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Correlation Studies of Mesta (*Hibiscus subdariffa L.)* of Two Seasons in a Location

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ABSTRACT

As days have been come to utilize eco-friendly fibre, fibre yielding crops has replaced the present need of human livelihood. Mesta (*Hibiscus subdariffa Linn*.) is known as the most important fibre yielding crop next to jute. Keeping all these views in mind and to solve the burning problem of the hour we have under taken a research programme on high yielding national recommended best ten cultivars of mesta viz. (i) RIN-003, (ii) RIN-301, (iii) RIN -322, (iv) RIN-92, (v) RIJ - 19, (vi) RIJ - 69, (vii) RIJ – 82, (viii) REX -55, (ix) REX – 57 and (x) REX – 49 in our location. Seeds were collected from Central Research Institute for Jute and Allied Fibres (CRIJAF), Saheb Kuthi, Nilgunje, Barrackpore, Kolkata in the month of March, 2011 for the programme. The seeds were grown in the research field of the Crop Research Farm (CRF), Department of Botany of this University following Randomized Block Design (RBD) in 4 replications in the month of March2011 and there after May 2012. Uniform agronomical measures were provided for uniform growth and development of the crop .Observing morphological peculiarities , various metrical characters were observe and recorded all the data for further calculation out of all only 5 metrical characters viz, (i) Plant height, (ii) Branch plant-1 (no), (iii)Leaves plant-1 (no), (iv)Basal girth (cm) and (v) Leaf area (cm) were considered for the correlation study following Panse and Sukhatme model (1954). Considering bi-variate data (i) Plant height vs branch/Plant-1, (ii) Plant height vs Leaf Plant-1 , (iii) Plant height vs basal girth and (iv) Plant height vs Leaf area (cm2) were calculated for exhibiting qualitative and quantitative aspect for this context. The aims and objects of this study were to explore the correlation of phenotypic characters and to study the comparison of genotypic potentiality in this Location.

Keywords: Eco friendly, next to jute, location, correlation study, genotypic potentiality.

1. INTRODUCTION

Roselle (*Hibiscus sabdariffa*) belongs to the family Malvacea. It is an annual herb cultivated for itsleaves, stem, seed and calyces [Umerchuruba C I, 1997]. The crop is native to India but was introduced to other parts of the world such as Central America, West Indies and Africa. It is best grown in tropical and sub-tropical regions. The physico-chemical characteristics of Roselle was studied and it was characterized as a highly acidic fruit with low sugar content. Succinic acid and oxalic acid were quantified as two predominant organic acids in Roselle. Roselle was found to contain higher amount of ascorbic acid compared to orange and mango [Wong et al, 2002].

A hundred gram serving of frozen roselle would supply 100 percent of current RDA (20 mg/day). It was found to be a fair source of vitamin A [Holden et al, 1999]. It is also rich in riboflavin, niacin, calcium and iron [Qi,Y,et al,2005,Babalola et al,2000]. It also contains antioxidants including flavonoids, gossypetine hibiscetine and sadderetine. Some of the anthocyanins of roselle identified by chromatographic process include delphinidin-3-sambubioside, cyaniding-3-sambubioside and delphinidin-3-glucose [Hong et al, 1990]. Many parts of roselle are of value. The young leaves are eaten as cooked vegetables especially with soup.

The seeds are pounded into meal which is used as oily soup or sauce after roasting. Oil extracted from the seed is a substitute for castor oil while the residue is used in a fermented form as soup or cake [Aliyu, L, 2000]. In countries like India, roselle calyces are utilized in producing refreshing beverages, jellies, jam, sauces and food preserves [Clydescale et al, 1979]. In Nigeria, the dried roselle calyces are prepared into a refreshing drink called ‘zobo’. The

drink is becoming popular because it is easily processed at home and served chilled, packaged in plastic bottles or polythene films. It serves as income generation source for many women.

The roselle is known as the *rosella* or *rosella fruit* in Australia. It is also known as 'Belchanda' among Nepalese, *Tengamora* among Assamese and "mwitha" among Bodo tribals in Assam, *Chukor* in Bengali, *Gongura* in Telugu, *Pundi* in Kannada, *Ambadi* in Marathi, LalChatni or Kutrum in Mithila] *Mathipuli* in Kerala, *chin baung* in Burma, *KraJiab Daeng* in Thailand, *som phor dee* in Lao PDR, *bissap* in Senegal, Guinea Bissau, Mali, Burkina Faso, Ghana, Benin and Niger, the Congo and France, *dah* or *dah bleni* in other parts of Mali, *wonjo* in the Gambia, *zobo* in western Nigeria (the Yorubas in Nigeria call the white variety Isapa (pronounced Ishapa)), Zoborodo in Northern Nigeria, *Chaye-Torosh* in Iran, *karkade*, Arabic pronunciation: [ˈkarkade]); in Egypt, Saudi Arabia, and Sudan, *omutete* in Namibia, *sorrel* in the Caribbean and in Latin America, *Flor de Jamaica* in Mexico, *Saril* in Panama, *grosella* in Paraguay, *rosela* in Indonesia, *asam belanda*[1] in Malaysia. In Chinese it is *en Hua*) . In Zambia the plant is called *lumanda* in ciBemba, *katolo* in kiKaonde, or *wusi* in chiLunda.

2. MATERIALS AND METHODS

Ten genotype of high yielding national recommended best cultivars of mesta viz. (i) RIN-003, (ii) RIN-301, (iii) RIN -322, (iv) RIN-92, (v) RIJ - 19, (vi) RIJ - 69, (vii) RIJ – 82, (viii) REX -55, (ix) REX – 57 and (x) REX – 49 in our location. Seeds were collected from CRIJAF, which were grown in the research field of the Crop Research Farm (CRF), Department of Botany of this University following Randomized Block Design (RBD) in 4 replications in two consecutive years i.e. in the month of March, 2011 and there after May, 2012. Uniform agronomical measures were provided for uniform growth and development of the crop.

Variety	Names
1	RIN – 92
2	REX – 57
3	REX – 55
4	REX – 49
5	RIJ – 82
6	RIJ – 69
7	RIJ- 19
8	RIN – 322
9	RIN – 003
10	RIN - 301

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3. RESULTS AND DISCUSSION

Results

Table 1: Correlation between plant height vs branches/plant

Var	Plant height/plant (cm)x	Branches/plant (no) y	x2	y2	xy	r value
1	68.58	10	4703.21	100	685.8	
2	104.14	6	10845.13	36	624.84	
3	99.06	13	9812.88	169	1287.78	
4	96.52	16	9316.11	256	1544.32	
5	76.2	14	5806.44	196	1066.8	0.0351
6	88.9	9	7903.21	81	800.10	
7	86.36	11	7458.04	121	949.96	
8	106.68	8	11380.62	64	853.44	
9	83.82	21	7025.79	441	1760.22	
10	109.22	22	11929.00	484	2402.84	
∑	919.48	130	86180.43	1948	11976.1	

Table 2: Correlation between Plant height vs leaves/plant

Var	Plant height/plant (cm)x	Leaves/plant (no) y	x2	y2	xy	r value
1	68.58	20	4703.21	400	1371.6	
2	104.14	21	10845.13	441	2186.94	
3	99.06	27	9812.88	729	2674.62	
4	96.52	26	9316.11	676	2509.52	
5	76.2	24	5806.44	576	1828.8	0.0111
6	88.9	25	7903.21	625	2222.5	
7	86.36	18	7458.04	324	1554.48	
8	106.68	20	11380.62	400	2133.6	
9	83.82	21	7025.79	441	1760.22	
10	109.22	22	11929.00	484	2402.84	
∑	919.48	224	86180.43	5096	20645.12	

Table 3: Correlation between plant height vs basal girth

Var	Plant height/plant (cm)x	Basal girth Y (cm)	x2	y2	xy	r value
1	68.58	1.0	4703.21	1	68.58	
2	104.14	1.2	10845.13	1.44	124.96	
3	99.06	1.3	9812.88	1.69	128.77	
4	96.52	1.6	9316.11	2.56	154.43	
5	76.2	1.3	5806.44	1.69	99.06	0.0073
6	88.9	0.9	7903.21	0.81	80.01	
7	86.36	1.1	7458.04	1.21	94.99	
8	106.68	0.7	11380.62	0.49	74.67	
9	83.82	1.4	7025.79	1.96	117.34	
10	109.22	1.5	11929.00	2.25	163.83	
∑	919.48	12.0	86180.43	15.1	1106.64	

Table 4: Correlation between plant height vs leaf area

Var	Plant height/plant (cm)x	Leaf area y (cm2)	x2	y2	xy	r value
1	68.58	67	4703.21	4489	4594.86	
2	104.14	80	10845.13	6400	8331.20	
3	99.06	72	9812.88	5184	7132.32	
4	96.52	78	9316.11	6084	7528.56	
5	76.2	76	5806.44	5776	5791.20	0.2117
6	88.9	60	7903.21	3600	5334.00	
7	86.36	66	7458.04	4356	5699.76	
8	106.68	71	11380.62	5041	7574.28	
9	83.82	62	7025.79	3844	5196.84	
10	109.22	64	11929.00	4096	6990.08	
∑	919.48	696	86180.43	48870	64173.14	

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Table 5: Correlation between plant height vs Branches/plant

Var	Plant height/plant (cm)x	Branches/plant (no) y	x2	y2	xy	r value
1	55.88	12	3122.57	144	670.56	0.0082
2	93.98	6	8832.24	36	563.88	
3	83.82	13	7025.79	139	1089.66	
4	78.74	18	6199.98	324	1417.32	
5	40.64	15	1651.60	225	609.60	
6	66.04	10	4361.28	100	660.40	
7	86.36	12	7458.04	144	1036.32	
8	88.90	7	7903.21	49	622.30	
9	91.44	20	8361.27	400	1828.80	
10	96.52	19	9316.11	361	1833.88	
∑	782.32	132	64232.09	1922	10332.72	

Table 6: Correlation between plant height vs leaves/plant

Var	Plant height/plant (cm)x	Leaves/plant (no) y	x2	y2	xy	r value
1	55.88	25	3122.57	625	1397.00	0.0007
2	93.98	24	8832.24	576	2255.52	
3	83.82	26	7025.79	676	2179.32	
4	78.74	28	6199.98	784	2204.72	
5	40.64	22	1651.60	484	894.08	
6	66.04	27	4361.28	729	1783.08	
7	86.36	22	7458.04	484	1899.92	
8	88.90	25	7903.21	625	2222.50	
9	91.44	26	8361.27	676	2377.44	
10	96.52	23	9316.11	529	2219.96	
∑	782.32	248	64232.09	6188	19433.54	

Table 7: Correlation between plant height vs basal girth

Var	Plant height/plant (cm)x	Basal girth y (cm)	x2	y2	xy	r value
1	55.88	1.3	3122.57	1.69	72.64	0.0839
2	93.98	1.5	8832.24	2.25	140.97	
3	83.82	1.6	7025.79	2.56	134.11	
4	78.74	1.8	6199.98	3.24	141.732	
5	40.64	1.4	1651.60	1.96	56.89	
6	66.04	1.0	4361.28	1.0	66.04	

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7	86.36	1.3	7458.04	1.69	112.268	
8	88.90	0.9	7903.21	0.81	80.01	
9	91.44	1.6	8361.27	2.56	146.30	
10	96.52	1.5	9316.11	2.25	144.78	
∑	782.32	13.9	64232.09	16.07	1095.73	

Table 8: Correlation between plant height vs leaf area

Var	Plant height/plant (cm)x	Leaf area (cm2) y	x2	y2	xy	ɼ value
1	55.88	77	3122.57	5929	4302.76	- 0.0253
2	93.98	94	8832.24	8836	8834.12	
3	83.82	81	7025.79	6561	6789.42	
4	78.74	88	6199.98	7744	6929.12	
5	40.64	85	1651.60	7225	3454.40	
6	66.04	71	4361.28	5041	4688.84	
7	86.36	76	7458.04	5776	6563.36	
8	88.90	81	7903.21	6561	7200.90	
9	91.44	71	8361.27	5041	6492.24	
10	96.52	74	9316.11	5476	7142.48	
∑	782.32	798	64232.09	64190	62397.64	

Table 9: Combined Correlation Values for the Year 2011-12 & 2012-13

Characters Year	Pl ant height vs Branch plant^{-1}	Plant height vs leaves plant^{-1}	Plant height(cm) vs basal girth (cm)	Plant height(cm) vs leaf area (cm)
1	r 0.0351	r 0.011	r 0.0073	r 0.211
2	r 0.0082	r 0.0007	r 0.083	r -0.025

4. DISCUSSION

In all these cases the value of correlation were found to be positive and up to the limit except one i.e. r -0.025. It indicates that the leaf area does not play any factor for the yield component of the plant. From the result of bi-variate correlation table (Table-9) it is found that the **ɼ value** is dependent on the height of the plant, diameter of the plant, thickness of fibre. No. of leaves and area of leaves is not a main factor (Gautam, 2004). Similar observations were found in case Bt cooton by Hallikari (2008) and Ratnam (2014). Indeed, no report is available in case of mesta i.e. *Hibiscua subdaripha* L.

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Photo–1: Standing crop with fruits

Photo–2: Before harvesting of crop

Photo–3: Before harvesting the crop

Photo–4: Before ripening of the crop