

Short Communication

Morphological characterization of chilli genotypes

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Characterization is the description of the attributes which, for a given genotypes may be considered invariant. It includes basic morphological description of accessions which may enable any subsequent contamination or mix-up of accessions to be identified. The extent of this description depends very much on the species in question and identifying duplicate or mislabeled accessions is much more difficult. Chillies are known as often cross pollinated but natural cross pollination percentage varies from 2 to 90% (Pickersgill, 1997) and due to this reason, it is always difficult to identify a true species in chilli. Again most of the inter-specific crosses having compatibility (Smith and Heiser, 1957) make more difficult to isolates a line from masses without any admixture. Thus a thorough description and species identification of the existing diverse germplasms is a prerequisite for better utilization of the germplasm in future breeding programme. Hence, such a research programme was undertaken to characterize the diverse assemblage of chilli.

The present investigation was carried out to characterize 49 widely diverse chilli genotypes collected from West Bengal, Andhra Pradesh, Karnataka and New Delhi. Seeds were grown during autumn-winter season (September to March) of 2007–08, 2008–09 and 2009–10 at Central Research Farm, Gayeshpur, Bidhan Chandra Krishi Viswavidyalaya, West Bengal, in randomized block design with 3 replications. Each plot consisted of 20 plants spaced by 45cm × 45cm. Five randomly selected plants were taken to record 22 qualitative characters (stem colour, plant growth habit, branching habit, leaf size, leaf shape, leaf margin, leaf colour, leaf pubescence,

pigmentation at node, number of flowers/axil, corolla colour, anther colour, calyx margin, mature fruit colour, ripe fruit colour, fruit shape, fruit position, adherence of calyx to fruit, fruit shape at pedicel attachment, blossom end fruit shape, fruit surface and seed colour) to characterize the genotypes as per Bosland and Votava (1999).

Frequency distribution of the chilli genotypes according to different characters expressed in them was presented in table 1. A general characterization may be arrived from the observation of different characters. The plants generally showed intermediate or spreading growth habit with only 10% genotypes had erect growth habit. Pigmentation in the stem was recorded in 61% genotypes. Predominant leaf shape was lanceolate, however 35% genotypes have ovate leaves. No serration or lobing what so ever was recorded in the genotypes. Leaf colour was mostly green although intensity of green colour varied from light to dark green. Pigmentation in the stem and leaf might be under the control of different groups of genes because 93% genotypes had green leaves while, only 32% genotypes showed green stem. Leaf pubescence was either absent or very sparse. Pigmentation in different vegetative plant parts like stem, node and leaves might be under different genetic control although in the node it is predominant. As high as 95% of the genotypes produced only one flower/axil. Three or more flowers/axil was borne in two genotypes indicating the species other than *annuum*. Predominant corolla colour was white. However, one genotype with yellow corolla and other two with purple corolla might be of other species. Most of the genotypes bear bluish anthers of different intensities and shades like pale blue (35%), blue (51%) and bluish yellow (8%), one of the identifying characters of *C. annuum*.

Calyx margin is also regarded as a species identifying character of *Capsicum* genus (Bosland *et al.*, 1988). No genotypes had entire calyx but intensity of dentations in most of the genotypes was lesser. The calyx in the

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Table 1: Frequency distribution for different qualitative characters in chilli genotypes

Characters	Specification	No. of genotypes	% of genotypes
Stem colour	Green	16	32.65
	Green with purple stripe	30	61.22
	Purple	3	6.12
Plant growth habit	Spreading	16	32.65
	Intermediate	28	57.14
	Erect	5	10.20
Branching habit	Sparse	0	0.00
	Intermediate	22	44.89
	Dense	27	55.10
Leaf size	Small	20	40.81
	Medium	25	51.02
	Large	4	8.16
Leaf shape	Deltoid	0	0.00
	Ovate	17	34.69
	Lanceolate	32	65.30
Leaf margin	Entire	49	100
	Undulate	0	0.00
	Ciliate	0	0.00
Leaf colour	Green	27	55.10
	Dark green	19	38.77
	Purple	3	6.12
Leaf pubescence	Absent	22	44.89
	Sparse	18	36.73
	Intermediate	8	16.32
Pigment at node	Dense	1	2.04
	Absent	5	10.20
	Present	44	89.79
No. of flowers/axil	One	47	95.91
	Two	0	0.00
	Three or more	2	4.08
Corolla colour	White	45	91.83
	Yellow	1	2.04
	Purple	3	6.12
Anther colour	Pale blue	17	34.69
	Blue	25	51.02
	Bluish yellow	4	8.16
Calyx margin	Purple	3	6.12
	Entire	0	0.00
	Intermediate	27	55.10
Mature fruit colour	Dentate	22	44.89
	Green	45	91.83
	Purple	2	4.08
Ripe fruit colour	Deep purple	2	4.08
	Black	0	0.00
	Orange	3	6.12
Fruit shape	Light red	4	8.16
	Red	17	34.69
	Dark red	25	51.02
Fruit position	Purple	0	0.00
	Long	26	53.06
	Very long	5	10.20
Adherence of calyx to fruit	Tapering	3	6.12
	Conical	14	28.57
	Oval	1	2.04
Fruit shape at pedicel attachment	Pendent	26	53.06
	Semi pendent	19	38.77
	Erect	4	8.16
Blossom end fruit shape	Loose	3	6.12
	Semi hard	12	24.48
	Hard	34	69.38
Fruit surface	Acute	7	14.28
	Obtuse	29	59.18
	Truncate	13	26.53
Seed colour	Cordate	0	0.00
	Lobate	0	0.00
	Pointed	46	93.87
Fruit surface	Blunt	3	6.12
	Shrunken	0	0.00
	Shrunken and pointed	0	0.00
Seed colour	Smooth	20	40.81
	Semi wrinkled	25	51.02
	Wrinkled	4	8.16
Seed colour	Light yellow	4	8.16
	Dark yellow	45	91.83
	Black	0	0.00
Seed colour	Brown	0	0.00

genotypes was either dentate (45%) or intermediate, (55%). In most of the genotypes (92%) unripe mature fruits were green, although, purple and deep purple fruits were found in two genotypes each. Ripe fruit colour of 94% genotypes was characteristically red in different intensities like light red (8%), red (35%) and dark red (51%). Uncharacteristic orange colour was recorded in three genotypes. The predominant fruit shape was long and conical, although very long, tapering and oval was also recorded in 18% genotypes. Fruit position in the genotypes was predominantly pendent and semi-pendent. Erect fruit orientation was recorded in four genotypes. Blossom end of the fruit was pointed in 94% genotypes and only 6% genotypes had blunt blossom end in the fruit. Fruit surface at harvest maturity in the 49% genotypes showed two distinct characters: smooth and wrinkled but in 51% genotypes it was semi-wrinkled. Seed colour in the genotypes was either light yellow or dark yellow which ruled out the presence of *C. pubescens* genotypes.

It was established beyond doubt that most of the genotypes belong to *C. annuum* and only one genotype BCC-59 possessing yellowish green corolla, blue anthers and had two or more flowers/node was true *C. frutescens*. In four genotypes, BCC-14, BCC-20, BCC-21 and BCC-32 the characters did not confirm that of true *C. annuum*. In the single fruited genotypes BCC-14, 20 and 21, both corolla and anthers were purple like *C. pubescens* but seed colour was yellow. It was presumed that these genotypes might have been developed through natural out-crossing between *C. annuum* and *C. pubescens* genotypes. In BCC-32, a single fruited genotype anther was bluish yellow with intermediate calyx teeth but had annular constriction like *C. chinense* which might have happened due to natural out-crossing between the genotypes of *C. annuum* and *C. chinense* during the course of development.

References

- Bosland PW, Iglesias J, Bailey A (1988) Capsicum pepper varieties and classification. Cooperative Extension Service-Circular 530. New Mexico State University, Las Cruces.
- Bosland PW, Votava EJ (1999) Peppers: Vegetable and Spice Capsicums. CABI Publishing.
- Pickersgill B (1997) Genetic resources and breeding of Capsicum sp. Euphytica 96: 129-133.
- Smith PG, Heiser CB (1957) Taxonomy of *Capsicum chinense* Jacq. and the geographic distribution of the cultivated Capsicum species. Bull Torrey Bot Club 84: 413-420.