

Spinifex : Seed Collection and Propagation

Spinifex sericeus, commonly called spinifex but also known as silvery sand grass, is a native sand-binding plant found growing on sand dunes around the coasts of the North Island and northern half of the South Island. It can also be found in Australia and New Caledonia.

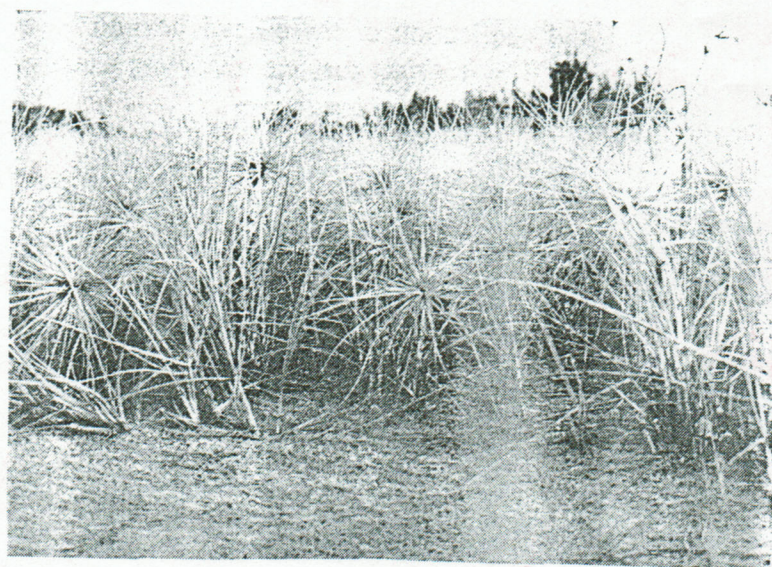
Spinifex is tolerant of salt spray, drought, extreme temperatures, strong winds and shifting sand. It is the dominant species on the seaward side of foredunes where, because of its greater tolerance of sea water, it even out performs the introduced marram grass.

Most of New Zealand's coastline has been altered and disturbed by agricultural, recreational and commercial practices and as a result spinifex and its native sand-binding partner, pingao, have been removed from substantial areas. To stem the resulting sand instability and erosion there is an urgent need to restore natural plant communities, including spinifex and pingao, to our sandy coasts.

Plant characteristics

Spinifex is grass-like in appearance and is characterised by strong creeping runners (stolons) that typically can be seen running down the seaward faces of fore dunes. Each node on the stolon produces erect growing leafy shoots (culms) and adventitious roots. The species is dioecious, that is the male and female flowers are borne on separate plants. The female flower or seedhead is probably its most recognised feature consisting of a loosely arranged ball of spines called spikelets.

Photos: Spinifex plants with mature seed heads.



The seed, which resembles the form of a wheat seed, is enclosed in several husky layers at the base of each spikelet, and there may be as many as 150 or more spikelets per head. When the seed is mature the ball (or spike) of spikelets is released from the plant and is dispersed by tumbling along the foreshore at the mercy of tide and wind.

Only 20 or 25% of spikelets, on average, appear to produce seed and this can drop to as low as 2 or 3% in some seedheads. As a result you can expect to get anything between 0 and 60 seeds from a seedhead.

Propagation of spinifex

Unlike pingao, spinifex is not an easy plant to propagate and there is still much we must learn about spinifex propagation before it is produced in the volumes required. Spinifex seems to germinate quite readily from clean seed, and this is the method recommended for those who are not so experienced in general plant propagation techniques, but the difficulty comes in removing the clean seed from the spikelets (see below). Spinifex can also be produced from cuttings, although more expertise, care and equipment are needed than is the case with seed production.

Seed collection

The easiest way to collect spinifex seed is to pick entire seed heads. It is important that these are not picked too early as the seed enclosed may not be fully formed. The best rule of thumb is only to pick heads when they come away easily in the hand. If you have to tug then it is probably too early. Another good indication that seed is ready to pick is if you can see many heads tumbling up and down the beach. These loose heads can also be collected.

Seed heads are ripe and ready for picking any time from mid January to early March depending on location. Seed maturity can vary from one year to the next so it pays to monitor ripening a few weeks in advance.

There are a couple of traps that often catch novice seed collectors. Firstly, avoid picking male flower heads as these do not contain seeds. The male flowers occur on separate plants to the seed-bearing heads and are distinctly different in appearance. Secondly, spinifex seed heads sometimes suffer from a disease caused by a floral smut. This disease destroys the seed and collection of these heads should be avoided. Smut infected seed heads can be recognised by the fact that the heads are usually only half formed and occasionally a sooty powder can be seen where the seed should have been.

Photos: A) Male flower (inflorescence)



A)

B) Smut infected seedhead.



B)

Seed storage

Spinifex seed heads should be dried thoroughly in the sun before they are stored. Once dried place the seedheads into bags that allow plenty of air movement and store in a cool dry location that is vermin proof. Rats and mice will make short work of the seed if they have access to them.

It is not known how long spinifex seed remains viable while in storage so it is recommended that the seed be cleaned and sown within 2 or 3 months of collection except in colder areas where frosts are experienced and sowing in early spring is suggested. Some New Zealand trials have indicated viability is as high as 80% when seed is sown soon after collection.

Seed cleaning

One of the more laborious tasks associated with raising spinifex by seed is the need to clean, or de-husk, the seed. Research indicates that clean seed removed from the spikelet has a considerably greater likelihood of germination than those sown still enclosed in spikelets.

At this stage the only recommended method of removing seed from the spikelets is by hand. Because many spikelets have no seed one method of separating those with seed is to pluck the spikelets from the seed head and soak them in sea water over night. Those with viable seed will generally sink, while the rest will float.

Sowing

Seed is best sown into wooden or plastic seed trays which have ventilation holes on the base. Optimum germination occurs between 15°C to 25°C so a glasshouse or plastic covered cloche will provide the best environment for germination to occur.

Spinifex has been shown to germinate considerably better in the dark than in normal light conditions. The best way to do this is to sow the seed at a depth of about 2.5cm in an all sand mix and cover the seed tray with a piece of black weed matting or a piece of cardboard. The seed should be placed evenly over a sand base and then covered with the 2.5cm sand covering. Water the seed tray regularly (2 or 3 times daily) but not excessively. It is wise to place seed trays on a surface, such as sand, that allows free drainage from the base so as to prevent waterlogging. Germination can occur within 2 to 3 weeks of sowing but is more likely to do so from 4 to 6 weeks and can continue sporadically for several months.

Pricking out

Each individual seedling can be transplanted (pricked out) to its own individual container once it has reached 6 to 8 cm and is robust with good root growth. The process of pricking out requires good eyesight and manual dexterity. Care should be taken not to damage the root system when removing each seedling from the seed tray and to ensure each seedling's roots are allowed to descend vertically and fully when placed in the potting mix. A pencil, or stick of similar dimensions (known as a dibble) is the best tool to use for this task. As for pingao, firstly, because they encourage the production of full and long, vertically descending root systems which are ideal for anchoring the plants in shifting sand, and secondly, because the plants can be planted directly from roottrainers into sand dunes thereby eliminating the more costly practice of growing them on in planter bags or pots. Roottrainers, when suspended in their wire baskets, also encourage free drainage and prevent waterlogging which spinifex seedlings are highly intolerant of.

Cuttings

For all cutting production the best results are generally achieved when an enclosed, high humidity cuttings tent, mist irrigation and beds with bottom heat are used. Cuttings can be successfully struck in small glasshouses but watering needs to be frequent and temperature fluctuations minimised. Spinifex has been successfully propagated on a small scale using two different forms of cuttings.

1. **Terminal / lateral shoot cuttings:** Cuttings are taken from terminal and lateral growing shoots of long, healthy stolons. Remove up to a third of the foliage and place the cutting into a tray or small plant pot. Pumice has proven to be a successful medium to use although sand would be expected to be equally successful. In one nursery 70% of cuttings rooted within 10 to 12 days using this method, but generally rooting would be expected to take longer.
2. **Stem section cuttings:** This method seems to have been successfully used by a number of nurseries recently, and it has the added advantage of allowing more cuttings to be taken from fewer plants. Stolons are cut into 2 or 3 node sections, all dead material is removed and the cuttings are laid flat on the surface of pumice (or sand) filled trays and placed under a misting unit or equivalent. The cuttings should only be taken from stolon sections which have no roots growing from the nodes. Rooting can occur within three weeks. Where more than one root system is produced from a cutting the original stem can be severed once the new growth has reached a robust size.

As for seed-raised spinifex cuttings can be pricked out into rootainers or other suitable containers once the new root and shoot formation is robust.

Potting mixes, fertilisers and seedling care.

Little, if any, research has been done on preferred potting mixes and fertilisers for spinifex. What is known is that spinifex at all stages of growth is intolerant of waterlogging so the mix must be free draining. It also appears that spinifex grown better in a fertility environment that is lower than is normal for other container grown plants. Consequently, a potting mix similar to that used for pingao is recommended, that is: 50% coarse, washed sand or pumice; 50% peat and/or bark; 2 to 2.5 kg (per cubic metre) of 8-9 month Osmocote plus controlled release fertiliser; 1 kg of dolomite lime and 1 kg of DAP (di-ammonium phosphate). See the pingao leaflet for important details about making a potting mix.

Many nurseries have had quite some success with propagation only to experience high mortality as the seedlings grow. We still have much to learn about spinifex seedling care and any success stories would be gratefully received by the author. Hardening off of successfully raised seedlings should be carried out as outlined in the pingao leaflet.

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