

1st April, 1921, to 31st March, 1922, 40 sacks of seed in pod sown. From Kaipara sand-dunes, 84 lb. threshed seed sown, 2,000 lupin plants transplanted. Also, within the above-mentioned periods, various kinds of seeds, plants, and shrubs were sown and planted, both in sheltered localities on the coastal dunes and on the inland drift, with varying success.

The following plants are now established: Ice-plant (varieties), *Hakea saligna*, willows, African boxthorn, *Eleagnus japonica* (cuttings), *Acacia lophanta*, *Pinus pinaster*, *P. maritima*, marram-grass (seed), toetoe-grass (seed), *Spinifer hirsutus* (silvery sand-grass), flax (*Phormium tenax*), and lyme-grass (seed).

Experimental Plot on the Sand-drift to test the Germination of Marram-grass Silvery-grass, and Lyme-grass Seed.—The marram-grass seed was sown intact, the seed-stalk and the seed-head being inserted into the sand, the seed-head being buried to two-thirds of its length. The area planted thus was one-fourth of an acre, in lines with 18 in. between the rows. The seed germinated quickly, and the young marram-plants now cover the area referred to, and will soon be a flourishing plantation. The silvery sand-grass seed (*Spinifer hirsutus*), sown in April also, and in the same locality, did not germinate until the late spring (November), when the young plants came away and made a successful growth. The lyme-grass seed sown during April in the same locality, and another portion under the shelter of the "bridge" marram plantation, germinated at the same time as the marram-grass seed, but the growth has not been so progressive as that of the marram-seed, but sufficiently assured to warrant the time spent in the harvesting and sowing of the seed. So successful has this experimental plot been that it has proved beyond doubt that plantations from the seeds experimented with could be established within sheltered places of the sand-dune areas where no growth of the above-mentioned plants are growing. It has also proved the fact that, like the lupin-seed, the marram-grass, silvery sand-grass, and lyme-grass seed can be sown as soon as harvested.

Marram-grass Plantation.—The planting of marram-grass (*Psammina arenaria*) was commenced on the 12th April and continued at intervals until the 19th October. Three new plantations were made in the areas above described, and the "Bot" marram plantation was extended from 10 acres to 30 acres. The new plantations and the extended one are approximately one mile apart, starting opposite the camp and continuing towards the Ruakaka River, two of the plantations being near the coastal dunes and the other two on the border of the inland drift. The plants in the new plantations came away well and are making good progress.

California Tree-lupin Plantations.—As the sand-dune workers had to be discharged on account of the restricted funds, the harvesting of the lupin-seed was left in abeyance. However, in the vicinity of the parent plants the seed has germinated freely, and in the coming spring thousands of young plants will be available for transplanting. Some forty sacks of seed have been harvested by me during periodical visits to the Waipu sand-drifts, and the lines of the lupin plantations near the camp extended towards the drifting sand. Also, $\frac{3}{4}$ cwt. of lupin-seed from the Kaipara sand-drifts has been sown on the inland drift, near the stock reserve adjoining the Uretiti Kauri-gum Reserve.

Green Hill Nursery.—The sand-dune workers, at intervals between other work, split sufficient posts and fenced in 7 acres of the Green Hill. This area has been subdivided into two paddocks, one to be used as a nursery, and the other for holding any stock found trespassing on the sand-dune areas and adjoining Crown lands. In May last $\frac{3}{4}$ acre was laid out in nursery beds for the *Pinus insignis* raised the previous season. The following month five thousand *Pinus insignis* were transplanted into the nursery beds, to acclimatize them prior to removal to the coastal sand-dunes when sufficiently grown. A thousand African boxthorn plants were used as a protecting breakwind on the northerly and easterly boundaries of the nursery, and on the southerly and south-westerly boundaries wattle-trees and flax have been planted. This season (October and November) the following quantities of pine-seed sown in nursery beds to raise trees for planting out on the coastal dunes: 1 lb. *Pinus insignis*, 4 oz. *P. muricata*, 1 lb. *P. maritima*; and 2 lb. *P. muricata* seed was sown on the sand-dunes where the dunes had sufficient growth to stop the drift sand. All the seeds named have germinated.

General Remarks.—Commenting on the growth of the marram plantations on the Waipu and the Ruakaka sand-dune areas, the plantation that has progressed most is Owen's plantation, at Ruakaka, planted out on the 31st June, 1920. This plantation now could supply well-grown plants to reclaim another portion of the sand-dune areas in this locality. The marram plantations established on the Waipu dunes have only developed in line with Owen's plantation in patches, but notwithstanding this the growth is very satisfactory. The growth of what is termed the "Government marram plantation," lying northerly from the camp, and established on the inland sand-drift, has progressed well, and this season will produce a good supply of plants. In fact, a supply of plants is available on the Waipu and Ruakaka plantations this season sufficient to keep five men employed, should it be desired to push the reclamation of the sand-dune areas along. Commenting on the destruction done to parts of the marram plantations after very heavy gales of wind, it seems absolutely necessary, and it is recommended by the best authorities, that the damaged parts should be replanted each season. In Webster's handbook on forestry (published 1919) it states that "in 1900 nearly 140 miles of littoral dunes were maintained by the State (Landes, France) at an average cost of slightly more than £25 per mile."

The lupin plantations already established, with the exception of the Ruakaka coastal dune plantation, are making rapid growth and extending their limits. In a few places on the coastal dunes, and also on the inland drift, the sand-drift has been permanently checked. The continuous line of lupin-plants from seed sown in February and March 1921, has become established, and a supply of seed will be available to sow other lines through the coastal dunes next season.

Kaipara Sand-dune Reclamation.

Areas (approximate) of marram-grass established: 10th March, 1920, to 31st March, 1921, 104 acres; 1st April, 1921, to 22nd September, 1921, 38 acres: total, 142 acres. Renewal within last period, $3\frac{1}{2}$ acres.