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Original article

Diversity of Orthoptera (Insecta) fauna of Achanakmar Wildlife Sanctuary, Bilaspur, Chhattisgarh, India

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ABSTRACT

The paper presents the distributional record of the Orthoptera fauna of Achanakmar Wildlife Sanctuary, Bilaspur, Chhattisgarh, India. Thirty-three species pertaining to 30 genera under five families are reported. The habitus photographs and map is provided for the first time.

Introduction

Members of the Order Orthoptera are usually known as short- and long-horned grasshoppers, pygmy grasshoppers, grouse-locusts, crickets, mole crickets, katydids, raspy cricket, and cave crickets. They may be winged, brachypterous, or apterous. These insects are usually moderate-sized to large (5–115 mm) (Shishodia 1997). The name "Orthoptera" refers to primitive or generalized winged insects and comes from the Greek "ortho", meaning "straight", and "ptera", meaning "wing."

The mouth parts are of the biting type or chewing type, the compound eyes are well developed, and the ocelli mostly number one to three. Antennae may be filiform and sometimes ensiform. The prothorax is large. The hind legs are usually enlarged and modified for leaping or jumping. The forewings, if well-developed, are elongated and more or less thickened with a submarginal costal vein and most often modified as stridulatory organs, whereas the hindwings are membranous with an extensive anal area. Females generally possess a well-developed ovipositor. The male external genitalia are symmetrical and concealed at rest by the enlarged ninth abdominal sternum (i.e., the subgenital plate), which may or may not bear a pair of styles. The cerci are usually short and unsegmented. Specialized auditory and stridulatory organs are frequently developed. Mostly the males stridulate but the females of some species can also produce sound. Metamorphosis is incomplete.

Little information about the presence of Orthoptera in the Achanakmar Wildlife Sanctuary, Chhattisgarh, India is known. Chandra and Gupta (2005) recorded one species of the Family Schizodactylidae from Achanakmar Sanctuary. Gupta et al (2008) reported orthopteran fauna of 18 species belonging to 18 genera under five families from Achanakmar Wildlife Sanctuary. Gupta and Chandra (2010) reported 64 species belonging to 57 genera under nine families from Achanakmar Wildlife Sanctuary, Bilaspur. Skejo and Gupta 2015 described the specific status of *Heditettix cristatus*. Gupta (2015a) reported 31 species and subspecies belonging to 29 genera under six families from Badalkhol Wildlife Sanctuary, Jashpur, Chhattisgarh. Gupta (2015b) investigated Orthoptera fauna and published a record of 56 species pertaining to 50 genera under seven families from Gurughasidas National Park in the Koriya and Surguja districts of Chhattisgarh. Gupta (2016a, 2016b) described *Euparatettix dandakaranyensis* and *Ergatettix subtrunctatus* from Chhattisgarh. Gupta (2016c) reported 41 species under five families from Surguja district Chhattisgarh. Gupta (2016d) reported 34 species under six families from Korba district in Chhattisgarh. Eades et al (2016) provided data on 27,260 species of Orthoptera fauna in the world, of which 1033 species were reported in India by Shishodia et al (2010). The aims of future studies on this geographically important Orthoptera fauna basically need to focus

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on its ecological importance and evaluate ecosystem services provided by the Orthoptera fauna.

Material and methods

Study area

The survey was performed in Achanakmar Wildlife Sanctuary, Chhattisgarh, India. The sanctuary is situated in the Bilaspur district. It covers an area of ~551.55 square kilometers, and lies between the latitudes of 22°24′–22°35′N and the longitudes of 81°34′30″–81°85′ E. The vegetation of sanctuary is primarily tropical deciduous forest. Achanakmar Wildlife Sanctuary is situated on the east boundary of Satpura Hills and north of the Mahanadi River.

The Achanakmar Sanctuary area has tropical moist deciduous forest. At places where the soil depth is low and shallow and the moisture-retaining capacity is low, a dry mixed forest has been developed. Therefore, along the Maniyari River, river bank type of vegetation grows. Achanakmar Sanctuary is very rich in flora: primarily Sal (*Shorea robusta*) as an upper canopy, and it consists of Saja (*Terminalia tomentosa*), Bija (*Pterocarpus marsupium*), Dhawda (*Anogeissus latifolia*), Mokha (*Schrebera sweitinoides*), Kusum (*Schleichera oleosa*), Padar (*Stereospermum suaveolens*), Kasai (*Bridelia retusa*), Landia (*Lagerstroemia parviflora*), Jamun (*Syzygium cuminii*), Mahua (*Madhuca indica*), Haldu (*Adina cordifolia*). In the middle canopy bamboo is in abundance, and other species are Awla (*Emblica officinalis*), Tinsa (*Ougeinia oojeinensis*), Baranga (*Kydia calycina*), Achar (*Buchanania lanzan*), Tendu (*Diospyros melanoxylon*), Tondri (*Casearia tomentosa*), Sehra (*Bauhinia retusa*), Amta (*Bauhinia malabarica*), Roli (*Mallotus philippensis*), Bel (*Aegle marmelos*), Dhaman *Grewiatiliifolia*), Garari (*Cleistanthus collinus*), Kachnar (*Bauhinia variegata*), Kumbhi (*Careya arborea*), Phetrakala (*Randia uliginosa*), Salai (*Boswellia serrata*), and a few other species.

The undergrowth consists of Banorahar (*Flemingia semialata*), Chhind (*Phoenix acaulis*), Dhawai (*Woodfordia fruticosa*), Galfulla (*Flemingia bracteata*), Neel (*Indigofera tinctaria*), Marodphal (*Helicteres isora*), Harsingar (*Nyctanthes arbortristris*), Kurchi (*Holarrhena antidysentrica*), Kalbansa (*Colebrookea oppositifolia*), Berbanda (*Vernonia divergens*), Baibarang (*Embelia robusta*), and Shataori (*Asparagus racemosus*).

In the ground flora, some common grasses are Gunher or Chhira (*Themeda quadrivalvis*), Kasul (*Heteropogon contortus*), Chhira (*Imperata cylindrica*), and Sabai (*Eulaliopsis binata*). The main climbers in the area are Mahul (*Bauhinia vahlii*), Gurar (*Milletia auriculata*), Palasbel (*Butea superba*), Ramdatoon (*Smilax zeylanica*), Painar (*Combretum decandrius*), Keonti (*Ventilago denticulata*), and a few others.

The specimens were collected by sweeping an insect net over vegetation, pebbles on the Maniyari River, the Khudia dam, and other streams, and collected by a light trap usually by using white sheet or mulmul cloth, hung between two trees or poles, with the light using a mercury bulb with a Honda generator or gas placed in front of it for night collection at Achanakmar Village and Chhaparva Forest Rest House. The specimens were euthanized by keeping them in a killing jar containing benzene vapor. The specimens were dry-preserved and card-mounted. Live images of the specimens were captured using a Sony digital camera (DSC-HX9V; Sony). The specimens were studied under a Leica Stereo-Zoom microscope (Leica M205 A; Leica) and deposited in the National Zoological collections of Zoological Survey of India (NZZSI; Kolkata, India).

Coordinates of the collection localities of Achanakmar Wildlife Sanctuary

Achanakmar village: 22°26′11.6′N, 81°50′18.5″E, altitude 433m
Baigababa Mandir: 22°24′ 20″N, 81° 51′ 23″E, altitude 391 m
Bokrakachar: 22° 26′12″N, 81° 50′ 19″E, altitude 433m
Bowdongri: 22°22′10′N, 81°36′42.8″E, altitude 393 m
Chhaparva: 22° 26′ 45′N, 81° 46′ 13″E, altitude 402 m
Karidongri FRH: 22°20′55.1′N, 81° 36′33.8″E, altitude 380 m
Karimati Talab: 22°23′14″N, 81° 44′ 50″E, altitude 433 m
Khudia: 22°22′31′N, 81°36′26″E, Altitude 406 m
Ranjan Talab: 22° 25′25″N, 81° 47′ 1.2″ E, altitude 453 m
Sihawalsagar: 22° 36′ 051′N, 81° 78′ 04″E, altitude 453 m

The abbreviations used in this study are as follows: AWLS, Achanakmar Wildlife Sanctuary; DC, day collection; NC, night collection.

Taxonomic accounts

Order Orthoptera Olivier, 1789
Suborder Caelifera, Ander, 1939
Superfamily Acridoidea Macleay, 1821
Family Acrididae Macleay, 1821
Subfamily Acridinae Macleay, 1821
Genus *Acrida* Linnaeus, 1758

1. *Acrida exaltata* (Walker, 1859)

(Figure 1A)
Truxalis exaltata Walker, 1859: 222.
Acrida exaltata: Kirby, 1914: 99.

Material examined. 1♂ (NC), Bilaspur, AWLS, Baigababa Mandir, Chhattisgarh, 13 vi 2013 (A. Raha et al.)-coll. NZZSI.

Distribution. India [Andaman and Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh (Bastar, Bilaspur, Jashpur, Korba, Koriya, and Raipur), Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Nagaland, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh and West Bengal]; Afghanistan; Bangladesh; Iran; Pakistan; Saudi Arabia; South-East Tibet; Sri Lanka; Yemen; and West Aden.

2. *Acrida gigantea* (Herbst, 1786)

(Figure 1B)
Truxalis gigantean Herbst, 1786: 191.
Acrida gigantea: Kirby, 1914: 98.

Material examined. 1♂, 1♀ (NC), Bilaspur, AWLS, Bokrakachar, Chhattisgarh, 11 vi 2012 (A. Raha et al.)-coll. NZZSI.

Distribution. India [Assam, Arunachal Pradesh, Chhattisgarh (Bilaspur, Korba, Koriya, Raipur, and Surguja), Himachal Pradesh, Madhya Pradesh, Tamil Nadu and Uttarakhand]; Africa; Malaysia; Malaya; and Nepal.

Genus *Phlaeoba* Stål, 1860

3. *Phlaeoba infumata* Brunner, 1893

(Figure 1C)
Phlaeoba infumata Brunner, 1893: 124.
Phlaeoba infumata: Dey and Hazra, 2003: 25.

Material examined. 2♂ (NC), Bilaspur, AWLS, Achanakmar village, Chhattisgarh, 1 vi 2012 (A. Raha et al.); 1♂ (NC), Bilaspur, AWLS, Chhaparawa, Chhattisgarh, 11 vi 2012 (A. Raha et al.)-coll. NZZSI.

Distribution. India [Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh (Bastar, Bilaspur, Korba, and Raipur), Delhi, Goa, Haryana, Himachal Pradesh, Madhya Pradesh, Manipur, Meghalaya, Nagaland, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, and West Bengal]; Bangladesh; East Nepal; Hainan

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