



What's New?

For Students

SOFT: Student Organic Farm Training

For New Farmers

Farm Income

Environmental Stewardship

Sustainable and Organic Production Methods

Events

Past Workshops

Links

Hānai‘Ai Newsletter

Videos

Cover Crops & Green Manures for Hawaii

CTAHR Contacts

Organic Agriculture at CTAHR

WSARE Projects

Bahia Grass *Paspalum notatum*

Summary

- Tropical to subtropical low growing creeping perennial grass
- Used primarily as a forage and valued for its dense cover, productivity, ease of establishment and persistence
- Used in Hawai‘i for orchard crops
- Used for erosion control
- Very shade tolerant
- Good salt tolerance
- Good drought tolerance
- Very vigorous aggressive grass (may be considered a weed), not easily eradicated
- Heavy seeder, viable seed disseminated in feces
- Root knot nematode resistant cultivars available

Common Name

Its common name is Bahia grass, grama dulce, forquinha, gengibrillo, pasto horqueta (Bogdan).

Scientific Name

The scientific name is *Paspalum notatum* Fluegge (Bogdan).

Cultivars

Bahia grass cultivar ‘Pensacola’ is the best known and widely cultivated in the USA and introduced elsewhere. Other important cultivars are ‘Tifhi-1’ (similar to Pensacola but provides grazing earlier and later in the season), ‘Common’, ‘Argentina’, ‘Batatai’, ‘Paraguay’ (nematode resistant), and ‘Wilmington’ (most frost resistant) (Bogdan).

Seed Description

Seeds are about 1.8 mm long and 1.2 mm wide (Bogdan), ovoid, glossy yellowish-green, and flattened on one side. Hand harvested seed has a high percentage of hard-seededness. Germination is low initially but improves with up to 3 years of storage (Baki).

Seedling Description

Seedlings can be subject to weed competition. Planting in a clean seedbed is recommended (FAO).

Mature Plant Description

Bahia grass is a low-growing creeping perennial with stolons and stout rhizomes. Stolons are pressed firmly to the ground, have short internodes, and root freely from the nodes forming a dense sod. Stems range from 15-70 cm (6-28 in.) high. The leaves are linear, between 5-20 cm (2-8 in.) long, 2-10 mm wide, tapering to a fine point. Bahia grass is a polymorphic species with three varieties: *notatum*, *latiflorum* Doell., and *saureae* Parodi (Bogdan).

Temperature

The optimum temperature range for Bahia grass is 25°- 30°C (77° - 86°F) maximum (30°C/86°F mean). It can tolerate temperatures down to 10°C/50°F (top growth is killed) (Baki).

Origin and Geographic Distribution

Bahia grass is considered to be indigenous to southern Brazil and the Americas. It is now distributed throughout the southern USA, Central and South America, parts of Australia, Asia and Africa (Baki)

Ecology

Bahia grass occurs naturally in sub-humid to humid subtropical climates. It is considered best suited to sandy or light textured soils. It is a vigorous aggressive grass that spread vegetatively and by seed (viable through feces) (Baki).

Water

Bahia grass prefers rainfalls between 800 to 2000 mm (32-79 in.) It can tolerate flooding up to 36 days. It has good drought tolerance (Baki).

Nutrients

Bahia grass (cv. 'Pensacola') responds well to N with increases in herbage yield and improvement in digestibility. Maximum N rates recommended are about 100-200 kg N/ha (90-178 lb/ac). Phosphorus applications increase tillering and yields. Potassium with N and P can increase DM yields and digestibility, but decrease crude protein in the herbage (Bogdan). The FAO reports bahia grass responding well to 10-12 kg/ha (9-11 lb/ac) copper in poor sandy soils.

Soil pH

Bahia grass grows at a pH between 4.0 – 6.5 (NRCS Tech Guide).

Soil Type

Bahia grass will grow on a wide range of soils, and is naturally adapted to sandy or light textured soils (Baki). It can grow well on wet clay soil (Bogdan).

Shade Tolerance

Bahia grass is considered very shade tolerant and has higher yields under 50% shade than in full sunlight (Baki).

Salinity Tolerance

Bahia grass has good salt tolerance. It can withstand up to 4,500 ppm NaCl in irrigation water. Higher salinity (9,000-27,000 ppm NaCl) reduced photosynthesis and transpiration but has little effect on respiration (Bogdan)

Herbicide Sensitivity

No information is available in this database on this topic.

Life Cycle

Germination is slow because the hard scales, lemma and palea of the floret do not allow rapid penetration of water. Early development of young plants is slow (Bogdan).

Seeding Rate

- 10-20 kg/ha (Bogdan).

- 2-5 kg/ha (FAO).
- Minimum 40 lbs. pure live seed/acre (NRCS).

Seeding Depth

1/2 to 3/4 inch or 1-2 cm (Bogdan).

Seeding Method

To improve germination, seed should be hammermilled (Baki). Alternately seed can be treated with 60% sulfuric acid for 23 minutes followed by submerging in water for 15 minutes (Bogdan). Drill into a fine seedbed and roll (FAO).

Seeding Dates

Year round in Hawai'i.

Inoculation

Not practiced. Some cultivars of bahia grass can form an association with the nitrogen-fixing bacteria *Azotobacter paspali*. N fixation is estimated to be on the order of 10-20 kg N/ha/yr (8.9-17.8 lb/ac/yr). A symbiosis between *P. notatum* cv. 'Batatai' with an endogenous mycorrhizal fungus of the genus *Endogene* has been reported resulting in more vigorous growth of inoculated seedlings than non-inoculated ones (Bogdan).

Seed Cost

No information is available in this database on this topic.

Seed Availability

Readily available.

Days to Flowering

No information is available in this database on this topic.

Days to Maturity

No information is available in this database on this topic.

Seed Production

Bahia grass ripens progressively over the summer in the USA. A series of harvests with a beater or stripper gives the highest yields. Seed yields are reduced when combine harvesting is used (FAO).

Seed Storage

Seed should be dried thoroughly immediately after harvest (FAO). Germination improves with up to 3 years of storage (Baki).

Growth Habit

Bahia grass is a low growing perennial spreading by short, stout, woody runners and by seed. The runners have many large fibrous roots which form dense, tough sods. Seedlings can be subject to weed competition initially (FAO).

Maximum Height

Bahia grass grows to a maximum height between 15-70 cm (about 6-28 inches), occasionally reaching 100 cm high (about 40 inches) (Bogdan).

Root System

The runners have many large fibrous roots which form dense, tough sods (FAO).

Establishment

Sprigging: Use pieces of rhizomes or stolons planted closely at spacings of 15-25 cm (6-10 inches) apart (Bogdan). Can also be sodded (FAO).

Maintenance

No information is available in this database on this topic.

Mowing

Grazing: Bahia should be grazed close to ground level to keep it acceptable to animals (Baki).

Incorporation

Not applicable. Not generally used as a green manure.

Harvesting

Bahia grass is not generally harvested for hay or silage as yields are low when in young leafy stage and quality is poor in later, higher yielding stages (Baki).

Equipment

No information is available in this database on this topic.

Uses

- Used primarily as a forage and is valued for its dense cover, productivity, ease of establishment and persistence
- Used for erosion control
- Recommended in Hawai'i for orchard crops

Mixtures

It is difficult to maintain legumes with Bahia grass because it is so competitive. However, Bahia grass has been successfully used with *Trifolium repens*, *Vigna parkeri* and perennial *Arachis* spp. in the subtropics (Baki). In Japan and Australia, mixes of Bahia grass with lucerne and with siratro (*Macroptilium atropurpureum*) have been successfully grown. In the USA, successful Bahia grass mixes with *Arachis monticola* and *Arachis glabrata* have been reported (Bogdan).

Biomass

No information is available in this database on this topic.

N Contribution

Estimated at 10-20 kg. N/ha/yr when forms association with *Azotobacter paspali* (Bogdan).

Non-N Nutrient Contribution

No information is available in this database on this topic.

Effects on Water

No information is available in this database on this topic.

Effects on Soil

No information is available in this database on this topic.

Effects on Livestock

Animal production on Bahia grass is acceptable: crude protein is about 14%, with seasonal fluctuations; total dry matter digestibility ranges from 40-53% (Bogdan). In the USA, Bahia grass pastures fertilized with N (100-200 kg/ha or 90-178 lb/ac) produce 400-600 kg/ha/yr liveweight gain and can carry 5 head/ha (Baki).

Pest Effects, Insects

No information is available in this database on this topic.

Pest Effects, Nematodes

Belonolaimus longicaudatus, a sting nematode, can attack Bahia grass roots with damage varying among the different cultivars. Bahia grass is root knot nematode resistant (especially cv. 'Paraguay') and has been used in rotations with crops susceptible to nematodes to reduce populations (Baki).

Pest Effects, Diseases

Paspalum ergot (*Claviceps paspali*) can reduce seed yields (cv. 'Pensacola' is resistant) (Baki).

Pest Effects, Weeds

Seedlings can be subject to weed competition. Planting in a clean seedbed is recommended (FAO).

Pest Effects, Vertebrates

No information is available in this database on this topic.

Uses in the Pacific Region

No information is available in this database on this topic.

Uses in Hawai`i

- The Hawai`i Natural Resources Conservation Service Technical Guide includes Bahia grass (cv. 'Pensacola'). Their specification describes Bahia grass as follows:
- Tolerates acid/low fertility soils;
- Minimum seeding rate of 40 lbs. pure live seed/acre;
- pH range from 4.0-6.5;
- Planting rate 40-80 bu/ac (sprigs or stolons, maximum 3x3 ft. spacing),
- Low maintenance required;
- Fair shade tolerance;
- Fair drought tolerance;
- Rainfall range of 40+ inches;
- Elevation range from 0-4500 ft.

Evans reports that Bahia grass has potential as a cover crop for bananas in Hawai`i based on research from Taiwan where it has been used for bananas, citrus, and lichee production.

References

Bogdan, A.V. 1977. Tropical Pasture and Fodder Plants. Longman Inc., New York. pp. 205-212.

Baki, B.B., Ipon, I.B., & Chen, C.P., 1992. *Paspalum notatum* Fluegge. In: 't Mannetje, L. & Jones, R.M. (Editors): Plant Resources of South-East Asia No 4. Forages. Pudoc-DLO,

Wageningen, the Netherlands. pp. 181-183.

Evans, Dale O., Joy, Robert J., & Chia, C.L., 1988. Cover Crops for Orchards in Hawaii. Hawaii Institute of Tropical Agriculture and Human Resources, University of Hawaii at Manoa, Honolulu, Hawaii, United States. 16 pp.

FAO Web Site

USDA Natural Resources Conservation Service, Hawai'i Field Office Technical Guide, Section IV, Code 340 "Cover and Green Manure Crop" May 1992. Pacific Islands Area Field Office Technical Guide (eFOTG) - East Area



These webpages were originally generated under a grant program from Western SARE entitled "Covering New Ground: Tropical Cover Crops for Improving Soil Quality" EW98-012 (1998-2002).