

duction of Leura has consistently been at least equal to that of Karridale and superior to that of Mt Barker and Larisa. Leura has also demonstrated a major advantage over other late-midseason cultivars by having the potential to remain green for a longer period into early summer. Seed production of Leura over all sites has generally been superior to that of Mt Barker, but less than that of Karridale. However, seed set has proved to be enough to maintain a dense sward over several years.

Leura will be recommended in the most favourable subterranean clover districts of Victoria, New South Wales, South Australia and Tasmania, where Mt Barker and Karridale have previously been recommended. Its good Phytophthora root-rot resistance also suggests its suitability to irrigation areas where a late-maturing cultivar is required. Its excellent late spring herbage production lends itself to the production of high quality hay. Its late maturity also gives it the potential to provide good quality feed for grazing animals well into summer.

Acknowledgements

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References

- ANON (1991) Leura subclover. *Australian Plant Varieties Journal*, **4**, 7-8.
- BARBETTI, M.J. and NICHOLS, P.G.H. (1991a) Susceptibility of subterranean clover varieties to rust under controlled environment and field conditions. *Australian Journal of Experimental Agriculture*, **31**, 77-80.
- BARBETTI, M.J. and NICHOLS, P.G.H. (1991b) Susceptibility of subterranean clover varieties to powdery mildew under controlled environment and field conditions. *Australian Journal of Experimental Agriculture*, **31**, 81-84.
- CLARK, S.G. and HIRTH, J.R. (1987) Growth and persistence of Mediterranean genotypes of midseason-late maturing subterranean clover (*Trifolium subterraneum*) in Victoria. *Australian Journal of Experimental Agriculture*, **27**, 551-557.
- COLLINS, W.J., FRANCIS, C.M. and QUINLIVAN, B.J. (1984) Registered cultivars of subterranean clover — their origin, identification and potential use in Western Australia. *Bulletin No. 4083. Western Australian Department of Agriculture*, pp 28.
- GLADSTONES, J.S. (1983) Proposed structure of the National Subterranean Clover Improvement Programme. *Western Australian Department of Agriculture Bulletin*, pp 42.
- GORRINGE, R.J. and PULLEN, R. (1983) Australian Plant Introduction Review, **15**, A-42. (CSIRO Division of Plant Industry: Canberra.)

New herbage plant cultivars

B. Legumes

1. Clover

(d) *Trifolium subterraneum* L. var. *yanninicum* (Katz. et Morley)

Zohary and Heller (sub clover) cv. Gosse

Reg. No. B-1d-31. Registered on October 21, 1991.

Originator: MITCHELL, G.J.

South Australian Department of Agriculture, P.O. Box 1571, Flaxley, S.A. 5153, Australia. Registrar: Oram, R.N.

CSIRO Division of Plant Industry, GPO Box 1600, Canberra, ACT 2601, Australia.

Released by South Australian Department of Agriculture.

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Origin

Gosse originated as an F₅-derived selection from the cross Neuchatel/CPI 39314 YB//Metemora///Trikkala, made in 1980 by P.E. Beale (South Australian Department of Agriculture) at the University of Western Australia. Field testing, using the code name FS-24, was conducted, as part of the National Subterranean Clover Improvement Program, by G.J. Mitchell, M.L. Stanley and A.D. Craig (S.A. Department of Agriculture), P.G.H. Nichols (Western

Australian Department of Agriculture), B.S. Dear (New South Wales Agriculture), K.F.M. Reed and S.G. Clark (Victorian Department of Agriculture) and P.M. Evans and R.J. Orr (Department of Primary Industry, Tasmania).

It was selected by G.J. Mitchell and recommended for registration by the South Australian Herbage Plant Liaison Committee. The South Australian Department of Agriculture will maintain breeders' seed.

Morphological description

Gosse is typical of var. *yannicum*, being almost glabrous and producing cream-coloured seeds. Growth habit is semi-prostrate. Leaves are obcordate and bright green. Leaf markings are different from those of Trikkala, Larisa and Yarloop, and are almost identical to those of Meteora; Gosse has somewhat more leaf flecking than Meteora. Leaflets of Gosse possess a light green crescent-shaped band, extending to the margin of leaflets of mature leaves, without crescent arms (C4 and B2, Collins *et al.* 1984). In cool weather, Gosse exhibits purple-black flecking across leaflets which is more prominent than for other *yannicum* cultivars, although the flecking virtually disappears with warmer spring temperatures. Stipules are green, possessing red veins and occasionally with red flushing between the veins. The calyx tube is green, glabrous and the corolla is white with only slight pink venation. Seed is enclosed in a transversely wrinkled calyx. Seed ovoid, approximately 105 000/kg.

Agronomic characters

Gosse contains low concentrations (0.06% dry weight) of formononetin (P.G.H. Nichols and B.H. Tan, pers. comm.). Of early mid season maturity, Gosse commences flowering about seven days later than Trikkala, eight days earlier than Larisa and 13 days earlier than Meteora (Mitchell *et al.* 1988, 1990; P.G.H. Nichols, pers. comm.). It persists satisfactorily in areas receiving at least 450 mm annual rainfall in South Australia. At Shenton Park, Western Australia, Gosse flowers 12 days later than Trikkala and 10 days earlier than Larisa (P.G.H. Nichols, pers. comm.).

Gosse has better seedling vigour than Trikkala, Larisa and Meteora and consistently yields more dry matter than Trikkala in the year of sowing

(Mitchell *et al.* 1988, 1990, 1991). Gosse produces slightly less seed than Trikkala in the first season (Mitchell *et al.* 1990). Gosse produces more hard seeds than Trikkala and Larisa but less than Meteora, although no consequent agronomic benefit has been identified in South Australia. The low hardseededness of existing cultivars limits the use of var. *yannicum* in dryland areas subject to periodic waterlogging in New South Wales (Dear *et al.* 1987).

Gosse tolerates waterlogging and has grown well on acid and neutral soils. In situations where newly sown clovers suffer little competition from other species or resident sub clovers, Gosse appears to offer no benefit over Trikkala in long-term production or persistence. Where sown into mixed pastures or weedy situations however, Gosse has persisted and produced significantly more forage than Trikkala over three years. At Flaxley, Gosse produced 130% more forage than Trikkala in three-year-old mixed swards, 217% more at Willunga and 15% more at Wirrega (Mitchell *et al.* 1991). Larisa was comparable to Trikkala in these trials.

Gosse is able to displace the *yannicum* cv. Yarloop, a highly oestrogenic cultivar. Three years after being sown into Yarloop-dominant land at Conmurra, Gosse comprised 59% of the resultant pasture versus 36% for Trikkala and 32% for Meteora (Mitchell *et al.* 1991). In a similar trial at Flaxley, Gosse comprised 25% of the resultant pasture, compared with 18% for Trikkala, 4% for Larisa and 2% for Meteora (Mitchell *et al.* 1991). Gosse's vigorous seedling growth and resistance to clover scorch (*Kabatiella caulivora* (Kirchn.) Karak) are thought to be responsible for its superior performance in these mixed swards.

Gosse has demonstrated better field resistance to clover scorch than Trikkala and Larisa in Western Australia (D.J. Gillespie, pers. comm.) and in South Australia (Mitchell *et al.* 1988, 1990, 1991). Limited testing indicates Gosse has slightly better resistance to *Phytophthora* root rot (*Phytophthora clandestina* Taylor, Pascoe, Greenhalgh) than Trikkala (S. Flett, pers. comm.), although its resistance to highly virulent isolates is not as good as for Larisa and Meteora. It has the same level of tolerance to red-legged earth mite (*Halotydeus destructor* Tucker) and lucerne flea (*Sminthurus viridis* L.) as Trikkala and Larisa (P. Schutz, A.W.H. Lake, J. Howie and D.J. Gillespie, pers. comm.). In laboratory screening Gosse is very tolerant to blue-green

aphid (*Acyrtosiphon kondoi* Shinji), tolerant to spotted alfalfa aphid (*Therioaphis trifolii* (Monell) f. *maculata*) and susceptible to cowpea aphid (*Aphis craccivora* Koch) (9), although none of these aphid pests have seriously damaged sub clover pastures in South Australia (Mathison *et al.* 1978).

Gosse is a direct replacement for Larisa and Meteora in South Australia. It is also a supplementary cultivar to Trikkala, having better production and persistence in mixed pastures in areas receiving more than 500 mm annual rainfall.

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New herbage plant cultivars

B. Legumes

23. *Clitoria*

(a) *Clitoria ternatea* L. Butterfly pea cv. Milgarra

Reg. No. B-23a-1. Registered on November 20, 1991.

Originator: HALL, T.J.

Queensland Department of Primary Industries, PO Box 308, Roma, Qld 4455.

Registrar: Oram, R.N.

CSIRO Division of Plant Industry, GPO Box 1600, Canberra, ACT 2601, Australia.

Released by Queensland Department of Primary Industries.

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Origin

Milgarra is a composite line developed by combining selected introduced and naturalized lines of *Clitoria ternatea* over three generations at Walkamin Research Station, following the classification and field evaluation of introductions in north Queensland.

References

- COLLINS, W.J., FRANCIS, C.M. and QUINLIVAN, B.J. (1984) Registered cultivars of subterranean clover — their origin, identification and potential use in Western Australia. *Bulletin No. 4083. Western Australian Department of Agriculture*, pp 17–18.
- DEAR, B.S., CREGAN, P.D. and HOCHMAN, Z. (1987) Factors restricting the growth of subterranean clover in New South Wales and their implications for further research. In Wheeler, J.L., Pearson, C.J. and Robards, G.E. (eds) *Temperate Pastures — Their Production, Use and Management* (Australian Wool Corporation/CSIRO) pp 55–57.
- MATHISON, M.J., KOBELT, E. and BALDWIN, G. (1978) Medic and sub clover susceptibility to SAA and BGA. Fact Sheet 28/78, *South Australian Department of Agriculture, Adelaide*.
- MITCHELL, G.J., CHINNER, S.R., COLMAN, P.V. and PRANCE, T. (1991) Flaxley Research Centre — pasture agronomy trials 1990. *Technical Report No. 181. South Australian Department of Agriculture, Adelaide*, pp 14–37.
- MITCHELL, G.J., HEAN, G.R., CRADDOCK, T.D., PRANCE, T. and MATHISON, M.J. (1990) Flaxley Research Centre — pasture agronomy trials 1988–89. *Technical Report No. 156. South Australian Department of Agriculture, Adelaide*, pp 17–23, 27–34, 42–46.
- MITCHELL, G.J., STANLEY, M.L., COOPER, M.J. and CRADDOCK, T.D. (1988) Breeding yanninicum subterranean clovers with improved clover scorch resistance — progress report. *Technical Report No. 136. South Australian Department of Agriculture, Adelaide*, p 11–15.

The dominant introductions in the composite were CPI 47187 and Q7006, and Australian naturalized lines Q17401, Q24717, Q24718 and Q24719. Other introductions included as a minor component were: Q9167, CPI 20733, 28110, 30001, 48337, 49963, 49706, 52394, 52395, 52396, 52397, 52398 and 61151, and a naturalized line, Q24720. This composite was grown for three seasons to produce Milgarra, which has been tested as Q17476.

Butterfly pea (or blue or kordofan pea) is widely distributed throughout the humid, lowland tropics of Africa, Asia and Central America. In Africa it grows in grasslands, often on seasonally-waterlogged black clays and in old cultivations. In Sudan it is grown for fodder or grazing and in Kenya it is grown in a mixture with *Chloris gayana* (Bogdan 1977). Butterfly pea is recognized as being adapted to clay soils (Blunt and Chapman 1978; Hall 1985; Parberry 1967) and has