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Varietal Identification in Groundnut (*Arachis hypogaea* L.) Through Morphological Characters

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ABSTRACT

Varietal identification has recently gained more importance with the introduction of Plant Variety Protection (PVP) and Plant Breeder's Rights (PBR). The present study on thirty groundnut genotypes was under taken to find out the extent by which the morphological characters could be used to differentiate the groundnut varieties in seed production. These genotypes showed variation for growth habit, leaflet colour, flowering pattern, pod constriction, pod surface texture, number of kernels, beak prominence, kernel colour, kernel shape and kernel size, thus can be differentiated from each other. From this it can be possible to identify the individual cultivars on the basis of morphological characters. To identify each genotype individually, a schematic diagram is presented based on the above parameters.

Key words : Groundnut, Identification,Morphology, Varieties

Groundnut is an annual soil enriching legume and one of the principle oil seed crops in the world. Being a highly self pollinated crop, number of old and new varieties are available with almost similar characters and it becomes difficult to distinguish the closely related ones. The ability to characterize and identify plant varieties is fundamental to several aspects of seed trade. So, the description of the varieties along with the assessment of varietal identity and purity are essential for seed production and certification. Farmers need assurance that they are being supplied with pure seed and consumers often insist on purchase of known identity. Therefore it is of utmost importance for those engaged in quality seed production, certification and plant breeding research, so that they are well acquainted with the diagnostic characteristics of different varieties of field and vegetable crops. Varietal identification has recently gained more importance with the introduction of Plant Variety Protection (PVP) and Plant Breeder's Rights (PBR). The present study on thirty groundnut genotypes was undertaken to find out the extent by which the morphological characters could be used to differentiate the groundnut varieties in seed production.

MATERIAL AND METHODS

The experimental material for the present study comprised thirty varieties of groundnut which are active in seed production chain and obtained from respective groundnut research centres from all over the country. The experiment was conducted at Seed Research and Technology Centre, ANGRAU, Rajendranagar, Hyderabad by adopting a spacing of 40 x 20 cm and each variety was sown in two rows each of five meters length. Recommended agronomic practices were followed to raise a healthy crop and the data was recorded on the growth habit, flowering pattern, leaflet colour and size, pod beak, reticulation and constriction, kernel colour, shape, number and size at different stages of crop growth as per UPOV guide lines.

RESULTS AND DISCUSSION

Morphological features of seed and plant parts are a major component of cultivar identification because they provide dependable data. However, it is rare for a variety to be identified by a single morphological character. Use of different morphological features in a sequential fashion is useful and convenient to distinguish the varieties (Singhal and Surendra Prakash, 1997). Differences were found in the genotypes studied for all the above characters except for general flowering pattern (Table-1). In all the genotypes the flowering in general was sequential. Ten varieties out of thirty showed erect growth habit, eighteen varieties showed semi erect growth habit and only two varieties viz., TG 64 and M 335 showed prostrate growth habit. These two could be differentiated from one another by observing the leaflet size, which was medium in TG 64 and small in M 335. Similarly leaflet size of two genotypes viz., TKG 19A and Karad 4-0 was small, while these two could be distinguished by taking the leaflet colour into consideration. Karad 4-0

Table 1 Characterization of groundnut varieties on the basis of morphological characters.

S.No.	Genotype	Growth habit	Prostrate varieties		Leaflet		Flowering		Pod		Beak prominence	Kernel			
			Main stem	Side branch	Size	Colour	General	Main stem	Constriction	Texture		Number	Colour	Shape	Size
		1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
1	GG-3	Erect			Large	Light green	Sequential	Sequential	Medium	Medium	I	Few	Pink	C	Medium
2	Dh-3-30	Erect			Medium	Medium green	Sequential	None	V.shallow	Fine	P	Few	Pink	C	Medium
3	VRI-4	Semi erect			Small	Med. green	Sequential	Sequential	Medium	Medium	MP	Few	Brown	C	Medium
4	ICGS-1	Semi erect			Medium	Dark green	Sequential	Sequential	Medium	Fine	I	Few	Brown	C	Medium
5	M-522	Semi erect			Medium	Dark green	Sequential	None	Medium	Medium	MP	Few	Brown	C	Medium
6	M-37	Semi erect	Erect	Flat	Medium	Med. green	Sequential	Sequential	Medium	Fine	I	Few	Brown	C	Medium
7	TG64	Prostrate			Medium	Dark green	Sequential	Sequential	Medium	Coarse	P	Few	Brown	C	Large
8	LGN-2	Erect			Medium	Med. green	Sequential	None	Deep	Fine	P	Few	Brown	C	Medium
9	GG-13	Semi erect			Small	Med. green	Sequential	None	Shallow	Medium	P	Few	Brown	C	Medium
10	RS-138	Semi erect			Medium	Med. green	Sequential	None	Shallow	Medium	P	Many	Brown	C	Medium
11	SG-84	Semi erect			Medium	Med. green	Sequential	None	Medium	Fine	MP	Few	Pink	C	Medium
12	CSMG-84-1	Erect			Medium	Med. green	Sequential	Sequential	Medium	Coarse	MP	Few	Variegated	C	Medium
13	RSB-87	Semi erect			Medium	Med. green	Sequential	None	Medium	Fine	VP	Few	Purple	C	Medium
14	TCGS-2	Semi erect			Small	Dark green	Sequential	Sequential	Medium	Medium	MP	Few	Brown	C	Medium
15	CHANDRA	Semi erect	Erect	Flat	Medium	Dark green	Sequential	None	Medium	Medium	MP	Medium	Brown	C	Large
16	M-335	Prostrate			Small	Dark green	Sequential	None	Medium	Coarse	P	Medium	Brown	C	Large
17	M-145	Semi erect			Small	Dark green	Sequential	None	Medium	Medium	P	Many	Light purple	C	Medium
18	ALR-1	Semi erect			Medium	Med. green	Sequential	None	Medium	Medium	VP	Few	Purple	C	Medium
19	TKG-19A	Erect			Small	Dark green	Sequential	Sequential	Medium	Coarse	MP	Few	Dark purple	C	Large
20	RG-141	Erect			Medium	Med. Green	Sequential	Sequential	Shallow	Medium	I	Few	Brown	S	Medium
21	ALR-3	Erect			Large	Light green	Sequential	Sequential	Deep	Coarse	P	Few	Brown	C	Medium
22	M-197	Semi erect			Medium	Med. green	Sequential	None	Shallow	Medium	P	Many	Brown	C	Medium
23	CHITRA	Semi erect			Medium	Med. green	Sequential	None	Medium	Coarse	MP	Few	Variegated	C	Medium
24	Karad 4-0	Erect			Small	Med. green	Sequential	Sequential	V.shallow	Medium	MP	Few	Brown	C	Medium
25	JAWAN	Semi erect			Medium	Light green	Sequential	Sequential	Shallow	Coarse	P	Few	Brown	C	Medium
26	ALR-2	Erect			Large	Dark green	Sequential	Sequential	V.shallow	Coarse	I	Few	Brown	S	Medium
27	Punjab-1	Erect			Medium	Dark green	Sequential	None	Shallow	Fine	P	Few	Brown	C	Medium
28	ICGS-5	Semi erect			Medium	Med. green	Sequential	Sequential	Deep	Medium	VP	Few	Brown	C	Medium
29	KAUSHAL	Semi erect			Small	Dark green	Sequential	Sequential	Shallow	Medium	P	Medium	Brown	C	Medium
30	Kadiri-2	Semi erect			Small	Med. green	Sequential	None	Medium	Medium	MP	Few	Brown	C	Medium

I: Inconspicuous MP: Medium prominent P: Prominent VP: Very prominent C: Cylindrical S: Spheroidal

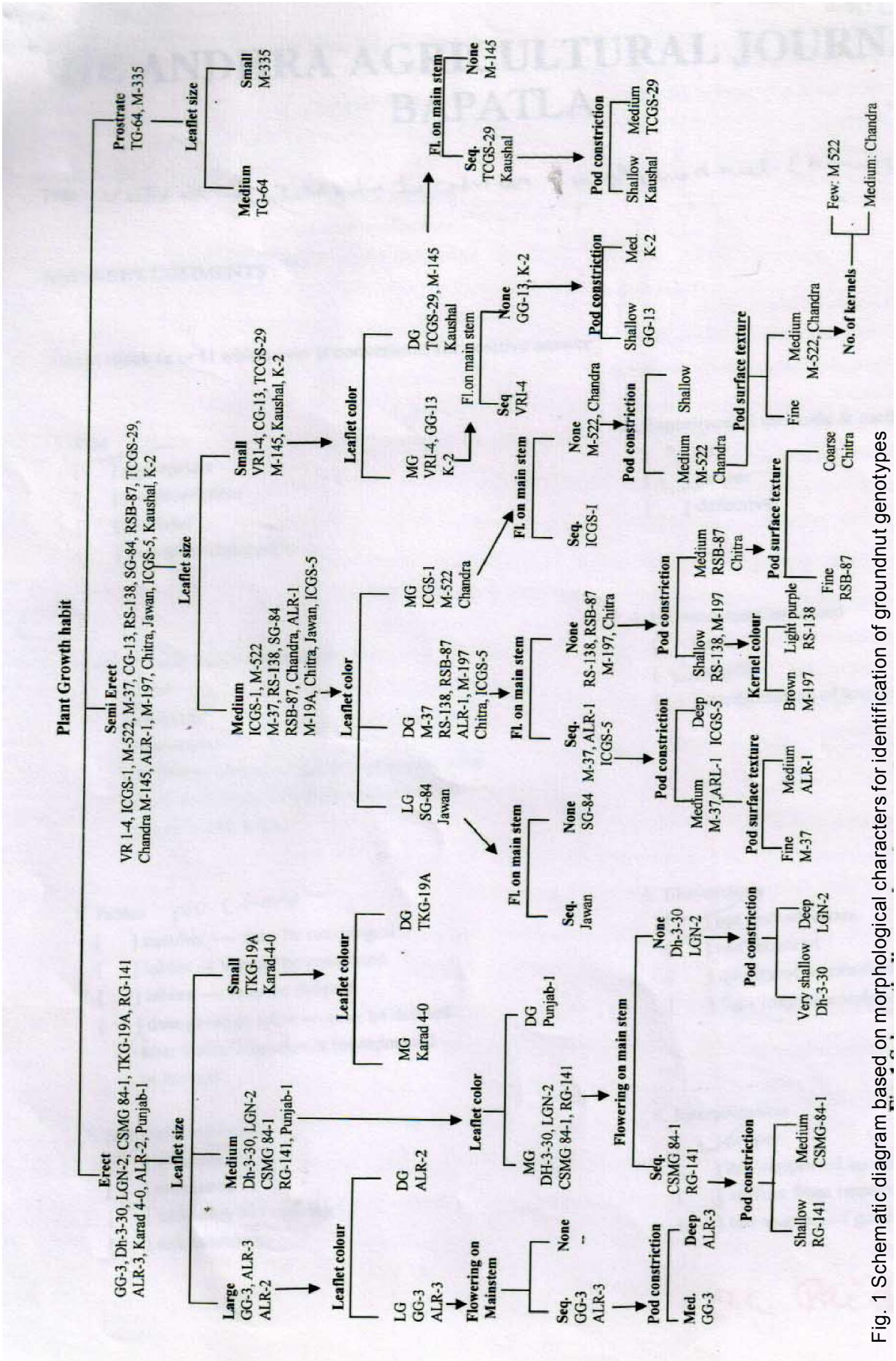

Fig. 1 Schematic diagram based on morphological characters for identification of groundnut genotypes

showed medium green leaves whereas TKG 19A showed dark green leaves. Based on pod constriction, the genotypes could be classified into four categories, *viz*., Very shallow, Shallow, Medium, and Deep pod constrictions. Three genotypes showed very shallow pod constriction, seven genotypes showed shallow pod constriction, sixteen genotypes showed medium pod constriction and the remaining four genotypes showed deep constriction of pods (Chandran *et al.,* 1998). Three groups were made based on pod reticulation, fine pod surface feature in seven genotypes, medium in fifteen genotypes and coarse in eight genotypes. Similar results emphasizing the importance of pod surface texture in distinguishing the varieties have been reported by Stalker (1990), Brigitte *et al.,* (1993), Chandran and Pandya (2000). Three genotypes out of thirty (RSB -87, ALR-1, ICGS-5) showed very prominent beak, ten genotypes showed medium prominence and remaining twelve genotypes showed prominent beak of the pod. The kernel colours of the varieties CSMG 84-1 and Chitra were variegated. Whereas M-145 showed light purple kernels and TKG-19A showed dark purple kernels. The kernel shape was spheroidal in only two genotypes (RG 141 and ALR 2) in all the other genotypes it was cylindrical. Similar results were reported by Jabeen *et al.,* (1998). Kernel size was found large in five genotypes (M-522, TG-64, Chandra, M-335 and TGK-19A) and medium in rest of the genotypes.

By following the schematic diagram (Fig. 1) based on the above parameters, we can identify each genotype individually. This information on hand is very useful for the seed grower, seed corporation and seed certification agencies and seed testing laboratories in order to determine genetic purity. The ultimate objectives are to determine the extent to which a seed sample confirms to a given cultivar and to assure the quality of seed marketed to the consumer.

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