



## ***Dario urops*, a new species of badid fish from the Western Ghats, southern India (Teleostei: Percomorpha: Badidae)**

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### **Abstract**

*Dario urops*, new species, is described from a small stream of the Barapole tributary of Valapattanam River in southern Karnataka and from Wayanad District, Kerala. It can be distinguished from its congeners by the presence of a conspicuous black blotch on the caudal peduncle and a horizontal suborbital stripe, by the anterior dorsal fin lappets in males not being produced beyond fin spines, and by its vertebral count.

**Key words:** Taxonomy; freshwater fish; Western Ghats Sri Lanka biodiversity hotspot

### **Introduction**

The family Badidae comprises a total of 19 described species (Kullander & Britz 2002; Geetakumari & Vishwanath 2010; Schindler & Linke 2010; Geetakumari & Kadu 2011) in two genera, *Badis* and *Dario*. Badids are small fishes distributed mainly in Nepal, northern India, Bangladesh and Myanmar, with only two species extending the range of the family into Thailand (Kullander & Britz 2002). Kullander & Britz (2002) were able only to include badids from the Mahanadi drainage and further north in their revision, although there were literature reports of badids collected in southern India (Day 1875–1878; Karmakar & Datta 1998). *Badis badis* was also recently recorded from Chennai by Knight & Rema Devi (2009). Day (1875–1878) mentioned the occurrence of *Badis dario* in the Western Ghats, a record that seems to have been overlooked since by most authors. During recent fieldwork in southern Karnataka, peninsular India, a small badid with an unusual colour pattern was collected from a small stream. During a search among Day's material housed at the Natural History Museum, London, the first author came across two lots labeled as *Badis dario* collected in 'Wynaad' (today's Wayanad district, Kerala). A closer inspection of Day's material and ours revealed that they are conspecific and represent a species new to science, which is described herein.

### **Materials and methods**

Ten measurements and 10 counts were taken from the holotype and an additional 10 specimens of the type series following the methods outlined in Kullander & Britz (2002). Additional fin ray counts and vertebral counts were obtained from the six specimens housed at The Natural History Museum (BMNH 1870.5.2.9, 1889.2.1.3193–7). We adopted Kullander & Britz's (2002) terminology for colour pattern and cephalic lateral-line pores. Numbers in parentheses following a count indicate the frequency of that count. Proportional measurements are summarized in Table 1. Specimens are deposited in the collections of the Conservation Research Group, St. Albert's College (CRG—SAC), Kochi, Kerala, India and The Natural History Museum, London (BMNH).

**TABLE 1.** Selected morphometric characters of *Dario urops*.

	CRG-SAC.2012.3.1 Holotype	CRG-SAC.2012.3.2–11 Paratypes (n=10)	
Standard length (SL) in mm	23.8	17.1–23.6	
<b>In percent of standard length</b>		range	mean ± SD
Head length	34.4	30.9–34.2	32.6 ± 1.1
Snout length	6.9	6.4–8.3	7.3 ± 0.7
Eye diameter	9.6	8.9–11.3	9.9 ± 0.7
Interorbital width	7.4	5.3–8.3	7.0 ± 0.9
Upper jaw length	7.4	6.0–8.2	7.0 ± 0.6
Lower jaw length	8.0	6.7–9.7	8.1 ± 0.9
Body depth	31.7	25.4–29.1	27.7 ± 1.3
Pelvic fin length	25.0	22.0–25.2	22.7 ± 0.9
Pelvic to anal distance	19.5	15.8–27.7	23.7 ± 3.4
<b>In percent of head length</b>			
Snout length	20.0	19.4–25.5	22.4 ± 2.2
Eye diameter	27.9	26.1–33.3	30.4 ± 1.9

***Dario urops*, new species**

Figures 1–2

**Holotype.** CRG—SAC.2012.3.1, 23.8 mm SL, male; India: Karnataka: from a small unnamed stream, off the Barapole tributary of Valapattanam river, 12°00.310'N 75°53.408'E; 811m asl.; R. Raghavan et al., 30 Jan 2012.

**Paratypes.** CRG—SAC.2012.3.2–11, 10, 17.1–23.6 mm SL, same data as holotype. BMNH 1870.5.2.9, 28.5 mm, Wynaad, India, F. Day. BMNH 1889.2.1.3193-7, 5, 16.4–23.6 mm, Wynaad, India, F. Day.

**Diagnosis.** *Dario urops* differs from all other species of the genus *Dario* by the presence of a conspicuous black caudal blotch on the caudal peduncle (vs. absence), by the presence of a horizontal suborbital stripe (vs. absence), by the anterior dorsal fin lappets in males not extending beyond fin spines (vs. extending considerably beyond spines), and by its vertebral count (14+14–15= 28–29 vs 11–13+12–14=24–27). It differs further from *D. dario* and *D. hysginon* by the absence in males of a dark stripe along the anterior margin of the pelvic fin, and from *D. dario* by the absence of bars in males.

**Description.** For general appearance see Figs. 1–2; morphometric data are provided in Table 1.

Body elongate, moderately laterally compressed. Predorsal contour straight to slightly convex, prepelvic contour convex, giving head a pointed appearance. Eye situated in anterior half of head, snout short. Mouth terminal. Angle of jaws situated at vertical through anterior third of eye. Dorsal contour of body slightly arched, convex, less so in females, ventral contour of body straight; both contours slightly converging towards caudal peduncle. Caudal peduncle only slightly attenuated posteriorly.

Lateral-line canal pores present only on head, absent from body. Head canal pores comprise: dentary pores 3 (d1–d3), anguloarticular pore 1 (aa2), preopercular pores 5 (p1, p2, p4–p6), nasal pores 2 (n1–n2), supraorbital pores 3 (f1–f3), extrascapular pores 3 (ex1–ex3), posttemporal pores 2 (po1–po2), coronalis pore 1 (cor), lachrymal pores 2 (l1, l3); no infraorbital pores.

Scales ctenoid on sides, cycloid on top of head. Predorsal scales 5 anterior to coronalis pore, 9 posteriorly. Four rows of scales on cheek. Circumpeduncular scales 16. Tubed lateral-line scales absent. Scales in a longitudinal row 28. Scales in transverse row 10.

Dorsal-fin rays XIV+9 (11), XV+8 (3), or XV+9(2). Anal-fin rays III+8 (14) or III+9 (3). Pectoral-fin rays 12 (11) or 13 (6). Pelvic-fin rays I+5 (17). Principal caudal-fin rays 7+7 (14) or 7+6 (3), with 4–5 dorsal and ventral procurrent rays.



**FIGURE 1.** *Dario urops*; India: Karnataka: Barapole river drainage; CRG-SAC.2012.3.1, holotype, male, 23.8 mm SL (above); CRG-SAC.2012.3.2–11, paratype, female, 21.0 mm SL.



**FIGURE 2.** *Dario urops*, not preserved, collected with the types, colouration in life immediately after capture.

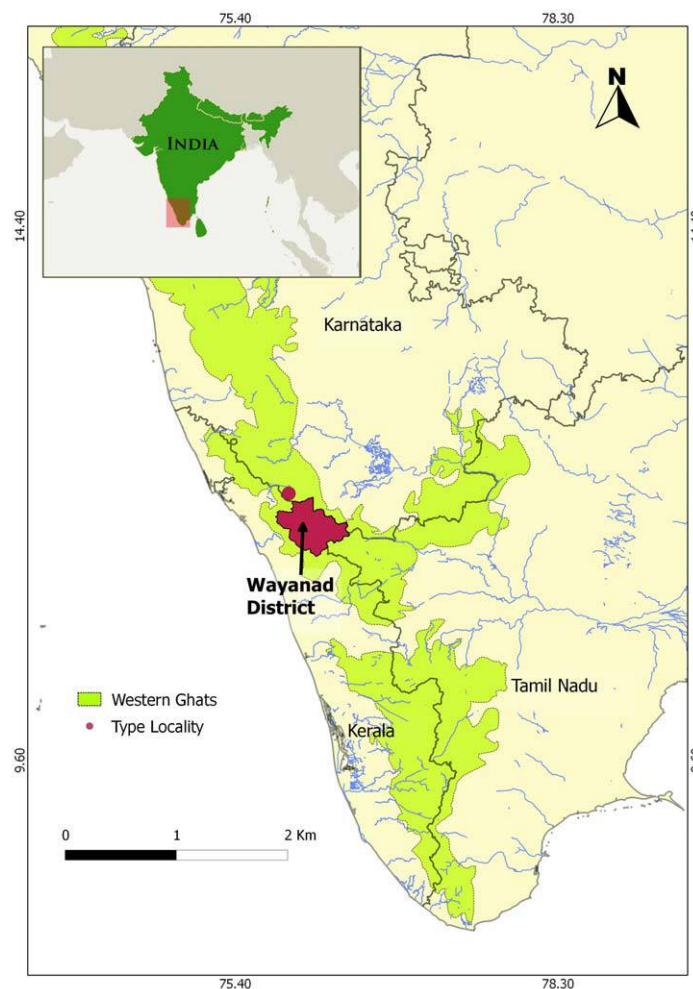
Interradial membranes of spinous dorsal fin projecting as short fin lappets that do not extend much beyond tips of spines. Soft dorsal and anal fins with rounded tips, extending to base of caudal fin only. Pectoral fin reaching to vertical through base of sixth or seventh dorsal-fin spine. Pelvic fin pointed in males, rounded in females, reaching posteriorly to anus or anterior base of anal fin. Caudal fin rounded to subtruncate.

Vertebrae  $14+14=28$  (1) or  $14+15=29$  (5).

**Coloration.** In preservative (Fig. 1), background colour beige to light brown with several dark brownish to black marks. Preorbital stripe dark brown, well developed in males, less conspicuous in females. Dark brown horizontal suborbital stripe extending from angle of jaw to vertical through posterior margin of orbit, less developed in females. Postorbital stripe dark brown, extending from upper posterior margin of eye towards nape beginning at 12 h to 13 h and running obliquely. Large dark brown blotch present on opercle, well developed in males but fainter in females, extended posterodorsally towards supracleithral area. No cleithral spot. Series of irregular dark marks along back reaching only two scale rows down. Base of each scale on sides of body with a darker area of denser melanophores forming narrow irregular zigzag-shaped bars on caudal peduncle. Prominent caudal blotch present separated from caudal peduncle bars by much lighter anterior halo-like area. Pectoral fin mostly translucent with few melanophores along fin rays and on fin membrane, all other fins dusky. Dorsal-fin and anal-fin membranes in spinous portions with dense aggregations of melanophores, less densely developed on soft fin membranes. Caudal fin with similar densities of melanophores on both fin rays and interradian membranes.

In life (Fig. 2), background colour yellowish beige. Supraorbital and suborbital stripes prominent. Opercle with golden green iridescence covering opercular blotch, but supracleithral extension of blotch prominent. A number of dark brown scales distributed irregularly on nape, along base of dorsal fin along and on side of body. Caudal blotch not always conspicuous. All fins except pectoral fin with a bluish-gray hue.

**Distribution.** *Dario urops* has been collected so far only from a small stream of the Barapole tributary of Valapattanam River in southern Karnataka (Fig. 3) and from an unspecified location in Wyanad. The Valapattanam is a

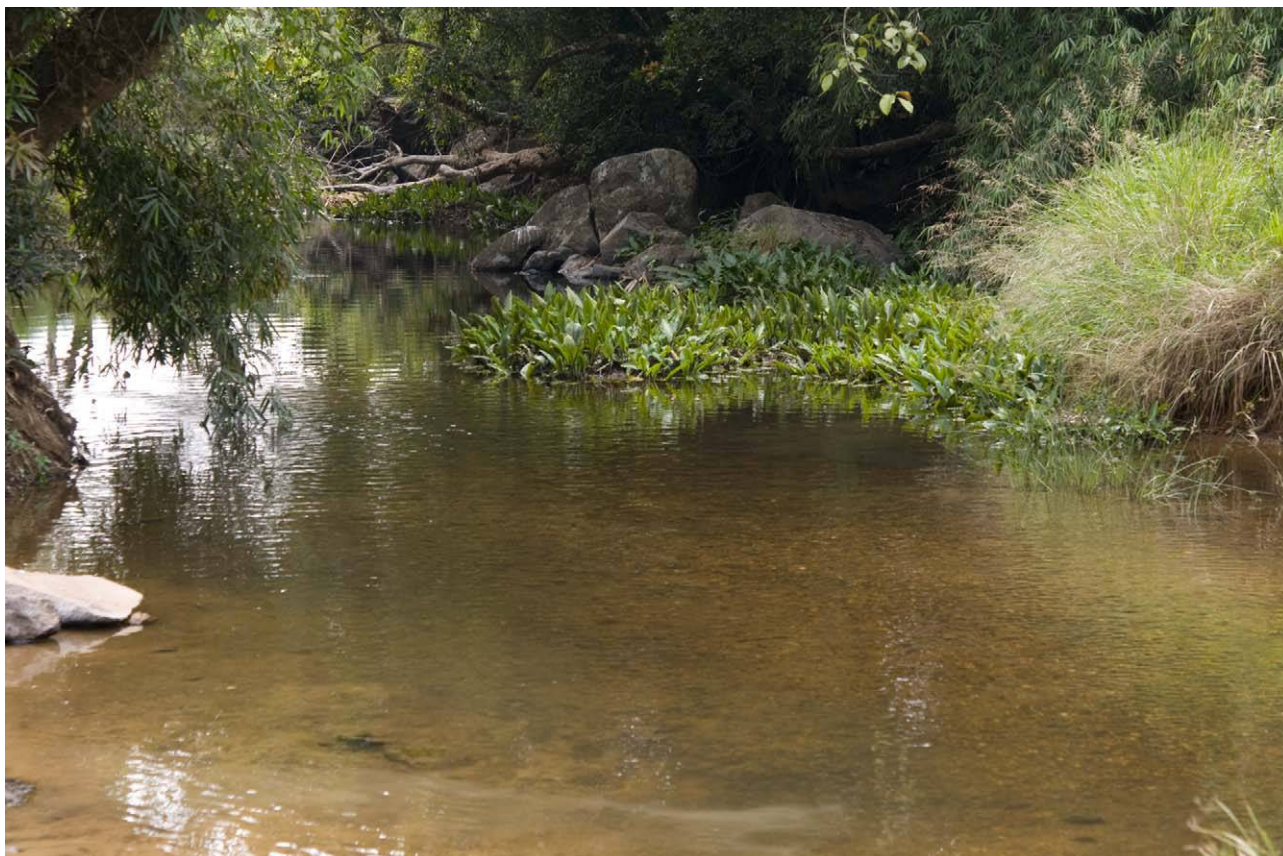


**FIGURE 3.** Map showing type locality of *Dario urops* and Wayanad district, where Day's specimens were collected.

westward drainage that flows into the Arabian Sea, while the district of Wyanad lies within the Cauvery basin, which drains eastward into the Bay of Bengal.

**Etymology.** The species name *urops* is derived from the Greek οὐρά, tail and ὄψ, eye and refers to the conspicuous eye spot on the caudal peduncle. A noun in apposition.

**Remarks.** The unnamed stream in southern Karnataka from which *D. urops* was collected is a small clear water stream, up to 10 m wide and 2 m deep, with a bottom formed of a mixture of sand and mud and larger boulders (Fig. 4). Large stands of the aquatic plant *Lagenandra* were growing out of the water. *Dario urops* was collected mostly from among bundles of tree roots hanging into the water along the edges of the stream and from thicker layers of leaf litter that had accumulated in low current depressions of the stream.



**FIGURE 4.** Type locality of *Dario urops*, an unnamed stream draining into the Barapole tributary of Valapattanam River, southern Karnataka.

## Discussion

*Dario urops* was first collected by Day more than 130 years ago at an unspecified location in ‘Wynaad’, present day Kerala. This species was mentioned under *Badis dario* in his monographs on Indian fishes (1875–1878: 129; 1889: 82) when referring to the occurrence of *B. dario* “along the Western Ghats.” Subsequent authors have mostly overlooked this record and were unaware of the presence of Day’s specimens in the collection of the BMNH.

The description of *D. urops* increases the number of species in that genus to four. This new species was placed by us in the genus *Dario* based on the absence of a body lateral line and infraorbital pores. The lack of some of the diagnostic characters of *Dario*, as defined by Kullander & Britz (2002), highlights the unusual nature of *Dario urops*. It lacks the conspicuously extended fin lappets of male *D. dario*, *D. hyginon*, and *D. dayingensis* and thus resembles the genus *Badis* in this character. *Dario urops* also has a highly unusual vertebral count of 14+14 or 14+15, which resembles much more the vertebral counts found in *Badis*. All this may indicate that *Dario urops* is the sister group of all other *Dario* species. This hypothesis is further supported by the presence of a caudal blotch

unknown in any other *Dario* species, but common in *Badis*, and thus most likely another plesiomorphy for *D. urops*. The hypothesis of a basal position for *Dario urops* will need to be tested with additional data.

The occurrence of a badid, especially a species of the genus *Dario*, in the Western Ghats was thus quite unexpected. The remaining three species are distributed in mountainous areas of the Brahmaputra and Ayeyarwaddy drainages of India and Myanmar, respectively (Kullander & Britz 2002). The new species *D. urops* extends the distribution of the genus *Dario* and that of the family Badidae as a whole south to the Western Ghats. The discovery of *D. urops* parallels that of other freshwater fish taxa with a mostly northeastern Indian/Myanmar distribution, of which members from the Western Ghats have been described only recently, like *Psilorhynchus tenura* (Arunachalam & Muralidharan 2008) and *Pseudolaguvia austrina* (Radhakrishnan, Sureshkumar & Ng 2011).

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