

SHORT COMMUNICATIONS

PARAGOMPHUS CAMPESTRIS SPEC. NOV., A NEW ENDEMIC DRAGONFLY FROM SRI LANKA (ANISOPTERA: GOMPHIDAE)

M. BEDJANIČ

Rakovlje 42/A, SI-3314 Braslovče, Slovenia
matjaz_bedjanic@yahoo.com

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The new sp. is described and illustrated. Holotype ♂: Mawanella, Hingula Oya; Kegalle distr., Sabaragamuwa prov.; 22-IV-1976; deposited in State Collection of Zoology, Munich. The currently known information on its distribution, phenology and ecology is provided and discussed.

DISCUSSION

Altogether 14 species of Gomphidae have so far been reported from Sri Lanka and with the exception of *Ictinogomphus rapax* (Rambur, 1842) all are endemic to the island (BEDJANIČ, 2004; BEDJANIČ et al., 2007; DE FONSEKA, 2000; Fraser, 1933, 1934). One of the commonest endemic representatives of the family is *Paragomphus henryi* (Laidlaw in Campion & Laidlaw, 1928), so far the only *Paragomphus* known from Sri Lanka. It is closely related to *P. lineatus* (Selys, 1850), an Oriental species with much wider distribution, found throughout India (FRASER, 1934; SUBRAMANIAN, 2009), in Myanmar, Nepal and reaching even southeastern Turkey and Syria in the West (BOUDOT et al., 2009).

Discussing *P. henryi*, FRASER (1933) described its Sri Lankan distribution as “*The commonest Gomphine in the island. I found it everywhere and at all elevations...*”, while FRASER (1934) wrote that “*It is the commonest Gomphine found in the island, and is met in numbers on most streams in submontane areas...*”. Almost eight decades later, due to diverse negative human influences on running waters, the situation is different and nowadays *P. henryi* is not so common anymore, being known from around 70 localities concentrated in central and southwestern

part of Sri Lanka (BEDJANIČ et al., 2013). Here, it inhabits fast to moderately slowly flowing streams and rivulets in hills and mountains. Since in the field *P. henryi* is easily recognized and well distinguished from other gomphids of the island, not much attention has been devoted to collecting and comparison of species' specimens in recent years.

In the frame of over a decade long work on the *Distribution atlas of the dragonflies of Sri Lanka* the only puzzling information falling out of the general ecological and distributional picture for the species has been the widely isolated record of a single male *P. henryi* from the northeastern plains of the island in Wilpattu National Park. The specimen was collected in 1976 by the Smithsonian insect project in Sri Lanka whose odonatological material was determined by M.A. Lieftinck. This dubious record was unresolved until my visit to the State Collection of Zoology in Munich, where in 2011 I came across a different looking *P. henryi* labeled specimen in the rich odonatological collection of G. von Rosen. Although its locality is not evidently isolated from records of *P. henryi*, the comparison with true *P. henryi* voucher specimens and photos surprisingly showed that it might belong to an undescribed species. Subsequent checking of the Smithsonian Institution material revealed that the mysterious Wilpattu specimen belonged to the same taxon. Checking of all available photographic material and some voucher specimens, as well as recent fieldwork on the island brought additional information and knowledge so it is possible to round up the story here with the description of the second endemic *Paragomphus* species from the lowlands of Sri Lanka.

PARAGOMPHUS CAMPESTRIS SP. NOV.

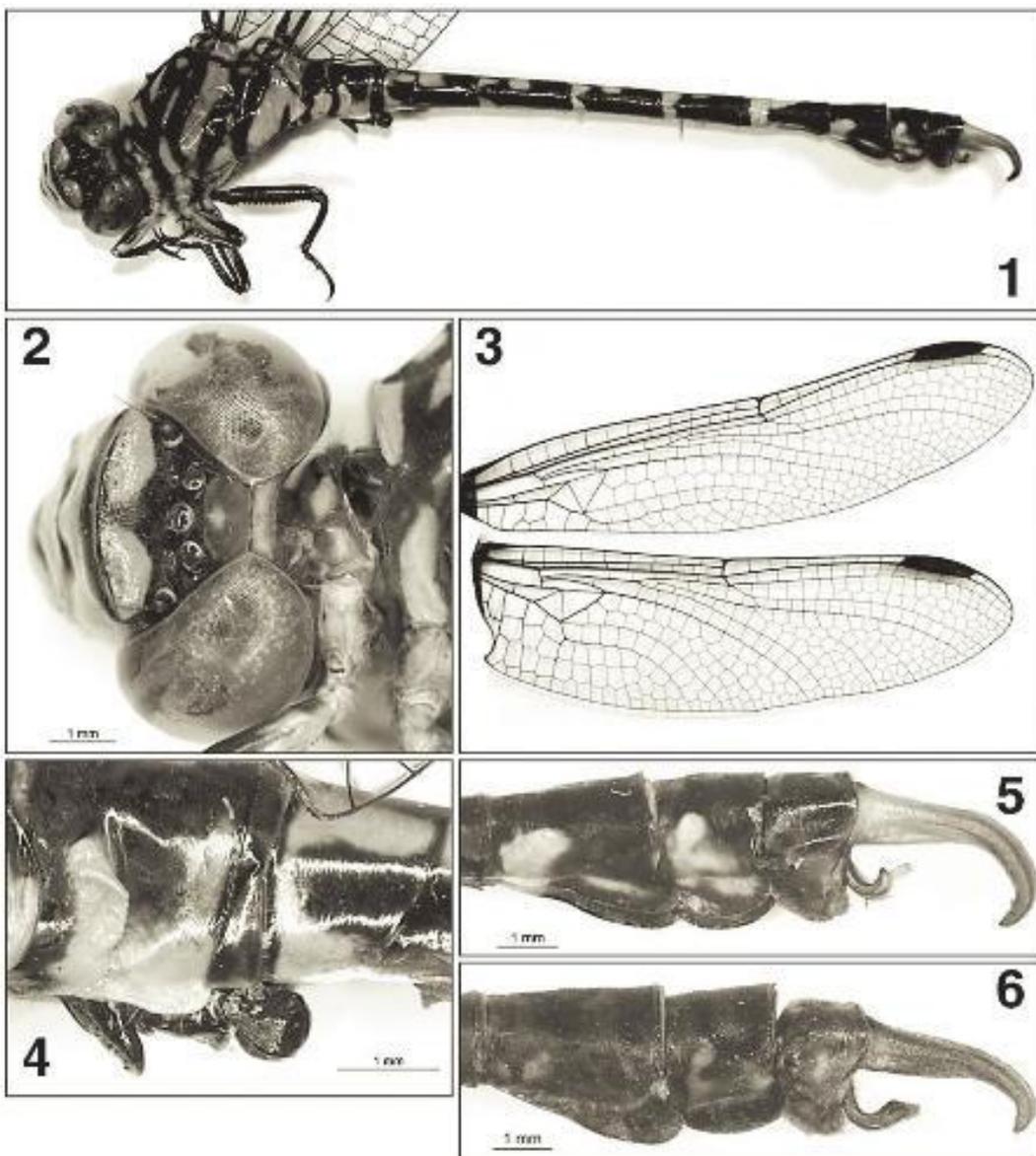
Figures 1-5

Material. – **Holotype:** 1♂ (mature male; from odonatological collection G. von Rosen: No. 4866, State Collection of Zoology, Munich, Germany), Mawanella, Hingula Oya; Kegalle district; Sabaragamuwa province; N7° 14.9', E 80° 27.9'; alt. 140 m; 22-IV-1976; G. von Rosen leg., M. Bedjanič det. – **Paratype:** 1♂ (mature male; from Entomological collection of NMNH, Smithsonian Institution, Washington DC, USA: USNM ENT 00360182); Wilpattu National Park, Kokmotte Bungalow; Puttalam district; North Western province; N 8° 31.7', E 80° 1.6'; alt. 30 m; 23/25-V-1976; K.V. Krombein, P.B. Karunaratne et al. leg., M. Bedjanič det. - The holotype is deposited at State Collection of Zoology (Munich, Germany). The paratype is deposited in the entomological collection of the National Museum of Natural History, Smithsonian Institution (Washington DC, USA).

Etymology. – The species epithet *campestris* (Latin) is an adjective referring to the occurrence of the new species in the lowlands of Sri Lanka.

DIAGNOSIS. 1 Medium-sized *Paragomphus*, with common black and yellow generic colouration, and the shape of superior anal appendages characteristic for the genus. Closely related to *P. henryi*, from which it can be differentiated by two isolated squarish black spots instead of a black line on the ventral border of postclypeus, by broader and more rounded yellow spots on frons, by yellowish oval spot behind the ocelli and yellowish instead of black occiput, by narrow yellow

humeral stripes, which are absent in *P. henryi* and by the upwards bent black line bordering metepimeron not reaching posterior end of thorax. Abdominal markings of both species are clearly different, *P. campestris* having two pairs of subdorsal spots on segments 4-6 instead of only one in *P. henryi*. Also anal appendages in males clearly different, with superior appendages more curved and inferior appendages shorter and strongly bent upwards in *P. campestris*. Eyes in males of the new species are blue in life, whilst they are greyish or bluish green in males of *P. henryi*. From the widely distributed and very variable *P. lineatus*, the new species is distinguished at a glance based on different thoracic markings and differences in anal appendages. Apart from thoracic and abdominal colour pattern also the vulvar scales are differently shaped in females of both species.



Figs 1-5. *Paragomphus campestris* sp. n., holotype ? : (1) whole body, lateral view; - (2) head and prothorax; - (3) wings, right pair; - (4) accessory genitalia, lateral view; - (5) anal appendages, lateral view; - Fig. 6. *P. henryi*: anal appendages, lateral view.

MALE (holotype, dried specimen). – Head . – Maxilla and labium light yellow, mandibles dark brown, with yellow dorsolateral portions towards labrum and anteclypeus. Labrum yellow, with only the edge bordered with black and with blunt triangular black area extending one third of its width from the base dorsally. Ventral part of genae yellow, dorsal part greyish. Anteclypeus and postclypeus yellow, the latter with two isolated squarish black spots on its ventral border. Anterior surface of frons shiny black, except of very narrow yellow line on the border to postclypeus. Dorsally, frons with two large semielliptical yellow spots, with straight anterior and evenly rounded posterior borders (Fig. 2). Bases of antennae black, scapus with yellowish anterior ring, other segments black. Vertex black, with ill-defined yellowish oval spot behind the ocelli crest. Occiput yellowish, its posterior border upturned and brownish at the top. Eyes in preserved specimen brown (Fig. 2).

Thorax . – Black, marked with yellow as in Figures 1 & 2. Prothorax with a pair of elongated yellow spots on dorsum of posterior lobe from which a tuft of long setae is growing and a pair of larger yellow spots laterally (Fig. 2). Mesothoracic collar stripe yellow and interrupted with black dorsal line. Middorsal carina black, except of small yellow spot anterior of pointed carina crest. Antehumeral stripes yellow, short and pointed. Small yellow upper humeral spots distinctly separated from narrow yellow humeral stripes, which are almost continuous with yellow mesinfraepisternum. Sides of thorax with broad yellow stripe on mesepimeron and broadly yellow metepimeron, with three yellow spots between them and a triangular spot above posterior coxa. Anterior and ventral border of metepimeron rimmed with black line, which is bent upwards posteriorly and doesn't reach posterior end of the segment. Under surface of thorax yellowish. Legs dark brown to black on tibiae and tarsi, inner surfaces of femorae brown, outer sides striped yellowish, as are trochanters and coxae (Fig. 1).

Wings hyaline, venation black. Forewings with 12 Ax and 7 Px, hindwings with 9 Ax and 7/8 Px. Pterostigma elongate and very dark brown, braced by thick black veins, covering 3 and 3½ underlying cells in forewings and 3½ and 4 cells in hindwings. 4 cells in anal triangle. From discoidal cell to the wing border a row of 8 undevided and 3 devided cells between veins A1 and CuP. Wing venation of the holotype male is shown in Figure 3.

Abdomen . – Black, marked with yellow as shown in Figure 1. Segment 1 with pointed yellowish dorsal apical spot and large latero-apical yellow spot on each side. Segment 2 with elongated dorsal yellow spot, sharply conical in basal third and markedly constricted in the middle of remaining two thirds of its length. Ventro-lateral parts of segment 2 yellow, including auricles. Segments 3-6 with two pairs of subdorsal spots on basal halves of segments. The basal pair triangular and except on segment 4 connected to basal latero-ventral yellow markings. The apical pair biggest and almost squarish on segment 3, becoming gradually smaller and narrower towards segment 6. Segment 7 with yellow basal annulus and

elongate subdorsal spot, both covering the basal two-thirds of the segment and interrupted dorsally by a thin black line. Segments 8 and 9 black dorsally, with yellow intersegmental joint between them. Both with latero-ventral basal yellow spots and broad rounded projections, which are yellowish basally and broadly bordered with dark brown. Segment 10 black dorsally with small yellowish spot, sides and ventral parts dark brownish.



Figs 7-8. *Paragomphus campestris* sp. n., life colouration: (7) ♂, Gal Oya, 1-VIII-2010; photograph by K. Conniff; - (8) teneral ♀, Mahiyangana, 29-X-2012, photograph by M. Bedjanič.

Accessory genitalia black, shown in Figure 4. Basal half of anal appendages yellow, becoming brown towards apex. Superiors long, double the length of segment 10, terminal half curved regularly downwards as in Figure 5. Seen from above, superiors separated at base, converging to the point of curving after which again slightly divergent. Inferior appendages one third of the length of superiors, brownish basally and yellowish apically, strongly curved in a downward and then upward direction, with small tubercle pointing straight upwards to the superiors and bifid apical part directed caudally towards curved section of superiors (Fig. 5).

FEMALE (photographs of freshly emerged animals only, see Fig. 8]. - Colouration in life very similar to male with more extensive yellow markings. Face yellow, with very restricted black markings, postclypeus without black line. Frons dorsally with two large semi-elliptical yellow spots, as in male. Yellow oval spot behind the ocelli crest more pronounced, occiput yellow.

Thorax marked as in male. Yellow spot anterior of pointed middorsal carina crest bigger. Narrow yellow humeral stripes clearly defined, the black line bordering metepimeron is bent upwards posteriorly and doesn't reach posterior end of the segment as in male. Wings hyaline, venation black. Forewings in two specimens with 14 Ax and 9 Px and 13/12 Ax and 8 Px, hindwings with 9/8 Ax and 8/7 Px. Pterostigma elongate and dark brown, covering 4-5 underlying cells.

In general, abdominal markings similar to male, but more extensive (Fig. 8). Segments 3-6 with two pairs of large subdorsal spots extending clearly over halves of the segments. Basal spots on these segments prolonged laterally in form of narrow whitish annules which are ventro-laterally extending apically over two thirds of the segments. Segment 7 similar, with broader basal latero-ventral annule and two pairs of yellow subdorsal spots connected. Segments 8-10 whitish to yellowish on sides. Vulvar scale short, triangularly shaped towards apex, with almost rectangular deep notch medio-apically.

Measurements (in mm). ♂ – head width: 6.2; abdomen length, with appendages: 32.8; foreand hindwing length: 26.2, 24.4; fore- and hindwing pterostigma length: 3.6, 3.5; superior appendages: 3.3; inferior appendages: 1.1.

FAUNISTIC RECORDS. – (1) Mawanella, Hingula Oya rivulet; Kegalle district; Sabaragamuwa province; N 7°14.9', E 80°27.9'; alt. 140 m; 22-IV-1976; G. von Rosen leg.; 1♂; – (2) Wilpattu National Park, Kokmotte Bungalow; Puttalam district; North Western province; N 8°31.7', E 80°1.6'; alt. 30 m; 23-25-V-1976; K.V. Krombein, P.B. Karunaratne et al. leg.; 1♂; – (3) Mahiyangana, Mahaweli Ganga 300 m N of the bridge on the Hasalaka-Mahiyangana road; Badulla district; Uva province; N 7°20.4', E 80°59.1'; alt. 80 m; 29-X-2012; M. Bedjanič; 1 ten. ♀ (photograph); – (4) Minneriya, surroundings; Polonnaruwa district; Northern Central province; N 8°7.5', E 80°53.5'; alt. 100 m; 9-VI-2011; 1 ten. ♀ (photograph submitted by N. van der Poorten); 10-VI-2011; 1 juv. ♀ (photograph submitted by N. van der Poorten); 1-VIII-2011; 1 juv. ♀ (photograph submitted by N. van der Poorten); – (5) Maha Oya, Maha Oya river under the bridge on the road Batticaloa-Mahiyangana; Ampara district; Eastern province; N 7°32.3', E 81°21.9'; alt. 50 m; 10-VII-2012; M. Bedjanič; 1 ten. ♂ (observed at emergence); – (6) Small rivulet 12km SE of Bulupitiya, before the inflow into the Senanayake Samudra Lake, Nilgala, Gal Oya National Park; Monaragalla district; Uva province; N 7°11.4', E 81°25.3'; alt. 100 m; 1-VIII-2010; K. Conniff; 1♂, 1 juv. ♂ (photographs).

DISTRIBUTION, PHENOLOGY AND ECOLOGICAL NOTES

All currently known faunistic records for *P. campestris* are summarized under species description section and presented in Figure 9. All six localities of the new species lie exclusively in the lowlands of Sri Lanka, with altitude ranging from only 30 m in Wilpattu National Park to 140 m in Hingula Oya near Mawanella. It is interesting that some of these localities, especially Mahaweli Ganga in Mahiyangana, lie in only a few kilometres distance to the hills in which the *Paragomphus* records were confirmed as *P. henryi*.

Based on the current knowledge it can be speculated that *P. campestris* is more widely distributed in the northern lowland part of the island, whereby its congener

P. henryi occurs in the hilly and mountainous regions of central and southern Sri Lanka (Fig. 9). It is possible, although not very likely, that some of the records for the latter species in the northern and eastern border sections actually belong to *P. campestris*, however, this can only be established with future fieldwork. Since the odonatological coverage of northern and eastern lowland parts of Sri Lanka had many white spots in the past and far more attention has been devoted to endemic species rich southwestern part of the island (Bedjanič et al., 2013), I expect that through additional fieldwork *P. campestris* will be discovered at more localities.

As the northern and eastern lowland parts of Sri Lanka are quite dry and not very rich with streams and rivers the search strategy for the

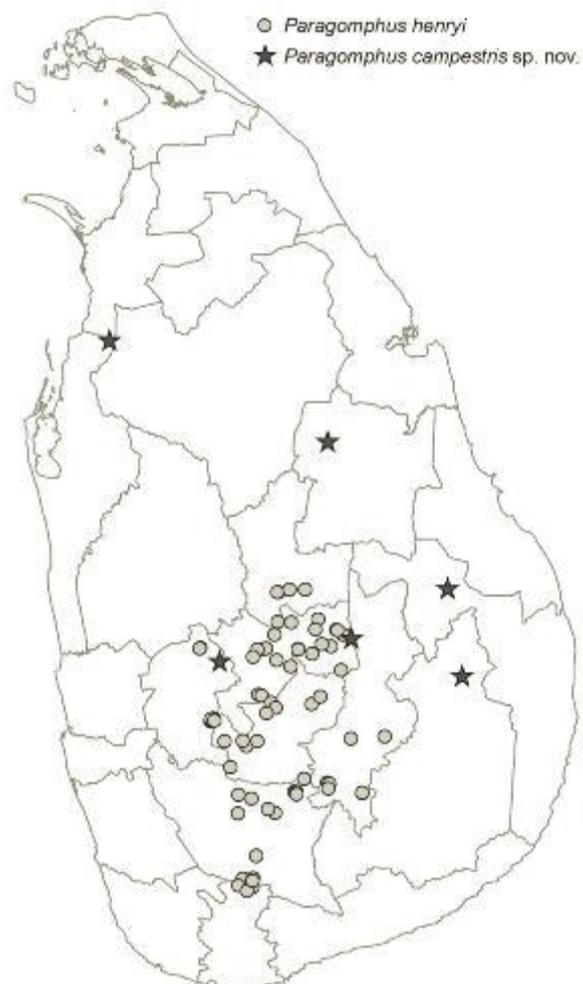


Fig. 9. Currently known distribution of *Paragomphus campestris* sp. n. and *P. henryi* in Sri Lanka, modified from BEDJANIČ et al., 2013.

species is obvious and simple, especially if available phenology data are considered. Based on the hereto known records, the adults of *P. campestris* can obviously be seen at least from April till October and emergence has been observed in June, July, August and October.

Although current knowledge on the habitat requirements of *P. campestris* is scarce, it seems that the species has quite wide ecological tolerance. It inhabits slowly flowing streams and rivulets as well as large lowland rivers like Mahaweli Ganga. The locality in Gal Oya National Park, where an adult and a juvenile male were observed in August 2010, can be described as a rocky rivulet with sandy banks surrounded by large evergreen trees and a few small shrubs and vines over the water (K. Conniff, pers. comm.). At least during the dry season, when emergence of *P. campestris* was observed in July 2012, Maha Oya river can be described as a small slowly flowing shallow sandy river with shrubs and some trees on the banks.

Due to the fact that *Paragomphus* specimens have not been carefully checked or extensively collected by researchers in the past and that only individual photographs or specimens are present in collections, it is almost impossible to speculate on the species abundance at certain localities. However, at least in Mahaweli Ganga, very numerous *Paragomphus* larvae, most probably belonging to *P. campestris*, were observed in July 2012 in the shallow sandy bottom near the banks north and south of the bridge on the Hasalaka-Mahiyangana road. If the larval identity speculation, based on observation of a just emerged female in October 2012 is correct, then the population of *P. campestris*, at least in the section of Mahaweli around and north of Mahiyangana is huge. But to convert the above speculations into solid facts, also for this Sri Lankan endemic, a detailed assessment of its distribution, estimation of population sizes and future monitoring are needed.

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