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The Genus *Aciagrion* Selys (Odonata)

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SUMMARY

In this paper the Ethiopian species of the genus *Aciagrion* Selys are described in detail and specific keys are given for the African species. Comparisons are made of structural features and markings. It is noted that black areas develop in two ways.

It is found that *Ischnuragrion* Longfield is a synonym of *Mombagrion* Sjöstedt, by virtue of the characters of the type species of *Mombagrion* (*gracile* Sjöstedt). This is a subgenus of *Aciagrion* Selys.

Ten African species of the genus are recognised here, of which two, *macrootithenae* and *zambiense*, are described as new species. New subspecies are also included as well as the hitherto unknown sex of two known species. Attempts are made at clearing up some unnamed species recorded in literature.

Some peculiar structural anomalies are discussed. For instance, in two species, *macrootithenae* and *nodosum*, the sternal spine on segment 8 of the female is much reduced or absent. Although the presence of the spine is strictly a generic character there is no doubt that these species are correctly placed in the genus and it appears to be a secondary loss. The position of the anal crossing Ac is also unstable in certain species and these two anomalies could cause erroneous generic identification if insufficient study is made of a specimen.

At the end descriptions are given of three Oriental species, including the type species. Brief notes are recorded on the other Asiatic species.

INTRODUCTION

Although at least 11 or 12 species of *Aciagrion* Selys have been recorded from the Oriental region those from the Ethiopian region have perhaps been less well known, more confused. The females are poorly recognised except in *A. hamoni* Fraser which was described from a female, the male being unknown at the time. One species from Central Africa which I originally determined as *A. gracile* (Sjöstedt) (Pinhey, 1964b) shows most abnormal structural peculiarities. It is now found to be a new species, *A. macrootithenae* spec. nov. Some generic and specific synonymy is also recorded in this revision.

In considering some of the species of the *gracile* group it was soon found that these were generically very like *Ischnuragrion* Longfield and this taxon is now placed in synonymy to *Aciagrion* Selys, subg. *Mombagrion* Sjöstedt.

The genus is sometimes recognisable in the field, at least the larger species, by the very slender abdomen; the pale blue, sometimes brownish, colours and their preference for palustrine habitats.

The African species are described here in detail. There are ten of these including two new species, as well as new subspecies. Three of the Oriental species are described at the end of the revision and others are briefly mentioned.

There has been an attempt in this revision to name certain undetermined species mentioned in literature. A short list of some specimens erroneously placed in this genus are also briefly recorded.

Species

The known African species are as follows:

♂ <i>A. congoense</i> (Sjöstedt)	♂ <i>A. macrootithenae</i> spec. nov.
♂ <i>A. zambianse</i> spec. nov.	♂ <i>A. heterosticta heterosticta</i> Fraser
♂ <i>A. africanum</i> Martini	♂ <i>A. heterosticta</i> subsp. <i>karamoja</i> nov.
♂ <i>A. steeleae</i> f. <i>steeleae</i> Kimmins	♂ <i>A. hamoni</i> Fraser
♂ <i>A. steeleae</i> f. <i>abercornensis</i> Pinhey	♂ <i>A. nodosum</i> (Pinhey)
♂ <i>A. gracile gracile</i> (Sjöstedt)	♂ <i>A. rarum</i> (Longfield)
♂ <i>A. gracile attenuatum</i> Fraser	

The unrecorded females of *A. g. attenuatum* Fraser and *A. s. steeleae* Kimmins are also described.

The Oriental species included in the revision but not analysed as a group are:

<i>A. aciculare</i> Lieftinck	<i>A. fragilis</i> (Tillyard)
<i>A. approximans</i> (Selys)	<i>A. hisopa</i> (Selys)
<i>A. azureum</i> Fraser	<i>A. occidentale</i> Laidlaw
<i>A. borneense</i> Ris	<i>A. olympicum</i> Laidlaw
<i>A. fasciculare</i> Lieftinck	<i>A. pallidum</i> Selys
<i>A. feuerborni</i> Schmidt	<i>A. tillyardi</i> Laidlaw

Material examined

Under described species the heading "Material examined" only refers to material either in the National Museum, Bulawayo, or to others on loan which were examined for this revision. It does not include species I have previously examined or collected which are in other collections unless otherwise stated.

Colour terminology

The pale ground colours in this genus are generally a shade of blue or green, with certain areas, labium, lower sides of thorax, legs and middle segments of abdomen yellow to whitish. There are also characteristic markings which are black or dark bronze-green or, in teneral, brown. In a few species the blue or green areas are partially toned down to yellowish brown.

However, as in many Odonata, it is not really possible to describe the true coloured areas (as opposed to blacker markings) in dried material unless the obvious living colours are more or less well preserved. For instance, a thorax which is sky blue, bluish green or nearly

emerald in life may change to a lilaceous or yellowish or some other pale tone irrespective of original colour. Abdominal segments 8-10, so often brightly blue or violet-blue in life in most *Coenagrionidae*, may change to some nondescript greyish or pinkish white or other shade. Again, particularly on the thorax, post-mortem effects may cause staining. Consequently, in descriptions of the body colours I often just say "pale", as opposed to black. This may seem confusing or inaccurate to many entomologists but an Odonatist will understand the term.

It is possible to preserve the body life-colours to some extent but collections are not always so well preserved.

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Acknowledgements are also due to those who have assisted in the collecting of material, especially R. C. Denning and J. A. Whellan.

Richard Brooke, as on previous occasions, has applied his classical experience in providing a name for one of the new species. He agrees that the name "macrootithenae" is rather unwieldy but it had to suit the particular character I wished emphasised, the extraordinarily long ovipositor.

HISTORICAL NOTES

Species now placed in *Aciastrion* Selys first came to light when Selys (1876) in his 5th *Légion Agrion* of the "Synopsis des Agrionines" described two of the species under *Pseudagrion* Selys, namely *approximans* Selys (1876a: 217, 218; 1876b: 507) and *hisopa* Selys (1876b: 509). The generic name *Aciastrion* was not erected by Selys for another fifteen years when he described *pallidum* (1891).

These three species are Oriental. The first Ethiopian species was Martin's *africanum* (1908). About a year later Sjöstedt described *Mombagrion* as a new genus, with *gracile* as its type species. In 1917 *Mombagrion congoense* Sjöstedt was added to the list. In the meantime Ris described another Oriental species of *Aciastrion*, *borneense* (1911) and Laidlaw two others, *occidentale* and *olympicum* (1919). The references for these species is given in this paper in the section on Oriental species.

Later authors in Asia were Fraser, Lieftinck and Schmidt; and in Africa Fraser, Kimmins and myself. Fraser (1933) gave *hisopa* (Selys) as the type species of *Acia-grion* Selys. Schmidt (1951) placed *Mombagrion* Sjöstedt in synonymy to this genus and mentioned that Ris had already come to the same opinion (*in litt.*).

Longfield (1945) described *Ischmuragrion* and its type species *rarum*. However, in the present revision it is shown that this is generically the same as true *Mombagrion* Sjöstedt, which is a subgenus of *Acia-grion* Selys.

Most Odonata genera distributed as far south as southern Africa were represented in literature more than half a century earlier in this part of Africa, recorded by Burmeister, Rambur, Selys and others. The fact that the first African *Acia-grion* was not described until 1908 and then from Guinea, is explained by the fact that this genus does not reach the southern coastal areas where many African generic representatives were first recorded. Moreover, they are very local insects.

GENERIC CHARACTERS AND SYNONYMY

Genus Acia-grion Selys

Acia-grion Selys, 1891, *Annali Mus. civ. Stor. Giacomo Doria*, 10 (2): 30, 509

Type species *Acia-grion hisopa* Selys

Mombagrion Sjöstedt, 1909, *Wiss. Ergebn. schwed. zool.*, 14 (1): 44

Type species *Mombagrion gracile* Sjöstedt.

This synonymy (Schmidt, 1951) has been accepted for many years (Pinhey, 1962). As will be shown here *Mombagrion gracile* is slightly different from *Acia-grion*, particularly in the shape of segment 10, whereas *Mombagrion congoense* Sjöstedt is quite typical of *Acia-grion*. The differences between these two can be used in dividing the genus into two subgenera. *Mombagrion* as described is no more than a direct synonymy but its type species gives a subgeneric distinction.

Earlier diagnostic features of *Acia-grion* Selys:

Slender *Coenagrionidae*, the body normally pale blue, greenish or sometimes pale brown with some bluish markings. Postocular spots very large. 10th abdominal segment in ♂ not prominently raised to a bifid apex. ♀ without prothoracic stylets but with vulvar spine on 8th sternite.

Wings broad. Pterostigma shorter than subpterostigmatal cell, usually more or less rhomboidal. Forewing with 9-12 postnodal cross veins Px. Anal crossing vein Ac at end of petiole (the point where the anal vein leaves the posterior wing margin), and positioned about half-way between the antenodal cross veins Ax. Discoidal cell (quadrilateral) shaped as in *Pseudagrion* Selys. Arculus situated at second Ax. R_{4+5} arises close to subnodus. Anal vein extends to about 7th or 8th Px.

In this revision some deviation has been found from this diagnosis:

1. Large postocular spots. The paler, generally larger species agree in this character but the smaller, often darker species, may have extensive black on the vertex causing marked reduction in the size of these spots. This reduced size occurs in *A. steeleae* Kimmins, *Ischmuragrion rarum* Longfield and in some Oriental species such as *A. fragilis* (Tillyard).
2. Vulvar spine on 8th sternite of ♀. This is surprisingly reduced, obsolescent or quite absent in *A. macrootithenae* spec. nov. and to a lesser extent in *A. nodosum* (Pinhey). These two species, nevertheless, belong to this genus, on their body shape, anal appendages and general venational characters. It may be assumed that this loss of the sternal spine is a secondary mutational modification, perhaps connected with specialised oviposition.
3. Ac situated at end of petiole. In just one ♀, the one described here under *A. africanum* Martin, Ac is distal to the point of separation of the anal vein. Combined with the presence of the 8th sternal spine this could place the ♀ in *Enallagma* Charpentier, but in other characters, such as the small size of the pterostigmata in relation to the subpterostigmatal cells, it is a true *Acia-grion*.

Again, in some specimens of either sex of *A. macrootithenae* spec. nov. Ac is actually proximal to the anal vein separation. Here, combined with the lack of an 8th sternal spine in the ♀, it might be supposed that this species belongs to *Teinobasis* Kirby. In the latter, however, the abdomen is still longer and Ac is situated much closer to the second Ax. The genitalia of this new species is very like *A. gracile* (Sjöstedt) and related species of *Acia-grion*. Moreover, the abnormal position of Ac in relation to the anal vein is individually variable and may be inconstant even in one individual.

These anomalies have been recorded previously (Pinhey, 1964b: 100).

4. Rhomboidal shape of pterostigma. This is variable in the African species, sometimes a parallelogram, usually smaller and more rhomboidal in hindwing. In *A. nodosum* (Pinhey) it is almost square in all wings. All have in common their small size in relation to the cells immediately below them.
5. 10th segment in ♂ not prominently raised and bifid at dorso-distal end. This applies to typical *Acia-grion*, *congoense*, *zambiense*, *africanum* and *steeleae*, as well as the few Oriental species examined for this revision. *A. gracile* (Sjöstedt) and all other known African species have this raised bifid projection except *A. heterosticta* Fraser in which it is a bifid projection but not raised: an intermediate stage. Since this is a feature of *gracile*, type species of *Mombagrion* Sjöstedt, all these species belong to this taxon, regarded here as a subgenus.

Essentially, however, it is now apparent that *Ischmuragrion* Longfield is identical, except in size, to the generic features of *Acia-grion* Selys, subgenus *Mombagrion* Sjöstedt. The generic description of *Ischmuragrion* differs from that given for *Acia-grion* Selys above in the following characters:

Smaller. Thorax with mesothoracic tubercles ("ear-like projections" on the thorax, in Longfield). 10th segment in ♂ raised to a bifid ridge, armed with small tubercles. Inferior anal appendage well developed. longer than superior appendage. Forewing with 8-9 Px. Arculus slightly distal to 2nd Ax. Anal vein extends to 4th or 5th Px.

These characters can be considered comparatively.

1. The type species *rarum* Longfield is certainly the smallest known amongst the African species recorded here. Size is no definite criterion. *A. steeleae* Kimmins and some Oriental species are far smaller than *congoense*, *heterosticta* and others.
2. Mesothoracic tubercles: these are modifications of the mesostigmal lamina and are developed in both sexes of every species examined; sometimes being quite extensive ridges. They are evidently concerned in the ♀ with tandem linkage gripping points. The fact that they are developed here also in males suggests to me that from an evolutionary aspect the tubercles, ridges or knobs were produced as mutations in both sexes and gradually modified selectively until, in the female, they suited the linkage requirements.
3. The raised bifid tubercular apex to segment 10 is found also in the *gracile* group, as stated above, with *heterosticta* showing an intermediate condition.
4. Inferior appendage longer than superior is again a character of *gracile* as well as *macrooithenae*.
5. The venational characters are not significant. The low nodal index is surely due to the small size of the species *rarum* and, positionally, the anal vein must end a few postnodal cross-veins proximal to typical *Aciagrion* condition for the same reason of total dimensions. In *steeleae* and even *nodosum* the anal vein may reach only to 5th Px. The position of the arculus slightly distal to second Ax seems to be a minor character. This variation may occur in other genera. It occurs occasionally in *gracile* and *nodosum*. When the arculus is well distal to second Ax, as in *Agriocnemis* Selys, then this becomes a significant feature.

The following synonymy is therefore recorded:

Aciagrion Selys

Ischnuragrion Longfield, 1945, *Archos Mus. Bocage*, 16: 6 **syn. nov.**

Type species *I. rarum* Longfield.

Subgenerally *Ischnuragrion* is a synonym of *Mombagrion* Sjöstedt, and the division of the African members of the genus is as follows:

Aciagrion Selys, subgenus *Aciagrion* Selys: *congoense*, *zambiense* spec. nov., *africanum*, *steeleae*. These have no raised bifid projection on 10th segment of ♂.

Aciagrion Selys, subgenus *Mombagrion* Sjöstedt: *gracile*, *macrooithenae* spec. nov., *heterosticta*, *hamoni*, *nodosum*, *rarum*. These all have a bifid projection on 10th segment of ♂ and all except *heterosticta* have this projection raised as in *Ischnura* Charpentier.

Modification of the generic diagnosis of Aciagrion Selys

The inclusion of subgenus *Mombagrion* Sjöstedt and the anomalies in various species indicate that the general diagnostic features must be widened as follows, at least for African species:

Generally very slender *Coenagrionidae*, the body normally pale blue, greenish or sometimes pale brown with some bluish markings. Postocular spots very large in the paler species but constricted in the blacker (usually smaller) species. 10th abdominal segment in ♂ often prominently raised to a bifid apex (*Mombagrion* Sjöstedt). ♀ without prothoracic stylets

but both sexes with modifications to the mesostigmal lamina. ♀ normally with vulvar spine on 8th sternite, occasionally obsolete.

Wings generally broad. Pterostigma rhomboidal or a parallelogram, shorter than subterostigmal cell. Forewing with 8-12 Px (depending largely on wing-length). Ac normally at end of petiole, about half-way between the antenodal cross veins. Discoidal cell as in *Pseudagrion* Selys. Arculus normally at second Ax. R_{4+5} arises close to subnodus. Anal vein extends to 7th or 8th Px, or more proximal in very small examples.

AFRICAN SPECIES

Comparisons of structural characters

The most important structural characters for comparisons are the mesostigmal lamina of both sexes; the posterior lobe of the prothorax; the anal appendages of the male; the prophallus; the length of the ovipositor sheath; the ♀ sternal spine on segment 8; the pterostigmata and the position of Ac in relation to the petiole. Some of these features have been discussed above.

Mesostigmal lamina and tandem linkage

This lamina, as already mentioned, is important in connection with tandem linkage, and the shape of the prothoracic posterior lobe of the female is also concerned with this.

It is probable that the superior anal appendage of the ♂ locks on to or against processes on the ♀ lamina and, if long enough, it fits under lateral ends of the posterior lobe of the prothorax. The inferior appendage presses down on the dorsal surface of the posterior lobe of the prothorax.

Species with long superior appendage are *congoense*, *zambiense*, *africanum* and, to a lesser degree, *hamoni*, *steeleae* and *heterosticta*. It would appear that if the posterior lobe of the prothorax of the ♀ is arched at the sides this would facilitate slipping the long superiors under this lobe. It is in fact found that in females examined this arching of the posterior lobe is most noticeable in *africanum*, *gracile attenuatum*, *hamoni* and the dark Mkushi River ♀ *rarum*; and arched to a lesser extent in *zambiense* and *heterosticta*. Thus there is some correspondence with those having longer superiors although not entirely.

In *steeleae* the posterior lobe is less depressed than in other species and in *macrooithenae* this lobe is quite erect, giving ease of entry for the appendages or, more likely, their teeth.

The mesostigmal lamina of the ♀ usually has a post-nodal knob or ridge. This may act as a stop to hold the superior appendage in position with its ventral tooth pressing upwards against the posterior lobe of the ♀ prothorax, whilst the inferior appendage presses down on this lobe. The dorsal tooth or hook on the inferior is generally small in this genus and basal in position, so that its coupling effect is difficult to assess. Does it catch on to the edge of the posterior lobe? In *africanum* and *nodosum* it is a more prominent structure directed posteriad. Perhaps here it has some effect in downward pressure on the lobe, in opposition to the ventral tooth of the superior.

In the melanic ♀ *rarum* the lamina modification is quite different, a ridge at the lower or lateral end of the mesostigmal lamina (cf. the type species *hisopa*). Perhaps this has some significance in holding the superior from lateral instead of dorsal slip whilst the long inferior presses on the posterior lobe?

The mesostigmal tumours or ridges may be compared in tabular form for the two sexes, together with the anal appendages, to find out if any significant relationships can be seen. If the superior appendage is longer than inferior this is indicated by +; if inferior is the longer, this is -; if of approximately equal length, an = sign is employed.

TABLE: MESOSTIGMAL LAMINA AND ANAL APPENDAGES

Species	Lamina ♂	Lamina ♀	Anal Appendages
<i>africanum</i>	long, curved post-dorsal ridge	slight hook	+
<i>congoense</i>	short straight post-dorsal ridge	post-dorsal knob	!
<i>steeleae</i>	semicircular post-dorsal ridge	(depression only)	+
<i>zambiense</i>	long, curved post-dorsal ridge	post-dorsal knob and spine	+
<i>gracile</i>	long, curved post-dorsal ridge	small post-dorsal knob	
<i>hamoni</i>	straight post-dorsal ridge	smallish post-dorsal knob or hemisphere	
<i>heterosticta</i>	long, curved post-dorsal ridge	conical post-dorsal knob	
<i>macrooithenae</i>	conical post-dorsal ridge	long, straight ridge	
<i>nodosum</i>	long, curved post-dorsal ridge	small post-dorsal knob	
<i>rarum</i>	long, curved post-dorsal ridge	Mkushi ♀: ventral ridge	

Several points can be gleaned from this small table.

1. In African species of subgenus *Aciagrion* the superior appendage of the ♂ is always much longer than the inferior. In *Mombagrion* the appendages are of equal reach in half the species, whilst in the other half the inferior is the longer.
2. There is a general tendency in the ♂ lamina to have a more developed ridge than in the ♀. The only exception is *macrooithenae* in which the ♀ has a larger ridge.

3. There is no direct correlation between length or curvature of ridge on ♂ lamina and the size or shape of the ♀ swelling.
4. In only the Mkushi ♀ *rarum* (of the African species) is the ridge on the lateral or ventral end of the lamina. The holotype ♂ *rarum* has a well developed post-dorsal tubercle or ridge. The allotype ♀, however, is in a general condition and the thorax is distorted. The sculpturing of the lamina is not clear. The ♀ of *A. hisopa* Selys, the type species, also shows a ventral ridge on the lamina. In the ♂ the lateral end is also raised, but less prominently than in the ♀.

It may be mentioned here that in ♀ *zambiense* there is a small black depression at the ventral end of the mesepisternum against the mesostigmal lamina. This depression may have some function during linkage but I am unable to suggest what this may be.

Anal appendages

There is not much more that need be said here about the anal appendages. In all African species the superior appendage has a ventral tooth, usually large and basal; more central in *zambiense* and *macrooithenae*; more apical in some Oriental species. The superior and often the inferior appendages are infolded apically. The inferior appendage has a small or large dorsal tooth or hook, usually situated or directed into the 10th segment; but prominently directed obliquely posterior in *africanum* and *nodosum* (like *Enallagma* Charpentier). Exteriously the inferior generally shows a small centro-lateral basal tooth which I refer to as a root-tooth. This would probably have no significance in tandem linkage unless it is a buffer against the lateral margin of 10th segment assisting in preventing lateral slip.

The general direction of the teeth in these appendages, inwards into segment 10, would appear to hamper quick linkage. I have not observed the actual link-up in this genus, although I have collected specimens already in tandem.

Prophallus

The prophallus generally shows small fine setae on the stem. The terminal chitinised portion in the head of the prophallus shows some variation in extent, size and shape. In *hamoni* and *hisopa* this chitinised portion is strongly divided. The apex of the glans has long, tapered lateral branches in *congoense*, *africanum*, *zambiense*, *heterosticta* and *rarum*; and more obtuse branches in *steeleae*. In *nodosum* there are no apical branches but long sub-apical ones. In *gracile* and *hamoni* there are no proper branches to the glans, the apex of which is a small funnel. In *macrooithenae* it terminates in a plain broad lobe.

Ovipositor

The ovipositor sheath normally extends slightly beyond segment 10 of the ♀, to about $\frac{1}{4}$ or $\frac{1}{2}$ the length of 10. Only in *macrooithenae* is the ovipositor far longer. Presumably deeper penetration is required into mud or under water plants in its natural swamps during oviposition.

Sternal spine

The sternal spine on the 8th segment of the female is normally well developed but, as mentioned above, it is reduced or obsolete in *nodosum* and *macrooithenae*: probably a

secondary modification pertaining to its habitat. Nielsen's *Mobeka* ♀, mentioned here under *hamoni*, also lacks the spine.

Pterostigma

The pterostigmata have been briefly discussed already. It seems possible that where the hindwing pterostigma is very obviously narrower than the forewing pterostigma, the post-nodal index number may be greater in the hindwing than if the two pterostigmata were the same size. This suggestion could only be followed up through examination of very long series of each species, and only if the proportionate widths of pterostigma in forewing and hindwing remain constant in a species. I have not examined this aspect since the only species of which there is abundant material in the National Museum is *steeleae*, in which the pterostigma is apparently a uniform parallelogram in all wings and therefore not suitable for this study. In *africanum* it is also a parallelogram in the short series examined; in species with rhomboidal pterostigma, we only have rather short series in *congoense*, *macrootithenae* and *heterosticta* on which the forewing and hindwing pterostigmata differ; few individuals in other species. I think, however, it is a reasonable supposition that if the hindwing pterostigma is shorter its space allowance will be filled by an extra cross vein for distal wing support. It is of interest to note that *nodosum* shows almost a square in all wings.

The surface formation of the pterostigma is generally just a confusion of minute creases, possibly due to shrinkage in drying or ageing. In the dark Mkushi ♀ *rarum* it has less creasing (fig. 10a).

Other structures

The position of Ac in relation to the petiole has been considered previously.

One more structural feature is a negative one. Both sexes may have short terminal spines on segment 9 but not on segment 10, unlike one of the groups of *Pseudagrion* Selys in which the ♂ has spines also on 10 (Pinhey, 1964a).

In build the larger species are more slender than the smallest ones. The species *steeleae* and *rarum* are not obviously slender.

Markings on head and body

One form of marking is here called a pseudoantehumeral stripe which shows on the pale-coloured synthorax of many species such as *congoense*. They are apparent in some, but not all individuals of a pale species as a yellowish or pale bluish stripe. Normally, a true pale (blue or green) antehumeral stripe on the mesepisternum is clearly framed in black, as in *africanum*, *steeleae*, ♂ *hamoni* and *rarum*. In *africanum* and *steeleae* the width of this pale antehumeral stripe is very variable. In those with the synthorax nearly devoid of black marking it is possible that the pseudoantehumeral stripes show up in life on the pale background as a pale blue or green colour.

Black markings

The labrum is normally pale (blue, green or other shade) and if there is any black it is a mid-basal dot in a small depression or a thin line in a basal groove. Occasionally there are distal dots. The postclypeus may be all pale; or there may be a black basal dot or line, also

in a depression or groove, or two distal spots, also in their depressions. Occasionally a third distal dot. Further blackening on the postclypeus often develops later than other black areas (figs. 1a, 3a).

The black on vertex, thorax and abdomen may be visible (perhaps greyer or browner) even in teneral, but on the postclypeus it does not usually develop early. In ♂ *gracile gracile* and *africanum* the postclypeus may have a black surround and median line to leave two pale blue triangles; in *steeleae steeleae* ♂♀ there is a black semicircular line; in ♂♀ *steeleae abercornensis*, ♂ *hamoni* and *rarum* the postclypeus is all black, at least at maturity.

The frons may have black in a basal depression, or it may spread across the dorsum of the frons. The vertex may have sparse markings in *congoense* and other pale species; or the curved depressed lines demarcating the postocular spots may be thickly black. In some of the smaller species the vertex is broadly black, the postocular spots consequently narrowed.

The prothorax in some of the paler species may show blackish smears between the swellings or tumours of the middle lobes or distinct black stripes. Sometimes the middle lobe is broadly black in the middle, as in ♂ *steeleae steeleae* and ♂ *hamoni*. In others, the prothorax is almost all black, in ♂♀ *steeleae abercornensis*, ♂ *nodosum*, ♂ *rarum* and ♀ (Mkushi) *rarum*.

The mesepisterna in some of the paler species may show a more or less complete black stripe on either side of the mid-dorsal carina and I have called these juxta-carinal stripes. These may be seen, for instance, in *congoense* (partial), *hamoni*, *nodosum* and *macrootithenae*. In all pale species there is a dorsal spot in the depression on the humeral suture; and normally in pale or dark species another spot in the dorsal depression on the second lateral suture. The first lateral suture rarely has any marking, occasionally a short dorsal line. In *steeleae* there may be dorsal lines but no spots on these sutures. In pale species there is often a ventral spot on the mesepimeron.

Except for pale antehumeral stripes the synthorax may be black to well below humeral suture in *steeleae abercornensis* or as far as the first lateral suture in *rarum*.

The legs are usually pale ochreous or cream with sparse brown complete or discontinuous lines. In *steeleae abercornensis*, ♂ *hamoni* and *rarum* they have thick black stripes.

Abdominal segment 1 usually has a dorsal black saddle, somewhat rectangular, often incomplete in the middle and usually not reaching the end of the segment. In ♀ *gracile attenuatum* this saddle may be reduced to two separate streaks. In *steeleae abercornensis* and ♂ *hamoni* the black band on this segment is complete.

Segment 2 in very pale species may be unmarked except for a thin dorsal crescent before the distal end; or there may be a dorsal line ending in a triangle; or a band expanding to a bell-shaped mark before the distal end. Species with a more or less complete dorsal band on this segment include ♂ *gracile gracile*, ♂♀ *nodosum*, ♀ *hamoni* and ♂ *rarum*.

In most species segments 3-7 have a progressively increasing bronze-brown or blackish dorsal band expanded before dorsal end to a broad black macula or annulus. The band is generally constricted at the proximal (basal) ends. In *africanum* segment 7 is generally bluer with the black confined to the basal half and restricted distal marking. One point of interest, in teneral or juveniles, is that the dark band on segments 3-4 develops later than on 5-7. I

believe that the end segments have some sex recognition value and their markings must develop earlier.

Segments 8-10 may be entirely pale, in life blue, sky blue, violet-blue or other tints. In *rarum* segment 8 may be half black or all black dorsally. Segment 9 sometimes has narrow basal lines or stripes. Segment 10 is all black dorsally in *nodosum* and *steeleae abercornensis* and in the latter species there is a continuous black band right along the abdomen.

Graded markings

One point arises from this analysis of black markings. The blackening appears to develop in two ways: (1) in irregularities on the cuticle, depressions, grooves, sutures and ridges, and (2) on smoother surfaces, which include the probable sex recognition markings.

1. Cuticular irregularities: Black may develop in a centro-basal depression or basal groove on labrum and postclypeus, or on two distal depressions on these; on a basal depression on frons; on curved depressions demarcating the postocular spots; at extreme base of antennae or in grooves to the side of the ocelli; in depressions between lobes and swellings on prothorax; at sutures and particularly at dorsal depressions on sutures of synthorax and on dorsum of segment 1.

2. Smooth surface blackening develops at the same time as the depressional markings (generally just as early in the adult) on parts of the vertex; on the mesepisterna and most segments of the abdomen. The presence or absence of markings on 8-10, which are usually blue segments in both sexes, may very likely be a vital part of the recognition pattern mentioned above, in contrast to the blacker segments 6 and 7.

These remarks could, of course, equally apply to other genera such as *Pseudagrion* Selys. Higher Odonata may show depressional black markings in sutures; and bands and other fasciae on other portions of thorax or abdomen. It is not all part of one pattern development. In the palest species black will usually develop to a limited extent but only in grooves or depressions. It would be interesting to know why this is so. The pigment concentrates in these points, perhaps triggered in some way by compression where the cuticle is infolded.

The broader black areas on vertex, thorax or abdomen are developed in the more darkly marked species at the same time as the depressional areas. The juxtacarinar stripe, often quite isolated or discontinuous, is a partial stage towards a dark synthorax.

Ecology

All the African specimens I have collected have been very locally distributed in swamps or the swampy verges of rivers, streams and pools. Fraser (1933) records *A. pallidum* Selys from arid localities amongst long grass, but this must be exceptional. Very little is really known about their habits. It seems probable that the long ovipositor of *macrothanae* is related to abnormal conditions. Dry season *Acigrion* are usually brown, wet season blue but this is not consistent.

Distribution

The genus in Africa is most prolific in South-central and East Africa, particularly Angola, Zambia, Malawi, Tanzania, Southern Congo-Kinshasa, Kenya and Mozambique, to a lesser extent in Rhodesia and equatorial West Africa. It is most probable, however, that

the sparse equatorial records are purely due to inadequate collecting and the genus may be more abundant there than records indicate.

Examination of material for this revision has extended the range of some species, *heterosticta*, northwards into Uganda, *congoense* south-eastwards into Mozambique, *gracile* southwards to Malawi and Rhodesia.

No species are recorded from Madagascar or other Ethiopian islands. Outside the Ethiopian region the genus extends through the warmer parts of Asia to Australia. At least one species, *A. olympicum* Laidlaw, reaches north to the foothills of the Himalayas.

KEYS TO AFRICAN SPECIES

Key to ♂♂

1. Distal end of 10th segment not extended to a bifid apex, the apex merely invaginated. Superior appendage much longer than inferior 2
 - Subg. *Acigrion* 2
- Distal end of 10th segment extended to a bifid apex. Superior appendage not obviously longer than inferior 6
 - Subg. *Mombagrion* 6
2. Inferior appendage with conspicuous dorsal spine directed obliquely posteriorly *africanum*
 - Inferior appendage with inconspicuous dorsal hook or tooth directed dorsad or into 10th segment 3
3. Abdomen less than 27 mm. Vertex broadly black with narrowed blue postocular spots; synthorax dorsum broadly black. Superior appendage much shorter than segment 10 4
 - Abdomen over 30 mm. Vertex pale with sparse black markings, very large postocular spots. Synthorax mainly pale on dorsum. Superior appendage as long or almost as long as segment 10 5
4. Postclypeus at least half blue. Synthorax black to humeral suture. Segment 10 all blue *steeleae steeleae*
 - Postclypeus all black. Synthorax black to well below humeral suture. Segment 10 black dorsally *steeleae f. abercornensis*
5. Segment 7 with continuous black band. Segment 10 with basal and distal annuli. Superior appendage distinctly shorter than segment 10, yellow on inner surface *zambiense*
 - Segment 7 with discontinuous black marking. Segment 10 without annuli. Superior appendage as long as segment 10, blackish on inner surface *congoense*
6. Vertex pale with only blackish traces. Abdomen over 35 mm. Segment 2 with sparse black markings or an incomplete dorsal band 7
 - Vertex very broadly black. Abdomen 32 mm or less. Segment 2 with complete black dorsal band 11

7. Superior and inferior appendages extend posteriorly about the same length. Abdomen 38-39 mm 8
 -Inferior appendage broader and longer than superior. Abdomen 36-37 mm 9
8. Mesostigmal lamina with long curved post-dorsal ridge . . . *heterosticta heterosticta*
 -Mesostigmal lamina with short straight post-dorsal ridge . . . *heterosticta karamoja*
9. Mesostigmal lamina with small conical post-dorsal ridge. Inferior appendage more than twice as long as superior, the superior with conspicuous spine-like ventral tooth projecting posteriad beyond the superior itself . . . *macrooithenae*
 -Mesostigmal lamina with long, curved post-dorsal ridge. Superior appendage not so short, its ventral tooth curved forwards into segment 10 10
10. Postclypeus with heavy black markings enclosing two pale (blue) triangles. Segment 2 with broad, nearly complete black dorsal band *gracile gracile*
 -Postclypeus pale with at most a basal dot. Segment 2 pale with only a small dark dorsal crescent near distal end *gracile attenuatum*
11. Postclypeus, vertex and synthorax mainly pale (bluish) with only rather sparse black markings. Segment 10 black dorsally. Abdomen 32 mm. Pterostigma almost square . . . *nodosum*
 -Postclypeus and vertex all black, synthorax dorsally mainly black. Segment 10 blue. Abdomen 29 mm or less 12
12. Abdomen 28 mm or more. Segment 8 all blue. Superior and inferior appendage of about same length. Pterostigma a parallelogram *hamoni*
 -Abdomen about 20 mm. Segment 8 black on basal half. Inferior appendage much longer than superior. Pterostigma rhomboidal *rarium*

Key to ♀♀

1. Vertex broadly black. Abdomen 19-30 mm 2
 -Vertex pale, with sparse markings. Abdomen 27-39 mm 6
2. Prothorax pale, with two black stripes. Mesepisternum with juxta-carinal stripe . . . 3
 Prothorax nearly all black or blackish dorsally. Mesepisternum black to humeral suture or below this; with pale antehumeral stripe 4
3. Pterostigma a narrow parallelogram. Juxta-carinal stripes thick and prominent. Segment 10 all pale (blue). Abdomen about 30 mm *africanum*
 Pterostigma a dark square. Juxta-carinal stripes narrow. Segment 10 all black dorsally. Abdomen 22-27 mm *nodosum*
4. Postclypeus pale. Abdomen 19 mm or less *rarium*
 -Postclypeus mainly black. Abdomen 24-25 mm 5
5. Postclypeus not all black. Mesepisternal black scarcely crossing the humeral suture, with broad pale antehumeral stripes. Segments 8-9 dorsally with only basal black fasciae . . . *steeleae f. steeleae*
 -Postclypeus all black. Mesepisternal black extending well below humeral suture, with very slender antehumeral stripes. Segments 8-10 all black dorsally *steeleae f. abercornensis*
6. Middle lobe of prothorax blue with black or brown stripes. Juxta-carinal lines at least partially developed 7

- Middle lobe of prothorax all bluish. No juxta-carinal line 10
7. Hindlobe of prothorax narrow and erect. Ovipositor sheath extending posteriad to $3 \times$ length of segment 10. Sternal spine on segment 8 obsolete . . . *macrooithenae*
 -Hindlobe of prothorax normal and depressed. Ovipositor sheath not extending more than $1\frac{1}{2} \times$ segment 10. Sternal spine well developed 8
8. Mesostigmal lamina with an inward spine on the post-dorsal tumour . . . *zambiense*
 -Mesostigmal lamina without this spine 9
9. Segments 8-10 all pale (blue). Ovipositor sheath extending $1\frac{1}{2} \times$ length of segment . . . 10.
 Abdomen 30-31 mm *congoense*
 -Segments 8-9 with small black basal fasciae, 10 all pale. Ovipositor sheath reaching slightly further, about $1\frac{1}{2} \times$ segment 10. Abdomen 27-30 mm *hamoni*
10. Abdomen 36 mm. or less 11
 -Abdomen 38-39 mm. *heterosticta*
11. Abdomen about 30-33 mm. Pterostigma brown *gracile gracile*
 -Abdomen 35-36 mm. Pterostigma grey *gracile attenuatum*

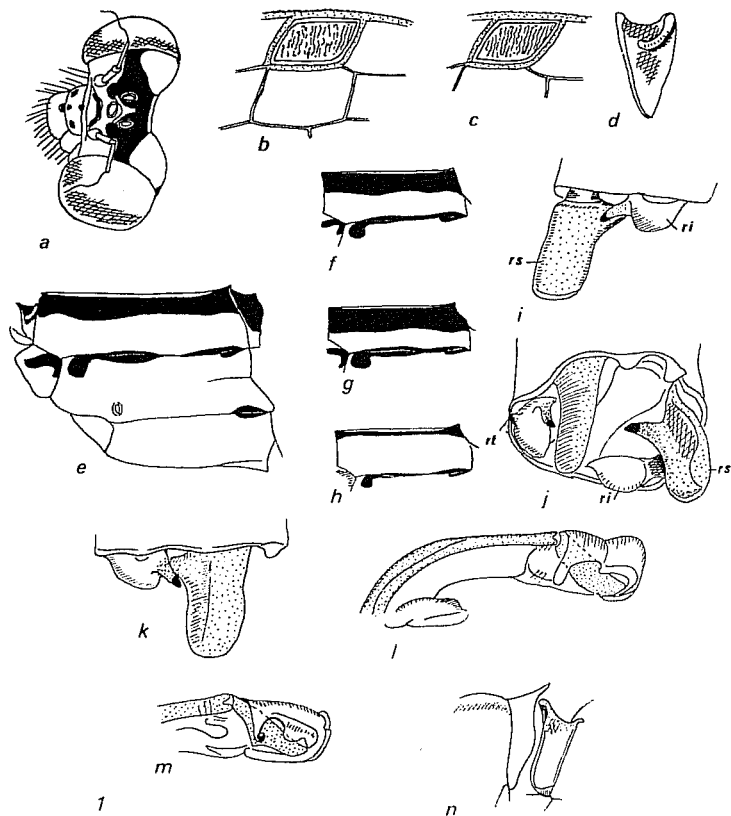
DESCRIPTION OF AFRICAN SPECIES

Subgenus *Aciagrion* Selys

1. *Aciagrion africanum* Martin (fig. 1a-n)
Aciagrion africanum Martin, 1908, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 43: 659 (11) (♂♀ Portuguese Guinea). Type ♂♀ said to be in Museum Genova.
Pseudagrion pseuderythromma Schmidt (Ris MS.), 1936, *Abh. senckenberg. naturforsch. Ges.* 433: 67 (♂, Congo-Kinshasa), *Syn. nov.*

There is no labelled type of *Pseudagrion pseuderythromma* in Stockholm Museum although the original description mentions a holotype and five paratype males. Dr. Inge Persson, however, informed me that there were four specimens in the museum of a species labelled *Pseudagrion* spec. K by Ris. These four are from Kingoyi, collected by Laman and since the type of *Mombagrion congoense* Sjöstedt was also from Kingoyi it seemed probable that Schmidt, who completed Ris' paper (1936) posthumously, must have considered that *pseuderythromma* was a synonym of *congoense* (which he certainly believed to be conspecific with *africanum*; *vide infra*).

It appeared to both Dr. Persson and myself that the four males of *Pseudagrion* spec. K must represent part of the type series of *pseuderythromma*. However, the figures 38 a, b in the original description indicated that by the inferior appendage the species was probably *africanum*, not *congoense*. Dr. Persson very kindly sent me the only complete ♂ of the *Pseudagrion* series for examination. This proves to be *Aciagrion africanum* Martin, of the pale form mentioned below as variety No. 3. I am convinced this is one of the type series of *pseuderythromma*; hence the synonymy recorded above. A description of this ♂ follows: ♂: Face and frons greenish blue; a mid-basal black dot on labrum, two lateral dots on postclypeus, a short basal bar on frons. Vertex with blue-black band from eye to eye in ocellar region, with small pale spots against the posterior ocelli. Large blue postocular spots.

1. a-n. *A. africanum* Martin

a. head of ♂ var. No. 1 (Kawambwa); b-c. pterostigma ♂ right forewing, hindwing; d. mesostigmal lamina ♂ (Kawambwa); e-h. synthorax ♂ var. 1, ♂ (Mwinilunga), ♂ var. 2 (Mwinilunga), ♂ var. 3 (Mwinilunga), respectively; i. appendages of ♂ (Katanga) from right; j-k. appendages of ♂ (Mporokoso) obliquely posterior, and from left; l. prophallus ♂ (Katanga); m. prophallus of ♂ (Kawambwa); n. mesostigmal lamina of ♀ (Mbala).

Abbreviations: ri = right inferior appendage, rs = right superior appendage, rt = lateral root-tooth on inferior.

Prothorax pale blue with black bands in the depressions. Synthorax pale blue, more whitish ventrally, with narrow blue-black juxta-carinal stripe, a humeral line thickened in the middle and the usual dorsal spot. A ventral spot on mesepimeron, a crescent on mesinfraepisternum, a short dorsal dash on first lateral suture and a dorsal spot on second lateral suture. Legs whitish ochreous.

Venation brown. Pterostigma a white-edged brown parallelogram, framed in brown, in each wing. Forewing with 12 Px but on right forewing one cross-vein is doubled to form a pseudo-13th Px. Ac at end of petiole, nearer to second than to first Ax.

Abdomen bright blue on basal segments, sky blue on segments 8-10. Segment 2 with black dorsal stripe expanded beyond middle to a bell ending well before distal end. Segment 3 with black dorsal stripe and an annulus before distal end; segments 4-6 with broadened brown dorsal band and distal annulus; 7 mainly black with blue lateral spot at $\frac{1}{3}$; segments 8-9 all blue, 10 with black distal margin and a U-shaped invagination. Anal appendages as in *africanum*, the superior all black, the inferior whitish with black-tipped brown tooth projected obliquely backwards.

Abdomen 30 mm, hindwing 20 mm.

This ♂ bears the following labels: "Kingoyi; Laman; Pseudagrion sp.K. Det. Dr. F. Ris: a red label numbered 115/71; a green label Riksmuseum Stockholm."

The original description of the holotype is from a paler ♂ in the series and differs as follows: much sparser markings on the vertex, only a narrow line—"hinter den hinteren Ocellen eine schmale Binde, welche die grossen Postocularflecke vorn begrenzt, sehr schmaler und unvollständiger Saum seitlich und hinten an den Postocularflecken". There are also sparser markings on prothorax and synthorax, narrower lines. Variation is mentioned, some paratypes being rather darker on head and thorax. The figures of the anal appendages are like *africanum*.

It is evident that the specimen sent by Dr. Persson is one of Ris' paratypes. Perhaps part of the series is in Museum Senekenberg.

Schmidt (1951: 136) placed *Mombagrion congoense* Sjöstedt in synonymy to *africanum* but recent examination of Sjöstedt's type indicates quite clearly that these are two distinct species. I have not been able to examine the type of *africanum* (if it is in Museum Genova) but in 1964 I did study and sketch a ♂ from Portuguese Guinea in Paris Museum, evidently from Martin's type series, and this agrees closely with the original inadequate description and, in genitalia, with Schmidt's figures 5b, c (1951), but not with type *congoense*.

Martin's original description, of which the essential points are translated here (rearranged for the format of this revision) did not include an illustration:

MALES

♂: Face yellowish; labrum and nasus (anteclypeus) paler, whitish. Head above yellowish, marked with black between the ocelli; with two very large postocular spots.

Prothorax yellowish with two small black traces. Synthorax yellowish with broad pale antehumeral stripes; sides yellowish with two separate blackish traces on the first (? humeral) suture. Black basal spots below wings. Legs pale.

Pterostigma grey, edged with yellowish, above less than one subpterostigmal cell. Forewing with 11-12 Px.

Abdomen very slender, olivaceous with brown sutural markings and annuli up to segment 4; segment 5 darker. Segments 8-10 yellow (? blue in life). Segment 10 finely black at base and at distal margin.

Superior anal appendage almost as long as segment 10, blackish, thick and subcylindrical. Inferior appendage scarcely developed.

Abdomen 28-30 mm, hindwing ♂ 17-19 mm, ♀ 21 mm. This description is followed by brief and equally inadequate details of the female, which is said to be very similar in markings.

The male from Portuguese Guinea which I examined in Paris Museum also agrees with the palest ♂ form (variety No. 3) in the series described below in the National Museum, Bulawayo. The head is pale bluish with a trace of a black line demarcating the postocular spots. The thorax is all pale bluish except for dorsal black dots on humeral and second lateral sutures and a black ventral spot on the mesepimeron. The pale yellow pterostigma is rhomboidal. The colours are, in fact, better preserved than in Martin's description.

The series in the National Museum, Bulawayo, is mainly from Zambia and most of these are much darker than the typical form. However, it is a variable species and occasional examples are very pale. It cannot, therefore, be considered as a racial difference. Nor in fact is it maturational, since immature males show most of the dark fasciae of the mature individual. It seems, in fact, that the type series represented a pale form. In Central Africa the dark forms are more abundant but whether this is the case in Portuguese Guinea could only be assessed by examination of long series from that territory.

♂ (Ikkelenge, Mwinilunga, in swamp, 20.i.1965, leg. E. Pinhey): A smallish species. Labium whitish ochreous. Face and vertex pale blue with black markings. Labrum with mid-basal dot; postclypeus mainly black. Frons broadly black on dorsum. Vertex with broad black band from eye to eye, leaving blue areas at the bases of the antennae and in front of the anterior ocellus. Moderately large pale blue postocular spots, demarcated by sinuous black of the vertex, these spots linked by a blue line at back of occiput.

Prothorax blue, heavily marked with black. Mesostigmal lamina with an obliquely raised rounded dorso-posterior tubercle. Mesepisternum black, slightly intruding over humeral suture at ventral end to join the black ventral spot on the mesepimeron. A blue antehumeral stripe slightly wider than half the mesepisternum. Sides all pale blue. A black dorsal bar on mesinfraepisternum and a dorsal spot on second lateral suture. Metasternite with some whitish pruinosity. Legs pale ochreous with traces of white pruinosity. Fore femur and fore tibia with brown external line. All tibiae with a row of brown posterior dots.

Venation brown. Pterostigma brown with pale edge, framed in black veins: almost a parallelogram but the distal edge is longer than the proximal: similar in all wings and shorter than one subpterostigmatal cell. Forewing with 11-12 Px. Ac at end of petiole, midway between the two antenodal cross-veins.

Abdomen blue, with black markings; segment 1 with pale-centred black rectangle on basal two-thirds; segment 2 with mid-dorsal line expanded to a bell-shaped mark at two-thirds; segment 3 with narrow brown dorsal band and black distal annulus; segments 4-6 broadly bronze-brown with black distal annulus; segment 7 broadly black on basal two-thirds, then narrowed and re-expanded to a large macula before end of segment: segments 8-10 all blue.

Superior appendage as long as segment 10, a black blade projecting horizontally posteriad; with a ventro-basal tooth. Inferior appendage very short, yellow, hirsute, with slender black dorsal tooth directed obliquely backwards.

Abdomen 28 mm, hindwing 19.5 mm.

Prophallus (Kawambwa, Zambia): Stem with few setae; chitinised portion in head large; apex of glans with long narrow curled lateral branches.

In life the pale markings are sky blue. The eye below is greenish yellow.

Variations

var. 1 (Kamapande). Postclypeus with basal dot and three distal dots; frons with narrower black basal band, more crescentic; vertex less broadly black, the postocular spots correspondingly larger. Antehumeral stripe wider, as broad as two-thirds of the mesepisternum. Segment 7 with less black.

var. 2 (Kamapande). Postclypeus blue without basal dot but with black marginal border; vertex more broadly black, without the pale area between anterior ocellus and frons. Antehumeral stripe nearly as broad as in var. 1. Segment 2 without dorsal line and the distal fascia is shield-shaped; segment 7 as in the Ikkelenge ♂ described above.

var. 3. A pale form from Mwinilunga, more like typical *africanum*: labrum with basal and two distal dots; frons with only a thin basal line; vertex all blue except short lines between the ocelli and a line demarcating each very large postocular spot. Synthorax mainly pale, with juxta-carinal black line, i.e. the antehumeral stripe is three-quarters the width of mesepisternum. Segment 2 with black dorsal line and very large distal bell-mark; Segment 7 as in the Ikkelenge ♂. A teneral ♂ from Limpasa dambo, Nkata Bay, is very like this except its yellower colouring.

var. 4 (East Angola). Postclypeus black with two blue triangles separated by black central band; frons, vertex and thorax as in the Ikkelenge ♂. Segment 2 with dorsal line expanding to a long bell.

var. 5 (Napukumweli, Congo). Labrum also black with two blue triangles; frons, vertex and thorax as in Ikkelenge ♂. Segment 2 with broad, blackish dorsal band, constricted to a line on distal one-fifth; segment 7 black except for a pale distal annulus.

A ♂ from Rhodesia (SE. of Nuanetsi) has unfortunately lost segments 8-10 and the appendages: In markings it is like *africanum* or the ♂ associated with *hamoni* in this revision. However, the prophallus shows clearly that it is an *africanum*. The head, thorax and abdomen are blue-green with black markings, segments 8-10 in the living specimen were all cobalt blue.

♂, SE. Katanga, loaned by Tervuren Museum. I had previously labelled this as *Aciagrion congoense* (Sjöstedt) but the present revision shows it to be *africanum*. Labrum and postclypeus pale blue.

Synthorax pale blue with brown mid-dorsal line. Dorsal spots on humeral and second lateral sutures and a ventral spot on mesepimeron.

Pterostigma brown, rhomboidal (unusual for this species).

Abdomen sky blue. Segment 1 with black rectangle on basal two-thirds; segment 2 with only minute triangles before distal end; segment 3 with fine dark dorsal line and a broad

spot before the black distal annulus; segments 4-6 bronze above, constricted before the black distal annulus; segment 7 bronze on basal half, distal half blue with two minute triangles before distal end; segments 8-10 all blue.

Superior and inferior appendages and prophallus typical.

This is a very pale form.

Comparisons

This species is very close to the new species *zambiense*, but with longer superior appendages. It is smaller than *congoense*. The thorax is often broadly black but occasionally as pale as in *congoense*. The prominent dorsal tooth of the inferior appendage directed obliquely backwards readily distinguishes *africanum*. From both *zambiense* and *africanum congoense* differs in the ♂ by the shorter and straighter ridge on the mesostigmal lamina and the absence of basal and distal black annuli on segment 10.

FEMALES

♀ (Mbala). In one respect this single female is atypical since Ac is distal to the end of the petiole, a condition of *Enallagma* Charpentier. However, in all other characters it is an *Aciagrion*.

Face yellowish brown; postclypeus with black basal line, frons with basal crescent. Vertex with an irregular black band, the postocular spots moderately large, linked across back of occiput.

Prothorax with two black dorsal stripes on median lobe. Mesostigmal lamina slightly raised at ventral end and at the black dorsal end there are anterior and posterior dorsal hooks, the lamina being depressed between these. Synthorax with broad black juxta-carinal band and the carina also black; fine black humeral line; dorsal dots on humeral and second lateral sutures.

Pterostigma a brown parallelogram in forewing, a rhombus in hindwing.

Segment 2 of the abdomen with broad black dorsal band expanded to a distal triangle. Segments 8-10 blue, 8 with a short basal bar, 9 with basal black streaks. Ovipositor scarcely extending beyond segment 10. A well developed ventral spine on segment 8.

Abdomen 30 mm, hindwing 20 mm.

Distribution

Rhodesia northwards to Congo, Portuguese Guinea.

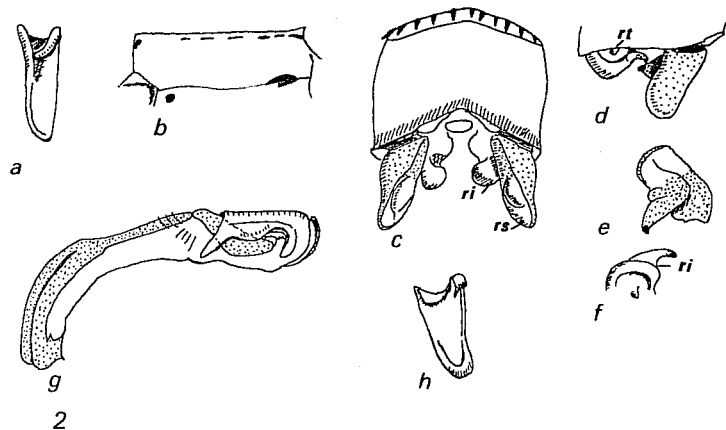
Habits

Prefers swamps or swampy verges of streams.

Material examined

Paris Museum: ♂ from Portuguese Guinea.

Tervuren Museum: ♂ from Kafubu, SE. Katanga, 21.xi.1962, No. 9823d, leg. Symoens.
National Museum, Bulawayo: Napukumweli, Garamba National Park, N. Congo-Kinshasa, 19.ix.1950, Miss. H. de Saeger; Lake Chila, Mbala (Abercorn), N. Zambia,



2. a-h. *A. zambiense* spec. nov.

a. mesostigmal lamina ♂ holotype; b. mesepisternum ♂ holotype; c-d. anal appendages ♂ holotype dorsally and from left; e-f. left superior appendage from inside and right inferior postlaterally; g. prophallus of ♂ holotype; h. mesostigmal lamina of ♀ allotype. Abbreviations as for fig. 1.

21.iii.1969, leg. K. W. Kühne; Mporokoso, N. Zambia, 16.iv.1967, leg. R. C. Dening; 30 miles S. of Kawambwa, N. Zambia, leg. E. Pinhey; 45 miles S. of Kawambwa, N. Zambia, 16.iii.1969, leg. E. Pinhey; Solwezi, NW. Zambia, iii.1960, leg. E. Pinhey; Ikelenge, N. Mwinilunga, NW. Zambia, ii.1960, leg. E. Pinhey; Ikelenge swamp, N. Mwinilunga, NW. Zambia, 20.i.1965, leg. E. Pinhey; Kamapande, N. Mwinilunga, NW. Zambia, 27.i.1965, leg. E. Pinhey; E. of Caianda, East Angola, 22.i.1965, leg. E. Pinhey; Limpasa dambo, Nkata Bay, Malawi, 12.v.1966, leg. E. Pinhey; 96 miles SE. of Nuanetsi, E. Rhodesia, iv.1961, leg. E. Pinhey.

2. *Aciagrion zambiense* spec. nov. (fig. 2a-h)

This species is very close to *africanum*. It differs chiefly in the form of superior anal appendage but there is some difference also in the prophallus. In distribution it overlaps with *africanum*.

MALES

♂—holotype (Mwinilunga): a very slender pale insect. Face and head above greenish ochreous, greener dorsally. Labrum with brown mid-basal dot, postclypeus with basal and two distal dots. Frons with basal line. Crescentic black marks posterior to and lateral to the anterior ocellus; a fine line demarcating the very large green postocular spots, line keed across back of occiput; orbits brown posteriorly.

Prothorax pale blue-green with brown dorsal stripes edging the swellings of the median lobe. Mesostigmal lamina pale, very like *africanum*, with long, curved post-dorsal ridge. Synthorax very pale greenish to bluish with sparse brown markings: traces of the dorsal end of a juxta-carinal line; a dorsal spot on humeral suture, a dorsal smear on mesinfraepisternum, a ventral spot on mesepimeron and a dorsal spot on second lateral suture. Legs cream with brown exterior lines on femora and tibiae.

Venation brown. Pterostigma brown, a parallelogram in forewing, a narrow rhomboid in hindwing, smaller than the subpterostigmatal cells. Forewing with 12 and 11 Px, hindwing with 10 Px. Ac at end of petiole, midway between the antenodal cross-veins.

Abdomen slender; pale blue on basal segments, yellow on middle segments, blue on segments 8-10. Segment 1 with black rectangle on basal two-thirds; segment 2 with brown distal triangle; segments 3-7 with bronze-brown band, constricted at both ends, and a blackish distal annulus. Segment 10 with black basal and distal annuli as in *africanum*, and a shallow U-shaped invagination.

Superior appendage a short broad blade, slightly shorter than segment 10, mainly black but yellow on inner distal half; a large ventral tooth, less basal than in *africanum*. Inferior appendage yellow, shorter than superior, with small curved dorsal hook. not like the prominent tooth of *africanum*.

The prophallus is depicted entirely here. It is close to *congoense* and *africanum*. There are setae on the stem and on the membrane below it; in the head the chitinised portion is not very large. The glans ends in long narrowed lateral branches but the subapical fold is less rounded than in *africanum* and broader than in *congoense*.

Abdomen 31 mm, hindwing 22 mm.

Variation

A much darker ♂ form from East Angola is evidently this species but the appendages are somewhat damaged. Face and frons blue-green. Labrum with basal dot, postclypeus with basal and two distal dots, frons with basal stripe. Vertex with thick black border to the large blue postocular spots. Black markings between and lateral to the ocelli.

Prothorax blue with two black stripes on middle lobe. Synthorax pale blue with thick juxta-carinal stripe; black line and dorsal spot on humeral suture, a dorsal spot on second lateral suture and a ventral spot on mesepimeron. Femora with brown exterior and posterior lines, tibiae with exterior lines.

Pterostigma a grey parallelogram, smaller in hindwing than in forewing.

Abdomen blue. Segment 1 with rectangle on basal two-thirds; segment 2 with thick short band from the distal triangle; other segments as in *africanum*; segments 8-10 blue, with black basal and distal annuli.

Left superior appendage lost, the right superior resembling the new species.

Abdomen 30 mm, hindwing 21 mm.

Comparisons

The superior appendage is shorter and yellower inside than in *africanum* or *congoense* and its ventral tooth is not so basal in position. The ridge on the lamina is similar to *africanum*, longer and more curved than in *congoense*. The 10th segment has black annuli like *africanum*, unlike *congoense*. The dorsal tooth on the superior appendage is more like *congoense*.

FEMALES

A general ♀ from Mwinilunga is almost certainly this species.

♀—allotype: Teneral; slender. Genae ochreous. Labrum darker, with black mid-basal dot; rest of face and head above greyish ochreous. Postclypeus with basal and two distal dots, frons with short basal line; short bars behind anterior ocellus and lateral to ocellar region; large blue postocular spots demarcated by a thickish black line.

Prothorax violaceous; faint brownish smears on middle lobe; two black basal bars on the depressed posterior lobe. Mesostigmal lamina slightly raised at lateral end, with a small post-dorsal swelling, ending in a sharp point like a head of a bird. A blackish smear behind this part of the lamina. Synthorax pale-coloured; with traces of juxta-carinal line; black dorsal spots on humeral and second lateral sutures. Legs whitish ochreous with exterior line and posterior dots on femora; exterior dots on tibiae.

Venation brown. Pterostigma a pale, white-edged, brown rhombus, smaller in hindwing than in forewing, shorter than the subpterostigmatal cells. Forewing with 13, 12 Px, hindwing with 10 Px. Ac at end of petiole, about midway between the antenodal cross-veins.

Abdomen slender. Segment 1 with brown rectangle on basal two-thirds; segment 2 with dorsal line and distal triangle; segments 3-7 with increasing bronze-brown band and distal dark brown annuli; segments 8-10 pale-coloured (probably blue in life), 10 pinched apically. Cerci small, conical. Segment 8 with well developed sternal spine. Ovipositor sheath extending half the length of segment 10 beyond this segment.

Abdomen 29.5 mm, hindwing 21.5 mm.

Distribution

NW. Zambia, East Angola.

Habits

Swamps near or in gallery forest.

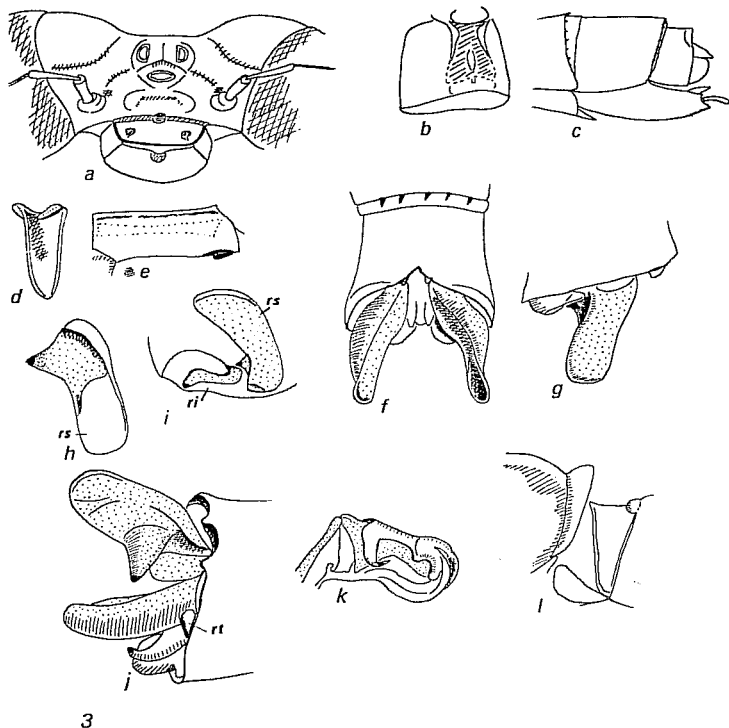
Material examined

National Museum, Bulawayo: holotype, Zambezi Source, N. Mwinilunga, NW. Zambia, 24.v.1964, No. 228D, leg. R. C. Denning; allotype, Isombo River, N. Mwinilunga, NW. Zambia, iv.1963, leg. E. Pinhey; ♂ E. of Caianda, East Angola, 22.i.1965, leg. E. Pinhey.

3. *Aciaagrion congoense* (Sjöstedt) (fig. 3a-l)

Mombagrion congoense Sjöstedt, 1917, *Ark. Zool.*, **11** (14): 15 (♂, Congo-Kinshasa); Schouteden, 1934, *Annls. Mus. r. Congo belge 4to Ser.*, **3**: 81 (Congo-Kinshasa).

The type ♂ *congoense* in Stockholm Museum was kindly sent to me in 1963 (Pinhey, 1963: 148) and again sent on loan for the present revision by Dr. Persson, and I examined it in February 1971. This type bears the following labels: "Kingoyi, Walder; Congo; Mombagrion ♂ congoense n. sp. Yngve Sjöstedt det.; 335/62; Riksmuseum Stockholm (2 labels); Mombagrion congoense Sjöst. (probably Sjöstedt's handwriting); 276/71." The abdomen is in a separate envelope.

3. a-l. *A. congoense* (Sjöstedt)

a. head of ♂ (cross-lines on grooves where black commences); b. segment 1, dorsolaterally (dark area shaded); c. terminal segments, abdomen of ♀; d. mesostigmal lamina ♂ (Dondo); e. mesepisternum ♂ (dotted area = pse.doantehumeral stripe); f-i. anal appendages (Dondo): dorsally, from left, right superior from inside, right-side appendages obliquely from right, respectively; j. appendages of holotype ♀ oblique dorsal view; k. prophallus of ♂ (Dondo); l. mesostigmal lamina of ♀ (Dondo).

MALES

♂—holotype: Labium pale ochreous. Entire face in front, frons, ocular lobes and the large postocular spots all pale greyish blue, the vertex browner. Labrum with black basal dot, postclypeus with two distal dots, base of frons with only a faint trace of a basal line.

Prothorax pale blue with sparse dark markings, the only prominent ones being the stripes on median lobe delineating the lateral swellings. Synthorax pale blue with sparse blackish markings: brown juxta-carinal line, blackish dorsal spots on humeral and second lateral sutures, brown dorsal smear on mesinfraepisternum and blackish ventral spot on mesepimeron. Legs pale greyish blue without black lines.

Venation brown. Pterostigma a dark brown rhombus in all wings, smaller than the subpterostigmatal cells. Forewing with 12 Px, hindwing with 10 Px. Ac at end of petiole and midway between the antenodal cross-veins or nearer second one.

Abdomen slender, blue. Segment 1 with dorsal rectangle on basal two-thirds; segment 2 with somewhat triangular black distal fascia; segment 3 with partial mid-dorsal line and black distal annulus; segment 4-5 bronze-brown dorsally, with distal black annulus; segment 6 more broadly bronze-brown with black distal annulus; 7 bronze-brown, blue distally, with small black dorsal spot before distal end; segments 8-10 blue, 10 with black distal margin and a U-shaped invagination.

Superior appendage black, blade-like, as in *africanum*, with pointed ventrobasal tooth and a baso-lateral root-tooth.

Prophallus, as far as it can be seen *in situ*, evidently very like the series described below from Moçambique.

Abdomen about 31 mm, hindwing 21,5 mm.

♂♂ from Moçambique do not differ much: there are traces of brown exterior lines on the legs, the pterostigma is not so dark brown and segment 2 has a mid-dorsal brown line more or less developed.

♂ (Dondo, December 1960): Face, frons and vertex pale bluish green with large post-ocular spots; ocellar area slightly browner. Labrum with basal dot.

Prothorax bluish green with traces of brown lines on median lobe. Mesostigmal lamina with small post-dorsal ridge, straighter and shorter than in *africanum*. Synthorax bluish green. A faint brown juxta-carinal line; black dorsal spots on humeral and second lateral sutures and on ventral end of mesepimeron. Fore femur and fore tibia with traces of a brown exterior line.

Venation brown. Pterostigma a brown parallelogram. Forewing with 12 Px. Ac at end of petiole and nearer second than first Ax.

Abdomen slender, pale blue, cobalt on segments 8-10; segment 1 with dorsal rectangle on basal two-thirds; segment 2 with median line and distal triangle; segments 3-7 with progressively wider bronze dorsal band and black distal annulus; 8-10 unmarked. Segment 10 with V-shaped notch.

Superior appendage black, blade-like, almost as long as segment 10, with ventro-basal tooth; brown on inner side of blade. Inferior appendage very short, yellowish brown with dorsal tooth.

Prophallus without clear setae on stem; chitinised apical portion continues well into the head; apex of glans with long slender curled branches.

Abdomen 31,5 mm, hindwing 21 mm.

Another ♂ (Dondo, 4th November, 1967) differs as follows: Frons with thin brown basal line. Prothorax with short dorsal stripes on median lobe; mesepisternum with narrow yellow

pseudoantehumeral stripe, incomplete dorsally (post-mortem changes). Another ♂ was compared with the type as long ago as 1962 and was found very similar.

♂ (Dondo, xii.1960): mesepisternum stained reddish brown. Frons with basal line. Abdomen 32 mm.

Another ♂ (same data) has a broken basal line on frons. Dorsal line on segment 2 obsolete but distal triangle present. Abdomen 33,5 mm. Still another (same data) has broad yellow pseudoantehumeral stripes. A Dondo ♂ (28.x.1963) is smaller, the abdomen 30,5 mm. Two Dondo ♂♂ (4, 13.xi.1967) have thicker black demarcation lines around the postocular spots. Another like this (24.v.1969) also has thicker prothoracic stripes, three dots on postclypeus and a thicker dorsal band on segment 2. On mesepisternum, just below the juxta-carinal line there is a faint narrow pseudoantehumeral stripe, incomplete dorsally as usual.

One Dondo ♂ (4.xi.1967) has thin demarcation lines at the postocular spots but thick prothoracic stripes, as well as the pseudoantehumerals.

A very teneral Dondo ♂ has all the black markings already developed. Pterostigma and anal appendages paler.

FEMALES

Similar to typical ♂ but less blue. Even the abdominal markings on segments 2, 8-10 are very similar.

♀ (Dondo, 28.x.1963). Face and postclypeus pale, with few dots, present or absent. Vertex pale, with thin or thick demarcation lines around postocular spots.

Prothorax with black dorsal streaks. Mesostigmal lamina hardly modified at all: pale blue with small hemispherical tubercle at post-dorsal angle. Synthorax pale blue with traces of juxta-carinal brown line and the usual sutural dots. Legs with traces of brown exterior dashes.

Pterostigma a brown parallelogram in all wings, tending to be whitish at edges.

Segment 2 with dorsal line and distal triangle; segments 8-10 all bluish, 10 constricted as usual at distal end. Ovipositor scarcely longer than segment 10. All have the ventral spine on segment 8.

Abdomen 30-32 mm, hindwing 21,5-23,5 mm.

Comparisons

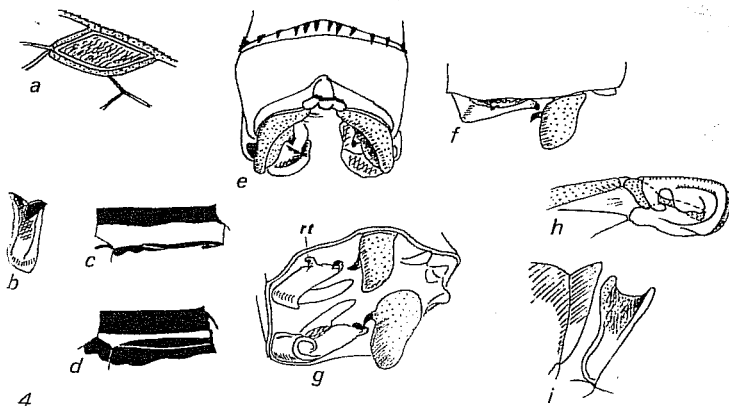
See *africanum* and *zambiense*.

Distribution

In the British Museum there are ♂♂ from Budongo Forest, Uganda, labelled *Mombagrion congoense* (det. Longfield). The known distribution is therefore Moçambique, Congo and Uganda.

Habits

Swamps, streams and reedy or grassy roadside pools.



4. a-i. *A. steeleae* Kimmins

a. pterostigma of right forewing, paratype ♂ *abercornensis* Pinhey; b. mesostigmal lamina ♂ *steeleae* (Khwaii); c. mesepisternum ♂ *steeleae* (Khwaii); d. mesepisternum ♂ *abercornensis* (Kawambwa); e-g. anal appendages ♂ *abercornensis* (Kamapande) dorsally, from left and obliquely posterior, respectively; h. prophallus of *abercornensis* (Kawambwa); i. mesostigmal lamina of ♀ *steeleae* (Khwaii).

Material examined

Stockholm Museum: type ♀, Kingoyi, Congo-Kinshasa, leg. Walder.
National Museum, Bulawayo: Dondo and Dondo Forest, Moçambique. xii.1960, leg. E. Pinhey; 28.x.1963, E. Pinhey; 4.xi.1967, leg. E. Pinhey; 24.v.1969, leg. E. Pinhey.

4. *Acigrion steeleae* Kimmins (fig. 4a-i)

Acigrion steeleae Kimmins. 1955. *Entomologist*, 88: 109 (♂, Bangweulu)
Acigrion steeleae abercornensis Pinhey. 1958. *Pap. nat. Mus. Sth. Rhod.*, 22B: 103 (♂♀ Mbala - Abercorn)

Type ♀ *steeleae* in British Museum (Nat. Hist.); type ♂♀ *abercornensis* in British Museum (Nat. Hist.), paratypes in National Museum, Bulawayo.

This is the smallest species of this subgenus. It is evident that *abercornensis* is a form not a race nor a developmental state since mature and teneral specimens of both forms can be found together although the melanic *abercornensis* is much the commonest, at least in the warm months. Named after the northerly town of Abercorn which is now Mbala.

forma *steeleae* Kimmins

MALES

♂ (Khwaii River): Face in front all blue-green; labrum with black mid-basal dot; postclypeus with basal dot and a basal line joined by a semicircular black line. Frons with black basal band. Vertex all black with narrow blue postocular spots linked across back of occiput.

Prothorax blue; black dorsally on median lobe enclosing two small blue central triangles. Mesostigmal lamina slightly turned up ventrally, with a small lobe at dorsal end. Mesepisternum black, slightly encroaching ventrally on to mesepimeron; with blue antehumeral stripes half the width of the mesepisternum; a black dorsal dot on humeral suture. Sides blue with traces of black dorsal lines on the two lateral sutures. Legs whitish ochreous: fore and mid femora with brown exterior stripe.

Venation brown. Pterostigma a pale brown, white-edged parallelogram, between the usual brown veins. Forewing with 9-10 Px. Ac at end of petiole and midway between antenodals or nearer the second.

Abdomen not so slender as the previous species; blue. Segment 1 with complete black dorsal band; segment 2 with complete band, constricted before distal end; segments 3-7 with black dorsal band constricted both ends of each segment; segments 8-10 all blue, 10 with a small U-shaped invagination.

Superior appendage black, much shorter than segment 10, directed horizontally; with ventral tooth. Inferior yellow, turned upwards and divided so that it is very short in a horizontal direction; with apical tooth. Prophallus very like *abercornensis*.

Abdomen 26 mm, hindwing 16,5 mm.

Kimmins' description of the type ♂ (Lake Bangweulu) differs slightly: postclypeus evidently with less black (not detailed); pterostigma bluish grey. forewing with 10-11 Px.

Abdomen 25 mm, hindwing 16 mm.

FEMALES

Kimmins did not describe this sex and a type is now chosen in the collections of the National Museum, Bulawayo.

♀—metallotype (Khwaii River): Face and frons in front orange; labrum with mid-basal dot; postclypeus orange with black central bar and curved lateral stripes almost joining to form two triangles (a further development from the Khwaii ♂). Frons mainly black above. Vertex broadly black with smallish blue pyriform postocular spots linked across back of occiput.

Prothorax blue, broadly black centrally on median lobe and this black subtending two spots on to the posterior lobe. Mesostigmal lamina depressed and black dorsally, with raised posterior edge but no post-dorsal tumour. Synthorax black to humeral suture, the median carina bluish and with broad blue antehumeral stripes slightly wider than half the mesepisternum. The black on humeral suture invades the mesepimeron ventrally to fuse with the ventral spot on that plate. Only a short dorsal line on second lateral suture. Legs cream; fore and mid femora with brown outer spots at distal end; tibiae, especially the fore tibia, with traces of a brown exterior line.

Pterostigma a very pale white-edged, greyish brown parallelogram in all wings.

Abdomen thick, with broad bronze-black band on segments 1-7; segments 8-10 blue, 8 with short basal bar bifid at its apex; segment 9 with two basal triangles. Well formed sternal spine on segment 8. Ovipositor sheath of normal length.

Abdomen 23,5 mm, hindwing 17 mm.

forma *abercornensis* Pinhey

MALES

♂—paratype (Lake Chila): This differs from *steeleae* in melanic features. Labrum with basal dot as in f. *steeleae* but postclypeus all black. Synthorax black to well below humeral suture, with narrow blue antehumeral stripe. Forewing with 9,10 Px. Segment 10 with black dorsal band.

Abdomen 24 mm, hindwing 17 mm.

♂ (Msamfu, Kasama, in copula) is more melanic: Postclypeus also all black. Frons above and vertex all black except the very small blue-green isolated postocular spots. Prothorax all black except a small blue lateral spot. The antehumeral stripe is about one-third the width of the mesepisternum but slightly widened at ventral end. Black dots on both lateral sutures. All femora and tibiae with thick black posterior stripes. Pterostigma pale greyish brown between dark brown veins. Segments 1-7 as in f. *steeleae*. Segment 10 black dorsally.

Prophallus (♂ Kawambwa): some setae on stem; apex of glans with obtuse branches. It is very like the illustration for f. *steeleae* in Kimmins (1955).

FEMALES

♀ (Msamfu, in copula): Labrum and front of frons yellow; postclypeus, frons above and vertex all black, with small blue isolated postocular spots and a pale line on back of occiput.

Prothorax black with blue anterior collar and lateral spots, and the lateral ends of the posterior lobe are also blue. Mesostigmal lamina as in f. *steeleae*. Synthorax black to well below humeral suture, with slender green antehumeral stripe, widened ventrally. Sides pale greenish, with black dorsal spot on second lateral suture. Femora with posterior and exterior brown stripes, tibiae with traces of exterior line.

Pterostigma a brown parallelogram in all wings.

Abdomen with continuous bronze-black dorsal band on all segments, including segments 8-10. Segment 8 with well formed spine.

Abdomen 22,5 mm, hindwing 18 mm.

Range of size: abdomen ♂♀ 23-25,5 mm, hindwing ♂♀ 16-17,5 mm.

A pair of this species from Katanga in Tervuren Museum was re-examined.

Comparisons

This is a small species, with thicker body than most of the genus and a very black vertex and abdomen. The superior appendage is short, black, horizontal, the inferior yellow, turned upwards, inconspicuous.

Distribution

N. and NW. Zambia, Katanga, East Angola, N. Okavango system of Botswana. Almost certainly occurs in south Tanzania.

Habits

In swamps or the swampy margins of streams, pools and lakes.

Material examined

National Museum, Bulawayo:

f. *steeleae*: Ikkelenge, N. Mwinilunga, NW. Zambia, ii.1960, leg. E. Pinhey; E. of Caianda, E. Angola, 22.i.1965, leg. E. Pinhey; Khwaii River, Okavango system, N. Botswana, xii.1968, leg. E. Pinhey; Mbala (Abercorn), N. Zambia, iii.1969, leg. K. W. Kühne.

f. *abercornensis*: Paratype ♂♀, Lake Chila, Mbala (Abercorn), N. Zambia, xii.1951, iv.1954, leg. E. Pinhey; Mbala, 4.iii.1958, 5.iii.1964, vi.1964, leg. L. D. E. F. Vesey Fitzgerald; Lake Chila, Mbala, iii.1969, leg. K. W. Kühne; Kamapande, Mwinilunga, NW. Zambia, i.1965, leg. E. Pinhey; Luwingu, N. Zambia, 19.iv.1967, leg. R. C. Dening; Khwaii R., N. Botswana xii.1968, leg. E. Pinhey; and series from the following localities from N. Zambia, all March 1969, leg. E. Pinhey: Msamfu (Kasama), Chisimba Falls (Kasama), Kawambwa, Kanona, Nsombo (Lake Bangweulu). Mkushi River (20 miles E. of Kapiri Mposhi).

Tervuren Museum:

♂♀. Ndoba, SE. Katanga, 27.i.1963, No. 10014a, leg. J. J. Symoens (det. Pinhey, re-examined 1971).

The following description may also refer to the species *A. steeleae* Kimmins.

Aciagrion spec., in Ris, 1931. *Revue suisse Zool.*, 38: 100; Longfield, 1945. *Archos Mus. Bocage*, 16: 28

Translated extract from Ris' description (modified):

♂ (Chimporo, S. Angola, x.1928): Subjuvenile [teneral], the size of a small *Enallagma* Charpentier. Somewhat stained. Face and frons pale bluish [postclypeus evidently not possible to describe]. Frons above and vertex black, with largish postocular spots.

Prothorax black dorsally, the posterior lobe depressed but slightly arched. Synthorax bronze-black to humeral suture with broad bluish antehumeral stripe about half the width of the mesepisternum. Black dorsal spot on second lateral suture. Legs pale yellowish.

Pterostigma very small, greyish, rhomboidal. Forewing with 9 Px. hindwing with 8 Px. Ac at end of petiole, about half-way between the antenodal cross-veins.

Abdomen with bronze-black dorsal band, narrower anteriorly on segments 2, 3-7; segment 8 blue, 9-10 stained but probably bluish.

Anal appendages "nicht gut zu sehen, scheinen (sup. und inf.) von ähnlicher Gestalt wie bei *Enallagma glaucum*, doch erheblich kleiner".

Abdomen 21 mm, hindwing 15 mm.

The very black prothorax could suggest the species *hamoni*, *nodosum*, *rarum* or *steeleae*. In size it is more suggestive of *rarum* or *steeleae*. By anal appendages resembling reduced shape of *Enallagma glaucum* (Burmeister) it is very unlike *rarum*.

In general characters, as far as the description can be assessed, it is either a small *steeleae* or a distinct unnamed species from Angola.

Subgenus *Mombagrion* Sjöstedt

Named from Mombo, in the foothills of the Usambara Mountains.

5. *Aciagrion gracile* (Sjöstedt) (fig. 5a-l)

Mombagrion gracile Sjöstedt, 1909, *Wiss. Ergebn. schwed. zool.*, 14: 44 (♂♀ Usambara Mountains)

Aciagrion gracile Schmidt, 1951, *Archos Mus. Bocage*, 20: 136

Type ♂♀ *gracile* in Stockholm Museum. This is the type species of *Mombagrion* Sjöstedt.

Synonymy:

Aciagrion attenuatum Fraser, 1928, *Trans. ent. Soc. Lond.* 76: 126 (♂, Zomba, Malawá = Nyasaland), *syn. nov.*

Holotype ♂ in British Museum (Nat. Hist.). It is evident that *attenuatum* differs only slightly in markings and coloration from *gracile* and it is at most only the southern race of *gracile*. True *gracile gracile* has been, however, inadequately collected and variation in this cannot yet be assessed. Fraser did not illustrate the original description of *attenuatum* but did so in 1955 (fig. 1, ghi).

Subspecies *gracile* Sjöstedt

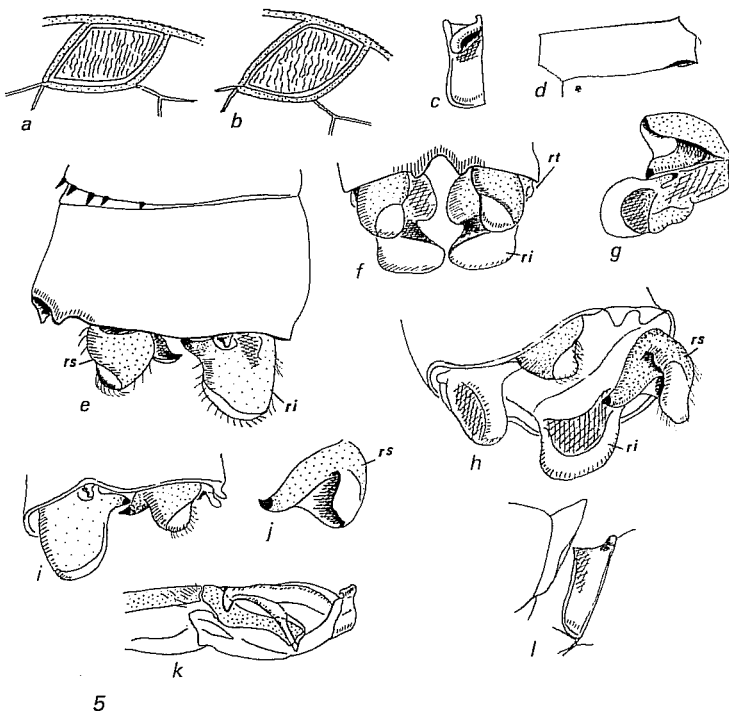
Through the generous assistance of Stockholm Museum I was able to examine the type ♂ *gracile* in 1963 and again, for more exhaustive study, in February 1971. It bears the following labels: "Mombo, Sjöstedt; Usambara; Juni; Typus; 334/62; Riksmuseum Stockholm (2 Labels), *Mombagrion gracile* Sjöst.; 275/71." The abdomen is in a separate envelope on the pin.

MALES

♂—holotype: Labium pale ochreous. Face and vertex greenish blue, tinged brown near the ocelli. Labrum with black mid-basal dot; postclypeus with black basal line, distal marginal line and central band, thus enclosing two blue triangles. Postocular spots very large. Back of occiput yellowish.

Prothorax pale bluish, indistinctly marked with brownish in centre and a brown line demarcating the lower edge of the swelling on the median lobe. Synthorax pale bluish, with faint brown juxta-carinal line ending dorsally in a black spot. Black dorsal spots on humeral suture and second lateral suture and a very faint brown ventral spot on mesepimeron. Legs pale ochreous to blue-grey with faint brown posterior stripes on femora and discontinuous lines on tibiae.

Venation brown. Pterostigma a brown rhombus in forewing, but narrower in hindwing (proximal and distal edges longer than anterior and posterior). Forewing with 14 Px, hindwing with 13 Px. Ac at end of petiole and half-way between the antenodal cross-veins or nearer the second.

5. a-l. *A. gracile* (Sjöstedt)

a-b. pterostigma ♂ *attenuatum* Fraser right forewing, hindwing; c. mesostigmal lamina ♂ *attenuatum* (Chiluvo); d. mesepisternum ♂ *attenuatum* (Chiluvo); e-g. anal appendages of type ♂ *gracile*, from right, dorsally and left appendages from inside, respectively; h-i. anal appendages ♂ *attenuatum* (Dondo), oblique posterior view, and from left; j. right superior of same, inside view; k. prophallus of *attenuatum* (Chiluvo); l. mesostigmal lamina of ♀ (Monkey Bay).

Abdomen slender, blue-green, sky blue on segments 8-10. Segment 1 with black rectangle on basal two-thirds; segment 2 with broad black dorsal band, constricted to a narrow bar at distal end; segments 3-4 with broad bronze-black dorsal band expanded to a large macula just before distal end; segments 5-7 all black except a pale blue baso-lateral spot; 8-10 all pale blue, segment 10 with raised V-shaped invagination but no distal spines.

Superior appendage black, triangular in lateral view, much smaller than inferior appendage. Distal end of superior less thickened, incurved, hirsute, hood-like; with well developed ventral tooth. Inferior appendage broad and thick, pale bluish, with softer apical margin; a dorso-basal blackish tooth directed into segment 10, and a latero-basal brown root-tooth. Prophallus not visible in type.

Abdomen 37 mm, hindwing 23,5 mm.

Comparisons

The small superior appendage of *gracile* is larger than in the new species *macrootithenae* and its tooth directed down and into segment 10 is more obscure than in *macrootithenae* in which it protrudes posteriorly beyond the main superior appendage. The superior in *heterosticta* is more like *gracile* but then the inferior of *heterosticta* is much smaller.

I have not checked the material labelled *gracile* from Tanzania and Uganda which I determined in Coryndon Museum and the British Museum (Nat. Hist.) (Pinhey, 1961: 39). It is possible that the Uganda specimens are *heterosticta*.

FEMALES

The type ♀ has not been re-examined for this revision. Females from North Malawi may be this race: ♀ (Nkata Bay, 14th December, 1960, D. H. Eccles). This is too general for close examination. The mesepisternum is deep brown and shows pale pseudoantehumeral stripes. Segments 1-2 have a broad black dorsal band. It is of equivalent size to males of *attenuatum* but too crumpled for exact measurement.

♀ (Limposa dambo, 12.v.1966): a smaller ♀ than the above, pale brownish in colour. Labrum with basal dot, postclypeus with basal and two distal dots, frons with basal line; thick black lines demarcate the large postocular spots and there are short bars between the ocelli.

Prothorax with brown dorsal bars. Synthorax with juxta-carinal line; the usual spots on humeral and second lateral sutures and ventral end of mesepimeron. All femora with exterior lines.

Pterostigma a brown parallelogram in all wings. Forewing with 12 Px.

Segment 1 with black rectangle on basal two-thirds; segment 2 with dorsal stripe enlarging to a distal triangle; segments 8-10 pale blue, 9 with black basal bars. Segment 8 with ventral spine.

Abdomen 30 mm, hindwing 23 mm.

Subspecies *attenuatum* Fraser

This was described from southern Malawi.

MALES

♂ (Chiluvo Hills, x. 1963): Face pale yellowish brown, vertex slightly redder, with faint brown lines demarcating the large postocular spots.

Prothorax plain pale brown. Mesostigmal lamina with a long curved post-dorsal ridge. Synthorax pale brown, without any juxta-carinal line, only the dorsal spots on humeral

and second lateral suture and a faint ventral spot on mesepimeron. Legs cream. Fore and mid femora with brown distal, external streak or spot.

Pterostigma a brown parallelogram in forewing, a narrowed rhombus in hindwing. Forewing with 13 Px. Ac at end of petiole, and nearer second than first Ax.

Abdomen slender, yellowish brown. Segment 1 with brown rectangle on basal two-thirds; segment 2 with distal brown crescentic line; segments 3-7 with progressively increasing bronze dorsal band and distal black annulus. Segments 8-10 violet blue, 10 raised to a bifid apex.

Superior appendage shorter than inferior, brown, conical in lateral view; the apex paler, hirsute and inturred; a fine black spine-like ventral tooth directed inwards. Inferior appendage a larger, broad lobe, incurved apically, with dorso-basal spine directed into segment 10.

Prophallus with irregular group of numerous small setae on stem; the chitinised stem extends well into the head. Apex of glans with small lateral branches.

Abdomen 37 mm, hindwing 22.5 mm.

Another Chiluvo ♂ has a basal line on the frons; segment 2 with both a distal triangle and a crescent. One Chiluvo ♂ has black basal dot on labrum, no marking on frons; thorax with trace of juxta-carinal line; segment 2 with brown dorsal band and distal crescent. Still another has faint juxta-carinal line and pseudoantehumeral stripe; segment 2 with dorsal line and distal crescent. Yet another Chiluvo ♂ has the face and vertex greenish.

A Dondo ♂ is like the first pale Chiluvo ♂. One from Rhodesia is more distinct. ♂ (Sebungwe, Rhodesia): Face and frons dark blue-green, the postclypeus very dark green; no black markings.

Prothorax violetish brown. Synthorax browner, with faint pseudoantehumeral stripes. No ventral spot on mesepimeron.

Pterostigma rhomboidal in forewing, narrower in hindwing.

Abdomen blue. Segment 2 with only a distal crescent.

A ♂ from Marromeu is very like the Sebungwe example: Face and frons deep green. Thorax pale blue-green. Pterostigma a rectangle in forewing, in both wings speckled with brown in neighbouring cells. Abdomen very blue. Segment 2 with distal crescent.

Comparisons

The differences between the males of subspecies *gracile* and *attenuatum* lie in the postclypeus, heavily black in *gracile*, unmarked in *attenuatum*; usually there is no juxta-carinal line in *attenuatum*; segment 2 has a broad band in *gracile* but very reduced markings, usually only a distal crescent, in *attenuatum*.

Fraser (1928) compared *attenuatum* with the Oriental *olympicum*, but the anal appendages are distinct.

FEMALES

The female has not previously been described.

Metallotype—♀ (Monkey Bay, iv.1966): Face pale brownish. Labrum with basal dot, postclypeus with basal and two distal dots; frons with basal line; a fine demarcation line around the postocular spots and short bars between the ocelli.

Prothorax pale brown, the posterior lobe with black basal spot, but no distinct stripes on median lobe. Mesostigmal lamina rather like *congoense*, slightly more depressed dorsally, but similarly with a small post-dorsal tubercle. Synthorax pale brownish with only the usual two black dorsal spots on humeral and second lateral sutures. A trace of a pseudoantehumeral stripe but no juxta-stripe. Legs cream with distal spot on fore and mid femora.

Wings in ♂. Pterostigma a white-edged, grey-brown parallelogram in forewing, a narrow rhombus in hindwing. Forewing with 12 Px.

Abdomen pale brownish. Segment 1 with two short dorsal bars, not a rectangle; segment 2 with very pale bronze band and distal crescent; segments 3-7 with bronze band and black distal annulus; segments 8-10 all pale, 10 pinched in apically as in other species. Segment 8 with ventral spine.

Abdomen 35 mm, hindwing 24.5 mm (left forewing missing).

A ♀ from Mwinilunga is very similar.

Distribution

subspecies *gracile*, north Malawi, Tanzania, Uganda;
subspecies *attenuatum*, south Malawi, Moçambique, Zambia, Rhodesia.

Habits

Found at quite reedy or grassy pools, streams or swamps.

Material examined

Subspecies *gracile*:

Stockholm Museum: holotype, Mombo, Usambara Mountains, June (*sine anno*) National Museum, Bulawayo: Nkata Bay, Malawi, 14.xii.1960, leg. D. H. Eccles; Limpasa dambo, Nkata Bay, 12.v.1966, leg. E. Pinhey.

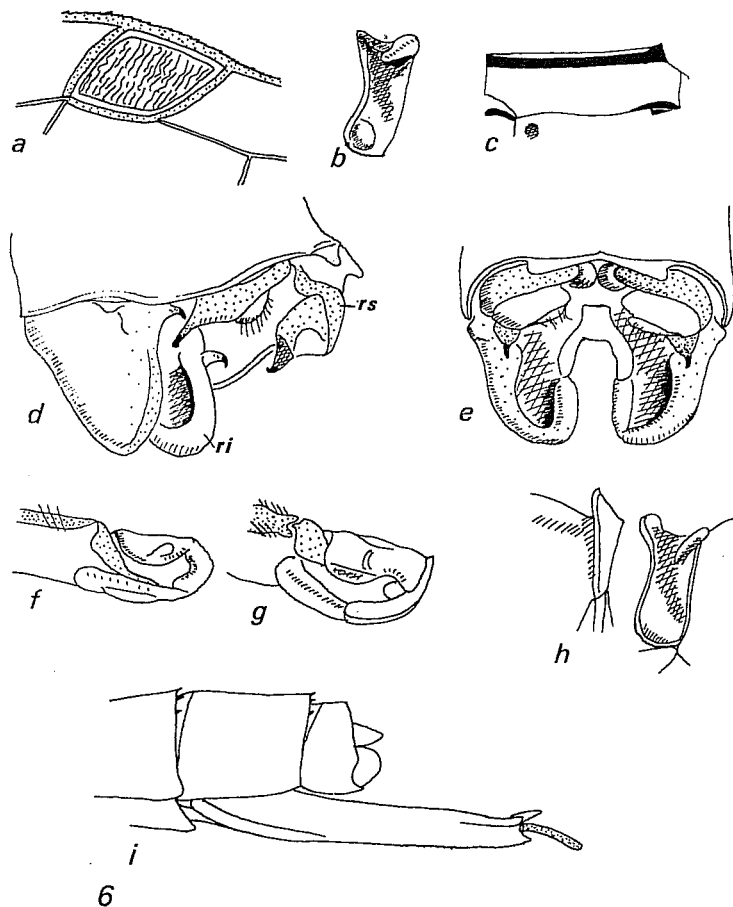
subspecies *attenuatum*:

National Museum, Bulawayo: series from Chiluvo Hills, Moçambique, x.1963, leg. E. Pinhey; Dondo, Moçambique, 24.v.1969, leg. E. Pinhey; Salone Forest, Marromeu, Moçambique, 9.xi.1967, leg. E. Pinhey; Nagupande River, Sebungwe, Rhodesia, x.1948, leg. J. A. Whellan; Monkey Bay, Malawi, 29.iv.1966, leg. E. Pinhey; Upper Zambezi River, N. Mwinilunga, Zambia, v.1961, leg. E. Pinhey.

6. *Aciaagrion macrootithenae* spec. nov. (fig. 6a-i)

Aciaagrion gracile Pinhey (nec. Sjöstedt), 1964, *Publicões cult. Co. Diam. Angola*, 63: 100 Despite its resemblance to *gracile* in the male this is, nevertheless, a very distinct species which, by virtue of its very long ovipositor in the female, must be distinctive in its habits. It is also peculiar in frequently lacking the ventral spine on segment 8. Added to these peculiarities is the variable position of the anal cross-vein Ac which is frequently situated before the separation of the anal vein from the margin. All these peculiarities might, at first sight, suggest a separate genus. I consider it is a species of unstable mutational change.

The name "macrootithenae" was suggested to me by Mr. Richard Brooke, in February 1971, by virtue of this abnormally long ovipositor.



6. a-i. *A. macrootithenae* spec. nov.
 a. Pterostigma holotype ♂ right forewing; b. mesostigmal lamina ♂ holotype; c. mesepisternum ♂ holotype; d-e. anal appendages ♂ holotype oblique view from left, and dorsally; f-g. prophallus of paratype ♂ (two aspects); h. mesostigmal lamina of ♀ metalotype (Zambezi Source); i. terminal segments of ♀ metalotype.

MALES

♂—holotype (Isombo River, 22.v.1961): Labium whitish ochraceous; labrum and genae pale ochraceous, labrum with black mid-basal dot; postclypeus ochraceous with basal and two distal dots. Frons and vertex ochraceous, frons with black basal line; a black line demarcating the large greenish postocular spots. Back of occiput whitish ochraceous.

Prothorax ochraceous with two black bands on median lobe, these being joined by a transverse band at posterior end of this lobe. Mesostigmal lamina raised at ventral end and with small post-dorsal tubercle (smaller than in *gracile*). Synthorax ochraceous. Mesepisternum with well-formed bronze-black juxta-carinal stripes, fused together at dorsal end. Black dorsal spots on humeral and second lateral sutures; brown ventral spot on mesepimeron and a trace of a dorsal brown smear on mesinfraepisternum. Metasternite with white pruinosity. Legs pale ochraceous; fore femur and fore tibia with brown exterior line.

Venation brown. Pterostigma shorter than subpterostigmal cells, brown, almost a rhombus in forewing but the upper distal angle more acute; in hindwing the posterior edge is shorter so the upper distal angle is still more acute. Forewing with 12 and 13 Px, hindwing with 11 Px. Ac, in some examples, at the end of petiole and nearer second than first Ax. Yet in some the Ac is more proximal to this point (Pinhey, 1964: 100). This abnormality may vary in one individual. For instance, a Mwinilunga ♂ has Ac well before end of petiole in right hindwing, but at the end of petiole in the other three wings.

Abdomen pale ochraceous, segments 8-10 violaceous; segment 1 with dorsal rectangle, pale in centre, on basal two-thirds; segment 2 with black dorsal stripe widened to a triangle before distal end; segments 3-6 mainly bronze-brown dorsally with black distal annuli; 7 darker, with pale yellow laterobasal spot; segments 8-10 unmarked, 10 with shallow invagination, the apex produced, bifid.

Inferior appendage as long as ventral length of segment 10, longer than dorsal length of this segment; superior appendage much shorter, smaller than in *gracile*. Superior with soft, curved apex (as in *gracile*), and a long flat ventral tooth which projects obliquely posteriad beyond this appendage. Inferior as in *gracile*, large, broad, hood-like, with small dorso-basal hook; a trace of a lateral root-tooth.

Prophallus with fine setae on stem; terminal portion of stem less heavily chitinised; glans without funnels or branches.

Abdomen 36 mm, hindwing 24.5 mm.

♂—paratypes: The basal band on frons may be complete or fractured in Angola or Mwinilunga specimens. In one Angola ♂ the abdomen is only 32 mm. Some examples are teneral, with the markings developed but the brown pterostigma is edged with white.

Comparisons

The ♂ differs from *gracile* in having more black on the thorax and the smaller superior appendage has its tooth much more conspicuously protruding posteriad. The raised lateral end of the mesostigmal lamina is distinctive.

FEMALES

♀—allotype (Zambezi Source, 24.v.1964): Labrum whitish with black mid-basal dot; postclypeus greenish with basal dot; frons and vertex pale blue-green, with two minute basal

dots on frons, and a line demarcating the large bluish postocular spots. Back of orbits yellow.

Prothorax all pale green with black smear at junction of median and posterior lobes; posterior lobe erect, directed vertically, unlike other species. Mesostigmal lamina curved up at lateral end and with a well developed post-dorsal ridge. Synthorax pale bluish green, with black juxta-carinal stripe. Dorsal spots on humeral and second lateral sutures and a trace of a ventral spot on mesepimeron. Metasternum pale cream. Legs cream. Fore femur and fore tibia with black exterior line.

Venation brown. Pterostigma in forewing a white-edged, brown parallelogram between brown veins, in hindwing a rhombus. Forewing with 12 Px, hindwing with 11 and 10 Px. Ac normally at end of petiole and nearer second than first Ax.

Abdomen slender, bluish on basal segments, yellow on middle segments, blue on segments 8-10. Segment 1 with pale-centred brown rectangle on basal two-thirds; segment 2 with brown dorsal stripe expanding to a broad triangle before distal end; segments 3-7 with progressively increasing bronze dorsal band and black distal annulus; segment 9 with two basal black dashes. Segment 8 without ventral spine. Ovipositor excessively long, extending three times the length of segment 10 beyond abdomen.

Abdomen 34 mm, hindwing 24 mm.

♀—paratypes: some have broken basal stripe on frons and two short stripes on middle lobe of prothorax. Others have complete basal stripe on frons and the stripes on prothorax. Even tenerals have these stripes well developed. One from Katanga has narrower pterostigma in hindwing. The peculiar feature of all the Angola examples and a few from Mwinilunga is the lack of a ventral spine on 8th segment. A short spine is present in two Mwinilunga examples.

Comparisons

The females are characterised by the well developed post-dorsal ridge on the lamina and, more particularly, by the unusually long ovipositor sheath and the reduction or obsolescence of the 8th sternal spine.

Distribution

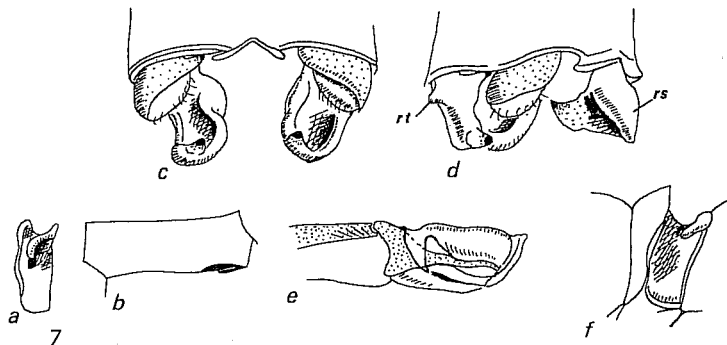
Known so far from NW. Zambia, East Angola and Shaba (Katanga).

Habits

Found in swamps. The excessive ovipositor of the female obviously suggests deep insertion during oviposition, perhaps through mud or through submerged plants into mud. The obsolete sternal spine is a most peculiar modification, perhaps a secondary mutational change resulting in some way from its habits.

Material examined

National Museum, Bulawayo: Holotype, Isombo River, N. Mwinilunga, Zambia, 22.v.1961, leg. E. Pinhey; Ikelenge, N. Mwinilunga, v.1961, leg. E. Pinhey; allotype and others Zambezi Source, N. Mwinilunga, Zambia, 24.v.1964, No. 229D, leg. R. C. Denning; series



7. a-f. *A. heterosticta* Fraser

a. mesostigmal lamina ♂ (Kafue); b. mesepisternum ♂ (Kafue); c-d. anal appendages ♂ *heterosticta* (Lubumbashi) dorsally, obliquely from left; e. prophallus of ♂ (Lubumbashi); f. mesostigmal lamina of ♀ (Lubumbashi).

from Lutchigena River, east of Caianda, E. Angola, 10.v.1963, leg. E. Pinhey; Lubumbashi (Elisabethville), Katanga, vii.1951, leg. C. Seydel. Type series in National Museum, Bulawayo. Paratype examples will be presented to the British Museum (Nat. Hist.) and the Transvaal Museum.

7. *Aciagrion heterosticta* Fraser (fig. 7a-f)

Aciagrion heterosticta Fraser, 1955, *Revue Zool. Bot. afr.*, 52: 19 (♂♀ Katanga)

Type ♂♀ in Tervuren Museum.

This very slender species has the longest abdomen known in the genus. It is closely allied to *gracile*, but the superior and inferior appendages are of the same length. Two subspecies are recognised, including the new subspecies *karamoja* from Uganda.

Subspecies *heterosticta* Fraser

MALES

♂—holotype (Katanga) after Fraser: Labrum greyish or pale bluish, rest of head pale purplish brown; postocular spots bluish.

Thorax pale bluish or lilaceous with poorly defined stripes [post-mortem changes]. Legs pale yellow with distal black spots on femora and discontinuous lines on tibiae.

Pterostigma small, ochreous with infuscated centre; of different shape and size in fore and hindwing; in forewing very oblique, in hindwing more quadrate. Forewing with 14 Px.

Abdomen very slender; segment 2 with vestigial black marking; segments 3-7 diffusely black dorsally; segments 8-10 palest blue.

Abdomen 39 mm, hindwing 24 mm.

♂ (Ngoma, Kafue National Park): Face bluish green, frons and vertex darker; a thin line demarcating the large pale blue postocular spots.

Prothorax brownish; posterior lobe raised at sides. Mesostigmal lamina with long curved post-dorsal ridge. Synthorax brownish blue with yellow pseudoantehumeral stripes; black dorsal dots on humeral and second lateral suture but no other markings. Legs cream with black distal spots on fore and mid femora.

Pterostigma a brown parallelogram in forewing, a narrowed rhombus in hindwing.

Abdomen long and slender; pale blue on basal segments and on 8-10. Segment 1 with only brown basal traces; segment 2 with distal crescent; segment 3 with median line and distal annulus; segments 4-7 with bronze band and black distal annuli; segments 8-10 unmarked, 10 with apex produced, bifid but not raised.

Superior and inferior appendages of same length, shorter than segment 10, rather bulbous, folded in as in *gracile*.

Abdomen 38.5 mm, hindwing 25 mm.

A ♂ from Lubumbashi is too stained for details, but the face is bluish green, thorax brown, abdomen blue at base and on segments 8-10. Abdomen 38.5 mm, hindwing 24.5 mm.

Another Lubumbashi ♂ is more brownish; yellower at sides of thorax. Segment 3 with bronze dorsal band.

Prophallus (Lubumbashi): Stem with setae; chitinised end portion broad, then tapered; apex of glans with long slender branches.

A series of teneral ♂♂ from near Ndola show the brown markings developed. Pterostigma whitish. The bronze on the abdomen is less sharp on segments 3-4 than on 5-7.

FEMALES

♀ (Lubumbashi): Face and vertex yellowish brown; a brown line at base of frons. Large postocular spots.

Prothorax pale brownish, without stripes. Mesostigmal lamina depressed dorsally and centrally, with post-dorsal knob. Synthorax brown above, yellowish brown laterally, with black dorsal dots on humeral and second lateral sutures but no other markings. Femora with distal spots.

Pterostigma a pale brown parallelogram in forewing, a narrowed rhombus in hindwing.

Abdomen slender. Segment 2 with distal crescent; segments 8-10 all pale. Segment 8 with ventral spine. Ovipositor of normal length.

Abdomen 38 mm, hindwing 25 mm.

A ♀ from 60 miles W. of Solwezi is similar. A ♀ from Lubumbashi in Tervuren Museum is also similar but the pterostigma is rhomboidal in the forewing, narrowed in hindwing. Teneral females from near Ndola are similar; the pterostigma whitish.

Subspecies *karamoja* nov.

The single ♂ from Karamoja District, N. Uganda, is very like typical *heterosticta* in size and anal appendages but the mesostigmal lamina is different.

♂—holotype: Face and frons bluish green, labrum with mid-basal dot; vertex reddish brown with large postocular spots.

Thorax, legs, wings and abdomen very like the nominotypical race. Mesostigmal lamina with the post-dorsal ridge short, more like *congoense* than *heterosticta*. The cells around the pterostigma are slightly stained brown.

Possibly the examples from Entebbe, Uganda, 1 tentatively placed in *A. varians* Martin (Pinhey, 1961: 39) may have been this race of *heterosticta* but this would need checking.

Distribution

Zambia, Shaba (Katanga), Uganda.

Habits

Swamps or swampy pools verging on slow streams.

Material examined

subspecies *heterosticta*:

Tervuren Museum: ♀ Lubumbashi, Katanga, 9.x.1951, leg. C. Seydel, det. F. C. Fraser (but the ♂ with same data is not this genus).

National Museum, Bulawayo: Lubumbashi, Katanga, 13.ix.1951, 24.ix.1951, xi.1951, leg. C. Seydel; Ngoma, Kafue National Park, Zambia, xi, 1955, leg. R. Sharman; 60 miles W. of Solwezi, NW. Zambia, 14.v.1963, leg. E. Pinhey; series of tenerals, Kafakula River, 25 miles S. of Ndola, Zambia, ii, iii.1960, 29.i.1965, leg. E. Pinhey.

subspecies *karamoja*:

♂ holotype in National Museum, Bulawayo: Aremo, Labwor Hills, Karamoja, N. Uganda, iv.1951, leg. T. H. E. Jackson.

8. *Aciagrion hamoni* Fraser (fig. 8a-i)

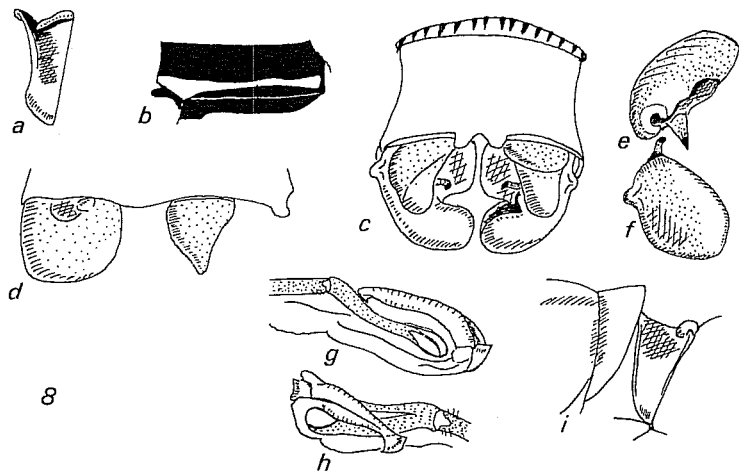
Aciagrion hamoni Fraser, 1955, *Revue fr. Ent.*, 22 (3): 240 (♀, Danane, Ivory Coast)

Type ♀ kindly loaned by Rech. Sci. Techn. Outre-Mer, Paris (not in Paris Museum). Unfortunately no male was assigned to this species but I have described a ♂ for this revision which I believe to be conspecific. The species was named after J. Hamon.

FEMALES

♀—holotype (Ivory Coast): Face and vertex pale blue with sparse black markings. Labium, genae and front of optic lobes yellowish. Labrum blue with cream margin and black basal dot; postclypeus with basal and two distal dots; frons with black basal line. A line demarcating the pale green, pyriform postocular spots. Posterior edge of occiput pale green; a black posterior smear on optic lobes.

Prothorax pale blue with black bands in the depressions; posterior lobe uniformly narrow. Synthorax pale blue, still paler at sides. Black dorsal spots on humeral and second lateral sutures; a thin black line on humeral suture, a dorsal smear on mesinfraepisternum and a black ventral spot on mesepimeron (not on the spiracle as Fraser records). Legs cream.

8. a-i. *A. hamoni* Fraser

a. Mesostigmal lamina ♂ (Garamba, 2056); b. mesepisternum ♂ (Garamba); c-d. anal appendages of ♂ (Garamba) post-dorsally, and from left; e-f. left superior and inferior appendages posteriorly; g-h. prophallus of ♂ (Garamba), from left and obliquely from right; i. mesostigmal lamina of ♀ (L. Nabugabo).

Fore femur and fore tibia with exterior brown traces; the usual black spines and some reddish hair. Claw reddish with black apex.

Venation dark brown. Pterostigma a brown rhombus with cream edge, between brown veins; slightly longer in forewing than in hindwing, the distal edge in the forewing being more convex. Forewing with 13 Px, hindwing with 11 Px. Ac at end of petiole.

Abdomen slender, blue on segments 1-3, 8-10, greenish yellow on middle segments. Segment 1 with black band on basal two-thirds; segment 2 with black dorsal band, inflated before distal end; segments 3-7 with bronze-brown dorsal band and black distal annuli; segment 8 blue with two minute black basal triangles; 9 with basal fasciae reaching nearly half-way along segment, 10 unmarked. Segment 8 with ventral spine. Cerci short, as in other species. Ovipositor sheath extending beyond segment 10 by half the length of that segment, its styles black.

Abdomen 29 or 30 mm, hindwing 23 mm.

Comparisons

This holotype ♀ from Ivory Coast is similar to *congoense* and *gracile attenuatum* but differs in having the black humeral line and the black basal fasciae on segments 8-9. It is smaller and the ovipositor sheath is slightly longer although not nearly so long as in *macroothinae*.

Two teneral females from Nabugabo, Uganda, in the National Museum, are evidently this species: Face and head pale; prothorax with stripes on middle lobe. Mesostigmal lamina depressed at dorsal end, with a small post-dorsal hemisphere. Synthorax with juxta-carinal line. Pterostigma a brown parallelogram in forewing, a rhombus in hindwing. Forewing with 13 Px, hindwing with 11-12 Px. Segment 2 with dorsal line and distal triangle; segments 8-10 bluish, 9 with large basal triangles. Ovipositor sheath extending beyond segment 10 by half the length of that segment. Abdomen 27-30 mm, hindwing 22-23 mm.

A ♀ (from Garamba National Park, No. 509): Probably the same species, but too stained for detailed examination. In my report on the Garamba material (Pinhey, 1966: 16, 77) it was recorded as *attenuatum*. In general it seems to be very like Uganda examples but more mature. The lamina is unfortunately damaged. Abdomen 29.5 mm.

A small ♀ (Etoumbi Forest) probably belongs here by general characters. Bluish green in colour. Mesostigmal lamina with scarcely any post-dorsal swelling. Abdomen 25 mm, hindwing 17 mm.

All these females have a ventral spine on segment 8.

A ♀ (Mobeka, Congo-Kinshasa) unidentified in an earlier paper (Pinhey, 1964: 122) may be a small specimen of this species. It lacked a sternal spine on segment 8 (like *macroothinae*). In other respects it is a true *Aciaagrion*. It is in C. Nielsen's collection: Face and thorax with sparse markings but abdomen with a more or less continuous black band on segments 1-9. Mesostigmal lamina not particularly modified but with a depression behind it. Forewing with 12 Px. Abdomen 25 mm, hindwing 18 mm.

In some respects it is like *nodosum* but despite the reduction in sternal spine it does not agree with the markings on vertex and abdomen. The depression posterior to the mesostigmal lamina on the mesepisternum is like *zambiense*, also pale in the female but with different abdominal markings.

MALES

The following ♂ from Garamba National Park probably represents the unknown ♂ of this species but I hesitate to designate it as an allotype. In my earlier report on Garamba Odonata (1966) I placed this in *attenuatum*, but it is quite distinct from *gracile* and its races. ♂ (Garamba, No. 2056): A smallish species. Face pale green; postclypeus all black, a narrow black triangle on lower anterior margin of frons and a very broad black basal band on frons. Vertex all black and narrowed bluish green postocular spots, linked across back of occiput.

Prothorax middle lobe black with large green lateral spots and small dorsal twin spots. Anterior collar green with black transverse band. Posterior lobe black medially, yellow laterally, the margin sinuously raised. Mesostigmal lamina raised at ventral end, depressed and black dorsally, with largish post-dorsal ridge. Synthorax bronze-black to well below humeral suture; with slender green antehumeral stripes about a third of the mesepisternum, widened ventrally. Sides pale green; a dorsal smear on mesinfraepisternum, a short dorsal line on first lateral suture and the usual dorsal spot on second suture. Legs cream, femora with thick black posterior stripe, fore and mid femora with also an exterior stripe.

Venation brown. Forewing with pterostigma a whitish-edged deep brown rhombus, slightly narrowed in hindwing. Right forewing with 13 Px, left hindwing 12 Px, other wings damaged. Ac at end of petiole, nearer second than first Ax.

Abdomen slender, greenish on basal segments, blue on terminal segments; segment 1 with complete black dorsal band; segments 2-7 with dorsal band, expanded distally; segments 8-10 blue, segment 10 with raised bifid process.

Superior and inferior appendages of about similar length, much shorter than segment 10. Superior in dorsal view showing black basal portion and paler distal part (as in *gracile*): bluntly conical, more so in lateral aspect, with folded or fluted inner surface and an inwardly directed, subapical ventral tooth. Inferior appendage much more massive, the two filling the entire ventral region, but scarcely longer than the superior; roundly incurved; a latero-basal root-tooth and a small black dorsal hook hidden well back in segment 10.

Prophallus distinctive: few spines on stem; terminal part of chitinised stem deeply divided and ending in a soft elliptical portion (in side view). Apex of glans a very small funnel with-out branches (in the illustrations it is shifted to one side of the stem).

Abdomen 28,5 mm, hindwing 21,5 mm.

Distribution

Uganda, Congo-Kinshasa (Zaire), Congo-Brazzaville, Ivory Coast.

Habits

I have not seen this species in life. Of the Garamba specimens, ♀ 509 was taken in "affleurement rocheux sous arbustes" and ♂ 2056 in "strate herbeuse". Another from Garamba was from swamp.

Material examined

Office de la Recherche Scientifique et Technique Outre-Mer: Holotype ♀, Danane, Ivory Coast, 20.v.1953, leg. J. Hamon.

National Museum, Bulawayo: Lake Nabugabo, Bukakata, Uganda, 28.vii.1962, Cambridge University Expedition; Garamba National Park, N. Congo-Kinshasa, No. 509, 10.v.1950. No. 2056, 9.vii.1951, leg. H. de Saeger; Etoumbi Forest, Makoua Prov., Congo-Brazzaville, viii.1960, submitted by T. H. E. Jackson.

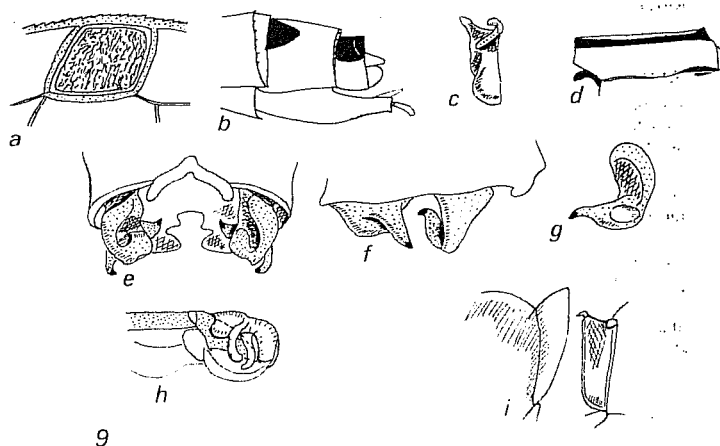
9. *Acigrion nodosum* (Pinhey) (fig. 9a-i)

Ischnuragrion nodosum Pinhey, 1964, *Publicões cult. Co. Diam. Angola*, 63: 105 (♂; N. Mwinilunga)

Types in National Museum, Bulawayo.

♂—holotype: Very slender. Face green. Labrum with mid-basal dot, postclypeus with thin basal line and two distal dots, frons with basal line. Vertex black with largish blue-green postocular spots, not linked across back of occiput.

Prothorax black with green lateral and central twin spots. Mesostigmal lamina slightly raised at ventral end; with post-dorsal tubercle. Synthorax with broad black juxta-carinal stripe, the carina yellowish green, most of the mesepisternum bluish green; black dorsal spots on humeral and second lateral sutures, a dorsal streak on first suture, a dorsal smear on mesinfraepisternum. Legs pale ochreous with brown exterior and posterior streaks on femora and tibiae.



9. a-i. *A. nodosum* (Pinhey)

a. Pterostigma holotype ♂ right forewing; b. terminal segments allotype ♀; c. mesostigmal lamina ♂ holotype; d. mesepisternum ♂ holotype; e-f. anal appendages ♂ holotype dorsally, and from left; g. superior appendage of same from inside; h. prophallus of ♂ (Zambezi Rapids); i. mesostigmal lamina of ♀ allotype.

Venation dark brown. Pterostigma blackish brown, rhomboidal in both wings, smaller than a subpterostigmatal cell. Forewing with 12 Px. Ac at end of petiole, mid-way between the antenodal cross-veins or nearer the second.

Abdomen slender, bluish green. Segment 1 with rectangle on basal two-thirds; segment 2 with broadish black band, constricted at distal end; segments 3-6 with broad bronze-brown band, constricted basally but expanded distally to a black annulus; segment 7 black with yellow basal spots. Segment 8 all blue, 9 blue with distal black annulus, 10 all black dorsally, with raised bifid distal process. In one ♂ segment 2 only has a dorsal triangle.

Appendages black, much shorter than segment 10. Superior appendage horizontal but slightly sinuous, infolded apically, with inner ventral tooth. Inferior appendage with long dorsal spine directed obliquely posteriad (original drawing of 1964 inadequate).

Abdomen 32 mm, hindwing 20,5 mm.

In life the face, postocular spots, thorax and base of abdomen were emerald; segments 8-9 cobalt.

♂ (Zambezi Rapids): In life the eye and sides of thorax were bright green; thorax dorsally blue, segments 8-9 sky blue. The prophallus: no setae on stem. Apex of glans short and broad, with subapical, curved, obtuse branches.

Comparisons

The vertex, segments 2 and 10 are blacker than in most otherwise pale species.

FEMALES

♀—allotype (Isombo River): Smallish. Labrum and postclypeus dark blue, postclypeus with two black distal dots and basal line. Vertex with broadish irregular black band. Narrowish blue postocular spots connected across back of occiput.

Prothorax with broad black dorsal stripes on median lobe. Mesostigmal lamina depressed and black dorsally, with very small antero-dorsal hook and small post-dorsal tumour. Synthorax with black juxta-carinal stripe; dorsal spots on humeral and second lateral sutures.

Pterostigma a brown rhombus but almost a square in all wings.

Segment 2 broadly black dorsally; segments 3-7 bronze-black with black distal annuli; segments 8-10 blue, 9 with black basal triangles, 10 black dorsally. Segment 8 with short ventral spine. Ovipositor scarcely reaching beyond segment 10.

Abdomen 27 mm, hindwing 20 mm.

A paratype ♀ is similar, but the sternal spine on segment 8 is obsolete. In life, the pale colours were greenish blue, 8-10 sky blue. ♀ (Msamfu): Postclypeus only partly black. The mesostigmal lamina has the post-dorsal tumour but no antero-dorsal hook. Sternal spine on segment 8 obsolete.

The obsolete 8th sternal spine is a similar condition to *macrootithenae*.

Distribution

N. and NW. Zambia. Almost certainly occurs in nearby Katanga (Shaba) and E. Angola.

Habits

Swampy gallery forest streams.

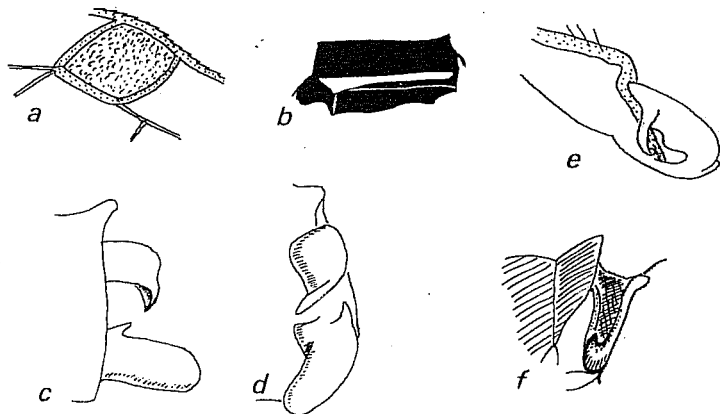
Material examined

National Museum, Bulawayo: ♂-holotype, Chinyaji River, N. Mwinilunga, NW. Zambia, 6.v.1963, leg. E. Pinhey; ♀-allotype, Isombo (Lisombo) River, N. Mwinilunga, NW. Zambia, 13.v.1963, leg. E. Pinhey; Ikelenge, N. Mwinilunga, NW. Zambia, ii.1960, iii.1962, leg. E. Pinhey; Zambezi Rapids, N. Mwinilunga, NW. Zambia, 21.i.1965, leg. E. Pinhey; Msamfu, Kasama, N. Zambia, 10, 18.iii.1969, leg. E. Pinhey; Jimbe source, N. Mwinilunga, 20.iv.1972, leg. E. Pinhey.

10. *Aciagrion rarum* (Longfield) (fig. 10a-f)

Ischnuragrion rarum Longfield, 1945, *Archos Mus. Bocage*, 16: 7 (♂♀ Lunda, Angola) Holotype, allotype and paratype ♂♂ in British Museum (Nat. Hist.), paratype ♂ in Mus. d'Hist. Nat. Les Chaux de Fonds.

The only possible specimen of this species in the National Museum, Bulawayo, is a very dark ♀ from Zambia which I think may be this species. Otherwise it represents an unnamed one.



10

10. a-f. *A. rarum* (Longfield)

a. Pterostigma ♀ (Mkushi River) right forewing; b. mesepisternum ♂ (modified, ex-Longfield); c-d. anal appendages of ♂ from left and right appendages dorsally (after Longfield); e. prothallus of ♂ (after Longfield); f. mesostigmal lamina of ♀ (Mkushi R.).

MALES

♂ (modified, from Longfield): Very small. Face blue, labrum with black basal line and mid basal dot; postclypeus black. Frons dorsally and vertex black, with narrow blue postocular spots and occipital plate.

Prothorax black above, blue laterally. Mesostigmal lamina with dorsal tubercles. Synthorax black to well below humeral suture, with slender bluish green antehumeral stripes about one-third the width of the mesepisternum. Sides blue, with black dorsal streaks on first and second lateral sutures. Legs cream, femora and tibiae with black exterior line.

Venation dark brown. Pterostigma black, cream-edged, in each wing, above less than one subpterostigmatal cell (from the illustration the pterostigma is a parallelogram, smaller in hindwing than in forewing). Ac mid-way between the antenodal cross-veins.

Segments 1-7 black dorsally, blue laterally; segments 8-10 blue, 8 black dorsally on basal half, 10 black distally, raised and bifid.

Anal appendages pale blue with black teeth (hooks). Superior appendage short with down-curved apical tooth. Inferior appendage much longer, as long as segment 10, with small dorso-basal tooth.

Prophallus (as illustrated in Longfield): stem with fine setae; glans with slender apical branches.

Abdomen 20 mm, hindwing 12.5 mm.

FEMALES

♀ (after Longfield): Very juvenile. Face all cream, with blue postocular spots; vertex blackish brown, thorax as in ♂ but dark brown [teneral condition]. Legs cream. Pterostigma cream.

Segments 1-9 black dorsally, 9 with cream mid-dorsal line; segment 10 and the cerci cream.

Abdomen 19 mm, hindwing 13 mm.

A mature ♀ from Zambia may be a very dark mature ♀ or a melanic form of *rarum*; or perhaps a Zambian race of *rarum*.

♀ (Mkushi River): Labrum green with black basal band; postclypeus all black. Frons and vertex all jet black without postocular spots; with some whitish pruinosity.

Prothorax all black, the posterior lobe depressed. Mesostigmal lamina with a latero-ventral ridge, dorsal end of lamina unmodified. This is quite unlike the other species. Synthorax black down to first lateral suture, with very slender green antehumeral stripes, incomplete dorsally. A black dorsal spot on second lateral suture. Femora yellow with very broad black posterior stripes; tibiae redder with thin black exterior stripes.

Venation brown. Pterostigma a short brown rhombus, smaller than a subpterostigmal cell; slightly smaller in hindwing than in forewing. Forewing 10-11 Px. Ac just beyond end of petiole, mid-way between the antenodals or nearer the second.

Abdomen black dorsally on all segments; segment 1 with pale central spot. Segment 8 with ventral spine. Ovipositor scarcely extending beyond segment 10.

Abdomen 19 mm, hindwing 13.5 mm.

Distribution

Angola, Zambia.

Habits

Little recorded. The Zambian ♀ was collected in swamp bordering the Mkushi River.

Material examined

National Museum, Bulawayo: ♀ Mkushi River, 80 miles E. of Kapiri Mposhi, Zambia, 7.iii.1969, leg. E. Pinhey.

MISPLACED AFRICAN SPECIES

- (a) *Aciaagrion varians* Martin, 1908. *Annali Mus. civ. Stor. Giacomo Doria*, 3 (43): 660 (12) (♂♀ Portuguese Guinea)

Type series in Paris Museum and Mus. Genova.

This is a species of *Ceriaagrion* Selys, teste Pinhey (1966: 288) where the synonymy was recorded as follows:

Ceriaagrion varians (Martin, 1908)

Ceriaagrion rubellocerinum Fraser

- (b) *Aciaagrion varians rubrostigma* Martin (ined.)

♂ from Portuguese Guinea in Paris Museum labelled as a type. This is a representative of *Ceriaagrion sanguinostigma* Fraser which is the valid name, teste Pinhey (1966: 288).

- (c) *Aciaagrion ischnuroides* Martin (ined.)

♂ (Sikasso), ♀ (Congo) in Paris Museum labelled as types. A further ♂ labelled *Enallagma ischnuroides* Martin, from Nigeria, is in the British Museum (Nat. Hist.), also labelled type. These are *Enallagma subtile* Ris, teste Pinhey (1966: 288).

- (d) *Aciaagrion pallens* Martin (ined.)

♀ (Congo) in Paris Museum, labelled type, is an *Enallagma* Charpentier, probably *E. subfurcatum* Selys, teste Pinhey (1966: 288).

ORIENTAL SPECIES

Only very limited material of three species from the Oriental Region has been examined for this revision. For the other species brief notes are given from literature.

11. *Aciaagrion hisopa* (Selys) (fig. 11a-i)

Pseudagrion ? *hisopa* Selys, 1876, *Bull. Acad. r. Belg. Cl. Sci.*, 42 (2): 509 (Malaya)

Aciaagrion hisopa Selys, 1891, *Annali Mus. civ. Stor. Giacomo Doria*, 10 (2): 511, 512

Aciaagrion hisopa krislna Fraser, 1921, *J. Bombay nat. Hist. Soc.*, 27: 543

This is the type species of the genus *Aciaagrion* Selys.

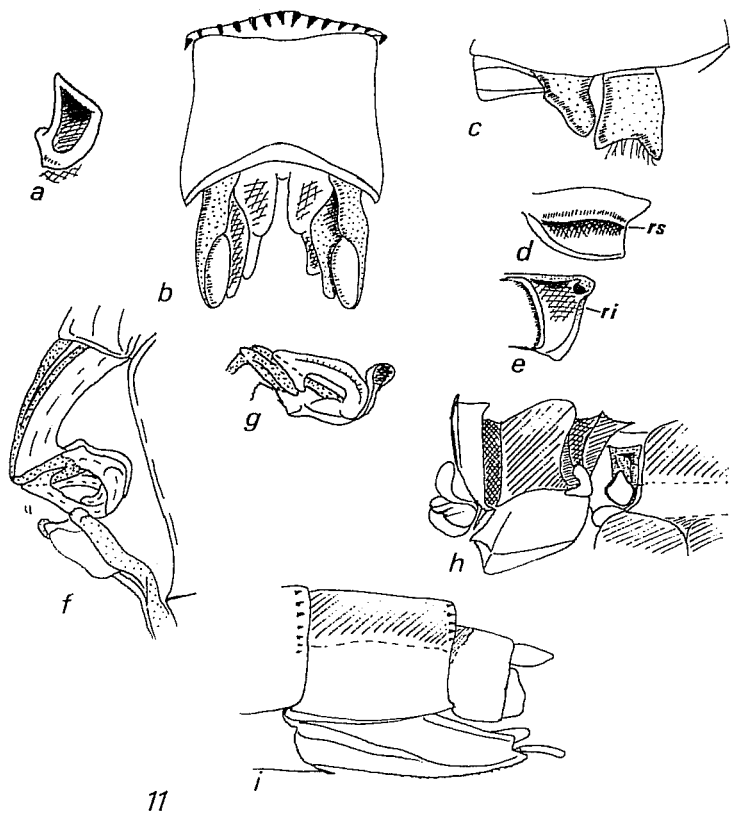
MALE

♂ (Coorg.): Face bluish green. Postclypeus all black. Frons blue. Vertex all black to bases of antennae, with moderate but narrowed blue postocular spots, linked across back of occiput.

Prothorax black, pale bluish at sides and on anterior collar. Mesostigmal lamina short, broad; black and excavated centrally, raised at ventral end. Synthorax black nearly to first lateral suture; with slender green antehumeral stripes, about a quarter the width of the mesepisternum, widened ventrally. Sides pale greenish ochreous. (Fraser, 1933, described the antehumerals as lilaceous violet.) Legs ochraceous, with black posterior stripes on femora and fore tibia.

Venation brown. Pterostigma a brown parallelogram, shorter than the subpterostigmal cell and slightly more extended at upper distal angle in hindwing than in forewing. Forewing with 10-11 Px. Ac at end of petiole, half-way between the antenodals or nearer the second Ax.

Abdomen greenish on basal segments, ochreous on middle segments, bluish on segments 8-10. Segments 1-2 with broad blackish dorsal band; segments 3-7 with progressively increasing band, but constricted at bases of segments. Segment 10 with black basal annulus; with shallow distal invagination.

11. a-i. *A. hisopa* (Selys) (Coorg)

a. mesostigmal lamina ♂; b-c. anal appendages of ♂ dorsally, and from left; d-e. right superior and right inferior appendages from inside; f-g. prothorax *in situ*, and apex; h. prothorax and mesostigmal lamina of ♀; i. terminal segments of abdomen of ♀.

Superior appendage shorter than segment 10, directed horizontally, shallowly divided at apex to form an acute upper apex and a broad subapical ventral tooth; this region hirsute.

On inner aspect it is somewhat excavated. Inferior appendage shorter, broad, ending apically in a broad black tooth, hooked inwardly.

Prophallus: Chitinisation of the stem is divided in the head end. The apex of the glans is somewhat T-shaped (as in several African species), with longish branches. No setae visible.

Fraser (1933: 342) described the pterostigma as much larger in forewing than in hindwing: black, edged yellow, between black veins. Forewing with 12 Px.

Abdomen 24-26 mm, hindwing 15-16 mm.

♀ (Coorg.): Postclypeus black. Vertex black, with narrowed postocular spots, linked across back of occiput.

Thorax similar to ♂. Prothorax black. Mesostigmal lamina black, excavated in dorsal portion, but laterally with a raised yellowish quadrangular platform. Mesepisterna black with slender pale antehumeral stripes.

Pterostigma brown, otherwise as in ♂.

Segments 1-7 as in ♂; 8-9 broadly black dorsally; segment 10 blue, narrowly black at base. Ovipositor sheath scarcely extending beyond segment 10.

Abdomen 26 mm, hindwing 17 mm.

Distribution

India, Pakistan, Ceylon, Burma and Malaysia.

Habits

Rivers and ponds (teste Fraser, 1933: 342).

Material examined

National Museum, Bulawayo: Viralpet, Coorg, S. India, 30.v.1923, leg. F. C. Fraser.

12. *Aciagrion pallidum* Selys

Aciagrion pallidum Selys, 1891, *Annali Mus. civ. Stor. Giacomo Doria*, 10 (30): 512, 513
Type ♂ in Museum Genova.

♂ (Poona): Labrum and genae orange; postclypeus and front of frons more brownish orange, frons and vertex pale reddish brown. Labrum and postclypeus with minute black basal dot. Frons with black basal line. Large pale bluish postocular spots connected by a line at back of occiput.

Prothorax brown (the collar pale blue, teste Fraser, 1933: 140). Mesostigmal lamina unfortunately damaged. Synthorax brown showing (according to Fraser) a pale bluish antehumeral stripe. A small black dorsal spot on humeral suture. Legs cream with black distal spots on fore and mid femora.

Venation brown. Pterostigma a white-edged pale brown parallelogram, shorter than one subpterostigmatal cell; shorter in hindwing than in forewing. Forewing with 10-12 Px. Ac at end of petiole or slightly proximal, about mid-way between the antenodal cross-veins.

Abdomen slender, pale yellowish brown (evidently bluer in life), with continuous bronze-black dorsal band on segments 1-7; segment 1 with pale centred band continued to transverse carina; segment 2 with continuous band, segments 3-7 with broader band, constricted at base; segments 8-10 violaceous, unmarked.

Anal appendages pale brown. Superior shorter than segment 10, broad at apex; black and hollowed out ventrally; with ventro-apical hook. Inferior much shorter, broad in lateral view and shallowly notched at apex.

Abdomen 30-31 mm, hindwing 18-18.5 mm.

♀ (Poona): very similar to ♂. Prothoracic hindlobe depressed medially but raised into a wide curve laterally. Mesostigmal lamina brown, depressed dorsally, raised and curved anteriorly at lateral end. The synthorax shows dark stripes across middle of mesepisternum which may be the position of the bluish antehumeral stripe mentioned (for the ♂) by Fraser (1933). Segment 2 with narrow dorsal stripe expanded to a triangle near distal end. Segments 8-10 very pallid. 9 with two faint brown streaks from base. Segment 8 with ventral spine, ovipositor sheath scarcely extending at all beyond segment 10.

Abdomen 30 mm, hindwing 20 mm.

Distribution

Fraser (1933) gives the drier zones of southern India, also Assam and Burma.

Habits

Evidently in dry areas, amongst long grass, unlike African species.

Material examined

National Museum, Bulawayo: Poona, India, August 1918, leg. F. C. Fraser.

13. *Aciagrion fragilis* (Tillyard)

Ischmura ? fragilis Tillyard, 1906. *Proc. Linn. Soc. N. S. Wales*, 31: 186-187 (N. Queensland).

A small slender dark species.

♂ (N. New Guinea): Face and front of frons blue-green; frons above and vertex black, with narrowed blue postocular spots linked across back of occiput.

Prothorax black dorsally with blue-green spots. Hindlobe narrow, somewhat erect. Mesostigmal lamina black dorsally, green laterally, with oblique black post-dorsal semicircular ridge like *steeleae*. Synthorax black to well below humeral suture, with narrow green antehumeral stripe about a third the width of the mesepisternum. Sides blue-green with black dorsal dash on first lateral suture and spot on second suture. (Legs lost on the specimen.)

Venation brown. Pterostigma a white-edged black parallelogram, a shorter rhomboid in hindwing, shorter than the subpterostigmal cells. Ac at end of petiole, mid-way between antenodal cross-veins or nearer the second.

Abdomen slender, blue, with continuous black dorsal band on segments 1-7; segment 1 with broad black band to transverse carina; segment 2 with broad band constricted distally; 3-7 with increasing bronze band, constricted basally, expanded before distal end. Segments

8-10 blue-green, 8 with faint narrow incomplete dorsal line, 9 with narrow basal annulus, 10 black dorsally, with a shallow V-shaped invagination.

Anal appendages black and rather like *nodosum*, much shorter than segment 10; superior appendage conical in lateral view, the apex pale, with long broad ventral black tooth. Inferior pale, much shorter, with lateral root-tooth and dorsal brown and black tooth.

Abdomen 23-24 mm, hindwing 13 mm.

Lieftinck (1949: 166) says the marking on segment 8 is variable.

♀ (N. New Guinea): Face and frons orange. Labrum with black basal line and mid-basal dot; postclypeus black with short orange sub-basal band; frons with black basal band. Vertex black with narrowed green postocular spots connected across back of occiput.

Prothorax mainly black with small greenish spots; posterior lobe erect. Mesostigmal lamina coloured as in ♂, with a smaller post-dorsal ridge, and the lateral end slightly raised. Synthorax as in ♂ but paler green. Legs cream with brown posterior stripe on femora, broader on fore femur.

Wings as in ♂.

Abdominal segments 1-6 very like ♂, paler ventrally; the distal segments lost.

Size similar to ♂. Lieftinck (1949) gives the abdomen range from different localities, 20,5-24,5 mm.

Distribution

N. Australia, New Guinea, Sumba, etc.

Habits

Not known to me.

Material examined

National Museum, Bulawayo: Hollandia, N. New Guinea, August-September 1930, leg. W. Stuber.

14. *Aciagrion aciculare* Lieftinck, 1929, *Tijdschr. Ent.* 72: 117-121 (♂♀ W. Java).

No examples in National Museum, Bulawayo.

Lieftinck (1954: 75) gives:

Distribution

Sumatra, Java.

Habits

Weedy ponds and forest marshes: chiefly at low altitudes.

15. *Aciagrion approximans* (Selys)

Pseudagrion microcephalum approximans Selys, 1876. *Bull. Acad. r. Belge. Cl. Sci.*, 42 (2): 507, 508

? *Aciagrion tillyardi* Laidlaw, 1919. *Rec. Ind. Mus.*, 16: 172, 187

Enallagma assamica Fraser, 1919, *J. Bombay nat. Hist. Soc.*, **26**: 877, 888

Type *approximans* in Dresden Museum.

No examples in National Museum, Bulawayo.

Fraser (1933: 342) describes and figures the species.

It is evidently another small blackish species, the anal appendages somewhat like *nodosum* and *hisopa*.

Distribution

Assam; doubtfully Malaysia, ? Sumatra.

16. *Aciagrion azureum* Fraser, 1922, *Mem. Dept. Agric. India (Ent.)*, **7** (7): 51 (♂ Assam)

Type ♂ in British Museum (Nat. Hist.). No example in National Museum, Bulawayo. Fraser (1933: 340) describes this species.

It is a larger species but also blackish, abdomen 30 mm. Anal appendages rather like *pallidum* and *olympicum*.

Distribution

Assam.

17. *Aciagrion borneense* Ris, 1911, *Ann. Soc. ent. Belg.*, **55**: 234-235 (♂ W. Borneo).

No examples in National Museum, Bulawayo.

Lieftinck (1954: 76) gives:

Distribution

Thailand, Malaya, Borneo, W. Sumatra.

Habits

Swamp forest at low altitudes.

18. *Aciagrion fasciculare* Lieftinck, 1934, *Stylops*, **3**: 15-17 (♂ W. Java).

No examples in National Museum, Bulawayo.

Lieftinck (1954: 76) gives:

Distribution

W. Java.

Habits

Marshes and shallow lakes.

19. *Aciagrion feuerborni* Schmidt, 1934, *Arch. Hydrobiol. Suppl.*, **13**: 344-6 (♂♀ N. Sumatra)

No examples in National Museum, Bulawayo.

Lieftinck (1954: 76) gives:

Distribution

N. Sumatra.

Habits

"Forest lakes in submontane areas."

20. *Aciagrion occidentale* Laidlaw, 1919, *Rec. Ind. Mus.*, **16**: 186

Aciagrion paludensis Fraser, 1922, *J. Bombay nat. Hist. Soc.*, **28**: 698, 699

No examples in National Museum, Bulawayo.

Fraser (1933: 335) describes and figures this species.

A small very slender, blackish species. Segments 1-7 broadly black, 8 with basal triangle. Anal appendages shorter than segment 10, the inferiors still shorter.

Distribution

S. India and Pakistan, Ceylon.

Habits

Marshes in jungle.

21. *Aciagrion olympicum* Laidlaw, 1919, *Rec. Ind. Mus.*, **16**: 171, 184-6 (Sikkim)

No examples in National Museum, Bulawayo.

Fraser (1933: 337) describes and figures this species.

Probably the largest Indian species, abdomen 32-34 mm, blackish. Segment 2 with dorsal line and distal triangle; 8-10 blue, segment 10 with dorsal band. Superior appendages as long as segment 10 and evidently somewhat like *hisopa*.

Distribution

E. Himalayas to Sikkim, at moderate altitudes.

Habits

Swamps near jungle.

22. *Aciagrion tillyardi* Laidlaw, 1919, *Rec. Ind. Mus.*, **16**: 187 (♂♀ Assam)

Fraser (1933: 342) places this in synonymy to *approximans*.

No examples in National Museum, Bulawayo.

Lieftinck (1954: 76) gives its distribution as NE. Sumatra. Also Assam.

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