



## Screening of Okra Varieties Against Okra Shoot and Fruit Borer, *Earias Vittella* (Fab.) in West Bengal.

### KEYWORDS

okra, *Earias vittella*, varieties, infestation.

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### ABSTRACT

An experiment was conducted at Central Research farm, Gayeshpur, West Bengal during pre-kharif 2012 and 2013 taken to know the infestation of okra shoot and fruit borer, *Earias vittella* (Fab.) on okra. Fifteen okra varieties viz. VNR Green, Sungro -319, PAN-2128, JKOH- 7315, Purna, Golden 2436, NS 819, Pankaj, Jaya, Mahyco- 64, Shakti F1 Hybrid, Parbhani Kranti, AROH-10, Avantika and Arka Anamika were screened to know their response on the basis of fruit damage scale. Only one variety showed tolerant, ten moderately resistance and four highly resistance in 2012, while during 2013 only single variety showed susceptible while two tolerant, nine moderately resistance and three highly resistance. During 2012 and 2013, VNR Green showed highest no. of fruit damage fruit weight damage and exhibited lowest healthy fruit yield. PAN-2128 showed lowest no. of fruit damage fruit weight damage.

### INTRODUCTION

Okra [*Abelmoschus esculentus* (Linnaeus) Moench] is an important Malvaceous vegetable crop of India. Among the states, West Bengal is the leading okra producing state which has production of around 718.9 thousand tonnes followed by Bihar (714.1 thousand tonnes) and Orissa (618.8 thousand tonnes). It is grown mostly in Hoogly, Mursidabad, Nadia, 24 Parganas, Bankur and Midnapur districts. Okra is attacked by a number of insect pests, of which shoot and fruit borer, *Earias* spp. is one of the major constraints in achieving potential yield. The infested fruits become unfit for human consumption, thus resulting in 35 to 76 % decrease in yield (Hafeez and Rizvi, 1994) and caused severe damage to the crop leading to yield losses to an extent of 3.5-90% in Andhra Pradesh (Krishnaiah et al., 1976) and 30.81% at Coochbehar, West Bengal (Ghosh et al., 1999). Application of pesticides as the plant protection measures to overcome the pest problem causes the pesticide residues problem in harvested product and hazardous to consumers. Considering the limitations of chemical control, use of natural plant resistance to their pest attack can overcome the problem. Keeping this in view, the present studies were undertaken to screen out some okra varieties/cultivars against okra shoot and fruit borer (*Earias* spp.).

### MATERIALS AND METHODS

The field experiment were conducted at Central Research Farm, Gayeshpur, West Bengal during pre-kharif 2012 and 2013. The seeds of fifteen okra varieties viz. VNR Green, Sungro -319, PAN-2128, JKOH- 7315, Purna, Golden 2436, NS 819, Pankaj, Jaya, Mahyco- 64, Shakti F1 Hybrid, Parbhani Kranti, AROH-10, Avantika and Arka Anamika were sown in plots measuring 4 x 1.5 m, having 50cm x40cm spacing. The experiments were laid out in a Randomized Block Design with three replications. In the fruit borer infestation, number and weight of healthy and damage

fruits were recorded at each harvest. Harvesting was done at regular interval (2-3 times/week). Then per cent damage on number was calculated by counting the infested and healthy fruits separately from five tagged plants and grades were also assigned for the fruit damaged based on the rating given by Mishra et al., (1988) [Grade: 1. Immune=0% (I) fruit damage; 2=Highly resistant (HR) 1-10%; 3=Moderately resistant (MR) 11-20%; 4 =Tolerant (T) 21-30%; 5= Susceptible (S)-31-40%; 6= Highly susceptible(HS) above 40%.] and it was adopted in the present study.

### RESULTS AND DISCUSSION

The incidence of okra fruit and shoot borer (*Earias* spp.) on different okra cultivars during 2012 and 2013 were presented in Table-1 and Table-2. During 2012, the variety VNR Green recorded 25.08% fruit damage and 16.01% fruit weight having the lowest yield of healthy fruit about 29.11 q/ha. This was followed by the variety Pankaj having 19.72% fruit damage and 15.03 % fruit weight damage with the yield of 15.37 q/ha. The lowest fruit damage (4.86%) and lowest fruit weight damage (1.91%) were recorded on PAN-2128 followed by Shakti F1 hybrid and the corresponding values were 9.70% (no. of fruit damage), 5.23 (fruit weight damage). During 2013, more or less similar trend in observation on fruit borer infestation was recorded in all the varieties. VNR Green showed highest no. of fruit damage (30.30%) as well as highest fruit weight damage (37.17%). Besides this damage percentage, VNR Green exhibited lowest healthy fruit yield. The lowest number of fruit damage (7.49%) as well as lowest fruit weight damage (9.52%) were observed in the cultivar PAN-2128 followed by 7.92% (no. of fruit damage) and 14.25% (weight damage) in the cultivar JKOH-7315.

From the classification based on number of damage fruit percentage, it was found that none of the 15 cultivars of okra was immune to shoot and fruit borer (Table-1 and

Table- 2). Only wild species of okra like *Abelmoschus manihot* (Raut and Sonone, 1979) and *A. manihot* spp. *tetraphyllus*, *A.tuberculatus* and *A.tetraphyllus* (Prabu et al., 2009) were reported as immune to *Earias* spp. In the present study, among the fifteen varieties, only three varieties namely PAN-2128, JKOH-7315 and Avantika showed less than 10% fruit damage in both the years and classified as resistant to *Earias* spp. Whereas Shakti F1 hybrid expressed 9.7 to 11.04% fruit damage, so it can be designated as highly resistant. Similarly okra varieties namely AE 79, AE69 and AE22 were reported as high resistant in terms of number of dying plant and percent fruit infestation caused by *Earias vittella* (Kumbhar et al., 1991). Lowest shoot damage i.e, 4 and 5% caused by fruit and shoot borer was recorded on AROH-2 and Komal hybrid F1, respectively. (Shukla et al., 1998) and lowest fruit damage by *E.vittella* was found in Hybrid no.8 (Naresh et al., 2003). One variety i.e, entry no. 105 was resistant (3.5% fruit infestation) but with low mean fruit yield (90.30 g/plant) (Mahaveer et al., 2009) which were in supportive with the present findings. Among the screened varieties, ten varieties namely Sungro-319, Purna, Golden 2486, NS819, Pankaj, Jaya, Mahyco-64, Parbhani Kranti, AROH-10 and Arka Anamika of okra in the present study were categorized as moderately resistant to shoot and fruit borer (*E.vittella*) (Table -1 and Table-2). Earlier reports were also in agreement to the present findings in which Parbhani Kranti, Arka Anamika, Sungrow Hybrid no. 18, Jaya were reported as moderately resistant to *Earias* spp. (Shukla et al., 1998; Ghosh et al., 1999 and 2010; Naresh et al., 2003; Rajesh and Jat, 2009). Similarly few other different varieties of okra were also reported as moderately resistant to shoot and fruit borer (*Earias* spp.) such as Pusa Swani, KA-026, PB236 and lines111,114 and 116 (Mahaveer et al.,2009). In the present study the okra variety Shakti F1 hybrid and Mahyco 64 had comparatively high yield i.e, 52.84 to 71.68 q/ha and 34.15 to 70.67 q/ha, respectively during 2012 and 2013 with moderate resistance to shoot and fruit borer. The variety VNR Green showed high infestation of shoot and fruit borer and caused 25.08 to 30.30% fruit damage and 16.01 to 37.17% weight damage with poor yield 29.06-29.11 q/ha and designated as susceptible (Table -1 and Table-2). Similarly, okra germplasm like AE57,AE22,AE27, Red okra and Vaishali Vadhu were highly susceptible (Kashyap and Verma, 1983) and Malav 31, Parbhani Kranti (Rajesh and Jat, 2009) and Indo American hybrid and White velvet, Long Green (Madav and Dumbre,1985) were reported as either tolerant or susceptible to fruit borer infestation. Tolerant entries are more effective in IPM practices to better establishment of natural enemies in the cultivation system than resistant or highly resistant varieties. However, resistant or highly resistant germplasm of okra can be utilized a resistance source of genome in breeding programme for developing resistant or tolerant varieties of okra to *Earias* spp.

**Table-1: Incidence of okra fruit borer (*Earias* spp.) on different okra varieties during 2012, West Bengal.**

Varieties	2012		Yield (healthy fruit) (q/ha)	Reaction
	% Damage			
	Nos.	Weight (g)		
VNR Green	25.08 (23.51)	16.01 (29.96)	29.11	T
Sungro-319	13.99 (17.04)	8.60 (21.96)	27.51	MR
PAN2128	4.86 (6.36)	1.91 (10.42)	54.96	HR
JKOH 7315	7.90 (13.65)	5.71 (16.14)	54.91	HR
Purna	10.60 (15.86)	7.49 (18.91)	42.40	MR
Golden2486	11.28 (17.98)	9.54 (19.62)	35.31	MR
NS 819	15.21 (18.26)	10.33 (22.27)	21.14	MR
Pankaj (local)	19.72 (22.59)	15.03 (26.04)	15.37	MR
Jaya	16.28 (18.38)	9.96 (23.78)	20.12	MR
Mahyco 64	12.79 (15.65)	7.38 (20.91)	34.15	MR
Shakti F <sub>1</sub> Hybrid	9.70 (13.06)	5.23 (18.04)	52.84	HR
Prabhani Kranti	14.07 (19.70)	11.38 (22.03)	26.54	MR
AROH 10	13.27 (17.25)	8.88 (21.30)	30.49	MR
Avantika	9.27 (16.06)	8.30 (17.09)	54.65	HR
Arka Anamika	18.19 (21.36)	13.26 (25.24)	18.44	MR
S.Em	1.93	2.51	4.12	-
C.D.(p=0.05)	5.59	7.26	11.95	-

Figures in the parenthesis indicate the angular transformed values.

**Table-2. Incidence of okra fruit borer (*Earias* spp.) on different okra varieties during 2013, West Bengal**

Varieties	2013		Yield (healthy fruit) (q/ha)	Reaction
	%Damage			
	Nos.	Weight		
VNR Green	30.30 (33.35)	37.17 (37.51)	43.46	S
Sungro-319	14.82 (22.43)	12.81 (20.63)	36.47	MR
PAN2128	7.49 (15.75)	9.52 (17.84)	56.19	HR
JKOH 7315	7.92 (16.27)	14.25 (21.74)	22.56	HR
Purna	11.95 (20.02)	13.09 (21.13)	53.53	MR

Golden 2486	12.36 (20.58)	14.67 (22.51)	76.03	MR
NS 819	19.65 (26.29)	22.57 (28.34)	34.78	MR
Pankaj (local)	27.34 (31.50)	32.23 (34.59)	60.17	T
Jaya	26.01 (30.62)	26.32 (30.83)	29.06	MR
Mahyco 64	13.13 (21.22)	18.79 (25.62)	70.67	MR
Shakti F <sub>1</sub> Hybrid <sup>1</sup>	11.04 (19.40)	14.12 (22.07)	71.68	MR
Prabhani Kranti	17.70 (24.82)	18.00 (25.08)	38.11	MR
AROH 10	14.04 (22.00)	16.40 (23.87)	62.75	MR
Avantika	9.61 (18.05)	12.24 (20.47)	77.11	HR
Arka Anamika	22.64 (28.41)	22.65 (28.33)	30.23	T
S.Em	1.24	1.75	4.65	-
C.D.(p=0.05)	3.57	5.06	13.48	-

Figures in the parenthesis indicate the angular transformed values.

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