

Tropical Forages

Hemarthria altissima

Scientific name



Hemarthria altissima (Poir.) Stapf & C.E. Hubb.

Synonyms

Basionym: *Rottboellia altissima* Poir.; *Manisuris altissima* (Poir.) Hitchc.

Family/tribe

Family: *Poaceae* (alt. *Gramineae*) subfamily:
Panicoideae tribe: *Andropogoneae* subtribe:
Rottboelliinae.

Morphological description

Perennial with short rhizomes; culms loosely tufted or prostrate to decumbent, 100–250 cm long, 2–4 mm diameter, rooting at lower nodes, ascending to 30–80 (–160) cm tall, nodes glabrous. Leaves green, often developing red colouration mostly on tips and sheaths, largely glabrous except for fringe on sheath of some genotypes; leaf sheaths loose, compressed, keeled, usually shorter than internodes, glabrous except near mouth; ligule a short, ciliate membrane; leaf blades linear or linear lanceolate, attenuate, 5–15 (–25) cm long and (2–) 3–4 (–6) mm wide, usually folded. Inflorescence comprising single spike, or a panicle of 2–4 spikes

arising inconspicuously from axils of upper leaves; spikes 5–12 cm long, ovate-keeled in section (1.5 × 3 mm), tapering toward the apex, semicylindrical, articulation line oblique, tardily disarticulating; spikelets 5–8 mm long, in pairs, one sessile and hermaphrodite, the other pedicellate, smaller and male). Caryopsis brown about 2 mm long.



Leaves, stems and inflorescences



Inflorescence comprising single spike (pictured), or a panicle of 2 - 4 spikes



Inflorescence, leaves and stem



Sprig planting from round bale



Testing new cultivars, UF/FAS Beef Teaching Unit, Gainesville, Florida

Common names

Africa: bataviesekweek, perdekweek, rooikweek (gras), rooivleigras, perdegras (Afrikaans); marotlo-a-mafubelu, mohlokorima, namele, tajoe (Lesotho); burgu, damarage, manu (Nigeria); tsangadzi (Zimbabwe)

Asia: 牛筋草 da niu bian cao (China); baksha, panisharu (India); מַרְשֵׁי מְאָדָּה (Israel)

English: African jointgrass, batavian quick grass, halt grass, horse grass, limpo grass, red quick, red swamp grass, red vlei grass, snake grass, swamp couch (grass); limpo grass (Florida); halt grass (Panama)

French: limpo herbe, avoir maîtrisé herbe, rouge vlei grass, batave l'herbe rapide, rouge vlei herbe, canapé, chiendent, marais canapé, marais chiendent, rouge marais herbe

Latin America: capim gamalote (Brazil); canutillo, gramilla cañita, pasto clavel (Argentina)

Distribution

Native:

Europe: Greece (incl. Crete); Italy (incl. Sicily); Spain (incl. Balearic Islands)

Africa: Algeria; Botswana; Canary Islands; Chad; Egypt; Ethiopia; Lesotho; Malawi; Mali; Mozambique; Nigeria; Senegal; South Africa; Swaziland; Tanzania; Tunisia; Zambia; Zimbabwe

Indian Ocean: Madagascar; Mauritius; Réunion

Asia: Georgia; India (Tamil Nadu); Indonesia (Kalimantan); Lebanon; Myanmar; Saudi Arabia; Thailand; Turkey; Vietnam

Cultivated:

Africa: South Africa; Zimbabwe

Australasia: Australia

Northern America: USA

Uses/applications

Forage

Primarily used for grazing but has been used successfully for hay and silage. Stockpiled or used as winter standover in southern Florida. Not well suited to cut-and-carry.

Environment

Its tolerance of low pH and high Al and Mn could be usefully applied in revegetation of acid mine waste where moisture conditions are suitable.

Other

The raw rhizomes seem to be eaten by children in Lesotho. Stems can be plaited into rope to bind harvested reeds forming the enclosure around a courtyard.

Ecology

Soil requirements

Grows in soils of any texture, providing moisture is adequate. Tolerates acid soils down to pH 4.5, but is best between 5.5 and 6.5. However, at least one accession, PI 364344, has been shown to tolerate pH down to 4.0, and have a high level of tolerance of excess aluminium and manganese. Similarly, salt tolerance has also been recognized.

Moisture

Found in flooded areas, swamps, lakes and vleis. It can withstand short, seasonal dry periods, but does not tolerate long droughts.

Temperature

Native and naturalized in warm temperate, subtropical and tropical climatic zones between about 40° N and 34° S, and from near sea level to 2,000 m asl. This equates to a range in average annual temperature from 16 to 27 °C. For the types assessed, the optimum temperature for growth is 31–35 °C, with growth declining rapidly above 38°C. Tops can be killed by moderate frost (temperatures down to -10 °C), but plants regrow with the onset of warm, moist conditions. Genotypic variation in winter-hardiness has been identified. While some genotypes are killed by heavy frosts (-13 °C) others can survive temperatures as low as -18 °C. 'Floralta' is slightly less winter-hardy than 'Redalta', but equal to or more winter hardy than 'Greenalta' and 'Bigalta'.

Light

No information available.

Reproductive development

Flowers October, November to May, June in the southern hemisphere, but sets very little seed.

Defoliation

The main advantage of this species over many other tropical grasses is superior early and late season growth. To capitalise on this advantage, it is usually mowed off and fertilized with up to 100 kg/ha N. The pasture is then destocked and allowed to accumulate for 3–4 weeks, giving a good yield of moderate quality feed. For best results, the grass is normally maintained between a 15 cm stubble and 30–45 cm regrowth (never above 60 cm). During the dormant period, all tops can be grazed or cut off. Excessive growth leads to not only quality loss, but also trampling losses and insect build-up. *H. altissima*, by virtue of its stoloniferous and rhizomatous growth habit, is tolerant of moderately heavy grazing, although persistence under such management varies among cultivars, e.g. 'Floralta' is more grazing-tolerant than 'Bigalta'.

Fire

It does not tolerate burning.

Agronomy

Guidelines for establishment and management of sown forages.

Establishment

Seed is not commercially available due to generally poor seed-set. It is therefore propagated by cuttings planted into wet soil, early in the season if unfrosted planting material is available, or in late summer having allowed a build-up of planting material during the peak season. It appears more successful establishment results if the cutting nursery is fertilized with nitrogen 2–3 weeks before harvest. Freshly mowed stems and stolons of 3- to 3-month old grass are spread over a well-prepared seedbed, partially covered with a disk harrow and rolled to

compact the soil around the cuttings. Planting rates of 1 t/ha vegetative material are recommended on "clean" ground or 1.5–2 t/ha if weeds or other grass are likely to compete. Livestock should be withheld until the grass is established, even cutting and conserving the initial growth flush to ensure establishing plants are not pulled out. When the grass reaches 10 cm or more high, susceptible weeds can be controlled with dicamba. Broadleaf herbicides should not be used for weed control if legumes are planted with the grass.

Fertilizer

Establishment fertilizer should be low in nitrogen to encourage root development without promoting excess weed growth. If cuttings have been harvested from fertilized ground, it is best to apply nitrogen and any other nutrients, particularly phosphorus and potassium, once the cuttings have started to grow. In Florida, an establishment dressing of 35 kg N, 10 kg P and 20 kg K/ha is recommended, with a follow-up dressing of about 75 kg N/ha 7 weeks later. Once the grass becomes well rooted, nitrogen should be applied to stimulate forage growth. For grazed established stands, maintenance dressings of 50–100 kg/ha N (and 40–60 kg/ha each of P and K if required) can be applied at the beginning of the season, with a similar N dressing later in the season. For conserved stands, where nutrient is removed from paddocks, similar N rates are used, but higher rates of P and K may be necessary. While *H. altissima* is responsive to fertilizer, particularly nitrogen, care should be taken to avoid pollution of natural waterways and storage that are often found nearby to suitably moist areas.

Compatibility (with other species)

H. altissima is normally not sown with other grasses, although can be invaded by more grazing tolerant species such as *Cynodon dactylon* under prolonged heavy grazing. There may be issues with compatibility with some species because there is evidence of allelopathic properties due to root exudates.

Companion species

Grasses: Normally not planted with other grasses. Grows in similar environment to *Acroceras macrum*.

Legumes: *Aeschynomene americana*, *Lotus uliginosus* (*pedunculatus*), *Trifolium repens*, *Vigna parkeri*.

Pests and diseases

No major foliar diseases have been identified. Although tolerant genotypes exist, 'Floralta', 'Bigalta' and 'Redalta' are susceptible to attack by sting nematodes (*Belonolaimus longicaudatus*). No major insect problems have been observed. The yellow sugarcane aphid (*Sipha flava*) attacks some accessions, but other accessions exhibit a degree of resistance. 'Floralta' and 'Greenalta', although susceptible, are less so than *Digitaria eriantha* cv. Pangola. The armyworm complex (*Laphigma* spp., *Spodoptera* spp. and *Mocis* spp.) can cause severe damage in isolated circumstances, but no more so than on most other tropical grasses. Isolated cases of damage from spittlebugs (*Prosapia bicincta*) and chinchbugs (*Blissus* spp.) have been reported. Spittlebugs may be more of a problem if the grass is not grazed and is allowed to accumulate throughout the summer.

Ability to spread

H. altissima spreads rapidly by prostrate culms/stolons. 'Bigalta' spreads more rapidly than 'Floralta' or 'Redalta', but 'Floralta' provides better ground cover than the other two.

Weed potential

Due to poor seed set and limited adaptational range, *H. altissima* poses little or no weed threat on well-drained or heavily grazed land. However, it has been found in natural areas in Florida, and consequently placed on the Florida Exotic Pest Plant Council's Category II invasive plant list. As a precaution, it should be kept isolated from wetlands and regularly monitored in areas where unintended spread might occur.

Feeding value

Nutritive value

Organic matter digestibility of young grass may be as high as 70% but drops to as low as 40% in mature grass. Some data suggest that digestibility of tetraploids may be higher than that of diploids. CP levels in grass less than 6 weeks old is usually >7%, but in 3–4 month regrowth, levels may be as low as 3%. Although CP levels are relatively low, OM digestibility and intake tend to remain higher than many other warm season grasses at a similar stage of growth. Protein supplementation using concentrates or legume is usually necessary.

Palatability/acceptability

Palatability varies with genotype. It is highly palatable and is valued as a fodder grass. 'Floralta' and 'Bigalta' are both more palatable than 'Redalta' and 'Greenalta', and 'Bigalta' is more palatable than 'Floralta'.

Toxicity

No record of toxicity.

Feedipedia link

<https://www.feedipedia.org/node/617>

Production potential

Dry matter

Dry-matter yields can be increased by increasing harvest interval and nitrogen fertilization. Application of 125 kg/ha N can increase yields from 10.5 to 17.5 t/ha DM, and at 480 kg/ha N, to nearly 30 t/ha DM. 'Floralta' is higher yielding than 'Bigalta' or 'Redalta'.

Animal production

Can carry 3–6 beasts (300–400 kg)/ha gaining an average of 0.55 kg/head/day during the growing season.

Over a 3-year period, liveweight gains of yearling steers grazing an aeschynomene- limpogross pasture averaged 0.70 kg/day compared with 0.39 kg/day for steers grazing N-fertilized limpogross.

Genetics/breeding

The basic chromosome number of *H. altissima* is 9 or 10. Diploids ($2n = 18$ or 20) and tetraploids $2n = 36$ or 40) have been identified. Two new cultivars, 'Kenhy' and 'Gibtuck' have been produced from a breeding program in Florida, through crossing the two tetraploid cultivars, 'Floralta' and 'Bigalta'.

Seed production

It is not a good seed producer.

Herbicide effects

H. altissima is tolerant of pre-emergence applications of atrazine. Control of broadleaf weeds is best done with dicamba since the grass is somewhat susceptible to 2,4-D. Annual grasses may be controlled by post-planting applications of atrazine, simazine, ethofumesate and metolachlor. *H. altissima* can be controlled using paraquat, glyphosate or fluzifop-butyl.

Strengths

- Adapted to wet soil.
- Productive when well fertilized.
- Good early and late season production.
- High digestibility.

Limitations

- Intolerant of very heavy grazing.
- Must be planted vegetatively.
- Crude protein levels tend to be low.
- Not well adapted to well-drained soils.
- Difficult to cure for hay at advanced stages of growth.

Selected references

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Cultivars

'**Bigalta**' (PI 299995) Released in Florida, USA (1978). Origin Limpopo Province, South Africa. A tetraploid ($2n = 36$) with fewer but broader leaves, and larger stems, than 'Redalta' and 'Greenalta'; similar in appearance to 'Floralta', but with less intense purple coloration under cool temperature stress or fertility deficiency. Less cold tolerance than 'Redalta' and 'Greenalta', with poorest early season growth. Intolerant of heavy grazing and only recommended for use under mechanical defoliation or light grazing. Although less persistent than 'Floralta', has been shown to have slightly greater *in-vitro* organic matter digestibility.

'**Floralta**' (PI 364888, PI 508285) Released in Florida, USA (1987). Origin the Luvuvhu River in Kruger NP, South Africa (22.38° S, 270 m asl, rainfall 400 mm). A tetraploid ($2n = 36$) morphologically similar to 'Bigalta' with larger stems and wider leaves than the diploid

'Redalta' and 'Greenalta', selected for persistence under grazing. More intense purple colouration under cool temperature stress or fertility deficiency than 'Bigalta', but generally does not show the intense red pigmentation that 'Redalta' shows under similar environmental conditions. Some difference in winter hardiness from other cultivars (see Temperature). Superior dry matter yield to other cultivars, and better IVOMD than 'Redalta' or 'Greenalta'. Used for grazing and hay production on poorly drained soils. Comprises about 95% of limpopo grass plantings in Florida.

'**Greenalta**' (PI 299994) Released in Florida, USA (1978). Origin the Pienaars River, North-West Province, South Africa (estimated 25.1° S, 1,000 m asl, rainfall 700 mm). A diploid ($2n = 18$). Retains medium dark green colour at maturity, even under stress conditions. Similar plant form to that of 'Redalta', except leaves are slightly wider.

'**Redalta**' (PI 299993) Released in Florida, USA (1978). Probably originating from Limpopo Province, South Africa. A diploid ($2n = 18$). Distinguished from other cultivars by characteristic red colour in mature growth or under stress conditions, and usually finer stems and narrower leaves. The most cold tolerant of the cultivars, having survived down to -18 °C.

'**Kenhy**' (Reg. No. CV-283, PI 682663) Released in Florida (2014). Selected from 51 hybrid seedlings produced by greenhouse hand crosses of 'Floralta' × 'Bigalta'. Evaluations included greenhouse pot studies, small plot clipping experiments, two different mob stocking grazing experiments, and an experiment to evaluate herbage accumulation and nutritive value under stockpiling management. 'Kenhy' and 'Gibtuck' were selected for superior herbage accumulation, persistence under grazing defoliation, improved nutritive value compared with 'Floralta', and utility as stockpiled forage.

'**Gibtuck**' (Reg. No. CV-284, PI 682664). Same as for 'Kenhy'.

Promising accessions

PI 364344 Selected in Florida, USA (1980). Originated from near Makhalanyaane, Lesotho (29°40' S, 1,600 m asl, rainfall 930 mm); tolerant of low temperature, salinity and of high concentrations of Al and Mn in acid soil, mine spoil and nutrient solution.

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