

Hooded grasshopper *Teratodes monticollis* (Gray, 1832) morphometric and intraspecific colour variation from Bonai Forest Division, Odisha, India

ABSTRACT

Hooded grasshopper belongs to order Orthoptera and family Acrididae. It is native to India and Sri Lanka. Hooded grasshopper *Teratodes monticollis* was described as *Gryllus monticollis* by English Zoologist George Robert Gray in 1832. The distribution of this species has been recorded from different parts of Burma, Ceylon, and India. The contemporary reports about records of this species from various states of India is very limited. Authors observed the intraspecific colour variation of *Teratodes monticollis* in Bonai Forest Division, Odisha, India and presented here. It might be due to some abiotic stress from the study areas.

Keywords: Component, grasshopper, intraspecific, phytophagous

INTRODUCTION

Across the globe, grasshoppers are among the most economically important insects and are an important component of grasslands and forest ecosystems. They are one of the earliest living groups of munching phytophagous insects, dating back to the early Triassic period around 250 million years ago. In the past decades, they were treated as nuisance and believed to be the reason of drought and famine because of their overpopulation and phytophagous nature specially on crops and plants. Due to lack of studies, less data available in literatures and previously more importance was given to larger majestic animals, there was not much ideas about the importance of these insects in our ecosystems. In last 2-3 decades, studies have been done on different insects including grasshoppers and their importance to balance our ecosystem as a potent pollinator. Due to urbanization, we are losing forest and agricultural lands along with floral and faunal species, among them grasshoppers are also very crucial for our environment. Authors are also working on minor faunal species of Odisha [1-2] but need more attention on them. Therefore, insects are studied in Bonai Forest Division, Odisha during 2021-2023 and observed many aspects. During the survey, authors encountered an intraspecific colour variation in *Teratodes monticollis* and documented. The genus *Teratodes* (Brunner von Wattenwyl, 1893) coming under family Acrididae, and this genus is comprised of three species; *brachypterus* (Carl, 1916), *monticollis* (Gray, 1832) and *folitus* (Herbst, 1803). The present communication brings attention towards the importance of insects and indicate the need of documentation.

MATERIALS AND METHODS

The investigated specimen in present study was observed with intraspecific colour variation and identified in the Bonai Forest Division (21.75° N latitude and 84.97° E longitude) of Sundargarh district, Odisha, India [3-5]. The studied specimen was spotted during a preliminary survey in the year 2022. This targeted specimen was investigated and closely observed in its natural habitat for 24 days (31st May 2022 to 23rd June 2022), during morning hours (7:00am to 12:00pm) and evening hours (4:30pm to 7:00pm). The main aim of our observation was to document its morphological features, habit, and habitat. Identification of *T. monticollis* (Gray, 1832) was confirmed after going through literatures to observe the

characteristics to identify the specimen and to be confirmed about its distribution and the morphological traits and figures mentioned in Kirby [6] and Willemse [7].

RESULTS AND DISCUSSION

During the present investigation, authors observed *T. monticollis*(Gray, 1832) in Odisha, India, and its's intraspecific colour variation i.e., green, and brown coloured, inside the deep sal forest areas, small shrub and open dry areas of Bonai Forest Division, Odisha.

MATERIAL EXAMINED

1 ♂ (green) and 1 ♀ (brown) Bonai (), Odisha State, India on small plant and tree- Jungle, 31.05.2022, Coll. Pradhan. I., Sanjeet Kumar, 1 ♀ (green) Bonai (), Odisha State, India on forest floor -Jungle, 23.06.2022, Coll. KumarSanjeet, Pradhan Ila (Figs. 1 & 2).

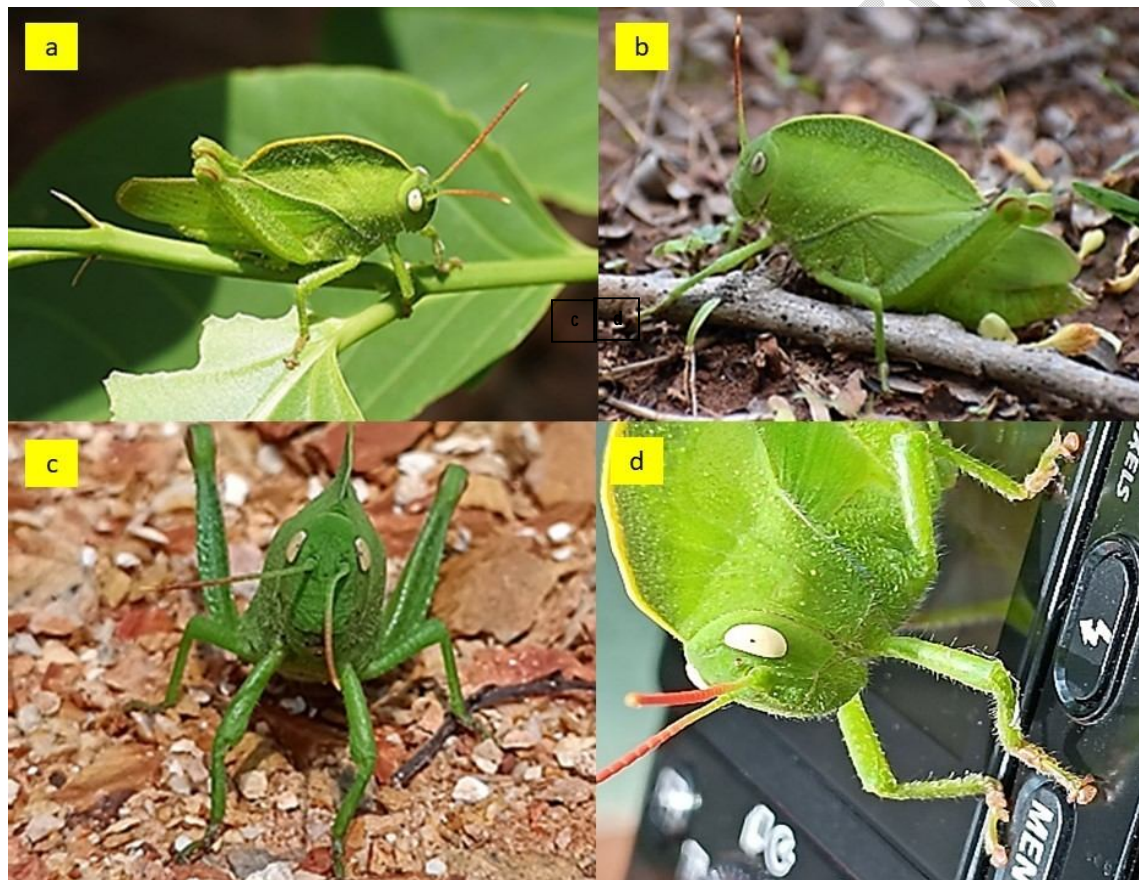


Figure 1: *Teratodes monticollis*(Gray, 1832) in Bonai Forest Division, Odisha, India **a.** lateral view of Male specimen **b.** lateral view of female specimen **c.** anterior view of female specimen **d.** anterior view of male specimen.

Table 1: Morphometric data of *T. monticollis* Gray, 1832

| Body part | Male (mm) | Female(mm) |
|----------------|-----------|------------|
| Length of body | 30.3 | 51.6 |
| Length of head | 6.2 | 13.7 |

| | | |
|-----------------------------|------|------|
| Length of antenna | 8.9 | 16.8 |
| Hight of pronotum | 11.4 | 23.6 |
| Length of pronotum | 15.8 | 32 |
| Length of wing | 22.9 | 26.7 |
| Length of fore limb | 10.5 | 28.9 |
| Length of mid limb | 10.4 | 28.8 |
| Length of hind limb | 33.2 | 55.3 |
| Length of femur (hind limb) | 11.1 | 22.3 |
| Length of tibia (hind limb) | 13.9 | 25.4 |

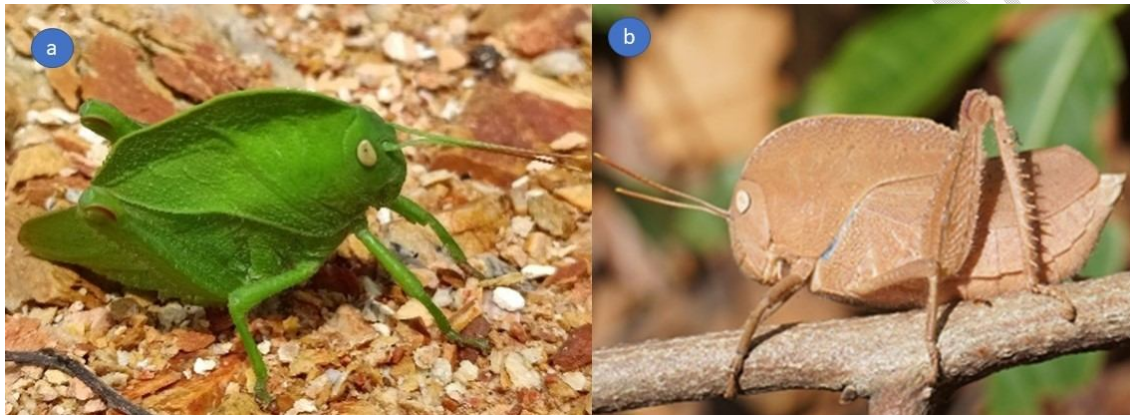


Figure 2: a & b *Teratodes monticollis* (Gray, 1832) female specimens of green and brown variant

DIAGNOSTIC FEATURES

Teratodes monticollis has a broad head, medium-sized body, a pronotum (much compressed forming a crest, the front arched above its head at a point, the middle portion forming a higher crest, denticulate and covering head anteriorly, half of the abdominal length posteriorly and never cross transverse sulci, frontal ridge is sulcate, short prosternal process, mesosternal interspace is open, straight and pointed apex.), lateral carinae absent, fastigium of vertex is rounded, one pair of filiform antennae which are shorter than the combined length of pronotum and head, antennae are wide apart from each other, out of three pair of limbs, fore limbs and mid limbs are shorter and hind limbs are longer. Hind femurs have small pointy spines on the upper carinae and on hind tibia 8-10 comparatively longer and strong spines are present dorsally. Tegmina is opaque, shorter or longer than the abdomen and wings are hyaline. The green variant specimen is uniformly green and the brown variant one is uniformly brown. Antennae reddish at the middle, yellowish at tips in both the variants while pale green at the basal part of the green variant and pale brown at the basal part of brown variant. The line of the whole crest of the pronotum is yellow in both male and female of green variant, and the whole crest of pronotum of brown variant is brown. Two arches of each knee, the upper carinae of the femur of hind limbs and the lower carinae and spines of the hind tibia are reddish and yellowish in colour in green variant and brownish and reddish in brown variant. Tegmina of green variant is evenly green with pale and yellow spots where as brown variant has evenly brown tegmina with pale and brown spots and tegmina of both

the variants are reticulated and thick. Wings are pale greenish in green variant and pale brown in brown variant. Around the crest of pronotum and out upper carina of the femurs pale and yellow spots are observed in green variant and pale and brown in brown variant. Abdomen area of female specimen is raised upward in both the variants which differentiate them from male specimens and wings of the male specimen are longer than the female specimen in comparison to their body size [8] (Table 1).

HABITAT

Teratodes monticollis can be found near or on shrubs and trees, and dry open habitats.

DISTRIBUTION

T. monticollis native to Burma, Sri Lanka, and India. In India this hooded grasshopper has been reported from; Jharkhand, Bihar, Chhattisgarh, Bengaluru, Rajasthan, Karnataka, Kerala, Tamil Nadu, Telangana, Andhra Pradesh, Maharashtra, Madhya Pradesh, Uttar Pradesh, Gujarat, and Odisha [9].

CONCLUSION

Teratodes monticollis (Gray, 1832) and its intraspecific colour variation is formally new to the Bonai Forest Division. Present study provides the first ever photographic evidence to confirm the occurrence, habit, and habitat studies of *T. monticollis* from Bonai Forest Division, Odisha, India. The green variant of *T. monticollis* has been observed and studied from India's various states like Jharkhand, Bihar, Chhattisgarh, Karnataka, Rajasthan, Kerala, Tamil Nadu, Telangana, Andhra Pradesh, Maharashtra, Madhya Pradesh, Uttar Pradesh, and Gujarat in addition to Odisha (Present study), but the brown variant is reported for the first time from India from the state of Odisha. *T. monticollis* with its two variants are very rare and less in numbers than other grasshoppers. Authors observed it from deepsal forest areas of Bonai Forest Division. It is a major defoliator of sandalwood, and teak and feeds on *Calotropis procera* and *Ziziphus nummularis*. It was also observed that there are less reports and documentations available on insects like grasshopper. Therefore, there is a need of more exploration works to bring attention about their habit, habitat, and role in ecological balance.

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REFERENCES

1. Rout S, Rath SK and Kumar S. (2023). Food and medicinal aspects of freshwater snail *Filopaludina bengalensis* (Lamarck, 1822). *Asian Journal of Biology*. 18(2): 11-14.
2. Rout S and Kumar S. (2023). Diversity of freshwater crabs, their importance, threats, and conservation aspects. *Journal of Biodiversity and Conservation*. 7(1): 1-4.
3. Rout S, Kumar SN and Kumar S. (2022). Traditional method of catching crab and fish from Bonai Forest Division, Odisha, India. *Journal of Biodiversity and Conservation*. 6(4): 513-515.
4. Manjula BL, Rout S, Dimri R, Dash SS and Kumar S. (2023). Medicinal climbers and Asian elephants: a conservation aspect. *Medicinal Climbers*. 32-36.

5. Rout S, Singh A, Dimri R and Kumar S. (2023). Atundi (*Combretum roxburghii* Spreng.): a medicinal climber with ecological and pharmacological significance. Medicinal Climbers. 37-41.
6. Kirby WF. (1914). Fauna of British India including Ceylon and Burma. Orthoptera (Acrididae).234-235.
7. Willemse C. Tijdschrift voor Entomologie. 1930; 73:209.
8. Gupta SK. (2015). On a collection of Orthoptera (Insecta) fauna from Gurughasidas National Park Koriya and Surguja districts Chhattisgarh India. International Journal of Global Science Research. 2(3):187-198.
9. Modi A and Raval K. (2021). New report on the occurrence of the hooded grasshopper-*Teratodes monticollis* (Gray 1832) (Insecta: Orthoptera: Acrididae) and the observation of the mating behaviour from Gujarat, India. Uttar Pradesh Journal of Zoology. 42(20): 15-20.
10. *Teratodes monticollis* (G.R. Gray, 1832) in GBIF Secretariat (2021), GBIF Backbone Taxonomy. Checklist dataset 16. Available: <https://doi.org/10.15468/39omei> accessed via GBIF.org on 2021-08-20.

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