A New Perennial Legume to Combat Dryland Salinity in South-Western Australia

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Introduction Dryland salinity has devastated large tracts of productive land in Australia. This has resulted from the clearing of native perennial vegetation and its replacement with annual crops and pastures. As annual plants are shallow rooted and only use water during their winter-spring growing season, unutilised rainwater leaks into groundwater tables which rise and bring stored salt to the soil surface. The adoption of deep rooted perennial pasture plants that increase the water use can help to manage dryland salinity whilst maintaining productivity. However, new plants are needed as few perennial pasture options currently exist. Preliminary research into the potential of hairy canary clover (*Dorycnium hirsutum* (L.) Ser.) to increase water use is presented.

Materials and methods Six replicate plots (2.5 m x 4 m) of *Dorycnium hirsutum*, lucerne cv. Sceptre (*Medicago sativa* L.), annual burr medic cv. Santiago (*Medicago polymorpha*) and a bare ground control, were established in 2002 at Merredin in the Western Australian wheat-belt, a low rainfall (315 mm annual mean) site with a mediterranean climate. Soil moisture content was monitored under these pastures using a neutron moisture meter from September 2002 to April 2004 at approximately 3 week intervals.

Results Establishment was slow in 2002 with an extremely dry winter growing season. During the first summer lucerne dried the soil more than the annual medic, but little difference was observed in soil water between *D. hirsutum* and the annual medic (Figure 1). Both annual and perennial species dried the soil during spring 2003, but rainfall during summer increased soil water under the annual medic while both perennials maintained a drier soil profile. *D. hirsutum* and lucerne dried the soil to a depth of 180 cm in the 2003/04 summer increasing the soil moisture deficit to 80 mm greater than that recorded under the annual medic.

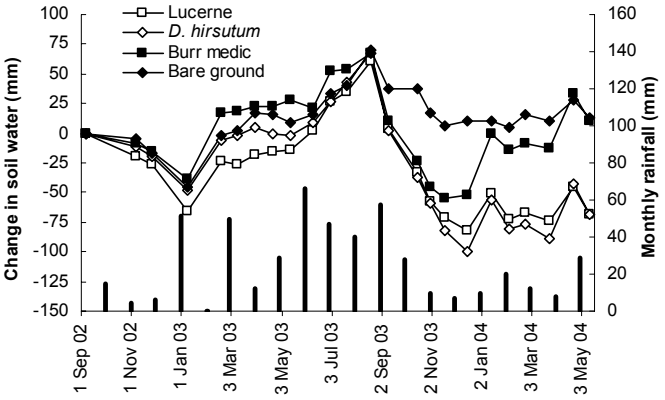

Figure 1 Monthly rainfall (bars) and Δ soil water (< 3 m) under bare ground, annual medic, lucerne and *D. hirsutum* pastures from September 2002 to April 2004 at Merredin, Western Australia

Conclusions Both lucerne and *D. hirsutum* dried the soil profile more than annual medic, thereby creating an additional buffer of 80 mm that would need to be exceeded before drainage could occur. Similar studies of lucerne have shown it to be effective at reducing recharge (Latta *et al.*, 2001 & 2002; Ward *et al.*, 2001). Water use of *D. hirsutum* was equal to lucerne in the second year. This was surprising given the different breeding history and adaptation of these species to a semi-arid mediterranean environment. We conclude that *D. hirsutum* shows some promise for reducing groundwater recharge and helping to manage dryland salinity in farming systems of the Western Australian wheat-belt.

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