(VII)

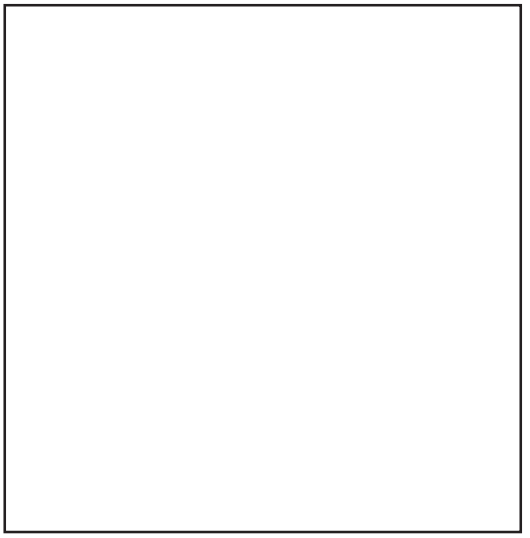
OCCURENCE OF ALBINO AND TRICOTYLEDONOUS SEEDLINGS IN *EUCALYPTUS CITRIODORA* HOOK. (MYRTACEAE)

Eucalyptus citriodora Hook. (Myrtaceae), the Lemon-scented gum, is an evergreen tree 24-40 m high with tall straight trunk 0.6-1.3 m in diameter, and thin, graceful crown of drooping foliage. Bark smooth, gray, peeling off in thin irregular scales or patches and becoming mottled, exposing whitish or faintly bluish inner layer with powdery surfaces appearing dimpled. Twigs slender, slightly flattened, light green, tinged with brown. Leaves alternate, narrowly lance-shaped, apically acuminate, basally acute, entire, glabrous, thin, light green on both surfaces, with many fine parallel straight veins and with vein inside edge.

Seedling evaluation is one of the most important aspects of seed testing. The observations of Wieringa and Leendertz (1928) attracted the attention of seed experts towards the morphological development of seedlings during the course of germination test on artificial media, as the key to the correct evaluation of normal and abnormal seedlings while conducting germination tests. The present report deals with the tricot and albino seedlings noticed during an experiment laid out to study the germination and vigour of seeds.

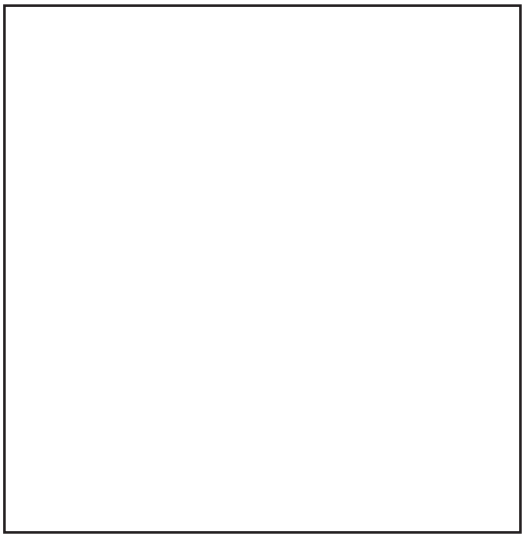
Seeds were collected from Medicinal Plant Board, Hyderabad (Andhra Pradesh) during June 2005. A germination study was carried out in the nursery using four replications of 400 seeds each as per ISTA rules. The treated seeds were sown in plastic trays filled with the Sterilized Industrial Sand and kept in the Nursery. Small quantity of water was added regularly to keep the sand moist. Germination was recorded daily. Germination commenced on the 12th day after sowing. Total 249 seeds germinated, out of which one seedling developed in to three cotyledons and one seedling developed in to albino seedling. The normal seedling has two cotyledons whereas the tricots possess three cotyledons (Figs. 1 and 2). After 5 days, the tricotyledonous and albino seedlings along with normal ones were transplanted into polybags

Fig. 1



Tricotylous seedling in *Eucalyptus citriodora* Hook.

Fig. 2



Albino seedling in
Eucalyptus citriodora Hook.

containing soil : sand : FYM in 2 : 1 : 1 ratio to observe further growth. The growth of the tricotyledonous seedling was slow in all respects as compared to normal ones. Even after several days of such exposure to sunlight, the albino seedlings remained white and failed to develop any trace of chlorophyll in stem or leaves (Fig. 2). The albino seedlings died 8 Days After Transplanting.

The presence of two cotyledons is the characteristic feature of Dicotyledons. The origin of tricotylous seedlings appears to be the result of the differentiation of supernumery primordial during embryogenesis. Occurrence of tricotyledony has been reported in a few tree species viz., *Acacia mellifera* (Vahl.) Benth. (Nagesh *et al*., 2001), *Prosopis cineraria* (L.) Druce (Nagesh *et al*., 2001).

Albinism is governed by single recessive gene and the traits are expressed only when it is in homozygous recessive condition. Besides mutations, whether induced or spontaneous, albino seedlings may be produced either by selfing of an albino carrier (Aa) or by mating of albino carriers. In both the cases, the results may be depicted as below :

Aa x Aa = AA Aa aa		3 - Normal green
1 2 1		1 - Albino

However, under natural conditions the frequency of such seedlings will vary depending upon the extent of selfing or mating. Albino seedlings do not posses chlorophyll, the food-manufacturing unit, hence they do not survive for long and die soon after the reserve food material stored in endosperm and cotyledon is exhausted by the seedlings. Albino seedlings generally die as they lack any gene to code for chlorophyll synthesis and thus are unable to photosynthesize. Although lethal, a mutation of this type is frequent in higher plants.

Generally, albino seedlings occur in very low frequency. But sometimes, when the seeds are collected from such a stand where plants are heterozygous for this trait i.e. carriers, having genotypic constitution (Aa) in the population of a given species. Where there is selfing or mating of Aa- genotypes, the frequency of such albino seedlings is quite high. Albino seedlings produced so by mating or selfing of Aa-genotypes result from the parent or parents with a pre-existing mutated gene for this character sometimes back in their history and could not be termed as a mutant. Since in the present study, *Eucalyptus citriodora* was raised through seeds, there was hardly any possibility of existence of any seed carrying the genotypic constitution, Aa. As this

species in general is wind pollinated, only one seedling out of 249 seedlings was spotted as albino. This may be attributed due to spontaneous mutation. This observation suggests that, in this case, the mutation might have occurred at some stage between seed formation and germination. Such a possibility has been reported in Red sanders (Vakshasya, 1981), *Gmelina arborea* (Venkatesh *et al*., 1978), *Bombax* L. (Venkatesh and Emmanuel, 1976), *Samania saman* (Nagesh *et al*., 2001) and in *Prosopis cineraria* (Nagesh *et al*., 2001).

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