In our Contemporaries

NZ Journal of Forestry Science

Seed maturation precedes cone ripening in New Zealand *Pinus radiata*

Rimbawanto A., Coolbear P., Dourado A.M., Firth A. Vol. 18(2): 139-48 (1988)

Cones matured more slowly than the seeds inside them. Thus seeds ripening on the tree were fully germinable and of high vigour by the end of July, much earlier than previously thought, although at this stage they were difficult to extract from the cones without several weeks of air-drying.

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Artificial ripening of prematurely harvested cones of New Zealand *Pinus radiata* and its effect on seed quality

Rimbawanto A., Coolbear P., Firth A. Vol. 18(2): 149-60 (1988)

Second-year cones harvested as early as April ripened successfully in dry storage and produced seeds of high germinability and vigour. This is three months earlier than previously recorded. The limiting factor was the point at which cones became amenable to efficient extraction by conventional kilning techniques.

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Frost damage, survival, and growth of *Pinus radiata, P. muricata,* and *P. contorta* seedlings on a frost flat

Balneaves J.M. Vol. 18(2): 161-5(1988)

Frost damage to *P. radiata* and *P. muricata* was severe on uncultivated plots but was significantly reduced on the intensely cultivated plots; rip/bed sites gave the best results. Survival of the three species followed similar trends.

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Assessment of *Platypus subgranosus* as a vector of *Chalara australis,* causal agent of a vascular disease of *Nothofagus cunninghamii*

Kile G.A., Hall M.F. Vol. 18 (2): 166-86 (1988)

Chalara australis was isolated from 0.6% of 2966 *P. subgranosus* adults, and 1.2% of tunnel walls in billets were infected. Isolations from beetle frass indicated that infection of trees occurred prior to beetle attack. The fungus is not dependent on the beetle for dissemination or ingression.

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Interaction of forest floor material and mineral soil on orthophosphate sorption

Comerford N.B., Dyck W.J. Vol. 18 (2): 191-8 (1988)

Admixing organic matter decreased the phosphorus sorption on both high and low phosphorus-fixing soil, presumably by the action of organic anions also in the leachate. When soil and organic material are mixed during cultivation, changes in phosphorus sorption characteristics of soils should be considered in evaluating cycling and mineralisation.

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Long-term growth responses in *Pinus radiata* fertiliser experiments

Woollons R.C., Whyte A.G.D., Mead D.J. Vol. 18(2): 199-209 (1988)

Four long-term trials in Australian plantation *Pinus radiata,* in which responses to fertiliser had been measured for between 10 and 18 years, were analysed to examine whether responses increase, decrease, or are maintained with the passage of time. Three of the four experiments showed a diverging and compounding response to fertiliser throughout the periods of measurement.

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Establishment of selected legumes in a mid-rotation *Pinus radiata* plantation

Gadgil R.L., Charlton J.F.L., Sandberg A.M., Allen P.J. Vol. 18(2): 210-20 (1988)

Lotus uliginosus, "Grasslands Maku", lotus hybrid G4712, and *Lupinus arboreus* all produced a sward or an understorey layer which persisted for at least four years. Four legumes failed completely when resown two years later without cultivation in the same stand.

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Nutrient concentrations within stems of *Pinus radiata*

Madgwick H.A.I., Frederick D.J. Vol. 18(2): 221-5 (1988)

Nutrient concentrations in both stemwood and stembark were plotted against stem diameter and tree age and regressions were calculated which may be combined with stem taper equations and wood density to predict nutrient removal in stemwood under a range of harvesting scenarios for the central volcanic plateau of New Zealand.

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Boron, copper, manganese, and zinc in stemwood of *Pinus radiata*

Madgwick H.A.I., Oliver G.R., Sims A.T. Vol. 18(2):226-30 (1988)

Boron and zinc concentrations increased with wood age in four *Pinus radiata* trees. Manganese increased with wood age in three trees and decreased in one. Copper concentrations were unrelated to age. Zinc concentrations varied significantly among trees.

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What's new in Forest Research

No. 175 Databases for New Zealand's indigenous vegetation

No. 176 Growing radiata pine from juvenile cuttings

No. 177 Strategic planning for forest management with FOLPI

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NZ Journal of Botany

Mortality, foliage loss, and possum browsing in southern rata *(Metrosideros umbellata)* in Westland, New Zealand.

Leutert A. Vol. 26(1): 7-20 (1988)

Foliage loss and possum browsing were assessed in three neighbouring study areas with different histories of possum occupation. As the time of possum occupation increased, foliage loss from individual trees and the numbers of trees showing such losses increased sharply in most stands. Dead and dying trees (>75% foliage loss) were scattered among healthier trees. Basal area of dead and dying trees ranged from 1.5% (five years' possum colonisation) to 32% (20 years' possum occupation) of the total. Foliage loss occurred over all altitudes and sites sampled, but in one area foliage loss on exposed sites or those with seral vegetation was significantly greater than on other sites. Foliage loss increased with increasing tree diameter,

was least from small rata trees in even-sized stands, and was greater in the canopy than in the sub-canopy. Possum browsing patterns were similar to foliage loss patterns. Browsing was heaviest in the canopy of large trees but, in the two areas with high numbers of possums, seedlings and small trees were also browsed. Intensity and occurrence of possum browsing were significantly correlated with foliage loss on individual trees, and dying trees were the most heavily browsed. It is concluded that the stress imposed by possum browsing is a principal cause for the dieback of southern rata.

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The ecology of *Dacrydium pressinum:* a review

Norton D.A., Herbert J.W., Beveridge A.E. Vol. 26(1): 37-62 (1988)

Literature relating to the ecology of rimu *(Dacrydium cupressinum)* is reviewed with respect to the reproductive biology, vegetative morphology and growth, and population dynamics of this species. A comprehensive reference list is included.

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Mountain beech *(Nothofagus solandri* var. *cliffortioides* decline in the Kaweka Range, North Island, New Zealand.

Hosking G.P., Hutcheson J.A. Vol. 26(3): 393-400 (1988)

Forest dieback in the Kaweka Range appears to be a stage in the natural process of replacement for mountain beech. An examination of stand structure in stable, transitional, and unstable forest showed dieback and tree mortality to be associated with mature and over-mature stands. Recruitment peaks suggest periodic natural disturbance, such as severe drought, initiates tree decline. Insects and disease, although contributing to the rate of decline, were shown to be symptoms rather than causes.

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Evolutionary interpretation of a high temperature growth response in five New Zealand forest tree species

Hawkins B.J., Sweet G.B. Vol. 27(1): 101-7 (1989)

A controlled environment experiment was undertaken to determine optimum growing temperatures for rimu *(Dacrydium cupressinum),* kahikatea *(Dacrycarpus dacrydioides),* totara *(Podocarpus totara),* kauri *(Agathis australis),* and mountain beech *(Nothofagus solandri* var. *cliffortioides),* at three light intensities.

Light intensity had no significant effect on the growth of any of the five species.

All species achieved maximum growth at a day temperature of 27°C, and at night temperatures of 22°C or 27°C. Significant differences in growth occurred for all species between the five temperature regimes examined.

All species showed a significant difference in net photosynthetic rate between temperature regimes. Rimu, kahikatea, totara, and kauri experienced maximum net photosynthetic rates in one of the 27°C regimes. Mountain beech had a maximum net photosynthetic rate in the 21°C regime. Both rimu and beech allocated significantly more photosynthate to leaves at 27°C than at 21°C day temperatures.

The optimal temperatures for photosynthesis and growth are much higher than reported for other temperate species. It is suggested that this attribute evolved in the subtropical climates of the Miocene, and has remained as a relic trait to the present. The significance of this is discussed, with particular reference to timberlines.

Agroforestry video wins first prize

A video on radiata pine agroforestry produced by the Forest Research Institute in Rotorua, has won first prize as the best overall entry at a technical film festival in Czechoslovakia.

The New Zealand entry was awarded the MAGNA MATER Grand Prix, as the best of 144 productions from 53 countries. The entries covered a wide range of science and education aspects of agriculture, fisheries and forestry.

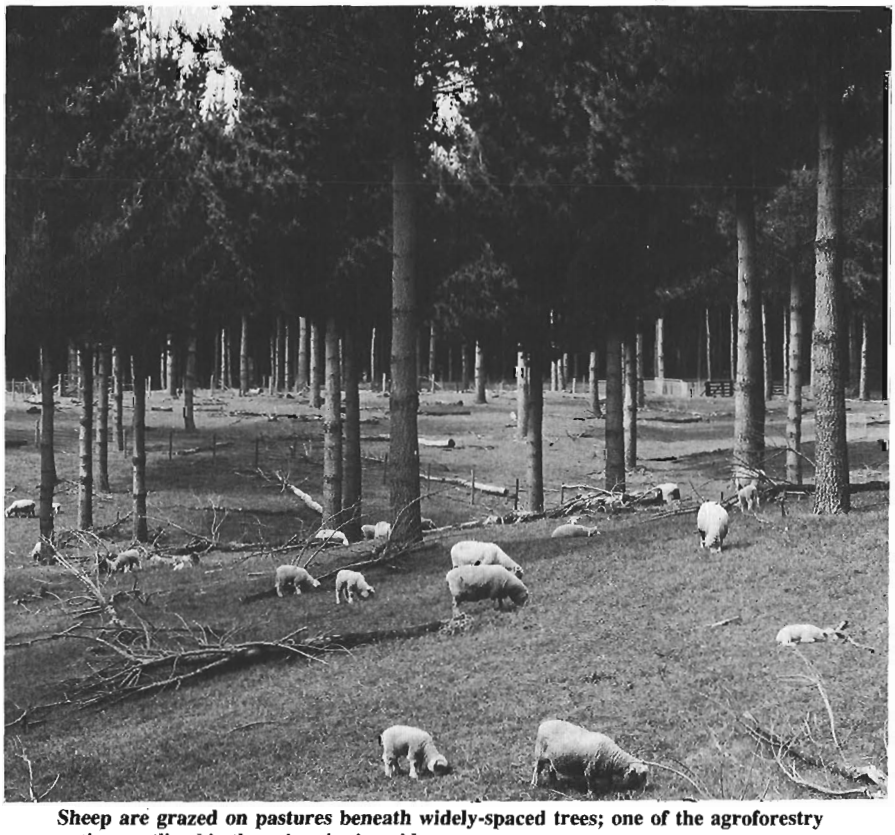
The 12-minute-long video is one of a series on agroforestry topics produced by the Forest Research Institute. It describes research and development into three different ways radiata pine and agriculture can be combined:

Forest grazing – forest sites are sown in forage legumes, and cattle are grazed to control weeds and to benefit tree growth;

Trees on pasture – widely-spaced trees are used in conjunction with understorey grazing as a profitable land-use system;

Timberbelts – shelterbelts are managed for both timber production and agricultural shelter. (This topic is also the subject of a separate, more detailed, video.)

The prizewinning video will be shown at various specialised events throughout Czechoslovakia over the next six months, on Czechoslovak television.



Sheep are grazed on pastures beneath widely-spaced trees; one of the agroforestry options outlined in the prizewinning video.