

## YIELD POTENTIAL OF SOME EGGPLANT VARIETIES UNDER PLANT GROWTH REGULATOR

B.C. SARKER, B. ROY, S. MUSTARY, B.S. SULTANA<sup>1</sup> AND B. BASAK<sup>1</sup>

Department of Agricultural Chemistry, Hajee Mohammad Danesh Science and Technology University, Dinajpur 5200, <sup>1</sup>Senior Scientific Officer, Soil Resource Development Institute, Bangladesh.

Corresponding author & address: Dr. Bikash Chandra Sarker, E-mail: bikashsarker@hotmail.com

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### ABSTRACT

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Yield potential of eggplant is an important determinant for selecting crop for effective and economic cultivation. An experiment was conducted in Hajee Mohammad Danesh Science and Technology University campus to investigate the yield potential of some eggplant varieties using plant growth regulator. Seven varieties of eggplant viz., BARIBegun1, BARIBegun2, BARIBegun4, BARIBegun5, Bismillah, BARIBegun6, and Islampuri were used for test crop and Naphthalic acetic acid (NAA) 100 ppm was used as plant growth regulator. Eggplant variety BARIBegun5 showed the highest plant height (31.0 cm) at vegetative stages among the tested varieties. The mean Leaf number (32.0) was also higher in BARIBegun 5 in comparison to others. Leaf surface area which is important to photosynthetic activities in eggplant was also significantly greater in BARIBegun2 cv. Tarapuri, compare to other varieties. Yield potent was significantly higher in BARIBegun5 followed by BARIBegun5. The lowest yield was performed by BARIBegun6. There is no significant effect of plant growth regulator NAA for growth and yield of eggplant. From this study it is inferred that eggplant cv. BARIBegun2 cv. Tarapuri might have best yield potential in the study area but it needs further extensive study using different plant growth regulators.

**Key words:** eggplant, plant growth regulator, yield, leaf surface area

### INTRODUCTION

Eggplant is an important winter vegetable crop in all regions of Bangladesh. Now it is also cultivated in summer but quality and market price are very low. In winter, limited water supply or uneven rainfall seriously affect on yield and quality of eggplant fruits. If sufficient water can be supplied during growing season, the economic yield of this vegetable crop will be very high. But in Northwest region of Bangladesh, especially in Dinajpur and Thakurgaon districts face uneven rainfall or drought during the winter season while eggplants need sufficient water for their growth and development.

*Solanum melangela* L. commonly known as eggplant is an economically important vegetable crop. It is a native of Indian sub-continent, with India as probable center of origin. It is grouped as C3 plant under the Solanaceae family and a tap rooted vegetable crop widely cultivated in the tropical, subtropical and temperate region of the world.

Although cultivated in Bangladesh, India, China, Japan and adjacent areas from prehistory, eggplant appears to have been known to western world no more than about 1500 years. The numerous Arabic, North African names for it, and the lack of ancient Greek and roman names, indicate that it was carried into Mediterranean area by Arabs in the so-called Dark Ages, or early Middle Ages. *Melongena*, now part of the scientific name was a 16th-century Arabic for one kind of eggplant.

It is one of the heat-loving vegetable crops that require a long warm season (a period of 100-140 days) for best yields. It is good source of vitamins and minerals making its total nutritional value comparable with tomato. Eggplant has been used in traditional medicines especially for asthma, bronchitis, cholera and are also beneficial in lowering blood cholesterol.

The eggplant is one of higher water exhaustive vegetable crops. A considerable amount of water is required for their growth, development and higher productivity during their entire growing period. Yield potentiality of some varieties is poor and the quality also inferior. Root growth is markedly reduced due to insufficient soil moisture supply resulted in decreased water uptake from the soil for their growth and development. During dry season, eggplant survives depending chiefly on retained soil water when irrigation facilities are limited and natural rainfall is uneven and insufficient during growing period. Therefore, it is essential to quantify its water requirement for getting maximum yield. Vegetable serves as an indispensable constituent of the human diet supplying the body with minerals, vitamins and certain hormone precursors, in addition to protein and energy. There are a lot of varieties of leafy vegetables in Bangladesh. Of them, spinach, kachu (aroids), ferns, cucumber, bathua, shaknote, kalmi, jute, mustard, pea, radish, cucumber etc. are available. But their balanced diet is yet practised by the people. Occasionally the leaves are used as vegetable in all parts of world. Besides being used for human consumption, the leaves serve as fodder, browse for cattle, sheep, goats, and other domestic animals. The indigenous vegetable like kachu (aroids), ferns, cucumber, bathua, shaknote, kalmi etc. serve as a good vegetable source for man in Bangladesh. Absolute growth rate is the increase in rate of DM production per unit of time. AGR decrease due to leaf abscission. Awan and Alizai (1989) carried out that applications of 100 ppm IAA to rice plant at penicle emergence stage significantly increase plant height and also protein content. Sontakey *et al.* (1991) observed that spray of with 100 ppm IAA on sesame cv. 128 increased branch

number/plant. Chhipa and Lal (1988) carried out an experiment with IAA on wheat cv. Raj 911. Plants were grown in 4-non saline sodic soils and seeds were treated with 200 ppm IAA. The plants increased number of tiller significantly. It is reported that the application of 5, 10 or 20 ppm NAA to black gram at 50% flowering stage increase dry weight i.e. absolute growth rate (AGR) increase due to the application of NAA.

#### Research objectives are:

1. To provide a suitable technology for a variety or varieties of eggplants with high yield potential for the Northwest region of Bangladesh.
2. To know the adaptive responses of some eggplants varieties under different plant growth regulators
3. To recommend a suitable variety for the farmers and peoples of the Northwest region of Bangladesh for food security.

#### MATERIALS AND METHODS

An field experiment was conducted at the experimental farm of Hajee Mohammad Danesh Science and Technology University, Dinajpur in 2009. A randomized completely block design (RCBD) with three replications was followed for the purpose. Treatment arrays are as: plant growth regulators (PGR): three levels including control W1; water spray with no PGR, W2; IAA 100 ppm and eggplant varieties: seven different varieties are-

- T1- BARIBegun1 cv. Uttara
- T2- BARIBegun2 cv. Tarapuri
- T3- BARIBegun4 cv. Kazla
- T4- BARIBegun4 cv. Nayantara
- T5- Bismillah
- T6- BARIBegun6, and
- T7- Islampuri

Seeds of some eggplants varieties were collected from different parts of Bangladesh including high yielding varieties from Bangladesh Agricultural Research Institute, Gazipur and some varieties from local market. Of them, seeds of five different varieties were used for plant culturing purposes.

The parameters were measured viz., leaf surface area, leaf number, plant height, total fruit weight per plant for each variety. The data collected on different parameters under the experiment were statistically analyzed to obtain the level of significance using MSTAT-C computer programme developed by Russel (1986). The treatments means were compared by Duncan's Multiple Range Test (DMRT).

#### RESULTS AND DISCUSSION

##### Leaf Surface area

The leaf surface area of different varieties of eggplant using plant growth regulator-Naphthalic acetic acid (NAA) as a function of time during study period was shown in Figure 1. There was general increase in leaf surface area with growing time and plant age. In the present study the varietal effect on eggplant height was found statistically significant at different days after sowing (Figure 1). At 30, 40, 50 and 60 days after sowing, leaf surface area was markedly influenced. The results showed that the highest leaf surface area (40.4 cm<sup>2</sup>) was found in T2 at 50 DAS followed by T<sub>1</sub>, T<sub>4</sub>, T<sub>7</sub>, T<sub>3</sub>, and T<sub>5</sub>, and the smallest leaf surface area was (15.8 cm<sup>2</sup>) observed in T<sub>6</sub>, at 50 days after sowing. The average tallest eggplants were (31.8 cm) recorded in T<sub>2</sub>, i.e., BARIBegun2 cv. Tarapuri. The smaller leaf surface area was found in T<sub>6</sub>, i.e., BARI Begun6 at 50 days after sowing.

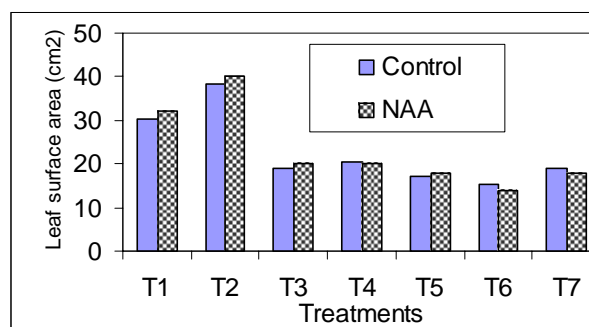


Fig. 1. Leaf surface area of different varieties of eggplant at different times of experiment

### The leaf number of eggplant

Leaf production of eggplant was variable during growing season. The number of leaves in different varieties of eggplant was presented in Table 1. A marked variation in leaf production of different varieties of eggplant was found at the different growth stages. Table 1 showed that leaf number gradually increased from seedling stage to maturity stage. It showed the gradual increase in leaf emergence as the growth time proceeds and stopped leaf emergence after 60 DAT. The varietal effect of eggplant on the number leaf was found statistically not significant at different growth stages (Table 1). In case of 50 to 60 days after transplanting, leaf numbers per plant were markedly influenced in all plants. The results showed that the highest number of leaf plant<sup>-1</sup> (31.2) was found in BARIBegun5 and the lowest leaf plant<sup>-1</sup> was (27.2) found in Islampuri variety. After 70 DAT, the leaf number was not increased due to age and leaf senescence. A general sigmoid growth pattern in leaves number growth was observed for eggplant which was also supported by Sarker (2009) and Mustari (2010). During fruit harvesting period, leaf growth was not significantly increased. Leaf senescence and death after 60 or 70 Days and dropping of aged and dead leaves was the common feature of eggplant deserved in the present study.

Table 1. Leaf number of different varieties of eggplant at different times of experiment

Time DAS	BARI 1 T1	BARI 2 T2	BARI 4 T3	BARI 5 T4	BARI 6 T5	Bismillah T6	Islampuri T7
10	6.8	7.0	9.0	9.1	8.6	11.7	9.8
20	11.1	11.6	14.1	11.0	12.9	15.1	11.1
30	15.0	17.4	23.3	25.7	21.7	24.7	17.2
40	20.8	19.1	22.8	25.7	25.0	28.0	19.4
50	26.1	24.1	25.6	29.0	27.2	28.0	25.0
60	30.6	24.1	27.8	31.2	28.3	30.2	27.2
70	30.6	24.1	27.8	31.2	28.3	30.2	27.2
80	30.6	24.1	27.8	31.2	28.3	30.2	27.2

### Plant height

The plant height (distance from soil surface to top of canopy) of different varieties of eggplant as a function of time during study period was shown in Figure 2. There was general increase in plant height with growing time and plant age. In the present study the varietal effect on eggplant height was found statistically not significant at different days after sowing (Figure 2). At 30, 40, 50 and 60 days after sowing, plant height was markedly influenced. The results showed that the highest plant height (31.8 cm) was found in T<sub>4</sub> at 50 DAS followed by T<sub>5</sub>, T<sub>3</sub>, T<sub>6</sub>, T<sub>7</sub>, and T<sub>1</sub>, and the smallest plant height was (24.8 cm) originated in T<sub>2</sub>, at 50 days after sowing. The average tallest eggplants were (31.8 cm) recorded for T<sub>5</sub>, i.e., BARIBegun5 cv. Nayantara. The shortest plant was (25.78 cm) found in T<sub>2</sub> i.e., BARIBegun2 cv. Tarapuri at 50 days after sowing.

All the eggplants continued to increase leaf number and attained highest at 60 DAS and began to decline slightly up to final harvesting stage. The higher plant in eggplant varieties might possibly due to varietal effect. Therefore, the increased growth in regard to plant height due to varietal effect was evident. It is interesting that there was no significant effect of plant growth regulators on plant height.

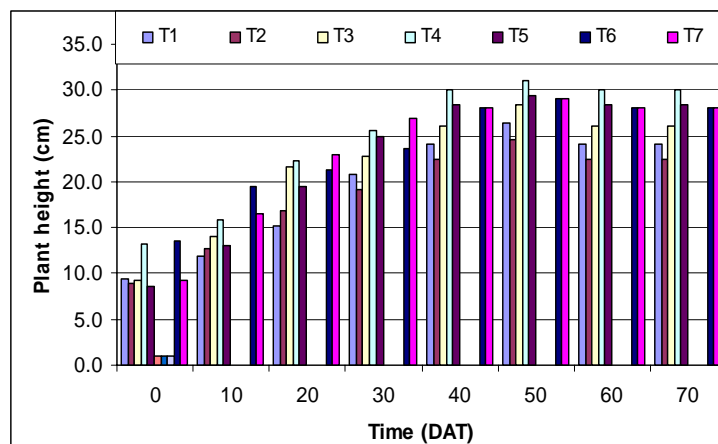


Fig. 2. Plant height of different varieties of eggplant at different times of experiment

### Yield

The different eggplant varieties showed a wide variation of fruit yield per plant (Figure 3). Fruit yield of eggplant varieties was significantly different due to varietal effect. There was no significant effect of NAA on the yield of eggplant fruits. The highest fruit yield per plant was found in T<sub>2</sub> plants, i.e., BARIBegun2 cv. Tarapuri (660 g per plant) followed by T<sub>5</sub>, T<sub>1</sub> and T<sub>6</sub> while the lowest in T<sub>3</sub> plant (199 g per plant). The T<sub>4</sub>, T<sub>6</sub>, and T<sub>7</sub> produced statistically identical seed yield.

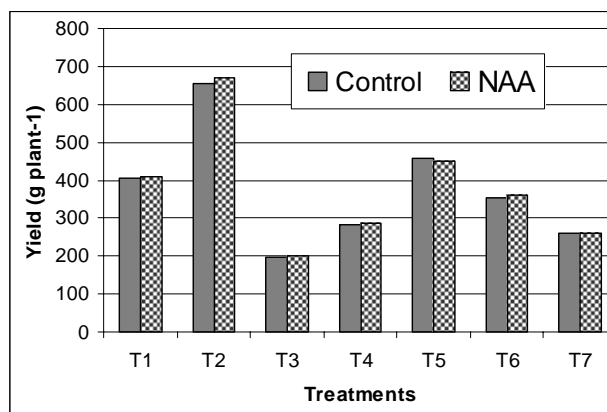


Fig. 3. Yield of different varieties of eggplant

### CONCLUSION

In conclusion the present studies indicated that growth and yield of different varieties was not markedly influenced due to plant growth regulator-NAA. Among the seven varieties of eggplant, BARIBegun 2 cv. Tarapuri showed the best yield potential in the study area. Therefore, it is suggested that the BARIBegun 2 cv. Tarapuri is recommended for the study area for getting better yield. But it also infers that more intensive research is needed considering other factors and using different PGRs.

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