

# Vertical Cattle Fodder - Bana Grass

## Scientific name

[\*Pennisetum purpureum\*](#) Schumach.

[\*Pennisetum purpureum\*](#) Schumach. x [\*Pennisetum glaucum\*](#) (L.) R. Br.

## Synonyms

*Pennisetum benthamii* Steud.

## Family/tribe

Family: *Poaceae* (alt. *Gramineae*) subfamily: *Panicoideae* tribe: *Paniceae*.

## Common names

elephant [grass](#), merker [grass](#), napier [grass](#), (English); napier, herbe éléphant, fausse canne àt; sucre (French); Elefantengras (German); capim-elefante (Portuguese); pasto elefante (Spanish); gigante (Costa Rica); mfufu (Africa); co voi (Vietnam); 'erepani (Cook Islands); acfucsracsrsr (Kosrae); bokso (Palau); puk-soh (Pohnpei); vao povi (Samoa).

## Morphological description

Robust [perennial](#) forming large, bamboo-like clumps, with culms usually 2-3.5 m high (up to 7.5 m) and branched towards the top; stems to 3 cm diameter near the base. Leaf blades [glabrous](#) or hairy, 30-120 cm long and 1-5 cm wide; leaf-sheaths [glabrous](#) or with stiff hairs. Spreads by short rhizomes, rooting from lower nodes or falling stems rooting at nodes creating a [stolon](#). [Inflorescence](#) a bristly false [spike](#) 10-30 cm long, 1.5-3 cm wide (excluding bristles) dense, usually yellow-brown in colour, more rarely greenish or purplish. Extensive root system penetrating to 4.5 m. About 3 million fertile spikelets or 'seeds'/kg.

## Distribution

Native to:

*Africa*: Kenya, Tanzania, Uganda, Ethiopia, Angola, Malawi, Mozambique, Zambia, Zimbabwe, Côte D'Ivoire, Ghana, Guinea, Liberia, Nigeria, Sierra Leone, Togo, Cameroon.

Introduced to most tropical and subtropical countries where it has become naturalised.

## Uses/applications

Mostly planted for [cut and carry](#) systems, and not for long-term grazed pastures. Also used for [hedgerows](#) and living fences, although roots compete with adjacent crop. Young growth makes good [hay](#), which can be fed as [hay](#) or pellets. Coarse stems in older growth make it unsuitable for [hay](#). Makes good [silage](#), although inferior to maize and sorghum. Old growth becomes too coarse to be of value for anything other than soil [conservation](#). Bana [grass](#) is commonly used as a windbreak in horticultural crops and orchards.

# Ecology

## Soil requirements

Grows on a wide range of soil types provided fertility is adequate and a [pH](#) range of 4.5-8.2 (mean 6.2). No readily available data on tolerance of salinity or high levels of Al and Mn.

## Moisture

[Top](#)

In the wild, normally only found in areas with [rainfall](#) >1,000 mm, and on river banks in areas of lower [rainfall](#). Although extremely [drought](#) tolerant by virtue of deep root system, needs good moisture for production. Does not tolerate prolonged flooding or [waterlogging](#).

## Temperature

Produces best growth between 25 and 40°C, and little growth below about 15°C, with growth ceasing at 10°C. Tops killed by frost, but re-grows with onset of warm, moist conditions. Grows from sea level to 2,000 m altitude.

## Light

Moderate shade tolerance, about equivalent to that of [Setaria sphacelata](#) and [Brachiaria decumbens](#).

## Reproductive development

An [obligate](#) quantitative short-day plant, with a critical [photoperiod](#) of 12-13 hours, flowering under a relatively wide range of photoperiods e.g. flowers January to June in South Africa. There is some variation among ecotypes in flowering time. Seed set is usually poor, possibly due to low pollen [viability](#).

## Defoliation

Normally cut at 15 cm above ground, although it can be harvested regularly up to 1.5m. **Cattle** eat mostly leaf. Proportion of leaf decreases, and [stem](#) increases, with age and height if not harvested regularly. Cut material should mostly be leaf.

## Fire

[Top](#)

Recovers well following fire. Seldom dry enough to burn under normal circumstances.

# Agronomy

[Guidelines for the establishment and management of sown pastures.](#)

## Establishment

Established from setts or cuttings (pieces of cane) or splits (rooted pieces of clump). Setts are taken from the basal 2/3 of moderately mature stems and should contain at least 3 nodes. These are pushed into the soil at 45°, basal end down, with 2 nodes buried. Cuttings can also be planted horizontally into a furrow, to a depth of 5-10 cm. Close spacing is required for soil [conservation](#) contour [hedgerows](#) and for high [rainfall](#) environments. More open spacing is used in drier environments.

## Planting & Growth

Should be planted into fertile soil clumps. Responds well to seasonal applications of Fish & Seaweed emulsion.

## Ability to spread

Spreads mostly by short rhizomes and tall stems that fall and root at the nodes.

# Feeding value

## Nutritive value

[Top](#)

Varies greatly with age of regrowth (leaf:[stem](#) ratio), and fertility, particularly nitrogen e.g. 6 week regrowth 10% [CP](#), 10 week regrowth 7.6% [CP](#). Can give up to 2-fold difference in [CP](#) level. [CP](#) and [IVDMD](#) levels of leaf range from 9.5-19.7%, and 68-74% respectively.

## Palatability/acceptability

Extremely palatable to all classes of stock when provided young and leafy.

## Toxicity

Can cause nitrate poisoning in **cattle** if sole component of diet. Oxalate levels of 2.5-3.1% of DM, but no problems recorded.

# Production potential

## Dry matter

Yields depend on fertility, moisture, [temperature](#) and management. DM yields of 10-30 t/ha/yr common, (and up to 85 t/ha/yr) if well fertilised; 2-10 t/ha/yr if unfertilised. More frequent cuts (up to 45 days) give less dry matter, but better leaf production than infrequent cuts.

## Animal production

[Top](#)

As with dry matter, animal production from [P. purpureum](#) depends on growing conditions for the [grass](#). Liveweight gains of 1 kg/hd/day during the [growing season](#) and 480 kg/ha/yr, and milk yields of >11 kg/day (4% fat) are achievable. Capable of carrying 2-7 beasts/ha in a grazed system.

# Genetics/breeding

[P. purpureum](#) : cross pollinating, also apomictic,  $2n = 27$ ,  $4x = 28$ ,  $8x = 56$   
[P. purpureum](#) x [P. glaucum](#) hybrids:  $2n = 20$ , 21.

# Seed production

Seed rarely harvested.

# Strengths

- High dry matter yields.
- Very palatable, high quality [forage](#) .
- [Drought](#) tolerant.
- Reshoots from Frost.

# Limitations

[Top](#)

- Needs protection from cattle.
- Matures rapidly and can becoming stemmy without regular harvesting.
- Usually needs to be planted vegetatively.

# Selected references

Bogdan, A.V. (1977) *Tropical [Pasture](#) and Fodder Plants*. (Longman: London and New York).

't Mannetje, L.(1992) *[Pennisetum purpureum](#)* Schumach. In: 't Mannetje, L. and Jones, R.M. (eds) *Plant Resources of South-East Asia No. 4. Forages*. pp. 191-192. (Pudoc Scientific Publishers, Wageningen, the Netherlands).

## Cultivars

<b>Cultivars *</b>	<b>Country/date released</b>	<b>Details</b>
'Cameroons'		Merker type (i.e. numerous relatively thin stems, narrow largely <a href="#">glabrous</a> leaves, good yields, resistant to <i>Helminthosporium</i> sp.).
'Capricorn'	Australia (1962)	Selected from CPI 7838, a Merker type, to provide a leafy grazing type of medium height with thick succulent stems, strong crowns and vigorous stooling. Leaves are relatively broad.