

Selection of most promising cashew germplasms by using D^2 analysis in Jhargram condition (West Bengal).

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Abstract: Cashew belongs to the family Anacardiaceae, to the genus *Anacardium* and to the species *occidentale*. India is the first country, which initiated a systematic research in the early 1950. No reliable records had obtained till so far in this regard. The study was undertaken in the Regional Research Station, Jhargram, W. B. in the period 2014 – 2018 (Mahalanobis 1928). The study reveals that maximum average intra cluster distance was recorded for the cluster no – 3. Highest total inter cluster distance was recorded in the cluster no – 3. The wide range of D^2 values (Table – 3 & 4) indicated enormous diversity in the cashew germplasms.

Key words: D^2 analysis, germplasms, divergence, correlated variables, cluster distance.

Introduction: Cashew (*Anacardium occidentale* L, Family-Anacardiaceae) is one of the first fruit trees from the new world to be introduced in the old world (Purse glove 1988). In recent times, the commercial importance of cashew is gaining momentum. In this context, the present investigation have been undertaken in order to keep our prime position in international market. There is an urgent need to increase the productivity of cashew per unit area through selection / D^2 analysis of improved types from the evaluation of existing cashew germplasms.

Review of literature: Form the literature survey it appeared that no reliable records regarding selection through D^2 analysis in cashew germplasms in West Bengal condition were available.

Material and methods: The various steps involved in the estimation of D^2 values are given below The study was undertaken in the Regional Research Station, Jhargram, W.B. in the period 2014 – 2018.

- a) Average inter and intra cluster distance analysis
 - i) Collection of data
 - ii) Test of significance
 - iii) Transformation of correlated variables.
 - iv) Computation of D^2 values.
 - v) Testing the significance of D^2 values.
 - vi) Contribution of individual characters towards divergence.
 - vii) Grouping of varieties into various clusters (Toucher Method 2003).
- b) Total Inter and Intra cluster distance analysis

The pooled information of 75 germplasm was subjected to the analysis of genetic divergence by following Mahalanobis D^2 statistics. The program me computes a new variable called the INDEX variable based on the numerical value of each variable (Barreto et al., 1998). The program enters the INDEX values in a variable reserved for the purpose in the MST file (Chako et al., 1990 & Damodaran et al., 1965).

Results & Discussion: The estimates of average and total cluster distance values were established (Table – 1 & Table - 2). The study reveals that maximum average intra cluster distance was recorded for the cluster no – 3, following by cluster no 9 & cluster no – 2. While maximum average inter cluster distance was observed in between cluster no – 13& 3. Maximum total intra cluster distance was noticed in between the cluster no 13 & 3. Highest total inter cluster distance was recorded in the cluster no – 3. The wide range of D^2 values (Table – 3 & 4) indicated enormous diversity in the cashew germplasms. The studied 75 cashew germplasms were subjected to group analysis and 14 clusters were recorded. The 75 germplasms were then subjected to selection index programme which shows a range of variation from 168.86 to 606.17. The best germplasm (Madras mixed arcot – 168.86) was the one that had be the smallest selection index value. As per the study, Madras mixed arcot was the most promising germplasm in West Bengal condition. This view can be supported by the observations of Hanson et al., 1957, Nair et al., 1991.

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	41.7													
B	91.5	46.9												
C	141	74.4	47.9											
D	70.7	124	174	46.2										
E	57.4	92.6	141	59.8	43.3									
F	62.5	88.4	138	90.5	80.8	45.9								
G	91.6	83.8	121	123	106	63.1	32.4							
H	54.7	74.1	121	95.1	71.2	69.9	86.7	0.0						
I	65.4	143	199	83.6	86	96.1	129	100	47					
J	138	78.9	62.8	183	150	132	112	115	193	44				

K	92.3	135	179	64.1	67.5	126	156	114	109	198	0.0			
L	104	84.6	112	139	115	78.8	70.8	102	143	99	168	0.0		
M	77.5	151	205	75.9	98.3	86.3	127	104	71	203	114	145	0.0	
N	118	76.5	86.1	155	127.	121	100	91.6	171	81	166	130	180	0.0

TABLE - 1: AVERAGE INTRA AND INTER CLUSTER DISTANCE (D^2) VALUES.

A = CLUSTER 1

F = CLUSTER 6

K = CLUSTER 11

B = CLUSTER 2

G = CLUSTER 7

L = CLUSTER 12

C = CLUSTER 3

H = CLUSTER 8

M = CLUSTER 13

D = CLUSTER 4

I = CLUSTER 9

N = CLUSTER 14

E = CLUSTER 5

J = CLUSTER 10

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	1741													
B	8309	2205												
C	20023	5547	2298											
D	5003	15468	30495	2143										
E	3301	8586	20049	3582	1877									
F	3907	7825	19276	8199	6537	2115								
G	8393	7025	14761	15148	1132	3984	1051							
H	3000	5504	14681	9057	5078	4897	7530	0.0						
I	4286	20710	39913	6999	7402	9248	16724	10002	2217					
J	19167	6226	3953	33787	22612	17640	12661	13274	37521	1991				
K	8524	18375	32218	4120	4562	15903	24559	13061	11980	39310	0.0			
L	10820	7157	12612	19375	13393	6220	5018	10473	20460	9855	28517	0.0		
M	6018	22826	42389	5774	9666	7464	16246	10912	5147	41373	13138	21246	0.0	
N	14011	5865	7416	24282	16364	14842	10012	8403	29444	6594	27848	16913	32609	0.0

TABLE - 2: TOTAL INTRA AND INTER CLUSTER DISTANCE (D^2) VALUES.

A = CLUSTER 1

B = CLUSTER 2

C = CLUSTER 3

D = CLUSTER 4

E = CLUSTER 5

F = CLUSTER 6

G = CLUSTER 7

H = CLUSTER 8

I = CLUSTER 9

J = CLUSTER 10

K = CLUSTER 11

L = CLUSTER 12

M = CLUSTER 13

N = CLUSTER 14



CLUSTER NO	TOTAL GERMPLASMS	NAME OF GERMPLASM
01	09	VRI – 5
02	19	WBDC IV
03	10	M – 33 /3
04	17	H – 2 / 16
05	06	TREE NO – 16
06	03	BR – 2 / 18
07	02	RED HAZARI
08	01	M – 26 / 1
09	02	TREE – 10/9
10	02	TREE – 30/1
11	01	ULLAL – 2
12	01	VTH – 59
13	01	M – 4/2
14	01	DISH- 1/11

TABLE – 3: POSITION OF CASHEW GERMPLASMS AS PER CLUSTER ANALYSIS.

SELECTION VALUE	NAME OF GERMPLASM	REMARKS
168.86	MADRAS MIXED ARCOT	BEST
200 – 300	H – 2/ 12 TO K – 30/1	MEDIUM
300 – 400	H – 2/11 TO TREE NO – 10/9	
MORE THAN 400	VTH – 30 TO	LOW

TABLE – 4: SELECTION INDEX VALUE OF CASHEW GERMPLASMS.