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JUNE 2010 | PRIMEFACT 1025

Tropical perennial grasses – planning ahead

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Tropical grass pastures are commonly sown as either a mixture of grass species and/or cultivars. Prostrate stoloniferous species such as Katambora Rhodes grass are very competitive when sown with more upright species such as Premier digit and Bambatsi panic and can affect their establishment.

Legumes can also be sown in mixtures with tropical perennial grasses. The most popular legumes to sow in mixtures are winter-growing annual legumes such as subterranean clover or medics and perennials such as lucerne.

Annual legumes are best sown in the autumn, in either the year before or after sowing the tropical perennial grasses and may be row-sown or broadcast. Similarly, lucerne can be sown at these times or it can be sown at the same time as the tropical grass. In spring, lucerne seedlings can be highly competitive with most tropical perennial grasses. Lucerne is best established by row sowing in alternate rows to the tropical grass.

When sowing species mixtures sowing rates and row spacings may need to be adjusted.

Sowing a companion legume can improve the nitrogen status of tropical grasses, leading to higher crude protein levels and digestibility and so increasing animal intake and liveweight gain.

Successful sowing, establishment and utilisation of tropical perennial grass pastures in your grazing system requires careful planning. Up to two years 'lead time' is necessary to control summer-growing annual grasses. With some thought and planning this 'lead time' can be incorporated into your cropping or grazing program, reducing the time that a paddock is out of production. The first part of the planning process involves making sure that the species and paddock selection are correct.

The next part of the planning process involves making sure that you understand the specific management requirements for tropical perennial grasses, particularly for nitrogen and the implications that this has for sowing companion legumes to provide that nitrogen and the effect that companion legumes and nitrogen have on seasonal pasture growth, pasture quality, intake and livestock growth rates.

The main growth period of tropical perennial grasses is in the warmer months from mid spring to mid autumn. Most tropical perennial grasses are frost susceptible and so will provide little or no green forage in the frost-period, which averages about 150 days per year (from April to October) in the Tamworth–Gunnedah area of the North-West Slopes of NSW. In wetter summers, tropical perennial grasses have high growth potential, up to 20 tonnes of dry matter/year, but this growth needs to be carefully managed to ensure that it meets your livestock production targets. How you manage a sown tropical grass pasture depends on the type of companion legume sown (if any), its nitrogen status and matching pasture growth and quality to livestock nutritional requirements.

Species mixtures

There are two different types of mixtures that need to be considered before sowing a tropical perennial grass pasture. First, mixtures of different tropical grasses and second, mixtures of tropical grasses and other species, mainly annual or perennial legumes.

The advantages of mixtures are that species with different growth habits, seasonal growth patterns and responses to management can often be used to complement each other and exploit different

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environmental niches for light, water and nutrients, providing a better balanced pasture. This can be particularly beneficial in a variable climate, where different species can respond to markedly different temperatures and rainfall events. An added advantage of sowing a legume is that they can provide a source of nitrogen to promote tropical perennial grass production and persistence and improve overall pasture quality. Disadvantages of mixtures are that different species may directly compete with each other when sown and grown together. Aggressive competition of seedlings, for example, may markedly affect the establishment of slower growing, less vigorous seedlings or competition for water may adversely affect the long-term persistence of different species.

Species with different growth habits (e.g. perennial versus annual) may also have different management requirements and with mixed pasture swards, preferential grazing of one species over another may affect persistence. Sowing of legumes may also limit herbicide options for controlling broadleaf weeds.

Increasingly, mixtures of the seed of two or more tropical perennial grasses are being marketed, usually as coated seed. However, some caution is required when considering these – are they the right species and cultivars for the paddock and soil type you are going to sow and are you going to end up with the type of pasture that you want? Recent research, for example has clearly shown that prostrate, stoloniferous species such as Katambora Rhodes grass will adversely affect the establishment of more upright and slower growing species such as Premier digit and Bambatsi panic. Therefore tropical grass mixtures with a high proportion (greater than 20%) of Rhodes grass should be avoided, particularly since it has a small seed size and so a high number of seeds by weight.

Generally, temperate rather than tropical legumes are more commonly sown as species in mixtures with tropical perennial grasses on the North-West Slopes of NSW. The main reasons for this are that the temperate legumes better complement the lack of tropical grass growth in winter–early spring, with annual winter-growing legumes providing green feed at this time and perennials such as lucerne providing it in early spring. Conversely, tropical legumes have a similar growth period to the grasses and are as frost susceptible. An alternative is to use fertiliser rather than legumes to provide nitrogen, but it is generally considered that nitrogen supplied by pasture legumes is more cost-effective.

The main issues about sowing mixtures of different species are involved with sowing time, competition and their different management requirements. Annual legumes are best sown in autumn and tropical perennial grasses in November–January. Traditionally perennial legumes such as lucerne are also best sown in autumn–early winter, but may be sown at the same time as a tropical perennial grass. However, recent research has shown that as a seedling, lucerne sown in swards in spring was highly competitive with a range of tropical perennial grasses and adversely affected their establishment. Therefore different considerations such as sowing in alternate rows to physically separate plants, or sowing at a different time of the year may be needed for the successful establishment of species mixtures. When sowing mixtures of species at the same time you will need to reduce sowing rates and to adjust row spacings to allow for subsequent sowings. Also, for best performance and persistence, tropical grass pastures sown with lucerne will need to be rotationally grazed.

Annual winter-growing legumes such as sub clover or medics could be sown either in the autumn before sowing the tropical grasses or in subsequent autumns after the grasses have established. If sowing in the autumn before planting tropical grasses, the legume pasture needs to be managed so that it produces a large number of seeds and builds up a substantial seed bank. If the annual legumes are sown after the tropical grass then they can either be surface broadcast or drilled into rows. If drilling into rows the tropical grasses will need to be sown in wider spaced rows or every second row. In both cases, the pasture will need to be grazed hard in late summer–early autumn to remove the bulk of the herbage mass to allow light to reach the soil surface. The legume seed can be broadcast or drilled after the grasses have frosted and growth ceased. Depending on seasonal conditions tropical grasses may or may not be sufficiently well developed in the first autumn after sowing to be able to be grazed. Similarly, perennial legumes such as lucerne may be sown before planting the tropical grasses or after they have been sown. For best results, direct drilling rather than surface broadcasting of lucerne is recommended, but establishing either tropical grasses into autumn sown lucerne or lucerne into a tropical perennial grass sward is not easy. Sowing tropical grasses with lucerne in autumn is also not recommended.

Implications of mixtures for grazing options

The main effects of sowing mixtures are two-fold. First, mixtures of tropical perennial grasses can eventually be dominated by aggressive species such as Rhodes grass, which generally have lower quality. Rhodes grass can be thinned from stands by heavy grazing, particularly when its nitrogen status is low and it is dry, but by that stage it has probably out-competed the better grasses that were in the original mixture. Second, the nitrogen

provided by a legume sown in a tropical grass pasture can markedly improve pasture quality and so impact on the type of livestock and production targets that can be achieved.

In pastures containing annual winter-growing legumes paddocks will need to be grazed hard in late summer–early autumn every year to remove the bulk of the herbage and open the pasture to allow good annual legume regeneration. In spring, aerial seeding annual medics require resting from grazing to allow flowering and set; annual legumes that bury their seed, such as subterranean clover, may need to be grazed so that the plants are not shaded and flower and seed production is high.

Undoubtedly, the largest effect of sowing mixtures containing legumes will be on the overall quality of the pasture. If plant nitrogen levels are low, crude protein levels of the tropical grasses will be low (6–8%) and appetite for and intake of grasses will be depressed.

One of the most important aspects of grazing management of tropical grasses is that with their high growth potential (up to 20 tonnes of DM/ha in summer or 120 kg DM/ha per day) you will need to match grazing intensity to growth to make the best use of the forage.

Further information

The department's website www.industry.nsw.gov.au contains other useful information.

ISSN 1832-6668

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Job number 10090 PUB10/97