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## SYNOPSIS OF THE DRAGONFLIES (ODONATA) OF CEYLON

by

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Thanks to the important work done by F. F. Laidlaw and F. C. Fraser on the Odonata of India and adjacent countries, we are now tolerably well informed about the occurrence and ecology of these insects in this part of the world.

In his recent paper on the derivation of the Ceylonese Odonata, Laidlaw (1951) has given a very useful analysis of the dragonflies of this island. For details concerning the composition and the origin of the dragonfly fauna, the reader is therefore invited to consult Dr. Laidlaw's interesting account. Consequently, there is no need to comment in great detail upon the collection dealt with in this paper, although in the annotated list that follows I have thought it worth while to include all species known from Ceylon, so as to make the survey up to date.

The present report is based on a collection of Odonata made in 1953, on an expedition to Ceylon by Dr. Fred Keiser, of the Naturhistorisches Museum at Basle, Switzerland. The insects were caught in a great many localities scattered all over the island, including a number of places situated in the northern provinces and the southern peripheral districts of the island, where little or no dragonfly-hunting had been done in the past.

Dr. Keiser's collection means a welcome addition to our knowledge of the regional fauna. There are many hundred specimens, and although very few Platystictidae and Gomphidae are included, the collection in other respects is a fairly representative one, comprising 65 species in all, or about 60% of the total. Apart from two species that appear to be new to science, it contains also a few little known forms, which are commented upon below.

In the present paper 107 species are recorded as occurring in Ceylon, a number very nearly the same as that mentioned by Laidlaw, who gave 100,

allowing for a few doubtful entries. Four previously recorded species, viz., *Elattonneura leucostigma* (Fraser), *Onychargia atrociana* Selys, *Indothemis caesia* (Ramb.), and *Brachythemis contaminata* (F.), were apparently overlooked, while on this occasion one already described species, *Anax indicus* Lieft., and two novelties, could be added to the list. On the other hand, it was thought best to exclude *Aciagrion hisopa* (Selys), as its occurrence in the island needs justification.

Species indicated by a dagger (†) are peculiar to Ceylon, while those marked with an asterisk (\*), either endemic or not, are not represented in the present collection.

The types of the new species are deposited in the Naturhistorisches Museum at Basle, while paratypes and a few duplicate specimens are in the Rijksmuseum van Natuurlijke Historie at Leiden.

My best thanks are due to the authorities of the Naturhistorisches Museum at Basle for the opportunity of studying the present collection and for their permission to retain some duplicate specimens.

#### Subordo Zygoptera

#### Family Chlorocyphidae

##### †1. *Libellago adami* Fraser

1 ♂, 3 ♀, Kandy (C.P.), 10.viii; 2 ♂, 1 ♀, Weragamtota (C.P.), 13.ix; 1 ♀, Yala (S.P.), 22.x; 1 ♂, Peradeniya (C.P.), 22.xii.1953.

This species was described almost simultaneously by Fraser (1939, pp. 23-24, fig. 1) and Lieftinck (sub *miae*, 1940, pp. 84-88, fig. 1), after specimens captured near Haragama and Nalanda (C.P.). Most closely related to *finalis* (Selys), which is the least common of the three endemic species of *Libellago* in Ceylon.

##### †2. *Libellago finalis* (Selys)

5 ♂, 1 ♀, Welimada (Uva), 24. ix.1953; 3 ♂, Hindagala (C.P.), 1.x.1953.

##### †3. *Libellago greeni* (Laidlaw)

1 ♂, Kandy, Pitakanda (C.P.), 19.vi.1953.

##### \*4. *Libellago indica* (Fraser)

Reported by Laidlaw (1924, p. 354, fig. 6, sub *Micromerus lineatus*) from Haragama (C.P.), but never found since. Though obviously nearly allied with the southeast Asiatic *lineata* (Burm.) and considered only subspecifically distinct by most previous workers on the genus, I believe *indica* to be a good species, as there is no geographical region of overlap and intermediate forms are not known.

## Family Epallagidae

†5. *Euphaea splendens* Selys

A series of both sexes was accumulated from various montane and hill stations where rapid streams were investigated in search of dragonflies.

## Family Agriidae (Calopterygidae auct.)

†6. *Vestalis (Vestinus) apicalis nigrescens* Fraser

Collected in various localities all over the island. The subspecies is confined to Ceylon, cf. Lieftinck (1940, pp. 81-82).

7. *Neurobasis chinensis chinensis* (L.)

A widely distributed species. Several specimens of both sexes were taken.

## Family Lestidae

\*†8. *Lestes divisa* Selys

Confined to the hilly tracts of Ceylon and closely allied to *gracilis*, but evidently a scarce and local insect.

9. *Lestes elata* Selys

Many specimens, including both sexes, from several localities.

†10. *Lestes gracilis gracilis* Selys

A good series from the mountain region of Nuwara Eliya, Nanu Oya and Hakgala (C.P.).

I have followed Ris's treatment of this polytypic species (1916, pp. 13-15), the typical race being confined to Ceylon.

\*†11. *Lestes orientalis* Selys

Of this large-sized and somewhat aberrant species, Fraser (in the F.B.I. series) remarks: "This species, which greatly resembles a *Megalestes*, must be either extremely local or very rare, as it has never been taken since the type was procured in 1858", now almost a century ago.

\*12. *Lestes praemorsa decipiens* Kirby

Originally described from Ceylon by Kirby (1893, pp. 565-566) and later re-defined by Lieftinck (1949, pp. 33-36, figs. 17-18). Ranges from India through Burma, Siam and Tonkin into Malaysia as far east as Borneo and Sumba I.

## Family Platystictidae

†13. *Platysticta apicalis* Kirby

1 ♂ (ad.), Koslanda, Diyaluma Falls (Uva), 4.ix.1953.

This and the next species are now well-characterized and can easily be held apart since Fraser (1933a) published valuable re-descriptions and good

figures of the genital organs. A very good figure of this fine species was given by Kirby (1893, pl. 42 fig. 1).

\*†14. *Platysticta maculata* Selys

Figured also by Kirby (1891, pl. 20 fig. 3-3a, sub *P. greeni*).

\*†15. *Drepanosticta adami* (Fraser)

\*†16. *Drepanosticta austeni* Lieftinck

\*†17. *Drepanosticta digna* (Selys)

†18. ***Drepanosticta fraseri***, sp. n. (fig. 1).

2 ♂, Kandy, Deiyannewela (C.P.), 17.x. & 2.xi.1953.

Both specimens are adult, but in rather poor condition.

Male (holotype). — Labium dirty brownish-yellow, its median lobe brown. Mandibles brownish-black with a creamy exterior spot about half-way its length; genae, most of the labrum, and the anteclypeus wholly, creamy-yellow intermingled with light blue, the anterior border of the labrum sharply defined black. Postclypeus and frons glossy bronze-black, the surface of frons very flat and almost polished. Vertex and epicranium dull bronze-black, lustreless. Occiput and rear of the head also dark, but the latter with distinct metallic reflections. Antennae with the first joint brownish-black, second joint light brown tipped with yellow, the remaining joints missing. Parorbital carina well developed, narrow, rounded; transverse postoccipital carina acute, the lateral extremities distinct, acute-angulate.

Prothorax entirely dull brownish-black save a small, diffuse, light brown dot situated above the coxa of the anterior leg at middle of propleuron; pronotum raised on each side of the middle so as to form two robust rounded tubercles; anterior and posterior lobes rounded, of simple structure, the former elevated with slightly backwardly directed margin, the latter depressed, its border hardly noticeably elevated.

Synthorax, as far down as the second lateral suture, dull bronze-black, the dorsum with low metallic-green lustre; median carina black, as are also the ante-alar triangles. An almost complete blue band, widest above and joining the first lateral suture, extends from just below the obscured upper border of the metepisternum downwards to the spiracle, where it merges into the dirty ochreous colour of the metinfraepisternite and the metepimeron, the lower (posterior) two-fifths of the metepisterna thus remaining bronze-black. Mesinfraepisterna, the coxae of legs, and the whole metepimeron and under surface of thorax dirty pinkish-ochreous.

Legs pale brownish-yellow, the carinae, spines, and apices of all femora narrowly brown; tarsal claws ferruginous. Wings brownish all over the

membrane. Accessory basal postcostal nervure situated slightly distal to the middle between base of wing and  $Ax_1$ .  $Ac$  oblique, placed mid-way between  $Ax_1$  and  $Ax_2$ ; it meets the wing margin well before the production of the proximal side of  $q$ , joining  $Ab$  at margin under an obtuse angle.  $Ab$  almost 2 times longer than  $Ac$ .  $Cu_1$  reaching the hind margin at 5-6 cells distal to level of subnodus. Postnodals 16-18 on fore, 15-17 on hinder wing.  $M_3$  arises a little proximal to or nearly at the subnodus; origin of  $Rs$  very near to that of  $M_3$ , either at or slightly beyond the subnodus.  $M_2$  originates at the 6th postnodal on fore, at the 5th on the hinder wing.  $M_{1a}$  2 cells distal to  $M_2$  in all wings. Two postquadrangular antenodal cells. Pterostigma sub-rectangular, expanded distally, inner angle but slightly oblique, proximal side not quite  $1\frac{1}{2}$  times shorter than anal side, which is markedly longer than

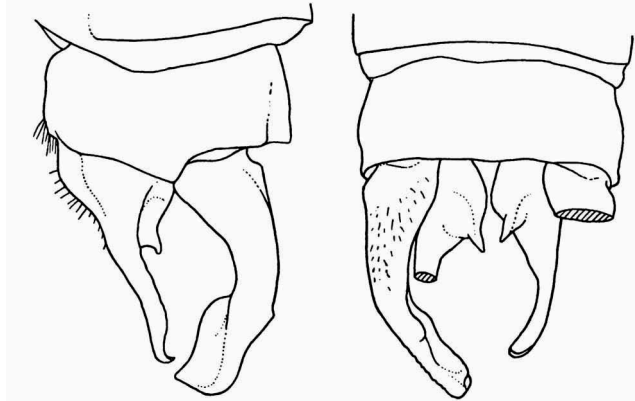


Fig. 1. *Drepanosticta fraseri*, sp. n. Ceylon. Left lateral and dorsal view of ♂ anal appendages. Right sup. app. omitted.

the costal side; distal side slightly convex and forming approximately a right angle with the anal side. Colour dark chocolate-brown between black nervures and surrounded by a fine yellowish line.

Abdomen long and of very slender build, the posterior segments markedly expanded in both dimensions. Segm. 1 bronze-black, only the lower part of the sides yellowish; 2 similarly coloured with a yellowish stripe, incomplete posteriorly, along ventral margin of the tergite; remaining segments 3-7 very dark brown, almost black, each carrying a light ochreous basal ring, that on 3 narrowest and almost interrupted mid-dorsally, those on succeeding segments 4-7 progressively larger, measuring about 0.7, 0.9, 0.9 and 0.7 mm, respectively. Segm. 8-10 black; 8 with almost rectangular blue mark occupying the distal one-third of its dorsum, the intersegmental membranes and the whole of the back of 9 and 10 likewise clear blue. Sternites obscured, but ventral surface of 10 ochreous-yellow (possibly blue in life?).

Anal appendages: superior pair dark brown, their apical one-third including the small and rounded postmedian tubercle, light brown; inferior pair with the expanded basal portion yellow beneath, the finger-shaped apical processes yellowish-brown (fig. 1).

Measurements: abd. + app. 42.0-43.5, hind wing 26.0-26.5 mm.

Female unknown.

This new species is a *Ceylonosticta* Fraser, a genus which I am unable to differentiate from *Drepanosticta* Laidlaw, and which I therefore consider synonymous with the latter.

By the character of the origin of the rather closely approximated veins  $M_3$  and  $R_s$  before and after the subnodus, respectively, this species does not fit precisely into group I of *Ceylonosticta*, as defined by Fraser (1933a, p. 203), but in other respects it clearly approaches most closely the cluster of five allied species constituting it. Of these, *tropica* and *subtropica* have the anterior lobe of the prothorax armed with long stalked processes and hence do not concern us here, while the other three are without such appendages. The new species differs from *adami* in the absence of blue colour on the dorsum of the prothorax and at the base of abd.-segment 8; also, *adami* lacks an upper spine or knob at the angulation of the appendix superior and is further distinguished by the curious spoon-shaped dilatation of the inferior appendages.

The second species, *montana*, is at once distinguished from *fraseri* by the labrum not bordered with black and by the presence of a large, obtusely pointed tooth along the upper border before the broad apical portion of the appendix superior. Lastly, *submontana*, has the hinder part of the vertex and the adjacent part of the occiput coloured a warm reddish brown at the middle, whereas in *fraseri* these parts are dull bronze-black; the first mentioned species also has a robust obtuse tooth on the upper border of its superior appendages which in *fraseri* is reduced to a low blunt tubercle; moreover the apical blue dorsal mark on segment 8 in *submontana* is triangular whereas in *fraseri* this spot is straight cut off anteriorly and rectangular in shape. Yet, these two species are evidently closely allied.

I have dedicated this handsome species to Dr. F. C. Fraser, in appreciation of his valuable work on Indian and Ceylonese dragonflies.

\*†19. *Drepanosticta hilaris* (Selys)

\*†20. *Drepanosticta lankanensis* (Fraser)

\*†21. *Drepanosticta montana* (Selys)

†22. *Drepanosticta nietneri* (Fraser)

1 ♀, Hindagala (C.P.), 1.x; 1 ♂, Ratnapura (Sab.), 8.x; 1 ♂, Carney (Sab.), 9.x.1953. All in poor condition.

\*†23. *Drepanosticta submontana* (Fraser)

\*†24. *Drepanosticta subtropica* (Fraser)

†25. *Drepanosticta tropica* (Selys)

1 ♀, Hakgala (C.P.), 31.v.1953.

\*†26. *Drepanosticta walli* (Fraser)

#### Family Protoneuridae

†27. *Elattonneura caesia* (Selys)

2 ♂, Kandy, Roseneath (C.P.), 12 & 15.vii.1953.

†28. *Elattonneura centralis* (Selys)

A number of specimens of both sexes from various localities.

\*†29. *Elattonneura leucostigma* (Fraser)

Described by Fraser (1933b) from examples taken near Nuwara Eliya (C.P.).

†30. *Elattonneura tenax* (Selys)

4 ♂, Madugoda (C.P.), 15.ix.1953.

This handsome insect has been well figured by Kirby (1893, pl. 41 fig. 2).

†31. *Prodasineura sita* (Kirby)

Apparently a very common species throughout the island in suitable places. A good series of both sexes were collected.

#### Family Platycnemididae

32. *Copera marginipes* (Ramb.).

Common everywhere and collected all over the island.

#### Family Coenagriidae (Agrionidae auct.)

##### Subfamily Argiinae

\*33. *Onychargia atrocyana* Selys

Recorded by Kirby (1893, p. 563) from Udagama and also mentioned by Fraser (1933-1936) as occurring in Ceylon.

##### Subfamily Coenagriinae (Agrioninae auct.)

34. *Pseudagrion malabaricum* Fraser

1 ♀, Negombo (W. P.), 5.viii; 1 ♂, Rajakadalawa (N.W.P.), 23.viii. 1953.

35. *Pseudagrion microcephalum* (Ramb.)

Many examples were taken in several localities.

†36. *Pseudagrion rubriceps ceylonicum* (Kirby)

Also a common insect, of which both sexes were collected in low country. The subspecies (Kirby, 1891, pp. 205-206, pl. 20 fig. 4, sub *Archibasis ceylonica*) is confined to Ceylon, cf. Laidlaw (1919, p. 194) and Lieftinck (1940, pp. 92-93).

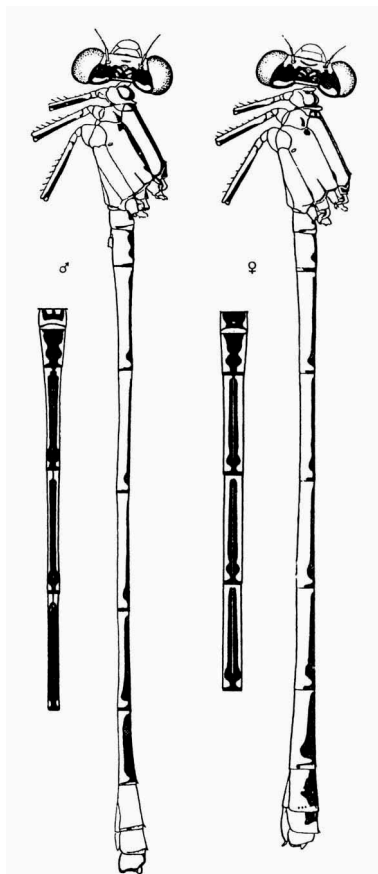


Fig. 2. *Coenagrion malayanum* (Selys). Java. Body colour-pattern of both sexes, and dorsal view of segm. 1-5 of abdomen (♂ Babakan, South Java; ♀ Mt. Ardjuno, North central Java).

\*37. *Ceriagrion cerinorubellum* (Brauer)

38. *Ceriagrion coromandelianum* (F.)

Occurs commonly in India and Ceylon. A series including both sexes was taken in various places.

For a re-description, accompanied by drawings of the anal appendages of the ♂ from Ceylon, the reader is referred to Lieftinck (1951, fig. 1).



39. *Coenagrion malayanum* (Selys) (fig. 2)

7♂, 3♀, Tissamaharama (S.P.), 24.x; 1♀, Kantalai (E.P.), 12.ix. 1953.

Previously recorded for Ceylon by Ris (1908, pp. 310-313) and Laidlaw (1924, p. 372).

The present individuals are inseparable from a series of Javan topotypes in the Leiden Museum collection (fig. 2). The species would seem to correspond more closely to the amended diagnosis of *Cercion* Navàs (genotype: *Agrion lindenii* Selys) than it does to that of typical *Coenagrion*. The wing venation and general build of the ♂ anal appendages, however, suggest a fairly close relationship with a sino-japanese cluster of aberrant members, of which *Agrion hieroglyphicum* Brauer seems to be the first described species. For a discussion of these forms, see Ris (1916, pp. 29-39, figs.), and for details of the wing venation of *Coenagrion*, see Lieftinck (1953, pp. 160-161, figs.).

A noteworthy character of ♂ and ♀ *malayanum* — and perhaps of other species of the same group as well — are the very strong, widely spaced spines which are situated along the posterior border of the 8th and 9th abdominal tergites. By this peculiar feature the insect is easily held apart from blue-bodied species of *Pseudagrion*, or *Aciagrion*.

Through the courtesy of the authorities of the Calcutta Museum, I had the opportunity some years ago of re-examining the contents of a tube with two examples of "*Enallagma malayanum*" from Nagpur (C. P., northern India), a species discussed also by Laidlaw (1919, p. 183). It was my hope that one of these spirit specimens would turn out to be the supposed allotype ♀, of which Laidlaw wrote that it possessed "a large, ventral, apical, spine on segment 8 of the abdomen". This statement lent much weight to the supposition that *malayanum* was a genuine *Enallagma* until Schmidt (1934, pp. 350-352, figs. 50-52) established the fact that the true ♀ of *malayanum* which he described from Java, had no such spine, the species, accordingly, being transferred to *Coenagrion* with some misgivings. The discovery of more females in Java has confirmed Schmidt's opinion beyond any doubt, so that we may safely conclude that Laidlaw's specimen from N. India was incorrectly determined. Unfortunately, the Nagpur specimens above referred to were the only examples still available, all remaining "*Enallagma*" in the Indian Museum, including those discussed by Laidlaw, being destroyed. Moreover, these two rescued individuals are not *malayanum* but clearly belong to *Enallagma parvum* Selys! As this species is also recorded for Ceylon, I have taken the present opportunity of including sketches of the ♂ anal appendages under the heading of the next species.

\*40. *Enallagma parvum* Selys (fig. 3).

Not mentioned in Laidlaw's published reports on Ceylonese dragonflies, but Fraser records it as occurring in Ceylon in the Fauna of British India. Otherwise known also from India and Burma. I possess a ♂ from Maymyo, Upper Burma, presented to me by Dr. Laidlaw, while the accompanying sketches (fig. 3) were drawn from a spirit specimen kindly sent to me for inspection by the Zoological Survey of India and returned to the Calcutta Museum, many years ago. This example, along with a ♀ of the same species, was accompanied by the following indications on the labels: "India, C.P., Nagpur, 28.ii-1.iii.1919/C.P.4-F.H.G./Zool. Survey India,

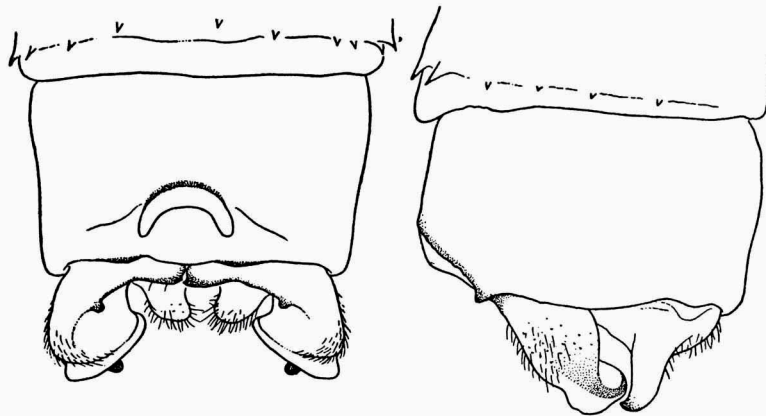


Fig. 3. *Enallagma parvum* Selys. Nagpur (C. P.), India. Dorsal and right lateral view of ♂ anal appendages.

*Enallagma malayanum* Sel., det. F. C. Fraser, no. 1406/H.2". The insects were very much discoloured, but the genital organs of both ♂ and ♀ were still in excellent condition, as is shown in fig. 3 for the ♂. The ♀ possessed a well-developed ventral apical spine on the 8th abdominal sternite.

41. *Aciagrion occidentale* Laidlaw

The present collection contains a series including both sexes from many localities and taken in almost all provinces of the island.

Originally described from Bombay and the Cochin State in India as a race of *hisopa* (Selys), but subsequently also reported for Ceylon, where it is quite common. The occurrence in Ceylon of *hisopa* is very doubtful and I have omitted this species from the list, pending its discovery and an examination of fresh examples from the island.

42. *Ischnura aurora aurora* Brauer

A common and widely distributed insect, represented in the present collection by many individuals.

43. *Ischnura senegalensis* (Ramb.)

Found abundantly all over the island.

\*44. *Agriocnemis femina* (Brauer)

The occurrence in Ceylon of this widespread species is called in question by Fraser, who remarks that, although he had seen many collections from the island, he never once met with it from there. This, in my opinion, should be no reason for its absence in Ceylon, as *femina* is an easily overlooked insect. All the same, Ris (1916, p. 23) records it for South Ceylon, where in May, 1889, Fruhstorfer took a large series of both sexes. On this evidence we may, I believe, safely include it in our list.

45. *Agriocnemis pygmaea* (Ramb.)

Numerous specimens, many taken in copula, were collected in various places scattered all over the island.

\*46. *Mortonagrion* spec.

Position doubtful. According to Laidlaw (1924, p. 373), who described a ♀ from Ambalangoda taken by Green, this is probably a *Mortonagrion*.

Subordo Anisoptera

Family Libellulidae

Subfamily Tetrathemistinae

\*†47. *Tetrathemis yerburyi* Kirby

An excellent picture of the ♀ of this peculiar little species was offered by Kirby (1893, pl. 41 fig. 4).

\*†48. *Hylaeothemis fruhstorferi* (Karsch)

As has been pointed out by Fraser (1946, pp. 97-100), who gave a revision of the known members of *Hylaeothemis*, the Ceylonese species *fruhstorferi* has proved quite different from its Indian relatives: the one occurring in Peninsular India, originally thought to be identical with *fruhstorferi*, being recognized as a distinct species, which was renamed *indica* Fraser.

49. *Lathrecista asiatica asiatica* (F.)

1 ♂, Yala (S.P.), 22.x.1953; 1 ♀, Elephant Pass (N.P.), 28.i.1954. Apparently an insect of wide distribution in Ceylon, but probably nowhere common and only found in low country.

50. *Cratilla lineata calverti* Förster

1 ♂, Kandy, Roseneath (C.P.), 15.vii.1953.

This single specimen is fully matured and does not differ in any way

from examples in our collection from southern India. The races of this polytypic species have recently been characterized by Lieftinck (1953, pp. 199-206, figs.; ♀ Ceylon).

51. *Potamarcha obscura* (Ramb.)

A large series of both sexes from most collecting localities.

52. *Orthetrum chrysis* (Selys)

1 ♂, Kandy, Pitakanda (C.P.), 19.vi; 1 ♂, Avissawella (W.P.), 7.x.1953.

53. *Orthetrum glaucum* (Brauer)

Common everywhere.

54. *Orthetrum luzonicum* (Brauer)

Apparently also widely distributed over the island, chiefly in submontane and montane regions.

55. *Orthetrum pruinosum neglectum* (Ramb.)

A common species, represented by both sexes.

56. *Orthetrum sabina sabina* (Drury)

Like the last a widely distributed and common insect.

57. *Orthetrum triangulare triangulare* (Selys)

Several males, all from the central, mountainous, stations. Figured by Kirby (1891, pl. 20 fig. 1, sub *O. carnaticum*).

Subfamily Brachydiplacinae

58. *Brachydiplax sobrina* (Ramb.)

1 ♀, Polonnaruwa (N.C.P.), 18.vii; 1 ♂, Negombo (W.P.), 5.viii; 1 ♀, Rajakadalawa (N.W.P.), 22.viii.1953.

Subfamily Sympetrinae

59. *Diplacodes nebulosa* (F.)

A species of low country, collected in various localities.

60. *Diplacodes trivialis* (Ramb.)

Common.

61. *Acisoma panorpoides* Ramb.

Several specimens from different collecting stations.

62. *Crocothemis servilia* (Drury)

A common species, found everywhere near stagnant water.

63. *Indothemis caesia* (Ramb.)

1 ♂, Mannar (N.P.), 9.i.1954.

The only specimen, from the extreme northern part of the island, does not differ from Indian examples in our collection. Characteristic of Peninsular

India and Ceylon, and according to Fraser, also once found near Bangkok in Siam.

\*64. *Indothemis limbata sita* Campion

Originally described from Ceylon, but also occurring in Peninsular India.

65. *Bradinyopyga geminata* (Ramb.)

1 ♂, 2 ♀, Haragama (C.P.), 5.xi.1953 and 2.i.1954.

A good picture of this insect is found in Kirby's paper (1893, pl. 41 fig. 3).

66. *Neurothemis intermedia intermedia* (Ramb.)

A series of both sexes from several localities.

Our specimens exhibit considerable variation in size as well as in the depth of the basal marking of the hind wing.

67. *Neurothemis tullia tullia* (Drury)

Many specimens of both sexes.

68. *Brachythemis contaminata* (F.)

Many specimens from various localities in the plains.

69. *Rhodothemis rufa* (Ramb.)

2 ♀, Rajakadaluwa (N.W.P.), 23. & 24.viii.1954.

For a good picture of the ♀ insect, the reader should consult Kirby (1893, pl. 42 fig. 3, sub *Orthetrum oblitum*).

70. *Sympetrum fonscolombi* (Selys)

A few examples, all from Nuwara Eliya (C.P.), 28.v.-2.vi.1953.

Subfamily Trithemistinae

71. *Trithemis aurora* (Burm.)

A common species, collected in many localities.

72. *Trithemis festiva* (Ramb.)

Like the foregoing found abundantly almost everywhere in the island.

\*73. *Trithemis kirbyi* Selys

Recorded for Ceylon by Kirby, but its occurrence in Ceylon needs justification. Apparently a very local insect.

74. *Trithemis pallidinervis* (Kirby)

A few specimens of both sexes from four provinces.

Subfamily Onychothemistinae

†75 *Zygonyx iris ceylanica* (Kirby)

1 ♂, Koslanda, Diyaluma Falls (Uva), 4.ix.1953; 1 ♂, Wewelwatta (Sab.), 10.x.1953.

\*76. *Onychothemis testacea ceylanica* Ris

I have not seen examples from Ceylon.

## Subfamily Zygommatinae

\*77. *Zygomma petiolatum* Ramb.78. *Tholymis tillarga* (F.)

Like the foregoing a species with crepuscular habits.

79. *Pantala flavescens* (F.)

Common everywhere.

\*80. *Hydrobasileus croceus* (Brauer)

An excellent picture of the ♀ is included in Kirby's paper (1893, pl. 41 fig. 1, sub *H. extraneus*).

81. *Tramea basilaris burmeisteri* Kirby

A few males from Mannar and Elephant Pass (N.P.).

82. *Tramea limbata similata* (Ramb.)

A small series from Mannar (N.P.), Mihintale (N.C.P.), Kandy (C.P.), and Tissamaharama (S.P.).

\*83. *Rhyothemis triangularis* Kirby84. *Rhyothemis variegata variegata* (L.)

A series of both sexes from various stations.

## Subfamily Urothemistinae

\*85. *Aethriamanta brevipennis* (Ramb.)

Reported from Ceylon about a century ago, but never found since.

86. *Urothemis signata signata* (Ramb.)

A small series of both sexes from Rajakadaluwa (N.W.P.), Inginiyagala (Uva), and Maha Oya (E.P.).

87. *Macrodiplax cora* (Brauer)

3 ♂, Negombo (W.P.), 4.viii.1953.

Well figured by Green, in Kirby (1893, pl. 42 fig. 2, sub *Urothemis vittata*).

## Family Corduliidae

## Subfamily Epophthalmiinae

\*†88. *Macromia zeylanica* Fraser†89. *Epophthalmia vittata cyanocephala* (Hagen)

1 ♀ (ad.), Polonnaruwa (N.C.P.), 18.vii.1953.

Family Gomphidae  
Subfamily Lindeniinae

90. *Ictinogomphus rapax* (Ramb.)

A small series of both sexes from different localities in low country.

\*†91. *Gomphidia pearsoni* Fraser

Subfamily Epigomphinae

\*†92. *Macrogomphus lankanensis* Fraser

Known only from Murunkhan (N.P.) and Haragama (C.P.), but not represented in the collection dealt with in this paper.

†93. ***Macrogomphus annulatus keiseri*** subsp. n. (fig. 4)

1 ♂ (ad.), Weragamtota (C.P.), "am Licht", 14.ix.1953.

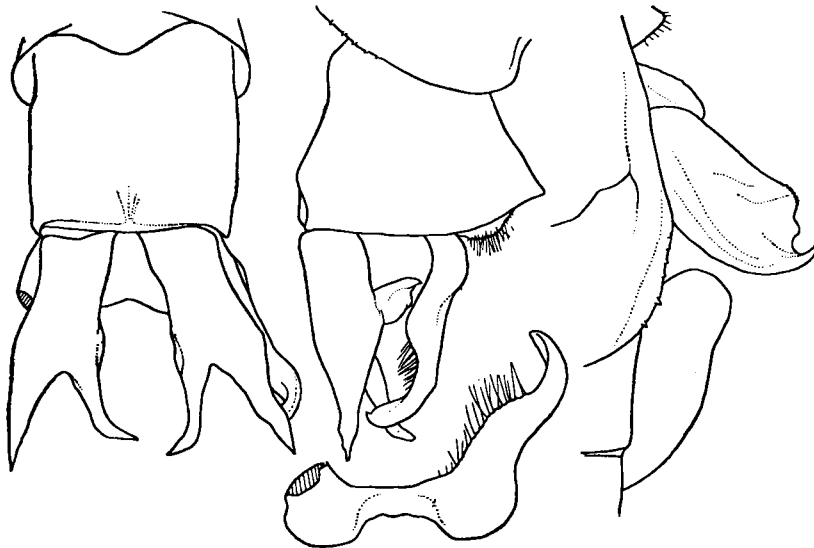


Fig. 4. *Macrogomphus annulatus keiseri*, subsp. n. Ceylon. Dorsal and right lateral view of ♂ anal appendages, ventral aspect of inferior appendage (left branch omitted), and right lateral view of ♂ genitalia (penis omitted).

Male (holotype).— Labium deep black, the lateral lobes lemon-yellow. Labrum black marked with two very large, sub-rectangular, greenish-yellow spots which are narrowly separated by black in the median line, the anterior border of the labrum remaining broadly black. Visible parts of the mandibles citron-yellow; genae dark brown save a diffuse yellowish central spot placed on its distal portion. Anteclypeus dark brown with a tiny and ill-defined greyish T-spot; postclypeus deep black with a large, sub-circular, greenish-yellow spot on either side filling out most of the lateral divisions

and connected with one another along anterior border by a fine yellow line. Frons black, the horizontal surface broadly greenish-yellow so as to form a transverse bar overlapping slightly on to the vertical surface and, posteriorly, invaded by a small, triangular, median forward prolongation of the transverse black band along base. Vertex, antennae, and epicranium black, the latter with its antero-lateral borders slightly raised and swollen, its surface smooth, finely longitudinally wrinkled, carrying an indistinct brownish-yellow median spot. Occipital plate and rear of the head black, the former fringed with light brown hairs.

Prothorax dull black with a yellow stripe along border of anterior lobe, vestiges of pale lateral spots just dorsal to the coxae, and a somewhat larger yellowish dot on either side of the middle along posterior lobe.

Synthorax deep black marked with bright greenish-yellow quite similarly to typical *annulatus* except that the two broad light-coloured lateral bands are relatively narrower, the black interspace distinctly wider than the mesepimeral band instead of being approximately equal in width to it; yellow spots on the infraepisternites similar in size to typical *annulatus*. Ventral surface black.

Legs, with the exception of small rusty-brown spots on the coxae, entirely black, the femora pruinulent blue.

Wings slightly flavescent all over the membrane, definitely more densely reticulated than in *annulatus*. Fore wing with 3, hind wing with 2 cubito-anal cross-veins in addition to *ti*. Nodal index  $\frac{12.19.19.13}{13.14.13.12}$ . Pterostigma

braced, deep black in colour, covering 5 cells. Anal triangle three-celled.

Abdomen deep black marked with bright greenish-orange, the shape of the light spots similar in principle to that of the typical subspecies, but all — except the antero-lateral mark on segm. 2 — a little smaller in size, the basal annules on 5-7 interrupted by black on mid-dorsum (broadly so on 7) and the lateral spots on 8 attaining only one-third of the segment's length when viewed from aside. Baso-lateral spots of segm. 9 placed transversely and lacking a tapered posterior off-shoot; segm. 10 black.

Anal appendages shaped as shown in fig. 4; colour deep black, the upper surface of the superiors each with a large yellow patch which, however, is restricted to the main body of the appendage. (Left branch of app. inf. broken off and lost.)

Measurements: abd. + app. 52, hind wing 38, pt. fw. 3.9, pt. hw. 4.0 mm.  
Female unknown.

Although one species of *Macrogomphus*, viz., *lankanensis* Fraser, was



already known to occur in Ceylon, the South Indian species *annulatus* (Selys) had not so far been taken in the island. The present individual brings the Ceylonese fauna in yet closer relationship to that of the Indian continent, for *keiseri* is doubtless the insular representative of *annulatus*. Of this species I have for comparison a good ♂ from Poona, Deccan (Western Ghats, India) taken in August, 1918, by Dr. Fraser, to whom I am indebted for it. The specimen from Ceylon agrees in all essential features with *annulatus*, except that it has the yellow markings of the thorax and abdomen more restricted and of a darker tint, and also in being far superior in body-size. Moreover, it differs from typical *annulatus* by having the wings more closely reticulated, the higher nodal index and the presence of 3 *Cux* in the fore wings instead of only 2 constituting the most noteworthy points of distinction. I am unable to judge whether the slight differences found in the structure of the posterior genital hamule and anal appendages are constant or not, but I should think that the Ceylonese insect is best considered a subspecies of *annulatus*, which originated from the mainland comparatively recently and yet became isolated long enough to allow for its differentiation into an insular subspecies.

I have named this fine subspecies in honour of its discoverer, the well-known dipterologist Dr. Fred Keiser, of the Basle Museum.

†94. *Microgomphus wijaya* Lieftinck  
2 ♀ (ad.), Haragama (C.P.), 29.xii.1953.

Originally described from the same locality, the ♂ being distinguished from other species by the non-bifid appendix inferior.

\*†95. *Heliogomphus ceylonicus* (Selys)

\*†96. *Heliogomphus lyratus* Fraser

\*†97. *Heliogomphus nietneri* (Selys)

\*†98. *Heliogomphus walli* Fraser

#### Subfamily Gomphinae

†99. *Cyclogomphus gynostylus* Fraser

1 ♂, 1 ♀ (in cop.), Kandy, Wace Park (C.P.), 25.v; 1 ♂, Kurunegala (N.W.P.), tank, 23.vi.1954.

This peculiar species breeds in marshes and sluggish streams.

\*†100. *Burmagomphus pyramidalis sinuatus* Fraser

Typical *pyramidalis* Laidlaw occurs in western Peninsular India. The Ceylonese representative was described from a single ♀, but after the discovery of the ♂ it was recognized as a subspecies of *pyramidalis*, cf. Lieftinck (1940, pp. 104-111, figs.).

†101. *Paragomphus henryi* (Laidlaw)

1 ♂ (juv.), Kandy, Lady Blake's Drive (C.P.), 11.vi; 1 ♂ (juv.), Ettampitiya (Uva), 25.ix.1953.

\*†102. *Megalogomphus ceylonicus* (Laidlaw)

#### Family Aeshnidae

##### Subfamily Gynacanthinae

\*103. *Gynacantha* spec. indet.

The identity of the only species of *Gynacantha* inhabiting Ceylon is uncertain as it rests on three doubtful records. Kirby (1893, p. 558) mentions a specimen from Negombo, without indication of the sex, sub *Acanthagyna subinterrupta*, and a specimen of *Acanthagyna furcata*, also from Ceylon, in the British Museum. Lastly, Laidlaw (1924, p. 338) had a ♀ taken near Chilaw, which he identified with *G. hyalina*. Now *G. subinterrupta* Ramb. does not occur in India; *G. furcata* Ramb. was based on a ♀ from Borneo; its type being lost, all we can say about it is that it is probably the same species as *bayadera* Selys & Ris. The third species, *G. hyalina* Selys, was described from Luzon (Philippine Is.) and, though it has repeatedly been reported from India, these Indian examples are probably not conspecific with the Philippine insect.

##### Subfamily Aeshninae

\*104. *Hemianax ephippiger* (Burm.)

Reported by Kirby (1893, p. 558) from Trincomali, 1892, but apparently never again captured in Ceylon.

\*105. *Anax guttatus* (Burm.)

Known from several localities in Ceylon. I took two males near Passara (Uva), 20.ix.1938, where *guttatus* flew in company of *A. immaculifrons* (Ramb.).

\*106. *Anax immaculifrons* (Ramb.)

107. *Anax indicus* Lieftinck

1 ♂ (ad.), Elephant Pass (N.P.), 28.i.1954.

Not recorded hitherto for Ceylon. Since describing this very distinct species (Lieftinck, 1949, pp. 589-591), I have examined one ♂ labelled "Ceylon  $\frac{62}{52}$ ", and one ♀ "Ceylon, Trincomalee, Yerbury, 24.xi.1891", both in the British Museum collection. There is another ♂ in the same collection

from Poona, India, v.1918, F. C. Fraser. Probably several more examples of *indicus* are mixed with *guttatus* and available for study in other museums and private collections.

In a letter dated June 2, 1947, Mr. John Cowley supplied me with the following interesting notes on Indian individuals of *Anax* previously labelled *guttatus* but recognized by him as belonging to two different species, e.g., *guttatus* and *indicus*: —

“1 ♂ *A. guttatus* det. Fraser, Upper Paralai, Annaimallai Hills, India, x.1932 (F. C. Fraser leg.). This is *indicus* Lieft.; the two pairs of post-jugal spots are broadly fused to form a continuous band on 6, 7 & 8, also the orange spot on 9 is clearly formed by the fusion of a very small basal and a large apical spot; intercarinal pale spots on 4-8; first elongate cell adjacent to membranule only weakly fluorescent; abd. + apps. 51 + 5.5, hw. 51 mm.

1 ♂ *A. guttatus* det. Fraser, Vizagapatam, India, 18.x.1927 (F. C. Fraser leg.). This is *indicus* Lieft.; notes as for the preceding specimen except that the postjugal spots are only just fused on 6, and prejugal spot absent from 8; abd. + apps. 54 + 6, hw. 49 mm.

1 ♂ *A. guttatus* det. Fraser, Fraserpet, Coorg, India, 26.ix.1923 (F. C. Fraser leg.). This is *guttatus* as distinguished by you; it has the first elongate cell adjacent to membranule markedly ferruginous; abdominal spots more greenish-yellow, especially the prejugal and basal postjugal; prejugal 3-8, but very small on 8, basal and apical postjugals 3-9, not fused, basal one small on 7-8, very small (only a dot) on 9; 10 unmarked or at most with only an obscure brownish dot; intercarinal pale spots not very distinct (discoloured?), only definitely visible on 5-6, and perhaps also on 4; abd. + apps. 58 + 5, hw. 51 mm.

1 ♀ Khasi Hills, Assam (N.N. Dunnai vend.): this is evidently *guttatus* from the colouration of frons, thorax, membranule and (ferruginous) elongate cell adjacent thereto; abdomen badly discoloured, but postjugal spots not fused on any segments; abd. (without apps.) 51, hw. 51.5 mm.

I have no doubt at all that you were quite right in distinguishing *guttatus* and *indicus* as two distinct species. I have compared the ♂♂ together: some apparent differences in the penis (dry, not dissected out, only 1 ♂ of each species) may be due to shrinkage; the spine of the anterior lamina in *indicus* seems to be broader than in *guttatus*; *guttatus* has sup. app. less abruptly broadened, inf. app. more narrowed apically so that its apical teeth are closer together with a deeper sulcus between them (2 ♂ *guttatus* from Formosa agree in this).”

Our present example from Elephant Pass is quite typical and agrees with the description of the ♂ in Mr. Cowley's collection from the Annaimallai Hills, cited above. Its measurements are: abd. + apps. 53 + 6, hind wing 50 mm.

Both sexes of *indicus* are readily distinguished from *guttatus* by the absence of a dark spot adjacent to the membranula of the posterior wing, by the different colour and fusion of the postjugal light marks on the posterior abdominal segments; and also by the anal appendages, which are shaped quite differently, these organs in the ♀ of *indicus* being decidedly more elongate and more tapered apically than in *guttatus*. It is now evident also, that Kennedy's sketches (1934, p. 354, figs. 13-14) of the ♂ anal appendages of supposed *A. guttatus*, drawn from a specimen caught by Dr. Fraser at Mercara, near Coorg (India), are clearly of *indicus*, not of "*guttatus*?". At the same time, I am satisfied that the discovery, many years later, of *indicus*, at once explains Kennedy's doubt about the correctness of the identification of his "*guttatus*".

From the material examined it is beyond question that *guttatus* and *indicus* may occur together in one locality, in India as well as in Ceylon.

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NOTE ON *LANTHANUSA DONALDI* LIEFTINCK:  
A CORRECTION

On page 164 of the previous volume of this journal (Zoologische Mededelingen, 1955, vol. XXXIII, No. 18), at the end of my description of *Lanthanusa donaldi*, last paragraph, I unfortunately committed a regrettable error in connection with the derivation of the name for this species. Advantage is taken of the present opportunity to adjust this involuntary confusion and to announce that the new species was indeed destined to be named in honour of my distinguished colleague Mr. Douglas E. Kimmins, of the British Museum (Natural History), in London. Although questions like this would rather seem to fall under the jurisdiction of metonymy and do not affect nomenclature — factum fieri infectum non potest! — I am pleased all the same to correct the mistake.