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# EVALUATION OF SOME COMMONLY AVAILABLE BRINJAL VARIETIES AND HYBRIDS AGAINST LEUCINODES ARBONALIS

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**Abstract:**
***Some commonly used varieties and hybrids of brinjal were evaluated against shoot and fruit borer, Leucinodes orbonalis Guenee during late kharif 2015-16 in insectary premises, Department of Entomology, S.V. Agricultural college, Tirupati. Eleven varieties and hybrids of brinjal were tested against shoot and fruit borer, Leucinodes orbonalis. The shoot damage was ranged from 4.06 to 15. 37 per cent in different cultivars. The lower shoot damage was recorded in Arka Neelakanth (4.06%), CVK (4.66%), Shyamala (5.30%), PHB-909 (6.06%) and Arka Keshav (6.46%). The mean fruit damage comparatively was less in hybrid Shyamala, Arka Neelakanth. In these two lines, on number basis, the mean per cent damaged fruits were 23 to 26 per cent. On weight basis also, similar results were obtained (22 to 23 % mean fruit damage). The highest mean fruit damage was recorded in CVK variety (65.83% on number basis and 59.55% on weight basis) followed by Ranjitha hybrid and Arka Kusumakar variety (58 to 59% and 53 to 57% on number and weight basis respectively) at 100 days after transplanting. In remaining lines also, above 35 per cent fruit damage was recorded. Plant height, number of branches, leaves and leaf area did not show any impact on the damage by L. orbonalis. Density of trichomes was found to have negative impact on L. orbonalis. The highest number of trichomes (201 per cm2 leaf area) was recorded on Shyamala. The lowest were in Arka Kusumakar which was highly susceptible one. However, in many of the tested lines, above 150 trichomes/cm2 leaf area were noted.***

**Keywords:** Brinjal Varieties; Hybrids; Leucinodes Arbonalis; Shoot Damage; Fruit Damage; Plant Characters.

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## 1. Introduction

Brinjal, (*Solanum melongena* L.) is the second important vegetable crop next to tomato grown in an area of 0.68 million hectares with annual production of 12.9 million tonnes accounting about 8.3 per cent of total vegetable production in India. The area under brinjal crop in Andhra Pradesh occupies 58 thousand hectares with annual production of 1160 thousand tones. The damage due to insect pests is one of the major reasons for the lower productivity in brinjal. This crop is vulnerable to attack of as many as 26 insect pests, starting from nursery to harvesting of the crop. Among all

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the insect pests, shoot and fruit borer, *Leucinodes orbonalis* Guenee is most destructive one. It causes about 16 and 70 percent damage to shoots and fruits of brinjal, respectively (Latif *et al*., 2010). Due to frequent picking, the use of insecticides for management of this pest started proving to be detrimental to the health of consumers vowing to the toxic residues of the chemicals in the produce. The indiscriminate use of pesticides also leads to environmental pollution and disruption of natural enemies. A shift from chemical approach is the urgent need by practicing alternative strategies for management of problematic pests like *L. orbonalis.* Integration of different management tactics to manage a single or multiple pest problems is common novel approach.

Some varieties of brinjal exhibit marked physico morphic characteristics which enhance durable resistance against *L. orbonalis*. The characteristics of plant interfere with insect behavior such as mating, oviposition and food ingestion. The hairyness or pubescence on the leaves facilitates pest resistance. Amin *et al.* (2014) observed that the egg plant varieties with hairy leaves and prickles on stem restricted the movement of larvae, which resulted in lowest percentage of fruit infestation. Prasad *et al.* (2014) noted that larval entry was affected by small pithy stem, thick cuticle, and sharp unicellular trichomes. In connection to this line, certain commonly available brinjal varieties and Hybrids were screened against one of the major insect pests i.e shoot and fruit borer, *Leucinodes arbonalis.*

## 2. Material and Methods

A field experiment in randomized block design with 11 treatments and 3 replications with plot size of 4×5 m was conducted during late *Kharif*, 2015-2016 at insectary, Department of Entomology, S.V. Agricultural College, Tirupati. The varieties selected for the field trial are Arka Kusumakar, Arka Neelakanth, Arka Nidhi, Arka Keshav, and Arka Sirisha. The seeds were brought from Indian Institute of Horticultural Research, Hessaraghatta, Bangalore. C.V.K (variety) and the hybrids *viz.*, Jyothi, Shyamala, Utkal, PHB-909, and Ranjitha were purchased from the local market, Tirupati. Thirty days old seedlings were transplanted in the main field with spacing of 75×50 cm. The transplanting operation was carried out on 12-9-2015 (late *Kharif*). Gap filling was done at 7 days after transplanting. Irrigation was given immediately after transplanting of the seedlings. Seedlings got established in the main field. After that irrigation was given as per the requirement.

The data with regard to incidence of shoot and fruit borer, *Leucinodes arbonalis* was recorded at ten days interval starting from 10 after transplanting. In each treatment, each replication, five plants were randomly tagged. In tagged plants, the data was recorded up to 120 days of the crop growth. During the vegetative growth *i.e.* before bearing fruits, the number of shoots infested to the total number of shoots per plant was recorded and percent infestation was calculated. After bearing the fruits, number of infested fruits to the total number of fruits per plant was recorded. Thus, the per cent fruit infestation by the borer on number basis at each harvest was noted by careful examination of each fruit and sorted out as healthy and damaged fruits in each plot separately. Fruits showing damage were easily separated with exit and entry holes. The number and weight of infested fruits to the total fruits in each plot were also recorded separately and on the basis of weight also, per cent infestation was calculated. The data was transformed into angular values and subjected to statistical analysis. The cumulative yield of brinjal fruits obtained from the pickings was also subjected to statistical analysis.

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The characters of plant and fruits were recorded at 70-75 days after transplanting in all the varieties and hybrids. Height of ten randomly selected plants from each replication of each treatment was measured with the help of meter scale. The stem girth of 11 different brinjal cultivars was recorded from randomly selected ten plants from each plot with the help of measuring tape. Total primary branches were counted from randomly selected ten plants in each plot and their average was worked out. Total leaves were counted from randomly selected five plants in each plot and their average was worked out. For leaf width, three leaves each from upper, middle and lower portion of the selected ten plants from each test entry were plucked and brought to the laboratory. Leaf width was measured with the help of scale. For trichomes, from each plant, one leaf was plucked. Like that all the plucked leaves were brought to the laboratory separately in polythene covers. The leaves were cleaned with blotting paper and $1cm^2$ bits were cut from the leaf lamina. The number of trichomes present in the $1cm^2$ area were counted by placing the bits on slide under the trinocular steriozoom microscope at 25 X magnification. The length of fruit was measured with a meter scale from randomly selected five matured fruits from three replications. The diameter of fruit was measured with meter scale from randomly selected five mature fruits from three replications. The length of pedicel was measured with a scale from randomly selected five mature fruits from three replications. The length of calyx was measured with a scale from randomly selected five mature fruits from three replications.

## 3. Results and Discussion

In the present experiment, shoot damage due to *L. orbonalis* was lower in Shyamala hybrid, CVK variety, Arka Neelakanth variety, Arka Keshav variety, Jyothi hybrid and PHb-909. The per cent dead hearts recorded were in the range of 4.06 to 15. 37.

Whereas relatively high per cent shoot damages were recorded in Arka Kusumakar variety Arka Nidhi variety, Utkal hybrid and Ranjitha hybrids. The damage in the above lines was up to 33.46 per cent.

The maximum of 17 to 20 per cent mean shoot damage (dead hearts) was observed up to 1-month age of the crop. At 40 days, 12 per cent and at 50 days, 6 per cent mean dead hearts were recorded. The crop was one month aged during September II fortnight - October I fortnight of 2015.

With respect to lines, the maximum mean shoot damage was seen in Arka Kusumakar variety (25.47%) followed by Utkal Hybrid (20.96%) and Arka Sirisha (19.87%). The lowest mean dead hearts were recorded in Shyamala Hybrid (8.88%). In the remaining lines, the mean dead hearts were 10.66 (CVK) to 16.62 (Arka Nidhi). Mean fruit damage during 60 to 120 DAT was 4 to 47 per cent and the maximum recording at 80 to 90 DAT.

The mean fruit damage comparatively was less in Shyamala hybrid and Arka Neelakanth. In these two lines, on number basis the mean per cent damaged fruits were 23 to 26 per cent. (on weight basis also similar results obtained (22 to 23% mean fruit damage). The highest mean fruit damage was recorded in CVK variety (65.83% on number basis and 59.5 % on weight basis) followed by Ranjitha hybrid and Arka Kusumakar variety (58 to 59 % and 53 to 57 per cent on number and weight basis respectively). In remaining lines also, above 35 per cent fruit damage was recorded. In most of the cultivars, data record on number of larva per plant was corresponding to the shoot

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and fruit damage levels. The fruit damage was higher at 70 – 100 DAT *i.e.* November to December, 2015-16.

Based on the fruit infestation levels on number basis, the tested lines are categorized as

- Moderately susceptible (22 to 26%): Shyamala, Arka Neelakanth
- Susceptible (37 to 47%): Arka Keshav, Arka Sirisha, Arka Nidhi, Jyothi, PHB909
- Highly susceptible (52 to 66%): Arka Kusumakar, CVK, Utkal and Ranjitha hybrid

The plant height in the 11 brinjal cultivars tested was significantly different from one another. Among all, CVK was grown tall (89.40 cm) followed by Arka Neelakanth (85.27 cm) and Utkal (81.60cm). Shyamala was grown up to 66.40 cm, the lowest height was recorded in Arka Keshav (57.47 CM) and Jyothi (57.07cm) (Table 4.8).

Table 1: The per cent drooped shoots (dead hearts) of brinjal due to *L. orbonalis* in test lines up to 50 days after transplanting

| **Variety/hybrid** | **10 DAT** | **20 DAT** | **30 DAT** | **40 DAT** | **50 DAT** | **Mean** |
|---|---|---|---|---|---|---|
| Arka Neelakanth | 13.32 (21.39) | 15.37 (23.04) | 15.99 (23.55) | 10.45 (18.85) | 4.06 (11.59) | 11.83 |
| Arka Kusumakar | 31.99 (34.43) | 30.66 (33.59) | 30.06 (33.20) | 25.58 (30.35) | 9.06 (17.38) | 25.47 |
| Arka Sirisha | 25.00 (29.96) | 24.86 (29.88) | 23.59 (29.04) | 16.89 (24.23) | 9.03 (17.47) | 19.87 |
| Arka Keshav | 12.98 (21.07) | 17.19 (24.46) | 14.34 (22.24) | 9.22 (17.66) | 6.46 (14.61) | 12.03 |
| Arka Nidhi | 27.90 (31.87) | 20.29 (26.62) | 19.96 (26.48) | 8.86 (17.24) | 6.13 (14.29) | 16.62 |
| CVK | 12.29 (20.47) | 14.19 (22.04) | 14.22 (22.13) | 7.95 (16.36) | 4.66 (12.35) | 10.66 |
| Jyothi | 12.60 (20.74) | 16.193 (23.71) | 14.42 (20.02) | 10.22 (18.62) | 7.53 (15.81) | 12.19 |
| Shyamala | 9.33 (17.76) | 11.793 (20.06) | 10.01 (18.42) | 7.91 (16.36) | 5.30 (13.26) | 8.88 |
| Utkal | 22.88 (28.56) | 33.460 (35.32) | 23.69 (29.09) | 15.06 (22.79) | 9.733 (18.16) | 20.96 |
| PHB-909 | 16.66 (24.05) | 18.26 (25.25) | 14.26 (21.62) | 9.40 (17.83) | 6.06 (14.24) | 12.92 |
| Ranjitha | 15.99 (23.55) | 19.33 (26.05) | 17.52 (24.70) | 10.99 (19.28) | 7.53 (15.89) | 14.27 |
| Mean | 18.18 | 20.14 | 16.69 | 12.05 | 6.88 | 14.79 |
| C.D | 2.40 | 2.81 | 2.08 | 1.94 | 1.85 | 2.22 |
| SE(m)± | 0.81 | 0.94 | 0.70 | 0.65 | 0.62 | 0.74 |

The data on dead hearts is mean of three replications
Figures in parentheses are angular transformed values

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Table 2: Per cent fruits damaged by *Leucinodes orbonalis* in test lines of brinjal (the damage is on number basis)

| **Variety/hybrid** | **60 DAT** | **70 DAT** | **80 DAT** | **90 DAT** | **100 DAT** | **110 DAT** | **120 DAT** | **Mean** |
|---|---|---|---|---|---|---|---|---|
| Arka Neelakanth | 23.55 (28.96) | 26.46 (30.93) | 29.46 (32.85) | 28.79 (32.43) | 26.89 (31.22) | 23.91 (29.26) | 24.40 (29.57) | 26.20 |
| Arka Kusumakar | 58.44 (49.84) | 58.46 (49.89) | 62.26 (52.07) | 58.56 (49.91) | 56.58 (48.76) | 54.84 (47.76) | 57.225 (49.14) | 58.05 |
| Arka Sirisha | 41.20 (39.91) | 40.56 (39.54) | 45.98 (42.67) | 41.56 (40.12) | 39.34 (38.82) | 42.78 (40.82) | 43.83 (41.46) | 42.18 |
| Arka Keshav | 36.78 (37.31) | 38.01 (38.04) | 36.54 (37.17) | 42.01 (40.38) | 39.43 (38.85) | 37.89 (37.96) | 38.31 (38.19) | 38.42 |
| Arka Nidhi | 47.89 (43.77) | 44.86 (42.02) | 45.78 (42.56) | 47.68 (43.65) | 47.01 (43.27) | 48.89 (44.34) | 45.33 (42.30) | 46.77 |
| CVK | 64.46 (53.38) | 68.86 (56.05) | 72.45 (58.31) | 68.53 (55.86) | 69.56 (56.49) | 62.64 (52.33) | 54.32 (47.51) | 65.83 |
| Jyothi | 38.29 (38.21) | 42.65 (40.75) | 43.14 (41.04) | 42.86 (40.87) | 37.91 (37.98) | 39.22 (38.76) | 40.56 (39.54) | 40.66 |
| Shyamala | 21.07 (27.27) | 23.22 (28.79) | 26.00 (30.64) | 25.98 (30.63) | 21.89 (27.88) | 22.86 (28.53) | 22.86 (28.49) | 23.41 |
| Utkal | 44.35 (41.73) | 46.12 (42.76) | 54.86 (47.77) | 53.98 (46.77) | 49.433 (44.65) | 54.68 (47.66) | 51.56 (45.87) | 50.71 |
| PHB-909 | 43.52 (41.26) | 41.07 (39.83) | 37.10 (37.51) | 45.22 (42.23) | 47.98 (43.82) | 42.14 (40.45) | 43.52 (41.26) | 42.93 |
| Ranjitha | 56.65 (48.80) | 61.78 (51.79) | 55.78 (48.30) | 59.77 (50.61) | 63.33 (52.71) | 58.68 (50.00) | 57.48 (49.28) | 59.06 |
| Mean | 43.29 | 44.73 | 46.30 | 46.81 | 41.98 | 44.41 | 43.58 | 44.44 |
| CD | 1.91 | 1.99 | 1.59 | 1.70 | 1.29 | 1.03 | 1.30 | 1.54 |
| SE(m)± | 0.31 | 0.68 | 0.53 | 0.91 | 0.77 | 0.69 | 0.46 | 0.62 |

The data on fruit damage on number basis is mean of three replications Figures in parentheses are angular transformed values

Table 3: The data on the per cent of brinjal fruits infested by *Leucinodes* in tested cultivars on weight basis

| **Variety/hybrid** | **60 DAT** | **70 DAT** | **80 DAT** | **90 DAT** | **100 DAT** | **110 DAT** | **120 DAT** | **Mean** |
|---|---|---|---|---|---|---|---|---|
| Arka Neelakanth | 20.77 (20.72) | 21.48 (27.57) | 26.15 (30.73) | 23.12 (28.72) | 22.25 (28.13) | 22.02 (27.96) | 23.66 (29.09) | 22.77 |
| Arka Kusumakar | 41.72 (53.72) | 50.22 (45.11) | 56.93 (48.96) | 56.41 (48.66) | 55.60 (48.20) | 56.23 (48.55) | 55.96 (48.40) | 53.29 |
| Arka Sirisha | 35.88 (35.88) | 38.95 (38.60) | 42.07 (40.42) | 40.65 (39.59) | 36.85 (37.36) | 46.90 (43.20) | 43.42 (41.20) | 40.67 |
| Arka Keshav | 31.12 (31.75) | 33.66 (35.44) | 40.08 (39.26) | 37.940 (38.00) | 37.03 (37.46) | 34.63 (36.03) | 45.52 (42.41) | 37.14 |
| Arka Nidhi | 41.67 | 40.29 | 43.75 | 45.55 | 47.77 | 45.65 | 56.13 | 45.83 |

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|---|---|---|---|---|---|---|---|---|
| | (41.67) | (39.38) | (41.39) | (42.43) | (43.70) | (42.49) | (48.50) | |
| CVK | 54.30 (56.03) | 57.50 (49.29) | 69.41 (56.40) | 65.87 (54.23) | 70.17 (56.87) | 58.35 (49.78) | 41.27 (39.95) | 59.55 |
| Jyothi | 33.79 (33.79) | 42.39 (40.60) | 35.93 (36.81) | 39.79 (39.09) | 35.97 (36.83) | 35.23 (36.39) | 39.63 (39.00) | 37.53 |
| Shyamala | 18.56 (19.72) | 22.23 (28.11) | 23.20 (28.78) | 23.37 (28.89) | 23.45 (28.95) | 22.17 (28.079) | 23.59 (29.04) | 22.36 |
| Utkal | 35.78 (37.92) | 44.27 (41.69) | 36.86 (37.36) | 51.41 (45.79) | 51.64 (45.92) | 54.90 (47.79) | 52.24 (46.26) | 46.72 |
| PHB-909 | 31.23 (35.88) | 38.60 (38.39) | 35.33 (36.45) | 45.56 (42.43) | 48.68 (44.22) | 41.78 (40.25) | 42.70 (40.78) | 40.55 |
| Ranjitha | 49.86 (51.78) | 59.59 (50.33) | 56.34 (48.62) | 57.32 (49.19) | 60.30 (50.92) | 56.49 (48.71) | 56.45 (48.68) | 56.62 |
| Mean | 35.88 | 40.86 | 42.36 | 44.22 | 44.51 | 43.12 | 43.6 | 42.08 |
| C.D | 0.79 | 2.20 | 2.06 | 2.05 | 1.56 | 2.01 | 1.84 | 1.78 |
| SE(m)± | 0.26 | 0.74 | 0.69 | 0.69 | 0.52 | 0.67 | 0.62 | 0.60 |

The data on per cent fruits infested on Wt. basis is mean of three replications Figures in parentheses are angular transformed values

Table 4: Mean number of *L. orbonalis* larva in fruits of plant at intervals in brinjal cultivars in fruiting stage

| **Variety/hybrid** | **60 DAT** | **70 DAT** | **80 DAT** | **90 DAT** | **100 DAT** | **110 DAT** | **120 DAT** | **Mean** |
|---|---|---|---|---|---|---|---|---|
| Arka Neelakanth | 1.20 (9.15) | 1.66 (9.02) | 1.26 (9.03) | 1.53 (7.10) | 2.10 (8.93) | 1.60 (1.26) | 1.73 (0.00) | 1.58 |
| Arka Kusumakar | 1.43 (9.02) | 2.73 (4.62) | 2.46 (7.10) | 2.53 (7.23) | 3.33 (6.62) | 3.60 (1.58) | 3.33 (4.90) | 2.74 |
| Arka Sirisha | 1.40 (6.93) | 1.73 (4.90) | 2.40 (6.45) | 2.46 (6.24) | 2.13 (8.39) | 2.23 (1.67) | 2.74 (4.16) | 2.15 |
| Arka Keshav | 1.46 (6.93) | 2.96 (6.23) | 2.26 (7.10) | 2.86 (7.84) | 2.46 (4.90) | 2.66 (1.70) | 2.53 (4.90) | 2.45 |
| Arka Nidhi | 1.53 (8.39) | 2.33 (6.44) | 2.46 (5.51) | 2.60 (6.95) | 2.53 (5.99) | 2.66 (1.51) | 2.53 (4.16) | 2.37 |
| CVK | 1.13 (6.93) | 2.40 (6.75) | 3.46 (7.23) | 2.40 (8.78) | 3.53 (7.10) | 3.33 (1.61) | 3.73 (4.90) | 2.85 |
| Jyothi | 1.53 (5.96) | 2.43 (6.71) | 2.84 (7.10) | 2.10 (10.51) | 3.66 (7.55) | 2.20 (1.68) | 2.53 (0.00) | 2.47 |
| Shyamala | 1.13 (5.33) | 1.53 (5.88) | 1.86 (7.40) | 1.40 (7.40) | 1.64 (7.23) | 1.40 (2.01) | 1.66 (0.00) | 1.52 |
| Utkal | 1.80 (7.10) | 2.40 (5.30) | 2.00 (9.48) | 2.46 (7.23) | 2.26 (7.40) | 2.26 (1.61) | 2.46 (0.00) | 2.23 |
| PHB-909 | 1.80 (8.39) | 2.50 (4.16) | 2.60 (6.62) | 1.89 (7.10) | 1.73 (4.90) | 2.53 (1.59) | 2.73 (1.00) | 2.25 |

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|---|---|---|---|---|---|---|---|---|
| Ranjitha | 1.00 (4.90) | 2.60 (4.90) | 2.16 (8.33) | 2.20 (7.10) | 3.73 (8.52) | 3.36 (1.76) | 3.60 (1.30) | 2.54 |
| Mean | 1.40 | 2.37 | 2.40 | 2.22 | 2.64 | 2.54 | 2.78 | 2.34 |
| C.D | 0.84 | 1.366 | 1.89 | 1.74 | 1.56 | 1.87 | 1.88 | 1.59 |
| SE(m)± | 0.56 | 0.45 | 0.68 | 0.69 | 0.78 | 0.86 | 0.75 | 0.68 |

The No. of larva in fruits of a plant is mean of three replications *Figures in parentheses are √ x+0.5 transformed values

Stem girth of 0.50 to 0.66 cm was noted in the cultivars. The highest was in Arka Sirisha, Arka Nidhi and Utkal (0.61-0.66). 5-7 branches were seen in the Ranjitha, Utkal, Shyamala, CVK, Arka Keshav, Arka Kusumakar and Arka Neelakanth. In remaining four lines 3-4 branches were recorded.

Height no. of leaves per plant was recorded in Ranjitha (53.95) which was highly significant from all other lines. In Arka Nidhi and Utkal, lowest leaves *i.e.* 17 per plant were observed. In remaining lines, 22 to 33 were observed. Highest leaf width of 10-12 cm was recorded in CVK and Shyamala. In Shyamala and Arka Neelakanth 9-10 cm leaves width was recorded.

Lowest trichome density was seen in Arka Kusumakar and Arka Nidhi (122-136/cm2). Relatively higher number of trichomes were recorded in Shyamala, Arka Keshav and Utkal (190-201/cm2). In remaining lines 164-185 trichomes were studied /$cm^2$. All the lines were statistically significant from one another in the trichome density.

The result showed that plant height may not play an important role in the infestation levels. Stem width has also not shown difference in the damage by the larvae may be because the larva enters through top tender growing part. Number of branches, leaves and leaf area also did show not any impact on the damage capacity of larva. Density of trichomes was found to have negative impact on *L. orbonalis* larva. The highest numbers of trichomes (201/$cm^2$ leaf area) were recorded on Shyamala which is found to be moderately susceptible. The lowest were in Arka Kusumakar which was highly susceptible one. However, in many of the test lines, above 150 trichomes/$cm^2$ area were present. Trichomes present on leaves and stem may be contributing to the less preference to bore in to the shoot and also fruit.

The fruit characters *i.e*. length, diameter of the fruit, length of the pedicel and length of calyx were found to have no significant role in the level of infestation by *L. orbonalis* larva.
The present results are similar to the results of Gangopadhyay *et al*. (1996) who reported that resistance against brinjal shoot and fruit borer does not depend on any single characteristic like spines, size of fruit, shape and arrangement of seeds in fruit.

Other related earlier reports are furnished below.

Yadav *et al*. (2003) screened ten brinjal cultivars against brinjal shoot and fruit borer. They found that all the cultivars were susceptible to the pest. Yadav and Sharma (2005) categorized 11 aubergine cultivars into less susceptible with < 25 per cent fruit infestation, susceptible with 25-35 per cent and highly susceptible with > 35 per cent infestation. Three out of 12 cultivars of brinjal were less susceptible to *L. orbonalis* with infestation less than 25 per cent

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Patel *et al*. (2001) reported that hybrids showed high resistance against *L. orbonalis*. Singh and Singh (2001) reported that only three out of twenty nine cultivars of brinjal were resistant to *L. orbonalis.* Asati *et al*. (2004) reported that increased phenol and chlorophyll content have been found to influence the infestation of fruit borer in brinjal. Doshi *et al.* (2002) screened of forty one brinjal genotypes against *L. orbonalis* and reported that BB 102 was most resistant with least fruit damage and highest fruit yield. Jat and Pareek (2003) tested ten aubergine cultivars for resistance to *L. orbonalis*. The shoot infestation of 3.28 to 12.71 per cent was recorded in tested lines.

Bharadiya and Patel (2005) reported SKN and BSR-14 as the lowest preferred ones by *L. orbonalis* among the18 cultivars tested. Elanchezyan *et al*. (2008) tested brinjal genotypes for tolerance level to *L. orbonalis* of which 3 were highly susceptible with 41% fruit damage. Only 2 genotypes were highly tolerant (1-10 %) while five with moderate level (11-20%) of fruit damage. Rashid and Singh (2014) screened 192 genotypes of brinjal against *L. orbonalis* and only two of them were found immune. Three were found to be resistant, twenty one as fairly resistant, fifty two as susceptible and sixty seven as highly susceptible. Kumar and Shukla (2002) screened twelve brinjal cultivars for borer infestation and found 33 to 53% damage of fruit. Elanchezyan *et al*. (2008) reported that fruit length has no significant correlation with *L. orbonalis* incidence.

Humayun *et al.* (2011) obtained significant correlation between fruit infestation by *L. orbonalis* and leaf trichomes, stem thickness and stem hair density. Wagh and Pawar (2012) found that the brinjal fruits having long pedicel were more susceptible than those with short pedicel. Amin *et al.* (2014) reported that higher number of leaves (195.5.) invites higher shoot and fruit borer infestation which was positively correlated (r = +0.55). Higher leaf area (63.53cm$^2$) and leaf trichome (256.7/25mm$^2$) had lower shoot and fruit infestation which was found negatively correlated (r=0.65). Among morphological characters viz., number of shoots, diameter and length of top inner node have positive correlation (r= +0.69, +0.85, +0.44) and number of prickles and trichomes on shoot have a negative correlation (r= -0.22, -0.70) with brinjal shoot and fruit borer infestation. Diameter of fruit, weight of fruit had positive correlation ($r^2$= +0.14, +0.10) and length of fruit (r= +0.36) and calyx showed negative effect (r= +0.79).

Niranjan (2015) reported no significant negative relation between shoot infestation by *L. orbonalis* and number of trichomes on leaves (r = -0.52). Whereas non-significant positive correlation with shoot thickness (r = +0.05), length of pedicle (r= +0.03) and calyx (r= +0.24), non-significant negative correlation with length of fruit (r= -0.25) and diameter (r = -0.04). were observed the shape and colour of fruit had no.

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