



Short Communication

New laboratory Culture method for White Grub National pest, India

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Abstract

White grubs are called as “May- June Beetles” or “Chaffer Beetles”. White grubs are also called as National pest. White grubs are root feeders, their beetle's 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 is important because of the lack of control over their damages. White grub have cosmopolitan in nature. Khed Taluka (Pune) is a part of Northern Western Ghats of Maharashtra, India. White grubs especially in Maharashtra namely *Holotrichia serrata* Fab., *Holotrichia fissa* Br., *Leucopholis lepidophora* Bl. (Melolonthidae), *Anomola* sp. (Rutelidae) in found. In the present study, Scarabaeidae adults were collected from leaves of host plants like Neem, Babhul, Ber and Khair. We find the occurrence of *Holotrichia serrata* in said area, in the commercial crop growing area we observed occurrence of white grub. This method is very useful to get white grub in laboratory condition and use them as per requirement for various stages for treatments. The laboratory culture method also benefited for availability of white grubs throughout year.

Keywords: White grub, National pest, May-June Beetles, natural method, Northern Western Ghats.

Introduction

White grub is a national pest. The species these families are often called scarabs or scarab beetles. The C-shaped larvae, grubs are pale yellow or white. Adult beetles are nocturnal, although the flower chafers (Cetoniinae) and many leaf chafers (Rutelinae) are active during the day. The grubs mostly live underground or under debris, so are not exposed to sunlight. The scarabaeids causing damage to groundnut (Peanut) in the world, listing a total of 22 species from 9 genera associated with groundnut in India¹. They cause damage to roots of commercial crops the damage caused by the White grub up to 70% was recorded². White grubs are root feeders and their beetles feeds on the leaves of host plants. *Holotrichia serrata* as a serious pest recorded in many parts of western Maharashtra, India^{3, 4}. The Khed Taluka (Pune District) is a part of Northern Western Ghats of Maharashtra, India. The major species of white grubs especially in Maharashtra namely *Holotrichia serrata* Fab., *Holotrichia fissa* Br., *Leucopholis lepidophora* Bl. (Melolonthidae), *Anomola* sp. (Rutelidae) are cosmopolitan in distribution. The fauna of Indian sub region is very rich and diverse, but it is yet to be fully explored^{5, 6}. In the present study, Scarabaeidae adults were collected from host plants on which they were feed. Pests are known to inflict considerable losses in cane yield as well as sugar output. The grubs of *Holotrichia serrata* feed on the roots and damage cause loss up to 40 to 70%. Availability of abundant roots and adequate moisture for a longer time in sugarcane, groundnut and pea crop tend to increase the white grub build up markedly⁷. This is further

facilitated by prevalence of host trees for adult feeding on borders of commercial crop.

Khed Taluka (Rajgurunagar) is a part of Northern Western Ghats which is situated at 18°51' North and 73°56' east. Western region of Khed Taluka is major groundnut, potato, maize, pea and sugarcane growing area. White grub damaging groundnut in the region includes⁸⁻¹⁰. Adults of Indian *Holotrichia* 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 delayed³. The adult beetles feed on the leaves of Neem, Babhul, Khair and Ber. *Holotrichia* species, especially *Holotrichia fissa* and *Holotrichia serrata* were the major species associated with groundnut, potato, maize, pea and sugarcane commercial crop growing area. The *Holotrichia fissa* was most abundant in western region as compared to other regions of Khed Taluka, Pune district, Maharashtra, India¹¹.

Material and Methods

Adult surveys to determine species occurrence were conducted in the seven important groundnut, potato, sugarcane, maize, pea etc. growing areas in Khed Taluka during at the time of first monsoon season of May to August, 2012. The second fortnight of June observed is the peak period of emergence of the June beetles and emergence continued until the fortnight of August¹². Beetles were collected from host plant of Neem (*Azadirachta indica*), wild Ber (*Zizyphus* ssp.), Babhul (*Acacia Arabica*) and Khair located on roadside of the predominantly groundnut fields. The members of the Scarabaeidae family vary greatly in

size (about 0.5 mm up to 150 mm body length in the longest) and they show a great diversity in shape, coloration, and sculpture¹³⁻¹⁵. Beetles rest in the soil during the day, and so are not readily available for collection; they were handpicked and/or shaken from the host trees during dusk. Collected adults segregated and kept in earthen pots. The scarabaeid adults were collected during the survey and identified to species level based on the key and characters lists given¹⁶⁻¹⁸.

The present study was conducted at the Department of Zoology, Hutatma Rajguru Mahavidyalaya, Rajgurunagar from May 2012 to February 2013. Two plastic tubs (55 cm by 35 cm by 15 cm) were filled with sand. In every plastic tub four earthen pots were placed. These earthen pots were filled with soil, and to provide food to adults host plant leaves and food to larvae root of potato, maize etc. Then segregated adults divided into groups of ten adults (five male and five female) and kept into the earthen pots. Adults were supplied with fresh Neem leaves daily and maintained the moisture condition at normal level. Beetles were kept in the earthen pots from the beginning of June until the end of July 2012. A granular formulation of BHC powder was applied around the exterior of the tub to prevent adults from ants entering the pots. These earthen pots maintain the temperature (27-30 centigrade) and moist condition.

Results and Discussion

The present study is new method for rearing of white grub. This laboratory culture method provides natural conditions to white grub. This method is suitable for rearing of white grub. Through this method of white grub available in a laboratory throughout year. With the help of this method we can use white grub for research work (for experimental purpose) at any time.

The laboratory culture method benefited to following results- Positive identification of white grub species should be made and the stage found (adult, egg, larvae, pupae) should be noted.

We can easily get LC₅₀ values of white grub for its control.

Adults are essentially impossible to kill by flooding. Eggs are also very difficult to kill by flooding. These stages occur from approximately May through July.

Larvae (grubs) and pupae, which occur mostly from August through April, are the easiest stages to kill by flooding, Biopesticides or chemicals.

The warmer the weather, the better the flood will kill larvae and pupae. If the water temperature in the flooded field is 24 to 27 Celsius to higher, a continuous flood will be sufficient grub control.

The flood water level should be about 2 inches above the soil surface. Many grubs will come to the soil surface and survive if there is less than two inches of standing water. Water depth

greater than 2 inches will increase grub mortality very little, if at all.

Given the option, the best time to kill grubs by flooding, Biopesticides or chemicals is in August. At this time, water temperature are warm, rainfall abundant damage by the grubs is just starting. Another way to help manage grub population is through water management. Almost all white grub species eggs need moisture to hatch, and they youngest grubs are very susceptible to desiccation. If areas of your commercial crop can handle reduce watering, do not irrigate in July and August, when while grub eggs and young grubs are present. That is caused them to dry up.

Conclusion

The present study concluded that the laboratory culture method of white grub we can study the morphology, life cycle, treat different experiment on white grub to various chemicals, Biopesticides, LC₅₀ etc. These are physical things you can do in your laboratory to help prevent white grub infestation from occurred the agriculture areas. Certain species of beetles prefer species of plants. So growing in an area where white grubs have been a problem in commercial crop is not great idea. The adults would only be attracted to these plants and its quick flight down to the commercial crops growing area to lay their eggs. White grub infestation starts at the edge of a field and slowly spreads, in an irregular pattern, throughout the field. Infested fields may need to be replanted and productivity can be severely reduced. Heavily infested areas may not be worth harvesting. Since, there are no insecticides labeled for grub control in groundnut, sugarcane, potato, maize, pea etc.

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