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# Assessment of Crop Lossess Inflicted By *Amrasca Biguttula Biguttula* (Ishida) and *Bemisia Tabaci* (Gennadius.) of Brinjal

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**Abstract**

The study was carried out to find out the assessment of crop losses inflicted by major sucking insect pests of brinjal, *Solanum melongena* L. The major sucking insect pests observed were jassid, *Amrasca biguttula biguttula* (Ishida) and whitefly, *Bemisia tabaci* (Gennadius.) on brinjal. The mean fruit yield obtained was 227.73 q $ha^{-1}$ in plots treated with alternate sprays of acephate 75 SP (0.05%) and malathion 50 EC (0.05%), while it was only 117.61 q $ha^{-1}$ in untreated plots. The yields obtained from treated and untreated plots differed significantly and the difference in yield was 110.12 q $ha^{-1}$. The per cent increase in yield over untreated control was recorded to be 93.73 per cent. If the losses due to sucking insects could be avoided by pest control measures, the production can appreciably be increased. During *Kharif*, 2016 the per cent avoidable losses due to these pests were 48.35 per cent in brinjal crop.

**Keywords:** Amrasca Biguttula, Bemisia Tabaci, Brinjal.

**Introduction**

Brinjal, *Solanum melongena* L. is often described as the 'King of vegetables' (Choudhary and Gaur, 2009). Brinjal known for ayurvedic medicinal properties, especially white brinjal is said to be good for diabetic patients (Fageria *et al.,* 2003). The fruit contains moisture 92.7 g, protein 1.4 g, fat 0.3 g, minerals 0.3 g (calcium 18 mg, magnesium 16 mg, phosphorus 47 mg, sulphur 44 mg, sodium 3 mg, potassium 2 mg, chlorine 52 mg, iron 0.9 mg, copper 0.17 mg etc.), fibre 1.3 g, carbohydrate 4.0 g and vitamins (vitamin A 124 IU, thiamine 0.04 mg, vitamin C 12 mg, riboflavin 0.11 mg and nicotinic acid 0.09 mg) per 100 g edible portion (Arkroyd, 1963).

It is an important vegetable crop grown throughout the world, especially in South-Asia and it is the native of India. In production and productivity, India is second in the world after China. In India, the total area under brinjal cultivation was 6.80 lakh hectares with an annual production of 127.06 lakh tonnes (Anonymous, 2015). The area and production of brinjal in Rajasthan was 64.60 thousand hectares and 21.23 million tonnes, respectively (Anonymous, 2015).

Among the various causes of low productivity of the brinjal, one of the most important factors is the damage inflicted by the insect pests. It is subjected to attack by number of insect pests right from nursery stage to till harvesting (Regupathy *et al*., 1997). The important pests are shoot and fruit borer, *Leucinodes orbonalis* (L.) Guen.; jassid, *Amrasca biguttula biguttula* (Ishida) aphid, *Aphis gossypii* Glover; epilachna beetle, *Epilachna vigintioctopunctata* Fab.; whitefly, *Bemisia tabaci* (Gennadius.) and red spider mite, *Tetranychus telarius* (L.) *(*Borad *et al*., 2002*)* . Some of them remain active throughout the year with many overlapping generations (Atwal and Dhaliwal, 1976). Rosaih (2001) reported that the losses caused by brinjal insect pest complex were as high as 70-90 per cent. Among sucking insect pests, jassids, *A. biguttula biguttula* and whitefly, *B. tabaci* cause damage by sucking cell sap on the leaves from the initial stage of crop growth. The yield loss due to the pest is to the extent of 70-92 per cent (Reddy and Srinivas, 2004, Jagginavar *et al*., 2009, Chakraborti and Sarkar, 2011). The present study aimed for assessment of crop losses inflicted by jassid, *Amrasca biguttula biguttula* (Ishida) and whitefly, *Bemisia tabaci* (Gennadius.) in brinjal crop.

**Material and Methods**

The present investigation was conducted at Horticulture Farm, S.K.N. College of Agriculture, Jobner (Rajasthan) on brinjal crop during *Kharif*, 2016. Geographically, Jobner is located at longitude of 72º 28' East, latitude of 26º 06' North and at an elevation of 427 meters from mean sea level (MSL) in Jaipur district of Rajasthan. The climate of the region is typically semi-arid which is characterized by extremes of the temperature both during the summer and winter. During summer, temperature may rise as high as 45ºC and in winter it may fall as low as 0ºC. The total rainfall was 480 mm which is mostly received from July to September. This region provides a safe long growing season for most of the crop.

A nursery bed of 3.0 m x 1.0 m x 0.15 m size was prepared for raising seedling of brinjal. The seeds of variety 'Pusa Purple Round was shown on 25$^{th}$ June, 2016. The seeds were sown in shallow furrows by dropping the seed at 1-2 cm depth. Before, sowing the seeds were treated with 0.02 per cent thiram to check the infection of damping off. A thin layer of well rottened FYM and fine soil were applied to cover the seeds. The regular irrigation, hoeing, weeding, plant protection measures *etc*. were done from time to time. The seedlings were ready for transplanting within five weeks of sowing.

The experimental field was thoroughly ploughed and cross ploughed with the help of mould board plough and cross-harrowing was done with tractor, followed by planking and leveling to bring the field to a good tilth. The beds of 3.0 m x 3.0 m size, paths and channels were also prepared.

The well rottened farm yard manure (200-250 q ha$^{-1}$) was applied at the time of field preparation. The recommended dose of fertilizers, *i.e.* NPK (80 : 80 : 60 kg ha$^{-1}$) were applied through Urea, DAP and Muriate of Potash. Full dose of Phosphorus and Potassium and half dose of nitrogen was applied at the time of final field preparation before transplanting and the remaining quantity of nitrogen as urea was applied in three splits after 30, 45 and 60 days of transplanting in the form of top dressing as per package of practices.

The brinjal seedlings of variety Pusa Purple Round were transplanted on 03$^{rd}$ week of July, 2016 when it was about 10-12 cm height. The seedlings were transplanted by hand method keeping row to row and plant to plant distance of 60 and 50 cm, respectively. The transplanting was done in the evening hours followed by light irrigation.

The young seedlings were irrigated twice a week, till the seedlings were established and in later stages at 7-10 days interval, except during the period of intermittent rains.

First weeding and hoeing was done after 15 days of transplanting and subsequent two weeding and hoeing were done after 30 and 45 days of transplanting.

Fruit picking was started when brinjal fruits attained full size and still remain tender, bright coloured with glossy appearance. It was done with the help of sharp knife at an interval of three days.

The plots were treated with alternate sprays of acephate 75 SP (0.05%) and malathion 50 EC (0.05%) at weekly interval. The fruit yields of treated and untreated plots were recorded at each picking of fruits.

The data of fruit yield obtained were converted into quintal per hectare to interpret the results of crop losses inflicted by incidence of insect pests on brinjal by paired 't' test. The avoidable loss and increase in yield of fruits over control (untreated) was calculated for each treatment (Pradhan, 1964).

$$\text{Avoidable Loss (\%)} = \frac{\text{Yield in treated plot - Yield in untreated control plot}}{\text{Yield in treated plot}} \times 100$$

$$\text{Increase in yield (\%)} = \frac{\text{Yield in treatment – Yield in untreated control}}{\text{Yield in untreated control}} \times 100$$

**Result And Discussion**

In the present investigation, the mean fruit yield of brinjal obtained 227.73 q ha$^{-1}$ during *Kharif,* 2016 in treated plots and 117.61 q ha$^{-1}$ in untreated plots (Table 1 and fig. 1). The calculated t-value (28.01) was greater than tabulated t-value (2.14, df-14) at 5 per cent level of significance and was proved to be significant. Therefore, the yield obtained in treated and untreated plots during the study differed significantly. In present investigation, the difference between the mean fruit yield of treated to untreated (increase in yield over untreated) was 110.12 q ha$^{-1}$. The per cent increase in yield over untreated control was recorded to be 93.63 per cent. During *Kharif*, 2016 the per cent avoidable losses recorded was 48.35 per cent. This suggests that if the losses due to insect pests could be avoided by pest control measures, the production can be appreciably increased. Mane and Kulkarni (2011) reported the loss in yield of brinjal due to brinjal pest complex was recorded to the tune of 23.49 per cent. Yadav and Kumawat (2013) reported that the per cent avoidable losses 48.87 and 47.63, respectively. during *Kharif*, 2010 and 2011. The varied damage caused by insect pests of brinjal was due to the varied biotic and abiotic factors of various localities.

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**Fig. 1**
**Assessment of losses due to whitefly and jassid on brinjal crop**

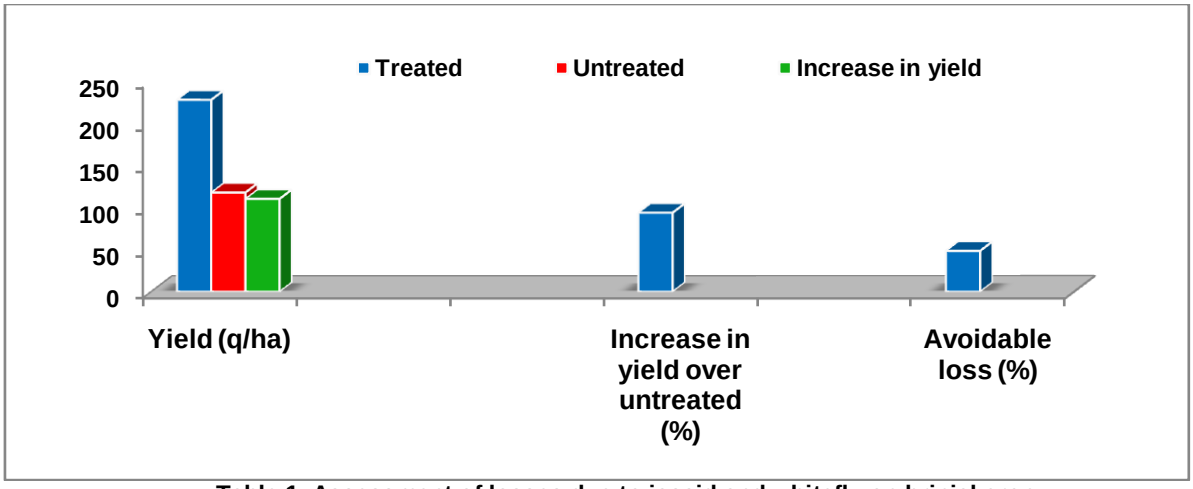


**Table 1 Assessment of losses due to jassid and whitefly on brinjal crop**

| Treatments | Yield (q $ha^{-1}$) | Increase in yield over Untreated control (%) | Avoidable loss (%) |
|---|---|---|---|
| Treated | 227.73 | 93.63 | 48.35 |
| Untreated | 117.61 | | |
| Increase in yield | 110.12 | | |
| t-cal. | 28.01 | | |