

Original Research Article

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Screening of Traditional Brinjal (*Solanum melongena* L.) Varieties against Cotton Leaf Hopper, *Amrasca bigutulla bigutulla* (Ishida)

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ABSTRACT

Brinjal (*Solanum melongena* L.) is an important solanaceous vegetable crop in sub-tropics and tropics. Adults and nymphs of Leaf hopper feed on the underside of the leaves by sucking plant sap, which results in yellowing and curling of leaves. It also injects toxic material into the leaves, which causes necrosis. Thirty four traditional brinjal cultivars were screened against cotton leaf hopper, maximum number of leaf hopper was noticed in hassiru udda badane (12.81) and minimum in Kanakapura badane (2.54). The entries viz., sthaliya badane, hole salu badane, heddara gulla badane, Andhra sahare badane, Apple badane, Kanakapura badane, biligundu badane, annageri badane, 40-A badane, biligundi badane, kalkare badane, kothithale badane, Sakleshpura badane, Ramadurga badane, Keredoddi kollegai badane, hosa Javari badane, bili chendu badane, bili udda badane, naabe badane, Ullala badane, Rosilla badane, mullugai badane, hebberalu badane, dodda mullina badane, Javari badane, dodda badane, annamadeya badane, mulla badane hasirukempu badane, hasiruudda badane, mobbugulla badane, were classified as moderately susceptible with an intensity value between 25.1-50 per cent.

Keywords

Brinjal, Leaf hopper, Resistance

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Introduction

Brinjal (*Solanum melongena* L.) is an important solanaceous vegetable crop in sub-tropics and tropics. It is extensively grown in India, Pakistan, China, Philippines, Bangladesh, Egypt, France, Italy, Middle East, Far East and U.S.A. (Anonymous, 2010). It is a good source of nutrients, minerals, antioxidants, vitamins, dietary fiber

and body building factors and proteins (Matsubara *et al.*, 2005; Obho *et al.*, 2005). One hundred grams of fruit contains 0.7mg iron, 13.0mg sodium, 213.0mg potassium (Nonnecke, 1989), 12.0mg calcium, 26.0mg phosphorus, 5.0mg ascorbic acid and 0.5 International Units of vitamin A and provides 25.0 calories (Tindall, 1978). In Pakistan, it occupies 9,044 ha area and its production is 88,148 tonnes (FAO, 2012). Yield of brinjal

in Pakistan has been reported to be 97,466 kg/ha. Insect pests are one of the important causes of yield reduction and limiting factors in production of brinjal. Several insect pests attack brinjal from time of planting till harvesting. Some of the important insect pests of brinjal in Pakistan are brinjal fruit borer, *Leucinodes orbonalis* Guenee (Lep., Pyralidae), brinjal stem borer, *Euzophera perticella* Ragonot (Lep., Pyralidae), leaf roller, *Eublemma olivacea* (Walker) (Lep., Noctuidae), beetle, *Epilachna vigintioctopunctata* Fabr. (Col., Coccinellidae), aphid, *Aphis gossypii* (Homop., Aphididae), Whitefly, *Bemisia tabaci* (Genn.) (Hemip., Alerodydidae), thrips, *thrips palmi* Karny (Thysanop., Thripidae) (Sirinavasan, 2009). Leaf hopper, *Amrasca biguttula biguttula* (Ishida) (Hemiptera: Cicadellidae) is also a serious pest in Pakistan (Ahmad, 1986; Mall *et al.*, 1992; Nagia *et al.*, 1993; Mahmood *et al.*, 2002;). Adults and nymphs of leaf hopper feed on the underside of the leaves by sucking plant sap, which results in yellowing and curling of leaves. It also injects toxic material into the leaves, which causes necrosis. The blades of severely infested leaves show burn symptom and such leaves may ultimately drop down (Rahman, 2009). Damage caused by leaf hopper to brinjal could be up to 54 percent (Rawat and Sahu, 1973). Chemical control is commonly practiced by the farmers for management of insect pests on brinjal, and the leaf hopper on other vegetables (Aslam *et al.*, 2004; Rahman *et al.*, 2009; Latif *et al.*, 2010; Saimandir and Gopal, 2012). This control method results in environmental contamination, bio-accumulation of chemicals in the ecosystem, health hazards and induction of resistance to insecticides (Dadmal *et al.*, 2004). Host plant resistance is a preventive control measure, which is compatible with integrated pest management (IPM) strategy. Growing resistant varieties, such as ISD006, BL114 and BL095 has been recommended as a

control method for leaf hopper on brinjal by Alam *et al.*, (2003). Screening of brinjal varieties have been done by a number of researchers. Gaiwad *et al.*, (1991) reported that brinjal varieties KB9, Pusa Purple Long, KP10 and BB1 were tolerant to leaf hopper. In another study, a large number of varieties were reported to be resistant against leaf hopper (Elanchezhyan *et al.*, 2008). Suiza (1997) in a study on resistance of brinjal to leaf hopper identified 19 brinjal accessions, which exhibited high level of resistance to leaf hopper. According to Lit (2009a) varieties A 300 (Mistasa), Abar, Parat, EG 2003, Mara and Acc 612 were resistant to leaf hopper in a four year resistance study in Philippines. On the basis of number of leafhoppers per leaf on different cultivars of brinjal, Mahmood *et al.*, (2002) concluded that the cultivars, Purple Long, Nepali and Neelum were resistant, Sigatoka Beauty and Sitara were moderately susceptible and Chayat, Greek, Local Gool, Violetta, Prospara and Violetta Lunga were most susceptible. Lit *et al.*, (2002) screened one hundred and seventeen eggplant genotypes for resistance against leaf hopper and reported that 28 entries were resistant, 69 were moderately resistant, 15 were intermediate and one (Acc 544 White) was the most susceptible to leafhopper. Although host plant resistance alone or in combination with other methods is environmentally safe and compatible with IPM, however this strategy is practical only when resistant varieties of crops are available and identified. Even a moderate level of resistance in a crop can have a positive impact and can reduce the number of pesticide applications (Srivastava, 1993). Population level of leaf hopper per leaf has been identified as a good criteria for declaring the varieties as resistant or susceptible (Bindra and Mahal, 1981). Thus, the present study was conducted to screen thirty four brinjal varieties for resistance against leaf hopper so that the varieties having tolerance or

resistance can be used alone or in combination with other control methods for effective management of leaf hopper.

Materials and Methods

A field experiment was carried out using 34 traditional brinjal cultivars during *kharif* 2013-14 at ZAHRS, UAHS Shimoga. Each of the brinjal cultivar was sown at a spacing of 75 x 60 cm in each replication. All the recommended package of practices was followed in establishing the plants except the plant protection measures. The experiment was laid out in RCBD with two replication (plate 1). The cultivars used in the study are given in (Table 1). In each treatment five plants were selected randomly. On each plant, three leaves representing top, middle and lower portions were selected. The total number of nymphs and adults on each leaf was counted and expressed in terms of numbers per three leaves per plant. First count was taken once pest incidence started and further counts were made at 7 days interval till harvest. Leaf hopper population on plants was assessed by noting the number of nymphs on top, middle and lower leaves of five plants from the starting of pest infestation. The detailed damage score is given in (Table 2 and 3). Later, average was calculated and used for analysis with square root transformation ($\sqrt{x + 0.5}$). Since the adult leaf hoppers are highly mobile, their count on individual leaves will not give a reliable estimation of pest infestation intensity. Counting of nymphs was continued at weekly intervals until there was a sharp decrease in the number of nymphs. Based on the intensity of hopper burn symptoms on leaves (Plate 3), brinjal cultivars were categorized into different resistant/susceptibility classes. The

visual assessment of hopper burn intensity was converted into numerical values by calculating the per cent intensity of infestation, adopting the formula given below.

Per cent intensity =

$$\frac{\text{Sum of all numerical ratings}}{\text{Total number of leaves assessed}} \times \frac{100}{\text{Max. grade}}$$

Scoring of plants for a hopper burn symptom on the leaves was done using 0-4 scale as suggested by Singh and Rai (1995). Based on the per cent intensity of infestation, the traditional cultivars were grouped into five categories as suggested by Singh (1996) and the grades are given below (Table 2 and 3).

Results and Discussion

The mean occurrence of leaf hoppers varied significantly among different cultivars (Table 4). The number of leaf hoppers ranged from 2.54-12.81, being higher in hasiru udda badane (12.81), followed by Thailand badane (10.71), mobbugulla badane (7.72), dorelo badane (6.46), anemadeha-1 badane (6.54) and hasirukempu badane (6.18). The lower number of leaf hoppers reported in Kanakapura badane (2.54) followed by heddara gulla badane (2.56), 40-A badane (2.78), kothithale badane (2.64) and Keredoddi kollegai badane (2.72), whereas, entries hosa javari badane (5.44), dodda mullina badane (5.29), Javari badane (5.94), dodda badane (5.58), anemadeha-1 badane (5.62), mulla badane (5.56) recorded moderate numbers. Based on the intensity of hopper burn symptoms, the traditional brinjal cultivars were categorized into resistant/susceptibility classes (Fig. 1).

Table.1 List of selected traditional brinjal cultivars

Sl. No	Variety	Sl. No	Variety
1	Sthaliya badane badane	18	Bliudda badane
2	Holesalu badane	19	Naabe badane
3	Heddaragulla badane	20	Ullala badane
4	Andhrasahare badane	21	Rosilla badane
5	Apple badane	22	Mullugai badane
6	Kanakapura badane	23	Hebberalu badane
7	Biligundu badane	24	Doddamullina badane
8	Annageri badane	25	Javari badane
9	40-A badane	26	Dodda badane
10	Biligundi badane	27	Harirukempu badane
11	Kalkare badane	28	Anaamadeya badane
12	Kothithale badane	29	Hasiruudda badane
13	Sakleshpura badane	30	Mobbugulla badane
14	Ramadurga badane	31	Thiland badane
15	Keredoddi kollegai badane	32	Dorelo badane
16	Hosajavari badane	33	Anemadeha-1
17	Bilichendu badane	34	Mulla badane

Table.2 Scoring of plants for hopper burn symptoms on the leaves

0	Healthy green leaves
1	Slight yellowing of leaf margin
2	Yellowing and necrosis of leaf margin
3	Intensive yellowing and necrosis of leaves
4	Complete necrosis of leaves

Table.3 Categorization of brinjal cultivars based on per cent intensity of leaf hopper infestation

Per cent intensity	Category
0 -Healthy green leaves	Immune
1-10 -Slight yellowing of leaf margin	Highly resistant
10.1-25-Yellowing and necrosis of leaf margin	Moderately resistant
25.1-50-Intensive yellowing and necrosis of leaves	Moderately susceptible
> 50 -Complete necrosis of leaves	Highly susceptible

Table.4 Screening of different traditional brinjal cultivars against leaf hopper

Cultivar	No. of leaf hopper/ plant										
	7 DAP	14 DAP	21 DAP	28 DAP	35 DAP	42 DAP	49 DAP	56 DAP	63 DAP	70 DAP	Mean
Sthaliya badane	5.50 (2.44) ^{e-i}	2.40 (1.69) ^l	3.93 (2.10) ^{h-l}	2.63 (1.72) ^{f-m}	3.50 (1.96) ^{c-f}	2.56 (1.70) ^{e-i}	1.765 (1.44) ^{ghi}	1.60 (1.44) ^{hij}	2.50 (1.73) ^a	3.56 (2.01) ^{h-l}	2.99 (1.82)
Holesalu badane	5.40 (2.42) ^{f-i}	1.07 (1.25) ^m	3.33 (1.95) ^{klm}	3.03 (1.79) ^{f-m}	2.00 (1.58) ^{fg}	2.36 (1.64) ^{e-i}	3.19 (1.88) ^{d-i}	1.70 (1.48) ^{hij}	2.90 (1.84) ^a	3.50 (1.99) ^{h-l}	2.84 (1.78)
Heddara gulla badane	5.50 (2.44) ^{e-i}	3.10 (1.89) ^{ikl}	2.13 (1.59) ^{mn}	2.13 (1.59) ^{h-m}	2.30 (1.67) ^{fg}	2.13 (1.59) ^{e-i}	1.53 (1.42) ^{ghi}	1.50 (1.41) ^{ij}	2.80 (1.81) ^a	2.50 (1.72) ^{k-o}	2.56 (1.71)
Andhra sahare	5.90 (2.52) ^{d-i}	3.10 (1.89) ^{jkl}	4.00 (2.12) ^{h-l}	4.50 (2.23) ^{d-j}	3.00 (1.85) ^{ef}	2.23 (1.58) ^{e-i}	2.63 (1.72) ^{e-i}	1.90 (1.54) ^{hij}	3.20 (1.92) ^{pq}	3.33 (1.95) ^{i-m}	3.37 (1.93)
Apple badane	5.40 (2.41) ^{f-i}	3.30 (1.94) ^{i-l}	2.73 (1.79) ^{lm}	1.39 (1.37) ^{klm}	1.30 (1.34) ^g	1.39 (1.37) ^{ghi}	3.06 (1.81) ^{d-i}	2.00 (1.58) ^{hij}	3.80 (2.07) ^o	1.39 (1.37) ^{op}	2.57 (1.70)
Kanakapura badane	4.50 (2.23) ⁱ	3.80 (2.07) ^{g-j}	1.13 (1.27) ^{no}	0.93 (1.19) ^{lm}	1.30 (1.34) ^g	1.03 (1.23) ^{hi}	2.50 (1.72) ^{e-i}	2.50 (1.73) ^{efi}	4.10 (2.14) ^{no}	3.63 (2.03) ^{h-l}	2.54 (1.69)
Biligundu badane	4.80 (2.30) ^{hi}	4.00 (2.11) ^{f-j}	4.50 (2.23) ^{g-k}	1.56 (1.43) ^{j-m}	3.00 (1.85) ^{ef}	1.56 (1.43) ^{ghi}	1.56 (1.43) ^{ghi}	2.20 (1.64) ^{g-j}	4.20 (2.16) ^{mno}	1.56 (1.43) ^{op}	2.89 (1.80)
Annageri badane	5.20 (2.38) ^{f-i}	3.90 (2.09) ^{f-j}	3.83 (2.08) ^{i-l}	3.50 (1.99) ^{f-l}	2.20 (1.64) ^{fg}	1.66 (1.42) ^{ghi}	2.26 (1.65) ^{f-i}	2.40 (1.69) ^{g-j}	4.80 (2.30) ^{k-n}	2.33 (1.67) ^{l-o}	3.20 (1.89)
40-A badane	5.50 (2.44) ^{e-i}	4.00 (2.12) ^{f-j}	4.83 (2.30) ^{f-k}	0.73 (1.10) ^m	2.25 (1.65) ^{fg}	0.63 (1.06) ⁱ	0.40 (0.94) ⁱ	2.50 (1.73) ^{e-i}	4.50 (2.23) ^{l-o}	2.50 (1.72) ^{k-o}	2.78 (1.73)
Biligundi badane	5.70 (2.48) ^{e-i}	4.20 (2.12) ^{f-i}	0.66 (1.07) ^o	0.66 (1.07) ^m	3.50 (1.96) ^{c-f}	0.63 (1.06) ⁱ	2.09 (1.52) ^{ghi}	2.60 (1.75) ^{e-h}	5.10 (2.36) ^{i-m}	4.50 (2.23) ^{f-j}	2.96 (1.77)
Kalkare badane	5.00 (2.33) ^{ghi}	4.20 (2.16) ^{f-i}	0.73 (1.10) ^o	0.73 (1.10) ^m	3.60 (1.99) ^{c-f}	0.63 (1.06) ⁱ	1.50 (1.37) ^{ghi}	2.30 (1.67) ^{g-j}	5.20 (2.38) ^{h-l}	5.80 (2.50) ^{ef}	2.96 (1.77)
Kothithale badane	5.90 (2.52) ^{d-i}	3.80 (2.07) ^{g-j}	2.73 (1.79) ^{lm}	0.66 (1.07) ^m	2.20 (1.64) ^{fg}	0.69 (1.09) ⁱ	2.26 (1.56) ^{f-i}	2.30 (1.67) ^{g-j}	5.20 (2.38) ^{h-l}	0.69 (1.09) ^p	2.64 (1.69)
Sakleshpura badane	6.00 (2.54) ^{d-i}	2.80 (1.81) ^{kl}	1.16 (1.28) ^{no}	1.66 (1.45) ^{j-m}	2.30 (1.67) ^{fg}	1.16 (1.28) ^{hi}	1.63 (1.45) ^{ghi}	2.40 (1.70) ^{f-j}	5.00 (2.34) ⁱ⁻ⁿ	3.93 (2.10) ^{g-j}	2.80 (1.7)
Ramadurga badane	5.90 (2.52) ^{d-i}	3.30 (1.94) ^{i-l}	3.83 (2.08) ^{i-l}	2.96 (1.84) ^{f-m}	2.10 (1.61) ^f	1.49 (1.40) ^{ghi}	1.49 (1.40) ^{ghi}	2.50 (1.73) ^{e-i}	6.50 (2.64) ^{b-f}	1.49 (1.40) ^{op}	3.15 (1.85)

Keredoddi kollegai badane	6.50 (2.64) ^{c-h}	3.80 (2.07) ^{g-j}	1.36 (1.36) ^{no}	1.36 (1.36) ^{klm}	2.60 (1.75) ^{efg}	1.36 (1.36) ^{ghi}	1.36 (1.36) ^{ghi}	2.20 (1.64) ^{g-j}	4.80 (2.30) ^{k-n}	1.90 (1.54) ^{no}	2.72 (1.74)
Hosajavari badane	6.80 (2.70) ^{c-g}	4.20 (2.16) ^{f-i}	3.40 (1.97) ^{jkl}	2.80 (1.79) ^{f-m}	2.70 (1.78) ^{efg}	2.80 (1.79) ^{d-i}	2.80 (1.79) ^{d-i}	2.20 (1.64) ^{g-j}	4.90 (2.32) ^{j-n}	3.90 (2.09) ^{g-k}	3.65 (2.00)
Bilichandu badane	6.40 (2.62) ^{c-h}	4.70 (2.27) ^{e-h}	3.50 (1.99) ^{jkl}	2.16 (1.62) ^{h-m}	2.20 (1.64) ^{fg}	2.16 (1.62) ^{e-i}	2.16 (1.62) ^{f-i}	1.80 (1.50) ^{hi;j}	4.90 (2.32) ^{j-n}	2.16 (1.62) ^{mno}	3.21 (1.88)
Biliudda badane	6.90 (2.72) ^{c-g}	3.80 (2.07) ^{g-j}	3.36 (1.96) ^{kl}	2.09 (1.51) ^{i-m}	3.10 (1.89) ^{ef}	2.09 (1.51) ^{f-i}	2.09 (1.51) ^{ghi}	1.70 (1.48) ^{hij}	5.80 (2.50) ^{e-k}	3.36 (1.96) ^{i-m}	3.43 (1.91)
Naabe badane	7.20 (2.77) ^{b-f}	3.50 (1.99) ^{ijk}	4.50 (2.23) ^{g-k}	2.23 (1.62) ^{h-m}	3.10 (1.88) ^{ef}	2.23 (1.62) ^{e-i}	2.23 (1.62) ^{f-i}	1.40 (1.37) ^j	5.40 (2.42) ^{g-l}	5.50 (2.44) ^{efg}	3.72 (2.00)
Ullala badane	7.50 (2.82) ^{b-e}	3.40 (1.97) ^{ijk}	1.13 (1.27) ^{no}	2.63 (1.72) ^{f-m}	3.10 (1.88) ^{ef}	1.13 (1.27) ^{hi}	1.13 (1.27) ^{hi}	1.50 (1.41) ^{ij}	6.00 (2.54) ^{d-i}	5.13 (2.37) ^{e-n}	3.26 (1.85)
Rosilla badane	7.10 (2.75) ^{b-f}	3.80 (2.06) ^{h-k}	4.40 (2.20) ^{g-k}	3.10 (1.88) ^{f-m}	2.80 (1.81) ^{ef}	3.10 (1.88) ^{c-h}	3.10 (1.88) ^{d-i}	2.50 (1.72) ^{e-i}	5.50 (2.44) ^{f-k}	3.10 (1.88) ^{j-n}	3.85 (2.05)
Mullugai badane	6.50 (2.64) ^{c-h}	3.20 (1.92) ^{i-l}	4.80 (2.29) ^{g-k}	2.90 (1.65) ^{g-m}	3.40 (1.95) ^{def}	2.90 (1.65) ^{e-i}	2.90 (1.65) ^{fgh}	2.50 (1.72) ^{e-i}	6.20 (2.58) ^{d-h}	4.80 (2.29) ^{e-i}	4.01 (2.03)
Hebberalu badane	7.50 (2.82) ^{b-e}	5.50 (2.44) ^{cde}	7.50 (2.28) ^c	5.33 (2.41) ^{d-h}	3.3 (1.94) ^{def}	4.86 (2.31) ^{b-e}	4.86 (2.31) ^{d-g}	3.20 (1.91) ^{d-g}	7.50 (2.82) ^{bc}	4.86 (2.31) ^{e-i}	5.44 (2.41)
Dodda mullina badane	8.20 (2.94) ^{abc}	5.50 (2.44) ^{cde}	4.93 (2.33) ^{e-j}	4.93 (2.33) ^{d-i}	4.20 (2.16) ^{b-e}	4.76 (2.29) ^{b-e}	4.76 (2.29) ^{c-g}	3.60 (2.01) ^{def}	7.10 (2.75) ^{bcd}	4.93 (2.33) ^{e-i}	5.29 (2.39)
Javari badane	7.80 (2.88) ^{bcd}	5.00 (2.32) ^{d-g}	5.78 (2.50) ^{d-g}	6.78 (2.69) ^{de}	3.30 (1.94) ^{def}	5.78 (2.50) ^{a-d}	8.28 (2.94) ^{bc}	4.00 (2.12) ^{bcd}	6.50 (2.64) ^{b-f}	6.21 (2.58) ^{ef}	5.94 (2.51)
Dodda badane	7.40 (2.80) ^{b-e}	6.60 (2.66) ^c	5.565 (2.46) ^{d-h}	3.93 (2.08) ^{e-k}	5.20 (2.38) ^{bcd}	3.93 (2.08) ^{b-g}	6.43 (2.52) ^{b-f}	3.60 (2.01) ^{def}	7.60 (2.84) ^b	5.56 (2.46) ^{efg}	5.58 (2.43)
Harirukempu badane	7.00 (2.73) ^{c-f}	6.20 (2.57) ^{bcd}	6.60 (2.66) ^{c-f}	5.60 (2.44) ^{d-g}	3.40 (1.97) ^{c-f}	4.90 (2.26) ^{b-f}	5.30 (2.33) ^{c-g}	3.80 (2.04) ^{cde}	6.50 (2.64) ^{b-f}	12.5 (3.31) ^b	6.18 (2.53)
Anaamadeya badane	7.00 (2.73) ^{c-f}	7.50 (2.82) ^b	3.43 (1.98) ^{jkl}	3.88 (2.09) ^{e-k}	5.40 (2.42) ^{abc}	3.43 (1.98) ^{b-h}	4.23 (2.16) ^{c-h}	5.00 (2.34) ^{abc}	5.90 (2.52) ^{e-j}	10.5 (3.31) ^{bc}	5.62 (2.43)
Hasiru udda badane	10.50 (3.31) ^a	9.50 (3.16) ^a	19.00 (4.41) ^a	23.50 (4.89) ^a	6.20 (2.58) ^{ab}	6.93 (2.72) ^{ab}	17.16 (4.20) ^a	5.90 (2.52) ^a	12.00 (3.53) ^a	17.50 (4.23) ^a	12.81 (3.55)
Mobbugulla badane	7.00 (2.71) ^{c-g}	6.70 (2.68) ^{bc}	7.06 (2.74) ^{cd}	14.00 (3.79) ^{bc}	6.00 (2.54) ^{ab}	6.76 (2.69) ^{ab}	7.26 (2.77) ^{bcd}	5.50 (2.44) ^{ab}	6.30 (2.59) ^{d-h}	10.70 (3.34) ^{bc}	7.72 (2.83)

Thiland badane	9.33 (3.13) ^{ab}	9.50 (3.16) ^a	11.50 (3.45) ^b	18.16 (4.31) ^{ab}	6.50 (2.64) ^a	9.09 (3.09) ^a	11.50 (3.46) ^{ab}	6.10 (2.56) ^a	12.50 (3.60) ^a	13.00 (3.65) ^b	10.71 (2.30)
Dorolo badane	5.865 (2.52) ^{d-i}	7.10 (2.75) ^b	5.70 (2.48) ^{c-g}	8.86 (3.01) ^c	4.20 (2.16) ^{b-e}	6.06 (2.56) ^{a-d}	8.00 (2.89) ^{bc}	5.50 (2.44) ^{ab}	6.90 (2.72) ^{b-e}	6.50 (2.64) ^c	6.46 (2.62)
Anemadeha-1 badane	6.73 (2.68) ^{c-h}	5.50 (2.44) ^{cde}	6.76 (2.67) ^{cde}	8.73 (3.03) ^{cd}	4.30 (2.18) ^{a-e}	6.26 (2.58) ^{abc}	6.73 (2.68) ^{b-e}	5.50 (2.44) ^{ab}	6.40 (2.62) ^{e-g}	8.50 (2.99) ^{cd}	6.54 (2.63)
Mulla badane	6.8 (2.69) ^{c-g}	4.96 (2.33) ^{de}	5.36 (2.41) ^{d-i}	5.60 (2.46) ^{def}	4.20 (2.16) ^{b-e}	4.96 (2.33) ^{a-e}	6.50 (2.64) ^{b-e}	5.10 (2.36) ^{ab}	7.10 (2.75) ^{bcd}	5.10 (2.36) ^{e-h}	5.56 (2.45)
S.Em.±	0.09	0.06	0.08	0.20	0.11	0.19	0.24	0.08	0.05	0.09	0.12
CD at 5%	0.38	0.25	0.36	0.81	0.46	0.77	0.98	0.32	0.21	0.37	0.49

The values in the parentheses indicate the angular transformed value

DAP- Days after planting

Values in each column superscripted by same letter do not differ significantly

Table.5 Damage score assigned for evaluating leaf hopper damage on traditional brinjal cultivars

Sl. No	Cultivar	% intensity	Category	Nymphs/ leaf
1	Sthaliya badane	33.21	MS	2.99
2	Holesalu badane	31.55	MS	2.84
3	Heddaragulla badane	28.44	MS	2.56
4	Andhra sahare	37.44	MS	3.37
5	Apple badane	28.55	MS	2.57
6	Kanakapura badane	28.21	MS	2.54
7	Biligundu badane	32.10	MS	2.89
8	Annageri badane	35.55	MS	3.20
9	40-A badane	30.88	MS	2.78
10	Biligundi badane	32.88	MS	2.96
11	Kalkare badane	32.88	MS	2.96
12	Kothithale badane	29.33	MS	2.64
13	Sakleshpura badane	31.10	MS	2.80
14	Ramadurga badane	34.99	MS	3.15
15	Keredoddi kollegai badane	30.21	MS	2.72
16	Hosajavari badane	40.55	MS	3.65
17	Bilichendu badane	35.66	MS	3.21
18	Biliudda badane	38.10	MS	3.43
19	Naabe badane	41.32	MS	3.72
20	Ullala badane	36.21	MS	3.26
21	Rosilla badane	42.77	MS	3.85
22	Mullugai badane	44.55	MS	4.01
23	Hebberalu badane	45.33	MS	5.44
24	Doddamullina badane	44.08	MS	5.29
25	Javari badane	49.50	MS	5.94
26	Dodda badane	46.50	MS	5.58
27	Hasirukempu badane	51.50	HS	6.18
28	Anaamadeya badane	46.83	MS	5.62
29	Hasiruudda badane	106.75	HS	12.81
30	Mobbugulla badane	64.33	MS	7.72
31	Thailand badane	89.25	HS	10.71
32	Dorelo badane	53.83	HS	6.46
33	Anemadeha-1 badane	54.50	HS	6.54
34	Mulla badane	46.33	MS	5.56

MS - Moderately susceptible

HS – Highly susceptible

Fig.1 Reaction of traditional brinjal cultivars for incidence of leaf hopper

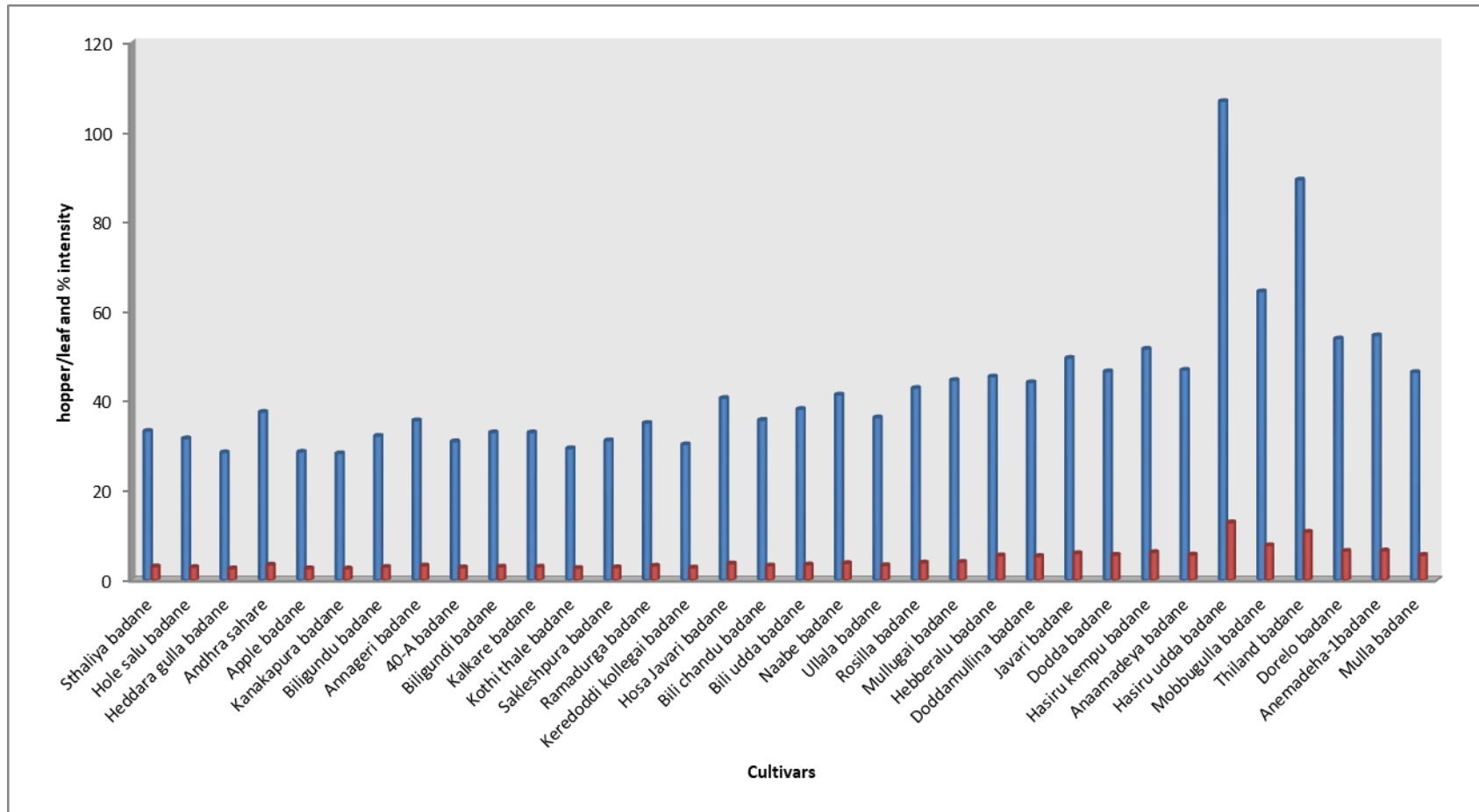
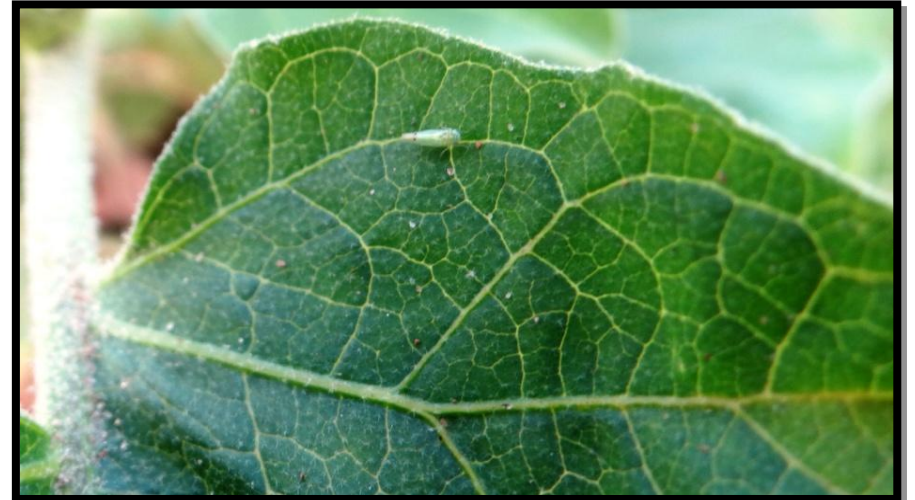


Plate.1 Damage symptoms and different stages of leaf hopper



Nymphs



Adult



Damage symptoms

The entries viz., sthaliya badane, hole salu badane, heddara gulla badane, Andhra sahare badane, Apple badane, Kanakapura badane, biligundu badane, annageri badane, 40-A badane, biligundi badane, kalkare badane, kothithale badane, Sakleshpura badane, Ramadurga badane, Keredoddi kollegai badane, hosa Javari badane, bili chendu badane, bili udda badane, naabe badane, Ullala badane, Rosilla badane, mullugai badane, hebberalu badane, dodda mullina badane, Javari badane, dodda badane, annamadeya badane, mulla badane hasirukempu badane, hasiruudda badane, mobbugulla badane, were classified as moderately susceptible with an intensity value between 25.1-50 per cent, whereas, entries viz., Thailand badane, dorelo badane, anemadeha-1 badane, were highly susceptible to leaf hopper attack with an intensity value of more than 50 per cent (Table 5). Similar results, but for different cultivars, have been reported by Mahmood *et al.*, (2002). According to them Violetta Lunga and Prospara brinjal cultivars had consistently higher and Nepali and Purple Long had lower number of leaf hoppers. The variety Black Beauty consistently had the higher and Nirala had the lower population (Yousafi *et al.*, 2013).

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