

Inheritance of Some Morphological Characters in Castor (*Ricinus communis* L.)

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Castor (*Ricinus communis* L.) is an important non-edible oilseed crop of arid and semi-arid regions. Morphological characters, viz., leaf shape (cup shape vs flat), stem color (green red and mahogany), bloom (single, double or triple), spike type (compact vs semi-compact) etc. are used as market character for identification of parents and hybrids during grow out test. This communication concerns with the inheritance of anthocyanin pigmentation of stem, bloom, leaf shape and type of spike in castor. The experimental material for present study was selected from the germplasm maintained at main Castor Reserach Station, Gujarat Agricultural University, Sardar Krushinagar. Six germinations (P_1 , P_2 , F_1 , F_2 , B_1 & B_2) of two diverse parents, viz. VP1 and Aruna were raised and evaluated at Department of Plant Breeding, B. A. College of Agriculture, GAU, Anand during *kharif* 1995-96, for various morphological characters. The recombination values were worked out by the product ratio method (Fisher and Balmukund, 1928).

The morphological characters of the the two parents P_1 and P_2 and hybrid is given in (Table 1). Inheritance of each of the characters (Table 2) viz. stem colour is governed by recessive epistasis gene action (9 : 3 : 4), bloom and leaf shape are governed by single dominant gene action (3 : 1), while 9 : 6 : 1, ratio obtained for spike of castor indicated that more than one gene were involved in the expression of this character. In BC_1 ($F_1 \times VP_1$), segregation was observed for stem colour, leaf shape and spike of castor, while in BC_2 ($F_1 \times Aruna$) segregation was observed for bloom and leaf shape. The behaviour of back cross progeny confirmed the results obtained in the F_2 generation. Morphogenic behaviour of stem colour either with complete or partial dominance was also reported earlier by Bhapkar & Deshmukh (1978). F_2 ratio of 9 (light red) : 3 (green) : 4 (mahogany) obtained in present study showed recessive epistasis or modifying gene action. Patwardhan (1931) mentioned that triple bloom (bloom on stem, petiole, peduncle and both surface of leaves) was dominant over double bloom (bloom on stem, petiole, peduncle and lower surface of leaves) and single bloom (bloom on stem, petiole and peduncle) over no bloom. In the present study, F_2 segregation of 3 triple : 1 double bloom confirmed this findings. Leaf shape was classified in two groups 3 flat : 1 cup shape in F_2 generation which indicates monogenic inheritance of this trait. In the present study,

TABLE 1

Morphological characters of parents and hybrid.

Character	Parents		Hybrid
	VP 1	ARUNA	F_1
Stem colour	Green	Red	Mahogany
Bloom	Triple	Double	Triple
Leaf shape	Cup	Flat	Flat
Spike type	Compact	Semi-compact	Semi-compact

TABLE 2

Segregation of morphological characters in F_2 and back-cross generations.

Character	Generation	No. of Observations	Observed frequencies			Segregation ratio	χ^2	
			red	green	mahogany		Cal. value	Table value
Stem colour	F_2	54	27	13	14	9 : 3 : 4	1.21	5.9
	$BC_1 (F_1 \times VP 1)$	30	—	16	14	1 : 1	0.13	3.84
Triple Double								
Bloom	F_2	54	37	17	—	3 : 1	1.21	3.84
	$BC_2 (F_1 \times ARUNA)$	44	26	18	—	1 : 1	1.45	3.84
Flat Cup								
Leaf shape	F_2	54	38	16		3 : 1	0.62	3.84
	$BC_1 (F_1 \times VP-1)$	30	12	18		1 : 1	1.2	3.64
	$BC_2 (F_1 \times (ARUNA))$	44	27	17		1 : 1	2.27	3.64
Semi Loose Compact								
Spike	F_2	54	27	21	6	9 : 6 : 1	2.4	5.99
	$BC_1 (F_1 \times VP-1)$	21	11	0	10	1 : 1	0.13	3.80

F₂ generation of 9 semi-compact : 6 loose : 1 compact is obtained from a cross between compact and semi compact spikes types. This indicated that inheritance was polygenic. It is concluded from this study that stem colour (green, red and mahogany) was governed by

recessive epistatic or modifying gene action; bloom (i.e. triple and double bloom) and leaf shape (cup and flat shape) have monogenic inheritance while type of spike (compact, semi-compact and loose) was found to be polygenic.

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Selection of suitable parents is an important step in a breeding programme. Study of the inheritance of selected characters helps in identifying suitable parents. The present investigation was conducted to study the inheritance of selected characters in castor.

The present investigation was conducted at the Agricultural University, Raipur, Chhattisgarh. The parents used were 30-5 and Chhobav were selected for the study. These were crossed in all possible combinations, excluding reciprocal crosses. The F₂ generation was raised in a randomized block design with three replicates at the Agricultural University, Raipur, Chhattisgarh. The study was conducted during summer 1998. The study was conducted in a single row of 10 plants per plot and the plants were spaced at 1.0 m x 1.0 m. The number of plants per plot was 10. The plants were harvested at maturity and recorded on five characters and the data were recorded in each row for statistical analysis. The data were analysed by using the chi-square test.