Management guidelines for dune use

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Leaflet No.
V–04.1

Planting programs for dune stabilisation

Introduction

Herbaceous pioneer zone vegetation plays a vital role in building coastal sand dunes and in stabilising them against the forces of wind erosion. In areas where dunes have been re-established (*see* Leaflets No.V-03.2, V-03.3 and V-03.4) and where dunes have been damaged by natural forces or by human activity (*see* Leaflet No. V-03.1), it is important to replant this vegetation quickly and effectively.

The most important primary sand-colonising plant along the southern and central Queensland coastline is sand spinifex grass *(Spinifex sericeus)*. This species is highly salt tolerant, has the ability to grow up through and stabilise accumulations of windblown sand, and can spread rapidly due to its strong, creeping runners. If the damaged dune supports some remnant sand spinifex grass, it may be easier to stabilise the area by fertilising the existing grass with a high-nitrogen fertiliser such as Nitram® (ammonium nitrate) to encourage rapid spreading of the runners over adjacent bare areas. Further information on sand spinifex grass is contained in Leaflet No. IV-01, and information on fertiliser programs for sand spinifex grass in Leaflet No. V-05.1.

Sand spinifex grass and cover crop growing through brush matting on an exposed dune which was previously bare, windblown sand.

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Other species of the herbaceous pioneer zone such as goat's foot vine *(Ipomoea pes-caprae)* and sea purslane *(Sesuvium portulacastrum)* are sometimes planted with sand spinifex grass to colonise bare areas. Other grasses, creepers and shrubs (secondary stabilisers) and trees (tertiary stabilisers) are usually planted on foredunes after the initial stabilisation by sand spinifex grass. They are also used with spinifex for plantings on less exposed foredunes and on hind dunes. This leaflet deals with methods of establishing sand spinifex grass on coastal dunes.

Planting seed

Seed of sand spinifex grass can be collected as the seedheads mature and detach from female plants around October and November. Dried seedheads can be stored for up to a year, but beyond this time the seed's viability may diminish to the extent that they are no longer worth using. The spherical seedheads can be hand planted by placing them in a small hole made with a shovel and covering them with sand. Alternatively they can be threshed and winnowed to obtain individual spikelets which are easily compacted for storage and are more suitable for mechanical planting operations. Care must be taken with threshing as the actual seed is not robust and may be damaged by rough handling. Seed and spikelets can be sown using mechanical planters or, alternatively, spikelets or whole seedheads can be broadcast over the sand surface and disced in.

Depth of planting depends on moisture conditions and should be in the range of 2.5–15cm. A depth of 5–6cm is probably ideal, but due to the likelihood of changing sand levels, it is good practice to plant seed across the recommended depth range.

The susceptibility of bare dunal areas to wind erosion while sand spinifex grass is germinating and establishing is a major concern. Two strategies to alleviate this problem are outlined below.

- A layer of brush matting can be laid over the sand after planting which will stabilise the surface against wind erosion, while allowing the sand spinifex grass to establish and eventually grow through and between the brush matting.
- A method preferred for larger projects is to stabilise the bare area with a suitable cover crop planted in conjunction with the sand spinifex grass. Cover crop and spinifex seed can either be sown in alternate runs with planting machinery, or broadcast together and disced in.

In both cases it is important to use a hardy cover crop suitable for the season, and to plant it at a sufficient rate and with adequate fertiliser to quickly produce a heavy standing crop to stabilise the sand surface. Cereal rye is a suitable cover crop for autumn and winter plantings, and forage sorghum is suitable for the summer in southern districts or for year-round plantings in northern areas. Fertilser rates for forage crops are given in Leaflet No.V-05.1. These rates will also meet the nutritional requirements of the sand spinifex grass. Germination and growth of sand spinifex grass is faster in the summer months, but is adequate at other times of year in Queensland. Planting projects are usually planned to coincide with reliable rainfall.

Seedlings

Nursery-raised seedlings or rooted cuttings from runners can be used to re-establish sand spinifex grass in bare areas. If moisture levels are adequate and the sand surface is kept stable so that the seedlings are neither buried nor left with roots exposed, then high survival rates can be expected. Seedlings are ready to plant when about 25cm tall and can be planted deeply with about one-third of the upper part of the plant below the sand surface.

Sand spinifex grass is generally raised in the nursery using a potting mix with a high sand content to simulate the environment into which the seedling will eventually be transplanted. This type of potting mix holds together poorly when the seedling is tapped out of a tube and for this reason paper pots are commonly used. The seedlings are planted with the pot still in place and the roots grow out through the

paper and into the surrounding sand. Planting density will reflect the time required to achieve an effective ground cover — 1m centres are common spacings for small to moderate areas. The application of 6–8g of high-nitrogen, slow-release fertiliser to each seedling at planting is recommended.

Runners

Spinifex stolon tips, which are cut from the terminal ends of the long runners, are commonly used to propagate sand spinifex grass in the field. The stolon tip is generally cut to a length of 40–60cm and must include at least one swollen node that is ready to produce roots. Stolon tips must be kept cool and wet after being cut. They should be planted into moist sand in a roughly horizontal manner at a depth of about 15–25cm with the end turned up to leave 10–15cm of the tip projecting above the sand surface.

Some type of surface stabilisation such as brush matting should be used on sites exposed to wind erosion. Because the stolons are planted before their root system has grown, losses are common and can exceed 50 percent in less than favourable conditions. Plant spacings are commonly in the range of 50–100cm but can vary in response to the supply of stolons, to allow for losses, and to reflect the time frame within which an effective ground cover is required. Early growth will be boosted by an application of fertiliser at planting as per the recommendation for nursery-raised seedlings.

Sprigs

Sprigs or small, rooted clumps of sand spinifex grass are also used to establish sand spinifex grass in bare areas. It is important to obtain sprigs from vigorously growing stands of spinifex where the plants show a number of swollen nodes located close together on the lower stem, from which new roots will grow. If such vigorous stands are not readily available, they can be produced on an area of relatively inactive spinifex, such as in a hind-dune area, by slashing to remove dead and unwanted leafy growth and applying Nitram® at 200kg/ha. If adequate moisture is received, suitable sprigs should be available in about six to eight weeks. These can then be removed by hand with a shovel or torn out with a tractor-mounted tyned implement and collected for planting.

Hand planting requires digging a suitable hole with a shovel in which to plant the sprig, or alternatively, large areas can be planted with a tractor-mounted seeding transplanter. In both cases, good moisture is the key to obtaining a good strike and therefore the sprigs should be planted deeply with 5–8cm of sand over the crown and the swollen nodes below the sand surface. Brush or mulch should be used to stabilise mobile sand surfaces while the sprigs are establishing. Sprigs can be fertilised with slow-release fertiliser at planting as per nursery-raised seedlings, or Nitram® at about 10–12g/plant can be applied to successfully established sprigs as they begin to show growth. Sprigs have a higher survival rate than runners but are generally slower to establish and start to spread. Planting rates are commonly in the same range of values as for seedlings and stolon tips and can be varied depending on the supply of planting material and the timeframe within which an effective ground cover is required.