Evaluation of brinjal varieties for yield, genetic variability and disease reaction grown as late rabi season crop in Assam

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ABSTRACT
Five hybrid brinjal varieties viz., Ketan, Vijay Kiron, Utkal Green, NV2035 Sarpan Bharata and two local cultivars viz., JC-1, Longai were evaluated at Horticultural Research Station, Kahikuchi, Guwahati as late rabi crop during 2014-16. Significant variation in plant growth parameters and fruit yield as well as bacterial wilt incidence (Ralstonia solanacearum) were shown by all the varieties. Utkal Green recorded the highest per plant fruit yield (2.32 kg/plant) leading to the maximum total marketable yield (469.66 q/ha) and longer active fruiting duration (43.70 days). It also showed resistant reaction to bacterial wilt, recording only 12.44 per cent wilt incidence as compared to other varieties where it was in the range of 34.44 to 62.22 % at 55 days after transplanting. Although, Ketan and Vijay Kiron recorded moderately higher per plant fruit yield of 1.52 and 1.47 kg/plant, respectively but their total marketable fruit production reduced substantially due to high incidence of bacterial wilt (62.22 and 57.78%, respectively). The local cultivars, JC-1 and Longai exhibited moderately resistant reaction to bacterial wilt which registered 40.00 and 34.44 , respectively.

Key words: Bacterial wilt, Brinjal, Kharif, Fruit production.

INTRODUCTION
Brinjal commonly known as eggplant (Solanum melongena L.) is one of the most important solanaceous vegetable crops grown in almost all parts of India, including Assam (Nayak and Sharma, 2013). Its fruits are good sources of calcium, phosphorus, iron and vitamins particularly vitamin ‘B’. It is also rich in medicinal values generally being used as an excellent remedy for those suffering from liver complaints and is employed as a cure for toothache. The green leaves of brinjal plant are the main source of antiscorbutic Vit.C. As it is rich in various nutritive values, therefore, can well be compared with tomato (Chaudhary, 1976). Almost all the vegetables can be grown in the north-eastern region owing to diverse climatic conditions, ranging from temperate to sub-tropical and almost tropical situations in the plains. Despite the favourable climatic conditions the production and productivity of vegetables is not enough to cater to the demand in the region. In order to meet the demand of vegetables in the region for the ever increasing population of the region the production needs to be raised substantially through area expansion and increasing productivity. Traditional production practices with low input supply and adoption of low yielding varieties are the reasons for the lower production. Keeping in view of the above facts and considering the potential, this investigation was carried out to study the performance of some brinjal varieties for growth, yield and yield attributing characters during Kharif season which play a significant role in uplifting the production of a crop.

MATERIALS AND METHODS
The present investigation was carried out at vegetable section of Horticultural Research Station, AAU, Kahikuchi, Guwahati located at 20°18’ N Latitude and 91°70’ E Longitude and 80.0 m above mean sea level in two consecutive years (2014-16). Soil texture of the experimental site was sandy loam to silty clay loam with pH 5.2, organic carbon content 0.65% and available N 350.60 kg/ha, available P 11.90 kg/ha and available K 207.50 kg/ha. Mean monthly temperature and relative humidity were in the range of 7.92 – 36.4°C, 64.1-87.9%, respectively with a total annual rainfall 1566-2000 mm. Five hybrid varieties viz., Vijay Kiran, Utkal Green (NBH3158), NU-2035, Ketan, Sarpan Bharata in addition to two AAU recommended cultivars viz., Longai and JC-1 were evaluated as late rabi season crop under Assam condition. The experiment was laid out in randomized block design with 3 replications with a plot size of 4.5 m x 3.0 m. The crop plot was applied with NPK @70:60:60 kg/ha and seedlings were transplanted at 75 cm x 60 cm spacing. The data were recorded plant height (cm), number of fruits/plant, fruit length(cm), fruit dia(cm), fresh fruit weight (g/plant), fruit yield per plant (kg), fruiting duration(days), total fruit yield(q/ha), shelf-life of fruits (days), organoleptic value(10.0), benefit: cost ratio. Data on natural incidence of bacterial wilt at 25, 35, 45, and 55 days

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after transplanting were recorded. The incidence of disease in each variety was calculated as per the formula given by Rahaman et al., (2011) as

$$\text{% Disease incidence} = \frac{\text{Number of infected plant units}}{\text{Total number of plant units}} \times 100$$

The data on disease incidence in all the varieties were transformed and analysis of variance were calculated out (Snedecor and Cochran, 1967).

**RESULTS AND DISCUSSION**

Significant variation among all the brinjal hybrids/cultivars due to genotype and environment interaction for all the plant growth and yield attributing characteristics except plant height were recorded. It is evident from the Table 1 that significant differences were recorded in fruit length. Among the hybrid/cultivar, a local cultivar JC1 recorded significantly higher fruit length (47.83 cm) followed by an hybrid Sarpan Bharata (47.17 cm). While the minimum fruit length (12.50 cm) was found in Vijay Kiron followed by Utkal Green (13.15 cm). Such findings of present investigation pertinent to the evaluation of brinjal cultivars were reported by Deotale et al., (1998) and Singh et al., (2014). Like other growth parameters significant variation was also observed in the fruit diameter among the brinjal hybrids/cultivars evaluated. Vijay Kiron showed the maximum diameter of fruit (9.50 cm) followed by Sarpan Bharata (6.67 cm) while minimum fruit diameter of 3.57 cm and 3.63 cm were recorded by local cultivar Longai and NV2035, respectively. These results were also in conformity with the findings of Rai et al., (1998) and Mohanty et al., (2001) who reported significant variation among the brinjal varieties for fruit diameters. Significant variation in days to harvest and fruiting duration was also observed among the brinjal varieties. Hybrid Utkal Green took highest time period of 92.7 days for first harvesting followed by JC-1 (82.7 days) and Sarpan Bharata (80.7 days) respectively, while NV2035 took least time (75.7 days) to give first harvestable fruit yield. Likewise, Longai and Utkal Green recorded longest fruiting duration of 58.7 and 43.7 days while minimum fruiting duration of 21.3 and 23.3 days were recorded by Sarpan Bharata and JC 1, respectively. Similar types of findings were reported by Pandit et al., (2010) during evaluation of brinjal varieties.

Though, there was no significant difference among the varieties in respect of plant height but highest plant height 79.5 and 79.3 cm was recorded by the hybrids NV2035 and Utkal Green, respectively. Minimum plant height (68.7 cm) was noted in local cultivar Longai. Thus a wide range of plant height (79.5 - 68.7 cm) was observed the hybrids/cultivars evaluated. The tallness, shortness and other morphological characteristics are varietal and climatic characteristics which are controlled and expressed by certain genes and climatic factors. These findings were in agreement with those of Singh et al., (2014) and Mohanty et al., (2001) who reported variation in brinjal plant height during evaluation brinjal cultivars.

During the course of investigation significant differences in various fruit and yield parameters of brinjal was recorded. Highest number of fruits per plant at 24.12, 19.24 and 17.64 were recorded by hybrid Utkal Green, local cultivar Longai and hybrid Ketan, respectively. Whereas minimum number of per plant fruit of 6.11, 8.02 and 8.97 were recorded by Sarpan Bharata, JC 1 and Vijoy, respectively (Table 2). These observations of the present study were also found in conformity with the findings reported by Kalloo et al., (1989), Mahanty and Prusti (2000). Similarly Utkal Green produced higher fruit yield per plant of 2.31 kg/plant with higher marketable fruit yield (4.69 q/ha). Ketan recorded second best marketable fruit yield (2.80 q/ha) with third best per plant fruit yield (1.52 kg / plant). While the lowest fruit yield of 0.73 kg/plant with 1.42 q/ha marketable fruits were found in Sarpan Bharata. Similarly maximum fruiting duration of 58.7 and 43.7 days was observed in local cultivar Longai and hybrid whereas lowest (21.3 days) was recorded by Sarpan Bharata. Almost similar types of results were also observed by Kumar et al., (2000) and Srivastava et al., (1997).

Brinjal varieties evaluated showed differential reaction to bacterial wilt. There were significant differences in respect of wilt incidence among the varieties/cultivars (Table 3). All the cultivars exhibited comparatively low level

| Variety       | Plant height(cm) | Days to harvest | Fruiting duration(days) | Fruit length(cm) | Fruit dia. (cm) |
|---------------|------------------|-----------------|------------------------|------------------|-----------------|
| Vijay Kiron   | 75.5             | 79.7            | 34.7                   | 12.50            | 9.50            |
| Utkal Green   | 79.3             | 92.7            | 43.7                   | 13.15            | 5.08            |
| NV2035        | 79.5             | 75.7            | 35.3                   | 20.25            | 3.63            |
| Ketan         | 71.4             | 77.7            | 29.3                   | 22.13            | 3.69            |
| Sarpan Bharata| 76.7             | 80.7            | 21.3                   | 47.17            | 6.67            |
| JC-1          | 72.3             | 82.7            | 23.3                   | 47.83            | 5.58            |
| Longai        | 68.7             | 79.3            | 58.7                   | 17.80            | 3.57            |
| S. Ed. (+)    | 0.38             | 0.59            | 6.2                    | 3.06             | 0.53            |
| CD (5%)       | NS               | 1.29            | 13.6                   | 6.67             | 1.16            |

Table 1: Performance of brinjal varieties as late rabi season crop (Mean of 2014-15, 2015-16).
of wilt incidence in the range of 32.22- 2.22% and 41.11 - 4.44% at 25 and 35 days after transplanting (DAT) and with the passes of time wilt incidence was also found to be in increasing trend in all the cultivars. As such, all the cultivars executed comparatively higher level of bacterial wilt incidence at 55 DAT and it varied from 62.22 to 12.44 %. Ketan, recorded highest wilt incidence (62.22%) followed by Vijay Kiron (57.78%), Sarpan Bharata (54.44%) and NV2035 (42.22%). The lowest wilt incidence (12.44%) was recorded by Utkal Green (5.78%). These findings were in conformity with conclusions drawn by Rahman et al., (2011) who screened brinjal varieties and registered significantly lower wilt incidences of 40.00% and 34.44%, respectively. These findings were also found in agreement with the findings reported by Ganesan et al. (2004) and Murugan et al. (2011).

The economic analysis of cultivation of different brinjal varieties elucidated that maximum net monetary benefit of Rs. 2,37,414.00 was recorded in Utkal Green which also resulted in maximum C:B ratio (cost benefit ration) of 5.35 (Table 2). The next most remunerative variety was Ketan which recorded a benefit cost ratio of 2.79.

**CONCLUSION**

Utkal Green showed promising fruit yield with high shelf life and organoleptic taste, in addition of resistant reaction to bacterial wilt in late rabi season in Assam. Local cultivar Longai was also found superior in respect of bacterial wilt resistance and total fruit yield. On the basis of these finding it can be concluded that brinjal cultivar Utkal Green, followed by cultivar Longai are the remunerative brinjal varieties for cultivation during late rabi season under Assam condition.
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