

# Giving woody seedlings a fighting start

CHERIE CAMPBELL BEGINS WITH ROOTS AND ALL ADVICE  
ON GETTING THE BEST OUT OF THESE YOUNGSTERS.

Just like all of us, long-lived woody plant species need a healthy start to life to give them the best chance of growing big and strong. Providing woody seedlings with optimal conditions for growth and survival helps to ensure their success later in life.

The Vegetation Theme of the Murray–Darling Basin Environmental Water Knowledge and Research (MDB EWKR) project are seeking to determine which watering regimes give woody seedlings a fighting start. This research will focus on four long-lived woody plant species common to the Murray–Darling Basin: River Red Gum (*Eucalyptus camaldulensis*), Coolabah (*Eucalyptus coolabah*), Black Box (*Eucalyptus largiflorens*) and Tangled Lignum (*Duma florulenta*). All of these plant species are structurally dominant on various parts of the floodplain throughout the Basin. They play an important role in providing refuge, habitat and food sources for a wide range of species, and contribute to ecosystem services such as carbon and nutrient cycling. The importance of these species is recognised by their inclusion in the Murray–Darling Basin Authority’s Basin-Wide Environmental Watering Strategy.

Seedlings represent the next generation for woody trees and shrubs, so their periodic germination and survival into adulthood is essential to ensuring the long-term survival of these populations and ecosystems. Seedling germination and survival has been observed to be highly variable across the Basin, with seedlings being scarce in some areas and abundant in others. Land and water managers are keen to foster the growth and survival of woody seedlings which will grow up to form the next generation of forests and woodlands.

A cross section of the PVC pipes showing seedling growth. Inset: Measuring and recording root and growth development. Both photos Ben Gawne.



## Getting the best start

In order to give woody seedlings the best start in life we are investigating the watering regimes that provide the best conditions for growth of roots, stems and leaves. Roots provide woody seedlings with access to water and nutrients, as well as anchoring the plant to the soil. Leaves are the energy powerhouse, providing the plant with access to food. Opportunities that result in greater root growth—longer and bigger roots—are likely to provide the plant with greater access to water and nutrients, increasing their capacity to survive dry periods. Similarly, healthy seedlings are likely to be taller and bigger with lots of leaf area, giving them the opportunity to produce more energy.

In order to determine optimal watering regimes for seedlings, we set up experiments at Wonga Wetlands in Albury, New South Wales. Seedlings from River Red Gum, Black Box, Coolabah and Tangled Lignum were germinated in pots, then transferred to PVC tubes and placed in tanks with different watering treatments applied. The treatments included five contrasting flow regimes:

1. constant dry
2. constant flood
3. flood then dry
4. dry then flood
5. alternating flood and dry periods.

These flow regimes focus on the effect of permanent inundation or drying, inundation during both early and later seedling life stages, and multiple wetting and drying periods during seedling establishment.

## Measuring and analysis

In total, approximately 350 seedlings were assessed as part of this experiment. Measurements of mortality, seedling height, number, and area of leaves and root length were collected from harvests undertaken at the start of the experiment, in the middle and at the end. We also calculated above and below ground biomass. Comparing the results between harvest times will enable growth rates and the effect of water regimes to be determined over time.

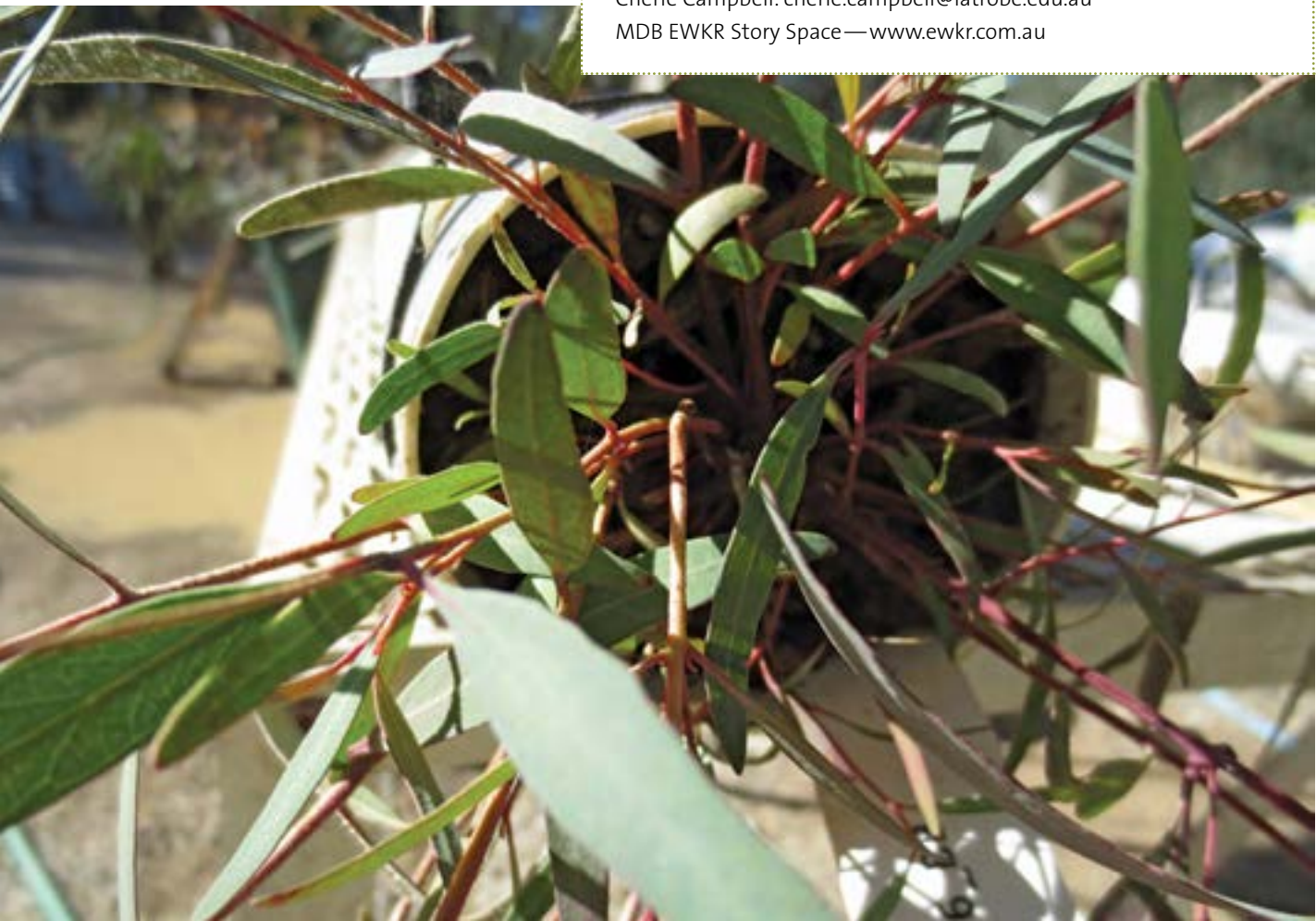
Analysis of data collected during this experiment will show the relationship between flow parameters such as duration, frequency and interflow dry period and woody seedling growth and establishment. We will then work with water managers to ensure the information on seedling water requirements will help them to make decisions that provide woody seedlings with the best possible start to life.

The MDB EWKR project is funded by the Australian Government's Commonwealth Environmental Water Office.

Below: Extensive coppicing of a Black Box seedling.  
Photo Cherie Campbell.

### FOR FURTHER INFORMATION

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