

Tropical Forages

Cynodon dactylon

Scientific name



Cynodon dactylon (L.) Pers.

Subordinate taxa:

Cynodon dactylon (L.) Pers. var. *afghanicus* J.R. Harlan & de Wet

Cynodon dactylon (L.) Pers. var. *aridus* J.R. Harlan & de Wet

Cynodon dactylon (L.) Pers. var. *coursii* (A. Camus) J.R. Harlan & de Wet

Cynodon dactylon (L.) Pers. var. *dactylon*

Cynodon dactylon (L.) Pers. var. *elegans* Rendle

Cynodon dactylon (L.) Pers. var. *polevansii* (Stent) J.R. Harlan & de Wet

Synonyms

Cynodon dactylon (L.) Pers.: *Cynodon dactylon* (L.) Pers. var. *densus* Hurcombe

var. *coursii*: Basionym: *Cynodon coursii* A. Camus

var. *dactylon*: Basionym: *Panicum dactylon* L.; *Capriola dactylon* (L.) Kuntze; *Digitaria stolonifera* Schrad.

var. *polevansii*: Basionym: *Cynodon polevansii* Stent

Family/tribe

Family: *Poaceae* (alt. *Gramineae*) subfamily: *Chloridoideae* tribe: *Cynodonteae*.

Morphological description

A fine to robust stoloniferous, sward-forming perennial herb, with rhizomes that can penetrate 40–50 cm in clay soil and 70–80 cm in sand. Foliage dense, 10–40 cm deep; culms 0.5–1 mm diameter, erect or geniculately ascending to 40 (–60) cm; leaf blades 3–15 (–20) cm long and 2–4 (–6) mm wide, glabrous or sparsely pubescent, often glaucous, with minutely scabrous margins; ligule a dense row of short hairs on a membranous rim, 0.2 mm long with tuft of longer hairs either end. Inflorescence a digitate panicle, comprising (2–) 4–5 (–7) racemes (in robust forms up to 10 racemes, sometimes in 2 whorls); racemes 1.5–6 (–10) cm long. Spikelets 2–3 mm long in 2 rows tightly appressed to one side of the rachis, often purplish; caryopses ovoid, about 1.5 mm long, yellow to reddish; 3–4.5 million seeds/kg.

Similar species

Cynodon dactylon: stolons and rhizomes; leaf blade dark green; ligule a dense row of short hairs

Digitaria didactyla: stolons but no rhizomes; leaf blade grey-green; ligule membranous.

Common names

Africa, Eastern: kalandalugo (Gisu, Uganda); oruchwamba (Runyankole/Rukiga, Uganda)

Africa, Western: jawegboto; kooko igba (Yoruba, Nigeria)

Africa, Southern: anosterkweek, Bataviesekweek, buffelskweek, elandskweek, fynkweek, gemsbokkweek, gewonekweek, kruisgras, kwaggakweek, kweekgras, regtekweek, renosterkweek, vingergras (Afrikaans, RSA); uqaqqa (Xhosa, RSA), isifulwane, isinandi,



Common small-leaved form



Giant Bermuda Grass



Inflorescences usually comprising 4-5 racemes



Prolific flowering



Seeds



Line illustration showing stolon and rhizome



Cattle grazing Tifton 85 bermudagrass

uqambalala, uqethu (Zulu, RSA); mohlwa, mohlwa-tshepe, morara, qhaqhawe, qhobosheane (Sesotho, Lesotho); usila (Angola); kapinga (Zambia)

Africa, Northern: doomaar (Somalia); عرق النجيل , النجيل, endjil, najir, nageel, ndjil, nedjem, negil, nigil, njem (Arabic); mor-chiendent (Morocco); nagila (Sudan)

Asia: smao anchien (Cambodia); 百慕大草, 百慕草, gǒu yá gēn, tie xian cǎo (China); gigirinling, grinting, hoe maneeek, jukut kakawatan, jukut raket, rumput bermuda, rumput grinting, rumput minyak, sukut grinting (Indonesia); chair (Iran); thayyel (Iraq); יַבְלִית yablith (yabbelit), יַבְלִית מְצוּיָה yabbelit metzuya, yableet matsui (Israel); 百慕大草, 百慕草, baamyudaa gurasu, 百慕大草, bamyudaa gurasu, 百慕大草, gyougishiba, 百慕草, gagina (Okinawa)(Japan); 百慕大草 u san jan di (Korea); hnha:z ph'è:d (Laos); irk-en-najil; shirch-un unjil (Lebanon); rumput minyak (Malaysia); mye sa myet, mye-za-gyi (Myanmar); bakbaka, kawad-kawad, kawad-kawaran, kulatai (Tagalog), kapot-kapot (Visayan), bakbaka (Ilokano); babalut, galud-galud (Philippines); свиной пальчатый svinoroy pal'chatyj (Russia); ya phaet, ยี่ห่วย yâa prâek (ya phraek) (Thailand); bermuda çimi, köpek dişi ayriği, köpek dişi yriği (Turkey); cò bermuda, cò'chi', cò chí trắng, cò chí - mùa khô, cò chí - mùa mưa, cò gà, cò'ông (Vietnam)

Asia, South: 百慕草 dūrbā (Bengali); 百慕草, 百慕草, baramudā grāsa, 百慕草, 百慕草, dūba ghāsa (doob ghas), 百慕草, dūrvā, 百慕草, 百慕草, kā'uca grāsa, doob, doorva, hariyali (Hindi); calcutta grass, dhoub grass (English); 百慕草, belikaruka, 百慕草, karuka, karuka-pulli (Malayalam); 百慕草, duba, 百慕草, duba ghāsa (Oriya); anantha, bhargavi, 百慕草, durva, doorva, golomi, neel durva, 百慕草, ruha, 百慕草, samanya durva, sathaparvika, sathaveerya, 百慕草, tiktaparvan, 百慕草, zakulaksaka, granthi, sveta (Sanskrit); arugu, arugampul, aruvam-pillu, mooyar-pul, 百慕草, arukampul, aruvampillu (Tamil); ambate-hullu, garikae (Kannada); doorva, haryali (Marathi); dub, kabbar, talla (Punjabi); garika, gerike, haryali (Telugu); ghass (Urdu) (a selection of the 215 common names listed for India); dubo, panjaa, seto duvo, situu (Nepal); khabbal, talla (Pakistan); aruham-pul, buha (Sri Lanka)

English: australian couch, bahama grass, bermudagrass, bermuda grass, common bermudagrass, couch grass, creeping panic grass, devilgrass, devil's grass, dogtooth grass, giant bermuda grass (= var. *aridus*), green couch, hariali grass, indian couch grass, indian doab, kiri-hiri, quick grass, reed grass, scotch grass, scutch grass, serangoon, star grass, wire-grass

Europe: troskut prstnatý (Czech); bermudagræs (Danish); handjesgras, hondsgass (Dutch); varvasheinä (Finnish); αγριάδα agriáda (Greek); csillagpázsit (Hungarian); capriola, gramigna comune (Italian); bermudagräs, zubaca (Serbia and Montenegro); hundtandsgräs (Swedish); chiendent, chiendent amélioré, chiendent dactyle, chiendent pied-de-poule, grand chiendent, gros chiendent, herbe des bermudes (French); Bermudagrass, echter Hundszahn, Finger-Hundszahn, gewöhnliches Hundszahngras, Hundszahngras, (German)

Madagascar: arampandrotra, fandrahana, fandrotsana, fandropalana, fandrotrana, kindresy

Pacific: kabuta (Fiji); manienie, manini (Hawaii); motie molulu (Niue)

Latin America: por'anr'áik (Mocoví, Argentina); capim-bermuda, capim-de-burro, capim-fino, grama bermuda, grama-paulista, grama são paulo, grama-seda (Brazil); agram, agrasia, cama de niño, chepica, chepica brava, chipica, diente de perro, gram, grama, grama brava, grama común, grama de españa, grama dulce, grama ramera, grama-seda, gramilla, gramilla blanca, gramilla brava, gramilla chica, gramilla colorada, gramilla del tiempo, gramilla forestal, gramilla italiana, gramillón, gramón, hierba bermuda, hierba fina, paja de la virgen, palo delgado, pasto argentina, pasto bermuda, pasto de ferrocarril, pasto de gallina, pasto de las bermudas, pasto de los perros, pasto ferrocarril, pata de perdiz, pelo de conejo, tejedora, yerba fina, zacate agrarista, zacate agujilla, zacate alicia, zacate de bermuda, zacate de conejo, zacate de gallina, zacate estrella, zacate gallina (Spanish); griming, tigriston (Suriname)

Distribution

var. *afghanicus*

Native:

Asia: Afghanistan

var. *aridus*

Africa: South Africa; Tanzania; Zambia

Asia: India; Israel; Sri Lanka

Giant type, naturalized and cultivated elsewhere

var. *coursii*

Native:

Indian Ocean: Madagascar

var. *dactylon*

Native:

Believed to have originated in Turkey and Pakistan, but has been introduced to all tropical and subtropical, and some temperate regions of the world.

var. *elegans*

Native:

Africa: Angola, Mozambique, Namibia, South Africa, Zambia, Zimbabwe

var. *polevansii*

Native:

Africa: South Africa (Transvaal)

Uses/applications

Forage

Used in permanent pastures for grazing or cut-and-carry, and for hay or pellets and silage production. Provides useful standover or deferred feed.

Environment

Valuable for soil conservation on slopes and for providing cover in drainage lines.

Other

Often used as a turf, and as a cover crop in orchards. Many medicinal benefits ascribed to various preparations of *C. dactylon*.

Ecology

Grows in open areas where there are frequent disturbances such as intensive grazing, flooding, and fire.

Soil requirements

Grows on a wide range of soils, but best in relatively fertile, well-drained soils. Adapted over a broad range of soil pH (4.5–8.5), but grows best when the pH is above 5.5. There is generally good tolerance of salinity, although some variation with genotype. As a general guideline, it makes only slow growth under saline conditions (maximum yields up to EC 7 mmhos/cm), 50% of maximum at 15 mmhos/cm, and nil at 22.5 mmhos/cm (1 mmho/cm = 1 dS/m). Can use irrigation water with salinity up to 10.8 dS/cm for plants growing in sand, to 6.1 dS/cm in loam, and to 3.6 dS/cm in clay. Generally not tolerant of high aluminium saturation, although some varieties appear more tolerant than others.

Moisture

Usually occurs over an average annual rainfall range of 625–1,750 mm, but down to 550 mm, and up to 4,300 mm. Very drought tolerant by virtue of rhizome survival through drought-induced dormancy over periods of up to 7 months. Tolerates at least several weeks of deep flooding.

Temperature

Widely distributed from >50° N in Europe to 34.5° S in South Africa, and probably further south outside its native range. It also grows from sea level over much of this latitudinal range to about 4,000 m asl in the Himalayas. This equates to a range in average annual temperature from about 6 to 28 °C. There are large differences among ecotypes in terms of temperature response. However, *C. dactylon* generally grows best with mean daily temperatures above 24 °C or over an optimal range of 17–35 °C. Grows very slowly at 15 °C. Plants become dormant when night temperatures fall below 0 °C, or the average daytime temperature below 10 °C, or cooler than a regime of an 8-hour day at 15 °C and a 16-hour night at 5 °C. Although foliage and stems are usually killed at temperatures of -2 to -3°C, plants regrow rapidly from rhizomes with the onset of warm conditions.

Growth begins at temperatures above 15 °C (59 °F) with optimum growth between 24 and 37 °C (75 and 99 °F); in winter, the grass becomes dormant and turns brown. Growth is promoted by full sun and retarded by full shade, e.g. close to tree trunks.

Light

C. dactylon is not shade tolerant and yields decrease rapidly with increasing shade. It usually dies out under medium to dense shade.

Reproductive development

Flowers throughout the growing season. Wind pollinated.

Defoliation

Extremely tolerant of heavy grazing, but more productive if correctly managed. Regular grazing and nitrogen fertilization are necessary to maintain quality. Cut for hay or silage when 30–40 cm tall or every 4–6 weeks, usually when in full bloom. 4 cuttings per year are possible. A stubble height of 5–10 cm under grazing or cutting gives good regrowth and maintains sward density. Renovate by ploughing

or discing when sod-bound.

Fire

It will stand severe fires due to the extensive rhizome development in most varieties and cultivars.

Agronomy

Guidelines for establishment and management of sown forages.

Establishment

Propagated by seed or vegetatively (turfs or stolon/rhizome pieces (sprigs). Normally sown at 5–10 kg/ha dehulled seed, the higher rate being used for more rapid cover. No seed dormancy has been reported. Seed is best sown onto a very well prepared, fine, weed-free seedbed and rolled in. Seedlings usually root down quickly. Improved varieties are usually planted vegetatively due to low seed set or to avoid genetic drift. Turfs or sprigs can be planted at 3.5–7 m²/ha (40–80 bu/ac) or on a 90 cm (or less) grid, into a roughly or well-prepared seedbed, but rolling is still essential. Machinery has been developed to facilitate harvesting and planting of sprigs. Seedlings and sprig-plantings grow vigorously once established.

Fertilizer

Survives at low fertility possibly due to non-symbiotic N fixation in the rhizosphere, measured at 30 kg/ha N in a 100-day period. Responds well to improved fertility, with applications of a minimum of 10 kg/ha/month N and up to 60 kg/ha/month N necessary for moderate to high productivity, particularly in some of the improved hybrids.

Compatibility (with other species)

C. dactylon is very competitive, particularly in fertile soils, and only aggressive legumes are capable of forming an association with it. It suppresses weeds well if kept mown or grazed closely and fertilized.

Companion species

Grasses: Generally not planted with other grasses.

Legumes: *Arachis glabrata*, *A. pintoi*, *Grona heterocarpa* subsp. *ovalifolia*, *Kumerowia (Lespedeza) striata*, *Neonotonia wightii*, *Stylosanthes humilis*, *Teramnus labialis*, *Trifolium incarnatum*, *T. repens*, *Vicia villosa*.

Pests and diseases

Rust (*Puccinia graminis*) and *Helminthosporium* leafspot are the major fungal diseases of *Cynodon dactylon*, although resistant types are available. Other fungal diseases include *Bipolaris*, *Gaeumannomyces*, *Leptosphaeria*, *Marasmius*, and tar spot (*Phyllachora*). Smuts from *Sporisorium*, *Sorosporium* and *Ustilago* can infest seedheads. Also attacked by the bacterium *Xanthomonas cynodontis*, and by barley yellow dwarf virus, lucerne dwarf virus, and viral stripe diseases (which affect corn and rice), as well as by a range of nematodes, the main one being root knot nematode (*Meloidogyne* spp.). Selection for nematode resistance has been important in breeding programmes.

Armyworm (*Spodoptera* spp.), tropical grass webworm (*Herpetogramma licarsisalis*), spittlebug (*Prosapia bicinata*) and bermudagrass mite (*Eriophes cynodontiensis*) are major pests. The parasitic flowering plants *Cuscuta pentagona*, *Nuytsia floribunda*, *Striga harmonithica*, and *S. lutea* can adversely affect stands.

Ability to spread

C. dactylon spreads rapidly by rhizomes and stolons, and also by seed. It can spread over 2 m/month during the growing season, a single plant forming a dense sward up to 25 m across in 2.5 years.

Weed potential

It poses a real weed threat in fertile soils and under extreme disturbance (mowing, heavy grazing, cultivation, fire). It is difficult to eradicate with chemicals or cultivation, and can become a serious weed in cultivated land. Declared weed in over 80 countries. It does not invade natural grasslands or forest vegetation.

Feeding value

Nutritive value

Crude protein varies with age of material and level of nitrogen fertilization, from about 3 to 9% in old grass, to about 20% in young, well-fertilized grass. IVDMD varies from 40 to 69% with genotype.

Palatability/acceptability

It is very palatable if kept short in growth and fertilized. Excellent grazing for village geese, ducks, goats, cattle and buffaloes if not trampled too much by these latter heavy beasts. The rhizomes have been fed to horses.

Toxicity

Some varieties have the potential to produce high levels of prussic or hydrocyanic acid (HCN), especially when high levels of nitrogen are

applied. However, instances of prussic acid poisoning in cattle grazing *C. dactylon* are rare. Although levels of total oxalate of >1% of the DM have been recorded, there is no experience of detrimental effects on grazing cattle. Frosted *C. dactylon* can cause photosensitization.

Feedipedia link

<https://www.feedipedia.org/node/471>

Production potential

Dry matter

Productivity depends on the cultivar used, the time of year and the amount of nitrogen available. DM yields of 1,000–3,000 kg/ha per month are possible in summer and 100–1,200 kg/ha in winter. 'Coastal' yields up to twice as much as most common ecotypes. Annual DM yields are generally of the order of 5–15 t/ha.

Animal production

Liveweight gain of cattle ranges from 200 to 300 (–500) kg/ha/yr, or over 700 g/hd/day, when moderate rates of N and other fertilizers are applied and at stocking rate of about 2 or more beasts/ha. Silage made from heavily fertilized, properly ensiled young grass can produce as much milk as corn silage and at a cheaper cost.

Genetics/breeding

var. *dactylon* ($2n = 18, 36, 54$)

var. *aridus* ($2n = 18$)

var. *afghanicus* ($2n = 18, 36$)

var. *coursii* ($2n = 36$)

var. *elegans* ($2n = 36$)

var. *polevansii* ($2n = 36$)

Cynodon dactylon is wind-pollinated, and generally self-incompatible, suffering from inbreeding depression when genotypes are self-pollinated. Quantitative traits such as seed yield and forage yield can be dramatically negatively affected. Breeding programmes have traditionally selected for DM yield, digestibility, disease and nematode resistance, and winter hardiness, and are now seeking to increase aluminium tolerance.

Seed production

Strains show considerable variation with respect to seed set, and in general, seed production is relatively low. One or two crops per season (mid- and late growing season). The crop is mowed into windrows, picked up and threshed by combines. Seed yields may range from about 100 kg/ha to as high as 350 kg/ha.

Herbicide effects

Herbicides that can be used to control *Cynodon dactylon* include the aryloxyphenoxy-propionates (fenoxaprop-P-ethyl, fluazifop-P, haloxyfop, propa-quizaop, quizalofop-P-ethyl), dinitroanilines (endimethalin, prodiamine, trifluralin), glyphosate, 2,4-D, 2,2-DPA, clomazone, and sulfonyleureas (imazapyr, sulfometuron, and thiazopyr). Sulfometuron and metribuzin are more effective than thiazopyr and imazapyr, and glyphosate gives variable results.

HerbiGuide in Australia (http://www.herbiguide.com.au/Descriptions/hg_Couch.htm) provides the following program options:

Herbicides provide the most reliable control.

100 mL glyphosate(450 g/L) plus 25 mL Pulse® in 10 L of water applied when the grass is actively growing every 8 weeks over the spring to autumn period or whenever fresh growth is 20–50 mm tall is the most effective control. For broad acre spraying use 6 L/ha glyphosate(450g/L).

Selective control amongst broad leaved plants can usually be achieved by spraying with 800 mL/ha Verdict®520 or 4 L/ha quizalofop (100 g/L) or 6.4 L/ha Fusilade®Forte plus 1% spray oil. Use 16 mL Verdict®520 or 80 mL quizalofop (100 g/L) or 125 mL Fusilade®Forte plus 100 mL of spray oil per 10 L water for hand sprays.

Painting runners or crowns with 1 L glyphosate in 2 L water is useful in sensitive areas.

Strengths

- Widely adapted to soils and climate.
- Palatable.
- High nutritive value when young.
- Excellent ground cover for soil conservation.

- Tolerant of heavy grazing.
- Makes useful hay and silage.
- Tolerant of salinity.
- Tolerant of flooding.

Limitations

- Low production unless well fertilized.
- Can become a weed in cultivation.
- Difficult to eradicate.

Internet links

http://www.herbiguide.com.au/Descriptions/hg_Couch.htm

Selected references

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Cultivars

Numerous cultivars have been produced in the USA through breeding or selection for biomass production, stem and leaf size, disease resistance, and stress tolerance.

'Alicia' Selected in Texas, USA (1967). Origin South Africa. Spreads and becomes established more rapidly, but is less winter hardy and less resistant to diseases, and has lower quality than 'Coastal'. Susceptible to rust.

'Brazos' (PI 464656) Bred in Texas, USA (1982) F1 hybrid ('Guymon' X 9958) × (X-820). Has larger leaves, stems and rhizomes than 'Coastal'. Slower to establish but higher forage quality (dry matter digestibility) and better gain per animal than 'Coastal'. Equal or superior to 'Coastal' in stand density, persistence under grazing, and winter hardiness. The larger stems do not favour hay drying, but do resist lodging in contrast to 'Coastal'. Better animal performance than 'Tifton 44', an improved winter-hardy cultivar.

'Callie' Selected in Mississippi, USA (1974). Selected from introductions from South Africa. Probably a hybrid, but exact origin unknown. A tall-growing type, with large stolons and wide leaves, producing an open sward. Establishes more rapidly, has better forage quality (dry matter digestibility), and has higher yields during the establishment year than 'Coastal'. Not very winter hardy, and susceptible to rust. 10–15% higher hay yields than 'Coastal'.

'Coastal' Bred in Georgia, USA (1943). F1 hybrid between 'Tiff' and tall-growing introduction from South Africa. Selected for palatability, efficiency, yield potential, management requirements, production under grazing, etc. Compared to common variety has larger and longer stems, stolons, and rhizomes; grows much taller; is lighter green; has deeper root system; is more resistant to foliage diseases, root knot nematode, frost, and drought; is much more efficient in nutrient and water use; is more palatable and produces nearly twice as much forage and animal products. Produces few seed heads that rarely contain viable seed; must be propagated vegetatively. Used for grazing and hay. Responds well to fertility and irrigation but also has considerable drought tolerance. Suppresses root-knot nematodes (*Meloidogyne* spp.), favouring association with root-knot susceptible legumes. Tolerates frequent and close grazing, but responds well to good grazing management. Winterkill occurs in colder environments.

'Coastcross-1' Bred in Georgia, USA (1967). Sterile F1 hybrid between self-incompatible parents, PI 255445 from Kenya and 'Coastal'. Selected primarily for improved forage quality. Taller, with broader, and softer leaves than 'Coastal'; strong stolon development, but few, if any, rhizomes. Forms open sod and is susceptible to invasion by the common type. Highly resistant to foliage diseases and the sting nematode (*Belonolaimus longicaudatus*). >10% higher digestibility and up to 30% better daily liveweight gains than 'Coastal'. Less winter-hardy than 'Coastal' or 'Oklan'; forage yields similar to those of 'Coastal'. Used for grazing and hay.

'Florakirk' (Tifton 35-3, later called Callie hybrid 35-3) Bred in Florida, USA (1994). F1 hybrid developed at Tifton, Georgia by crossing 'Callie' (var. *aridus*) with 'Tifton 44' and selecting for greater cold tolerance and rust resistance. Fine-stemmed variety producing high dry matter yields when grazed at 4–5 week frequency, and with good forage quality, excellent persistence, and good drought and cold

tolerance. Grows well in areas that are too cold for *C. nlemfuensis*. Unaffected by two-line spittle bug (*Prosapia bicinata*). Released primarily for hay production. Has high HCN-p potential, especially with high levels of nitrogen.

'Grazer' Bred in Louisiana, USA (1985). F1 hybrid between PI 320876 from the Alps of northern Italy, and PI 255450 from Kenya. More prostrate than most hybrids, and darker green than 'Coastal', developed primarily for grazing. Has winter hardiness, persistence, and drought tolerance about equal to 'Coastal'. Establishes more rapidly, forms a shorter, denser sod, and produces fewer rhizomes than 'Coastal'. Lower forage yields but higher digestibility than those 'Coastal', giving comparable or higher average daily gain and gain per hectare.

'Greenfield' Selected in Oklahoma, USA (1954). Selected at Stillwater from a large number of naturalized Oklahoma strains. Intermediate between coarse and very fine types. Has numerous short, crooked rhizomes, and purple exposed stolons, forming a dense mat. Readily established and fast spreading. Winter hardy and produces early spring growth. Lower forage yields than 'Midland' and similar cultivars. Used for pasture and erosion control, growing well on thin, eroded soils.

'Guymon' Bred in Oklahoma, USA (1982). Hybrid between winter-hardy, self-incompatible accessions PI 253302 from Yugoslavia and PI 12156, collected near Guymon. A general purpose, seed-propagated, cold-tolerant variety for soil stabilization and erosion control on lawns, playgrounds, roadsides, and similar areas. Also suitable for pasture use, but produces less forage than 'Midland' or 'Tifton 44'. Has greater cold tolerance than seeded common varieties.

'Hardie' Bred in Oklahoma, USA (1974). An infertile, vegetatively propagated F1 hybrid between 9945A (PI 206427, var. *dactylon*, from Elazig, Turkey) and 8153 × 9953 (both variants of PI 223248, var. *afghanicus*, from Khanadad, Afghanistan). Taller growing with longer and broader leaves than 'Midland', and larger rhizomes and stems producing a more open sod than 'Midland'. Leaves tend to accumulate anthocyanin pigmentation during cool weather. May not establish as readily as 'Midland'. More winter hardy than 'Coastal' or 'Oklan'. Higher forage quality than and similar yield to 'Midland', producing better individual animal performance and greater gain/hectare/year. Good early season growth. Susceptible to leaf-spot disease. Grows best on deep, fertile soils. Used for pasture and hay production.

'Jiggs' Selected in Texas, USA (1989). Adapted to heavy clay soils. Easier to establish than 'Tifton 85' and spreads rapidly by runners. Susceptible to leaf diseases during rainy periods or in the more humid regions. Used for hay or grazing particularly in irrigated, intensively managed pastures.

'Midland' Bred in Georgia, USA (1953). F1 hybrid between cold-resistant common type from Indiana, and 'Coastal'. Most productive of 66 F1 hybrids. Taller, larger, leafier, more disease-resistant, and producing more open sod than common types; also darker green, and tending to produce more heads. More cold resistant, with better early spring growth than 'Coastal', but less productive if 'Coastal' not subject to winterkill. The most winter hardy of the improved, upright, high-producing cultivars. Adapted to shallow, drought-prone soils.

'NK37' or **'Giant'** Selected in USA (1972). A giant, diploid seeding type. Root knot nematode resistant. Selected for arid environment. Susceptible to *Helminthosporium* leaf spot. In more humid environments, tends to be productive for a short time after establishment and then has declined rapidly in yield. Distinguished from common types by its greater vigour and lack of pubescence.

'Oklan' USA. Selected for good forage quality (high digestibility). Less winter-hardy than 'Hardie' or 'Midland', and starting growth later in spring than 'Midland'. Propagated by stolons.

'Raven' Selected in Texas, USA. Chance appearance of suspected natural sterile hybrid in sward. Phenotypically different from 'Common' and 'Coastal'. Stem and leaf size considerably larger than 'Common' and slightly larger than 'Coastal'. Visibly dense and healthy even with poor fertility and lack of irrigation. Under identical production practices, 'Raven' has comparable biomass production and nutritional quality to current *C. dactylon* forage type cultivars and is less susceptible to foliar fungal diseases than 'Jiggs'.

'Russell' Selected in Alabama, Louisiana, USA (1994). Vegetatively propagated variety that appeared in a field originally planted to 'Callie' in Russell County, Alabama. Resembles the common type in many respects, producing both rhizomes and stolons, forming a dense sod that holds up well under grazing and being especially effective in preventing erosion. Strikes more readily from clippings, gives higher yields, spreads more rapidly, and is more winter-hardy than 'Coastal'. Forage quality similar to that of 'Coastal'.

'Suwannee' Bred in Georgia, USA (1953). F1 hybrid between 'Tiff' and a tall-growing introduction from South Africa. Similar to 'Coastal', although more erect, producing more open sod (and therefore less weed resistant), less tolerant of close grazing, but more drought-resistant and superior in productivity and efficiency of nutrient and water use on deep sands. Better adapted to soils of low fertility than 'Coastal'. Used for grazing and hay.

'Tiff' Selected in Georgia, USA. Discovered by J.L. Stephens in old cotton patch near Tifton, Georgia in 1929. Has long decumbent stems, few seed-heads and an abundance of large stolons and rhizomes. Superior to common types for both hay and pasture.

'Tifton 44' Bred in Georgia, USA (1978). F1 hybrid between 'Coastal' and a naturalized accession from Berlin, Germany. Lower growing, with finer stems, more rhizomes, and denser sod than 'Coastal'. More resistant to leaf diseases than 'Midland'. Starts growth a little earlier in spring, and is more winter-hardy than 'Coastal'. More productive and more digestible giving 15–20% higher average daily liveweight gains during summer than 'Coastal', but slower to establish, seldom providing any significant forage production during the establishment year. Used for grazing and hay.

'Tifton 68' Bred in Georgia, USA (1984). F1 hybrid between the two most digestible accessions in a collection of 500 introductions, PI

255450 from Kiboko, Kenya, and PI 293606 from Nairobi, Kenya. Selected for rapid spread and high production. Giant type with large stems, long stolons, and no rhizomes. Spreads rapidly when planted vegetatively. Higher production, digestibility, and average daily gain than 'Coastal', but is not very winter hardy. Used for grazing and hay.

'Tifton 78' Bred in Georgia, USA (1984). F1 hybrid between 'Callie' and 'Tifton 44'. Selected for ease of establishment, rapid spread, and early growth. Taller, more stoloniferous (spreading more rapidly), establishes more readily, starts growth earlier and has better forage quality than 'Coastal'. Similar in spread, establishment, and growth habit to 'Callie', but produces more rhizomes, is more winter-hardy, and resistant to rust. Can produce 25% more dry matter, with 7% higher digestibility, leading to a 36% overall improvement in liveweight performance over 'Coastal'. Not as winter hardy as 'Tifton 44'. Used for grazing and hay.

'Tifton 85' Bred in Georgia, USA (1991). F1 hybrid from cross between PI 290884 from South Africa and 'Tifton 68'. Selected for increased dry-matter yield and improved forage digestibility. It is taller, has larger stems, broader leaves, and a darker green colour than most other hybrids. Has large rhizomes (though fewer than 'Coastal' and 'Tifton 44') and very large, rapidly spreading stolons. Can produce 26% more dry matter with 11% higher digestibility than 'Coastal'. Not very winter-hardy. Used for grazing and hay.

Other cultivars such as 'C2', 'Sunturf', 'Tifway', 'Tifway II', 'Tifgreen', 'Tifgreen 328', 'Tifdwarf', 'FloraDwarf' (putting greens), 'GN-1', 'MS-Choice', 'MS-Express', 'MS-Pride', 'NuMex Sahara', 'Sultan', 'Yuma', 'Blue-muda' have been developed for turf.

Promising accessions

None reported.

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