Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

E-ISSN: 2320-7078
P-ISSN: 2349-6800
www.entomoljournal.com
JEZS 2020; 8(3): 1468-1469

Received: 10-03-2020
Accepted: 12-04-2020

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Evaluation of some insecticides as seed dresser against white grubs in groundnut crop

BL Jakhar, AS Baloda, KK Saini and Tara Yadav

Abstract
A field experiment comprised of nine insecticides was conducted at Rajasthan agricultural research farm field during *kharif* 2018. Imidacloprid 600 FS @ 6.5 ml per kg seed treatment was significantly superior over all other treatments with lowest plant mortality against white grub and highest pod yield followed by clothianidin 50 WDG @ 2.0 g per kg seed.

Keywords: Imidacloprid, seed treatment, white grub, plant mortality, pod yield

Introduction
The white grub are immature stage of beetles popularly known as May beetle. They belong to the family Scarabaeidae of the order Coleoptera. Scarabaeidae is the second largest family which includes over 30,000 species (Khanal *et al.*, 2012) [6]. In India nearly 300 species of white grub were recorded (Bhawane *et al.*, 2011) [3]. White grub are hidden enemies of field crops because much of their life cycle is subterranean and remain unnoticed even after complete destruction of a healthy crop. White grubs are polyphagous in nature and feeds on different cultivated crops and trees. Cultivated crops such as groundnut, cereals, millets, pluses, vegetables and plantation crops were attacked by white grub (David *et al.*, 1986) [4]. The yield loss due to white grubs was reported to be as high as 100 per cent (Patil and Hapse, 1981) [8]. In India 12 species of white grubs is of major importance (Kapadia *et al*. 2006) [5]. Chemical treatment is the major tactics of white grub management (Veeresh, 1974). The white grub is control initial stage of its growth and small quantity of insecticides were used in seed treatments so this study was carried out.

Materials and Methods
The experiment was laid out in randomized block design with ten treatments including control, each replicated thrice under All India Network project on soil arthropod pests at Rajasthan Agricultural Research Station, Durgapura, Jaipur. The seeds of groundnut were sown in the field on the last week of June during *kharif*, 2018 in the plots measuring 6.0 x 4.0 m^2 keeping 0.45 and 0.10 m row to row and plant to plant distance, respectively. The recommended package of practices was followed to raise the crop.
Recommended dose of insecticides were used for the seed dressing and mixed thoroughly with hands after wearing hand gloves. Treated seeds were allowed to dry on the plastic sheet at least for 2 to 3 hours under the shade and treated seeds were used for sowing within few hours. Observations were taken on initial plant population just after the germination and plant mortality due to whitegrub at harvesting time. The data on groundnut pod yield was also recorded treatment wise at harvesting time. as *Argulus* is identified.

Results and Discussion
The plant mortality due to white grub in different insecticidal treatment was significantly low as compared to untreated plots at harvesting time. Results are presented in table 2. The minimum per cent plant mortality was recorded in plots treated with imidacloprid 600 FS (9.33%) followed by clothianidin 50 WDG (10.33%), imidacloprid 17.8 SL (12.33%) and chlorantraniliprole 18.5 SC (14.67%) which were found significantly superior over rest of the treatments but Singh *et al*. (2012) [10] revealed that clothianidin 50 WDG at 2.0 g/kg seed, provided maximum protection with minimum plant damage followed by imidacloprid 17.8 SL at 3 ml/kg seed. Highest plant mortality occurs in plots treated with acephate 50% + imidacloprid 1.8% followed by fipronil 40% + imidacloprid 40% but significantly superior than untreated control.

Rest of the treatments was found in the middle order of efficacy with respect to plant mortality. The decreasing trend of efficacy with increasing per cent plant mortality of the tested treatments was found to be in the order of imidacloprid 600 FS clothianidin, imidacloprid 17.8 SL, chlorantraniliprole, fipronil, thiamethoxam 30 FS and thiamethoxam 25 WDG, fipronil 40% + imidacloprid 40% and acephate 50% + imidacloprid 1.8%, respectively. The maximum production was recorded in imidacloprid 600 FS with 24.63 q/ha followed by clothianidin and imidacloprid 17.8 SL whereas, chlorantraniliprole, fipronil, thiamethoxam 30 FS and thiamethoxam 25 WDG were found next best treatments with 21.10, 19.30, 17.60, 17.16 q/ha pod yield, respectively. All these treatments were significantly superior over check. The least effective treatments were fipronil 40% + imidacloprid 40% and acephate 50% + imidacloprid 1.8% with 15.33, 14.06 q/ha pod yield, respectively but statistically superior as compared to control. Untreated check provided 3.46 q/ha pod yield. The present finding are corroborate with Avila and Gomez (2003) [1] they reported that seed treatment with clothiandin, imidacloprid and thiamethoxam treatments have more yields than other treatments. This type study was supported Reddy (2000) Kumar *et al.* (2008) and Yadav (2017) [9, 7, 12].

Table 1: Details of insecticides

S. No.	Treatments	Dose/ kg seed
1	Thiamethoxam 30 FS	3.0 ml
2	Thiamethoxam 25 WDG	4.0 g
3	Imidacloprid 17.8 SL	3.0 ml
4	Fipronil 5 SC	10 ml
5	Clothianidin 50 WDG	2.0 g
6	Imidacloprid 600 FS	6.5 ml
7	Acephate 50% +Imidacloprid 1.8%	4.0 g
8	Chlorantraniliprole 18.5 SC	2.0 ml
9	Fipronil 40% + Imidacloprid 40%	3.0 ml
10	Untreated check	-

Table 2: Evaluation of some insecticides used as seed dresser against white grub in groundnut crop

S.N	Treatments	Dose/ kg seed	Plant mortality (%)	Pod yield (q/ha)
			2018	2018
1	Thiamethoxam 30 FS	3.0 ml	18.33 (25.25)	17.60
2	Thiamethoxam 25 WDG	4.0 g	19.00 (25.75)	17.16
3	Imidacloprid 17.8 SL	3.0 ml	12.33 (20.48)	22.03
4	Fipronil 5 SC	10 ml	16.00 (23.52)	19.30
5	Clothianidin 50 WDG	2.0 g	10.33 (18.44)	24.03
6	Imidacloprid 600 FS	6.5 ml	9.33 (17.43)	24.63
7	Acephate 50% +Imidacloprid 1.8%	4.0 g	25.00 (29.77)	14.06
8	Chlorantraniliprole 18.5 SC	2.0 ml	14.67 (22.49)	21.10
9	Fipronil 40% + Imidacloprid 40%	3.0 ml	23.67 (28.88)	15.33
10	Untreated check	-	94.33 (76.34)	3.46
	SE(m)	-	1.836	1.413
	C.D. at 5%	-	5.49	4.23
	C.V. %	-	11.02	13.69

Conclusion/Summary: The groundnut seed should be sown after treatment with Imidacloprid 600 FS @ 6.5 ml//kg seed for the control of white grub.

Acknowledgement
I have great pleasure and privilege in expressing my deep sense of gratitude and sincere regards to Net-work coordinator, SAP for providing necessary inputs and facilities.

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