TAXONOMIC STUDIES ON ACRIDIDAE (ORTHOPTERA: ACRIDOIDEA) OF GUJARAT REGION UNDER WESTERN GHATS OF INDIA

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ABSTRACT: Thirteen species of locusts and grasshoppers representing ten genera and seven subfamilies belonging to the family Acrididae are reported from different localities of Gujarat region under Western Ghats of India. Localities surveyed and distribution of each species collected from Gujarat region under Western Ghats of India is discussed. A comprehensive report of Acridoid fauna of this region is given for the first time.

KEY WORDS: Acrididae, Gujarat, Taxonomy, Diversity, Orthoptera.

Acrididae is a family of economically important species of Orthopterous pests. It is not only the most diverse group in the superfamily Acridoidea but also have the greater number of species. All the agriculturally important species of locusts and grasshoppers belong to this family. They cause considerable damage to agricultural crops, grasslands and pastures. Identifying features of these pests are absence of fastigial furrow, frontal ridge wide and usually depressed at media ocellus; antennae longer than fore femora; dorsum of pronotum usually with median and lateral carinae; prosternal process present or absent; tympanum usually present; tegmina and wings fully developed, reduced or absent; lower basal lobe of hind femur mostly shorter or as long as upper one; Brunner's organ present, external apical spine of hind tibia mostly absent.

Bolivar (1902, 1914), Kirby (1914), Uvarov (1927, 1966), Henry (1937, 1940), Tandon & Shishodia (1969, 1977), Usmani & Shafee (1983, 1984, 1990), Bhowmik (1985), Shishodia & Mandal (1990), Shrinivasan & Muralirangan (1992), Hazra et al. (1993), Shishodia (1997, 1999, 2000, 2008), Shishodia & Tandon (2000), Shishodia et al. (2003), Ingrisch et al. (2004), Saini & Mehta (2007), Chandra et al. (2007, 2010), Shishodia & Gupta (2009), Usmani et al. (2010), Usmani et al. (2011), Usmani & Kumar (2011), Kumar & Usmani (2012a,b) and Kumar & Usmani (2014) have contributed to the taxonomy of Indian Acridids.

Gujarat is a state in the western part of India. It has an area of 196,204 km² (75,755 sq mi) with a coastline of 1,600 km (990 mi). The state is bordered by Rajasthan to the north, Maharashtra to the south, Madhya Pradesh to the east, and the Arabian Sea as well as the Pakistani province of Sindh to the west. The great river Tapti, flowing in a deep trench from the east cuts through Surat and the eastern country is mountainous. This is the northern extension of the Western Ghats and further south, the Ghats are forested and the small district of the Dangs is in this area. The west flowing rivers which originate in the Western Ghats are: Purna, Auranga and Par. The districts of Gujarat in Western Ghats ecoregion are The Dangs, Surat, Navsari and Valsad.

No survey work so far has been done exclusively for this group from Gujarat region under Western Ghats of India. There are very few reports such as Muralidharan & Patel (2007a,b) and Shishodia et al. (2010) on the taxonomy of acridids from this region. Except for some sporadic reports there is no systematic study on the locusts and grasshoppers belonging to the family Acrididae from this region, a hot spot of Biodiversity. Keeping in view the above fact, the present work

is aimed at studying one of the families of Orthoptera which is most widely distributed and shows a very high degree of biological diversity.

In the present study the authors uphold Orthoptera Species File (Eades et al., 2015) in classifying Acrididae. Species identification is based on both the conventional and genitalic characters. Most of the genera are represented by single species.

MATERIAL AND METHODS

The present authors collected new material (477 specimens) of adult grasshoppers of both sexes from various localities of Gujarat region under Western Ghats of India which served the basis for the present critical study. A complete record was also maintained indicating the reference number, locality, data of collection and name of host plants etc.

I) Collection of adult grasshoppers: The authors surveyed various agricultural areas of various localities of Gujarat region under Western Ghats of India during the period 2013-2014 for the collection of grasshoppers and locusts. They were caught by hands, by forceps, and by the ordinary aerial insect net. The net was used for catching insects individually or by sweeping on grasses, bushes and other vegetables. Attempts were made to collect the specimens from their host plants as well as those attracted to light during the night. They were captured on different dates in different months from various crops. Different parts of crops were examined. Attention was also given to fruits and vegetables. The collected specimens were killed in cyanide bottles.

II) Preparation for morphological studies: Dry mounts were also prepared for better understanding of certain characters like size, colour, texture etc. For this purpose, the specimens were first relaxed, stretched and later, pinned and labeled. Permanent collections of pinned specimens were kept in store boxes and cabinets for further studies on their morphological structures.

III) Preparation for genitalic studies: For a detailed study of the various components of genitalia, the permanent slides were prepared and examined under the microscope in order to make a detailed study of the genitalic structures. Drawings were initially made with the help of a camera lucida. Details were filled in by conventional microscope examination.

The material collected during survey has been deposited in the Zoological Museum of the Aligarh Muslim University, Aligarh, India.

RESULTS AND DISCUSSION

The present study included 477 specimens of family Acrididae from different habitats of various cultivated and non-cultivated areas of Gujarat region under Western Ghats of India. This captured material includes thirteen species over ten genera and seven subfamilies. A key for their separation is given below:

Key to Acrididae of Gujarat region under Western Ghats of India

1. Prosternal process usually absent, if present, body strongly elongate and antennae ensiform; hind tibia without external apical spine; epiphallus bridge shaped, bridge undivided; spermatheca with apical diverticulum short or rudimentary, pre-apical diverticulum sac like.....**8**

- Prosternal process present; hind tibia with or without external apical spine; epiphallus disc or bridge shaped, bridge divided or undivided; spermatheca with apical and pre-apical diverticula tubular.....**2**

2. Lower knee lobe of hind femur never spined; valves of ovipositor never serrate or spined; hind tibia never flattened.....**5**
- Lower knee lobe of hind femur spined; valves of ovipositor serrate or spined; hind tibia flattened.....**3**
3. Male supra-anal plate with a tubercle on each side of a median apical process, making the plate appear weakly trilobate; posterior ventral basivalvular sclerites of ovipositor with one or two tooth like spines on its inner ventral margin.....**4**
- Male supra-anal plate without lateral tubercles; posterior ventral basivalvular sclerites of ovipositor without any well defined spines on its lower inner margin.....
.....***Oxya grandis grandis*** Willemse, 1925
4. Male cercus weakly bifurcate; ventral surface of subgenital plate with a broad median longitudinal groove.....***Oxya fuscovittata*** (Marschall, 1836)
- Male cercus obtuse or truncate; ventral surface of subgenital plate convex, flat or, at most, with a weak apical concavity .....***Oxya hyla hyla*** Serville, 1831
5. Radial area of tegmen without transverse stridulatory veinlets; valves of aedeagus flexure.....**6**
- Radial area of tegmen with a series of regular, parallel, thickened, transverse stridulatory veinlets; valves of aedeagus divided or connected by small or indistinct flexure.....
.....***Spathosternum prasiniferum prasiniferum*** (Walker, 1871)
6. Mesosternal interspace open; external apical spine of hind tibia usually absent.....**7**
- Mesosternal interspace closed; external apical spine of hind tibia present.....
.....***Tropidopola longicornis*** (Fieber, 1853)
7. Last abdominal tergite in male without well developed furcula; bridge of epiphallus usually undivided medially.....***Eyprepocnemis alacris alacris*** (Serville, 1838)
- Last abdominal tergite in male with well developed furcula; bridge of epiphallus divided medially.....***Eucoptacra praemorsa*** (Stal, 1860)
8. Frons usually oblique; medial area of tegmen usually without intercalary vein, if present, never serrated in both sexes.....**9**
- Frons usually vertical; medial area of tegmen with intercalary vein usually serrated.....**11**
9. Head elongate; hind femur very long and slender.....**10**
- Head never elongate; hind femur never very long and slender.....
.....***Phlaeoba infumata*** Brunner, 1893
10. Lateral carina of pronotum not edged within with black line; apical diverticulum of spermatheca with rounded apex.....***Acrida exaltata*** (Walker, 1859)
- Lateral carina of pronotum edged within with black line; apical diverticulum of spermatheca with truncated apex.....***Acrida gigantea*** (Herbst, 1786)
11. Dorsum of pronotum without longitudinal ridges.....**12**
- Dorsum of pronotum with numerous longitudinal parallel ridges.....
.....***Morphacris fasciata*** (Thunberg, 1815)
12. Pronotum with median carina equally raised in prozona and metazona, not forming tooth like projection.....**13**
- Pronotum with median carina strongly raised in prozona forming two tooth like projections, sharp in metazona.....***Trilophidia annulata*** (Thunberg, 1815)
13. Frontal ridge of uniform width with nearly parallel margins; foveolae shorter.....
.....***A. thalassinus thalassinus*** (Fabricius, 1781)
- Frontal ridge gradually tapered towards the fastigium; foveolae longer.....
.....***A. thalassinus tamulus*** (Fabricius, 1798)

Oxya grandis grandis Willemse, 1925

Oxya grandis Willemse, 1925. Tijdschr. v. Entomologie, 68: 36.
Oxya grandis Willemse; Usmani & Shafee, 1985. Oriental insect, 19: 315.
Material examined: INDIA, Gujarat, Surat, 2♀, 06-XII-2013, on grasses; 3♀, 09-XII-2013, on grasses; Navsari, 3♀, 10-XII-2013, on grasses; Valsad, 1♀, 10-X-2014, on grasses; Navsari, 2♀, 11-X-2014, on grasses; The Danges, 1♀, 12-X-2014, on grasses; Surat, 2♀, 15-X-2014, on grasses.
Measurements (length in mm): Female: Body: 26.17; Pronotum: 6.46; Antenna: 9.30; Tegmina: 27.90; Hind Femur: 19.09.
Distribution: Assam, Punjab, Gujarat and Kerala.

Oxya fuscovittata (Marschall, 1836)

Gryllus fuscovittatus Marschall, 1836. Ann. Naturhist. Mus. Wien, 1 (2): 211.

Oxya turanica Uvarov, 1912. Trudy Russk. Entomol. Obshch., 40 (3): 28. Syn. By Hollis, 1971. Bull. Br. Mus. (Nat. Hist.) Ent., 26 (7): 289.
Oxya oryzivora Willemse, 1925. Tijdschr. v. Entomologie, 68: 25. Syn. By Hollis, 1971. Bull. Br. Mus. (Nat. Hist.) Ent., 26 (7): 289.
Oxya uvarovi Willemse, 1925. Tijdschr. v. Entomologie, 68: 11, 22. Syn. By Hollis, 1971. Bull. Br. Mus. (Nat. Hist.) Ent., 26 (7): 289.
Oxya fuscovittata (Marschall); Kumar and Usmani, 2014. Journal of Entomology and Zoology Studies, 2 (3): 133.
Material examined: INDIA, Gujarat, Surat, 1♂, 2♀, 07-XII-2013, on grasses; Navsari, 5♂, 4♀, 10-XII-2013, on Grasses; Valsad, 2♂, 4♀, 13-XII-2013, on grasses; 2♂, 1♀, 10-X-2014, on grasses; The Danges, 2♂, 4♀, 12-X-2014, on grasses; 1♂, 3♀, 14-X-2014, on grasses; Surat, 2♂, 3♀, 1-X-2014, on grasses.
Measurements (length in mm): Male: Body: 21.91; Pronotum: 4.53; Antenna: 9.19; Tegmina: 18.72; Hind Femur: 14.18. **Female:** Body: 26.28; Pronotum: 6.09; Antenna: 8.43; Tegmina: 23.81; Hind Femur: 16.69.
Distribution: Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Goa, Gujarat, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Uttar Pradesh and West Bengal.

Oxya hyla hyla Serville, 1831

Oxya hyla Serville, 1831. Ann. Sci. nat., 22 (86): 28-65, 134-167, 262-292.
Heteracris viridivitta Walker, 1870. Catalogue of the Specimens of Dermaptera Saltatoria in the Collection of the British Museum, 4: 605-801. Syn. By Bolivar, 1918. Trab. Mus. Cienc. nat., Madrid (Ser. zool.), 34: 15.
Oxya acuminata Willemse, 1925. Tijdschr. v. Entomologie, 68: 42. Syn. By Hollis, 1971. Bull. Br. Mus. (Nat. Hist.) Ent, 26 (7): 282.
Oxya ebneri Willemse, 1925. Tijdschr. v. Entomologie, 68: 46. Syn. By Hollis, 1971. Bull. Br. Mus. (Nat. Hist.) Ent., 26 (7): 282.
Oxya multidentata Willemse, 1925. Tijdschr. v. Entomologie, 68: 44. Syn. By Hollis, 1971. Bull. Br. Mus. (Nat. Hist.) Ent., 26 (7): 282.
Oxya hyla hyla Serville; Kumar and Usmani, 2014. Journal of Entomology and Zoology Studies, 2 (3): 133.
Material examined: INDIA, Gujarat, Surat, 2♂, 3♀, 06-XII-2013, on grasses; 1♂, 2♀, 09-XII-2013, on grasses; Navsari, 2♂, 3♀, 10-XII-2013, on Grasses; Tapi, 4♂, 7♀, 11-XII-2013, on grasses; Valsad, 3♂, 5♀, 13-XII-2013, on grasses; 3♂, 4♀, 10-X-2014, on grasses; Navsari, 5♂, 3♀, 11-X-2014, on grasses; The Danges, 2♂, 5♀, 12-X-2014, on grasses; 2♂, 1♀, 13-X-2014, on grasses; 1♂, 2♀, 14-X-2014, on grasses; Surat, 2♂, 4♀, 15-X-2014, on grasses.
Measurements (length in mm): Male: Body: 22.50; Pronotum: 4.42; Antenna: 8.09; Tegmina: 19.05; Hind Femur: 13.13. **Female:** Body: 26.59; Pronotum: 5.16; Antenna: 7.96; Tegmina: 27.21; Hind Femur: 15.73.
Distribution: Andhra Pradesh, Arunachal Pradesh, Bihar, Assam, Himachal Pradesh, Jammu and Kashmir, Madhya Pradesh, Manipur, Meghalaya, Nagaland, Orissa, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttrakhand, Goa, Delhi, Chhattisgarh, Kerala, Gujarat, Uttar Pradesh and West Bengal.

Spathosternum prasiniferum prasiniferum (Walker, 1871)

Heteracris prasinifera Walker, 1871. Cat. Derm. Salt. Br. Mus. London, 65.
Caloptenus caliginosus Walker, 1871. Cat. Derm. Salt. Br. Mus. London, 69. Syn. By Bey-Bienko & Mishchenko, 1951. Locusts and Grasshoppers of the U.S.S.R. and Adjacent Countries, 1: 160[168].
Stenobothrus strigulatus Walker, 1871. Cat. Derm. Salt. Br. Mus. London, 82. Syn. By Bey-Bienko & Mishchenko, 1951. Locusts and Grasshoppers of the U.S.S.R. and Adjacent Countries, 1: 160[168].
Stenobothrus simplex Walker, 1871. Cat. Derm. Salt. Br. Mus. London, 82. Syn. By Bolivar, 1899. Ann. Soc. Entom. Belgique, 43: 589.
Stenobothrus rectuss Walker, 1871. Cat. Derm. Salt. Br. Mus. London, 83. Syn. By Bey-Bienko & Mishchenko, 1951. Locusts and Grasshoppers of the U.S.S.R. and Adjacent Countries, 1: 160[168].
Spathosternum prasiniferum prasiniferum (Walker); Kumar and Usmani, 2014. Journal of Entomology and Zoology Studies, 2 (3): 134.

Material examined: INDIA, Gujarat, Surat, 6♂, 10♀, 06-XII-2013, on grasses; 2♂, 1♀, 07-XII-2013, on grasses; 4♂, 2♀, 09-XII-2013, on grasses; Navsari, 12♂, 8♀, 10-XII-2013, on Grasses; Tapi, 4♂, 2♀, 11-XII-2013, on grasses; Valsad, 3♂, 3♀, 13-XII-2013, on grasses; 4♂, 2♀, 10-X-2014, on grasses; Navsari, 2♂, 5♀, 11-X-2014, on grasses; The Danges, 4♂, 3♀, 12-X-2014, on grasses; 5♂, 8♀, 13-X-2014, on grasses; 3♂, 6♀, 14-X-2014, on grasses; Surat, 7♂, 10♀, 15-X-2014, on grasses.
Measurements (length in mm): Male: Body: 16.15; Pronotum: 2.79; Antenna: 4.89; Tegmina: 13.77; Hind Femur: 7.86. **Female:** Body: 18.17; Pronotum: 3.58; Antenna: 3.95; Tegmina: 14.75; Hind Femur: 9.43.
Distribution: Jammu & Kashmir, Himachal Pradesh, Punjab, Gujarat, Haryana, Delhi, Rajasthan, Uttar Pradesh, Bihar, West Bengal, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, Karnataka, Kerala, Andhra Pradesh, Arunachal Pradesh and Goa.

Tropidopola longicornis (Fieber, 1853)

Opsomala longicornis Fieber, 1853. Lotos, 3: 98.
Opsomala syrica Walker, 1871. Catalogue of the Specimens of Dermaptera Saltatoria in the Collection of the British Museum Supplement: 51. Syn. By Mishchenko, 1965. Fauna of Russia Orthopt., 190[164].
Opomala cylindrica Giglio-Tos, 1893. Boll. Musei Zool. Anat. Comp. R. Univ. Torino, 8(164): 11. Syn. By Massa & Fontana, 1998. Boll. Mus. civ. St. nat. Verona, 22: 76.
Tropidopola nigerica indica Uvarov, 1937. Ann. Mag. nat. Hist., 10 (19): 519. Syn. By Mishchenko, 1965. Fauna of Russia Orthopt., 190[164].
Tropidopola longicornis (Fieber); Massa, 2009. Jour. Orth. Res., 18 (1): 81.
Material examined: INDIA, Gujarat, Surat, 1♂, 1♀, 09-XII-2013, on grasses; Navsari, 2♂, 1♀, 11-X-2014, on grasses; The Danges, 1♂, 14-X-2014, on grasses.
Measurements (length in mm): Male: Body: 33.99; Pronotum: 5.13; Antenna: 8.76; Tegmina: 22.00; Hind Femur: 13.15. **Female:** Body: 46.43; Pronotum: 7.10; Antenna: 10.11; Tegmina: 31.05; Hind Femur: 17.32.
Distribution: Bihar, Maharashtra, Gujarat and Punjab.

Eyprepocnemis alacris alacris (Serville, 1838)

Acridium alacre Serville, 1838. Histoire naturelle des insectes. Orthopteres, 682.
Acridium deponens Walker, 1859. Ann. Mag. nat. Hist., 3 (4): 222. Syn. By Willemse, 1957. Publ. natuurhist. Genootsch. Limburg, 10: 241.
Heteracris rudis Walker, 1870. Catalogue of the Specimens of Dermaptera Saltatoria in the Collection of the British Museum, 4: 662, 664. Syn. By Willemse, 1957. Publ. natuurhist. Genootsch. Limburg, 10: 241.
Caloptenus reductus Walker, 1870. Catalogue of the Specimens of Dermaptera Saltatoria in the Collection of the British Museum, 4: 714. Syn. By Dirsh, 1958. Proc. R. Ent. Soc. London, (B) 27: 33-45.
Acridium scitulum Walker, 1871. Catalogue of the Specimens of Dermaptera Saltatoria in the Collection of the British Museum Supplement, 62. Syn. By Willemse, 1957. Publ. natuurhist. Genootsch. Limburg, 10: 241.
Euprepocnemis plorans intermedia Bolivar, 1902. Ann. Soc. ent. Fr., 70: 630. Syn. By Willemse, 1957. Publ. natuurhist. Genootsch. Limburg, 10: 241.
Eyprepocnemis alacris alacris (Serville); Kumar and Usmani, 2014. Journal of Entomology and Zoology Studies, 2 (3): 136.
Material examined: INDIA, Gujarat, Surat, 2♂, 1♀, 06-XII-2013, on grasses; 2♂, 1♀, 09-XII-2013, on grasses; Navsari, 1♂, 3♀, 10-XII-2013, on Grasses; Valsad, 3♂, 1♀, 13-XII-2013, on grasses; 1♂, 2♀, 10-X-2014, on grasses; Navsari, 3♂, 2♀, 11-X-2014, on grasses; The Danges, 1♀, 12-X-2014, on grasses; 2♂, 13-X-2014, on grasses; 1♀, 14-X-2014, on grasses; Surat, 2♂, 5♀, 15-X-2014, on grasses.
Measurements (length in mm): Male: Body: 25.12; Pronotum: 4.81; Antenna: 9.38; Tegmina: 23.40; Hind Femur: 14.52. **Female:** Body: 33.79; Pronotum: 6.19; Antenna: 10.52; Tegmina: 28.25; Hind Femur: 19.04.
Distribution: Tamil Nadu, Uttar Pradesh, Assam, Manipur, Meghalaya, Kerala, Andhra Pradesh, Punjab, Haryana, Rajasthan, Himachal Pradesh, Jammu & Kashmir, Arunachal Pradesh, Bihar, Chhattisgarh, Delhi, Goa, Karnataka, Madhya Pradesh, Gujarat, Orissa, Sikkim, Tripura, West Bengal and Maharashtra.

Eucoptacra praemorsa (Stal, 1860)

Acridium (Catantops) praemorsum Stal, 1860. Kongliga Svenska fregatten Eugenies Resa omkring jorden under befal af C.A. Virgin aren 1851-1853 (Zoologi), 2 (1): 330.
Acridium saturatum Walker, 1870. Catalogue of the Specimens of Dermaptera Saltatoria in the Collection of the British Museum, 4: 704. Syn. By Bolivar, 1917. Rev. Real Acad. Cienc. Exact., Fisic. Natur., 16: 404.
Caloptenus obliterans Walker, 1870. Catalogue of the Specimens of Dermaptera Saltatoria in the Collection of the British Museum, 4: 712. Syn. By Bolivar, 1917. Rev. Real Acad. Cienc. Exact., Fisic. Natur., 16: 404.
Caloptenus sinensis Walker, 1870. Catalogue of the Specimens of Dermaptera Saltatoria in the Collection of the British Museum, 4: 704. Syn. By Bolivar, 1917. Rev. Real Acad. Cienc. Exact., Fisic. Natur., 16: 404.
Caloptenus striqifer Walker, 1871. Catalogue of the Specimens of Dermaptera Saltatoria in the Collection of the British Museum Supplement, 66. Syn. By Bolivar, 1917. Rev. Real Acad. Cienc. Exact., Fisic. Natur., 16: 404.
Eucoptacra praemorsa (Stal); Nayeem & Usmani, 2012. Munis Entomology & Zoology, 7 (1): 401.
Material examined: INDIA, Gujarat, Surat, 2♂, 1♀, 07-XII-2013, on grasses; Navsari, 1♂, 3♀, 10-XII-2013, on Grasses; Valsad, 3♂, 3♀, 13-XII-2013, on grasses; The Danges, 1♂, 1♀, 12-X-2014, on grasses; 2♂, 3♀, 14-X-2014, on grasses.
Measurements (length in mm): Male: Body: 16.78; Pronotum: 3.55; Antenna: 7.46; Tegmina: 18.31; Hind Femur: 10.99. **Female:** Body: 17.94; Pronotum: 4.46; Antenna: 5.22; Tegmina: 20.75; Hind Femur: 11.75.
Distribution: Andhra Pradesh, Arunachal Pradesh, Assam, Chhattisgarh, Gujarat, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtara, Manipur, Meghalaya, Orissa, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, Uttarakhand and West Bengal.

Phlaeoba infumata Brunner, 1893

Phlaeoba infumata Brunner, 1893. Ann. Mus. Civ. Stor. Nat. Genova, 2-13 (33): 124.
Phlaeoba infumata Brunner; Kumar and Usmani, 2014. Journal of Entomology and Zoology Studies, 2 (3): 144.
Material examined: INDIA, Gujarat, Surat, 2♂, 1♀, 07-XII-2013, on grasses; Navsari, 2♂, 1♀, 10-XII-2013, on Grasses; Valsad, 2♂, 4♀, 13-XII-2013, on grasses; 3♂, 10-X-2014, on grasses; Navsari, 2♀, 11-X-2014, on grasses; The Danges, 3♂, 5♀, 12-X-2014, on grasses; 2♂, 1♀, 13-X-2014, on grasses; Surat, 3♂, 7♀, 15-X-2014, on grasses.
Measurements (length in mm): Male: Body: 22.08; Pronotum: 4.32; Antenna: 8.37; Tegmina: 19.98; Hind Femur: 14.29. **Female:** Body: 31.92; Pronotum: 6.58; Antenna: 9.06; Tegmina: 27.55; Hind Femur: 19.06.
Distribution: Andhra Pradesh, Arunachal Pradesh, Assam, Gujarat, Bihar, Chhattisgarh, Delhi, Goa, Haryana, Himachal Pradesh, Manipur, Tamil Nadu, Uttar Pradesh, Madhya Pradesh and West Bengal.

Acrida exaltata (Walker, 1859)

Truxalis exaltata Walker, 1859. Ann. Nat. Hist., (3) 4: 222.
Tryxalis brevicolis Bolivar, 1893. Feuille Jeunes Nat., 23: 162. Syn. By Dirsh and Uvarov, 1953. Tijdschr. v. Entomologie, 96: 232.
Acrida lugubris Burr, 1902. Trans. Ent. Soc. Lond., 157. Syn. By Dirsh and Uvarov, 1953. Tijdschr. v. Entomologie, 96: 232.
Acrida exaltata (Walker); Kirby, 1910. A Synonymic Catalogue of Orthoptera (Orthoptera Saltatoria, Locustidae vel Acridiidae), 3 (2): 94.
Acrida curta Uvarov, 1936. Zool. J. Linn. Soc., 39: 536. Syn. By Dirsh and Uvarov, 1953. Tijdschr. v. Entomologie, 96: 232.
Acrida lugubris astigmata Prasad, 1956. Proc. nation. Acad. Sci. India, B-26 (1): 22. Syn. By Dirsh, 1961. Eos, 37: 398.
Acrida exaltata (Walker); Kumar and Usmani, 2014. Journal of Entomology and Zoology Studies, 2 (3): 143.
Material examined: INDIA, Gujarat, Surat, 2♂, 1♀, 06-XII-2013, on grasses; Surat, 1♂, 1♀, 07-XII-2013, on grasses; Surat, 1♂, 1♀, 09-XII-2013, on grasses; Navsari, 2♂, 10-XII-2013, on Grasses; Tapi, 2♂, 1♀, 11-XII-2013, on grasses; Valsad, 1♂, 13-XII-2013, on grasses;

2♀, 10-X-2014, on grasses; Navsari, 1♂, 11-X-2014, on grasses; The Danges, 3♂, 1♀, 12-X-2014, on grasses; 2♂, 13-X-2014, on grasses; 1♂, 3♀, 14-X-2014, on grasses; Surat, 2♂, 15-X-2014, on grasses.

Measurements (length in mm): Male: Body: 3; Pronotum: 5.10; Antenna: 12.81; Tegmina: 27.81; Hind Femur: 20.11. **Female:** Body: 49.67; Pronotum: 7.72; Antenna: 11.59; Tegmina: 37.89; Hind Femur: 26.76.

Distribution: Sikkim, Jammu & Kashmir, Andhra Pradesh, Arunachal Pradesh, Bihar, Chhattisgarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Nagaland, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttarakhand, West Bengal, Assam and Uttar Pradesh.

Acrida gigantea (Herbst, 1786)

Truxalis giganteus Herbst, 1786. Herausgegeben von Johan Caspar Fuessly, 7-8: 191.

Acrida gigantea (Herbst); Kirby, 1910. A Synonymic Catalogue of Orthoptera (Orthoptera Saltatoria, Locustidae vel Acridiidae), 3 (2): 93.

Acrida gigantea (Herbst); Kumar and Usmani, 2014. Journal of Entomology and Zoology Studies, 2 (3): 143.

Material examined: INDIA, Gujarat, Surat, 2♂, 1♀, 09-XII-2013, on grasses; Tapi, 3♂, 2♀, 11-XII-2013, on grasses; Valsad, 1♂, 13-XII-2013, on grasses; Navsari, 2♂, 1♀, 11-X-2014, on grasses; The Danges, 1♂, 2♀, 13-X-2014, on grasses; Surat, 2♀, 15-X-2014, on grasses.

Measurements (length in mm): Male: Body: 30.39; Pronotum: 4.98; Antenna: 9.72; Tegmina: 25.39; Hind Femur: 17.80. **Female:** Body: 46.54; Pronotum: 7.25; Antenna: 11.52; Tegmina: 36.37; Hind Femur: 25.27.

Distribution: Himachal Pradesh, Jammu & Kashmir, Punjab, Haryana, Gujarat, Rajasthan, Madhya Pradesh, Tamil Nadu and Uttarakhand.

Morphacris fasciata (Thunberg, 1815)

Gryllus fasciatus Thunberg, 1815. Mem. Acad. Imp. Sci. St. Peterburg 5: 211-301.

Gryllus sanguineus Thunberg, 1815. Mem. Acad. Imp. Sci. St. Peterburg, 5: 231. Syn. By Johnston, 1956. Annotated catalogue of African grasshoppers, 521.

Gryllus sulcatus Thunberg, 1815. Mem. Acad. Imp. Sci. St. Peterburg, 5: 234. Syn. By Dirsh, 1966. Publ. Cult. Comp. Diamant. Angola Ser. 3, Vol. 74: 437.

Oedipoda strigata Serville 1838. Histoire naturelle des insectes. Orthopteres, 726. Syn. By Johnston, 1956. Annotated catalogue of African grasshoppers, 522.

Morphacris adusta Walker, 1870. Catalogue of the Specimens of Dermaptera Saltatoria in the Collection of the British Museum, 3: 790. Syn. By Johnston, 1956. Annotated catalogue of African grasshoppers, 522.

Cosmorhyssa costata Saussure, 1888. Mem. Soc. Phys. Hist. Nat. Geneve, 30 (1): 37. Syn. By Dirsh, 1966. Publ. Cult. Comp. Diamant. Angola Ser. 3, Vol. 74: 437.

Morphacris fasciata (Thunberg); Nayeem and Usmani, 2012. Munis Entomology & Zoology, 7 (1): 405.

Material examined: INDIA, Gujarat, Surat, 1♂, 1♀, 06-XII-2013, on grasses; 1♂, 07-XII-2013, on grasses; Valsad, 4♂, 1♀, 13-XII-2013, on grasses; Navsari, 2♂, 1♀, 11-X-2014, on grasses; The Danges, 3♂, 1♀, 14-X-2014, on grasses.

Measurements (length in mm): Male: Body: 25.39; Pronotum: 4.98; Antenna: 9.89; Tegmina: 19.39; Hind Femur: 11.80. **Female:** Body: 29.48; Pronotum: 5.65; Antenna: 11.22; Tegmina: 22.71; Hind femur: 13.41.

Distribution: Bihar, Chhattisgarh, Gujarat, Kerala, Lakshadweep Island, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu and West Bengal.

Trilophidia annulata (Thunberg, 1815)

Gryllus annulatus Thunberg, 1815. Mem. Acad. Imp. Sci. St. Peterburg, 5: 234.

Gryllus bidens Thunberg, 1815. Mem. Acad. Imp. Sci. St. Peterburg, 5: 235. Syn. By Willemse, 1930. Tijdschr. v. Entomologie, 73: 57.

Acridium vulnerata Haan, 1842. Verhandelingen over de natuurlijke geschiedenis der Nederlandsche overzeesche bezittingen 16 Zoologie, 161. Syn. By Willemse, 1930. Tijdschr. v. Entomologie, 73: 55.

Epacromia turpis Walker, 1870. Catalogue of the Specimens of Dermaptera Saltatoria in the Collection of the British Museum, 4: 775. Syn. By Willemse, 1930. Tijdschr. v. Entomologie, 73: 55.

Trilophidia annulata (Thunberg); Bolivar, 1902. Ann. Soc. ent. Fr., 70: 604.
Trilophidia annulata (Thunberg); Kumar and Usmani, 2014. Journal of Entomology and Zoology Studies, 2 (3): 139.
Material examined: INDIA, Gujarat, Surat, 1♂, 1♀, 06-XII-2013, on grasses; Surat, 1♂, 5♀, 07-XII-2013, on grasses; Navsari, 2♂, 1♀, 10-XII-2013, on Grasses; Tapi, 2♀, 11-XII-2013, on grasses; Valsad, 3♂, 2♀, 10-X-2014, on grasses; The Danges, 4♂, 1♀, 13-X-2014, on grasses; 5♂, 4♀, 14-X-2014, on grasses.
Measurements (length in mm): Male: Body: 16.42; Pronotum: 3.37; Antenna: 6.47; Tegmina: 17.18; Hind Femur: 8.66. **Female:** Body: 21.63; Pronotum: 3.79; Antenna: 6.05; Tegmina: 19.01; Hind Femur: 9.43.
Distribution: Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Himachal Pradesh, Jammu & Kashmir, Karnataka, Gujarat, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Nagaland, Orissa, Rajasthan, Sikkim, Tripura, Uttarakhand, Goa, Tamil Nadu, Uttar Pradesh, Kerala and West Bengal.

Aiolopus thalassinus thalassinus (Fabricius, 1781)

Gryllus thalassinus Fabricius, 1781. Species Insectorum, 1: 367.
Acridium grossum Costa, 1836. Fauna del regno di Napoli. Ortotteri, 25. Syn. By Johnston, 1956. Annotated catalogue of African grasshoppers, 507.
Acridium laetum Brulle, 1840. *In* Webb, P.B. & Berthelot. Histoire naturelle des Iles Canaries. 2(2): 77. Syn. By Kirby, 1910. A Synonymic Catalogue of Orthoptera (Orthoptera Saltatoria, Locustidae vel Acridiidae), 3 (2): 191.
Gryllus flavovirens Fischer, 1846. Nouv. mem. Soc. Imp. natur. Moscou, 8: 299. Syn. By Kirby, 1910. A Synonymic Catalogue of Orthoptera (Orthoptera Saltatoria, Locustidae vel Acridiidae), 3 (2): 191.
Epacromia angustifemur Ghiliani, 1869. Ann. Soc. Entom. Belgique, 12 C.R. 179. Syn. By Kirby, 1910. A Synonymic Catalogue of Orthoptera (Orthoptera Saltatoria, Locustidae vel Acridiidae), 3 (2): 191.
Epacromia rufipes Ivanov, 1888. Proc. nat. hist soc. Kharkov Univ., 21: 309-377. Syn. By Benediktov, 2000. Vestnik Zoologii, 34 (3): 81.
Aiolopus thalassinus kivuensis Sjostedt, 1923. Ark. Zool., 15 (6): 18. Syn. By Johnston, 1956. Annotated catalogue of African grasshoppers, 509.
Aiolopus acutus Uvarov, 1953. Publ. Cult. Comp. Diamant. Angola, 21: 111. Syn. By Hollis, 1968. Bull. Br. Mus. (Nat. Hist.) Ent., 22 (7): 340.
Aiolopus thalassinus (Fabricius); Hollis, 1968. Bull. Br. Mus. (Nat. Hist.) Ent., 22 (7): 340.
Aiolopus thalassinus thalassinus (Fabricius); Bughio, Sultana, Rind and Wagan, 2014. J. Bio. & Env. Sci., 4 (4): 413.
Material examined: INDIA, Gujarat, Surat, 5♂, 4♀, 06-XII-2013, on grasses; Surat, 3♂, 3♀, 07-XII-2013, on grasses; Navsari, 1♀, 10-XII-2013, on Grasses; Tapi, 2♂, 1♀, 11-XII-2013, on grasses; Valsad, 2♂, 10-X-2014, on grasses; Navsari, 3♀, 11-X-2014, on grasses; The Danges, 3♂, 5♀, 12-X-2014, on grasses; 5♂, 2♀, 14-X-2014, on grasses; Surat, 1♂, 1♀, 15-X-2014, on grasses.
Measurements (length in mm): Male: Body: 18.45; Pronotum: 2.96; Antenna: 6.25; Tegmina: 18.35; Hind Femur: 9.72. **Female:** Body: 22.83; Pronotum: 3.60; Antenna: 6.11; Tegmina: 20.28; Hind Femur: 11.00.
Distribution: Arunachal Pradesh, Himachal Pradesh, Jammu & Kashmir, Rajasthan, Gujarat, Haryana, Punjab, Uttar Pradesh and Uttarakhand.

Aiolopus thalassinus tamulus (Fabricius, 1798)

Gryllus tamulus Fabricius, 1798. Supplementum Entomologiae Systematicae Suppl., 195.
Gomphocerus tricoloripes Burmeister, 1838. Handbuch der Entomologie, 2-2(I-VIII): 649. Syn. By Rehn, 1902. Proc. Acad. Nat. Sci. Philad., 54: 631.
Epacromia rufostriata Kirby, 1888. Proc. zool. Soc. London, 1888 (4): 550. Syn. By Hollis, 1968. Bull. Br. Mus. (Nat. Hist.) Ent., 22 (7): 314.
Aiolopus thalassinus tumulus (Fabricius); Hollis, 1968. Bull. Br. Mus. (Nat. Hist.) Ent., 22 (7): 347.
Aiolopus thalassinus tumulus (Fabricius); Kumar and Usmani, 2014. Journal of Entomology and Zoology Studies, 2 (3): 141.

Material examined: INDIA, Gujarat, Surat, 3♂, 7♀, 09-XII-2013, on grasses; Valsad, 2♂, 2♀, 10-X-2014, on grasses; Navsari, 1♂, 3♀, 11-X-2014, on grasses; The Danges, 3♂, 1♀, 13-X-2014, on grasses; Surat, 2♂, 1♀, 15-X-2014, on grasses.
Measurements (length in mm): Male: Body: 14.82; Pronotum: 2.90; Antenna: 5.99; Tegmina: 17.20; Hind Femur: 9.34. **Female:** Body: 21.32; Pronotum: 3.58; Antenna: 6.15; Tegmina: 19.09; Hind Femur: 10.71.
Distribution: Andaman and Nicobar Islands, Andhra Pradesh, Punjab, Rajasthan, Gujarat, Arunachal Pradesh, Bihar, Chhattisgarh, Delhi, Haryana, Himachal Pradesh, Karnataka, Kerala and Madhya Pradesh.

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