



Tropical grasses

Technical Note F10

In the tropical and subtropical zones tropical grasses can be a highly productive, permanent, pest and disease free pasture base, providing medium quality forage for 6 to 12 months of the year.

Varieties

Many varieties have been released and planted on dairy farms. With time a modest number of these are commonly grown on farm, often self selected from mixtures planted. Commonly used grasses can be reasonably described by the regions as below;

- Tropical upland – kikuyu, setaria, panicums (guinea and green panic), brachiaria, star grass, paspalum.
- Subtropical upland – kikuyu.
- Subtropical coastal – kikuyu, paspalum, setaria, Rhodes grass, green and Gatton panic.
- Subtropical hinterland – Rhodes grass, green and Gatton panic, paspalum. Kikuyu on deep, volcanic soils.

Most imported tropical grasses are from Africa. Main factors affecting grass choice are soil type and quality, temperature range (latitude), rainfall and soil fertility. Kikuyu requires deep fertile soils and a relatively cooler climate. Panicums prefer a light soil texture and paspalum a heavy clay base. Rhodes grass is suited to many soil types and performs best in drier areas (<1000 mm). Setaria is suited to high rainfall zones (>1000 mm).

All tropical grasses require a nitrogen source to remain vigorous, usually nitrogen fertiliser but in some cases a legume when the grass does not shade it out. Within species there are many variations among cultivars, often based on height or flowering habit. Shorter cultivars of setarias and panicums are easier to manage for high leaf and low fibre than the original tall cultivars.



Delayed flowering until the summer or autumn provides a longer growing season for Rhodes grass.

Establishment

Establishment is related to soil moisture conditions in the 6 weeks after planting, and success is often highest in early spring or autumn under dryland conditions. Summer heat waves will kill seedlings. Autumn plantings are often with a mix of grass seed and a cover crop of oats to suppress grass weeds and provide early forage.

There are substantial variations in the pure live seed (PLS) content of tropical grass seed and this needs to be accounted for in planting. Recommended seeding rates vary from 1 kg/ha for PLS of 30% to 5 kg/ha for PLS of 10% and usually average about 3 kg/ha. Seed pelleting with lime has become more common to increase germination and ease spread of seed when broadcast at planting, but markedly reduces the number of seeds per unit weight, often by about half.

Planting success requires a fully cultivated, fine seedbed. Seed is often surface spread, very lightly harrowed (e.g. light chain) and rolled with a heavy roller. Rolling is critical to success by pushing the seed into contact with soil. Graze lightly after establishment and allow to seed during the first year.

Water use

Tropical grasses respond to irrigation by increasing growth rate throughout the growing season. Total production is very high at up to 20 t DM/ha/year and efficiency medium at 16 kg DM/mm total water.

Soil fertility

At planting N is beneficial in boosting early growth on seedlings at approximately 50 N/ha. All grasses require nitrogen source for sward strength and production, at 50-100 kg N/ha/year for sward cover and vigour, and to 300 kg N/ha/year for maximum production (Cowan et al. 1995). Nitrogen applied in 3 applications each year, more frequent has not increased production. If urea is used it is preferable to spread into dry grass stubble of 20 cm or more in the week before rainfall. In coastal environments 100 kg N/ha/year maintained sward strength whilst optimum milk production occurred when 200 to 300 kg N/ha/year was applied (Teitzel et al. 1991).

Tropical's respond to P and K if soil availability levels are limited. Always test your soil to determine the nutrient status and identify potential limitations or excess that will restrict establishment and growth. Continued use of P and K dependent on soil tests:

- Soil P less than 25 ppm, apply 20 kg P/ha/year
- Soil K less than 0.8 mequiv%, apply 50 kg K/ha/year.

Lime may be needed after some years on certain soil types such as red kraznozems, if soil pH falls below 5.5. Add gypsum when Ca:Mg ratio is less than 1.

Diseases and pests

Very rarely a problem. Armyworm attack can be serious during autumn and winter in wetter years, particularly in well fertilised pastures. There are a range of insecticides that can be sprayed, as the armyworm feeds at night, spraying in the later afternoon may be more beneficial.

Growth and grazing

Leaf yield is the primary determinant of animal production, stem yield has little effect except at very high levels where it impedes animal access to leaf. Leaf yield is determined by growth rate, N fertiliser and stocking rate. Optimum average

stocking rate measured as 4 to 6 cows/ha irrigated and 1.5 to 3 cows/ha dryland (Davison et al. 1985), and in practice changes from well above these values in mid summer to approximately half these values in late autumn and early spring.

Leaf quality varies with growth rate and age of regrowth, but is generally medium quality forage. CP varies from 10 to 20 % DM and NDF from 55 to 70% DM (Forage Plus project). Milk response ranges from 6 to 18 L/kg N.

With grass mixture animals will selectively graze the more palatable species. With adequate leaf yield grasses are very robust under a wide range of grazing systems, from small paddock to open grazing, and from short to long rotations. In far north Queensland, the farms practice a simple grazing rotation with the aim of easy management and allowing cows to select the maximum amount of leaf. The farms tend to have around 20 permanent paddocks of tropical grass, cows are offered a new paddock each day - and in some cases after each milking. The rotation is not fixed; cows enter the paddock that is assessed visually to be most ready for grazing. With this system, cows are always offered the best opportunity to select leaf. The number of paddocks grazed during the high-growth summer season is reduced to increase grazing pressure, and to maintain leafy pastures ahead of the herd.

Milk production from tropical grasses is 10 to 14 L/cow/day after concentrates and supplements accounted for. Tropical grasses are generally marginal or deficient in P and Na for cows, containing in the order of 0.25 and 0.1 % DM respectively. Some species, such as Rhodes grass, can be adequate in salt if grown in saline soils. Calcium is also needed as in most grasses it is locked up with oxalate particularly setaria (see Table below), and in kikuyu is naturally low (Fulkerson 2012). High nitrogen application reduces plant P concentration. CP values range from 10 to 20 %DM and are related to N application.

Minerals/Oxalate (% DM)	Kikuyu	Setaria	Rhodes
Calcium	0.25	0.27	0.43
Potassium	2.93	3.20	1.47
Sodium	0.03	0.74	0.55
Soluble oxalates	1.25	5.39	0.24

Differences in soluble oxalate levels and nutrient concentration of kikuyu, setaria and Rhodes grass grown in northern New South Wales

Weeds

A well fertilised and stocked tropical grass has few weed problems. An optimum stocking rate leaves a 20 cm stubble at the end of winter. Weed control by slashing or spraying may be needed during establishment.

Animal health

Health problems are rare with tropical grasses. Nitrate poisoning is possible at very high rates of nitrogen application. Oxalate poisoning sometimes occurs with a flush of setaria growth, as oxalate precipitates the calcium from the cows blood.

A condition described a kikuyu bloat has caused cow deaths on some farms and is largely prevented with salt supplementation. Kikuyu is very low in sodium (salt).

Silage and hay

Tropical grasses are readily made into an acetic acid type silage. Often a sugar supplement, such as molasses, is added at 30 kg/t at ensiling. Wilting to 35-40% DM essential to concentrate sugars. Silages are palatable. However low quality often means animal production response is small, and the economics are often negative.

Highest quality is made before stem elongation and emergence of seed heads, at about 4 weeks regrowth. ME value falls from 9 MJ/kg DM at early vegetative to 6 MJ at flowering.

Further information

Contact the DAFF Customer Service Centre by Phone 13 25 23, or Email callweb@daff.qld.gov.au

More technical notes can be found at: www.dairyinfo.biz

Callow et al. (2013) Successful Dairy Production in the Sub-Tropics

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