To determine the percentage of test cultivars lost as a result of shoot and fruit borer

Abstract: The responses of commercial cultivars of okra (Abelmoschus esculentus L. Moench) to several pests were assessed. Research on okra's varietal resistance to the main insect pest, Abelmoschus esculentus (L), was carried out in the Department of Entomology's experimental field at the College of Agriculture, Gwalior, during the 2015–2016 kharif season. Where in the eight types of okra (Pusa A-4, Pusa falguni, Jaya, Swati, Shreya, Viraj, and Virat.Maximum shoot infestation (8.13%) was found in Pusa A-4, followed by Kashi pargati and Pusa falguni with 7.29% and 5.88%, respectively. Minimum shoot infestation (1.41%) was recorded in Jaya, which was on par with Shreya, followed by Swati, Viraj, and Virat with 2.03%, 4.47 %, 5.15 %, and 5.38 %, respectively. Shreya and Jaya were on level with one another. Maximum fruit infestation (19.57%) was found in Pusa A-4, followed by Kashi pargati and Pusa falguni with 17.76% and 14.62%, respectively. Minimum fruit infestation (1.99%) was found in Jaya, followed by Shreya, Swati, Viraj, and Virat with 4.46 %, 10.67 %, 12.28 %, and 12.73 %, respectively.

Keywords: *Okra, shoot and fruit borer, genotypes,Percentage*

1.Introduction: India grows okra, also known as lady's finger or bhindi, or Abelmoschus esculentus (L.) Moench, mostly for its immature fruits. Fruits of the okra plant are nutrient-dense and healthy. Although its primary use is as a fresh vegetable, it can also be found frozen, dehydrated, or tinned. It contains fat, carbs, and minerals like calcium (90 mg/100 g), iron (1.5 mg/100 g), magnesium, and other nutrients. It is also a significant source of vitamins, including vitamin A, B, and C (30 mg/100 g). sodium (Aykroud, 1963) Okra stems and roots are also utilized as a purifying agent. while making gur or brown sugar (Chauhan, 1972) Ripe okra seeds are roasted and ground . certain nations utilized as a coffee replacement. ripe fruits and stalks with rough The paper business uses fiber. About 40% of the seed contains oil. It's reported that okra is rather beneficial for spermatorrhoea, chronic dysentery, and genito-urinary diseases (Nandkarni,1919) . Its therapeutic benefits have also been noted for treating ulcers and providing relief from blood clots (Adams,).Because they are a good source of vitamins, minerals, carbs, and other nutrients, vegetables are a vital part of our diet. It is a necessary component of a balanced diet to combat malnutrition, particularly in developing nations like India where it poses a serious risk to the health of both adults and children (Randhawa, 1974 and Khan Masood et al., 2001). Numerous insect pests affect okra.This crop is attacked by roughly 13 primary insect and noninsect pest species at different phases of growth (Dhamdhere et al.,In 1984. Okra, regrettably, is the worst victim of the fruit borer and shoot borer (Earias) vittella Fab.), the primary obstruction for the growing of this crop. Under various agroclimatic circumstances, the losses could range from 10.1% to 50.0% Khasyap verma, 1983) as well.Early in the crop's life, larvae burrow and dig through delicate shoots. downwards that deteriorate, fall, and Points of growth are eliminated. When fruits are larvae pierce these and consume the interior tissues that acquire a distorted shape lacking any market worth.

2.Material & Methods: The study was conducted at Research farm RVSKVV, Gwalior MP, during the 2015–2016 Kharif season. Eight okra genotypes—Pusa A-4, Pusa falguni, Jaya, Swati, Shreya, Viraj, and Virat—were used in the trials, which were run in three replication Plot size were 2.4x1.2 m in size and were spaced 60×30 cm apart.. Five randomly selected plants per plot were the focus of the observations. As soon as they become infested, weekly treatments were initiated. Every week, counts of all the shoots in five randomly selected plants including the infested ones were conducted. The findings were presented as a percentage for different sampling intervals.

3.Result & Discussion

Table-1: Per cent yield loss of different varieties caused by shoot and fruit borer

Treatment	Yield losses (per cent)								
	40 DAS	47 DAS	54 DAS	61 DAS	68 DAS	75 DAS	82 DAS	89 DAS	Mean
Kashi pargati	18.42 (25.42)**	18.04 (25.12)**	18.51 (25.46)**	18.67 (25.56)**	17.58 (24.79)**	18.94 (25.70)**	19.26 (25.95)**	17.33 (24.58)**	18.34 (25.34)**
Viraj	12.74 (20.92)	12.52 (20.71)	12.81 (20.95)	12.92 (21.03)	12.02 (20.22)	13.10 (21.22)	13.38 (21.45)	12.21 (20.40)	12.71 (20.87)
Virat	13.21 (21.31)	12.98 (21.23)	13.27 (21.36)	13.39 (21.46)	12.76 (20.86)	13.56 (21.58)	13.85 (21.85)	12.62 (20.81)	13.20 (21.31)
Jaya	3.42 (10.65)	3.36 (10.55)	3.44 (10.68)	3.47 (10.73)	3.28 (10.43)	3.51 (10.79)	3.58 (10.90)	3.28 (10.43)	3.42 (10.65)
Swati	11.07 (19.43)	10.88 (19.25)	11.10 (19.44)	11.18 (19.51)	10.42 (18.77)	11.37 (19.70)	9.52 (17.93)	10.55 (18.92)	10.76 (19.13)
Shreya	4.64 (12.43)	4.55 (12.32)	4.66 (12.47)	4.70 (12.53)	4.45 (12.18)	4.76 (12.60)	4.88 (12.74)	4.47 (12.21)	4.64 (12.44)
Pusa A-4	20.31 (26.78)	19.96 (26.78)	20.39 (26.85)	20.58 (26.97)	19.37 (26.11)	20.86 (27.17)	21.29 (27.48)	19.40 (26.13)	20.27 (26.76)
Pusa falguni	15.16 (22.91)	14.87 (22.68)	15.24 (22.98)	15.38 (23.09)	14.49 (22.36)	15.56 (23.23)	15.85 (23.46)	14.60 (22.46)	15.14 (22.90)
SE.m	0.69	0.82	0.41	0.52	0.72	0.67	0.66	0.48	0.35
CD at 5%	2.09	2.48	1.23	1.58	2.18	2.03	2.00	1.44	1.06

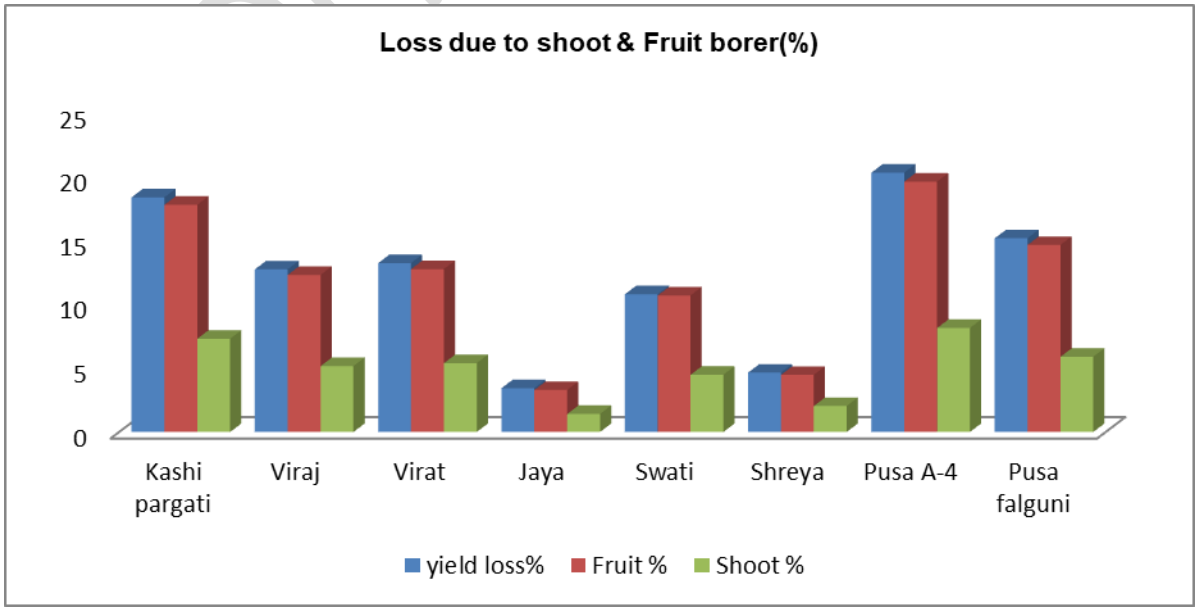

Fig.1 Per cent shoots infested by shoot and fruit borer in different cultivar in Kharif

Table 2: Per cent shoots infested by shoot and fruit borer in different

Varieties	Per cent shoot infestation at				
	40 DAS	47 DAS	54 DAS	61 DAS	Mean
Kashi pargati	10.10 (18.50)^{c}**	9.28(17.71)^{c}**	5.86(13.98)^{c}**	3.91(11.37)^{c}**	7.29(15.63)^{c}**
Viraj	6.63(14.91)	6.79(15.09)	4.30(11.94)	2.87(9.72)	5.15(13.10)
Virat	7.08(15.41)	7.11(15.44)	4.39(12.07)	2.93(9.82)	5.38(13.38)
Jaya	1.68(7.38) $^{\underline{a}}$	1.88(7.82) $^{\underline{a}}$	1.22(6.27) $^{\underline{a}}$	0.83 (5.18) $^{\underline{a}}$	1.41(6.74) $^{\underline{a}}$
Swati	5.77(13.87)	5.91(14.04)	3.73 (11.11)	2.49(9.05)	4.47(12.19)
Shreya	2.49(9.05) ^{a}	2.73(9.48)	1.72(7.51) ^{a}	1.17(6.19) ^{a}	2.03(8.16) ^{a}
Pusa A-4	11.56(19.87) $^{\underline{c}}$	10.42(18.82) $^{\underline{c}}$	6.35(14.59) $^{\underline{c}}$	4.17(11.79) $^{\underline{c}}$	8.13(16.56) $^{\underline{c}}$
Pusa falguni	8.06(16.47)	7.52(15.90)	4.73 (12.55)	3.22(10.32)	5.88(14.02)
SE.m	(0.56)	(0.54)	(0.46)	(0.38)	(0.48)
CD at 5%	(1.69)	(1.65)	(1.39)	(1.17)	(1.46)

** Figures in parenthesis are angular transformed value

DAS= days after sowing, a= Minimum, a=at par with minimum, c=Maximum, c= at par with maximum

Table 3: Per cent fruits infested by shoot and fruit borer in different varieties

Treatment	Per cent fruit infestation at								
	40 DAS	47 DAS	54 DAS	61 DAS	68 DAS	75 DAS	82 DAS	89 DAS	Mean
Kashi pargati	24.73 (29.78) ^{c}**	21.69 (27.71) ^{c}**	19.35 (26.03) ^{c}**	15.85 (23.38) ^{c}**	14.10 (21.94) ^{c}**	13.11 (21.12) ^{c}**	10.49 (18.79) ^{c}**	8.69 (17.07) ^{c}**	17.76 (24.87) ^{c}**
Viraj	18.08 (25.15)	15.89 (23.46)	14.19 (22.07)	11.63 (19.87)	10.37 (18.67)	9.49 (17.86)	7.60 (15.92) $_{c}$	6.29 (14.47)	12.28 (20.48)
Virat	19.32 (26.04)	16.23 (23.72)	14.48 (22.32)	11.86 (20.09)	10.56 (18.87)	9.67 (18.04)	7.73 (16.08) $_{c}$	6.41 (14.62)	12.73 (20.85)
Jaya	4.99 (12.81) $_{\underline{a}}$	4.43 (12.02) $_{\underline{a}}$	4.12 (11.58) $_{\underline{a}}$	3.39 (10.47) $_{\underline{a}}$	3.22 (10.21) $_{\underline{a}}$	3.09 (10.00) $_{\underline{a}}$	1.93 (6.49) $^{\underline{a}}$	1.99 (8.00) $^{\underline{a}}$	3.28 (10.27) $_{\underline{a}}$
Swati	15.73 (23.33)	13.81 (21.77)	12.32 (20.49)	10.09 (18.45)	8.98 (17.34)	8.21 (16.58)	6.57 (14.78)	5.45 (13.45)	10.67 (19.02)
Shreya	7.41 (15.75)	6.22 (14.41) $_{a}$	5.79 (13.88) $_{a}$	4.75 (12.54) $_{a}$	4.60 (12.34) $_{a}$	4.51 (12.22)	2.60 (7.57) ^{a}	2.40 (8.56) ^{a}	4.46 (12.15) $_{a}$

Pusa A-4	28.31 (32.14) c	23.78 (29.18) c	20.69 (27.05) c	16.88 (24.26) c	14.92 (22.71) c	13.70 (21.72) c	10.96 (19.33) c	9.12 (17.58) c	19.57 (26.25) c
Pusa falguni	20.44 (26.85)	17.17 (24.45)	15.97 (23.52)	13.00 (21.12)	11.44 (19.76)	12.13 (20.38) c	9.71 (18.15) c	8.10 (16.52) c	14.62 (22.46)
SE.m	(0.92)	(0.91)	(0.91)	(0.80)	(0.73)	(0.70)	(1.69)	(0.82)	(0.82)
CD at 5%	(2.80)	(2.75)	(2.77)	(2.43)	(2.23)	(2.11)	(3.15)	(2.48)	(2.49)

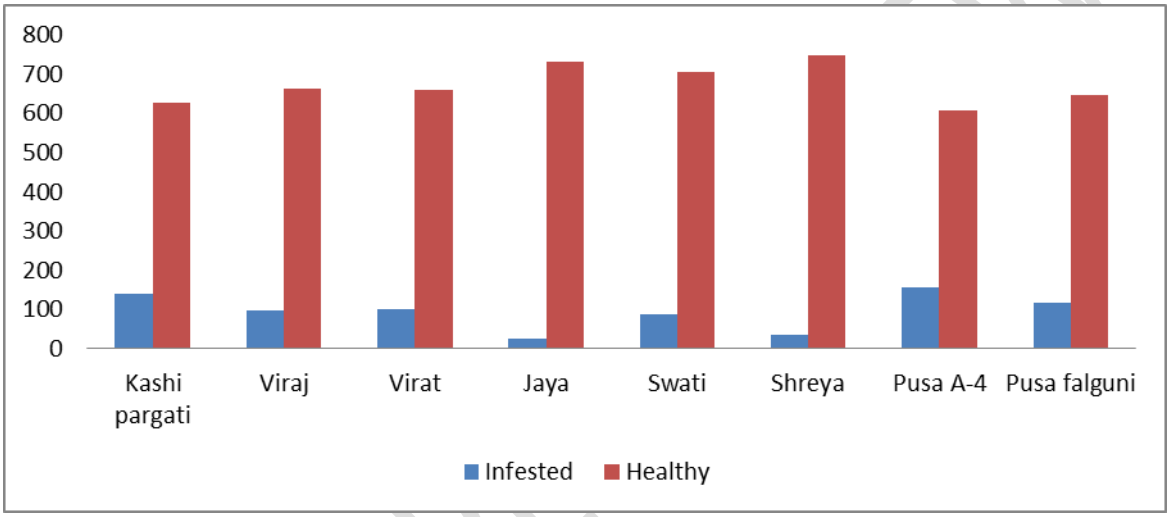

Fig 2.Infested & healthy fruit yield of different varieties infested by shoot and fruit borer

Table-4: Infested fruit yield of different varieties infested by shoot and fruit borer

	Infested fruit yield (g/5 plants) at								
Treatment	**40 DAS**	**47 DAS**	**54 DAS**	**61 DAS**	**68 DAS**	**75 DAS**	**82 DAS**	**89 DAS**	**Total**
Kashi pargati	27.24	23.89	21.31	17.45	15.52	14.44	11.55	9.57	140.98
Viraj	18.68	16.38	14.61	11.97	10.65	9.77	7.81	6.48	96.35
Virat	20.17	16.95	15.08	12.33	10.93	10.04	8.03	6.67	100.20
Jaya	4.72	4.13	3.84	3.14	2.99	2.87	2.29	1.84	25.81
Swati	16.65	14.60	13.02	10.66	9.48	8.70	6.96	5.77	85.83
Shreya	6.75	5.67	5.28	4.31	4.18	4.10	3.28	2.73	36.30
Pusa A-4	31.59	26.54	23.09	18.85	16.68	15.32	12.26	10.19	154.51
Pusa falguni	21.88	18.38	17.09	13.92	12.25	12.99	10.39	8.67	115.57
SE.m	0.62	0.76	0.85	0.73	0.76	0.73	0.58	0.46	5.23
CD at 5%	1.87	2.31	2.58	2.21	2.32	2.21	1.77	1.38	15.86

Table-5: Healthy fruit yield of different varieties infested by shoot and fruit borer

Healthy fruit yield (g/5 plants) at

Treatment	40 DAS	47 DAS	54 DAS	61 DAS	68 DAS	75 DAS	82 DAS	89 DAS	Total
Kashi pargati	120.65	108.47	93.81	76.02	72.62	61.87	48.33	45.37	627.13
Viraj	127.86	114.41	99.48	80.67	77.67	64.83	50.67	46.67	662.26
Virat	132.55	113.66	98.60	79.79	75.72	63.95	49.96	46.18	660.40
Jaya	133.27	119.03	107.98	87.50	88.12	78.80	61.84	54.12	730.66
Swati	133.79	119.55	104.21	84.55	81.37	67.84	65.96	48.84	706.12
Shreya	138.84	118.95	107.90	87.37	89.75	82.05	64.44	58.28	747.59
Pusa A-4	123.95	106.43	90.12	72.77	69.37	58.14	45.31	42.35	608.44
Pusa falguni	122.43	105.16	95.08	76.61	72.40	70.49	55.19	50.70	648.05
SE.m	3.65	3.03	3.12	2.83	4.18	4.28	3.34	1.74	16.09
CD at 5%	11.07	9.20	9.48	8.60	12.67	12.99	10.13	5.28	48.79

3.1 The percentage of shoots that are contaminated by shoot borer

The average results from ten weeks of observations that were made at various times following the seeding of several kinds. Maximum shoot infestation (8.13%) was found in Pusa A-4, followed by Kashi pargati and Pusa falguni with 7.29% and 5.88%, respectively. Minimum shoot infestation (1.41%) was recorded in Jaya, which was on par with Shreya, followed by Swati, Viraj, and Virat with 2.03%, 4.47 %, 5.15 %, and 5.38 %, respectively. In terms of statistics, Jaya and Shreya were comparable. The results of Rahman et al. (2012), Sharma and Jat (2009), and Mandal et al. (2006) are completely consistent with the current investigation. According to Rahman et al. (2014), Taj Vendhi was the most favored variety since it had the greatest average shoot and fruit infestation (about 26% and 24%, respectively). Conversely, the least preferred variety, Arka Anamika, had the lowest rates of fruit and shoot infestations, at 10% and 11%, respectively.

3.2 Percentage of fruits with shoot and fruit borer infestations

based on the average results from ten weeks of observations that were made at various times following the seeding of several kinds. The least amount of fruit infestation (1.99%) was found in Jaya, and the highest amount (19.57%) was found in Pusa A-4, followed by Kashi pargati and Pusa falguni with 17.76% and 14.62%, respectively. Shreya, Swati, Viraj, and Virat had the highest levels of fruit infestation (4.46%), 10.67%, 12.28%, and 12.73%, respectively. Shreya and Jaya were on level with one another.Because Mazed (2009) studied with several cultivars (apart from Arka Anamika, BARI-1, and OK285) and in different seasons (May to September), he reported that Arka Anamika was highly preferred despite producing a low yield among the kinds. According to Rahman et al. (2012) and Sharma and Jat (2009), Arka Anamika is the least preferred variety when it comes to okra shoot and fruit borer. According to Memon et al. (2004) and Aziz (2010), the Desi variety was the most preferred variety by the okra shoot and fruit borer, while Green polo and Arka Anamika were the least susceptible. According to Rahman et al. (2014), Taj Vendhi was the most favored variety since it had the highest average infection of shoots and fruits (approximately 26% and 24%, respectively).

3.3 **healthy and infested fruit yield**

The lowest healthy fruit output (598.60 g/5 plant) was observed in Pusa A-4, followed by Kashi pargati and Pusa falguni. The most healthy fruit yield (727.31 g/5 plant) was recorded in Jaya, which was on par with Shreya. Similar to Shreya, Jaya had the lowest amount of contaminated fruit (26.03 g/5 plant), whereas Pusa A-4 had the highest amount of infected fruit (154.57 g/5 plant), followed by Kashi pargati and Pusa falguni.

4.Conclusion : Based on the average results from ten weeks of observations that were made at various times following the seeding of several kinds. Maximum shoot infestation (8.13%) was found in

Pusa A-4, followed by Kashi pargati and Pusa falguni with 7.29% and 5.88%, respectively. Minimum shoot infestation (1.41%) was recorded in Jaya, which was on par with Shreya, followed by Swati, Viraj, and Virat with 2.03%, 4.47 %, 5.15 %, and 5.38 %, respectively. In terms of statistics, Jaya and Shreya were comparable.. Maximum fruit infestation (19.57%) was found in Pusa A-4, followed by Kashi pargati and Pusa falguni with 17.76% and 14.62%, respectively. Minimum fruit infestation (1.99%) was found in Jaya, followed by Shreya, Swati, Viraj, and Virat with 4.46 %, 10.67 %, 12.28 %, and 12.73 %, respectively. In terms of statistics, Jaya and Shreya were comparable. The lowest healthy fruit output (598.60 g/5 plant) was observed in Pusa A-4, followed by Kashi pargati and Pusa falguni. The most healthy fruit yield (727.31 g/5 plant) was recorded in Jaya, which was on par with Shreya. Similar to Shreya, Jaya had the lowest amount of contaminated fruit (26.03 g/5 plant), whereas Pusa A-4 had the highest amount of infected fruit (154.57 g/5 plant), followed by Kashi pargati and Pusa falguni.

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