

Register of Australian Herbage Plant Cultivars

B. Legumes

4. Glycine

a. Neonotonia wightii (Wight & Arn.) Lackey

cv. Tinaroo

Reg. No. B-4a-1

Registered prior to December 1971

Published in the 2nd ed. of the Register of Australian Herbage Plant Cultivars, 1972

Origin (11)

This cultivar is derived from seed introduced by the Queensland Department of Primary Industries in 1945 from the Department of Agriculture, Kenya. Seed was distributed, under the number Q2056, to research stations at Ayr and Kairi in 1947. After comparison with other varieties showed it to be superior, seed was multiplied by the Department and its release approved by the Queensland Pasture Liaison Committee in August 1962.

Morphological description (13)

Herbaceous perennial with strong tap root and trailing, climbing, and twining stems. Stems are slender and well branched, and under grazing may arise from a crown below the soil surface; the runners frequently root at the nodes, develop brown coloration in epidermis with age, and are moderately pubescent with hairs semi-erect retrorse. Leaves pinnately trifoliolate. Leaflets ovate-acute to ovate-obtuse, 5-10 cm long and 4.0-6.5 cm wide, broader on one side of the midrib than the other in the lateral leaflets; appressed puberulent hairs on both surfaces, frequently glabrescent on upper surface. Stipules lanceolate, 4-6 mm long, deciduous. Petiole 2.5-13 cm long. Inflorescence axillary many-flowered racemes, 4-10 cm long on peduncles 5-12.5 cm long, not condensed into a head as in the type form of the species but moderately interrupted; pedicels 2 mm long, minutely hirsute; bracteoles hirsute setaceous. Flowers 4.5-6 mm long, creamy white with obscure small violet streaks on lower part of standard; calyx tube campanulate, pubescent, teeth scarcely twice the length of tube; corolla scarcely exceeding the calyx, standard orbicular, spreading subauriculate at base, wings narrow, adhering to shorter obtuse keel. Pod brown, antrorse hirsute, straight, 2.5-4.0 cm long and 3 mm wide, containing 4-5 seeds, shattering at maturity. Seed oblong with rounded corners and laterally compressed, olive-green to light brown, occasionally mottled, 130 000-140 000/kg. Chromosome number: this cultivar is diploid $2n = 22$ (12).

Differs from cv. Clarence in its more branched habit and more proliferous crown. The stems of Tinaroo are also more stoloniferous and slender, and the young shoots lack brown pigment; stem hairs are semi-erect to appressed and point toward the base (retrorse). The leaflets are more ovate-acute, less elliptic-obtuse, appearing almost glabrous at times, and the lower surface has finer venation and the veins and hairs lack the brown pigment of Clarence. The flowers are smaller, creamy white, and less marked with colour.

Agronomic characters (1-4, 6, 7, 9, 11)

Summer-growing perennial, defoliated but rarely killed by frost. Best adapted to areas with summer rainfall (760-1500 mm annual) and low frost incidence; in the tropics more suited to subcoastal elevated areas than the humid coast. Tolerance to cold is greater than *Centrosema pubescens* but leaf shedding follows ground frosts, though not so markedly as in Siratro. Thrives in fertile soils, is reasonably drought-tolerant, and requires good drainage. It has a fairly specific rhizobial requirement which is met by 'cowpea' inoculant (5, 10).

Growth is slow during the first year from seed; slower than both Clarence and Cooper, but thereafter it is prolific in late spring through summer to autumn. Growth commences in late September and, if not subject to early frosts or extreme drought, continues later into autumn-winter than Clarence

or Cooper. It is highly nutritious and moderately palatable. It associates well with various erect grasses such as setaria, green panic, and Guinea.

Tinaroo, like other cultivars of the species, is cleistogamous and self-pollinated (8). It is later in flowering and maturing seed than either Clarence or Cooper. In south-eastern Queensland flowering commences in early to mid June and seed matures in September (in frost-free sties). It forms a high percentage of hard seed.

References

1. Allen, G.H. (1960). *Glycine* – a pasture legume for Queensland. *Qd. Agric. J.* **86**, 273-5.
2. Allen, G.H. (1961). *Glycine* proves its value. *Qd. Agric. J.* **87**, 96-7.
3. Anon. (1965). Pasture Legumes. Queensland Country Life Mag. Special Features, 18th Dec. 1965.
4. Buckley, K.S. (1959). Plant testing for soil conservation at Inverell. II. Summer growing species. *J. Soil Conser. Serv. N.S.W.* **15**, 299-314.
5. Diatloff, A., and Ferguson, J.E. (1970). Nodule number, time to nodulation, and its effectiveness in eleven accessions of *Glycine wightii*. *Trop. Grassl.* **4**, 223-8.
6. Douglas, N.J., and Luck, P.E (1964). Farmers' guide to tropical pastures in south-east Queensland. *Qd. Agric. J.* **90**, 583-94.
7. Edye, L.A., and Kiers, H.J. (1966). Variation in maturity, stolon development and frost resistance of *Glycine javanica*. *Aust. J. Exp. Agric. Anim. Husb.* **6**, 380-7.
8. Hutton, E.M. (1960). Flowering and pollination in *Indigofera spicata*, *Phaseolus lathyroides*, *Desmodium uncinatum* and some other tropical legumes. *Emp. J. exp. Agric.* **28**, 235-43.
9. Kyneur, G.W. (1960). *Glycine* on the Atherton Tableland. *Qd. Agric. J.* **86**, 507-13.
10. Norris, D. (1966). Personal communication. CSIRO Div. Trop. Pastures, Brisbane.
11. Queensland Department of Primary Industries, Brisbane (1967). Personal communication.
12. Pritchard, A.J., and Wutoh, J.G. (1964). Chromosome numbers in the genus *Glycine* L. *Nature, Lond.* **202**, 322.
13. Williams, R.J. (1966). Personal communication. CSIRO Div. Plant Ind., Brisbane.

Register of Australian Herbage Plant Cultivars

B. Legumes

4. Glycine

a. Neotononia wightii (Wight & Arn.) Lackey

cv. Cooper

Reg. No. B-4a-2

Registered prior to December 1971

Published in the 2nd ed. of the Register of Australian Herbage Plant Cultivars, 1972

Origin (4)

Introduction by the CSIRO Plant Introduction Section in January 1959, as C.P.I. 25702 from the Agricultural Corporation, Kongwa, Tanganyika. It was grown first at the CSIRO pasture research stations at Gatton and Samford and later at other sites in the southern Brigalow region of Queensland. Mr. L. Edye selected it for its early flowering habit compared with Tinaroo, its high vigour, and drought resistance. Its commercial release was approved by the Queensland Pasture Liaison Committee in August 1962.

Morphological description (6, 8)

Stems are more branched and more slender and stoloniferous than Clarence but not as lax, wide-spreading, or stoloniferous as Tinaroo. It is more pubescent all over than Tinaroo or Clarence. The stem hairs are retrorsely semi-erect as in Tinaroo, but are white and more reflective and produce an ash-silvery appearance. Petioles 5-13 cm long. Leaflets 5-8 cm long and 4-6.5 cm wide, generally broad ovate-obtuse to elliptical. The lateral leaflets are unsymmetrical, being larger on one side of the midrib than the other, but the base is oblique, truncate to subcordate, and the smaller side has its broadest part toward the apex, the larger its broadest part toward the base, producing a skewed shape; margins are conspicuously pubescent, the upper surface sericeous, slightly more so than the lower. Stipules lanceolate, setaceous, 4 to 6 mm long. Inflorescence 5-13 cm long on peduncles 5-10 cm long strongly interrupted. Flowers 6 mm long, white with pink-violet streaks on standard, in whorls of 2 to 3; calyx tube sericeous, teeth setaceous and 1.5 times the length of the calyx. Pods 2.5-4.0 cm long, acuminate to weakly uncinuate, mid brown, and constricted between the seeds. Approximately five-seeded, antorsely hirsute. Seeds light brown, 150 000-160 000/kg. Chromosome number: diploid, $2n = 22$ (7).

Can be distinguished from Clarence and Tinaroo by (a) its ash-silver vesture, the hairs being colourless on all parts of the plant, highly reflective, and masking the brown veinal pigmentation, (b) its leaflet shape, (c) the constrictions in its pods, and (d) its more pronounced branching.

Agronomic characters

Flowers in late April and matures seed earlier (4-6 weeks) than Tinaroo (1, 5) but a little later than Clarence (2, 5). It continues growth a little later into the autumn than Clarence because of its later flowering. It is more drought-resistant than either Clarence or Tinaroo and adapted to slightly lower rainfall regions (2, 3, 5). Its seedling vigour is greater than that of both Clarence and Tinaroo and it is more productive in its first year (6). It has a specific inoculant requirement similar to Tinaroo.

References

1. Anon. (1964). New plants for northern pastures. *Rur. Res.* CSRIO **46**, 13-17.
2. Anon. (1964). *Economic Pastures. Their Establishment and Development in N.S.W. and Queensland*. 56 pp. (Anderson Seeds Pty. Ltd., Summer Hill, N.S.W.)
3. Douglas, N.J., and Luck, P.E. (1964). Farmers' guide to tropical pastures in southern-east Queensland. *Qd. Agric. J.* **90**, 583-94.
4. Edye, L.A. (1966). Personal communication. CSIRO Div. Trop. Pastures, Townsville.
5. Edye, L.A., and Kiers, H.J. (1996). Variation in maturity stolon development and frost resistance of *Glycine javanica*. *Aust. J. Exp. Agric. Anim. Husb.* **6**, 380-7.
6. Ferguson, J.E. (1969). Observations on the growth characteristics of *Glycine javanica*. *Qd. Agric. J. Sci.* **26**, 513-16.
7. Pritchard, A.J., and Wutoh, J.G. (1964). Chromosome numbers in the genus *Glycine* L. *Nature, Lond.* **202**, 322.
8. Williams, R.J. (1966). Personal communication. CSIRO Div. Plant Ind., Brisbane.

Register of Australian Herbage Plant Cultivars

B. Legumes

4. Glycine

a. *Neonotonia wightii* (Wight & Arn.) Lackey

cv. Clarence

Reg. No. B-4a-3

Registered prior to December 1971

Published in the 2nd ed. of the Register of Australian Herbage Plant Cultivars, 1972

Origin

Introduced by the New South Wales Department of Agriculture in 1956 from South Africa. It was evaluated for a number of years at the research stations at Grafton and Wollongbar where its early-flowering habit and higher production compared with Tinaroo led to its development and commercial release in 1962 (5).

Morphological description (7)

Stems coarser, less well branched than Cooper or Tinaroo and less stoloniferous; brown pigmentation of epidermal tissues and hairs pronounced over the whole plant, extending to young shoots; is more pubescent over the whole plant with stem hairs antrorsely appressed. Leaflets 5-10 cm long, 4-6 cm wide, ovate-obtuse to elliptical, base obtuse (asymmetrical about the midrib as in Tinaroo), puberulent on upper surface and less appressed pubescent on lower surface, both surfaces more obviously hairy than Tinaroo but the upper less hairy than Cooper. The veins of the lower surface prominent and rusty brown-coloured. Stipules lanceolate acute but less attenuated than Tinaroo. Inflorescence, an interrupted raceme 5-20 cm long on peduncle about 8-10 cm, stouter than Cooper or Tinaroo; pedicels 2-3 mm long, bracteoles setaceous as in the other cultivars. Flowers 9 mm, larger than Cooper or Tinaroo with obvious pink-violet marks on the standard; calyx 4.5-6 mm long, teeth twice as long as the tube; corolla 1.5 times as long as calyx. Pods dark brown antrorsely hirsute. Seeds olive-green to dark brown, 156 000-170 000/kg. Chromosome number: tetraploid, $2n = 44$ (6).

Agronomic characters

It is a little earlier flowering than Cooper (3), sufficiently so to mature seed before frosts in northern New South Wales and southern Queensland (1, 2). It also commences growth earlier in spring than Cooper or Tinaroo (1), but autumn-winter growth is poorer (7). It has a specific inoculant requirement similar to Tinaroo.

Although smaller-seeded than Tinaroo, seedling establishment and first year growth are usually more rapid (7). It is considered more suitable than the other varieties for areas subject to early frosts (2).

References

1. Anon. (1964). *Economic Pastures. Their Establishment and Development in N.S.W. and Queensland*. 56 pp. (Anderson Seeds Pty. Ltd., Summer Hill, N.S.W.)

2. Douglas, N.J., and Luck, P.E (1964). Farmers' guide to tropical pastures in south-east Queensland. *Qd. Agric. J.* **90**, 583-94.
3. Edye, L.A., and Kiers, H.J. (1966). Variation in maturity stolon development and frost resistance of *Glycine javanica*. *Aust. J. Exp. Agric. Anim. Husb.* **6**, 380-7
4. Hall, F. Autry (1965). *Glycine* based pastures for the North Coast. *Agric. Gaz. N.S.W.* **76**, 642-8.
5. Murtagh, G.J., and Wilson, G.P.M. (1962). *Glycine*: a summer growing legume. *Agric. Gaz. N.S.W.* **73**, 634-7.
6. Pritchard, A.J. (1966). Personal communication. CSIRO Div. Trop. Pastures, Brisbane.
7. Williams, R.J. (1966). Personal communication. CSIRO Div. Plant Ind., Brisbane.

Register of Australian Herbage Plant Cultivars

B. Legumes

4. Glycine

a. *Neonotonia wightii* (Wight & Arn.) Lackey

cv. Malawi

Reg. No. B-4a-4

Registered January 1976

Published in the Journal of the Australian Institute of Agricultural Science 42(4), December 1976.

Origin

Introduced as CPI 28279 in 1960, this cultivar originated in Malawi, and came to Australia via the Grasslands Research Station, Marandellas, Rhodesia. It was included in a range of glycines in trials by CSIRO and the Queensland Department of Primary Industries in south-east Queensland in the early 1960's. It has been tested on the Atherton Tableland from 1964-75. Submitted for registration by the Queensland Department of Primary Industries and recommended by the Queensland Herbage Plant Liaison Committee. Registered, January 1976.

Morphological description (4, 5)

Malawi is usually less branched than Tinaroo and Cooper and stolons are less well rooted. Leaves generally larger, 50-125 mm long, 40-150 mm wide and darker green than Tinaroo or Cooper, and have a more glabrous appearance than Clarence. Leaf hairs semi-erect, brown on the leaf margins and veins. Brown hairs on the ventral surfaces of partly and newly expanded leaflets more closely appressed than Tinaroo giving the veins a darker, more prominent appearance. Petioles 25-175 mm, semi-erect retrorsely hirsute. Stems prostrate to semi-erect retrorsely hirsute. Pedicels, 3 mm, often with marked purple pigmentation on dorsal and lateral surfaces; Cooper unpigmented, Tinaroo and Clarence less strongly pigmented to unpigmented. Leaflets ovate-acute to ovate acuminate. Pods brown, retrorsely hirsute. Inflorescence axillary many flowered raceme 15-35 cm on peduncle 3-7 cm. Florets, white approximately 8 mm with violet-purple markings on standard. Chromosome number: tetraploid ($2n = 44$) (8). Malawi can be distinguished from Tinaroo by longer racemes, stronger appression of hairs on the stem and young leaflet and darker green leaves; from Cooper by time of flowering and hair colour; and from Clarence by time of flowering and hair colour; and from Clarence by time of flowering and retrorsely hirsute stems and petioles. Retrorsely hirsute pods distinguished it from all three cultivars. There are 50 000-55 000/kg.

Agronomic characters

Establishment and early growth are slower than Clarence and Cooper but similar to Tinaroo. Seasonal growth pattern, time of flowering and seeding are also similar to Tinaroo (4, 5). On soils where Tinaroo thrives, Malawi has not been superior. In the main dairying areas of the Atherton Tableland where soil pH is generally below 6, Malawi has consistently outyielded Tinaroo, Cooper and Clarence cultivars and combines with grasses to form vigorous and persistent pastures under commercial grazing conditions. Initially, production is slightly inferior to *Desmodium intortum* cv. Greenleaf, but it is more persistent. In south-east Queensland it has shown little promise.

Symbiosis with *Rhizobium* strain CB756 compares favourably with Tinaroo, Cooper and Clarence in time to initial nodulation, number of nodules and efficiency of nitrogen fixation (1).

Seed yields of c. 300 kg/ha have been obtained with a header harvester over a number of seasons at Walkamin in North Queensland.

The protein content and *in vitro* digestibility of Malawi compare favourably with other commercial cultivars of *N. wightii* and Greenleaf desmodium.

References

1. Diatloff, A., and Ferguson, J.E. (1970). Nodule number, time of nodulation and its effectiveness in eleven accessions of *Glycine wightii*. *Trop. Grasslds* **3**, 223-8.
2. Eyde, L.A. (1967). Yield comparisons of thirty-eight introductions of *Glycine javanica* in swards in three environments. *Aust. J. Exp. Agric. Anim. Husb.* **7**, 342-50.
3. Eyde, L.A., Williams, W.T., and Pritchard, A.J. (1970). A numerical analysis of variation pattern in Australia introductions of *Glycine wightii* (*G. javanica*). *Aust. J. Agric. Res.* **21**, 513-16.
4. Ferguson, J.E. (1969). Observations on the growth characterisation of *Glycine javanica* L. *Qld. J. Agric. Anim. Sci.* **26**, 513-16.
5. Ferguson, J.E. (1969). Characterisation of introductions of *Glycine javanica* L. *Qld. J. Agric. Anim. Sci.* **26**, 517-28.