

The effects on both indigenous and exotic trees were so pronounced as to lend support to the widely expressed view that this was the most severe drought experienced in Hawkes Bay for 50 years. Damage might well have been worse had it not been for the very favourable conditions in the autumn.

The first exotics to react to the drought were *Crytomeria japonica* and *Cupressus lawsoniana*. The latter which is widely planted for shelter was killed or died back severely on the drier sites over most of Central Hawkes Bay. In many cases the upper crown died but a few of the lower branches revived in the autumn. *Cupressus macrocarpa* was much less affected, but on alluvial gravel flats in the driest localities this tree showed, towards the end of the drought, a browning off and apparent death of all the foliage. In the autumn these trees made a surprising recovery: the browned foliage did not revive but new terminal growth occurred. However, the recovery was not sustained and in the following spring this new growth withered and considerable mortality occurred. It is yet early to assess the effect of disease on trees weakened by drought.

Pinus radiata suffered severely only on the driest gravel flats where in one case about 75 per cent mortality was noticed under forest conditions. Elsewhere there were cases of terminals of the weaker members of a stand dying back, but on the whole no serious damage occurred. Plantations about 10 years old seemed most susceptible.

Eucalypts on gravel flats suffered severe defoliation, but mostly put out fresh growth in the autumn. Larch and poplars also cast their foliage on drier sites, shooting again later.

Among indigenous species there was occasionally mortality among isolated and marginal rimu in the foothill zone where the average annual rainfall is upwards of 50 inches per annum but where this drought was, relatively, just as severe as on the lower country. Totara which is a common second growth species on well drained land browned off severely on the flats but made a good recovery later. Black beech showed some permanent damage.

The most striking feature in the incidence of drought damage was the relative immunity of trees growing on the hills, even where the soil was shallow and underlain by rock, compared with those on alluvial flats.

G. H. HOCKING.

EXOTIC FORESTS AND RUNOFF

There is much popular enthusiasm for the planting of trees to regulate stream flow. But that such planting can be a double edged weapon is the experience of some farmers on the borders of both Maramarua and Riverhead State Forests in the Auckland Conservancy.

Maramarua is an exotic forest of some 14,000 acres, of which about 10,000 acres are in *Pinus radiata*. It is the experience of those farmers whose creeks rise in this forest that, far from producing a better and more regular supply of water, the planting is tending to dry them up altogether, and several have had to put down bores to maintain an adequate water supply. In this forest there is a creek whose catchment has been planted in *P. radiata*. Formerly a certain culvert in it was constantly washing out and the bridge which subsequently replaced the culvert was at times covered by flood waters. Since the trees have grown up the floods have become progressively smaller until now a rise of more than two feet is almost unknown. There is now a heavy canopy in this area and the ground cover of manuka scrub has been almost completely suppressed and a heavy litter of needles has accumulated.

A very similar adjoining catchment was planted in *P. laricio* at the same time. At the age of 16 years when these observations were made, the canopy of *P. laricio* had not yet suppressed the scrub entirely and there was a much lighter accumulation of litter. Observations on the stream flow in these two creeks over a period of two weeks showed that the rise in each after rain began at the same time but was more rapid and reached a greater height in the *P. laricio* catchment.

At Tairua Forest on the Coromandel Peninsula a similar drying up of streams has occurred. Here a water supply was put in some 15 years ago in an area covered with low bracken and manuka. *P. radiata* was planted at about the same time. This water supply has now almost completely dried up, as have other streams flowing out of the opposite side of the same area.

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It is understood that a reduction in the normal flow as well as flood level has been observed in some exotic forests elsewhere in the Dominion. Further information on such occurrences or conflicting experience would be valuable; also any evidence which may indicate whether such effects are permanent or transitory.—Ed.

NATURAL REGENERATION OF MONKEY PUZZLE (*Araucaria imbricata*) IN N.Z.

It may be of interest to know that *Araucaria imbricata*, Monkey Puzzle or Chile Pine, produces fertile seed and in favourable localities is capable of regenerating naturally in New Zealand.

While in the Tapanui District in September, 1946, two small specimen trees approximately 30 feet high and 12 inches D.B.H. were noted in the grounds of the Roman Catholic Church. One of these trees was bearing cones and numerous sound seeds were found in the grass beneath it. Further examination showed that four or more