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EUROPEAN OLIVE (*OLEA EUROPAEA*) AS AN ECONOMIC AND SUSTAINABLE AGRICULTURAL OPTION FOR THE RANGELANDS

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INTRODUCTION

Decline in global markets for traditional arid-zone products, such as wool, is stimulating the search for new, economically attractive and sustainable agricultural/horticultural options in remote rural areas of Australia (Price *et al.* 2002). On Mount Weld pastoral station, situated in the semi-arid rangeland of Western Australia, trials involving European olive commenced in 1999.

In regions such as central Australia and the Goldfields, there is a history of individual plantings of European olive in semi-arid and arid rangeland environments. However, the absence of commercial quantities of European olive in the interior of Western Australia, where climatic conditions are hot and dry, has been noted (Kailis 1997). Preliminary trials conducted on Mount Weld pastoral station aim to test growth of a semi-commercial quantity of European olive in hot and dry conditions, typical of semi-arid rangelands.

Mount Weld pastoral station is located south of Laverton, which is approximately 350 km north north-east of Kalgoorlie, in central south-east Western Australia. The station covers approximately 800,000 ha and is currently managed by Placerdome Asia Pacific, a company that conducts mining and mineral exploration activities as well as managing the pastoral operations on the station. Trials of potentially commercial crops are part of a biodiversity conservation plan for Mount Weld station (James *et al.* 2001). This plan includes the testing of crops that have potential for sustainable land use in the future, and of enterprises that can play a role in the rehabilitation of degraded land.

MATERIALS AND METHOD

Preliminary trials of European olive were conducted at two sites with contrasting soil types and soil profiles. The first site was established in 1999 at Davis Well where 88 trees from five cultivars were planted on soil with a shallow profile (0.4 - 0.5 m of clay soil above laterite). The second site was established in 2000 at Jubilee Well where 98 trees from 11 cultivars were planted on a soil with a deeper profile (more than 1 m of coarse, sandy soil).

Growth performance assessments were carried out regularly at both trial sites, including the measurement of tree height, crown girth, trunk diameter and an estimation of biomass using the Reference Unit Method (Kirmse and Norton 1985). Direct comparison of the growth performance at these two sites was complicated by the fact that tree placement was randomised at Davis Well but not at Jubilee Well, the two groves were established at different times, and the cultivars selected and numbers of each planted at the sites differed. As a consequence, tree performance was assessed independently at the two trial sites (Price *et al.* 2002).

RESULTS AND CONCLUSIONS

Although the growth performance of European olive at the two sites could not be compared statistically, differences in tree growth were apparent. Differences in biomass were identified (from Reference Unit Method results) between individual groves, as well as individual cultivars, between the period September 2002 to April 2004. Trees from 8 out of 11 cultivars growing at Jubilee Well produced small quantities of fruit during the 2001/02 spring-summer season (cultivars; *Ascolana*,

Kalamata, Jumbo Kalamata, Pendolino, Olea Mission, New Norcia Mission, Verdale and Nabtari). At Davis Well by comparison during the 2001/02 spring-summer season, minimal fruit formation was observed on two trees only (cultivars; *Ascolana* and *Verdale*) (Price *et al.* 2002). Significantly, fruit ripening occurred earlier than at other more temperate olive growing areas in WA.

Importantly, preliminary trials of European olive on Mount Weld pastoral station highlight the fact that this crop may potentially be grown successfully in the semi-arid rangelands. The overall potential of European olive as a commercial crop, however, still needs further evaluation. Results from the first two trials conducted on Mount Weld pastoral station were encouraging, and a third grove was established in 2002 at Hacks Well, which is close to the two original sites and also on Mount Weld pastoral station.

The Hacks Well trial has been designed as a randomised block, to test potential variations in growth performance of European olive subjected to different soil and water conditions. Three different cultivars of European olive have been selected for this third trial, based on results from the preliminary trials at the Davis and Jubilee groves. Further assessment of growth performance and fruit production will be undertaken at the three trial sites on Mount Weld, and this will include detailed recording of fruit production from individual trees and laboratory testing of olive oil quality.

REFERENCES

- James, C., True, D., Lamont, R. and Longworth, J. (2001). *A biodiversity conservation plan for Mount Weld station*. Report to Placer Dome Granny Smith.
- Kailis, S.G. (1997). Potential for European olive growing in Western Australia. Proceedings of the third international symposium on olive growing. *Acta Horticulturae* 474: 771-775.
- Kirmse, R.D. and Norton, B.E. (1985). Comparison of the Reference Unit Method and Dimensional Analysis Methods for two large shrubby species in the Caatinga Woodlands. *Journal of Range Management* 38: 425-428.
- Price, G., Barrett-Lennard, E.G., Fox, J.E.D. and Kailis, S.G. (2002). Preliminary report on the growing potential of the European olive (*Olea europaea* L.) under Australian arid-zone conditions. *Advances in Horticultural Science* 16: 131-137.