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White grub diversity explored from Jalna, Maharashtra

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Abstract
This study's main objective was to assess the types of white grubs and the interactions between insects and their hosts in Jalna, Maharashtra, India from May to August of the year 2022 at various altitudes. The adults of 24 species and 13 genera of scarabaeids, including members of the subfamilies Rutelinae, Melolonthinae, Cetoniinae, Dynastinae, and Scarabaeinae, were collected from several localities in jalna. The two most frequent species were *Holotrichia longipennis* and *Anomala dimidiata*. It was found that the scarabaeid beetles were serious agricultural pests. Due to the reduction in biodiversity and degradation of natural habitats brought on by climate change and human interference with natural ecosystems, a species richness inventory is required in this area. Planning a management strategy for these beetles in natural areas and maintaining the ecological balance depend on having a thorough understanding of the current species distribution around the planet.

Keywords: White grub, *Holotrichia longipennis*, *Anomala dimidiata*

Introduction
One of the biggest superfamilies in Coleoptera, the family Scarabaeidae has over 31,000 species worldwide and accounts for approximately 91% of all scarabaeoids (Fincher, 1989; Jameson *et al*., 2001) [3-4]. The world's largest populations are concentrated in tropical areas, mainly in Africa and Asia. The family Scarabaeidae has around 2,500 species in the Indian subcontinent. Melolonthinae, Rutelinae, Dynastinae, and Cetoniinae are the most economically significant subfamilies of the Subcontinent, to which the majority of phytophagous scarabs belong to (Ali, 2001) [1]. Scarabaeid insects and their larvae do severe damage to both cultivated and forest plants. Mehta *et al*. (2008) [5] claim that mature beetles feed on the leaves of various fruit and forest trees between the months of May and June. The white grubs, which are the larvae of scarabaeids, severely harm the roots of cereals, legumes, tiny fruit plants, shrubs, and trees in various parts of the world. According to Mehta *et al*. (2010) [6], white grubs are a significant national pest in India that severely harm fruit trees and field crops. This inquiry was done to determine the variety of white grubs and the relationship between these beetles and their insect hosts. For these scarabaeid beetles, a subfamily-level key is also developed.

Materials and Methods
Study Site
Handpicking and light traps were used to gather scarabaeid insects in several areas throughout Jalna, Maharashtra (India). A location for Jalna is 19.8347° N and 75.8816° E. 508 meters are above the average sea level.

Collection of Larva and adult beetles
Light traps were put up to catch the adult (beetles) of white grubs from various sites around the district of Jalna because the majority of these scarabeid beetles are positively phototectic and are thus drawn to light sources. In the late evening, between 7:00 and 10:30, these traps were placed. Hand-collected species from the family Cetoniinae that are diurnal by nature and do not show an affinity to light were made. A taxonomic key, relevant literature, and a direct comparison of the specimens were used to identify the gathered beetles later in the research lab.

Result and Discussion

Research on the variety of species of white grubs at the chosen place

Field research was done in 2022 to catalogue the several species of these beetles found on different fruit trees, forest trees, bushes, grasses, field crops and flowering plants. During this research, 24 species of beetles from 13 genera and 5 subfamilies were found. The subfamilies from which the most beetles were gathered were Rutelinae (11 species), Melolonthinae (8 species), Cetoniiae (3 species), Dynastinae (1 species), and Scarabainae (1 species). Genus Anomala (7 species) has the most species, followed by Genus Holotrichia (4 species), Genus Brahmina (2 species), Genus Melolontha (2 species), Genus Oxycetonia (1 species), Genus Lepidiota, Genus Xylotrupes, Genus Onitis, and Genus Maladera.Study on Insect- host association of identified species of Scarabaeid Beetles.

The most widespread species of white grubs were the subject of a host choice research, and the results show that these beetles choose the following plants for feeding:

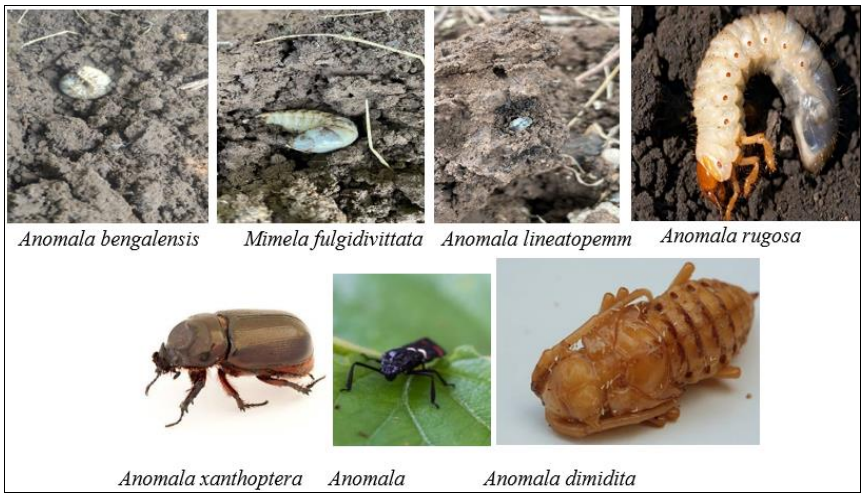
1. *Citrus limetta*
2. *Saccharum officinarum*
3. Sugar cane
4. Pigeon pea
5. Green gram
6. Soyabeen
7. Pearl millet
8. Sorghum
9. Pomegranate

Subfamily level key for Scarabaeid beetles

A dichotomous key for identifying the principal Scarabaeidae subfamilies.

Diversity of scarabaeids at Jalna, Maharashtra

Subfamily: Rutelinae

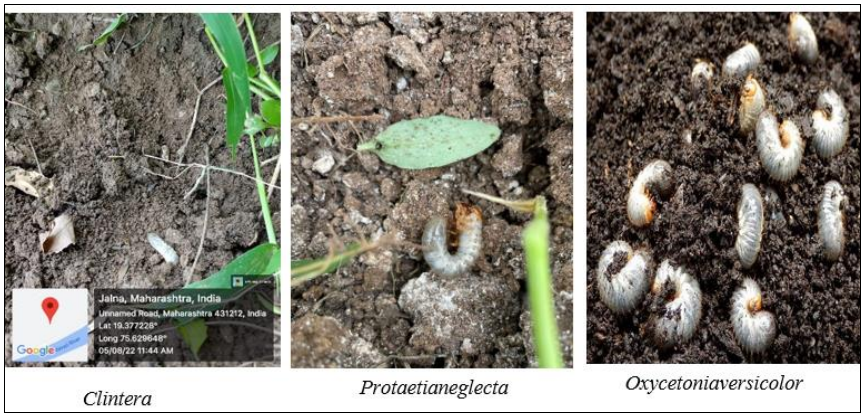


Subfamily: Melolonthinae

Subfamily: Dynastinae

Xylotrupesgidon larva *Xylotrupesgidon larva*

Sub family: Cetoniinae



Clintera *Protaetianeglecta* *Oxycetoniaversicolor*

Sub family: Scarabaeinae

Onitis

Conclusion

There is financial damage as a result of the beetles' aggregation on several host trees and plants and the destruction of their leaves, flowers, and occasionally even immature fruits. The grubs, on the other hand, continue to live underground and aggressively consume the living roots. The objective of the current study is to assess the species diversity of scarab beetles in a few different sites around the Jalna area. The list of insects now includes 24 species of beetles from 13 genera and 5 subfamilies. The most species were found in the Rutelinae subfamily, which was followed by Melolonthinae, Cetoniinae, Dynastinae, and Scarabainae. Field observations and sampling revealed the dominance of A. dimidiata.The other species, such as Brahmina, Melolontha, Mimela, Sophrops, Clinteria, Protaetia, Oxycetonia, Lepidiota, Xylotrupes, Onitis, and Maladera, saw the Xylotrupes as a potential food source.

A. dimidiata has been shown to have the broadest host range among beetles that eat a variety of plants. It consumes the leaves of various fruit trees, forage and forest trees, decorative and floral plants, wild shrubs and field crops during the day and night.

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