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Arriba y arriba: Registros más septentrionales de *Macromidia donaldi donaldi* (Fraser, 1924) y *Merogomphus longistigma* (Fraser, 1922) de los Western Ghats de la India (Odonata: Synthemistidae: Gomphidae)

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Abstract: The occurrences of *Macromidia donaldi donaldi* (Fraser, 1924) and *Merogomphus longistigma* (Fraser, 1922) are reported for the first time in the northern Western Ghats of India. The observations are the northernmost records of these species. Detailed descriptions, diagnostic characters and a comparison on with closely related species are provided.

Keywords: Geographical Distribution, Maharashtra, Natural History, New spatial records, Pune district.

Resumen: Las ocurrencias de *Macromidia donaldi donaldi* (Fraser, 1924) y *Merogomphus longistigma* (Fraser, 1922) se informan por primera vez en el norte de Western Ghats de la India. Las observaciones son los registros más septentrionales de estas especies. Se proporcionan descripciones detalladas, caracteres de diagnóstico y una comparación con especies estrechamente relacionadas.

Palabras clave: Distribución geográfica, Distrito de Pune, Historia Natural, Maharashtra, Nuevos registros espaciales.

Maharashtra is one of the largest Indian States located in the western and central region of the country. The state has a rich faunal diversity, and is composed by six biogeographic provinces namely, West Coast, Western Ghats - Malabar Plains, Western Ghats - Mountains, Deccan Peninsula - Central Highlands, Deccan Peninsula - Central Plateau, Deccan Peninsula - Deccan South (Rodgers et al., 2002; Tiple & Koparde 2015). The Odonata fauna of the state is well-reported through several studies conducted since the beginning of the twentieth century (Laidlaw, 1917; Fraser, 1919; 1932; 1934; 1936). Then, many authors have significantly contributed to the taxonomy, diversity, and distribution

of odonates of the Maharashtra State (Prasad, 1996; Babu et al., 2009; Babu & Nandy, 2010; Tiple, 2012; Tiple et al., 2013; Tiple et al., 2014; Kulkarni & Subramanian, 2013; Koparde et al., 2014; Koparde et al., 2015; Koparde et al., 2019; Jere et al., 2020; Mujumdar et al., 2020). The most recently updated Odonata list of Maharashtra compiled by Tiple & Koparde (2015), enlisted 134 species of odonates from the state. More recently four new species *Ceriagrion chromothorax* Joshi & Sawant, 2019; *Bradinopyga konkanensis* Joshi & Sawant, 2020; *Euphaea pseudodispar* Sadasivan & Bhakare, 2021 and *Euphaea thosegharensis* Sadasivan & Bhakare, 2021 (Joshi & Sawant, 2019; Joshi & Sawant, 2020; Bhakare et al., 2021) have been described from the Northern Western Ghats and Konkan region of the State. The more recent additions of *Melanoneura bilineata* Fraser, 1922 (Koli & Dalvi, 2021); *Agriocnemis keralensis* Peters, 1981 and *Gynacantha khasiaca* McLachlan, 1896 (Mujumdar et al., 2020; Koli et al., 2021), increased to 141 species the reported odonates of Maharashtra. In the present study, we report the first record of *Macromidia donaldi donaldi* (Fraser, 1924) for Maharashtra based on the collections of specimens and sightings in the Pune district and confirm the occurrence of *Merogomphus longistigma* (Fraser, 1922) in the state based on the collection of one male and sightings in the Satara district, representing its northernmost distribution.

We carried out field surveys from March to November of 2021 in different parts of the Northwestern Ghats in the state of Maharashtra. Specimens were captured using a standard aerial entomological net and preserved in 70% ethanol. The captured specimens were closely examined in the laboratory using a Carl Zeiss stereomicroscope (Stemi 305) and identification was confirmed with the help of taxonomic keys (Fraser, 1934; 1936; 1953). Photographs were taken by using a digital camera (Canon 1200D), a Smartphone camera (Redmi) and microscope camera (MICAPSECOCMOS510B). Measurements of the wings and abdomen were taken using a digital caliper. The terminology used in the description of body parts followed Garrison et al. (2006) and for the wing venation followed Riek & Kukalová-Peck (1984).

The following abbreviations were used: LHW - left hind wing, RHW - right hind wing, LFW - left fore wing, RFW - right fore wing, S1-10 - abdominal segments, Pt-pterostigma, Ax-antenodal crossveins, Px-postnodal crossveins.

A total of 26 individuals of *Macromidia donaldi donaldi* (Fraser, 1924) (10 males and 16 females) were observed on 29.06.2021, on 30.06.2021 31 individuals (14 male, 17 female) and four females were observed on 16.07.2021 in the stream periphery of Vinjai Temple, Tahmini, Pune (18°26'52.74"N, 73°25'50.53"E, 614 m asl.). On 14.07.2021 and 15.07.2021, one male and one female were observed near a stream of Panshet Dam, Pune (18°23'3.34"N, 73°37'6.60"E, 586 m asl.).

A total of three male individuals of *Merogomphus longistigma* (Fraser, 1922) were encountered on 26.09.2021 in Atoli, adjacent to the Guteghar Lake in the Satara district (17°17'25.25"N, 73°47'27.71"E, 665 m asl.). Of which a single male was captured. Later on, the next

day (27.09.2021) a single male was sighted at a rocky stream of Bopoli (17°23'3.61"N, 73°41'42.32"E, 595 m asl.), Satara district.

Synthemistidae Tillyard, 1917

Genus *Macromidia* Martin, 1907

Macromidia donaldi donaldi (Fraser, 1924)



Fig. 1.

Macromidia donaldi donaldi (Fraser, 1924) from Tahmini and Panshet dam of Pune, Maharashtra, India. A. Male from Tahmini on 30.06.2021; B. Female from Panshet Dam on 15.07.2021; C. Female from Tahmini on 29.06.2021; D. Lateral view of male from Tahmini on 01.07.2021. (Photos: A, B & C- Ameya Deshpande; D- Arajush Payra).

Material examined. India, Maharashtra state: Pune, Tahmini, Vinjai Temple, 18°26'52.74"N, 73°25'50.53"E, 29-VI-2021, 2 ♂, 1 ♀, 30-VI-2021, 4 ♂, 2 ♀ (Collected by A. Payra & A. Deshpande).

Male

Measurements (in mm): Abdomen + caudal appendages - 30, FW - 28.5, HW - 29

Female

Measurements (in mm): Abdomen + caudal appendages- 30, FW- 29-29.5, HW-28.5

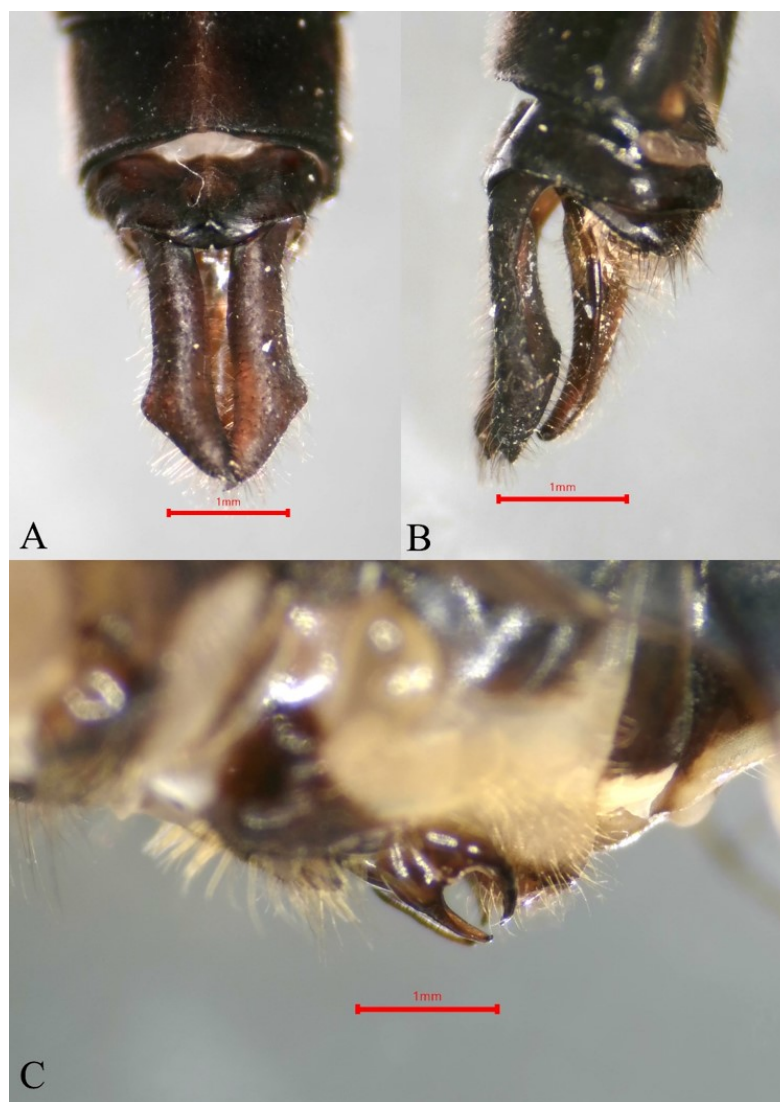


Fig. 2.

Macromidia donaldi donaldi (Fraser, 1924). A. Dorsal view of the caudal appendages; B. Lateral view of the caudal appendages. C. Lateral view of the secondary genitalia. (Bar scale = 1mm).

Diagnosis. This subspecies can be distinguished from its congeners by the following characters: mesepisternum uniformly colored, lacking antehumeral stripes, three lateral yellow stripes on synthorax, a single row of cells at the beginning of discoidal field (shared with *Macromidia genialis* Laidlaw, 1923) and the shape of caudal appendages (see fig 65 in Fraser 1936). From the recently described subspecies from Sri Lanka, *Macromidia donaldi pethiyagodai* van der Poorten, 2012, which is very similar the males of *Ma. d. donaldi* can be separated by having S1 with brown dorsum and a ventrolateral yellow spot (vs. S1 dorsally yellow in dorsum *Ma. d. pethiyagodai*). Sub basal spot on S7 being broad (vs. narrower in *Ma. d. pethiyagodai*). Lateral Stripes on thorax are comparatively longer in *Ma. d. donaldi* than *Ma. d. pethiyagodai* (van der Poorten 2012; Kosterin 2018).

Ecological notes. All individuals were observed close to a stream, amid the dense shrubs and vegetation. Most of them were seen perched

together under dense bamboo bushes about 1–2 m above ground. Some were perched on the twigs of tree branches at about 3 m above the ground. During cloudy days a few individuals were observed hovering over shaded areas of the stream.

Gomphidae Rambur, 1842

Genus *Merogomphus* Martin, 1904

Merogomphus longistigma (Fraser, 1922)

Material examined. India, Maharashtra, Satara, Atoli, Guteghar Lake, 17°17'25.25"N, 73°47'27.71"E, 26-IX-2021, 1 ♂ (Collected by A. Payra & A. Deshpande).

Male

Measurements (in mm): Abdomen+ caudal appendages- 40, FW- 33.8, HW-32.4

Diagnosis. *Merogomphus longistigma* (Fraser, 1922) closely resembles *Merogomphus tamaracherriensis* Fraser, 1931, which was earlier considered a subspecies of *Me. longistigma* (*Merogomphus longistigma tamaracherriensis* Fraser). In 1953, Fraser designated it as a full species. *Me. Longistigma* can be differentiated from *Me. tamaracherriensis* by the occiput green (vs. black occiput in *Me. tamaracherriensis*). Jointed mid dorsal spot on S3 (vs. fragmented or separated mid dorsal spot on S3 in *Me. tamaracherriensis*). Presence of mid dorsal spot on S4–S6 (vs. absence of mid dorsal spot on S4–S6 in *Me. tamaracherriensis*). Basal half of cerci bulky, with stouter and prominent outer spine (vs. cerci much straighter at base, with outer spine much shorter and smaller in *Me. tamaracherriensis*) (Fraser, 1922; 1934; 1953).

Ecological notes. A specimen of this species was first encountered at Atoli, while perched on a road close to the stream, near Guteghar Lake. Later, two individuals were spotted at the same place while hovering over the stream and resting on rocks of stream periphery. The stream was partly covered with bank periphery vegetation, also some parts with open sunlit areas where the individuals were observed. The species was sighted a second time near Bopoli, while the individual was perched on stream periphery rocks, at an open sunlit area.

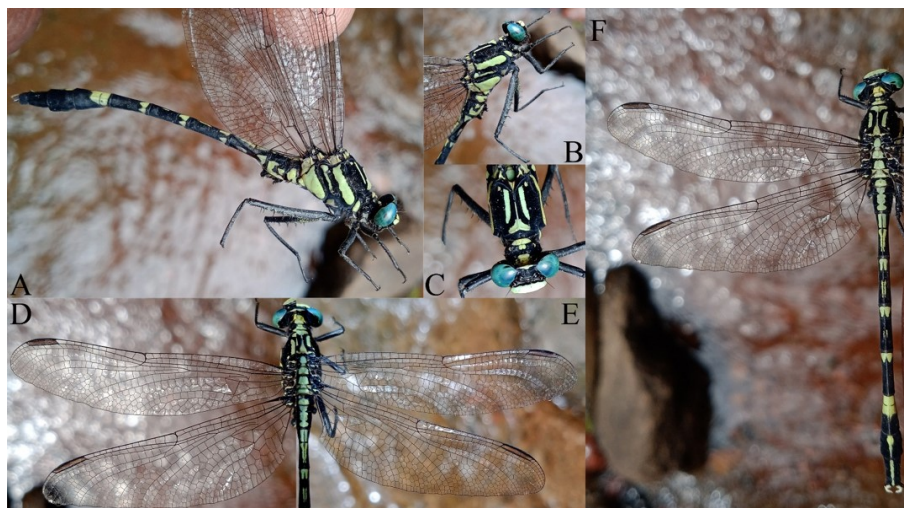


Fig. 3.

Merogomphus longistigma (Fraser, 1922) from Atoli, Guteghar Lake, Satara, Maharashtra, India on 26.09.2021. A. Lateral view of specimen; B. Lateral view of thorax; C. Dorsal view of thorax and head; D. Left fore-wing and hind wing; E. Right fore-wing and hind wing; F. Dorsal view of specimen (Photos: Arajush Payra).



Fig. 4. *Merogomphus longistigma* (Fraser, 1922). A. Dorsal view of the caudal appendages; B. Lateral view of the caudal appendages. C. Lateral view of the secondary genitalia. (Bar scale = 1mm).

Ecological notes. A specimen of this species was first encountered at Atoli, while perched on a road close to the stream, near Guteghar Lake. Later, two individuals were spotted at the same place while hovering over the stream and resting on rocks of stream periphery. The stream was partly covered with bank periphery vegetation, also some parts with open sunlit areas where the individuals were observed. The species was sighted a second time near Bopoli, while the individual was perched on stream periphery rocks, at an open sunlit area.

Macromidiadonaldi (Fraser, 1924) was originally described in *Indomacromia* Fraser, 1924 based on a single male obtained in the Sampaje Ghat near to the Sampaje River, currently in Kodagu district in the Karnataka State (see Fraser, 1924, 1936). Later it was included in the genus *Macromidia* Martin, 1907 (Fraser, 1931), an Oriental genus currently including ten species distributed from Sri Lanka, India, China, Indonesia, and Japan (Paulson et al., 2021). In the Indian sub-region, *Macromidia* is represented only by *Macromidia donaldi donaldi* (Fraser, 1924). Another subspecies *Macromidia donaldi pethiyagodai* van der

Poorten, 2012 is confined to Sri Lanka (van der Poorten, 2012). To date, *Macromidia donaldi donaldi* (Fraser, 1924) has been reported from Goa, Karnataka, Kerala, Madhya Pradesh, and Odisha (Subramanian et al., 2018). Our present records from Vinjai Temple and Panshet, represent the northernmost distribution of the species as well as the addition of a new dragonfly for the state of Maharashtra.

Martin (1904) described the genus *Merogomphus* Martin, 1904 with *Merogomphus pavici* Martin, 1904 as the type species. Currently, the genus includes seven species distributed in south/southeast Asia (Paulson et al., 2021). Initially the genera *Merogomphus* and *Anisogomphus* Selys, 1857, Kosterin (2016) considered species with lyrate cerci in *Merogomphus*, while those with simple cerci and divergent epiproct branches were transferred to newly created genus *Euthygomphus* Kosterin, 2016 (type species *Leptogomphus martini* Fraser, 1922). Thus, *Merogomphus* s. consists of only two species in India, *M. longistigma* (Fraser, 1922) and *M. tamaracherriensis* Fraser, 1931, both endemic to the Western Ghats of India (Subramanian et al., 2018). Earlier the species was known from Tamil Nadu, Kerala, Karnataka, and Goa (Subramanian et al., 2018). Some photographic records were also made by Hemant Ogale, in 2018 and 2019 from Amboli and Chaukul village of Sindhudurg district, Maharashtra (Anonymous, 2021). Hence our present record of *M. longistigma* from Atoli and Bopoli of Satara represents the northernmost localities of the species which are located about 150 km north in a straight line from the previously known locality of Amboli, Sindhudurg district.

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