

the thallus is composed of compactly arranged parenchymatous cells devoid of intercellular spaces (figure 4). They are angular, thin walled and without any deposition in their lumen. This can be the storage zone of the thallus. The rhizoids, scales, sex organs and sporogonia are not found.

The morphological pattern of thalli; their dichotomous branching with linear to obcordate, paralleled segments; flat, dorsiventral spongy nature of the thallus; dorsal assimilatory zone with air spaces and ventral storage parenchyma, suggest an approach to the vegetative form of *Riccia frostii*, Aust. Hence it is named as *Riccia chitaleyii* sp. nov. after an eminent palaeobotanist Dr (Mrs) Chitaley.

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EFFECT OF IRRADIATION AND CENTRIFUGATION ON SEEDLING ENANTIOMORPHISM IN GREEN GRAM AND BLACK GRAM

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ENANTIOMORPHIC structures in plants and plant organs have been reported by several workers in recent years. Interestingly a correlation exists between enantiomorphic structures and several morphological, anatomical and physiological characters and in turn on yield in crop plants.^{1,2} However, the enantiomorphism with regard to the twisting of the plant and plant organs either to the left or to the right directions is non-Mendelian. The exact genetic basis that controls this phenomenon is not known.³ During the course of our investigations on enantiomorphic seedlings of green gram and black gram and its possible influence on the yield, the plants developing from the left-handed seedlings gave nearly 20% higher yield as compared to the right-handed ones. In this communication we report the effect of X- and gamma irradiation and centrifugation to determine the influence of these on seedling enantiomorphism so as to fix the desired type of seedling.

Pre-soaked (3 hr) seeds were subjected to centrifugation and X- and gamma irradiation for 1, 3, 5, 7, 9, 10 and 15 dosages. A set of 1,600 pre-soaked seeds of green and black grams were centrifuged (refrigerated) at 15,000 rpm for 1 hr. The seeds were later sown in the earthen pots. The seedlings were

classified for their enantiomorphism and scored following the usual procedure.⁴ The data were statistically analysed.

In the green gram, out of a total of 1193 seedlings scored following X-irradiation, the R-handed seedlings were significantly higher (57.7%) than the L-handed seedlings. Hence, X-irradiation seems to affect the L/R ratio of enantiomorphism of seedlings. If the effect of individual dosages is considered, there were no significant differences in lower doses. However, at 15 kR the normal ratios were much disturbed (L-handed seedlings were 58.1%). On the contrary, the effect of X-irradiation seems to be ineffective in black gram where out of 1024 seedlings only 321 (40%) were L-handed as in control. It is evident that X-irradiation drastically affects seedling enantiomorphism itself as the occurrence of the number of seedlings with no overlapping and neutral seedlings were substantial contrary to controls where the incidence of neutrals was negligible and seedlings with no overlapping were totally absent.

Data on the effect of gamma irradiation with the same doses on seedling enantiomorphism in green gram also gave higher value for L-handed seedlings (58.2%) as compared to R-handed ones (41.7%). In black gram, however, the effect of gamma rays was two-fold. There was significantly higher incidence of the L-handed seedlings contrary to higher number of the R-handed seedlings in controls and X-irradiated material. Secondly, a drastic reduction in the number of neutral seedlings was also observed. This shows that gamma rays are ideal for altering the ratio of the L- and R-handed seedlings in the desired direction in black gram. The studies on the effect of the X-irradiation on the seedlings and spikelet handedness in Einkorn wheats by Ono *et al.*,⁵ showed changes in the ratio of the left and right-handed seedlings and spikelets and reduction of the mean concordance proportions and its transmission to subsequent generations. More work using higher doses of X- and gamma irradiation may give useful results.

Besides the effect of ionising radiations, the influence of centrifugation was also observed. Out of 1,500 seedlings in green gram scored, 756 were the L-handed and the rest were the R-handed. Seedlings³ with no overlapping were not observed. Test of significance also shows the unity of the L- and R-handed seedlings in contrast to the ratios of controls where the R-handed seedlings were significantly high (64.5%). In black gram also equal ratios (L- 49% and R- 50.5%) were obtained after centrifugation. Reddy and Srinivasachar⁶ opine that due to centrifugation a pseudo gravity sets in and this interferes with the cell division and hence the alterations in the ratios of the L- and R-handed seedlings presently studied could be due to this.

From the foregoing, it is clear that the external

agents such as X- and gamma radiations and centrifugation influence the enantiomorphism of plant organs in general and seedlings in particular and will pave a way to obtain in desired plant type, since one type of enantiomorph was found to be superior over the other in terms of yield potential.^{1,2}

Bahadur and Reddy⁷ have opined that the isomerism in the cyathia of *Euphorbia millii* is possibly due to the stereoisomerism of the hormone molecules present in plant system. Hence, radiation and centrifugation possibly disturb the isomeric patterns of hormones which result in alteration of the ratios of the L- and R-handed and neutral seedlings with no overlapping.

Finally, it is of interest to underline the observations of Ono *et al.*⁵ According to them, "Further study to clarify the mechanism of the radiations effect may throw more light upon the problem of the right and left-handedness which is ultimately a fundamental problem of morphogenesis."

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TWO NEW ROOT-ROT DISEASES OF SPICES

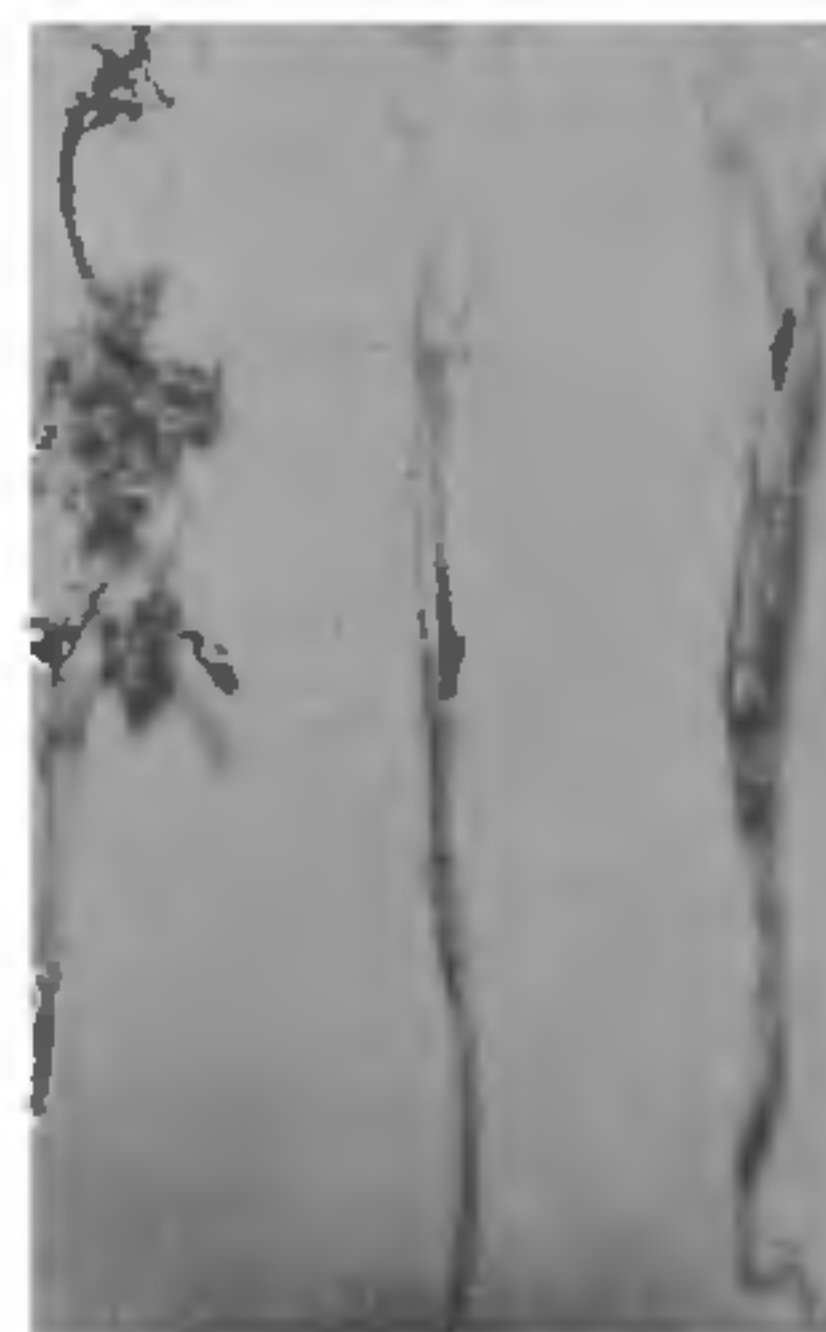
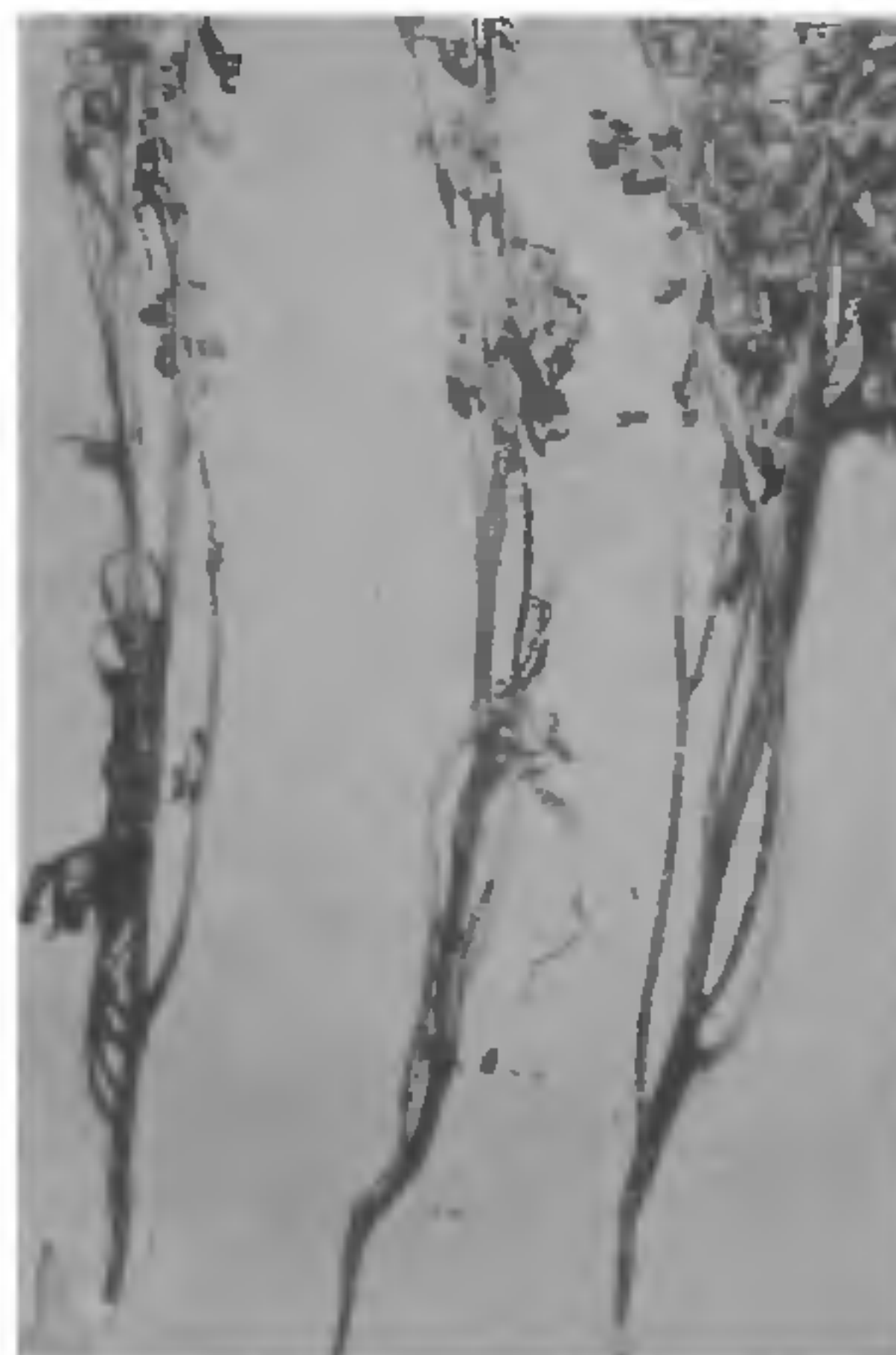
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WHILE studying the field diseases of spices, two severe root-rots of *Trigonella foenum-graecum* L. and *Coriandrum sativum* L. caused by *Alternaria alternata* (Fr.) Kessiler and *Curvularia pallescens* Boedijn respectively were observed during March and April for the past two years. Frequency of the disease was observed upto 40 and 20% respectively. Younger plants were more susceptible than the older ones. At seedling stage rot was recorded upto 50—75% in both

cases. The fields, in which the disease appeared, had sandy loam soil and previously paddy was grown in kharif season in both the years. The disease was severe under heavy irrigation and water-logged conditions.

Root-rot of fenugreek (*Trigonella foenum-graecum*)

The infected plants show poorly developed roots, finer rootlets are either not fully developed or destroyed due to rotting. Lower leaves of the infected plants gradually lose their green colour, turn pale yellow. Growth of the infected plants remains stunted. Plants are easily detached at soil level when pulled out.



Figures 1-2. Root-rot of 1. Fenugreek and 2. Coriander.

Root-rot of coriander (*Coriandrum sativum*)

Roots become brownish to black and brittle secondary root system totally lacking. Basal portion of the leaves become conspicuous giving pale of sick