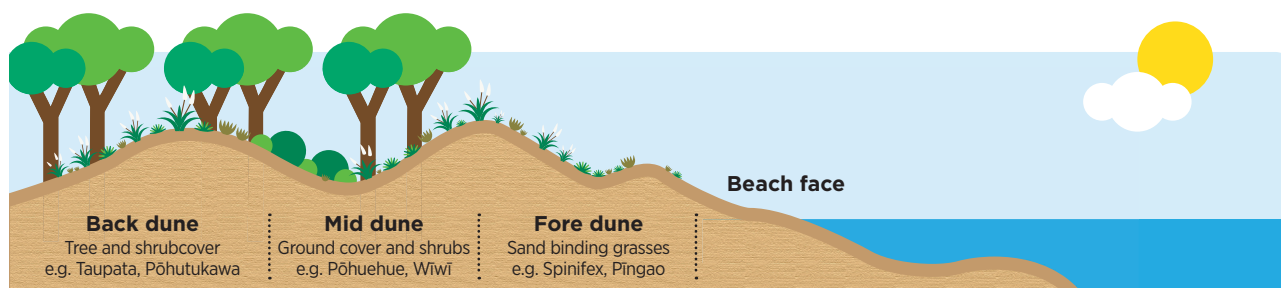


Dune Plants

This brochure provides information on the two most commonly planted fore-dune species, spinifex (kōwhangatara) and pīngao. Together these two unsung heroes, one a grass (spinifex) and the other a sedge (pīngao), do more for the stabilisation of frontal dunes and protection of the property that sits behind them than any other intervention in the restoration toolbox. Pīngao and spinifex are effective in long term control of coastal erosion. Plants can grow to keep up with the movement of sand where as rigid walls and structures are soon buried or undermined. It is now best practice to use native vegetation in dune restoration programmes.

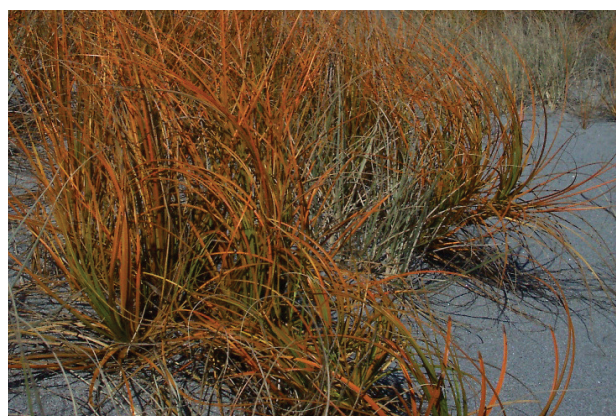
The natural progression of plant species within a dune system



Pīngao (Golden Sand Sedge) *Ficinia spiralis*

Pīngao is a native sand-binding plant and was historically a prominent feature of New Zealand's dune landscapes. Its tufts of coarse grass-like leaves are a rich golden colour and are borne on long, thick rope-like stems trailing across the dunes. The colouration of pīngao makes it stand out against the grey-green of spinifex (kōwhangatara), our other native sand-binding grass species.

Pīngao is a sand binder and dune builder. Wind blown sand is trapped amongst its leaves, which accumulates and supplies nutrients to the plant. The stems continue to sprout new shoots as the sand shifts and covers them. The seed heads are conspicuous with their rigid dark spikes which grow above the leaves and bear hundreds of dark brown seeds, that usually mature in mid/late December.



Pīngao at Coastlands – brilliant orange winter colouration.

Status

Pīngao used to be the most widespread and successful plant of our dune lands, along with spinifex (kōwhangatarā). Endemic to New Zealand, it is not found elsewhere in the world. Pīngao has now declined to the extent that it has disappeared from many areas and is vulnerable elsewhere.

Today our natural dune systems have been reduced to one quarter of their former extent, and occupy only 3,000 hectares in the Bay of Plenty region. With increasing recreational use, grazing, fire, introduced invasive plants, rabbits, subdivision, coastal reclamation and sand mining – all of these factors have contributed to the reduction of pīngao along with our protective foredunes.

Use of pīngao

Pīngao is much sought after by Māori weavers. Sun-dried, it produces a bright golden yellow fibre which provides a vibrant contrast to the red and black dyed fibres used in tukutuku panelling, and also for the weaving of kete and whāriki. A resurgence in Māori crafts has created a demand for pīngao as a raw material. At the same time pīngao is not plentiful. Supplementary planting and careful management of established stands is now necessary.

Pīngao is actually a sedge not a grass. This means that it can survive a light spray with grass specific sprays and makes it suitable for planting at the border between grassed reserves/lawns and fore-dune systems.

Spinifex (kōwhangatarā) *Spinifex sericeus*

Spinifex (Kōwhangatarā) is a native species and is common on the sand dunes around the coasts of New Zealand, Australia and New Caledonia.

It is identifiable by its rough or hairy grass appearance, silvery colour, and creeping runners that run down or across the dunes.

Other features include the large seed heads of radiating spikes (female, seed bearing inflorescence), which once mature or ripe blow free to roll about the beach until becoming lodged and releasing their seeds. Spinifex also spreads by horizontal creeping runners which give out roots and side runners at each leaf junction.

Spinifex is an important pioneer sand stabilising plant occurring naturally on the coastal dunes of New Zealand. It is salt-tolerant and once established can withstand

extreme temperature, drought and has the ability to grow through accumulations of wind blown sand.

It is, along with pīngao, a dunes best protection against wind erosion

Spinifex grows well on all parts of the frontal dune and is usually the dominant species along with pīngao colonising the seaward slope. Both spinifex and pīngao are the main species used in planting programmes for dune re-vegetation programmes.

Because of its high tolerance to salt water, spinifex grows down to the toe of the dunes and helps build up the dune front. The upright leafy shoots reduce surface wind velocity resulting in sand deposition with frequent burial of the leaves and stems. Cycles of sand deposition and vegetative growth are important features of the dune-forming process.



Seed collection and growing of spinifex

Spinifex is harder to propagate than pīngao. It germinates readily from good seed but then has a high mortality rate as the seedlings grow. (This should not discourage you as you may be able to identify new methods of propagation and help with future plantings.)

The seed is contained in a seed head, resembling a spiky ball. Each seed head can contain up to 150 spikelets containing seed. When the seed is mature the seed head is released from the plant and is often found being blown along a beach and over dunes by the wind. This usually occurs after Christmas.

Guidelines for seed collection

- Collect entire seed heads by either collecting fallen seed heads or those which come away easily by hand from the parent plant.
- Collect only mature golden straw-coloured seed heads (see photo 1).
- Avoid picking male flower heads as they contain no seeds (see photo 2) and do not pick half formed heads – as they are either still developing or may have some defects.
- Avoid also seed heads that have strange black lumps half way up the spikes. This is a fungus called Black Smut – honest! Any seeds on infected heads will not germinate (see photo 3).
- Try to collect seed heads that are close to male plants (see photo 2). This ensures the best possible pollination of seeds.
- Store seeds in breathable bags. Paper rubbish bags are ideal. Plastic bags can cause mould to grow on the seeds which will destroy them.
- Record on the bag, the date and name of the beach where you collected the seed heads.
- Store bags away from rodents or sparrows. They like to eat spinifex seed!



Photo 1: Golden seed heads.



Photo 2: Male flowers.



Photo 3: 'Black Smut' Fungus.

Propagation guidelines

- Separate the spikelets looking for fertile seeds (see photo 4).
- Plant in potting mix with the point down, and tail up at a depth of 2-3cm, water daily and keep between 15-25°C – a small glasshouse or similar will provide a suitable environment.

Germination occurs between 2-6 weeks after sowing and is often sporadic. Ensure that the seed tray has free drainage to prevent water logging.

- The transfer of seedlings from the seed tray to either root trainers or planter bags can be done when they are 6-8cm high. Take care not to damage the root system when removing from the seed tray. Ensure the roots are vertically descending when removing from the seed tray, and that they are also vertically descending when re-potting. This helps to encourage long vertical root systems which help with plant establishment in moving sands.
- A mixture, 50/50 of coarse sand and peat is recommended with a slow release fertiliser to assist plant growth. Once planted in bags or root trainers, ensure the plants don't become waterlogged – they require good free drainage.
- Trials of growing spinifex have included taking cuttings and the planting of whole seed heads.

Cuttings – taken from healthy long growing shoots. Place the cutting in a coarse sand mix and water regularly. Roots may begin to appear after 2 weeks – cuttings can then be planted out into bags or root trainers.

Whole seed head plantings – in some areas whole seed heads have been planted in a trench (100-150mm) deep, covered with sand and left to germinate naturally. Lower rates of success have been achieved, but this is a quick, low-input method.

- Young plants should be protected from frosts during the winter period and shaded/watered during the summer period.



Photo 4: Separating spikelets.



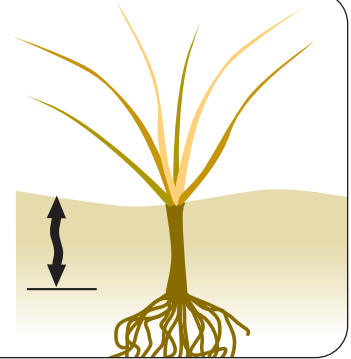
Photo 5 and 6: Seed trays at the nursery.

Planting

Planting should be carried out between June and September to ensure good establishment for the coming summer period. Plant at 50–100cm spacing and bury the potting mix about 100mm below sand level.

Planting spinifex and pīngao

Plant 100mm to 200mm below ground level to protect root mass from wind exposure and dehydration.



Additional information for growing pīngao

The following are basic guidelines. Propagation of pīngao by seed is more successful than growing from cuttings.

Seed head collection

Seed heads are conspicuous from October onwards, with the upright spikes bearing hundreds of brown seeds. The seeds ripen from mid December onwards and can be easily identified when some seed husks have already started shedding and are found around the base of the plant.

Either collect full seed heads by cutting off with garden secateurs or by shaking attached seed heads inside a bag to dislodge any ripe seed. Seed should be collected in a paper bag so the seeds don't sweat. Paper bags containing seeds should be marked with the date and location of seed collection.

Seed can either be dry stored or sown fresh into a moist 50/50 peat/sand mixture to germinate — keep moist.

Propagation

Once germinated (4–8 weeks), water regularly and ensure the seed tray has good free drainage. The seedlings should be left to grow to 8cm high before pricking out into root trainers or planter bags. Potting mix should consist of around 30% coarse sand and the remainder a peat/potting mix. Slow-release fertiliser assists with plant growth and nutrients.

Pīngao plants should be protected from frosts during the winter period and shaded/watered during the summer.

Planting

Planting should be carried out between May and September (once Autumn rains have arrived) to ensure good establishment for the coming summer period. Plant at 50–100cm spacing and bury the potting mix about 100mm below sand level.

Kia ngātahi te tiaki takutai - Working together to care for our coast

Find out more

For more information on Coast Care groups and programmes contact:

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Bay of Plenty Regional Council in partnership with Tauranga City Council; Whakatāne, Western Bay of Plenty, and Ōpōtiki District Councils; and the Department of Conservation.