The Development of Talish Clover (*Trifolium tumens* Steven ex M. Bieb.) as a Potential New Perennial Pasture Legume for Low Rainfall Temperate Environments

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The development of Talish clover (*Trifolium tumens* Steven ex M . Bieb .) as a potential new perennial pasture legume for low rainfall temperate environments

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Introduction *Trifolium tumens* is a long-lived , deep rooting perennial legume from the *Trifolium* Sect . *Vesicaria* Crantz . , with a natural distribution across Turkey , Caucasus and Iran (Zohary and Heller 1984) . There are a number of described varieties of *T . tumens* (Zohary and Heller 1970) , but no commercial cultivars . *T . tumens* can be found growing across a broad range of environments . On a germplasm collecting mission to Azerbaijan by the senior author in 2004 , *T . tumens* was collected from altitudes ranging from 11 to 1591metres above sea level , in soils ranging from pH(1 :5 H_2O) 5 .0 to 9 .0 and rainfall zones of 300 to 1300mm per annum . In Azerbaijan *T . tumens* can be found growing in heavily grazed lowland pastures with companion species *Medicago sativa* subsp . *caerulea* , *Trifolium fragiferum* , *Lotus corniculatus* , *Trifolim diffusum* , *Trifolium lappaceum* ,*Medicago polymorpha* and *Chicorum intybus* or in lightly grazed alpine meadows with companion species *Lolium perenne* ,*Dactylis glomerata* ,*Trifolium repens* ,*Trifolium pratense* and *Trifolium ambiguum* . In many areas it was seen as an important legume component in the pasture and at low rainfall sites (＜400 mm) was the only perennial *Trifolium* species present .

Methods A collection of 63 accessions of *T . tumens* , sourced from Genetic Resource Centres , or collected in Azerbaijan in 2004 (Table 1) were assembled at the Tasmanian Institute of Agricultural Research Plant Materials Centre . This germplasm represents around 90% of the available germplasm held in world ex situ collections .

Table 1 *Source of germplasm .*

Genetic Resource Centre	Country of origin	Number of accessions
New Zealand , Margot Forde Germplasm Centre	Armenia	4
	Georgia	2
	Russia (Dagestan)	2
	Azerbaijan	7
USDA , ARS National Temperate Forage Legume Germplasm Resources Unit	USSR	1
	Uzbekistan	1
Australian Trifolium Genetic Resource Centre	Iran	4
Tasmanian Institute of Agricultural Research	Azerbaijan	38
	unknown	4

20 plants from each accession were grown as spaced plants at Launceston , Tasmania , Australia , 41°45′ S , 147°17′ E . Plants were characterised for a range of morphological and phenological features including growth habit , rhizome and stolon production , flowering time , seed production , seed size and leaf markings .

Results and discussion The germplasm characterised was highly variable both within and between accessions . The number of previously described varieties within the species could explain the variability recorded between accessions . *T . tumens* is described as rhizomatous (Zohary . M . and Heller . D . 1984) , however , none of the accessions produced rhizomes . A number of accessions were shortly stoloniferous in habit , rooting at the nodes , in particular those originating from the Talish Mountain region around Lerik in Azerbaijan . The range in time to flowering was between 116 and 204 days from May 1st . Seed production ranged between 0 .7 and 31 grams per plant . Seed size ranged between 0 .691 and 1 .341 gms . *T . tumens* has a wide range of leaf markers with over 20 different markings observed .

Conclusions Grazing systems in low rainfall temperate regions of Australia currently rely heavily on annual legume based pastures . Perennial legumes such as *Trifolium repens* and *Trifolium pratense* are not well adapted to areas receiving below 700mm rainfall per annum and *Medicago sativa* is not well adapted to heavy grazing pressure . This preliminary work has identified *T . tumens* germplasm with the potential to be developed as a drought tolerant , deep rooted perennial forage plant suitable for growing in low rainfall temperate regions .

References

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