



WHITE GRUB- A SERIOUS POLYPHAGOUS PEST IN UTTARAKHAND, DAMAGE LIFE-HISTORY AND MANAGEMENT

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White grub has assumed the status of a serious pest in hilly region of Uttarakhand. Its menace is increasing and serve outbreaks occurred over large areas during the past few years. In endemic condition the loss due to white grub to various crops have been estimated to 80% and sometimes entire crops are damaged. It is known as “Kurmula” Uttarakhand in hills. Its damage in almost all kharif crops grown under rainfed conditions. Besides this the grub damages are serious in root portion, the adults attack a number of fruits and forest trees shrubs, agricultural crops and even ornamental plants, are feed on the foliage doing active seasons i.e., June – July.

Predominant species of white grub prevalent in Uttarakhand hills

1. *Holotirchia longipennis* 2. *Holotrichia seticollis* 3. *Anomala dimidiata*

Host plant spectrum – Host plant is the major environmental factor affecting the abundance and distribution of white grub.

I. Host range of beetles-

i. Fruit trees-	ii. Forest trees-	iii. Wild shrubs
More preferred (Apple, pear, walnut, chestnut, plum,)	Bhimal (<i>Grewia optiva</i>)	Wild rose (<i>Rosa brononii</i>)
Less preferred (Peach, Almond, Apricot)	Kharif (<i>Celis australis</i>)	Raspberry (<i>Rubus ellipticus</i>)
	Uttish (<i>Alnus nepalensis</i>)	
	Oak (<i>Quercus spp</i>)	
	Tun (<i>Toona ciliata</i>)	

iii. Crop plants-Host range of grubs

Grubs are polyphagous and damage almost all rainy season crop grown under rainfed conditions.

Upland rice – *Oryza sativa*

Barnyard millet – *Echinochloa frumenlacea* (Jhingora /sawan)

Finger millet – *Eleusine coracana* (Madva or kodon)

Foxtail millet – *Setaria italica* (Kori)

Potatoes, Amaranths are the worst affected kharif crops by white grub.

Soybean, Maize and Buck wheat are the relatively low infected crops due to white grubs. Pulses like green gram, black gram and horse gram (Kulthi) are heavily infested crops. In month of April/March rabi crops like wheat and barley are also damaged to some extent when the overwintering grubs comes out from the “dipause” and moved upwards in soil before the pupation damaged due to grubs in such cases are rare and negligible.

Life cycle of white grub- *Holotricha longipennis* – Is a predominant species of white grub prevalent in Garhwal region of UP hills. Yellow raspberry (*Rubus ellipticus*) is the most preferred host plant for beetle and for white grub, which feeds voraciously on the roots of upland rice, barnyard millet, finger millet and chillies, Padala *et al.*, 2017.

Emergence of the beetles starts in late may at dusk after a heavy monsoon rains. After the emergence mating takes place on the host trees and lasts for about 9-16 minutes. Mating female along to the leaves of host trees attached to male in tail to tail position.

The mated females return to the soil and lay 10 to 40 eggs at depth of 5 - 15cm in most soil. The pre- oviposition period varies from 2-5days. Freshly laid eggs are opaque pearly white in colour and elliptical in shape. The length and width of freshly laid egg are 2.90mm & 1.80 mm respectively. Before hatching eggs increase in size, turn spherical in shape and dark brownish in colour. The incubation period varies from 10-17 days.

Pupation starts in the month of late March. The length and width of pupa ranges from 22-24 mm and 10- 13 mm respectively. The pupal period ranges from 16-25 days.

The newly emerged adults are greyish white in colour, which later turn brownish beetles size 19 -29 mm length and 10-14 mm width and longevity ranges from 23 to 32 days after emergence, Veeresh *et al.*, 1991.

Management – An effective management strategy has been formulated for both the damaging stages i.e., beetles and grub in U. P. hills.

1. In month of March - April, deep ploughing of fallow/waste lands is quite effective in reducing the white grub population before pupation.
2. Use of light trap coinciding with onset of rains starting from second week of May to 1st fortnight of July is quite effective during peak emergence period.
3. Collection of *H. longipennis* during the night hours from most preferred hosts namely *Rubus ellipticus* (Hisalo).
4. Spraying of monocrotophos 36EC @ 0.05% or carbaryl @ 0.2% in day time on preferred host plants during peak emergence period is quite effective to reduce the beetle population.
5. Use of chlorpyrifos 25EC/Quinalphos 25EC @ 40 lt/ha mixing with 40kg pulverized soil/wood ash in standing *kharif* crops is quite effective in controlling the grubs. The insecticide should be broadcasted in the fields in optimum soil moisture conditions, 3weeks after the first heavy monsoon rains.
6. Application of phorate 10 G @ 25 kg/hac in 1st week of July with intercultural operations where moisture stress conditions prevail, is effective against the grubs.
7. Deep ploughing of fallow /waste lands in the month of August-September to expose the 3rd instar grubs for predatory birds, is effective in reducing the grub population.
8. Sowing of tolerant crops like Amaranthus, soybean and maize in endemic pockets is recommended which are less susceptible to grub in comparison to millets and upland rice which are highly susceptible crops.
9. Application of well decomposed FYM in the field as also effective to some extent in killing the 1st instar grubs as the newly hatched grubs can serve partly decomposed organic matter.

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