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THE GREEN-ROOF Revolution

As gardens take to the sky, an Australian company is playing its part in the green-roof revolution by supplying lightweight products with an enviable history overseas.

With interest in non-traditional gardens booming, horticulture around the world is turning to new products and technology to make elevated and vertical plantings possible.

Fytogreen Australia, an Australian company based at Somerville in Victoria, is now entering its fifth year of business.

Its core product is a medium known as Hydrocell, a substance that by volume comprises 3% dry matter and 97% cavity. This cavity holds both water (up to 60%) and air (37% at saturation).

Formed from a urea amino-plast resin foam, Hydrocell is said to be environmentally safe, biodegradable, sterile, inert and water-based. It is non-hydrophobic, absorbing water readily.

The product is sold in two forms: as solid, hard foam Hydrocell RG30 for roof gardens and planter boxes, and as regular Hydrocell hard foam flakes for use in soil to aid turf, tree and garden-bed establishment and in potting mixes for hanging baskets, planter boxes and patio pots.

"Root hairs tend to grow into and through the Hydrocell flake," Fytogreen's Stuart Tyler says.

It is described as a "lightweight, water-efficient, roof-garden profile" used in the Netherlands for more than 20 years.

"Since 1985 two million square metres of roof gardens, podiums and planter boxes have been established in Europe using the Hydrocell profile," Tyler says. "Locally, Fytogreen Australia has created around 12,000 square metres of roof gardens.

"Its light weight reduces engineering costs and enables roof gardens to be built where previously they could not. It has huge water-holding capacity, which means less watering. Flytogreen's roof-garden profile

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profile can hold enough water for up to one month's watering, yet saturated it is still lighter than the dry weight of traditional podium soil profiles.

"It is water-efficient, cutting maintenance costs, and requires 50% less water than traditional podium soil but has increased root-growing volume in a thinner profile, allowing plants to flourish."

Tyler says Hydrocell is low in organics to prevent slumping, needs no top-up, is open and free-draining, and does not stain paving.

"It has a stable, long-life expectancy, with examples showing a 20-year-plus life span," he says.

Hydrocell is suitable for use in all types of roof gardens. Extensive gardens with shallow profiles of 80 millimetres to 100mm require no maintenance and are ideal in inaccessible areas, planted with sedums and other succulents and grasses.

Semi-extensive gardens with a thin profile of 100-200mm demand little or no maintenance, do well in areas with limited access and can be designed to support turf, grasses and groundcovers. Intensive plantings of 200-1200mm allow a full plant selection and are an excellent option for recreational spaces.

Tyler suggests lightweight roof gardens include 50% washed sand, 40% Hydrocell and 10% composted organics (known collectively as Hydrocell-40 lightweight soil) laid over a solid layer of Hydrocell RG30, a geotextile membrane, a drainage cell of Fytonop and, finally, a LDPE sheet. "This is our Fytogreen roof-garden profile for intensive types of gardens," he says.

Fytogreen has already created gardens on the roofs of key buildings in Melbourne such as a residential apartment block in FreshWater Place, Southbank, designed by architect Laurence Blyton and built by Multiplex for Australand.

Foaming equipment was craned in to allow dispersion of a 100mm layer of Hydrocell RG30 as a reservoir layer to water up to the Hydrocell-40 blend lightweight topsoil blend. With a minimum profile of 400mm, the garden is now home to tall-fescue turf, deciduous trees and groundcovers. Created in 2004, the area was extended two years later and is now used recreationally by residents.

Hydrocell-40 is also recommended for use in planter boxes and patio boxes, again with a 100mm-thick layer of Hydrocell RG30 as as a reservoir layer that also filters and protects the geotextile and drain layers.

Going up

But the product options do not end there. Fytogreen's range includes Fytofoam, Fytocell, Fytowall and Modular Turf. Fytofoam is designed for broadacre application, while Fytocell is a specialist hard foam for hydroponic systems.

Modular Turf is is turf module for use in vertical situations such as staircases, and on grass-topped bollards. Tyler says more than 30 turf varieties have been tested successfully to date.

Fytowall is perhaps the most spectacular of all, at least to the naked eye. It is a series of vertical growing panels designed to support vegetative walls either indoors or out.

Fytogreen was first unveiled at the Landscape Australia Expo in Melbourne in August, where it attracted much industry attention.

So far, more than 100 plant species have been evaluated on a research wall, with watering, feeding and growth rates all measured. Developed in Australia, the Fytowall system consists of 40mm-by-90mm zincalume vertical battens and a box edge to which a frame or façade is attached.

Each interchangeable panel – measuring 100 centimetres by 50cm high by 14cm deep – covers 5000 square centimetres, weighing up to 44 kilograms fully saturated with plants (or 88kg per square metre of surface area).

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Brief: NESTPR
Page 3 of 4

"Under normal watering conditions, however, you could expect the panels to be at approximately 25% to 35% saturation by volume – that is, holding 25-30 litres of water and nutrients," Tyler says.

"Plant weight per panel depends on the species and age, but fully grown you could allow for from 12kg per square metre for plants like mondo grass up to 24kg for turf."

Plants are selected individually for each site. The automated irrigation and feeding system is both rain- and greywater-compatible and uses 50% less water than standard gardens, Tyler says.

The company installed a vertical garden featuring Fytowall at Frankston Private Hospital in Frankston, Victoria, in January, using Sea Isle paspalum turf, seaside daisy, black mondo grass, Festuca glauca and rock daisy to create what Tyler calls a "living art picture" in an open-air courtyard. "since then we have installed another four vertical gardens here in Australia, with a number of large – meaning above 100 square metres – Fytowall commercial projects well into the planning stage," he adds.

1 Condor Tower in the Docklands Precinct, Melbourne, with a 4th floor, 750 square metre Tall Fescue lawn that had limited root zone depth due to the step down height of the surrounding paving level. 2 Hydrocell foam can be manufactured and applied on site, as demonstrated by an installation team working on the the rooftop on the Freshwater Place apartment bloack in Melbounre.

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1 A vertical garden installed at Frankston Private Hospital in Melbourne last January is formed from Fytowall panels. 2 Roof garden on the CH2 (council House #2) building in Melbourne's CBD. It was constructed in 2006. This area is used as the staff's outdoor recreational space. 3 Freshwater Place, Melbourne, is the home to the highest turf lawn in Australia: tall fescue laid over a Hydrocell-40 topsoil blend. Manchurain pears, cycads, shore juniper, hebes and groundcovers also thriv in the rooftop garden. 4 An outdoor priva residence in the Melbourne suburb of Mentone which was created for the TV show *Better Homes & Gardens*. This setting is suitable for south facing walls and comprises of acorus, black mondo and tall green mondo with ferns, carex grasses and pattersonia.