



Evaluation of Insecticides as Seed Treatment Against Termite in Groundnut

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ABSTRACT

A field experiment comprised of nine insecticides was conducted at Rajasthan Agricultural Research farm during *kharif* 2018 to 2020. The seeds of groundnut variety RG 510 were sown in the field on the last week of June during *kharif*, 2018 to 2020 in the plots measuring 6.0 x 4.0 m² 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. Imidacloprid 600 FS @ 6.5 ml per kg seed treatment was significantly superior over all other treatments with lowest plant mortality against termite and highest pod yield followed by fipronil 5 SC (7.33%) and imidacloprid 17.8 SL (9.00%). The maximum production was recorded in imidacloprid 600 FS with 18.81 q/ha followed by fipronil (16.35q/ha) and imidacloprid 17.8 SL (16.0q/ha) whereas, clothianidin 50WDG, thiamethoxam 30 FS and thiamethoxam 25 WDG were found next best treatments.

Key Words: Imidacloprid, seed treatment, termite, plant mortality, pod yield.

INTRODUCTION

Groundnut (*Arachis hypogaea* L.) is grown in tropical and sub-tropical regions and in the continental part of temperate countries. The seed (kernels) contains up to 50 per cent of a non-drying oil, 40-50 per cent fat, 20-50 per cent protein and 10-20 per cent carbohydrate (Mehta, 2002). Groundnut is attacked by more than 100 insect-pests right from planting stage to its storage. The annual yield loss in groundnut due to insect-pests is approximately 15 per cent (Dhaliwal *et al*, 2010; Jasrotia *et al*, 2016). Among the insect-pests inflicting damage to groundnut, the defoliators such as, the groundnut leaf miner (GLM), the red-headed hairy caterpillars (RHC), the tobacco caterpillar, the gram pod borer, Bihar hairy caterpillar and termites are the most important in India reported by Atwal and Dhaliwal (2008).

Termites damage the seedlings by cutting either just below or above the soil surface. In mature plant, termites feed on root system and inside the stems, which directly kills the plant or indirectly lowers

yield through decreased translocation of water and nutrients. Severely infested plants wilt, dry up and can be easily pulled up. It inflicts heavy damage to the crop cultivated in sandy loam soil and damage the crops right from sowing till harvest. Infestation is particularly serious in dry season. The problem is more predominant in rainfed areas than irrigated. Use of undecomposed FYM under un-irrigated conditions can also increase the chances of termite attack.

Termites that belong to the families Hodotermitidae, Kalotermitidae, Rhinotermitidae, Termitidae Macrotermes, Microcerotermes, Microtermes, Odontotermes, Procornitermes, and Syntermes) cause great loss in agriculture (UNEP Report, 2000). Out of 300 species of termites known so far from India, about 35 species have been reported damaging agricultural crops and buildings. The major mound-building species in India are *Odontotermes obesus*, *Odontotermes redemanni*, and *Odontotermes wallonensis*, and the subterranean species are *Heterotermes indicola*,

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Table 1. Detail of insecticides.

Sr. No.	Treatment	Dose/ kg seed
1	Thiamethoxam 25 WDG	3.2 g
2	Imidacloprid 17.8 SL	4.0 ml
3	Acephate 50% +Imidacloprid 1.8%	4.0 g
4	Fipronil 5 SC	10.00 ml
5	Thiamethoxam 30 FS	3.0 ml
6	Imidacloprid 600 FS	6.5 ml
7	Clothianidin 50 WDG	2.0g
8	Fipronil 40% + Imidacloprid 40%	3.0 g
9	Chlorantraniliprole 18.5 SC	2.0 ml
10	Control	-

Coptotermes ceylonicus, *C. heimi*, *Odontotermes horni*, *Microtermes obese*, and *Microcerotermes beesoni* (Rajagopal, 2002). Application of chemical insecticides is still regarded as the most preferred pest management strategy among the farmers for termite management with seed treatment. Hence, a study was conducted to evaluate 10 insecticides as seed treatment against termite in groundnut.

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 variety RG 510 were sown in the field on the last week of June during *kharif*, 2018 to 2020 in the plots measuring 6.0 x 4.0 m² 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 hr 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 were also recorded treatment wise at harvesting time.

RESULTS AND DISCUSSION

The plant mortality due to termite in different insecticidal treatment was significantly low as compared to control at harvesting time. The minimum per cent plant mortality was recorded in plots treated with imidacloprid 600 FS (6.67%) followed by fipronil 5 SC (7.33%) and imidacloprid 17.8 SL (9.00%) which were found significantly superior over rest of the treatments (Table 2). Highest plant mortality occurred in control plots (89.33%) followed by treated with Acephate 50% + imidacloprid 1.8% and fipronil 40% + imidacloprid 40% but significantly superior than control in 2018. Similar trends were also observed during the years 2019 and 2020. Rest of the treatments was found in the middle order of efficacy with respect to plant mortality. The pooled results also showed that the minimum plant mortality as recorded in the treatment imidacloprid 600 FS (8.28%) followed by fipronil 5 SC (10.52%). Maximum plant mortality as recorded in control (72.51%). 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, Fipronil 5SC, imidacloprid 17.8 SL, clothianidin 50WDG, thiamethoxam 25 WDG, thiamethoxam 30 FS , fipronil 40% +

Evaluation of Insecticides as Seed Treatment

Table 2. Evaluation of insecticides as seed dresser against termite in groundnut crop.

Sr No.	Treatment	Dose/ kg seed	Plant mortality (%)			
			2018	2019	2020	Mean
1	Thiamethoxam 25 WDG	3.2 g	13.67 (21.28)	16.11 (23.60)	14.85 (22.61)	14.87 (22.67)
2	Imidacloprid 17.8 SL	4.0 ml	9.00 (17.29)	12.13 (20.27)	11.62 (19.92)	10.91 (19.24)
3	Acephate 50% +Imidacloprid 1.8%	4.0 g	23.00 (28.36)	24.73 (29.76)	20.62 (26.74)	22.78 (28.48)
4	Fipronil 5 SC	10.00 ml	7.33 (15.59)	11.51 (19.48)	12.74 (20.89)	10.52 (18.65)
5	Thiamethoxam 30 FS	3.0 ml	15.33 (22.69)	17.03 (24.34)	19.67 (26.04)	17.34 (24.57)
6	Imidacloprid 600 FS	6.5 ml	6.67 (14.88)	8.67 (17.07)	9.51 (17.95)	8.28 (16.63)
7	Clothianidin 50 WDG	2.0g	12.33 (20.32)	13.55 (21.58)	15.40 (23.08)	13.76 (21.74)
8	Fipronil 40% + Imidacloprid 40%	3.0 g	20.33 (26.75)	22.63 (28.39)	22.89 (28.53)	21.95 (27.91)
9	Chlorantraniliprole 18.5 SC	2.0 ml	21.67 (27.53)	22.94 (28.57)	23.23 (28.78)	22.61 (28.38)
10	Control	-	89.33 (71.11)	63.49 (53.03)	64.72 (53.54)	72.51 (59.22)
	SE(m)	-	1.721	1.768	1.599	2.159
	C.D. at 5%	-	5.15	5.29	4.78	6.46
	C.V. %	-	11.21	11.50	10.32	13.97

imidacloprid 40% , chlorantraniliprole, and acephate 50% + imidacloprid 1.8%, respectively.

The maximum production was recorded in imidacloprid 600 FS with 18.81 q/ha followed by fipronil (16.35q/ha) and imidacloprid 17.8 SL (16.0 q/ha) whereas, clothianidin 50WDG, thiamethoxam 30 FS and thiamethoxam 25 WDG were found next best treatments with 15.09, 13.43 and 13.17 q/ha pod yield, respectively. All these treatments were significantly superior over check in the pooled result. The present finding were corroborated with Singh *et al* (2004) that imidacloprid 600 FS @ 10

ml/kg seed was most effective with the minimum plant damage (4.18%) in pearl millet. Sundriya and Acharya (2012) mentioned that imidacloprid 70 WS @ 10 g/kg as seed treatment gave effective control of termite in wheat. These reports strongly support the present conclusion. Maximum plant stand (77.7 plants/m²) and minimum infested tillers (5 tillers/plot) due to termites and maximum grain yield (42.2 q/ha) was obtained in imidacloprid @ 2.0 ml/kg followed by chlorpyrifos @ 5 ml/kg seed, whereas carbaryl found least effective (Mishra *et al*, 2007). Gadhiya (2012) reported that

Table 3. Pod yield of groundnut .

Sr. No.	Treatment	Dose/ kg seed	Pod yield (q/ha)				ICBR ratio
			2018	2019	2020	Mean	
1	Thiamethoxam 25 WDG	3.2 g	13.93	14.05	11.55	13.17	1:19.22
2	Imidacloprid 17.8 SL	4.0 ml	16.03	15.80	16.19	16.00	1:20.24
3	Acephate 50% +Imidacloprid 1.8%	4.0 g	9.30	12.55	12.49	11.44	1:21.12
4	Fipronil 5 SC	10.00 ml	17.30	16.15	15.60	16.35	1:22.73
5	Thiamethoxam 30 FS	3.0 ml	13.06	13.65	13.60	13.43	1:20.98
6	Imidacloprid 600 FS	6.5 ml	18.46	18.20	19.77	18.81	1:24.80
7	Clothianidin 50 WDG	2.0g	14.26	15.20	15.81	15.09	1:10.08
8	Fipronil 40% + Imidacloprid 40%	3.0 g	11.33	13.00	12.87	12.40	1:4.50
9	Chlorantraniliprole 18.5 SC	2.0 ml	10.23	12.85	12.52	11.86	1:5.62
10	Untreated check	-	3.47	5.35	5.88	4.90	-
	SE(m)	-	0.938	0.933	1.136	0.555	
	C.D. at 5%	-	2.80	2.79	3.40	1.66	
	C.V. %	-	12.75	11.81	14.30	9.18	

insecticidal seed treatments of fipronil 5 SC @ 5 ml/kg, imidacloprid 600 FS @ 3 ml/kg and bifenthrin 10 EC @ 2 ml/kg seeds were found highly effective in suppression of termites damage in wheat.

CONCLUSION

The groundnut seed should be sown after treatment with Imidacloprid 600 FS @ 6.5 ml/kg seed for the control of termite.

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