protocol was used to eliminate polysaccharides generally known to affect the quality and thus digestibility of DNA. On further purification by CsCl density gradient centrifugation, DNA was digested with Hind III, Eco RI and Eco RV (Promega), electrophoresed and transferred onto Gene-Screen plus nylon membrane (DuPont) using an LKB vacuum blotting unit. Hybridization was carried out following Kochert et al.14 using α-32P labelled recombinant plasmids as probes. Out of 15 probe–enzyme combinations tried 10 combinations detected polymorphism. Clone BIG 431 detected DNA polymorphism among all the selected somaclones (Figure 3). The two early maturing somaclones could not be distinguished from each other in spite of their phenotypic differences but all the six could be differentiated from the parent variety. The variation in Southern hybridization pattern indicated occurrence of DNA rearrangements and/or point mutations in the selected somaclones. These somaclones are in the advanced generation of selfing and have attained uniformity for the selected traits. The observed DNA alterations, therefore, represent stable and heritable somaclonal variation at molecular level.

In vitro plant regeneration from phyllloid flowers of niger (Guizotia abyssinica coss)

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The occurrence of phyllody disease in niger is reported. An in vitro regeneration technique for production of whole plantlets from phyllody parts in niger is described. Antibiotic sensitivity test with tetracycline caused remission of symptoms indicating perpetuation of the causative organism namely the mycoplasma-like organisms (MLO). The technique could facilitate rapid screening of germplasm and breeding materials against MLO's and pave the way for identification of sources of resistance.

Plant tissue culture has potential application in the development of disease-resistant crops. Besides, the system also enables rapid screening of a large number of genotypes year-round within a relatively small space. The crops affected by phyllody disease which is caused

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by mycoplasma-like organisms (MLO) and transmitted through leaf hopper vector (Orosius albidicinus) are known to suffer heavy economic losses. The causal agent is perpetuated by the vector from season to season with the help of a wide range of host plants. One of the most durable and stable methods to control this disease is by developing resistant varieties. It is against this context that large-scale screening of germplasm for phyllody resistance assumes importance. However, the problems associated with maintenance and multiplication of vector as well as culturing of MLO's makes such a screening very difficult.

The author noticed in the germplasm of niger, a stray plant affected with phyllody disease (Figures 1, a and b). The symptomatology is similar to that reported in Sesamum indicum (Pedaliaceae) and other members of Compositae. A perusal of literature on plant viral diseases indicates that there is no such record of phyllody disease in niger either from India or elsewhere. Attempts were made to multiply both normal and phyllody plant parts and successfully maintain MLO's in tissue culture.

For in vitro culture, the explants were surface-sterilized with 0.1% mercuric chloride and rinsed with 5 changes of sterile water. The cultures were maintained at 25° ± 2°C with 16 and 8 h photoperiod regime and light intensity of 2000 lux in a growth chamber. Basal salts of Murashige and Skoog (MS), Gamborg (B-5) and Blaydes (BLA) supplemented with growth regulators (GA3, KN, BAP, IAA and NAA) at concentrations varying from 0.1 mg to 2.0 mg/l both individually and in combinations were tried. Cultures were tested for antibiotic sensitivity with Terramycin (tetracycline) at concentrations of 100, 250 and 500 ppm.

Of the various media tried, MS medium proved to be the best followed by BLA. Rapid sprouting and multiple shoot proliferation from phyllody flowers were observed on MS medium supplemented with GA3 (2 mg/l) on the third day after culture. Shoot multiplication and elongation was observed on the same medium also containing KN (2 mg/l). MS medium with GA3 (2 mg/l) and NAA (1 mg/l) was found to be the best for rooting of individual shoots. Shoot regeneration from normal-looking plant parts was slow, but the hormonal requirements were similar to those for phyllody flowers. Healthy shoots were obtained on MS medium with GA3 (2 mg/l) and IAA (2 mg/l) or KN (2 mg/l). Rapid regeneration of the phyllody structures can be attributed to increased accumulation of indole acetic acid which is reported to be responsible for proliferation of ovules and shoots in Sesamum indicum. Regenerated shoots from phyllody-affected plant parts continued producing vegetative floral structures while the multiple shoots from normal plant parts produced normal flowers, but with reduced number of florets (Figures 2, a and b respectively). Transfer of in vitro raised cultures to the multiplication medium with antibiotic tetracycline showed various degrees of reversion to normal (Table 1). The occurrence of reversion only indicates perpetuation of the MLO's within the regenerated tissue and reversion was maximum in the medium with concentration of 250 ppm tetracycline. In a few cases the author could also successfully transmit the disease through graft transmission using in vitro raised phyllody plantlets.

Considering the difficulties involved in conventional...
Radioprotection by nitrous oxide: role of cellular water content

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Contrary to earlier reports that nitrous oxide (N₂O) potentiates radiobiological damage, we have observed radioprotection in very dry seeds. It is known that N₂O converts hydrated electrons (e⁻) into hydroxyl radicals (OH⁻) probably accounting for the commonly observed radiosensitization. Considering the available data, the role of water in altering the N₂O-mediated modification of radiobiological damage is considered.

That nitrous oxide (N₂O) which converts electrons into hydroxyl radicals¹, also enhances radiosensitivity has been reported for the aqueous suspension of Bacillus megaterium spores²⁻⁴, vegetative cells of E. coli⁵⁻⁷ and mammalian cells⁸. However, a lack of radiosensitizing effect by N₂O has also been reported for lymphocytes⁹, Chinese hamster V 79 cells¹⁰ and vegetative cells of bacteria¹¹⁻¹³. It has been shown that cell concentration, dose-rate and irradiation temperature affect the radiosensitization of Pseudomonas radiola 0-1 by N₂O¹⁴. There are also reports³,¹⁵ that only a few strains of vegetative cells of bacteria and only two mutants of E. coli K-12, respectively were radiosensitized by N₂O. An entirely novel finding, however, was recently reported by Singh and Kesavan¹⁶ that N₂O-saturated post-hydration affords radioprotection to a greater extent than N₂ to dry barley seeds exposed to ⁶⁰-Co-gamma-rays in vacuo. This unexpected observation holds considerable implications to basic radiobiology.

We present in this paper data on the effect of varying seed moisture content in relation to the radioprotective action of N₂O.

Pure-line barley seeds (Hordeum vulgare) of a hullless strain (1B 65) were used in these experiments. Seeds were equilibrated to the desired moisture contents following the method of Kesavan et al.¹⁷ For each treatment, about 100 seeds were put into 10 ml glass ampoules which had been first evacuated at 10⁻² torr for 4 h and then sealed off with a glass-working torch.

The glass ampoules containing the seeds in vacuo

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