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FIELD SCREENING OF MOTHBEAN, *VIGNA ACONITIFOLIA* (JACQ.) MARECHAL ENTRIES AGAINST JASSID, WHITEFLY AND THRIPS

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ABSTRACT

Fifteen entries of mothbean, *Vigna aconitifoli* (Jacq.) Marechal were screened under field conditions against jassid, *Empoasca m*otti Pruthi, whitefly, *Bemisia tabaci* Genn. and thrips, *Caliothrips indicus* Bagnal for two consecutive seasons *kharif ,* 2004. During the investigation the following entries were found least susceptible, CZM–1, Jwala and RMB–54 against jassid CZM–99, Jwala and RMM–101 against whitefly and Jwala, RMB–54 and CZM–45 against thrips. None of the varieties were found immune to the attack of jassid, whitefly and thrips.

Key words: Mothbean, screening, jassids, whitefly, thrips

INTRODUCTION

Mothbean, *Vigna aconitifolia* (Jacq.) Marechal is one of the important pulse crops well suited for arid and semi–arid regions of the country. At the national level, Rajasthan state enjoys the privilege of being at the top in its production contributing about 75–80 per cent of the total national production. In the arid region of Rajasthan, it is the only pulse crop cultivated during *kharif*. The state occupies an area of 1,491,872 ha with an annual production of 790,650 tonnes (Anonymous, 2003). Mothbean is comparatively rich in proteins and is comparatively less expensive. The seed of mothbean contain about 10.30 per cent moisture, 25.66 per cent protein, 2.78 per cent fat, 0.41 per cent mineral matter 3.90 per cent fibre and 61.76 per cent carbohydrate (Despandey and Rao, 1954, Brown and Gaur 1960 and Pant and Tulsiani, 1963).

The crop has not received proper scientific attention towards its cultivation in general and the pests problems are less studied. The crop is damaged by a number of insect pests jassid, *Empoasca motti*; whitefly, *Bemisia tabaci* and thrips, *Caliothrips indicus*. Jassids and whiteflies also act as vector of yellow mosaic virus apart from causing direct damage (Satyavir *et al.,* 1984). The present study aims to explore the sources of resistance among mothbean varieties against insect pests.

MATERIALS AND METHODS

Field experiments were laid out at the Agronomy Farm of S.K.N. College of Agriculture, Jobner (Rajasthan) during *kharif*, 2003 and 2004. Fifteen entries of mothbean were screened against jassids, whitefly and thrips. The experiment was laid out in a randomized block design with three replications. The seed of entries were sown on 20th July 2003 and 23rd July 2004 in the plots measuring 2.40 x 1.80 m^2 having row to row and plant to plant distance of 30 cm and 15 cm, respectively. The entries were allowed to have a natural infestation. Weekly observation on population of jassid, whitefly and thrips were recorded soon after the appearance of the insect pests till the maturity of the crop. The population of jassid was recorded by using an iron cage (45 x 45 x 45 cm^3 size) covered by muslin cloth by placing over on randomly selected plants, disturbing manually by shaking the plants and the jassid thus disturbed settled on the wall of the cages were immediately counted. The population of whitefly was recorded by counting the nymph and adults on five randomly selected plants, which were previously tagged in each plot. The population of thrips (nymph and adults) was counted on permanently tagged five plants in each plot. Giving a gentle jerk to selected branches on white sheet measuring (30 x 20 c^2), the thrips fell down on the sheet and were counted immediately. The data obtained on jassids, whiteflies and thrips population recorded from the experimental field were transformed into $\sqrt{X+0.5}$ (Gomez and Gomez, 1976) and subjected to statistical analysis. The data obtained in two different years were pooled. The peak population of jassids, whiteflies and thrips on mothbean entries recorded during the crop season were categorized on the basis of mean peak population with standard deviation.

RESULTS AND DISCUSSION

None of the entries of mothbean was found completely free from the attack of jassid. The infestation was first observed in the third week of August (three week of after

sowing) during both the years. The pooled data of jassid population (Table 1) revealed that the mothbean entries were categorized as least susceptible (mean jassid population below 14.21/plant), moderately susceptible (14.21 to 20.35/plant) and highly susceptible (above 20.35/plant) on the basis of mean ± standard deviation data. According to this criterion CZM–1, Jwala and RMB–54 were rated as least susceptible. The entries, RMO–423, RMB–101, RMB–60, CZM–45, RMM–101, RMO–40, CZM–99, RMM–102 were rated as moderately susceptible and entries RMM–103, RMO–435, RMM–104 and GMO–9910 as highly susceptible. The pooled data of whitefly population (Table 2) showed that the mothbean entries could be categorized as least susceptible (mean whitefly population below 14.79/plant), moderately susceptible (14.79 to 24.87/plant) and highly susceptible (above 24.87 /plant). Considering the peak whitefly population the entries CZM–99, Jwala and RMM–101 were considered as least susceptible while GMO–9910 CZM–1 and RMM–104 observed as highly susceptible and remaining entries

Table 1. Resistance of mothbean entries to jassid, *E. motti* (Pooled mean, *Kharif*, 2003 and 2004)

S. No	Entries	Mean jassid population per plant at weekly intervals								Mean
		1st	IInd	IIIrd	IVth	Vth*	VIth	VIIth	VIIIth	
1.	CZM–1	1.14 (1.26)	3.73 (2.09)	7.67 (2.86)	8.40 (2.98)	12.70 (3.63)	6.14 (2.57)	2.00 (1.56)	0.40 (0.92)	5.27 (2.40)
2.	CZM–45	1.94 (1.55)	4.87 (2.31)	10.67 (3.34)	11.73 (3.49)	17.20 (4.20)	9.60 (3.17)	3.97 (2.11)	0.93 (1.19)	7.61 (2.85)
3.	CZM–99	3.20 (1.92)	4.77 (2.29)	10.73 (3.34)	11.90 (3.51)	17.64 (4.25)	9.04 (3.08)	4.07 (2.13)	1.04 (1.24)	7.80 (2.88)
4.	Jwala	2.60 (1.76)	3.70 (2.05)	7.90 (2.89)	10.10 (3.25)	12.74 (3.63)	5.20 (2.39)	2.40 (1.70)	0.00 (0.71)	5.58 (2.46)
5.	RMO–40	2.77 (1.80)	5.10 (2.36)	10.74 (3.35)	13.90 (3.79)	17.30 (4.22)	10.23 (3.27)	4.27 (2.18)	0.77 (1.13)	8.13 (2.94)
6.	RMO–423	3.80 (2.06)	4.87 (2.31)	11.07 (3.39)	14.10 (3.81)	15.30 (3.97)	9.80 (3.20)	4.10 (2.14)	1.07 (1.25)	8.01 (2.92)
7.	RMO–435	2.90 (1.84)	6.33 (2.61)	13.40 (3.73)	18.90 (4.40)	21.17 (4.65)	14.84 (3.91)	5.40 (2.43)	1.30 (1.34)	10.53 (3.32)
8.	RMB–54	2.50 (1.72)	4.20 (2.16)	7.70 (2.86)	8.70 (3.03)	13.14 (3.69)	6.10 (2.56)	3.30 (1.94)	0.47 (0.97)	5.76 (2.50)
9.	RMB–60	3.14 (1.90)	4.83 (2.30)	10.94 (3.38)	14.70 (3.89)	17.10 (4.19)	8.24 (2.95)	4.50 (2.22)	1.03 (1.24)	8.06 (2.92)
10.	RMB–101	3.13 (1.90)	5.20 (2.38)	10.90 (3.37)	15.10 (3.94)	15.80 (4.04)	9.53 (3.16)	4.27 (2.18)	1.00 (1.22)	8.12 (2.93)
11.	RMM–101	3.20 (1.92)	5.17 (2.38)	11.04 (3.39)	12.67 (3.63)	17.23 (4.21)	8.90 (3.06)	4.83 (2.30)	0.90 (1.18)	7.99 (2.91)
12.	RMM–102	2.90 (1.84)	5.27 (2.40)	11.00 (3.39)	14.14 (3.82)	17.64 (4.25)	9.70 (3.19)	4.20 (2.16)	0.94 (1.20)	8.22 (2.95)
13.	RMM–103	3.00 (1.87)	6.74 (2.69)	14.17 (3.82)	17.60 (4.25)	20.90 (4.62)	12.94 (3.66)	5.37 (2.42)	1.13 (1.27)	10.23 (3.27)
14.	RMM–104	2.90 (1.84)	6.30 (2.60)	14.20 (3.83)	18.80 (4.38)	21.54 (4.68)	13.74 (3.77)	5.17 (2.37)	0.94 (1.19)	10.45 (3.30)
15	GMO–9910	3.50 (1.99)	6.70 (2.68)	13.64 (3.76)	19.10 (4.42)	21.80 (4.72)	14.57 (3.87)	5.67 (2.47)	1.14 (1.27)	10.76 (3.35)
	SEm ±	0.05	0.06	0.08	0.09	0.09	0.08	0.05	0.03	0.05
	CD (P = 0.05)	0.14	0.16	0.21	0.24	0.25	0.21	0.13	0.08	0.14

* Peak population of jassid; Figures in parentheses are $\sqrt{X+0.5}$ transformed values.

Table 2. Resistance of mothbean entries to whitefly, *B. tabaci* (Pooled mean, *Kharif*, 2003 and 2004)

S. No	Entries	Average number of whitefly per plant at weekly intervals								Mean
		1st	IInd	IIIrd	IVth	Vth*	VIth	VIIth	VIIIth	
1.	CZM–1	3.00 (1.86)	8.80 (3.04)	12.47 (3.73)	21.70 (4.70)	27.20 (5.25)	13.80 (3.78)	6.10 (2.56)	1.77 (1.50)	11.85 (3.51)
2.	CZM–45	1.57 (1.43)	6.10 (2.56)	8.10 (2.93)	15.50 (3.99)	21.00 (4.63)	11.10 (3.40)	6.44 (2.22)	1.40 (1.37)	8.65 (3.02)
3.	CZM–99	0.00 (0.71)	1.50 (1.41)	3.50 (2.00)	8.00 (2.91)	11.40 (3.44)	7.10 (2.75)	2.00 (1.55)	0.30 (0.88)	4.23 (2.17)
4.	Jwala	0.00 (0.71)	1.40 (1.38)	3.50 (1.99)	8.73 (3.03)	11.53 (3.46)	7.70 (2.86)	2.30 (1.66)	0.00 (0.71)	4.40 (2.21)
5.	RMO–40	1.27 (1.33)	6.27 (2.60)	9.70 (3.19)	19.33 (4.44)	20.50 (4.58)	11.03 (3.39)	4.20 (2.17)	1.17 (1.29)	9.18 (3.11)
6.	RMO–423	1.73 (1.49)	6.50 (2.63)	9.40 (3.13)	15.83 (4.03)	20.20 (4.54)	13.30 (3.71)	4.00 (2.11)	0.90 (1.18)	8.98 (3.08)
7.	RMO–435	1.97 (1.57)	6.27 (2.60)	9.77 (3.20)	16.40 (4.11)	20.40 (4.57)	10.77 (3.35)	4.70 (2.28)	1.20 (1.30)	8.93 (3.07)
8.	RMB–54	1.73 (1.49)	5.87 (2.52)	10.33 (3.28)	17.70 (4.26)	18.80 (4.39)	12.54 (3.60)	3.74 (2.05)	0.77 (1.13)	8.93 (3.07)
9.	RMB–60	1.80 (1.51)	6.27 (2.59)	10.00 (3.24)	17.33 (4.22)	21.10 (4.64)	11.00 (3.39)	4.42 (2.21)	1.17 (1.29)	9.14 (3.10)
10.	RMB–101	1.50 (1.41)	6.70 (2.67)	9.50 (3.16)	16.50 (4.12)	20.54 (4.58)	11.84 (3.51)	4.30 (2.19)	1.30 (1.34)	9.02 (3.08)
11.	RMM–101	0.00 (0.71)	1.80 (1.52)	3.57 (2.01)	7.87 (2.89)	11.70 (3.49)	8.27 (2.95)	2.14 (1.60)	0.14 (0.79)	4.43 (2.22)
12.	RMM–102	1.67 (1.47)	6.00 (2.54)	10.17 (3.26)	17.27 (4.21)	20.30 (4.56)	11.00 (3.38)	4.20 (2.16)	1.10 (1.26)	8.96 (3.07)
13.	RMM–103	1.60 (1.45)	6.07 (2.55)	10.64 (3.33)	18.30 (4.33)	19.80 (4.50)	11.50 (3.46)	5.30 (2.40)	1.17 (1.29)	9.30 (3.13)
14.	RMM–104	2.90 (1.84)	9.23 (3.12)	13.07 (3.68)	22.67 (4.81)	27.04 (5.25)	14.27 (3.83)	6.67 (2.67)	0.80 (1.52)	12.20 (3.56)
15	GMO–9910	2.67 (1.77)	8.80 (3.04)	12.90 (3.66)	21.97 (4.74)	26.00 (5.14)	14.67 (3.88)	6.50 (2.64)	1.80 (1.51)	11.91 (3.52)
	SEm ±	0.05	0.06	0.07	0.09	0.10	0.08	0.06	0.04	0.05
	CD ($P = 0.05$)	0.13	0.16	0.21	0.24	0.27	0.23	0.16	0.10	0.15

* Peak population of whitefly; Figures in parentheses are $\sqrt{X + 0.5}$ transformed values

were observed as moderately susceptible. The pooled data of thrips population (Table 3) revealed that the entries Jwala, RMO–54 and CZM–45 were least susceptible, RMM–104, RMO–435 and GMO–9910 as highly susceptible; whereas, remaining entries were observed as moderately susceptible. In the present investigation CZM–1, Jwala and RMB–54 were observed least susceptible to the attack of jassid. The present finding partially get support from finding of Satyavir *et al.* (1984) and Dabi and Gour (1988). The entries which were found in middle order to the jassid population are in close conformity with that of Dhamaniya *et al.* (2005). The mothbean entry CZM–1 was found highly susceptible to whitefly, as earlier observed (Anonymous, 2001).

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Table 3. Resistance of mothbean entries to thrips, *C. indicus* (Pooled mean, *Kharif*, 2003 and 2004)

S. No	Entries	Average number of thrips per plant								Mean
		1st	IInd	IIIrd	IVth	Vth*	VIth	VIIth	VIIIth	
1.	CZM–1	1.30 (1.33)	2.84 (1.82)	4.00 (2.12)	6.90 (2.72)	11.20 (3.42)	7.67 (2.85)	4.10 (2.14)	0.57 (1.03)	4.82 (2.31)
2.	CZM–45	0.94 (1.12)	1.95 (1.56)	3.40 (1.97)	6.17 (2.57)	8.30 (2.96)	5.33 (2.40)	2.33 (1.62)	0.10 (0.77)	3.56 (2.01)
3.	CZM–99	2.14 (1.61)	2.77 (1.80)	4.43 (2.22)	7.85 (2.89)	11.34 (3.44)	7.23 (2.78)	4.02 (2.12)	0.67 (1.07)	5.05 (2.36)
4.	Jwala	0.00 (0.71)	2.07 (1.60)	2.43 (1.71)	5.67 (2.48)	6.60 (2.66)	3.70 (2.05)	1.04 (1.24)	0.00 (0.71)	2.69 (1.78)
5.	RMO–40	2.15 (1.62)	3.13 (1.90)	4.93 (2.32)	7.60 (2.84)	12.20 (3.56)	5.47 (2.44)	3.47 (1.99)	0.10 (0.77)	4.88 (2.32)
6.	RMO–423	1.70 (1.48)	3.27 (1.93)	4.00 (2.11)	7.40 (2.80)	11.74 (3.48)	6.10 (2.55)	4.13 (2.13)	0.70 (1.09)	4.88 (2.31)
7.	RMO–435	1.54 (1.42)	4.27 (2.17)	6.23 (2.59)	10.50 (3.31)	15.47 (3.99)	12.00 (3.53)	5.83 (2.51)	1.37 (1.36)	7.15 (2.77)
8.	RMB–54	0.00 (0.71)	3.80 (2.06)	3.07 (1.88)	5.60 (2.46)	7.30 (2.78)	4.33 (2.19)	1.10 (1.26)	0.00 (0.71)	3.15 (1.91)
9.	RMB–60	2.20 (1.63)	1.40 (1.37)	3.37 (1.96)	8.07 (2.92)	11.20 (3.41)	6.27 (2.60)	4.10 (2.13)	1.30 (1.33)	4.74 (2.29)
10.	RMB–101	2.00 (1.57)	2.90 (1.84)	5.33 (2.40)	7.27 (2.78)	11.50 (3.46)	9.17 (3.09)	4.50 (2.22)	0.70 (1.09)	5.42 (2.43)
11.	RMM–101	1.73 (1.49)	2.80 (1.81)	3.67 (2.04)	7.47 (2.82)	11.77 (3.50)	7.30 (2.79)	4.04 (2.12)	0.70 (1.09)	4.93 (2.33)
12.	RMM–102	2.14 (1.61)	2.34 (1.68)	4.10 (2.14)	7.73 (2.87)	12.84 (3.65)	8.00 (2.91)	3.83 (2.07)	0.40 (0.94)	5.17 (2.38)
13.	RMM–103	2.33 (1.67)	2.67 (1.78)	3.30 (1.94)	7.37 (2.80)	13.34 (3.70)	7.80 (2.87)	3.60 (2.02)	0.60 (1.05)	5.13 (2.37)
14.	RMM–104	2.30 (1.66)	4.10 (2.14)	5.47 (2.44)	10.10 (3.25)	15.00 (3.94)	12.93 (3.66)	6.30 (2.59)	1.22 (1.31)	7.18 (2.77)
15	GMO–9910	2.37 (1.69)	4.64 (2.24)	6.30 (2.60)	10.67 (3.33)	16.30 (4.09)	12.60 (3.61)	6.43 (2.62)	1.40 (1.37)	7.59 (2.84)
	SEm ±	0.04	0.06	0.06	0.07	0.08	0.08	0.07	0.03	0.05
	CD (P = 0.05)	0.11	0.15	0.16	0.19	0.23	0.23	0.18	0.07	0.14

*Peak population of thrips; Figures in parentheses are $\sqrt{X + 0.5}$ transformed values

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