

Centrosema*Centrosema pascuorum* Mart. ex Benth. (centurion)

cv. **Cavalcade**
(Reg. No. B-15b-1)

Origin (5)

Cavalcade was bred by R. J. Clements, C. J. Thomson and W. H. Winter, CSIRO Division of Tropical Crops and Pastures, in a program conducted at Katherine Research Station, Northern Territory and the Cunningham Laboratory, Brisbane, Queensland. It originated from a cross between CPI 40060, collected by R. J. Williams in Ceará, Brazil, and CPI 55697, collected by R. L. Burt in Pernambuco, Brazil. A modified pedigree breeding program was employed, in which generations of single seed descent (F_3, F_5) were alternated with field selection (F_2, F_4 and F_6 generations) for herbage yield, prolific flowering and seeding, suitable flowering data, and freedom from symptoms of damage by root nematodes (*Meloidogyne* sp.). Cavalcade, code-named 2/2, was one of the seven F_7 lines selected for regional testing in north-west Australia by CSIRO and the Northern Territory Department of Primary Production.

Submitted for registration jointly by CSIRO Division of Tropical Crops and Pastures and the Northern Territory Department of Primary Production, CSIRO Division of Tropical Crops and Pastures will maintain breeders' seed. Recommended for registration by the Northern Territory Herbage Plant Liaison Committee. Registered November 1984.

Morphological description (5)

C. pascuorum is an annual, twining/scrambling species which produces roots on trailing stems in favourable conditions. Stems are cylindrical, scarcely pilose, and extend for up to 2 m from the crown. Stipules are subulate to narrowly triangular, 4–9 mm in length. Petioles are glabrous to scarcely pilose, 25–50 mm long including the upper rachis. Leaves are trifoliolate, often held erect, and paraheliotropic especially during dry conditions. Leaflets are linear-lanceolate, commonly 5–10 cm long and 5–10 mm wide, glabrous to scarcely pilose, with acute to acuminate apices. Inflorescences are racemose, 1-flowered to 4-flowered, with resupinate flowers borne singly or in pairs at the end of a short peduncle (7–12 mm). Two peduncles often occur at a single leaf axil. Pedicels are 4–10 mm long. Bracts are of two types. The proximal bracts are stipuliform, triangular, 1 mm long or less, situated singly or in pairs at the bases of the peduncle and the pedicel. The distal bracts are ovate, borne singly at the base of the pedicel and enveloping the pedicel, 2–4 mm long. The paired bracteoles are ovate, falcate, acuminate, 4–6 mm long and 2–4 mm wide. The calyx tube is 3–4 mm long and bears five linear teeth. The two upper teeth are 3–5 mm long, the lowest tooth 4–7 mm long, and the lateral teeth intermediate in length. Minute hooked hairs occur on external surfaces of the calyx, bracts and bracteoles, and more sparsely on both surfaces of the leaflets and on the stems. The corolla is crimson, 1.5–2.5 cm long and wide, and the standard is spurred on the back towards the base. Flowers are predominantly self-pollinated. Mature pods are rather torulose, slightly curved, laterally compressed, 3.5–7.0 cm long (including an awn up to 1 cm long) and 3–4 mm wide, and contain up to 15 seeds. There is a dark longitudinal stripe near each suture. At maturity, pods shatter explosively, scattering the seeds for distances of one metre or more. The seeds are ovoid to cylindrical, rarely subreniform, more or less laterally compressed, monochromatic and greenish-yellow to brown in colour or rarely mottled with dark brown or black markings (especially in Venezuelan accessions). The somatic chromosome number is 22(7).

Cavalcade is morphologically typical of the common Brazilian forms of *C. pascuorum* except for its less hairy leaves and stems. There are 48 000 seeds per kilogram.

Agronomic characters

C. pascuorum occurs naturally in seasonally arid regions in tropical South and Central America (6,7). Small plot trials in Queensland (1,2,4,5,8,9,12), the Northern Territory (3,5,8,11,15,16,17) and Western Australia (8,13,18) have shown that it is well adapted to tropical regions having reliable wet (700–1500 mm) and dry seasons, particularly the Top End of the Northern Territory. In areas with less reliable rainfall patterns, or lower temperatures, it rarely persists for more than two or three years.

C. pascuorum establishes rapidly in cultivated seedbeds at sowing rates of 2–4 kg ha⁻¹ of viable seed. Inoculation with commercial *C. pubescens* strains of *Rhizobium* (e.g. CB 1923) is recommended. The species is aggressive, regenerates readily and competes strongly with associated grasses. It is able to survive prolonged waterlogging and partial submersion on the seasonally flooded coastal plains of the Northern Territory (3,11), yet can tolerate remarkably high internal moisture deficits during droughts (10). It fixes large amounts of nitrogen (14) and provides 4–6 tonnes ha⁻¹ year⁻¹ of relatively high quality herbage (2.4% N, 0.16% P) in well-fertilized, ungrazed, legume-dominant swards in the Northern Territory (3,8,15,18). The mean herbage yield of Cavalcade in the second year of the multi-site trial exceeded those of its parents by 22 and 40% (3,5,15,18).

Cavalcade commences flowering in mid-March and produces large quantities of seed. Seed reserves at a number of sites in the Northern Territory averaged 250 kg ha⁻¹ in two successive years (3,5,15,18) and levels of more than 500 kg ha⁻¹ were obtained at some sites. Harvestable seed yield exceeded 1 tonne ha⁻¹ during seed increase under irrigated conditions at Katherine, from a plot of approximately 1 ha, using suction harvesting techniques. The mean surface soil seed reserves of Cavalcade were more than twice those of its parents in the second year of a multi-site trial in the Northern Territory (3,5,15,18). Hard seed levels are very high immediately after seeds ripen, but fall steadily during the dry season to 10–30% in December (5).

Cavalcade is expected to be particularly useful as a high-quality dry season feed. Grazing *C. pascuorum* pastures during the dry season (June–November inclusive) at Katherine at a stocking rate of 3.3 steers ha⁻¹ has maintained legume dominance over a five-year period and consistently given liveweight gains of 20–50 kg head⁻¹ (18). In one year, a pasture sown to a mixture of breeding lines from which Cavalcade was derived was grazed at 3.3 steers ha⁻¹ from late December to late September. The animals gained over 150 kg head⁻¹, and the pasture produced abundant forage and seed even with such a high level of utilisation (18).

REFERENCES

- ANNING, P. (1982)—Evaluation of introduced legumes for pastures in the dry tropics of northern Queensland. *Tropical Grasslands* 16: 146–155.
- BURT, R. L. (1980)—Personal communication. CSIRO Div. Tropical Crops and Pastures, Townsville.
- CALDER, G. J. (1982)—Personal communication. NT Dep. Primary Prod., Darwin.
- CAMERON, D. G. and MULLALY, J. D. (1969)—The preliminary evaluation of leguminous plants for pasture and forage in sub-coastal central Queensland, 1962–69. *CSIRO Div. Plant Ind. Rev.* 6: (2): 29–54.
- CLEMENTS, R. J. (1984)—Personal communication. CSIRO Div. Tropical Crops and Pastures, Brisbane.
- CLEMENTS, R. J. and WILLIAMS, R. J. (1980)—Genetic diversity in *Centrosema*. In "Advances in Legume Science" pp. 599–567 (eds R. J. Summerfield and A. H. Bunting) (Royal Botanic Gardens: Kew).
- CLEMENTS, R. J., WILLIAMS, R. J., GROF, B. and HACKER, J. B. (1983)—*Centrosema*. In "The Role of *Centrosema*, *Desmodium* and *Stylosanthes* in Improving Tropical Pastures" pp. 69–96 (eds K. I. Burt, P. P. Rotar, J. L. Walker and M. W. Silvey) (Waterviv Press: Boulder).
- CLEMENTS, R. J., WINTER, W. H. and REID, R. (1984)—Evaluation of some *Centrosema* species in small plots in northern Australia. *Tropical Grasslands* 18: 83–91.
- JONES, R. J. (1979)—Comparison of legumes on different soils. CSIRO Div. Tropical Crops and Pastures Divisional Report for 1978–79, p. 20.
- LUDLOW, M. M., CHU, A. C. P., CLEMENTS, R. J. and KERSLAKE, R. G. (1983)—Adaptation of species of *Centrosema* to water stress. *Aust. J. Plant Physiol.* 10: 119–130.
- MCCOSKER, T. H. (1982)—Personal communication. Mt Bunday Station, P.O. Box 3, Adelaide River, NT.
- O'DONNELL, J. F. and SMITH, F. T. (1974)—Evaluation of a plant collection from South America and Africa. *CSIRO Div. Plant Ind. Intro. Rev.* 10: 21–31.
- PAGE, M. C. (1983)—Personal communication. WA Dep. Agric., Derby.
- PEAKER, D. C. I., JONES, R. K. and MCCOWN, R. L. (1983)—Dryland farming systems for the semi-arid tropics of Australia. In "New Technology in Field Crop Production" pp. 258–271 (eds D. E. Byth, M. A. Foale, V. E. Mungomery and E. S. Wallis) (Qld Branch, Australian Institute of Agricultural Science: Brisbane).
- STOCKWELL, T. G. (1983)—Personal communication. NT Dep. Primary Prod., Katherine.
- WESLEY-SMITH, R. N. (1983)—Personal communication. NT Dep. Primary Prod., Darwin.
- WINTER, W. H. (1978)—Legume evaluation in N.W. Australia. CSIRO Div. Tropical Crops and Pastures Divisional Report for 1977–78, p. 38.
- WINTER, W. H. (1984)—Personal communication. CSIRO Div. Tropical Crops and Pastures, Darwin.