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Screening of some hybrids and varieties of okra in Ahmednagar district of Maharashtra, India against aphids

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ABSTRACT

In *Kharif* 2022 and Summer 2023, a preliminary screening trial was carried out on thirteen hybrids and varieties of okra to determine their relative sensitivity or resistance against key insect pests, specifically aphids at MPKV, Rahuri. Each hybrid showed a different genotype's susceptibility to the major insect problem, aphids. Among them, hybrids Bhindi No. 10 and Radhika had the lowest pooled aphid infestation, with 4.20 and 5.53 aphids/ 3 leaves/plant, respectively. Nonetheless, both hybrids fell into the resistance group. It was found that Syngenta OH-102, Venus plus, ADV-216 and Mahyco exp hybrid 111 were categorized into the moderate resistance group.

Key words: *Okra, Aphid, Infestation, Hybrids, Varieties*

Introduction

Okra, *Abelmoschus esculentus* (L.) Moench Known by several names, such as gumbo, bhindi, lady's finger is a green fresh fruit vegetable that is native to India's tropical and subtropical regions. It is a member of the Malvaceae family. Okra thus plays a major part in a healthy human diet since it is low in fat, high in minerals, and provides carbohydrates. After being brought to Ethopia, okra was mostly grown there starting in the 12th century (Benchasri, 2012). Okra is a perineal vegetable crop that is grown in India throughout the *Kharif*, Rabi and Summer season. Measurably, 5,54,800 hectares of okra are planted, yielding a production of 6,81,8900 MT and 12.3 MT per ha. The states of Andhra Pradesh, Uttar Pradesh, Bihar, Orissa, West Bengal, Karnataka, and Assam are significant producers of okra (Anonymous, 2022). Okra covers 14,110 hectares in Maharashtra and yields 1,36,790 MT of yield annually on an area of 9.70 MT/ha (Anonymous, 2022). Grown in Pune, Nagpur, Nashik, Jalgaon, Ahemadnagar, Aurangabad, and Parbhani districts in Maharashtra (Anonymous, 2018). It is also an excellent source of iron and calcium. Fresh pods are becoming more and more popular as a diet supplement because they are almost fat-free, high in fiber, and contain a number of important minerals (Cook *et al*., 2000). Okra is a medicinal vegetable that has been shown to reduce blood sugar, body weight,

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and total serum cholesterol levels when combined with a high-fat diet. Due to its gastroprotective properties against ethanol, okra may help in preventing stomach ulcers (Elkhalifa *et al*., 2021). Every day, there is a greater need for vegetables like okra. Growers benefit from a short growing season and high output, which increase their income per unit area. One of the main things that hinders the production of okra is the destruction caused by insect pests. However, during the crop season, producers face numerous challenges. Okra is also thought to be a refuge for pests and illnesses, so when it comes to time to get rid of them, more caution is needed. The vegetative and fruiting phases of the crop's growth are distinct processes. The same insect pests that decimate cotton plants are also thought to target okra plants, which are allegedly targeted by around 145 different insect pest species. Horrifyingly, okra harvests from farmers often deviate significantly from yields that are predicted and realized. The yields of most vegetable crops are less than half of their potential. According to another source, 72 distinct species of insects have been documented to yet (Rao and Rajendran, 2003). While sucking pests including aphids (*Aphis gossypii* Glover), leafhoppers (*Amrasca* (*sundapteryx*) *biguttula* Ishida), whiteflies (*Bemisiatabaci gennadius*), and shoot and fruit borers (*Earias vittella* Fabricius) also cause significant crop damage, shoot and fruit borers are the primary pests of okra. The harm caused by sucking pests typically persists until the harvesting stage and usually starts early in the seedling development process. Aphids and leafhoppers are major pests that weaken, destroy, and reduce crop yield in the early stages of the crop. According to Chaudhary and Dadeech (1989), yield losses would have been 54.0 4% if they hadn't been reduced at an early stage.

Materials and Methodology

Studies on the performance of thirteen okra hybrids and varieties *viz*., Phule vimukta, PDKV pragati, Mahycoexp hybrid 1, Mahyco exp hybrid 111, Mahyco No. 64, ADV-216, Syngenta OH-102, Ankur-2338, Ankur Siddhi-221, Radhika, Bhindi No. 10, Venus plus and Rukmini were selected. Seeds of different hybrids were sown in 3 m x 3 m plot at spacing of 60 cm x 30 cm. All agronomic practices were strictly followed except applications of pesticides. The experiment was laid in single factor randomized block design with three replications. The population of pests was recorded at weekly interval throughout the crop growing period starting from the first appearance of pest. The incidence pattern and population buildup of aphids were recorded from randomly selected five plants from upper, middle and lower leaves in each plot. The infestation of sucking pest was categorized as per the scale adopted by Patel *et al*. (2002), Nagar *et al*. (2017) and Kadu, (2018). For this purpose, mean value of individual hybrids and varieties ($\bar{X}_i$) was compared with mean value of all hybrids and varieties ($\bar{\bar{X}}$) and standard deviation (SD). The retransformed data was used for computation of ($\bar{\bar{X}}$), ($\bar{X}_i$) and SD for each parameter. The scale is Resistant (R): $\bar{X}_i$< ($\bar{\bar{X}}$– SD), Moderately Resistant (MR): $\bar{X}_i$> ($\bar{\bar{X}}$ – SD)< ($\bar{\bar{X}}$), Moderately Susceptible (MS): $\bar{X}_i$>$\bar{\bar{X}}$ <($\bar{\bar{X}}$+SD), Susceptible (S): $\bar{X}_i$> ($\bar{\bar{X}}$+SD)< ($\bar{\bar{X}}$+2SD).

Average infestation of aphid (*Aphis gossypii* (Glover) on different okra hybrids and varieties during *Kharif* 2022 and Summer 2023 (Pooled)

The infestation of aphids on different hybrids and variety was differing significantly by observing throughout the both season pooled average population of aphid was differing from 4.20 aphids/3 leaves/plant to 15.88 aphids/3 leaves/plant. However both the season, *i.e*. *Kharif* 2022 and Summer 2023 more or less similar results conferred. Among 13 varigated okra hybrids and varieties, hybrid Bhindi No. 10 and Radhika were reported the lowest population of aphid and recorded 4.20 and 5.53 aphids/3 leaves/plant, respectively. However the hybrids and varieties

PDKV pragati (10.89 aphids/3 leaves/plant), Mahyco No. 64 (13.79 aphids/3 leaves/plant) and Rukmini (15.88 aphids/3 leaves/plant) found with at par highest population of aphid. Other hybrids and varieties Syngenta OH-102 (7.85 aphids/3 leaves/plant), Venus plus (7.98 aphids/3 leaves/plant), ADV-216 (8.70 aphids/3 leaves/plant), Mahyco exp hy 111 (9.40 aphids/3 leaves/plant), Mahyco exp hy 1 (9.63 aphids/3 leaves/plant), Ankur Siddhi-221 (9.75 aphids/3leaves/plant), Ankur-2338 (9.94 aphids/3 leaves/plant) and Phule vimukta (10.33 aphids/3 leaves/plant) were stasticatically at par and reported with moderate to highest population of aphid.

Table 1. Average infestation of aphid on different okra hybrids and varieties during *Kharif* 2022 and Summer 2023 (Pooled analysis)

Sr. No.	Okra hybrids and varieties	Average mean population of aphids/3 leaves/ plant		Pooled Mean	Grades
		Kharif 2022	Summer 2023		
1	Phule vimukta	11.59(3.48)	9.07(3.09)	10.33(3.29)	MS
2	PDKV pragati	11.87(3.52)	9.90(3.23)	10.89(3.37)	MS
3	Mahyco exp hybrid 1	10.65(3.34)	8.61(3.02)	9.63(3.18)	MS
4	Mahyco exp hybrid 111	10.33(3.29)	8.47(2.99)	9.40(3.14)	MR
5	Mahyco No. 64	14.30(3.84)	13.28(3.71)	13.79(3.78)	S
6	ADV-216	9.81(3.21)	7.59(2.84)	8.70(3.03)	MR
7	Syngenta OH-102	8.27(2.95)	7.43(2.81)	7.85(2.88)	MR
8	Ankur-2338	11.23(3.42)	8.65(3.00)	9.94(3.22)	MS
9	Ankur Siddhi-221	10.97(3.38)	8.53(2.98)	9.75(3.19)	MS
10	Radhika	6.44(2.62)	4.62(2.25)	5.53(2.44)	R
11	Bhindi No.10	5.37(2.4)	3.03(1.88)	4.20(2.16)	R
12	Venus plus	8.70(3.03)	7.26(2.78)	7.98(2.91)	MR
13	Rukmini	16.87(4.16)	14.90(3.91)	15.88(4.04)	S
	SE (m) ±	0.15	0.16	0.15	
	CD at 5%	0.46	0.47	0.45	
	CV (%)	8.38	9.37	8.46	

*Figures in the parentheses are (x+0.05) trans- formed values

Table 2. Categorization of okra hybrids and varieties for their resistance or susceptibility to aphid

Based on population of aphids/3 leaves/ plant : X = 9.53 , SD = 3.05		
Category of resistance	Scale for resistance	Hybrids and varieties
Resistant (R)	$\bar{X}_i$ <6.48	Bhindi No.10 (4.20) Radhika (5.53)
Moderately Resistant (MR)	$\bar{X}_i$ > 6.48 < 9.53	Syngenta OH-102(7.85) Venus plus(7.98) ADV-216 (8.70) Mahyco exp hybrid 111 (9.40)
Moderately Susceptible (MS)	$\bar{X}_i$>9.53<12.58	Ankur Siddhi-221 (9.75) Ankur-2338 (9.94) Mahycoexp hybrid 1 (9.63) Phule vimukta (10.33) PDKV pragati(10.89)
Susceptible (S)	$\bar{X}_i$ > 12.58 < 15.63	Mahyco No.64 (13.79) Rukmini (15.88)

Categorization of okra hybrids and varieties for their resistance or susceptibility to aphid

In order to diffenciate on based on the pooled average population of aphids per three leaves on different okra hybrids and varieties were categorized in different category. The hybrid Bhindi No.10 and Radhika were found with lowest population from 4.20 to 5.53 aphids/3 leaves/plant which were categorized as resistant hybrid. The hybrids Syngenta OH-102, Venus plus, ADV-216 and Mahyco exp hybrid 111 were characterized as moderately resistant with population ranging from 7.85 to 9.40 aphids/3 leaves/plant. However Moderately susceptible hybrids and varieties were Ankur Siddhi-221, Ankur-2338, Mahyco exp hybrid 1, Phule vimukta and PDKV pragati which population of aphids varies from 9.75 to 10.89/3 leaves/plant. Among 13 okra

hybrids/varieties, Mahyco No. 64 and Rukmini categorized as susceptible with population of aphid ranges from 13.79 to 15.88 aphids/3 leaves/plant.

From screening of aphid infestation on varying okra hybrids and varieties it has been found that minimum incidence were found correlated with resistance. Despite these hybrids and varieties were not previously screened, the comparable results can be collaborated and in contrast with the succeeding findings of Khoso *et al.* (2017) reported the reduced aphid populations on okra are linked to greater resistance than reduced aphid population with higher okra population. Ghawade *et al*. (2018) reported PDKV Pragati showed at par resistance with Parbhani Kranti with moderate resistantance to aphid in okra. Navneet *et al.* (2018) and Tanni *et al.* (2019) found lowest aphid population linked to okra resistance. Kekan *et al*. (2022) conferred that the Phule vimukta variety with minimum mean aphid population 5.13/3 leaves as compared to the hybrid Bhindi No.10 6.04 aphids/3 leaves/plant in okra.

Conclusion

Indian market is full of available hybrids and varieties of different vegetable crops. By considering the nutritional, medicinal and industrial importance of okra in human diet, the farmers always want to grow short duration, hardy, highly profitable vegetable like okra. When farmer want to grow vegetables they always have confusion regarding varietal selection. This finding provides an idea about smart selection of variety. As from our research, hybrid Bhindi No. 10 and Radhika were found resistance in terms of aphid infestation. However some of variety also found moderately resistance this will help in reducing their cost in managing sucking pests, if farmer want go for organic farming this finding will be truly helpful.

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