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Per se Performance of Pumpkin Genotypes (*Cucurbita moschata* Duch.Ex. Poir.)

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Abstract Evaluation of ten pumpkin genotypes collected from various sources was carried out. Observations were recorded on the following traits viz. vine length at 90 days after sowing, days to first female flower appearance, node number for first female flower appearance, sex ratio, days to fruit harvest, number of fruits per vine, average fruit weight, fruit diameter, number of seeds per fruit, 100 seed weight and fruit yield per vine along with quality traits such as flesh thickness and total soluble solids. Among the genotypes, KP-41 followed by KP-25 and KP-2 recorded the highest mean value of fruit yield.

Keywords Pumpkin, Genotypes, *Per se* performance.

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Introduction

Pumpkin (*Cucurbita moschata* Duch. Ex. Poir.) is one of the most important cucurbitaceous vegetable crop grown throughout India under wide range of agro climatic conditions and is known for its high carotene content in the fruit. In our country, a wide range of variability in vegetative and fruit characters is available in pumpkin. But very little attention has been paid for its genetic improvement. Selection of high yielding types with desired quality attributes is very essential to meet the growing need of yield and quality enhancement. This could be achieved through several improvement programs. Evaluation or screening of germplasm is the first step in any improvement program to select high yielding types with all desirable attributes. Hence, the present study was undertaken with an objective of selecting high yielding types of pumpkin.

Materials and Methods

The experiment was conducted at the Vegetable Sci-

Table 1. Details and source of genotypes.

Sl. No.	Genotypes	Source
1.	KP-2	Kittur Rani Channamma College of Horticulture, Arabhavi.
2.	KP-25	Kittur Rani Channamma College of Horticulture, Arabhavi.
3.	KP-33	Kittur Rani Channamma College of Horticulture, Arabhavi.
4.	KP-39	Kittur Rani Channamma College of Horticulture, Arabhavi.
5.	KP-41	Kittur Rani Channamma College of Horticulture, Arabhavi.
6.	KP-53	Kittur Rani Channamma College of Horticulture, Arabhavi.
7.	Belagavi Local	Kittur Rani Channamma College of Horticulture, Arabhavi.
8.	Arka Chandan	Indian Institute of Horticultural Research, Bengaluru
9.	Pusa Vikas	Indian Agricultural Research Institute, New Delhi
10.	Pusa Vishwas	Indian Agricultural Research Institute, New Delhi

ence unit of Kittur Rani Channamma College of Horticulture, Arabhavi, Belagavi District (Karnataka), during 2011-12 with ten genotypes from diverse sources. The details and source of genotypes has been given in the Table 1. These plants are raised in randomized block design (RBD) replicated twice with ten plants in each replication following a spacing of $2 \times 1 m^2$. Recommended package of practices of University of Agricultural Sciences, Dharwad was followed to grow a successful crop of pumpkin [1]. Observations were recorded on vine length at 90 days after sowing, days to first female flower appearance, node number for first female flower appearance, sex ratio, days to first fruit harvest, number of fruits per vine, fruit diameter, average fruit weight, fruit length, number of seeds per fruit, 100 seed weight and fruit yield per vine along with quality traits such as flesh thickness and total soluble solids of the fruit. The data were subjected to statistical analysis to obtain information on the mean performance.

Results and Discussion

Development of high yielding genotypes of crops requires information about the nature and magnitude of variability present in the available genotypes and depends on judicious assessment of available data on phenotypic characters that are connected with yield. Hence, ten pumpkin genotypes were evaluated for growth, earliness quality and yield attributes (Table 2). Among the pumpkin accessions, the highest mean value of fruit weight was recorded by the accession KP-41 (4.47 kg) followed by Belagavi Local (4.16 kg). Though the fruit number per vine is an important trait, in recent days preference is more for small to medium sized fruits. In the present study, the accessions, KP-33 (2.38 kg) and KP-25 (3.28 kg) registered comparatively lesser fruit weight in favorable direction. Earlier results recorded [2] in ridge gourd also confirmed the relationship with less fruit weight and high yield favorably. The data on vine length at 90 days after sowing indicated that among the seven genotypes, the accession KP-39 (4.98 m) recorded the longest vine length followed by the accession KP-33 which recorded 4.61 m. Similar to these results [3] also identified the highest mean performance for vine length in the line CM-12 of pumpkin genotype.

In general, earliness in cucurbits is measured as the days taken for first female flower appearance, node number for first flower appearance and days to first fruit harvest are considered as desirable traits in any hybrid development program. In the present study, minimum number of days taken for first female flower appearance and node number for first female flower appearance was observed in the genotype Pusa Vishwas (48.20 days) followed by Arka Chandan (48.70 days) (for less days taken for first female appearance) and Belagavi Local (17.70) followed by KP-41 (18.23) for less node number for first female flower appearance, which could be adjudged as the best parents for development of pumpkin hybrids with earliness. Similar results were also obtained [4] in bottle gourd for earliness. Eastimation of sex ratio is highly essential for cucurbits which indicate the ability of the crop to set fruits. Evaluation of genotypes with mean performance revealed that the accession KP-25 (7.74) followed by Pusa

Table 2. Mean performance of pumpkin genotypes for yield and quality traits. DAS - Days After Sowing.

Genotypes	Vine length at 90 DAS (m)	Number of days to first female flowering	Node number to first female flower	Days to first fruit harvest	Sex ratio	Number of fruits per vine	Average fruit weight (kg)	Fruit length (cm)	Fruit diameter (cm)	Number of seeds per fruit	100 seed weight (g)	Flesh thickness (cm)	Total soluble solids (°Brix)	Fruit yield per vine (kg)
KP-2	3.36	51.20	20.00	98.50	9.81	2.41	3.53	19.70	16.62	182.40	9.85	3.39	4.04	8.53
KP-25	3.49	56.00	20.30	105.30	7.74	2.79	3.28	23.86	16.58	239.10	9.34	3.94	3.79	9.06
KP-33	4.61	62.20	21.00	92.70	10.28	2.07	2.38	19.66	16.15	299.70	9.17	3.50	3.63	5.16
KP-39	4.98	56.00	20.31	93.70	11.03	1.29	3.12	23.53	17.58	229.60	12.48	3.97	4.85	4.93
KP-41	3.66	55.00	18.23	93.90	10.30	2.57	4.47	26.49	17.69	319.40	13.93	4.22	4.60	10.98
KP-53	3.67	55.60	23.19	101.20	10.82	1.43	4.07	18.90	16.79	191.10	10.88	3.35	3.38	5.33
Belagavi Local	4.20	65.40	17.70	99.10	10.80	1.45	4.16	22.85	19.25	197.20	13.61	4.49	4.30	6.71
Arka Chandan	3.80	48.70	22.72	94.40	11.05	1.30	2.51	18.92	13.87	163.40	7.87	3.27	5.32	3.62
Pusa Vikas	4.39	49.10	21.04	101.10	9.22	1.00	2.43	18.83	17.08	210.90	9.42	3.49	3.96	3.49
Pusa Vishwas	4.11	48.20	20.01	98.80	9.76	1.10	3.35	19.07	17.96	242.60	9.49	3.28	3.35	3.36
SEm±	0.26	2.03	1.00	2.68	0.90	0.23	0.53	0.92	0.69	16.62	0.57	0.21	0.33	0.52
CD at 5%	0.74	5.84	2.89	7.74	2.61	0.68	1.54	2.65	1.99	47.65	1.65	0.61	0.97	1.49
CD at 1%	1.00	7.86	3.89	10.41	3.50	0.92	2.07	3.56	2.67	64.11	2.22	0.82	1.30	2.01
CV (%)	8.97	5.47	6.97	3.83	8.21	17.33	19.34	6.43	5.67	9.89	7.54	8.36	11.32	8.61

Vikas (9.22) and Pusa Vishwas (9.76) recorded desirable sex ratio (low values). Reported similar results [5] of lowest sex ratio in bitter gourd. The days to first fruit harvest is yet another indicator of the earliness especially in hybrid vegetables which could fetch premium price and catch the early market. The accession KP-33 (92.70 days) followed by KP-39 (93.70 days) and KP-41 (93.90 days) recorded the lowest favorable *per se* values among the pumpkin genotypes of study. Higher the fruit number more will be the yield. In this study, the accession KP-25 (2.79) followed by KP-41 (2.57) and KP-41 (2.41) recorded the highest *per se* value for this trait. Similar findings were reported [2] in ridge gourd for higher fruit number per vine. Cylindrical shape pumpkin is novel type and preferable for easy packing, transport and display in the market. Among the ten genotypes of pumpkin, the accessions Belagavi Local (19.25 cm) and Pusa Vishwas (17.96 cm) recorded favorable *per se* values of maximum fruit diameter. These results were supported by the earlier findings [6] in pumpkin lines CM16 and CM81. Pumpkin fruit flesh as powder is now valued as industrial product for nutrient supplement. Fruit flesh thickness is a desirable quality trait in pumpkin. Among the 10 lines of pumpkin, the accessions Belagavi Local (4.49 cm) and KP-41 (4.22 cm) recorded the highest *per se* value for fruit flesh thickness. Similar findings were made [6] in pumpkin genotypes CM23 and CM67 respectively. Fruits with more number of seeds are a preferable trait in hybrid vegetables which could increase revenue during hybrid seed production.

Seed number per fruit was the highest in the accessions KP-41 (319.40) and KP-33 (299.70) among the genotypes. Pumpkin seeds are good source of protein. Tribal people consume pumpkin seeds as roasted one. In pumpkin fruits with more seed weight is preferred. Observation on 100 seed weight of ten genotypes of present study revealed that the accession KP-41 (13.93 g) and followed by the accession Belagavi Local (13.61 g) recorded the highest *per se* value for this trait.

Like ash gourd, pumpkin fruits are also utilized for preparing special kind of sweets. Estimation of total soluble solids content among the ten pumpkin genotypes showed that the accession Arka Chandan (5.32 °Brix) recorded the highest *per se* value for

total soluble solids content followed by the accession KP-39 (4.85 ^{0}Brix). Hence the parents Arka Chandan and KP-39 could be utilized to develop hybrids with more total soluble solids content. These results were supported by the findings [2] in ridge gourd line IC413577 and the tester IC 362481. Analysis of fruit yield per vine would be useful in the selection of parents as a source of breeding material for development of better hybrids. Among the ten genotypes of pumpkin the accessions KP-41 (10.98 kg) followed by KP-25 (9.06 kg) recorded high *per se* values of fruit yield per vine.

Conclusion

Selection of parents with the highest fruit yield is the primary objective in any hybrid development program. Based on the present study, among the ten pumpkin genotypes, the accession KP-41recorded the highest mean value of fruit yield (10.98 kg per vine) followed by KP-25 with the highest mean fruit yield of 9.06 kg per vine. Further the accessions KP-2 (8.53 kg per vine) and Belagavi Local (6.71 kg per vine) also recorded higher values of fruit yield per vine. Further these lines viz., KP-41, KP-25 and KP-2 could be adjusted as the ideal donor for yield as it proved its potential to serve as the best parents for earliness and fruit number per vine. This study clearly indicated that favorable varieties could be developed with earliness, more number of fruits per vine, more flesh thickness coupled with fruit length in pumpkin.

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