Digitaria eriantha

Scientific name
Digitaria eriantha Steud.
This is such a diverse species (see Table 1), that from time to time it has been necessary to refer to some of the former species in the text.

Synonyms
Digitaria commutata subsp. eriantha (Steud.) Maire
Digitaria decumbens Stent
Digitaria eriantha Steud. subsp. eriantha
Digitaria eriantha Steud. subsp. pentzii (Stent) Kok
Digitaria eriantha Steud. subsp. stolonifera (Stapf) Kok
Digitaria eriantha Steud. var. stolonifera Stapf
Digitaria goniculata Stent
Digitaria glauca Stent, nom. illeg.
Digitaria pentzii Stent
Digitaria pentzii Stent var. minor Stent
Digitaria pentzii Stent var. stolonifera (Stapf) Henrard
Digitaria polevansii Stent
Digitaria seriata Stapf
Digitaria setivalva Stent
Digitaria smutsii Stent
Digitaria stentiana Henrard
Digitaria valida Stent
Syntherisma eriantha (Steud.) Newbold

D. umfolozi is not recognised by major taxonomic authorities, but is described in some literature as a stoloniferous species with hairy leaves, growing to 70 cm tall, from KwaZulu Natal, South Africa, and is probably synonymous with *D. eriantha*.

Family/tribe

Common names
common finger grass, digit grass, pangola grass, woolly finger grass (English); digitaria (French); pangolagras (German); pangola, pasto pangola (Spanish).

Former *D. decumbens* - pangola grass, pongola grass.

*D. eriantha* - woolly finger grass.

*D. pentzii* - woolly finger grass.

*D. setivalva* - woolly finger grass.

*D. smutsii* - smuts finger grass.

*D. valida* - giant pangola grass, pangola gigante.

Morphological description
An extremely variable species, comprising a number of morphologically different former species. In general, a perennial, sometimes stoloniferous, or tufted and rhizomatous, rhizomes knotty and unbranched, stolon internodes glabrous or hairy; culms, simple or branched, 35-180 cm tall. Basal leaf sheaths mostly silky and hairy (rarely glabrous); leaf blades 5-60 cm long, 2-14 mm wide, glabrous or hairy; ligule an unfringed membrane, 2-5 mm long. Inflorescence a digitate (single whorl) or subdigitate (2 or more whorls) panicle comprising 3-17 racemes, 5-20 cm long. Spikelets 2-4 mm long; lower glume a membranous scale, upper glume ½–⅔ as long as spikelet; upper glume and lower lemma purple and silvery, covered with 1 mm long hairs. 3.3 million seeds/kg.

Morphologically very similar to *D. milanjiana*, the only consistent difference being that nerves of the lower lemma are smooth in *D. eriantha*, and scaberulous in *D. milanjiana*. Also similar to *D. didactyla* (syn. *swazilandensis*), but differs in being more robust (culms of *D. eriantha* > 2.5 mm diameter at base).

Distribution
Native to:
*Afircz.* Angola, Botswana, Mozambique, Namibia, South Africa, Zimbabwe, Swaziland.

Uses/applications
Used for grazing, hay or silage. Suitable for cut-and-carry. Stoloniferous types provide good ground cover for soil conservation.

Ecology
Soil requirements
About 70% of collections of *D. eriantha* come from sands and sandy loam soils, the remainder from loams, clay loams and clays. Seeding types tend to be restricted to sandy soils in their native habitat, possibly because seedlings do not establish readily on heavier soils without disturbance. Both tufted and stoloniferous seeding types are mostly used on sandy soils in cultivation, although they will grow on clay soils, once established. Pangola types are used on a wide range of soils from sands to heavy clays, of low or high fertility. About 65% of collections come from soils with a pH between 6.0 and 7.0, 10% between 4.4 and 5.9, and 25% between 7.1 and 9.1. In cultivation, the pangola types appear slightly more acid-tolerant and less alkali-tolerant than the seeding types, with a suggested range of (4.5-) 5.0-6.0 (-7), compared with (4.5-) 5.5-7.0 (-8.5). Pangola has low to moderate salt/alkalinity tolerance, and moderate tolerance of aluminium (to 34% saturation of CEC).

**Moisture**

*D. eriantha* is found in areas with average annual rainfall ranging from 300-1,300 mm, although mostly from 450-800 mm. All types are very drought tolerant. Seeding varieties are mostly used in areas with rainfall from about 750-1,000 mm. Pangola types are used in both low rainfall environments (±800 mm), but more often in higher rainfall areas (1,200 to >3,000 mm). Pangola types are more tolerant of flooding and waterlogging than seeding types.

**Temperature**

The species extends from about 14-34ºS, and from near sea level in South Africa to 2,250 m asl in Lesotho. Warm to hot summers, and cold winters, often with frosts, are experienced over most of this distribution. Average annual temperatures are mostly of the order of 16-24ºC. *D. smutsii* types appear to have a lower temperature threshold than pangola types, starting growth earlier in the season and growing longer into periods with cool night temperatures. 'Premier' (a *D. smutsii* type) is usually planted in subtropical areas with an average annual temperature of 15-21ºC, and pangola in subtropics and tropics, with average temperatures from about 19-24ºC. 'MARDI' was selected in an area in the wet tropics with an average annual temperature of 26ºC. Although accessions have been collected from high altitudes, the species is generally frost sensitive. However, accessions show some difference in both frost tolerance and regrowth capacity after frost.

**Light**

*D. eriantha* is generally considered to have low shade tolerance, although some types appear to be more shade tolerant than others e.g. in Malaysia, *D. setivalva* rated "medium" for shade tolerance (cf. *Brachiaria brizantha*, *B. decumbens*, and *Setaria sphacelata*), while *D. decumbens* and *D. pentzii* rated low (cf. *Cynodon plectostachyus* and *Brachiaria mutica*).

**Reproductive development**

In the subtropics, pangola flowers through much of the growing season with a peak in mid-summer; while other genotypes flower in late spring and again in autumn.

**Defoliation**

All genotypes of *D. eriantha* are tolerant of heavy grazing. Regular grazing is necessary to maintain quality and to minimise disease incidence. Probably best if the grass is maintained between 10-15 and 30-40 cm, although this may not be feasible under sheep grazing. Ideally, it should be grazed every 2-3 weeks. Stoloniferous cultivars often become "sodbound" and may benefit from periodic cultivation. This can be as radical as is appropriate in the situation, since these types redevelop rapidly from cultivated pieces.

**Fire**

Tolerant of fire.

**Agronomy**

Guidelines for the establishment and management of sown pastures.

**Establishment**

Many of the stoloniferous types produce little or no seed and must be propagated vegetatively. A bulky stand with a high proportion of culms and ascending or arching stolons is cut by hand or with a forage harvester, and the material spread on a cultivated surface at 0.5-2 t of green matter per hectare. This is then cultivated into prepared ground and rolled. Alternatively pieces of stolon can be pushed into the soil on about a metre grid. Under good growing conditions, vegetatively planted swards establish rapidly, suppressing weeds in the process. Seeding varieties require a fine, firm, clean seedbed for establishment, to avoid competition in the early stages. Seed is slightly hairy and may not flow readily through some planting equipment. Mixing seed with superphosphate, or sawdust or pelleting facilitates flow. Stoloniferous types establish more readily than tufted ones.

**Fertiliser**

*D. eriantha* is tolerant of, but unproductive under low fertility conditions. 'Pangola' responds well to nitrogen, giving linear increases up to 300-350 kg/ha N. However, other types also respond well to improved nitrogen fertility, but perhaps not to the same extent as 'Pangola'. 100-300 kg/ha N should be applied in split applications according to needs and environmental conditions, rather than in a single application at the beginning of the season. Levels of other nutrients, particularly phosphorus, should also be monitored.
Compatibility (with other species)

Tussock types combine well with other species, but stoloniferous types can be very competitive and suppress companion legumes.

Companion species

Grasses: Usually not planted with other grasses.

Legumes: Different legumes are sown with *D. eriantha* depending on the genotype of the grass and the environment involved. In the wet tropics, vigorous stoloniferous species such as *Desmodium heterophyllum* and *Arachis pintoi* are successful with the pangola types. *Aeschynomene falcata*, *Chamaecrista rotundifolia*, *Lotonicis bainesii*, *Trifolium repens*, *T. subterraneum* are more appropriate companions for the sub-tropically adapted tufted types.

Pests and diseases

Susceptibility to rust (*Puccinia oahuensis*) varies among genotypes. False smut (*Ephelis* sp.) in seed heads is a minor problem, particularly during prolonged wet periods. Pangola grass is also attacked by the fungi, *Mycosphaerella tassina*, *Piricularia grisea*, and *Rhizoctonia solani*.

The most serious disease of *D. eriantha* is pangola stunt virus, transmitted by whitebacked planthopper (*Sogatella furcifera* Homoptera: Delphacidae), or *S. kolophon*. Symptoms are stunting, yellowing, reddening, and twisting of leaves and inflorescences, swelling of small veins, and excessive tillering. Other viruses include digitaria striate *cytorhabdovirus* (chlorotic spots and stripes), pangola stunt *fijivirus*, sugarcane mosaic *potyvirus*, and potato virus Y.

Nematodes include: *Belonolaimus longicaudatus* (sting nematode), *Dolichodorum nigeriensis*, *Helicotylenchus pseudorobustus*, *Meloidogyne incognita*, *Peltamigratus nigeriensis*, *Pratylenchus brachyurus* (root lesion nematode), *Rotylenchulus reniformis*, and *Scutellonema clathricaudatum*. However, 'Pangola' is largely resistant to root-knot nematode and is recommended as a rotation crop on sandy soils infested with cotton root-knot nematode (*Meloidogyne incognita*).

Insects pests include spittlebugs (*Tomaspis flavopicta*, *T. humeralis*, *Prosapia bicincta*), rhodes grass mealy bug (*Antonina graminis*), chinch bug (*Blissus leucopterus*), sugar-cane aphid (*Sipha flava*), army worms (*Laphigma* spp., *Spodoptera* spp. and *Mocis* spp.), mole crickets and leafhoppers.

Ability to spread

Spreads by seed and/or stolons depending on genotype.

Weed potential

Not considered a serious weed.

Feeding value

Nutritive value

*D. eriantha* is one of the higher quality tropical grasses. As with other grasses, particularly the panicoid species, nutritive value varies with age of material, soil fertility, and genotype. CP values are commonly of the order of 9-14%, and may exceed 20%, and IVDMD 45-70%. 'Pangola' has relatively high concentrations of Na in its tissues, compared with many other tropical grasses.

Palatability/acceptability

Most genotypes are very palatable, particularly when young and are preferred to common pangola. Palatability may not be as good in soils of low fertility.

Toxicity

No record of toxicity. Contains low levels of soluble oxalate and therefore has low risk of causing oxalate-related animal health problems, i.e. suitable for horses and lactating cows.

Production potential

Dry matter

DM yields vary with fertility, genotype, and environmental and management conditions, but normally range from about 10-20 t/ha, and under ideal conditions may exceed 30 t/ha.

Animal production

An excellent species for beef and milk production. N fertilized pasture can produce >1,000 kg/ha/yr LWG and 6,000 kg/ha/yr milk, with stocking rates of 2.5-7.5 animals/ha.

Genetics/breeding

2n = 18, 27, 36, 40, 45, 50, 54, 108 (see Table 1).

Seed production

Seed production by fertile genotypes averages about 190 kg/ha, although header yields of up to 300 kg/ha have been achieved under ideal conditions. Timing of harvest is critical as seed drops when the crop is ripe. Seed should be harvested when seedhead colour
changes from green to grey, and the seed becomes easy to rub from the seedhead. Seed crops can be reduced by false-smut (*Ephelis* sp.), particularly in periods of prolonged wet weather - spraying with benomyl fungicide can limit the damage.

### Herbicide effects

No information available.

### Strengths

- Adapted to light-textured soils and red loam soils.
- Persistent, productive.
- Drought-tolerant.
- Tolerant of moderate levels of exchangeable aluminium.
- Good cool-season activity in *D. smutata* types.
- Tolerant of fire.
- Tolerates short-duration heavy grazing by cattle and sheep.
- Contains low levels of soluble oxalate.

### Limitations

- Pangola types must be planted vegetatively.
- Limited cool season growth in pangola types.

### Selected references


### Internet links


### Cultivars

<table>
<thead>
<tr>
<th>Cultivars</th>
<th>Country/date released</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>'Advance'</td>
<td>Australia (1989)</td>
<td>Synthetic variety from hybrid between CPI 38869 and CPI 16778A. Initially released as 'Apollo' on the basis of slightly higher early season growth than 'Premier'. Produces less seed than 'Premier' and is not used commercially.</td>
</tr>
<tr>
<td>'Irene'</td>
<td>South Africa (1940s)</td>
<td>A heterogeneous variety. Difficulties in seed production and establishment.</td>
</tr>
<tr>
<td>'MARDI' (PI 299892)</td>
<td>Malaysia (1974)</td>
<td>Formerly classified as <em>Digitaria</em> setivalva. Origin uncertain. Foliage to 70 cm and flowering stems to 1.3 m high. Very leafy, with leaf blades about 20 cm long and 1 cm wide. Selected for superior performance in the wet tropics.</td>
</tr>
<tr>
<td>'Mealani'</td>
<td>Hawaii, USA</td>
<td>Colchicine-induced hexaploid (2n = 54) from pangola (2n = 27). A stoloniferous grass to a height of 0.6-1.2 m, with very hairy stolon nodes. Leaves to 225 mm long and about 8 mm wide, smooth on both sides. Spikelets are about 6 mm long. Very few, if any, viable seeds produced. Used for pasture and erosion control from sea level to over 800 m in Hawai‘i, in areas receiving an annual rainfall of at least 1,000 mm. More productive than cv. Pangola during the cool season, above 730 m elevation.</td>
</tr>
<tr>
<td>'Pangola' (PI 111110; CPI 18578)</td>
<td>Florida, USA (1943)</td>
<td>Vegetative planting material received in USA from South Africa, and in Australia from Hawai‘i. A stoloniferous perennial, with hairy stolon nodes. Leaves straight, smooth, near-glabrous, with ligule 2.5-5.0 mm long. Highly male and female sterile. Used for pasture and erosion control. Largely resistant to root-knot nematode and recommended as a rotation crop on sandy soils infested with cotton root-knot nematode (<em>Meloidogyne incognita</em>).</td>
</tr>
<tr>
<td>'Premier' (CPI 38869)</td>
<td>Queensland, Australia (1962)</td>
<td>From South Africa. A tufted perennial with foliage normally 30-50 cm and culms to 130 cm; culm leaves up to 30 cm long and 11 mm wide, basal leaves up to 45 cm long and 7 mm wide, often with a few hairs in the axils and glaucous on the underside; ligule 3 mm long; racemes 9-14 (usually 11) cm long in 3 or more whorls on a common axis up to 4 cm long; spikelets 3-3.5 mm long. Adapted to low fertility sandy and loam soils and to more fertile, lighter clay and scrub soils. Unsuitable to heavy cracking alkaline clay soils. Used as a pasture and erosion control in areas receiving a minimum of 600 mm annual rainfall.</td>
</tr>
<tr>
<td>'Slenderstem' (PI 200985; 'Leesburg 5')</td>
<td>Florida, USA (1969)</td>
<td>Stoloniferous perennial of unknown origin. Closely resembles PI 106657 (originally classified as <em>Digitaria seriatia</em>). Characterised by slender stems, scarcity of seedheads, dense upright growth in established pastures, and dusty bluish tinge (glaucous) on dense undisturbed growth. Produces denser stolon mat and is leafier than 'Pangola'. Similar frost sensitivity to 'Pangola', but more productive in the early growing season.</td>
</tr>
</tbody>
</table>
Promising accessions

Table 1. Distinguishing characteristics of former species components of *Digitaria eriantha*.

<table>
<thead>
<tr>
<th>Species</th>
<th>D. decumbens</th>
<th>D. eriantha</th>
<th>D. pentzii</th>
<th>D. setivaula</th>
<th>D. smutsii</th>
<th>D. valida</th>
</tr>
</thead>
<tbody>
<tr>
<td>Origin</td>
<td>South Africa (Mpumalanga)</td>
<td>South Africa, east Africa</td>
<td>South Africa, east Africa</td>
<td>East and south tropical Africa</td>
<td>South Africa</td>
<td>South Africa</td>
</tr>
<tr>
<td>Ploidy</td>
<td>2n = 30 (27 in 'Transvala')</td>
<td>2n = 18, 36, 40</td>
<td>2n = 18, 27, 36, 45, 54</td>
<td>2n = 18</td>
<td>2n = 18, 36</td>
<td>2n = 18, 27, 36, 30</td>
</tr>
<tr>
<td>Growth habit</td>
<td>strongly stoloniferous</td>
<td>tufted, sometimes short stolons</td>
<td>tufted or stoloniferous</td>
<td>stoloniferous</td>
<td>tufted, no stolons</td>
<td>stoloniferous</td>
</tr>
<tr>
<td>Culm length</td>
<td>to 120 cm</td>
<td>to 80 cm</td>
<td>to 120 cm</td>
<td>to 80 cm</td>
<td>to 150 cm</td>
<td>to 130 cm</td>
</tr>
<tr>
<td>Leaf length</td>
<td>10-25 cm</td>
<td>8-20 cm</td>
<td>to 30 cm</td>
<td>3-15 cm</td>
<td>to 50 cm</td>
<td>NA</td>
</tr>
<tr>
<td>Leaf width</td>
<td>2-7 mm</td>
<td>4 mm</td>
<td>to 6 mm</td>
<td>2-5 mm</td>
<td>8-12 mm</td>
<td>NA</td>
</tr>
<tr>
<td>Raceme number</td>
<td>3-10</td>
<td>3-9</td>
<td>14</td>
<td>3-11</td>
<td>4-14</td>
<td>NA</td>
</tr>
<tr>
<td>Raceme length</td>
<td>to 13 cm</td>
<td>6-15 cm</td>
<td>to 18 cm</td>
<td>2-20 cm</td>
<td>to 17 cm</td>
<td>NA</td>
</tr>
<tr>
<td>Spikelet length</td>
<td>2.7-3 mm</td>
<td>3-3.5 mm spreading</td>
<td>2.5-3.5 mm erect (not spreading)</td>
<td>2.5-3.5 mm long, spreading</td>
<td>3.5 mm short, not spreading</td>
<td>&gt;D. eriantha cf. D. pentzii</td>
</tr>
</tbody>
</table>

Promising accessions

<table>
<thead>
<tr>
<th>Promising accessions</th>
<th>Country</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>'Survenola' (X46-2, PI 421785)</td>
<td>Florida, USA (1982)</td>
<td>Synthetic hybrid referred to as <em>Digitaria x umfrfoez</em>, between PI 299892 (originally classified as <em>Digitaria setivaula</em>) as the female parent, and PI 299850 (originally classified as <em>Digitaria valida</em>) as the male. Cultivar name derived from successful adaptation in Suriname and Venezuela. Stoloniferous perennial with much wider leaf blades than other cultivars (usually 6-13 mm vs. 8 mm or less). Higher DM yields if adequately N-fertilized, higher NQMD, and better frost tolerance and winter survival than 'Pangola' or 'Transvala'. Resistant to pangola stunt virus. Used for grazing and hay production in the tropics and limited areas of Florida on well-fertilized upland soils.</td>
</tr>
<tr>
<td>'Taiwan' (PI 279651 'Taiwan A-24')</td>
<td>Florida, USA (1978)</td>
<td>Introduced from the Taiwan Agricultural Research Institute, Taipei as a single selection denoted as 'Taiwan A-24' strain of pangola digitgrass. A diploid (2n = 18), closely resembling the triploid 'Pangola', but with larger leaves and stems than 'Pangola' and 'Transvala'. Less winter-hardy and has a more restricted growing range than 'Pangola'. More resistant to yellow sugarcane aphid (<em>Sipha flava</em>) and rust (<em>Puccinia oahuensis</em>) than 'Pangola', and has high resistance to pangola stunt virus. Used for grazing and hay production.</td>
</tr>
<tr>
<td>'Tip Top'</td>
<td>South Africa (1995)</td>
<td>A diploid, tufted perennial, selected from 'Irene' by ARC for seed quality, homogeneity of growth form (upright), early flowering, better leaf:stem ratio and rust resistance. Culms to 2 m. Survives on annual rainfall &gt;600 mm, and tolerates very cold winters. Grows well on shallow, stony soils.</td>
</tr>
<tr>
<td>'Transvala' (PI 299601)</td>
<td>Florida, USA (1973)</td>
<td>From Mpumalanga (eastern Transvaal), Africa (25.38°S, 760 m asl, rainfall 790 mm). Hairy upper surface of the leaf blade adjacent to the collar. Selected for resistance to pangola stunt virus and sting nematode, both of which reduce the yield of 'Pangola'. A triploid (3x = 27) with nearly complete male sterility. Some resistance to rust (<em>Puccinia oahuensis</em>). Used for grazing and hay production.</td>
</tr>
</tbody>
</table>
cv. Premier and Lotononis bainesii cv. Miles, Pangola (prev. D. decumbens) and Stylosanthes hamata cv. Verano.