

The growth of *trifolium montanum* in south-eastern Australia

B.S. Dear

Department of Agriculture, N.S.W. C/- CSIRO P.O. Box 1600 Canberra City
A.C.T. 2601

Trifolium montanum L. sub spp. *humboldtianum* (1) is a perennial legume native to the high alpine valleys and meadows of the Caucasus region of Southern U.S.S.R. and north-eastern Turkey. Several authors have commented on its usefulness in that area. Mirkin et al. (2), for example, reported that clumps of *T. montanum* were surrounded by zones of well developed grass indicating better nitrogen nutrition and suggested planting strips of *T. montanum* to improve pasture productivity. There is however a general scarcity of information on this species, especially concerning its productivity and persistence. Other species, namely *T. repens* and *T. ambiguum*, found in association with *T. montanum* have been successfully used in pastures and for soil erosion control in southeastern Australia (3) and New Zealand. However there are no published reports on the value of any of the 27 lines of *T. montanum* known to have been introduced into Australia since 1932.

To investigate the performance of *T. montanum* in elevated pastures, one of the more recently introduced lines, CPI53171, was included in a legume screening trial in 1976 at Round Plain, near Berridale N.S.W., at an elevation of 1150m. The trial also included *T. repens* and *T. pratense*.

Young seedlings were transplanted directly into a mown native pasture consisting mainly of *Themeda australis* and *Poa* spp. The persistence, productivity, growth habit and flowering ability were monitored.

In the first three years, approximately 20% of the *T. montanum* plants died; those remaining, however, proved extremely persistent with the population remaining stable during the next two years. Excavation of the adult plants revealed they had formed deep, forked taproots descending to 40 cm which would have contributed to their tolerance of the 1977 and 79 droughts. By way of contrast, both *T. repens* and *T. pratense* had disappeared completely from the sward by the fourth year.

Growth of *T. montanum* begins at this location in mid-October, following a period of complete dormancy during winter. Growth continues into summer until heat and moisture stress slows growth which is resumed when favourable conditions occur in early autumn and finally finishes with the onset of frosts in May.

Only a small percentage of plants (9%) were observed to flower in a two-year period. This coincides with a report (4) that plants may have extended vegetative phases lasting 2-3 years between flowering.

Two characteristics of this species were observed which may militate against its use as a pasture species. The plants showed no tendency to spread and create a thick sward, their crowns expanding only slightly over a five-year period. The resulting low plant density reduces the productivity per unit area although productivity per plant was reasonable. Heavy sowing rates would be necessary to compensate for this characteristic. Another disadvantage may be the erect habit, the large leaflets (72 mm long x 17 mm wide) being borne on long upright petioles which could be easily trampled by stock.

The persistence and drought tolerance demonstrated by *T. montanum* suggests that, despite its drawbacks, this species may be suitable in elevated regions (>1100m) that experience periodic summer dry spells.

1. Zohary, M. (1970) "Flora of Turkey and East Aegean Islands". (Ed. P.H. Davis) Vol. 3 Edinburgh Univ. Press.

2. Mirkin, B.M., Denisova, A.V. and Popova, T.V. (1967) Bot Zh. SSR 52:(1) 93-8. (Herb. Abst. 37(4) 300).

3. Bryant, W.G. (1974) *J. Aust. Inst. Agric. Sci.* 40, 11-19

4. Golnbeva, I.V. (1968) *Bot. Zh. SSR* 53(1) 1604-11 (*Herb. Abst.* 39(2) 997).