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**Abdul Mujeeb S**  
Ph.D. Scholar, Department of  
Entomology, S.V. Agricultural  
College, Tirupati, Acharya N.G.  
Ranga Agricultural University,  
Andhra Pradesh, India

**Tarak Nath Goswami**  
Department of Entomology,  
Bihar Agricultural University,  
Sabour, Bhagalpur, Bihar, India

## Unveiling the diversity of rice gundhi bug in two distinct paddy field environments

**Abdul Mujeeb S and Tarak Nath Goswami**

### Abstract

A survey was conducted in two distinct paddy field environments, namely, Sabour (Bihar) and Tirupati (Andhra Pradesh) from where population of rice gundhi bugs were collected to assess the diversity and species composition. The study unveiled two species of rice gundhi bug, namely, '*Leptocorisa oratorius* (Fabricius) and *L. acuta*' (Thunberg) in both the locations. The study also torched that the *L. oratorius* was the most dominant species in both the study areas.

**Keywords:** *Leptocorisa*, survey, paddy, diversity

### Introduction

Paddy, the most important field crop, faces infestations from over 128 insect pests (Kalode, 2005) [5], among which the rice gundhi bug is considered as one of the most important grain-sucking pests. The gundhi bug falls under the infraorder Pentatomorpha (Heteroptera: Hemiptera) is known to feed directly on paddy spikelets, making it notorious to the rice growers. In tropical Asia, Gundhi bug induced crop losses were first documented by Koningsberger (1878) [6] in Java whereas Lefroy (1908) [8] reported the first *Leptocorisa* outbreak in Indian paddy. Out of several species of gundhi bug in Asia countries, *L. oratorius* is considered as the important species in tropics, whereas *L. acuta* and *L. chinensis* are prevalent in upland areas or temperate climates (Litsinger *et al.*, 2015) [9]. The present study aimed in exploring the diversity of rice gundhi bug in two distinct paddy environments of India.

### Materials and Methods

#### Sampling locations

Gundhi bugs affecting rice plants were gathered from a total of two sampling locations. The first site, denoted as Site I, is situated in the vicinity of Tirupathi, Andhra Pradesh, precisely near PaidiPalle, at coordinates (13°35'04.8"N 79°21'19.5"E). The second location, referred to as Site II, is positioned at the Bihar Agricultural University Research Farm in Sabour, Bhagalpur, and is marked by coordinates (25°62'78"N 87°13'47"E).

#### Site I

Before the division of undivided Andhra Pradesh leading to the creation of Telangana, the geographical region was segmented into seven distinct agro-climatic zones: Krishna Godavari Zone, North Coastal Zone, Southern Zone, Northern Telangana Zone, Southern Telangana Zone, Scarce Rainfall Zone, and High Altitude and Tribal Area Zone. One specific collection of gundhi bug populations was sourced from Tirupathi, a location within the Chittoor district falling under the purview of the Southern Zone. This particular zone receives an annual precipitation of 1060 mm and is characterized by the presence of coastal alluvial sand and lateritic soils. The predominant agricultural activities in this region encompass the cultivation of various crops, including paddy, millets, sugarcane, groundnut, and mesta, as outlined in the study conducted by (Rao *et al.* in 2013) [8].

#### Site II

The state of Bihar is partitioned into three primary agro-climatic zones: Zone I, encompassing the North West Alluvial Plains; Zone II, comprising the North East Alluvial Plains; and Zone III, which constitutes the South Bihar Alluvial Plains. The subsequent collection of rice gundhi bug populations was conducted in Sabour, located within the Bhagalpur district of Zone III in

**Corresponding Author:**  
**Tarak Nath Goswami**  
Department of Entomology,  
Bihar Agricultural University,  
Sabour, Bhagalpur, Bihar, India

Bihar. The annual precipitation for this zone amounts to 1105 mm, while the soil type predominantly consists of coastal alluvial sand. The soil composition in this area results from the accumulation of alluvial deposits carried by the river Ganga. The Bhagalpur district is renowned for cultivating fruit crops like mango and litchi. In terms of field crops, the prevailing practices in this location primarily revolve around the Rice-Wheat and Rice-Maize cropping systems, as documented by (Shankar *et al.* in 2009) [13].

### Collection of gundhi bugs from two locations

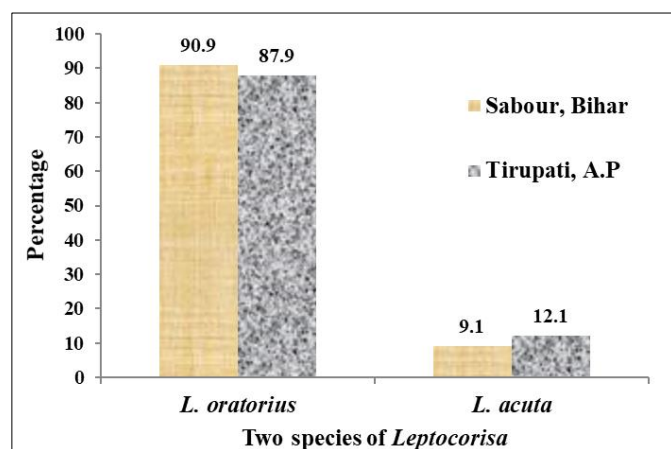
Collection of gundhi bugs was carried out in the mentioned locations during the second fortnight of September and October in the year 2020 using standard insect collecting net. After each collection, the bugs were immediately preserved in glass jars containing 70% ethanol till their species confirmation and counting.

Classification of the collected bugs into two different species, namely '*Leptocorisca oratorius* and *L. acuta*' was based on the presence or absence of 'black-colored ventro-lateral 'spots on the abdomen. The process of identification was further validated by adhering to the identification key provided by Siwi and Doesburg (1984) [12].

## Results and Discussion

### Relative species composition of rice gundhi bug

The present study revealed two different species of rice gundhi bugs, namely, '*Leptocorisca oratorius* (Fabricius) and *L. acuta*' (Thunberg) in both the rice environment. The relative percent composition of two different species found in two different rice environments is illustrated in figure 1.



**Fig 1:** Relative composition of two rice gundhi bug species at two different rice environments

The figure depicted that at Sabour, an average of 90.9 percent of the *Leptocorisca* was belonging to *L. oratorius* whereas at Tirupati the percent share of the same was 87.9. Regarding the other species, *L. acuta*, the percent shares were 9.1 and 12.1 at Sabour and Tirupati, respectively. Thus the study demonstrated that in both the rice environment of India *Leptocorisca oratorius* dominates over *L. acuta*. As per EPPO (2021) [2], *L. acuta* is distributed in Bihar, Assam, Delhi, Karnataka, Kerala, Madhya Pradesh, Odisha, West Bengal, Punjab, Rajasthan, Tamil Nadu, Tripura and UP. The *L. oratorius* is distributed in the states like Andaman and Nicobar Islands, Assam, Karnataka, Kerala, Maharashtra, Meghalaya, Nagaland, Orissa, Tamil Nadu, UP and WB. The present study is in confirmation with a similar work done by

Kumar and Goswami (2020) [7] with additional information about the same from Tirupati. Diversity of rice gundhi bugs was as studied at Rice Research Institute, Ambasamudram (Tamil Nadu) by Elanchezhyan (2015) [11] revealed that (96.82%) of earhead bugs were *L. oratorius* which again corroborates the finding of the present study.

## Conclusion

Information revealed from the present investigation demonstrated that both in two different rice environments, one at the eastern part of India and another at Southern India the gundhi bug species '*Leptocorisca oratorius* dominates over *L. acuta*'. From the management point of view this could be valuable in future.

## Acknowledgements and Declaration

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## Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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