room (temperature 20±2°C, light period 12 h with flourescent tubes). Light brown, water-soaked lesions started appearing after 3 days and a profuse whitish growth of sporangia and sporangiophores was visible after 5 days of incubation. The pathogen was thus multiplied and maintained on detached leaves as above by serial inoculations for further experiments.

Six fungicides, viz. Dithane M-45 (75% manganese ethylene bis-dithiocarbamate+2% zinc ion) @ 0.3%, Blitox (50% copper oxychloride) @ 0.3%, Foltaf (80% N-(1,2,2-tetrachloroethyl-cis-Δ-4-cyclohexane-1, 2-dicarboximide) @ 0.2%, Bordeaux mixture (2:2:250), Mikal (50% aluminium tris phosphonate+25% N-(trichloromethyl thio phthalimide)) @ 0.2%, Ridomil (25% N-(2,6-dimethylphenyl)-N-methoxyl-acetylalanine) @ 0.2% and a combination of Ridomil (0.1%) plus Dithane M-45 (0.3%) were evaluated against this disease. Leaves of potato variety Kufri Chandramukhi were taken from plants after 18 h of spray with test fungicides and placed in enamel trays lined with moist cotton. Unsprayed leaves were used as controls. Leaves were inoculated and incubated as described earlier. Observations on per cent leaf area infected were recorded on a 0–5 scale after 5 days of inoculation. All the fungicides provided complete control of the late blight infection except Blitox (0.3%) and Bordeaux mixture (0.8%) in which 15 to 20% disease intensity was observed.

In another experiment, detached potato leaves were first inoculated with sporangial suspension and then sprayed with the test fungicides after 12 h. Observation on disease development recorded after 5 days revealed that only Ridomil (0.2%) and Ridomil (0.1%) plus Dithane M-45 (0.3%) were able to arrest the disease development while all other chemicals proved ineffective in checking the infection when applied as post-inoculation treatments (figure 1).

With the use of this technique fresh and viable inoculum of *P. infestans* can be maintained on detached leaves and the sporangial inoculum can be rapidly multiplied for use in fungicide evaluation, screening of germplasm under laboratory conditions and other laboratory experiments.

A LEAF MUTANT IN GRAM (*CICER ARIETINUM* L.)

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A spontaneous mutation affecting leaf morphology was obtained in gram (*Cicer arietinum* L.) variety Pink-2. It bred true indicating that the character was controlled by a recessive gene. The mutant leaf was small in size and narrow in shape (figure 1). Trigenic interaction has been reported in the inheritance of leaf shape in gram[1] and the narrow tiny leaf was designated as Slv Slv tlv tlv nlv nlv double recessive homozygote. The present note deals with the effect of leaf size on the seed yield and its components when compared to its parent and another similar genotype (GRU 2/6119) obtained from ICRISAT.

The characters observed are presented in table 1. There was very little difference in the plant height; however, the mutant matured earlier than its parent; there was an increase in the number of branches per plant, biological yield and grain yield. However the pod number was reduced in the mutant. The grain colour was also changed to brown from its parents' pink colour. It might be possible that the brown colour was associated with leaf shape as GRU 2/6119 also had brown seed coat. The flower colour was the same as its parent (white) but differed from GRU 2/6119 (blue).

The mutant showed superiority over its parent and GRU 2/6119 in grain yield, biological yield and the harvest index, indicating that leaf shape brought

Figure 1. Leaf mutant in gram.

Table 1 *Mean values of yield and its components*

	GRU 2 6119	Pink-2	Pink-2 mutant
Maturity (days)	127	117	114
Plant height (cm)	47	54 6	50 4
No. of branches/ plant	7	11	13.2
No. of pods plant	24 6	82 4	63
No. of grains pod	1	1	1.1
100 grains weight (g)	14.8	16.2	14 4
Grain type	Desi	Pink (Gulabi)	Desi
Biological yield (g m^{-2})	0.30	0.61	0.90
Grain yield (g m^{-2})	0.11	0.17	0.37
Harvest index	36	27	42

Figure 2. Leaf mutant along with its parent and another mutant.

some physiological changes resulting in an increase in productivity. Besides, the mutant is of interest in genetical studies as a marker.

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INTERACTIVE EFFECTS OF SOIL FERTILITY AND SALT STRESS ON THE ACTIVITIES OF CERTAIN ENZYMES OF NITROGEN METABOLISM IN MUSTARD

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ALTHOUGH significant interaction between salinity and soil nitrogen has been found in many crops[1], information on the activities of enzymes related to nitrogen metabolism is scanty except for nitrate reductase[2]. However, the effects of salt stress, *per se* have been found to inhibit[3,4] or promote[5] the activities of nitrate reductase (NR), glutamine synthetase (GS) and glutamate dehydrogenase (GDH) depending on the crop, the stage of growth and the salt concentration. In this regard information on glutamate synthase (GOGAT) is meagre. The present study was prompted by the lack of information on mustard and the common practice of cultivation of this crop with substandard ground waters in the semi-arid parts of Rajasthan with soil fertilization.

Plants of *Brassica juncea* (cv. Varuna) were grown in glazed pots (40 kg loamy sand soil) under low (LF-no fertilizer to soil having 0.15% organic carbon, 15 kg/ha available P_2O_5 and 220 kg/ha available K_2O) and improved (IF-60 kg N/ha, 40 kg P_2O_5/ha and 20 kg K_2O/ha) soil fertility conditions. Plants under both the conditions were irrigated at weekly intervals from 20 DAS to 85 DAS with saline waters of 0, 50, 100 and 150 meq/l concentrations having salts in the same proportion as that of local ground waters[2]. At pre-flowering (45 DAS) and flowering (65 DAS) stages, two uppermost fully expanded leaves were homogenized in 0.1 M Tris HCl buffer (pH 7.6) containing 2% polyvinyl pyrrolidone (PVP) and 10^{-4} M ethylenediaminetetraacetic acid (EDTA) at 4°C. After centrifugation, the supernatant was used for the assay of GS (sodium glutamate substrate)[6], GDH (α-keto glutarate substrate)[7] and GOGAT (glutamine and α-keto glutarate substrate)[7]. Activities of these enzymes were ascertained from the change in the absorbance per unit time. TCA (10%) was added to an aliquot of the aforesaid supernatant and the precipitated protein was dissolved in NaOH (0.1 N) for its spectrophotometric estimation[8]. NR was estimated *in vivo* from leaf disks using KNO_3 as