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Management of termite by broadcasting of novel insecticides in standing crop of wheat

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ABSTRACT

Field experiment was carried out for the management of termite by broadcasting of novel insecticides in standing crop of wheat on cv. GW 496 during 2016-17 crop seasons at Wheat Research Station, SDAU, Vijapur, Gujarat. Seven insecticidal treatments viz., imidacloprid 17.8 SL, fipronil 5 SC, thiamethoxam 30 FS, imidacloprid 600 FS, clothianidin 50 WDG, fipronil + imidacloprid 40% WG, chlorpyriphos 20% EC and untreated control check were evaluated against termite by broadcasting method with the help of sand. The minimum per cent damaged effective tiller/m row and number of damaged effective tillers/ha were found in plots treated with fipronil + imidacloprid 40% WG @ 400 g a.i./ha. The maximum grain yield in g/m row from the same treatment followed by treatment of fipronil 5 SC @ 125 g a.i./ha against termite infesting wheat.

Key words: Broadcasting, damaged effective tiller, insecticidal treatment, termite, fipronil + imidacloprid 40 WG

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Termite *(Odontotermes abesus Rambur)* is predominant insect pest causing 20-40 per cent damage to the wheat crop in the field condition mainly in rainfed areas (Misra *et al.*, 2003). Termites damage were a major problem in Rajasthan and some parts of Madhya Pradesh whereas their damage was low in clay and black soils, high in sandy loam soils and severe in red soils (Sharma *et al.*, 2004). High incidence of termites was also observed in fields of fallow-wheat, sorghum-wheat, maize-wheat and bajra-wheat cropping systems. Similarly, the infestation of termite was higher in rainfed fields as compared to irrigated fields (Sharma *et al.*, 2004). Termite damage may lead to poor germination in crops like sugarcane, wheat, gram, maize, cotton, groundnut, chillies etc. however, their incidence at maturity stage lead to drastic reduction of yield (Verma and Kashyap, 1980). Sharma (1967) estimated the termite losses to wheat crop varying from 0 to 15 per cent in western Rajasthan. At present, insecticides are the mainstay for termite management strategies in crops and urban areas in India and the world (Peterson *et al.*, 2006; Potter, 2011). Termites are extremely difficult to manage since they live in underground nest with ramification of galleries thus chemical pesticides are the only means for the management of termite at present (Rathour *et al.*, 2014). Chemicals insecticides like fipronil, bifenthrin, chlorpyriphos, endosulfan, cypermethrin, imidacloprid, carbosulfan and triazophos were being recommended for control of termite (Kumawat, 2001; Rana *et al.*, 2001; Kishor *et al.*, 2017). Thus, the present investigation was carried out for the evaluation of effect of broadcasting method of novel insecticides against termite in standing crop of wheat in field condition.

MATERIALS AND METHODS

Field experiment was carried out for the management of termite by broadcasting of novel insecticides in standing crop of wheat on cv. GW 496 during 2016-17 crop seasons at Wheat Research Station, SDAU, Vijapur, Gujarat. Experiment was laid out in Randomized Block Design (RBD) in three replications. The net plot size was 13 x 1.6 m with row to row spacing of 20 cm. Seven insecticidal treatments viz., imidacloprid 17.8 SL @ 80 g a.i./ha, fipronil 5 SC @ 125 g a.i./ha, thiamethoxam 30 FS

@ 75 g a.i./ha, imidacloprid 600 FS @ 144 g a.i./ha, clothianidin 50 WDG @ 100 g a.i./ha, fipronil + imidacloprid 40% WG @ 400 g a.i./ha, chlorpyriphos 20% EC @ 600 g a.i./ha and untreated control check were evaluated against termite by broadcasting method. The required amount of insecticides were diluted first in 5 liter of water and then mixed with 100 kg of sand or loose soil per hacter and broadcasted on crop area just after the initiation of termite damage followed by light irrigation. In each plot five spots each of 2 m row length were randomly selected and ear marked permanently for recording observations. Observations on total number of healthy and termite damaged effective tillers from the spots as well as from net plot were recorded just before maturity of the crop and presented as per cent damaged effective tillers and number of damaged effective tillers per m row length and hacter respectively. Grain yield from net plots were recorded ad expressed in q/ha.

RESULTS AND DISCUSSION

There was no termite damage noticed in all the insecticidal treatments after 3rd, 4th and 5th weeks of sowing including the untreated check. At ear head stage, per cent damaged effective tillers/m row was minimum in fipronil + imidacloprid 40% WG @ 400 g a.i./ha and it was at par with all the insecticidal treatments except clothianidin 50 WDG @ 100 g a.i./ha, chlorpyriphos 20% EC @ 600 g a.i./ha and untreated check (Table 1). The number of damaged effective tillers/ha was significantly higher in untreated check as compared to insecticidal treatments. Among all the insecticidal treatments, it was significantly less in fipronil + imidacloprid 40% WG @ 400 g a.i./ha and it was at par with fipronil 5SC @ 125 g a.i./ha, imidacloprid 17.8SL @ 80 g a.i./ha and imidacloprid 600 FS @ 144 g a.i/ha. The grain yield in g/m row revealed non-significant difference among the insecticidal treatments. The maximum grain yield was recorded in plot treated with higher dose of fipronil + imidacloprid 40% WG @ 400 g a.i./ha and fipronil 5SC @ 125 g a.i./ha. The grain yield (q/ha) was also found non-significant however, the highest grain yield was recorded higher dose of fipronil + imidacloprid 40% WG @ 400 g a.i./ha followed by fipronil 5 SC @ 125 g a.i./ha (Table 1).

Similar finding was reported by Kishor et al., 2017 where the minimum damage of affected tillers/m row was 0.40 and 0.41per cent in the treatments of fipronil 5 SC @ 3.0 lit/ha and imidacloprid 600 FS @ 1.5 lit/ha likewise, the recorded grain yield in both g/m row and q/ha were significantly higher in treated plot with fipronil 5 SC @ 3.0 lit/ha and imidacloprid 600 FS @ 1.5 lit/ha with 39.75q/ha and 39.25 q/ha respectively. Moreover, the minimum damaged number of effective tillers/ha were recorded in treated plots with fipronil followed by treated plots with imidacloprid and thiamethoxam as well as the grain yield in both g/m row and q/ha were also significantly higher in treated plot with fipronil (38.61g/m row and 18.17q/ha) followed by treated plots with imidacloprid (37.38g/m row and 17.75q/ha) and thiamethoxam (36.25g/m row and 17.50q/ha) against termite of wheat as reported by Singh et al. (2015).

CONCLUSION

Broadcasting of fipronil + imidacloprid 40% WG @ 400 g a.i./ha was found effective followed by fipronil 5 SC @ 125 g a.i./ha for the management of termite in the standing crop of wheat and also provided the maximum grain yield amongst all the insecticidal treatments.

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Table 1. Effect of broadcasting of novel insecticidal in standing crop of wheat against termite

S. N.	Treatment	Dose (g a.i./ha)	% damaged effective tillers/m row	No. of damaged effective tillers/ha	Grain yield	
					g/m	q/ha
1.	Imidacloprid 17.8 SL	80	4.40*abc (0.59)**	649+ab (10763)++	63.00	34.86
2.	Fipronil 5 SC	125	4.23ab (0.54)	632ab (9902)	66.00	36.24
3.	Thiamethoxam 30 FS	75	5.90abcd (1.08)	849b (20889)	60.00	32.68
4.	Imidacloprid 600 FS	144	5.58abcd (0.94)	802b (22353)	61.00	34.27
5.	Clothianidin 50 WDG	100	11.57de (4.03)	850b (28199)	54.00	31.84
6.	Fipronil+ imidacloprid 40% WG	400	3.76a (0.43)	484a (4887)	66.00	36.33
7.	Chlorpyriphos 20% EC	600	17.91de (9.45)	858bc (29298)	52.00	31.26
8.	Untreated check	-	26.88f (20.42)	1062c (77613)	51.00	31.09
S.Em±			2.14	102	5	2.21
C.D. at 5%			6.50	311	NS	NS
C.V. %			37.02	22.95	13.43	11.41

*Figures followed within same column are Arcsin percentage transformation

**Figures given in parenthesis are Reangular value

+Figures followed within same column are Logarithmic transformation

++ Anti-logarithmic transformed values in parenthesis

Figure followed with same letters are not differed statistically