

waters have receded (Bogdan, *loc. cit.*). The native *H. acutigluma* in northern Australia serves a similar purpose, and is one of the major forages of buffaloes on the flood plains east of Darwin (Calder, *loc. cit.*). The flooding and drying cycles throughout the year allow massive regeneration by seed (Wildin, J. H. and Chapman, D. G. [1987]. Poned Pasture Systems—capitalising on available water. Queensland Dep. Primary Industries Bulletin RQR 87006) and this ensures persistence after extensive drought periods (Wildin, J. H. [1987]. Pers. comm. Queensland Dep. Primary Industries, Rockhampton).

In practice hymenachne serves a similar purpose to aleman grass (*Echinochloa polystachya* (HBK) Hitchcock) as a deep water complement to para grass in the ponded pasture systems being developed in central Queensland. Olive hymenachne grows better than Amity aleman in the water up to 1 m deep adjacent to the pondage banks (Wildin, J. H. and Chapman, D. G. *loc. cit.*). However, it does not grow in permanent water, requiring alternating periods of flooding and dryness to establish and survive (Calder, G. J. [1981]. *Hymenachne acutigluma* in the Northern Territory. Northern Territory Dep. Primary Industries Bulletin No. 46). It is not as drought resistant as para and may not be as drought hardy as Amity Aleman (Wildin, J. H. Pers. comm.).

In Surinam, crude protein content was found to be high, 15.8% in the whole plant and 22.6% in the leaves with crude protein digestibilities of 66 to 80% (Bogdan *loc. cit.*).

Propagation to date has been by stem cuttings (Bogdan; Wildin and Chapman, *loc. cit.*). However, in central Queensland Olive hymenachne flowers and sets viable seed during short days commencing in May (Wildin, J. H. pers. comm.).

25. ALEMAN

a. *Echinochloa polystachya* (HBK) Hitchcock (aleman grass)

cv. Amity

(Reg. No. A-25a-1)

Origin

Aleman grass, or pasto aleman, forms extensive colonies in the seasonal swamps and on less wet ground in tropical and subtropical countries of America from southern USA to northern Argentina and is much used for animal forage especially in Brazil (Bogdan, A. V. [1977]. Tropical Pasture and Fodder Plants (Grasses and Legumes), pp. 129-130. Longmans: London.). CPI 61147 aleman grass derives from the Orinoco Delta and Venezuela via the International Research Institute, Tucupita, Venezuela. It was tested for use in ponded pastures in water too deep for para grass (*Brachiaria mutica* Stapf) on properties in Central Queensland, especially "Granite Vale", the property of J. & P. Olive, on Amity Creek near St. Lawrence.

It was approved for general release by the Queensland Herbage Plant Liaison Committee which recommended its registration on the submission of the Queensland Department of Primary Industries. Registered July, 1988.

Morphological description

Echinochloa polystachya is an aquatic or sub-aquatic perennial, with coarse stems 1-2.5 m high, thick in the lower parts, from long rhizomes, internodes glabrous, nodes glabrous or obscurely pubescent. Ligule a rim of stiff, yellow hairs to 4 mm long. Leaf blades 20-60 cm long, 10-25 mm wide, scabrous on the margin. Panicles mostly 15-25 cm long, dense, the short thick branches ascending. Spikelets 5-7 mm long, lanceolate. Upper floret hermaphrodite, 5-6 mm long, with awn 5-7 mm long, or mucronate; lower floret staminate with awn on lemma 7-17 mm long (Bogdan, *loc. cit.*, Hitchcock, A. S. [1950]. Manual of the Grasses of the United States, p. 771. USDA Misc. Pub. no. 200, U.S. Govt. Printing Office: Washington.)

Amity differs from the species norm in having flowering culms 110-200 cm long, 7-10 noded, nodes glabrous. Ligule hairs 1-1.5 mm long. Leaf blades 30-36 cm long, 10-12 mm wide. Panicle axis 20-30 cm long. Spikelets 4.5-5.5 mm long, 1.7-2 mm wide. The most distinctive differences are the much shorter mucros of the lemmas of Amity; the lemmas of *E. polystachya* are normally awned rather than mucronate. (Simon, B. K. [1987]. Pers. comm.).

In greater detail (B. K. Simon, pers. comm.), Amity has flat, linear, glabrous, smooth leaves, tapering to a narrow apex, rounded or auriculate at the base. Panicle axis scabrous; primary branches with spikelets appressed to the rachis, 2.5-9 cm long. Pedicels 0.3-2 mm long, scabrous, disarticulation at the base of the spikelet. Spikelets planoconvex, lanceolate. Lower glume 2.5-3 mm long, ovate-lanceolate. Upper glume 4.5-5.5 mm long, lanceolate, 6-7 nerved, chartaceous, glabrous, strigose on the nerves apically, acuminate, 5-5.5 mm long. Lemma of lower floret 5-5.5 × 1-1.5 mm, lanceolate, chartaceous, 7-9 nerved, the surface glabrous, acuminate, with mucro 1-1.5 mm long; lower palea linear, acute. Upper floret lemma 4.5 mm long, white, cartilaginous, smooth, ovate-lanceolate, glabrous, acuminate, with mucro to 0.5 mm long; upper palea cartilaginous, smooth, enclosed at its apex by the lemma.

Agronomic characters

Valued as a deep water plant of the seasonal swamps of South America where it is used for grazing, soilage and for hay making (Bogdan *loc. cit.*), aleman grass can also be used in normal sown pastures in high rainfall areas, although if planted in dry uplands it will thrive for the first year only, then become weak and slowly succumb (Judd, B. I. [1975]. *New World tropical forage grasses and their management*. 6. Bahia grass, vasey grass, river grass, signal grass. *World Crops* 27(4): 175-177).

It is adapted to relatively infertile soil but responds strongly to improved fertility, especially nitrogen application. It is particularly well adapted to complementing para grass in ponded pasture areas where water is too deep for para grass. The latter does not grow well in water deeper than 30 cm and, in some regions such as central Queensland, will not grow in water deeper than 60 cm (Wildin, J. H. and Chapman, D. G. [1987]. *Ponded Pasture Systems Capitalizing on Available Water*. Qld Dep. Primary Industries Bulletin RGR 87006). Aleman will grow in water seasonally up to 1 metre deep, and for short periods even deeper. It is, as a result, useful in locations near the ponding banks. Deeper water reduces the frost risk and extends the period of green forage availability considerably.

Seed production is poor, and aleman grass is normally propagated by stem cuttings.

Aleman is very palatable and eagerly sought out by grazing animals. In Venezuela dry matter digestibilities after 41, 48, 55 and 62 days regrowth were 63, 62.2, 59.1 and 60.5% respectively with crude protein levels of 10.3, 9.1, 8.9 and 8.2% respectively. (Combellas, J. and Gonzales J., E. [1973]. Yield and nutritive value of tropical forages. 4. *Echinochloa polystachya* (HBK) Hitchc. *Agronomia Tropical* 23(3): 269-275. *Herb. Abstr.* 45(2): 37 (1975).

Aleman grass is normally propagated by stem cuttings. In central Queensland aleman will flower throughout the year when plants have stems longer than 1 m. However, seed kernels have not been found and propagation by seed is unlikely.

Selector for both grasses

J. H. WILDIN

Queensland Department of Primary Industries

P.O. Box 6014

Rockhampton Mail Centre

Queensland 4702