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Short Note

Characterization of chilli (*Capsicum annuum* L.) genotypes based on morphological parameters

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Abstract

Study on morphological categorization of chilli genotypes was conducted on 30 varieties grown in a randomized block design, replicated thrice during two consecutive seasons of 2005 and 2006 at Experimental Farm of the Department of Vegetable Science and Floriculture, Himachal Pradesh Krishi Vishvavidyalaya, Palampur. Genotypes were categorized for mature and ripe fruit colour, fruit shape at pedicel attachment and blossom end, fruit position and fruit bearing habit.

Key words: Germplasm, crop improvement, morphological characters, chilli.

Capsicum has been used since ancient times not only as a traditional medicine but also as a natural colorant. Chillies originated in Latin American regions of New Mexico and Guatemala as a wild crop in around 7500 BC. It was introduced into India from Brazil at the end of 15th century by the Portuguese (Pruthi, 1976) and adapted to the Indian conditions so much that India is considered as secondary centre of origin (Deshpande, 2001). India has immense potential to grow and export different types of chillies required by various markets around the world. Indian chilli export though showing satisfactory trends but nowadays facing severe competition in the international market from other chilli growing countries. The area and production of chilli crop are increasing annually yet its average yield (dry) remains low. The average productivity in the country is around 1,112 kg/ha, while Andhra Pradesh tops with the maximum productivity of 1,948 kg/ha followed by Punjab (1,607 kg/ha). The lowest productivity is in Himachal Pradesh (270 kg/ha). Thus, there is a pressing demand to develop high yielding varieties through genetic improvement of the chilli germplasm for domestic consumption and export.

Within the capsicum genus, there is a tremendous genetic diversity, which enable breeders with the opportunity to utilize this species in a wide range of environmental niches. However, wide range of phenotypes often complicate cultivar selection. Systematic description of germplasm is an important aspect leading to more efficient and desirable use in crop improvement. Moreover, information regarding morphological characters and categorization of genotypes according to consumer acceptance is helpful for the breeders in further research and development of new improved types. Therefore, the present study was conducted on 30 varieties of chilli collected from different parts of country with an objective to identify suitable genotypes for yield improvement and to categorize them for different parameters like: mature and ripe fruit colour, fruit shape at pedicel attachment and blossom end, fruit position and fruit bearing habit.

The study was conducted on 30 varieties of chilli (Table 1) grown in a randomized block design, replicated thrice during two consecutive *Kharif* seasons of 2005 and 2006 at Experimental Farm of the Department of Vegetable Science and Floriculture, Himachal Pradesh Krishi Vishvavidyalaya, Palampur. Forty-five day old seedlings were transplanted at a distance of 45 x 45cm with one seedling per hill with normal recommended agronomical and plant protection measures were adopted for raising of healthy crop and the efforts were made for characterization of the tested genotypes on the basis of their morphology as per the minimal descriptors of vegetable crops for chilli suggested by Srivastava *et al.* (2001) as well as on visual observation for the mature and ripe fruit colour, fruit shape at pedicel attachment and blossom end (fig.1 & fig.2), fruit position and fruit bearing habit.

Thirty genotypes of chilli were critically observed for morphological characterization and the results are presented in Table 2. In the present study, Palam Yellow, G-4, Surajmukhi, Anugraha, Pusa Sada Bahar, Ujwala were found promising for high yield potential and other traits.

These genotypes had certain morphological features suitable for Indian markets.

Table1. Chilli genotypes and their sources

Genotype	Source
G-4 (Bhagyalakshmi)	Agricultural Research Station, Lam, Guntur
Anugraha	KAU, Kerala
Ujwala	-do-
CO-3	TNAU, Coimbatore
Kadyavallur Local	-do-
PKM-1	-do-
KCA-190	-do-
KCA-171	-do-
K-1	Kovilpatti, Tamil Nadu
Palam Yellow	Department of Veg. Sci. & Flori., CSK HPKV, Palampur
Surajmukhi	-do-
DPCH-1	-do-
LCA-357	IARI, New Delhi
NCH-162	-do-
DCL-352	-do-
ACH-201	-do-
HCH-9639	-do-
BC-25	-do-
DCL-520	-do-
ACS-2000-2	-do-
DCL-524	-do-
Pusa Sada Bahar	-do-
Ajeet-1	-do-
SKAU-SC-304-1	Division of Olericulture, SKUAST(K),Shalimar, J&K
Kashmir local	-do-
SKAU-SC-23-1	-do-
SKAU-SC-578-1	-do-
SKAU-SC-101	-do-
Arka Lohit	IIHR, Bangalore
Pant C-1	G.B. Pant UA & T, Pantnagar

Palam Yellow had yellow fruit colour, Anugraha had light green fruit colour, G-4 had green colour, while all other had dark green colour fruits but all of them on ripening had deep red ripe fruit colour. These genotypes possessed acute fruit shape at pedicel attachment and pointed fruit shape at blossom end. Some of the genotypes like: Surajmukhi, Ujwala and Pusa Sada Bahar had erect fruit orientation whereas G-4 and Anugraha had pendent fruit position as compared to Palam Yellow which had semi-pendent fruit position. The fruit bearing habit of G-4, Anugraha and Palam Yellow was solitary whereas Surajmukhi, Ujwala and Pusa Sada Bahar bear fruits in cluster.

Table 2. Characterization of chilli (*Capsicum annuum* L.) genotypes based on various morphological parameters

Category	Class	Genotypes
Mature fruit colour	(a) Yellow	DPCH-1, Palam Yellow
	(b) Light green	Anugraha, ACH-201, Arka Lohit, KCA-190, KCA-171, DCL-520, SKAU-SC-578-1, Ajeet-1
	(c) Green	G-4, CO-3, PKM-1, SKAU-SC-304-1, DCL-352, Kadyavallur local, BC-25, Kashmir local, K-1, SKAU-SC-23-1, ACS-2000-2, SKAU-SC-101, DCL-524, Pant C-1
	(d) Dark green	HCH-9639, LCA-357, NCH-162, Ujwala, Pusa Sada Bahar, Surajmukhi
Ripe fruit colour	(a) Bright red	DPCH-1, LCA-357, SKAU-SC-304-1, NCH-162, Arka loti, K-1, SKAU-SC-23-1, SKAU-SC-578-1, Pant C-1
	(b) Red	HCH-9639, PKM-1, Kadyavallur local, BC-25, KCA-190, KCA-171, DCL-520, SKAU-SC-101, Pusa Sada Bahar, Ajeet-1, Surajmukhi
	(c) Deep red	G-4, Anugraha, Palam Yellow CO-3, DCL-352, ACH-201, Kashmir local, ACS-2000-2, DCL-524, Ujwala
Fruit shape at pedicel attachment	(a) Acute	G-4, Anugraha, ACH-201, Arkalohit, KCA-190, KCA-171, K-1, SKAU-SC-101, DCL-524, KCA-190, KCA-171, K-1, SKAU-SC-101, DCL-524, Ujwala, Pusa Sada Bahar, Surajmukhi, Pant C-1
	(b) Obtuse	DPCH-1, HCH-9639, CO-3, Palam Yellow, DKM-1, LCA-357, SKAU-SC-304-1, NCH-162, DCL-352, Kadyavallur local, BC-25, Kashmir local, SKAU-SC-23-1, ACS-2000-2, SKAU-SC-578-1, Ajeet-1
Category	Class	Genotypes
	(c) Truncate	DCL-520
	(d) Lobate	-
	(e) Cordate	-
Fruit shape at blossom end	(a) Pointed	G-4, HCH-9639, Anugraha, CO-3, Palam Yellow, PKM-1, LCA-357, SKaU-SC-304-1, NCH-162, DCL-352, ACH-201, Kadyavallur local, Arkalohit, BC-25, KCA-190, Kashmir local, KCA-171, K-1, DCL-520,

		SKAU-SC-23-1, aCS-2000-2, SKAU-SC-578-1, SKAU-SC-101, DCL-524, Ujwala, Pusa Sada Bahar, Surajmukhi, Ajeet-1
	(b) Blunt	DPCH-1, Pant C-1
	(c) Sunken	-
	(d) Sunken & pointed	-
Fruit position	(a) Erect	DPCH-1, Ujwala, Pusa Sada Bahar, Surajmukhi, Pant C-1
	(b) Semi-pedent	Palam Yellow, SKAU-SC-304-1, DCL-352, SKAU-SC-23-1, SKAU-SC-578-1, SKAU-SC-101
	(c) Pendent	G-4, Anugraha, HCH-9639, CO-3, PKM-1, LCA-357, NCH-162, ACH-201, kadyavallur local, Arka loti, BC-25, KCA-190, KCA-171, Kashmir local, K-1, DCL-520, ACS-2000-2, DCL-524, Ajeet-1
Fruit bearing habit	(a) Solitary	G-4, HCH-9639, Anugraha, CO-3, Palam Yellow, PKM-1, LCA-357, SKAU-SC-304-1, NCH-162, DCL-352, ACH-201, Kadyavallur local, Arka loti, BC-25, KCA-190, KCA-171,
	(b) Cluster	DPCH-1, Ujwala, Pusa Sada Bahar and Surajmukhi

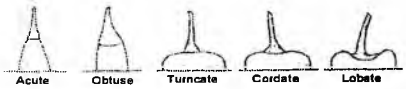


Fig.1 Fruit shape at pedicel attachment

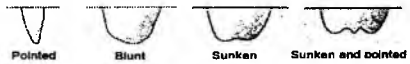


Fig.2 Fruit shape at blossom end

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