

WHITE GRUBS AND THEIR MANAGEMENT IN GROUNDNUT



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White grubs are soil-inhabiting polyphagous pests and are also known as root grubs. They feed on organic matter in soil as well as the root system of many economic crops. They belong to scarabidae family of coleopteran insect order.

Distribution and species complex:

The important species of white grubs which infest groundnut belong to three sub-families; Melolonthinae, Rutelinae and Dynastinae. The genus *Holotrichia* includes the major species of white grubs inflicting serious damage to groundnut cultivation in rainy season. *H. consanguinea* is pre-dominant in Rajasthan, Gujarat, Haryana, Punjab, Bihar and Uttar Pradesh whereas, *H. serrata* is most destructive in states like, Karnataka, Andhra Pradesh, Tamil Nadu and Maharashtra and later it has spread to western and peninsular India. The species of white grub those are endemic to Saurashtra region of Gujarat are, *Apogonia rauca*, *Schizonycha ruficollis* and *Adoretus* sp.

Host range:

Apart from groundnut, they are known to attack roots of guava, sugarcane, coconut, areca nut, tobacco, potato and many other oilseeds, pulses and vegetable crops.

Favourable conditions:

White grubs are present throughout the year however; their activity can be seen only during the rainy season (May/June-December). Adults emerge in large numbers for mating after the first monsoon rains in mid-May or June months and again they return to soil for rest of its life cycle. White grubs prefer light clay soils rich in organic matter; aeration; moisture and soil temperature around 25°C. They have a single generation in a year where, grub (larvae) is the damaging stage and adults are free living.

Life cycle and Biology:

The adult beetles are 18-20 mm long and 7-9 mm wide (Fig. 1). They emerge from the soil during dusky hours (7PM to 10PM) after good rains in mid-May or later. Once active, the beetles follow the daily rhythm of emergence and congregation on host trees at dusk and return

to soil at dawn. The beetles feed on the foliage of variety of host trees such as, ber, drumstick, tamarind, banyan, acacia, neem, mahagoni, jamun, guava, sapota, banana, mango, fig etc found in and around the farm. The mated females returns to soil in early morning and starts egg-laying. The white grub, *H. consanguinea* completes its life cycle in 76-96 days. The egg period is 8-10 days, larval period is 56-70 days and pupal period is 12-16 days whereas, *H. serrata* completes its life cycle in 141-228 days wherein, the egg, larval and pupal periods are, 10-12, 121-202 and 10-14 days, respectively. The grubs are active in their second, third and fourth instar larval stages during rainy seasons (July-October) and feed on organic matter until they come in contact with living roots of plants. Eggs are white and round in shape. The young grubs are white translucent (Fig. 2) whereas mature grubs are pale in colour and 'C' or semi-circular shaped (Fig. 3). Before pupation the grub ceases to feed and descends down in the soil to the depth of 40-70 cm. A short pre-pupal period is spent preparing an earthen chamber for pupation. The beetles remain in the soil in inactive state at a depth of about one meter till the next monsoon rains. All the species of white grubs attacking groundnut are having single generation per year with an active larval diapauses stage.

Nature of damage:

Damage is caused by grubs where, young grubs feed on fine rootlets while mature grubs feed on both roots and pods. The affected plants show varying degrees of wilting, which ultimately die and died plants can easily be pulled out (Fig. 4). The grubs cause infestation in patches leading to 'patchy appearance' of field (Fig. 5).

Economics of damage:

In endemic areas, the damage to groundnut crop ranges from 20-80%. The chemical control may be initiated if the pest population crosses threshold level of one grub per square meter.

Management:

Management of white grubs can be achieved only through the community approach by targeting the weak points in the life cycle or by altering the favourable factors responsible for

infestation and establishment of the pest. The management practices were grouped suitably in to the following sub sections:

Adult control

- Place light traps @ 1 trap/ha between 7PM to 10PM after receipt of first monsoon rains.
- Trim off trees and shrubs in and around the fields.
- Spray insecticides such as imidacloprid 17.8SL @ 1.5 ml/lt or monocrotophos 36SL @ 1.6 ml/lt during the evening hours on trees and shrubs.
- Place 3 pheromone (synthetic pheromone-Anisole) dispensers per tree at 15 meter radius for three consecutive evenings after the first monsoon rains.
- Collect and destroy the adults fallen near the base of trees.

Grub control

- Take up deep summer ploughing to expose the pupae to scorching sun radiation and predation by birds.
- Use well decomposed organic manures.
- Crop rotation with jowar/sorghum and bajara/pearl millet.
- Incorporate carbofuran 3CG @ 33.0 kg/ha or phorate 10CG @ 25.0 kg/ha in soil before sowing.
- Seed furrow application of insecticides such as, thiamethoxam 25 WS @ 1.9 lt/ha or fipronil 5FS @ 2.0 lt/ha.
- Seed treatment with chlorpyriphos 20EC @ 6.5-12.0 ml/kg or imidacloprid 17.8SL @ 2.0 ml/kg seed.
- Take up early sowing if irrigation facility available.
- Drench the root zone of crop with chlorpyriphos 20 EC @ 4.0 lt/ha or quinalphos 25EC @ 3.2 lt/ha three weeks after the adult emergence.

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Fig. 1: Adult beetle



Fig. 2: Young grub



Fig. 3: Mature grubs



Fig. 4: Grub feeding on root system



Fig. 5: Patchy appearance in field