i>Ceriagrion citrinum</i> Champion, 1914: 278 [type: Lagos, Nigeria; BMNH].
<i>C. corallinum</i> Champion, 1914	<i>Ceriagrion corallinum</i> Champion, 1914: 279 [type: Port Lokko, Sierra Leone; BMNH]. <i>Ceriagrion bidentatum</i> Fraser, 1941a: 64 [type: Budama, Uganda; BMNH]; junior synonym (Legrand 1984:244).
<i>C. glabrum</i> (Burmeister, 1839)	<i>Agrion rhomboidale</i> Palisot de Beauvois, 1807: 85; nomen nudum. <i>Agrion glabrum</i> Burmeister, 1839: 821 [type: Cape of Good Hope, South Africa, MLUH]. <i>Agrion ferrugineum</i> Rambur, 1842: 280 [type: Madagascar, ISNB]; junior synonym Selys (1869b: 95). <i>Telebasis glabra</i> (Burmeister, 1839) – Selys-Longchamps (1869a: 24). <i>Brachybasis glabra</i> (Burmeister, 1839) – Selys-Longchamps (1869b: 95). <i>Ceriagrion glabrum</i> (Burmeister, 1839) – Selys-Longchamps (1876: 527). <i>Brachybasis rhomboidalis</i> (Palisot de Beauvois, 1807) – Kirby (1890: 187); nomen nudum. <i>Ceriagrion rhomboidale</i> (Palisot de Beauvois, 1807) – Grünberg (1903: 699); nomen nudum. <i>Ceriagrion glabrum longispinum</i> Pinhey, 1963: 18 [type: Ketta Forest, Congo-B: NMBZ].
<i>C. ignitum</i> Champion, 1914	<i>Ceriagrion ignitum</i> Champion, 1914: 281 [type: Aburi, Ghana; BMNH].
<i>C. katamborae</i> Pinhey, 1961	<i>Ceriagrion katamborae</i> Pinhey, 1961: 20 [type: Katambora, Zambia; NMBZ].
<i>C. mourae</i> Pinhey, 1969	<i>Ceriagrion mourae</i> Pinhey, 1969: 3 [type: Mamunge, Mozambique; NMBZ].

<i>C. suave</i> Ris, 1921	<i>Ceriagrion suave</i> Ris, 1921: 316 [type: Kapiri, Congo-Kinshasa; MRAC]. ? <i>Ceriagrion moorei</i> Longfield, 1952: 44 [type: Yapi, Ghana; BMNH]; suspected synonymy. ? <i>Ceriagrion hamoni</i> Fraser, 1955: 237 [type: Yabasso, Burkina Faso; MNHN]; suspected synonymy.
<i>C. tricrenaticeps</i> Legrand, 1984	<i>Ceriagrion tricrenaticeps</i> Legrand, 1984: 242 [type: Makokou, Gabon; MNHN].
<i>C. varians</i> (Martin, 1908)	<i>Aciagrion varians</i> Martin, 1908: 666 [type: Guinea?; MNHN]. <i>Ceriagrion platystigma</i> Fraser, 1941a: 63 [type: NW shores of Lake Victoria, Uganda; BMNH]; new synonymy. <i>Ceriagrion sanguinostigma</i> Fraser, 1955: 33 [type: Bambesa, Congo-Kinshasa; MRAC]; new synonymy. <i>Nepocnemis platystyla</i> Fraser, in litteris [type: Eala, Congo-Kinshasa; MRAC]. – Pinhey (1962: 288); nomen nudum. <i>Aciagrion varians rubrostigma</i> Martin, in litteris [type: Portuguese Guinea; MNHN]. – Pinhey (1966: 288); nomen nudum. <i>Ceriagrion platystictoides</i> Fraser, in litteris [Entebbe, Uganda; BMNH]; nomen nudum.

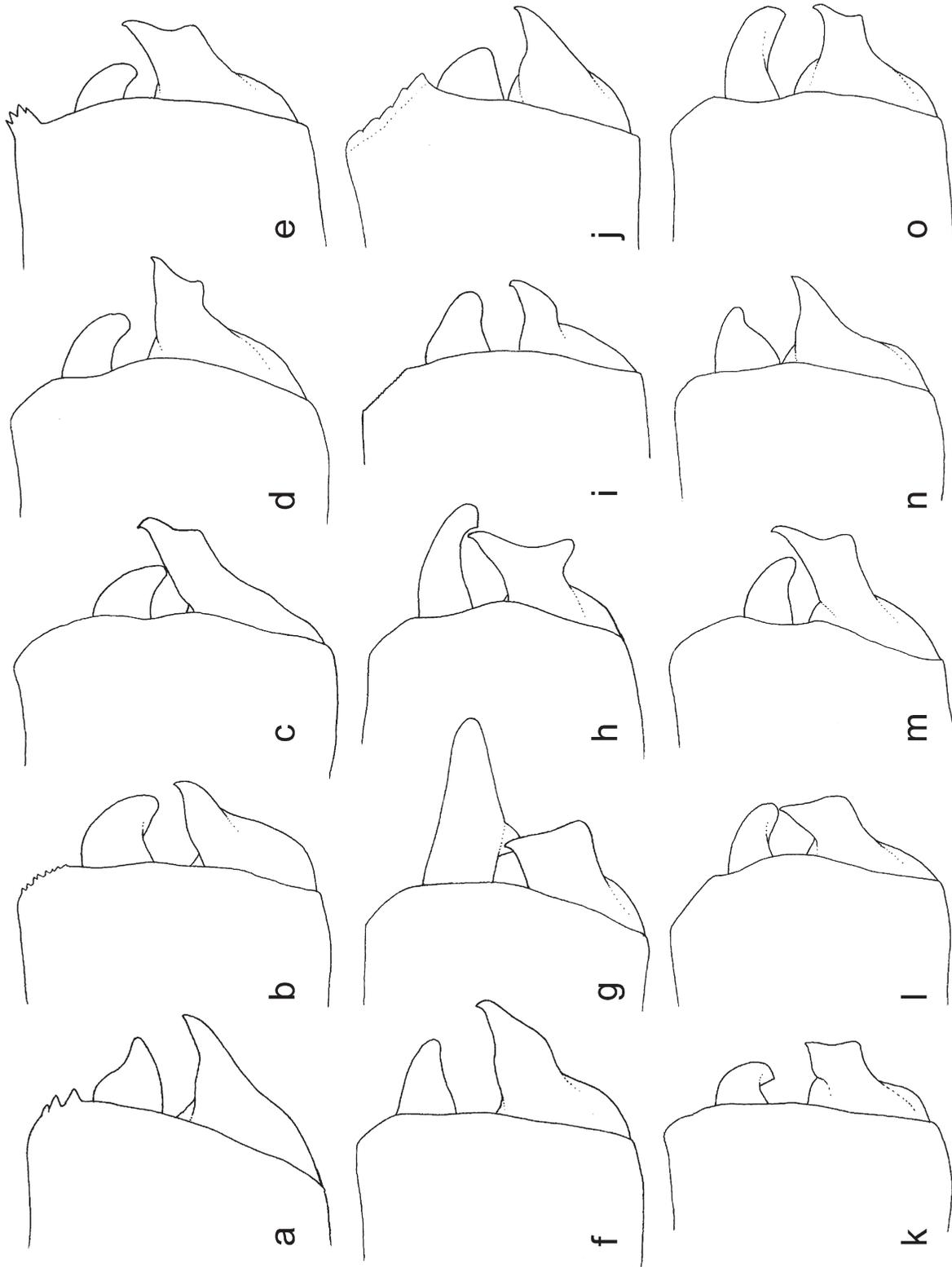
Table 2. Habitat and range of *Ceriagrion* species of continental tropical Africa\* including suspected synonyms *C. hamoni* and *C. moorei*

<i>C. annulatum</i>	Very few records from Katanga to Cameroon, probably in forest
<i>C. bakeri</i>	Standing waters from NW Uganda and N Zambia to Senegal
<i>C. citrinum</i>	Swampy forest in S Benin and S Nigeria
<i>C. corallinum</i>	Swamp near forest from Uganda and N Botswana to Sierra Leone
<i>C. glabrum</i>	Any open stagnant water in tropical Africa, also on oceanic islands
<i>C. ignitum</i>	Known only from two sites in S Ghana and central Congo-Kinshasa
<i>C. katamborae</i>	Swamps in Zambia and N Botswana
<i>C. kordofanicum</i>	Open pools with floating vegetation from Sudan to Mozambique and Zambia
<i>C. mourae</i>	Known only from two sites in miombo in Mozambique and E Tanzania
<i>C. rubellocerinum</i>	Forest from NE Congo-Kinshasa to Sierra Leone
<i>C. sakejii</i>	Swamps in border region of Zambia and Congo-Kinshasa
<i>C. suave</i> *	Open water in savannah and woodland throughout tropical Africa
<i>C. tricrenaticeps</i>	Isolated records from Liberia, S Cameroon, Gabon and NE Congo-Kinshasa
<i>C. varians</i>	Forested swamp from W Kenya and N Zambia to S Nigeria
<i>C. whellani</i>	Open swamp from Botswana, Kenya, and Zimbabwe to Sierra Leone

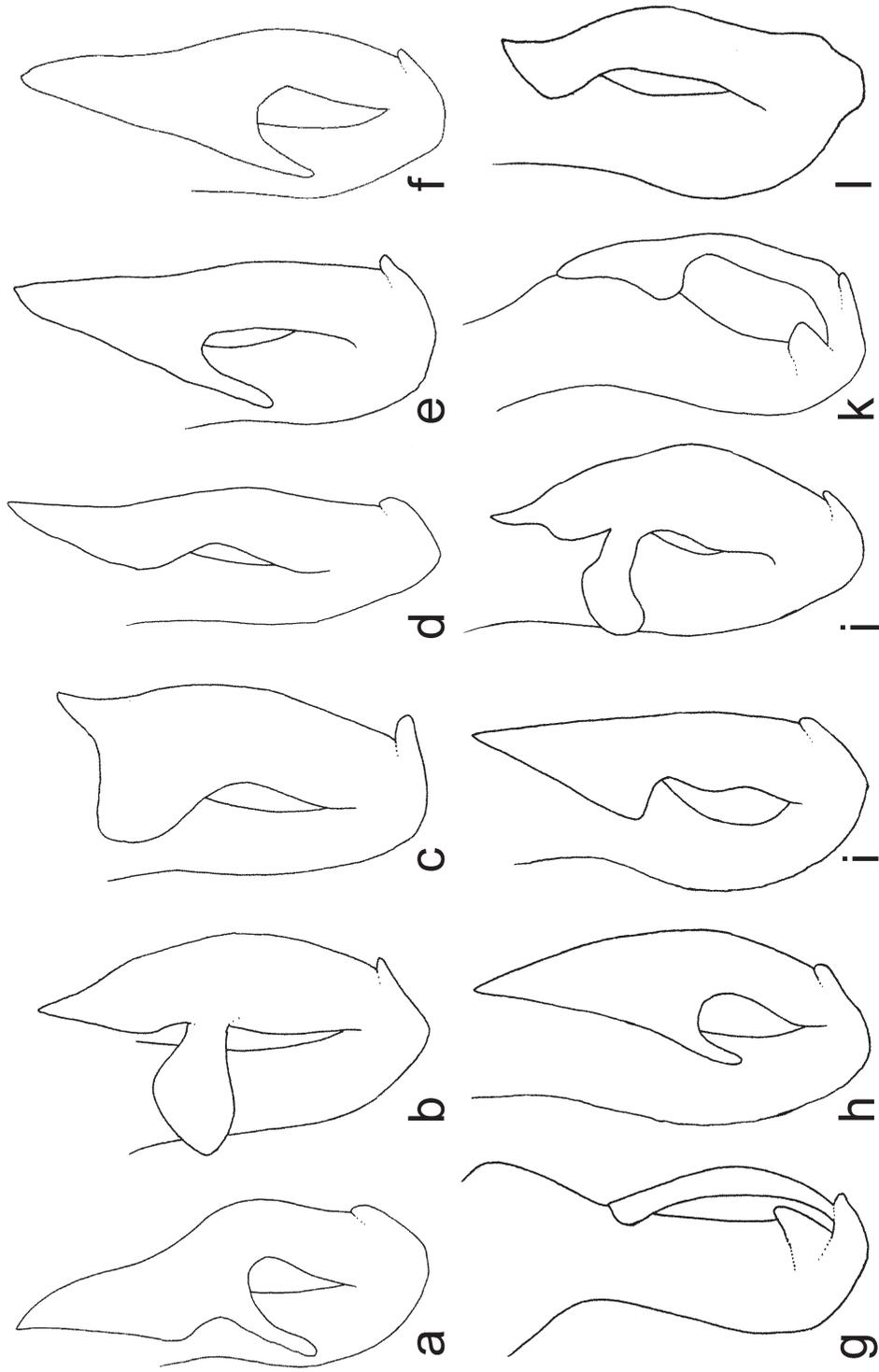
Fig. 1. *Ceriagrion* male Fw Pt. – (a) *C. glabrum* [Ketta Forest, Congo-Brazzaville]; (b) *C. rubellocerinum* [Ikoyi, Nigeria]; (c) *C. varians* [Entebbe, Uganda].



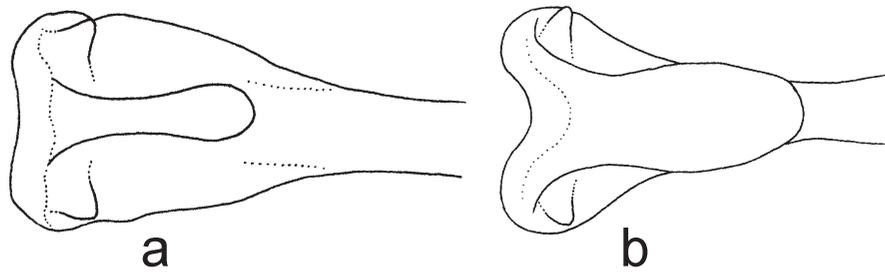
Figs 2a-o: *Ceriatrion* male appendages in dorsal view. a, *C. annulatum* [holotype]; b, *C. bakeri* [Yom, Nigeria]; c, *C. citrinum* [holotype]; d, *C. corallinum* [holotype]; e, *C. glabrum* [Lake Margherita, Ethiopia]; f, *C. ignitum* [holotype]; g, *C. katamborae* [Okavango Delta, Botswana]; h, *C. kordofanicum* [West Madi, Uganda]; i, *C. mourae* [Rufiji Delta, Tanzania]; j, *C. rubelloccerinum* [Ikoyi, Nigeria]; k, *C. sakeji* [paratype]; l, *C. suave* [Malindi, Kenya]; m, *C. tricenaticeps* [after Legrand (1984)]; n, *C. varians* [holotype *C. sanguinostigma*]; o, *C. whellani* [holotype].



Figs 3a-o: *Ceriagrion* male appendages in lateral view. a, *C. annulatum* [holotype]; b, *C. bakeri* [Yom, Nigeria]; c, *C. citrinum* [holotype]; d, *C. corallinum* [holotype]; e, *C. glabrum* [Lake Margherita, Ethiopia]; f, *C. ignitum* [holotype]; g, *C. katamborae* [Okavango Delta, Botswana]; h, *C. kordofanicum* [West Madi, Uganda]; i, *C. mourae* [Rufiji Delta, Tanzania]; j, *C. rubellocerinum* [Ikoyi, Nigeria]; k, *C. sakejii* [paratype]; l, *C. suave* [Malindi, Kenya]; m, *C. tricrenaticeps* [after Legrand (1984)]; n, *C. varians* [Entebbe, Uganda]; o, *C. whellani* [holotype].



Figs 4a-l: *Ceriatrion* penis in lateral view. a, *C. bakeri* [Vom, Nigeria]; b, *C. citrinum* [Old Calabar, Nigeria]; c, *C. corallinum* [lectotype *C. bidentatum*]; d, *C. glabrum* [Lake Margherita, Ethiopia]; e, *C. ignitum* [paratype]; f, *C. kordofanicum* [West Madi, Uganda]; g, *C. rubelloccerinum* [after Legrand & Couturier (1985)]; h, typical "*C. suave*" [after Marshall & Gables 1977]; i, typical "*C. moorei*" [after Marshall & Gables 1977]; j, *C. tricenaticeps* [after Legrand (1984)]; k, *C. varians* [after Legrand & Couturier (1985)]; l, *C. whellani* [Garamba, Congo-Kinshasa]. Penises of *C. annulatum*, *C. katamborae* and *C. mourae* (not shown) are like 4g, 4e-f and 4a respectively.



Figs 5a-b: *Ceriagrion* penis in ventral view, after Legrand & Couturier (1985). a, *C. rubellocerinum*; b, *C. varians*.

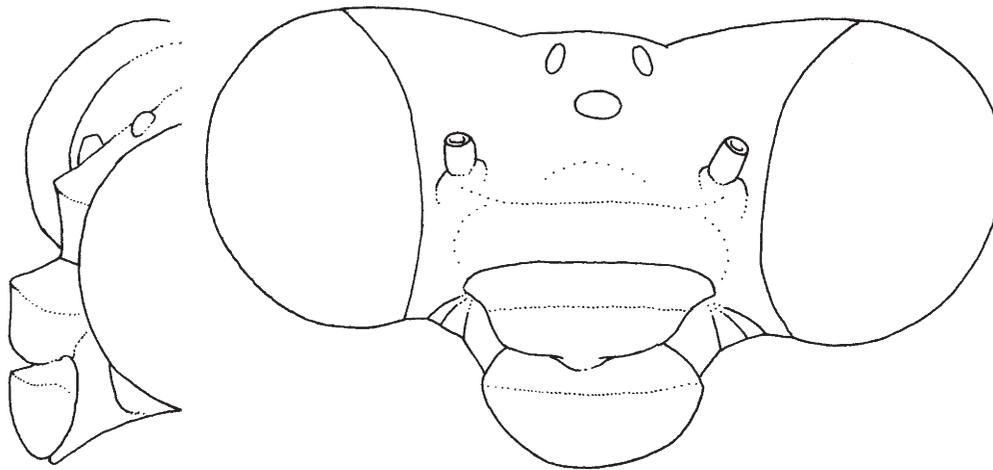


Fig. 6: *Ceriagrion tricrenaticeps* [Tucson, Liberia] male face in lateral (left) and frontal view; lower mouth parts omitted. The three parallel densely dotted lines represent the transverse ridges on the (from above to below) frons, clypeus and labrum. The frontal ridge is diagnostic of the genus; the sharp labral ridge is unique to the depicted species.



Figs 7a-f: *Ceriagrion* males. Photographs by author. a, *C. corallinum* [Entebbe, Uganda]; b, *C. glabrum* typical [Thyolo, Malawi]; c, *C. glabrum* "longispinum" [Lokutu, Congo-Kinshasa]; d, *C. ignitum* [Lokutu, Congo-Kinshasa]; e, *C. varians* [Entebbe, Uganda]; f, *C. whellani* [Entebbe, Uganda].