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Correlation Studies in Muskmelon for Growth, Yield and Quality Attributes

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ABSTRACT

The performance of muskmelon hybrids under northern dry zone of Karnataka was carried out in experimental block of university of horticultural sciences, Bagalkot. In this research growth, yield and quality parameters were analysed for 8 muskmelon hybrids with one commercial check and also the correlation among the parameters are estimated for sixteen different growths, yield and quality attributing characters. Vine length, number of branches per plant and number of leaves per plant are having positive association with number of fruit per plant and total sugars. Vitamin C is negatively associated with vine length, number of branches per plant and number of leaves per plant, fruit weight flesh thickness and yield. Fruit weight and yield negatively correlated with node to first flowering, days to first female flower and sex ratio. Vitamin C is negatively associated with total sugars, where the total sugars highly positive significant with total soluble solids (^{0} Brix).

Key words: *Muskmelon, Correlation, Quality, Hybrids.*

INTRODUCTION

Cucumis melo L. (Reticulatus group) commonly called as cantaloupe or muskmelon is a member of the family *Cucurbitaceae*[1]. Melon was first domesticated in Egypt and Iran during the second and third millennium BC[5]. The main centre of diversity is located in Asia, from the Mediterranean basin (Turkey) to Central Asia (Iran, Uzbekistan) to India to East Asia[6].

Muskmelon is gaining lot of importance due to its short duration, high production potential with high nutritive value, taste, delicacy and also its suitability for cultivation under rainfed and irrigated conditions almost throughout the year. In India, it is extensively cultivated in hot and dry areas of Uttar Pradesh, Punjab, Rajasthan, Madhya Pradesh, Bihar and Karnataka.

Though muskmelon is most nutritious, its productivity is very low as compared to other vegetable fruits in India. This may be due to pre-mature flower drop, lack of initiation of more female flowers in proportion to male flowers, inadequate source-sink relationship and poor translocation of photo-assimilates at later stages of crop growth. Although, the average potential yield of melons is 60 t/ha, the actual yield of muskmelon ranges from 12.5–20.0 t/ha depending on the management practices[4]. This gap certainly indicates that there is a great scope for improving the productivity by using suitable varieties and hybrids. The lack of knowledge about the relationship among the characters associated with growth, yield and quality can be overcome by correlation studies. The muskmelon crop can be easily identified with the positively significant characters by the correlation estimates and thereby improvement and development of the crop should be done.

With respect to this crop the correlation study reveals that yield per plant has been reported to be positively correlated with the number of fruits, average fruit weight[10]. Fruits per vine and fruit weight were positively correlated with yield and they were considered as selection parameters for yield. The main aim of this research is to find out the association of characters with the attributing parameters using simple correlation studies.

MATERIAL AND METHODS

The investigation was carried out at the Research Block, Department of Vegetable Science, College of Horticulture, Bagalkot during *rabi* 2012-13. The material and methods adopted during the course of study was eight muskmelon hybrids *viz.,* T_1: Tamanna, T_2: Kunadan, T_3: NS-7455, T_4: Golden Glory, T_5: Natalya, T_6: NUN-0001, T_7: NS-910, T_8: NUN-1002 and one variety as a check T_9: Arka Jeet.

The experiment was laid out in Randomized block design with above nine treatments with plot size of 7.5 m X 5.0 m and each treatment consist of 15 plants out of them 5 plants are randomly selected representative

sample for observations, the recorded data analysed to estimate correlation between the 16 characters includes growth, yield and quality. The collected data was pooled and analysed statistically as described by Sunder Raj *et al*[7].

Characters for correlation studies and their range: 1:Vine length (74.40 to 160.20cm); 2:Number of branches/plant (4.23 to 7.80); 3:Number of leaves/plant (70.00 to 158.46); 4:Node to first flowering (2.53 to 3.66); 5:Days to first female flower (27.66 to 33.86); 6:Sex ratio (1.55 to 3.57); 7:Number of fruit per plant (2.83 to 4.86); 8:Fruit weight (300.80 to 863.13 g); 9:yield (12.04 to 34.52 t/ha); 10:Flesh thickness (15.70 to 24.93 mm); 11:Cavity size(4.15 to 7.17 cm); 12:Seeds per fruit (269.73 to 493.40); 13:Total sugars (47.43 to 51.73 mg/100g); 14Vitamin C (20.13 to 24.76 mg/100g); 15:β-carotene (11.93 to 17.86 IU); 16:TSS(11.73 to 13.53 ^{0}Brix).

RESULT AND DISCUSSION

Correlation coefficients worked out among different growth, yield and quality parameters in muskmelon are presented in Table 1.

Vine length had highly positive significant correlation with number of branches per plant (0.913), number of leaves per plant (0.936), significant correlation with total sugars (0.734) and it was negatively correlated with days to first female flowering (-0.748). The number of branches per plant had highly significant correlation with number of leaves per plant (0.956), number of fruit per plant (0.821), total sugars (0.855) and TSS (0.811) content. On other hand it had negative correlation with days to first female flowering (-0.756) and seeds per fruit (-0.675). These results are on par with the findings of Taha *et al*[8]., in melon, Kumar *et al*[2]., in sponge gourd and Tamil selvi *et al*[9]., in pumpkin.

Number of leaves showed highly significant correlation with number of fruits per plant (0.842), total sugar content (0.829) and significant correlation with TSS content (0.728). Whereas, highly negative correlation with days to first flowering (-0.833), seeds per

fruit (-0.737) and vitamin C content (-0.741). These results are in conformity with the results of Taha *et al*[8]., in melon, Kumar *et al*[2]., in sponge gourd, Tamil selvi *et al*[9]., in pumpkin

and Naroui Rad *et al*[3]., in fluted pumpkin.

The character days to first female flowering shows significant positive correlation with vitamin C content (0.691) and it has significant negative association with number of fruits per plant (-0.769) and total sugar content (-0.695). Total sugar content shows significant positive association with number of fruits per plant (0.670) and significant negative association with seeds per fruit (-0.749). Similar results were obtained by Taha *et al*[8]., in melon, Kumar *et al*[2]., in sponge gourd, Tamil selvi *et al*[9]., in pumpkin and Naroui Rad *et al*[3]., in fluted pumpkin.

Fruit weight has highly positive significant correlation with total yield (0.986), whereas, total yield has significantly positive

correlation with β-carotene content (0.692). Negative association was observed with cavity size (-0.863) and vitamin C content. These results were confirmed with the results of Tamil selvi *et al*[9]., in pumpkin and Naroui Rad *et al*[3]., in fluted pumpkin.

The character cavity size shows significant positive correlation with vitamin C content (0.778) and significant negative association with total sugars (-0.698). Similar results were obtained by Taha *et al*[8]., in melon and Kumar *et al*[2]., in sponge gourd.

Total sugar content shows highly positive significant correlation with TSS (0.955) content and highly negative correlation with vitamin C content (-0.939). Vitamin C content shows only high significant negative correlation with TSS content (-0.931). These results are in accordance with the results of Taha *et al*[8]., in melon, Kumar *et al*[2]., in sponge gourd and Tamil selvi *et al*[9]., in pumpkin.

Table 1: Correlation coefficients among the different growth, yield and quality attributes of muskmelon hybrids

@	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1.000	0.913**	0.936**	0.162	-0.748*	-0.406	0.831**	0.377	0.397	0.551	-0.406	-0.620	0.734*	-0.662	0.366	0.621
2		1.000	0.956**	0.257	-0.756*	-0.337	0.821**	0.423	0.294	0.378	-0.530	-0.675*	0.855**	-0.698*	0.443	0.811**
3			1.000	0.359	-0.833**	-0.463	0.842**	0.290	0.291	0.459	-0.522	-0.737*	0.829**	-0.741*	0.385	0.728*
4				1.000	-0.283	-0.288	0.167	-0.317	-0.323	-0.178	0.052	-0.339	0.013	-0.035	0.210	0.042
5					1.000	0.506	-0.769*	-0.426	-0.377	-0.399	0.548	0.455	-0.695*	0.691*	-0.616	-0.583
6						1.000	-0.584	-0.319	-0.313	0.215	0.625	0.261	-0.256	0.327	-0.324	-0.154
7							1.000	0.245	0.135	0.134	-0.412	-0.749*	0.670*	-0.597	0.281	0.630
8								1.000	0.986**	0.441	-0.663	0.295	0.481	-0.647	0.652	0.373
9									1.000	0.461	-0.863**	0.294	0.491	-0.657	0.692*	0.393
10										1.000	-0.084	-0.182	0.454	-0.316	0.069	0.258
11											1.000	0.128	-0.698*	0.778*	-0.543	-0.608
12												1.000	-0.594	0.356	0.235	-0.571
13													1.000	-0.939**	0.404	0.955**
14														1.000	-0.663	-0.931**
15															1.000	0.422
16																1.000

* &**indicate significance at p=0.05 and p=0.01 respectively

Characters; 1: Vine length ; 2:Number of branches/plant; 3:Number of leaves/plant; 4:Node to first flowering; 5:Days to first female flower; 6:Sex ratio; 7:Number of fruit per plant; 8:Fruit weight; 9:yield (t/ha); 10:Flesh thickness (mm); 11:Cavity size(cm); 12:Seeds per fruit; 13:Total sugars(mg/100g); 14Vitamin C(mg/100g); 15:β-carotene; 16:TSS(^{0}Brix).

CONCLUSION

Number of leaves showed highly significant correlation with number of fruits per plant and vein length is positively associated with number of branches per plant and number of fruit per plant, increasing vein length maybe due to the higher photosynthetic rate. Hence these main growth parameters can have considered for the further selection in crop improvement program. In this selection of one character translate to improvement of other because of their mutual relationship of characters.

REFERENCES

1. Bailey, L.H. and Bailey, E.Z., Hortus Third. Macmillan Pub. Co. New York (1976).
2. Kumar, R., Ameta, K.D., Dubey, R.B. and Pareek, S., Genetic variability, correlation and path analysis in sponge gourd (*Luffa cylindrica* Roem.) *African J. Biotec.*, **12(6):** pp. 539-543 (2013).
3. Naroui Rad, M.R., Allahdoo M. and Fanaei, H.R., Study of some yield traits relationship in melon (*Cucumis melo* L.) germplasm gene bank of Iran by correlation and factor analysis. *Trakia J. Sci.*, **8(1):** 27-32 (2010).
4. Nempalsingh, M., Bhardwaj, A.K., Abnish Kumar, and Singh, K.M., Modern technology on vegetable production. International Book Distributing Company., Lucknow, India, pp. 235-241 (2004).
5. Pangalo, K.J., Critical review of the main literature on the taxonomy, geography and origin of cultivated and partially wild melons. Trendy Prikl Bot., 23:397-442 (1929).
6. Robinson, R.W. and Decker-Walters, D.S., Cucurbits. CAB International, Oxon (GB), 226 (1997).
7. Sunder raj, N., Nagaraju, S., Venkataramu, M.N and Jaganath, M.K., Design and analysis of field experiments. M.Sc. Series No. **22:** *Univ. Agril. Sci..*, Bangalore (1972).
8. Taha, M., Omara, K. and El Jack, A., Correlation among Growth, Yield and Quality Characters in *Cucumis melo* L. *Cucurbit Genetics Cooperative Report,* **26:** 9-11 (2003).
9. Tamil selvi, N.A., Jansirani, P., Pugalendhi L., and Nirmalakumari A., *Per se* performance of genotypes and correlation analysis in Pumpkin (*Cucurbita moschata* Duch.ex Poir) *Electronic J. Plant Breed.,* **3(4):** 987- 994 (2012).
10. Vijay, O.P., Genetic variability, correlation, and path-analysis in muskmelon (Cucumis melo L.). *Indian J. Hort.*, **44:** 233-238 (1987).