



Short Communication

## Distribution and Abundance of White grubs (Coleoptera: Scarabaeidae) in Khed Taluka, part of Northern Western Ghats, MS, India

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### Abstract

White grubs became increasingly difficult pests in India for the last few years. The white grubs are called Chaffer beetle or May- June beetle. White grubs are root feeders and their beetles feeds on the leaves of host plants. Their infestation has been reported throughout the country and magnitude of the problem has been widespread over the past years. In majority of the farming situation, control of these pests are largely abandoning because of the lack of control over their damages. Khed Taluka (Pune) is a part of Northern Western Ghats of Maharashtra, India. Five major species of white grubs especially in Maharashtra namely *Holotrachia consaguinea* Bl., *Holotrachia serrata* Fab., *Holotrachia fissa* Br., *Leucopholis lepidophora* Bl. (Melolonthidae), *Anomola* sp. (Rutelidae) in distribution. In the present study, Scarabaeidae adults were collected from leaves of host plants like Neem, Babhul, Ber and Khair. The *Holotrachia serrata* is most abundant species found in Khed Taluka which is part of Northern Western Ghats (MS), India.

**Key words:** Diversity and abundance, Coleoptera: Scarabaeidae, *Holotrachia serrata*, Northern Western Ghats.

### Introduction

Khed Taluka (Rajgurunagar) is a part of Northern Western Ghats which is situated at 18° 51' North and 73° 56' east. It is located at the end of northern block of the Pune district in Maharashtra state of India. Rajgurunagar is located on the bank of the Bhima River and 40 km away from Pune. White grubs cause damage to roots of commercial crops the damage caused by the White grub up to 70%<sup>1</sup>. The Scarabaeids causing damage to groundnut (Peanut) in the world, listing a total of 22 species from 9 genera associated with groundnut in India<sup>2</sup>. The many Melolonthine genera found under the crop in India, the genus *Holotrachia* includes the most important pest species in groundnut<sup>3,4</sup>. They recorded *Holotrachia serrata* as a serious pest in many parts of western Maharashtra.

The fauna of the Indian sub region is very rich and diverse, but it is yet to be fully explored<sup>5</sup>. White grubs have become serious pests of most agricultural crops, fruits, vegetables, ornamental plants, plantation crops, pastures, turf and meadow grasses, lawns, golf courses and forest trees in different part of the world<sup>6,7</sup>. The biology of the insect has been reported<sup>8</sup>. Different species of white grubs have similar patterns of life cycle but may vary according to the climatic factors at the time of emergence, egg lying, active larval period, time of pupation and other stages. The life history of some of the beetles which take more than three years in temperate regions and two years seems

to be the normal<sup>8</sup>. Some appears every year, though indicating the existence of three broods in those regions where three- year life cycle exists but the size of the broods may be markedly different and the injury varies correspondingly. Few species may complete their life cycle in one year e.g. all the known species of *Holotrachia*<sup>4</sup> the others like Chapter 2: General review of the literatures 46. European cock chafer *Melolontha melolontha* has at least of three years cycle<sup>9</sup> and many others have biannual cycle.

Normally in India, adult beetles emerge from the soil during April-June in response to the first seasonal rains<sup>4,5</sup>. Adults of Indian *Holotrachia* species become active with the arrival of the monsoon or heavy pre-monsoon showers; if the monsoon is late, the beetle's emergence is similarly delayed<sup>4</sup>. Emergence takes place at dusk between 19.30 and 20.45 h at 27-30°C. The second fortnight of June observed is the peak period of emergence of the June beetles and emergence continued until the fortnight of August<sup>10</sup>. It has also been observed that the particular intensity of light at dusk also triggers the emergence of adults. Mating can occur on trees not normally fed on, with beetle subsequently moving to preferred species to feed<sup>4</sup>. The adults mate in the evening and at dawn. Females return to the ground to deposit the eggs in the soil depending upon the softness of the soil. White grub damaging groundnut in the region includes<sup>1, 11, 12</sup>.

## Material and Methods

Beetles are nocturnal in habit and defoliate the foliage of the plants during night hours. They attack at any stages such as vegetative or growing and fruiting stage on leaves inflorescence. Adult surveys to determine species occurrence were conducted in the groundnut, maize, pea, potato and sugarcane growing areas in Khed Taluka during at the time of first monsoon rainy season of April to August, 2012. Such plants can be easily pulled out from the soil. The severely infested fields show patchy appearance due to withering or drying up of the plants. Beetles were collected from host plant of Neem (*Azadirachta indica*), wild Ber (*Zizyphus* ssp.), Babhul (*Acacia Arabica*) and Khair (*Acacia catechu*) located on roadside of the predominantly groundnut fields. Beetles were collected handpicked and/ or shaken from the host trees during their nightly activity period and few species are preserved in 70% ethyl alcohol for identification and other was cultured in laboratory.

The Scarabaeid adults were collected during the survey and identified to species level based on the key and characters lists given<sup>8,13,14</sup>.

## Results and Discussion

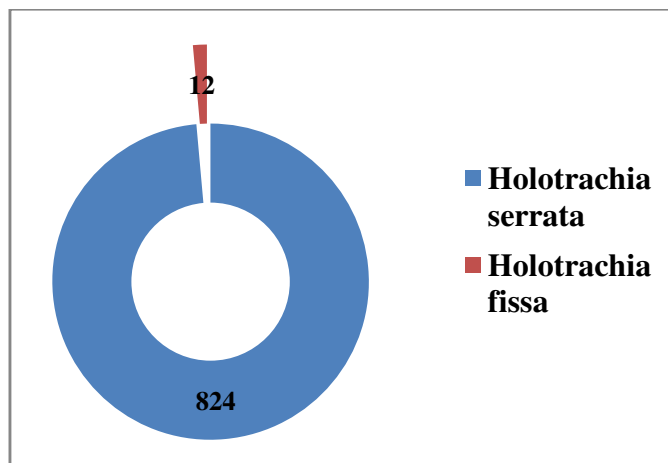
The survey of major groundnut, maize, pea, potato and sugarcane growing areas of Khed Taluka during the first monsoon rainy season of May to August, 2011 revealed two species of Melolonthinae in one genera (table 1). The 836 numbers of beetles observed on and collected from various tree species indicated that distinct host preferences occur among the species encountered. *Holotrachia serrata* species dominant in the Khed Taluka almost collected from host plant Neem occasional taken from babhul. *Holotrachia fissa* was collected almost ber, with occasional specimen taken from babhul, neem, and Khair. The adult survey resulted in two species of *Holotrachia serrata* and *Holotrachia fissa*, beetles from several villages in Khed Taluka were collected (mostly from Neem, Ber, Khair and Acacia) in April to August, 2011.

**Table-1**

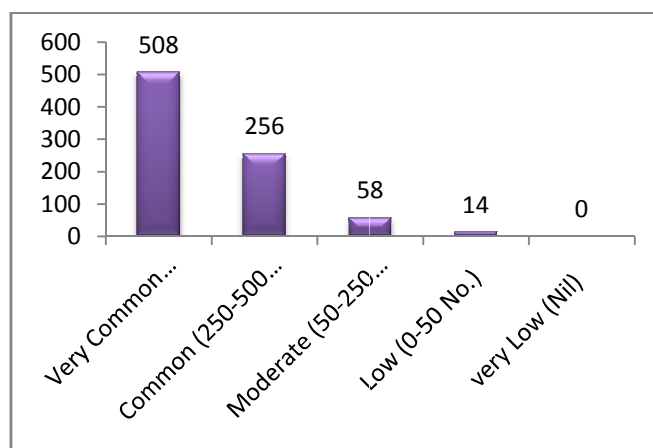
**Melolonthinae white grub species collected as adults on host trees in the groundnut, maize, pea, potato and sugarcane ecosystem of Khed Taluka**

| Species                    | Qty. | Location  | Host Plants                 |
|----------------------------|------|---|-----------------------------|
| <i>Holotrachia serrata</i> | 824  | Wadgaon-Patole, Kadus (Tokewadi) Jaulake Khurd and Chas | Neem, Babhul                |
| <i>Holotrachia fissa</i>   | 12   | Wadgaon-Patole, Kadus (Tokewadi)                        | Ber, Neem, Babhul and Khair |

Out of 836 beetles in which *Holotrachia serrata* are 824 in number and *Holotrachia fissa* are 12 in number shown in table 1 and endemism distribution of white grubs shown in figure 1.



**Figure-1**  
 Graph shows distribution of white grub species



**Figure-2**  
 Graph shows Endemism of white grub species found in Khed Taluka, part of Northern Western Ghats (MS), India

Endemism diversity and distribution of white grubs found in Khed Taluka, *Holotrachia* species were collected very common (508) in Wadgaon – Patole village, common (256) in Kadus (Tokewadi) village, moderate (58) in Jaulake Khurd, Bhamburwadi, Chas villages, low (14) in Waki Bk. (Bham), Dawadi, Nimgaon villages and very low (Not recorded) in Varude, Wafgaon, Gulani, Yelwadi, Wada, Bhorgiri, Dehane villages.

## Conclusion

The data provided clear evidence of the link between commercial crops as well as host plant loss in Khed Taluka and the presence of white grubs (*Holotrachia*) adults. The present study in which major groundnut, maize, pea, potato and sugarcane growing areas were highly infested. However, of these four trees species, only the two were observed as hosts in the present study especially Neem is highly in damaged. It is an urgent need to control the white grub infestation of commercial

crops and host plants. In other Indian cropping system, *Holotrachia serrata* occur in high population under fibrous rooted crops, but cause more visible damage to these crops. Adults of *Holotrachia serrata* were attracted to Neem and Babhul but high in Neem and *Holotrachia fissa* were attached to Ber, Neem, Babhul and Khair but especially highly in Babhul (*Acacia Arabica*). The predominance of *Holotrachia* adult's collections and the diversity of species in the 'Other' group; these other species were not studied further.

Rainfall, temperature, atmospheric humidity and wind velocity largely govern the emergence, movement and distribution of adults<sup>5</sup>. The adult beetles strip the foliage of the shade trees, crop plants or any forest trees. Females crawl or fly to a low branch or other support, where they hang with the tip of the abdomen extruded. Males emerge shortly afterwards and mate for 10-15 minutes after a short searching flight, hanging inverted from the female genitalia.

The compilation of adult preference for trees for feeding and/ or mating (table 2) provides valuable data for the Khed Taluka environment that will assist farmers and their advisor in identifying the existence of pest problems prior to planting, through identifying which trees to search for adults. Also, an additional host trees, tamarind, not recorded<sup>4,12</sup> or was recorded for *Holotrachia serrata* but in Khed Taluka also not recorded. These differences perhaps reflect the availability of trees species in the difference environments, and suggest the adult host preference for *Holotrachia* species need to be confirmed wherever the spectrum of tree species in the local environment is different.

**Table-2**

**Preference of adults of Scarabaeid species on host trees in areas of Khed Taluka**

| Plant Species                    | <i>Holotrachia serrata</i> | <i>Holotrachia fissa</i> |
|----------------------------------|----------------------------|--------------------------|
| <i>Azadirachta indica</i> (Neem) | +++                        | ++                       |
| <i>Zizyphus zizupa</i> (Ber)     | Nil                        | ++                       |
| <i>Acacia Arabica</i> (Babhul)   | +                          | +                        |
| <i>Acacia catechu</i> (Khair)    | Nil                        | +                        |

Preference rating is the frequency of occurrence on host trees: +++= High, ++= Moderate, += Low.

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