

Perennial grasses take hold in sandy soils

Farmers in Western Australia's mid-west looking to diversify their cropping and grazing enterprises are increasingly exploring the benefits of sub-tropical perennial grasses. This article, in a series from the Grower Group Alliance, outlines how to better manage grasses in sandy soils.

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Sub-tropical perennial grasses are proving a boon for farmers with sandy soils because the plants can access water stored at depth, enabling farms to run more livestock.

In the Mediterranean climate of south-west Western Australia, particularly on sandier soils in the medium- to high-rainfall areas, perennial grasses are actually growing on stored water.

The sandy soils are proving to be highly successful because of the depth of the soil profile and the ability of these plants to access deep stored water.

Farmer experience along with several small- and large-scale trials throughout the Mingenew and Irwin areas of WA have proven perennial grasses can increase livestock carrying capacity significantly and add value to mixed farming systems.

A large-scale trial at Irwin monitoring livestock performance of sub-tropical perennial grasses sown during 2002 have proven the economic viability of this new grazing system (see Table 1).



Photos: Mingenew-Irwin Group

Irrigated perennial grasses trials at Irwin, Western Australia, show perennial varieties are economically viable in grazing systems, especially in sandy soils where they allow for higher stocking rates.

Benefits of grasses

Sub-tropical perennial grasses grow on a wide range of soil types and can access deep stored soil moisture as well as growing out-of-season (October–May).

The major benefits of perennial grasses in a grazing system include an increased carrying capacity on previously unproductive soils and increased production on all soil types, with extreme production possible on water gaining sites.

The grasses also can use extra water, so help prevent rising groundwater (salinity),

enable stock to be carried on green feed at the notoriously difficult autumn feed gap time, allow better use of the full farm feed mix and reduce the costs associated with feeding livestock.

Using perennial grasses also reduces wind and water erosion, increases soil fertility and improves soil structure.

Which species?

WA farmers have been having success with Rhodes grass (Callide, Katambora, fine cut and top cut), which spread well by above-ground runners.

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TABLE 1 Comparison of livestock production on annual and perennial grass

Craig and Donelle Forsyth, Irwin, Western Australia, farm on deep grey acidic sand with an annual rainfall of 480mm. A mix of sub-tropical grasses was sown on 90ha during September 2002 (fine cut Rhodes, Gatton Panic, Signal and Bisset Creeping Blue grasses). Animals grazed the paddock plus 210ha of weedy annual pasture for 145 days. Two paddocks were grazed from May 20–October 6. Cattle spent 110 days on the grasses and were rotated on to the annual pastures for 35 days to allow the grasses to recover.	
Pastures established	
Perennial grasses	3t/ha dry matter (days grazed: 110)
Annual pastures	0.5t/ha dry matter (days grazed: 35)
Results	
On perennial grasses	2.04 head/ha (17–21 DSE/ha)
On annual pastures	0.9 head/ha (7–9 DSE/ha)
Average weight gain	122kg per head at 0.84kg per day (over 145 days)
Total weight gain	243kg/ha or \$389/ha.
Source: Mingenew-Irwin Group.	



These runners are an advantage when sowing on non-wetting sands where establishment is often difficult.

Katambora, fine cut and top cut species also have reasonable salt tolerance.

Bunch grasses such as Green and Gatton Panic produce higher quality feed and grow well on poor, deep sands.

Also proving successful is Bambatsi Panic, which has a high waterlogging tolerance, some salt tolerance, is drought-tolerant and persists well on heavier soils.

Although less productive than other species, Bambatsi Panic has excellent feed quality.

Signal grass, Setaria, Premier and Digit grass are also proving to be successful, as is Kikuyu on areas with a shallow watertable.

Establishment is critical

On sandy soils, sub-tropical perennial grasses can be established by sowing during spring, when soil temperatures are rising (more than 17 degrees Celsius) and rainfall to germinate is still possible. This is a difficult time to establish pastures and strict attention to detail is required.

With a hot, dry summer dominating yearly weather patterns, WA trials have shown sowing into moist soil and with rising temperatures (9am soil temperature more than 17°C) will produce the best results.

In the mid-west of WA, this means the best time to sow is August–September to ensure there is enough moisture to allow the plant's root system to establish adequately and survive the hot, dry summer.

Controlling annual pastures and weeds before sowing perennial grasses is essential.

Perennial grass seed is small and does not compete well during its germination phase with other more vigorous annual plants that are either already established or germinating.

Start controlling weeds about 1–2 months before sowing by using livestock to graze paddocks heavily, followed by a double chemical knock-down.

Conserving moisture is also critical given that sowing is at the end of the winter growing season when less rainfall is expected.

Sowing pastures

For best results, establish perennials using minimal soil disturbance methods such as knife points and press wheels to compact the soil around the seed.

The furrow created by machinery wheels also maximises water capture and enhances germination.

Because of its size and light weight, perennial grass seed often needs to be sown with a carrier (fertiliser or sand) and needs to be placed on top of, or close to the soil surface.



The perennial grass variety Setaria (pictured) under irrigation at Irwin, Western Australia, is suitable for areas with a shallow watertable. Varieties such as Green and Bambatsi Panic also produce higher quality feed and grow well on poor, deep sands.

Press wheels are useful to minimise airflow around these surface seeds and loose soil, which would dry rapidly if left unattended.

Sow at 2–4 kilograms per hectare and include a phosphorus and nitrogen-based fertiliser.

Seed production

Western Australia depends heavily on Queensland for its supply of perennial grass seed.

But demand has doubled yearly since 2000. The demand, along with Queensland's supply becoming more difficult to access due to a combination of shortages and drought, and the threat of bringing new weed seeds and diseases into WA.

This has led the Mingenew–Irwin Group, together with the Department of Agriculture, WA, and Evergreen Group, to

trial seed production under irrigation. The trial was also supported by the Mid-West Development Commission.

Initial results suggest seed will be commercially viable, with both spring and autumn providing harvesting opportunities.

Timing the harvest

Harvesting perennial grass seed is not easy. The most significant seed yield and quality

Grower Group Alliance

The Mingenew–Irwin Group is part of the Grower Group Alliance, which also includes the Corrigin Farm Improvement Group, Facey Group, Pulse Association of the South East, South East Premium Wheat Growers' Association and Liebe Group.

Research institutions involved in the alliance include: Department of Agriculture, WA; CSIRO; Centre for Legumes in Mediterranean Agriculture (CLIMA); WA Herbicide Resistance Initiative (WAHRI); the Co-operative Research Centre for Plant-based Management of Salinity; and the University of WA. The alliance is funded by the Grains Research and Development Corporation.

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requirements are related to the timing and method of harvest but this can be hampered by the continual turnover and a large variation in seed maturity within a crop.

Yields vary considerably depending on the variety sown. In Queensland, Rhodes grass crops can produce yields of up to 1.5 tonnes per hectare, while others such as Gatton Panic yield only 100kg/ha.

Timing harvest to achieve high yields and quality seed depends on variety, weather conditions, the ability to recognise seed ripeness and the method of harvesting.

As with most crops, maturity varies between varieties.

Generally, harvest crops when the bulk of seed is not far from shedding.

Test seeds by gently rubbing and shaking the seed heads or by 'milking' the seed heads working from the base to the tip.

Check the samples for the presence of caryopses — the hard seed centre.

Caryopses in Panic and Rhodes grasses can be determined by rubbing the seeds in the palm of the hand and feeling grittiness in the sample.

Choice of equipment

While there are several harvesting methods, farmers in the Mingenew–Irwin area have used existing combine harvesters.



Craig Forsyth, Irwin, Western Australia, produces cattle on a mix of Rhodes, Setaria, Signal, Bambatsi and Creeping blue grass.

Harvesters can either direct harvest a crop or can pick up windrows or swaths that are generally mown and left to dry in the paddock for a day (depending on row thickness and weather conditions) before being picked up and threshed.

Under ideal conditions, windrowing can increase yields and produce better quality seed than if direct harvested.

But losses also can be higher if wind, heavy rainfall or hail falls on the row.

The choice of harvester depends largely on what growers have available.

Most growers use open fronts due to annual cereals and pulse grains dominating in the area.

But growers who specialise in perennial seed production could opt for a narrow-

fronted harvester when crops are heavy to avoid overloading or wide fronts on low-density, lighter seed crops.


Management

To obtain the full value out of a stand of sub-tropical grasses the well-established set stocking approach needs to change.

Perennial grasses are best suited to rotational grazing methods — the key being high stocking numbers for short periods with long periods of rest.

Sub-tropical grasses are no different to any annual grass in that they need quality nutrition (such as nitrogen, especially if biomass production is high).

Many WA farmers are striving to establish a base of winter-active legumes (for example, sub-clover and serradella) to provide winter feed at a time when the grasses are not as active but also to produce nitrogen. Alternatively, apply nitrogen fertiliser.

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About the author


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