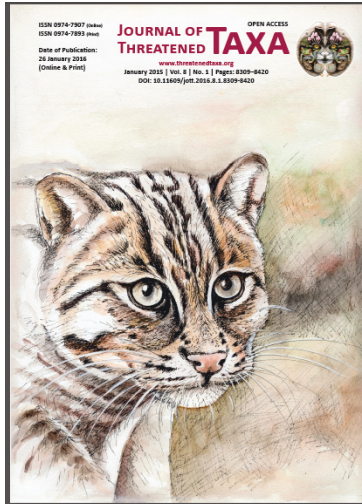


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SHORT COMMUNICATION

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TAXONOMIC STUDIES ON ACRIDINAE (ORTHOPTERA: ACRIDOIDEA: ACRIDIDAE) FROM THE NORTHEASTERN STATES OF INDIA

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Abstract: From a survey of the northeastern states of India, seven species belonging to three genera of the subfamily Acridinae were recorded. In addition to conventional morphological characters, the detailed structure of the male and female genitalia were studied. All the species are described and illustrated. A key to the known genera of the subfamily Acridinae is also provided.

Keywords: Acrididae, Acridinae, key, northeastern India.

Bei-Bienko & Mishchenko (1951) divided the family Acrididae into six subfamilies: Acridinae, Oedipodinae, Catantopinae, Pyrgomorphae, Pamphaginae and Egnatiinae, principally based on the presence or absence of prosternal process, external apical spine of hind tibia, fastigial furrow, intercalary vein of tegmina, dark band on wing, filiform or ensiform condition of the antennae, size of the arolium between claws, oblique or vertical condition of the frons. The subfamily Acridinae from the Indian Subcontinent (Bangladesh, Nepal, Bhutan, Sri Lanka, Maldives, India and Pakistan) has been studied by Kirby (1914), Bei-Beinko & Mischenko (1951) and Dirsh (1965). Shishodia & Tandon (2004) reported seven genera and 10 species under the subfamily Acridinae from Manipur. Shishodia & Dey (2006) reported eight genera and 11 species under the subfamily Acridinae from Nagaland. Shishodia & Dey (2007) report five

genera and eight species under the subfamily Acridinae from Mizoram. In the present paper the authors recorded three genera and seven species from the northeastern Indian states.

All the species reported from the northeastern states were studied in detail using conventional morphological and genitalic characters. The key to genera and species wherever necessary are provided. Diagnosis and genitalic characters are given for each species.

MATERIAL AND METHODS

A survey for the collection of acridid specimens was conducted from 2008 to 2011 from the grasslands and agricultural fields of Assam, Sikkim, Manipur, Arunachal Pradesh, Meghalaya, Tripura, Mizoram and Nagaland. The specimens were handpicked or collected by a sweeping net. The collected specimens were preserved in 70% ethyl alcohol so as to prevent them from shrinking and spoilage and soon specimens become soft enough, and helps in proper stretching. For genitalic studies the apical tip of the abdomen was cut and boiled in 10% KOH solution and genital structures were isolated. All drawings were prepared under camera lucida attached to standard microscopes. The descriptions of the phallic complex follow the terminologies used in Dirsh

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Conflict of Interest: The authors declare no competing interests.

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(1965). Specimens are deposited in the museum of the department of Zoology, Aligarh Muslim University, Aligarh (MZD-AMU).

***Acrida exaltata* (Walker, 1859)**
(Image 1; Fig. 1)

Truxalis exaltata Walker, 1859. *Ann. Nat. Hist.* 4(3): 222.

Tryxali sbrevicolis Bolivar, 1893. *Feuille Jeunes Nat.* 23: 162. Syn. by Kirby, 1910. *A Synonymic Catalogue of Orthoptera* (Orthoptera Saltatoria, Locustidae vel Acridiidae) 3(2): 103.

Acrida lugubris Burr, 1902. *Trans. Ent. Soc. Lond.* 157. Syn. by Uvarov, 1921: *Ann. Mag. nat. Hist.* 7(9):481.

Acrida curta Uvarov, 1936. *Linn. Soc. J. Zoology*, 39. Syn. by Dirsh & Uvarov, 1953: *Tijdschr. Ent.* 96(3): 231. Syn. by Dirsh & Uvarov. 1953. *Tijdschr. v. Entomologie*, 96: 232.

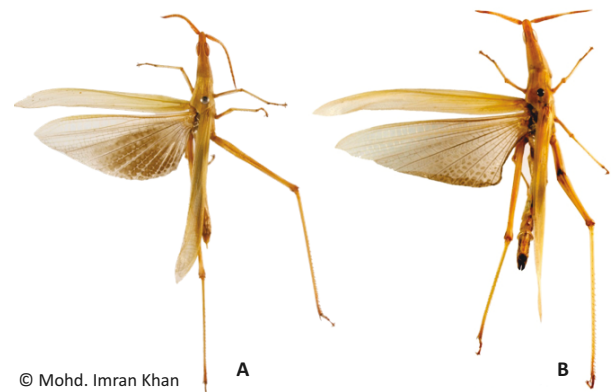
Acrida exaltata (Walker); Willemse, 1951. *Publties natuurh. Genoot.* Limburg, 4: 100.

Material examined: 136a-08/z, 29.x.2008, four females, two males, on paddy field, Sansari, Guwahati, Assam; 136b-08/z, 2.ii.2009, seven females, two males, on grasses, Pasighat, East Siang, Arunachal Pradesh; 136c-08/z, 3.ii.2009, two females, on grasses; West Imphal, Manipur.

Diagnosis: Green in colour. The head and pronotum of about equal length; tegmina obtusely pointed, scarcely longer than hind femora; wings yellowish hyaline, the cells in the posterior part cloudy in the middle.

Male genitalia: Supra-anal plate broadly angular, slightly longer than wide, lateral margins slightly curved medially, apex obtusely conical; cercus uniformly broad, less than three times as long as wide, apex broadly rounded. Sub genital plate elongate-angular, longer than wide, apex obtusely rounded. Epiphallus with moderately broad median bridge, its anterior margin convex with small paired, bilobed, nodulated lophi and blunt, peg like ancora. Aedeagus flexured, apical valve narrow, curved, shorter than basal valve, connected with basal valve with flexure, apex pointed; basal valve broad basally.

Female genitalia: Supra-anal plate wide, flattened, as long as wide, apex obtusely conical; cercus short, longer than wide, apex obtusely rounded. Sub genital plate with posterior margin slightly convex in the middle; posterior marginal setae and jannone's organs present; egg-guide long, three and a half times as long as wide. Spermatheca with apical diverticulum short, apex truncated, shorter than pre-apical diverticulum; pre-apical diverticulum sac like. Ovipositor with dorsal



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Image 1. *Acrida exaltata*. A - male; B - female

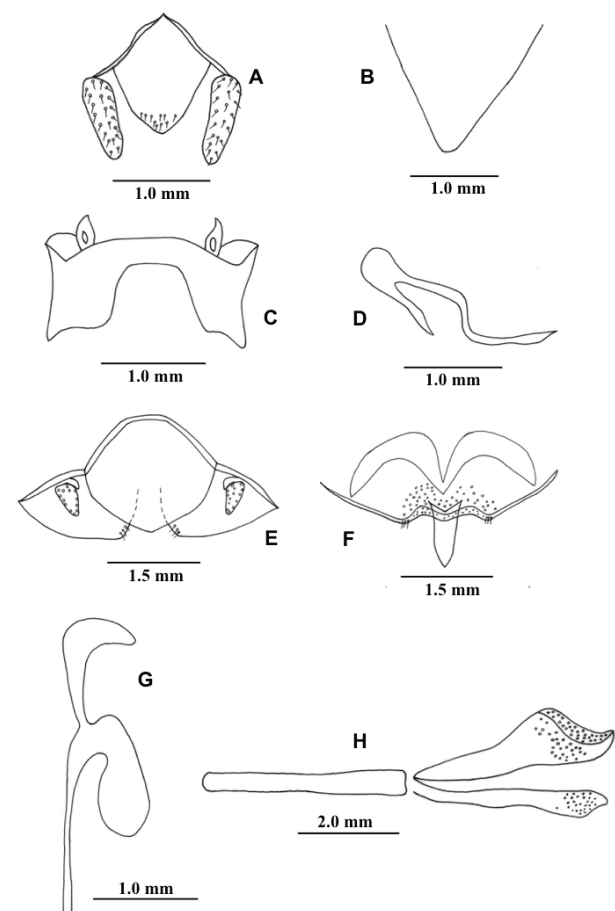


Figure 1. *Acrida exaltata*. A–D (male); E–H (female)
A - Supra anal plate; B - Subgenital plate; C - Epiphallus;
D - Aedeagus; E - Supra anal plate; F - Subgenital plate; G - Spermatheca; H - Ovipositor

valve broad, slightly more than three times as long as wide, shorter than lateral apodeme; ventral valve with apical tip short, basal sclerite narrow and tuberculate; mesial valve slightly dilated apically.

Morphometry: (length in mm)

Male: Body length 32.17, Tegmina 26.21, Pronotum 1.41, Hind femur 19.79

Female: Body length 49.89, Tegmina 45.48, Pronotum 2.56, Hind femur 31.74

Distribution: India: Sikkim, Kashmir, the Himalyas, Assam and Uttar Pradesh.

***Acrida gigantea* (Herbst, 1786)**

(Image 2; Fig. 2)

Truxalis gigantean Herbst, 1786. *Fuessly Archiv*;: 191.

Acrida gigantean (Herbst); Kirby, 1914. *Fauna Brit, Orth.*: 98.

Acrida gigantea (Herbst); Shrinivasan; 1986. Eastern Ghats insects, Part 1, *Zoo. Surv. India*, Madras: 10.

Acrida gigantea (Herbst); Tandon & Shishodia; 1995. Himalayan Ecosystem Series: Fauna of Western Himalaya (U.P), Par 1, *Zoo. Surv. India*;: 37.

Acrida gigantea (Herbst); Joshi et al.; 2004. *Journal of Tropical Forestry*, 20(3-4): 72.

Acrida gigantean (Herbst); Shishodia, 2006a. *Bionotes* 8(1): 11.

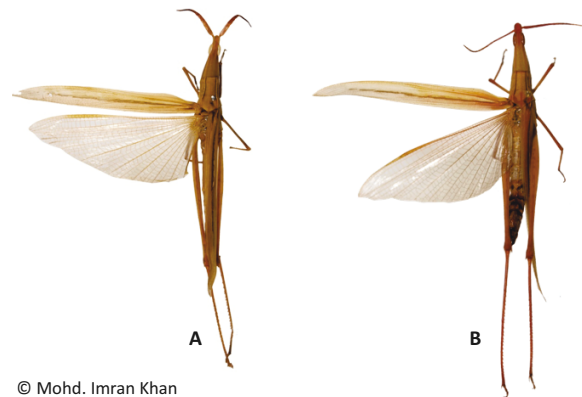
Acrida gigantea (Herbst); Shishodia, 2008b. Faunal Diversity of Jabalpur District, M.P., (*Zool. Surv. India*): 97.

Material examined: 137a-08/z, 29.x.2008, four females, two males, on paddy field, Guwahati, Assam; 137b-08/z, 2.ii.2009, seven females, two males, on grasses, East Siang, Arunachal Pradesh.

Diagnosis: Head slightly, if at all, longer than the pronotum, and often shorter. Green in colour. Head and pronotum with 2 or 3 pale pink bands on each side; tegmina with two broad pink longitudinal bands, between which is often a whitish line.

Male genitalia: Supra-anal plate triangular, longer than wide, apex rounded, cercus elongate, three times as long as wide, apex acutely rounded. Sub genital plate elongate, much longer than broad, narrowing apically. Epiphallus bridge shaped, ancorae well developed, lophi triangular, bridge narrow, uniformly broad. Aedeagus, basal valve broader and longer than apical valve, apical valve narrow, upward, apex pointed.

Female genitalia: Supra-anal plate broad, broader than long, apex pointed, cercus small, broad, narrowing apically, twice as long as wide, apex rounded. Sub genital plate, posterior margin entirely setose, surface with two small patches, egg-guide narrow, elongate, four times as long as wide. Spermatheca, apical diverticulum broad, sac like, wider and longer than pre-apical diverticulum. Apical diverticulum short and broad. Ovipositor, dorsal valve broad, margin smooth, apical tip rounded, ventral valve with apical tip acutely rounded, serrated, apodeme



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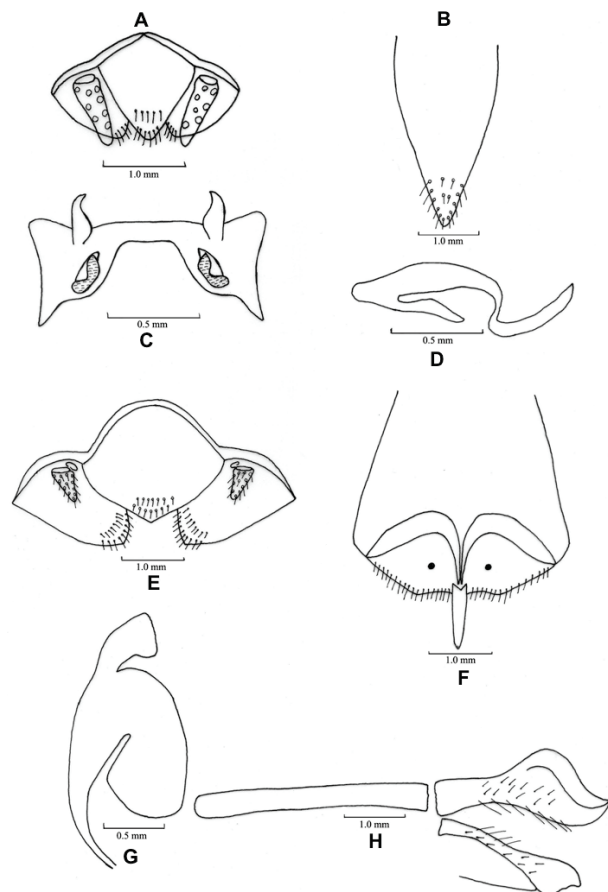
Image 2. *Acrida gigantea*. A - male; B - female

Figure 2. *Acrida gigantea*. A-D (male); E-H (female)
A - Supra anal plate; B - Subgenital plate; C - Epiphallus;
D - Aedeagus; E - Supra anal plate; F - Subgenital plate;
G - Spermatheca; H - Ovipositor

considerably longer than dorsal valve.

Morphometry: (length in mm)

Male: Body length 27.3, Tegmina 21.6, Pronotum 5.6, Hind femur 18.9

Female: Body length 47.8, Tegmina 43.1, Pronotum

9.1, Hind femur 22.5

Distribution: India: Himachal Pradesh, Madhya Pradesh, Tamil Nadu and Uttarakhand; Malaysia and Malaya.

***Phlaeoba infumata* Brunner, 1893**

(Image 3; Fig. 3)

Phlaeoba infumata Brunner von Wattenwyl, 1893. *Ann. Mus. Civ. Stor. Nat. Genova* 213(33): 124.

Phlaeoba infumata Brunner; Kirby, W.F. 1914. *Fauna of British India, including Ceylon and Burma. Orthoptera (Acrididae)* 103.

Phlaeoba infumata Brunner; Uvarov, 1921. *Ann. Mag. nat. Hist.* 97: 486.

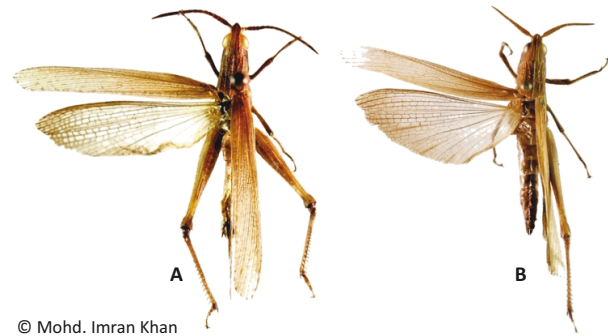
Phlaeoba infumata Brunner; Willemse, C. 1951. *Publ. natuurhist. Genootsch. Limburg* 4: 85.

Material Examined: 138a-08/z, 21.x.2008, nine females, two males; on grasses, RaiBhoi, Umran, Meghalaya; 138b-08/z, 22.x.2008, seven females, three males, on grasses, Jowai, Ummalong; 138c-08/z, 1.ii.2009, on grasses, Papumpare, Itanagar, Arunachal Pradesh; 138d-08/z, 11.ii.2009, 10 females, three males, on grasses, Aizwal, Selesih, Mizoram; 138e-08/z, 13.ii.2009, 15 females, five males, on grasses, Agartala, Lembucherra, Tripura; 138f-08/z, 17.x.2009, eight females, five males, on grasses, East Imphal, Manipur; 138g-08/z, 19.x.2009, four females, three males, on grasses, Dimapur, Nagaland.

Diagnosis: Uniform brownish testaceous. The fastigium of the vertex rather short and obtuse, concave above, with a continuous median carina extending along the head and pronotum. Antennae ensiform, as long as or longer than head and pronotum together.

Male genitalia: Supra-anal plate broadly triangular, slightly longer than wide, apex broadly rounded; cercus broad, narrowing apically, two and a half times as long as wide, apex rounded. Sub genital plate wide, flattened, broad basally, obtusely narrowing apically, longer than wide, apex elongate, incurved, rounded. Epiphallus with bridge narrow, ancorae moderate, with pointed apices, lophi small, single lobed. Aedeagus flexured, apical valve narrow, strongly curved, upward, much narrower and shorter than the basal valve, apex pointed, basal valve broad and dilated basally.

Female genitalia: Supra-anal plate wide, flattened, wider than long, apex obtusely rounded, cercus short, broad, one and a half times as long as wide, apex rounded. Sub genital plate with posterior margin having triangular projection in the middle; posterior marginal setae and jannone's organs present; egg-guide slightly more than twice as long as wide. Spermatheca with



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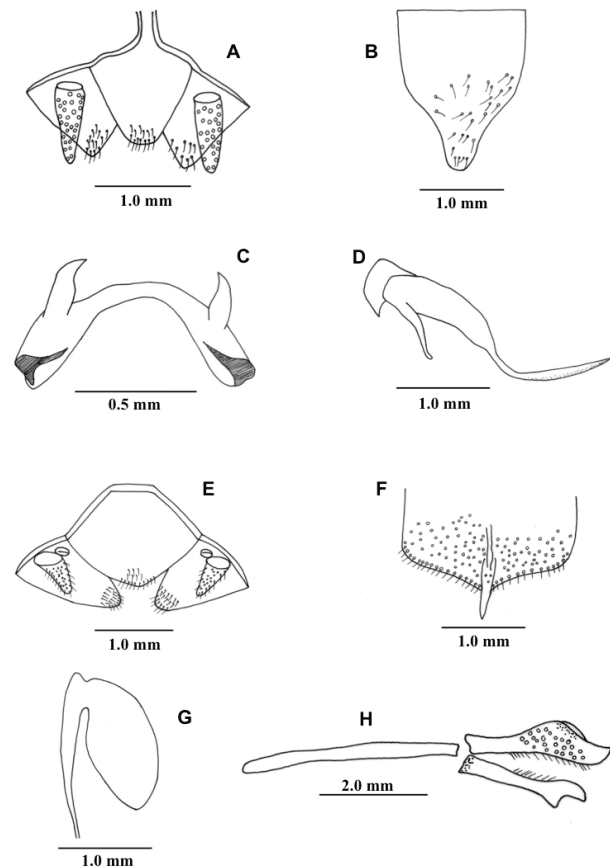
Image 3. *Phlaeoba infumata*. A - male; B - female

Figure 3. *Phlaeoba infumata*. A–D (male); E–H (female)
 A - Supra anal plate; B - Subgenital plate; C - Epiphallus;
 D - Aedeagus; E - Supra anal plate; F - Subgenital plate;
 G - Spermatheca; H - Ovipositor

apical diverticulum short and tubercle-like, pre-apical diverticulum well developed and sac like. Ovipositor with dorsal valve narrow, slightly more than four times as long as wide, shorter than lateral apodeme; ventral valve with apical tip long and pointed, slope deeply concave, mesial tooth truncated, basal scleritesetose on apical half.

Morphometry: (length in mm)

Male: Body length 20.89, Tegmina 16.4, Pronotum 1.98, Hind femur 13.15

Female: Body length 26.5, Tegmina 22.7, Pronotum 2.44, Hind femur 16.95

Distribution: India: Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chattisgarh, Delhi, Goa, Haryana, Himachal Pradesh, Madhya Pradesh and Manipur; Bangladesh, East Nepal, Hainan Islands and Myanmar.

***Phlaeoba panteli* Bolivar, 1902**

(Image 4; Fig. 4)

Phlaeoba panteli Bolivar, 1902. *Ann. Soc. ent. Fr.* 70: 589.

Phlaeoba wathousei Kirby, W.F. 1910. A Synonymic Catalogue of Orthoptera (*Orthoptera Saltatoria, Locustidae* and *Acrididae*) 3(2): 361 Syn. by Otte, D. 1995. Orthoptera Species File 5:263.

Phlaeoba panteli (Bolivar); Kirby, W.F. 1914. *Fauna of British India, including Ceylon and Burma. Orthoptera (Acrididae)* 105.

Material Examined: 139a-08/z, 14.x.2008, three females, two males, on grasses, Ranka, Gangtok, Sikkim; 139b-08/z, 25.x.2008, six females, two males; on grasses, RaiBhoi, Umanan, Meghalaya; 139c-08/z, 14.ii.2009, seven females, on grasses, Kamalghat, Agartala, Tripura; 139d-08/z, 15.x.009, four females, two males, on grasses, West Imphal, Manipur.

Diagnosis: Ferruginous brown, with scattered black dots. Antennae narrowly ensiform, shorter than the head and pronotum together, brown at the tips. Vertex horizontal, with the marginal carinae converging behind the eyes, fastigium broad, rounded in front, the median carina continued on the head and pronotum.

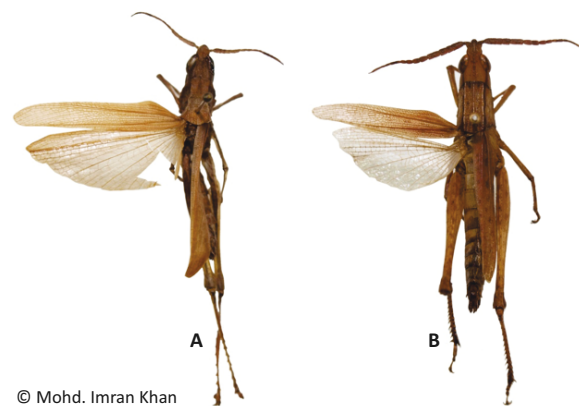
Male genitalia: Supra-anal plate triangular, cercus straight, conical; Sub genital plate short, with obtuse apex; Epiphallus, bridge moderately narrow, ancorae short, lophi lobiform; Aedeagus, apical valve narrower and much shorter than the basal valve.

Female genitalia: Supra-anal plate elongate, one and half times as long as wide apex rounded, cercus uniformly broad, two and half times as long as wide, apex rounded. Sub genital plate, posterior margin setose, with a median projection; Spermatheca, apical diverticulum rudimentary, pre-apical diverticulum well developed and sac like. Ovipositor, dorsal valve shorter than lateral apodeme, tips acute.

Morphometry: (length in mm)

Male: Body length 19.10, Tegmina 15.0, Pronotum 1.15, Hind femur 12.15

Female: Body length 33.39, Tegmina 19.19, Pronotum 2.70, Hind femur 19.22



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Image 4. *Phlaeoba panteli*. A - male; B - female

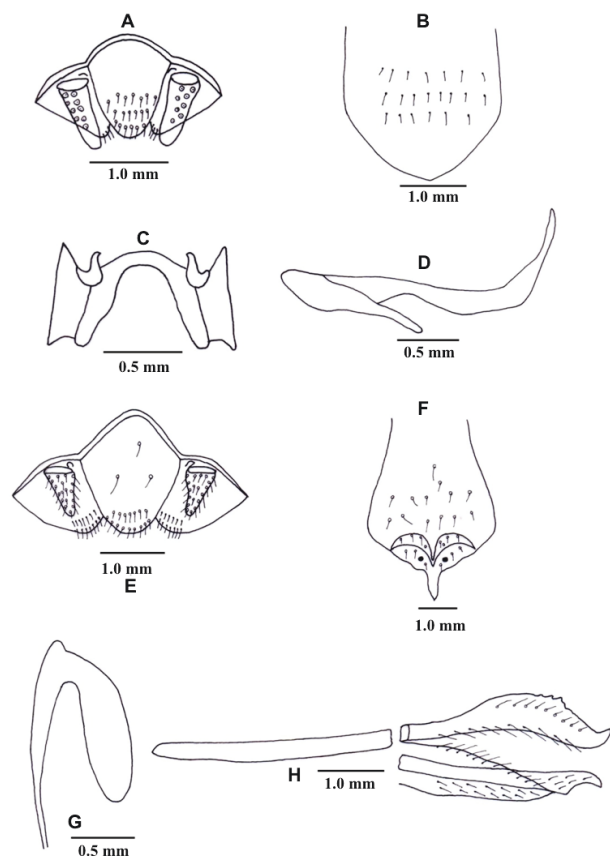
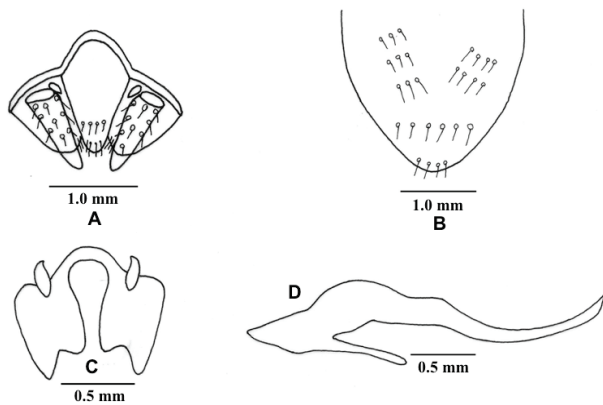


Figure 4. *Phlaeoba panteli*. A-D (male); E-H (female)
A - Supra-anal plate; B - Subgenital plate; C - Epiphallus;
D - Aedeagus; E - Supra-anal plate; F - Subgenital plate;
G - Spermatheca; H - Ovipositor

Distribution: India: Andhra Pradesh, Arunachal Pradesh, Bihar, Himachal Pradesh, Madhya Pradesh, Manipur, Meghalaya, Tripura, Tamil Nadu, Uttarakhand and West Bengal; Afghanistan.



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Image 5. *Phlaeoba angustidorsis*. (male)Figure 5. *Phlaeoba angustidorsis*. A–D (male)
A - Supra anal plate; B - Subgenital plate; C - Epiphallus;
D - Aedeagus***Phlaeoba angustidorsis* Bolivar, 1902**

(Image 5; Fig. 5)

Phlaeoba angustidorsis Bolivar, 1902. *Ann. Soc. ent. Fr.* 70: 590.*Phlaeoba angustidorsis* Bolivar; Kirby, W.F. 1914. *Fauna of British India, including Ceylon and Burma*. Orthoptera (Acrididae) 104.**Material Examined:** 140a-08/z, 14.x.2008, five males, on grasses, Ranka, Gangtok, Sikkim; 140a-08/z, 30.x.2008, two males, on grasses, Patorkuchi, Guwahati, Assam.**Diagnosis:** Ferruginous brown, the male with a yellow band extending to the tip of the tegmina. Fastigium of the vertex shorter than the eye, smooth, carinated in the

middle. Pronotum very narrow, with the lateral carinae parallel, or slightly convergent behind in the male.

Male genitalia: Supra-anal plate elongate narrow, two times as long as wide, apex rounded, cercus elongate, narrowing apically, three times as long as wide, apex rounded. Subgenital plate broad, apex broadly rounded. Epiphallus bridge shaped, bridge narrow, ancorae and lophi developed, ancorae with tips pointed. Aedeagus, basal valve broad, shorter than apical valve. Apical valve elongate, narrow, pointed apically.**Morphometry:** (length in mm)

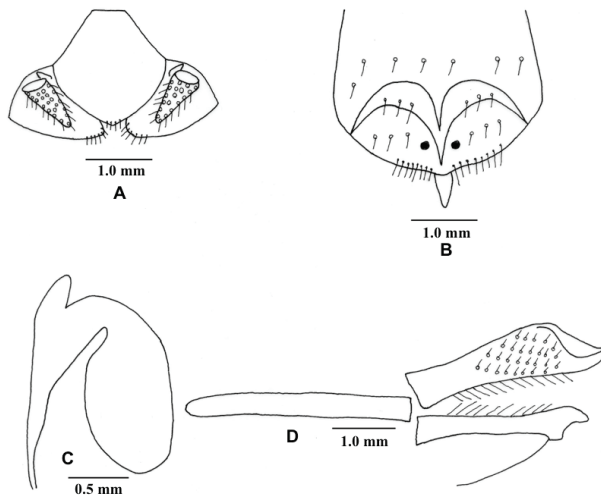
Male: Body length 18.7, Tegmina 11.3, Pronotum 4.5, Hind femur 13.00

Distribution: India: Tamil Nadu; Malaysia and Malaya.***Phlaeoba tenebrosa* (Walker, 1871)**

(Image 6; Fig. 6)

Opomala tenebrosa Walker, F. 1871. *Catalogue of the Specimens of Dermaptera Saltatoria in the Collection of the British Museum Supplement*: 53*Phlaeoba tenebrosa* (Walker); Kirby, W.F. 1910. *A Synonymic Catalogue of Orthoptera (Orthoptera Saltatoria, Locustidae vel Acridiidae)* 3(2): 138.*Phlaeoba tenebrosa* (Walker); Uvarov. 1925[1924]. *Jour. Asiat. Soc. Bengal* 20: 318.*Phlaeoba tenebrosa* (Walker); Uvarov. 1929. *Revue Suisse de Zool.* 36: 537.*Phlaeoba tenebrosa* (Walker); Yin, Xiang-Chu, Kai-Ling Xia et al. 2003. *Fauna Sinica, Insecta* 32 (supplement): 177.*Phlaeoba tenebrosa* (Walker); Azim & Reshi. 2010. *Acta Zool. Mex.* (n.s.) 26(1): 221.**Material Examined:** 141a-08/z, 2.ii.2009 on grasses, four females, East Siang, Arunachal Pradesh.**Diagnosis:** Body small to medium size; antennae ensiform, as long as or longer than head and pronotum together; head normal; vertex with distinct median carinula; fastigium of vertex depressed with median and lateral carinulae; fastigial foveolae not visible from above; frons slightly oblique; frontal ridge deeply sulcate.**Female genitalia:** Supra-anal plate broad, as long as wide, apex pointed, cercus broad narrowing apically, slightly more than two times as long as wide, apex rounded. Subgenital plate wide, posterior margin slightly notched in the middle, setose medially, surface with brown patches, egg-guide, short, two times as long as wide, narrowing at apex. Spermatheca, apical diverticulum long, broad, sac like; pre-apical diverticulum short rudimentary. Ovipositor with dorsal valve broad, apical tip rounded, dorsal condyle well developed, slightly shorter than lateral apodeme, ventral valve

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Image 6. *Phlaeoba tenebrosa* (female)Figure 6. *Phlaeoba tenebrosa* (female)
A - Supra anal plate; B - Subgenital plate; C - Spermatheca;
D - Ovipositor

narrow, apical tip acute.

Morphometry: (length in mm)

Female: Body length 27.8, Tegmina 24.4, Pronotum 5.5, Hind femur 15.9

Distribution: India: Arunachal Pradesh.

***Orthochtha indica* Uvarov, 1942**

(Image 7; Fig. 7)

Orthochtha indica Uvarov, 1942a: *Ann. Mag. nat. hist. London* 9(11) (56): 587.

Orthochtha indica Julka et al., 1982: *Oriental Insect* 63: 71.

Orthochtha indica Bhowmik & Halder, 1983b: *Rec.*

zool. Surv. India 81(1&2): 171.

Orthochtha indica Bhowmik, 1985b: *Rec. zool. Surv. India, Occ. Pap. No. 78*: 12.

Orthochtha indica Hazra et al. 1995: State Fauna Series, 4: Fauna of Meghalaya, Part 3, *Zool. Surv. India*: 239.

Orthochtha indica Saini & Mehta, 2007: *Bionotes* 9(3):76.

Material examined: 142a-08/z, 14.x.2008, three females, two males, on grasses, Sichey, Gangtok, Sikkim; 142b-08/z, 21.x.2008, five females, two males, on grasses, Umran, RaiBhoi, Meghalaya; 142c-08/z, 10.ii.2009, seven females, five males, on grasses, Sihphir, Aizwal, Mizoram.

Diagnosis: Body of median size; antennae ensiform, much longer than head and pronotum together; head conical, never elongate; fastigium of vertex depressed, with lateral carinulae; fastigial foveolae absent; frontal ridge sulcate; pronotum elongate, constricted in the middle.

Male genitalia: Supra-anal plate elongate-angular, cercus narrow-conical; slightly incurved with obtuse apex, sub genital plate short, subconical; Epiphallus, bridge narrow medially, ancorae large, lophilobiform; aedeagus, apical valve about as long as and much narrower than basal valve.

Female genitalia: Supra-anal plate broad, slightly broader than long, apex broadly rounded, cercus broad basally, narrowing apically, slightly longer than two times as long as wide, apex narrowly rounded. Sub genital plate elongate, wide, posterior margin smooth without setae, patches absent, egg-guide narrow, three times as long as wide, apex pointed. Spermatheca apical diverticulum elongate uniformly, narrowing apically, much longer than pre-apical diverticulum. Pre-apical diverticulum short, broad, sac like. Ovipositor broad with apex pointed, one and half time shorter than lateral apodeme, ventral valve elongate narrow, apical tip rounded.

Morphometry: (length in mm)

Male: Body length 23.9, Tegmina 20.64, Pronotum 1.84, Hind femur 16.14

Female: Body length 35.5, Tegmina 26.5, Pronotum 2.2, Hind femur 21.65

Distribution: India: Delhi, Himachal Pradesh, Maharashtra, Madhya Pradesh and Meghalaya.

DISCUSSION

A critical analysis on the distribution of the genera and species belonging to various subfamilies of Acrididae in the present work reveals that the genera and species are widely distributed in different regions of

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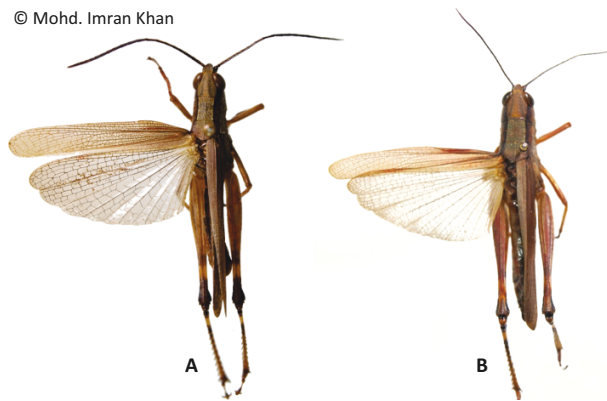
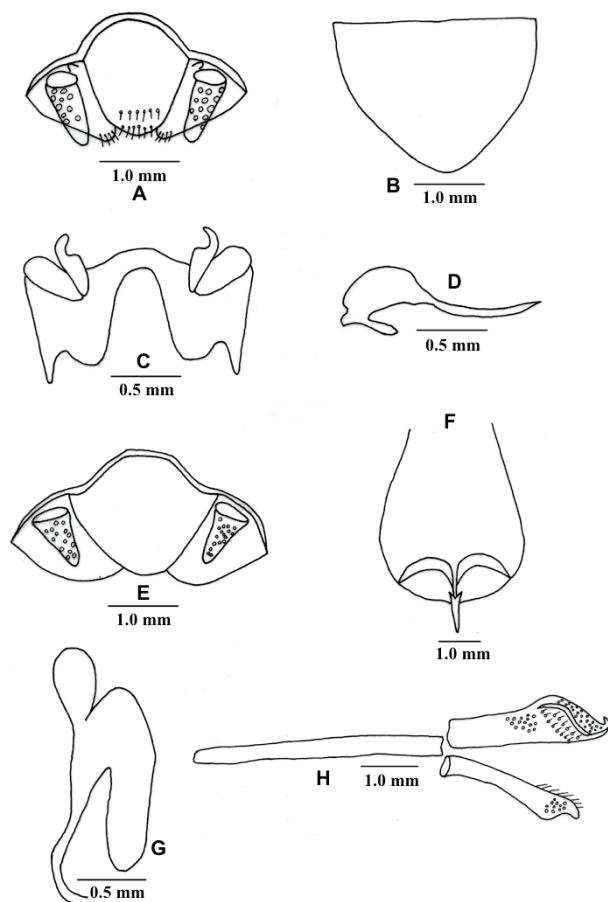
Image 7. *Orthochotha indica*. A - male; B - female

Figure 7. *Orthochotha indica*. A–D (male); E–H (female)
 A - Supra anal plate; B - Subgenital plate; C - Epiphallus;
 D - Aedeagus; E - Supra anal plate; F - Subgenital plate;
 G - Spermatheca; H - Ovipositor

Assam, Sikkim, Manipur, Arunachal Pradesh, Meghalaya, Tripura, Mizoram and Nagaland. During this study a total of seven species belonging to three genera of the subfamily Acridinae were recorded from the eight North-Eastern states of India. Earlier studies on the systematics of Indian Acrididae are exclusively based on the external characters like colour, size, texture, number of antennal segments etc. Beside conventional characters, in the present study an attempt has also been made to make a comprehensive study on the genitalic structures, viz., supra-anal plate and cerci, subgenital plate, epiphallus and aedeagus of the male; sub genital plate, supra-anal plate and cerci, ovipositor and spermatheca of the female. The significance of conventional and genitalic structures in the classification of Indian Acridoidea is shown. The northeastern part of India comprising eight states is one of the most important biodiversity hotspots in India and the world. Most of the northeastern states have more than 60% of their geographical area under forest cover. This region is full of diversity of various insects. Meghalaya represents the most diverse state in having the most number of specimens as well as the number of genera while the least number of specimens and genera were recorded from Tripura and Sikkim. While the other states were represented by a moderate number of genera belonging to different subfamilies. This may be attributed to the fact that Meghalaya has the higher forest cover area as well as grasslands when compared to the other states. Extensive surveys of these areas were made which results in good diversity as depicted in the results.

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Key to the genera of the subfamily Acridinae MacLeay, 1821 recorded from the northeastern states of India

1. Head never elongate; Hind femur never very long and slender 2
- Head elongate; hind femur very long and slender *Acrida* Linnaeus, 1758
2. Pronotum with lateral carinae straight, nearly parallel *Phlaeoba* Stal, 1860
- Pronotum with lateral carinae diverging in metazoan *Orthochtha* Karsch, 1891

Key to the species of the genus *Acrida* Linnaeus, 1758

1. Body greenish; lateral carina of pronotum not edged within with black line *A. exaltata* Walker, 1859
- Body dry grass coloured; lateral carina of pronotum edged within with black line *A. gigantea* Herbst, 1794

Key to the Indian species of *Phlaeoba* Stal, 1860

1. Lateral carina of pronotum distinct 2
- Lateral carina of pronotum indistinct or coarsely indicated or absent, pronotum coarsely punctured *P. tenebrosa* Walker, 1871
2. Wings more or less fuscous at apex 3
- Wings hyaline *P. panteli* Bolivar, I., 1902
3. Antennae ringed or tipped with obscure yellow *P. anqustidorsis* Bolivar, I., 1902
- Antennae unicolorous *P. infumata* Brunner, 1893





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