Paspalum atratum

Scientific name
Paspalum atratum Swallen

Synonyms
Paspalum plicatulum var. robustum Hack
Paspalum sp. aff. P. plicatulum

Family/tribe

Common names
atra paspalum (USA); atratum (southeast Asia); capim-pojuca (Brazil); pasto pojuca (Venezuela).

Morphological description
A leafy upright perennial tussock grass, usually less than 1.0 m tall, to 2 m when in flower. Leaves to >2.5 cm wide, shiny and brittle, even when mature; leaf margins scabrous; leaf hairiness varies with provenance. Seed borne in a simple panicle to 26 cm long comprising up to 20 racemes, the lower ones to 14 cm long. Spikelets about 3 mm long and 2 mm wide. 250,000-450,000 seeds/kg.

Distribution
Native to: South America. Brazil (Goias, Mato Grosso, and Minas Gerais states), Bolivia (Santa Cruz).

Uses/applications
Used as a long-term pasture in the open and under trees. Upright habit and ease of cutting make it useful in cut-and-carry systems, although the sharp leaf edges can cause discomfort to the handler. Popular as a hedgerow for erosion control but tends to compete more vigorously with adjacent crop rows than does vetiver grass (Vetiveria zizanioides). Unlike vetiver grass, it can also be fed to animals. Shows early promise for hay making.

Ecology
Soil requirements
Successful on soils ranging from sands to clays, and can tolerate poorly drained, acid, low fertility conditions. Responds to improved nitrogen fertility.

Moisture
Mostly occurs in areas with rainfall 1,500-2,000 mm/yr. In cultivation, it will persist with about 1,100 mm/yr, but is best with over about 1,500 mm. Prefers moist, well- or poorly-drained soils. Although not as drought tolerant as Brachiaria decumbens or B. brizantha, P. atratum survives dry conditions reasonably well. Very tolerant of flooding but does not grow in permanent water.

Temperature
Occurs between about 13.9ºS in Bolivia and 20ºS in Brazil, to 600 m asl. These areas have an average annual temperature of about 23ºC. However, it has adapted to areas with average annual temperatures as low as 20ºC, but is best grown between about 22 and 27ºC. P. atratum is primarily a warm season grass, having limited cool season growth. Tops are killed by frost, but plants recover quickly with onset of warm conditions.

Light
Moderate to good shade tolerance - useful in agroforestry.

Reproductive development
Flowering in the first year may be minimal, but thereafter, commences early April (southern hemisphere) or October (northern hemisphere) in the subtropics, and earlier in lower latitudes. Within 5-10º of the equator, flowering may cease altogether. Flowering is disrupted if the stand is cut or grazed low within 2 months of commencement of flowering, destroying the elongating apical meristem. Seed tends to be shed as soon as it matures (shatters).

Defoliation
Tolerant of low grazing and regular cutting, although best results obtained from more lenient management. Very easy to cut with scythe or mower.

**Fire**

Fire is not normally an issue where *P. atratum* is grown, but on the rare occasion that stands may be burnt, plants recover rapidly.

**Agronomy**

Guidelines for the establishment and management of sown pastures.

**Establishment**

Reports of dormancy levels in fresh seed vary from low to quite high, but, even with dormant seed, germination reaches acceptable levels after 3-4 months. Germination of fresh seed can be improved from about 20% to nearly 100% by removal of the lemma and palea. Seed has a very limited "shelf life" under ambient conditions, and may remain viable for less than a year. Seed stored for several years should be stored at low temperature and low relative humidity. Seed is normally sown at 2.5 kg/ha, either broadcast or in 0.5-1 m rows. Establishes rapidly from seed, or from rooted tillers.

**Fertiliser**

Survives at low fertility but responds to nitrogen applications of the order of 150-200 kg/ha/yr N. Other deficiencies should be corrected.

**Compatibility (with other species)**

Can compete with aggressive species such as *Paspalum notatum* cv. Pensacola, even under heavy grazing. Due to its moderate shade tolerance, it can be grown under trees.

**Companion species**

Grasses: Best not planted with other grasses, although may combine with *Setaria sphacelata* in some situations.
Legumes: *Arachis pintoi*, *Calopogonium mucunoides*, *Centrosema acutifolium*, *Desmodium heterocarpum* ssp. *ovalifolium*, *Pueraria phaseoloides*.

**Pests and diseases**

In Florida, armyworms can be a problem later in the growing season, and some mole cricket damage has occurred. A leaf spot (*Helminthosporium* sp.) has been recorded on older leaves. Severe leaf spot has been noted in Brazil. Spittlebug has not been a problem. No record of nematode damage.

**Ability to spread**

No vegetative spread, but will spread by seed if allowed to mature late in the season. However, if grazed or mowed within 100 days of flowering, seed set is minimised.

**Weed potential**

*P. atratum* has been assessed as a weed in some areas due to the misconceptions that it is a "water grass" and that it develops a soil seed bank. It does not grow in inundated situations and seed does not survive any length of time in the soil.

**Feeding value**

**Nutritive value**

IVDMD from 50-68%, mean CP 11%.

**Palatability/acceptability**

Well eaten by cattle, buffaloes, horses, fish, and pigs.

**Toxicity**

No record of anti-nutritional factors.

**Production potential**

**Dry matter**

Yields commonly 10-15 and up to 26 t/ha/yr DM.

**Animal production**

Stocking at 6 yearlings/ha, can achieve 0.6 kg/day LWG over a 168-day season. Higher per head gains have been achieved when grown with a legume.

**Genetics/breeding**
Tetraploid \((2n = 4x = 40)\), apomict.

**Seed production**

There is little flowering in the first year in plants established after June (northern hemisphere) or January (southern hemisphere). In the second year, stock should be removed or a cleaning cut given at least 100 days prior to harvest to avoid damage to elongating apical meristem. Seed crops are usually ready for harvest about 4 weeks after flower emergence. Can produce up to 230 kg/ha of seed, but in practice, a harvest of 100 kg/ha of dried and cleaned seed is realistic. Crops should be monitored closely to pick the precise time for harvest, since ripe seed is readily dislodged from the head. Well-fertilised seed crops are bulky and tend to lodge (fall over) making harvesting difficult. Seed should be dried to, and maintained at, <10% moisture content if it is to stay viable for any period of time. Hand-harvested, slow-dried seed of Paspalum atratum shows normal rates of deterioration under normal storage, but combine-harvested and/or rapidly dried seed has a relatively short shelf life. In the tropics, seed is dried slowly in the shade to preserve its viability. While similarly structured, related seeds are prone to some threshing damage and some fast-drying damage, this grass, like the closely related \(P. plicatulum\), is particularly sensitive. Machine-harvested seed should therefore be dried comparatively slowly to low moisture and then maintained at that level. Further, seed produced in the upland tropics tends to contain an unusually high proportion of immature caryopses, resulting in lower than normal vital quality. This generally happens as a consequence of slow caryopsis development when growing conditions are sub-optimal, in this case probably because temperatures during crop development are marginally too low for production of the highest-quality seed. Abscission then occurs in a high proportion of spikelets before maturation is complete, leading inevitably to low mature caryopsis counts irrespective of harvest methods. Immature caryopses of all species are of low vigour and viability and have a short life expectancy.

**Herbicide effects**

Seedlings are damaged by 2,4-D, but not by dicamba at 0.5 kg/ha AI. Pre-emergence applications of clomozone, fluometron, diuron, imazetapyr, metribuzin, trifluralin, and norflurazon prevent establishment from seed. Mature stands can be largely controlled using glyphosate at 3-4 kg/ha AI. If spray water contains high concentrations of antagonistic calcium and magnesium salts (see herbicide label), the addition of ammonium sulphate at 10 kg/ha, with glyphosate at 2 kg/ha AI, may improve kill.

**Strengths**

- Easy to sow and quick to establish.
- Adapted to wet, acid soils.
- Tolerant of flooding.
- Palatable to cattle, horses and sheep.
- Tolerates close grazing.

**Limitations**

- Relatively short grazing season.
- Limited to moist situations.
- Unpalatable when mature.
- Seedlings susceptible to 2,4-D.

**Selected references**


**Internet links**

http://rcrec-ona.ifas.ufl.edu/cirs-397.html
http://crop.scijournals.org/cgi/content/full/39/6/1847

**Cultivars**

<table>
<thead>
<tr>
<th>Cultivars</th>
<th>Country/date released</th>
<th>Details</th>
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<tbody>
<tr>
<td>‘Cambá FCA*’</td>
<td>Argentina</td>
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<tr>
<td>(BRA-009610)</td>
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<tr>
<td>‘HiGane’</td>
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<td>(ATF 2013, BRA-9610)</td>
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<tr>
<td>‘Pojuca’</td>
<td>Brazil</td>
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<tr>
<td>(BRA-009610, VSW 9880)</td>
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Seedheads (a simple panicle) and seeds.
Easily cut, upright tussocks - well suited to cut and carry.
Plants produce high seed yields in subtropics.
Forms strong palatable tussocks.

Mature plants - past the stage for optimal use.

Cutting cv. Terenos for night feeding in Makroman, Indonesia.

Hedgerows in Mindanao, Philippines.

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**Note:** All cultivars are derived from or similar to BRA-009610, a largely glabrous, broad-leafed provenance from the vicinity of Campo Grande in Brazil.

**Promising accessions**

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