

RETENTION OF LIME AND PHOSPHATE BY THE SOIL.

Under the high rainfall of the West Coast—80 in. to 100 in. per annum—it was thought possible that the downward movement of lime and phosphate would be rapid. Two series of soil-samples taken from treated and untreated pakihi land have shown on analysis that the phosphate added in manures is held tenaciously by the top 3 in. of soil. In the case of lime the analyses indicate that the downward percolation of lime is more rapid, but after two years the enrichment of lime compounds in the soil below a depth of 6 in. is not great.

USE OF INOCULATING SOIL.

In the early experiments conducted by the Cawthron Institute on pakihi land, it was thought possible that in view of the small bacterial population of the untreated land the inoculation of the land at time of sowing mixture would help materially in the rapid establishment of clovers. Plots sown with and without soil inoculation have shown little difference, probably indicating that the seed carries sufficient bacteria to enable normal development of clovers and lotus. Sowings on the field scale have confirmed the plot results, and inoculation of the land prior to pasture seeding has been abandoned.

GRASS-SEED MIXTURES.

In so far as the initial establishment of pasture on pakihi land, where little is done in the preparation of the seed-bed, is concerned, the inclusion in the seed mixture of suitable amounts of white and red clovers, lotus, alsyke, crested dogstail, and fog are important. All these make good growth in the early stages of establishment. Perennial rye, cocksfoot, and paspalum are not prominent during the first two years after sowing, but show more vigorously as consolidation of the land is effected under grazing. Where the land is drier, and where discing is employed to secure a seed-bed, growth of both rye and cocksfoot is much better. For the wet conditions on the West Coast the following mixture of grasses and clovers has given the best results: Perennial rye, 8 lb.; Italian rye, 6 lb.; cocksfoot, 4 lb.; brown-top, 2 lb.; crested dogstail, 2 lb.; Yorkshire fog, 2 lb.; white clover, 4 lb.; red clover, 2 lb.; alsyke, 1 lb.; *Lotus major*, $1\frac{1}{2}$ lb.; *Lotus angustissimus*, $\frac{1}{2}$ lb.: total, 35 lb. per acre.

GRAZING ESTABLISHED PASTURES.

Records have been kept during the past season of the amount of grazing afforded by pastures which at the commencement of the season had been down for three years. Dairy cows were grazed on one block, yearling heifers on another, and hoggets on a third. In every case stock has kept in good condition. The dairy cows have milked well, and both the heifers and hoggets gained rapidly in weight.

Particulars of the grazing on the three blocks are recorded below:—

*Block I (Area, 6 acres, located on Wood's Farm, off the Main Gorge Road).—*Monthly grazing record in cow days: October, 14; November, 158; December, 180; January, 84; February, 60; March, 45; April, 35; May, 35: total, 611.

In addition, a horse had intermittent grazing on the 6-acre block. This grazing could be safely estimated at not less than the equivalent of 14 cow days, making a grand total of 625 cow days for the season, or 104 cow days per acre. During those periods when the block was spelled the cows had but poor grazing on the open pakihi. On this account the cows came back to the 6-acre block in a hungry state, and consequently the actual grazing was heavier than would appear from a consideration of the actual number of cow days recorded. For the whole year there can be little doubt that the pasture under good management would have carried not less than one-third cow per acre.

*Block II (Area, $1\frac{1}{16}$ th acres, located at Sergeant's Hill, Westport).—*This block was grazed by yearling heifers. The following is the monthly grazing record, in heifer days: November, 28; December, 112; January, 98; February, 47; March, 31; April, 30; May, 31; June, 10: A total of 387 heifer days on $1\frac{1}{16}$ th acres = 365 heifer days per acre.

On the basis of two heifers being equivalent to one dairy cow in consumption of pasture, the block has given grazing equal to 182 cow days per acre during the season. For the full year the figures indicate that this pasture would carry half a cow per acre.

*Block III (Area, $\frac{7}{15}$ th acre, located at Sergeant's Hill, Westport).—*This block was grazed by four hoggets. When feed was scarce the sheep were transferred to an adjacent block where somewhat similar grazing was available. A record was kept of the actual grazing on Block III, which provided 796 lamb days for the whole season, or the equivalent of 1,705 lamb days per acre. The figures indicate that the pasture would carry over four and a half hoggets per acre throughout the year. This is equivalent to nearly half a cow per acre in carrying-capacity. During grazing the hoggets increased in weight from an average figure of $87\frac{1}{2}$ lb. per head early in November to $111\frac{1}{2}$ lb. per head on the 7th March.

PHORMIUM TENAX.

Good growth of flax has been made on a number of the experimental plots. The best result has been secured with the complete treatment consisting of lime, phosphate, potash, and nitrogen. The omission of nitrogen from the treatment has been noticeable at once in poor colour and reduced growth. The omission of phosphate from the treatment has resulted in very little growth of the flax-plants. Plots without phosphate, even although supplied with the other plant-foods, were as poor as the untreated plots.

The omission of potash from the manurial treatment has had, so far, no marked detrimental effect on growth of the flax-plants.