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Spinifex Research Project. A Collaborative Research Project Between Naturally Native New Zealand Plants Ltd and New Zealand Forest Research Institute®

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INTRODUCTION

In 1996 Naturally Native New Zealand Plants Ltd. was approached by Natural Logic, an ecological consultancy company operating in the field of revegetation planting, to research the growing of spinifex [*Spinifex sericeus* (syn. *S. hirsutus*)] for planting on coastal dunes in Northland. This company required these plants to restore degraded coastal sand dunes in a rather difficult exposed site and could not find a source for the plants anywhere.

Spinifex along with pingao (*Desmoschoenus spiralis*), had long been recognised as an important indigenous sand binding species. In 1911 Leonard Cockayne the eminent botanist, had noted that these species, along with *Euphorbia glauca* were the most prevalent sand-binding species occurring on the fore dunes throughout most of New Zealand. It also occurs naturally on the eastern coast of Australia where it is a dominant sand dune species.

However, even as late as 1996, little was known as to how to propagate spinifex in sufficient quantities required to make it a viable option to use in sand dune restoration. Some nurseries, notably the Whakatane District Council Nursery and Christchurch City Council Nursery, had been experimenting with propagating spinifex with mixed results and the numbers of plants available were minimal. Cutting propagation had been tried and proved to be very costly and damage to

existing plants was unacceptable. As a result early beach restoration work by Regional Authorities was based on using pingao as the main sand-binding species.

Problems centered around the supposed low viability of the seed. It was felt that with a little research work, a method could be found to extract large volumes of seed from the tumble weed heads collected on beaches in late summer. Experience with sowing dunes with mechanical seed drills in Australia had shown that by using large quantities of seed acceptable results could be obtained. It was assumed that by sowing large quantities of seed, spinifex would be able to be produced commercially in the nursery.

The initial proposal put to Naturally Native was to investigate a means of mechanically processing the seed heads to extract seed so that large numbers would be available at low cost. However, we very soon realized that such a project was beyond us, as it was too costly, and so was abandoned.

FORMATION OF THE COASTAL DUNE VEGETATION NETWORK

In 1997 a group of Regional Council and Local Authority staff met at New Zealand Forest Research Institute (Forest Research) in Rotorua to consider the problem of producing plant material for dune restoration work. From this meeting the Coastal Dune Vegetation Network (CDVN) was formed. The CDVN has been most successful and has grown rapidly. At its last annual meeting in Christchurch in March 2000 over 120 people from a range of interested groups including Regional Authorities, Local Councils, Crown Research Institutes, Department of Conservation, Beach Care Groups, and conservation interests attended.

The CDVN funding is derived from member councils and a number of other interested parties belonging as collaborators. CDVN funds are matched with contributions from Government research grants to fund the research programme. The initial research that the CDVN became involved in was to find a means of growing spinifex plants in commercial quantities.

Naturally Native New Zealand Plants Ltd became involved in the project at the outset as we saw this as an opportunity to learn how to grow these difficult plants and so solve one of our customer's problems, i.e., the need for spinifex plants. Our role was that of a collaborator. We could not afford the high cost of participating as a full member of the CDVN so offered our service to provide a site to set up the nursery trials.

PROPAGATION TRIALS IN THE NURSERY

The first propagation trials were surprisingly basic but produced some significant results. A number of different treatments were decided on in consultation with the team from Forest Research and other interested people. We all had ideas as to how best to grow these plants, based mostly on our observations of the plants in the wild. Credit must be given to the scientists from Forest Research, who welcomed any idea and included most in the trials.

The initial trials were set up in our cutting propagation house, in autumn, as this facility was not being fully utilized at the time. It soon became evident that we were a little short sighted. Soon the spring activity meant we wished we had the space being used for the trials for our own production requirements.

Sorting Seed. Our involvement started with organising staff for the very labour-intensive task of sorting viable seed from the tumble heads. Our propagation staff

had to sow the seed in various ways and then record the germination as it progressed. This was overseen by the scientists from Forest Research, who visited the nursery on a regular basis. As there were a number of different treatments the task was quite time consuming.

Initial Results. It became quite apparent early in the work that the 19% germination achieved from planting whole tumble heads direct into the sand dunes could be improved. The secret to success was clearly to start with selecting viable seed. It also became evident that some methods of sowing the seed in the initial trial were clearly inappropriate and resulted in time-consuming pricking out and high death rate in the seedlings.

PLANTING OUT TRIALS

The first plants produced, numbering only several hundred, were planted in local dune areas, in the Bay of Plenty, in an organised planting trial. It was felt that it was no good just producing plants, they had to be able to subsequently thrive in the dune environment to make the whole concept work. Initial trials involved factors such as depth of planting and various fertiliser regimes.

THE SECOND YEAR

The second year of the project saw us even more committed to this research. A repeat of all the initial trials was set up to prove that our results had not just been due to chance. A much greater quantity of seed was collected from various coastal locations and so it was decided to attempt to produce “commercial” volumes as part of the trials. The majority of the seeds were sown according to the best results that had been obtained the year before. However disaster struck soon after the trial had been set up and the seed planted. It came in the form of one curious sparrow that was intent on building a nest in the shed near by. Birds certainly communicate! Within the space of an hour, flocks of sparrows had descended on the spinifex trial area and were removing the seeds to use the stalks in their nests. Then they realised the seeds were edible. Quick action by the nursery staff saved only half the trial. However by years end we were able to prove that it was possible to produce spinifex in commercial quantities in the nursery situation and at a reasonably acceptable price.

A PLACE TO GROW SPINIFEX

During 1999 we decided that if we were to grow spinifex seriously we needed to have a dedicated place for this purpose. A fortuitous meeting with a senior staff member from Whakatane District Council enabled us to lease the Whakatane District Council Nursery and establish it as the Naturally Native Dune Vegetation Centre. The location of this nursery adjacent to the coast in the Eastern Bay of Plenty makes it an ideal location to produce these plants. This year over 30,000 spinifex have been grown under contract to various local authorities.

CONCLUSION

By collaborating with a Crown Research Institute such as Forest Research, Naturally Native New Zealand Plants Ltd has been able to take part in a research project that would have otherwise been far beyond the means of a business of our size. Although the cost to us appeared minimal at the time, when staff time,

materials, and disruption to our production patterns are all taken into consideration the cost has actually been quite considerable. Forest Research has estimated it to be in the vicinity of \$40,000. The whole research process has been really practically orientated, largely because of the people involved including both scientists and the nursery staff and the fact that there was a practical goal set at the outset.

We have, by being involved, found a small area of specialisation for our company. We are committed to being a key producer of plants for dune restoration — not just spinifex, and this will require even more research in the future. However we recognise that the market for such plants is limited, as at this stage only councils are purchasing them.

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Focus on New Zealand Flax: *Phormium* Production in 2000[©]

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INTRODUCTION

This paper is a combination of 3 years intensive research on *Phormium* J.R. Forst. & G. Forst. for a Bachelor of Science in Crop Technology and Management at Writtle College, United Kingdom and a passion on my part for a truly amazing New Zealand native, making its mark around the world on our modern global landscapes.

My first encounter with *Phormium* was at Lees and Company, a specialist grower of container nursery stock to the landscaping industry in the United Kingdom. In the early 1980s, the plants arrived in large boxes from South Africa rapped in nappies. Later that same season, smaller plants wrapped in bundles of 25 in brown paper and sphagnum moss arrived from New Zealand. An air of mystique shrouded these plants and like any keen plantsperson I started thinking. What conditions would these plants grow under? What feed makes them thrive? How hardy are they and how do you propagate them? This search inevitably led me here to New Zealand, and 3 years on I'm still searching and learning. I'd like to share with you some of my research and key findings.