

MORE AESCHYNOMENE PASTURE LEGUMES FOR THE TROPICS AND SUB-TROPICS

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ABSTRACT

Two cultivars of *Aeschynomene villosa* were released in Queensland in 1995. Cultivars 'Reid' (previously CPI 91209) and 'Kretschmer' (previously CPI 93621) are both native to Mexico and are the first cultivars of *A. villosa* to be released as pasture legumes. They will complement the three *Aeschynomene* cultivars already in use in tropical and sub-tropical northern and eastern Australia, namely cultivars 'Glenn' and 'Lee' (*A. americana*) and 'Bargoo' (*A. falcata*). Characteristics of Reid and Kretschmer jointvetch include, early seeding perennials within high seed yields, prostrate to semi-erect growth habit, adaptation to a wide range of soil types in medium rainfall areas, tolerance of temporary waterlogging, palatability of high quality forage, responsive to added phosphorus, and tolerance of light frosts. Commercial seed will be available for sale about October, 1997. Reid and Kretschmer villose jointvetch are widely adapted high quality pasture legumes which will complement current legume cultivars and will broaden the scope for sown pasture development in sub-tropical and tropical northern Australia.

KEYWORDS

Aeschynomene villosa, Reid jointvetch, Kretschmer jointvetch, Legume, seed production

INTRODUCTION

Three *Aeschynomene* cultivars are currently available for sowing in sub-tropical and tropical eastern and northern Australia. They are *A. americana* cv Glenn (Oram, 1990) and cv Lee (Bishop *et al.*, 1995), and *A. falcata* cv Bargoo (Oram, 1990). The area sown to Bargoo is restricted by a lack of commercial seed but Glenn and Lee are widely sown (Bishop and Hilder 1993).

Following the growing and classification of the Australian collection of *Aeschynomene* in 1983 (Bishop *et al.*, 1988) a series of early phase pasture legume evaluation activities identified a number of promising new legumes (Bishop and Hilder, 1996). A current project "Back-up legumes for stylos" (Bishop, 1994) has accelerated the second stage evaluation of these promising legumes and in September, 1995. *A. villosa* cvv Reid and Kretschmer were registered for commercial release by the Queensland Herbage Plant Liaison Committee. Both originated from Mexico, Reid from 22°26'N at altitude 1250 mm and Kretschmer from 19°24'N at altitude 2420 mm.

MATERIALS AND METHODS

Evaluation sites in the "Back-up Legumes for Stylos" project most relevant to the evaluation of Reid and Kretschmer, were near Gympie (Lat 26°01'S, Long 152°27'E, 900 mm AAR), Sarina (21°28'E, 145°58'E, 1000 AAR) and Koumala (21°36'S, 149°18'E, 1400 AAR) on Queensland's east coast. All sites had soils with a sandy loam A horizon overlying clay, with soil phosphorus levels in the A horizon of 9, 12 and 4 ppm phosphorus (bicarbonate extract) respectively. In the 1992/93 summer promising accessions of *Aeschynomene villosa* (plus up to 20 other legumes) were sown into a prepared seedbed using 100 m² plots and two replications. Plots were grazed by steers from the end of the first summer. Sites with soil P below 10 ppm had 10 or 20 kg/ha P applied at sowing.

Population and dry matter yield were recorded in May towards the end of each growing season. Other demonstration and observation

sites sown at Koumala and Gympie since 1986 were inspected and recorded for data to support a release case for new *A. villosa* cultivars. As part of the development process for these cultivars, seed multiplication was undertaken at the Walkamin Research Station (17°13'S, 145°43'E) in north Queensland, on a neutral red clay soil derived from basalt.

RESULTS AND DISCUSSION

Annual rainfall was well below average at all sites and often poorly distributed, particularly in 1993/94 and 1995/96 (years 2 and 4). The cessation of rainfall in early January, 1996 caused pastures to be moisture stressed by the time plots were recorded in late April, 1996. Legume population and dry matter yield for Reid and Kretschmer compared with Glenn and Lee at two grazed sites are shown in Table 1. Dry matter yields were quite low, but Reid and Kretschmer persisted and yielded better than Glenn and Lee in the drier than average conditions.

The persistence of Reid and Kretschmer over 5 years at Koumala, when growing with Tully grass (*Brachiaria humidicola*) in grazed demonstration plots, indicates an ability to persist with competitive companion grasses. In year 2 Reid had 14 plants and 8 seedlings/m² and Kretschmer 9 plants and 9 seedlings/m². In year 5 populations at the end of the summer were 9 plants/m² and 8 plants/m² respectively. Other small plot demonstrations in the Gympie district of south-east Queensland confirm good persistence and regeneration in continuously grazed narrow-leaf Carpet grass (*Axonopus affinis*) pastures. A larger grazing evaluation with 2 ha each of Reid and Kretschmer, sown in 1992, was interrupted by dry conditions. However the current observations suggest moderate to heavy grazing, to keep growth of companion grasses under control, favours *A. villosa* persistence.

In a phosphorus response trial at "Tedlands", as part of the "Back-up legumes for stylos" project (unpublished data), the application of 10 kg/ha P doubled the yield of Reid in years 2 and 3 (293 to 586 kg/ha) while 40 kg/ha P gave another three-fold increase (586 to 1927 kg/ha).

Seed pods of Reid and Kretschmer "shatter" and drop their seed on ripening. However total seed yields of close to 1 tonne/ha (Table 2) were achieved from 0.2 ha plots at Walkamin in north Queensland by suction harvesting following direct heading. Reid flowers several weeks earlier than Kretschmer (Table 2) and Kretschmer flowers several weeks earlier than Glenn which is 4 to 6 weeks earlier than Lee (Bishop *et al.*, 1995).

Powdery mildew can affect the leaves of Reid and Kretschmer in the autumn when growth slows but they are less affected than the annual Glenn. In seed crops *Sclerotinia - Botrytis* and *Rhizoctonia* can affect flowering stems necessitating spraying with fungicides.

Features of cultivars Reid and Kretschmer jointvetch which will help extend the area currently growing Glenn and Lee include:

- early seeding perennial with high seed yield
- prostrate, semi-erect growth habit
- adaptation to medium rainfall (900-1500 AAR)
- adaptation to a wide range of soils, including clays

- tolerant of temporary waterlogging
- tolerant of "light" frosts
- palatable high quality forage

Reid and Kretschmer villose jointvetch are well adapted high quality pasture legumes which complement currently available legume cultivars and they will broaden the scope for sown pasture development in sub-tropical and tropical eastern and northern Australia.

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REFERENCES

Bishop, H.G. 1994. Finding backup legumes for stylos. Proceedings of 8th Australian Rangeland Conference, Katherine, N.T., May 1994. Pp 175-176.

Bishop, H.G., B.G. Cook, J.M. Hopkinson and T.B. Hilder. 1995. *Aeschynomene americana* L. American jointvetch cv Lee. Australian Journal of Experimental Agriculture. **35**: 122-123.

ian Journal of Experimental Agriculture. **35**: 122-123.

Bishop, H.G. and T.B. Hilder. 1993. The *Aeschynomene* genus as a source of pasture legumes for tropical and sub-tropical Australia. Proceedings of the XVII International Grassland Congress. 2153-2154.

Bishop, H.G. and T.B. Hilder. 1996. *Aeschynomene* accessions evaluated in COPE plantings; in Development of new legumes and grasses for the cattle industry of Northern Australia, Final Report of MRC Projects CS 054/185 and DAQ 053/081 (compilers B.C. Pengelly and I.B. Staples). Published by CSIRO and DPI, c/- CSIRO Cunningham Lab., St Lucia Q 4067. Pp 155-165.

Bishop, H.B., B.C. Pengelly and D.H. Ludke. 1988. Classification and description of a collection of the legume genus *Aeschynomene*. Tropical Grasslands. **22**: 160-175.

Oram, R.N. 1990. Register of Australian herbage plant cultivars. CSIRO Division of Plant Industry, Melbourne 276-278.

Table 1

Legume population and dry matter yield in year 3 and 4 for the legumes Reid and Kretschmer compared with current cultivars Glenn and Lee at two grazed evaluation sites in South-east and Central Queensland.

Site	Gympie				Sarina			
	Year 3		Year 4		Year 3		Year 4	
	plants/m ²	kg/ha						
Reid	16	24	6	57	8	256	5	71
Kretschmer	13	30	2	19	9	305	4	72
Glenn	6	6	<1	3	1	0	<1	13
Lee	1	38	0	0	1	45	1	38

Table 2

Seed production of Reid and Kretschmer from seed multiplication plots at Walkamin in north Queensland.

	Reid	Kretschmer
	----- date -----	
Date sown	06.01.95	06.01.95
First flowers	27.03.95	10.04.95
Header harvest	28.05.95	06.07.95
	----- kg ha ⁻¹ -----	
Headed seed yield	547	421
Suctioned seed yield	418	504
Total seed yield	965	924