Biological Forum – An International Journal **(SI-AAEBSSD-2021) 13(3b): 103-109(2021)**

ISSN No. (Print): 0975-1130
ISSN No. (Online): 2249-3239

Screening of Soybean Genotypes against Major Insect Pests

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(Received 01 July 2021, Accepted 28 September, 2021)
(Published by Research Trend, Website: www.researchtrend.net)

ABSTRACT: The field trial was conducted at Regional Agricultural Research Station, Polasa, Jagtial during the kharif seasons 2014-15 and 2015-16 to evaluate eight soybean germplasms comprising of advanced breeding lines, released varieties for resistance against stem fly and tobacco caterpillar. Based on the stem tunnelling and tobacco caterpillar larval incidence the germplasms were categorized into resistance groups. Among the different genotypes, KDS 869, JS 20-98, RSC 10-46, NRC 116, RVS 2008-24, KDS 753, RVS 2008-8 were highly resistant to stem fly and tobacco caterpillar. Whereas, JS 335 was highly susceptible to tobacco caterpillar. On the other hand MACS 1454 was highly susceptible to stem fly and tobacco caterpillar.

Keywords: Soybean, Stem fly, Tobacco caterpillar, Screening, Genotypes.

INTRODUCTION

Soybean [*Glycine max* (L.) Merrill] is an important pulse and oilseed crop grown in India. The luxuriant growth of soybean accompanied by green, soft and succulent foliage, provides an ultimate source of food, space and shelter to insects. The stem fly, *Melenogromyza sojae* (Zehntner) is considered as one of the major pests attacking the crop throughout the year causing cent per cent infestation at different growth stages (Singh and Singh, 1990). Further, it has also been reported that more than 90 per cent of plants are infested by the pest during *Kharif* season (Gain and Kundu, 1988). The maggot enters the stem through the leaf petiole and bores both upward and downward which results in to tunnel in the affected plant. Its infestation significantly reduces the plant height, number of branches/plant, number of trifoliate leaves, leaf area/plant and dry matter accumulation (Talekar, 1980). The soybean defoliators mainly include tobacco caterpillar (*Spodoptera litura*) and green semilooper, *Crysodexis acuta*. The caterpillars of these pests damage the crop at vegetative stage and in severe cases of infestation completely defoliate the crop and drastically reduce the yield (Patil *et al.*, 2014). It was reported that *S.litura* causes 30-50 per cent damage to pods. Whereas, semilooper causes 50-60 per cent damage, girdle beetle causes 60-80 per cent damage and stemfly causes 16-20 per cent damage in soybean crop during *kharif* season (Anonymous, 2007). Indiscriminate use of chemicals in soybean plant has led to the problems like pest resurgence, pest outbreak, development of resistance to insecticides, elimination of natural enemies, risks to human and animal health besides environmental pollution (Ra*o et al*., 2000). Hence there is a dire need to explore the most eco-friendly methods of pest control by developing pest resistant variety. Various trails have been conducted regularly to develop different sources against insect pests. Gupta *et al*., (2004) studied on stem fly (*Melanagromyza sojae*), incidence based on mean pest incidence. MACS-13, JS 84-200, JS 86-24, JS 81-1610 and JS 78-41 (14.3-15.7% damaged stem length) were resistant to stem fly. Previously out of 80 soybean varieties, developed for cultivation in India, 14 varieties have showed resistant/tolerance to one of the other major insect-pests. These varieties were JS-80- 21, JS-90-41, JS-93-05, MAUS-47, MACS-50, MAU-2, MAUS-32, Pusa-16, PNSA-20 and VL Soya-47 (Joshi and Sharma, 2003). Forty one genotypes were evaluated against the major pests (defoliators and stem fly) of soybean, out of which ten genotypes were resistant high yielding, eight were resistant low yielding and twenty three genotypes categorized under susceptible low and high yielding (Singh *et al.*, 2007). The suitable varieties recommended by ICAR for north eastern plain are NRC 2, JS 80-21, PK 472, MAUS 71, JS 335, RKS 18, JS 97-52 (Singh and Sharma 2013) were having less pest incidence. Therefore, the present study was undertaken to screen the soybean genotypes against major insect pests of soybean.

MATERIALS AND METHODS

Thirty germplasms consisting of advanced lines, released varieties were sowed in Randomized block design with two replications at Regional Agricultural Research Station (RARS), Polasa, Jagtial (Telangana), India during *Kharif*, 2014-15 and 2015-16. Each genotype had 3.5 × 3. 5 m plot size and sown at 45 cm row spacing. Observations on per cent damage and stem tunnelling due to stem fly was recorded. Number of infested plants by stem fly (Hole at the base of the plant) were counted in each plot per meter row length and converted to per cent damage stem tunneling was calculated by following formula.

$$\% \text{ Stem Tunneling} = \frac{\text{Length of tunnel}}{\text{Plant height}} \times 100$$

The incidence of leaf eating caterpillar, *Spodoptera litura* was recorded by taking the visual counts of larval population in one meter row length of each replication of the treatment. The data was converted to appropriate transformed values and subjected to statistical analysis categorization using the AICRPs method (Sharma, 1996).

RESULTS AND DISCUSSION

A. Screening of soybean genotypes against stem fly (Melanagromyza sojae)

The results obtained from the screening of soybean genotypes against stem fly carried out at two stages of the crop growth period namely at flowering and harvesting stage (Tables 1, 2 and Fig 1, 2).

Table 1: Screening of soybean genotypes against stemfly incidence during flowering stage at RARS, Jagtial, during *kharif*, 2014 and 2015.

Sr.No.	Genotypes	% Stemfly incidence (Flowering stage)	
		2014	2015
1.	AMS 1002	22.50(28.32)*	23.61(29.07)
2.	JS20-98	11.11(19.47)	22.50(28.32)
3.	KDS869	10.56(18.96)	16.25(23.77)
4.	RSC10-46	21.11(27.35)	11.11(19.47)
5.	DSb28-3	18.75(25.66)	25.00(30.00)
6.	NRC116	11.81(20.10)	11.81(20.10)
7.	DS3102	23.61(29.07)	30.00(33.21)
8.	RVS2008-24	10.00(18.43)	22.22(28.12)
9.	AMS 1004	15.56(23.23)	34.03(35.68)
10.	KDS753	11.11(19.47)	12.50(20.70)
11.	JS20-87	20.56(26.96)	27.50(31.63)
12.	VSL88	26.11(30.73)	26.67(31.09)
13.	RSC10-15	24.31(29.54)	28.75(32.42)
14.	DSb24	16.67(24.09)	31.25(33.99)
15.	RVS2008-8	12.50(20.70)	10.00(18.43)
16.	MACS1454	23.75(29.17)	35.00(36.27)
17.	PS1552	50.00(45.00)	32.22(34.58)
18.	JS20-96	21.67(27.74)	24.31(29.54)
19.	NRC100	25.56(30.47)	30.00(33.21)
20.	KBS23-2014	21.25(27.45)	11.25(19.60)
21.	VLS-67	12.50(20.70)	23.75(29.17)
22.	LSB-23	10.00(18.43)	26.11(30.73)
23.	TS-13	16.25(23.77)	18.75(25.66)
24.	Bheem	44.44(41.81)	30.56(33.56)
25.	Basara	15.55(23.23)	15.56(23.23)
26.	AMS.MB-5-19	17.50(24.73)	20.56(26.96)
27.	EC212093GP-56	11.25(19.60)	21.11(27.35)
28.	EC242093GP-16	16.11(23.66)	21.25(27.45)
29.	JS-93-05	22.92(28.60)	17.50(24.73)
30.	JS-335(LC)	26.67(31.09)	25.00(30.00)
	SEM	1.42	1.78

*Figures in parentheses are arcsine transformed values

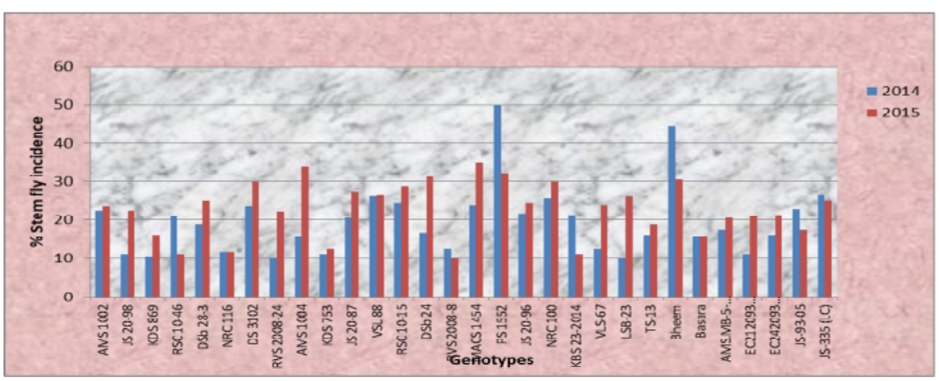

Fig. 1. Screening of soybean genotypes against stem fly incidence during flowering stage at RARS, Jagtial during *kharif*, 2014-2015.

Table 2: Screening of soybean genotypes against stem tunneling during harvesting stage at RARS, Jagtial, during *kharif*, 2014 and 2015

Sr. No.	Genotypes	%Stem tunneling (Harvesting stage)	
		2014	2015
1.	AMS 1002	31.96^{MR}(34.43)*	26.45^{MR}(30.45)
2.	JS20-98	24.68^{HR}(29.79)	26.05^{MR}(30.69)
3.	KDS869	27.77^{HR}(31.8)	19.55^{HR}(26.24)
4.	RSC10-46	31.63^{MR}(34.22)	14.75^{HR}(22.59)
5.	DSb28-3	31.22^{MR}(33.97)	26.70^{MR}(31.11)
6.	NRC116	28.28^{HR}(32.12)	17.20^{HR}(24.5)
7.	DS3102	32.37^{MR}(34.68)	30.05^{LR}(33.24)
8.	RVS2008-24	22.71^{HR}(28.68)	25.95^{MR}(30.62)
9.	AMS 1004	29.29^{R}(32.77)	39.20^{LR}(38.76)
10.	KDS753	27.91^{HR}(31.89)	16.05^{HR}(23.62)
11.	JS20-87	31.48^{MR}(34.13)	29.20^{MR}(32.71)
12.	VSL88	32.66^{MR}(34.85)	28.90^{MR}(32.52)
13.	RSC10-15	32.47^{MR}(34.74)	29.45^{MR}(32.87)
14.	DSb24	31.09^{MR}(33.89)	31.95^{LR}(34.42)
15.	RVS2008-8	27.60^{HR}(31.69)	11.05^{HR}(19.42)
16.	MACS1454	32.39^{MR}(34.69)	40.75^{HS}(39.67)
17.	PS1552	32.49^{MR}(34.75)	36.15^{S}(36.96)
18.	JS20-96	31.87^{MR}(34.37)	16.10^{HR}(23.66)
19.	NRC100	32.61^{MR}(34.82)	30.80^{LR}(33.71)
20.	KBS23-2014	31.73^{MR}(34.28)	17.10^{HR}(24.43)
21.	VLS-67	29.27^{R}(32.75)	26.54^{MR}(31.01)
22.	LSB-23	27.61^{HR}(31.70)	28.21^{MR}(32.08)
23.	TS-13	30.28^{MR}(33.39)	22.79^{MR}(28.51)
24.	Bheem	31.93^{MR}(34.41)	31.24^{LR}(33.98)
25.	Basara	19.84^{HR}(26.45)	17.41^{HR}(24.66)
26.	AMS.MB-5-19	31.17^{MR}(33.94)	23.61^{HR}(29.07)
27.	EC212093GP-56	27.98^{HR}(31.94)	25.54^{MR}(30.47)
28.	EC242093GP-16	30.19^{MR}(33.33)	25.71^{MR}(30.46)
29.	JS-93-05	32.14^{MR}(34.53)	19.95^{HR}(26.53)
30	JS-335(LC)	32.73^{MR}(34.9)	27.10^{MR}(31.37)
	GM	33.12	30.02
	SEM	1.25	1.58
	CD@1%	4.89	6.16
	CD@5%	3.62	4.57

*Figures in parentheses are arc sine transformed values

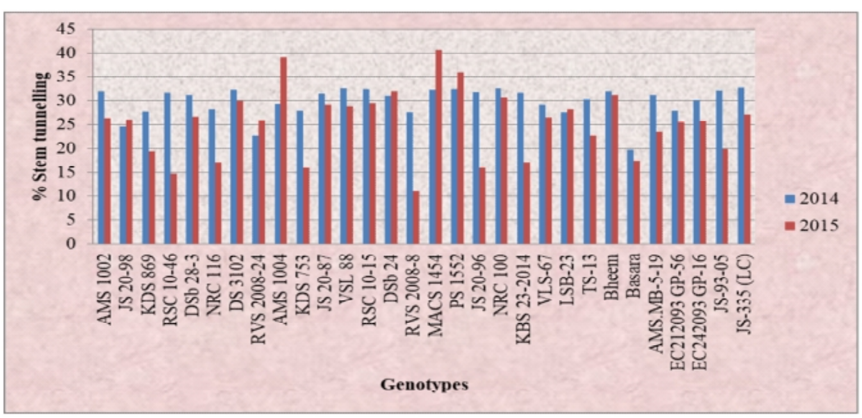

Fig. 2. Screening of soybean genotypes against stem tunnelling during harvesting stage at RARS, Jagtial during *kharif*, 2014-2015.

The perusal of the data obtained from the screening of soybean genotypes against stem fly at flowering stage during *kharif*, 2014 indicated that the stem fly infestation recorded per meter row length (mrl) of various genotypes ranged from 10.00 to 50.00 per cent and the twenty seven genotypes which recorded the stem fly infestation ranged from 10.00 to 26.67 per cent which were on par with each other and were regarded as next best treatments. The maximum stem fly infestation of 50.00 per cent was recorded in PS 1552 which was on par with Bheem (44.44%). The minimum stem fly incidence was observed in the genotypes RVS 2008-24 and LSB-23, with 10 per cent infestation.

The stem fly infestation recorded during *kharif* 2015 ranged from 10.00 to 44.44 percent and no significant differences were observed between the genotypes with respect to the stem fly infestation.

The stem fly infestation at the harvesting was assessed based on the stem tunneling caused by stem fly at harvesting stage during *kharif*, 2014 which ranged from 19.84 to 32.73 per cent. During harvesting stage also, Basara recorded significantly lowest stem tunneling of 19.84 per cent followed by RVS 2008-24 (22.71 per cent) in contrast to local check, JS-335 which recorded significantly highest stem tunnelling (32.73%). The stem tunneling recorded in the other genotypes varied from 24.68 per cent to 32.47 per cent.

The screening studies carried out during *kharif*, 2015 revealed that the stem fly tunneling in different treatments varied from 11.05 to 40.75 per cent and during this season RVS 2008-8 genotype showed its supremacy over other genotypes by recording significantly lowest infestation of 11.05 percent followed by RSC 10-46 (14.75%) and KDS 753 (16.05%). While maximum stem tunnelling of 40.75 per cent was observed in MACS 1454 followed by AMS 1004 (39.20%). The stem tunnelling in rest of the genotypes varied from 17.41 per cent to 36.15 per cent.

B. Categorization of soybean genotypes against Stem fly based on stem tunneling

Based on the per cent stem tunneling caused by stem fly in different genotypes of both the *kharif* seasons of 2014 and 2015, the genotypes were categorized into six classes as Highly Resistant (HR), Resistant (R), Moderately Resistant (MR), Low Resistant (LR), Susceptible (S) and Highly Susceptible (HS) based on the scale developed by AICRIP method of categorization (Sharma 1996).

A perusal of results furnished in the Table 3 revealed that out of the thirty genotypes screened for the *kharif*, 2014 nine genotypes were classified as highly resistant, two as resistant and nineteen as moderately resistant genotypes. The genotypes JS 20-98, KDS-869, NRC 116, RVS 2008-24, KDS 753, RVS 2008-8, Lsb-23, Basara and EC212093GP-56 which recorded the stem tunnelling range between 0.00 per cent to 28.23 per cent were categorized as highly resistant and two genotypes AMS 1004 and VLS-67 which recorded the stem tunnelling range between 28.23 to 29.50 per cent were categorized as resistant. While the remaining nineteen genotypes AMS 1002, RSC 10-46, DSb 28-3, DS 3102, JS 20-87, VLS 88, RSC 10-15, DSb 24, MACS 1454, PS 1552, JS 20-96, NRC 100, KBS 23-2014, TS-13, Bheem, AMS.MB-5-19, EC242093GP-16, JS-93-05 and JS-335 with stem tunnelling range between 29.50 per cent to 33.12 per cent were categorized as moderately resistant. None of the genotypes showed susceptible reaction against the pest.

The results for the *kharif*, 2015 revealed that out of the thirty genotypes, ten genotypes were classified as highly resistant, thirteen as moderately resistant, five as least resistant, one each as susceptible and highly susceptible genotypes. The genotypes KDS-869, RSC 10-46, NRC 116, KDS 753, RVS 2008-8, JS 20-96, KBS 23-2014, Basara, AMS.MB-5-19 and JS-93-05 which recorded the stem tunnelling range between 0.00 per cent and 24.04 per cent were categorized as highly resistant and thirteen genotypes AMS 1002, DSb28-3, JS20-87, VSL-88, RSC 10-15, VLS-67, Lsb-23, TS-13, EC212093GP-56, EC242093GP-16 and JS-335 which recorded the stem tunnelling range between 25.45 to 30.02 per cent were categorized as moderately resistant, while the five genotypes, DS 3102, AMS 1004,DSb 24, MACS and NRC 100, with stem tunnelling range between 30.02 percent to 34.59 per cent were categorized as least resistant. One genotype PS 1552 with stem tunnelling range between 34.59 - 36.36 per cent showed susceptible reaction against the pest, whereas MACS 1454 genotype above 36.36 per cent stem tunnelling showed high susceptibility against the pest.

The present results on stem tunneling by stem fly support with the findings of Jayappa (2000) who reported stem tunneling of 13.1-31.90 per cent in different soybean varieties by stem fly. The results reported by Venkataravanappa (1996) were also in line with the present findings who screened 21 soybean varieties against *M. sojae,* and found few varieties *viz.*, MACS 366, MACS 124, JS 89-43, MACS 375, KB 111, JS SH -41, JS SH 1310, MACS 329 and JS 87-59 (normal duration) and JS 87-50 and JS 87-59 (early duration) as moderately resistant. The present findings are in confirmity with Kavita, (2006), where gentotype NRC's recorded lowest stem tunneling and genotype MAS-2001-1 and KHSb-2 recorded highest stem tunneling among 27 tested genotypes. Singh *et al*., (1988) reported that DS 76-129, PK 472, MACS 75 and JS 76-259 cultivars did not differ significantly with regard to infestation by *M. sojae*. The varietal evaluation studies of soybean cultivars carried out for major insect pests at Parbhani showed that stem length tunnelled due to stem fly *(Melanagromyza sojae*) varied from 5.87 to 14.07%. The highest stem length tunnelling was recorded in JS (SH)-9246 (14.07%) and the lowest in NRC-37 (5.86%) as reported by Salunke *et al*., (2002). Upadhay (2017) reported that out of nine soybean genotypes tested, JS 20-122 recorded the least per cent stem tunneling (4.67%) whereas the maximum per cent tunneling (20.82%) was observed in genotype JS 20-111. On the basis of incidence of stem fly, genotype JS 20-108 was found to be less susceptible and check variety JS 20-29 was highly susceptible.

C. Screening of soybean genotypes against tobacco caterpillar, (Spodoptera litura)

The varietal preference studies of soybean against tobacco caterpillar carried out during *kharif*, 2014 showed significant differences in the reaction of genotypes against tobacco caterpillar. The results revealed that the genotype NRC 116 recorded significantly lowest (1.17 larvae/mrl) larval population at par with KDS-869 (1.17 larvae/mrl). Significantly highest (7.00 larvae/mrl) larval population of *S. litura* was recorded in JS 335 than rest of the genotypes followed by DSb 24 (6.00 l/mrl) and , JS 20-87 (5.83l/mrl) and TS-13 (5.00 larvae/mrl) which were on par with each other (Table 3).

The screening studies carried out during *kharif* ,2015 season also followed the similar trend where in the genotype NRC 116 exhibited the lowest (1.10 larvae/mrl) *S. litura* larval population and it was at par with PS 1552 (1.30 larvae/mrl) , JS 20-98 (1.30

larvae/mrl) followed by NRC 100 (1.40 larvae/mrl) and KDS 753 (1.40 larvae/mrl). The tobacco caterpillar showed significantly highest preference to JS -335 (4.50 larvae/mrl) followed by DSb 28-3 (4.30 larvae/mrl) and KBS 23-2014 (4.10 larvae/mrl) which were on par with each other Table 3.

Table 3: Screening of soybean genotypes against tobacco caterpillar during *kharif* at RARS, Jagtial, 2014 and 2015.

Sr.No.	Genotypes	Number of larvae (mrl)	
		2014	2015
1.	AMS 1002	3.50^{LR}(1.99)*	2.30^{R}(1.67)
2.	JS20-98	1.17^{HR}(1.28)	1.30^{HR}(1.34)
3.	KDS869	2.17^{HR}(1.63)	2.20^{HR}(1.64)
4.	RSC10-46	1.83^{HR}(1.52)	2.10^{HR}(1.61)
5.	DSb28-3	4.83^{HS}(2.30)	4.30^{HS}(2.19)
6.	NRC116	1.17^{HR}(1.28)	1.10^{HR}(1.26)
7.	DS3102	1.83^{HR}(1.52)	1.50^{HR}(1.41)
8.	RVS2008-24	3.00^{HR}(1.86)	1.70^{HR}(1.48)
9.	AMS 1004	2.83^{HR}(1.82)	2.50^{LR}(1.73)
10.	KDS753	2.17^{HR}(1.63)	1.40^{HR}(1.37)
11.	JS20-87	5.83^{HS}(2.51)	3.30^{HS}(1.94)
12.	VSL88	3.33^{MR}(1.95)	3.20^{HS}(1.92)
13.	RSC10-15	4.17^{HS}(2.15)	1.90^{HR}(1.54)
14.	DSb24	6.00^{HS}(2.54)	3.50^{HS}(1.99)
15.	RVS2008-8	2.17^{HR}(1.63)	2.30^{R}(1.67)
16.	MACS1454	4.83^{HS}(2.30)	$3.40^{HS(}$1.97)
17.	PS1552	3.17^{HR}(1.91)	1.30^{HR}(1.33)
18.	JS20-96	3.33^{MR}(1.95)	1.60^{HR}(1.44)
19.	NRC100	2.50^{HR}(1.72)	1.40^{HR}(1.37)
20.	KBS23-2014	4.83^{HS}(2.30)	4.10^{HS}(2.14)
21.	VLS-67	4.17^{HS}(2.15)	2.40^{MR}(1.69)
22.	LSB-23	2.83^{HR}(1.82)	2.30^{R}(1.67)
23.	TS-13	5.00^{HS}(2.34)	2.00^{HR}(1.58)
24.	Bheem	2.17^{HR}(1.63)	2.90^{HS}(1.84)
25.	Basara	4.67^{HS}(2.26)	1.60^{HR}(1.44)
26.	AMS.MB-5-19	2.83^{HR}(1.82)	3.50^{HS}(1.99)
27.	EC212093GP-56	3.83^{HS}(2.08)	2.70^{HS}(1.78)
28.	EC242093GP-16	3.33^{MR}(1.95)	3.40^{HS}(1.97)
29.	JS-93-05	4.33^{HS}(2.19)	2.80^{HS}(1.81)
30.	JS-335(LC)	7.00^{HS}(2.73)	4.50^{HS}(2.23)
	GM	3.49(1.96)	2.48(1.70)
	SEM	0.07	0.05
	CD@1%	0.27	0.20
	CD@5%	0.20	0.15

*Figures in parentheses are square root transformed values

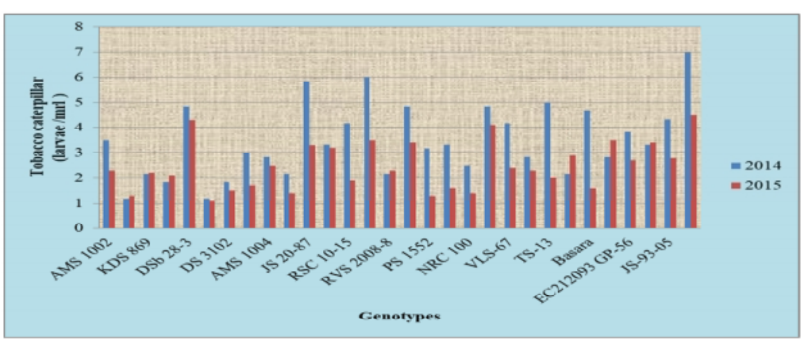

Fig. 3. Screening of soybean genotypes against tobacco caterpillar during flowering stage at RARS, Jagtial during *kharif*, 2014 and 2015.

D. Categorization of genotypes against tobacco caterpillar, S.litura

Based on the reaction of soybean genotypes against *S. litura* infestation during *kharif* 2014 and 2015, the genotypes were broadly classified in to six categories as Highly Resistant (HR), Resistant (R), Moderately resistant (MR), Low resistant (LR), Susceptible (S) and Highly susceptible (HS) based on the scale developed by AICRIP method of categorization (Sharma 1996). The results showed that for the *kharif*, 2014, fourteen genotypes *viz.*, JS 20-98, KDS 869, RSC 10-46, NRC 116, DS 3102, RVS 2008-24, AMS 1004, KDS 753, RVS 2008-8, PS 1552, NRC 100, Lsb 23 Bheem and AMS.MB-5-19 recorded population in the range of 0.00 - 3.22 larvae/mrl were classified as highly resistant, while, VSL 88, JS 20-96 and EC212093GP-56 recorded population in the range of 0.00 - 3.22 larvae/mrl were moderately resistant and AMS 1002 with a population range of 3.49- 3.69 larvae/mrl was classified as least resistant and the remaining twelve genotypes *viz.,* DSb 28-3, JS 20-87, RSC 10-15, DSb 24, MACS 1454, KBS 23-2014, VLS 67, TS 13, Basara, EC212093GP-56, JS-93-05 and JS-335 with a high population range of above 3.76 larvae/mrl fell under highly susceptible category. None of the genotypes were categorized under resistant and susceptible category.

The results showed that for the *kharif*, 2015, thirteen genotypes *viz*., JS 20-98, KDS 869, RSC 10-46, NRC 116, DS 3102, RVS 2008-24, KDS 753, RSC 10-15, PS 1552, JS 20-96, NRC 100, TS-13 and Basara recorded population in the range of 0.00 – 2.28 larvae/mrl were classified as highly resistant, while, AMS 1002, RVS 2008-8 and LSB -23 recorded population in the range of 2.28 - 2.33 larvae/mrl were resistant whereas VLS -67 and AMS 1004 with a population range between 2.33- 2.48 larvae/mrl were classified as moderately resistant. Whereas, AMS 1002 with a population range between 2.48- 2.63 larvae/mrl was claasified as least resistant and the remaining twelve genotypes *viz*., DSb 28-3, JS 20-87, VLS 88, DSb 24, MACS 1454, KBS 23-2014, Bheem, AMS.MB-5-19, EC212093GP-56, EC242093GP-16, JS-93-05 and JS-335 with a high population above 2.68 larvae/mrl fell under highly susceptible category. None of the genotypes were categorized under susceptible category (Table 4).

The results obtained from the present findings were in line with the results of Hag *et al*. (1984); Gary *et al*. (1985) who reported the tolerance of soybean cultivars Caribe VCF-1 (BP-2) and F-76-8827 against *S. litura* and soybean cultivars *viz*., PL-209837 and FC 3152 possessed non-preference and antibiosis characters of host plant resistance against *S. litura*. Manu and Patel (2015) studied the host plant resistance against leaf eating caterpillars in seven varieties of soybean and reported that among different varieties highest number of leaf eating caterpillars (3.97 larvae/mrl), maximum per cent defoliation (40.56%) and maximum relative yield loss was recorded by JS 335 variety. Harish *et al.*, (2009) recorded lowest percentage of defoliators in KHSb-2 (14.33%) followed by DSb-1 and were categorized as highly resistant. Whereas, JS 335 and Monetta were classified as highly susceptible. Nayaka (2013) evaluated relative susceptibility of soybean genotypes against defoliators and reported that among the fifty genotypes, AMS-9933, was categorized as moderately resistant. Salunke (1999) reported that out of 14 soybean cultivars, highest incidence of defoliators was recorded in MAUS-2 and lowest leaf damage was recorded in cultivar NRC-37. Ashish *et al*., (2003) reported that the variety JS 71-05 and NRC 33 were highly resistant and NRC 18 and NRC 7 were resistant to tobacco caterpillar. Ahirwar *et al.* (2015) reported the maximum number of defoliator larvae on JS 335 during the fortnight of August. Shete *et al*., (2019) reported the lowest *S. litura* larvae on line KDS-1045, KDS-980 and check MAUS-158 and JS 97-52, while the highest numbers of larvae were observed on line DSB-28-3 and check JS-335. These results were in line with the present findings.

CONCLUSION

The perusal of the results obtained from the screening studies carried out with thirty genotypes against two major pests, stem fly, and tobacco caterpillar during *kharif*, 2014 and 2015 seasons resulted in the identification of some promising genotypes against these major pests. Among the different genotypes which showed differential reaction against the major pests, KDS 869 was highly resistant to both the pests, while six genotypes, JS 20-98, RSC 10-46, NRC 116, RVS 2008-24, KDS 753, RVS 2008-8 had shown highly resistant to moderate reaction to both stem fly and tobacco caterpillar. JS 335, Dsb 28-3 and MACS 1454 were highly susceptible to stem fly and tobacco caterpillar.

FUTURE SCOPE

Based on the results obtained from the study, the genotypes which showed the promising results against the major pests need to be tested under green house conditions to confirm their performance against the major pests of soybean before using them in resistance breeding studies.

Acknowledgement. The author extends their acknowledgement to the advisory committee for guiding and also the non-teaching staff of the Regional Agricultural Research Station, Polasa, Jagtial for providing all the facilities and kind support.

Conflict of Interest. The authors have not declared any conflict of interest.

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