

INHERITANCE OF FASCIATION IN MUNGBEAN (*VIGNA RADIATA* (L.) WILCZEK)

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ABSTRACT

The inheritance of fasciation was studied in the parents, F₁, F₂ and F₃ generations of mungbean. The fasciation of branches is under the control of a single recessive gene with pleiotropic effect leading to the increase in the number of floral organs. The gene symbol *fs*₁ is proposed for fasciation.

Key words: Mungbean, *Vigna radiata*, fasciation, pleiotropic effect.

Mungbean, or greengram (*Vigna radiata* (L.) Wilczek), an important grain legume of India is also grown in Pakistan, Bangladesh, Sri Lanka, Philippines, Taiwan, Nepal, Thailand, Laos, Kampuchea, Vietnam, Indonesia, Eastern Malaysia, Southern China, Java, etc. Its germplasm has narrow variability. Therefore, experiments were initiated to increase the variability through induced mutations in a widely cultivated variety. A mutant with fasciation of branches and increased number of floral organs was noticed [1] in M₂ bulk population of cv. T 44, irradiated with 10 kR ⁶⁰Co gamma rays. The frequency of mutants was 0.03% of the total M₂ population. The mutant bred true in subsequent generations. Pollen sterility was higher in the mutant than in the parent variety. This paper reports on the inheritance of this mutant.

MATERIALS AND METHODS

Observations were recorded on the fasciation of branches and number of floral organs in the parents, F₁, F₂ and F₃ generations (including reciprocals) of the cross T 44 x T44 (Fas). T 44, the parent variety, had normal stem and floral organs while its mutant, designated as T 44(Fas) had fasciation of branches and increased number of floral organs. Goodness of fit was determined by χ^2 test for segregation ratios.

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RESULTS AND DISCUSSION

An examination of the parents revealed that T 44 had pentamerous flowers with 5 sepals, 5 petals, diadelphous stamens (1+9), and one pistil, whereas the mutant had 5 to 6 sepals, 6 to 7 petals, 11 to 14 diadelphous stamens (1+10 to 1+13), and 2 to 4 pistils. The pistils in the mutant developed pods with seeds. The mutant plants had fasciation of branches. The F₁ plants of cross T 44 x T 44(Fas) (including reciprocal) had normal stem and floral organs, suggesting that fasciation is a recessive trait controlled by nuclear gene(s). The F₂ segregation in the crosses T 44 x T 44(Fas) and T 44(Fas) x T 44 showed a close fit to the 3 normal : 1 fasciated ratio ($\chi^2 = 0.333$ and 0.479 , $P = 0.70-0.50$ and $0.50-0.30$). The F₃ progenies were in the ratio of 1 (normal) : 2 (segregating) : 1 (fasciated) (Table 1). Thus, fasciation of branches is due to a single recessive gene. All the fasciated plants also had higher number of floral organs. This suggests that the gene responsible for fasciation has pleiotropic effect on the number of floral organs. Gene symbol *fs*₁ is proposed for fasciation in mungbean.

Table 1. Segregation for fasciation in F₂ and F₃ generations in mungbean

Cross	Generation	Observed segregation			Expected ratio	χ^2	P
		normal	segregating	fasciated			
T 44 X T 44(Fas)	F ₂	50	0	14	3:1	0.333	0.70-0.50
T 44 X T 44(Fas)	F ₃	13	21	9	1:2:1	0.767	0.70-0.50
T 44 X T 44(Fas)	F ₂	155	0	46	3:1	0.479	0.50-0.30
T 44(Fas) X T 44	F ₃	12	26	9	1:2:1	0.915	0.70-0.50

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REFERENCE

1. D. P. Singh. 1981. Fasciated mutant in greengram (*Vigna radiata* (L.) Wilczek). Mut. Breed. Newsl., 18: 5.