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# White Grub: A Nefarious Pest.

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**Abstract**

White grub is a polyphagous pest which adversely affects the productivity of agricultural crops. They cause extensive damage to many agricultural and horticultural crops as well as grasses. Most of the field crops grown during the rainy season in India are damaged due to the attacks of white grubs viz., groundnut, sugarcane, pearl millet, sorghum, cowpea, pigeon pea, green gram, cluster bean, chillies, upland paddy etc., This article tries to reveal the predatory nature of white grubs and also flashes on relevant literature regarding the host plants of these pests.

**Keywords:** White grubs, polyphagous, crops, attack, damage.

**Introduction:**

The family Scarabaeidae is the second largest family which comprises 30,000 species recorded worldwide (Gupta, 2012) and about 2500 species are reported from India (Krajcik,2012) and most of them are phytophagous (sub families Melonthinae, Rutelinae, Dynastinae and Cetoninae) (Chandra *et al.*, 2012). White grubs are larvae of melolonthinae (Scarabaeidae: Coleoptera). The adults of white grubs are known as Chafers, May or June beetles all over the World. White grubs are one of the most destructive soil insects, affecting the gains from agricultural crop fields. White grubs are common dweller of soils and are considered as most destructive soil pests of many crops in India. White grubs feed on the roots of host plants, while the adult beetles feed on the foliage of plants. An appearance of attacked plant becomes pale, wilted and finally dries. The damage caused by them can be seen in patches but during epidemics the entire crop may be exhausted. The damage due to white grubs is severe in economic crops like sugarcane, groundnut, cereals, millets, pulses, vegetables and plantation. *Holotrichia longipennis H.consanguinea Blanch, H.reynaudi Blanch, H.seticollis Moser, Brahmina coriacea (Hope), dimidiata (Hope), Leucopholis lepidophora L.coneophora Brum., Melolontha spp.,* are some major pest species that attack different plants in different regions of the country (Gitanjali Devi, 2019). White grubs cause serious damage to cereal crops such as maize, wheat, barley, jowar, bajra, oil seed crops like groundnut, sesame, sunflower, soyabean, vegetable crops like brinjal, cucurbit and okra and other commercial crops like sugarcane, cotton, tobacco etc., (Fujiie and Yoloyama). White grubs cause damage to roots of commercial crops the damage caused by the White grub up to 70% (Bhawane et al., 1997). Due to the abundance and significant ecological roles, the structure and composition of scarab has a crucial role in determining the nature of the ecosystem. They have various ecological roles and can be broadly categorized as phytophagous and non-phytophagous. (Spector, 2006). They function as scavengers, plant feeders, earth movers, pollinators, predators (Halffter, 1966). The ICAR recognized the importance of white grubs and empowered the research work through Ad-hoc research project from 1974 at five different localities in the country as AICRP on white grubs.

The fauna of the Indian sub-region is abundant and diverse, but it is yet to be fully explored. Many researchers from India and abroad have studied about the diversity, distribution, abundance and host range of white grubs. In India work and awareness regirding the white grub attacks is not very encouraging and is restricted to certain geographical regions of the country. This article flashes on damage caused by white grubs to various host plants and tries to assemble some relevant information related with this issue. An attempt has been made to review the available literature on the white grubs attacking various agricultural crops in India.

**Review on Predaceous Behaviour and Host Plants of White Grubs:**

Arrow (1910, 1917, 1931) published first comprehensive account of scarabaeid beetles of Indian region wise three volumes of fauna of British India, in which he reported 58 species from Madhya Pradesh. Srivastava and Khan (1963) observed that *H. instilaris* in Rajasthan showed preference for drumstick and made severe damage. Y Chandra and Rai (1967) recorded Oxycetonia albopunctata for the first time on bajra hybrid. Singh (1964) observed that Holotrichia longipennis, Anomala, and Adoretus sp. and Brahmina coriacea belonging to this group damage the semi ripe fruits of apple, peach, palm and apricot in Himachal Pradesh and hilly areas of U.P. Vasu (1970) observed that the adults of *Orycetes rhinoceros*

feed on palm leaves. This pest destroys the tissue at the leaf base. Coconut white grubs feed on tender parts of the coconut roots. In case of severe attack, shedding of immature nuts results in great loss to the yield. Srivastava (1971) reported that *Chiloloba acuta* damage to the inflorescence of bajra and feed gregariously on the anthers and stigma of bajra. Veeresh (1974) recorded an unusual damage to guava trees due to white grubs which lead to death of trees through the scrapping of barks. Pal (1977) reported that the adult beetles of *H. serrata* were attracted to neem, acacia, ber, guava. The white grubs feed on the roots, causing the plant to show, varying degrees of yellowing, wilting and die ultimately. The roots show a sharp cut which can be differentiated from usual damage. The affected plants can be pulled up easily. Patches of dead plants are seen throughout the field which later coalesce to produce intensive areas of damage (Yadava, 1991). White grubs have been reported to be pod borers too (Anitha, 1992). The presence of one grub may cause mortality of 80-100 percent plants. Because of the taproot system and smaller amount of roots, the damage to groundnut is more pronounced as compared to fibrous rooted crops. *H. consanguinea* was found to cause 50-100% damage to groundnut (Joshi et al., 1969, Sharma and Shinde, 1970 and Yadava et al, 1978). Yadava (1991) reported 20.100% plant mortality in affected areas, 10.60% in H serrara areas. Husain (1974) recorded 100% damage in vast tracts extending from 320-400 m in 1968 and 1969 in Andhra Pradesh. Pal (1977) reported 5000 ha to be affected in Andhra Pradesh. Rao et al., (1976) reported 10,000 ha in localized areas of Gooty, Kalyandurg and Penukonda areas of Anantapur and Dhone and Pattikonda of Kurnooi where a crop loss of 60.80% annually was recorded.

The adults of white grubs come out generally during May-June from the soil and settle on the trees like neem, moringa, Prosopis, Acacia, apple and plants like wild rose, Polygonum, etc. for feeding and mating (Yadava and Sharma, 1995). Tiwari et al., (1999) recorded 47 species of white grubs, nineteen species, viz., Apogonia sp., A. setosa, Holotrichia sp. nr. cavifrons, Adoretus (Chaetadoretus) sp., A. caliginosus, A. versutus, Anomala marginipennis, A. polita, A. xanthoptera, M. horsfieldi, Popillia cyanea, P, macclellandi, P. nasuta, Rhinyptia suturalis, Xylotropes gideon, Anatona stillata, Chiloloba acuta, Clinteria klugi and Glycyphana horsfieldi from Himachal Pradesh (India) and observed that Brahmina coriacea caused 99.0 per cent damage to apple leaves and destroyed potato cropThe many Melolonthine genera found under the crop in India, the genus Holotrachia includes the most important pest species in groundnut (Yadava and Sharma 1995). They recorded Holotrachia serrata as a serious pest in many parts of western Maharashtra. . Mehta et al., (2010) Observed the most destructive species causing economic losses viz., Brahmina coriacea (Hope), Holotrichia longipennis Blanch, Anomala dimidiata Hope, Phyllognathus dionysius (Fabricius.), Lepidiota stigma (Fabricius.), Holotrichia seticollis Moser and Melolontha spp. Bhawane et al., (2012) observed that the grubs of Leucopholis lepidophora, Holotrichia fissa, Holotrichia karschi, Holotrichia serrata, Adoretus versutus, Adoretus lasiopygus, Anomala bengalensis are polyphagous root grubs and serious pests of agricultural, horticultural and silvicultural crops. Kulkarni et al., (2019) stated that white grubs are among the toughest-to-manage pests of economic importance and they observed the damage made by H. rustica and H. mucida on teak plants.

**Table 1:** Major Host Plants of White grubs in various states of India.

| State | Species | Host (Grub) | Reference |
|---|---|---|---|
| Andhra Pradesh | *Holotrichia serrata F.* | Jowar, Tobacco | Pal, 1977 |
| Maharashtra | *H. serrata F.* | Jowar, Sugarcane | Joshi et al., 1969, Sharma & Shinde 1970 |
| Bihar | *H. serrata F.* | Gauva, Bean | Pal,1977 |
| Gujrat | *Holotrichia consanguinea .* | Groundnut | Pal, 1977 |
| Rajasthan | *H. consanguinea H. insularis* | Bajra, Chillies, Maize, Sugarcane | Khan, 1963. Pal, 1977. |
| Haryana | *H. insularis Anomala sp.* | Bajra | Pal,1977 |
| Karnataka | *H. serrata F.* | Coffee, Tobacco | Pal, 1977 |
| Kerala | *Leucophilis concophora* | Coconut | Pal, 1977 |
| Uttar Pradesh | *H. serrata F.* | Groundnut, Sugarcane | Singh, 1964 |
| Tamil Nadu | *H. serrata F.* | Sugarcane | Pal, 1977 |
| Himachal Pradesh | *Brahmina coriacea* | Apple leaves, Potato, Peach, Palm | Singh, 1964 Pal, 1977 |

**Conclusion:**

This article has attempted to assemble all the relevant information regarding predatory nature and host range of white grubs. Many researchers from different parts of the country have studied diversity, distribution, host range and attacks of white grubs. Out of all the works mentioned above majority of them found that *Holotrichia serrata, Holotrichia consanguinea* are most commonly occurring white grub species in India. White grubs are polyphagous pests which adversely affect the yield of agricultural and horticultural crops. Propper management practices are essential in order to reduce the attacks of white grubs. Reduction in the attacks of these severe pests is necessary to increase the crop yield in plantation, agricultural and horticultural field.

**References:**


1. Arrow, G. J. (1910) The Fauna of British India including Ceylon and Burma, (Cetoniinae and Dynastinae) Vol. V-XIV, Taylor & Francis, London, 322pp.
2. Arrow, G. J. (1917) The fauna of British India including Ceylon and Burma, Vol. V-XIII (Rutelinae, Desmonychinae and Euchiirinae). Taylor & Francis, London, 387pp.
3. Arrow, G. J. (1931) The fauna of British India including Ceylon and Burma, Vol. V-XII (Coprinae). Taylor & Francis, London, 128pp.
4. Chandra K, Gupta D. An inventory of scarab beetles (Coleoptera: Scarabaeidae) of Achanakmar-Amarkantak Biosphere Reserve, Chhattisgarh, India. International Journal of Science and Nature. 2012; 3:886-891
5. Dadmal SM, Khadakkar S. Revision of Holotrichia Hope (Scarabaeidae: Melolonthinae) in different agro – climatic zones of Maharashtra (India). Journal of Entomology and Zoology Studies. 2014; 2(3):50-58.
6. Fujiie A, Yoloyama T. Improvement and use of Metarhizium anisopliae for controlling Anomala cuprea. In: Proceedings of the international symposium on the use of biological control agents under Integrated Pest Management. Food and Fertilizer Technology Centre, Republic China Taiwan, FFTC Book series 47. 61-69.
7. Gupta S. Distribution and abundance of Brahmina coriacea (Hope) in Himachal Pradesh. MSc Thesis. CSK HPKV, Palampur, Himachal Pradesh, India, 2012.
8. Halffter G, Matthews EG. The natural history of dung beetles of the subfamily Scarabaeinae (Coleoptera: Scarabaeidae). Folia Entomologica Mexicana. 1966; 12:1-313.
9. Joshi, B. G., Ramaprasad, G. and Rao, R. S. N. 1969. Occurrence of white grub, Holotrichia serrata F. as a new pest of tobacco. Indian 1. Ent., 31 (3): 285.
10. Khan, K. M. and Ghai, S. 1974. White grubs and their control in India. Festicides 8 (12): 19-25.
11. Krajcik M. Check list of the World Scarabeeoidea. Annexure X-Supplement. 2012; 5:278.
12. Mehta, P. K., Chandel, R. S., Mathur, Y. S. 2010. Status of white grubs in north western Himalaya. Journal of Insect Science (Ludhiana) 2010 Vol.23 No.1 pp.1-14.
13. Pal S. K. 1977. White Grubs and Their Management. Central Arid Zone Research Institute, Jodhpur.
14. .Rao, G. N. and Vijaylakshmi, U. 1959. A note on the occurrence of certain parasitic fungi on insect pests of sugarcane. Curro Sci., 28: 295.
15. Sharma, S K. and Shinde, V. K. R. 1970. Control of white grub Lachnostema (Holotrlchia) sanguinea Blanch. (Coleoptera: Scarabaeidae) PANS, 16 (I): 176-179.
16. Singh, C. 1964. "Temperate Fruits Pests" in Entomology in India. pp. 225. Ent. Soc. India, New Delhi.
17. Spector S. Scarabaeine dung beetles (Coleoptera: Scarabaeidae: Scarabaeinae): An invertebrate focal taxon for biodiversity research and conservation. Coleopterists Bulletin. 2006; 60(5):71-83.
18. Srivastava, B. K. and Khan, R. M. 1963. Bionomics and control of Holotrichia insularis Br. (Melolonthidae : Coleoptera). Indian J. Ent., 25 (4): 347-354.
19. Vasu, H. D. 1970. Ricinus communis Linn. as a new host record for the white grub. (Lachnosterna. consanguinea BI.) in India. Indian J. Ent., 32 (2): 182-183.
20. Veeresh, G. K. 1973. Preliminary evaluation of insecticides for the control of root grub Holotrichia serrata F. (MeJolonthidae : Coleoptera). Pesticides, 7 (3): 27.
21. Yadava, C. P.S and Sharma G. K., Indian white grubs and their management. Technical Bulletin No. 2, Project Coordinating centre AICRIP of White grub, ICAR, New Delhi, 1995, p. 26.