



Survey of Tree Planting on an East Coast Hill-country Farm

AS a result of past injudicious clearing and burning of bush on hill country, many New Zealand farmers are now threatened with the development on their holdings of considerable areas of unstable, moving land and heavily-flooding streams. This menace can be controlled in part by the planting of trees and the formation of plantations in strategic positions, and such woodlands can also produce much-needed farm timber and shelter while adding greatly to the amenities and value of the farmlands involved. In the "Journal" for April, 1946, an account was given by V. P. Boot of protective planting carried out on Puketiti Station, Mr. A. B. Williams's east coast hill farm. In the following article M. Sutherland, Farm Forestry Officer, Department of Agriculture, Wellington, surveys the behaviour of different tree species and discusses aspects of the formation and growth of the plantations in the light of silvicultural development during 40 years of tree growing on this station.

BOTH success and failure are demonstrated in these plantations, but they are of special value in showing how, by simple and persistent annual planting, there may be built up throughout the farm a system of double-purpose woodlots which should become of considerable utilitarian value to their owner.

Aspect and Climate

This station lies on rolling and broken country in Waipu County, about 3 miles west of Te Puia Springs township. It now covers about 6500 acres of hill grazing under introduced grass, and of this area it is estimated that about 60 acres are still under native forest, chiefly in scattered patches and valleys throughout the holding.

The lowest part of the holding lies 1000ft. above sea level, with the peak of Puketiti (1733ft.) rising in the centre. The ground lies generally to the east and north, but plantations have been grown on all aspects and this factor appears to have little influence on tree growth in this region.

The most general winds are from south and west, but comparatively little indication of any harmful influence of strong wind is apparent in the tree growth of the area.

The temperature record nearest to this locality—at Gisborne—shows a mean monthly maximum of 66.6 degrees F. and an average minimum of 47.4 degrees. The maximum mean monthly temperature is 95.2 degrees and the extreme minimum 32.4.

The annual rainfall at Puketiti is high, averaging 82.93in., with a mean

monthly figure of 6.91in. and a maximum monthly rainfall of 10.14in. The average rainfall for the dry month is 3.18in. in November.

Frost occurrence is negligible in its effect on tree growth and no damage to plantations has been recorded at Puketiti.

Soil and Topography

Two main soil types are found on the holding: Most of the higher knobs are of the Matakaoa sandy loam of the brown loam group, with 4 to 6in. of brown sandy loam on dark yellow sandy loam on rotted, compact, yellow loam; on the lower slopes occurs the Mangatu clay loam of secondary podzol series of soft blue mudstone with sandstone bands, or 4in. of dull brown, moderately-compact clay loam on sticky mudstone clay. From general observation plantations would be expected to grow more rapidly on the brown loam areas.

The hilly area is much broken by watered valleys or gullies, many of them worn to sub-gullies by temporary stream flow, the margins being covered by unstable mudstone formation prone to mass movement of the surface layer known as "slumping." This process of land movement on steeply-sloping ground may be described briefly as follows: The original forest growth regulated the absorption of moisture and the soil surface was held in an absorbent but not waterlogged condition, but after the clearing of native vegetation and the burning of the top mat of humus covering, and with the sowing of English grasses and introduction of stock, the

HEADING PHOTOGRAPH: Looking northward to Puketiti peak. *Pinus radiata* were planted to consolidate a moving slope, with a closely-planted poplar species trial in the centre. Lombardy poplars were contour planted to hold the slope.