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FRI/INDUSTRY RESEARCH COOPERATIVES

MANAGEMENT OF IMPROVED RADIATA BREEDS COOPERATIVE

FOREST RESEARCH INSTITUTE
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CLONAL AGING TRIAL

– ESTABLISHMENT REPORT

F. CLARKE

Report No. 14 October 1989

Confidential to Participants of the Management of Improved Radiata Breeds Cooperative

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EXECUTIVE SUMMARY

CLONAL AGING TRIAL
ESTABLISHMENT REPORT

F. CLARKE

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This report describes the establishment of a trial to assess and compare the degree of physiological aging in radiata pine clonal ortets planted in 1982 with subsequent serial repropagations of the same clones. Cuttings from tree form ramets, 5 years after planting and cuttings from seedlings (GF22), one and two years from seed have been stuck as controls.

The trial has been established at the Tree Genes International Pty Ltd nursery located at Pinebank, Tarago, Australia. The trial aims to provide information on the degree of clonal aging that has occurred and the effects on growth and form of clones maintained as serially repropagated hedges.

INTRODUCTION

The future of clonal forestry is dependent on being able to propagate cuttings from selected clones following extensive clonal testing. Maintenance of acceptable physiological age, currently defined as 1 to 4 years, or indeed manipulation of physiological age, will have an important bearing on the effective implementation of clonal forestry strategies. Hedging of clonal mother plants has proved an effective method of controlling physiological aging but little is known about the effects of regular serial repropagation on aging. Trial results will be offered as an "in kind" contribution to the Management of Improved Breeds Cooperative.

TRIAL LOCATION, METHOD AND DESIGN

The trial has been established at the Pinebank nursery located 16 km from Tarago, NSW. In winter 1990, cuttings will be planted out for field assessment on two sites as yet to be decided.

Selection of clones

Six clones were selected from 6 control-pollinated families of which 3 are unrelated families from the Australian breeding programmes and 3 from the NZ "268" clonal series. Two of the "268" families have a common maternal parent.

Seedlings, of improvement rating GF22 sown in each of the last 2 years, have provided cuttings as juvenile controls, not clonally identified.

Clones were selected as being above average for growth and form in 5-year-old clonal trials at Pinebank.

Two clones were selected for their apparent juvenility in serially repropagated mother plant beds and two for their apparent aging. Of the two "268" maternally related clones, one is indicating juvenility and the other has aged.

Cutting origins

Seventeen to thirty eight cuttings were taken from the ortets of each of the 6 selected clones. The ortets were established as seed in 1982 in the CSIRO Division of Forest Research nursery at Yarralumla. Cuttings from some first serial ramets were also collected, as many cuttings from

the ortets were of poor quality due to heavy dothistroma infection in the nursery. These cuttings were stuck as separate treatments.

Fifty cuttings were taken in the Pinebank clonegarden, from second or third serial repropagations of the 6 clones.

Fifty cuttings were taken from two or three trees of each clone located in the Pinebank clonal trials. Trees were derived from the above ortets or their first serial ramets and were planted in 1984. These cuttings will provide a physiological 5-year-old control.

In all there are 23 treatments.

Aging assessment

Cuttings were visually assessed for bud type after sticking. Further regular assessment will take place following rooting.

The length of primary needles was measured for each treatment.

Sticking

Sticking took place 21 to 25 July 1989.

Due to heavy dothistroma infection being present in the Yarralumla nursery, all cuttings were dipped in a solution of Sumisclex fungicide (1 gm product:10 l water).

Cuttings were stuck in a medium of 50:50 aged pinebark fines and sand on top of a sandy loam soil (1 kg per 10 m^2 magamp was mixed with the medium). Goal herbicide was applied.
Mist irrigation is being applied for 1 minute every hour for, currently, 6 hours per day. The bed is covered with a shade cloth clotch to ensure adequate humidity until rooting occurs.

Each of the treatments has been replicated 3 times in the nursery bed, the first in sequence, the other 2 at random.

Management

The nursery performance of the 23 treatments will be recorded followed by planting to assess field performance of clones subject to various nursery management practices.