PLANTATION FORESTRY: THE RESERVATIONS

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Whether we like it or not, we in New Zealand have been landed with one of the world's biggest forestry monoculture situations. Many years ago the doyen of American forest pathologists, John S. Boyce, sounded a warning that came to be regarded as an axiom; that monocultures were undesirable because of the risk of uncontrollable spread of disease. Later on came another warning, from the eminent Oxford forest pathologist, T. R. Peace, who said we should not accept old axioms uncritically. He pointed out that, while some monocultures were vulnerable, others seemed to belie Boyce's axiom; that each situation had to be looked at (now and in the future) in its own context.

I think that in our New Zealand monoculture system we have so far been commercially lucky in that *Dothistroma* needle blight has been so readily controlled by an acceptably economic spray programme. In some ways I could wish that it had been a somewhat tougher proposition because we have, perhaps, been lulled into a false sense of security. For years radiata pine was almost free of problems — *Diplodia* die-back was its worst disease, and that could be rated as important only locally and occasionally. The wonder tree seemed as safe as houses. Then *Dothistroma pini* caused a flurry, with as many as thirty scientists at one stage being involved with it. Then came copper control and radiata is now back where it was — or, if not as safe as houses, at least as safe as wooden huts! Let me sound two notes of warning:

(1) Weather conditions in a future season may favour *Dothistroma* more than it has so far, and luck will then no longer be on our side.

(2) A slight genetic shift in *Dothistroma pini* may quite suddenly produce a new race of the fungus that will enjoy mature radiata pine as it already does mature ponderosa and corsican pines.

Such a thing has happened before in other crops. In fact, the U.S. National Academy of Sciences convened a top level committee to investigate the degree to which man has come to rely on so few, highly selected, varieties; and the examples of nationwide calamity when a pathogen undergoes mutation and reverses the situation. Genetic vulnerability of major crops has thus been recognised in the agricultural field, though

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the concept still has to strike home in forestry (see *N.Z. Journal of Forestry, 21*: 150-3, 1976). You will thus understand why, in some ways, I could have wished that the *Dothistroma* lesson had been a harder one.

We badly need genetic diversity. If we cannot find it outside *Pinus radiata* at least let us keep as much diversity as possible within that remarkable species. We should be thankful that the native stands of radiata pine in California appear likely to remain available as a future gene pool. If in New Zealand we pursue the propagation of clonal lines from cuttings, for heaven's sake let us not fall into the trap of restricting this to just a handful of élite parent trees — let us be intelligently generous with the genetic spread.

My theme so far has touched on the dangers of unheeded warnings. Because I have worked and preached for so long on *Phytophthora cinnamomi* I am reluctant to dwell on this root rot fungus here in case I arouse comments of "hobby-horse" or "wolf". Yet, I cannot let the occasion pass without saying that, just because we are lucky enough to have found a control through use of superphosphate on gumland soils, and because other forests appear at the moment to be tolerant of its presence, we must not overlook what happened in eastern Victoria in 1956 when thousands of acres of *Eucalyptus sieberi* died. One abnormal season could, in New Zealand as it did in Victoria, change the whole pattern of tolerance.

One disease situation in *Pinus radiata* seems to be meeting a hushed silence. Yet in many ways it is more spectacular than anything else we have had in plantation forestry. I refer to *Armillaria* root rot which has killed trees from the first year of planting, and continues at rates up to 10% per annum. It is especially serious on sites converted from tawa to pines on the Mamaku and Pureora Ranges. Its effects extend for several years; and beyond the large dead gaps it creates in the stand, lack of branch suppression reduces the commercial value of the isolated and fringe survivors. I personally believe that the *Armillaria* situation provides strong backing for a drastic rethink about land use in the centre of the North Island and elsewhere. I believe, in fact, that if plantation forestry is to continue to expand at the planned rate it should receive absolute priority in a working circle centred on existing mills. Within this circle:

(a) Haulage distance would be economic in terms of cost and fuel requirement, having regard to the energy crisis.

(b) It should be permissible to commit grassland to plantation forestry — this, for example, could include land west of Lake Taupo and part of the eastern King Country;

(c) All native forest except the *very* derelict (and I mean *very*) should be left alone except for increased goat and other animal control.

This will acknowledge the very real *Armillaria* problem and satisfy the legitimate and urgent need to conserve remaining native forest. Outside the circle there would be a relaxing of the pressure to extend the conversion of native forests to exotics.

If I had as much time again for this talk, I would give prominence also to some of the diseases presenting major problems overseas, but not yet here in New Zealand. These would include other needle blights, *Poria* root rot and conifer rusts, in particular western gall rust which needs no alternative host to pine. For much of what I have said, too, it would be possible to present additional support from examples of insect pests, but being a pathologist I have kept to the field I know best.

Getting away now from disease and contentious issues, may I put in a plea for retention of scenic corridors and pockets of bush on farmland. I could give specific examples where this should have been done at the time when conversion to exotics took place, but was not. In making this plea I recognise the need for compensation from the public purse when this involves private forestry.

Let us also be honest and admit that seried ranks of *Pinus radiata are* monotonus and seldom begin to imitate the mixed native conifer forests of the northern hemisphere. In a recent survey of users of the Coromandel Forest Park only 7% of the replies accepted pine forests as being thoroughly acceptable for recreation.

In summary, I believe that we must not anticipate the future health of our plantations solely on experience to date. Long-range weather cycles and exceptional seasons may dictate disease incidence well above levels so far experienced. Genetic changes in existing pathogens could well initiate epidemics of embarrassing proportions. We must seek diversity at the species, provenance and population level to reduce the impact of such genetic changes. I see a need for a drastic change in land-use policy that would allow, and in fact encourage, concentration of plantations in relation to existing large mills, in territory at present having a predominantly agricultural use. This would meet current demands for conservation of fuel as well as of native forest, and avoid the problem of *Armillaria,* which is rapidly becoming a major disease with an insidious potential not yet fully realised.