Figure 1. Left, Infected plant, showing shortening of internodes and bunching of leaves. Right, healthy plant.

Eleusine coracana, Setaria italica, Sorghum vulgare, S.bicolor and *Saccharum officinarum.* Out of these *S.bicolor* produced local lesions. Attempts to infect *Avena sativa, Hordeum vulgare, Triticum valgare,* and *Nicotiana Tabacum* were unsuccesful.

Oryza sativa was found to be symptom-less-carrier of the virus.

The properties of the virus showed a dilution-end-point in between 1:1000–1:5000, a thermal-inactivation-point between 50-55° C (when heated for 10 min) and a longevity '*invitro*' for 65–75 hr at room temperatures (30 ± 1° C).

Figure 2. Left, Infected leaf showing mosaic, Right, Healthy leaf.

The virus was readily transmitted to *Zea mays* by aphid *Aphis gossypii Rhopalosiphum maidis* and *Myzus persicae* giving 40, 45 and 60% infections respectively. Aphid *R. maidis* was found colonizing the maizeplants, thus proving to be its natural vector.

The symptoms, host range, physical properties and insect vectors of the above virus suggest it to be maize dwarf mosaic virus (MDMV)[1,2]. This is probably the first record of MDMV in India.

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A PRODUCTIVE EARLY SALT-TOLERANT IR-8 MUTANT

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IR-8 is the most popular dwarf high yielding rice variety as it has revolutionized rice yields for the last two decades. But it is now losing its area under cultivation due to its late maturity, though in some parts of the country it is still accepted. Its grains are coarse, translucent with a 'white belly' in endosperm. Breakage in this white chalky portion leads to a low recovery of head rice. Since induction of mutations is a proven supplement to conventional breeding to confer specific improvement in a variety without altering its otherwise acceptable phenotype[1,2], mutagens singly and in combination were used to rectify the genetic defects in this variety. Using γ-rays, EMS and DES, Kaul[3] isolated 20 useful mutants of rice. Of these, IRm-6, obtained after 6 hr of 1.5% EMS treatment to 12 hr presoaked seeds of IR-8 rice appears most promising after five generations of testing.

This mutant is fine-grained (figure 1) early maturing, protein-rich and high-yielding (table 1). In addition, the shoot height, tiller number, kernel transparency and photosynthetic pigment contents are altered in the mutant. Besides, it exhibits better salt tolerance

TABLE 1

Performance of IR-8 and IRm-6 (Mean value of 40 observations)

Traits	IR-8	IRm-6
Shoot height (cm)	90.6 ± 0.7	95.7 ± 0.6
Productive tillers	8.7 ± 0.5	11.7 ± 0.4
Maturity period (seed to seeding)	150.6 ± 1.5	130.8 ± 1.8
Grain length (mm)	6.4 ± 0.2	6.3 ± 0.3
Grain breadth (mm)	2.7 ± 0.2	2.4 ± 0.1
Grain fineness (L:B)	2.4	2.6
Grain yield (t/ha)	5.3 ± 0.6	6.5 ± 0.5
Seed protein (%)	7.1 ± 0.3	8.8 ± 0.5
* Photosynthetic pigments (mg/gm)	1.3	1.9
Harvest index	4.9	5.5

* mean value of 5 observations, ± represent standard error values, mean differences significant at 5 *P* level.

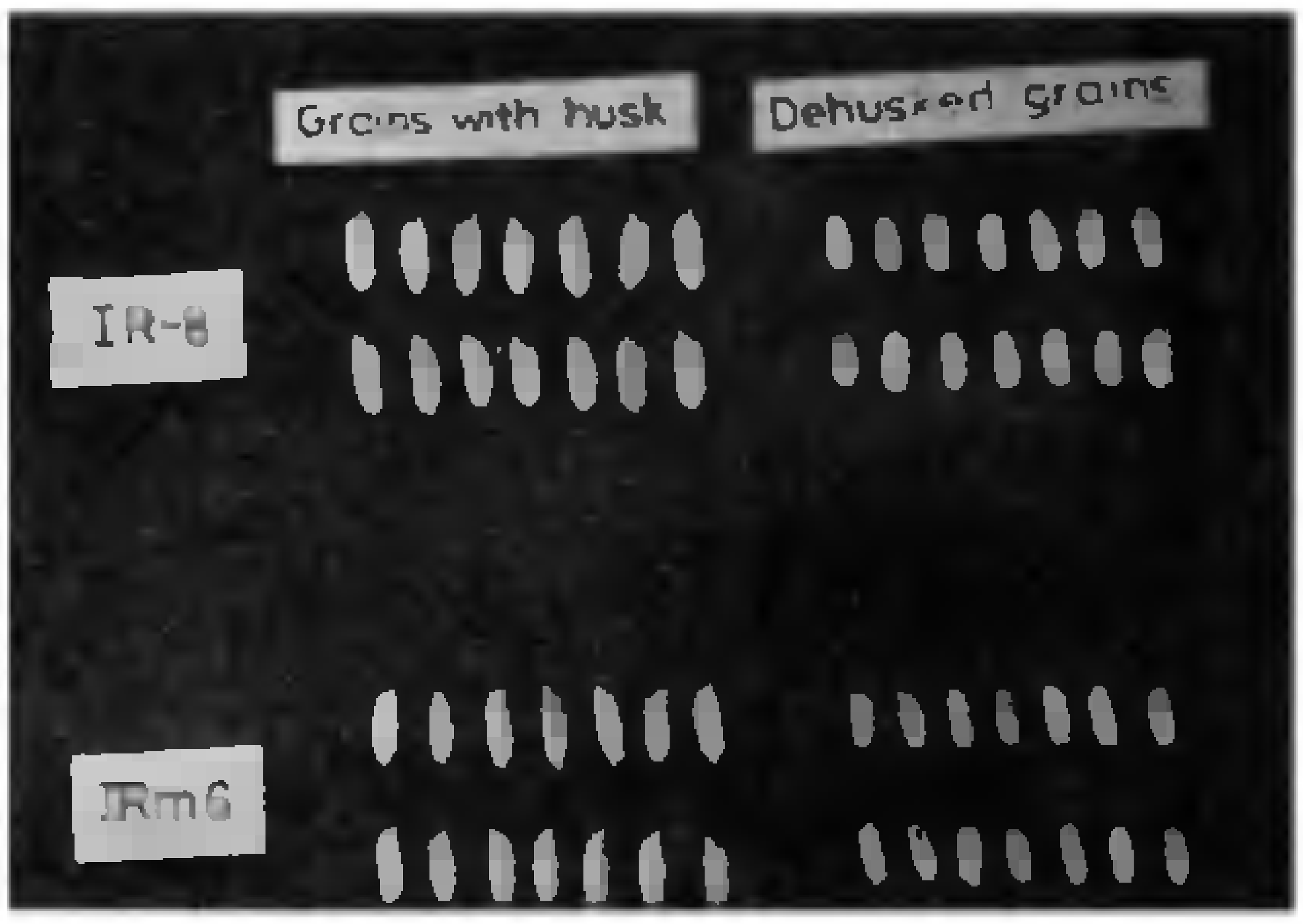

Figure 1. Grains of IR-8 and IRm-6.

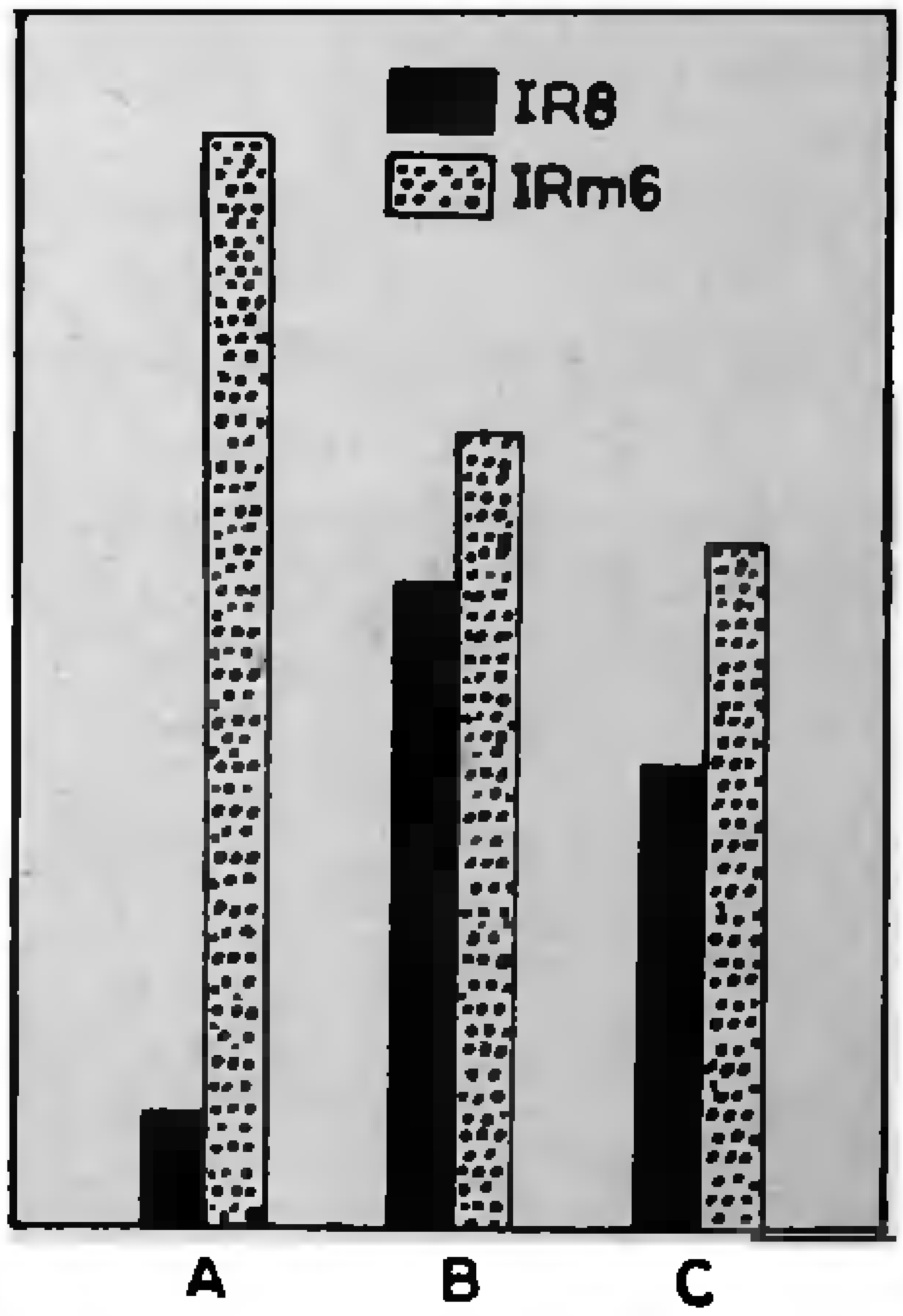

Figure 2. Histogram depicting salt tolerance index ---A, grain yield---B, and seed protein production---C.

than IR-8 as revealed by seed germination and seedling survival data obtained after utilising NaCl, Na_2SO_4 and $CaCl_2.2H_2O$ salts singly and in combination in various proportions up to 15 m.mhos/cm in laboratory, using petri plates (figure 2). Enhanced grain yield in this mutant is due to increased tiller number and photosynthetic efficiency. Direct effects of these traits over grain yield are positive and high, both at phenotypic and genotypic level and they represent first order component of grain yield (Kaul and Sharma, unpublished). Grain fineness is improved in the mutant by reduction in grain breadth (figure 1, table 1).

In the majority of the cereals and legumes, correlation between grain yield and seed protein is negative[1-4]. This is also true for rice[4,5]. But in IRm-6, both yield, seed protein content and production as well as salt tolerance are simultaneously increased indicating thereby a breakage of the negative relationship between grain yield and seed protein content; the breakage was effected by induced mutations. In figure 2, the salt tolerance index is indicated by ratio saline growth/non-saline growth into 100, the grain yield is given in terms of tonnes per hectare, and the seed protein production per plant is calculated by multiplying seed protein percent and grain yield, divided by 10 in order to adjust in a single histogram. The protein yield superiority is maintained constantly by the mutant in 5 generations of testing. This enhancement, may, however, represent the protein-yield threshold in this genotype beyond which further increase of one trait is likely to go at the cost of other. The slightly increased shoot height of IRm-6 (table 1) is not detrimental because it exhibits resistance to lodging. Isolation of an early, productive, salt-tolerant, fine-grained mutant of IR-8 represents a progress in rice improvement through induced mutations. Thus induced mutations seem to have a great potential in rice as the two improved mutants in Jhona-349 and a long fine-grained recombinant of these mutants were developed recently in this crop[6].

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TWO NEW DISEASES OF ORNAMENTAL PLANTS: FUSARIUM ROT OF *GLADIOLUS* AND *MAMMALARIA* SPECIES

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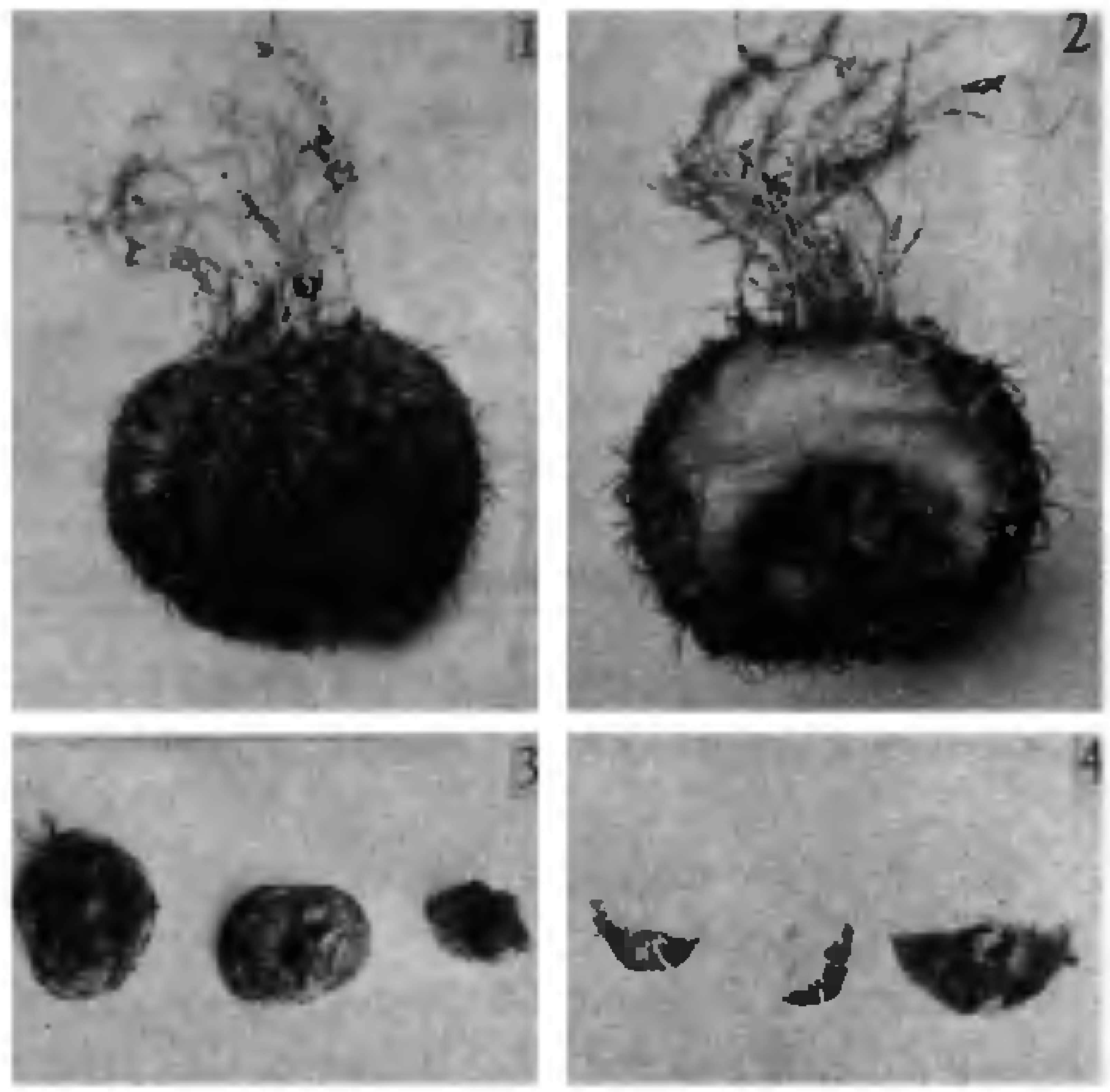
DURING a survey in the vicinity of Delhi and also in private orchards, rotting of corms and bulbs of *Gladiolii* and *Mammalaria* was prevalent resulting in heavy losses as examined in storage of the above treated and semitreated seed lots (figures 1–4).

Infected bulbs and corms on splitting open showed symptoms of soft rotting of the cells emanating pungent odour. They became discoloured from the central region which gradually extended upwards. Under high humidity conditions followed by suitable temperature (25 to 30° C) infection appeared in the form of heavy growth of the fungus mycelium which is



Figures 1–4. 1. *Mammalaria* sp. A Healthy corm. **2.** Diseased corm on splitting open. **3.** *Gladiolii* sp. Healthy bulbs. **4.** Diseased bulbs overgrown with *F. solani.*

white in colour, bearing spore masses. Gradually the fungal growth encircles the whole of the bulb and corm and finally rotting sets in.

The fungus was isolated on PDA and the morphological studies of the fungus were made at 25 ± 1° C. The causal organism was identified as *Fusarium solani* (Mart.) Sacc. in both the plants. A survey of the literature[1,2] reveals that *F. solani* is being reported on these hosts for the first time from India.

The pathogenicity of the fungus was established by confirming Koch's postulate in both the cases. The culture of the fungus has been deposited in Indian Type Culture Collection (ITCC No. 1804), Mycology Division, IARI, New Delhi.

Four systemic fungicides *viz* Thiram, Bavistin, Agalol and Mercuric chloride were tested for their relative efficacy *in vitro* at 0.1–0.5% dissolved in 1000 ml of water. The affected bulbs and corms were dipped in the above solutions ranging from 5–30 min. These were then air-dried and resown in earthen pots. It was observed that of all the fungicides tested Agalol gave best emergence at the concentration of 0.5% followed by mercuric chloride and Bavistin (as compared with the control).

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