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Short Communication

Performance of twelve exotic and local mango germplasm in Chapai Nawabganj region of Bangladesh

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ABSTRACT

Performances of twelve exotic mango germplasm were evaluated with the local in respect of their qualitative and quantitative fruit characteristics at the Regional Horticulture Research Station, Bangladesh Agricultural Research Institute, Chapai Nawabganj, Bangladesh. Germplasm includes Botolbeki, Khirbombai, Bissanath, Gilapirkara, Pukurpar, Carabao, Zalibam, Bogla, Kurpabhog, Lohachur, Baunilata and Madrazi. The heaviest fruit (430.0 g) was produced in Botolbeki followed by Bissanath (295.0 g) while Carabao produced the lightest fruit (103.3 g). The highest edible portion (70.4%) was obtained from Botolbeki while the lowest edible portion was found in Khirbombai (50.0%). The TSS was recorded maximum (23.3%) in Lohachur closely followed by Carabao (22.6%) whereas minimum TSS (14.2%) was found in Bissanath. The highest number of fruits (61) was obtained from Carabao and the highest yield (20.23 kg) as well as the highest fruit length (10.9 cm), breadth (8.7 cm) and thickness (7.5 cm) were found in Botolbeki whereas the lowest yield was found in Gilapirkara (1.41 kg). Considering fruit and stone characteristics, yield and edible portion Botolbeki followed by Bissanath, Pukurpar, and Kurpabhog found superior. Among the germplasm, Lohachur, Gilapirkara and Carabao has greater sweetness having very lower fruit yield. Four germplasm namely Botolbeki, Bissanth, Pukurpar and Kurpabhog can be further studied for variety release.

Introduction

Mango (*Mangifera indica* L.) is the most popular fruit of Bangladesh. It has many uses and importance for its high food value, great utility, characteristic flavor, pleasant aroma and delicious tastes. It contains appreciable quantity vitamins A and C, soluble sugars and minerals which are readily available and easily assimilable in human body (Samad et al., 1975). Perhaps no other fruit in the tropical and sub-tropical countries compares with mango and on this account mango has rightly been popularly called the king of fruits in Indo-Pak, sub-continent. In Bangladesh, now it occupies an area of 27,466 hectares of land with an annual production of 8,89,176 metric tons (BBS, 2012).

Although the commercial mango varieties in Bangladesh namely Gopalbhog, Langra, Khirshapat and Fazli have excellent fruit quality but none of them possess many others desirable characters, such as regular bearing, dwarfness, tree size and attractive skin color. But some local varieties possess the above characteristics having lower yield. Introduction is one of the methods of varietal development. Hence, varietal development program through introduction has been designed to develop regular bearing, high yielding and good quality mango variety. Regional Horticulture Research Station, Chapai Nawabganj of Bangladesh Agricultural Research Institute has already collected 42 exotic germplasm of mango from different sources (Bhuyan, 2004). Therefore, the present study was undertaken to study the performance of 12 exotic and local germplasm under Chapai Nawabganj condition.

Materials and methods

Experimental location

The experiment was carried out at the Regional Horticulture Research Station, Chapai Nawabganj.

Plant materials

Twelve mango germplasm such as Botolbeki, Khirbombai, Bissanath, Gilapirkara, Pukurpar, Carabao, Zalibam, Bogla, Kurpabhog, Lohachur, Baunilata and Madrazi were included in the study.

Cultivation procedure

The experiment was laid out in randomized complete block design with three replications. Three trees of each germplasm of same age were selected. A single uniform tree of each germplasm constituted the unit replication. The plants were fertilized as per schedule described by Hossain (1989a). Intercultural operation such as weeding, ploughing, irrigation and spraying of insecticides and fungicides were done as when necessary. Ripcord 10 EC @ 1 ml and Dithane M-45 @ 2 g per litre of water with the help of a power sprayer, first at panicle stage and the second at pea stage of fruits were applied to control mango hoppers and anthracnose as per recommendation of Hossain (1989b).

Data collection and statistical analysis

Five well matured fruits of each germplasm were harvested randomly from each tree for recording data on physico-chemical characteristics. The collected data of various parameters were statistically analyzed using the CropStat7.2 software programme following the appropriate design of experiment (Russel, 1986).

Results and Discussion

Fruit characteristics of twelve exotic and local mango germplasm

The qualitative and quantitative characteristics of the mango germplasm were varied greatly. A wide range of variability was observed among various germplasm under study in respect of different parameters. The fruit quality mainly differed in terms of fruit weight and flesh thickness (Table 1). The highest fruit weight (430.0 g) was observed in Botolbeki and the lowest fruit weight (103.3 g) was found in Carabao. In another study, Uddin et al., (2007) reported higher range of fruit weight from 121.40 to 637.40 g. Therefore, the present study indicates no major variation of yield from exotic varieties. Result indicates that the germplasm Khirbombai, Bissanath, Gilapirkara, Pukurpar, Bogla, Kurpabhog, and Lohachur produced comparatively higher fruit weight while germplasm Carabao, Zalibam, Baunilata, and Madrazi produced lower fruit yield the average yield of our modern mango varieties. Fruit size and fruit breadth did not vary among the germplasm studied. The length of mango furit harvested from all the germplasm were 9.8-10.9. Botolbeki has the highest fruit size in terms of length (10.9 cm), breadth (8.7 cm) and thickness (7.5 cm) while the lowest breadth (8.4 cm) as well as thickness (3.9 cm) was found in Carabao.

Stone characteristics of twelve exotic and local mango germplasm

Fruits edible flesh depends on the stone weight and size indicate a very important fruit quality character. Stone characteristics are found to be different in the studied germplasm (Table 2). Stone weight ranged from 20.0-53.0 g in the studied germplasm, where Lohachur has maximum stone weight (53.0 g) and the minimum stone weight (20 g) found in Carabao followed by Madrazi (26.0 g). Among the germplasm, eight has greater stone weight over 40 g and other four (Carabao, Zalibam, Baunilata and Madrazi) has stone weight under 40 g indicating higher edible portion although fruit weight was lower in these germplasm. Sotne length varied greatly among the germplasm collected and it was longest in Botolbeki (8.8 cm) and shortest in Zalibam (6.1 cm). In case of stone breadth Botolbeki and Bissanath had highest breadth of 5.0 cm while Carabao had lowest breadth of 2.8 cm. Stone thickness also different greatly among the germplasm and it was ranged from 1.5-3.8 cm.

Yield and other fruit characteristics of twelve exotic and local mango germplasm

Number of fruits per tree of different germplasm was varied from 6.0 to 61.0 (Table 3). The highest number of fruits was recorded from Carabao (61.0) followed by Bissanath (55.0) whereas Gilapirkara produced the lowest number of fruits (6.0) per tree followed by Lohachur (7.0). Wide variation was observed in case of yield of mango among the germplasm. The highest yield was observed in Botolbeki while the lowest yield was found in Gilapirkara. The highest yield (20.23 kg) as well as the highest length (10.9 cm), breadth (8.7 cm) and thickness (7.5 cm) were found in Botolbeki whereas the lowest yield was found in Gilapirkara (1.41 kg) (Table 1 & 3). Botolbeki obtained maximum edible portion (70.4%) followed by Bissanath (66.1%) while Khirbombai germplasm had minimum edible portion (50.0%). This result shows the similarity with Bhuyan & Kobra (2007) where it ranged from 45 to 76% edible portion. Maximum soluble sugar content was obtained from Lohachur (23.3%) closely followed by Carabao (22.6%) while minimum was found in Bissanath (14.2%). In case of sweetness of mango, the present study showed similarities with the results (13.7 to 20.9%) obtained from study conducted by Hossain et al. (2002).

Table 1. Fruit characteristics of twelve exotic and local mango germplasm grown at Regional Horticulture Research Station, Chapai Nawabganj.

Germplasm	Fruit weight (g)	Fruit size (cm)		
		Length	Breadth	Thickness
Botolbeki	430.0	10.9	8.7	7.5
Khirbombai	220.0	10.2	8.0	6.1
Bissanath	295.0	10.6	8.6	6.7
Gilapirkara	235.0	10.1	8.2	5.3
Pukurpar	253.0	10.4	8.5	6.3
Carabao	103.3	10.4	7.4	3.9
Zalibam	156.6	10.0	7.9	5.2
Bogla	210.0	9.8	8.1	6.2
Kurpabhog	216.6	10.2	8.2	6.2
Lohachur	220.0	10.6	7.9	5.5
Baunilata	166.6	10.0	8.0	5.9
Madrazi	133.3	10.0	7.6	5.2
LSD (5%)	6.19	0.94	1.08	0.14
LSD (1%)	8.75	1.33	1.52	0.20
[z]Level of Significance	**	NS	NS	**

[z]Means within column followed by same letters are non-significant according to the Duncan's Multiple Range Test at P < 0.05, ns: non-significant, **Significant at P <0.001.

Table 2. Stone characteristics of twelve exotic and local mango germplasm grown at Regional Horticulture Research Station, Chapai Nawabganj.

Germplasm	Stone weight (g)	Stone size (cm)		
		Length	Breadth	Thickness
Botolbeki	45.0	8.8	5.0	2.1
Khirbombai	50.0	7.8	4.2	2.0
Bissanath	45.0	7.4	5.0	1.9
Gilapirkara	50.0	6.8	3.9	3.8
Pukurpar	50.0	7.7	3.9	2.4
Carabao	20.0	7.6	2.8	1.5
Zalibam	36.0	6.1	3.3	1.5
Bogla	40.0	6.3	4.6	2.1
Kurpabhog	43.0	6.9	3.9	2.1
Lohachur	53.0	8.6	3.8	2.5
Baunilata	33.0	6.5	3.6	2.3
Madrazi	26.0	7.0	3.2	1.9
LSD (5%)	3.45	0.2	0.63	0.14
LSD (1%)	4.88	0.29	0.89	0.2
[z]Level of Significance	**	**	**	**

[z]Means within column followed by same letters are non-significant according to the Duncan's Multiple Range Test at P < 0.05, ns: non-significant, **Significant at P <0.001.

Table 3. Yield and other fruit characteristics of twelve exotic and local mango germplasm grown at Regional Horticulture Research Station, Chapai Nawabganj.

Germplasm	No. of fruits/ plant	Yield/ plant (kg)	Edible portion (%)	TSS (%)
Botolbeki	47.0	20.23	70.4	15.0
Khirbombai	44.0	9.68	50.0	17.0
Bissanath	55.0	16.21	66.1	14.2
Gilapirkara	6.0	1.41	53.9	19.7
Pukurpar	53.0	13.42	57.8	19.7
Carabao	61.0	6.32	54.8	22.6
Zalibam	14.0	2.20	51.1	16.6
Bogla	25.0	5.25	60.3	15.0
Kurpabhog	53.0	11.48	58.5	15.0
Lohachur	7.0	1.54	56.1	23.3
Baunilata	18.0	2.99	58.0	17.0
Madrazi	16.0	2.13	60.1	17.0
LSD (5%)	1.48	0.69	0.73	1.43
LSD (1%)	2.09	0.97	1.03	2.02
[z]Level of Significance	**	**	**	**

[z]Means within column followed by same letters are non-significant according to the Duncan's Multiple Range Test at P < 0.05, ns: non-significant, **Significant at P <0.001.

Conclusion

Considering fruit and stone characteristics, yield and edible portion Botolbeki followed by Bissanath, Pukurpar, and Kurpabhog found superior. However, germplasm Lohachur, Gilapirkara and Carabao has greater sweetness having very lower fruit yield. Therefore, four germplasm namely Botolbeki, Bissanth, Pukurpar and Kurpabhog can be further studied for variety release.

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