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SHORT COMMUNICATION

ADDITIONAL MORPHOLOGICAL NOTES ON THE MALE OF *ICIUS ALBOTERMINUS* (CALEB, 2014) (ARANEI: SALTICIDAE) WITH NEW DISTRIBUTION RECORDS FROM INDIA

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Additional morphological notes on the male of *Icius alboterminus* (Caleb, 2014) (Aranei: Salticidae) with new distribution records from India

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Abstract: This paper includes additional detailed characters and new distribution records of the male of *Icius alboterminus* (Caleb, 2014) from India. A detailed morphological description based on scanning electron microscopic (SEM) images and illustrations of the reproductive organ are provided.

Keywords: Additional characters, Gujarat, jumping spider, new records, taxonomy.

Abbreviations: ALE—anterior lateral eye | AME—anterior median eye | AS—anterior spinnerets | CMS—clypeal marginal scale | CP—cheliceral pit | E—embolus | OLS—opisthosomal leaf-like scales | OS—ordinary setae | LS—larger leaf-like scale | MS—minute prosomal scales | OS—ordinary setae | PLE—posterior lateral eye | PME—posterior median eye | POS—posterior spinnerets | PS—plumose setae | PSS—plumose setae of spinnerets | RTA—retrolateral tibial apophysis | SCP—scattered papillae | SD—sperm duct | SP—setae on protuberance | SSB—setae on stout base | TB—tegular bump | I–IV—1st to 4th legs.

Several new salticid species were described recently from India (Caleb 2014; Prajapati et al. 2016, 2018; Sanap et al. 2017; Caleb 2017). All three Indian species of the genus *Icius* Simon, 1876—*Icius alboterminus* (Caleb, 2014), *Icius kumariae* Caleb, 2017 and *Icius vikrambatrai* Prajapati, Malamel, Sudhikumar & Sebastian, 2018—

were described within a span of five years (Caleb 2014, 2017; Prajapati et al. 2018). Of these, *I. alboterminus* (Caleb, 2014) was originally described under the genus *Phintella* Strand in Bösenberg & Strand, 1906 and was recently transferred to *Icius* (Caleb 2017). In the present paper, we provide additional and previously undescribed morphological characters for the male of *I. alboterminus* from Gujarat. The species has been reported only from its type locality in Chennai, Tamil Nadu (Caleb 2014) and the current record in Gujarat extends its distribution by about 1,560km from the type locality.

MATERIALS AND METHODS

Samples were hand collected and preserved in 70% ethyl alcohol. The specimens were studied under a Dewinter Zoomstar-II stereomicroscope. All measurements are in millimeters (mm). Length of the palp and leg segments are given as follows: total (femur, patella, tibia, metatarsus (except palp), tarsus). B/W drawings were made by means of a drawing apparatus attached to the Dewinter Zoomstar-II microscope. Scanning Electron Microscopic (SEM) images were

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Competing interests: The authors declare no competing interests.

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taken by means of a ZEISS EVO 18 Scanning Electron Microscope. The studied specimens are in the personal collection of Dhruv Prajapati (GJSP).

TAXONOMY

Icius Simon, 1876

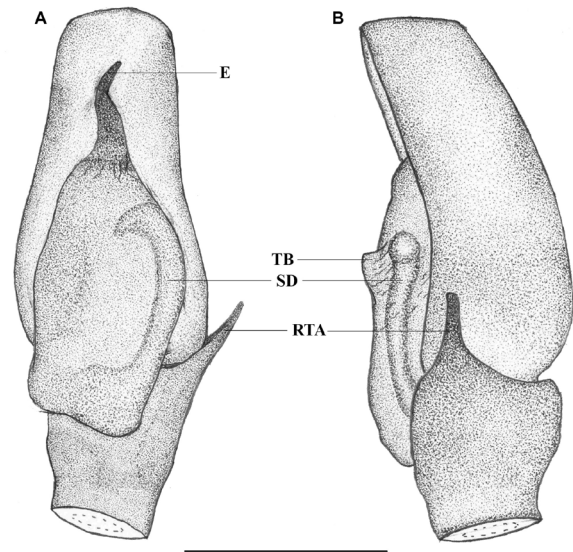
Type species: *Icius hamatus* C.L. Koch, 1846.

Icius alboterminus (Caleb, 2014)

Images 1A–H, 2A–H, 3A–D; Figures 1A–B, 2

Specimens examined: GJSP90243A, 1 male, 2.v.2019, India, Gujarat, Jamnagar, Khijadiya Bird Sanctuary (22.523N, 70.139E), 7m, from foliage, coll. D.A. Prajapati; GJSP90243B, 2 males, 8.v.2019, India, Gujarat, Kheda, Pariej wetland (70.139N, 72.610E), 20m, from foliage, coll. D.A. Prajapati; GJSP90243C 1 male, 9.v.2019, India, Gujarat, Anand, Kanewal wetland (72.610N, 72.539E), 9m, from foliage, coll. D.A. Prajapati.

Male of *Icius alboterminus* can be easily distinguished from all other *Icius* species by the dorsal abdominal pattern (see Fig. 1 in Caleb 2014); claw-shaped embolus



Figures 1A–B. *Icius alboterminus* (Caleb, 2014), male from Pariej wetland in Gujarat, India: A—left palp, ventral view; B—same, retrolateral view. Scale bar: 0.2mm (A–B). © Dhruv Prajapati.

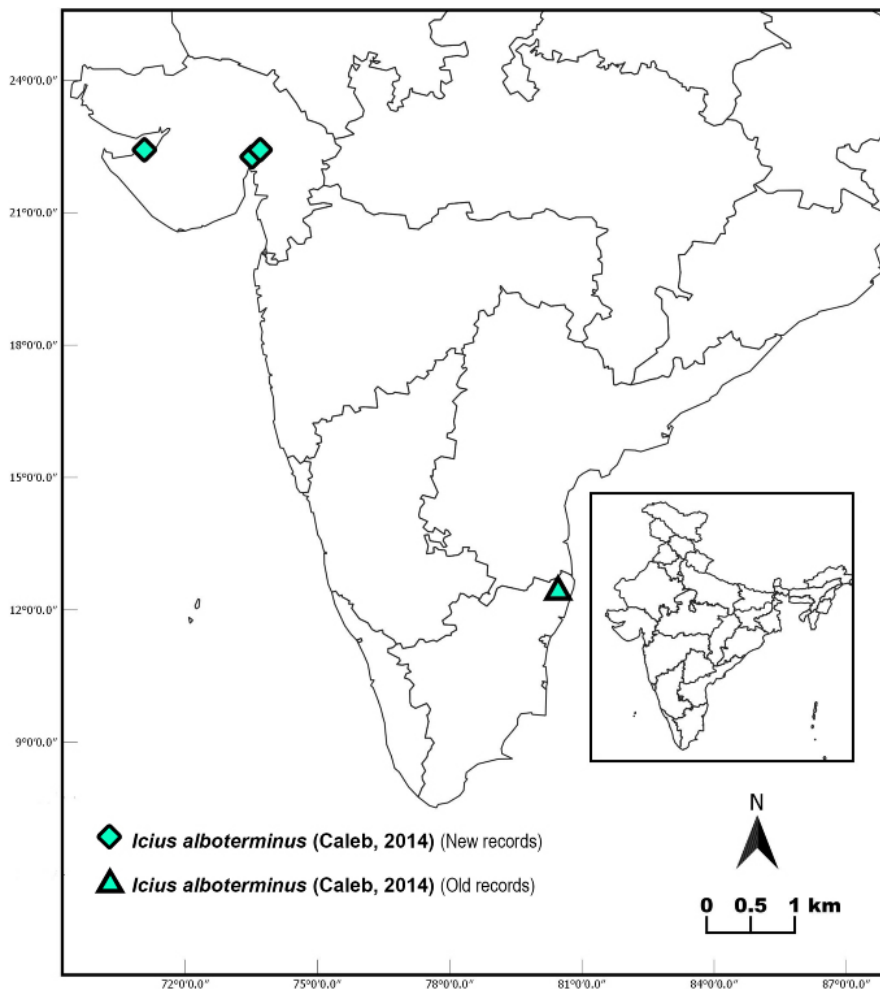
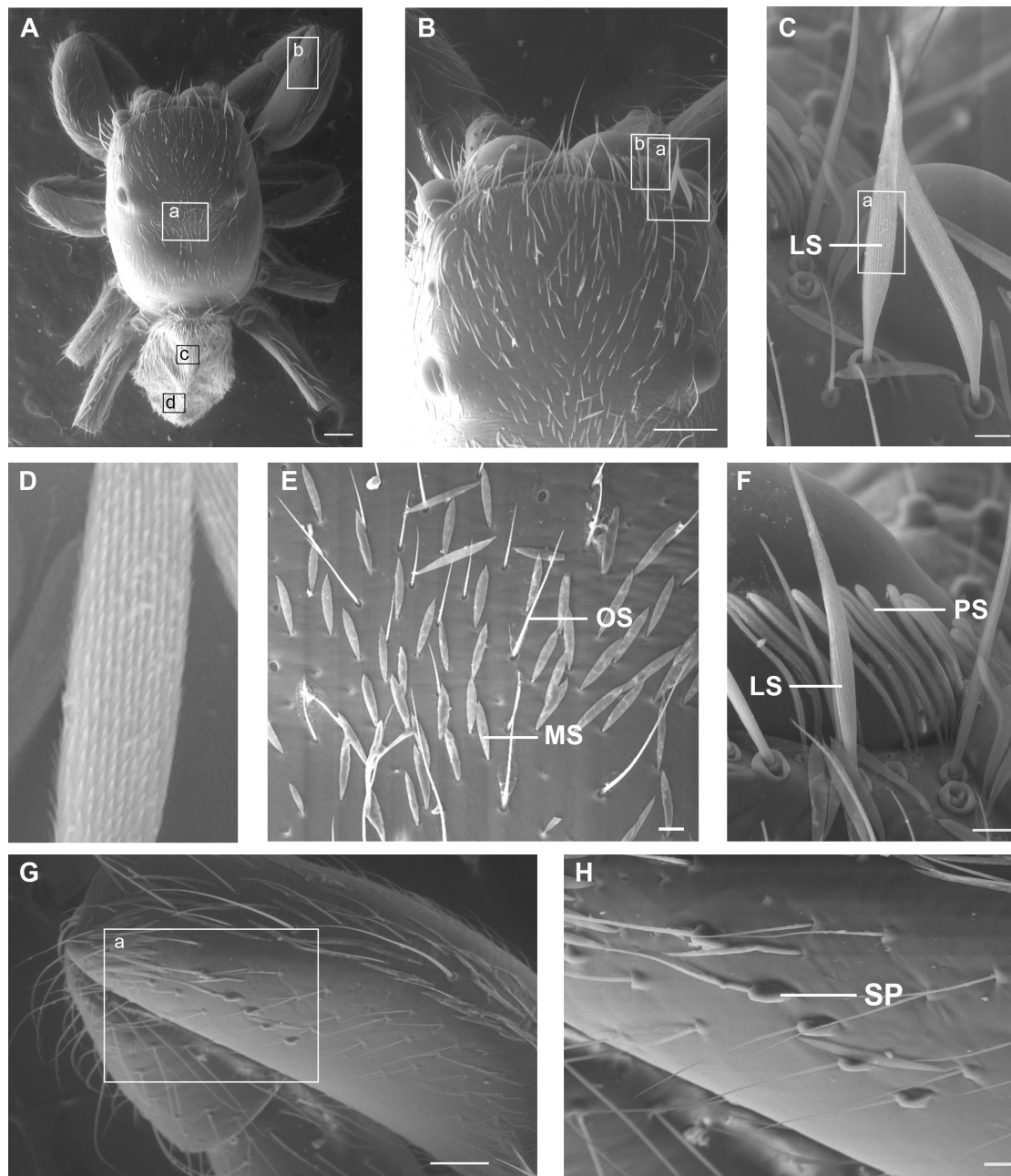


Figure 2. Distributional records of *Icius alboterminus* (Caleb, 2014) (squares indicate new records and triangle indicate previous record) from India.



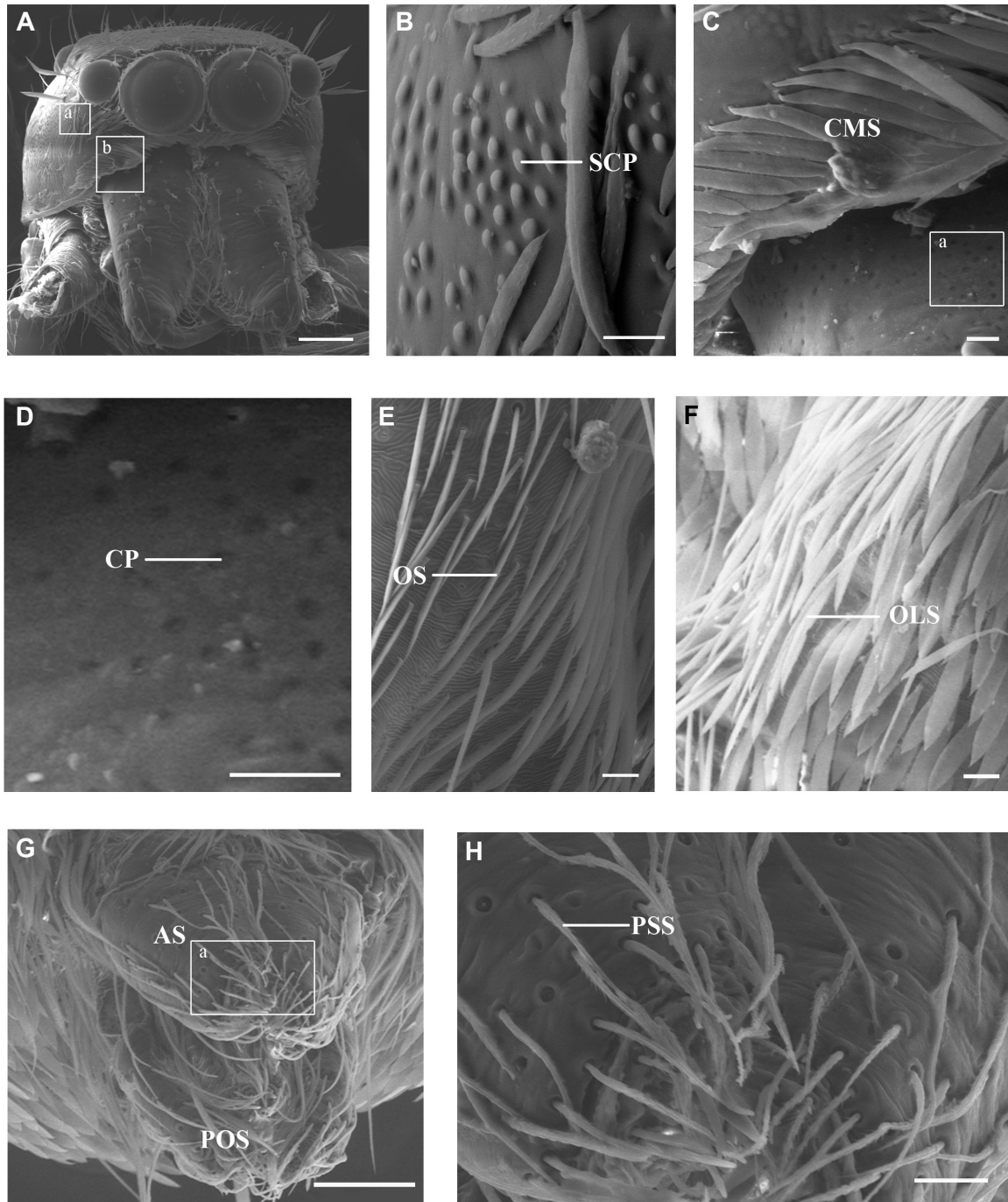
Images 1 A–H. Scanning electronic microscopic (SEM) images of *Icius alboterminus* (Caleb, 2014), male from Pariej wetland in Gujarat, India: A—body, dorsal view | B—cephalic region, dorsal view | C—enlarged portion of Image B(a) showing leaf-like scales | D—enlarged portion of Image C(a) showing details of leaf-like scale | E—enlarged portion of Image A(a) | F—enlarged view of Image B(b) | G—femur I (left), enlarged view of Image A(b) | H—enlarged view of Image G(a). Insets of A(c & d) are shown in Image 2E & 2F. Scale bars: 0.02mm (A–B), 0.002mm (C–F), 0.01 (G), 0.001 (H). © Dhruv Prajapati & R. D. Kamboj.

directed at 2 O'clock position (Images 3A–B, Figure 1A) (slightly bent in *I. kumariae* and *I. vikrambatrai*, see figs 10, 11, 16 in Caleb 2017; figs 6, 7 in Prajapati et al. 2018); RTA with narrow tip directed at 1 o'clock position in ventral view (Image 3A, Figure 1A) (branched in *I. kumariae*, see figs 10, 11, 16, 17 in Caleb (2017); tridentate in *I. vikrambatrai*, see figs 5, 14, 15 in Prajapati

et al. (2018)). For diagnosis of female see Caleb (2014).

DESCRIPTION

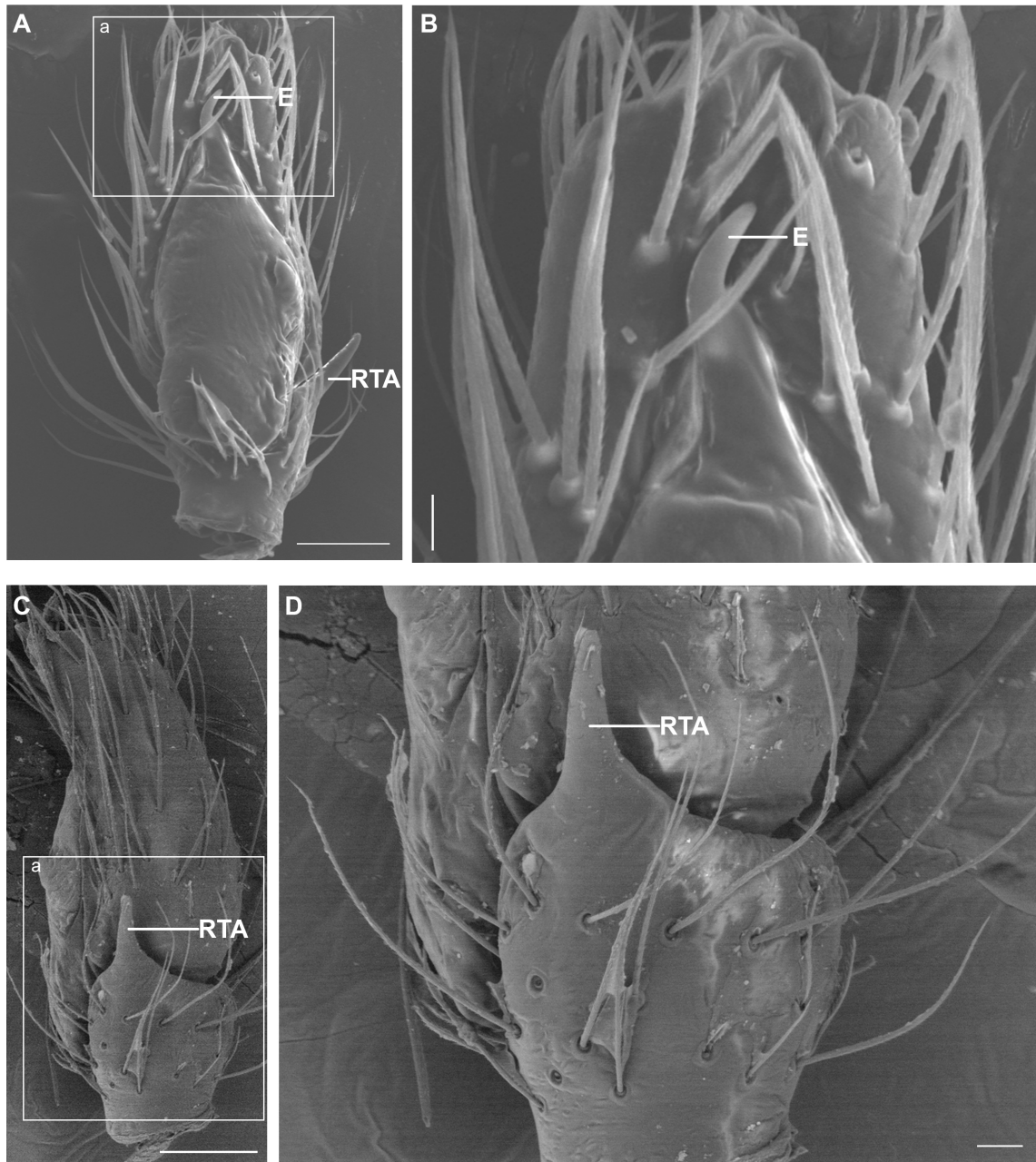
Male (Images 1A–H, 2A–H): Prosoma pear-shaped, blackish-brown, with a thin white marginal stripe of uniform thickness; antero-lateral sides of prosoma with whitish minute leaf-like scales. Cephalic region blackish,



Images 2 A–H. Scanning electronic microscopic (SEM) images of *Icius alboterminus* (Caleb, 2014), male from Pariej wetland in Gujarat, India: A—prosoma, frontal view | B—enlarged view of Image A(a) | C—enlarged view of Image A(b) | D—enlarged view of Image C(a) | E—enlarged view of Image 1A(c) | F—enlarged view of Image 1A(d) | G—spinnerets, ventral view | H—enlarged view of Image G(a). Scale bars: 0.02mm (2A), 0.002mm (2B–F, H), 0.01mm (G). © Dhruv Prajapati & R. D. Kamboj.

with scattered pale yellowish minute leaf-like scales and ordinary setae (Image 1E); eyes encircled by minute orange yellowish plumose setae (Image 1F), six leaf-like scales (with ribbed surface) located between ALEs and PLEs on either sides (Images 1A–1D, 1F), scattered papillae visible on lateral sides of cephalic region, near

ALEs (Images 2A–B). Clypeus margin with whitish leaf-like scales (Images 2A, 2C). Clypeus, chelicerae, endites, labium and sternum brownish. Chelicerae with one promarginal and one retromarginal teeth and with 18–20 small setae dorsally with stout base (Image 2A); apical region of chelicerae with several pits (Images



Images 3A–D. Scanning electronic microscopic (SEM) images of *Icius alboterminus* (Caleb, 2014), male from Pariej wetland in Gujarat, India: A—left palp, ventral view | B—enlarged view of Image A(a) showing embolus | C—left palp, retrolateral view | D—enlarged view of Image C(a) showing magnified view of RTA. Scale bars: 0.01mm (A, C), 0.002 (B, D). © Dhruv Prajapati & R. D. Kamboj.

2C–D); fangs medium sized, yellowish-brown. Leg I blackish-brown, legs II–IV yellowish-brown with black blotches; antero-prolateral region of femur I with eight setae on protuberance distributed in two rows (five in first row and three in second row) (Images 1A, 1G–H). Opisthosoma oval, covered with ordinary setae and leaf-like scales (Images 2E–F), brownish anteriorly and blackish brown at posterior end; one anterior and two antero-lateral white dots on each side of abdominal

margin, two white dots on mid-anterior region of abdomen, two on medio-lateral abdominal margin and single white dot above spinnerets. Spinnerets blackish, covered with plumose setae (Images 2G–H). Body length 2.59. Prosoma length 1.23, width (at the middle) 0.93, height (at the middle) 0.51. Opisthosoma length 1.36, width (at the middle) 0.93, height (at the middle) 0.78. Eye diameter: ALE 0.17, AME 0.24, PLE 0.11, PME 0.06. Eye interdistances: AME–AME 0.02, AME–ALE 0.01,

ALE–ALE 0.52, ALE–PME 0.23, PLE–PLE 0.61, PME–PME 0.59, PME–PLE 0.16. Clypeus height at ALE 0.23, at AME 0.009. Chelicera length 0.46. Measurements of palp and legs. Palp 1.02 (0.38, 0.11, 0.15, 0.38), I 2.30 (0.64, 0.41, 0.52, 0.39, 0.34), II 1.90 (0.57, 0.32, 0.40, 0.32, 0.29), III 2.06 (0.59, 0.30, 0.45, 0.39, 0.33), IV 2.48 (0.76, 0.35, 0.54, 0.47, 0.36). Leg formula: 4132. Palp (Images 3A–D, Figures 1A–B): embolus short and resembles the “claw” of a raptor; embolic tip narrowed and directed at 1 o’ clock position ventrally (Images 3A–B, Figure 1A). Bulb protruded posteriorly (not prominent in Caleb 2014; see Figs 9–10 in Caleb 2014) (Images 3A, 3C, Figure 1A). Tegular bump can be seen from retrolateral view (Images 3C, Figure 1B). RTA simple, broad at the base and narrow at its blunt tip (a spiniform tip is shown in the original illustration; see figs 9–10 in Caleb 2014) (Images 3A, 3C–D, Figures 1A–B). Distribution: *Icius alboterminus* is endemic to India and known from the following localities:

Gujarat: Khijadiya Bird Sanctuary in Jamnagar District; Pariej wetland in Kheda District; Kanewal wetland in Anand district (new records) (Figure 2).

Tamil Nadu: Thirumullaivoyal in Chennai (holotype) (Figure 2).

DISCUSSION

Newly collected specimens from Gujarat have a slightly prominent posterior protrusion of the bulb, which is not significant as seen in illustrations given by Caleb (2014). This may be due to the change in angle of view or may be considered as an intraspecific variation but more specimens need to be examined to confirm this assumption.

All the collected specimens were from vegetation near wetlands which may indicate its preference to habitats associated with water bodies. The type locality of the species is also near a suburban lake (Araabath Lake) which may define its preferred habitat (Caleb 2014). The new localities are Khijadiya Bird Sanctuary,

Pariej wetland and Kanewal wetland. Habitat of all these localities are almost similar which include vegetation belonging to *Prosopis* sp., *Ipomoea* sp., *Azadiracta indica*, *Achyranthes aspera*, *Cressa cretica*, *Aeluropus lagopoides*, *Sueada* sp. and *Calotropis procera*. Since many states have similar habitat, *I. alboterminus* might also be found in states such as Karnataka, Maharashtra, Rajasthan, Madhya Pradesh. This case might be similar as *Chrysilla volupe* (Karsch, 1879), which was earlier known from Sri Lanka and later from Bhutan but no records were there in India. Later many specimens were collected and recorded from India (Caleb et al. 2018).

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Conservation Application

Do wildlife crimes against less charismatic species go unnoticed? A case study of Golden Jackal *Canis aureus* Linnaeus, 1758 poaching and trade in India
– Malaika Mathew Chawla, Arjun Srivathsa, Priya Singh, Iravatee Majgaonkar, Sushma Sharma, Girish Punjabi & Aditya Banerjee, Pp. 15407–15413

Review

Hazards of wind turbines on avifauna - a preliminary appraisal within the Indian context
– Himika Deb, Tanmay Sanyal, Anilava Kaviraj & Subrata Saha, Pp. 15414–15425

Communications

Analysis of stereotypic behaviour and enhanced management in captive Northern Giraffe *Giraffa camelopardalis* housed at Zoological Garden Alipore, Kolkata
– Tushar Pramod Kulkarni, Pp. 15426–15435

A new species of shieldtail snake (Reptilia: Squamata: Uropeltidae) from Kolli Hill complex, southern Eastern Ghats, peninsular India
– S.R. Ganesh & N.S. Achyuthan, Pp. 15436–15442

The insect fauna of Tenompok Forest Reserve in Sabah, Malaysia
– Arthur Y.C. Chung, Vivianny Paul & Steven Bosuang, Pp. 15443–15459

Tiger beetles (Coleoptera: Cicindelinae) of Davao Region, Mindanao, Philippines
– Milton Norman Medina, Analyn Cabras, Harlene Ramillano & Reagan Joseph Villanueva, Pp. 15460–15467

An assessment of the conservation status of a presumed extinct tree species *Wendlandia angustifolia* Wight ex. Hook.f. in southern Western Ghats, India
– Chellam Muthumperumal, Paramasivam Balasubramanian & Ladan Rasingam, Pp. 15468–15474

Short Communications

Additional morphological notes on the male of *Icius alboterminus* (Caleb, 2014) (Aranei: Salticidae) with new distribution records from India
– Dhruv A. Prajapati & R.D. Kamboj, Pp. 15475–15480

Three moss families (Bryopsida: Calymperaceae, Hyopterygiaceae, & Pterobryaceae): new distribution records to bryoflora of Andhra Pradesh, India
– Ananthaneni Sreenath, Midigesi Anil Kumar, Paradesi Anjaneyulu & Boyina Ravi Prasad Rao, Pp. 15481–15488

Notes

Mating behavior of the Yellow-throated Marten *Martes flavigula* (Mammalia: Carnivora: Mustelidae)
– Abinash Parida, Meesala Krishna Murthy & G.S. Solanki, Pp. 15489–15492

New to Myanmar: the Rosy Starling *Pastor roseus* (Aves: Passeriformes: Sturnidae) in the Hkakabo Razi Landscape
– Sai Sein Lin Oo, Myint Kyaw, Nay Myo Hlaing & Swen C. Renner, Pp. 15493–15494

New records of *Heloderma alvarezii* (Wiegmann, 1829) (Sauria: Helodermatidae) on the coast of Oaxaca and increases to its distribution in Mexico
– Jesús García-Grajales, Rodrigo Arrazola Bohórquez, María Arely Penguilly Macías & Alejandra Buenrostro Silva, Pp. 15495–15498

Description of a new subspecies of the genus *Microcerotermes* Silvestri, 1901 (Amitermitinae: Termitidae: Isoptera) and the first record of another termite species from Meghalaya, India
– Khirod Sankar Das & Sudipta Choudhury, Pp. 15499–15502

A new record of the hoverfly genus *Dasysyrphus* Enderlein, 1938 (Insecta: Diptera: Syrphidae) from India
– Jayita Sengupta, Atanu Naskar, Aniruddha Maity, Panchanan Parui, Sumit Homchaudhuri & Dhriti Banerjee, Pp. 15503–15506

First record of Banded Lineblue *Prosotas aluta* Druce, 1873 (Insecta: Lepidoptera: Lycaenidae) from Bangladesh
– Rajib Dey, Ibrahim Khalil Al Haidar, Sajib Rudra & M. Rafiqul Islam, Pp. 15507–15509

Notes on *Ptilomera agriodes* (Hemiptera: Heteroptera: Gerridae) from Eastern Ghats, India
– J. Deepa, A. Narahari, M. Karuthapandi, S. Jadhav & C. Shiva Shankar, Pp. 15510–15513

***Didymocarpus bhutanicus* W.T. Wang (Gesneriaceae): a new addition to the herbs of India**
– Subhajit Lahiri, Sudhansu Sekhar Dash, Monalisa Das & Bipin Kumar Sinha, Pp. 15514–15517

Rediscovery of *Epilobium trichophyllum* Hausskn.: a rare and endemic plant from Sikkim Himalaya, India
– David L. Biate & Dinesh K. Agrawala, Pp. 15518–15521

Additions of woody climbers (Lianas) to the flora of Manipur, India
– Longjam Malemnganbee Chanu & Debjyoti Bhattacharyya, Pp. 15522–15529

Molecular characterization of stinkhorn fungus *Aseroë coccinea* Imazeki et Yoshimi ex Kasuya 2007 (Basidiomycota: Agaricomycetes: Phallales) from India
– Vivek Bobade & Neelesh Dahanukar, Pp. 15530–15534

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