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ROOT TRAINER TECHNOLOGY FOR MASS PRODUCTION OF CLONAL PLANTING STOCK

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PREFACE

For any tree improvement programme, the quality of planting stock is an important prerequisite, which determines the establishment and subsequent growth of seedlings in plantations. Even though, the quality of seeds is ensured, inappropriate method of raising the nursery may lead to poor quality of planting stock. Hence, nursery technology need to be standardised for each species so as to obtain optimum growth of healthy seedlings in the nursery. Conventionally, for most of the tree species, seedlings are raised in mother beds and then picked into polythene bags and maintained until field planting, except for a few species where direct dibbling is practised. Although, this method of nursery raising has certain disadvantages, yet it continues to be widely practised being economical and due to minimal infrastructure requirement. However, when the quality of the planting stock is uppermost for improving the productivity of plantations, alternate improved technology cannot be overlooked. In this context, root trainer technology for raising nursery, which is known to have many advantages over polypot nursery, is the best option. This is the reason why within a few years of its introduction in India, the root trainer technology is being adopted by many State Forest Departments and industries for large scale planting programmes.

This edited volume brings together for the first time, valuable information on root trainer technology and its application in mass production of superior planting stock, especially clonal. Contributions of various authors from research institutes, forest departments and industries in the form of chapters, which made this publication possible, are gratefully acknowledged. We are grateful to Shri D.S. Rao, IFS, Chief Conservator of Forests (Development) whose keen interest and concern for the improved nursery technology made this publication possible through Forest Development Fund. Technical assistance provided by Shri V. Asokan for preparing camera ready copy of this publication is duly acknowledged.

We hope, this publication which will be very useful to practicing foresters, researchers and others who deal with the raising of nursery of tree species, will promote root trainer technology for raising high quality planting stock in Kerala and other States.

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PRINCIPLES AND CONCEPTS OF ROOT TRAINER TECHNOLOGY

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INTRODUCTION

In early stage of development of a seedling, basic energy is derived from food stored in the cotyledons. In almost all plant species, when seed is sown, radicle emerges earlier than the plumule and develops into primary root i.e. tap root. Development of plumule into aerial shoot is mainly governed by the root system. Various soil factors, particularly moisture, penetrability and porosity play an important part in the development of the root system. Root gets suffocated due to poor aeration, or strike against impenetrable hard substratum, resulting in their coiling, spiraling or withering. It is often realized that stunted tree forms are the best indicators of presence of impenetrable substratum. To overcome such a situation, which is adverse to survival and growth, energy is diverted towards development of secondary and tertiary roots. Some of the lateral root hairs, developed on the tap-root take lead and develop into secondary roots and subsequently the tertiary roots. Angle between primary and secondary root is initially acute and during the course of development, depending on opportunities, it becomes less and less acute and further widens upto 70^{o}-85^{o} giving rise to sub-surface lateral spread. Supply of mineral nutrients being maximum in the upper horizon secondary roots remain confined to upper layers of sub-soil horizons.

GROWTH AND FORM OF ROOT SYSTEM

In tropical country like India, the growing period stretches from October to June (9 months). However, the soil environment during the two spells of growing period i.e., 15th October to 30th November (one and half months) and 15th February to June (four and half months), is generally adverse for plant growth. During the first spell, only surface feeders have advantage over deep rooted ones. On retrieval of monsoon from 15th September water constraints are successively on the increase in upper horizons. Although, availability of minerals is sufficient in upper horizons, water is the main constraint during the period.

During the second spell, water further recedes to still deeper horizons and due to absence of root systems and lack of root pressure in the feeder zones,