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Brachiaria ruziziensis

Germain and Everard

Graminae

Synonyms

Brachiaria eminii Mez.

Common names

Kennedy ruzi grass (Australia), Congo signal grass (Africa), prostrate signal grass (Kenya).

Description

A spreading perennial with short rhizomes, similar in habit to Para grass. The inflorescence consists of dense and spikelike racemes. The spikelets are all sessile and close together, the rachis of the racemes winged, broad and over 3 mm wide. The spikelets are hairy and the lower glume under half the length of the spikelet (Harker & Napper, 1960). It has softer leaves than *B. brizantha*.

Distribution

Lake Edward and Lake Kivu districts, Rwanda, Burundi, and the Ruzizi plains in Zaire, now widely distributed in the tropics.

Season of growth

Summer.

Altitude range

1 000-2 000 m in Kenya, up to 1 200 m in Panama (Ratray, 1973).

Rainfall requirements

It requires a reasonably high rainfall, but can endure hot dry spells. A rainfall of 1 000 mm or more is best.

Drought tolerance

It has good drought tolerance.

Soil requirements

It requires a soil of high fertility, such as latosols carrying mesophyll rain forest. It will tolerate acid soils. It needs good drainage.

Ability to spread naturally

It spreads well from rhizomes.

Land preparation for establishment

A well-prepared seed-bed is recommended, but light disc-harrowing gives good results.

Sowing methods

Drill the seed into a well-prepared seed-bed. In Zaire it has been sown in rows 60 cm apart, or broadcast over the land after scarification of the soil with a disc harrow or brushcutter, without burning the native pastures, and grazed as soon as it is ready (Risopoulos, 1966).

Sowing depth and cover

Surface sow in moist soil, and sow no deeper than 2 cm in dry soil (Bogdan, 1964). In Zaire it is recommended to sow at a depth of 1-2 cm. Under humid conditions seeds lose their vitality after one year (Risopoulos, 1966).

Sowing time and rate

In Zaire the seed rate recommended is 30 kg/ha.

Number of seeds per kg.

About 250 000.

Seedling vigour

Excellent (Davidson, 1966).

Vigour of growth and growth rhythm

It gives good early wet season growth for eight weeks after the opening rains (Falvey, 1976) and it seeds heavily in April at South Johnstone, north Queensland (lat. 17°36'S).

Response to defoliation

It forms a dense mat under grazing which withstands grazing well (Davidson, 1966). The yields of dry matter did not vary very significantly in Sri Lanka with monthly cutting at 2.5 cm or 7.6 cm but bimonthly cuts yielded a little higher (Appadurai & Goonawardene, 1973).

Grazing management

In combination with *Stylosanthes humilis* in northern Australia it must be grazed heavily to maintain this legume in the sward (Falvey, 1976).

Response to fire

Selection 6019 at CIAT, Colombia, does not tolerate fire (CIAT, 1978).

Suitability for hay and silage

It made very good silage with *Stylosanthes guianensis* in Zaire with 1 percent molasses and without additive (Risopoulos, 1966) and made good hay in Zambia (van Rensburg, 1969).

Toxicity

No toxicity has been recorded by Everist (1974).

Seed yield

A seed yield of 125 kg/ha has been recorded in Queensland and 200 kg/ha in Zaire (Risopoulos, 1966).

Cultivars

'Kennedy', described above, is the only present cultivar. Selection 6019 has been tested at CIAT, Colombia.

Diseases

It is comparatively free from diseases.

Main attributes

Its fast growth early in the wet season, its compatibility with *Stylosanthes humilis* and *S. hamata*, its good seed production and ease of establishment.

Main deficiencies

Its winter growth is slow. It needs well-drained fertile soils.

Optimum temperature for growth

33°C day, 28°C night (Dienum & Dirven, 1972).

Minimum temperature for growth

Low yields resulted from a 24/19°C regime. Ludlow (1976) found this species, of several tropical grasses, the most affected by low temperatures.

Frost tolerance

It is killed by heavy frosts, and spring regrowth is very slow after light frosts.

Response to light

Yields increase with increasing light intensity (Dienum & Dirven, 1972).

Ability to compete with weeds

It successfully suppresses weeds.

Maximum germination and quality required for sale

The seed is germinated at 20-35°C after treatment with sulphuric acid for ten minutes. Fifteen percent germinable seed and 40 percent purity in Queensland.

Pests

There are few pests.

Palatability

It is very palatable. At the Cerrado Centre, Brazil, it was preferentially grazed ahead of *Stylosanthes guianensis* during the rainy season.

Chemical analysis and digestibility

High temperatures have an adverse effect on digestibility (Dienum & Dirven, 1972). Digestibility decreased in 18-day material from 78.4 percent at day/night temperatures of 24/18°C to 72.7 percent at 29/30°C and 69.5 percent at 34/30°C (Dirven, 1973). Feeding value declined when it seeded heavily at South Johnstone, Queensland, in April (Mellor, Hibberd & Grof, 1973a). Scout (1959) in Zaire found fresh grass to contain 13.9 percent crude protein, 27.2 percent crude fibre, 9.0 percent ash, 2.3 percent ether extract and 47.6 percent nitrogen-free extract in the dry matter.

Natural habitat

A pioneer species of cleared rain forest in Africa.

Tolerance to flooding

It does not tolerate flooding.

Fertilizer requirements

It needs high phosphorus in the early growth on a wide range of soils. It responds well to nitrogen, either inorganic or from legumes, but its nitrogen requirement exceeds that of Guinea grass, which makes the latter more attractive (Mellor, Hibberd & Grof, 1973b). Risopoulos (1966) recorded an increased yield of 10 739 kg/ha from nitrogen application in Zaire.

Compatibility with other grasses and legumes

Ruzi grass combines well with legumes such as *Centrosema pubescens* or *Pueraria phaseoloides* if the mixture is leniently grazed. In Zaire it has combined well with *Setaria sphacelata* and *Stylosanthes guianensis*. In northern Australia *Stylosanthes humilis* and *S. hamata* can be introduced by cultivating the grass and oversowing the legumes (Falvey, 1979).

Genetics and reproduction

It appears to be apomictic.

Seed production and harvesting

It seeds heavily at Gandijika, Zaire (lat. 6°45'S with four months dry season) (Risopoulos, 1966). Seed can be harvested in May in Queensland, either by hand or with a tractor-mounted buffer type seed harvester but yields are lower by this method (Davidson, 1966).

Economics

An important grazing species in the wetter tropics.

Animal production

Brahman steers grazing Kennedy ruzi grass at Utchee Creek, north Queensland, gave a poor winter performance on grass in association with legumes compared with the performance on Guinea grass, but nearly equalled Guinea when 27 kg N/ha was applied. Ruzi grass/legume

pastures produced 1 157 kg/ha live-weight gain, while ruzi grass plus 200 kg N/ha per year gave 1 513 kg/ha live-weight gain (Mellor, Hibberd & Grof, 1973a).

Links for the genus:

- [Grass genera of the world](#): Information about botany, ecology etc. of the Eriochloa genus; link to photograph
- [Genetic improvement of Brachiaria](#)

Further reading

Davidson, 1966; Dienum & Dirven, 1972; Mellor, Hibberd & Grof, 1973.J

Dormancy

Fresh seed shows post-harvest dormancy and delayed germination. Fresh seed gave 20 percent germination in Queensland, and after 12 months' storage this increased to 40 percent (Davidson, 1966). Dormancy can also be broken by treating the seed with concentrated sulphuric acid for 15 minutes (Barnard, 1969) or mechanical scarification (Jones, 1973).

Value for erosion control

It is useful for erosion control in areas where it grows well.

Green-matter and dry-matter yields

In Tanzania, ruzi grass yielded 21 159 kg DM/ ha (Naveh & Anderson, 1967). At South Johnstone, north Queensland it yielded 19 500 kg DM/ha under a six-week cutting interval and an input of 220 kg N/ha/year (Grof & Harding, 1970). In Sri Lanka yields of 16 807, 22 031 and 25 585 kg DM/ha per year with nitrogen applications of 112, 224 and 366 kg N/ha (Appadurai, 1975). In French Guyana the yield was 20 574 kg DM/ha and 1 180 kg/ha crude protein (Borget, 1966) and in Zaire yields of 31 352 kg and 21 468 kg green matter per hectare per year were obtained in successive years, 1958-59, with 100 kg nitrogen and 100 kg superphosphate per hectare per year (Risopoulos, 1966). At Gualaca, Panama, it produced 11 000 kg DM/ha without fertilizer and 27 000 kg DM/ha when fertilized with 600 kg N/ha per year in a rainfall area of 3 997 mm per year.

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Data



Brachiaria ruziziensis seed being collected by hand in Northeast Thailand
Photo by H. M. Shelton



Congo signal grass, Tengeru, Tanzania
Photo by S. Reynolds



Congo signal grass, Tengeru, Tanzania
Photo by S. Reynolds

scientific name

Brachiaria ruziziensis R. Germ. and C.M. Evrard

Synonyms

Urochloa ruziziensis (R. Germ. and C.M. Evrard) Crins

Family/tribe

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

Common names

ruzi grass, Congo grass, Congo signal grass, prostrate signal grass (English); Congo señal, gambutera, Kenia, pasto Congo, pasto ruzi (Spanish); capim Congo, ruziziensis (Portuguese).

Morphological description

A tufted, creeping perennial with short rhizomes forming a dense leafy cover. Culms arise from many-noded creeping shoots and short rhizomes, growing to a height of 1.5 m when flowering. Leaves are soft but hairy, up to 25 cm long and 15 mm wide. Inflorescence consists of 3–9 relatively long racemes (4–10 cm), bearing spikelets in 1 or 2 rows on one side of a broad, flattened and winged rachis. Spikelets hairy, 5 mm long. Seed weight 250,000/kg.

B. ruziziensis is very closely related to *B. decumbens*, being differentiated morphologically on rachis shape, which is subfoliolate and 2–3.5 mm wide in the former and flat and 1–1.7 mm wide in the latter, and on the position of the lower glume, which is 0.5–1 mm distant from the rest of the spikelet in the former and very close to the upper glume in the latter.

Distribution

Native to:

Africa: Burundi, Rwanda, eastern Zaire.

Occurs in grasslands and disturbed areas.

Naturalised throughout the humid tropics.

Uses/applications

Permanent or semi-permanent pasture for grazing or for cutting for green feed and conservation. Also planted for grazing under coconut plantations.

Ecology

Soil requirements

Ruzi grass requires light to loam soils of moderately high fertility (pH 5.0–6.8) and cannot tolerate strongly acid conditions.

Moisture

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Ruzi is a grass for the lowlands and up to 2,000 m in the humid tropics, with a minimum of 1,200 mm AAR . However, it can tolerate a dry season of 4 months but will die out in extended dry conditions. Having poor tolerance to flooding, it thrives best on well-drained soils.

Temperature

Warm season growth (optimum growth at 33/28°C day/night); minimum night temperature of 19°C with no frost tolerance . It is killed by heavy frost and regrowth is very slow after light frosts.

Light

Ruzi has moderate shade tolerance and is grown under coconut plantations.

Reproductive development

Flowers into shortening days, mid-autumn in northern Queensland, Australia (18°S).

Defoliation

It can stand moderately heavy grazing and requires high levels of fertilising to persist under frequent cutting.

Fire

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Ruzi will recover after a fire, but burning is not recommended.

Agronomy

Guidelines for the establishment and management of sown pastures.

Establishment

Ruzi can be established from seed, which is often cheap but needs to be stored for at least 6 months after harvest. Broadcast seed at 2.5–10 kg/ha (depending on seed quality) onto a well-prepared seedbed and lightly cover. Should not be sown deeper than 2 cm. Infertile soils should be fertilised to supply N, P and K prior to planting. Seedling growth is vigorous.

Alternatively, ruzi grass can be established vegetatively from stem cuttings with rooting nodes.

Fertiliser

Ruzi demands high fertility soils and adequate fertiliser to persist under grazing or cutting.

Compatibility (with other species)

Under light grazing, ruzi forms a dense cover and competes with weeds. The sward opens under heavier grazing, allowing broad-leaf weeds to establish and legumes to persist. It will combine with a range of tuining, erect and shrub legumes.

or twining, erect and shrub legumes.

Companion species

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Legumes: *Stylosanthes guianensis* , *Desmodium intortum* , *Centrosema molle* , *Leucaena leucocephala* .

Pests and diseases

Ruzi is severely attacked by spittlebug (*Aeneolamia* spp., *Deois* spp. and *Zulia* spp.) in tropical America.

Leaf is attacked by foliar blight (*Rhizoctonia solani*) in tropical America.

Seed heads are attacked by a fungus (*Sphacelia* spp.) in Zaire.

Ability to spread

Ruzi spreads relatively slowly in existing vegetation by stolons and seed drop. Spread is more rapid where a clean seedbed is provided and soil fertility is sufficiently high.

Weed potential

Unlikely to become a weed of importance due to its relatively slow spread and high fertility requirements, but has potential to become a minor weed.

Feeding value

Nutritive value

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Good nutritive value - better than most other *Brachiaria* spp. with CP commonly 7–13%, and up to 20%, and digestibility 55–75%. For ruzi grass hay cut 45 days after seeding in northeast Thailand, the IVDMD, crude fibre, NDF and ME concentrations were 61%, 80.5%, 72.8% and 7.9 MJ/kg, respectively.

Palatability/acceptability

Very palatable. Selective, heavy grazing pressure and the need for high soil fertility can result in the loss of ruzi grass .

Toxicity

Photosensitization may occur and some references suggest that ruzi grass should not be fed to sheep, goats or young cattle.

Production potential

Dry matter

Less productive than *B. decumbens* in Australia and South America although yields have exceeded 20 t/ha/year with high rates of nitrogen. In Sri Lanka, DM yields of 16.8, 22.0 and 25.6 t/ha/year were achieved with N applications of 112, 224 and 366 kg/ha, respectively. On an oxisol at Coronel Pacheco, Brazil, ruzi grass produced 6.0 t/ha DM without added fertiliser and 12.0 t/ha with 150 kg/ha N fertiliser.

Animal production

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Liveweight gains have exceeded 1,000 kg/ha/year on pastures of ruzi with legumes, and over 1,500 kg/ha/yr with 200 kg/ha N fertiliser. Steers grazing *B. ruziziensis* on Brazilian savannas at 2 head/ha gained 285 kg/ha/year.

Genetics/breeding

Diploid; reproduction is sexual with a high degree of cross-pollination. Breeding programs are related to the ability of a tetraploid form of *B. ruziziensis* to confer sexual reproduction ability to interspecific *Brachiaria* hybrids involving the tetraploid, apomictic *B. decumbens* / *B. brizantha* complex (see fact sheet on *Brachiaria* hybrids). Typical chromosome number, $2n = 18$. Also tetraploid, $2n = 4x = 38$.

Seed production

Seed production is excellent. Yields of 125–200 kg/ha pure seed have been achieved by combine harvesting, and up to 700 kg/ha seed has been harvested by ground sweeping. Head emergence is relatively uniform, supporting combine harvesting or sweating. In Thailand, hand-harvested seed heads are stacked about 1 m deep and allowed to sweat for about 3 days. The heads are turned daily to facilitate the separation of seed from the head and to prevent overheating. Alternatively, the “living sheath” method is used, where heads are tied together in groups and effectively sweated in the field for 1–2 weeks before harvest. The grouped seed heads are shaken into a large net every 2–3 days until all seed is collected.

Main countries of seed production are Brazil and Thailand.

Seed has a high percentage of dormancy following harvest (<20% germination). Primary dormancy is physiological, whilst long-term dormancy is mechanical, caused by a restriction of the seed coat. Dormancy may be broken by 6–9 months storage or by acid scarification.

Herbicide effects

No information available.

Strengths

- Palatable and good quality.
- High seed yields.
- Rapid establishment from seed or cuttings.

Limitations

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- Needs fertile, well drained soil.
- Lower DM production compared with *B. decumbens*.
- Poor persistence on infertile and/or poorly drained soils.
- Poor dry season growth.
- Very susceptible to spittlebug.

Other comments

Ruzi grass is generally less popular than *B. decumbens* as a forage species because it is not productive on acid-infertile soils, is spittlebug susceptible and produces less DM than *B. decumbens*.

Selected references

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Miles, J.W., Maass, B.L. and do Valle, C.B. (eds) (1996) *Brachiaria: Biology, Agronomy and Improvement*. CIAT, Cali, Colombia.

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Internet links

<http://www.fao.org/ag/AGP/AGPC/doc/Gbase/data/pf000193.htm>

<http://www.tropicalgrasslands.asn.au/pastures/ruzi.htm>

Cultivars

Cultivars	Country/date released	Details
'Kennedy' Ruzi (CPI 30231, CIAT 605, BRA 000281, ILCA 16692)	Australia Thailand	'Kennedy' performs well on the wet tropical coast of Queensland. Seed holds better in the head than signal grass (<i>B. decumbens</i>) and high seed yields are obtained. Seed is currently produced in northeast Thailand and sold throughout southeast Asia as "Ruzi".

Promising accessions

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Promising accessions	Country	Details
None reported.		



Seedcrop and seeds.

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Soft hairy leaves.

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Spreads by stolons.

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Forms a dense leafy cover in fertile situations.

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Harvesting seed in Thailand.

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