Tripsacum andersonii

Scientific name

Tripsacum andersonii J.R. Gray

Note: *T. andersonii* has commonly been referred to as the closely related species, *Tripsacum laxum* Nash, in most agricultural literature. These are presently (2019) accepted by GRIN as separate species. The interspecific difference seems to be related to the natural hybridization origin of *T. andersonii* but is here considered to be negligible as far as information on the forage grass known under either of the two names is concerned. Therefore, information from both names is used here.

Synonyms

None listed in GRIN.

Family/tribe

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

Morphological description

Robust perennial bunch grass, monoecious, with short rhizomes; shallow-rooted. Stems somewhat compressed, up to 5 cm diameter at the base; flowering culms up to 4 m tall. Leaf blades up to 120 cm long and up to 10 cm wide, shortly tomentose on the upper surface, glabrous on the under surface. Subdigitate terminal and axillary inflorescences with up to 8 slender racemes; male portion of raceme apical to 25 cm long, female portion basal to 8 cm; male spikelets 3–5 mm long; female spikelets dorsally compressed, 8–10 mm long, falling entire, deciduous with accessory branch structures; flowers are sterile.

Similar species

Tripsacum andersonii: 3–8 racemes per terminal inflorescence

Tripsacum laxum: 10–50 racemes per terminal inflorescence

Robust perennial bunch grass with short rhizomes

Leaves to 10cm wide; inflorescence a subdigitate panicle comprising up to 8 racemes

Inflorescences with white stigmas of ♀ flowers in basal part of raceme

Tripsacum andersonii J.R. Gray – 1, habit; 2, ligule; 3, inflorescence; 4, male spikelet; 5, female spikelet.

Line illustration

Sterile "seed units" from segmentation of female basal portion of raceme.

Whole plant

Plot in Sulawesi

Common names

Asia: rumput jagung, rumput jelai (Malaysia); หญ้ากัวเตมาลา, ya-kuatemala (Thailand)

English: Guatemala grass, Guatemalan gamagrass, Honduras grass

French: herbe du Honduras, herbe du Guatemala

Latin America: capim Guatemala (Brazil); hierba de Guatemala, hierba prodigio, pasto Guatemala, pasto prodigioso, zacate prodigio (Spanish)

Distribution

Native/naturalized:

Northern America: Mexico

Central America: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama.

South America: Bolivia, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, Venezuela.

Cultivated:

Widely cultivated throughout the tropics as a fodder plant and for environmental services.

Uses/applications

Forage

Perennial fodder bank for cut-and-carry, especially useful as green feed during dry conditions. Recommended in Kenya as an alternative to Napier grass (*Cenchrus purpureus*) in dairy production in areas of the country that are prone to Napier stunt disease. Used to produce moderate quality silage. The combination of usually high moisture content and low content of water-soluble carbohydrates can prevent pH reduction and lessen storage quality. As a result, wilting prior to ensiling is recommended.

Environment

Has environmental value though its use to provide hedgerows (living fences) and for contour strips for soil erosion control and mulching, for soil rehabilitation and nematode management in run-down tea plantations (Sri Lanka) and, when used in rotations, reported to reduce bacterial wilt prevalence in potato crops (Burundi).

Ecology

Soil requirements

Best in fertile, well-drained soils but can tolerate low pH and some Al. Can grow on ultisols, oxisols, peats, acid sulphate soils and very acid coastal marine sands. Grows well on podsolic soils in Suriname.

Moisture

Requires reliable rain or soil moisture but can remain green over a short dry season; reported to tolerate drought better than *Cenchrus purpureus*. Rainfall adaptation range reported to be 800–>2,000 mm/year. Has some tolerance of waterlogging and flooding.

Temperature

Generally grown in humid tropical lowlands and up to 1,800 m asl in the tropics, *e.g.* in east and central Africa, but could not grow in wet peat lands at high altitude in Burundi; reported temperature range: 18–30 °C.

Light

Reported to have some shade tolerance.

Reproductive development

Monoecious (both the male and female reproductive systems exist on the same plant). Stems develop at a rather late stage; properly managed the aerial biomass consists of leaf only. Seed is sterile.

Defoliation

Will not tolerate grazing, overly frequent or severely low cutting. Can be cut at 60–90-day intervals no lower than 10-25 cm above the soil surface.

Fire

Unlikely to be burned but will recover from the coarse stem bases and rhizomes.

Agronomy

Guidelines for establishment and management of sown forages.

Establishment

Always planted from stem cuttings with 3–5 nodes, rooted culms or rhizomes (800–3,000 kg/ha) at spacings of 0.5 × 1 m. Can be cut 4–6 months after planting.

Fertilizer

Heavy fertilizer applications (N-P-K) needed for optimum growth as herbage removal quickly extracts soil nutrients.

Compatibility (with other species)

May be grown with twining legumes (that rarely persist under the grass cutting regime) or with companion rows of shrub/tree legumes.

Companion species

Legumes: Not usually grown with other species but can be established with climbing legumes such as *Desmodium intortum*, or in

association with tree/schrub species including *Calliandra calothyrsus*, *Leucaena leucocephala*, *Sesbania sesban*, *Flemingia macrophylla.*

Pests and diseases

No major pests or diseases reported. Reported that Guatemala grass has the potential to harbor rodents more than other grasses which can lead to human health risks.

Ability to spread

The clump base of rhizomes can expand to a few metres diameter if left uncut.

Weed potential

Little or no viable seed is set. Rhizomatous and so unmanaged stands can be difficult to remove. No other known weed risks.

Feeding value

Nutritive value

Much depends on the frequency of cutting because the heavy stems become very fibrous with maturity; generally low in protein relative to digestible carbohydrate if not managed and fertilized. With adequate N fertilizer, crude protein of leaf remains high even at late maturity. Depending on NPK fertilization, CP concentration of a 120-d regrowth measured in tropical Mexico was 10–15% in leaves and 6–11% in stems. Said to be poorer quality than *Cenchrus purpureus*, but this would depend on relative stages of growth. Digestibility ranges reported are 49–79% and ME 1.56–1.76 MJ/kg. Reported mineral concentrations are 0.18% P, 1.69 % K and 0.50% Ca. More persistent than *Cenchrus purpureus*, but may be less productive and of lower nutritional value.

Palatability/acceptability

Reported to be good when leaf is young.

Toxicity

None reported.

Feedipedia link

https://www.feedipedia.org/node/365

Production potential

Dry matter

Annual DM yields in the range of 18–30 t/ha, cutting at 10–25 cm above soil surface.

Animal production

LWGs of 280 g/head/day (300 kg/ha) over 10 months with rotational grazing in Suriname were reported.

Genetics/breeding

2*n* = 64. *T. andersonii* is regarded as a natural hybrid between species of *Tripsacum* and *Zea*. Molecular marker analysis suggest hybridization between *T. latifolium* (2*x*) and *T. maizar* (2*x*) to give triploid *T. latifolium* (3*x* = 54), which then hybridized with *Zea luxurians* (2*n* = 20). Highly uniform morphology suggests a single hybrid origin.

Seed production

Seed units are mostly or completely sterile and all propagation is vegetative.

Herbicide effects

No information available.

Strengths

- Highly productive under good conditions.
- Provides an alternative to napier grass.
- Leaf-only production under proper management.
- Environmental value through use for hedgerows, erosion control and pest and disease management.

Limitations

- Poor quality feed under infrequent cutting.
- Planting from cuttings labour intensive.

Internet links

https://uses.plantnet-project.org/en/Tripsacum_andersonii_(PROSEA)

Selected references

Barré, M., Berthaud, J., González-de-León, D. and Savidan, Y. (1994) Evidence for the tri-hybrid origin of *Tripsacum andersonii* Gray. Maize Genetics Cooperation Newsletter 68:58–59. mnl.maizegdb.org/mnl/68/90barre.html

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deWet, J.M.J., Fletcher, G.B., Hilu, K.W. and Harlan, J.R. (1983) Origin of *Tripsacum andersonii* (Gramineae). American Journal of Botany 70:706–711. doi.org/10.1002/j.1537-2197.1983.tb12449.x

Villanueva-Ávalos, J.F. and Quero-Carrillo, A.R. (2015) *Tripsacum* spp.: Un recurso forrajero nativo, relegado en México. Libro Técnico No. 4. INIFAP, Santiago Ixcuintla, Nayarit, Mexico.

Cultivars

'Guatemala' Released in India but status as a cultivar unsure.

Promising accessions

None reported.