and from − 8·34 (number of days to maturity) to 6·80 (plant height) in parents, F_1 and F_2 populations, respectively.

TABLE I

Correlated response for different characters with yield in Amaranthus hypochondriacus *L.*

Characters	Parent	F_1	F_2
Number of days to flowering	15·3189	− 0·6750	1·1202
Plant height	22·7071	10·5638	6·7997
Number of panicles/plant	1·7503	0·7452	2·8729
Length of the panicle	0·0000	−0·2323	0·8668
Weight of the grains/panicle	0·0000	3·1598	−0·0979
Number of days to maturity	9·3601	− 5·5986	−8·3428
Grain weight (1,000-grains)	4·6023	0·0193	0·0454
Harvest index	37·1492	5·5357	3·4287
Pollen fertility	35·7563	−1·3936	−0·5959

As is apparent from Table I, the harvest index had the highest correlated response, followed by pollen fertility and plant height in parental populations indicating a possibility of increased yield, through selection for the above-mentioned traits.

An estimate of correlated response in F_1 and F_2 populations revealed that plant height had the highest value (with grain yield/plant), followed by harvest index and number of panicles/plant. Thus selection for these three main yield contributing characters is likely to prove beneficial for obtaining higher yield/plant.

Pollen fertility showed negative correlation response with yield in F_1 and F_2 while its positive response in parental populations indicated less importance in the selection programme. On the other hand number of days to flowering and length of the panicle showed negative correlation response in F_1 but revealed positive response (with grain yield/plant) in F_2 generation.

In an analysis of data from all the generations characters of plant height, harvest index and number of panicles/plant were observed to have a fair correlation response with yield. Thus improvement in grain yield appears possible through the selection for the aforementioned characters.

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Cytogenetics Laboratory,
National Botanical
Research Institute,
Lucknow 226 001 (India),
July 23, 1979.

RAM MILAN PANDEY.

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EFFECT OF ROOT-KNOT NEMATODE ON THE SUSCEPTIBILITY OF PUSA PURPLE CLUSTER BRINJAL TO BACTERIAL WILT

BRINJAL (*Solanum melongena* L.) variety 'Pusa Purple Cluster' was reported to be highly resistant to bacterial wilt caused by *Pseudomonas solanacearum* Smith (Rao *et al.*[1]). Several plants of this variety were found wilting at the Experiment Station, Indian Institute of Horticultural Research, Hessaraghatta, Bangalore. Such plants were found infected with the root-knot nematode, *Meloidogyne incognita* (Kofoid and White) Chitwood and the wilt bacterium, *P. solanacearum*. A pot culture experiment was set up to study the role of the root-knot nematode on the susceptibility of 'Pusa Purple Cluster' variety of brinjal to bacterial wilt.

Four-week old brinjal seedlings (var. Pusa Purple Cluster) grown in sterilized soil were transplanted singly in 15 cm earthen pots containing sterilized soil. For each plant, 10 ml of bacterial suspension (0·5 optical density) grown on nutrient agar for 48 hr at 30° C was used for inoculation. Freshly hatched second stage larvae of *M. incognita* were used for inoculation at about 2,000 larvae per plant. The six treatments included were: nematode alone (N), bacterium alone (B), nematode and bacterium simultaneously (N + B), bacterial inoculation 3 weeks after nematode inoculation (N → B), nematode inoculation 3 weeks after bacterial inoculation (B → N) and control (C). Each treatment was replicated 10 times. Observations on wilting were recorded 2 months after first inoculation.

It is evident from results presented in Table I that wherever the nematode and the bacterium were inoculated in combination, 20 to 40% plants wilted. More number of plants wilted (40%) when the nematode and the bacterium were inoculated simultaneously than the nematode followed by the bacterium or *vice versa* (20%). There was no wilting in the treatments "nematode alone", "bacterium alone" and "control".

TABLE I

Effect of M. incognita *on the susceptibility of PPC brinjal to* P. solanacearum

Treatments	No. of plants wilted	% of plants wilted
N	0/10	0
B	0/10	0
N + B	4/10	40
N → B	2/10	20
B → N	2/10	20
C	0/10	0

These results clearly indicate that the root-knot nematode is perhaps responsible for breaking bacterial wilt resistance in 'Pusa Purple Cluster' variety of brinjal. This may be due to the root-knot nematode acting as a modifier of plant tissue in such a way, that the tissue becomes more suitable for bacterial colonization as suggested by Johnson and Powell[2].

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Indian Institute of Horticultural Research, 255, Upper Palace Orchards, Bangalore 560 006, *July* 25, 1979.

P. PARVATHA REDDY.
D. B. SINGH.
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LEAF MUTATIONS INDUCED WITH NMU AND GAMMA RAYS IN LENTIL (*LENS CULINARIS* MEDIC.)

IN the course of mutation studies in lentil, mutations affecting leaf morphology were isolated. Leaf mutations having unaltered number of leaflets/leaf and set seeds were reported earlier[1]. The present study deals with the morphological description and mode of inheritance of two leaf mutations showing reduction in the number of leaflets/leaf and complete sterility.

Dry seeds of the lentil variety L–258 were treated with 0·005 and 0·01% aqueous solution of N-nitroso-N-methyl urea (NMU) and 6 and 10 kR doses of Co^{60} gamma rays. M_2 progenies were raised from M_1 plants for screening various mutations. Leaf variants were isolated in M_2 generation and confirmed as mutants in M_3 generation. The mutants were named according to the most conspicuous character, though other characters were also altered.

Boat leaf: The striking feature of this mutant was 3 to 4 boat-shaped leaflets/leaf (Fig. 1). The leaflets appeared to develop from the same place due to the reduction in the length of leaf rachis and the whole leaf exhibited trifoliate or tetrafoliate structure. The mutant had dwarf growth habit due to shorter internodes. The leaflets were thick, dark green in colour and curved upward at the base in a characteristic manner to give a boat-shaped appearance. The midrib of the leaflets was poorly developed and the leaflets were devoid of glandular hair. The mutant plants remained green for longer period than control and produced a few small and deformed flower buds which failed to open. All the floral parts of these buds were rudimentary. The mutation was isolated in 0·01% NMU treatment. One M_2 progeny segregated into one mutant and 25 normal plants. One normal plant of the mutated progeny again segregated in M_3 consisting of 2 mutants and 37 normal plants.

FIG. 1. Left to right: (1) Normal leaf, (2) boat leaf and (3) rolled leafy structure of crinkled leaf mutant.

Crinkled leaf: The mutant was very conspicuous because of the twisting, folding, shrinking and irregular serration on the margin of the leaflets. A few leaflets of the mutant plant were fused and rolled into a small leafy structure (Fig. 1). The leaf was short with 6–8 small, tender, pale-green, overlapping and irregular shaped leaflets. The mutant plants flowered at about the same time as the parental type, but produced a few small actinomorphic flowers. The flowers had small sepals and petals, but rudimentary androecium and gynoecium. The mutation was isolated in M_2 generation following treatment with 10 kR gamma rays. One M_2 progeny segregated into 3 mutants and 20 normal plants. In M_3, 2 normal plants of the mutated progeny again segregated and