

Snug Tiers walk 22.2.22

With Neil Davidson

1. Paleo- history

- SE Tas provided a refuge for plant species during the last glaciation.
- Sea levels were much lower than today and wide diversity of plant species, including eucalypts occupied extensive habitats on what is now the continental shelf off the mouth of the Derwent River.
- From 10,000 years ago, as the climate began to warm, plant species started moved up-slope into new habitats as they became available.
- Snug Tiers offered a great diversity of habitats.
 - from low to intermediate in altitude,
 - highly varied geology,
 - on each rock type varied ecological niches - from shallow soils on drought prone ridges to waterlogged depressions exposed to intense frost.
- Consequently, Snug Tiers has high species diversity
- Snug Tiers is home to 18 of the 30 eucalypt species in Tasmania

2. Eucalypt species

Monocalyptus

Ashes: *E. regnans*, *E. obliqua*, *E. delegatensis*

Peppermints: *E. tenuiramis*, *E. pulchella*, *E. amygdalina*, *E. nitida*, *E. coccifera*

Symphyomyrtus

Gums: *E. globulus*, *E. cordata*, *E. urnigera*, *E. johnstonii*, *E. gunnii*, *E. ovata*, *E. rodwayi*, *E. viminalis*, *E. dalrympleana*, *E. rubida*,

3. Geology – has a big effect on plant stress

Permian mudstone:

Sedimentary - laid down in a shallow sea during glaciation - formed from fine glacial till + drop stones

Rock is fine grained, horizontally bedded, strongly cemented, highly fossiliferous

Rock weathers to shallow powdery soils which are highly drought prone on N-facing ridges

Triassic sandstone:

Sedimentary – laid down across broad valleys by braided rivers

Rock is coarse grained and commonly cross bedded as a result of changes in river flow.

Rock weathers deeply to sand and sandy loam

Jurassic Dolerite

Igneous – rose in dykes and commonly intruded between mudstone and sandstone rocks. Formed a massive 100m thick sill over south eastern

Rock is coarse grained, during cooling cracked into hexagonal columns (e.g. Mt Wellington)

Weathers to boulders and dense yellow brown clay high in montmorillonite which expands when wet and cracks when dry.

Extensive block faulting during the **Tertiary** resulted in many sharp changes between the above rock types around Hobart.

Study area at Snug Tiers

During my PhD 1981-1984 I studied the ecological factors controlling the sharp changes in eucalypt species dominance at Snug Tiers.

I focussed my study on one depression and the surrounding ridges.

I focussed on 6 eucalypt species that were arrayed around this depression:

Monocalyptus: *E. delegatensis*, *E. coccifera*, *E. pulchella* and Symphyomyrtus: *E. gunnii*, *E. johnstonii* and *E. urnigera*.

I established fenced reciprocal transplant trials of 144 seedlings (24 replicates of each species) at 5 sites within canopy gaps in natural stands of each of the 6 species. Note *E. delegatensis* and *E. urnigera* were codominant at one site.

I studied the performance of the planted seedlings in response to environmental stresses – frost, drought, waterlogging, nutrition.

I conducted studies in the field on natural stands

I conducted glasshouse studies on potted seedlings exposed to artificially induced stress (frost, drought and waterlogging).

Topics covered

- Competition in the absence of extremes
- Severe winter frost – gardens, natural stands and glasshouse
- Out-of-season summer frosts – gardens and glasshouse
- Interaction between frost and waterlogging – glasshouse
- Waterlogging – subgeneric differences – glasshouse
- Drought – soil water deficit and dry winds – gardens, natural stands and glasshouse
- Hybridisation between lowland and upland species.