



Efficacy of insecticides as seed treatment for the management of white grubs

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Abstract

The efficacy of six insecticides namely chlorpyrifos 20 EC (5.0 ml/kg seed), imidacloprid 17.8 SL (5.0 ml/kg seed), clothianidin 50 WDG (3.5 g/kg seed), thiamethoxam 25 WG (3.5 g/kg seed), bifenthrin 10 EC (2.5 ml/kg seed) and chlorantraniliprole 18.5 SC (2.5 ml/kg seed) as seed treatment was tested against grubs of *Melolontha indica* Hope under laboratory conditions. Rajmash, *Phaseolus vulgaris* L. was used as test crop. The experiment was conducted in plastic trays filled with soil and farm yard manure (FYM) in 3:1 ratio. In each tray, ten third instar grubs of *M. indica* were released and 20 treated rajmash seeds were sown at a depth of about 5 centimeter. The results revealed that plants from chlorantraniliprole 18.5 SC (2.5 ml/kg seed) treated seeds registered least mortality (20.0 %), followed by chlorpyrifos 20 EC (5 ml/kg seed) (21.67 %) at 10 days after sowing (DAS). The grub mortality recorded in seeds treated with chlorantraniliprole 18.5 SC (2.5 ml/kg seed) and chlorpyrifos 20 EC (5 ml/kg seed) was 56.67 and 46.67 per cent, respectively at 20 DAS. Therefore, seed treatment with chlorantraniliprole 18.5 SC (2.5 ml/kg seed) could be another alternative in addition to chlorpyrifos 20 EC (5 ml/kg seed) for effective management of *M. indica* grubs infesting rajmash under field conditions in high hills of north western Himalaya.

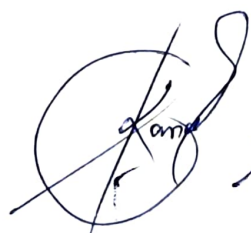
Key words: Insecticides, Rajmash, seed treatment, white grubs.

In Himachal Pradesh, white grubs are the most destructive and troublesome soil pests affecting production of many crops especially in high hills. Rajmash, *Phaseolus vulgaris* L. in particular is attacked by a large number of insect-pests including white grubs at different crop growth stages from germination to harvest (Sood *et al.* 2003). The economic importance of white grubs is primarily due to root damage caused by feeding activity of third instar grubs resulting in plant mortality and subsequent yield losses (Chandel *et al.* 2015). The grubs of *Melolontha* sp. have been observed to damage roots of rajmash causing sudden wilting and death of plants in different regions of the state. The plants at 5-6 leaves stage are more prone to the attack of white grubs causing considerable plant mortality at this stage (Mehta *et al.* 2010). In Sangla valley of Kinnaur, Himachal Pradesh, white grubs potentially caused 8-10 per cent plant mortality in rajmash (Sood *et al.* 2007). Rajmash, is an important pulse crop grown in different states of India including Himachal Pradesh for grains as well as for vegetable purposes (Singh and Singh 2015). Nationally, it is cultivated on an area of approximately

228 thousand hectares with a production of nearly 2277 thousand tones. In Himachal Pradesh, it is cultivated in high hills of Chamba, Kinnaur, Kullu, Lahaul & Spiti, Mandi, Shimla and Sirmaur districts on about 3.80 thousand hectares with an annual production of 50.87 thousand tones (Anonymous 2018). Therefore, it is necessary to manage the menace of white grubs in this important pulse crop. White grubs are generally managed by soil application of synthetic insecticides either through drenching or by broadcasting after mixing with sand or fine soil. However, soil application of insecticides is usually ineffective because insecticides are not readily trans-located through soil to the root zone in lethal concentrations. Moreover, *Melolontha* grubs are generally present in the soil at a depth of about 5-10 centimeters, and it is very difficult to manage them with soil treatment. Therefore, the present study was undertaken to evaluate the efficacy of some new insecticides as seed treatment against grubs of *Melolontha indica* Hope.

Materials and Methods

The study was carried out in the White Grub Laboratory of the Department of Entomology, CSK

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