O'Halloran Agroforestry Trial Description – PUR$L conference

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Background:

In 1994 an agroforestry trial was established on 58 ha of land owned by Robert O'Halloran of Cherry Tree Estate, Kojonup. The purpose of the trial was to:

1. Establish trees in combination with agriculture, which will produce products such as posts, rails, firewood, biomass and essential oils.

2. Monitor the effect of the trees on groundwater levels.

Results from a soil survey found that more than half of the site has features which can severely restrict growth – high salinity, unstable soils and waterlogging. Two timber producing species were chosen for these soils – *Eucalyptus camaldulensis* (River Red Gum) and *Casuarina obesa* (Swamp Sheoak). The trees were established in 2 row belts with 50 m wide alleys. In the year following establishment of the agroforestry trial, 15 000 oil mallees were planted as a resource for biomass and oil. The mallees were planted amongst the agroforestry trial in 2 row belts with 15 m wide alleys.

Aerial view of agroforestry trial on Cherry Tree Pool Estate, Katanning.

Tree Production:

An assessment of tree growth and form was carried out in 2002 and found that the *E. camaldulensis* had grown quite well under the poor conditions, however most of the *C. obesa*

had died as a result of grazing by sheep. The oil mallees had also grown very well, however the small width of the alleys had caused considerable competition on pasture growth. Alternatively there has been limited competition between the *E. camaldulensis* and the pasture within the adjacent alleys.

A growth plot was established to assess the potential firewood production of *E. camaldulensis* growing in an area with salinity levels of 153 mS/m[1]. Production data has been calculated and presented as a 'within the strip' calculation (Table 1) which assesses only the area taken up by the 2-row belt of trees and also as an 'overall hectare' basis (Table 2).

Table 1. Growth data of 8.0 year old *Eucalyptus camaldulensis* from all trees in plot, using the 'within the strip' calculations.

Mean diameter (cm)	**Mean height** (m)	**Top height** (m)	**Basal area** (m2/ha)	**Total volume** (m3/ha)	**Trees/ha**
15.1	6.3	8.9	29.1	59.7	1176

Table 1. presents the potential total firewood volume for a whole hectare planted to trees. This was calculated using tree height and diameter. In order to estimate the potential merchantable firewood volume, a plot of trees would need to be cut down and weighed. As the trees are too young for selling as firewood, it was decided this wouldn't be carried out until the trees were 10 years of age.

Nevertheless, total volume figures are still useful for projecting firewood returns. Firewood in Katanning retails for between $50 - $90/ tonne with harvest and handling costs of $17/ tonne. Gross firewood returns for this site would therefore range from $2 985 - $5 373 per hectare of trees. For further information on the Australian firewood industry see the ANU Forestry Market Report No. 16 'Firewood Market'[2]

Water use:

Production data has also been calculated on an "overall hectare" basis which includes the area taken up by the pastured alley between the tree belts. Production data presented in this way reflects production from all the land, even though some of it is not occupied by trees. These calculations are particularly useful when trying to explain the impact of trees on water-tables. Table 2. presents the potential volume of trees covering a hectare of land at Cherry Tree Pool Estate.

[1] Vertical reading with a Geonics Limited EM38 on a heavy clay soil.
[2] Australian National University Forestry Market Report No. 16 'Firewood Market' http://sres.anu.edu.au/associated/marketreport/report16.pdf

Rob O'Halloran has also seen some visual improvements to the site. "A large bare patch to the southern end of the site is now generating a cover of barley grass. Had I not planted the trees, the scald would only have got progressively worse" Mr O'Halloran said.

Table 2. Growth data of 8.0 year old *Eucalyptus camaldulensis* from all trees in plot, using the 'overall hectare' calculations.

Mean diameter (cm)	**Mean height** (m)	**Top height** (m)	**Basal area** (m2/ha)	**Total volume** (m3/ha)	**Trees/ha**
15.1	6.3	8.9	6.3	14.5	256

Further saltland tree crop trials are being established in Broomehill, Kojonup and Nyabing in 2002. These trials shall be assessing the suitability of a range of salt tolerant eucalypt and casuarina species for sawlog production.

8 year old *E. camaldulensis* belts on Cherry Tree Pool Estate, Katanning.

Conclusion:

1. Tree production data shows that of the timber species planted, *E. camaldulensis* is the most productive on this site (potentially for firewood).
2. Water use data show that water-tables have declined under 8-year-old trees growing in 50 m wide alleys at an overall density of 256 trees per hectare.