

Species Profiling of White Grub Beetles and Evaluation of Pre and Post Sown Application of Insecticides against White Grub Infesting Soybean

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Abstract : White grub (Coleoptera: Scarabaeidae) is a major destructive pest in western Himalayan region of Uttarakhand. Beetles feed on apple, apricot, plum, walnut etc. during night while, second and third instar grubs feed on live roots of cultivated as well as non-cultivated crops. Collection and identification of scarab beetles through light trap was carried out at Crop Research Centre, Govind Ballab Pant University Pantnagar, Udham Singh Nagar (Uttarakhand) during 2018. Field trials were also conducted in 2018 to evaluate pre and post sown application of different insecticides against the white grub infesting soybean. The insecticides like Carbofuran 3 Granule (G) (750 g a.i./ha), Clothianidin 50 Water Dispersal Granule (WG) (120 g a.i./ha), Fipronil 0.3 G (50 g a.i./ha), Thiamethoxam 25 WG (80 g a.i./ha), Imidacloprid 70 WG (300 g a.i./ha), Chlorantraniliprole 0.4% G(100 g a.i./ha) and mixture of Fipronil 40% and Imidacloprid 40% WG (300 g a.i./ha) were applied at the time of sowing in pre sown experiment while same dosage of insecticides were applied in standing soybean crop during (first fortnight of July). Commutative plant mortality data were recorded after 20, 40, 60 days intervals and compared with untreated control. Total 23 species of white grub beetles recorded on the light trap and *Holotrichia serrata* Fabricious (Coleoptera: Melolonthinae) was found to be predominant species by recording 20.6% relative abundance out of the total light trap catch (i.e. 1316 beetles) followed by *Phyllognathus* sp. (14.6% relative abundance). *H. rosettae* and *Heteronychus lioderus* occupied third and fourth rank with 11.85% and 9.65% relative abundance, respectively. The emergence of beetles of predominant species started from 15th March, 2018. In April, average light trap catch was 382 white grub beetles, however, peak emergence of most of the white grub species was observed from June to July, 2018 i.e. 336 beetles in June followed by 303 beetles in the July. On the basis of the emergence pattern of white grub beetles, it may be concluded that the Peak Emergence Period (PEP) for the beetles of *H. serrata* was second fortnight of April for the total period of 15 days. In May, June and July relatively low population of *H. serrata* was observed. A decreasing trend in light trap catch was observed and went on till September during the study. No single beetle of *H. serrata* was observed on light trap from September onwards. The cumulative plant mortality data in both the experiments revealed that all the insecticidal treatments were significantly superior in protection-wise (6.49-16.82% cumulative plant mortality) over untreated control where highest plant mortality was 17.28 to 39.65% during study. The mixture of Fipronil 40% and Imidacloprid 40% WG applied at the rate of 300 g a.i. per ha proved to be most effective having lowest plant mortality i.e. 9.29 and 10.94% in pre and post sown crop, followed by Clothianidin 50 WG (120 g a.i. per ha) where the plant mortality was 10.57 and 11.93% in pre and post sown treatments, respectively. Both treatments were found significantly at par among each other. Production-wise, all the insecticidal treatments were found statistically superior (15.00-24.66 q per ha grain yields) over untreated control where the grain yield was 8.25 & 9.13 q per ha. Treatment Fipronil 40% + Imidacloprid 40% WG applied at the rate of 300 g a.i. per ha proved to be most effective and significantly superior over Imidacloprid 70WG applied at the rate of 300 g a.i. per ha.

Keywords : bio efficacy, insecticide, soybean, white grub

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