
pastures
australia
A collaboration between AWI, GRDC, MLA, RIRDC and Dairy Australia

# Signal grass

## Scientific name(s)

*Brachiaria decumbens* (*Urochloa decumbens*)

## Strengths

- Well-adapted to acid and neutral soils in the humid tropics (above 1500 mm AAR)
- Tolerates high soil aluminium levels
- Very persistent, including under seasonally dry conditions
- Maintains green leaf well into seasonally dry periods
- Productive, capable of sustaining high stocking rates and grazing pressures
- Tolerant of low fertility
- Responds well to N and P fertiliser
- Excellent seed producer:  inexpensive and high-quality seed usually available

## Limitations

- Slow to establish if dormant seed is sown
- Tends to dominate companion legumes
- Can cause photo-sensitisation skin damage in cattle and deer (rare in Australia)
- Poorly eaten by horses and can cause 'big-head' disease
- Pastures can be seriously damaged by turf leaf hopper

## Plant description

**Plant:**  Low-growing leafy perennial grass with an erect or trailing habit.  Leaf canopy can grow to 50 cm above ground.

**Stems:**  May contain short underground runners (rhizomes) or hairless above-ground runners (stolons) to 70 cm long, which root down and branch at the nodes.

**Leaves:**  Soft and lance-shaped with a sharp point and often bending at the tips.  Bright green with soft hairs on the upper and lower surfaces and short bristles on the margins which catch the finger when drawn from the tip to the base.  Variable length, commonly to 20 cm long and commonly width to 15 mm.  Fringe of fine bristles at the leaf base.

**Seedhead:**  Complex, made up of 2-3 rod-like branches separated by 2-5 cm on the stem with one at the stem tip.  Each branch is 3-5 cm long , 3-5 mm wide and is made up of 2 rows of alternating seeds totalling about 40 seeds.  Each row is attached to the underside of a zig-zag shaped stem which has a fringe of hairs where it joins the stalk.

**Seeds:**  Egg-shaped seeds 4 mm long and 2 mm wide, smooth and shiny with a fringe of hairs near the tip and a distinctive 1 mm membrane where the seed meets the stem.

## Pasture type and use

Used mostly for permanent beef-grazing pasture on slightly to moderately acid soils in the higher rainfall, and seasonally dry, tropics.  An excellent beef-finishing pasture when fertilised or grown with well-adapted companion legumes.

## Where it grows

### Rainfall

1,500 - 3,000 mm/year, including areas with a dry season of 5-6 months.  Best production is in tropical coastal areas at rainfall >1,500 mm/year, and the elevated tropics above 1,200 mm/year.

### Soils

Grows on a wide range of soils, but best on well-drained and deep alluvial soils and clay soils of basaltic origin.  Tolerates weathered tropical soils characterised by low pH (acid) and high aluminium (Al) saturation.  Adapted to soils of low fertility but is very responsive to applied N and P.  Will tolerate short-term flooding, but not prolonged water-logging.

### Temperature

Well-adapted to latitudes between 12ºS and 28ºS, with best growth in the humid and sub-humid tropics.  Most productive in coastal and sub-coastal areas, including tropical highlands in the humid tropics (to 800 m ASL).  It is not recommended in the subtropics

because of poor early- and late-season growth. Leaves are killed by mild frosts, but plants regrow with the onset of warm conditions.

## Establishment

### Companion species

Grasses: Very competitive with other grasses and usually sown as a single grass species. Signal Grass can be sown with a range of grasses including 'Callide' Rhodes grass, 'Gatton' panic and setarias
(eg. 'Splenda' or 'Narok') but tends to dominate long-term under conditions where it is well-adapted and grazed.

Legumes: Very competitive with companion legumes in areas of good adaptation. The best companion species under intensive grazing is pinto forage peanut, which can form long-term pastures with signal grass. Centro, creeping vigna and villose jointvetch tolerate intensive grazing but are more difficult to maintain in pastures with signal grass. Other legumes such as the silverleaf and greenleaf desmodium, and glycine, will only persist under light grazing or spelling. Forage peanut and creeping vigna are the most persistent under dairy management.

### Sowing/planting rates as single species

3-6 kg/ha good quality uncoated* seed for pasture (90+% purity and 70%+ total viability (germination + tetrazolium tests)), 5-10 kg/ha for seed or hay crops. Fresh seed has low germination. Seed should be 6-12 months old if possible to reduce dormancy while maintaining high levels of viability.
* coating can considerably increase the weight of uncoated seed and this varies between coatings. Sowing rates for coated seed need to be adjusted based on the coating used.

Establishment is improved if seed is covered with soil
(0.5 - 1.0 cm) after broadcasting and soil-seed contact improved by rolling.

### Sowing/planting rates in mixtures

Often sown as the only grass in a pasture. If companion grasses are used, adjust the sowing rate to total 4-6 kg/ha. Do not adjust for legumes.

### Sowing time

To avoid slow poor establishment associated with cool soils: sow during summer months in the sub-tropics and elevated tropical areas; spring/summer in tropical coastal areas. Plant before seasonal rainfall and ensure a moist soil profile for 10 - 14 days after sowing if possible. Plants will often establish from dormant seed over the summer growing period.

### Inoculation

Not applicable.

### Fertiliser

Although tolerant of low fertility, it is generally sown on fertile soils. However, responds strongly to N and P; S and K deficiencies should be overcome in high production systems. Lime application to reduce acidity is not usually required.

## Management

### Maintenance fertliser

In high production beef-finishing systems without legumes apply 50-60 kg/ha/yr fertiliser N (e.g. 110 - 130 kg urea) to maintain productivity, more if higher production is sought. Pastures with high (30-50%) populations of legume (e.g. forage peanut) do not require nitrogen application.
For tropical dairying, up to 350 kg /ha/yr fertiliser N is often applied.
Applications of P, S, and K are recommended every 3-4 years in high production systems to overcome soil deficiencies.

### Grazing/cutting

Graze lightly within 6 months of planting to encourage early plant development..
Very tolerant of cutting and grazing by cattle once established and may dominate under set-stocking at high stocking rates. Productive beef finishing pastures (nitrogen fertilised or with a strong legume component) carry about 1.5 beasts/ha. Rotational grazing is mostly used for dairy production as is standard practice.

### Seed production

An excellent seed producer.  Seed is mostly grown by specialist seed growers in north Queensland where flowering tends to be strongest over summer when there is sufficient moisture for active growth and high temperatures.  One or two harvests are possible each wet season.
Seed crops are naturally poorly synchronised and seed is shed once mature.  Recovery by direct heading is maximised through cleaning cuts and high rates of nitrogen fertiliser which synchronises seed head development and encourages a dense leaf canopy which traps fallen seed. Seed yields of up to 800 kg/ha high quality seed can be recovered.
Freshly-harvested seed has a high proportion of dormant seeds and should not be sown within a few months of harvest.

### Ability to spread

Spreads well by runners which root down at the nodes, particularly in the first year after sowing when there is often bare soil.  Spread into bare areas is encouraged by grazing and fertiliser application to encourage vigorous growth.

### Weed potential

Low weed potential in undisturbed natural communities but has become a weed in disturbed areas.  Can be a weed of certain grass field and seed crops and pastures grazed by horses.

### Major pests

Generally considered to have no major insect pests, although there has been damage caused by the following:
Turf leaf hopper  has sporadically defoliated large patches of pasture in north Queensland requiring control with insecticides.  Pasture webworms  cause minor damage to pastures, and army worms  and cane grubs  often damage well-fertilised stands.

### Major diseases

Generally considered to have no major disease problems, although leaf rust, seed head ergot) and brachiaria blight can reduce growth and seed yields.

### Herbicide susceptibility

Selective control of grasses:  tolerant of atrazine used pre- or early-post emergence.  Intolerant of most other grass-controlling herbicides.
Control of broadleaved weeds: tolerant of 'hormone' herbicides such as 2,4-D,  picloram+2,4-D and dicamba.

## Animal production

### Feeding value

Moderate - high but dependent on soil fertility and age and proportion of leaf and stem.  Crude protein ranges from about 8% (mature material) to 20% (fertilised young leaf) and crude protein digestibility ranges from 30% (flowering) to70% (3-week regrowth).  Digestibility for young leaf is about 75%, declining to 50% when mature.  Mature, hayed-off material is of low quality.

### Palatability

Palatable to ruminants when young and fertilised, declining quite rapidly with maturity.
Generally not eaten by horses.

### Production potential

Strongly influenced by availability of nitrogen:  35 T DM/ha/yr achievable (monthly cuts) in tropical coastal environments when well-fertilised and about 28 T DM/ha/yr in tropical tableland environments when irrigated reducing to 16 T DM/ha/yr under rainfall.

Liveweight gain of 1 kg/hd/day achievable over summer when stocked at ~2 hd/ha on moderately fertilised pastures (~50 kg/N/ha/yr) in coastal areas of north Queensland and 220 kg/hd/yr over the year.

### Livestock disorders/toxicity

Contains chemicals which can damage the liver and cause skin photosensitisation in cattle, deer and sheep (rarely fed to sheep) if signal grass is a large component of the diet, although the condition is rare in Australia.  Rotation with other grasses is recommended if symptoms

(swelling skin and raw sores) occur.
Signal grass is generally poorly accepted by horses, but can cause a 'big-head' in horses unless calcium is supplemented or alternative feed is provided.

## Cultivars

| Cultivar | Seed source/Information |
|---|---|
| Basilisk | Australian Herbage Plant Cultivars<br>Southedge Seeds |
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## Further information


Bishop, H. (2007) Pastures: Mackay Whitsunday region. A guide for developing productive and sustainable pasture-fed grazing systems. Department of Primary Industries and Fisheries, Brisbane.

Tropical Forages (SoFT) - Signal grass

Lenne, J.M. and Trutmann, P. (eds) (1994) Diseases of tropical pasture plants. CAB International, UK.
Loch, D.S. and Ferguson, J.E. (eds) (1999) Forage seed production 2. Tropical and sub-tropical species. CABI Publishing, UK.

Miles, J.W., Maass, B.L. and do Valle, C.B. (eds) (1996) Brachiaria: Biology, agronomy and improvement. Joint publication by CIAT, Cali, Colombia and EMBRAPA/CNPGC, Campo Grande, MS, Brazil.

Oram, R.N. (ed) (1990) Register of Australian herbage plant cultivars. 16. Brachiaria a. Brachiaria decumbens. CSIRO Australia, Melbourne.

Partridge, I.J. (ed.) (1996) Tropical Pasture Seed Production (QE96004) The State of Queensland, Department of Primary Industries, Brisbane.


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## Author and date


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