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Role of tall growing millet crops in the biological suppression of aphid, *Myzus nicotianae* Blackman in bidi tobacco

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ABSTRACT: An experiment was conducted for three consecutive seasons at Regional Agricultural Research Station, Nandyal, from 2002-03 to 2004-05 using different tall growing millets as border crops alone (sorghum, maize and bajra), border crop with one spray of imidacloprid at 35 days after transplanting and spraying of only chemicals, imidacloprid 18.5% SL and acephate 75% WP at 35 days after transplanting and 55 days after transplanting, respectively, with an aim to suppress the aphid, *Myzus nicotianae* in bidi tobacco. On border crops, predators like *Coccinella* sp. (1.95), chrysopids (1.20), spiders (0.85) and syrphids (0.35) were recorded. Highest natural enemy population was recorded on sorghum (8.12 per plant), followed by maize (4.31 per plant) and bajra (2.56 per plant). *Cyrtopeltis* bugs (3.1) and coccinellids (0.17) were recorded on tobacco. Highest cured leaf yield of 1246 kg / ha was recorded when sorghum was border crop and one spray of imidacloprid was given at 35 days after transplanting. Significantly higher yield was recorded in treated plots as compared to control (1044.5 kg/ha) and among the treatments there was no significant difference.

KEY WODRS: Biological suppression, millet crops, *Myzus nicotianae*, tobacco aphid

INTRODUCTION

The bidi tobacco is one of the important commercial crops in Kurnool district of Andhra Pradesh. It is being cultivated in around 10,000 ha in black soils on residual soil moisture as late kharif crop. The tobacco aphid, *Myzus nicotianae* Blackman is one of the important biotic factors limiting tobacco cultivation in Kurnool district (Prasada Rao *et al.*, 2005). The aphid infests the transplanted tobacco middle in the season. Farmers solely dependent upon synthetic chemicals to control the pest. Over-reliance and indiscriminate use of insecticides promote insecticide resistance in the pest leading to failure of control measures. Taking all these issues into consideration, the investigation was proposed to suppress the pest biologically.

MATERIALS AND METHODS

An experiment was conducted for three consecutive seasons from 2002-03 onwards to study the role of tall growing millet crops as a border to tobacco main crop in the biological suppression of *Myzus nicotianae* with three replications in a randomized block design at the Regional Agricultural Research Station (RARS), Nandyal. The treatments were: 1. Sorghum border (2 rows), 2. Maize border (2 rows), 3. Bajra border (2 rows), 4. Sorghum border + one spray imidacloprid 25 g a.i./ha, 5. Maize border + one spray imidacloprid 25 g a.i./ha, 6. Bajra border + one spray imidacloprid 25 g a.i. / ha, 7. One spray imidacloprid 25 g a.i. / ha + one spray acephate 750 g a.i. / ha, 8. Control (No border crop and no spray). Observations were recorded at fortnightly interval on

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the pest incidence and natural enemy population on ten plants in each plot. Yield was also recorded.

RESULTS AND DISCUSSION

Aphid infestation

All the treatments were significantly superior to control (Table 1). Among the treatments, border crops (sorghum and maize) in combination with one spray of imidacloprid were significantly superior over border crops alone. However, the treatment bajra + one spray imidacloprid was on par with bajra border alone. In control plot (tobacco sole crop), the aphid infested plants recorded was 98.7%. In the remaining treatments, aphid infestation ranged from 8.8 to 49.6 percent. Highest per cent reduction (91%) of aphid infested plants over control was recorded in sorghum with one spray of imidacloprid followed by maize border with one spray imidacloprid (85.56%), one spray imidacloprid with one spray acephate (80.6%) and bajra border with one spray imidacloprid (52.4%). Border crops alone prevented aphid infestation by 50.46 to 68.9 per cent over control. Shenoi *et al.* (2005) also reported that bajra or jowar as barrier crop with one spray of imidacloprid (0.003%) was effective in significantly reducing the aphid infestation (95%) in FCV tobacco in Karnataka light soils. They have also reported that chemical module involving rotation of sprays with imidacloprid and acephate required a minimum of three sprays for achieving the same results.

Natural enemy population

The data on natural enemy population on tobacco and barrier crops are presented in Table 2. Only *Cyrtopeltis* sp. (3.1) and *Coccinella* sp. (0.17) were recorded on tobacco crop irrespective of border crops. *Coccinella* sp., spiders, syrphids and green lacewings were recorded on all the three border crops. In general the predators were found in high numbers in treatments involving only border crops. The treatments with spray schedules showed drastic reduction in the population of natural enemies in tobacco crop (1.89 per plant). Maximum predator population of 3.44 per plant was recorded on tobacco crop with maize border, followed by tobacco sole crop (3.27 per plant), sorghum border (3.13 per plant) and bajra border (2.68 per plant). Regarding natural enemy population on border crops, highest number (8.12 per plant) was recorded on sorghum border alone, followed by maize border (4.08 per plant)

Table 1. Effect of border crops on the incidence of tobacco aphid, *Myzus nicotianae*

Treatments	Mean per cent plants infested by aphids*	Mean per cent reduction of aphid infested plants over control
Sorghum border	30.6 (33.6)	68.9 (56.1)
Maize border	32.8 (34.9)	66.7 (54.7)
Bajra border	49.6 (44.6)	50.4 (45.2)
Sorghum border + one spray imidacloprid 25 g a.i. / ha	8.8 (17.2)	91.0 (72.5)
Maize border + one spray imidacloprid 25 g a.i. / ha	14.4 (22.3)	85.5 (67.7)
Bajra border + one spray imidacloprid 25 g a.i./ ha	46.0 (42.3)	52.4 (46.3)
One spray imidacloprid 25 g a.i./ ha + one spray acephate 750 g a.i./ ha	19.0 (26.9)	80.6 (63.8)
Tobacco sole crop (no border & no spray)	98.7 (86.0)	-
SEM ±	1.41	
CD (P = 0.05)	4.30	
CV%	6.70	

Table 2. Mean population of natural enemies on tobacco and border crops (on 10 selected plants / plot)

Treatment	Population per plant on tobacco	Population per plant on border crop (*Cyrtopeltis* sp., *Coccinella* sp., chrysopids and Spiders)
Sorghum border	3.13	8.12
Maize border	3.44	4.31
Bajra border	2.68	2.50
Sorghum border + one spray imidacloprid 25 g ai/ha	1.89	8.22
Maize border + one spray imidacloprid 25 g ai/ha	1.88	4.08
Bajra border + one spray imidacloprid 25 g ai/ha	1.86	2.50
One spray imidacloprid 25 g ai/ha + one spray acephate 750 ai/ha	1.32	-
Tobacco sole crop (No border & no spray)	3.27	-

Table 3. Yield data of bidi tobacco in different treatments

Treatment	Yield (kg / ha)
Sorghum border	1175.5
Maize border	1209.4
Bajra border	1221.7
Sorghum border + one spray imidacloprid 25 g a. i. / ha	1246.0
Maize border + one spray imidacloprid 25 g ai / ha	1188.6
Bajra border + one spray imidacloprid 25 g ai / ha	1182.5
One spray imidacloprid 25 g ai / ha + one spray acephate 750 ai/ha	1258.5
Tobacco sole crop (no border & no spray)	1044.5
CD (P = 0.05)	83.0
CV (%)	6.73

and bajra border (2.5). On tobacco crop, predominant natural enemy recorded was *Cyrtopeltis* sp. and on border crops, predominant natural enemy recorded was *Coccinella* sp. It is evident from the data that these tall growing millet crops played a significant role in the build up and conservation of natural enemy population and also higher yield (Table 3).

Hence it can be concluded that these tall growing millet crops as a barrier to main tobacco crop will play a significant role in the suppression of *M. nicotianae*, which is an important pest of tobacco.

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