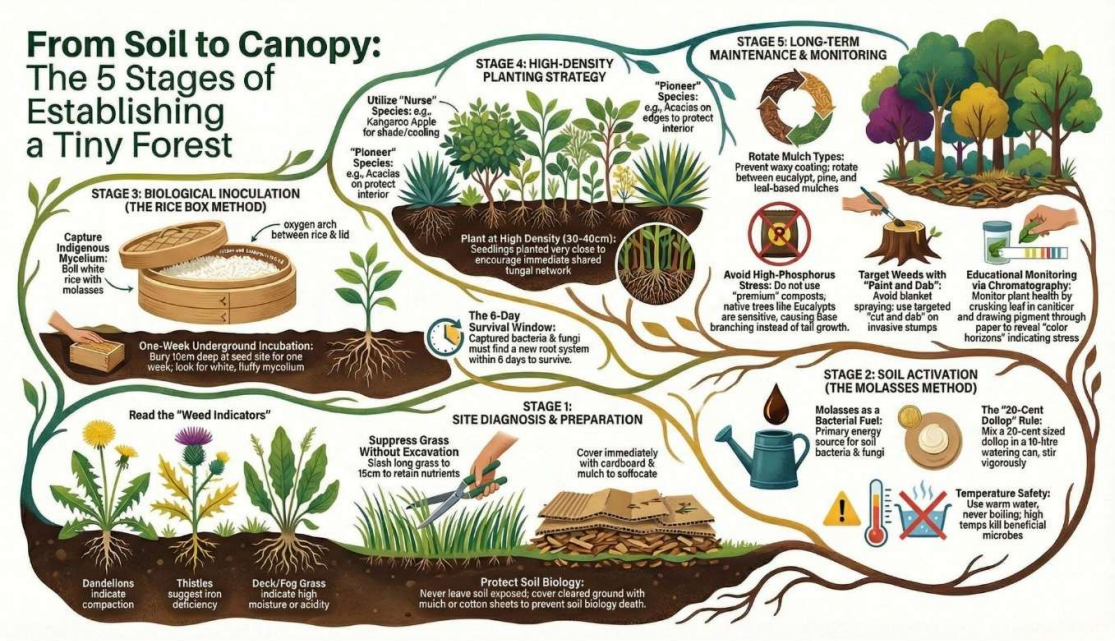
My Tiny Forest



The following notes are on from a visit by Penny Hoswell from Wollongong Botanic Gardens advising on establishing a tiny forest at Robertson Primary School. The notes are thanks to Gaye White of WinZero.

Establishing a **Tiny Forest** involves creating a complex, high-density biological system where plants mimic natural rainforest ecosystems by sharing resources through underground networks. The following details outline the specific techniques and biological principles required for success, based on the session's discussions.

Core Principles of Tiny Forests

Tiny Forests are based on the concept of **high-density planting**, in this example at Robertson Primary School to use **rainforest species** that grow close together and share resources. Unlike traditional plantations where trees are often isolated, a Tiny Forest mimics a natural ecosystem where plants support one another through a complex underground network.

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Symbiotic Relationships: Trees in these systems rely on a **"parent" relationship**. In nature, a parent tree signals to its offspring when they reach the sunlight, allowing specific fungi to colonise their roots and provide nutrients.

Biological Health: The success of the forest depends on **fungus and bacteria** (mycelium) colonising the root systems. This biological activity helps plants sequester carbon and build humus.

The Importance of Diversity: Most rainforest species are "sharers," though some plants, such as banksias or certain palms, prefer to remain in colonies of their own kind

The Role and Proportion of Molasses

Molasses acts as a primary energy source for the soil bacteria and fungi that provide nitrogen and phosphorus to the trees.

- **Watering Proportions:** For the initial "watering in" of seedlings, add a **"20-cent dollop"** of molasses to a standard **10-litre watering can**.
- **Mixing Technique:** It is essential to **stir the mixture vigorously** to ensure the molasses is fully dissolved rather than settling at the bottom.
- **Temperature Safety:** While **warm water** can be used to help the molasses dissolve, you must **never use boiling water**, as high temperatures kill the beneficial bacteria and fungi.
- **Soil Activation:** Molasses is also applied to the ground before laying down cardboard and mulch to kickstart biological activity and help suppress existing grass.

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Biological Inoculation: The Rice Box Method

To ensure young trees thrive as if they were still with their "parent" trees, this technique captures specific indigenous soil biology from the seed's original site.

- **Preparation:** Boil white rice with **molasses and water**. Use a **steamer-style rice box**, filling it only to the top of the bottom rim. This is crucial to maintain an **"oxygen arch"** between the rice and the lid, which allows the fungi to grow.
- **Inoculation:** Bury the box **10 cm deep** at the original site where the seeds were collected. Cover it with soil and leaf litter for **one week**, ensuring you do not squash the area down with your feet, as this would collapse the necessary oxygen arch.
- **Monitoring Success:** A successful box will be filled with **white, fluffy mycelium**. If the rice shows **green mould**, it indicates that moisture or pressure caused the lid to touch the rice, and the process must be repeated.
- **Application:** These boxes must be placed **directly beside the root systems** of new seedlings during planting. The captured bacteria and fungi must find a root system within **six days** of being removed from their original site to survive.

Site Preparation and Soil Health

Preparation focuses on suppressing grass and maintaining soil moisture without disturbing the existing biological structure.

- **Grass Suppression:** Instead of excavating, use a layer of **cardboard, molasses, and mulch** to suffocate grass. If the grass is long, slash it to about **15 cm** before covering; at this height, it provides the maximum amount of protein and nutrients to the soil as it decomposes.
- **Avoiding Phosphorus Stress:** Do not use "premium" high-phosphorus composts. Native trees are highly sensitive to **excess phosphorus**, which can cause them to become stressed and **branch out from the base** rather than growing tall and straight.

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- **Weed Indicators:** Use existing "weeds" to diagnose the site before you begin. **False dandelions** indicate soil compaction, **thistles** suggest an iron deficiency, and **dock or fog grass** indicate high moisture or acidic soil.

The eucalypt trees at the Wollongong Botanic Gardens branched from the base because they were exposed to **excessively high levels of phosphorus**.

Penny explained that while establishing a Tiny Forest at the Wollongong Botanic Gardens, compost was ordered that was intended to be low in phosphorus. However, the product delivered was a "premium" variety with high phosphorus content. This caused the eucalypts to become **stressed**, resulting in them **branching like a mallee** instead of growing tall and straight.

Key insights regarding this branching include:

- **Phosphorus Sensitivity:** Native Australian plants, particularly eucalypts, only require phosphorus in **very small amounts** to grow taller; high levels are detrimental to their natural growth pattern..
- **Stress Response:** The branching from the base is specifically identified as a **stress response** to the nutrient imbalance in the soil.
- **Planting Errors:** Because volunteers were used to plant the trees, some may have skipped using the corrective potting mix intended to buffer the high-phosphorus compost, further contributing to the branching issues.

To avoid this in future Tiny Forest projects, the sources recommend **avoiding excavation** and not adding extra phosphorus-heavy fertilizers or composts, instead relying on the natural fungus in the soil.

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Planting and Maintenance Strategy

Tiny Forests rely on high density and the use of "nurse" species to protect sensitive seedlings and encourage resource sharing.

- **High-Density Spacing:** Seedlings should be planted very close together, typically **30 to 40 cm apart**, to encourage the development of a shared fungal network.
- **Optimal Timing: Autumn** is the preferred season for planting, as it offers better moisture conditions and less environmental stress than the spring.
- **Species Succession:** Start with **pioneer species** like Pittosporums and Acacias. It is recommended to plant **Acacias toward the edges** of the forest; because they are shorter-lived, they can damage slower-growing interior trees when they eventually fall.
- **Nurse Trees:** Using **Kangaroo Apple** at the ends of planting rows can provide essential **shade and cooling** for younger seedlings during hot periods.
- **Mulch Rotation:** To prevent a **waxy coating** that rejects water, do not use the same type of mulch (like eucalypt) repeatedly. Rotate between eucalypt, pine, and leaf-based mulches to break the cycle of tannins.

Penny provided several warnings and observations regarding the spraying of weeds, particularly in the context of soil health and the establishment of Tiny Forests:

• **Loss of Soil Biology: Penny warned that when weeds are poisoned, some of the essential soil fungus is lost**. While she acknowledged that using Roundup is sometimes necessary or "okay," the chemicals do have a negative impact on the microbial networks.

• **Blanket Spraying Concerns:** She expressed specific interest in whether the weed management involved **blanket spraying or individual targeted spraying**. This distinction is important because blanket spraying is more likely to damage the broader soil ecosystem.

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- **Logistical Coordination with Cardboard:** Penny advised that if a site is being treated with spray, you should **"whip up the cardboard"** to work around the spraying schedule. This suggests that the cardboard mulch layers should be managed carefully to ensure they do not interfere with the spraying or vice versa.

• **Exposure of Soil:** A significant warning from Penny was that **exposing the soil after clearing weeds** (like privet) is detrimental. She noted that once you cut weeds low and expose the ground, the **soil becomes "dead to everything"** due to exposure. She insisted that the soil must be covered as quickly as possible—even with cotton sheets or towels—to protect the biology.

• **No-Poison Alternative:** For some areas, she suggested that you can avoid poison altogether. Her preferred method is to **plant directly into the area without poison**, provided you **cover the site** immediately to suppress the remaining weeds.

• **Paint vs. Spray:** The sources note a preference for **painting (cut and dab)** weeds with poison rather than spraying them, as it is a more targeted approach used by professional bush regenerators. Penny mentioned that if they dab Roundup on a cut stump, it usually needs about **90 minutes** to be effective and ensure the plant does not resprout.

Educational Monitoring (This might be something that Penny might like to demonstrate with the children in a session)

For groups wishing to monitor plant health, **chromatography** can be used as an educational tool. By crushing a leaf in hand sanitiser and drawing the pigment through paper, participants can see **"colour horizons"** that identify what specific environmental factors are currently stressing the plant.

Penny suggested, **chromatography** be used as a diagnostic and educational tool to monitor the health of seedlings as they transition from a protected environment into the sunlight.

The following details outline the process and purpose of this technique:

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- **Procedure:** To perform the test, a leaf is taken from a plant and crushed. The crushed leaf material is then placed in a small cup with a piece of torn-off paper and **hand sanitiser**.
- **Observation:** Over a period of a few hours, the liquid is drawn up the paper 1. As it rises, it creates different **colour horizons**..
- **Diagnostic Use:** These colour horizons allow observers, particularly students, to identify what is specifically **stressing the plant**. By analysing the distinct colours that appear, it is possible to determine how the plant is reacting to its environment 1.
- **Educational Context:** This process is often used with children to help them identify "what's just happening" with the trees. It provides a visual representation of the plant's internal state, such as its reaction to sun exposure after being moved from a nursery setting..

Australia Handbook for Tiny Forest**. It isn't exactly what Penny recommends but may be a useful resource.**

This is the plant list **from the Wollongong Botanic Gardens Tiny Forest**