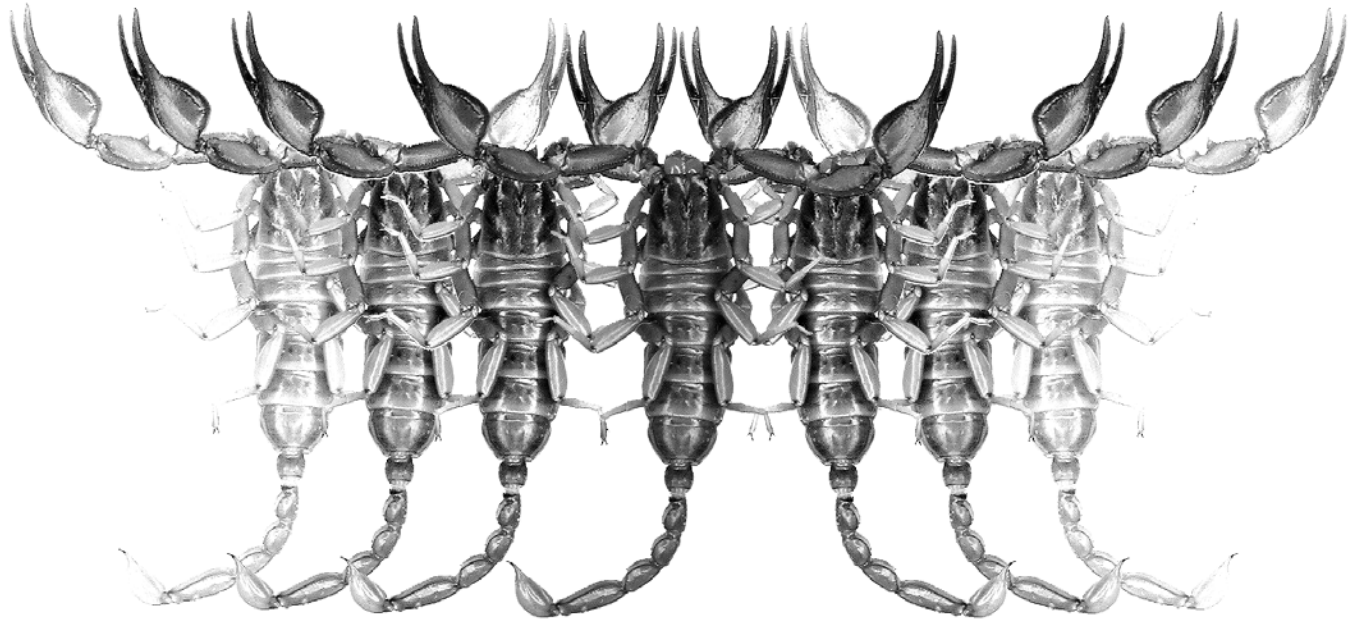


Euscorpium

Occasional Publications in Scorpiology



**A New Species of *Orthochirus* Karsch, 1892
(Scorpiones: Buthidae) from Maharashtra, India**

**Amod M. Zambre, Zeeshan A. Mirza, Rajesh V. Sanap, Raman Upadhye
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January 2011 – No. 107

Euscorpius

Occasional Publications in Scorpiology

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Publication date: 18 January 2011

A new species of *Orthochirus* Karsch, 1892 (Scorpiones: Buthidae) from Maharashtra, India

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Summary

A new species of scorpions of the genus *Orthochirus* (Buthidae) is described from Jalna, Maharashtra, India. A key to Indian scorpion of the genus *Orthochirus* is provided.

Introduction

The family Buthidae with 85 genera and 895 species, is the largest of the scorpion families, widespread around the world; its members are found in tropical, subtropical, and partly in temperate habitats (Rein, 2010). In India, this family is represented by 54 species and 11 genera (Zambre & Bastawade, 2009). The genus *Orthochirus* Karsch, 1891 includes 30 species distributed in drier regions of the Old World. The following species have been reported from India with confidence: *O. bicolor*, *O. flavescens*, *O. fuscipes*, *O. krishnai*, and *O. pallidus* (Kovařík, 2004, Tikader and Bastawade 1983). Kovařík (2004) in his revision considered *O. krishnai* Tikader et Bastawade, 1983 as a *nomen dubium*; however, recently, Zambre & Bastawade (2009) described the male of *O. krishnai* and provided proof on its validity.

In the course of a study on Indian scorpions, material examined from Jalna District, Maharashtra revealed the presence on an undescribed species of the genus *Orthochirus*. In the present communication we describe the new species and provide a key to the Indian members of this genus.

Material and Methods

Specimens were examined under Labomed CSM2 stereomicroscope. Morphometrics were recorded using

an Aerospace digital caliper (closest 0.01mm). Illustrations were produced using Adobe Photoshop CS2 and Adobe Illustrator CS3. Measurements follow Stahnke (1970), and are given in mm. Trichobothrial notations follow Vachon (1974); morphological terminology mostly follows Vachon (1952) and Hjelle (1990). Photographs of the new species, in habitus were taken using a Nikon D90 camera body equipped with a Nikkor 60 mm f2.8 Macro lens. Specimens have been deposited in the collection of the Bombay Natural History Society (BNHS), Mumbai, India. Morphological details for *Orthochirus* species have been taken partly from Kovařík (2004), Tikader & Bastawade (1983), Zambre & Bastawade (2009), and specimens in the collection of the BNHS.

Abbreviations of trichobothria: *d*, dorsal; *e*, external; *dt*, dorsal terminal; *db*, dorsal basal; *et*, external terminal; *est*, external subterminal; *esb*, external suprabasal; *eb*, external basal.

Taxonomy

Family Buthidae C. L. Koch, 1837

Orthochirus Karsch, 1892

Orthochirus: Vachon, 1974: 910, 936; Tikader & Bastawade, 1983: 113; Sissom, 1990: 102; Kovařík, 1996: 177; Fet & Lowe, 2000: 193; Fet E. et al., 2003: 69; Kovařík, 2004: 4.



Figure 1: Satellite image showing Jalna District, Maharashtra, India the type locality of *Orthochirus bastawadei*, sp. nov.

Type species: *Orthodactylus olivaceus* Karsch, 1881 = *Orthochirus scrobiculosus* (Grube, 1873).

Diagnosis: Dorsal trichobothria of femur arranged in beta-configuration. Tibial spurs present on legs III and IV. Movable fingers of pedipalps with 7–10 rows of granules and 2–5 distal granules. Carapace, in lateral view, distinctly inclined downward from median eyes to anterior margin. Metasomal segments I to III with carinae. Metasomal segments IV and V ventrally punctate.

***Orthochirus bastawadei* Zambre, Mirza, Sanap,
Upadhye et Javed, sp. nov.
(Figs. 3–17)**

Type material: Holotype female, INDIA: near Maharashtra Industrial Development Corporation (MIDC) area, Jalna District, Maharashtra, India, 23 November

2009, coll. Durgesh Pangarkar (BNHS SC- 51). Paratypes: 2 males (BNHS SC- 52 and BNHS SC- 53), same data as above.

Etymology. Patronym in honor of Dr. Deshbhushan Bastawade, India for his immense contribution to the field of Indian scorpiology.

Diagnosis. A species of moderate size in relation to other species of the genus; total length 36.54 mm in the female and 31.72 mm in male. General coloration dark coffee-brown to black; fingers and legs clear yellow with black pigmentation (Figures 3–6). Pedipalps with 9 rows of denticles on the fixed and movable fingers; external accessory denticles moderate. Trichobothriotaxy A-β (beta), orthobothriotaxic. Distance between trichobothrium d_1 and d_3 less than distance between d_3 and d_4 ; trichobothrium e_1 in line with d_3 (Fig. 17). Complete lack of bristlecombs on legs (Figure 16).



Figure 2: Typical habitat of the region in Jalna District where the types of *Orthochirus bastawadei*, **sp. nov.**, were collected. Photo by Parag Dandge.

Telson almost glabrous. Metasomal segments IV and V without median carinae. Spaces among punctae on ventral surface of metasomal segments IV and V smooth. Dorsal surface of metasomal segment IV and V mesially densely granulated. Pectines six times longer than wide, with 18–19 teeth in females, 20–20 in males (Figures 9, 11 & 13).

Orthochirus bastawadei **sp. nov.** can be distinguished from the mainland Indian species of this genus on the basis of the following character states: mesosoma and metasoma entirely blackish (metasomal segments are yellowish-brown in *O. flavescens* and *O. pallidus*; metasomal segments I–II are yellow and the rest black in *O. bicolor*); dorsal surface of metasomal segments mesially with granulation arranged in a distinct stripe (nearly smooth or with sparse granulation not arranged in a distinct stripe in *O. pallidus*); bristlecombs on legs I–III absent (bristlecombs on legs I–III present in *O. fuscipes*, *O. bicolor*, *O. pallidus*, *O. krishnai*). Pectinal teeth 18–19 (female) and 20–20 (male) in number [23–23 (male) and 22–22 (female) in *O. krishnai*; 16–16 (female) in *O. pallidus*]. For more details, see Table 2.

Description based on female holotype BNHS SC - 51: Measurements in Table 1.

Coloration (in alcohol). Carapace, mesosoma and metasoma black; telson reddish black with black aculeus; pedipalps dark brown to black, fingers yellow. Legs are pale yellowish, with both femur and patella mostly blackish. Sternites dark brown while presternal region brownish yellow.

Coloration in life (Fig. 3–5). Carapace and mesosomal entirely black; metasoma blackish brown with a beady gloss; pedipalp femur, patella and manus coffee-brown, manus with dark reticulated markings; movable and immovable fingers pale. Vesicle reddish brown.

Prosoma (Fig. 8, 10 & 12). Carapace densely and evenly granulated; interocular region granulated; median ocular tubercle very weakly granulated, without prominent carinae. Anterior margin straight and granulated with few short red setae. Lateral margin composed of minutely crenulate granules. Posterior margin granulated, composed of unevenly sized granules. Lateral ocular tubercle with five eyes of which four (three large and one small) are contiguous.

Mesosoma (Fig. 6 & 14). Tergites I–VII with a median T-shaped carina; segment III–VII with poorly developed lateral carinae. Tergite VII pentacarinata, both pairs of lateral carinae moderate; median carinae



Figures 3–4: *Orthochirus bastawadei*, sp. nov., a female showing live coloration. Photos by Parag Dandge.



Figure 5: *Orthochirus bastawadei*, sp. nov., a male showing live coloration. Photo by Parag Dandge.

present on the anterior half, weakly marked. Intercarinal spaces granulated. Sternites III–VI without carinae; sternite VII granulated on posterior and lateral margins, with two pairs of moderate carinae. Pectinal tooth count 18–19.

Metasoma (Fig. 6, 7 & 15). The segment I with 8 granulated carinae, lateral carinae smooth. Segment II bears six carinae while segment III bears five carinae. Segment IV with a pair of weak dorsal carinae. Segment V with weak dorsal carinae and two incomplete dorsolateral carinae only in the posterior half, composed of large denticles. Dorsal surface of metasomal segments I–III with mesial granulation arranged in a distinct stripe. All segments punctate, intercarinal regions on segments II–III granulated. Punctuation well developed on all segments except segment I, which is comparatively weakly punctate. Spaces among punctations smooth. Dorsal surface of all segments is mesially

distinctly granulated. The entire metasoma and telson almost glabrous except for a few red setae on the telson and dorsal ridge of the segments III–V. The telson is punctate and lacks granules.

Chelicerae. Basal piece yellowish brown with black ornamentation, anterior margin dark black. Dentition as characterised in the family and genus. A few short silky hairs present.

Pedipalp (Fig. 17). Trichobothrial pattern orthobothriotaxic, Type A (Vachon 1974). Dorsal trichobothria on femur in β (beta) configuration (Vachon, 1975). Femur pentacarinata, all carinae crenulate. Patella with 7 smooth carinae. Dentate margins on fixed and movable fingers with 9 imbricate rows of granules; external accessory granule moderate.

Legs (Fig. 16). The femur conspicuously granular. Tarsi and basitarsi I and II furnished with setae. Bris-



Figures 6–7: *Orthochirus bastawadei*, sp. nov., female holotype (BNHS SC- 52): 6. Dorsal aspect. 7. Ventral aspect.

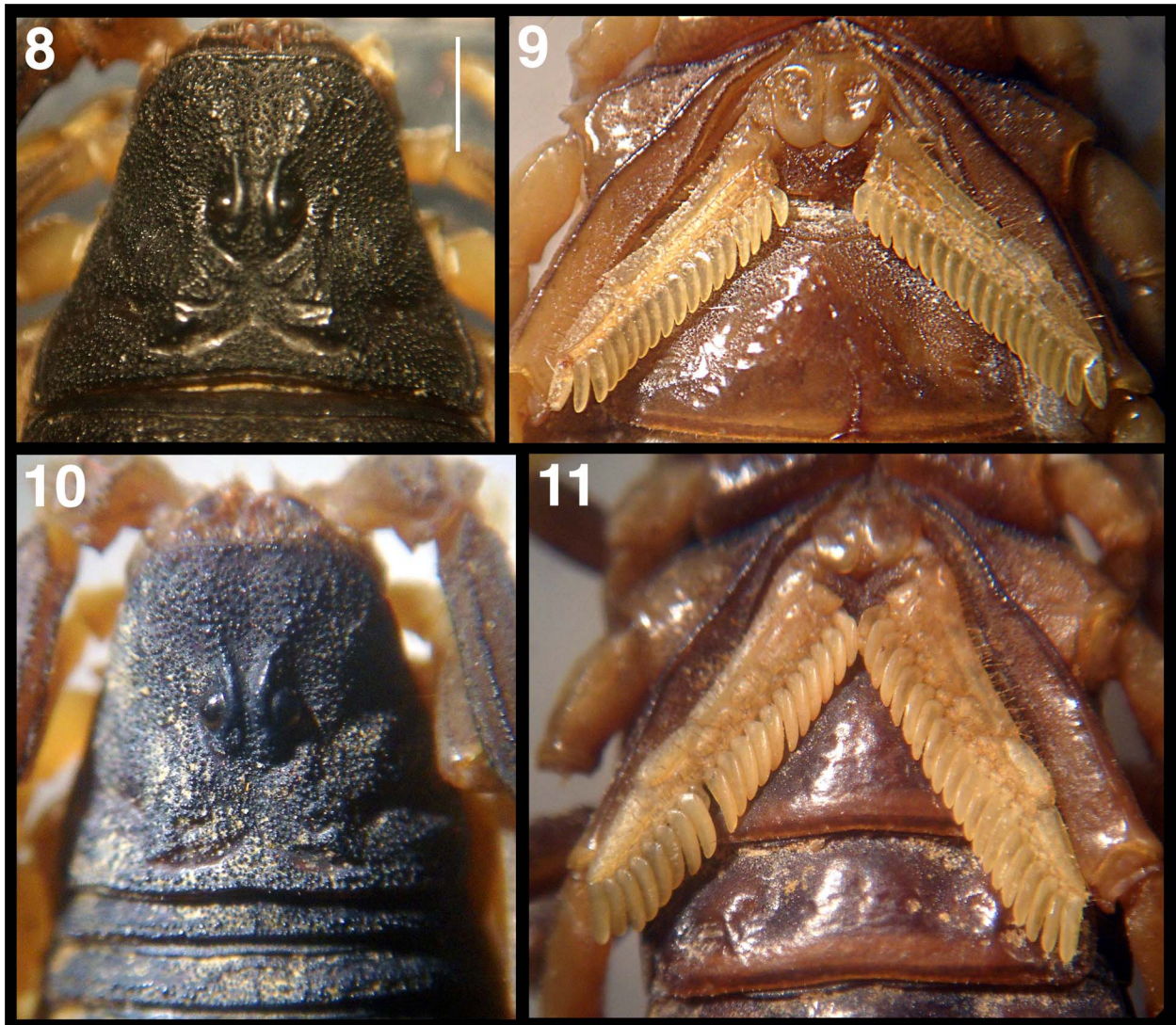
tlecombs absent on all legs. The inner sides of legs I–III bear rows of spines.

Variation. Two male (Fig. 10) paratypes are similar to female holotype but differ in the following set of characters: (a) a slightly higher pectinal tooth count of 20–20 (Figure 11); (b) mesosoma with rudimentary lateral carinae on segments II–VI; (c) carinae on metasomal segments I–III on metasoma weakly developed as compared to female (Figure 10); (d) a comparatively smaller size, 25.22–31.72 mm.

Distribution and natural history (Fig. 1 & 2). The type locality, MIDC area in the Jalna District of Maharashtra, is characterized with open area with a few trees sparsely dotting the landscape. The new species was collected under boulders. The new species is common throughout the district in similar ecological

conditions with other sympatric species, namely *Heterometrus xanthopus* (Scorpionidae) and *Hottentotta tamulus* (Buthidae). The species may yet be found in adjoining districts which share similar habitats. Specimens observed in the wild and in captivity would remain stationary in a position with their tails curled and pressed down on their mesosoma as observed in *O. scrobiculosus* by E. Fet et al. (2003) as well as other *Orthochirus* species in India (Zambre, pers. obs.) and *Buthoscorpio rayalensis* (see Javed et al., 2010).

While collecting the types, one of us (RU) got stung by one of the specimens. Pain was agonizing and lasted for at least five hours and was much more painful compared to the sting of *Hottentotta tamulus*. Additionally, numbness on the stung finger was much more developed than in the sting of *H. tamulus*, and lack of sensation persisted for a considerable period of time. Taking into account the severity of the envenomation, it



Figures 8–11: *Orthochirus bastawadei*, sp. nov. 8–9. Female holotype (BNHS SC- 52). 8. Carapace 9. Pectines. 10–11. Male paratype (BNHS SC-52). 10. Carapace. 11. Pectines.

would be imperative to consider this species to be medically important.

Discussion

Tikader & Bastawade (1983) listed *Orthochirus melanurus* Kessler '1874' (and not 1876 as listed by Tikader & Bastawade, 1983: 134) from India based on two specimens received from the National collection of the Zoological Survey of India, Kolkata (ZSIK) collected from Punjab, North western India (registration numbers not available). Kovařík (2004) listed *O. melanurus* in the synonymy of *O. scrobiculosus* based on Birula (1909), but did not include India in the distribution of the species. Ythier (2010) doubtfully listed *O. melanurus* as a subspecies of *O. scrobiculosus* but the exact status of *O. melanurus* remains unresolved.

Further fresh collection from Punjab and examination of the specimens examined by Tikader & Bastawade (1983) will help evaluate the systematic status of the population presently referred to as *O. scrobiculosus* from Punjab. Presently the genus is represented by six species (excluding *O. melanurus/O. scrobiculosus*) but it is likely that more species will be found as Indian scorpions are poorly documented which is evident from the recent discoveries of new species from India (example Javed et al 2010; Mirza & Sanap, 2010; Zambre & Lourenço, 2010).

Acknowledgments

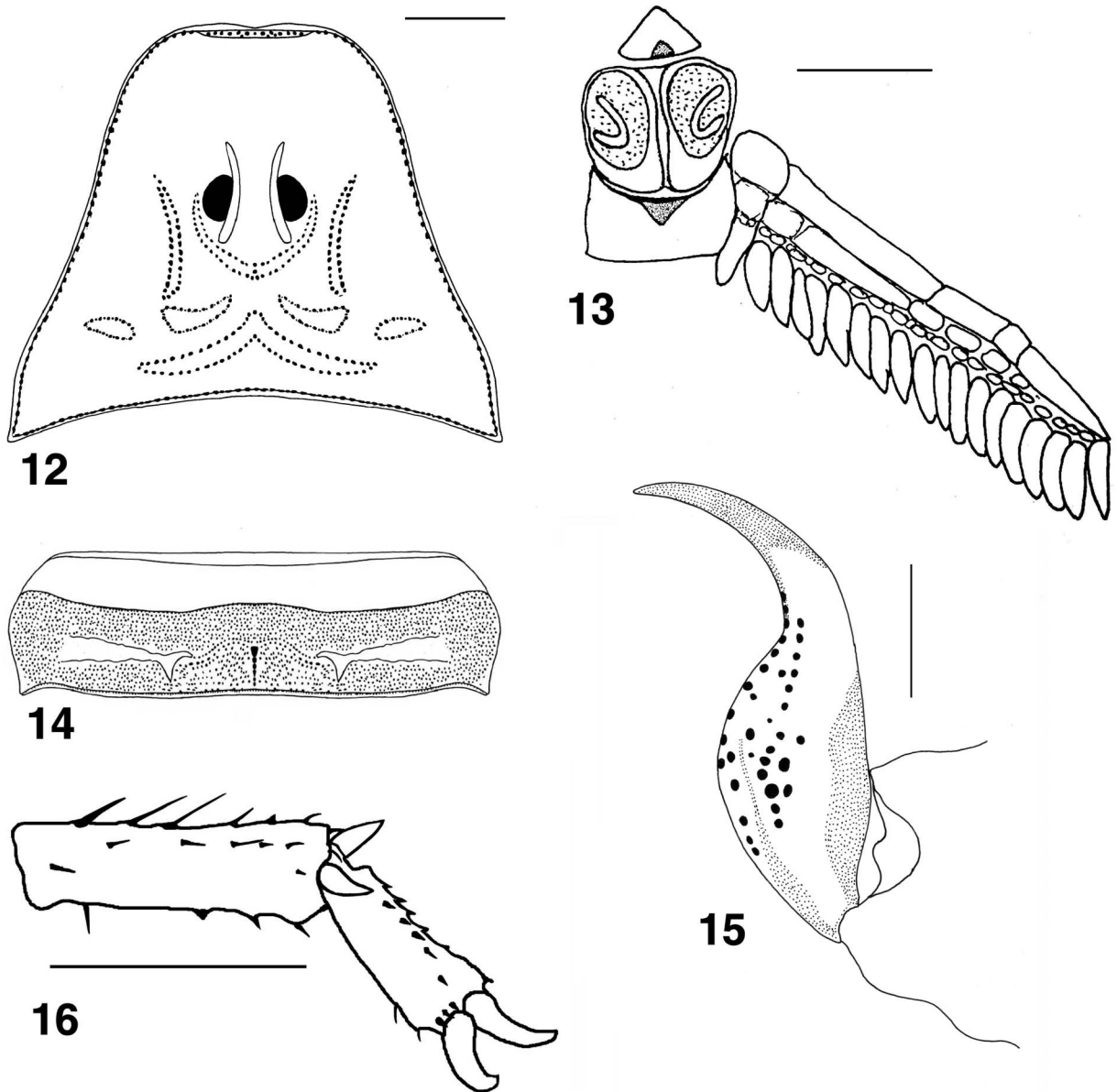
Special thank to Durgesh Pangarkar for collecting the type specimens of the new species. The authors are grateful to Athreya family, Kaati Trust, for the use of

	Holotype (female, BNHS SC- 51)	Paratype (male, BNHS SC- 52)	Paratype (male, BNHS SC- 53)
Total length:	36.54	31.72	25.22
Carapace length	3.66	3.57	3.04
anterior width	2.71	2.63	2.92
posterior width	4.97	4.48	3.52
Metasomal segment I length	2.36	2.08	1.46
width	3.01	2.63	2.28
Metasomal segment II length	2.90	2.65	2.02
width	3.07	2.80	2.26
Metasomal segment III length	3.05	2.74	2.32
width	3.29	3.01	2.64
Metasomal segment IV length	3.58	3.86	3.88
width	3.48	3.34	3.98
Metasomal segment V length	4.20	4.12	3.46
width	3.50	3.43	3.96
Vesicle length	3.33	3.06	2.68
Aculeus length:	1.17	0.94	0.86
Pedipalp femur length	2.58	3.31	2.46
width	0.89	0.86	0.80
Pedipalp patella length	3.24	3.53	2.56
width	1.19	1.05	1.94
Pedipalp chela length	4.66	5.45	4.32
width	0.97	0.93	0.62
Movable finger length	2.70	5.45	3.04

Table 1: Morphometrics (in mm) of holotype and paratype of *Orthochirus bastawadei*, **sp. nov.**

Species	Characters							
	1	2	3	4	5	6	7	8
<i>Orthochirus bicolor</i> (Pocock, 1897) (Fig. 18C)	1	1	1	1	0	1	1	1
<i>Orthochirus bastawadei</i> , sp. nov. (Figs. 3–4)	1	0	1	1	0	1	1	1
<i>Orthochirus flavescens</i> (Pocock, 1897) (Fig. 18B)	1	2	1	1	0	1	1	1
<i>Orthochirus fuscipes</i> (Pocock, 1900)	1	1	1	1	0	0	2	1
<i>Orthochirus krishnai</i> Tikader et Bastawade, 1983 (Fig. 18D)	1	1	1	1	0	0	0	1
<i>Orthochirus pallidus</i> (Pocock, 1897) (Fig. 18A)	1	1	1	0	1	0	0	0
Characters:								
1 - Rows of granules on movable fingers of pedipalps with external granules.								
2 - Tarsi of legs I to III with bristlecombs.								
3 - Entire telson glabrous (short, thin setae may issue from some punctae).								
4 - Metasomal segments IV and V in adults ventrally without median carinae.								
5 - Spaces among punctae on ventral surface of metasomal segments IV and V granulated in adults.								
6 - Dorsal surface of metasomal segment IV mesially densely granulated.								
7 - Dorsal surface of metasomal segment V mesially densely granulated.								
8 - Metasomal segments IV and V in adults clearly punctate, punctuation to some extent discernible also on segment III.								
Explanatory notes: 1 = yes, 0 = no, 2 = character may be variable or related to sexual dimorphism.								

Table 2: Character analysis of Indian species of *Orthochirus* based on Kovařík (2004).



Figures 12–16: *Orthochirus bastawadei*, sp. nov., female holotype (BNHS SC- 52). 12. Carapace. 13. Pectines. 14. Mesosomal tergite II. 15. Lateral aspect of telson. 16. Lateral aspect of leg III tarsi.

their lab facilities; Neelesh Dahanukar, Indian Institute of Science Education and Research for the use of their microscopes; Jan O. Rein, Scorpion Files for providing references; Dr. D. B. Bastawade for reviewing the manuscript; Varad Giri (Curator B.N.H.S.), Parag Dandge for help with images of habitat and live specimens, and Chintan Sheth for all the kind help. ZM wishes to thank the American Arachnological Society for a grant to carry out surveys in Maharashtra. ZM & RS sincerely acknowledge help from Agarwal Jan Seva Charitable Trust to procure equipment; to Vishal Shah,

Vishvanath Rathod, Shardul Bajikar, and Amit Panariya for constant support and encouragement. RU wishes to acknowledge Kulbhushan Naik, Bhagwan Gadekar, Roshan Mehra, Lakshmikant Shinde, Bhalchandra Raut, and Sangram Tarde. We thank all the reviewers and the editor for their constructive comments. SMMJ & ZM express their gratitude to Shri Anil Kumar V. Epur, Chairman, WWF-AP State Advisory Committee, Shri Ravi Singh, SG & CEO, WWF-India, New Delhi and Ms. Farida Tampal, State Director, WWF-India, AP State Office, Hyderabad for constant support and en-

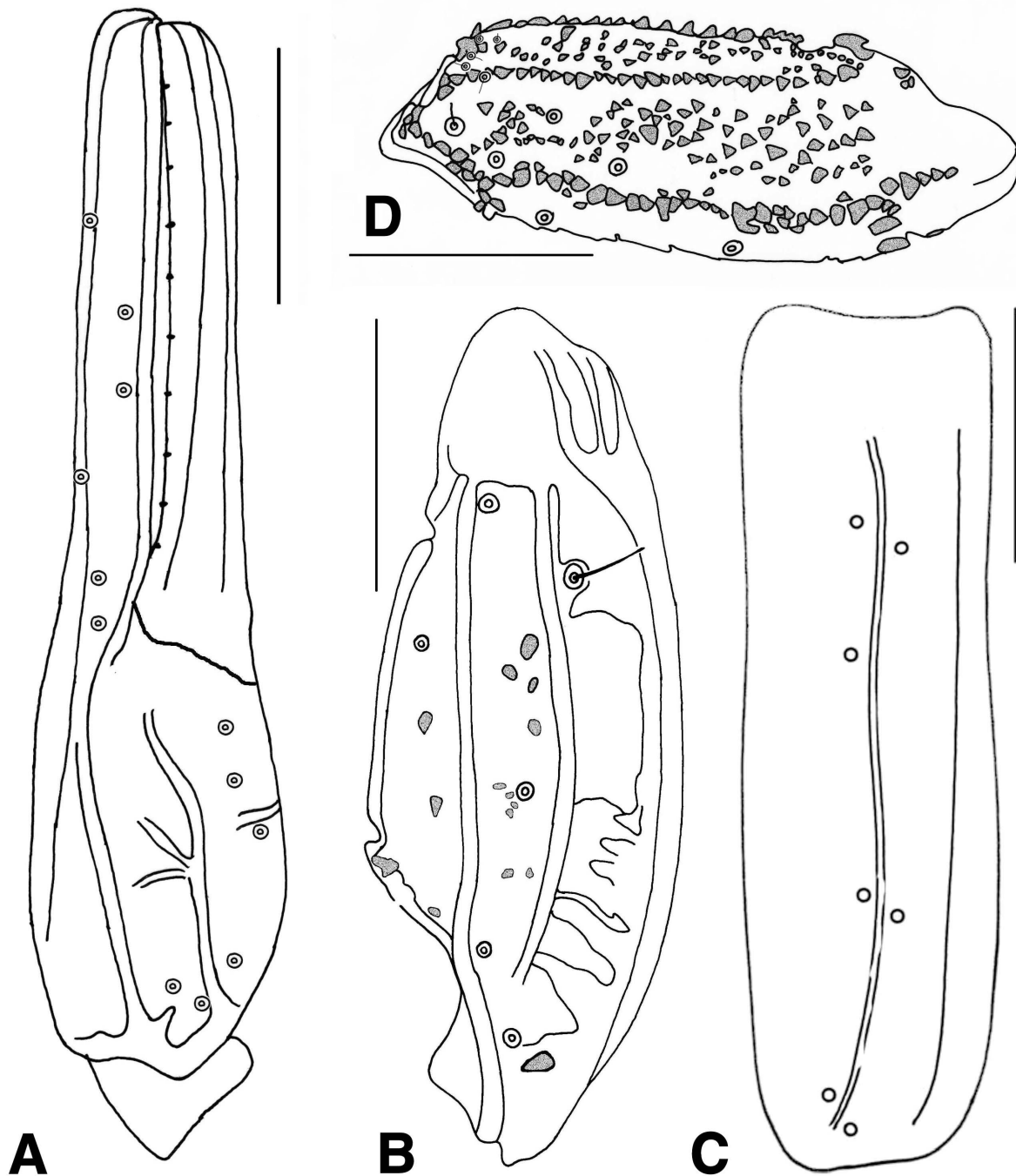


Figure 17: *Orthochirus bastawadei*, sp. nov., female holotype (BNHS SC- 52). Trichobothrial pattern: A) chela, B) patella dorsal aspect, C) patella external aspect, D) femur.

couragement. Victor Fet, F. Kovařík and one anonymous reviewer are thanked for their valuable inputs from which the manuscript benefited.

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Figure 18: Other *Orthochirus* species known from India (except *O. fuscipes*). (A) *Orthochirus pallidus*; (B) *Orthochirus flavescens*; (C) *Orthochirus bicolor*; (D) *Orthochirus krishnai*. Photos by Amod Zambre.

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