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Distribution and Abundance of White grubs (Coleoptera: Scarabaeidae) in Jalna, Maharashtra, India

M. A. Aute*[1] and S. A. Saraf[2]

[1-2] Department of Zoology, Government College of Arts and Science, Chhatrapati Sambahjinagar - 431 004, Maharashtra, India

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Maharashtra, which is located at 19.8347° N and 75.8816° E, includes Jalna as a constituent portion. It is situated in the Indian state of Maharashtra. White grubs wreak havoc on the roots of commercial crops, causing up to 70% of the damage [1]. 22 species from 9 genera that are connected to groundnut in India are listed in The Scarabaeids Causing Damage to Groundnut (Peanut) in the World [2]. The most significant groundnut pest species belong to the several Melolonthine genera found under the crop in India, specifically the genus Holotrachia [3-4]. In various areas of Maharashtra, *Holotrachia longipennis* was noted as a major pest.

Although the fauna of the Indian subcontinent is extremely rich and diverse, it has not yet been well studied [5]. In many parts of the world [6-7], white grubs have developed into important pests of the majority of agricultural crops, fruits, vegetables, ornamental plants, plantation crops, pastures, turf and meadow grasses, lawns, golf courses, and forest trees. There have been reports on the insect's biology [8]. While the life cycles of different species of white grubs are generally similar, they can differ depending on the climate at the time of emergence, egg laying, the active larval stage, the pupal stage, and other phases. Some beetles have a life cycle that lasts more than three years in temperate zones and two years elsewhere. to be the standard. In places with three-year life cycles, some species are yearly present and indicate the presence of three broods, albeit the size of the broods may change noticeably and the injury varies accordingly. Only a small number of species, such as all of the known species of Holotrichia [4], can complete their life cycle in a single year. cock chafer from Europe *Melolontaha melolontaha* has a cycle that lasts at least three years [9], while many other species have a biannual cycle. The biology of white grubs has been subject to study, revealing similarities in their life cycles across species. However, these life cycles can vary depending on factors such as climate, emergence timing, egg laying, larval activity, pupal stage, and other phases of development.

In India, adult beetles often erupt from the ground between April and June in reaction to the first rains of the season [4-5]. When the monsoon or intense pre-monsoon showers arrive, adult Indian Holotrachia species begin to move around. If the monsoon is delayed, the beetle's emergence is also postponed [4]. Emergence occurs at dusk between 19.30 and 20.45 hours at 27-30 degrees Celsius. June beetle emergence peaked in the second fortnight of the month and persisted until the second week of August. Additionally, it has been noted that the unique light intensity around dusk also causes adults to emerge. It is possible for beetles to mate on trees that are not typically eaten, after which they move to eat the preferred species. At dusk and in the evening, the adult's mate. Depending on how soft the dirt is, females go back to the ground to lay their eggs. Groundnuts that are harmed by white grub in the area include [1], [11-12].

Because they are nocturnal by nature, beetles feed on plant foliage at night. They can attack leaves at any stage, including the vegetative, growing, and fruiting stages. Adult surveys were carried out in the groundnut, citrus limetta, saccharum officinarum, sugar cane, and pigeon pea growing regions in Jalna from April to August of 2012 to ascertain species presence. These plants are simple to remove from the ground. The badly infested areas seem patchwork as a result of the vegetation wilting or drying out. On the roadside of the primarily groundnut- producing fields, beetles were gathered from host plants of *Citrus limetta*, *Saccharum officinarum*, Sugar cane, and pigeon pea. During their nightly activity period, beetles were hand-picked and/or shaken from the host trees. A few species were kept in 70% ethyl alcohol for identification, and other species were cultivated in a lab.

The key and character lists provided [8], [13-14] was used to identify the adult scarabaeid species that were collected during the survey.

During the first monsoon rainy season of May to August 2022, a survey of the main groundnut, *C. limetta*, *Saccharum officinarum*, sugar cane, and pigeon pea growing areas of Jalna revealed two species of Melolonthinae in one genus. The numbers of beetles observed on and collected from different tree species revealed that the species encountered have different host preferences. Host plants *C. limetta* and *S. officinarum are* almost exclusively collected by the dominant *Holotrachia longipennis* species in the Jalna. Infrequent specimens of *Holotrachia rosettae* have been found in *Saccharum officinarum*, Sugar cane, and pigeon pea.

Holotrachia longipennis and *Holotrachia rosettae*, two species of beetles from numerous villages in Jalna were collected as part of the adult survey (mainly from *Citrus limetta*, *Saccharum officinarum*, Sugar cane, and pigeon pea in April to August, 2022).

***Correspondence to:** M. A. Aute, E-mail: jayeshaghade@gmail.com; Tel: +91 8208725977

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In (Table 1), there are 94 beetles, 82 of which are *Holotrachia longipennis*, and 12 of which are *Holotrachia rosettae*. The distribution of white grub endemism is also given.

White grub distribution and endemism were discovered in the Jalna district. Holotrachia species were reported to be very abundant (50) in the village of Sasht Pimpalgaon and common (44) in Jalna.

The results showed unequivocal proof of the relationship between commercial crops and host plant loss in the Jalna district and the presence of white grubs (Holotrachia), in which the principal groundnut, *Citrus limetta*, *Saccharum officinarum*, Sugar cane, and pigeon pea growing areas were severely infested. However, only two of these four tree species were shown to be hosts in the current investigation, and *Citrus limetta* in particular is severely harmed. Controlling the white grub infestation in business buildings is urgently needed. Plant hosts and crops. *Holotrachia longipennis* is a pest that causes obvious harm to fibrous-rooted crops in another Indian cropping system despite its great prevalence. *Holotrachia rosettae* were linked to *Citrus limetta*, *Saccharum officinarum*, Sugar cane, and pigeon pea but particularly to *Saccharum officinarum*. Adults of *Holotrachia longipennis* were attracted to *Citrus limetta* and *Saccharum officinarum* but high in *Citrus limetta*. The diversity of species in the 'Other' group and the prevalence of Holotrachia adult samples; these other species were not further explored.

Table 1 Melolonthinae white grub species collected as adults on host trees in the groundnut, *Citrus limetta*, *Saccharum officinarum*, Sugar cane, and pigeon pea ecosystem of Jalna

Species	Qty.	Location	Host Plants
Holotrachia longipennis	82	Jalna	*Citrus limetta*, *Saccharum officinarum*
Holotrachia rosettae	12	Sasht Pimpalgaon (Jalna)	*Citrus limetta*, *Saccharum officinarum*, Sugar cane, and pigeon pea

The emergence, mobility, and distribution of adults are substantially governed by rainfall, temperature, air humidity, and wind speed [5]. The leaves of any forest tree, crop plant, or shade tree is stripped by the adult beetles. The tip of the female's abdomen protrudes when she hangs from a low branch or other support after crawling or flying there. Shortly after, males emerge and mate for 10 to 15 minutes while hanging upside-down from the female genitalia.

For the Jalna District environment, the compilation of adult preference for trees for feeding and/or mating (Table 2) offers valuable information that will help farmers and their advisors identify the presence of pest problems prior to planting by identifying which trees to search for adults. In addition, tamarind, another host tree, was either not recorded [4], [12] or was recorded for *Holotrachia longipennis*, but it was not recorded in the Jalna district. The adult host choice for Holotrachia species needs to be confirmed wherever the range of tree species in the local environment is varied, since these differences may represent the availability of tree species in the various habitats.

Table 2 Preference of adults of Scarabaeid species on host trees in areas of Jalna district

Plant species	*Holotrachia longipennis*	*Holotrachiarosettae*
Citrus limetta	+++	++
Saccharum officinarum	Nil	++
Sugar cane	+	+
pigeon pea	Nil	+

The frequency of occurrence on host trees is indicated by the preference rating: +++= High, ++= Moderate, and += Low

SUMMARY

In India, white grubs have recently become a more challenging pest. The white grubs are sometimes known as May-June beetles or Chaffer beetles. White grubs consume plant roots, and their beetles consume the leaves of their hosts. The extent of their infestation has been widely publicized over the past few years, with reports coming from all around the nation. Because of the inability to manage their damages, most farming operations have essentially abandoned efforts to control these pests. The Indian state of Maharashtra includes Jalna. *Holotrachia consaguinea* Bl., *Holotrachia longipennis* Fab., *Holotrachia rosettae* Br., *Leucopholis lepidophora* Bl. (Melolonthidae), and *Anomola sp*. (Rutelidae) are the five main species of white grubs, particularly in Maharashtra. Scarabaeidae adults were gathered for the current study from the leaves of host plants including *Citrus limetta*, *Saccharum officinarum*, Sugar cane, and pigeon pea. The *Holotrachia longipennis* is the most prevalent species in Jalna, a city in the Indian state of (Maharashtra). Research efforts have focused on studying these pests and their impact on various host plants such as Citrus limetta, Saccharum officinarum (sugarcane), and pigeon pea. Understanding the behavior and biology of these pests is crucial for developing effective management strategies to mitigate their damage and protect agricultural yields in affected areas like Maharashtra.

LITERATURE CITED

1. Bhavane 1997. Comparative study on the haemocyte of scarabaeidae. *Indian Jr. Comp. Animal Physiology* 15: 27-30.
2. Rao BHK, Narayana KL, Narsimha Rao B. 1976. White grub problem in Andhra Pradesh and their control. *In*: Proceeding of the 1st All India Symposium on Soil Biology and Ecology in India, Banglore, 22- 26 September, 206-209.
3. Musthak Ali TM. 2001. Biosystematics of phytophagous Scarabaeidae- an Indian overview. *In*: (Eds) Sharma, G., Mathur, Y.S., Gupta, R.B.L. Indian Phytophagous Scarabaeidae and their Management, Agrobios (India). pp 5-47.
4. Yadava CPS, Sharma GK. 1995. Indian white grub and their management, All India Coordinated research Project on White grubs, Technical Bulletin No. 2. Indian Council of Agriculture Research.
5. Mishra PN, Singh MP. 1999. Determination of predominant species of white grubs in Garhwal Region of Uttar Pradesh Hills (India). *Journal of Entomological Research* 23: 12-19.

6. Guppy JC, Harcourt GD. 1970. Spatial pattern of the immature stages and teneral adults of *Phyllophaga spp*. (Coleoptera: Scarabaeidae) in permanent meadow. *Canadian Entomologist* 102: 1345-1359.
7. Potter DA, Patterson CG, Redmond CT. 1992. Influence of turf grass species and tall fescue endophyte on feeding ecology of Japanese beetle and southern masked chafer grubs (Coleoptera: Scarabaeidae). *Journal of Economic Entomology* 85: 900-909.
8. Veeresh GK. 1977. Studies on the root grub in Karnataka, UAS Monograph Series No. 2, University of Agricultural Science, Hebbal, Bangalore, Karnataka. pp 87.
9. Keller S. 2000. Use of *Beuveria brongniartii* in Switzerland and its acceptance by farmers. *In*: (Eds) S. Keller. Integrated control of soil pest subgroup "Melolontha", Proceedings of the meeting; IOBL, Switzerland, 19- 21 October 1998, IOBC/wprs Bulletin 23: 67-72.
10. Mittal IC, Pajni HR. 1977. New species belonging to (Coleoptera: scarabaeid: Melolonthidae) from India. *Entomon* 2: 85-88.
11. Hussain M. 1974. Some observation on the biology and control of *Phyllophaga consaguinea* Blanch, a potent pest of groundnut in Andhra Pradesh. *Indian Jr. Plant Protection* 2: 107-110.
12. Pal SK. 1977. White grubs and their management, Monographs No. 5 central Arid Zone research Institute Jodhpur India.
13. Mittal IC. 2000. Survey of Scarabaeid (Coleoptera) fauna of Himanchal Pradesh (India). *Journal of Entomological Research* 24: 133-141.
14. Khan KM, Ghai S. 1982. Taxonomical status of genus Holotrachia Hope (Melolonthidae: Scarabaeid) with description of five new species from India along with re descriptions of two poorly described species and a key to species. *Bulletin of Entomology* 23: 28-45.