Shade House Structures

- How I built shade houses for my orchids
- Things that worked
- Things that didn't work

Murray Baker — OSWA — 22 November 2024

Before there was a Shade House

Orchids were hung:

- under the eaves of the house (messy, cluttered, head banging)
- on the clothes line (plants invariably got sun-burnt when first put there, even in April)
- under a sheet of plastic stretched between the house and the fence (messy, cluttered, head banging)

→ a shade house was needed!

Considerations

The shade house should:

- be as large as possible
- receive lots of daylight
- have good air movement

→ location is important

Considerations

The shade house should:

- be as large as possible
- receive lots of daylight
- have good air movement

→ location is important

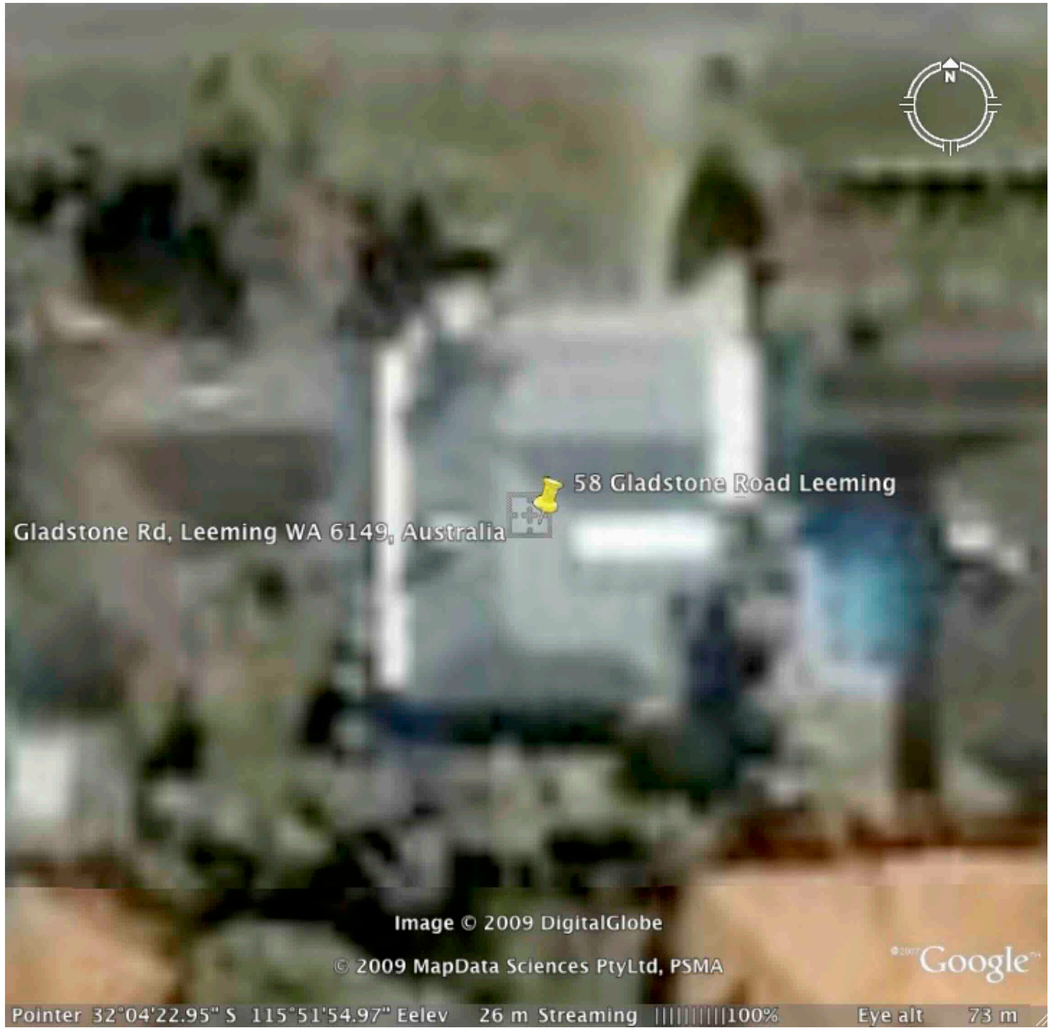
The shade house should also:

- be easy to build
- be easy to maintain
- have plenty of space for orchids
- maintain humidity
- keep pests out

→ design is important

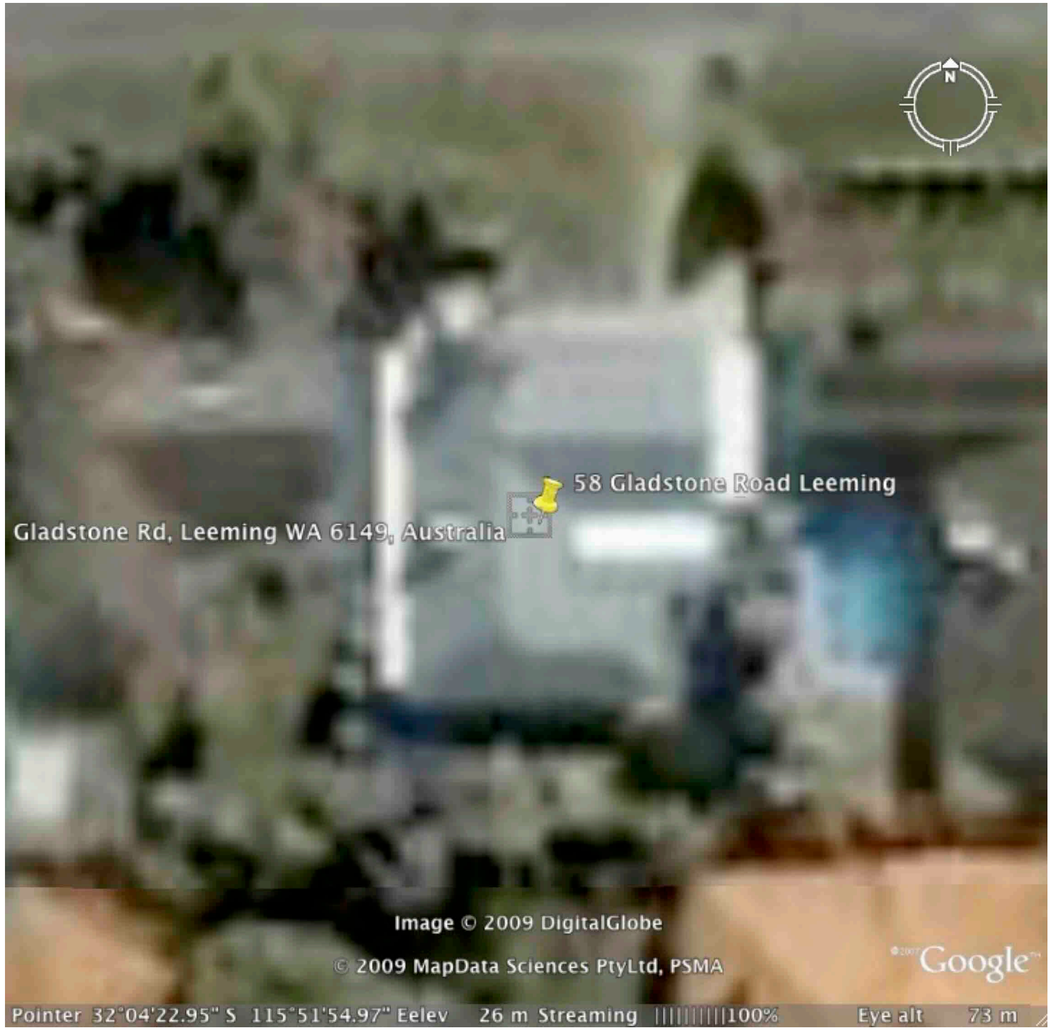
The site

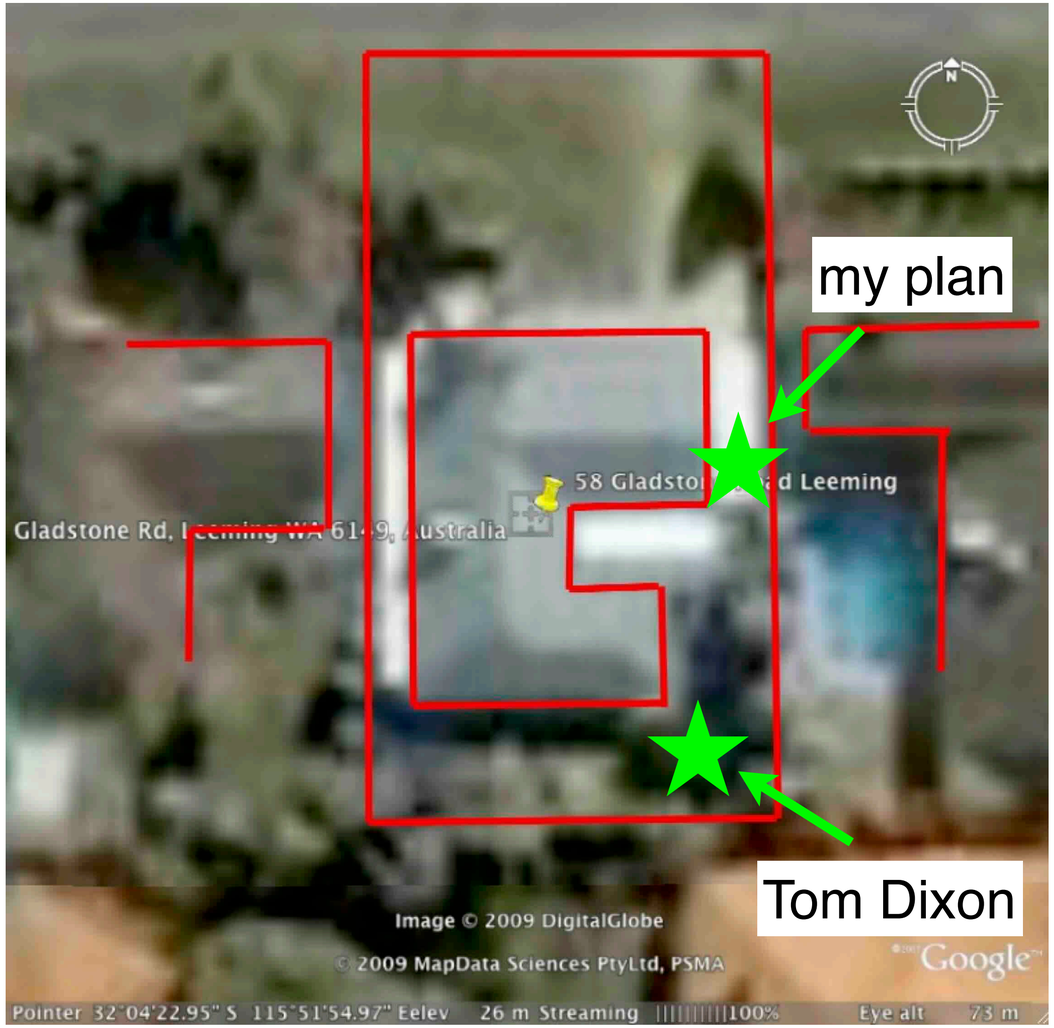
Google Earth images from 2009



The site

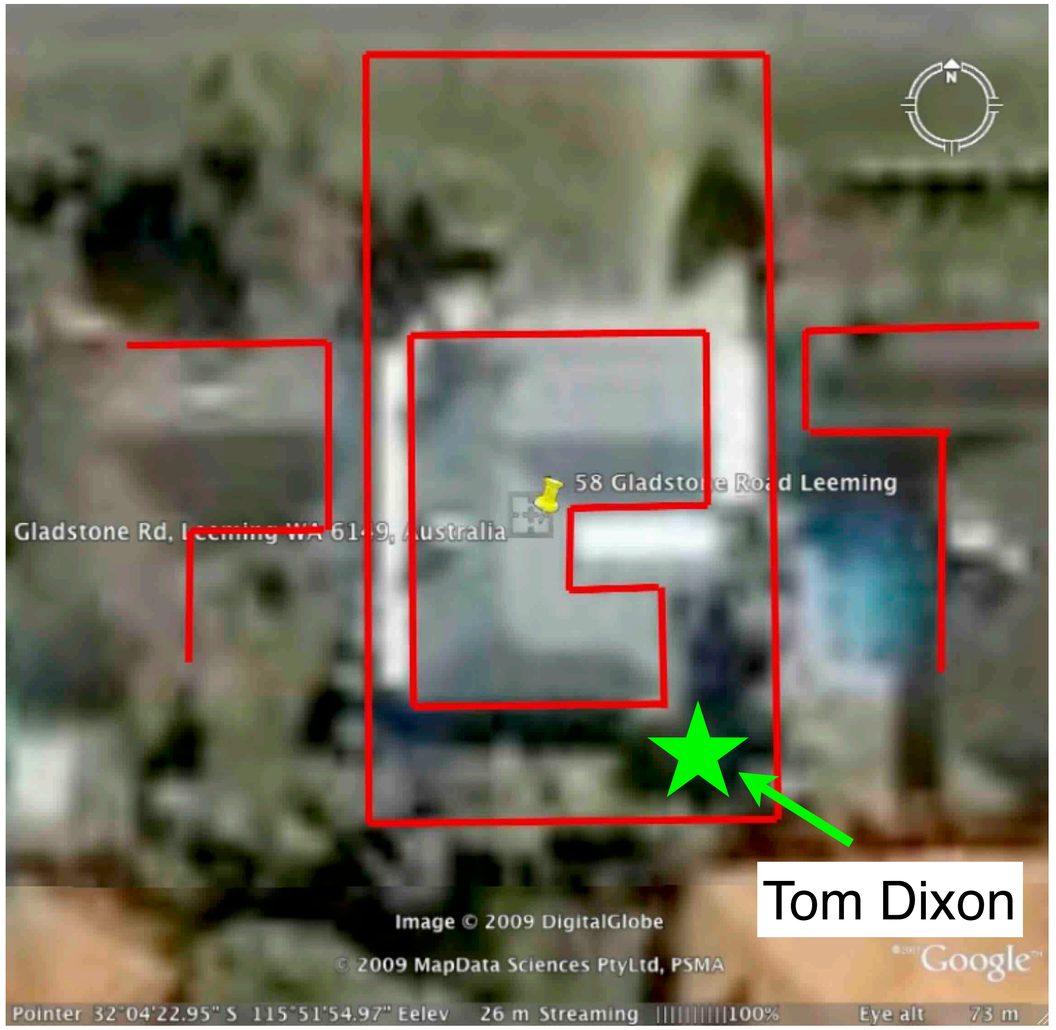
Google Earth images from 2009





The site

Google Earth images from 2009



A commercial shade house?

- mesh construction
- requires a level site
- expensive (compared to what I could make myself)
- specific sizes (not easily customisable to my site)

Building my own Shade House

My goals:

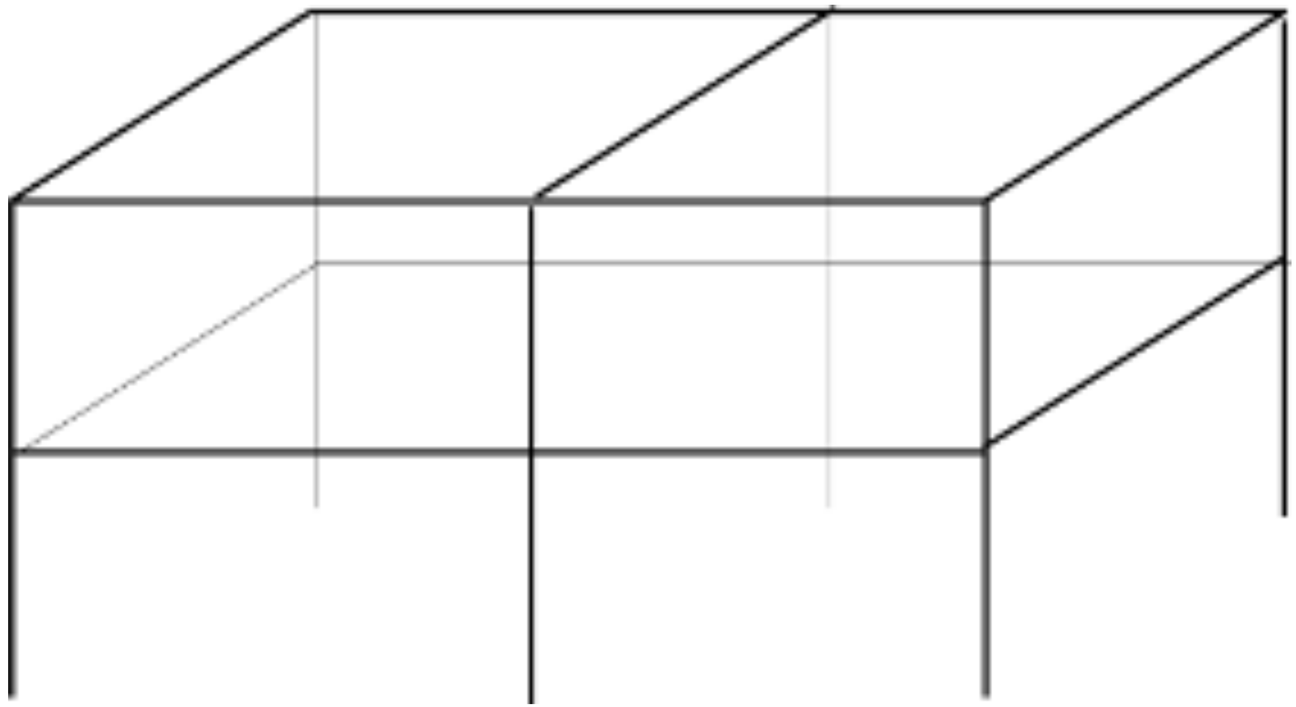
- build a functional shade house that looks decent
- build it in a way that is tolerant of mistakes
- do it cheaply and simply

So:

- no irreversible things...no welding, no concrete or cement...and no heavy or awkward components

The plan

- a box covered with shade cloth
- 4 m x 3 m area and 2.4 m tall
- a door somewhere
- some benches inside (attached to frame)



Building materials

galvanised pipe

galvanised pipe fittings

galvanised mesh

Building materials

- galvanised pipe
- galvanised pipe fittings
- galvanised mesh

Midalia Steel

DCW Enterprises (Maddington)

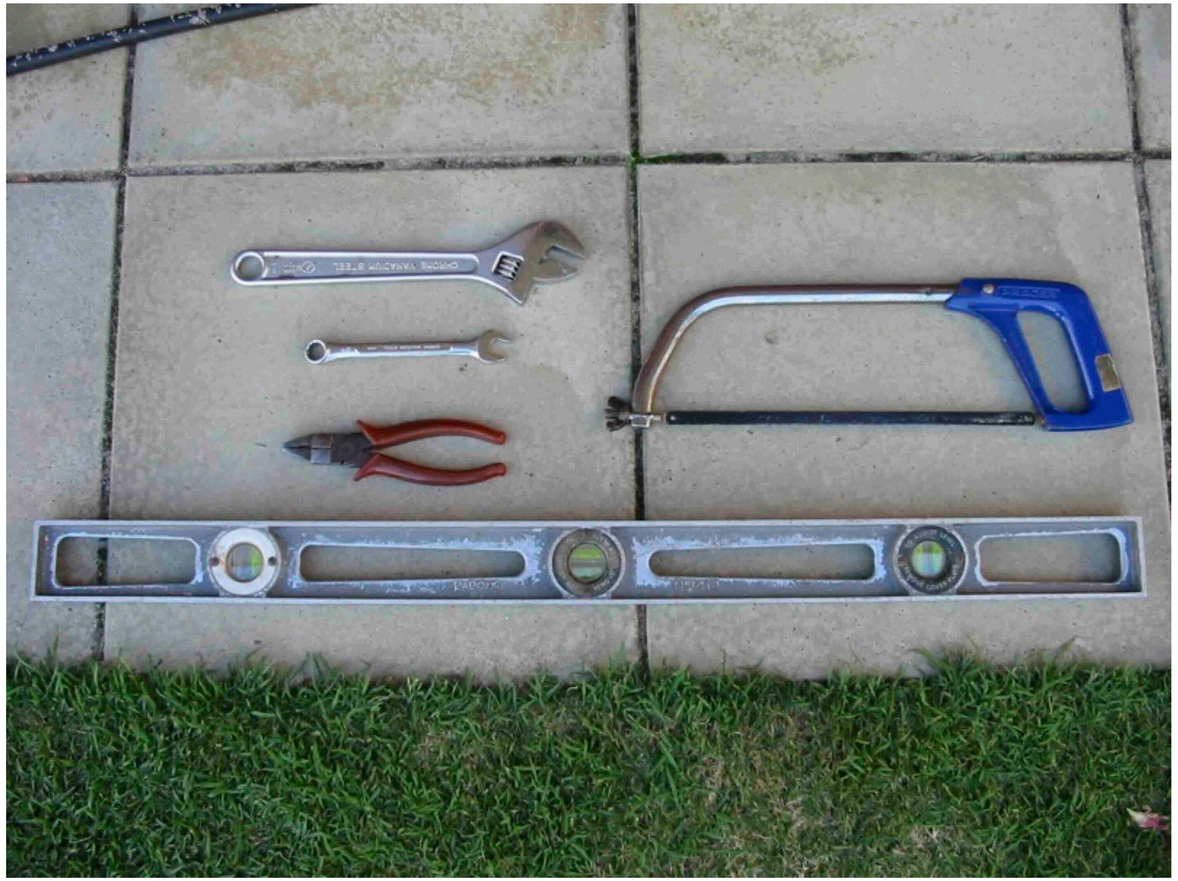
- galvanised wire
- cable ties

Bunnings

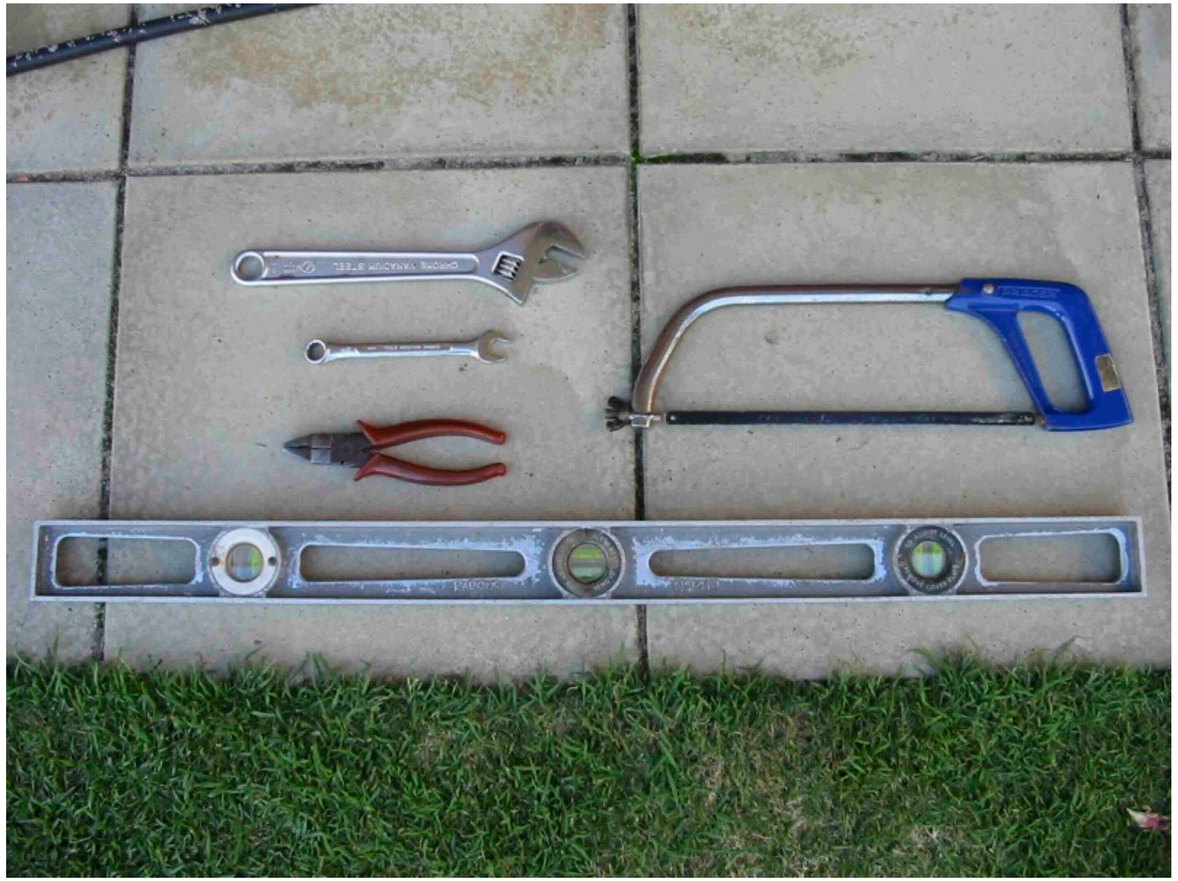
- shade cloth

Bunnings, DCW Enterprises, Jaylon (Malaga)

Tools



Tools



... and a ladder and some milk crates to reach high places

The finished product

- galvanised fittings for door
- benches are attached to the frame
- not anchored

The finished product

- extra pipe on each side near roof
- benches and roof are level but ground is not

The finished product

- 75% green knitted shade cloth
- lots of cable ties to hold the shade cloth nicely in place
- need an extra layer of shade cloth over the top in summer

The finished product

- ethernet cabling to hang pots
- floor lined with jarrah sawdust

The finished product

- North-facing door → extra shade cloth in door frame

- ferret-proof

What worked?

- construction was easy (even benches and door)
- metal frame was robust, benching increased rigidity
- no need to anchor the shade house (it was heavy)
- fitting shade cloth was tedious, but the final product looked nice
- no barbed wire!

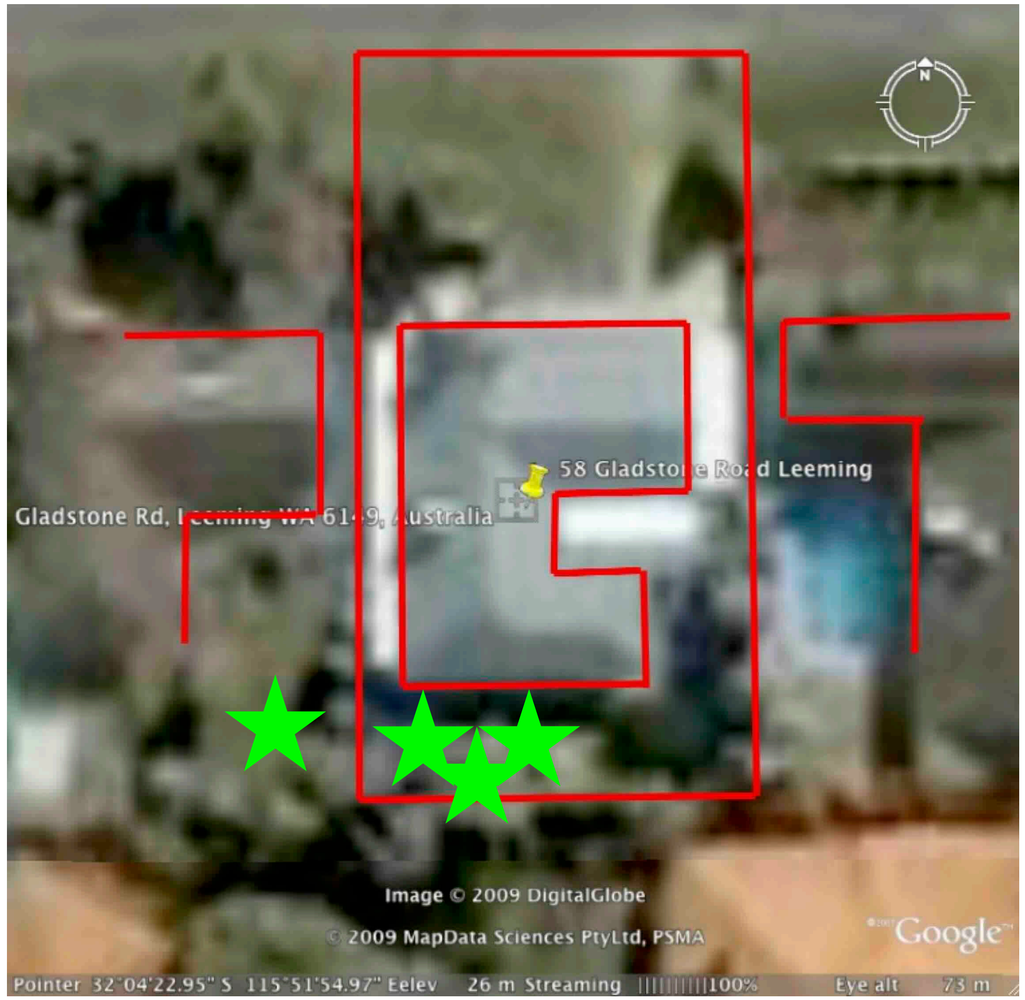
What didn't work?

- mesh (3 mm wire) too thin → sagged
- benches were width of a sheet of mesh (1.2 m) → too wide
- shade house not tall enough?
- ethernet cabling hanged too low
- no protection for plants from winter rain
- cable ties → ongoing maintenance
- jarrah sawdust was messy *and did not raise humidity* !

Reclaiming the back yard

Before

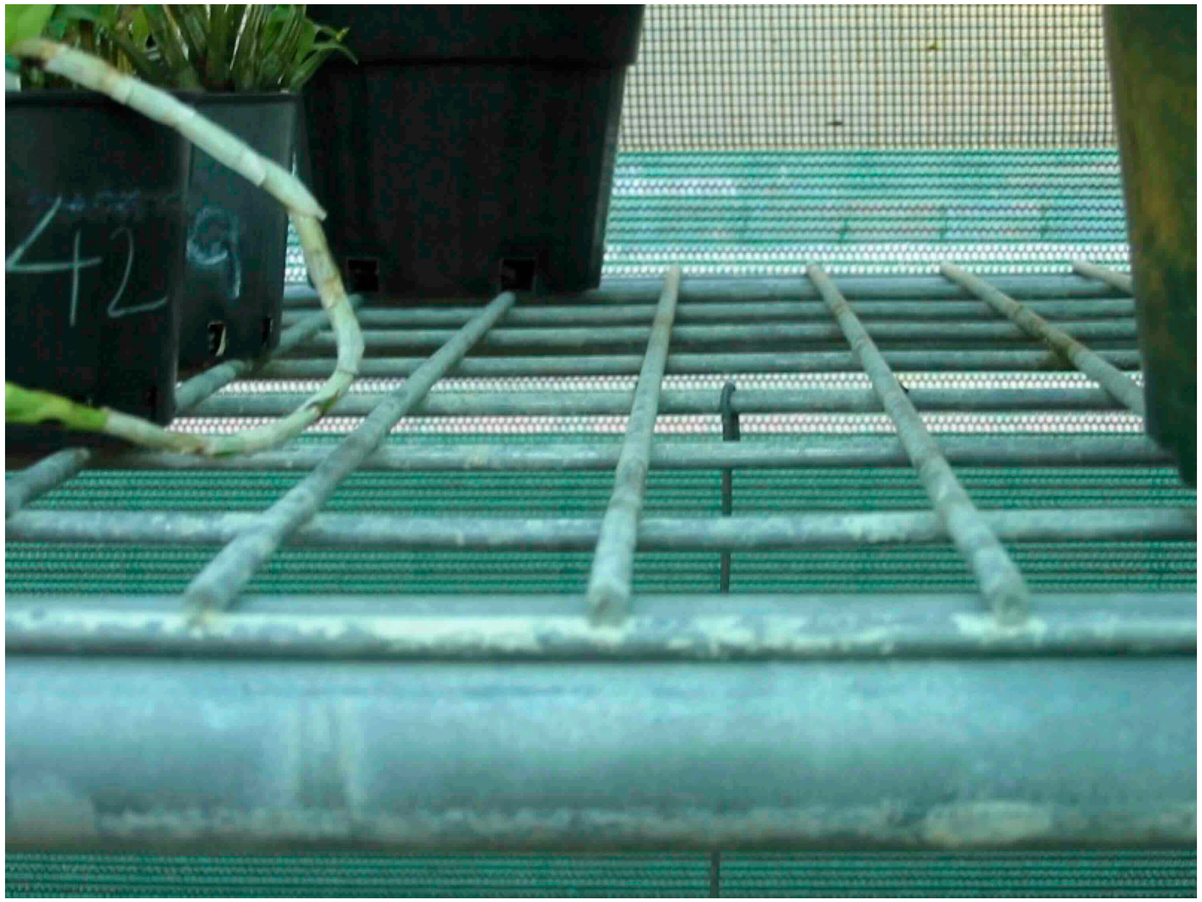
After



The Shade House was easy to move

grrrr...

Improvements



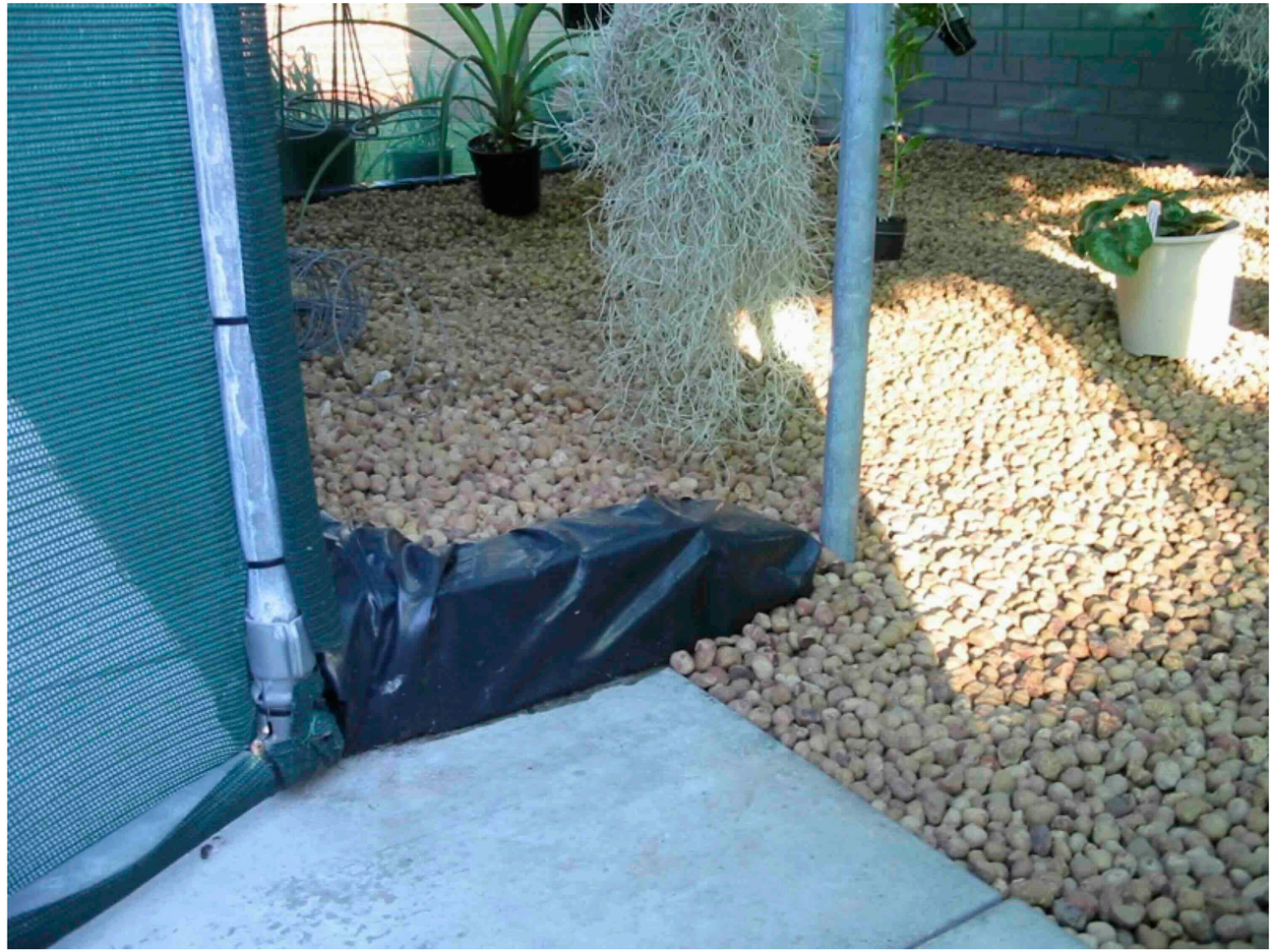
- stronger mesh (5 mm wire, 50 x 75 mm grid)
- narrower benches (53 cm)

→ benches do not sag

→ pots fall over more easily

→ not enough bench space for plants!

Improvements



- floor lined with black plastic that has a few holes poked through for drainage
- floor covered with pebbles → much cleaner than jarrah sawdust
- brick border keep out weeds

Improvements

- extra pipes up high
- knots in ethernet cable

→ not ideal for hanging pots

→ no easy way to protect plants from winter rain

- reticulation! → watering
- electricity! → never used

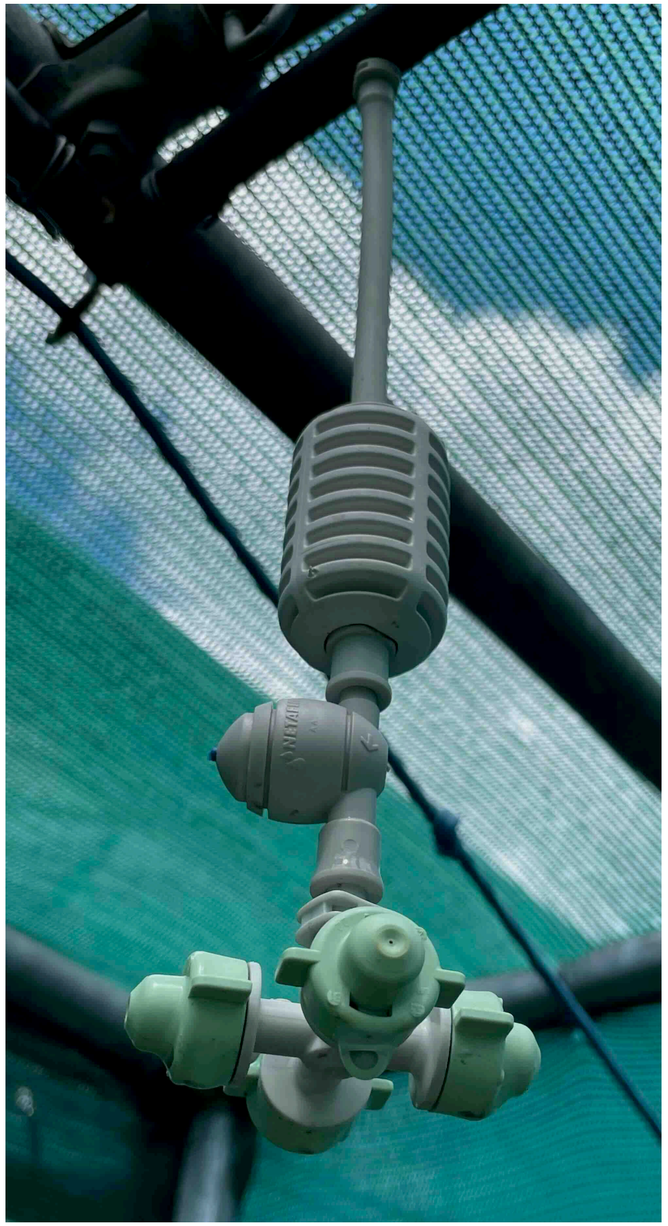
Improvements

- Netafim watering system

→ 10 - 20 minutes for watering

→ 10 - 30 second bursts for misting (to temporarily raise humidity and for cooling)

- easy cleaning and/or replacement of misting heads
- colours of misting heads and anti-drip parts are important!



Current setup

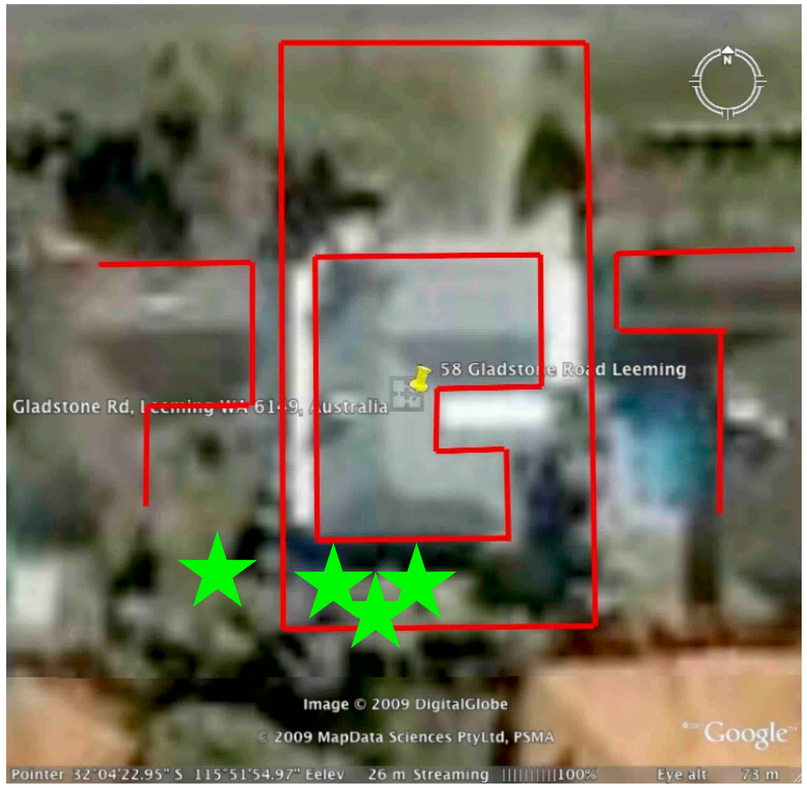
- benches too close together and too narrow
- still no protection from winter rain
- nowhere good for hanging plants
- plants yellowish

→ too much light and/or not enough fertiliser 😬💀

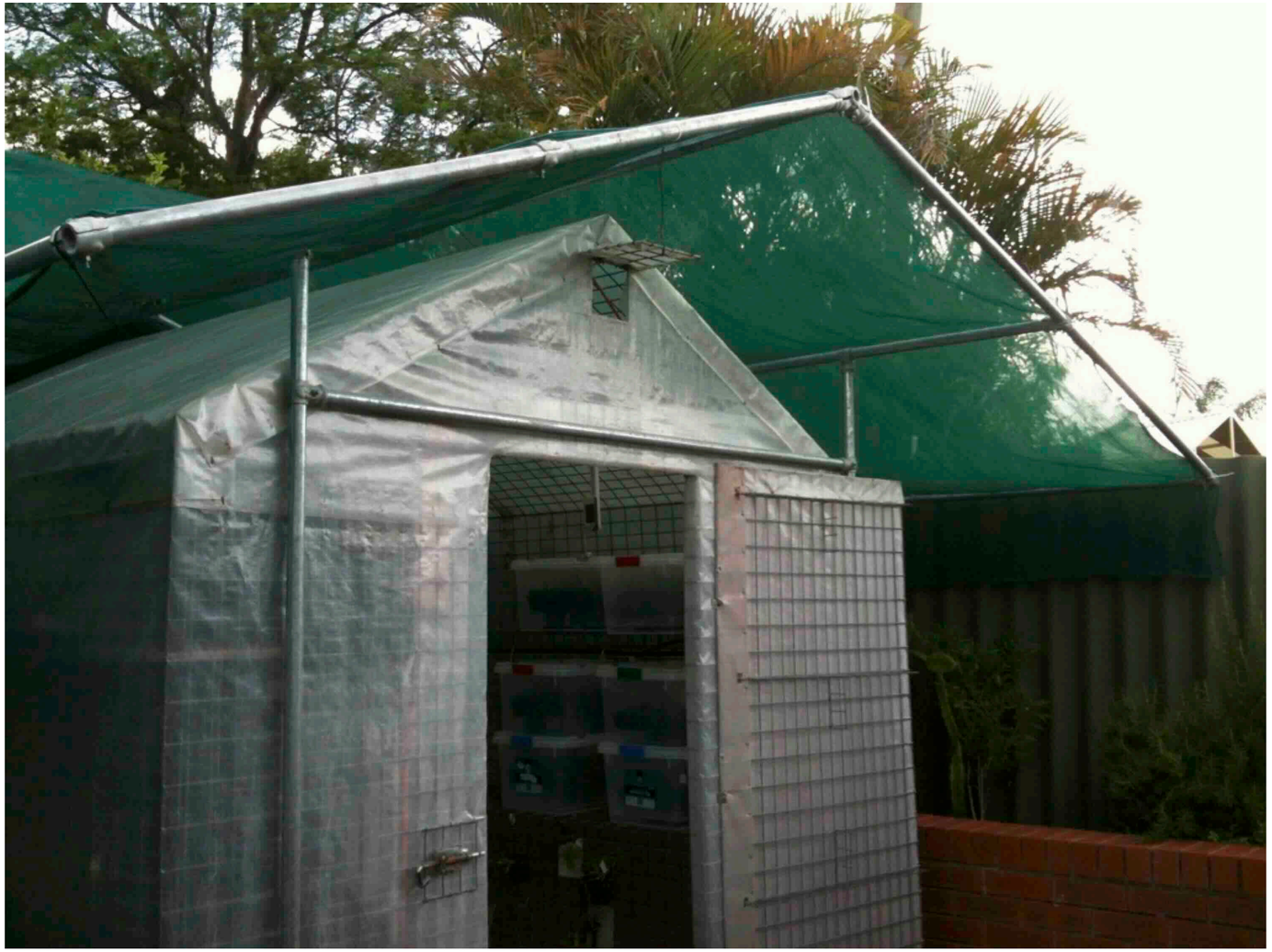
Current version

- reticulation → automatic, works even while I'm away
- internet access to watering controller
- watering/misting system helps with low humidity in summer
- hanging plants → meh!
- need extra shade in summer

Shade House Structures 2, 3, and 4



The Hothouse



- second hand from a retired OSWA member
- originally 3.6 m x 2.4 m
- to fit available space, re-assembled as 2.4 x 2.4 m
- Solarweave skin, no insulation
- shade cloth suspended above the Solarweave

The Hothouse

- for insulation, added covering made of pool blanket
- the blue pool blanket filters out other colours of light, especially red
- red is needed for healthy growth! 💀💀💀

The Hothouse

- In its original form, the hothouse was designed with hand-watering of orchids in mind.
- A qualified electrician was employed to install outdoor power points inside the hothouse.

Later additions included:

- timers to control switching on and off for fans and heaters
- one complicated irrigation controller for the hothouse and shade houses
- humidity sensor + control
- temperature sensor + control

The Hothouse

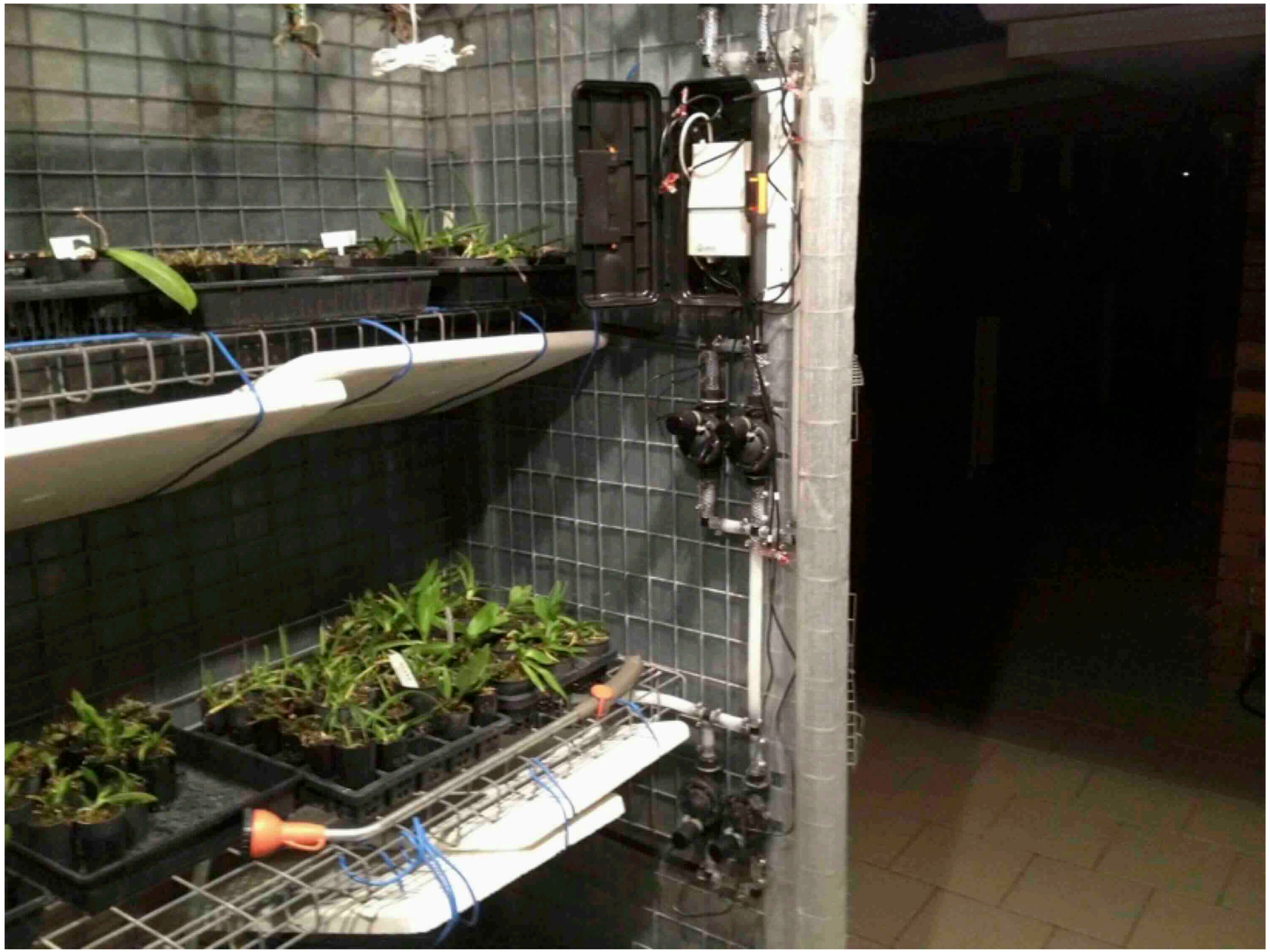
- two tiers of shelves
- water trays for humidity
- fan for air movement
- taps
- watering/misting system
- provision for heater
- provision for evaporative cooler

The Hothouse

The arrangement of power points and controllers inside the hothouse was too complicated!

- timers get out of sync → watering happens when fans are operating
- water and electricity, ugh!
- humidity in the hothouse could be controlled but the humidifier died → currently working to find a better solution

The Hothouse



- is a two-tiers system a good idea?
- putting a complicated irrigation controller system *inside* the hothouse was a bone-headed idea

The Hothouse

- evaporative cooler attached outside hothouse (saves space)
- filled automatically from mains (float valve from pet water bowl)
- cools in summer
- not very good for humidification

Watering/Misting control

- watering/misting timers now *outside* the hothouse
- all connections are screw-on or clip-on

Watering/Misting control

- watering of hothouse and three shade house areas controlled by Orbit B-Hyve
- accessible via internet
- automatically suspends watering if rain predicted
- battery operated

Watering/Misting control

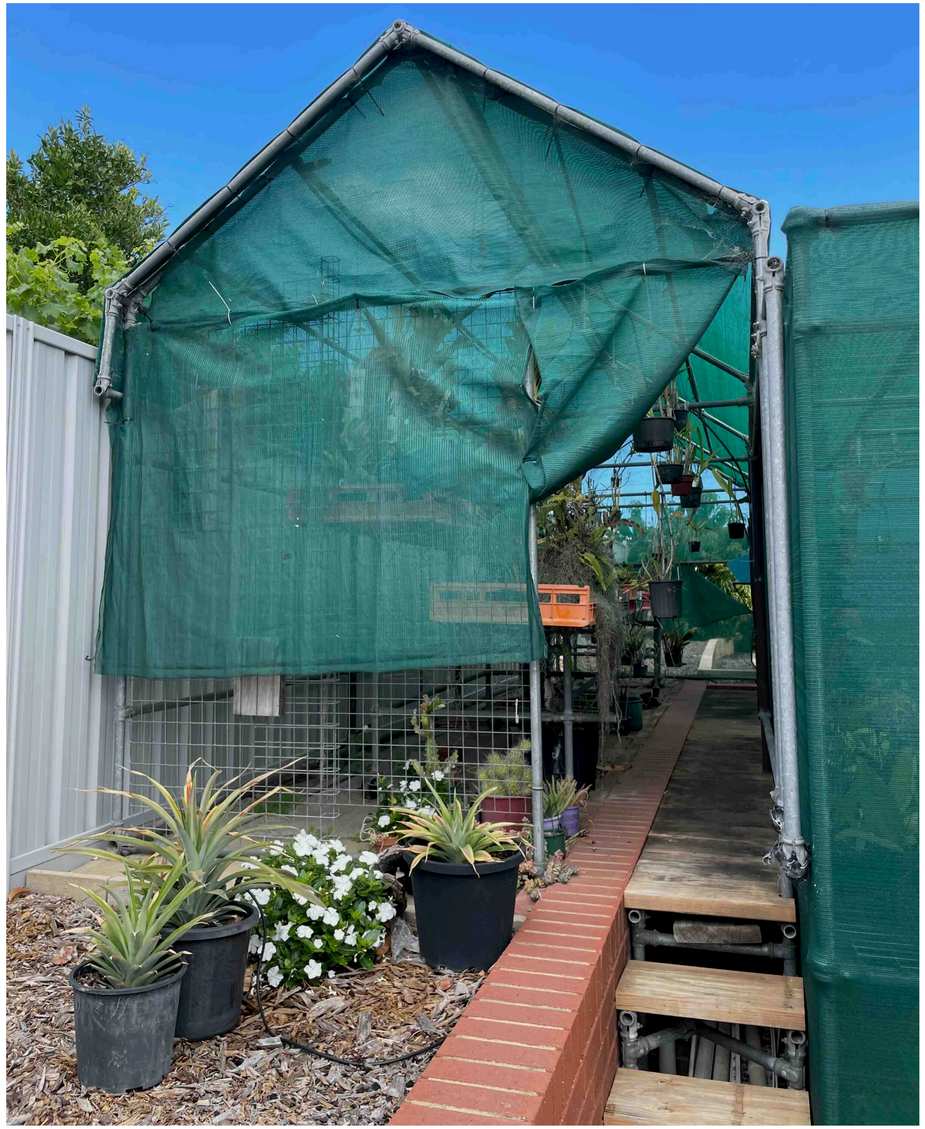
- misting of each shade house is controlled by a separate Holman misting timer
- not accessible via the internet
- battery operated

The long Shade House

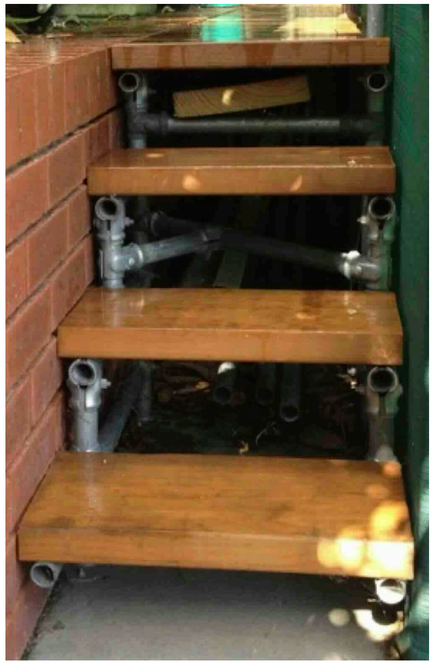
Complicated (but fun) build:

- gable roof
- long site (7.5 m)
- narrow site (2.2 m maximum)
- built over two levels

The long Shade House



- extra floor suggested by Malcolm Davis
- treated pine planks on galvanised pipe scaffold



The long Shade House

- galvanised pipe benches
- bread crates instead of mesh
- watering/misting
- hanging space
- front is shaded by another shade house

The long Shade House

- Shade cloth (75%) and Solarweave covers made by Jaylon
- Solarweave cover:
  - → Anzac Day — on
  - → Fathers Day — off
  - → excellent protection from winter rain

The long Shade House

The long Shade House

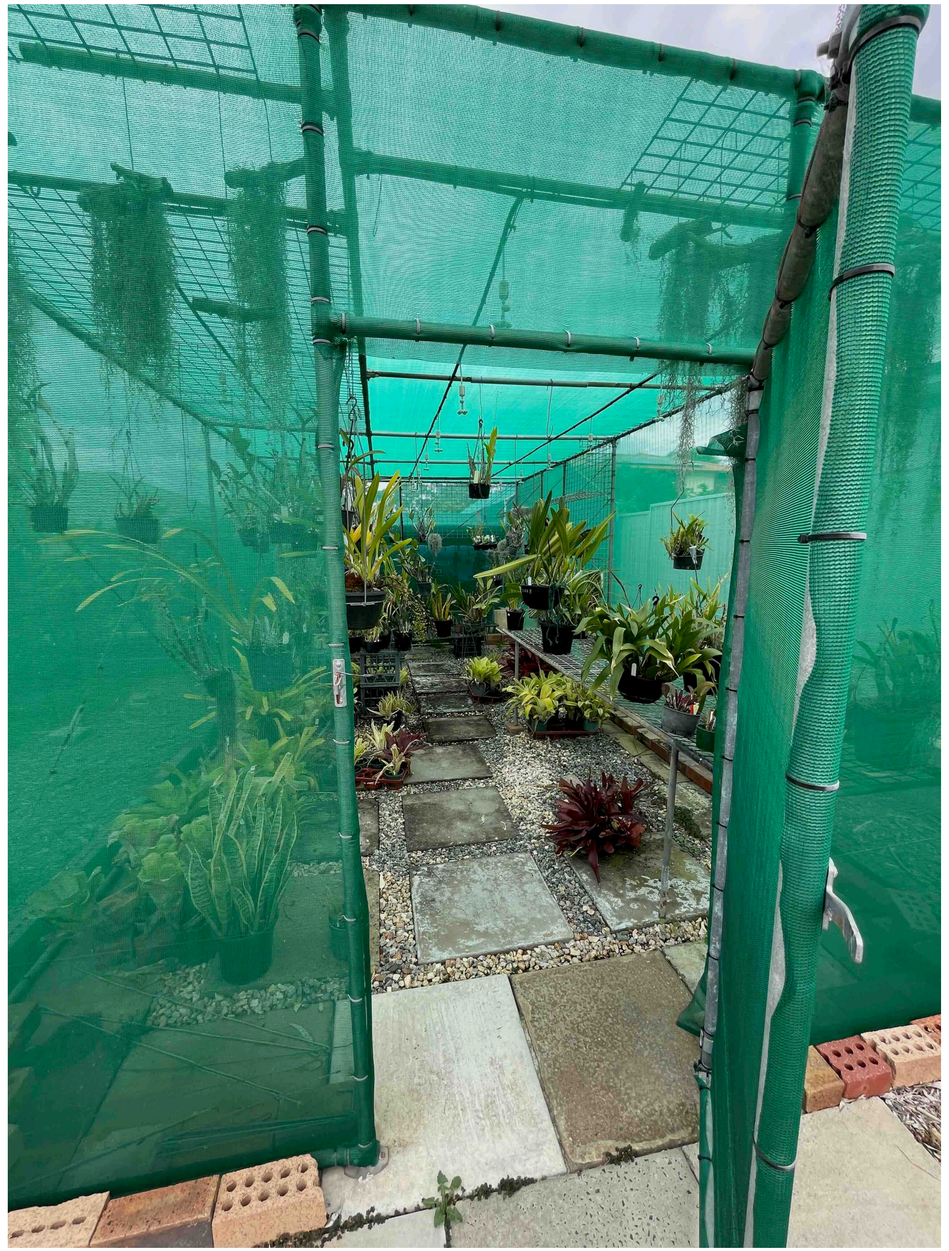
- slab floor
- benches on wheels
- slabs have subsided
- sewer is accessible?
- new fence work undermined slabs

The New Shade House

- Built using thin-walled galvanised pipe, length of pipe ~ 6.5 m, so:
  - → 6.5 m long
  - → 3.25 m wide
  - → 3.25 m
- slabs for footings
- 75% green shade cloth (??)
- bricks to keep weed seeds out

The New Shade House

- slabs for footings
- 75% green shade cloth quite stretchy, hard to measure and fit
- floor lined with Polyshade and covered with slabs and stones (Ian Duncan)



Thin-walled pipe not recommended

- long lengths of pipe sagged easily 😕
- shade house was quite wobbly 💀 💀
- mesh fixed to corners did not add rigidity 😕 💀

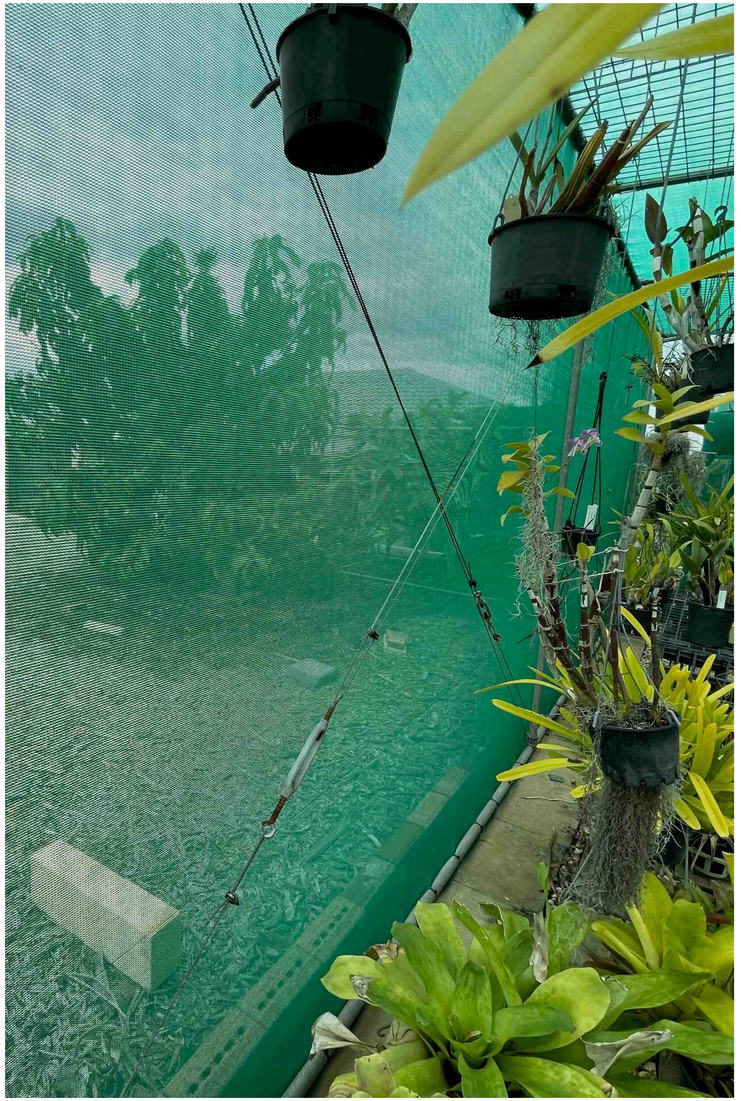
Thin-walled pipe not recommended

strong winds blew the structure off its footings

dodgy temporary(?) solution

Thin-walled pipe not recommended

- needed stainless steel tie wires for rigidity



The New Shade House

- stainless steel wires to support watering/ misting fittings
- benches from Raye McIntosh or made from mesh scraps
- mesh attached to high roof for hanging
- hanging area on the wrong side?

The New Shade House

- milk crates 🙃
- shelves surplus from hothouse 🙂
- still a work in progress

Shade House Structures

- A few of my ideas came from reading orchid books and magazines.
- Most of my ideas came from talking with other growers and seeing their setups (and taking lots of photos).
- Thank you to all the growers who have given me ideas.
- Thank you for listening.