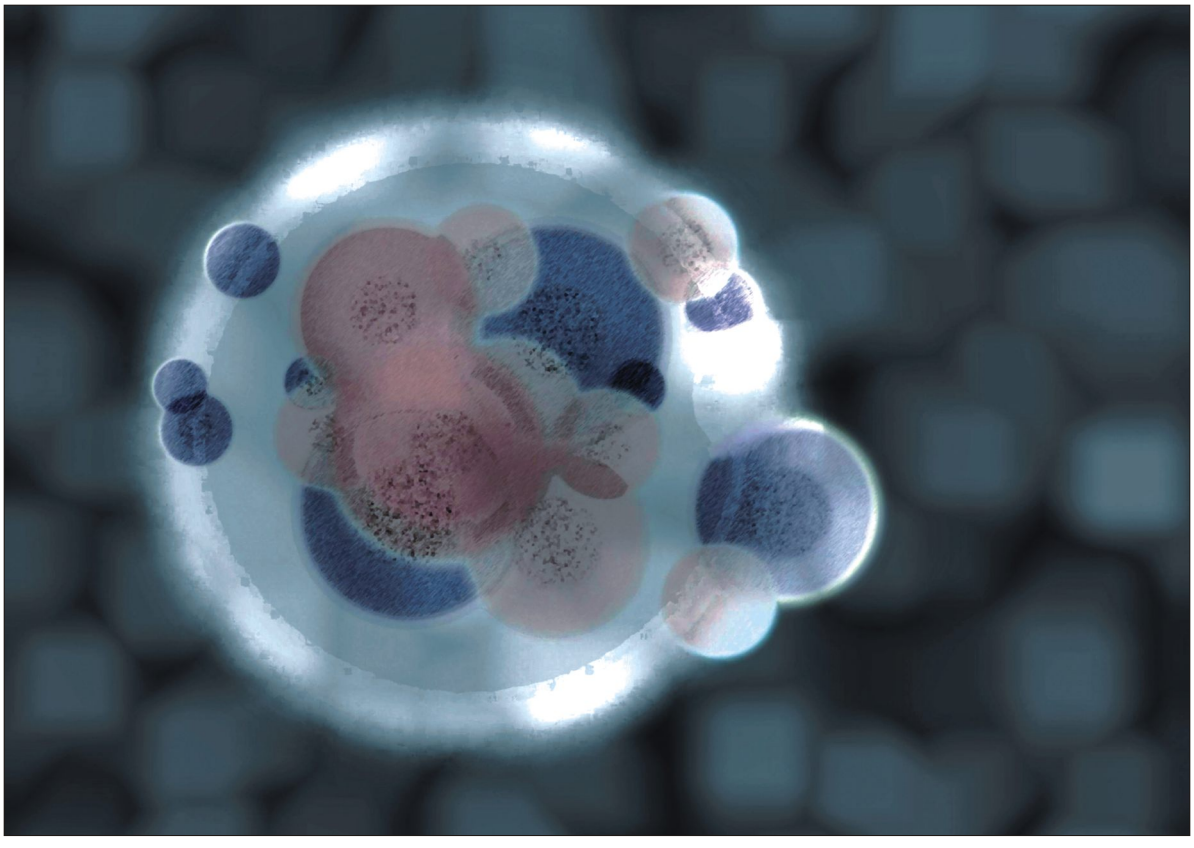

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Performance of Teasle Gourd Genotypes Grown on Different Trellis

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Abstract: Study the yield of ten new teasle gourd genotypes grown on different trellis with a view to identify a high yielding variety and an acceptable trellis suitable for easy hand pollination. Among ten genotypes developed through inter and intra sexual crosses, the genotypes TG 920722 were found superior and produced significantly higher yield (7.47 kg/plant) than all other genotypes. Different types of trellis e.g. Upright konchee trellis, Flat bamboo trellis and Vertical rope net trellis significantly influenced the yield attributes of teasle gourd genotypes. The vertical rope net trellis gave better results than all other trellis in respect of success of fruit setting, fruit length, fruit diameter, individual fruit weight, number of fruit per plant and fruit yield per plant.

Key words: Trellis, teasle gourd, production

Introduction

Teasle gourd (*Momordica dioica* Roxb.) is a cucurbitaceous vegetable of Indo Malayan origin (Rashid, 1976; Singh, 1990). It has been cultivated in Bangladesh, India and some of the neighbouring countries for a long time. In the recent past, teasle gourd was a minor vegetable but now it has become an important and probably the most expensive summer vegetable of Bangladesh (Rashid, 1976). It has high food value, containing the highest amount of carotene (1620 μg/100 g of edible portion) among the cucurbitaceous vegetable (Gopalan *et al.*, 1982). Teasle gourd may be cheap source of vitamins and minerals (Azad, 1944; Bhuiya *et al.*, 1977). It is gaining popularity day by day because of its high export potential and in the internal market. It remains available during March to October, the lean period of vegetable supply in Bangladesh.

As a vine crop, teasle gourd has a number of problems including low yield. There are few land races having some local popular names but no high yielding variety is available for commercial cultivation in Bangladesh (Rashid, 1983). Improvement of this crop has not been attempted, perhaps because of its dioecious nature and its vegetative mode of propagation. Hand pollination in teasle gourd significantly contributes to improve its fruit setting (Hossain *et al.*, 1987). They reported that artificial pollination in teasle gourd gave 100% fruit setting but natural pollination contributed only about 50% fruit setting. Das (1988) reported that natural pollination in teasle gourd produces 25-30% fruit, while through hand pollination 95% fruit setting is possible. As teasle gourd is a vine crop, it need trellis or support for successful trailing. In Bangladesh different traditional types of trellis are being used in different areas of the country and there is no definite form of trellis. For successful hand pollination easy approach to the female flower is needed. It is difficult to pollinate the flowers if they opened around middle areas of a big flat trellis. Close supervision, intercultural operations and harvesting of fruits are also difficult in case of big type of traditional trellis. Development of some high yielding varieties and determination of suitable type of trellis may help maximizing teasle gourd production, which will reduce the high market price. This study was initiated to determine the high yielding genotypes and an acceptable trellis for easy pollination leading to successful teasle gourd production.

Materials and Methods

The present experiment was conducted at the Horticultural Farm of Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur. The experiment consisted of three types of trellis viz. Upright konchee trellis-the bamboo branches were placed upright around the plant covering area; Flat bamboo trellis-a horizontal net like structure was made by placing by bamboo sticks on the top of a frame also made of bamboo poles of 1.5 m height; Vertical rope net trellis-made of jute rope net hanged with bamboo pole and GI wire and placed vertically at the centre of the beds and ten genotypes developed through inter and intra sexual crosses namely, TG920604, TG920612, TG920616, TG920624, TG920308, TG920509, TG920722, TG921203, TG921210, TG921216 and two local cultiver Big tapering, Big round. The two factor experiment was laid out in randomized complete block design with three replication. The tuberous roots of female plants planted in pots containing a mixture of soil and decomposed cowdung (1:1, v/v). Healthy female seedling at 3-5 leaf stage was transplanted at the centre of 9 m^2 plots and 2 plants each. The male plants were raised separately near to the experimental field for using in pollination. The transplanting of male plants was done 20 days prior to that of female plants. Fertilizers of urea 500 kg, TSP 600 kg, Murate of Potash 400 kg, Gypsum 75 kg, Zinc Sulphate 6 kg, Mustard oil cake 500 kg and Cowdung 8000 kg per hectare were applied as basal and 4 split applications (Das, 1988; Azad, 1994). For hand pollination male flowers were collected early in the morning from the male plants for pollinating female flowers. The data were recorded on different parameters such as fruit setting rate (%), fruit length (mm), fruit diameter (mm), individual fruit weight (g), number of fruits per plant, fruit yield per plant (kg) and analysed statistically for interpretation of results.

Results and Discussion

Effect of genotypes on the success of fruit setting, fruit length, fruit diameter, single fruit weight, number of fruit per plant and fruit yield per plant of teasle gourd are presented in Table 1. From the Table 1 revealed that the highest percentage of fruit setting was recorded in the genotype TG920722 (87.56%) which was significantly higher than all other genotypes. The genotypes TG921203, TG921216, Big tapering, TG920624, TG920509, Big round, TG920308, TG920612, TG921210 and TG920616 were statistically

Table 1: Mean performance of genotypes on different characters of teasle gourd

Genotypes	Fruit setting rate (%)	Fruit length (mm)	Fruit diameter (mm)	Single fruit weight (g)	Number of fruit/plant	Fruit yield /plant (kg)
TG 920604	82.86c	72.73h	40.22de	62.93ef	66.00e	3.66gh
TG 920612	84.52bc	70.96h	38.88e	60.95f	72.89d	3.83g
TG 920616	83.27bc	74.98gh	42.00cd	62.40ef	69.00e	3.59gh
TG 920624	85.20b	63.44i	40.15de	72.43d	79.67bc	5.85e
TG 920308	84.59bc	80.38ef	38.24e	56.09g	66.11e	3.64gh
TG 920509	84.89bc	77.96fg	42.94bc	82.53b	68.56e	3.43h
TG 920722	87.56a	109.21a	44.70ab	83.83b	93.22a	7.47a
TG 921203	85.48b	100.70b	42.69bc	95.16a	75.78cd	7.17b
TG 921210	84.38bc	83.69e	39.08e	64.55e	73.44d	4.92f
TG 921216	85.30b	88.82d	43.04bc	77.01c	83.11b	6.53c
Big tapering	85.24b	94.99c	38.99e	72.13d	83.22b	6.14d
Big round	84.88bc	71.79h	45.46a	59.78f	79.56bc	4.68f

In a column mean having common small letter(s) did not differ significantly at 5% level

Table 2: Effect of trellis on the fruit setting rate, fruit length, fruit diameter, single fruit weight, number of fruit per plant and fruit yield per plant of teasle gourd

Trellis	Fruit setting rate (%)	Fruit length (mm)	Fruit diameter (mm)	Single fruit weight (g)	Number of fruit/plant	Fruit yield/ plant (kg)
Upright konchee trellis	82.27c	78.95c	39.24c	67.08c	70.50c	4.73c
Flat bamboo trellis	84.38b	82.84b	41.55b	71.31b	76.08b	5.43b
Vertical net trellis	87.89a	85.62a	43.32a	74.05a	81.06a	6.00a

In a column mean having common small letter(s) did not differ significantly at 5% level

identical having 83.27% to 85.48% success of fruit setting after hand pollination. Lowest fruit setting was recorded in the genotype TG920604 having 82.46%success of fruit set. Individual fruit length was also influenced by different genotypes. Among the genotypes, TG920722 produced longest fruit (109.21 mm) followed by TG921203, Big tapering and TG921216. Minimum individual fruit length was recorded in TG920624 which was significantly different from all other genotypes. Similar results were also observed by Hossain *et al*. (1987). Highly significant variation among the genotypes in respect of fruit diameter was observed in this study. The genotype Big round produced significantly thicker fruit (45.46 mm) which was statistically identical to that of TG920722. Fruits of the genotype TG920308 had minimum fruit diameter (38.24 mm). In case of single fruit weight TG921203 produced the heaviest fruit weight (95.16 g) which was statistically superior over all other genotypes (Table 1). Minimum individual fruit weight was recorded from TG920308 genotypes. Saha *et al*. (1989) found that individual fruit weight varied due to genotypes. Significant differences were also observed among the genotypes for the number of fruit per plant. The highest number of fruit per plant was recorded in TG920722 (93.22), which was significantly higher than all other genotypes. Saha *et al*. (1989) reported that genotypes had significant influence on fruit number. In case of yield per plant, TG920722 (7.47 kg/plant) genotypes gave highest yield and the second highest yield per plant was obtained from TG921203 (7.17 kg/plant) followed by TG921216 and Big tapering, TG920624 and TG921210 which were significantly different from each other. Such a wide range of variation in yield per plant among the genotypes of teasle gourd was reported by Saha *et al*. (1989) and Hossain *et al*. (1987).

Main effect of trellis on the fruit setting rate, fruit length, fruit diameter, single fruit weight, number of fruit per plant and fruit yield per plant of teasle gourd are given in Table 2. Statistically distinct variations were found among the different types of trellis in success of fruit set. The highest percentage of success was recorded on vertical net trellis (87.67%) and the lowest on upright konchee trellis (82.27%). In case of vertical rope net trellis hand pollination could be performed perfectly and quickly and easier than those of other types of trellis used. Hand pollination was very troublesome and the time consuming in case of upright konchee trellis and flat bamboo trellis. Some of the flowers were not visible at the time of pollination in upright konchee trellis and stick appeared to be dangerous for eyes during pollinating the flowers by hands. Flowers opened around the central areas of flat bamboo trellis were also difficult for pollination as they were out of reach from the side of the trellis. The success of fruit setting in teasle gourd was an agreement with the observations made by Das (1988), Hossain *et al*. (1987) and Islam *et al*. (1992). Different types of trellis (Table 2) also significantly influenced the fruit length and fruit diameter. Maximum fruit length (85.62 mm) was recorded in vertical net trellis followed by flat bamboo trellis (82.84 mm), which were significantly higher than that of upright konchee trellis. Similar trend was also observed in case fruit diameter. Observed variations might be due to uneven sunlight interception in different types of trellis, which might have affected the fruit diameter. Different types of trellis also influenced fruit colour. Deep green fruits were produced on vertical net trellis and pale yellowish green fruits on upright konchee trellis. Individual fruit weight also varied significantly due to the variations of trellis. Maximum fruit weight was recorded on vertical net trellis (74.05 g) followed by the flat bamboo trellis (71.31 g) and upright konchee trellis (67.08 g). In vertical net trellis crops grew better than other trellis might be due to equal and sufficient penetration of sunlight in all parts of the plant. In case of flat bamboo trellis fruits were under the trellis and in

upright konchee trellis fruits were inside the trellis or canopy where high interception was not sufficient. This might be the case of variation in single fruit weight among the types of trellis. Significant variation in fruit number per plant was also observed in different types of trellis. The vertical net trellis encouraged maximum (81.06) fruiting followed by the flat bamboo trellis (76.08) and upright konchee trellis (70.50). The yield of teasle gourd was significantly influenced by different trellis (Table 2). The highest yield was observed that on vertical net trellis (6.00 kg/plant) followed by flat bamboo trellis (5.43 kg/plant) and upright konchee trellis (4.73 kg/plant). These variations indicate that there is enough scope for selecting suitable type of trellis for teasle gourd production. This result was in confirmity with the results presented by Chowdhury *et al*. (1983) in cucurbits. The variations found among the different types of trellis indicated that on vertical rope net the vines creeped successfully which enhance vigorous vegetative growth leading to maximum fruit yield. Photosynthetic activities of the plant grown on vertical net trellis might be higher for producing higher yield. The wide spread teasle gourd plants on the vertical net trellis might had maximum exposure to sunlight and ultimately produced maximum net assimilate which in turn resulted maximum fruit yield.

No significant variation was observed in the interaction effects of genotypes and types of trellis for all the characters studied.

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