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RESEARCH ARTICLE

Screening of soybean genotypes against stem fly, *Melenogromyza sojae* (Zehntner)

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ABSTRACT

Thirty seven genotypes were screened against stem fly during *Kharif* 2006 and 2007 seasons. The genotypes NRC-55, NRC-51, NRC-52 and DSb-101 were recorded significantly lower stem fly incidence and stem tunnelling per cent compared to rest of the genotypes. The promising MACS-798, MACS-740, MACS-817 and DSb-102 were also recorded stem fly incidence and stem tunnelling and found next best to NRC's and DSb-101 genotypes but proved superior over national check. The genotypes MAS-2000-1 and KHSb-2 were recorded higher stem fly incidence and stem tunnelling and found significantly inferior among the genotypes. Among the genotype NRC-55, NRC-51, and Dsb-101 were categorized as resistant. Moderately resistant genotypes include, MACS-798, MACS-740, MACS-817, NRC-52 and DSb-102 and susceptible genotypes includes MAS-2000-1 and KHSb-2. Further remaining twenty seven genotypes were categorized as moderately susceptible.

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INTRODUCTION

Soybean [*Glycine max* (L.) Merrill] is an important pulse and oilseed crop. With its luxuriant growth of soybean accompanied by green, soft and succulent foliage, provide an ultimate source of food, space and shelter to insects. The stem fly, *Melenogromyza sojae* (Zehntner) is considered as a 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 more than 90 per cent of plants infested 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 hight, number of branches / plant, number of trifoliate leaves, leaf area / plant and dry matter accumulation (Talekar, 1980). Indiscriminate use of chemicals in soybean plant has led to the problems like pest resurgence, pest outbreak development of resistance to insecticides eliminator of natural enemies, risks to human and animal health besides environmental pollution (Rao *et al.*, 2000). However, the management of pest in soybean only through chemicals, there is a need to explore the most eco-friendly method of pest control by developing pest resistant varieties therefore, the present study was undertaken to screen the soybean genotypes against stem fly.

MATERIALS AND METHODS

Thirty seven soybean genotypes were obtained from All India Coordinated Research Project on Soybean, Indore and Breeder, AICRP, Soybean Dharwad centre for evaluation in the field to find out the genotype resistance to the stem fly,

M. sojae infestation. The field experiment was carried out at ARS, Bailhongal in Randomised Block Design (RBD) with two replications. Each soybean genotype was sown in three rows of 5 meter length with a spacing of 30X10 cm in each replication. All the recommended packages of practices (RPP) (Anonymous, 2007) were followed in establishing the plants except the plant protection measures. Observations on per cent stem fly incidence and stem tunneling at flowering and at harvesting were recorded and worked out to percentage.

The genotypes were categorized into different groups *viz.,* resistant,(R) moderately resistant (MR), moderately susceptible (MS) and highly susceptible (HS) by considering the means ($\bar{x}$) and standard deviation (σ) of per cent stem tunneling. A preliminary classification of the germplasm lines was done considering the above parameters by following the formula as indicated below (Croxton and Cowden, 1964) :

- Resistant (R) - germplasm lines with per cent stem tunneling between

  $\bar{x} - \sigma$
- Moderately resistant (MR) – germplasm lines with per cent stem tunneling between

  $\bar{x} - \sigma, \bar{x} + \sigma$
- Moderately susceptible (MS) – germplasm lines with per cent stem tunneling

  $\bar{x} - \sigma, \bar{x} + \sigma$
- Susceptible (S) – germplasm lines with per cent stem tunneling

  $\bar{x} + \sigma, \bar{x} + \sigma$
- Highly susceptible (HS) – germplasm lines with per cent stem tunneling

  $> \bar{x} + \sigma$

RESULTS AND DISCUSSION

The significantly lower per cent stem fly incidence was noticed in NRC's and DSb-101 genotypes. Whereas, KHSb-2 (41.50%) and MAS-2000-1 (42.11%) were recorded higher incidence of stem fly and were found significantly inferior among the genotypes. The genotypes MACS-798, MACS-740, MACS-817 and DSb-102 were found to be significantly at par with each other and significantly inferior to NRC's but superior over rest of the genotypes (Table 1).

At harvesting stage, significantly lower stem fly incidence (23.37%) was recorded in NRC-51 followed by NRC-52, NRC-55 and DSb-101 and these were at par with each other and significantly superior over rest of the genotypes (Table 2). The genotypes MAS-2000-1 (44.87%) and KHSb-2 (43.87%) were recorded significantly higher stem fly incidence over rest of the genotypes. The promising genotypes, MACS-798 , MACS-740 and MACS-817 were recorded moderate stem fly incidence and proved next best to NRC's genotypes and superior to national check entries.

The stem tunnelling during flowering stage revealed that the lower stem tunnelling (11.25%) was recorded in NRC-55 genotype followed by DSb-101 (11.72%), NRC-51 (11.81%) and NRC-52 (12.48%) which were at par with each other and found significantly superior over rest of the genotypes. The genotypes MACS-798, MACS-740 , MACS-817 and MACS-212 were next best to NRC's and DSb-101 and DSb-102 genotypes. Whereas MAS-2000-1 (28.93%) and KHSb-2 (28.68%) entries were presented significantly highest stem tunnelling compared to rest of the genotypes (Table 1). During harvesting stage, the higher per cent stem tunnelling (33.37%) was recorded in KHSB-2 followed by MAS-2000-1 (32.73%). Both these were found significantly inferior among the entries. Whereas the lower stem tunnelling of 13.31 per cent was recorded in NRC-55 and was on par with NRC-52, NRC-51 and DSb- 101 genotypes and were found significantly superior over rest of the genotypes. The promising genotypes MACS-798, MACS-740 and MACS-817 were found next best to NRC's genotypes (Table 2).

The present observations on stem fly incidence and stem tunnelling are supported by the findings of large no of workers, namely Patil and Kulkarni (2004) from Dharwad and Belgaum district and Jayappa (2000) from Bangaluru.However, MACS series recorded lowest stem tunnelling (Anonymous, 1985). The present findings are in conformity with Kavita (2006) who reported that NRC's and DSb-101 recorded lowest stem tunnelling and genotype MAS-2000-1 and KHSb-2 recorded highest stem tunnelling among 27 tested genotypes.

A large number of workers in the past evaluated series of entries recording minimum or at par incidence with resistant checks and were reconsidered as resistant or promising ones. Where as, in the present study, varietal assessment was done based on the standard deviation value. Among the genotypes NRC-55 (13.33%), NRC-51 (14.57%) and DSb-101 (14.36) were recorded lowest stem tunnelling and falling in resistant genotype category. The entries MAS-2000-1 (32.73%) and KHSb-2 (33.37%) recorded highest stem tunnelling falling in susceptible genotypes. Five genotypes were found moderately resistant and remaining 27 were moderately susceptible (Table 3). Similar varietal evaluation was also documented by Kundu and Misra (1985) who reported that, PK-628 was resistant to stem fly. Himso-558A, Himso-1059, MACS-94, MACS-176, JS-79-295 and PK-327 showed multiple resistance including stem fly as revealed in AICRP reports Anonymous (1998). The present findings are in conformity with Kavita (2006) who reported NRC-55 as resistant, MAS-2000-1 and KHSb-2 as susceptible genotypes.

Table 1: Screening of soybean genotypes against stem fly (%) and stem tunneling (%) in flowering stage at ARS, Bailhongal

Sr.No.	Entries	Flowering stage					
		Stemfly (%)			Stem tunneling (%)		
		2006	2007	Mean	2006	2007	Mean
1.	MRSB-342	31.60 (34.19) [c]	29.87 (33.08) [d]	30.73 (33.65) [c]	26.87 (31.20) [a]	25.25 (30.15) [b]	26.06 (30.68) [ab]
2.	MACS-798	23.77 (29.14) [d]	25.25 (28.18) [e]	24.51 (29.67) [d]	20.50 (26.88) [b]	20.50 (26.89) [d]	20.50 (26.92) [d]
3.	MACS- 740	24.42 (29.59) [d]	26.75 (31.14) [d]	25.58 (30.40) [d]	20.75 (27.03) [b]	22.00 (27.95) [cd]	21.37 (27.52) [cd]
4.	MACS-817	25.50 (30.32) [d]	30.00 (33.38) [cd]	27.75 (31.78) [cd]	20.90 (27.19) [b]	22.00 (27.95) [bc]	21.45 (27.57) [cd]
5.	MACS- 212	35.95 (37.13) [bc]	27.50 (31.60) [e]	31.72 (34.27) [bc]	20.02 (26.56) [b]	24.00 (29.33) [bc]	22.01 (27.97) [cd]
6.	MACS- 450	37.65 (37.82) [b]	30.00 (33.20) [cd]	33.82 (35.55) [bc]	23.57 (28.98) [b]	23.50 (28.99) [bc]	23.53 (29.00) [bc]
7.	MACS330xPK327	38.50 (38.23) [b]	28.25 (32.09) [d]	33.37 (35.28) [bc]	25.77 (30.49) [ab]	23.62 (29.06) [bc]	24.69 (29.80) [bc]
8.	MAS –2000-1	44.47 (41.18) [a]	39.75 (39.08) [a]	42.11 (40.45) [a]	29.00 (32.57) [a]	28.87 (32.49) [a]	28.93 (32.52) [a]
9.	MAUS– 30	37.55 (37.77) [b]	31.50 (34.23) [c]	34.52 (35.97) [b]	27.60 (31.68) [a]	25.12 (30.15) [bc]	26.36 (30.88) [b]
10.	PKS -15	39.40 (38.87) [b]	29.50 (32.88) [cd]	34.45 (35.95) [b]	28.50 (32.19) [a]	24.37 (29.26) [bc]	26.43 (30.96) [b]
11.	PKS -18	37.50 (37.75) [b]	32.00 (34.44) [c]	34.75 (36.12) [b]	21.92 (27.88) [b]	23.50 (28.98) [c]	22.71 (28.45) [cd]
12.	NRC -55	20.10 (26.61) [e]	20.00 (26.55) [f]	20.05 (26.60) [de]	10.75 (19.07) [c]	11.75 (20.04) [f]	11.25 (19.60) [e]
13.	NRC -52	22.37 (28.19) [d]	22.62 (28.38) [ef]	22.49 (28.32) [de]	11.10 (19.68) [c]	13.87 (21.85) [ef]	12.48 (20.68) [e]
14.	NRC – 51	20.62 (26.97) [e]	21.37 (27.51) [f]	20.99 (26.64) [de]	11.00 (19.32) [c]	12.62 (20.78) [ef]	11.81 (20.09) [e]
15.	UGM – 20075	38.00 (38.04) [b]	29.50 (32.89) [d]	33.75 (35.52) [bc]	24.82 (29.84) [ab]	22.50 (28.30) [cd]	23.66 (29.10) [bc]
16.	PK – 1347	36.37 (37.25) [b]	30.75 (33.67) [c]	33.56 (35.40) [b]	23.87 (29.47) [b]	22.37 (28.21) [cd]	23.12 (28.73) [bc]
17.	JS335xTGx855- 53	35.87 (36.62) [b]	31.50 (34.13) [cd]	33.68 (35.47) [bc]	23.10 (28.72) [b]	21.75 (28.48) [d]	22.42 (28.25) [cd]
18.	JS(SH) -93-97	37.37 (37.80) [b]	30.25 (33.36) [c]	33.81 (35.55) [bc]	25.82 (30.54) [ab]	23.37 (28.89) [c]	24.59 (29.73) [bc]
19.	JS90-41xNRC-25	38.87 (38.53) [b]	32.00 (34.44) [c]	35.45 (36.51) [ab]	26.00 (30.64) [ab]	25.62 (30.39) [b]	25.81 (30.53) [bc]
20.	JS-99-76	32.20 (34.55) [c]	28.50 (32.24) [d]	30.35 (33.37) [bc]	22.25 (28.12) [b]	23.00 (28.62) [cd]	22.62 (28.39) [cd]
21.	EC – 241778	36.15 (36.89) [b]	30.62 (33.57) [c]	33.38 (35.30) [bc]	21.67 (27.85) [b]	22.50 (28.30) [cd]	22.08 (27.32) [cd]
22.	EC – 241780	32.12 (34.81) [c]	32.50 (34.65) [bc]	32.31 (34.63) [bc]	20.57 (26.93) [b]	21.50 (27.60) [cd]	21.03 (27.30) [cd]
23.	DSb (PR) – 101	22.32 (28.17) [de]	20.37 (26.81) [f]	21.34 (27.49) [de]	11.07 (19.39) [c]	12.37 (20.57) [f]	11.72 (20.00) [e]
24.	DSb (PR) – 102	24.37 (24.53) [d]	23.50 (28.99) [e]	23.93 (29.30) [de]	11.62 (19.80) [c]	14.75 (22.57) [e]	13.18(21.30) [e]
25.	DSb (PR) – 103	32.17 (34.88) [c]	35.25 (36.42) [b]	33.71(35.49) [bc]	23.15 (28.78) [b]	25.12 (30.05) [b]	24.13 (29.42) [c]
26.	DSb (PR) – 105	34.37 (35.85) [bc]	31.50 (34.13) [c]	32.93 (35.00) [bc]	23.97 (29.25) [b]	22.87 (28.54) [c]	23.42 (28.93) [bc]
27.	DSb (PR) – 106	28.90 (32.52) [cd]	31.75(34.29) [c]	30.32 (33.40) [bc]	19.85 (26.40) [b]	21.75 (27.79) [cd]	20.80 (27.13) [d]
28.	DSb (PR) – 107	32.77(34.89) [c]	31.50 (34.12) [c]	32.13 (34.51) [bc]	21.80 (27.70) [b]	22.87 (28.54) [c]	22.33 (28.20) [cd]
29.	DSb (PR) – 108	34.87 (36.17) [c]	26.75 (31.13) [d]	30.81 (33.71) [c]	24.67 (25.26) [ab]	23.00 (28.65) [bc]	23.83 (29.84) [bc]
30.	DSb (PR) – 109	35.87 (36.77) [bc]	28.75 (32.42) [cd]	32.31(34.63) [bc]	24.87 (29.87) [ab]	20.75 (27.09) [d]	22.81 (27.13) [cd]
31.	DSb (PR) – 110	32.87 (34.94) [c]	29.00 (32.57) [c]	30.93 (33.77) [c]	21.22 (27.37) [b]	21.87 (27.50) [c]	21.54 (27.68) [d]
32.	PK- 1029 ©	33.20 (35.16) [c]	28.25 (32.10) [d]	30.72 (33.65) [bc]	21.75 (27.75) [b]	24.85(29.90) [b]	23.30 (28.86) [bc]
33.	Bragg ©	34.62 (36.02) [c]	30.25 (33.36) [c]	32.43 (34.70) [bc]	21.67 (27.72) [b]	22.37 (28.14) [c]	22.02 (27.97) [cd]
34.	KHSB - 2 ©	41.91 (40.36) [a]	40.50(39.52) [a]	41.20 (39.93) [a]	26.87 (31.16) [a]	30.50 (33.52) [a]	28.68 (32.37) [a]
35.	JS – 9305 ©	36.27 (37.01) [b]	32.00(34.44) [c]	34.13 (35.76) [b]	23.92 (29.26) [b]	24.25 (29.50) [b]	24.08 (29.38) [bc]
36.	JS – 355 ©	38.50 (38.33) [b]	32.00 (34.44) [c]	35.25 (36.42) [b]	23.00 (28.61) [b]	24.00 (29.33) [b]	23.50 (29.00) [bc]
37.	Monetta ©	36.72 (37.27) [bc]	29.87 (33.11) [c]	33.29 (35.24) [bc]	22.50 (28.26) [b]	23.87 (29.33) [bc]	23.18 (28.79) [bc]
	S.E.±	1.50	1.062	1.280	1.731	0.748	0.743

DAS- Days after sowing, Figures in parentheses are arc sine transformed values, Means in the columns followed by the same alphabet do not differ significantly by DMRT (P=0.05)

Table 2 : Screening of soybean genotypes against stem fly (%) and stem tunneling (%) in harvesting stage at ARS Bailhongal

Sr.No.	Entries	Harvesting stage					
		Stem fly (%)			Stem tunneling (%)		
		2006	2007	Mean	2006	2007	Mean
1.	MRSB-342	40.50 (39.52) [b]	33.25 (35.21) [c]	36.87 (37.39) [c]	25.37 (30.21) [c]	24.72 (29.78) [c]	25.04 (30.03) [bc]
2.	MACS-798	25.87 (30.55) [e]	27.75 (31.79) [d]	26.81 (31.18) [e]	22.47 (28.32) [cd]	20.00 (26.56) [d]	21.22 (27.42) [d]
3.	MACS- 740	26.25 (30.78) [e]	28.25 (32.09) [d]	27.25 (31.50) [de]	23.50 (29.00) [cd]	22.50 (28.31) [d]	23.00 (28.66) [d]
4.	MACS-817	26.47 (30.93) [e]	30.50 (33.52) [c]	28.48 (32.24) [de]	23.12 (28.75) [cd]	21.00 (27.27) [d]	22.06 (28.00) [de]
5.	MACS- 212	40.25 (39.96) [b]	29.00 (32.57) [c]	34.62 (36.06) [cd]	26.62 (31.03) [bc]	23.75 (29.16) [c]	25.18 (30.10) [bc]
6.	MACS- 450	44.00 (41.54) [b]	35.25 (36.42) [b]	39.62 (39.00) [b]	29.00 (32.54) [ab]	25.00 (28.65) [c]	27.00 (31.31) [b]
7.	MACS330xPK327	47.25 (43.42) [a]	34.50 (35.97) [b]	40.87 (39.77) [b]	31.62 (34.18) [ab]	24.75 (29.83) [c]	28.18 (32.06) [b]
8.	MAS –2000-1	48.25 (43.99) [a]	41.50 (40.10) [a]	44.87 (42.05) [a]	33.72 (35.48) [a]	31.75 (34.05) [a]	32.73 (34.90) [a]
9.	MAUS– 30	35.75 (36.70) [c]	36.25 (37.01) [b]	36.00 (36.87) [c]	26.60 (31.04) [bc]	24.75 (28.48) [c]	25.67 (30.44) [bc]
10.	PKS -15	39.25 (38.78) [bc]	31.50 (34.12) [c]	35.37 (36.48) [bc]	25.87 (30.54) [c]	23.75 (29.16) [c]	24.81 (29.87) [bc]
11.	PKS -18	40.75 (39.65) [bc]	34.00 (35.66) [b]	37.37 (37.68) [bc]	27.37 (29.33) [bc]	25.00 (29.99) [c]	26.18 (30.79) [bc]
12.	NRC -55	26.75 (31.14) [de]	23.00 (28.65) [ef]	24.87 (29.90) [e]	13.62 (21.61) [e]	13.00 (21.13) [f]	13.31 (21.40) [e]
13.	NRC -52	28.75 (32.39) [d]	20.87 (27.16) [f]	24.81 (29.87) [e]	15.50 (23.13) [e]	14.37 (22.25) [ef]	14.93 (22.74) [e]
14.	NRC - 51	24.00 (29.33) [e]	22.75 (28.49) [ef]	23.37 (28.90) [f]	14.77 (22.57) [e]	14.37 (22.24) [ef]	14.57 (22.44) [e]
15.	UGM - 20075	42.00 (40.40) [b]	33.75 (35.51) [c]	37.87 (37.98) [bc]	28.47 (33.25) [bc]	25.50 (30.33) [c]	26.98 (31.31) [bc]
16.	PK – 1347	34.25 (35.81) [cd]	31.25 (33.98) [cd]	32.75 (34.90) [cd]	26.62 (31.05) [a-c]	28.00 (31.78) [bc]	27.31 (31.50) [b]
17.	JS335xTGx855- 53	41.00 (39.82) [bc]	33.62 (35.48) [c]	37.31 (37.64) [bc]	28.37 (32.14) [ab]	26.37 (30.88) [c]	27.37 (31.52) [b]
18.	JS(SH) -93-97	38.50 (38.35) [c]	32.50 (34.65) [c]	35.50 (36.57) [bc]	27.12 (31.37) [bc]	25.12 (30.06) [c]	26.12 (30.72) [bc]
19.	JS90-41xNRC-25	40.75 (39.64) [b]	34.50 (35.97) [bc]	37.62 (37.82) [bc]	26.75 (31.09) [bc]	23.75 (29.81) [c]	25.25 (30.17) [bc]
20.	JS-99-76	36.50 (37.14) [cd]	33.25 (35.21) [c]	34.87 (36.18) [cd]	24.97 (29.96) [bc]	24.50 (29.66) [c]	24.73 (29.83) [bc]
21.	EC - 241778	42.83 (40.78) [b]	34.50 (35.97) [bc]	38.66 (38.44) [bc]	31.25 (33.95) [ab]	23.75 (29.16) [c]	27.50 (31.63) [bc]
22.	EC - 241780	43.52 (41.24) [b]	35.50 (36.56) [b]	39.51 (38.94) [a-c]	29.32 (32.71) [b]	24.00 (29.33) [c]	26.66 (31.08) [bc]
23.	DSb (PR) – 101	29.65 (32.98) [de]	22.00 (27.96) [f]	25.82 (30.53) [e]	14.72 (22.54) [e]	14.00 (21.93) [ef]	14.36 (22.26) [e]
24.	DSb (PR) – 102	26.25 (30.82) [e]	24.87 (28.55) [e]	25.56 (30.37) [e]	14.60 (22.75) [e]	17.00 (24.31) [e]	15.80 (23.42) [e]
25.	DSb (PR) – 103	33.75 (35.50) [d]	34.75 (36.12) [bc]	34.25 (35.80) [cd]	26.25 (30.81) [bc]	30.87 (33.82) [b]	28.56 (32.30) [ab]
26.	DSb (PR) – 105	37.00 (37.46) [cd]	34.00 (35.66) [bc]	35.50 (36.57) [bc]	26.30 (30.85) [bc]	25.87 (30.56) [c]	26.08(32.10) [b]
27.	DSb (PR) – 106	30.00 (33.18) [de]	32.50 (34.74) [cd]	31.25 (33.98) [cd]	24.00 (29.33) [cd]	23.87 (29.23) [c]	23.93 (29.27) [cd]
28.	DSb (PR) – 107	35.00 (36.27) [cd]	34.00 (35.66) [bc]	34.50 (35.97) [cd]	27.50 (31.63) [bc]	24.12 (29.39) [c]	25.81 (30.53) [c]
29.	DSb (PR) – 108	36.75 (37.29) [cd]	35.50 (36.56) [c]	36.12 (37.00) [bc]	27.75 (31.80) [bc]	22.00 (27.91) [d]	24.87 (29.87) [cd]
30.	DSb (PR) – 109	40.00 (39.22) [bc]	33.50 (35.36) [c]	36.75 (37.32) [bc]	27.35 (31.51) [bc]	24.12 (29.39) [c]	25.73 (30.48) [c]
31.	DSb (PR) – 110	37.75 (37.90) [c]	31.75 (34.28) [c]	34.75 (36.12) [cd]	23.50 (29.00) [cd]	23.87 (27.88) [c]	23.68 (29.10) [cd]
32.	PK- 1029 ©	39.10 (38.55) [bc]	33.00 (35.05) [cd]	36.05 (36.90) [bc]	27.02 (31.29) [bc]	24.25 (29.49) [c]	25.63 (30.44) [bc]
33.	Bragg ©	39.75 (39.07) [bc]	33.00 (35.05) [cd]	36.37 (37.09) [bc]	24.50 (28.65) [bc]	23.00 (28.65) [d]	23.75 (29.16) [cd]
34.	KHSb - 2 ©	48.00 (43.85) [a]	39.75 (39.08) [a]	43.87 (41.48) [a]	34.50 (35.94) [a]	32.25 (34.59) [a]	33.37 (35.27) [a]
35.	JS – 9305 ©	39.25 (38.78) [bc]	31.00 (33.83) [d]	35.12 (36.33) [bc]	28.62 (32.33) [b]	27.75 (31.78) [bc]	28.18 (32.06) [b]
36.	JS – 355 ©	40.00 (39.23) [bc]	33.50 (35.35) [c]	36.50 (37.11) [bc]	26.25 (30.82) [bc]	26.00 (30.63) [c]	26.12 (30.80) [bc]
37.	Monetta ©	39.75 (39.07) [c]	32.00 (34.44) [c]	35.87 (36.81) [bc]	27.75 (31.79) [bc]	26.50 (30.88) [c]	26.62 (31.07) [bc]
	S.E.±	1.446	0.889	1.227	1.161	1.076	0.795

Figures in parentheses are arc sine transformed values, Means in the columns followed by the same alphabet do not differ significantly by DMRT (P=0.05)

Table 3: Reaction of soybean genotypes against stem fly incidence at ARS, Bailhongal

Class	Genotypes
Resistant (R)	NRC 55, NRC-51 DSb -101
Moderately resistant (MR)	MACS-798, MACS-740, MACS-817, NRC-52, DSb-102
Moderately susceptible (MS)	MACS-212, MRSB-342, JS – 9305, MACS 330 x PK 327, MAUS-30, PKS-15, PKS-18, UGM-20075, JS-335 x TGx 855-53, JS (SH) 93-97, JS-99-76, EC-241778, EC-241780, DSb-103, DSb-105, DSb-108, DSb-106, DSb-107, DSb-109, DSb-110, Monetta (C), PK 1029 (C) , Brag (c), MACS-450 (C), JS-335 (C), JS 90-41 x NRC-25 and PK-1347
Susceptible (S)	MAS-2000-1, KHSb-2
Highly susceptible (HS)	---

REFERENCES

Anonymous (1985). Annual Report. Asian Vegetable Research and Development Centre. pp. 211-212.

Anonymous (1998). Annual report. All India coordinated Research project on soybean, pp.225-226.

Anonymous (2007). *Recommeded package of practices for agricultural crops,*Publication Centre University of Agricultural Sciences, Dharwad (KARNATAKA) INDIA. pp126-133.

Croxton, E.C. and Cowden, D.J. (1964). *Applied Statistics* Prentice Hall, NEW DELHI, INDIA, 843pp.

Gain, D. and Kundu, G.G. (1988). Insecticidal control of soybean stem miner *Melanagromyza sojae* (Zehnt.). *Entomon.*, **13**(1) : 99-102.

Jayappa, A.H. (2000). Studies on the soybean stem fly *Melenogromyza sojae* (Zehnt) with reference to crop loss assessment, screening of varieties and management. M.Sc (Ag.) Thesis, University of Agricultural Sciences, Bengaluru, KARNATAKA (INDIA).

Kavita, Savajji (2006). Bio-ecology and management of soybean stem fly, *Melanagromyza sojae* (Zehntner) (Diptera : Agromyzidae) M.Sc. (Ag.) Thesis, University of Agricultural Sciences, Dharwad, KARNATAKA (INDIA) .

Kundu, G.G. and Misra, S.D. (1985). Field evaluation of some soybean germplasm for resistance to stem fly, *Melanagromyza sojae* (Zehnt.), root knot nematode, *Meloidogyne incognita* and yellow mosaic virus. *Indian J.Entomol.*, **47**(2) : 230-232.

Patil, R.H. and Kulkarni, K.A. (2004). New promising seed dress for the management of soybean seedling borers. *Pestology,* **28**: 1 22-25.

Rao, M.S., Raman,G.V., Srimannarayana,G. and Venkatesalu,B. (2000). Evaluation of some IPM packages in management of pod borer complex of pigeonpea.*Pestology*, **23**(8): 41-43.

Singh, O.P. and Singh, K.J. (1990). Seasonal incidence and damage of *Melanagromyza sojae* (Zehntner) on soybean. *Indian J. Plant Prot.*, **18** : 271-275.

Talekar, N.S. (1980). Search for beanfly resistance in soybean, mungbean and snapbean. In : *Processing of legumes in the tropics*. Faculty of Agriculture, University Pertanian Malaysia, Serdang, SELANGOR, MALAYSIA, pp. 293-295.

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