

## THREE NEW *DREPANOSTICTA* SPECIES FROM SRI LANKA (ZYGOPTERA: PLATYSTICTIDAE)

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*D. mojca* sp. n. (holotype ♂: 10km NEE of Deniyaya; Matara distr.; Southern prov.; N 6.36°, E 80.46°; 02-V-2003; to be deposited at Sri Lanka National Museum, Colombo), *D. bine* sp. n. (holotype ♂: Opanayake, Ratnapura distr.; Sabaragamuwa prov.; N 6.62°, E 80.66°; 13-X-1970; deposited at National Museum of Natural History, Smithsonian Institution, Washington, USA) and *D. anamia* sp. n. (holotype ♂: Katugas Falls near Ratnapura; Ratnapura distr.; Sabaragamuwa prov.; N 6.68°, E 80.41°; 04-V-2003; to be deposited at Sri Lanka National Museum, Colombo), are described. Their currently known distribution, phenology, ecology and threat status are presented and discussed. The remarkable *Drepanosticta* diversity in Sri Lanka makes the island a globally important Platystictidae hotspot.

### INTRODUCTION

Due to their small size, dull colours, inconspicuous behaviour and hidden life along seepages and small streams that are mostly overgrown by dense vegetation or located in the dark shade of forests, Platystictidae usually escape the attention of general entomologists and naturalists. Apart from the fact that they are underrepresented in many entomological collections, their overall similar general appearance often conceals the exceptional species diversity and variation in minute morphological structures.

Around 120 species from the genera *Drepanosticta* Laidlaw, *Platysticta* Selys, *Protosticta* Selys, *Sulcosticta* van Tol and *Sinosticta* Wilson have so far been described from the Oriental region (KALKMAN et al., 2008, VAN TOL, 2009) and many new species are still awaiting description. Most species have very small ranges and many are island endemics. As far as southeastern Asia is concerned, the knowledge on taxonomy, biogeography and phylogenetic relationships of this extremely interesting family of forest damselflies has made a marked progress

only recently, mainly through the work of J. VAN TOL (2009) and some other authors.

Sri Lanka's remarkably diverse Platystictidae were recognized by some of the most prominent odonatological researchers of the last 150 years. E. de Selys-Longchamps, H.A. Hagen, W.F. Kirby, F.F. Laidlaw, F.C. Fraser and M.A. Lieftinck described numerous species. Around 20 endemic platystictide taxa are currently known from the island (FRASER, 1933a, 1933b; LIEFTINCK, 1940, 1955, 1971; BEDJANIČ, 2004, 2009; BEDJANIČ et al., 2007, 2009). This diversity is impressive, since the distribution of all Platystictidae species is limited to the wet and intermediate zones in southwestern and central parts of Sri Lanka – in an area of only ca 20,000 km<sup>2</sup>. Thus, Sri Lanka can legitimately be classified as one of the global Platystictidae »hotspots«.

Particularly interesting and remarkable on the global scale is the *Drepanosticta* species radiation, with a total of 14 described endemic representatives. From examination of odonatological collections in the Natural History Museums of Vienna (Austria) and London (UK) and, above all, the ongoing revision of the abundant Platystictidae material in the Entomological Collection at the Smithsonian Institution, Washington DC, USA (the Smithsonian insect project in Sri Lanka: 1969-1975) brought new insights into the diversity of this genus. Together with the material and observations made during the author's expeditions to Sri Lanka in 1995, 2001, 2003 and twice in 2009, there is now sufficient knowledge to make taxonomic descriptions of three new species. Revisions of the genera *Drepanosticta* and *Platysticta* in Sri Lanka, with descriptions of additional new taxa, determination keys and biogeographical and phylogenetic considerations will follow in subsequent papers.

## SYSTEMATIC PART

### *DREPANOSTICTA MOJCA* SP. NOV.

Figures 1-5

**Material.** – **Holotype:** ♂ (mature), Deniyaya, stream in the forest 10km NEE of Deniyaya; Matara district; Southern province; N 6.36°, E 80.46°; alt. 330m; 2-V-2003; M. Bedjanič leg.; – **Paratypes:** 1 ♂ (from entomological collection of NMNH, Smithsonian Institution, Washington DC, USA: USNM ENT 00359674); Kottawa Forest Reserve; Kottawa; Galle district; Southern province; N 6.1116°, E 80.3145°; 6-X-1973; R. & B. Robinson leg.; 1 ♂ (in alcohol), Stream in Haycock area between tea plantations; Hiniduma; Galle district; Southern province; N 6.3422°, E 80.3099°; alt. 120m; 15-V-2009; M. Bedjanič & S. Gunasinghe leg. Holotype is to be deposited at Sri Lanka National Museum (Colombo, Sri Lanka). Paratypes are deposited in the USNM (Washington DC, USA) collection.

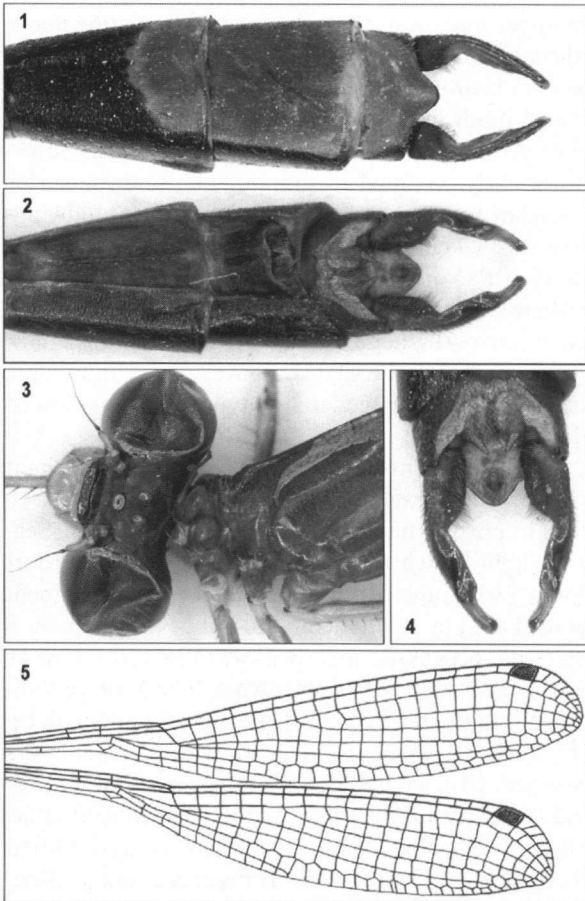
**E t y m o l o g y.** – The species epithet, a noun in apposition, is a patronym honouring my wife Mojca Bedjanič.

**DIAGNOSIS.** – Medium-sized, dark brown *Drepanosticta* with remarkable,

almost totally reduced male inferior appendages. Last tergite in males dorsoposteriorly prolonged, unknown in other Platystictidae species. Anterior lobe of prothorax with a pair of long stalked processes, similar to two other species from Sri Lanka, viz. *D. tropica* (Selys) and *D. subtropica* (Fraser). Differs from these by mono-coloured dark brown prothorax and processes, by prothorax shape and by brown sides of synthorax, with sky-blue thoracic stripes on mesepimeron and brownish ventral surface of thorax. Metepimeron and ventral thorax portions in *D. tropica* and *D. subtropica* yellowish. Males are distinguished at a glance based on the shape of anal appendages.

**MALE (holotype, dried specimen).** – **Head.** – Labium light brown, bases of mandibles dark brown, with light grey (blue in life) dorsolateral portions towards labrum and anteclypeus. Labrum and anteclypeus light grey (blue in life), anterior part of labrum brown, with rather dense long light brown setae. Genae shiny black,

as is postclypeus. Frons flattened, also shiny black, below antennae near postclypeus with some long light setae, which are also present on anterior border of postclypeus. Vertex, occiput and epicranium black, with a tint of very dark metallic-green lustre, slightly brownish around posterior ocelli. Occiput behind ocelli with a row of few setae. Bases of antennae greyish brown, scapus and



Figs 1-5. *Drepanosticta mojca* sp. nov.: (1) abdomen with anal appendages, dorsal view [male holotype]; – (2) abdomen with anal appendages, ventral view [male holotype]; – (3) head and prothorax, lateral view [male holotype]; – (4) the same, enlarged appendages [male holotype]; – (5) wings, right pair [paratype].

pedicellus brown, flagellum dark brown (Fig. 3). Rear of the head shiny black. Transverse occipital carina black, angulated. Eyes in preserved specimen dark brown.

**T h o r a x .** – Prothorax dark greyish brown (Fig. 3). Anterior lobe with elevated, up-turned anterior margin, which is laterally strongly prolonged and erected in a pair of flat, narrow processes. Processes directed dorsally and slightly posteriorly, with rounded tips, curled up towards head (possibly due to preservation) and reaching back as far as posterior lobe. Median lobe gently raised on each side with a median cleft and laterally with a small posterior embossment. Posterior lobe narrow, slightly elevated in the middle, posterior margin slightly expanded and elevated laterally (Fig. 3). Dorsum of synthorax blackish dark brown, with a tint of very dark metallic-green lustre, brown towards humeral suture. Mesepimeron and metepisternum brown, as are mesinfraepisternum, metinfraepisternum, coxae and metepimeron. Sky blue stripe along obsolete mesometapleural suture, starting from thickened dark brown upper margin of metepisternum and ending above spiracle. Under surface of thorax of lighter brown colour. Legs light brown.

**W i n g s .** – Clear, venation dark brown. Forewings with  $15\frac{1}{2}$  (2 additional veins between C and Sc in right wing), hindwings with 16 and 15 Px (1 additional vein between C and Sc in left wing). Arculus distal to Ax2, R4+5 at subnodus, somewhat thickened in forewings, slightly proximal to subnodus in hindwings. IR3 separates from R4+5 at the level of first crossvein distal to arculus, in hindwings it starts slightly distal of subnodus. Y vein stalked. CuP reaching hind margin of forewing approximately at level of Px5, in hind wing at level of Px5. Number of cells between Arc and place where CuP meets hind margin of hind wing 10. Pterostigma dark brown, encircled by narrow lighter line and surrounded by thick dark brown veins, proximal side oblique, distal side slightly convex, wider than high. Venation in distal portions of forewings damaged in holotype, wing venation of paratype male is shown in Figure 5.

**A b d o m e n .** – Slender, brown, segments 8-10 black. Segment 1 with light brown ventrolateral portion which is narrower distally, segment 2 also light brown ventrolaterally, in distal half light portion narrower, limited to ventral side. Segments 3-6 basally with narrow light brown rings which are not connected dorsally and are narrowly prolonged ventrally to almost end of segments. Segment 7 with light markings reduced. Dorsum of segment 9-10 light blue, segment 8 with rounded dorsal blue marking, occupying slightly more than distal third of the segment (Fig. 1). Segment 10 with rounded, slightly triangular distal prolongation of last tergite, measuring approximately half of the segment and with tip bordered narrowly brown (Figs 1, 2, 4). Anal appendages dark brown. Superiors strong, more than twice of segment 10 in length, broad at the base, at one quarter rapidly flattened laterally and angulated inwards. Basal parts covered with setae, which are very dense medially and ventrally. Inferiors extremely reduced, shifted strongly proximally towards base of segment as seen in Figures 2 and 4. Basal

portions expanded, each with robust medially directed spine, which only reach bases of superiors.

**FEMALE** (photographs only, Figs 17-18). – Colouration in life very similar to male (Fig. 17). Labrum and anteclypeus sky-blue, anterior part of labrum dark brown, with rather dense long light brown setae. Eyes grey in dorsal and ventral thirds, in-between brown. Prothorax dark brown, with a pair of processes, as in male, but their tips straight, only very slightly curved anteriorly towards the top (Fig. 18). Vertex of synthorax very dark as in male, brown towards humeral suture. Blue thoracic band starts from upper margin of metepisternum and reaches spiracle, then ends conically narrowed, rest of thorax brown. Legs greyish, as in Figure 18. Dorsum of abdominal segments 9-10 sky-blue, dorsum of 8 of same colour, blue part rounded proximally, with tip almost reaching segment base. Ovipositor and styli reach half of segment 10.

**NOTES ON LIFE COLOURATION AND VARIATIONS.** – Eyes of males in life bluish grey dorsally, with broad median brown to yellowish belt and ventral portion again light grey. (Fig. 16). Labrum, anteclypeus and small portion of mandibulae bases sky blue. Trochanters and small proximal parts of femora yellowish.

As for variation in paratypes, the male from Kottawa does not have any thoracic blue band, but this might be due to preservation. It has strongly pronounced mesostigmal lamellae, which are erected, triangular, with rounded tip. Forewings with 14, hindwings with 13 Px. Vein R4+5 proximal to subnodus in fore- and hindwings, IR3 starts slightly distal of subnodus in all wings. Y vein sessile in all four wings. Additionally, dorsal blue marking on segment 8 occupies distal two thirds of the segment and distal prolongation of last tergite at extreme tip is not rounded, but slightly concave. Structurally, as for prothorax and anal appendages, similar to holotype, therefore more material is needed to validate extent and importance of above variations in southernmost populations. Paratype from Haycock, possibly also due to preservation, with reduced blue stripe on thorax, which is clear sky blue in the upper third only, but then faints and is hardly visible towards spiracle. Prothorax processes with tips straight, only very slightly curved anteriorly. Venation is shown in Figure 5. Origin of veins R4+5 and IR3 slightly different in all wings, arising approximately at subnodus. Y vein stalked in all four wings. Dorsal blue marking on segment 8 broadly triangular, occupying distal two thirds of the segment.

**Measurements** (in mm, paratype's range in brackets), ♂. – Head width: 4.1; abdomen length: 37.8 (34.2-35.7); fore- and hindwing length: 23.3, 22.2 (20.3-21.5, 19.5-20.3); fore- and hindwing perostigma length: 1.0, 1.1; prothorax projections: 0.8; superior appendages: 1.3.

**FAUNISTIC RECORDS.** – (1) Bodhinagala; Ingiriya Forest Reserve, about 30km SE of Colombo; Kalutara district; Western province; N 6.7647<sup>o</sup>, E 80.1498<sup>o</sup>; alt. 50m; 15-VI-2008; K. Conniff; 1 ♀; 11-V-2009; M. Bedjanič & K. Conniff; 1 ♂; – (2) Deniyaya, stream in the forest 10km NEE of Deniyaya; Matara district; Southern province; N 6.36<sup>o</sup>, E 80.46<sup>o</sup>; alt. 330m; 2-V-2003; M. Bedjanič; 1 ♂; – (3)

Stream in Sinharaja Forest Biosphere Reserve, 1km NE of Beverly Estate Lower Division; Deniyaya; Ratnapura district; Sabaragamuwa province; N 6.4088<sup>o</sup>, E 80.5461<sup>o</sup>; alt. 330m; 1-V-2003; M. Bedjanič; 1 ♂; – (4) Enselwatte; Ratnapura district; Sabaragamuwa province; N 6.4043<sup>o</sup>, E 80.6175<sup>o</sup>; 25-V-1975; S. Wood & J. Petty; 1 ♂; – (5) Stream in Haycock area between tea plantations; Hiniduma; Galle district; Southern province; N 6.3422<sup>o</sup>, E 80.3099<sup>o</sup>; alt. 120m; 15-V-2009; M. Bedjanič & S. Gunasinghe; 7 ♂; – (6) Kottawa Forest Reserve; Kottawa; Galle district; Southern province; N 6.1116<sup>o</sup>, E 80.3145<sup>o</sup>; 6-X-1973; R. & B. Robinson; 1 ♂

*DREPANOSTICTA BINE* SP. NOV.

Figures 6-10

**Material.** – **Holotype:** ♂ (mature, from entomological collection of NMNH, Smithsonian Institution, Washington DC, USA: USNM ENT 00359717); Opanayake, M.P. 84; Ratnapura district; Sabaragamuwa province; N 6.62<sup>o</sup>, E 80.66<sup>o</sup>; 13-X-1970; O. Flint leg. – **Paratypes:** 3 ♀ (from entomological collection of NMNH, Smithsonian Institution, Washington DC, USA: USNM ENT 00359723, 00359726, 00359727), faunistic data same as holotype; 5 ♂ (from entomological collection of NMNH, Smithsonian Institution, Washington DC, USA: USNM ENT 00359718- 00359722), faunistic data same as holotype; 4 ♂ (from entomological collection of NMNH, Smithsonian Institution, Washington DC, USA: USNM ENT 00359728-00359731), Kalatuwawa Reservoir; Ratnapura district; Sabaragamuwa province; N 6.8560<sup>o</sup>, E 80.2031<sup>o</sup>; 19-IX-1970; O. Flint leg.; 2 ♂, 1 ♀ (in alcohol), small stream on the road Laxapana-Norton Bridge, 1km E of Laxapana; Nuwara Eliya district; Central province; N 6. 9263<sup>o</sup>, E 80. 4895<sup>o</sup>; alt. 550m; 28-VII-2009; M. Bedjanič & K. Conniff leg. – Holotype is deposited in USNM (Washington DC, USA). Paratypes are deposited in USNM (Washington DC, USA) and in author's collection from which a pair is to be deposited at Sri Lanka National Museum (Colombo, Sri Lanka).

**Etymology.** – The species epithet, a noun in apposition, is a patronym honouring my son Bine Bedjanič.

**DIAGNOSIS.** – Medium-sized, brown to dark greenish brown *Drepanosticta*. Distinguished from all of its congeners by brown head, by remarkable green, blue and brown colouration of the eyes in living animal and by dark brownish synthorax with only a very narrow, largely obscured or even totally missing bluish stripe along obsolete mesometapleural suture. It is related to *D. montana* (Selys), *D. submontana* (Fraser) and *D. fraseri* Lieftinck, but they all have at the most a small brownish patch on the head behind ocelli, well developed thoracic stripes on metepisternum, as well as obtuse postmedian tubercles on superior anal appendages of males.

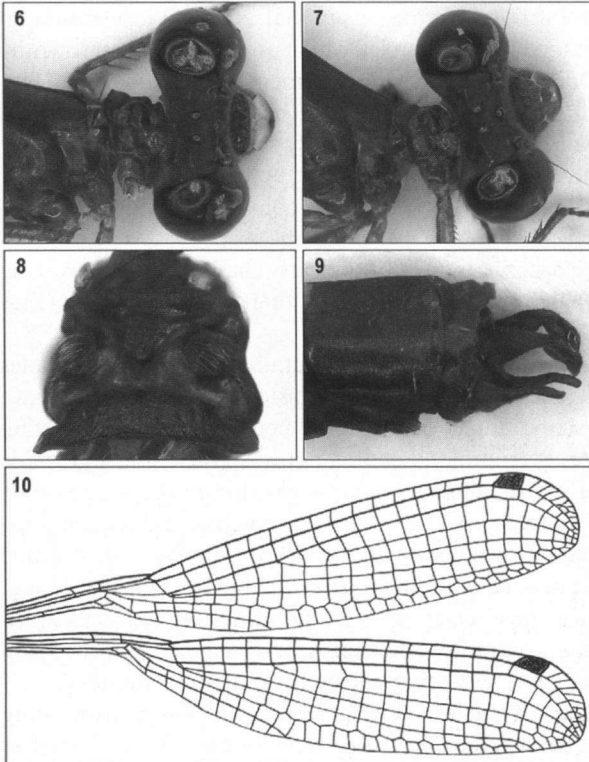
**MALE** [holotype, dried specimen]. – **Head.** – Labium light brown and greyish, bases of mandibles dark brown, slightly bluish towards labrum, genae brown. Labrum and anteclypeus light blue, anterior border of labrum brownish laterally and gradually becoming dark brown in the median part. Postclypeus dark brown, almost black, anterior border with strong setae. Frons flattened, glossy brown, flattened squarish area between antennae and below anterior ocellus light

brown with slightly darker striae. Vertex and epicranium brown, lustreless (Fig. 6). Antennae with scapus dark brown basally, light brown apically, pedicellus brown, as are distalia. Rear of the head of lighter brown tone. Occiput behind ocelli with a row of some quite long and some shorter setae. Transverse occipital carina brown, acutely angulated. Eyes in preserved specimen dark brown.

**T h o r a x .** – Prothorax brown, median part of posterior lobe as well as rounded tubercles on median lobe blackish brown (Fig. 6). Anterior lobe simple and rounded with elevated anterior margin. Median lobe raised on each side forming two rounded dark tubercles which are densely overgrown by long light setae (Fig. 8). Posterior lobe depressed and only very slightly elevated in the middle, but with expanded lateral lobes gently turned to the front. Prosternum brown, distal half medially black. Dorsum of synthorax blackish dark brown, with slight dark metallic-green shine. Humeral suture narrowly brown, slightly wider portion of lighter brown colouration only along its upper fifth. Mesepimeron and metepisternum dark brown without any blue marking on metepisternum, lower fifth of both lighter brown, as are mesinfraepisternum, metinfraepisternum, coxae and metepimeron. Under surface of thorax brown, with lighter portion in the middle.

Legs light brown.

**Wings.** – Clear, venation brown. Forewings with  $14\frac{1}{2}$  (2 additional veins between C and Sc in left wing), hindwings with  $14\frac{1}{2}$  and  $13\frac{1}{2}$  Px. One Pcv, only in right forewing an additional Pcv, situated halfway between proximal one and Y vein. Arculus distal to Ax2, R4+5 at subnodus, IR3 arising



Figs 6-10. *Drepanosticta bine* sp. nov.: (6) head and prothorax, lateral view [male holotype]; – (7) head and prothorax, lateral view [female paratype]; – (8) prothorax, dorsal view [male holotype]; – (9) anal appendages, lateral view [male holotype]; – (10) wings, right pair [paratype].

from proximal fourth of first cell distal to subnodus. Y vein stalked. CuP reaching hind margin of fore wing at level of Px4, in hind wing at level of Px5. Number of cells between Arc and place where CuP meets hind margin of hind wing 10. Pterostigma light brown, encircled by narrow lighter line and surrounded by thick dark brown veins, proximal side oblique, distal side convex, wider than high. Wing venation of paratype male is shown in Figure 10.

**A b d o m e n.** – Slender, posterior segments slightly expanded. Segments 1-7 castaneous brown, 8 dark brown, 9-10 almost black. Narrow light brown basal rings on segments 3-7, dorsum of segment 9-10 dirty grey (blue in life, FIG. 9). Anal appendages dark brown, robust. Superiors broad at the base, then angulated strongly inwards and downwards at the middle. Dorsally, superiors without any postmedian tubercle or tooth as observed in *D. montana*, *D. submontana* and *D. fraseri*. Inferiors almost as long as superiors, stout. Basal portion expanded, inner side with a small robust spine, which is pointed inwards and curved slightly downwards. Proximal portions in lateral view almost straight, slightly sinuous, curved inwards distally (Fig. 9).

**FEMALE** (dried specimen). – Similar to male, but smaller and more robust insect. Colouration lighter brown, almost without dark brown, blackish or metallic-green tones (i.e. Fig. 7). Prothorax brown, as in male, median lobe raised on each side forming two rounded dark tubercles which are densely overgrown by long light setae (Fig. 7). Dorsum of intersegmental membrane between 8-9 segment as well as dorsum of 9-10 segments dark grey (blue in life). Cerci triangular, brownish. Ovipositor and styli brown, proximally slightly exceeding cerci.

**NOTES ON LIFE COLOURATION AND VARIATIONS.** – Pedicellus of antennae light brown, flagellum dark brown. Eyes beautifully coloured in adult animals – upper, dorsal third grass green, changing into a narrow stripe of sky blue, which is widened dorsally near the occiput, but ventrally clearly changes into contrasting yellowish brown portion which occupies little more than half of the eyes (Figs 19-20).

In adult male vertex of synthorax clearly dark metallic-green, in some males this lustre is present also on mesepimeron and mesepisternum. Some males have a very narrow, feint bluish stripe along obsolete mesometapleural suture, starting from upper border of metepisternum and ending above spiracle. In single male specimen, a small patch of bluish colouration is visible also on the wing side of upper metepisternum border and very mildly also on midcoxa and median lobe of prothorax. In adult males, brown abdomen is marked dorsally with sky blue on diffusely defined apical portions of segments (2)3-7 (Fig. 20). Dorsum of segments 9 and 10 sky blue, as is the intersegmental membrane between segments 8 and 9. In some specimen blue colouration is also present on segment 8, occupying maximally distal fifth of segment and being narrowly squarish or rounded.

Also in some adult females, a very narrow, feint or obscure bluish stripe along obsolete mesometapleural suture, starting from upper border of metepimeron



and ending above spiracle can be observed (Fig. 19). Sky blue apical portions of segments 2-6 more clearly defined than in males. Dorsum of segments 10 and 9 sky blue, as is the intersegmental membrane between segments 9 and 8, the later segment without blue markings (Fig. 19).

**Measurements** (in mm, paratype's range in brackets), ♂ – Head width: 4.9 (4.4-4.7); abdomen length: 38.3 (35.1-43.5); fore- and hindwing length: 24.1, 24.4 (22.1-28.3, 22.1-28.5); fore- and hindwing pterostigma length: 1.2, 1.2; superior and inferior appendages: 1.1, 0.9; ♀ – head width: 4.3; abdomen length: 31.0 (30.2-33.8); fore- and hindwing length: 23.5, 23.4 (22.3-25.7, 22.1-25.7); fore- and hindwing pterostigma length: 1.3, 1.4; ovipositor length: 2.3 (2.4-2.6).

**FAUNISTIC RECORDS.** – (1) Mahabage, Ing Oya, Kithulgala; Kegalla district, Sabaragamuwa province; N 7.0011<sup>o</sup>, E 80.4346<sup>o</sup>; alt. 240m; 15-VI-2006; K. Conniff; 1 ♂; 1-VII-2006; K. Conniff; 1 ♀; – (2) Small stream in the secondary forest 1km S of the bridge near Plantation Hotel in Kithulgala; Kegalla district, Sabaragamuwa province; N 6.9844<sup>o</sup>, E 80.4137<sup>o</sup>; alt. 430m; 21-V-2009; M. Bedjanič; 2 ♂, 1 ♀; – (3) Left tributary of Kelani river in secondary forest 3km upstream of the bridge near Plantation Hotel in Kithulgala; Kegalla district, Sabaragamuwa province; N 6.9739<sup>o</sup>, E 80.4278<sup>o</sup>; alt. 160m; 22-V-2009; M. Bedjanič; 2 ♂; – (4) Small stream on the road Kithulgala towards Hitigegama, 5km NW of Laxapana; Nuwara Eliya district; Central province; N 6.9729<sup>o</sup>, E 80.4510<sup>o</sup>; alt. 255m; 27-VII-2009; M. Bedjanič; 1 ♂; – (5) Small stream on the road Laxapana-Norton Bridge, 1km E of Laxapana; Nuwara Eliya district; Central province; N 6.9263<sup>o</sup>, E 80.4895<sup>o</sup>; alt. 550m; 28-VII-2009; M. Bedjanič & K. Conniff; 10 ♂, 2 ♀; – (6) Laxapana, 6.9km NW; Kegalla district, Sabaragamuwa province; N 6.9674<sup>o</sup>, E 80.4379<sup>o</sup>; alt. 330m; 25-IX-1970; O. Flint; 1 ♂; – (7) Kalatuwawa Reservoir; Ratnapura district; Sabaragamuwa province; N 6.8560<sup>o</sup>, E 80.2031<sup>o</sup>; 19-IX-1970; O. Flint; 4 ♂; – (8) Bodhinagala; Ingiriya Forest Reserve, about 30km SE of Colombo; Kalutara district; Western province; N 6.7647<sup>o</sup>, E 80.1498<sup>o</sup>; alt. 50m; 25.VI.2006; G. de Silva Wijeyeratne; 1 ♂; 11-V-2009; M. Bedjanič & K. Conniff; 5 ♂; – (9) Agalawatta, malaise trap; Kalutara district; Western province; N 6.5417<sup>o</sup>, E 80.1551<sup>o</sup>; 23/25-VII-1975; Y.M. Huang, E.L. Peyton, S. Karunaratne and Mahinda; 1 ♂; – (10) Opanayake, M.P. 84; Ratnapura district; Sabaragamuwa province; N 6.6226<sup>o</sup>, E 80.6555<sup>o</sup>; 13-X-1970; O. Flint; 6 ♂, 5 ♀; – (11) Sinharaja Forest Biosphere Reserve, stream along the road from Martin's Guesthouse to the new visitors centre; Kudawa; Ratnapura district; Sabaragamuwa province; N 6.4315<sup>o</sup>, E 80.4152<sup>o</sup>; alt. 400m; 14-V-2009; M. Bedjanič & K. Conniff; 2 ♂; – (12) Sinharaja Forest Biosphere Reserve, forest around the outflow of the pond at information centre near Martin's Guesthouse; Kudawa; Ratnapura district; Sabaragamuwa province; N 6.4328<sup>o</sup>, E 80.4147<sup>o</sup>; alt. 490m; 13-V-2009; M. Bedjanič; 2 ♀; – (13) Stream in Haycock range; Hiniduma; Galle district; Southern province; N 6.3335<sup>o</sup>, E 80.3112<sup>o</sup>; alt. 120m; 15-V-2009; M. Bedjanič & S. Gunasinghe; 5 ♂; – (14) Stream in Haycock area between tea plantations; Hiniduma; Galle district; Southern province; N 6.3422<sup>o</sup>, E 80.3099<sup>o</sup>; alt. 120m; 15-V-2009; M. Bedjanič & S. Gunasinghe; 5 ♂, 2 ♀; – (15) Stream on the road Morawaka-Diyadawa on

the slopes of Diyadawa forest; Matara district; Southern province; N 6.3122<sup>o</sup>, E 80.5430<sup>o</sup>; alt. 145m; 16-V-2009; M. Bedjanič & S. Gunasinghe; 3♂; – (16) Small tributaries to Hiyare lake on the N shore; Galle district; Southern province; N 6.0585<sup>o</sup>, E 80.3165<sup>o</sup>; alt. 100m; 15-V-2009; M. Bedjanič & S. Gunasinghe; 10♂, 1♀

*DREPANOSTICTA ANAMIA* SP. NOV.

Figures 11-15

**Material.** – **Holotype** ♂ (mature), Katugas Falls 2km N of Ratnapura; Ratnapura district; Sabaragamuwa province; N 6.68<sup>o</sup>, E 80.41<sup>o</sup>; 4-V-2003; M. Bedjanič leg.; – **Paratypes:** 2♂, 4♀, Deniyaya, stream in the forest 10km NEE of Deniyaya; Matara district; Southern province; N 6.36<sup>o</sup>, E 80.46<sup>o</sup>; alt. 330m; 29-IV-2003; M. Bedjanič leg.; 2♂ (from entomological collection of NMNH, Smithsonian Institution, Washington DC, USA: USNM ENT 00359688, 00359691), Laxapana, 6.9km NW; Kegalla district, Sabaragamuwa province; N 6.9674<sup>o</sup>, E 80.4379<sup>o</sup>; alt. 330m; 25-IX-1970; O. Flint leg.; 1♀ (from entomological collection of NMNH, Smithsonian Institution, Washington DC, USA: USNM ENT 00359690), Laxapana; Nuwara Eliya district; Central province; N 6.9270<sup>o</sup>, E 80.4821<sup>o</sup>; alt. 400m; 24-28-IX-1970; O. Flint leg.; 4♂ (from entomological collection of NMNH, Smithsonian Institution, Washington DC, USA: USNM ENT 00359684-00359687), Tunmodera, near Labugama; Colombo district, Western province; N 6.8638<sup>o</sup>, E 80.1660<sup>o</sup>; alt. 65m; 19-IX-1970; O. Flint leg.; 1♀ (from entomological collection of NMNH, Smithsonian Institution, Washington DC, USA: USNM ENT 00359689), Kalatuwawa Reservoir; Ratnapura district; Sabaragamuwa province; N 6.8561<sup>o</sup>, E 80.2032<sup>o</sup>; alt. 100m; 19-IX-1970; O. Flint leg. – Holotype and paratype female are to be deposited in Sri Lanka National Museum (Colombo, Sri Lanka). Other paratypes are deposited in USNM (Washington DC, USA) and in author's collection

**Etymology.** – The species epithet, a noun in apposition, is a patronym honouring my daughter *Ana Mia Bedjanič*.

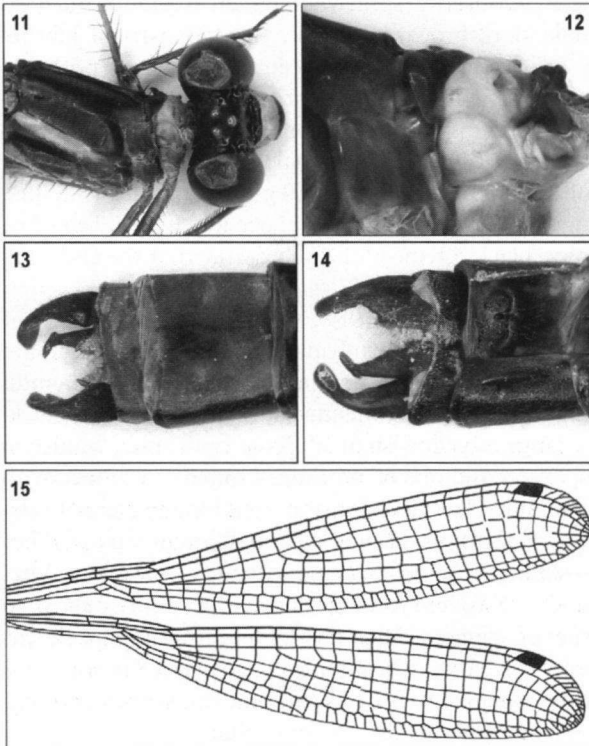
**DIAGNOSIS.** – Large, dark brown to almost black *Drepanosticta*, recognized by characteristic orange-yellowish colouration of prothorax, distinctive small nipples on pronotum as well as by peculiarly shaped inferior appendages in males. It does not seem to have any near allies.

**MALE (holotype, dried specimen).** – **Head.** – Labium light brown and greyish, mandibles dark brown below, bases greyish (light blue in life) towards labrum, narrow ventral stripe dark brown. Labrum and anteclypeus greyish (light blue in life), anterior border of labrum black (Fig. 11). Postclypeus black, anterior border laterally with some long setae. Frons flattened, shiny black below ocelli and antennae. Occiput, vertex and epicranium black, lustreless, behind antennae, to the level of posterior ocelli, shiny black. Small light patches arising lateral of posterior ocelli. Antennae with scapus black, only distal part narrowly whitish, pedicellus dark brown, flagellum broken. Rear of the head black. Hind border of occiput behind ocelli with four separated groups of long and some short setae, two placed transversely in the middle and two diagonally, slightly above the edges of occipital carina. Transverse occipital carina black, acutely angulated. Eyes in preserved specimen dark brown.

**Th o r a x .** – Prothorax light beige (orange-yellowish in life) in the median part, posterior lobe black, anterior margin of anterior lobe dark brown. Anterior prothorax lobe with elevated and thickened anterior margin. Median lobe slightly raised and rounded on each side, with a distinct, small, apically inclined nipple, base of which is anteriorly excavated, forming pronounced sulcus towards anterior lobe. Posterior lobe depressed, with expanded and rounded lateral lobes (Fig. 11). Dorsum of synthorax black, small portion of brown only in posteriolateral and anteriolateral corners of mesepisternum, brown also mesinfraepisternum. Mesepimeron and metepisternum black, light brown only in posteriolateral and anteriolateral corners. Distinct blue stripe along obsolete mesometapleural suture, starting from thickened dark brown upper margin of metepisternum and passing spiracle, after which it becomes narrower and gradually vanishes from blue into light brown colour ventrally. Metinfraepisternum and coxae greyish brown, metepimeron dark brown in the middle, greyish brown posteriorly and ventrally. Under surface of thorax light beige. Legs greyish brown, femora with lighter distal portions.

**W i n g s .** – Clear, venation dark brown, almost black, lighter brown near the bases. Forewings with  $18\frac{1}{2}$ , hindwings with 17 Px. Arculus distal to Ax2, R4+5

well proximal to subnodus, IR3 arising from R4+5 at the level of subnodus. Y vein stalked. CuP reaching hind margin of fore wing at level of Px6, in hind wing at level of Px7. Number of cells between Arc and place where CuP meets hind margin of hind wing 12. Pterostigma dark



Figs 11-15. *Drepanosticta anamia* sp. nov.: (11) head and synthorax, lateral view [holotype]; – (12) prothorax, lateral view [female paratype]; – (13) anal appendages, dorsal view [holotype]; – (14) anal appendages, ventral view [holotype]; – (15) wings, right pair [holotype].

brown with a tint of dark reddish, encircled by narrow lighter line and surrounded by thick dark brown veins, proximal side oblique, distal side only slightly convex, wider than high. Wing venation of holotype male is shown in Figure 15.

**Abdomen.** – Slender and long, dark brown almost black, especially on segments 7-10. Segment 1 brown, with light brown proximal portion, segment 2 brown, segments 3-7 dark brown, gradually almost black towards end of abdomen, basally with narrow light brown rings which are not connected dorsally and are narrowly prolonged ventrally to almost end of segments. Dorsum of segment 9-10 greyish blue (sky blue in life), segment 8 with small triangular dorsal blue marking, occupying distal fifth of the segment. Anal appendages blackish brown, inner sides and inferiors brown. Superiors very broad and rounded at the base, but inner sides strongly excavated. Distal half flattened laterally, strongly angulated downwards and inwards, with rounded tips. Proximal half of inferiors broad and strong, with dorsal spine in the middle. Distally narrowed and turned slightly up, ending in a peculiar structure, similar to a narrow inverted boot, with totally flat surface of the sole turned slightly upwards and tips pointing inwards (Figs 13-14).

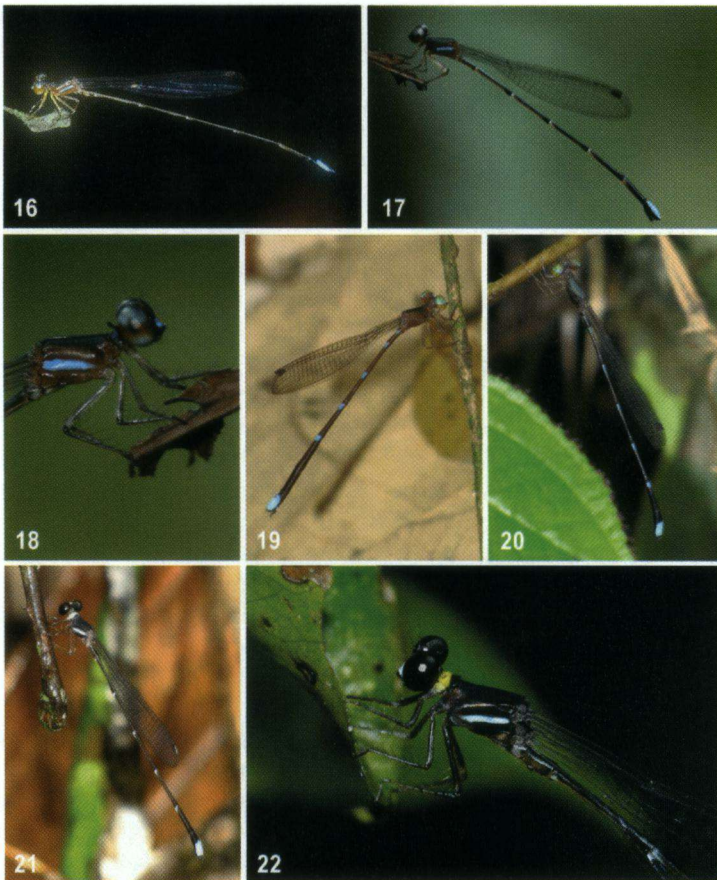
**FEMALE** (dried specimen). – Similar to male, but smaller and more robust insect. Wings slightly enfumed. Colouration somewhat lighter, except for the head all other black parts of male, dark brown in female. Anterior part of labrum black, posteriorly slightly brownish, the line between whitish part (probably blue in life) not straight as in male but with whitish notch in the middle. Prothorax similar to male, whitish, lateral parts of posterior lobe slightly different and more rounded (Fig. 12). In wings, R4+5 well proximal to subnodus, IR3 arising from subnodus. Dorsum of abdominal segments 9-10 greyish blue (blue in life), segment 8 with small triangular dorsal blue marking, occupying distal third of the segment. Cerci triangular, black. Ovipositor finely serrated at the end, styli proximally slightly exceeding cerci.

**NOTES ON LIFE COLOURATION AND VARIATIONS.** – Unlike in other species of Sri Lankan *Drepanosticta*, the eyes are uniformly dark brown in adult animals, similar to *Platysticta* (Figs 21-22). Labrum and anteclypeus, as well as mandibulae bases sky blue in adults. Flagellum of antennae dark brown, almost black. Middle lobe of prothorax orange or yellowish in adults of both sexes, whitish in juveniles (Figs 21-22). Nipples on midlobe of prothorax sometimes tipped with grey or with blackish tips. Rounded lateral expansions and hind margin of posterior lobe with slightly different shape in specimens from different regions. Thoracic stripe sky blue. Wings slightly enfumed in some specimens. In all paratypes vein IR3 arising from subnodus. Y vein in some specimens very short stalked, in one specimen sessile. Dorsum of segments 10 and 9 sky blue. In some specimens blue triangular mark occupies more than a distal third of segment 8 in some it is narrower and squarish or even indented with black, in some this segment is completely black with only intersegmental membrane being blue.

Measurements (in mm, paratype's range in brackets), ♂. – Head width: 5.0 (4.5-4.9); abdomen length: 44.1 (42.7); fore- and hindwing length: 27.9, 27.2 (26.9-28.4, 26.0-27.8); fore- and hindwing pterostigma length: 1.3, 1.4; superior and inferior appendages: 1.0, 0.7; ♀ – head width: 4.9 (4.8); abdomen length: 39.0 (34.0-39.0); fore- and hindwing length: 28.4, 27.8 (26.1-29.3, 25.3-28.7); fore- and hindwing pterostigma length: 1.4, 1.4; ovipositor length: 1.9 (1.8-2.0).

FAUNISTIC RECORDS. – (1) Mahabage, Ing Oya, River Resort Hotel; Kithulgala; Kegalla district, Sabaragamuwa province; N 7.0012° E 80.4346°; alt. 240m; 26-II-2006; K. Conniff; 1 ♂; 21-VI-2006; K. Conniff; 4 ♂, 2 ♀; 1-VII-2006; K. Conniff; 5 ♂, 3 ♀; 15-VIII-2006; K. Conniff; 1 ♂, 25-VII-2009; M. Bedjanič; 10 ♂, 5 ♀; – (2) Mahabage, Ing Oya, small seepage beside the road from River Resort to Beliena Cave; Kithulgala; Kegalla district, Sabaragamuwa province; N 7.0072° E 80.4295°; alt. 240m; 26-VII-2009; M. Bedjanič; 2 ♂; – (3) Mahabage, Ing Oya, Left tributary of Ing Oya on the way from River Resort to Beliena Cave; Kithulgala; Kegalla district, Sabaragamuwa province; N 7.0082° E 80.4291°; alt. 260m; 26-VII-2009; M. Bedjanič; 2 ♂; – (4) Small stream in the secondary forest 1km S of the bridge near Plantation Hotel in Kithulgala; Kegalla district, Sabaragamuwa province; N 6.9844° E 80.4137°; alt. 430m; 21-V-2009; M. Bedjanič; 3 ♂, 1 ten.; – (5) Small stream on the road Kithulgala towards Polpitiya, 6km NW of Laxapana; Nuwara Eliya district; Central province; N 6.9729° E 80.4510°; alt. 270m; 27-VII-2009; M. Bedjanič; 1 ♂; – (6) Small stream on the road Kithulgala-Laxapana, 1km NW of Laxapana; Nuwara Eliya district; Central province; N 6.9335° E 80.4773°; alt. 400m; 28-VII-2009; M. Bedjanič & K. Conniff; 1 ♂; – (7) Small stream on the road Laxapana-Norton Bridge, 1km E of Laxapana; Nuwara Eliya district; Central province; N 6.9263° E 80.4895°; alt. 550m; 28-VII-2009; M. Bedjanič & K. Conniff; 2 ♂; – (8) Laxapana, 6.9km NW; Kegalla district, Sabaragamuwa province; N 6.9674° E 80.4379°; alt. 330m; 25-IX-1970; O. Flint; 2 ♂; – (9) Laxapana; Nuwara Eliya district; Central province; N 6.9270° E 80.4821°; alt. 400m; 24/28-IX-1970; O. Flint; 1 ♀; – (10) Tunmodera, near Labugama; Colombo district, Western province; N 6.8638° E 80.1660°; alt. 65m; 19-IX-1970; O. Flint; 4 ♂; – (11) Kalatuwawa Reservoir; Ratnapura district; Sabaragamuwa province; N 6.8561° E 80.2032°; alt. 100m; 19-IX-1970; O. Flint; 1 ♀; – (12) Bodhinagala; Ingiriya Forest Reserve, about 30km SE of Colombo; Kalutara district; Western province; N 6.7647° E 80.1498°; alt. 50m; 15-VI-2008; K. Conniff; 1 ♀; 11-V-2009; M. Bedjanič & K. Conniff; 2 ♂, 2 ♀; – (13) Katugas Falls 2km N of Ratnapura; Ratnapura district; Sabaragamuwa province; N 6.6825° E 80.4121°; 4-V-2003; M. Bedjanič; 1 ♂; – (14) Stream at 10th bend in Balutota Pass on the road Deniyaya-Rakwana; Rakwana; Ratnapura district; Sabaragamuwa province; N 6.4572° E 80.6246°; alt. 800m; 17-V-2009; M. Bedjanič & S. Gunasinghe; 5 ♂, 1 ♀; – (15) Sinharaja Forest Biosphere Reserve, stream along the road from Martin's Guesthouse to the new visitors centre; Ratnapura district; Sabaragamuwa province; N 6.4315° E 80.4152°; alt. 400m; 14-V-2009; M. Bedjanič & K. Conniff; 1 ♂; – (16) Sinharaja Forest Biosphere Reserve; Mure Kale, near villgers hut; Ratnapura district; Sabaragamuwa province; N 6.4316° E 80.3989°; 13-VI-2006;

G. de Silva Wijeyeratne; 1 ♂; – (17) Sinharaja Forest Biosphere Reserve; Kudawa; Ratnapura district; Sabaragamuwa province; N 6.4085°, E 80.4445°; 01-VII-2008; K. Conniff; 1 ♂; – (18) Deniyaya, stream in the forest 10km NEE of Deniyaya; Matara district; Southern province; N 6.36°, E 80.46°; alt. 330m; 29-IV-2003; M. Bedjanič; 10 ♂, 5 ♀, 5 ten.; – (19) Stream on the road Morawaka-Diyadawa on the slopes of Diyadawa forest; Matara district; Southern province; N 6.3122°, E 80.5430°; alt. 145m; 16-V-2009; M. Bedjanič & S. Gunasinghe; 3 ♂; – (20) Small stream near the entrance to Kanneliya Biosphere Reserve; Galle district; Southern province; N 6.2509°, E 80.3381°; alt. 65m; 15-V-2009; M. Bedjanič & S. Gunas-



Figs 16-22. Life colouration of newly described species: (16) *Drepanosticta mojca* sp. nov. [male]; – (17) the same [female]; – (18) the same, synthorax and head with visible prothorax projections [female]; – (19) *D. bine* sp. nov. [female]; – (20) the same [male]; – (21) *D. anamia* sp. nov. [juvenile male]; – (22) the same, synthorax and head [male]. – (Figs 17, 18 and 22 photographed by K. Conniff).

inghe; 1 ♂; – (21) Shady river along forest trail in Kanneliya Biosphere Reserve; Galle district; Southern province; N 6.2595<sup>o</sup>, E 80.3436<sup>o</sup>; alt. 110m; 1-VII-2007; K. Conniff; – (22) Small tributaries to Hiyare lake on the N shore; Galle district; Southern province; N 6.0585<sup>o</sup>, E 80.3165<sup>o</sup>; alt. 100m; 21-VI-2006; K. Conniff; 4 ♂, 2 ♀; 15-V-2009; M. Bedjanič & S. Gunasinghe; 1 ♂.

## TAXONOMIC NOTES AND DISCUSSION

The diversity of the genus *Drepanosticta* in Sri Lanka is remarkable at a global level, and with our three new species, bringing the current total to 17 described species, the island can legitimately be declared as one of the global Platystictidae hotspots.

As already suggested by VAN TOL (2009), the Sri Lankan *Drepanosticta* taxa, based on an example of *D. nietneri* (Fraser), phylogenetically pertain to a basal clade that is separated from the rest of Southeast Asian Platystictidae and species currently ascribed to the genus *Drepanosticta*. It should be noted, however, that based on morphology, even among Sri Lankan representatives, some clearly defined species groups can be recognized. Revision of generic characters and grouping is beyond the scope of this paper. An ongoing molecular analysis of the extensive material from Sri Lanka might bring new insights and changes in this segment as well (M. Bedjanič & J. van Tol, in prep.). In this respect, the three new species do not appear related, but at least *D. mojca* and *D. bine* have closely related species among previously described taxa in Sri Lanka. Some comments on the species relations are given below, based on morphological characters only.

*D. mojca* – The notable and almost total reduction of inferior appendages in males of this species is unmatched in the family. Furthermore, the curious distal prolongation of the male's last tergite has no comparison among congeners. However, the anterior projections of the prothorax (Figs 16-18) are developed in two other Sri Lankan species, viz. *D. tropica* (Selys) and *D. subtropica* (Fraser). Moreover, both of them have somewhat similarly shaped and quite long superior appendages, but the inferior appendages are not reduced and have strong basal spine and are markedly attenuated towards apex (FRASER, 1933a; 1933b). It is possible that these very thin parts of inferiors lost their role in mating and have been evolutionary reduced to the extent seen in *D. mojca*. An answer to this hypothesis and relations in this species group will be provided by molecular analysis. It should be noted that another new species with almost totally reduced inferior appendages has been recently discovered in forests around Kithulgala and Laxapana. It is closely related to *D. mojca*, but its taxonomic status requires further study.

*D. bine* – At a glance it is distinguished from all of its congeners by its brown head and beautiful green, blue and brown colouration of the eyes in living animal (Figs 19-20). The only described species with small chocolate brown patch on

vertex and front of occiput are *D. montana* (Selys), *D. submontana* (Fraser) and *D. fraseri* Lieftinck, the latter being of doubtful identity, which will be dealt with elsewhere. Also in the colouration of prothorax and presence of robust rounded tubercles on pronotum, these species seem to be related to *D. bine*. However, they all have clearly defined light thoracic stripes on the metepisternum, while in some specimens of *D. bine* the blue thoracic markings are totally reduced and in others there is only a narrow largely obscured blue stripe along obsolete mesometapleural suture. At the moment, it is not clear whether this variation is age dependant or a stable character of populations from different regions. Here, too, molecular analysis will show relations within this group of species more exactly.

*D. anamia* – It does not seem to have any near allies and can be recognized by its considerable size, characteristic orange-yellowish colouration of prothorax, distinctive small nipples on the pronotum (Figs 21-22) and curious shape of inferior anal appendages in the male. In the field, as far as eyes colouration, flight, resting posture and general appearance are concerned, it superficially resembles a *Platysticta* more than a *Drepanosticta*. It will be interesting to see the taxonomic placement of *D. anamia* after a detailed revision of Sri Lankan Platystictidae is made, based on morphological as well as molecular analyses.

#### DISTRIBUTION, PHENOLOGY AND ECOLOGICAL NOTES

Complete distribution and phenology data for all three new *Drepanosticta* species are listed under individual taxonomic descriptions. A short summary of the current knowledge and observations with added notes on their habitats is given in the following lines.

*D. mojca* – It is known from 6 localities, all confined to Sri Lanka's »Wet zone«, in Kalutara, Ratnapura, Galle and Matara districts (Fig. 23). The localities are widely scattered at distances of 50 to 20 kilometres and only the ones in Sinharaja Forest Biosphere Reserve and its surroundings seem to be potentially connected by the presence of suitable habitats. The southern and the easternmost records are both more than three decades old, so the presence of *D. mojca* there should be checked through additional fieldwork. At least in the South, in the Kottawa Forest Reserve, characteristic rainforest habitats are fortunately still present. It should be noted that *D. mojca*, although easily determined when closely observed in the hand, is rather inconspicuous in the field and might be easily overlooked. Individuals can be found some meters away from streams, in shady and dark undergrowth below higher canopy, usually perching motionless on leaves and twigs at knee height. Along a small stream in the Haycock area flowing through a narrow forest corridor surrounded by sparsely cultivated tea plantations, we have observed several *D. mojca* males in a single place – all other records are more or less coincidental observations of single males. At this locality also *D. lankanesis* (Fraser) and *D. bine* were present. As regards phenology, based on hereto known

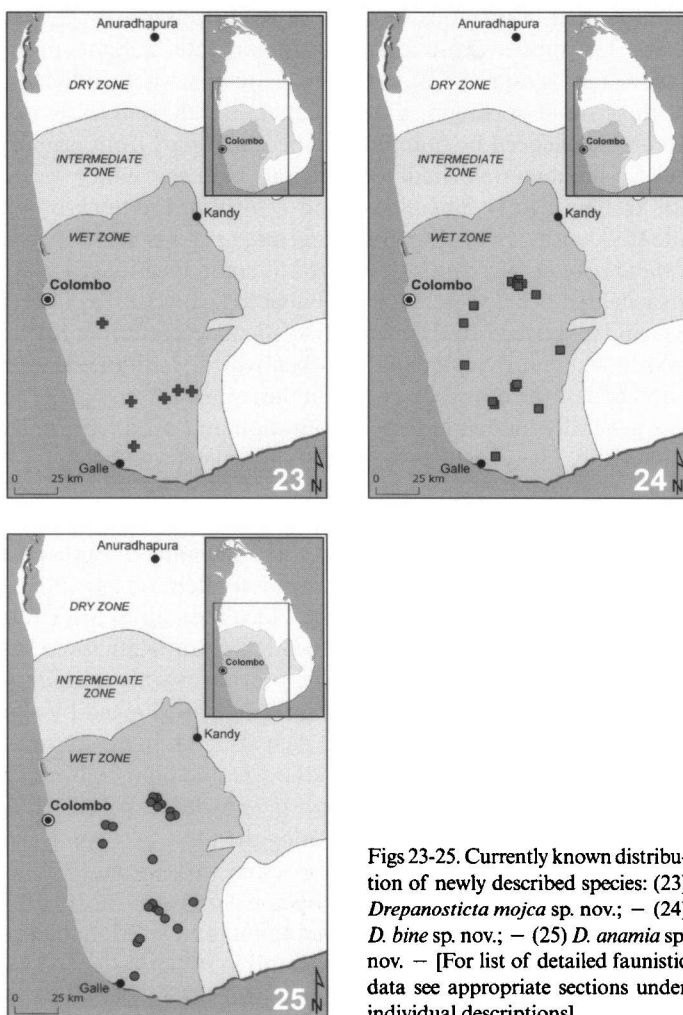


data, the adults of *D. mojca* fly in May and June as well as in October. It is expected that through additional fieldwork the species will be discovered in more localities and that a thorough knowledge of its habitat requirements and phenology will be improved as well. However, even with this surmise, *D. mojca* can still be assessed as a rare species. Due to isolation of its populations and continued destruction of appropriate lowland habitats, it should be listed among the endangered endemic dragonflies of Sri Lanka.

*D. bine* – It is currently known from 16 localities, all confined to Sri Lanka's »Wet zone«, in Kegalla, Nuwara Eliya, Kalutara, Ratnapura, Galle and Matara districts (Fig. 24). In *D. bine*, the populations are isolated but the records are more numerous than in previous species and have been mostly gathered in the last few years. The species is found around minor water habitats in rainforests, such as trickles, marshy springs and very small streams, where individuals can be found near the ground or clinging a few decimetres high from leaves or twigs. Its habitats are not influenced by human activities, but apart from primary forests, the species also inhabits well shadowed habitats with secondary vegetation. At localities of *D. bine* also *D. lankanensis* and *D. brincki* Lieftinck have been observed quite frequently, while *D. anamia*, *Platysticta* cf. *maculata* Selys, *D. mojca* and *Platysticta apicalis* Kirby also occurred at some locations. The altitudinal range of its localities is between 50-500m. Phenologically, the flying period of *D. bine* adults can be ascribed to a general Platystictidae pattern in Sri Lanka, i.e. from end April-May until September-October, which traditionally corresponds with start and end of the monsoon period in the southwestern part of the island. Apart of its generally hidden life, the colouration and markings of *D. bine* are quite characteristic. Therefore, it is easily determined without being captured and is less often overlooked. With additional fieldwork, the species will be discovered in more locations. However, its populations are isolated and due to further destruction of the appropriate small forest wetland habitats in south-western part of Sri Lanka, *D. bine* requires nature conservation attention as well.

*D. anamia* – It is currently known from 22 localities, all in Sri Lanka's »Wet zone«, in Kegalla, Nuwara Eliya, Colombo, Kalutara, Ratnapura, Galle and Matara districts (Fig. 25). In contrast to the previous two species, *D. anamia* is a fairly large and conspicuous damselfly that is not overlooked by experienced odonatologists. Animals are usually found near streams, hanging from leaves at belt or chest height. When juvenile, due to the size and light colour of the prothorax the adults can be mistaken for a *Platysticta* by less experienced observers. This species seems to be more common among the three new species described, but many localities are grouped in the same forested areas around Kithulgala and Laxapana as well as in the Sinharaja and Kanneliya Forest Biosphere Reserves and their surroundings. *D. anamia* inhabits small to mid-sized shaded streams in primary and secondary forests. It has been found in rather disturbed landscapes but with a corridor of well preserved trees and bushes along the stream. A stream

in Balutota Pass near Rakwana, for example, flows through sterile pine plantations, but at least in the short term, even a narrow shaded corridor of primary and secondary vegetation still offers suitable conditions for this species. The accompanying Platystictidae at localities of *D. anamia* were most commonly *D. lankanensis*, *D. brincki*, *Platysticta* cf. *maculata* and *D. bine*. The altitudinal range of its localities is between 50-800m, so *D. anamia* apparently has a wider ecological tolerance than *D. mojca* and *D. bine*. The flight season stretches from the end of April till September, with a single end-February record, which could indicate that it flies also during the end of the »dry season« in the southwestern part of



Figs 23-25. Currently known distribution of newly described species: (23) *Drepanosticta mojca* sp. nov.; – (24) *D. bine* sp. nov.; – (25) *D. anamia* sp. nov. – [For list of detailed faunistic data see appropriate sections under individual descriptions].

the island. More fieldwork will provide new records of *D. anamia*, however, as in *D. mojca* and *D. bine*, potentially suitable habitats have been severely fragmented and mainly left only as small pockets among vast areas of sterile tea plantations, clear-cut eroded slopes and fields. Therefore, even the potential area of its occupancy is small. Also in this species, a detailed assessment of its distribution, estimation of population sizes and future monitoring are needed.

### CONSERVATION ASPECT

The island of Sri Lanka is, together with the south Indian Western Ghats, classified as one of the global »biodiversity hotspots« (MITTERMEIER et al., 2000). In odonatological terms, the number of around 125 hitherto recorded species is not extremely high by itself, but the very high level of endemism, reaching almost 50% in some genera and families, is indeed remarkable at the global scale (KALKMAN et al., 2008).

However, apart from being one of the »hottest« in biodiversity terms, the region has by far the highest human population density in this prestigious company. In the case of Sri Lanka's »Wet zone«, which accounts for only a quarter of the land surface in the central and southwestern parts of the island but contains roughly three quarters of the island's endemic biota, a density of nearly 700 people/km<sup>2</sup> was calculated (MITTERMEIER et al., 2000). The rapid destruction and fragmentation of rainforests have brought the island to the brink of disaster in the last few decades. Today, the surface covered by relatively undisturbed natural forests is estimated at much less than 10%. In other words, only around 800 km<sup>2</sup> of undisturbed natural forest remains in the southwestern part of Sri Lanka and most of it has been severely fragmented and isolated.

In this respect, the restriction of several Platystictidae species to the small streams in the rainforests' shadows is fatal. The meticulously cut tea plantations and bare, eroded slopes covered with grass are far from being suitable for their survival. In addition to the rainforest destruction and fragmentation, the destruction of forest corridors along streams, water extraction for irrigation purposes, over-use of pesticides and heedless pollution of streams and rivers in the central and southwestern parts of Sri Lanka represent significant risk factors for the survival of these tender damselflies. Particularly so, as most *Drepanosticta* species have very restricted ranges and many of them are persisting only in small remaining pockets of their original habitat.

Looking from a slightly more optimistic perspective, the distribution of the three new species seems not to be very limited and it is definitely a good news that there are many recent records confirming their presence at different sites. Another positive finding is that some populations can obviously survive also in rather disturbed forests or even in habitats with only a narrow forest corridor along streams. Therefore, at least in the case of *D. anamia* and *D. bine*, their conservation status,

in the short run, is not critical. However, the estimation that their populations are in fact already severely fragmented and isolated is very likely. Although their extent of occurrence according to the international IUCN criteria is more than 5,000 km<sup>2</sup>, their presently known area of occupancy is much smaller and will due to the above reasons not change considerably also with discovery of new sites. In the future, therefore, all three beautiful new *Drepanosticta* species surely deserve our close conservation attention and monitoring.

#### ACKNOWLEDGEMENTS

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