

The biochemical significance of the enzymatic cleavage of PDP is not clear at this moment.

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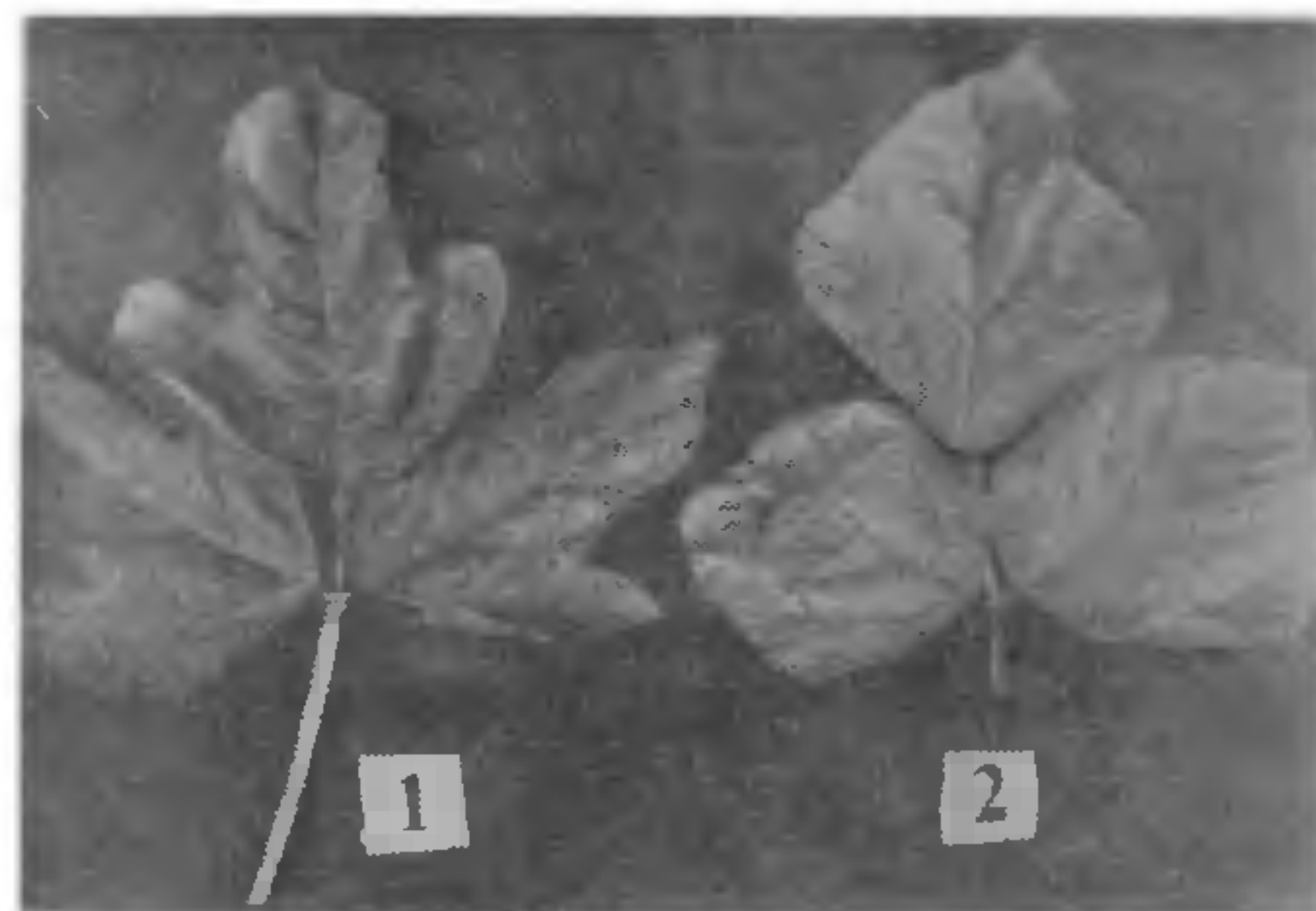
# **GENETIC ANALYSIS OF THE TRILOBATE LEAF MUTANT IN MUNGBEAN (*VIGNA RADIATA* VAR. *AUREUS* (L.) WILCZEK)**

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SEEDS of mungbean cultivar K851 were irradiated with different doses of gamma rays (source  $^{60}Co$ ) and

from the  $M_1$  generation of the seeds treated with 60 kR dose a leaf mutant was selected. This mutant plant had all trilobate leaves in contrast to the standard plants which had monolobate leaves (figures 1 and 2). A true breeding stock of the mutant was prepared for further studies and the present communication reports the results of the inheritance studies conducted in this mutant line.



**Figures 1 & 2.** Leaves of the trilobate mutant (1) and the normal (2) plants.

Seeds of the trilobate leaf mutant of mungbean selected in the  $M_1$  generation were grown during the next season and the true breeding ones were selected. These were again tested for segregation in the preceding season in a plant to row system. As there was no further segregation, these plants were marked as true breeding trilobate leaf mutants. The plants of cultivar K851 were used as the standard parent. For making the crosses, the unopened flower buds were emasculated in the evening, immediately sprayed with 50 ppm aqueous solution of kinetin (Sigma, USA) to minimise flower shedding and were pollinated the next morning. Reciprocal crosses were attempted between the mutant and the standard genetic stock and the data recorded on  $F_1$ 's (both ways),  $F_2$  and the backcross progenies. Cytological studies were also done by squashing young anthers<sup>1</sup>.

All the  $F_1$  plants raised from the seeds obtained by reciprocally crossing the mutant types with the standard ones exhibited the mutant phenotype, thus suggesting the dominant expression of the mutant gene over its standard allele. There were, however, no differences in the  $F_1$  progenies of the reciprocal crosses.

The  $F_1$  plants were further crossed to the two parental types and were also allowed to self fertilize. The data presented in table 1 reveal that the  $F_2$  progeny showed a 3:1 segregation ratio typical of the one expected in case of a single dominant gene inheritance. In the backcross progeny of the cross  $F_1 \times$  mutant, all the plants were mutant type while in the cross  $F_1 \times$  standard, a typical 1:1 segregation ratio was

TABLE 1

Segregation of the trilobate gene in mungbean indifferent generations of selfing and crossing

Progeny of	Segregation pattern (No. of plants)			Ratio	P
	Normal	Mutant	Total		
Mutant selfed	0	172	172	0:1	—
F <sub>1</sub> 's:					
(Standard × Mutant)	0	46	46	0:1	—
(Mutant × Standard)	0	53	53	0:1	—
F <sub>2</sub> :					
(F <sub>1</sub> × F <sub>1</sub> )	32	127	159	1:3	0.2
Back crosses:					
(F <sub>1</sub> × Normal)	27	34	61	1:1	0.5
(F <sub>1</sub> × Mutant)	0	69	69	0:1	—

observed. Thus, it can be concluded that the leaf shape (trilobate vs monolobate) is governed by a single gene with the trilobate (Tlb) gene showing dominance over its standard allele t lb<sup>+</sup> (monolobate leaves).

The meiotic studies conducted on the mutant plants revealed a normal division, indicating that the mutant phenotype was not due to any structural abnormality in the karyotype.

Interestingly, the gene for anthocyanin pigmentation appeared to be tightly linked with the Tlb gene as the plants with trilobate leaves were always purple stemmed. This phenomenon is under investigation.

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Nair<sup>2,3</sup>, in his treatise of pollen grains of cultivated plants, studied several ornamentals, namely, *Canna*, *Bougainvillea*, *Hibiscus* and *Euphorbia pulcherrima*, and reported a series of reduction in the excrescences of the pollen of *Canna* varieties. In *Nymphaea stellata* var. *August Coach*, a large number of pollen types were observed which included monads, dyads, triads, tetrads and abnormal mini and giant grains, besides an array of apertural types and surface patterns<sup>4</sup>. The present report relates to the occurrence of pollen anomaly in the same pollen mass of *Dombeya* × *cayeuxii* Hort. ex André (*D. wallichii* × *D. mastersii*) belonging to the family Sterculiaceae.

Pollen morphological studies have been made both by light microscope and scanning electron microscope. Pollen preparations have been made according to the acetolysis method<sup>5</sup>. For scanning electron microscopic studies, acetolysed pollen grains were transferred to absolute alcohol, mounted on stubs, coated with gold in sputter coater under vacuum and photographed in scanning electron microscope (JEOL JSM 35C).

In the pollen mass, based on both light microscope and scanning electron microscope, seven pollen types have been observed which are summarised in table 1 and described below:

1. *Basic pollen type*: Pollen grains 3-4-zonoporate, spheroidal, size 83 µm (76-87 µm). Pore circular (6-7 µm) or elliptical (6 × 4 µm or 5 × 3 µm), annulate, annulus thick. Exine surface spinate, spine-base bulbous, spine length 7-10 µm, width at the base 6-10 µm; interspinal region reticulate. Exine thickness without spines 2 µm. (figure 1 and 2). As observed under light microscope, the columellae are dimorphic in size. The bulbous base of the spines is formed and supported by the longer columellae and the interspinal region has smaller columellae. Ektexine is thinner than endexine.

#### POLLEN ANOMALY IN *DOMBEYA* × *CAYEUXII* HORT. EX ANDRE (*D. WALLICHII* × *D. MASTERSII*)

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A CHANGE in the genetical system of plants is often reflected in pollen morphological characters. A deviation in apertural features in the pollen of naturally occurring hexaploid and octoploid plants of *Sisymbrium irio* was reported earlier<sup>1</sup>. However, in the cultivated plants, a high degree of pollen variability and abnormality is prevalent in the same pollen mass.