

Register of Australian Herbage Plant Cultivars

B. Legumes

1. Clover

Trifolium ambiguum M. Bieb. (Caucasian clover) cv. Treeline

Reg. No. B-1g-2

Registered May 1970

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

Origin

Developed from a seed sample of tetraploid material received in 1937 (C.P.I.6884) from the Botanical Institute, Tiflis, Georgia, U.S.S.R. Reputed to be typical of hay and pasture forms of this clover occurring naturally at medium elevations in the mountains of the Caucasus and Armenia (2). Possibility of some cross pollination by other forms of *Trifolium ambiguum* during first two generations in Australia.

Selected continuously from the third to sixth Australian generations by Hely (6,7) for (a) compatibility with available strains of nodule bacteria introduced from habitat, (b) seedling vigour, (c) survival above the practical range of *Trifolium repens* L. in the Snowy Mountains region, south-eastern Australia. Field work done by F.W. Hely in cooperation with Soil Conservation Service of New South Wales (especially W.G. Bryant, Cooma) and CSIRO colleagues A.B. Costin and D.J. Wimbush. Self- and cross-compatibility studies, nodulation, and breeding work done by F.W. Hely; flowering and seed production studies done by J.D. Williams and H. Koenigkamp, CSIRO; chromosome number checking done by R.N. Oram, CSIRO. Finally derived from polycross of 30 carefully chosen plants.

Developed for use in revegetation projects at elevations near that of the tree-line in south-eastern Australia. Breeder's seed held by the CSIRO Division of Plant Industry, Canberra.

Submitted for registration by the CSIRO Division of Plant Industry, Canberra, and the Soil Conservation Service of New South Wales. Recommended for registration by New South Wales Herbage Plant Liaison Committee. Registered May 1970.

Morphological description (2,5,6,9)

A tetraploid form of the species, this cultivar differs from cv. Summit in the following characteristics. The growth habit of 1-2-yr-old plants is generally open, asymmetric, tall (to approx. 40 cm). Leaflets mostly plain dark green; 18% with pale green, usually faint, inverted V marking in lower part of leaflet; shape ovate to broadly lanceolate. Mean mature leaflet approx. 37mm long, approx. 21mm wide and width to length ratio 0.55. Flower colour white early, becoming medium to deep pink; calyx up to 12 mm long; corolla 10-15 mm. Head in full bloom moderately compact to lax (fewer flowers), 20-45 mm long, 25-35 mm wide; hemispherical to long globoid. Seeds mostly reddish brown, few dull yellowish, approx. 616,000 per kg. Chromosome number $4x = 32$.

Agronomic characters (1-4, 7-9)

Subalpine form which survives fairly well with good nutrition in most severe sites in high country of south-east Australia but is better suited for use at about the tree-line (4). Tolerates lower pH than *Trifolium repens* L. and is more efficient than it in extracting phosphorus and calcium from acid soils (3). Does not nodulate with volunteer bacteria in Australia and special strains of *Rhizobium trifolii* required; strains recommended for inoculation are CC227 and CC231 together (6,7); nodules overwinter and continue symbiotic nitrogen fixation in next season. Strongly rhizomatous, good winter dormancy. Resistant to seasonally waterlogged conditions.

Treeline spreads well through open snowgrass (*Poa* spp.) stands, the long rhizomes and daughter plants securing the soil and providing favourable microenvironments for new grass establishment.

Substantially self-sterile and cross-incompatible. Requires warmer conditions for growth and flowering and flowers more unevenly and sparsely than cv. Summit. Seed production good with heavy concentration of honey bees.

Generally this cultivar requires a higher plane of nutrition and less severe cold growing conditions than cv. Summit. Given these conditions, it is substantially more vigorous than cv. Summit. At 1830 metres in the Snowy Mountains region it will replace *T. repens* (subalpine forms) at various levels of nutrition and appears to be capable of overgrowing cv. Summit. It is considered by the Soil Conservation Service of New South Wales to have great value in revegetation work about the tree-line in the Snowy Mountains region, N.S.W.

References

1. Bergersen, F.J., Hely, F.W., and Costin, A.B. (1963). Overwintering of clover nodules in alpine conditions. *Aust. J. Biol. Sci.* **16**, 920-1.
2. Bobrov, E.G. (1950). "*Species of Clover new to Cultivation.*" (In Russian.) 68 pp. (Acad. Sci. U.S.S.R., Moscow.)
3. Bryant, W.G. (1971). The problem of plant introduction for alpine and subalpine revegetation, Snowy Mountains, N.S.W. *J. Soil Conserv. Serv. N.S.W.* **27**(4), 209-26.
4. Costin, A.B., and Wimbush, D.J. (1963). Reaction of species to adverse conditions in the Snowy Mountains. CSIRO Aust. Div. Pl. Ind. Fld. Sta. Rec. No. 2(2), pp. 19-30.
5. Donskova, A.A. (1968). Life cycle of *Trifolium ambiguum* M.B. under the conditions of the Caucasian high-mountains. (In Russian - English summary.) *Bjull. Mosk. Obsc. Isp. Prir. (Biol.)* **73**(4), 47-62.
6. Hely, F.W. (1957). Symbiotic variation in *Trifolium ambiguum* M. Bieb. with special reference to the nature of resistance. *Aust. J. Biol. Sci.* **10**, 1-16.
7. Hely, F.W. (1971). Adaptation of wild cross-fertilized clovers for better nodulation and other characters required in cultivars. CSIRO Aust. Plant Introd. Rev. No. 8(1), pp. 29-35.
8. Kannenberg, L.W., and Elliot, F.C. (1962). Ploidy in *Trifolium ambiguum* M. Bieb. in relation to some morphological and physiological characters. *Crop Sci.* **3**(5), 318-21.
9. Zohary, M. (1970). In "*Flora of Turkey and the East Aegean Islands*". Ed. P.H. Davis. Vol. 3, pp. 394-5. (Edinburgh Univ. Press.)