



Research Article

SCREENING OF BRINJAL (*SOLANUM MELONGENA* L.) VARIETIES AGAINST INSECT PEST COMPLEX

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Abstract: The present investigations were undertaken in kharif 2015-16 at College of Agriculture Research Farm, Gwalior to study the less susceptible variety of brinjal against jassid, whitefly, aphid and shoot & fruit borer, *Leucinodes orbonalis* G. Population of jassid, whitefly and aphid, none of the tested variety was found free from infestation. The jassid, whitefly and aphid populations among different varieties was ranged from 7.8 to 19.0, 11.9 to 22.8 and 19.4 to 42.6 on number basis, respectively. Variety Ananya was found less susceptible followed by Kiran, BR-112 and Nano-38. Whereas variety Local Deshi found highly susceptible followed by Green Star and Qayamat. Based on observation recorded on percent shoot & fruit infestation by *L. orbonalis* G. none of the tested variety was found free from infestation. The percent fruit damage among different varieties was ranged from 3.6 to 23.1 percent on number basis and 2.9 to 12.8 percent on weight basis. Variety Ananya was found less susceptible followed by Kiran, BR-112 and Nano-38. Whereas variety Local Deshi found highly susceptible followed by Green Star and Qayamat. Variety Local Deshi was found highly susceptible to the jassid followed by Green Star and Qayamat. Variety Ananya was found less susceptible followed by Kiran, BR-112 and Nano-38. Variety Local Deshi was found highly susceptible to the whitefly followed by Green Star and Qayamat. Variety Ananya were found less susceptible followed by Kiran, BR-112 and Nano-38. Variety Local Deshi was found highly susceptible to the aphid followed by Green Star and Qayamat. Variety Ananya were found less susceptible followed by Kiran, BR-112 and Nano-38. Variety Ananya was found less susceptible to *L. orbonalis* G. followed by Kiran, BR-112 and Nano-38. Variety Local Deshi was found highly susceptible to *L. orbonalis* G. followed by Green Star and Qayamat. Local Deshi was highly susceptible to *L. orbonalis* G. based on shoots infestation whereas moderately susceptible based on fruit infestation.

Keywords: Insect Pest Complex, Shoots infestation

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Introduction

Brinjal or egg plant, *Solanum melongena* Linnaeus is one of the important vegetable crops grown in India and other parts of the world. In Madhya Pradesh, it is grown as a rainfed crop and is cultivated on nearly 446 thousand hectares of land with an annual production of 565 thousand tones. The average yield in Madhya Pradesh is 1279 kg/ha [1,2]. It has an important place in kitchen gardens, owing to its nutritive value and comparatively low cost. Moreover, brinjal has got medicinal properties, white brinjal particularly said to be good for diabetic patients [3-5]. Each 100 g edible portion of brinjal contains 92.7 g moisture, 1.4 g protein, 0.3 g fat, 0.3 g mineral, 1.3 g fibre, 4 g carbohydrate, 10 mg calcium, 16 mg magnesium, 47 mg phosphorus, 0.9 mg iron, 3.0 mg sodium, 200 mg potassium, 0.17 mg copper, 44 mg sulphur, 52 mg chlorine, 124 IU vitamin A, 0.04 mg thiamine, 0.11 mg riboflavin, 0.09 mg nicotinic acid and 12 mg vitamin C [3]. Aphid, jassid and whitefly are cosmopolitan in distribution and are found wherever brinjal is grown. Population of these insects is often seen on tender parts of the plant, particularly on leaves. The nymphs and adults of these insects suck the cell sap from leaves and tender parts of plants which leads to yellowing, deformation, wilting and ultimately drying of the affected parts. Sucking insects also act as a vector of different diseases on brinjal such as little leaf by jassids and shoot fly mould by aphids and whiteflies. The shoot and fruit borer are the most severe pest of brinjal. The larvae bore into tender shoots resulting the withering of infested shoots and tender leaves [3-9]. At the later stages of the crop growth, the caterpillars bore into flower buds and fruits. The affected flower buds are shed while fruits become unfit for human consumption. The damage of 18.6 to 42.7 percent by the fruit borer was reported by [9] and [15]. Peswani and Lal (1964) reported that the yield of brinjal fruits was lowered down by 20.7 percent when the

entire infested fruit was considered unusable and 9.7 percent loss when only the damaged portion of infested fruit was not used. Owing to the availability of the brinjal crop all over the year, this crop suffers very significantly from insect-pest attack. Brinjal is attacked by 142 species of insect-pests, four species of mites and three species of nematodes in different countries of world. Brinjal fruit & shoot borer *Leucinodes orbonalis* G. is the most serious pest of brinjal in India [7]. Brinjal fruit & shoot borer is an endemic pest and inflicts direct loss to the brinjal crop. The caterpillar is highly destructive and cosmopolitan pest causing damage to 50-70 % of plants [8]. In order to prevent the loss caused by insects and to produce a quality crop, it is essential to manage the pest population at appropriate time with suitable measures. Use of resistant varieties is recognized as an important tool in bio-intensive pest management system. The morphological and physical characteristics of plants and fruits are associated with attraction, feeding and oviposition of the insect pests. The identification of biophysical characteristics from insect resistant varieties is of most practical significance [9-11]. The adoption of intercropping has been advocated for the management of insect pests on brinjal. Looking to the importance of the crop and losses caused by insect-pests, the present studies were conducted with following objectives. To find the less susceptible varieties against shoot and fruit borer (*Leucinodes orbonalis*) and sucking insect pest of brinjal.

Material and Methods

The present investigations were carried out during kharif season of 2014-15 at the research farm of College of Agriculture, Gwalior, Madhya Pradesh.

Table-1 Mean Population of Sucking pest, fruit infestation and weight loss by Shoot and fruit borer in different varieties

SN	Varieties	jassid / 3 leaves	of whitefly / 3 leaves	Aphid	Percent fruit infestation	Percent loss in fruit weight
1	Kiran	8.6 (2.92)	12.4 (3.49)	21.3 (4.60)	4.4 (11.95)	4.1 (11.55)
2	Qayamat	13.6 (3.67)	18.7 (4.31)	35.8 (5.97)	20.9 (27.14)	10.3 (18.65)
3	Green Star	16.8 (4.09)	21.4 (4.61)	37.4 (6.10)	22.3 (28.10)	11.5 (19.77)
4	BR-112	9.9 (3.14)	14.7 (3.82)	22.1 (4.69)	5.8 (13.82)	6.0 (14.06)
5	Ananya	7.8 (2.77)	11.9 (3.42)	19.4 (4.39)	3.6 (10.80)	2.9 (9.80)
6	Nano-38	11.0 (3.31)	14.8 (3.83)	25.0 (4.98)	11.9 (20.09)	7.2 (15.45)
7	Mukta Moti	11.1 (3.32)	15.4 (3.91)	26.9 (5.18)	14.4 (22.30)	7.5 (15.80)
8	Rajkiran	12.2 (3.48)	16.8 (4.08)	30.4 (5.49)	19.8 (26.35)	9.4 (17.83)
9	Mukta Round	11.7 (3.42)	16.4 (4.04)	28.4 (5.32)	15.6 (23.26)	7.9 (16.26)
10	Local Deshi	19.0 (4.35)	22.8 (4.76)	42.6 (6.52)	23.1 (28.65)	12.8 (20.95)
	SE(m)±	(0.07)	(0.04)	(0.26)	(0.18)	(0.22)
	CD at 5%	(0.20)	(0.11)	(0.78)	(0.55)	(0.65)

* Figures in parenthesis are transformed values

Location and climate

Gwalior is situated in Gird zone at the latitude of 26°13' North and longitude 76°14' east with an altitude of 211.52 meters from mean sea level, in Madhya Pradesh. This Region comes under semi-arid sub-tropical climate with extreme weather condition having hot and dry summer and cold winter. Generally, monsoon sets in during the last week of June. Annual rainfall ranges from 700 to 800 mm, most of which falls during last June to the middle of September. In this area winter rains are occasional and uncertain. The maximum temperature goes up to 45°C during summer and minimum as low as 5°C during winter. Ten brinjal varieties sown Kiran, Qayamat, Green Star, BR-112, Ananya, Nano-38, Mukta Moti, Rajkiran, Mukta Round, and Local Deshi [10-16].

Details of experiment

Crop: Brinjal / Eggplant / Aubergine

Number of varieties: 10

Design: Random Block Design (RBD)

Number of replications: 3

Plot size: 3.0 x 2.5 m

Row to row: 50 cm

Plant to plant: 50 cm

Fertilizer: 100:50:50 (NPK) kg/ha

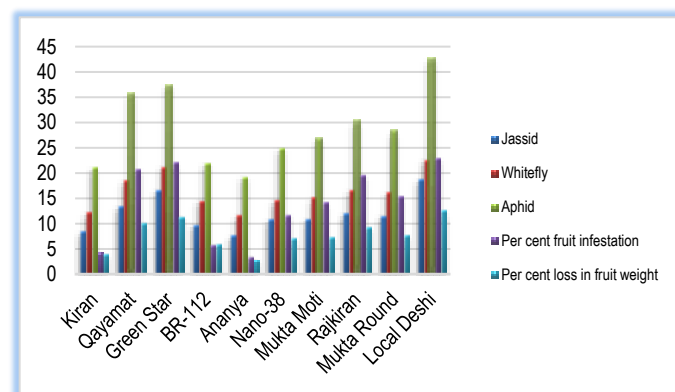
Method of observation

Observation on number of jassid, whitefly and aphid were recorded at weekly intervals starting from the infestation of the pest. Before fruiting number of uninfested and infested twigs by *Leucinodes orbonalis* were recorded on five tagged plants. At the time of fruiting number of infested fruits and uninfested fruits received from the tagged plants were recorded at each picking. The weights of infested and uninfested fruits were also recorded to work out the percent fruit damage on weight basis. The shoot infestation was recorded by counting total number of healthy and infested shoot on randomly selected five plants in each treatment. For recording fruit infestation, during harvesting brinjal fruits from each plot were separated as infested and healthy fruits at each picking. The fruits showing exit holes of insect were considered as infested fruits. These healthy and infested fruits were weighted and counted separately. Further the percentage of fruit infestation was worked out based on number and weight of the fruits at each picking for different treatments. The data recorded on percent shoot and fruit infestation was then subjected to angular transformation for statistical analysis.

Results and Discussion

The present investigations were carried out to find out the less susceptible variety against sucking insect pest and shoot & fruit borer (*Leucinodes orbonalis*). The obtained results are presented here with Varietal screening against jassid, whitefly, aphid, shoot and fruit borer infestation. Data recorded on number of Sucking pest in different varieties from 36 to 120 days after transplanting (DAT) are presented in [Table-1]. Ten varieties of Ananya, Kiran, BR-112, Nano-38, Mukta Moti, Mukta Round, Rajkiran, Green Star, Qayamat and Local Deshi were screened for their response against jassid, whitefly, aphid and shoot and fruit borer based on percent shoot & fruit infestation. None of these varieties was found resistant to shoot & fruit borer. Chaudhary *et al.* (1995) reported none of the

variety to be resistant against the pest [4]. Sharma *et al.* (1998) reported that none of the cultivar was found to be tolerant to these pests [13]. Variety Local Deshi (19.0) was found highly susceptible to the jassid followed by Green Star, Qayamat and Rajkiran. Variety Ananya (7.8) was found less susceptible followed by Kiran, BR-112 and Nano-38. Variety Local Deshi (22.8) was found highly susceptible to the whitefly followed by Green Star, Qayamat and Rajkiran. Variety Ananya (11.9) were found less susceptible than the rest of the varieties but which was at par with Kiran. Variety Local Deshi (42.6) was found highly susceptible to the aphid than the rest of the varieties but which was at par with Green Star and Qayamat. Variety Ananya (19.4) were found less susceptible than the rest of the varieties but which was at par with Kiran, BR-112 and Nano-38. Based on shoot infestation Local Deshi was found highly susceptible (12.7 percent) followed by Green Star and Qayamat. Variety Ananya (3.4 percent) was found less susceptible followed by Kiran, BR-112, Nano-38 and Mukta Moti. Brinjal shoot & fruit borer infestation on different varieties were found in the following order of intensity Local Deshi, Green Star, Qayamat, Rajkiran, Mukta Round, Mukta Moti, Nano-38, BR-112, Kiran and Ananya. Whereas based on fruit infestation on number basis variety Local Deshi (23.1 percent) was found to be highly susceptible to the pest than rest of the varieties but which was at par with Green Star. Variety Ananya (10.80 percent) was found less susceptible followed by Kiran, BR-112 and Nano-38. Based on fruit infestation on weight basis variety Local Deshi (2.9 percent) was found to be highly susceptible to the pest followed by Green Star and Qayamat. Whereas variety Ananya (2.9 percent) was found less susceptible followed by Kiran, BR-112, Nano-38 and Mukta Moti. The present findings Patel (1995) and Sharma (1998) and Yadav (2003) also reported Pusa kranti to be less susceptible against brinjal shoot & fruit borer. Manoj kumar (1997) reported Pant samrat to be less susceptible against these pests which corroborate the present finding.



Conclusion

Based on observation recorded on population of jassid, whitefly and aphid, none of the tested variety was found free from infestation. The jassid, whitefly and aphid populations among different varieties was ranged from 7.8 to 19.0, 11.9 to 22.8 and 19.4 to 42.6 on number basis, respectively. Variety Ananya was found less susceptible followed by Kiran, BR-112 and Nano-38. Whereas variety Local Deshi found highly susceptible followed by Green Star and Qayamat.

Based on observation recorded on percent shoot & fruit infestation by *L. orbonalis* G. none of the tested variety was found free from infestation. The percent fruit damage among different varieties was ranged from 3.6 to 23.1 percent on number basis and 2.9 to 12.8 percent on weight basis. Variety Ananya was found less susceptible followed by Kiran, BR-112 and Nano-38. Whereas variety Local Deshi found highly susceptible followed by Green Star and Qayamat.

Application of research: Variety Ananya was found less susceptible to fruit and shoot borer, *L. orbonalis* G. followed by Kiran, BR-112 and Nano-38.

Variety Ananya was found less susceptible against sucking pests (jassid, whitefly and aphid) followed by Kiran, BR-112 and Nano-38.

Variety Local Deshi was found highly susceptible to sucking pests of brinjal, whitefly followed by Green Star and Qayamat.

Variety Local Deshi was found highly susceptible to sucking pest of brinjal, *L. orbonalis* G. followed by Green Star and Qayamat

Research Category: Agriculture Entomology

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Author Contributions: All authors equally contributed

Author statement: All authors read, reviewed, agreed and approved the final manuscript. Note-All authors agreed that- Written informed consent was obtained from all participants prior to publish / enrolment

Study area / Sample Collection: Research farm, College of Agriculture, Gwalior

Cultivar / Variety name: *Solanum melongena* Linnaeus- Ananya, Kiran, BR-112, Nano-38, Mukta Moti, Mukta Round, Rajkiran, Green Star, Qayamat and Local Deshi

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with None declared human participants or animals performed by any of the authors.

Ethical Committee Approval Number: Nil

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