Victorian at the driest site (Sandford, light soil) or following severe infestation with root-feeding cockchafers (*Adoryphorus couloni* Burmeister).

In 1985 and 1986, Martlet swards were less infected with crown rust and stem rust than Tasmanian No. 1 and Tasdale swards were, but more infected than swards of Grasslands Nui and Ellett. This ranking of infection contrasts with that found in 1974–76, when the polycross progenies from the parental plants used in Martlet, and Tasmanian No. 1, were superior to Grasslands Nui in freedom from rusts.

Seedling vigour of Martlet closely parallels that of Tasmanian No. 1 and Tasdale and is slightly less than that of Ellett. Limited tests indicate that 62% of plants will potentially be infected with ryegrass endophyte (*Acremonium loliae* Latch, Christensen and Samuels).

Herbage production from Martlet has not differed significantly from that of other cultivars recommended for Tasmania at low and medium rainfall sites; its rankings for autumn and winter production have generally been higher than other cultivars, except where it has not persisted well due to drought or insect attack. At Cressy (660 mm rainfall), Martlet has been superior to Tasdale in autumn and summer production, but not different to the most productive cultivar, Ellett. At Elliott (1170 mm rainfall), Martlet has been the most productive cultivar from autumn to early spring, producing 16% more dry matter than Ellett and 19% more than Tasdale. Spring production has been similar to other cultivars at all except 1 site. Trial results have confirmed the results of polycross progeny trials and the expected performance of genotypes derived from Tasmanian No. 1.

Seed production from a first year stand has been good.

The cultivar is expected to replace others in the medium to high rainfall zones of Tasmania.

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Gamba grass

Andropogon gayanus Kunth

cv. Kent
(Reg. No. A-20a-1)

Origin (4,10)

CSIRO conducted preliminary trials on *A. gayanus* at the Katherine Research Station from 1946, using two introductions, C.P.I. 2312 supplied in 1931 by C. P. Taylor from Zaria in Nigeria and C.P.I. 9207 supplied by Ramos de Otero, Division of Agrostology, Deodora, Brazil in 1944 as var. *squamulatus*. The original source of C.P.I. 9207 in Africa is not known.

Residual material of gamba grass from these introduction trials was grown by Mr

Frank Kent of the Northern Territory Administration at Berrimah Experiment Farm in the mid-1950's. Progeny of this material was used to establish a larger area on Berrimah. This stand still existed in 1981 and formed the basic of the present cultivar (7).

The exact introduction(s) from which cv. Kent originated is now unclear, but as the species is cross-fertilized and several generations have been produced since the original introductions, it probably has been derived by natural selection following crossing within and between C.P.I. 9207 and C.P.I. 2312.

Submitted for registration by the Northern Territory Department of Primary Production which will maintain a supply of breeder's seed. Recommended for registration by the Northern Territory Herbage Plant Liaison Committee. Registered July, 1986.

Morphological description (1,2)

Andropogon gayanus is a large perennial grass forming dense hemispherical tussocks up to 70 cm in diameter. Culms arise from freely branching rhizomes with very short internodes. Culms branch intravaginally (2). Height at maturity, if left unchecked, may be from 1–4 m (8). Leaf laminae are linear, acute, up to 45 cm long, 1.5–5 cm wide with a strong white mid-rib. Lamina glabrous or pubescent on both surfaces. Adaxial surface of the sheath pubescent, especially when young. Leaves are almost unribbed and tend to fold when dry. Ligule mostly present, membranous.

Inflorescence a large spathate panicle with up to six groups of primary branches, 2–18 in a group; final branches filiform, 5–8 cm long, terminating in a pair of racemes. The spathes supporting the primary branches have well developed blades. Spatheoles supporting the rays have somewhat inflated sheaths, with blades reduced or absent. Racemes are 4–8 cm long, with 10–14 joints which are 4–5 mm long, inflated, usually hairy on sides, each bearing a pair of spikelets. The sessile spikelet of the pair 7–9 mm long, bisexual, with a kneed and spirally twisted awn 1–4 cm long. Pedicelled spikelet male, its pedicel similar to the raceme joint. Joints and pedicels ciliate on one (var. *gayanus*) or both sides (var. *squamulatus* and var. *bisquamulatus*). The pedicelled spikelet is glabrous or puberulous in var. *squamulatus* and hairy to villous in var. *bisquamulatus* (2). The species is cross-fertilized (1).

Cultivar Kent grows to 4 m height and has pubescent leaves. Pedicels 4–5 cm long, conspicuously ciliate on both margins. Pedicelled spikelet 5–7 mm long, sessile spikelet 5–8 s, with blades reduced or absent. Racemes are 4–8 cm long, with 10–14 joints which are 4–5 mm long, inflated, usually hairy on sides, each bearing a pair of spikelets. The sessile spikelet of the pair 7–9 mm long, bisexual, with a kneed and spirally twisted awn 1–4 cm long. Pedicelled spikelet male, its pedicel similar to the raceme joint. Joints and pedicels ciliate on one (var. *gayanus*) or both sides (var. *squamulatus* and var. *bisquamulatus*). The pedicelled spikelet is glabrous or puberulous in var. *squamulatus* and hairy to villous in var. *bisquamulatus* (2). The species is cross-fertilized (1).

Cultivar Kent grows to 4 m height and has pubescent leaves. Pedicels 4–5 cm long, conspicuously ciliate on both margins. Pedicelled spikelet 5–7 mm long, sessile spikelet 5–8 mm, glabrous. Awn of sessile spikelet 15–30 mm long, and of pedicelled spikelet 5–10 mm long. Pedicelled spikelet puberulous or villous, hence Kent cannot be assigned to either var. *squamulatus* or var. *bisquamulatus*, but resembles the latter in height. Caryopsis, 2-3 mm long, 1 mm wide, about 890,000 per kg, light brown to brownish black.

Agronomic characters (1,2,3,4,5,6,7,11)

Gamba grass is easily established, highly productive, highly palatable to livestock, compatible with legumes and drought resistant (1,9). The species in general and cv. Kent are adapted to the seasonally wet tropics with a 3–6 month dry season and a wet season with 750–1500 mm of rainfall.

The species is adapted to a wide range of soil types from light sands to clay loams,

and prefers well drained soils. It is not adapted to heavy clay soils which waterlog during the wet season (7,9).

One of its most important agronomic characters is its ability to remain green well into the dry season, especially if grazed in the wet season, combined with the ability to provide a significant flush of early season growth at the beginning of the rainy season (1,7,9). Data from the Northern Territory indicate superior yield and animal productivity in the late dry/early wet season at the Coastal Plains Research Station (3) compared to pangola and native pasture. Dry matter yields of 4–9000 kg/ha have been recorded for a full twelve month period (1). The species has a relatively low requirement for phosphorus for successful growth (6,9). Other observational data over a 20 year period between 1960–1980 from a number of sites in the Northern Territory receiving between 800–1500 mm of rain per annum indicate the ability of cultivar Kent to survive a regular annual burn in the dry season. It has also spread downwind by seed at many of these sites (4,7).

Establishment can be effected by sowing as little as 1 kg/ha of clean, deawned seed of high viability. Rates as high as 40 kg/ha may be required if seed is uncleaned (3,7). The density of thin stands will improve in the second year from self sown seed (3,7).

A range of legumes has been grown successfully with Kent. These include *Stylosanthes hamata* cv. Verano, *S. scabra* cv. Seca, *S. guianensis* cv. Cook, Endeavour, Graham, *Centrosema pubescens*, *Macroptilium atropurpureum* and *Calopogonium mucunoides*. Choice of a legume would depend on location and expected use of the pasture (1,3,7,9).

A. gayanus has three distinct types of root—fibrous roots close to the surface absorb water from the surface soil and probably contribute to its early, vigorous regrowth, cord roots which are thick and both store starch and anchor the tussock, and vertical roots which are able to extract water from depth well into the dry season. This root system significantly contributes to the ability of the plant to be both drought resistant and to respond vigorously to early rains (2).

Kent gamba grass is highly palatable when green and management of the stand should aim at high levels of utilization in the early wet to avoid rankness of growth. Management of a stand for animal production should strike a balance between yield and quality. It is considered a species of medium quality (1,3).

Andropogon gayanus is a short day plant with a critical day length for flowering of 12–14 hrs (12), with cultivar Kent flowering in Darwin in April (7). Tillers formed early in the season make the greatest contribution to final seed yield and management for seed production should aim to stimulate early tiller production through fertilizer and husbandry (6). Seed is normally mature in late May and can be harvested by a beater type harvester or a conventional header. Cleaning and handling the light, fluffy seed can be difficult (7).

No diseases of any significance have been recorded on gamba grass in Australia.

REFERENCES

1. Bogdan, A. V. (1977)—Tropical Pasture and Fodder Plants. (Longman: London).
2. Bowden, B. N. (1964)—Studies on *Andropogon gayanus* Kunth III. An outline of its biology. *J. Ecol.* **52:** 255–71.
3. Ford, B. D., Calder, G. J. and Lemcke, B. G. (1981)—Unpublished data. N.T. Dep. Prim. Prod., Darwin.
4. Friend, T. E. (1981)—Personal communication. Qld. Dep. Prim. Ind., Brisbane.
5. Graham, T. G. (1951)—Tropical pasture investigations. *Qld. Agric. J.* **73:** 311–26.
6. Haggar, R. J. (1966)—The production of seed from *Andropogon gayanus*. *Proc. I.S.T.A.* **31:** 251–9.
7. Harrison, P. G. (1981)—Personal communication. N.T. Dep. Prim. Prod., Darwin.
8. Hepper, F. N. (ed.) (1972)—Flora of West Tropical Africa. Vol. 3, Part 2. (Crown Agents for Overseas Governments and Administrations: London).
9. Jones, C. A. (1979)—The potential of *Andropogon gayanus* Kunth in the oxisol and ultisol savannas of tropical America. *Herbage Abstr.* **49:** 1–6.
10. Philips, L. J. (1981)—Personal communication. CSIRO Div. Trop. Crops & Pastures, Katherine.
11. Reid, P. A. and Miller, I. L. (1970)—New grasses for the Top End. Gamba grass. *Turnoff.* 26–7.
12. Tompsell, P. B. (1976)—Factors affecting the flowering of *Andropogon gayanus* Kunth. Responses to photoperiod, temperature and growth regulators. *Ann. Bot.* **40:** 695–705.