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An assessment of the diversity of the Acrididae (Orthoptera) in the Nashik Region, Maharashtra

Arati Tidame, Shaikh Yasmeen
Department of Zoology, Dr. Rafiq Zakaria College for Women, Chhatrapati Sambhajinagar, Maharashtra, India

Abstract
The variety of life found in the study area shows that the ecosystem is healthy and well-balanced. This is because of different factors like plant life, weather, and human actions. Having many different species means the environment is stable. If there is a drop in species, it might mean the environment is under stress or being affected by human activities. Keeping track of these changes and taking steps to protect the environment is important to keep nature healthy and support long-term sustainability. Acrididae family members are large in sized and generally called short horned grasshoppers. The survey on Acrididae (Short-horned grasshoppers) was carried out during the period of 2022 to 2024.In present study 8 species of Acrididae family representing 6 subfamilies, 7 tribes and 7 genus.

Keywords: Acrididae, Orthoptera, Diversity, Nashik

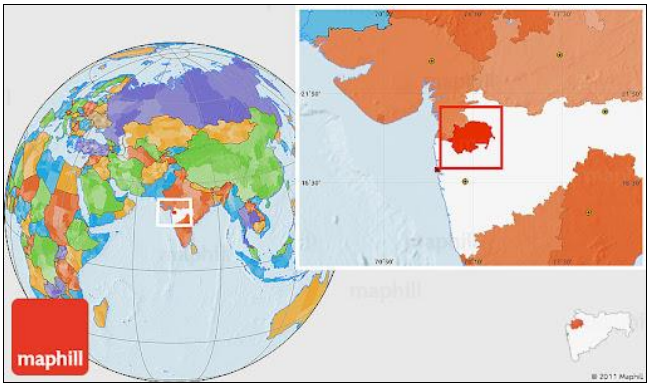
Introduction

Insects are the most varied group of living things on Earth and have adjusted to many different environments, thriving in their own special role. Insects can recognize the difference between air that is more polluted and air that is not, and they may switch to a different plant as their host when the environment becomes less favorable. Since insects are the most numerous and varied group of animals, they play a key role in showing how the environment is changing. The name Orthoptera comes from Greek words, where "Ortho" means straight and "pteron" means winged. These insects are usually shaped like a cylinder, and their long back legs are built for jumping. (Debdas Jana et. al., 2015) [2]. Orthoptera have become a key group of invertebrates used for checking and understanding the environment (Henle *et al*. 1999; Maas *et al*. 2002) [3]. The order is split into two main groups, namely Caelifera, which are also called short-horned grasshoppers, and Ensifera, known as long-horned grasshoppers. Acrididea is the biggest group in this order, with around 11,000 species found all over the world. Out of these, 290 species from 138 different groups have been found in India, Mohale M.P. *et. al*., (2016) [12]. The family Acrididae has the most variety, with 8,000 species and 28 of these are found only in India, as reported by Chandra and Gupta (2013) [1].Grasshoppers can be found in many different environments and are important because they can damage a wide variety of green plants. Among insects, the group called Orthoptera is one of the biggest, with more than 20,000 different types found around the world. About 10% of these, which is around 1,750 species, are found in India (Tandon S.K. *et al*., 1998) [15]. Some insects change their color and behavior when there are a lot of them. These insects are called locusts. Grasshoppers usually have antennae that are shorter than their body and small ovipositors. Locusts are a type of grasshopper from the family Acrididae. They can form very big groups, called swarms. These swarms can be very harmful and move together in a coordinated way. Because of this, these grasshoppers have two different stages: one where they live alone and another where they live in groups. Locust swarms can damage crops badly. (Hirdesh Kumar and Mohd. Kamil Usmani 2014) [5]. In Germany, about half of the Orthoptera species are listed as being at risk (Ingrisch and Köhler 1998) [6, 7], and many of these species live in dry, open areas (Ingrisch and Köhler 1998) [6, 7]. Orthoptera play a key role in food chains as they are early consumers and make up a large part of the insect population in grassland areas (Jamison *et al*., 2002 and Odum *et al*., 1962) [8, 13]. They are also an important food source for many rare bird species, along with reptiles and mammals (e.g. Kok and Louw 2000) [9]. The main factors that influence where Orthoptera are found are the structure of the plants and the climate (Hochkirch *et al*. 2007a; Hochkirch *et al*. 2008; Weyer *et al*. 2012). The family Acrididae has the highest number of species, with about 8,000 in total. Out of these, 285 species are found in India, and they belong to 135 different genera. Among these, 136 species and 28 genera are native to India only. These insects are known as grasshoppers. They have antennae that are usually shorter than their body, about half the body length, and have less than 30 segments. They also have a three-valved ovipositor and three segmented tarsi.

Materials and Methods

Study area

The present study on the diversity of Orthoptera was carried out in different localitities of Nashik, Maharashtra, India. Geographically Nashik district fall between 18.33º to 20.53º North latitude and 73.16º to 75.16º East longitude at the Northwest region of Maharashtra state, at a height of 565 meters above mean sea level. Nashik districts covers 15,582 sq. kilometre in the North Maharashtra. The city's tropical location, high altitudes combined offer a relatively mild form of tropical wet and dry climate. The temperatures increase slightly in October but this is followed by the cool season from November to February. The cool season sees high temperatures of around 28^{0}c. During the day but cold nights, averaging around 10ºc. and extremely dry air.



Source: Maphill

Fig 1: Highlighting Study area

Sample collection, Preservation and Identification

Orthopteran insects was collected by using aerial net sweeping and hand picking method. These aerial net sweeping over the crops and catching the insects. These collected insects transfer into a jaar containing cotton soacked in ethyl acetate to kill the specimen. Killed specimen removed from jar to prevent from decolouration. The specimens kept for relaxation, after relaxation the insects properly set on stretching board, wing stretched properly using paper strips. Afterthat legs was stretched properly, pinned insects by using entomological pins. And dry it for 72 hrs. The collected specimen was preserved and kept into Entomological insect storage box. So on the basis of its characteristics by using identification key Fauna of British India, the insects was identified.

Result and Discussion

In the present study, recorded 8 species of Acrididae belongs to 7 genera, 7 tribes and 6 subfamilies i.e. Hemiacridinae, Cyrtacanthacridinae, Oedipodinae, Catantopinae, Spathosterninae, Acridinae from Nashik region. In 2009 Gabriel Paulraj studied on Grasshoppers distribution from two districts of Tamil Nadu. Nine localities selected during the period of August 2004 to December 2006. 33 species grouped under four families were recorded. Among these Acrididae family was found to be the dominant representing 21 species which was 63.6% of the collected species. These can be classified under 7 subfamilies and 15 genera. According to Mayya *et al*., (2005) carried out surveyed on grasshoppers from Kannada's dakshin Karnataka district. These study reported 28 species of Acrididae (short-horned) grasshoppers from 12 different localities. It shows how the variety and number of grasshoppers differ, indicating that areas with human activity, pollution and farming have less diversity than areas that are more disturbed and polluted. H.A.Dhamake et. al., (2014) [4] reported 20 speciesof Orthoptera from Maval, Haveli tahsil of Pune district. These 20 species belongs to 20 genera, 15 subfamilies, 5 families were reported. Family Acrididae are dominant with 13 species then Tettigonidae with 3 and Gryllidae with 2 species while Tetrigidae, Pyrgomorphidae each represented by 1 species.

Table 1: List of collected Tettigonids from Nashik region, Maharashtra, India

Suborder	Family	Subfamily	Tribe	Genus	Species
Caelifera	Acrididae	Hemiacridinae	Hieroglyphini	Hieroglyphus	banian
		Cyrtacanthacridinae	Cyrtacanthacridini	Cyrtacanthacris	tatarica
		Cyrtacanthacridinae	Cyrtacanthacridini	Cyrtacanthacris	aeruginosa
		Oedipodinae	locustini	Gastrimargus	africanus
		Catantopinae	catantopinae	Diabolocatantops	innotabilis
		Acridinae	Acridini	Acrida	exaltata
		Oedipodinae	Trilophidini	Trilophidia	japonica
		Spathosterninae	Spathosternini	Spathosternum	prasiniferum

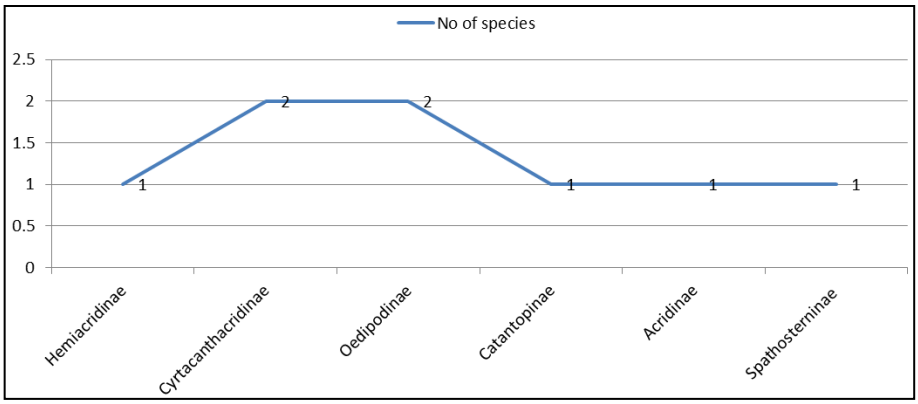


Fig 1: Subfamilywise distribution of Acrididae

Systematic Account

Order: Orthoptera
Superfamily: Acrididoidea
Family: Acrididae

Subfamily: Hemiacridinae
Hieroglyphus banian, Fabricius, 1798.

Subfamily: Cyrtacanthacridinae
Cyrtacanthacris tatarica, Carl linnaeus 1758.
Cyrtacanthacris aeruginosa, Caspar stoll 1813

Subfamily: Catantopinae
Diabolocatantops innotabilis, Walker 1870.

Subfamily: Oedipodinae

Gastrimargus africanus, Henri de saussure 1888.
Trilophidia japonica

Subfamily: Acridinae
Acrida exaltata, Francis Walker 1859.

Subfamily: Spathosterninae
Spathosternum prasiniferum, F. Walker1871.

Conclusion
According to the current study on Acrididae occurrence from Nashik, Maharashtra, India is very distinct. This study reports 8 species belongs to 7 genera, 7 tribes and 6 subfamilies of Acrididae family.This represents the some areas of Nashik district shows the diversification of Short horned grasshoppers, belonging to Order Orthoptera and Family acrididae. The Presence of Multiple subfamilies and tribes shows that the region provides favourable environmental conditions and variety of habitats supporting different grasshoppers species**.**

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