

REVEGETATION



E. orthostemon, Yenyenning Lakes

EUCALYPTS FOR USE IN SALINE REVEGETATION

Dean Nicolle & Malcolm French

REVEGETATION of areas showing secondary salinity is an important priority for many landholders, but what species should be used? We believe that there are better species of eucalypts for saline revegetation than some of those currently recommended for planting.

We have undertaken extensive field and scientific research, including trial plantings, investigating local species that have a high tolerance to salinity and waterlogging. At the same time these species have other attributes that can add value to the farm revegetation program, for example:

- ▶ shelter and wind breaks
- ▶ fire resistance with rapid and profuse recovery, plus rapid recovery from other episodic events such as strong winds and localised flooding.
- ▶ fuelwood production, from small to larger scale biomass production
- ▶ biomass for reconstituted wood products such as panel wood
- ▶ essential oils
- ▶ enhancement to the local ecosystem
- ▶ maintaining genetic integrity – there are risks of hybridization with introduced species that may not be acceptable

- ▶ maintenance of other landscape values.

The past extensive use of *Eucalyptus camaldulensis* var. *camaldulensis* (river red gum - a non native species to the agricultural regions of WA) as a salinity control species highlights our concerns. This species has been proven to have on average a lower tolerance to both salinity and drought than many other species. Poor site selection for this species is also often the reason for its poor performance.

Local saline tolerant species are generally poorly known in cultivation but are well suited to the task and are listed below for urgent consideration in all farm saline revegetation programs in agricultural WA.

The species are not ranked according to salt tolerance, rather species selection should be based on selecting local species and site attributes such as soil type, degree of salinization and other environmental effects. All species are considered to be salt tolerant under natural conditions, however, as many are little known in cultivation, their performance in cultivation will be site specific. No known eucalypt species will grow vigorously (if at all) on bare, salt-crustured soils.

(Note: Several of the following species have a conservation rating and seed may not be readily obtainable. All seed collectors must hold licences from the Department and strictly follow all licence conditions.)

Ten taxa recommended for consideration for revegetation of saline soils

We consider that the following ten species groups are the most salt tolerant re-sprouting eucalypts. Importantly, all are lignotuberous and will rapidly regenerate following fire or other destructive events. They are principally of a bushy, spreading habit, presenting good windbreak and fauna habitat qualities.

► *E. angustissima* subsp. *angustissima* and subsp. *quaerenda*

Habit: Mallee, 2-5 m, foliage dense and to ground level.

Distn: Subsp. *angustissima* occurs naturally on sands along saline drainage lines and salt lake edges on the Esperance plains from Lort River to Israelite Bay. Subsp. *quaerenda* occurs naturally around salt lakes in the Lake Grace to Lake King area. Associated eucalypts include *E. litorea*, *E. incrassata*, *E. leptocalyx* and *E. aff. perangusta*.

Notes: Fast growth rate; eucalyptus oil potential; shelter/windbreak. Distinguished by the crown of very narrow (pine needle-like), erectly held leaves. On the upper Lort River on the Esperance Plains subsp. *angustissima* is known to grow to 10 m high.

► *E. sargentii* subsp. *fallens* and subsp. *onesia* ms

Habit: Mallee, 3-8 m, foliage dense and to ground level.

Distn: Both subspecies occur naturally along saline drainage lines and salt lake edges. Subsp. *fallens* occurs naturally in the Binnu area north of Geraldton. Subsp. *onesia* occurs naturally from Piawaning south to near York.

Notes: Fast growth rate, shelter/windbreak

► *E. orthostemon* ms (*E. orthostemon* was formally regarded as part of *E. vegrandis* with the latter now known to be restricted to the Katanning to Bremer Bay area.)

Habit: Mallee, 3-6 m, foliage dense, though not usually to ground level.

Distn: Occurs naturally in drainage lines, around salt lakes and in a variety of other habitats, from the Wongan Hills area south to Katanning.

Notes: Fast growth rate, shelter/windbreak, waterlogging tolerance.

► *E. brachycorys*, *E. comitae-vallis* and *E. exigua*

Habit: Mallees, 3-7 m, foliage dense though not usually to ground level.

Distn: All three closely related species occur naturally in saline depressions and around salt lakes as well as on red loam plains. *E. brachycorys* occurs throughout the northern Wheatbelt and inland to the Lake Deborah area. *E. comitae-vallis* occurs further inland in the Lake Barlee to Kalgoorlie area. *E. exigua* occurs to the south of the above two species, from Varley to Lake Johnston. Associated eucalypts include *E. myriadena*, *E. alipes* and *E. salicola*.

Notes: Moderate growth rate, shelter/windbreak.

► *E. famelica* and *E. litorea*

Habit: Mallees, 2-6 m, foliage dense and to ground level.

Distn: *E. famelica* occurs naturally in depressions and near salt lakes on the Esperance plains from Hopetoun to the

Stokes Inlet area. The very similar *E. litorea* occurs around salt lakes in the Israelite Bay area. Associated eucalypts include *E. angustissima* and *E. incrassata*.

Notes: Moderately fast growth rate, shelter/windbreak

► *E. halophila*

Habit: Mallee, 2-4 m, foliage dense and to ground level.

Distn: Occurs naturally on sand around salt lakes on the Esperance plains from the Scadden area to the Mt. Beaumont area. Associated eucalypts include *E. rigens*, *E. merrickiae* and *E. leptocalyx*.

Notes: Moderately fast growth rate, shelter/windbreak

► *E. merrickiae*

Habit: Mallee, 2-4 m, foliage dense and to ground level.

Distn: Occurs naturally around salt lakes on the Esperance plains from the Scadden area to the Mt. Ridley area. Associated eucalypts include *E. halophila*.

Notes: Fast growth rate, shelter/windbreak

► *E. rigens*

Habit: Mallee, 2-4 m, foliage dense and to ground level (bushy).

Distn: Occurs naturally bordering salt lakes on the Esperance plains from the Scadden area to the Mt. Beaumont area. Associated eucalypts include *E. halophila* and *E. leptocalyx*.

Notes: Moderately fast growth rate, shelter/windbreak

► *E. foliosa*

Habit: Mallee, 2-5 m, foliage dense and to ground level.

Distn: Occurs naturally bordering salt lakes and in saline depressions on the Esperance plains in the Scadden area. Associated eucalypts include the tree form of *E. uncinata*.

Notes: Moderate growth rate; shelter/windbreak

► *E. hypochlamydea*

Habit: Mallee, 4-8 m, foliage restricted to upper part of the plant.

Distn: Occurs around salt lakes and in saline areas as well as occurring on red loam plains, from north of Geraldton east to Balladonia and south to the south-central Wheatbelt.

Associated eucalypts include *E. alipes*, *E. exigua*, *E. celastroides* ssp. *virella*, *E. concinna*, *E. cylindrocarpa*, *E. yilgarnensis*, *E. grasbyi*, *E. brachycorys*, and *E. myriadena*.

Notes: Moderately fast growth rate. The closely related *E. salicola*, a tree that grows around salt lakes and drainage lines, may also be useful in the revegetation mix.

Non-sprouting taxa for saline soils

The following species groups are considered to be the most salt tolerant non-sprouting eucalypts. All are non-lignotuberous and killed by fire or other destructive events. They are rapid growing and several are well known to perform in saline areas. We recommend these species in the revegetation mix in salt affected soils particularly to provide a good range of habitats and for their sustainability in water logged conditions. *Casuarina*, *Melaleuca*, *Acacia*, *Callistemon* etc (non eucalypt species), should also be considered to provide a good species balance.

REVEGETATION

continued from page 7

► *E. alipes* ms, *E. mimica* subsp. *mimica* and subsp. *continens*

Habit: Mallets, 3-8 m, foliage dense, restricted to the upper crown.

Distn: All three taxa occur typically in drainage lines and around salt lakes. *E. alipes* occurs from north-east of Hyden and south to Pingaring and to the Lake King area. *E. mimica* occurs in the Newdegate area. Associated species include *E. sargentii* subsp. *sargentii*, *E. exigua*, *E. salicola* and *E. myriadena*.

Notes: Fast growth rate

► *E. eremophila* and *E. goniocarpa*

Habit: Mallets, 4-8 m, foliage dense, restricted mainly to the upper crown.

Distn: *E. eremophila* occurs on a variety of soils and occurs around (and in) salt lakes on the Esperance plains. It is distributed from Zanthus south to near Esperance and west to Lake Chinokup. *E. goniocarpa* occurs in depressions and on slight rises in the Lake King area.

Notes: Fast growth rate. The mallee form of *E. eremophila* that has a wide distribution throughout the wheatbelt has been published as *E. tenera* and is not considered for saline revegetation.

► *E. kondininensis*

Habit: Mallet, 8-18 m, foliage dense, restricted mainly to the upper crown.

Distn: Occurs around salt lakes and in saline depressions from Yealering east to Lake Johnson. Associated species include *E. orthostemon* and *E. celastroides* ssp. *virella*.

Notes: Moderately fast growth rate; shade; windbreaks. Proven degree of saline tolerance, however, may not withstand the same waterlogging as other species. Lignotuberous (sprouting) variants are known in some areas and may be particularly useful for reclamation of saline areas. Hill-dwelling variants are also known; their performance in saline soils is unknown. *E. kondininensis* is a common nursery standard.

► *E. sargentii* subsp. *sargentii*

Habit: Mallet, 5-12 m, foliage dense, restricted to the upper crown.

Distn: Occurs in saline depressions and around salt lakes from Cadoux south to Lake Grace and east to near Hyden. Associated species include *E. mimica* ssp. *mimica* and *continens* and *E. celastroides* ssp. *virella*.

Notes: Moderate growth rate, past performer in saline soils. Commonly used.

► *E. spathulata*

Habit: Mallet, 7-12 m, foliage dense, restricted mainly to the upper crown.

Distn: Occurs in saline depressions and around salt lakes from Mt Stirling south to Ongerup. Associated species



E. rigens, Mt Ney track, Esperance Plains



E. sargentii subsp. *onesia* ms. north-east of Calingiri.

include *E. extensa*, *E. occidentalis*, *E. vegrandis* and *E. orthostemon* ms.

Notes: Fast growth rate, very versatile and commonly used.

Acknowledgements

Thanks to Peter White from the Department and Nathan McQuoid of Greening Australia Western Australia for their valued comments and input.

Dean Nicolle has Australia's largest and most complete eucalypt arboretum – Currency Creek Arboretum in South Australia. You can find out more on <http://www.chariot.net.au/~vo/cca/html> Malcolm French, author of "The Special Eucalypts of Perth and the South West" is a eucalypt enthusiast with dedication to enhancing agricultural production and the environment simultaneously for the benefit of all. Phone: 0408 990 988