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SEMIQUANTITATIVE ANALYSIS FOR CLASSIFICATION OF GOBHI SARSON (*Brassica napus* L) GERMPLASM

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Twenty nine accessions of gobhi sarson were evaluated for eight agro-morphological traits and classified using metroglyph analysis. These accessions exhibited substantial variation for all the agromorphological traits except for the days to maturity (CV 8.1%) and oil content (CV3.6%), the maximum being for secondary branches/plant (CV 59.8%). The cluster I was the largest with 34.5% of the accessions. Eight acessions did not fall in any group. The cumulative index score ranged from 10 (NECN 15 to 19 (NECN 8). About 24.1% of the accessions have the mean index score of 13. Group IV had the highest mean index score of 14.7. Eight accessions having high index score were identified for the possible use as donors in the hybridization programme and their characters were presented.

Key Words : *Brassica napus*, metroglyph analysis, germplasm, gobhi sarson

Gobhi sarson (*Brassica napus* L) is of mediterranean origin and a recent crop introduction to India and has shown excellent performance in region with cooler climates especially in hill zones of Himachal Pradesh and Punjab. It is also gaining acceptance in *tarai* region of Uttar Pradesh and Haryana. Besides high yield potential, this crop has high oil content (34.2-48.0%) and relatively tolerant to prevalent diseases and pests of the mustard crop. The oil quality is also better than that of Indian mustard in terms of low erucic acid and glucosinolate contents. It is, therefore, imperative to assess the potential of gobhi sarson genetic resources for their possible utilization in the breeding programme. The present investigation attempts to study the variation and diversity in some accessions for various agro- morphological traits.

MATERIALS AND METHODS

The materials comprised twenty nine accessions of gobhi sarson (Table 1). The experimental details, growing conditions, agronomic practices followed, sample size and characters investigated were essentially the same as described elsewhere (Yadav *et al.*, 1997) Range, mean and coefficients of variation (CV %) were computed to assess the extent of variation in agro-morphological traits. Metroglyph and index score method (Anderson, 1957) was carried out

Table 1. Gobhi sarson accessions investigated

1.	KBNS 10	2.	PBNS 91	3.	NECN 4
4.	NECN 10	5.	NECN 11	6.	NECN 2
7.	NECN 12	8.	NECN 3	9.	NECN 13
10.	NECN 15	11.	NECN 16	12.	NECN 17
13.	BN 3	14.	BN 6	15.	BN 7
16.	BN 8	17.	BN 10	18.	BN 19
19.	BN 13	20.	BN 37	21.	BN 4
22.	BN 16	23.	BN 5	24.	BN 50
25.	BN 41	26.	BN 24	27.	BN 12
28.	BN 17	29.	BN 15		

to study the diversity in the accessions. To judge the worth of accession, the index score for each accession was estimated by summing up index values of all the characters.

RESULTS AND DISCUSSION

The accessions investigated exhibited considerable variability for all the characters except for days to maturity, and oil content as evidenced by range, mean and coefficients of variation (Table 2). Secondary branches/plant had the maximum variation (CV 59.8%) followed by primary branches/plant (CV 30.9%) the oil content varied the least ranging from 38.8 to 44.5 per cent. Moderate to high variability was recorded for the remaining traits (Table 2).

Analysis of diversity

It is foremost to choose sufficiently diverse parents for the success of the hybridisation programme. Metroglyph analysis is considered

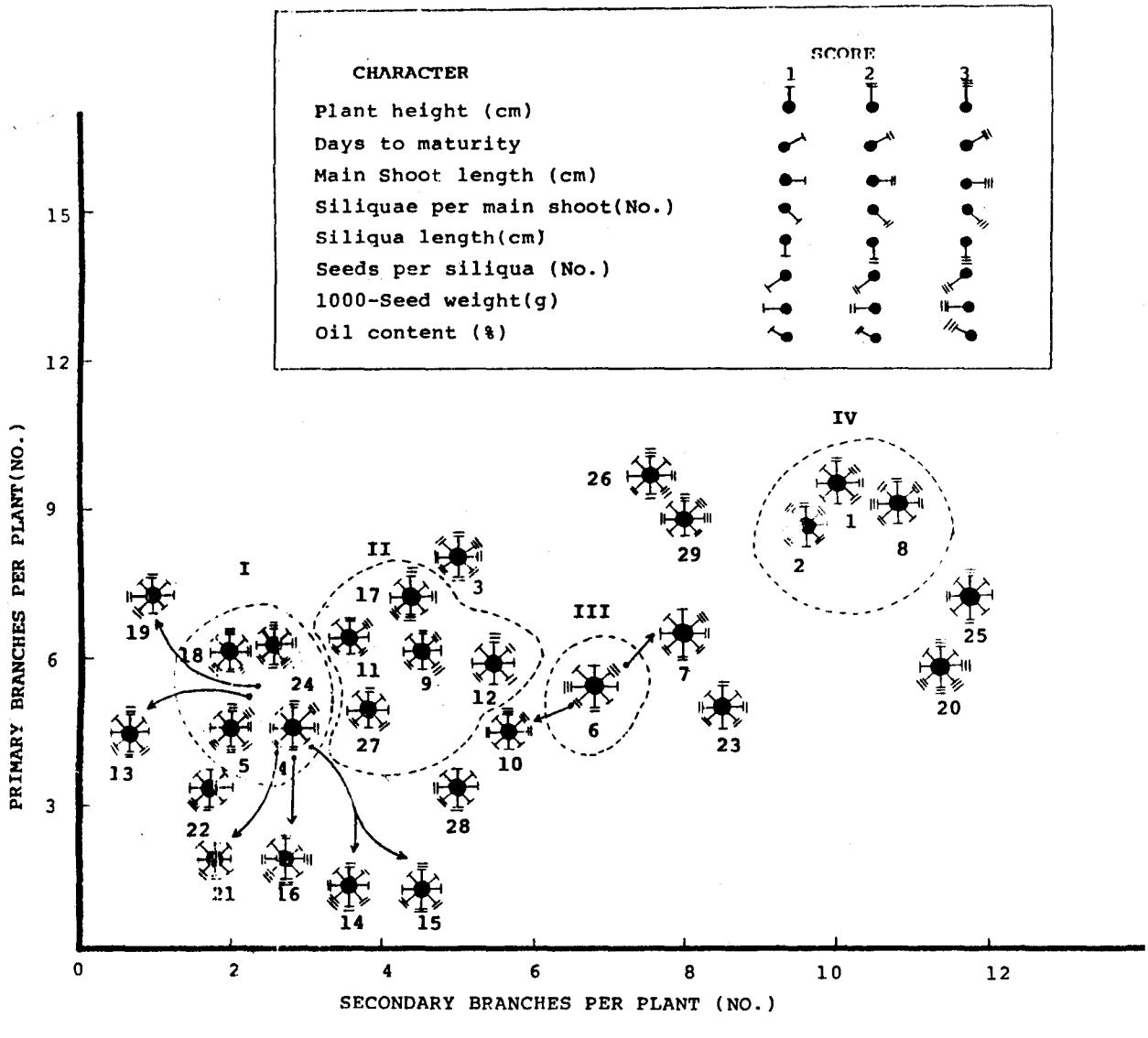

Fig. 1. Scatter diagram of metroglyph analysis

suitable for preliminary grouping of the germplasm. The metroglyph analysis was carried out using mean values of eight characters. Taking two most variable characters viz., secondary branches and primary branches on X and Y axis, respectively, 29 genotypes were plotted. The remaining six characters were denoted by rays at different positions of the glyph (Fig. 1). The range values were classified into three classes (Table 3) and represented by different bars on the rays of the glyph. The three classes for each trait was given an index score of 1, 2 and 3 for the lowest, middle and the highest class, respectively. The sum of index values of all the eight characters in each accession was taken as on index of its total worth.

Table 2. Range, mean and coefficients of variation (CV) for agro- morphological traits in gobhi sarson

Character	Range	Mean ± SEM	CV (%)
Plant height (cm)	117.8 - 197.4	162.8 ± 3.7	12.4
Days to Maturity	126 - 157	141.9 ± 2.1	8.1
Primary branches/plant (no.)	3.4 - 9.6	5.9 ± 3.4	30.9
Secondary branches/plant (no.)	1.8 - 11.8	5.3 ± 5.9	59.8
Main shoot length (cm)	45.4 - 107.8	70.7 ± 2.4	18.3
Siliquae/main shoot (no)	33.4 - 76.8	52.0 ± 1.8	18.5
Siliqua length (cm)	4.2 - 6.6	5.3 ± 0.1	13.6
Seeds/siliqua (no.)	10.4 - 27.2	20.1 ± 0.7	18.6
1000 Seed weight (g)	2.5 - 5.7	3.6 ± 0.1	20.6
Oil content (%)	38.8 - 44.5	40.7 ± 0.3	3.6

The accessions exhibited substantial diversity as revealed by the scatter diagram (Fig. 1) and

Table 3. Index-score values for different characters

Character	Score		
	1 (<)	2	3 (>)
Plant height	145	145-170	170
Days to maturity	137	137-146	146
Main shoot length	67.0	67.0-87.0	87.0
Siliqua/main shoot	49.0	49.0-63.0	63.0
Siliqua length	5.0	5.0-6.0	6.0
Seeds/siliqua	17.0	17.0-22.0	22.0
1000-seed weight	3.61	3.61-4.66	4.66
Oil content	42.0	42.0-44.0	44.0

twenty one accessions were assigned to four clusters. The first cluster comprised 10 accessions (34.5%) and was the largest (Table 4). The index

Table 4. Index score values and composition of clusters

Cluster	Index score value			Accessions
	Range	Mean	No.	Name
I	10-18	14.4	10	NECN 10, NECN 11, BN 3, BN 4, BN 6, BN 7, BN 8, BN 13, BN 19, BN-50
II	11-15	13.2	5	NECN 13, NECN 16, NECN 17, BN 10, BN 12
III	13-14	13.7	3	NECN 2, NECN 12, NECN 15
IV	13-16	14.7	4	KBNS 10, PBNS 91, NECN 3

Table 5. Cluster means for different agro-morphological characters

Character	Cluster			
	I	II	III	IV
Plant height (cm)	169.4	156.2	150.6	158.9
Days to maturity	136.5	142.2	155.0	154.7
Main shoot length (cm)	68.7	64.8	75.5	69.9
Siliquae/main shoot	53.9	51.2	44.1	51.5
Siliqua length (cm)	5.68	4.98	5.15	4.51
Seeds/siliqua	21.9	19.4	16.9	16.6
1000-Seed weight (g)	3.54	2.86	4.30	4.21
Oil content (%)	40.5	40.1	40.0	42.4

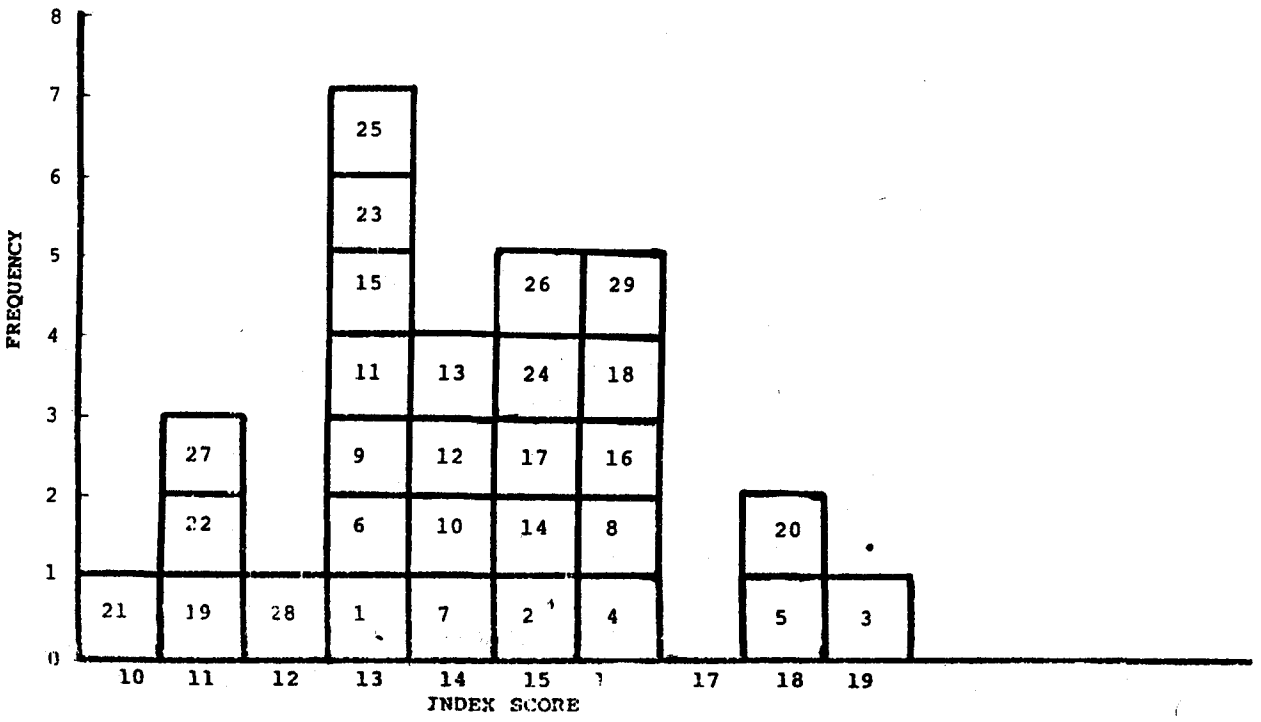

Fig. 2. Frequency distribution of the accessions based on index score values

score of the accessions ranged from 10 (BN 19) to 18 (NECN 11). This cluster was characterized by tall and early maturing genotypes with high number of siliquae on main shoot, long siliqua and high seeds/siliqua. (Table 5).

Five accessions were grouped together to form cluster II, (Table 4). The genotypes in this cluster were relatively early as compared to those of clusters III and IV as well as having high seeds/siliqua. (Table 5). The mean index score

Table 6. Promising accessions identified

Genotype	Index score	Plant height (cm)	Days to maturity	Main shoot length (cm)	Siliquae/main shoot	Siliqua length (cm)	Seeds/siliqua	1000-Seed weight (g)	Oil content (%)
NECN 4	19	167.6	150	69.0	53.0	6.04	21.6	4.39	44.3
NECN 11	18	176.6	150	75.6	51.8	6.04	25.0	3.04	41.0
BN 37	18	170.2	129	93.4	67.6	6.32	25.4	3.18	40.6
BN 15	16	133.2	133	61.8	42.0	5.44	23.2	3.01	39.0
BN 19	16	183.4	132	74.8	65.0	5.88	22.2	3.01	39.6
BN 8	16	154.0	131	107.8	48.6	6.48	24.6	4.07	41.0
NECN 3	16	165.4	155	75.0	46.8	4.64	20.0	4.88	43.5
NECN 10	16	179.0	152	68.0	46.0	5.72	22.0	3.04	41.2
PBNS 91	15	145.6	150	60.0	49.8	4.40	19.4	4.38	44.5

was 13.2. The cluster III consisted of three accessions with mean index score of 13.7 (Table 4). These accessions were characterized by long main shoot, long siliqua and high seed weight (Table 5). Three accessions constituting the cluster IV (Table 4) exhibited the highest oil content among the four clusters. Of the four clusters, this cluster had the highest mean index score (14.7).

The total index score varied from 10 (NECN 15) to 19 (NECN 8). The frequency distribution of the accessions is depicted in Fig. 2. A score of 13 was exhibited by the maximum number of accessions (7). The results indicated that metroglyph analysis coupled with index score values enabled the identification of superior accessions for utilization in the breeding programme (Table 6).

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