

## SCREENING OF DIFFERENT GENOTYPES/CULTIVARS AGAINST SUCKING PESTS INFESTING BRINJAL

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### ABSTRACT

*An experiment was conducted to screen 12 different genotypes/ cultivars of brinjal for their susceptibility to sucking pests under field condition at Main Vegetable Research Station, Anand Agricultural University, Anand during rabi 2010-11. Out of twelve genotypes/cultivars (ABH-1, PLR-1, AB-09-14, AB-09-19, AB-07-2, AB-07-8, AB-08-5, AB-09-1, Doli-5, GOB-1, NDB-18 and JBGR-1), genotypes AB-09-19 (2.56/leaf) and NDB 18 (2.60/leaf) recorded minimum aphid than rest of the genotypes and both were at par with each other. Genotype AB-09-1 (2.29/leaf) and JBGR 1 (2.46/leaf ) were at par with each other but recorded minimum jassid than rest of the genotypes/cultivars screened. AB-09-1 (2.56/leaf) and NDB 18 (2.67/leaf) recorded significantly minimum whitefly than rest of the genotypes/cultivars and both were at par with each other. Genotype AB 09-14 recorded significantly higher aphid (3.70/leaf), jassid (3.95/leaf) as well as whitefly (4.21/leaf) and found most susceptible. Genotype AB-09-01 yielded significantly higher fruits (296.64 q/ha) than PLR-1, GOB-1, AB-07-2, AB-07-8, AB-08-5 and AB-09-14 whereas, genotype AB-09-14 registered significantly lower fruit yield (131.00 q/ha) and was at par with AB-08-5, AB-07-8, AB-07-2, GOB-1 as well as PLR-1.*

**Key words:** Brinjal, cultivars, genotypes, screening, sucking pests

### INTRODUCTION

Brinjal (*Solanum melongena* Linnaeus) is known as a “King of vegetables” originated from India where a wide range of wild types and land races occurs. The crop is grown throughout tropical, sub-tropical and warm temperate areas of the world. In world, the production of brinjal is about 4.18 crore metric tonnes (MT). India is the second largest producer of brinjal after China (Anon., 2010a). In India, the crop is extensively cultivated in about 5.7 lakh hectares with a production of 96 lakh tonnes. In India, it is cultivated mainly in West Bengal, Orissa, Bihar and Gujarat states.

In Gujarat, it is cultivated in 0.65 lakh hectares with an annual production of 11.44 lakh tonnes and a productivity of 17.37 tonnes per hectare (Anon., 2010b). According to Shanmugavelu (1989), edible fruits of brinjal contain 92.7 per cent water, 1.1 per cent protein, 0.02 per cent fat, 0.54 per cent ash and 5.5 per cent carbohydrates. It contains vitamins A, B, C and also rich in minerals like iron, phosphorus and calcium.

Brinjal crop suffers severely due to the attack of various insect pests which reduces its yield and quality of fruits. In India, the crop is damaged by more than 30 insect pests

obtaining from nursery stage (Regupathy *et al.*, 1997). Patel *et al.* (1970) recorded 16 pest species attacking brinjal in Gujarat. Of which jassid, *Amrasca biguttula biguttula* (Ishida); whitefly, *Bemisia tabaci* Gennadius and aphid, *Aphis gossypii* Glover are the major and important sucking pests infesting brinjal. Both nymphs and adults of sucking pests viz., *A. biguttula biguttula*, *B. tabaci* and *A. gossypii* occur regularly on the crop from the early stage and remains till to the harvest of the crop causing enormous damage by sucking cell sap from the leaves and tender plant parts. Due to aphid infestation under surface of the leaves get crinkled and slightly curled backwards. The vitality of the plant is diminished and the plants turn yellow, get deformed and dry away. The nymphs and adults of jassid inject their toxic saliva while feeding. As a result the plant become stunted, the leaves crinkle, turn yellowish and become cup shaped. Brownish or reddish colour may develop along the edges of the leaves. Sarkar and Kulshreshtha (1978) reported that leaf hopper acts as a vector for transmission of little leaf disease in brinjal. Due to whitefly infestation leaves wrinkled, curled downwards and ultimately shed. Besides the feeding damage, aphids and whitefly also exude honeydew which favours the development of sooty mould. In case of severe infestation, this black coating is so heavy that it interferes with the photosynthetic activity of the plant resulting in stunted growth.

Resistant varieties provides insect control no additional cost, acts as preventive measure against build up of insect with other method of pest control and are free from environmental pollution problems. Many brinjal varieties were screened by different scientists [Ghosh and Senapati (2001) at Pundibari, Kumar *et al.* (2002) at Udaipur, Elanchezhyan *et al.* (2008) at Madurai]. Limited work has been done on screening of

different genotypes/cultivars against sucking pests in brinjal particularly in middle Gujarat. Hence, the present investigations were carried out.

#### MATERIALS AND METHODS

The present investigation was carried out to evaluate the susceptibility of different twelve genotypes/cultivars of brinjal against sucking pests at Main Vegetable Research Station, AAU, Anand, Gujarat in randomized block designed with three replications in the plot size of 4.2 x 3.6 m with spacing of 90 x 60 cm during *rabi* season of the year 2010-11. Brinjal seedlings of respective genotypes/cultivars (ABH-1, PLR-1, AB-09-14, AB-09-19, AB-07-2, AB-07-8, AB-08-5, AB-09-1, Doli-5, GOB-1, NDB-18 and JBGR-1) were transplanted during last week of September and raised successfully by adopting recommended suitable agronomical practices. For recording observations, five plants were selected randomly and tagged in each net plot area. For recording observations on sucking pests viz., aphid, jassid and whitefly, three (one from top, middle and bottom) leaves of same selected 5 plants were carefully examined for the presence of nymphs and adults during early morning hours when the pests were less active. The fruit yield of each genotypes/cultivars was recorded picking wise from each net plot. The observations were made at weekly interval starting from the one week after transplanting till to the harvesting of the crop. The whole experimental plot was kept free from any insecticide application. The periodical data on number of sucking pests viz., aphid, jassid and whitefly population recorded at weekly interval were subjected to analysis of variance (ANOVA) by standard statistical procedure (Steel and Torrie, 1980) after transforming them to square root. However, the data on yield were analyzed without any transformations. The data were

analyzed periodically as well as pooled over periods.

## RESULTS AND DISCUSSION

The results on susceptibility of different brinjal genotypes/cultivars to sucking pests (aphid, jassid and whitefly) are presented in Table 1 and also depicted in Figure 1. The order of genotypes/cultivars for their susceptibility (Column 2 in Table 1) to aphid (with number of aphid/leaf given in brackets after each genotypes/cultivars) was AB-09-19 (2.56) < NDB 18 (2.60) < JBGR-1 (3.15) < ABH-1 (3.19) < Doli-5 (3.26) < AB-09-1 (3.30) < PLR-1 (3.34) < AB-08-5 = GOB-1 (3.38) < AB-07-2 = AB-07-8 (3.42) < AB-09-14 (3.70). There was a significant difference among the genotypes/cultivars. Genotypes AB-09-19 and NDB 18 recorded minimum aphid than rest of the genotypes and both were at par with each other. JBGR-1 recorded significantly lower aphids than AB-09-14 but was at par with remained genotypes/cultivars. Genotype AB-09-14 found most susceptible which recorded significantly higher aphid but was at par with AB-07-2, AB-07-8, AB-08-5, GOB-1, PLR-1, AB-09-1 and Doli -5.

The order of genotypes/cultivars for their susceptibility (Column 3 in Table 1) to jassid (with number of jassid/leaf given in brackets after each genotypes/cultivars) was AB-09-1 (2.29) < JBGR-1 (2.46) < AB-09-19 = PLR-1 (3.30) < AB-07-8 (3.34) < ABH-1 (3.38) < AB-08-5 = NDB-18 (3.50) < Doli-5 = GOB-1 (3.54) < AB-07-2 (3.66) < AB-09-14 (3.95). There was a significant difference among the genotypes/cultivars. Genotype AB-09-1 and JBGR 1 were at par with each other but recorded minimum jassid than rest of the genotypes/cultivars screened. Genotype AB 07-08 was at par with AB-09-19 as well as PLR-1 on one hand and with ABH-1, AB-08-5, NDB-18, Doli-5, GOB-1 as well as AB-07-2 on other hand of chronological order. Genotype AB 09-14 recorded significantly

higher jassid population than rest of the genotypes/cultivars except AB 07-02 with which it was at par.

The order of genotypes/cultivars for their susceptibility (Column 4 in Table 1) to whitefly (with number of whitefly /leaf given in brackets after each genotypes/cultivars) was AB-09-1 (2.56) < NDB-18 (2.67) < PLR-1 (3.50) < AB-08-5 (3.58) < ABH-1 = AB-09-19 (3.62) < AB-07-8 (3.66) < GOB-1 = JBGR-1 (3.74) < AB-07-2 (3.78) < Doli-5 (3.83) < AB-09-14 (4.21). There was a significant difference among the genotypes/cultivars. Among the different genotypes, AB-09-1 and NDB-18 recorded significantly minimum whitefly than rest of the genotypes/cultivars and both were at par with each other. Genotype AB-07-08 was at par with AB-09-19, ABH-1, AB-08-5 and PLR-1 on one hand and with GOB-1, JBGR-1, AB-07-2 and Doli-5 on other hand of chronological order. Genotype AB 09-14 recorded significantly higher whitefly population among the genotypes/cultivars and found most susceptible.

The order of genotypes/ cultivars with yield (Column 5 in Table 1 and Figure 2) in quintal per hectare (q/ha) given in brackets after each genotypes/cultivars was AB-09-1 (296.64) > AB-09-19 (268.86) > ABH-1 (254.80) > NDB 18 (252.40) > Doli-5 (248.63) > JBGR-1 (233.20) > PLR-1 (194.62) > GOB-1 (175.24) > AB-07-2 (162.89) > AB-07-8 (158.78) > AB-08-5 (143.69) > AB-09-14 (131.00). The difference among the genotypes/cultivars was significant for fruit yield. Genotype AB 09-01 yielded significantly higher fruits than PLR-1, GOB-1, AB-07-2, AB-07-8, AB-08-5 and AB-09-14 but was at par with AB-09-19, ABH-1, NDB 18, Doli-5 and JBGR-1. Genotype AB-09-14 registered significantly lower fruit yield and was at par with AB-08-5, AB-07-8, AB-07-2, GOB-1 as well as PLR-1.

Overall, AB 09-01, AB 09-19, NDB 18 as well as JBGR 1 had lower infestation of sucking pests and yielded higher fruits considered as less susceptible, ABH 1, Doli-5, PLR 1 as well as GOB 1 considered as moderately susceptible, AB-09-14, AB-07-2, AB-07-8 as well as AB-08-5 had more infestation of pests with lower fruit yield considered as more susceptible.

The relative susceptibility of brinjal varieties to sucking pests were studied by many research workers at different places [Pawar *et al.* (1987) in Maharashtra; Anon. (1988) at Junagadh, Jyani *et al.* (1995 and 1997) at Anand, Patel *et al.* (1995) at Navsari, Soundararajan and Baskaran (2002) at Coimbatore, Ghosh and Senapati (2001) at Pundibari, Kumar *et al.* (2002) at Udaipur, Elanchezhyan *et al.* (2008) at Madurai and Anon. (2011) at Anand]. In present investigation, the local genotypes were screened hence, publish information is found scanty on susceptibility while spanning the literatures. However, Doli-5 was reported as susceptible to whitefly (Anon., 1988), as resistant to jassid and susceptible to whitefly (Jyani, 1995 and 1997), as resistant to jassid (Patel *et al.*, 1995). Similarly, ABH-1 was reported as susceptible to whitefly (Jyani, 1997). At Anand in Gujarat, jassid population was higher in JGBR 06-07, AB 08-14, AB 07-02 and AB 09-14 than checks JBGR-1, GOB-1, GBL-1, PLR-1 and GJB-2 (Anon., 2011). In present investigation also, AB 09-01, AB 09-19, NDB 18 and JBGR 1 found less susceptible; ABH-1, Doli-5, PLR-1 as well as GOB-1 moderately susceptible, whereas, AB-09-14, AB-07-2, AB-07-8 as well as AB 08-5 found more susceptible. Thus, the above reports of Jyani (1995 and 1997), Patel *et al.* (1995) and Anon. (2011) are more or less corroborated with present findings. The results regarding other genotypes/cultivars in present findings could not be supported as these

genotypes were not evaluated by any workers elsewhere.

## CONCLUSION

Out of different 12 genotypes/cultivars evaluated, Genotypes AB-09-01, AB-09-19, NDB-18 as well as JBGR-1 had lower infestation of sucking pests with higher fruit yield considered as less susceptible, ABH-1, Doli-5, PLR-1 and GOB-1 considered as moderately susceptible, AB-09-14, AB-07-2, AB-07-8 as well as AB-08-5 had more infestation of pests with lower fruit yield considered as more susceptible.

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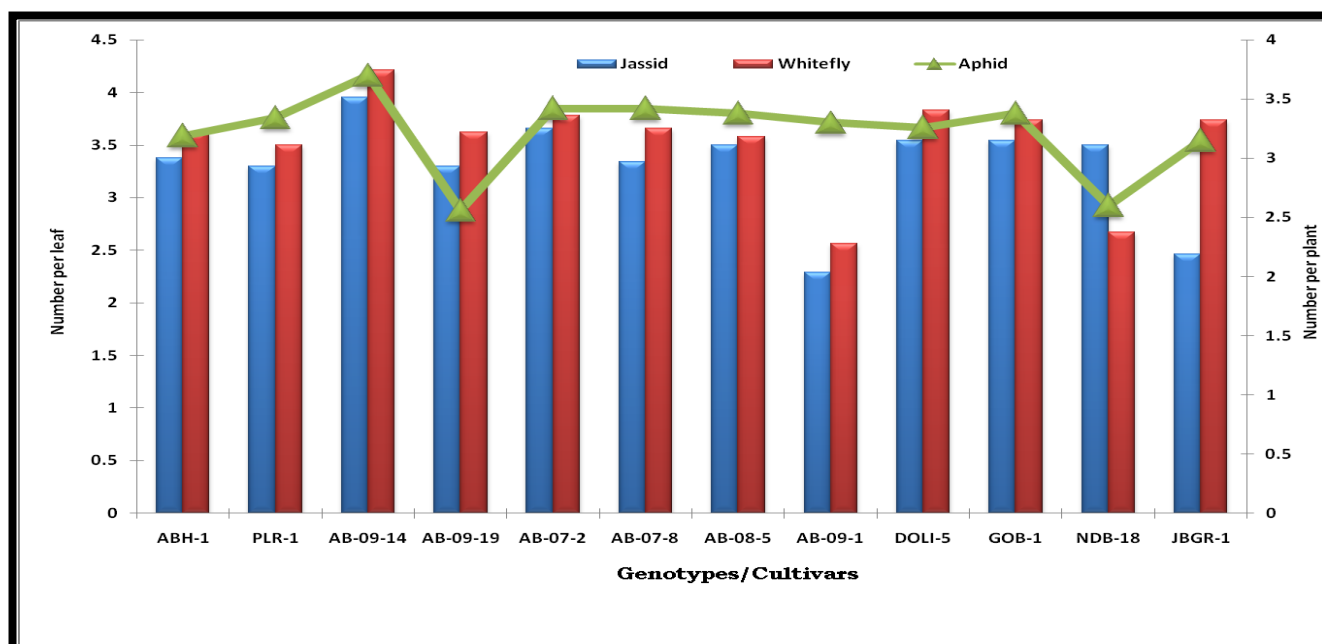
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**Table 1: Population of sucking pests in different brinjal genotypes/ cultivars and yield**

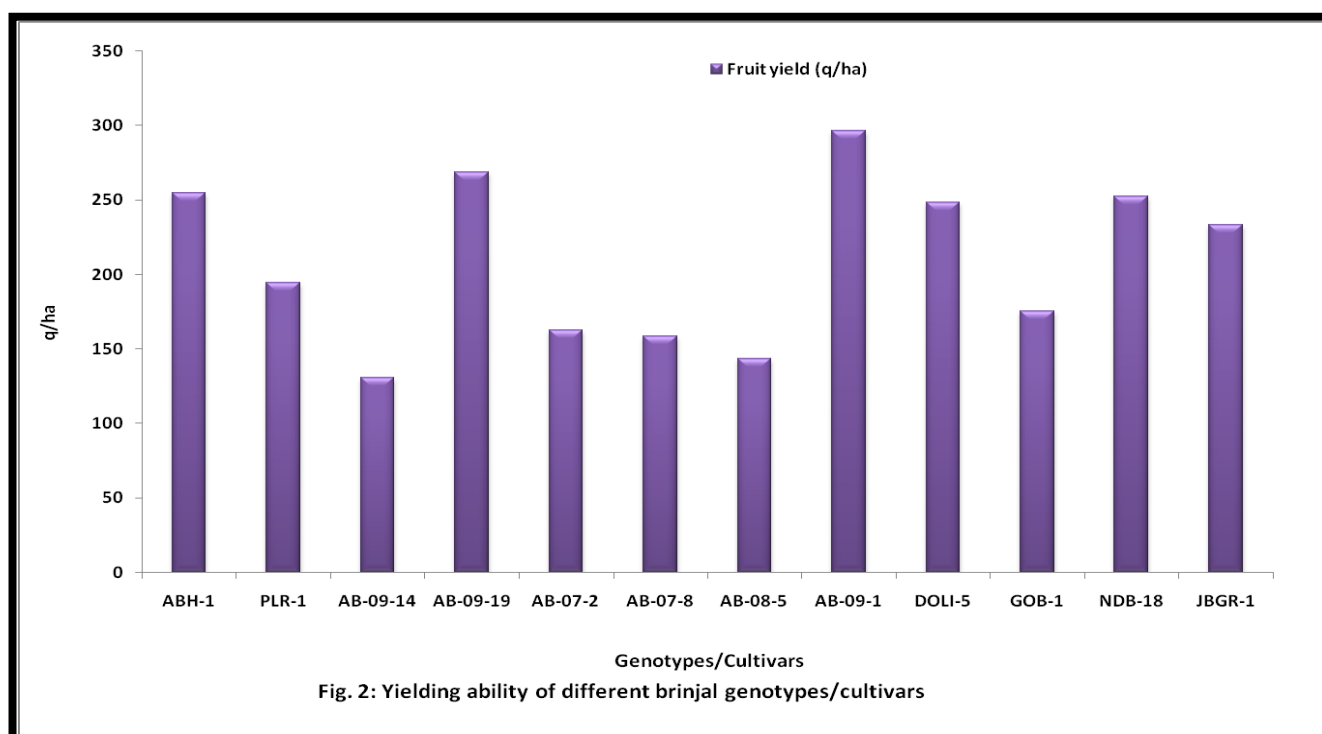
| Genotypes/Cultivars  | Number of sucking pests per leaf |                              |                               | Fruit yield (q/ha)     |
|----------------------|----------------------------------|------------------------------|-------------------------------|------------------------|
|                      | Aphid                            | Jassid                       | Whitefly                      |                        |
| 1                    | 2                                | 3                            | 4                             | 5                      |
| ABH-1                | 1.92 <sup>b</sup><br>(3.19)      | 1.97 <sup>bc</sup><br>(3.38) | 2.03 <sup>bcd</sup><br>(3.62) | 254.80 <sup>ab</sup>   |
| PLR-1                | 1.96 <sup>bc</sup><br>(3.34)     | 1.95 <sup>b</sup><br>(3.30)  | 2.00 <sup>b</sup><br>(3.50)   | 194.62 <sup>bcde</sup> |
| AB-09-14             | 2.05 <sup>c</sup><br>(3.70)      | 2.11 <sup>d</sup><br>(3.95)  | 2.17 <sup>e</sup><br>(4.21)   | 131.00 <sup>e</sup>    |
| AB-09-19             | 1.75 <sup>a</sup><br>(2.56)      | 1.95 <sup>b</sup><br>(3.30)  | 2.03 <sup>bcd</sup><br>(3.62) | 268.86 <sup>ab</sup>   |
| AB-07-2              | 1.98 <sup>bc</sup><br>(3.42)     | 2.04 <sup>cd</sup><br>(3.66) | 2.07 <sup>cd</sup><br>(3.78)  | 162.89 <sup>de</sup>   |
| AB-07-8              | 1.98 <sup>bc</sup><br>(3.42)     | 1.96 <sup>bc</sup><br>(3.34) | 2.04 <sup>bcd</sup><br>(3.66) | 158.78 <sup>de</sup>   |
| AB-08-5              | 1.97 <sup>bc</sup><br>(3.38)     | 2.00 <sup>bc</sup><br>(3.50) | 2.02 <sup>bc</sup><br>(3.58)  | 143.69 <sup>e</sup>    |
| AB-09-1              | 1.95 <sup>bc</sup><br>(3.30)     | 1.67 <sup>a</sup><br>(2.29)  | 1.75 <sup>a</sup><br>(2.56)   | 296.64 <sup>a</sup>    |
| Doli-5               | 1.94 <sup>bc</sup><br>(3.26)     | 2.01 <sup>bc</sup><br>(3.54) | 2.08 <sup>d</sup><br>(3.83)   | 248.63 <sup>abc</sup>  |
| GOB-1                | 1.97 <sup>bc</sup><br>(3.38)     | 2.01 <sup>bc</sup><br>(3.54) | 2.06 <sup>cd</sup><br>(3.74)  | 175.24 <sup>cde</sup>  |
| NDB-18               | 1.76 <sup>a</sup><br>(2.60)      | 2.00 <sup>bc</sup><br>(3.50) | 1.78 <sup>a</sup><br>(2.67)   | 252.40 <sup>abc</sup>  |
| JBGR-1               | 1.91 <sup>b</sup><br>(3.15)      | 1.72 <sup>a</sup><br>(2.46)  | 2.06 <sup>cd</sup><br>(3.74)  | 233.20 <sup>abcd</sup> |
| <b>ANOVA</b>         |                                  |                              |                               |                        |
| <b>S. Em. ± :</b>    |                                  |                              |                               |                        |
| <b>Genotypes (G)</b> | 0.04                             | 0.03                         | 0.02                          | 26.70                  |
| <b>Period (P)</b>    | 0.04                             | 0.01                         | 0.01                          | -                      |
| <b>G x P</b>         | 0.12                             | 0.04                         | 0.04                          | -                      |
| <b>C. D. at 5%:</b>  |                                  |                              |                               |                        |
| <b>G</b>             | 0.12                             | 0.08                         | 0.05                          | 78.30                  |
| <b>P</b>             | 0.10                             | 0.03                         | 0.03                          | -                      |
| <b>G x P</b>         | NS                               | 0.11                         | 0.12                          | -                      |
| <b>C. V. (%)</b>     | 16.41                            | 10.74                        | 7.07                          | 12.01                  |

Notes: 1. Treatment means with letter(s) in common are not significant at 5 % level of significance in respective column

2. Figures in parentheses are retransformed values; those outside are  $\sqrt{X + 0.5}$  \* transformed values



**Fig. 1: Performance of different brinjal genotypes/cultivars against sucking pests**



**Fig. 2: Yielding ability of different brinjal genotypes/cultivars**

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