

## Eucalyptus leucoxylon Yellow Gum

### TAXONOMY

Division	Angiosperm (flowering plant)
Subclass	Dicotyledonae (dicotyledon)
Family	MYRTACEAE

**Taxonomic Identification Number** 9146 (ANH et al 2006)

### Previous Taxonomic Names

The current taxonomic name *E. leucoxylon* has been in use since 1855 (ANH et al 2006). Six subspecies are currently recognised in Victoria (RBGM n.d.), two have only been recently described and recognised and are not included in Flora of Victoria (1996).

The newly described subspecies are:

*E. leucoxylon* ssp. *connata* (Rule 1991) and *E. leucoxylon* ssp. *bellarinensis* (Rule 1998).

### Taxonomic Status

Victorian eucalypts are currently under review by taxonomist Kevin Rule (K. Rule 2005 pers. comm.).

### Common Names:

Yellow Gum (preferred name), White Ironbark, South Australian Blue Gum (ANGB n.d.)

### MORPHOLOGY

Mallee or tree to 25 m tall. Bark at base usually coarse, loose, fibrous with most of trunk or stems smooth and yellowish. Juvenile leaves sessile, opposite for many pairs sometimes with opposite leaf bases connate, ovate to broadly lanceolate to 10cm long, 7cm wide, and blue-green, green or glaucous in colour. Adult leaves petiolate, lanceolate, 12-20cm long, 2-3.5cm wide, slightly glossy, green, intramarginal vein remote from edge, with a moderate to dense network of veins often visible. Numerous island and intersectional oil glands also visible. Inflorescences axillary, unbranched, peduncles to 1.1cm long, 3 flowered.

Buds on pedicels (stalks), ovoid or globular to 1.5cm long, 0.8cm diameter, no scar, with a conical or beaked cap. Fruit on pedicels (stalks), square-like to globular in shape, 4-6 valves descending below rim (Walsh & Entwistle 1996).

### SUBSPECIES

Six subspecies are currently recognised in Victoria (RBGM n.d.).

- ***E. leucoxylon* ssp. *bellarinensis*** - Endemic to the Bellarine Peninsula. Small, mallee-like tree with fibrous, grey, box-like bark at the base and a smooth upper trunk. Juvenile leaves are waxy, opposite and stalk-less for more than 25 pairs. Several pairs are stem-clasping at the base. Globular buds are often prominently beaked. The large, rounded fruits are on long stalks that are longer than fruit (Rule 1998).
- ***E. leucoxylon* ssp. *connata*** - Similar to ssp. *bellarinensis* but with smooth bark along the full trunk, shorter beaked buds, smaller fruit on shorter stalks and no waxiness (Rule 1991).
- ***E. leucoxylon* ssp. *leucoxylon*** - Non waxy, adult leaves less than 2.5 cm wide, fruits between 9-13 mm long. Flowers cream-white or pink (Walsh & Entwistle 1996). Non-waxy seedlings (Rule 1990). There are no official records of this subspecies occurring in the Corangamite region (Walsh & Entwistle 1996).
- ***E. leucoxylon* ssp. *megalocarpa*** - Extremely large fruit with white, pink or red flowers and wide leaves, it occurs on the far western Victorian border and into South



Australia. (Walsh & Entwistle 1996).

- ***E. leucoxyton ssp. pruinosa*** - Has small fruits and leaves, and waxy juvenile leaves. Includes inland populations from South Australia to Central Victoria (Rule 1991). In the Barossa Valley in SA it is a small-fruited, small-leaved form with little or no pruinosity and lacks consistency in connate juvenile leaves (Kevin Rule, pers comm).
- Flora of Victoria (1996) does not distinguish *ssp. bellarinensis* and *ssp. connata* in its treatment of *E. leucoxyton*, but includes their morphological characteristics within its description of *E. leucoxyton ssp. pruinosa*.
- ***E. leucoxyton ssp. stephaniae*** - Small tree or mallee habit, occurring in the Wimmera and into South Australia. Pedicels are shorter than fruit. Leaves are never stem-clasping (Walsh & Entwistle 1996).

#### HYBRIDS

*E. leucoxyton* is reported to hybridise with at least 12 other Victorian eucalypt species as well as species from other states - some of these hybridise naturally in the wild and others in nursery cultivation (Hingston et al 2003).

Known to form hybrids with the closely related *E. melliodora* (Yellow Box). Care should be taken when these two species occur together, or in abutting populations (Rule 1991).

#### SIMILAR SPECIES

There is a superficial similarity between *E. camaldulensis* (River Red Gum) and *E. leucoxyton ssp. pruinosa* as a tall tree. *E. leucoxyton* can be identified by yellower, smooth bark and the presence of glaucous leaves in the crown and/or from coppice and seedlings (Gowers 1990).

#### GEOGRAPHIC RANGE

*Eucalyptus leucoxyton* is widespread across central and western Victoria. Also NSW and SA (Walsh & Entwistle 1996).

- ***E. leucoxyton ssp. bellarinensis*** - Only found on the Bellarine Peninsula where it grows on heavy clay soil that are waterlogged in winter and affected by salty coastal winds. Populations have been recorded on coastal sites close to the Southern Ocean in the Ocean Grove and Torquay area and on the western side of Jan Juc, as well as the western end of Lake Connewarre (Rule 1998).
- ***E. leucoxyton ssp. connata*** – Limited to the outer areas of Melbourne and Geelong on hilly, well drained slopes of sandstone origin. It is extremely common in the Brisbane Ranges and also in small pockets near Torquay and Anglesea, and in north-east metropolitan Melbourne and the Sunbury area. The population in the You Yangs National Park should be treated with caution as it appears to have come from an artificial seeding program of many decades ago (Rule 1991).
- ***E. leucoxyton ssp. leucoxyton*** - has a widely disjunct range including south of the Little Desert, the Murray floodplain and SA. There are no official records of this species in the Corangamite region (Walsh & Entwistle 1996).
- ***E. leucoxyton ssp. pruinosa*** – Found in central and western Victoria, and in the Geelong area, often in relatively well-watered country, and on deep soil, but also stony hills. Also SA (Walsh & Entwistle 1996). It also occurs in the drier parts of the Barossa Valley (Kevin Rule, pers comm.).
- ***E. leucoxyton ssp. megalocarpa*** – Restricted to the far south-west of the state, also SA (Walsh & Entwistle 1996).
- ***E. leucoxyton ssp. stephaniae*** – Indigenous to the north-west of the state, and SA. Has been widely planted for its pink-red flowers (Walsh & Entwistle 1996).

- There is also an unnamed, very large-fruited form that occurs in upper south-east SA (Kevin Rule, pers comm.).

## BIOREGIONS

Central Victorian Uplands      Otway Plain      Victorian Volcanic Plain

## PLANT COMMUNITIES

In Corangamite, *E. leucoxyton* is associated with dry and grassy forests, grassy woodlands and grasslands.

## FRAGMENTATION

- ***E. leucoxyton subsp bellarinensis*** - Recent clearing (since European settlement) and continuing loss now elevates this subspecies to endangered in Victoria. It is listed as threatened flora under the FFG Act, 1988. Endangered species are at risk of disappearing if current practises and land use continue (DSE 2003). Only a few isolated pockets of very low numbers exist due to clearing for urban development and farmlets (Rule 1998).
- ***E. leucoxyton ssp. connata*** - Vulnerable in Victoria -small populations and land use change threaten population viability. It is likely to become endangered with current land use processes (DSE website 2005). One of the largest woodland stands (8 ha, over 130 trees) was cleared in 1997 at Bannockburn. The largest existing population is in the Brisbane Ranges, and there are isolated, small pockets on the coast west of Geelong. The population in the You Yangs is considered non-indigenous and is likely to be from a planting project. (Rule 1991)

## RELEVANT HISTORY & RESEARCH

An Action Statement has been prepared for the Bellarine Yellow Gum ***E. leucoxyton subsp bellarinensis***. (DSE 2003)

It is hoped that genetic research by CSIRO, GAV and DPI will be undertaken in 2006-7 to clarify differences in the subspecies and provide better guidance for seed collection and revegetation.

## POPULATION DENSITY

***E. leucoxyton subsp bellarinensis*** - populations vary from 20 to 200 individuals with most being scattered trees. This subspecies is considered highly fragmented with a reduction over the last three generations of 95%. (DSE 2003)

***E. leucoxyton subsp connata*** - large populations of over 100 plants in the Brisbane ranges. Coastal sites have isolated plants with only a few individuals (Mark Trengove, pers comm.).

## BREEDING SYSTEMS

### FLOWERING

Prolific (GAV n.d.), indigenous populations have white-cream flowers, although the non-indigenous subspecies *stephaniae* and *leucoxyton*, have pink to red flowers (Walsh & Entwistle 1996).

Flowering time varies between subspecies, but *E. leucoxyton ssp. pruinosa* flowers from May to December (Walsh & Entwistle 1996).

### POLLEN

Yields of pollen considered deficient for beekeepers. Nursery cultivars, particularly red flowered varieties are especially low in pollen (Clemson 1985).

Ford et al (1979) state that *E. leucoxyton* produces large amounts of nectar.

### POLLINATION

Considered a major source of good quality honey, producing an abundance of nectar which bees will work most of the day. (Clemson, 1985).

Eucalypts do not generally have specialised flowers, and can be pollinated by a range of insects (bees, flies, moths and beetles), birds (honeyeaters being the most important) and mammals (Williams et al 1982).

### POLLINATORS

Birds, Insects, Marsupials (Bonney 2003).

Ford et al (1979) considered that the large amounts of nectar produced by *E. leucoxylon* may be an indication that the species is both bird and insect pollinated.

## SEED

### SEED DESCRIPTION

Seed brown, irregularly ovoid and slightly flattened (Walsh & Entwistle 1996).

Published seed weights and viability levels vary.

- ***E. leucoxylon***  
350 seeds/gram (Gowers 1990)  
600 viable seeds/gram (Earl et al 2001; Ralph 2003).
- ***E. leucoxylon* ssp. *leucoxylon***  
235 viable seeds/gram (Turnbull & Doran 1987).  
165 germinants/gram at 25°C (Gunn 2001).
- ***E. leucoxylon* ssp. *pruinosa***  
205 viable seeds/gram (Turnbull & Doran 1987).  
262 germinants/gram at 25°C (Gunn 2001).

### SEED CROP

Published seed collection data varies:

- ***E. leucoxylon*** - Collect seed February to May. Seed is generally released between 3 weeks and 2 months of reaching maturity (Ralph 1994).
- ***E. leucoxylon* ssp. *leucoxylon*** - Collect seed throughout the year (Bonney 2003).

Seed collection practises may impact severely on the long term viability of remnants. Collection should be considered as part of a wider strategy to conserve the threatened subspecies.

### SEED DISPERSAL

Birds (Bonney 2003)

### EXTRACTION & STORAGE

Allow mature fruits to dry when they will release seed. Sieve to remove unwanted material (Ralph 1994; Bonney 2003).

Seed generally maintains viability for 4-5 years at room temperature but storage at lower temperatures can dramatically increase this period (Ralph 2003).

- ***E. leucoxylon* ssp. *leucoxylon*** - 71% germination after 5 years in storage at 18-22°C. Dropping to 30% germination after 10 years (Gunn 2001).
- ***E. leucoxylon* ssp. *pruinosa*** - 63% germination after 5 years in storage at 18-22°C. Dropping to 23% germination after 10 years (Gunn 2001).

### PROPAGATION

Propagate from seed (Bonney 2003).

Optimum germination for ssp. *leucoxylon* and ssp. *pruinosa* is 25°C (Turnbull & Doran 1987).

Bonney (2005) writes that ssp. *leucoxylon* should be sown during spring or when warm moist conditions are present.

### GERMINATION TIME

Most Eucalypts germinate within 2-5 weeks of sowing (Ralph 2003).

### TREATMENT OPTIONS

Smoke treatment has been found to enhance germination with a number of Eucalypt species.

Eucalypt germination has also been improved by stratification, at 4-5°C for one week (Ralph 2003).

### FIELD ESTABLISHMENT METHOD

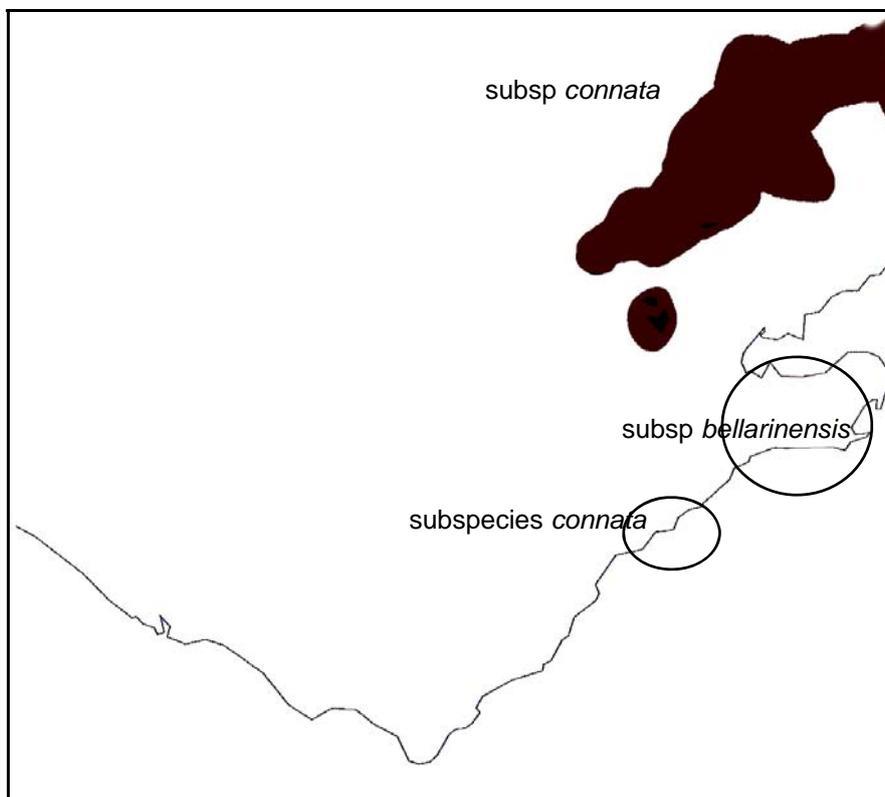
Tube stock preferred method as uses less seed.

Very successfully direct seeded (GAV n.d.) although may be inappropriate (higher seed use than tubestock) due to limited seed supply and status of subspecies.

Natural regeneration is from seed when pasture competition is lacking and in wet summers.

## SEED COLLECTION RANGE - *Eucalyptus leucoxylon* subspecies

*Eucalyptus leucoxylon* is an extremely diverse and complex species, such that it can be difficult to recognise subspecies in the field. The two subspecies which occur in Corangamite are threatened plants listed under the Flora and Fauna Guarantee Act, 1988. Consideration should be given to collecting seed as part of a regional conservation program supported by the Department of Sustainability and Environment in line with the Action Statement. With few plants and poor seeding rates, over-collection of subspecies in the Geelong region could threaten small populations.



**MAP: *Eucalyptus leucoxylon* subspecies *connata* & *bellarinensis* distribution**

DATA SOURCE: DSE Flora Information System, 2004, accessed November, 2005

- Larger populations of *E. leucoxylon* subsp *connata*
- Isolated populations of each subspecies

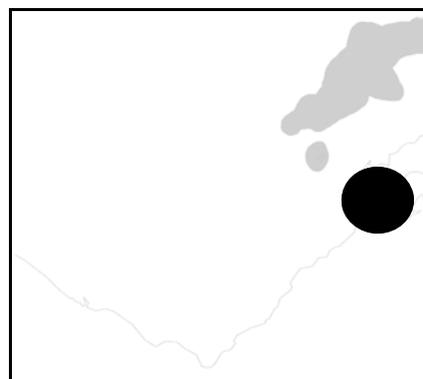
***Eucalyptus leucoxylon subsp bellarinensis***

**Narrow—within which, seed should be collected from remnant stands that are close to the revegetation project.**

Extremely limited in distribution and threatened in the region, collection should be limited to providing seed back to existing remnant stands. Genetic viability of small sites is a concern and genetic research is planned for 2006-7.



*Eucalyptus leucoxylon subsp bellarinensis*



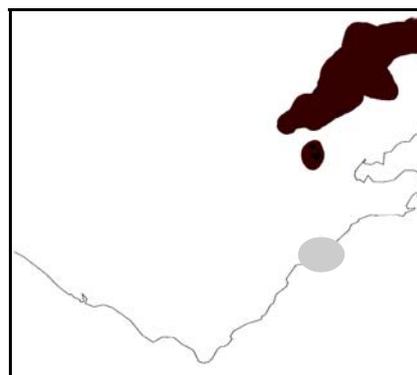
***Eucalyptus leucoxylon subsp connata—Brisbane Ranges area***

**Intermediate —within which, seed collection can be extended to formally contiguous remnants.**

Populations within the Brisbane Ranges are considered the most extensive. It is appropriate to collect widely and from at least 30 parents to revegetate areas close to this population.



*Eucalyptus leucoxylon subsp connata*



***Eucalyptus leucoxylon subsp connata –coastal remnants***

**Narrow—within which, seed should be collected from remnant stands that are close to the revegetation project.**

Coastal populations are both isolated and on the extreme of the natural range for Yellow Gum and are under different environmental conditions to other populations. Genetic research is required to determine the difference between coastal populations and Brisbane Ranges populations (research planned for 2006).



*Eucalyptus leucoxylon subsp connata*

