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New state records of some Dermaptera De Geer, 1773 (Insecta) species in India

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Abstract: The insect order Dermaptera is globally composed of approximately 2,000 species distributed over 245 genera and 16 families, of which approximately 285 species composed within 72 genera and 16 families are known from India until now. A recent examination of some unidentified Dermaptera species housed in the National Zoological Collection of the Zoological Survey of India revealed new state records for six Dermaptera species in India. All the six species are dealt herein with material examined, diagnostic characters, distribution, remarks, and photographs of adult male and female, penultimate sternite and ultimate tergite with forceps, and male genitalia.

Keywords: Distribution, earwigs, oriental, orthopteroid insects, taxonomy.

Editor: Anonymity requested.

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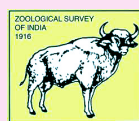
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Author contributions: TD—conceptualization, primary taxonomic identification, morphological description, capturing photographs, writing original draft. KGE—conceptualization, methodology, verification of taxonomic identification, data analysis, review and editing, resources, finalization of the original draft, and supervision. SKS—conceptualization, methodology, verification of taxonomic identification, data analysis, review and editing, resources, preparation of photographic plates, finalization of the original draft, and supervision.

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INTRODUCTION

Insects of the order Dermaptera together with Orthoptera and Phasmatodea are commonly grouped as 'orthopteroid insects' because of their characteristic interrelationship (Deepak & Ghosh 2018). Elongated flattened bodied earwigs are the most common members of this order (Deepak & Ghosh 2018).

The order Dermaptera is known by approximately 1,900 species distributed over 245 genera and 16 families (Hopkins et al. 2017). In India, the order is recorded by 285 species belonging to 72 genera and seven families (Srivastava 1986, 1988, 1989, 1993, 1997, 2003a,b, 2005a,b, 2008a,b, 2013; Julka & Purohit 1984; Hegde et al. 2015; Deepak & Ghosh 2018; Karthik et al. 2022). A recent examination of the unidentified specimens housed in the National Zoological Collection of the Zoological Survey of India (ZSI) and labeled as collections of different states of India along with respective verbatim data revealed many new distributional records for different states of India.

The present communication reports new distribution records of six species of dermapterids in India.

MATERIAL AND METHODS

In the present study, some unidentified Dermaptera specimens collected by many scientists from different parts of the country and housed in the National Zoological Collection of ZSI, some of which date back to 1964–65, were examined. The specimens were found preserved in 70% ethanol.

The specimens were examined under stereo-zoom trinocular microscope (LIECA EZ4) and identified up to species level using the keys of Srivastava (1988, 2003, 2013) and other relevant literature. The male genitalia were dissected from the penultimate sternite with the help of forceps and examined for confirming species identity. The photographs of dorsal habitus of adults and male genitalia were captured with the camera (LIECA M205 A) attached to the stereo-zoom microscope. The photographic plates were compiled in Adobe Photoshop CS3.

RESULT

Of the examined species, *Euborellia compressa* (Borelli, 1907) presents new records for Haryana; *Nala lividipes* (Dufour, 1829) for Andhra Pradesh, Gujarat,

Haryana, and Jharkhand; *Labidura riparia* (Pallas, 1773) for Bihar, Gujarat, Haryana, Jharkhand; *Forcipula quadrispinosa* (Dohrn, 1863) for Haryana; *F. trispinosa* (Dohrn, 1863) for Madhya Pradesh; and *Echinosoma parvulum* Dohrn, 1863 for Jharkhand.

Systematic account

Superfamily Anisolaboidea Sakai, 1982

Family Anisolabidae Verhoeff, 1902

Subfamily Anisolabinae Verhoeff, 1902

Genus *Euborellia* Burr, 1910

Euborellia compressa (Borelli, 1907)

(Images 1A,B; 2A,B; 3A)

Anisolabis compressa Borelli, 1907, *Boll. Musei Zool. Compo R. Univ. Torino*, 25(558): 3.

Euborellia compressa Burr, 1915, *J. R. micr. Soc.*, 1915: 548, pl. 12, fig. 8.

Material examined: 23 exs. (10 males, 13 females), India, Haryana (vill. Bajaura and its surroundings, Mandi Kulu Road, Kulu subdivision), 07 February 1965, A. Husain, ZSI Registration No. 37887/H5.

Diagnosis (male): Body colour black to reddish-brown; sides of pronotum, antennae, and legs yellow; head yellowish-brown in male and reddish-brown in female; ultimate tergite dark brown in both sexes. Head triangular, longer than broad; frons slightly convex with its hind margin faintly emarginated in the middle. Eyes shorter than postocular area. Pronotum quadrate, slightly longer than broad, widened posteriorly with straight lateral margin. Prozona slightly raised and metazona flat. Abdomen elongated; 5th–9th segments with oblique carina; ultimate tergite smooth, transverse, gradually sloped backwards and obliquely and weakly concave above the base of forceps; penultimate sternite transverse, posteriorly narrowed with its hind margin subtruncate in the middle. Forceps asymmetrical, remote at base, gradually tapering with its internal margin serrated.

Male genitalia (Image 3A): Paramere as long as broad, square-shaped with distinct oblique median membrane; external apical angle sharp and tips obtuse; distal lobes with denticulate chitinous pads; virga not visible.

Remarks: *Euborellia compressa* (Borelli, 1907) and *E. annulipes* (Lucas, 1847) are closely related with regard to external morphology except the following characters. *E. compressa* (Borelli, 1907) has clear yellow legs while *E. annulipes* (Lucas, 1847) has black bands on legs. The paramere of *E. annulipes* (Lucas, 1847) is rectangular while it is square in *E. compressa* (Borelli, 1907).

Distribution: India (Himachal Pradesh, Haryana (new

record), Jammu & Kashmir, Tamil Nadu, Uttarakhand, Uttar Pradesh, and West Bengal), Pakistan (Northwestern Province, Chitral), Uganda, and Zaire.

Threatened status: *Euborellia compressa* (Borelli, 1907) is not assessed on the IUCN Red List. Rapid habitat destruction both at the global and local level may lead to reduction in population size of the species.

Family Labiduridae Verhoeff, 1902

Subfamily Nalinae Steinmann, 1975

Genus *Nala* Zacher, 1910

***Nala lividipes* (Dufour, 1829)**

(Images 1C, D; 2C, D; 3B)

Forficula pallipes Dufour, 1820, *Ann gener des Sc. Phys. de Bruxelles*, 4: 316, pl. 116, figs. 7a & b.

Forficula dufouri Desmarest, 1820, *Fauna fr. Orth.*, pl. 1, fig. 7.

Forficula lividipes Dufour, 1829, *Annls Sci. Nat.*, 13: 340.

Forficesila castanea Serville, 1839, *Hist. Nat. Ins. Orth.*, Paris: 26.

Forficesila meridionalis Serville, 1839, *Hist. Nat. Ins. Orth.*, Paris: 26.

Forficesila vicina Lucas, 1846, *Expl. Alger*, 3: 5, pl. 1, fig. 2, 2a.

Labidura lividipes vicina Bormans, 1900, *Das Tierreich*, 11: 36.

Labidura inconspicua Kirby, in Distant, 1900, *Ins. Transvaal.*, 1: 12, pl. 1, fig. 1.

Echinosoma? obscurum Kirby in Distant, 1900, *Ins. Transvaal.*, 1: 12, pl. 1, fig. 2.

Labaidura lividipes Bormans and Krauss, 1900, *Das Tierreich*, 11: 36.

Paralabidura lividipes Burr, 1910, *Trans. ent. Soc. Lond.*: 184.

Nala lividipes Burr, 1911, *Genera Insect.*, 122: 36.

Labidura australica Mjöberg, 1913, *Ent. Tidskr.*: 27.

Material examined: 03 exs. (2 males & 1 female), India, Andhra Pradesh, Madhavaram, 10 October 1963, B. Nath, ZSI Registration No.: 41004/H5. 01 ex. (01 male), India, Gujarat, Morbi, Mesariya, 07 December 2017, H. S. Banyal & Party, ZSI Registration No.: 40998/H5. 02 exs. (01 male & 01 female), India, Haryana, Hisar, 06 September 1963, R. K. Bhatnagar, ZSI Registration No.: 39245/H5. 02 exs. (01 male & 01 female), India, Jharkhand, Latehar, Auranga river, 23 October 2021, Emily & Party, ZSI Registration No.: 37880/H5. 08 exs. (03 males, 05 females), India, Jharkhand, Betla National Park, 28 October 2021, Emily & Party, ZSI Registration No.: 37881/H5.

Diagnosis (male): Body colour dull blackish-brown; pronotum dark brown; elytra and wings yellowish-brown with the apical part of wing bright yellow; legs yellow with femur and tibiae having black bands. Head quadrate with its hind margin emarginate in the middle. Eyes as long as the postocular area. Pronotum slightly longer than broad, posteriorly widened with its margin round. Abdomen finely pubescent. Penultimate sternite triangular with slight emargination present in the middle of hind margin. Forceps gently incurved, tapering, with the apices pointed; inner margin ventrally crenulate with a distinct tooth at apical third.

Male genitalia (Image 3B): Parameres three times longer than broad, narrowed apically with pointed acute tips; external margin convex; virga thin, tubular with distinct basal vesicle.

Remarks: This species is closely related with *Nala nepalensis* (Burr, 1907) but can be easily distinguished by the structure of their forceps.

Distribution: India (Andhra Pradesh (new record), Arunachal Pradesh, Chattisgarh, Delhi, Gujarat (new record), Haryana (new record), Himachal Pradesh, Jammu & Kashmir, Jharkhand (new record), Karnataka, Madhya Pradesh, Odisha, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh, and West Bengal), Bhutan, Nepal, and Sri Lanka.

Threatened status: *Nala lividipes* (Dufour, 1829) is not assessed on the IUCN Red List. Rapid habitat destruction both at the global and local level, however, may lead to reduction in population size of the species.

Subfamily Labidurinae Burr, 1909

Genus *Labidura* Leach, 1815

***Labidura riparia* (Pallas, 1773)**

(Images 1E, F; 2E, F; 3C)

Forficula riparia Pallas, 1773, *Reise Russ. Reichs*, 2: 727.

Forficula pallipes Fabricius, 1775, *Syst. Ent.*: 270.

Forficula maxima Villiers, 1780, *Linn. Ent.*, 1: 427.

Forficula bilineata Herbst, 1786, *Arch. Insektengesch.*, 7 & 8: 103.

Forficula gigantea Fabricius, 1787, *Mant. Ins.*, 1: 224.

Forficula bidens Olivier, 1791, *Encyl. Méthod.*, 3: 466.

Forficula crenata Olivier, 1791, *Encyl. Méthod.*, 3: 467.

Forficula flavipes Fabricius, 1793, *Ent. Syst.* 2: 2.

Forficula erythrocephala Fabricius, 1793, *Ent. Syst.*, 2: 4.

Forficula rufescens Beauvois, 1805, *Ins. Afr. Amer. Orth.*: 35.

Forficula morbida Serville, 1831, *Ann. Sci. nat.* 22: 35.



Image 1. Dorsal habitus of: A—*Euborellia compressa* (Borelli, 1907), male | B—*Euborellia compressa* (Borelli, 1907), female | C—*Nala lividipes* (Dufour, 1829), male | D—*Nala lividipes* (Dufour, 1829), female | E—*Labidura riparia* (Pallas, 1773), male | F—*Labidura riparia* (Pallas, 1773), female | G—*Forcipula quadrispinosa* (Dohrn, 1863), male | H—*Forcipula quadrispinosa* (Dohrn, 1863), female | I—*Forcipula trispinosa* (Dohrn, 1863), male | J—*Forcipula trispinosa* (Dohrn, 1863), female | K—*Echinosoma parvulum* Dohrn, 1863, male | L—*Echinosoma parvulum* Dohrn, 1863, female. © Tanusri Das.

Forficula affinis Guérin-Méneville, in Ramon, 1836, *Hist. Cuba Ins.*, 7: 330, pl. 12, fig. 2.

Forficesila gigantea Burmeister, 1838, *Hand. Ent.*, 2: 751.

Forficula bivittata Klug, in Burmeister, 1838, *Hand. Ent.*, 2: 751.

Forficula suturalis Burmeister, 1838, *Hand. Ent.*, 2: 752.

Forficula marginella Costa, 1839, *Atti. Accad. Bourbon*, 4: 50.

Forficesila terminalis Serville, 1839, *Hist. Nat. Orth.*: 25.

Forficula icterica Serville, 1839, *Hist. Nat. Orth.*: 25.

Forficula bicolor Motschulsky, 1846, in Fischer, 1846, *Horae ent. Ross.*, 4: 354.

Forficula fischeri Motschulsky, in Fischer, 1846, *Horae ent. Ross.*, 4: 354.

Forficula amurensis Motschulsky, 1858, *Bull. Soc. nat. Moscou*, 32: 499.

Labidura riparia Dohrn, 1863, *Stettin. ent. Ztg.*, 24: 313.

Labidura bengalensis Dohrn, 1863, *Stettin. ent. Ztg.*, 24: 312.

Labidura serville Dohrn, 1863, *Stettin. ent. Ztg.*, 24: 316.

Labidura auditor Scudder, 1876, *Proc. Boston Soc. nat. Hist.*, 18: 252.

Labidura granulosa Kirby, 1891, *J. Linn. Soc. Zool.*, 23: 511.

Labidura pulvialis Kirby, 1891, *J. Linn. Soc. Zool.*, 23: 512.

Labidura clarki Kirby, 1891, *J. Lin. Soc. Zool.*, 23: 512.

Labidura distincta Rodzianko, 1897, *Wein ent. Ztg.*, 16: 153.

Apterygida huseinae Rehn, 1901, *Proc. Acad. Nat. Sci. Philad.*: 273.

Labidura truncata Kirby, 1903, *Ann. Mag. nat. Hist.*, 7 (11): 67.

Tomopygia sinensis Burr, 1904, *Trans. ent. Soc. Lond.*: 288.

Labidura dubronyi Borg, 1904, *Ark. Zool.*, 1: 565.

Labidura karschi Borg, 1904, *Ark. Zool.*, 1: 565.

Labidura mongolica Rehn, 1906, *Proc. U.S. natn. Mus.*, 29: 503, fig. 2.

Labidura riparia hurculeana Semenov, 1908, *Ent. Obozr.*: 171.

Labidura leucotarsata Mjöberg, 1913, *Ent. Tidskr.*, 34: 27.

Labidura confusa Capra, 1921, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 53: 157.

Labidura cryptera Liu, 1946, *J. West China Border*

Res. Soc., 16: 20, fig. 6.

Labidura? elegans Liu, 1946, *J. West China Border Res. Soc.*, 16: 20, fig. 4.

Diplatys himalayanus Baijal and Singh, 1954, *Agra Univ. J. Res. (Sci.)*, 3 (2): 455, figs. 1–4.

Spongiphora nainitalensis Baijal and Singh, 1954, *Agra Univ. J. Res. (Sci.)*, 3 (2): 456, fig. 5–9.

Erotesis jeolikotensis Baijal and Singh, 1954, *Agra Univ. J. Res. (Sci.)*, 3 (2): 458, figs. 10–13.

Elaunon nainitalensis Baijal and Singh, 1954, *Agra Univ. J. Res. (Sci.)*, 3 (2): 460, figs. 16–19.

Labidura orientalis Steinmann, 1979, *Acta zool. hung.*, 25 (3–4): 422, figs. 12–13.

Material examined: 01 ex. (01 male), India, Bihar, Nalanda, Rajgir, 13 March 1973, Bhola Nath & party, ZSI Registration No.: 38991/H5. 10 exs. (03 males, 06 females & 01 Nymph), India, Gujarat, Jamjodhpur, 20 January 2017, H.S. Hegde, ZSI Registration No.: 40999/H5. 02 exs. (01 male, 01 female), India, Haryana, Karnal, 20 September 1963, R.K. Bhatnagar, ZSI Registration No.: 38992/H5. 01 ex. (01 male), India, Jharkhand, Latehar, Auranga river, 23.x.2021, Emily & Party, ZSI Registration No.: 37883/H5. 01 ex. (01 female), India, Jharkhand, Betla National Park; 28 October 2021, Emily & Party, ZSI Registration No.: 37882/H5.

Diagnosis (male): Body colour brown with head, pronotum, elytra, wings and abdomen blackish-brown; antennae, sides of pronotum, and middle of elytra yellow; legs pale yellow with dark joints; ultimate tergite and forceps yellowish-brown with its apical part dark brown; penultimate sternite dark brown. Head quadrate. Pronotum straight at sides; postero-lateral angle and hind margin round. Prozona tumid and metazona depressed. Elytra and wings well developed. Ultimate tergite transverse with spines or disc present at the base of forceps. Penultimate sternite triangular. Forceps long, tapering gradually and internally provided with two pairs of teeth. Forceps variously shaped.

Male genitalia (Image 3C): Parameres flat, three to four times longer than broad, with its margin staright, and bears a membranous epimerite at the apex; virga distinctly visible, basally with a vesicle and an inner sinuous tube.

Remarks: The species exhibit extreme variations in general body colouration, size and shape of pronotum, texture and extent of elytra and wings, and shape of ultimate tergite and forceps (specially the inner armature).

Distribution: India (Arunachal Pradesh, Assam, Bihar (new record), Chattisgarh, Gujarat (new record), Haryana (new record), Himachal Pradesh, Jharkhand

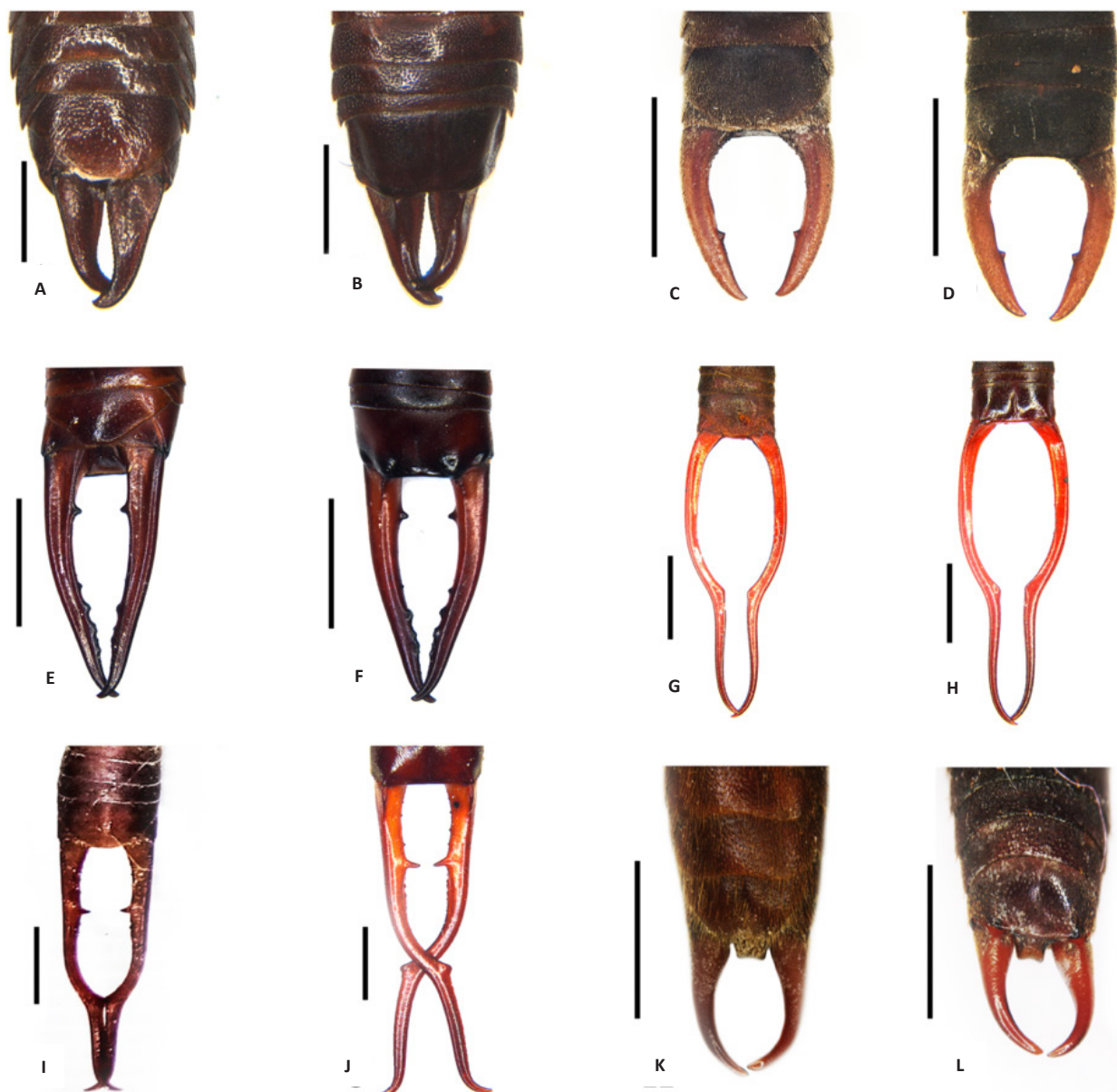


Image 2. Penultimate sternite with forceps (A, C, E, G, I, K) and Ultimate tergite with forceps (B, D, F, H, J, L) of: A, B—*Euborellia compressa* (Borelli, 1907) | C, D—*Nala lividipes* (Dufour, 1829) | E, F—*Labidura riparia* (Pallas, 1773) | G, H—*Forcipula quadrispinosa* (Dohrn, 1863) | I, J—*Forcipula trispinosa* (Dohrn, 1863) | K, L—*Echinosoma parvulum* Dohrn, 1863. © Tanusri Das.

(new record), Karnataka, Madhya Pradesh, Manipur, Meghalaya, Mizoram, Odisha, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh, West Bengal, Delhi, and, Jammu & Kashmir) and cosmopolitan.

Threatened status: *Labidura riparia* (Pallas, 1773) is not assessed on the IUCN Red List. However, rapid habitat destruction both at the global and local level may lead to reduction in population size of the species.

Genus *Forcipula* Bolivar, 1897

***Forcipula quadrispinosa* (Dohrn, 1863)**

(Images 1G, H; 2G, H; 3D)

Labidura quadrispinosa Dohrn, 1863, *Stettin. ent. Ztg.*, 24: 311.

Forcipula quadrispinosa Bolivar, 1897, *Annls. Soc. ent. Fr.*, 66: 283.

Labidura morosa Kirby, 1891, *J. Linn. Soc.*, 23: 513.

Forcipula jacobsoni Burr, 1908, *Ann. Mag. nat. Hist.*, (8) 1: 47.

Forcipula simplex Bey-Bienkjo, 1970, *Zool. Zh.*, 49: 1815.

Genitalata mahajani Kapoor, 1974, *Zool. J. Linn. Soc.*, 155: 83, figs. 1-4.

Material examined: 02 exs. (01 male, 01 female), India, Haryana, Badshapur, 28 April 1964, S. K. Mitra, ZSI Registration No. 40349/H5.

Diagnosis (male): Body colour dull brown with head and abdomen blackish-brown; elytra and wings reddish-brown; legs yellow. Pronotum longer than broad with raised prozona and depressed metazona. Elytra and wings well developed. Abdomen provided with sharp incurved spines at the sides of second to fifth segments. Ultimate tergite depressed medially, with its hind and parallel margin straight, oblique above the base of forceps. Penultimate sternite triangular, narrowed posteriorly with rounded hind margin. Forceps strongly arcuate in the basal half, internally crenulated then slightly bend inwards and straight with gradually tapering tip.

Male genitalia (Image 3D): Parameres about five times longer than broad, apically round with short epimerite; virga distinct.

Remarks: *Forcipula quadrispinosa* (Dohrn, 1863) and *F. trispinosa* (Dohrn, 1863) are closely related species and can be distinguished by the shape of their forceps and male genitalia.

Distribution: India (Assam, Bihar, Chattisgarh, Himachal Pradesh, Jammu & Kashmir, Karnataka, Madhya Pradesh, Odisha, Haryana (new record), Rajasthan, Sikkim, Tamil Nadu, Telangana, Uttarakhand, Uttar Pradesh, and West Bengal), Bhutan, Indo China, Mauritius, Myanmar, Nepal, Philippines, Reunion Island, southern China, and Thailand.

Threatened status: *Forcipula quadrispinosa* (Dohrn, 1863) is not assessed on the IUCN Red List. Rapid habitat destruction both at the global and local level, however, may lead to reduction in population size of the species.

***Forcipula trispinosa* (Dohrn, 1863)**

(Images 1I, J; 2I, J; 3E)

Labidura trispinosa Dohrn, 1863, *Stettin. ent. Ztg.*, 24: 310.

Forcipula trispinosa Bormans and Krauss, 1900, *Das Tierreich*, Lief 11: 30.

Labidura (?) *pugnax* Kirby, 1891, *J. Linn. Soc. (Zool.)*, 25: 510, pl. 12, fig. I.

Forcipula trispinosa var. *minor* Burr, 1910, *Fauna British India Dermaptera*: 93, pl. 3, fig. 260.

Forcipula trispinosa sub. sp. *minor* Brindle, 1966, *Ann. Mag. nat. Hist.*, (13) 9: 268.

Forcipula pugnax var *parallela* Borelli, 1912, *Bull.*

Mus. Hist. nat. Paris: 14.

Forcipula walkeri (nec Kirby) Kapoor and Malla, 1978, *J. inst. Sc.*, 1: 2.

Forcipula afghana Steinmann, 1980, *Acta zool. hung.*, 26 (1-3): 243.

Material examined: 02 exs. (01 male, 01 female), India, Madhya Pradesh, Shadol, Narmada River, Amarkantak, 27 May 1963, S. Chakrapany, ZSI Registration No.:38830/H5.

Diagnosis (male): Body colour blackish-brown; elytra, wings and forceps reddish-brown. Head quadrate with its hind margin emarginate medially. Pronotum longer than broad; prozona raised and metazona depressed. Elytra and wings well developed. Abdomen presented with spines on each side of second to fourth segments. Ultimate tergite transverse. Penultimate sternite triangular. Forceps elongate; internally serrated with a pair of tooth present at basal one third, afterwards bent at apical one third; pointed apically.

Male genitalia (Image 3E): Parameres long, apically narrowed with acute tip, epimerite short; virga distinctly visible with large basal vesicle.

Remarks: *Forcipula trispinosa* (Dohrn, 1863) and *F. quadrispinosa* (Dohrn, 1863) are closely related species and can be distinguished by the shape of their forceps and male genitalia.

Distribution: India (Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Maharashtra (new record), Madhya Pradesh (new record), Meghalaya, Mizoram, Punjab, Sikkim, Uttarakhand, Uttar Pradesh, and West Bengal), Afghanistan, Bhutan, Nepal, and Pakistan.

Threatened status: *Forcipula trispinosa* (Dohrn, 1863) is not assessed on the IUCN Red List. Rapid habitat destruction both at the global and local level, however, may lead to reduction in population size of the species.

Superfamily Pygidicranoidea Popham, 1965

Family Pygidicranidae Verhoeff, 1902

Subfamily Echinomatinae Burr, 1910

Genus *Echinosoma* Serville, 1839

***Echinosoma parvulum* Dohrn, 1863**

(Images 1K, L; 2K, L; 3F)

Echinosoma parvulum Dohrn, 1863, *Stettin. ent. Ztg.*, 24: 66.

Material examined: 04 exs. 4 (03 males, 01 female), India, Jharkhand, Latehar, 23 October 2021, Emily & Party, ZSI Registration No.: 38982/H5.

Diagnosis (male): Body colour dull brown with short pubescence present all over; legs yellowish with

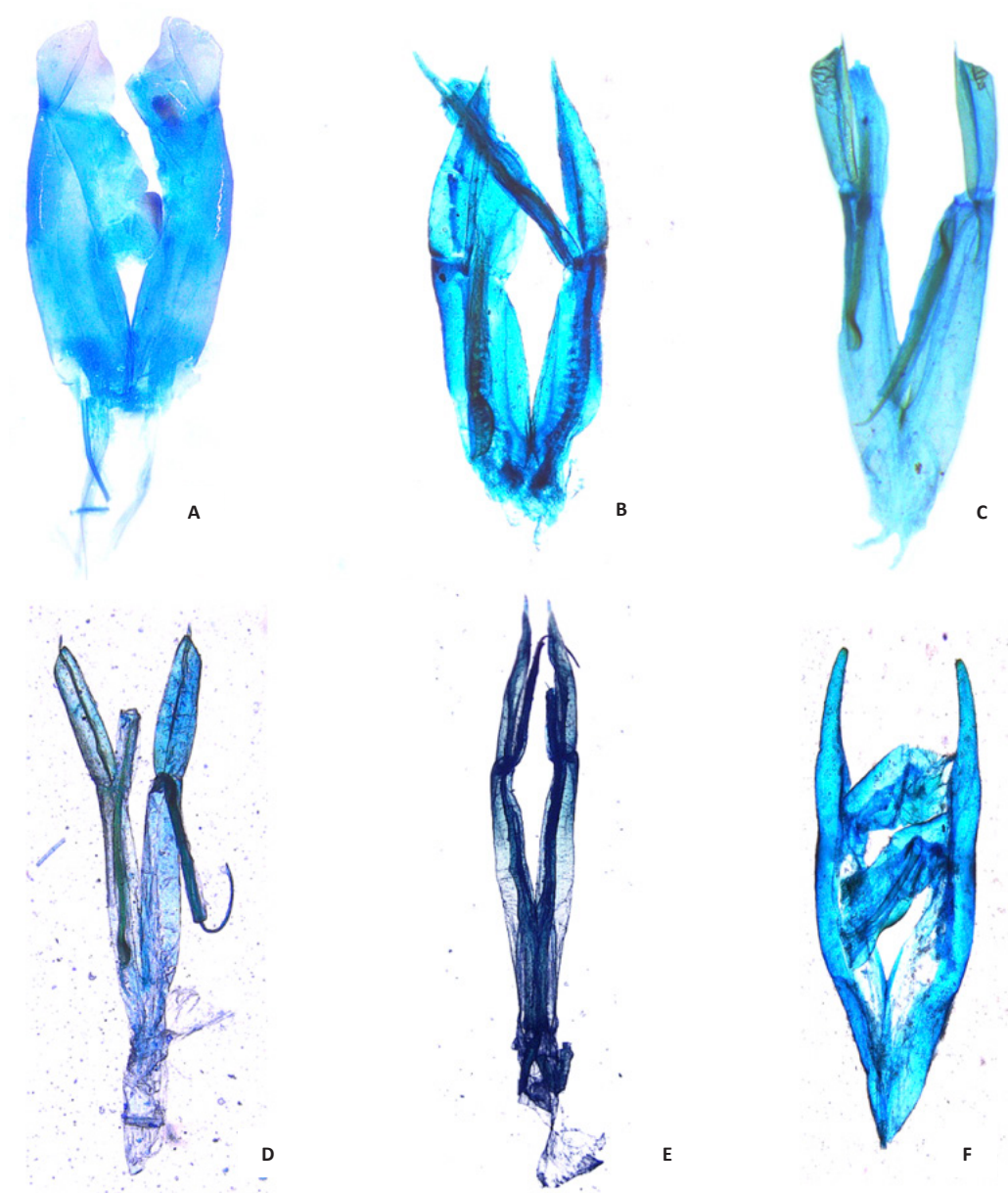


Image 3. Male genitalia of: A—*Euborellia compressa* (Borelli, 1907) | B—*Nala lividipes* (Dufour, 1829) | C—*Labidura riparia* (Pallas, 1773) | D—*Forcipula quadrispinosa* (Dohrn, 1863) | E—*Forcipula trispinosa* (Dohrn, 1863) | F—*Echinotoma parvulum* Dohrn, 1863. © Tanusri Das.

black bands. Head pentagonal. Pronotum broader than long; prozona raised and metazona depressed. Elytra well developed and wings absent. Forceps small, bow shaped, with its apical end pointed.

Male genitalia (Image 3F): Parameres as long as proparameres, with faintly undulate external margin and rounded tip; distal lobes longer than parameres; virga short.

Remarks: The species can be easily distinguished from *Echinotoma andamanensis* Srivastava, 1988 by the shape of various parts of male genitalia and virga and

also the shape of female pygidium.

Distribution: India (Jharkhand (new record), Karnataka, Madhya Pradesh, Tamil Nadu, Uttarakhand, and Uttar Pradesh) Sri Lanka, and Vietnam.

Threatened status: *Forcipula trispinosa* (Dohrn, 1863) is not assessed on the IUCN Red List. Rapid habitat destruction both at the global and local level, however, may lead to reduction in population size of the species.

DISCUSSION

Earwigs are generally nocturnal insects and take shelter in small, dark, and moist areas during the daytime. Some species show wider distribution throughout the country while some are found only in specific regions. For example, *Nala lividipes* (Dufour, 1829), *Labidura riparia* (Pallas, 1773), *Forcipula quadrispinosa* (Dohrn, 1863), and *F. trispinosa* (Dohrn, 1863) are the dominant species of the country as are widespread throughout many states. Moreover, *Nala lividipes* (Dufour, 1829) and *Labidura riparia* (Pallas, 1773) are also common inhabitant of agricultural crop fields of the country. Another frequently available species is *Euborellia compressa* (Borelli, 1907) which shelters inside the bark of rotting logs as well as in moist ground. On the contrary, *Echinosoma parvulum* Dohrn, 1863 is a relatively less distributed species in India. Indian Dermaptera fauna represents only about 15% (285/1,900) of the world fauna, indicating that the group is not well studied in the country. This shortfall of documentation demands for a comprehensive taxonomic exercise on Dermaptera fauna of the country.

Of the 285 Dermaptera species known from India and the oriental region, 165 are known only from India, exhibiting a high endemism of about 58 percent.

REFERENCES

- Deepak, C.K. & D. Ghosh (2018). Insecta: Dermaptera, pp. 265–272. In: Chandra, K., D. Gupta, K.C. Gopi, B. Tripathy & V. Kumar (eds.). *Faunal Diversity of Indian Himalaya*. Zoological Survey of India, Kolkata, 872 pp.
- Hegde, V.D., B. Lal & R.K. Kushwaha (2015). Insecta: Dermaptera, pp. 217–226. In: Director (ed.). *Fauna of Uttar Pradesh, State Fauna Series, 22*. Zoological Survey of India, Kolkata, 792 pp.
- Hopkins, H., M.D. Maehr, F. Haas & L.S. Deem (2017). *Dermaptera Species File*. Version 5.0/5.0. <http://dermaptera.speciesfile.org/HomePage/Dermaptera/HomePage.aspx>. Accessed on 25 July 2020.
- Julka, J.M. & G.L. Purohit (1984). Biology of *Forcipula quadrispinosa* (Dohrn) (Dermaptera: Labiduridae) with notes on the effect of altitude on its life-history, pp. 29–38. In: Proceeding of the workshop on High Altitude Entomology and Wildlife Ecology Held at Solan, Himachal Pradesh, 366 pp.
- Karthik, C.M., Y. Kamimura & C.M. Kallelshwaraswamy (2022). A new species of *Diplatys* (Insecta, Dermaptera, Diplatyidae) earwig from the Western Ghats of India. *ZooKeys* 1088: 53–64.
- Srivastava, G.K. (1986). Studies on Indian Labidurinae (Dermaptera). *Records of the Zoological Survey of India* 89: 1–36.
- Srivastava, G.K. (1988). *Fauna of India and the adjacent countries, Dermaptera, Part-I, Superfamily: Pygidicranoidea*. Zoological Survey of India, Calcutta, I-XII, 268 pp.
- Srivastava, G.K. (1989). Insecta: Dermaptera, pp. 147–170. In: *Fauna of Orissa: State Fauna Series: 1, Part-2*. Zoological Survey of India, Kolkata, 318 pp.
- Srivastava, G.K. (1993). Notes on the species of *Aborolabis* Srivastava (Insect: Dermaptera) from the Indian subcontinent. *Records of the Zoological Survey of India* 90(1–4): 23–25.
- Srivastava, G.K. (1997). Dermaptera, pp. 203–206. In: *Fauna of Delhi, State Fauna Series, 6*. Zoological Survey of India, Kolkata, 903 pp.
- Srivastava, G.K. (2003a). *Fauna of India and the adjacent countries, Dermaptera (Part-II), (Super family: Anisolaboidea)*. Zoological Survey of India, Kolkata, 235 pp.
- Srivastava, G.K. (2003b). Insecta: Dermaptera, pp. 203–226. In: *State Fauna Series 9, Fauna of Sikkim, Part 2*. Zoological Survey of India, Kolkata, 813 pp.
- Srivastava, G.K. (2005a). Dermaptera, pp. 107–109. In: *Fauna of Sambhar Lake (Rajasthan), Wetland Ecosystem Series, 6*. Zoological Survey of India, Kolkata, 200 pp.
- Srivastava, G.K. (2005b). Insecta: Dermaptera. 103–110. In: Director (ed.). *Fauna of Western Himalaya (Part-2)-Himachal Pradesh*. Zoological Survey of India, Kolkata, 359 pp.
- Srivastava, G.K. (2008a). Insecta: Dermaptera. 105–108. In: Director (ed.). *Faunal Diversity of Jabalpur District, Madhya Pradesh*. Zoological Survey of India, Kolkata, 417 pp.
- Srivastava, G.K. (2008b). Insecta: Dermaptera. 51–52. In: *Fauna of Pin Valley National Park, Conservation Area Series*. Zoological Survey of India, Kolkata, 147 pp.
- Srivastava, G.K. (2013). *Fauna of India and the adjacent countries, Dermaptera (Part-3), (Superfamily: Apacgyoidea and Forficuloidea)*. Zoological Survey of India, Kolkata, 469 pp.

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