



Screening of Certain Genotypes of Greengram (*Vigna radiate* (L.)) Against Thrips

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ABSTRACT

An experiment was conducted for screening of certain genotypes of greengram against *Thrips palmi*. The response of genotypes was observed in terms of thrips population and yield. The results indicated that the 96 genotypes were moderately preferred by thrips with the mean thrips population ranged between 2.3 and 3.7 / plant and yield ranged between 24.6 g /20 plants (IC 336736) to 66.59 g /20 plants (IC 39379). Forty five genotypes showed high preference to thrips with the mean thrips population ranged between 3.7 to 4.6 / plant and the yield varied from 17.67 g /20 plants (IC 324025) to 21.35 g / 20 plants (IC 325988). Nine genotypes showed very high preference to thrips. The mean thrips population ranged between >4.6 / plant and yields ranged between of 12.50 g / 20 plants (IC 39412) to 16.00 g / 20 plants (IC 369819). One genotype LGG 460 showed least preference to thrips with 2.4 of mean thrips population per plant and recorded highest yield of 60.00 g / 20 plants.

Key words : Genotypes, Greengram, Thrips, Population, Yield.

Greengram is an excellent source of high quality protein, which contains about 25% protein. India is the leading country in the production of green gram with around 65% of the world hectareage and 54% of the world production (Pohelman, 1991). In Andhra Pradesh, greengram is cultivated in an area of 4.4 lakh ha with a production of 2.17 lakh tones (Ministry of Agriculture, Govt. of India. 2008). One of the major constraints for the low yield in greengram is damage caused by insect pest complex. The important insect pests of greengram are leaf hoppers, whitefly, stemfly, spotted pod borer, tobacco caterpillar and thrips. Thrips constitute a major group of insect pest complex on greengram (Chhabra and Kooner, 1998). Besides direct injury by feeding, many species of thrips also act as vectors of plant viruses (Anantha Krishnan, 1980) particularly tospoviruses (Kormelink, 1994).

Of the several viral diseases attacking greengram, leaf curl disease caused by peanut bud necrosis virus (PBNV), transmitted by *Thrips palmi* (Karny) (Sreekanth, 2002) is considered to be a major threat, causing 40% yield loss (Nene, 1972). Based on the serological and vector relationships and, leaf curl disease of greengram and blackgram was known to be caused by Tomato Spotted Wilt Virus (TSWV), the virus that causes bud necrosis disease in groundnut (Ghanekar *et al*, 1979 a) and reported to be transmitted by

Scirtothrips dorsalis (Hood.) (Amin *et al.*, 1981; Ghanekar *et al.*, 1979b) and *Frankliniella schultzei* (Amin *et al.*, 1981) on groundnut. Subsequent studies by Reddy *et al.* (1992) showed that a virus distinct from TSWV, was responsible to cause Peanut Bud Necrosis Disease (PBNV) and named as Peanut Bud Necrosis Virus (PBNV). Vijayalakshmi (1994) and Lipra (1999) documented that *T. palmi* was the vector of PBNV on groundnut, but not *S. dorsalis* or *F. schultzei*.

The efficacy of insecticides for the management of thrips has been reported by several workers. Of late the management of viral diseases transmitted through thrips with chemicals is successful partially only due to the prevalence of high temperature coupled with prolonged dry spell during early stage of crop growth. In this context, identification of greengram genotypes tolerant/resistant to thrips provides a cheap and cost effective component for management of thrips.

MATERIAL AND METHODS

Study on "Screening of certain genotypes of greengram [*Vigna radiata* (L.) Wilczek] against thrips" was conducted at Regional Agricultural Research Station (RARS), Lam, Guntur, Andhra Pradesh during *Kharif* and *Rabi* 2008-2009.

Investigation was carried out to screen the resistance levels of greengram genotypes against the thrips. Greengram germplasm obtained from

Table 1. Classification of greengram genotypes based on incidence of thrips (no).

Greengram genotypes with								
Moderate preference (2.3 - 3.7)			High preference(3.8-4.6)			Very high preference(>4.6)		
Entry no	Thrips/ Plant (no)	Yield gm/ 20plant	Entry no	Thrips/ Plant (no)	Yield gm/ 20plant	Entry no	Thrips/ Plant (no)	Yield gm/ 20plant
IC39368	3.1	33.33	IC39371	3.8	20.60	IC39412	6.2	12.56
IC39370	3.5	27.18	IC39386	3.8	23.78	IC325770	5.0	14.57
IC39372	3.3	26.47	IC39391	4.1	20.83	IC370489	4.8	14.08
IC39373	3.4	26.24	IC373547	3.9	20.83	IC325823	5.0	13.58
IC39374	3.1	26.00	IC39408	3.8	23.47	IC338882	5.1	12.67
IC39376	3.0	34.75	IC39409	4.2	20.25	IC338914	4.9	13.92
IC39377	3.4	35.58	IC39410	4.2	18.83	IC338922	4.9	13.42
IC39378	3.5	25.92	IC39414	4.6	19.17	IC338952	4.7	15.58
IC39379	3.1	66.59	IC39416	3.9	19.42	IC369819	4.9	16.08
IC39382	3.7	34.67	IC39417	4.5	19.50	Negligible preference		
IC39383	3.5	26.13	IC39418	4.5	18.50	Entry no	Thrips/ Plant (no)	Yield gm/ 20plant
IC39384	3.3	30.33	IC39421	4.3	19.83	LGG460	2.4	60.00
IC39385	3.7	26.09	IC39422	4.3	17.69	-	-	-
IC39387	3.2	31.55	IC39424	4.4	18.83	-	-	-
IC39388	3.1	29.49	IC39429	3.8	20.25	-	-	-
IC39389	3.3	39.11	IC39509	4.3	18.42	-	-	-
IC39390	3.3	35.68	IC311408	4.5	18.83	-	-	-
IC39394	3.5	40.68	IC311410	3.8	19.00	-	-	-
IC39395	3.3	39.13	IC311418	4.5	19.50	-	-	-
IC39396	3.7	26.17	IC311419	4.6	19.44	-	-	-

National Bureau of Plant Genetic Resource, (NBPGR), Hyderabad & Local Popular variety was used as a source material for study. The experiment was laid out in a Randomized Block Design (RBD) with three replications and 150 genotypes as treatments. Each genotype was sown in a single row of 5 m length with a distance of 30 cm between rows and 10 cm between plant to plant with in the row. Local cheek LGG 460 was sown after every 10 genotypes. The thrips population was recorded at weekly intervals on top, middle and lower leaves randomly and the overall mean was computed.

Statistical Analysis

The data on the mean population of *T.palmi* was analyzed as per the standard procedure. The mean CD values were utilized in quantifying the preference of *T.palmi* and were graded into four groups as per the method suggested by Manoharan *et al.*, 1982.

1. Negligible Preference - Genotypes with values < Mean – C.D.
2. Moderate Preference – Genotypes with values between mean – C.D and Mean.
3. High Preference - Genotypes with values between means and mean + C.D.
4. Very high Preference - genotypes with values > Mean +C.D

RESULTS AND DISCUSSIONS

The thrips population and yield recorded on 150 genotypes of greengram and local check are presented in table. The thrips population on different genotypes varied from 2.4 (LGG 460) to 6.2 (IC 39412) per 5 plants and differed significantly.

Based on mean thrips population and CD values, the greengram genotypes were classified in to different groups. One of the genotypes (LGG 460) screened exhibited least preferred by thrips.

Table 1. cont.....

Greengram genotypes with								
Moderate preference (2.3 - 3.7)			High preference(3.8-4.6)			Very high preference(>4.6)		
Entry no	Thrips/ Plant (no)	Yield gm/ 20plant	Entry no	Thrips/ Plant (no)	Yield gm/ 20plant	Entry no	Thrips/ Plant (no)	Yield gm/ 20plant
IC39397	3.5	26.95	IC311420	4.3	19.03	-	-	-
IC39398	3.7	27.33	IC311424	4.1	20.72	-	-	-
IC39399	3.2	41.05	IC324025	4.4	17.67	-	-	-
IC39401	3.7	27.25	IC325752	4.2	18.98	-	-	-
IC39402	3.1	28.30	IC325774	4.2	19.42	-	-	-
IC39404	3.0	26.92	IC325853	4.6	19.13	-	-	-
IC39406	3.7	31.24	IC325929	4.3	20.17	-	-	-
IC39407	3.3	32.17	IC325988	4.1	21.35	-	-	-
IC39413	3.2	39.00	IC325989	4.1	20.33	-	-	-
IC39415	3.4	28.83	IC325995	4.1	20.52	-	-	-
IC39419	3.5	32.70	IC326026	4.2	18.92	-	-	-
IC39423	3.5	28.17	IC326730	4.3	19.33	-	-	-
IC39425	3.3	28.74	IC326755	4.2	18.33	-	-	-
IC39426	3.0	26.99	IC328924	4.6	19.33	-	-	-
IC39446	3.3	27.72	IC329067	3.8	20.27	-	-	-
IC39510	3.4	31.11	IC332246	4.1	19.33	-	-	-
IC39511	3.5	27.50	IC336778	4.3	19.50	-	-	-
IC311395	3.0	30.67	IC338850	4.5	19.75	-	-	-
IC311397	3.5	29.33	IC338875	4.5	19.25	-	-	-
IC311409	3.5	29.25	IC338902	4.3	18.67	-	-	-
IC311437	3.6	28.33	IC370474	4.5	19.42	-	-	-
IC311445	3.6	27.42	IC370515	4.2	20.96	-	-	-
IC311446	3.3	27.42	IC370532	4.5	18.33	-	-	-
IC324005	3.7	26.67	IC373426	4.2	20.83	-	-	-
IC324012	3.0	30.00	IC323998	4.6	18.07	-	-	-
IC324021	2.5	27.67	-	-	-	-	-	-
IC324036	3.0	29.81	-	-	-	-	-	-

The genotype IC 39412 which recorded 6.2 thrips per plant, exhibited very high preference, and nine genotypes which recorded thrips population in the range greater than 4.6 per plant, exhibited very high preference. The forty five genotypes with the range of 3.7 to 4.6 thrips population per plant exhibited high preference to thrips. The rest of 96 genotypes with the range of 2.3 to 3.0 thrips population per plant exhibited moderate preference to thrips. Among all the varieties, the popular variety LGG 460 (2.4 nos) exhibited negligible preference to thrips.

Effect of thrips population on greengram yield

Yield on different genotypes varied from 66.59 g (IC 39379) to 12.56 g (IC 39412) Among the moderate preferred genotypes, yield varied from 24.67 g (IC 336736) to 66.59 g (IC 39379) per 20 plants. The highest yield was recorded as 66.59 g (IC 39379), followed by 41.05 g (IC 39399) and 40.68 g (IC 39394). The lowest yield was recorded in IC 336736 as 24.67 g per 20 plants.

In high preference genotypes the yield varied from 23.78 g (IC 39386) to 17.67 g (IC 324025)

Table 1. cont.....

Greengram genotypes with								
Moderate preference (2.3 - 3.7)			High preference(3.8-4.6)			Very high preference(>4.6)		
Entry no	Thrips/ Plant (no)	Yield gm/ 20plant	Entry no	Thrips/ Plant (no)	Yield gm/ 20plant	Entry no	Thrips/ Plant (no)	Yield gm/ 20plant
IC325738	3.5	-	-	-	-	-	-	-
IC325756	3.6	-	-	-	-	-	-	-
IC325782	3.1	-	-	-	-	-	-	-
IC325787	3.0	-	-	-	-	-	-	-
IC325788	3.6	-	-	-	-	-	-	-
IC325791	3.4	-	-	-	-	-	-	-
IC325799	3.0	-	-	-	-	-	-	-
IC325810	3.2	-	-	-	-	-	-	-
IC325817	3.7	-	-	-	-	-	-	-
IC325833	3.7	-	-	-	-	-	-	-
IC326724	3.4	-	-	-	-	-	-	-
IC329057	3.3	-	-	-	-	-	-	-
IC329078	3.3	-	-	-	-	-	-	-
IC330853	3.1	-	-	-	-	-	-	-
IC330875	3.4	-	-	-	-	-	-	-
IC330881	3.5	-	-	-	-	-	-	-
IC331228	3.2	-	-	-	-	-	-	-
IC331240	3.3	-	-	-	-	-	-	-
IC332183	3.2	-	-	-	-	-	-	-
IC332184	3.3	-	-	-	-	-	-	-
IC332214	3.3	-	-	-	-	-	-	-
IC332278	3.4	-	-	-	-	-	-	-
IC332313	3.7	-	-	-	-	-	-	-
IC332327	3.3	-	-	-	-	-	-	-
IC332332	3.2	-	-	-	-	-	-	-
IC333086	2.3	-	-	-	-	-	-	-
IC333090	3.5	-	-	-	-	-	-	-

per 20 plants. The highest yield was recorded in IC 39386 (23.78 g) followed by IC325988 (21.35g), IC 39408 (21.00 g), IC 370515 (20.96 g), IC 39391 (20.83 g), IC 373547 (20.80 g), IC 373547 (20.80 g), IC 373426 (20.80 g), IC39371 (20.60 g), IC 329067 (20.27 g), IC 39429 (20.25 g), IC 325929 (20.17 g) and IC 325989 (20.00 g). The lowest yield was recorded in IC 324025 (17.67g per 20 plants).

In very high preferred genotypes the yield varied from 12.50 g (IC 39412) to 16.00 g (IC 369819). The highest yield was recorded in IC 369819 (16.08 g) followed by IC 338952 (15.58 g)

and IC 325770 (14.57 g) . The lowest yield was recorded in IC 39412 (12.50 g per 20 plants).

The genotype LGG 460 which showed negligible preference yield of 60.00 g / 20 plants.

Information on relative preference of these greengram genotype to thrips is not available in literature. However, greengram genotypes viz., SML 77, 99,100,103,112, Pusa 107, UPM 82-4 and UPM 83-6 were reported to be resistant to thrips. (Chhabra *et al.*, 1993). Sreekanth *et al.* , (2002) identified four greengram genotypes viz., LGG 460, LGG 480, LGG 491 and LGG 582 as resistant to thrips. Chhabra

Table 1. cont.....

Greengram genotypes with								
Moderate preference (2.3 - 3.7)			High preference(3.8-4.6)			Very high preference(>4.6)		
Entry no	Thrips/ Plant (no)	Yield gm/ 20plant	Entry no	Thrips/ Plant (no)	Yield gm/ 20plant	Entry no	Thrips/ Plant (no)	Yield gm/ 20plant
IC333153	3.7	26.75	-	-	-	-	-	-
IC333175	3.5	35.37	-	-	-	-	-	-
IC333213	3.4	25.15	-	-	-	-	-	-
IC336736	3.6	24.67	-	-	-	-	-	-
IC336750	3.5	25.33	-	-	-	-	-	-
IC336779	3.3	28.67	-	-	-	-	-	-
IC336972	3.3	25.66	-	-	-	-	-	-
IC338814	3.0	32.00	-	-	-	-	-	-
IC338848	3.4	25.33	-	-	-	-	-	-
IC338852	3.5	26.83	-	-	-	-	-	-
IC338858	3.3	30.83	-	-	-	-	-	-
IC338866	3.3	30.17	-	-	-	-	-	-
IC338868	3.4	29.83	-	-	-	-	-	-
IC338883	3.5	25.00	-	-	-	-	-	-
IC338889	3.5	27.33	-	-	-	-	-	-
IC338904	3.3	37.22	-	-	-	-	-	-
IC339641	3.6	32.59	-	-	-	-	-	-
IC369790	3.3	33.85	-	-	-	-	-	-
IC369823	3.7	26.08	-	-	-	-	-	-
IC370467	3.1	30.67	-	-	-	-	-	-
IC370497	3.5	29.33	-	-	-	-	-	-
IC370498	3.4	28.67	-	-	-	-	-	-
SEm	0.314	2.37	-	-	-	-	-	-
CD(0.05)	0.87	6.57	-	-	-	-	-	-
CV(%)	14.39	15.73	-	-	-	-	-	-

and Malik (1992) observed that the development of thrips would prolong and their longevity shortened on the resistant genotypes. Vijayalakshmi (1994) showed that the PBNV incidence was low in thrips resistant genotypes as compared to susceptible genotypes. Culbreath *et al.* (1993) and Buiel and Parlevliet (1996) stated that the resistant genotypes reduced the rate of epidemic development with considerable reduction incidence of PBNV. All the above observation lent strong support to the present findings. These genotypes can be utilized in

developing desirable greengram varieties resistant to *T.palmi* and PBNV eventually in providing most efficient and economic control strategy to farmers.

During the present investigation maximum grain yield was obtained in the moderately preferred genotypes. The higher yields obtained with these genotypes may be due to low attack of thrips population. Least preferred genotype LGG 460 recorded highest yield of 60.00 g /20 plants. The present findings are in agreement with Masood Khan *et al.* (2004).

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