



Short Communication

A long pedicelled mutant and its inheritance in grasspea (*Lathyrus sativus* L.)

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Pedicel is a flower bearing axis. In grasspea (*Lathyrus sativus* L.) pedicel terminates in a single flower and its length varies in a limited range. Conspicuous reduction in the length of pedicel was, however, noticed in a dwarf mutant of grasspea var. Bio R-231 showing very poor yield [1]. In contrast to this, unusually long pedicel was detected in an induced mutant manifesting earliness in flowering and maturity with considerably higher yield in the same variety. Characteristic features of the mutant and inheritance pattern of the length of pedicel have been stated in the present text.

The experimental material consisted of an induced mutant with remarkably longer pedicel and early maturity and a short pedicelled dwarf mutant of the mother strain (cultivar Bio R-231) of grasspea (Fig. 1, 2). The long pedicelled mutant isolated from gamma ray irradiated (400 Gy) M_2 progeny of var. Bio R-231 was characterized on the basis of phenotypic manifestations in M_2 and M_3 plants. Length of pedicel and plant height in the two mutants and the mother strain (control) was measured in cm. at regular intervals and finally during harvest from randomly chosen 30 M_3 plants (Fig. 3, 4). Inheritance of pedicel length was studied following intercrosses between the two mutants and between the control and the present mutant. The F_1 s were selfed and backcrossed to the recessive parent. The segregating populations in F_2 were grouped into different classes on the basis of pedicel length taking a class interval of two. Mode of inheritance of pedicel length was predicted by analyzing frequency of F_2 classes with the help of chi-square test.

The mutant showed higher rate of growth than the control and the dwarf mutant from early seedling stage. It was taller but with marginally reduced number of primary branches. The rate of increase in plant height and appearance of primary branches in the mutant was faster than other parents (Fig. 4, 5). As compared to the control and dwarf mutant, the length of pedicel increased remarkably but the rate of enhancement was also found to be different from the control and dwarf mutant (Fig. 3). It was found that the range of variation of pedicel length in the mutant was remarkably wider with higher mean value than in

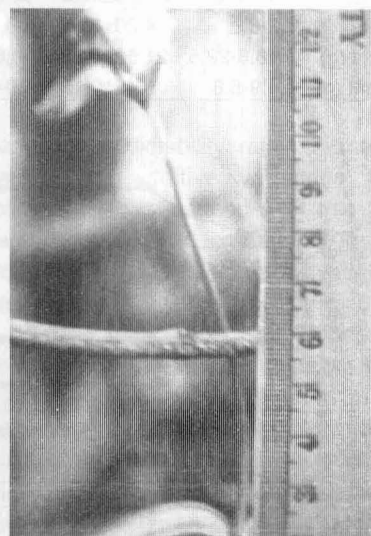


Fig. 1. A long pedicelled mutant showing pedicel

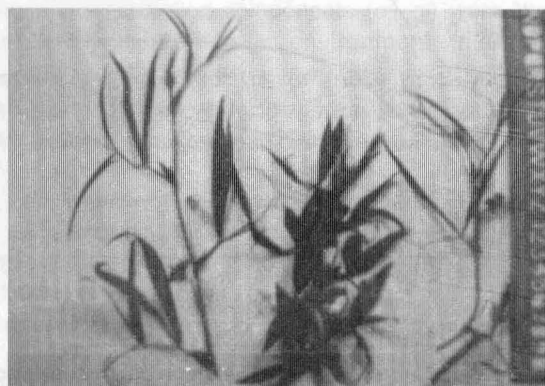


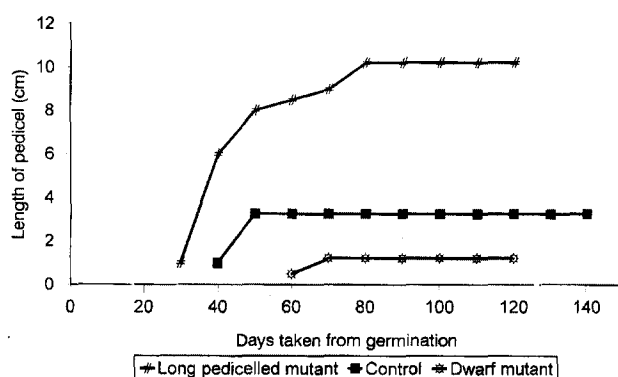
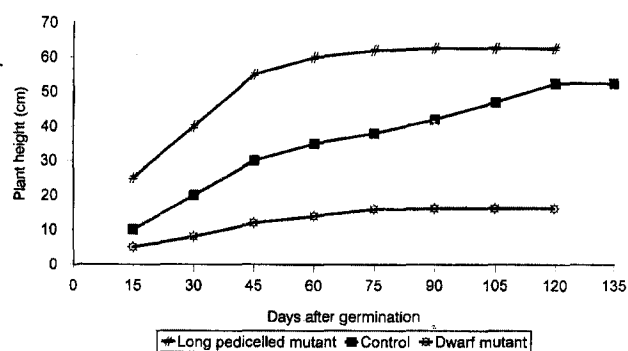
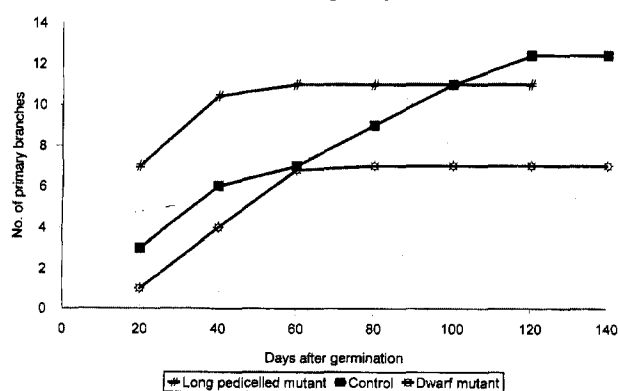
Fig. 2. Control and dwarf mutant (middle) of grasspea

the control (Table 1). This mutant with long pedicel was earlier in flowering and maturity by nearly 13 days and 20 days respectively than control. Moreover, its yield had increased almost two times to that of the control. It might therefore be designated as a long pedicelled, early maturing high yielding mutant and length of pedicel might be used as a reliable marker character to identify this mutant from other genotypes in grasspea.

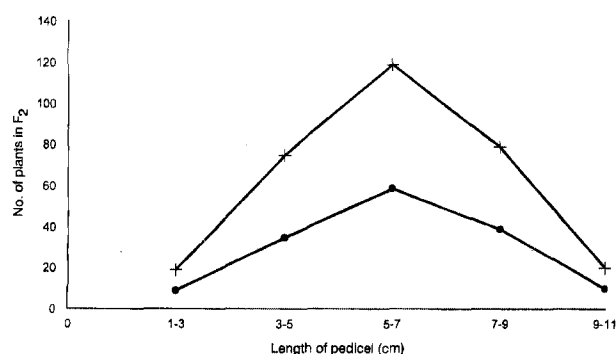
Inheritance of pedicel length: F_1 s derived through intercrosses between the true breeding long pedicelled

Table 1. Range and mean of important characters of long pedicelled mutant and control plants of grasspea

Characters	Long pedicelled mutant		Control	
	Range	Mean \pm SE	Range	Mean \pm SE
Plant height (cm)	59-65	62.57 \pm 0.21	50-55	52.40 \pm 0.03
Internodes/plant	190-202	199.10 \pm 0.24	208-212	210.12 \pm 0.01
Branches/plant	8-11	10.43 \pm 0.29	10-15	12.40 \pm 0.11
Length of pedicel (cm)	7.9-10.2	9.90 \pm 0.19	2.5-3.4	3.26 \pm 0.08
Days to first flowering	30-38	35.20 \pm 0.42	45-52	4.80 \pm 0.04
Days to maturity	111-117	11.40 \pm 0.19	132-136	13.40 \pm 0.01
Pods/plant	91-102	99.75 \pm 0.28	80-88	8.40 \pm 0.03
Seeds/pod	2-6	4.20 \pm 0.62	3-4	3.60 \pm 0.14
Seed yield/plant (g)	18.8-22.5	21.52 \pm 0.23	10.6-12.2	11.60 \pm 0.04
100 seed weight (g)	4.9-5.8	5.46 \pm 0.12	5.0-6.2	5.50 \pm 0.10

**Fig. 3.** Rate of increase in pedicel length in control and two mutant lines of grasspea**Fig. 4.** Rate of increase in plant height in control and two mutants of grasspea**Fig. 5.** Appearance of primary branches in control and two mutants of grasspea

(7.9-10.2; 9.9 ± 0.19) and the short pedicelled (1.12-1.31 cm; 1.22 ± 0.05) dwarf mutant manifested intermediate length of pedicel, ranging between 4.2-6.4 cm with a mean value of 5.5 ± 0.35 . The variation of pedicel length in F_2 was found to be wider as well as continuous, extending within the ranges of the two mutants (Fig. 6). Some of the F_2 plants have also shown similar range and mean value of pedicel length as the present control variety Bio R-231. The F_2 progeny was grouped into five different phenotypic classes on the basis of mean and variation of pedicel length fitting closely ($\chi^2 = 0.773$; $P = 0.90-0.95$) to 1(8. 1-10.5; 9.9 ± 0.22): 4(7.5-8.1; 7.8 ± 0.04): 6(5.5-7.51; 6.8 ± 0.17): 4(2.9-4.2; 3.902 ± 0.11): 1(1.12-1.44; 1.24 ± 0.03) segregation. Following crosses between control and long pedicelled mutant mean value and variation in pedicel length were also intermediate in F_1 and variable within parental limits showing good fit to 1:4:6:4:1 in F_2 (Fig. 6). This type of continuous variation in pedicel length has indicated involvement of two pairs of genes

**Fig. 6.** Frequency distribution (F_2) curve showing continuous variation in (+) control \times long pedicelled mutant and (•) long pedicelled \times dwarf mutant of grasspea

showing polygenic interaction. The F_2 plants showing long pedicelled mutant phenotype bred true producing only long pedicellate plants in F_3 generation. Continuous variation has also been reflected in the observed 1(5.5-7.5cm; 6.81 ± 0.15): 2 (3.1-4.5cm; 3.9 ± 0.10): 1 (1.10-1.51cm; 1.23 ± 0.03) phenotypic segregation ($\chi^2 = 0.107$; $P = 0.90-0.95$) in back cross progeny of $F_1 \times$ dwarf mutant in which the two phenotypic classes showing identical pedicel length due to presence of single (dominant) contributing allele belonging to either of the two loci have merged together and the usual 1:1:1:1 genotypic ratio has thus been modified.

Reference

1. Talukdar Dibyendu, Biswas S. C. and Biswas A. K. 2001. An induced dwarf mutant of grasspea. Indian J. Genet., 61: 383-384.