*Summary*

*This factsheet introduces the Which Plant Where Living Lab, a new network of urban planting sites as part of the Which Plant Where research program, funded by Hort Innovation. The Living Lab involves the establishment and monitoring of new urban planting sites to evaluate plant performance across a wide range of environmental conditions and the associated environmental benefits that underpin healthy urban environments.*

**We are looking for growers, local and state government, industry, schools, NGO's and other organisation-managed land in urban areas to take part in a national Living Lab program.**

## The urban climate

Man-made surfaces absorb and re-radiate heat very effectively, meaning that cities are typically hotter than surrounding areas – the so-called urban heat island effect. Set against a background of increasingly warmer and more extreme climates across the globe, urban populations are experiencing ever more challenging climatic conditions. The ability of plants to provide shade and cool the local environment makes urban greening an effective strategy for improving the liveability of our cities, particularly in a changing climate.
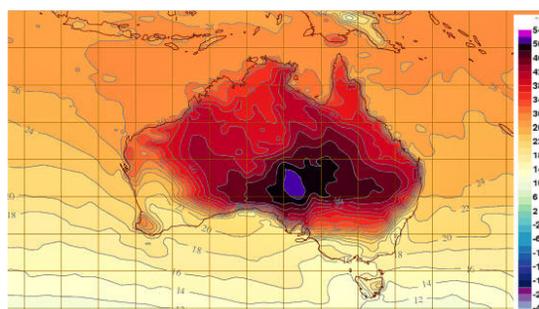


*In recent years, meteorologists have added a new colour to our weather maps to indicate the record-breaking, intense heat experienced during heatwave conditions.*
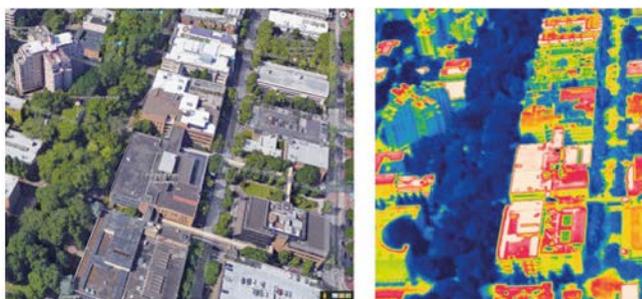


*Thermal images of cities highlight the temperature differences between buildings and adjacent vegetation, and the essential role that urban vegetation plays in reducing heat at the local scale.*

In addition to the cooling effects of vegetation in urban environments, trees and shrubs provide a myriad of other benefits to society. For example, they make major contributions to improving air quality and regulating water cycling by trapping air pollutants and reducing storm water run-off. Furthermore, by providing habitat to support biodiversity in our city-scapes, urban vegetation contributes to human wellbeing and the health of urban ecosystems across Australia.

One of the key challenges in landscape design is to identify which plant species will thrive in urban landscapes and provide the greatest benefits for urban populations. The *Living Lab* will help increase our understanding of the role of local environmental conditions (e.g. planting context, micro-climate, soil type) in determining plant performance and the benefits associated with urban greening.

## What is the *Which Plant Where Living Lab*?

The *Living Lab* is a standardised set of tree and shrub plantings suitable for significant urban areas throughout Australia that will allow us to: 1) test the performance of species with different morphologies and growth forms under a wide range of environmental conditions; and 2) evaluate the co-benefits of urban greening (e.g. heat mitigation, enhanced biodiversity) by examining the role of vegetation structure and diversity.

There are three levels of participation in the *Living Lab*, involving trees and shrubs, planted on their own and together:

**Level 1**: Tree only design (4 tree species)



Suitable for:
-Streetscapes
-Medians
-Paths
-Parks

*Example of linear plantings for the three levels of participation. Non-linear planting designs are also appropriate.*

**Level 2**: Shrub only design (4 shrub species)



Suitable for:
-Streetscapes
-Medians
-Road verges
-Below power lines
-Above underground utilities

*Please note that a minimum of four sets (of 4 tree species and/or 16 shrubs) per level is needed for those level plantings you include at your site.*

**Level 3**: Trees + shrub design (4 tree plus 4 shrub species)



Suitable for:
-Parks
-Gardens
-Larger plantings

The *Living Lab* design will allow us to assess the benefits of greater species diversity and structural complexity of plantings across urban landscapes. By establishing a network of *Living Labs* in cities across Australia, we will be able to compare the performance of, and benefits associated with, standardised tree and shrub plantings in a variety of different climates, soils and landscape contexts. It will also allow us to evaluate the extent to which more structurally complex plantings (trees + shrubs) that provide a more diverse habitat, can support greater diversity. Other potential benefits we will study include the role of different leaf and canopy characteristics in the ability of plants to intercept particulate matter from the air and thus reduce urban pollution. Also, the cooling potential of different canopy structures, to explore the role of vegetation in mitigating the urban heat island effect.

## Our Species

As part of a target list of several hundred species being tested under *the Which Plant Where research program*, we have identified several important test species that allow a robust comparison among tree species with different life histories (deciduous *vs.* evergreen) and shrub species with different plant architectures and flower characteristics.

**Trees**

1) *Lagerstroemia indica* (Crepe myrtle)
(exotic/deciduous/8 m)

2) *Liriodendron tulipifera* (Tuliptree magnolia)
(exotic/deciduous/20 m)

3) *Elaeocarpus reticulatus* (Blueberry ash)
(native/evergreen/15 m)

4) *Lophostemon confertus* (Queensland brush box)
(native/evergreen/20 m)

**Shrubs**

1) *Melaleuca citrina* (Red bottlebrush)
(native, 3 m) *synonym *Callistemon*

2) *Westringia fruticosa* (Coastal rosemary)
(native, 1.5 m)

3) *Baeckea virgata* (Dwarf Baeckea)
(native, 1.5 m) *synonym *Sannantha virgata*

4) *Hibbertia obtusifolia* (Hoary Guinea-flower)
(native, 1 m)

Although we have a list of preferred tree and shrub species, we have an extended list of species that can be substituted/added in to the different categories, if required. Please contact us for more details.

**How can you get involved?**

1. It's quite simple. Depending on the size and characteristics of your available urban space, first decide whether you are able to plant both trees and shrubs, or just trees or shrubs on their own. Remember that we need you to plant a minimum of four sets of each planting level. For level 1 (trees only) that's 16 trees; for Level 2 (shrubs only) that's 64 shrubs and; for Level 3 (trees + shrubs) that's a total of 16 trees plus 64 shrubs.

2. Let's get to work! We can help you to acquire good quality plant material and will provide a standardized, easy-to-follow planting protocol.

3. Finally, we will monitor plant performance in all network planting sites, and provide you with tailored, site-specific and network-level information relating to growth, survival and co-benefits during the project.

# For more information

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