

Inheritance of determinate growth habit in fenugreek (*Trigonella foenum-graecum* L.)

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Abstract

Inheritance of determinate growth habit in fenugreek (*Trigonella foenum-graecum* L.) was examined in six generations of the reciprocal crosses of HM 350 with NLM and HM 65. All the F_1 plants had indeterminate growth habit in both the crosses. In F_2 , segregation was observed in 3 : 1 ratio for indeterminate and determinate plant types revealing that determinate habit was under the control of a single recessive gene. The results were further confirmed by observing 1 : 1 ratio in back crosses involving HM 350 as one of the parents.

Key words: fenugreek, growth habit, inheritance, *Trigonella foenum-graecum*.

Fenugreek (*Trigonella foenum-graecum* L.) is one of the important legume crops grown during *rabi* season. It has multifarious uses viz. seed, fodder, feed, vegetable, spices etc. It is rich in proteins and vitamins and has good medicinal value also. Being a legume crop, it enhances the fertility of the soil. Breeding of determinate type varieties is the major research strategy in all legume crops including fenugreek. Determinate varieties have their own advantages like early and synchronous maturity, compact plant type, higher per plant yield etc. Information on inheritance of determinate growth habit in fenugreek is still lacking and therefore, the present investigation was undertaken.

The experimental material comprised three true breeding genetically diverse genotypes of fenugreek viz. HM 350 (having determinate growth habit), NLM and HM 65 (having indeterminate growth habit). The genotype

HM 350 was crossed to both NLM and HM 65 and F_1 , F_2 and back cross generations were developed to study the growth habit. The genetic material was grown in a randomized block design in triplicate during *rabi* 2000-2001 at the research farm of CCS Haryana Agricultural University, Hisar with row to row spacing of 30 cm. Non-segregating generations (P_1 , P_2 and F_1) were grown in single rows, whereas F_2 and back crosses had four and two rows each, respectively. Observations on behaviour of growth habit of individual plants were recorded in each generation and Chi-square test was applied to test the goodness of fit for the observed segregation ratios.

All the F_1 plants in both the crosses viz. NLM x HM 350 and HM 350 x HM 65 had indeterminate growth habit (Table 1). These results indicated that indeterminate growth habit is dominant over the determinate growth

Table 1. Mode of segregation for growth habit in fenugreek

Generation/cross	Number of plants observed		Total	Expected ratio	X ² value	P = 0.05
	Determinate type	Indeterminate type				
F ₁ (NLM x HM 350)	-	63	63	-	-	-
F ₂ (NLM x HM 350)	44	155	199	1:3	0.886	0.50-0.30
B ₁ (NLM x HM 350) x NLM	-	108	108	-	-	-
B ₂ (NLM x HM 350) x HM 350	55	48	103	1:1	0.476	0.50-0.30
F ₁ (HM 350 x HM 65)	-	54	54	-	-	-
F ₂ (HM 350 x HM 65)	61	159	220	1:3	0.872	0.50-0.30
B ₁ (HM 350 x HM 65) x HM 350	73	67	140	1:1	0.257	0.70-0.50
B ₂ (HM 350 x HM 65) x HM 65	-	122	122	-	-	-

habit. In F₂ generations of both the crosses, segregation was observed in the ratio of 3 indeterminate : 1 determinate which showed a good fit to 3 : 1 monohybrid ratio. These results indicated that indeterminate habit in NLM and HM 350 was controlled by a single dominant gene whereas its recessive counterpart governed the determinate habit in HM 350. The back crosses involving HM 350 as one of the parents also segregated and showed a good fit to 1 determinate : 1 indeterminate ratio which further confirmed the above findings. Reports to confirm these findings in fenugreek are not available, however, in other crops there are contradictory reports on this aspect. Rheenan *et al.* (1994) have reported that determinate growth habit in chickpea is dominant and under digenic control, whereas Gumber & Singh (1997) reported in pigeonpea that determinate habit was under the control of two recessive genes. However, Cheralu (1993) indicated that a single recessive gene was responsible for the expression of determinate growth habit in pigeonpea.

The present study, thus indicated that indeterminate growth habit is dominant over determinate habit which in turn is under single recessive gene control in fenugreek. The simple inheritance pattern further indicated that determinate habit can easily be incorporated into desirable genotypes and it can also be used as a marker trait for easy identification of varieties in breeding and seed production programmes.

References

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