

Dwarf mutant of *Papaver somniferum* with high morphine content

Opium poppy, *Papaver somniferum* L. is an important medicinal plant known for its morphine, codeine, and thebaine alkaloids. This Institute had earlier released two latex opium yielding poppy varieties, "Shyama" and "Shweta", which are now cultivated by the farmers under the supervision of the Narcotic Department of the Government of India. However, both these varieties became susceptible to downy mildew (*Peronospora arborescens*). Lodging due to heavy capsule weight is another problem affecting latex yield.

With these problems in mind, we undertook mutation breeding on the above mentioned two varieties employing gamma rays (5 kR, 15 kR, 20 kR) and EMS (0.2%, 0.4%, 0.6%) and combined mutagens (5 kR + 0.2% EMS, 5 kR + 0.4% EMS and 5 kR + 0.6% EMS). M₁ from the treated seeds (405 plants) was raised in winter 1984-85. M₂ generation of 13,500 plants (i.e. 270 M₁ progenies x 50 plants) was raised in winter 1985/86. A dwarf mutant with high morphine content was indentified in M₂ from the variety "Shweta" treated with 5 kR + 0.4% EMS. The mutant differs by its dwarf stature, compact leaf arrangements, multilocular capsules, increased capsule number, and small capsule size (Table). The mutant is under testing for its superior morphine production. It may be used as dwarf gene source in hybridization for improving lodging resistance. This mutant is a novel type, which was not available in our germplasm collection.

Table. Alkaloid content and other traits of dwarf poppy mutant and its parent in M₂. (mean \pm SE based on 22 plants; alkaloid value based on 5 bulked samples in case of control and 15 samples in the mutant.)

Characters	Dwarf mutant	Parent
Plant height (cm)	47.71 \pm 1.36	95.90 \pm 1.08
Peduncle length (cm)	14.98 \pm 0.50	21.72 \pm 0.20
No. of capsules/plant	8.77 \pm 0.85	2.54 \pm 0.11
Capsule index	0.66 \pm 0.02	0.85 \pm 0.02
Anther length (cm)	0.33 \pm 0.01	0.49 \pm 0.01
Length of filament (cm)	1.33 \pm 0.03	1.52 \pm 0.02
Straw weight (g)/plant	12.60 \pm 1.46	21.68 \pm 0.19
Morphine content (%)	0.84 \pm 0.03	0.42 \pm 0.04
Codeine content (%)	0.07 \pm 0.01	0.06 \pm 0.01
Thebaine content (%)	0.07 \pm 0.01	0.06 \pm 0.01

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