

Short Communication

## Management of Termites in Pearl millet with Imidacloprid Seed Treatment

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Termite (*Microtermes obesi* H and *Odeontotermes obesus*) is a major pest limiting productivity of pearl millet. There is a need to develop an alternate management practice in view of adverse effect of insecticide in used at present. In this context seed treatment with imidacloprid is effective and economical method for the control of this pest. Imidacloprid is a new pesticide formulation belonging to nitro methylene/nitro guanidine group. It has been found effective against sucking pests of oat, wheat, chili, okra, sorghum and termite in sugarcane (Gupta and Lal, 1995; Mote *et al.*, 1995; Gourmet *et al.*, 1996). Hence in the present investigation imidacloprid 70 WS and 600 FS were evaluated against termite in pearl millet.

The field experiment was conducted during kharif 2001 and 2002 at RCA, Udaipur. Pearl millet variety Raj-171 was sown in 4.05 x 2.70 m plots at 45 x 15 cm spacing on 15 July in 2001 and 19 July in 2002. The experiment was conducted in RBD with four replications. There were 12 treatments including standard check chlorpyrifos @ 4 ml kg<sup>-1</sup> seed and untreated check. Imidacloprid 70 WS @ 5, 7, 10, 15, 20 and 30 g kg<sup>-1</sup> seed and Imidacloprid 600 FS @ 6, 8, 12, and 17 ml kg<sup>-1</sup> seed were used as seed treatment.

Observations on germination were recorded by counting the seedlings two weeks after sowing and plants damaged due to termite were recorded 50 days after sowing.

The phytotoxicity of different treatments was assessed by visual observations on lesion, wilting and necrosis symptoms on leaves. The population of grub and adults of *Chrysoperla camea* and coccinellids were counted in each treatment at regular interval.

During the year 2001, termite damage to plants among different treatments ranged from 4.29 in Imidacloprid 70 WS @ 20 g kg<sup>-1</sup> seed to 15.18% in Imidacloprid 600 FS @ 6 ml kg seed<sup>-1</sup> as against 22.94% damaged plants in untreated check. The termite damage was lowest in Imidacloprid 70 WS @ 20 g kg<sup>-1</sup> seed. It was at par with Imidacloprid 70 WS @ 30 g kg<sup>-1</sup> seed (4.93%), 15 g kg<sup>-1</sup> seed (5.50%), 10 g kg<sup>-1</sup> seed (5.69%) Imidacloprid 600 FS @ 17 ml kg<sup>-1</sup> seed (5.37%), 12 ml kg<sup>-1</sup> seed (6.19%) and 8 ml kg<sup>-1</sup> seed (6.25%; Table 1).

During the year 2002, the damage ranged from 4.21% in Imidacloprid 70 WS @ 30 g kg<sup>-1</sup> seed to 13.39% in Imidacloprid 70 WS @ 5 g kg<sup>-1</sup> seed as against 21.65% in untreated check. The effects of seed treatment with Imidacloprid 70 WS and Imidacloprid 600 FS were comparable. The lowest termite damage was recorded in case

Table 1. Efficacy of imidacloprid seed treatment against termite damage and effects on germination and grain yield of pearl millet

Treatment	No. of seed germinated/plot		Termite damaged plants (%)		Grain yield (q ha <sup>-1</sup> )	
	2001	2002	2001	2002	2001	2002
Imidacloprid 70 WS						
5 g kg <sup>-1</sup> seed	205	201	22.38 (14.50*)	21.46 (13.39)	22.65	24.11
7 g kg <sup>-1</sup> seed	201	197	18.98 (10.59)	18.18 (9.73)	23.66	24.96
10 g kg <sup>-1</sup> seed	207	202	13.80 (5.69)	13.33 (5.31)	27.23	25.94
15 g kg <sup>-1</sup> seed	206	199	13.56 (5.50)	11.92 (4.27)	25.46	27.35
20 g kg <sup>-1</sup> seed	200	196	11.96 (4.29)	12.19 (4.46)	27.32	26.23
30 g kg <sup>-1</sup> seed	199	205	12.83 (4.93)	11.85 (4.21)	26.08	26.58
Imidacloprid 600 FS						
6 ml kg <sup>-1</sup> seed	202	202	22.93 (15.18)	21.16 (13.14)	21.05	21.79
8 ml kg <sup>-1</sup> seed	199	203	14.48 (6.25)	13.42 (5.29)	24.85	25.10
12 ml kg <sup>-1</sup> seed	206	194	14.41 (6.19)	13.67 (5.69)	25.74	25.53
17 ml kg <sup>-1</sup> seed	197	201	13.39 (5.37)	11.90 (4.25)	24.68	25.24
Chlorpyrifos 20 EC @ 4 ml kg <sup>-1</sup> seed	204	197	20.99 (12.84)	20.08 (11.80)	22.17	23.27
Untreated check	206	204	28.62 (22.94)	27.73 (21.65)	17.33	17.66
S.Em±	6.23	5.67	0.72	0.60	1.20	1.27
CD at 5%	NS	NS	2.06	1.73	3.45	3.66

\* Figures in parentheses are retransformed per cent values.

of seed treatment with Imidacloprid 70 WS @ 30 g kg<sup>-1</sup> seed (Table 1).

The two year investigation reveals that seed treatment with Imidacloprid 70 WS at the rate of 10, 15, 20 and 30 g kg<sup>-1</sup> seed and Imidacloprid 600 FS at the rate of 8, 12 and 17 ml kg<sup>-1</sup> seed were equally effective. These treatments were signi-

ficantly superior over Imidacloprid 70 WS at the rate of 5 and 7 g kg<sup>-1</sup> seed, Imidacloprid 600 FS @ 6 ml kg<sup>-1</sup> seed and standard check chlorpyrifos 20 EC @ 4 ml kg<sup>-1</sup> seed.

The seed treatment with Imidacloprid 70 WS @ 5, 7, 10, 15, 20 and 30 g kg<sup>-1</sup>, Imidacloprid 600 FS @ 6, 8, 12 and

17 ml kg<sup>-1</sup> seed and chlorpyrifos 20 EC @ 4 ml kg<sup>-1</sup> did not cause adverse effect on germination. The number of seeds germinated among different treatments and untreated check were at par in both the years. The plant population at germination among different treatments varied from 197 to 207 and 194 to 205 plant/plot in the years 2001 and 2002, respectively (Table 1).

Imidacloprid 70 WS and 600 FS did not cause phytotoxicity to plants. No burning symptoms and lesions appeared on the leaves. The chlorophyll content in pearl millet leaves did not vary significantly among different treatments, indicating no sign of phytotoxicity. It ranged from 0.890 to 0.946 and 0.888 to 0.928 mg g<sup>-1</sup> leaves during 2001 and 2002, respectively.

The population of grub and adults of *Coccinellids* and *Chysoperla carnea* in different treatments ranged from 0.22 to 0.26 and 0.22 to 0.26; 0.31 to 0.37 and 0.31 to 0.36; 0.18 to 0.22 and 0.18 to 0.24; 0.27 to 0.34 and 0.29 to 0.34% per plant during 2001 and 2002, respectively.

The higher grain yield was recorded in Imidacloprid 70 WS @ 10, 15, 20 and 30 g kg<sup>-1</sup> seed and Imidacloprid 600 FS @ 8, 12, and 17 ml kg<sup>-1</sup> during both the years. All these treatments were at par. The higher termite damage and lower grain yields were recorded in seed treatment with chlorpyrifos @ 4 ml kg<sup>-1</sup> seed, Imidacloprid 70 WS @ 5 and 7 g kg<sup>-1</sup> seed and Imidacloprid 600 FS @ 6 ml kg<sup>-1</sup> seed. Keeping in view the results, the seed treatment with Imidacloprid 70

WS @ 10 g kg<sup>-1</sup> seed and imidacloprid 600 FS @ 8 ml kg<sup>-1</sup> seed can be considered as effective and optimum dose as it involves low input and exhibited higher grain at par to the higher doses of imidacloprid 70 WS and 600 FS. The effectiveness of imidacloprid seed treatment against internal feeders of sorghum and pest complex of pearl millet has also been reported by Katole *et al.* (2003), Prem Kishore and Barman (2003) and Noor (2003).

## References

- Gourmet, C., Kolb, F.L., Smyth, C.A. and Pederson, W.L. 1996. Use of imidacloprid as seed treatment to control barley yellow dwarf virus in oat and wheat. *Plow Disease* 80: 136-141.
- Gupta, G.P. and Lal, R. 1995. Comparative toxicity of Imidacloprid against red cotton bug *Dydercus Koneigii* Fab. (Hemiptera: Pyrrhocoridae). *Pesticide Research Journal* 7: 39-41.
- Katole, S.R., Kudale, N.V. and Thakare, S.M. 2003. New systemic insecticides against internal feeders of sorghum. In *Proceedings of the National Symposium on Frontier Areas of Entomological Research*, pp. 26-27, IARI, New Delhi.
- Mote, U.N., Mohite, A.P. and Lolage, G.R. 1995. Effect of Imidacloprid as seed dresser and foliar sprays against sorghum shootfly. *Pestology* 19: 24-29.
- Noor, A. 2003. Management of termite and foliage pests of pearl millet with seed and foliar treatments in arid areas. In *Proceedings of the National Symposium on Frontier Areas of Entomological Research*, pp. 34-35, IARI, New Delhi.
- Prem Kishore and Barman, A.K. 2003. Towards development of IPM module against pearl millet pest complex. In *Proceedings of the National Symposium on Frontier Areas of Entomological Research*, pp. 32-33, IARI, New Delhi.