

# Water Management Using Polysaccharide-Based Products in Growing Media for Container Plant Production<sup>©</sup>

Alan Horgan

Certis UK, Suite 5, 1 Riverside, Granta Park, Great Abington, Cambridgeshire,  
CB21 6AD, UK

Email: horgan@certiseurope.com

## INTRODUCTION

There are a number of drivers for saving water on ornamentals nurseries. These include:

- Possible increases in transpiration if air temperatures rise as a result of climate change.
- Increasing demands on water supplies as a result of population growth.
- Competition for water resources between edible and ornamental crops.
- Increasing costs for labour, energy for operating pumps, and fertiliser (impact of nutrient leaching from over-watered crop).

Products such as the polysaccharide-based Celcote<sup>®</sup> (marketed in the U.K. by Certis), that can retain water within substrates and moderate its supply to the crop, are therefore of increasing interest to growers.

## Physical Properties of Celcote

Celcote contains a plant-derived polysaccharide which has been modified to enable it to bind onto organic fibres when mixed into growing media. On first watering it produces a water-holding film around the fibres without affecting the air filled porosity of the medium. This film absorbs water and gradually releases it as the plant uses it.

## PRODUCT PERFORMANCE TRIAL

### Method

Celcote's performance has been demonstrated in a trial at the nursery stock research centre at Boskoop, The Netherlands, on container-grown *Caryopteris × clandonensis*. Celcote was incorporated into the growing medium for half the plants, at 2 kg·m<sup>-3</sup>. Plants from each treatment were irrigated under three alternative water regimes: 100% (which matched the amount of water applied to measured evapotranspiration, 80% of evapotranspiration demand (deficit irrigation regime), and 120% of evapotranspiration demand (to represent overwatering).

Crop growth and quality assessments were made at the end of the growing season.

### Results

Maximum fresh weight of plants was obtained under the 100% irrigation regime for both treatments. However (Fig. 1) both the deficit and overwatering regimes caused less weight reduction in the Celcote treatments than in the untreated control plants.

The tallest plants were those grown in the Celcote-treated medium for each of the irrigation regimes (Fig. 2).

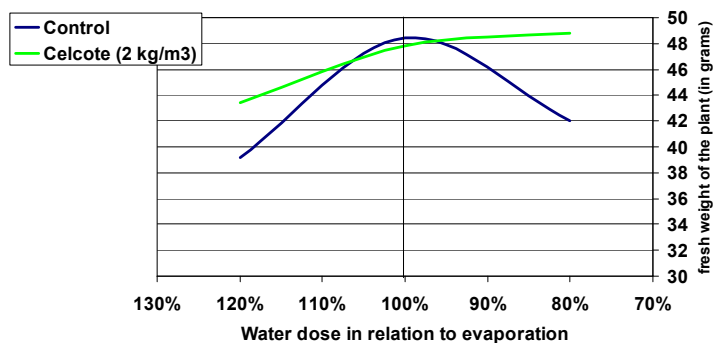


Fig. 1. Influence of Celcote<sup>®</sup> on the fresh weight of the plant.

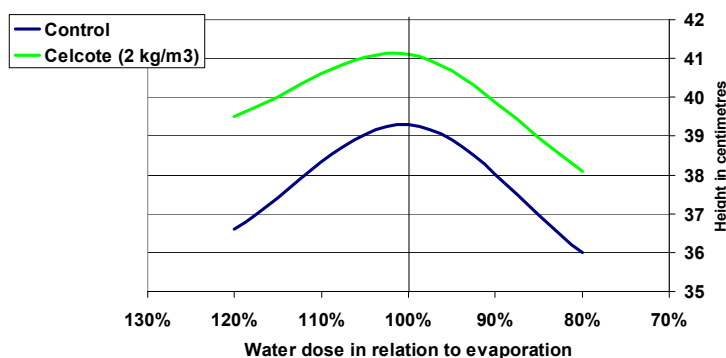


Fig. 2. Influence of Celcote<sup>®</sup> on plant height.

Degree of rooting was scored from 0 (no roots visible at bottom of pot) to 5 (bottom of pot completely covered by root). Highest rooting scores were obtained from plants in the Celcote treated medium at both the 80 and 120% watering regimes (Fig. 3). In the 100% regime, rooting scores were identical in Celcote-treated and untreated media. Rooting in untreated medium was poorer in both the over and underwatered regimes than in the “optimum” regime.

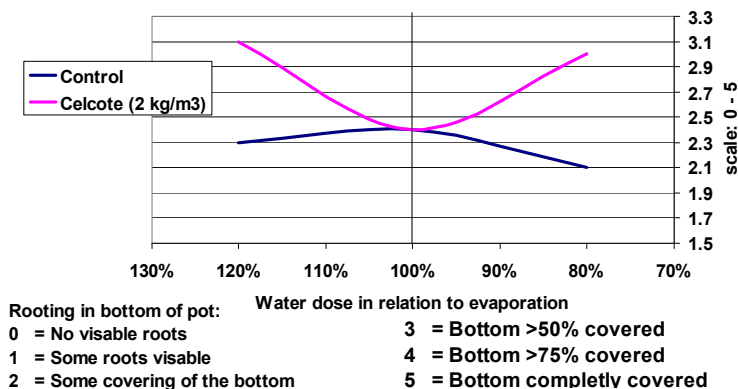


Fig. 3. Influence of Celcote<sup>®</sup> on the degree of rooting.

Root quality was scored on the proportion of the medium ramified by fine hair roots. In the untreated medium overwatering (120% regime) had a particularly detrimental impact on the root quality score, the impact was reduced in the Celcote-treated medium (Fig. 4).

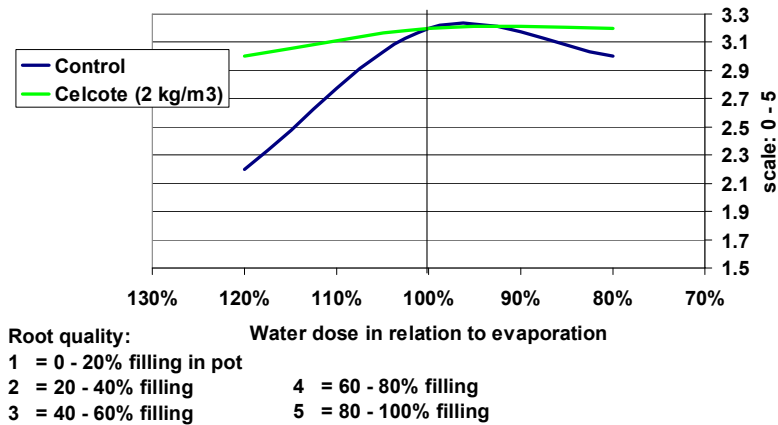


Fig. 4. Influence of Celcote<sup>®</sup> on root quality.

### Discussion

Results from the Boskoop trial show that incorporating Celcote could reduce the impact of over or underwatering. In particular, the treatment would enable growers to reduce the amount of water applied without significantly reducing crop growth or quality. Plants in a “lean” watering regime in Celcote-treated media were bigger, stronger, and more saleable.

Opportunities to use Celcote to reduce irrigation inputs and improve product retail shelf life have also been explored in grower trials. For example, Baginton Nurseries near Coventry, U.K., has found that its retail garden centre customers are now specifying the use of water saving products in order to cut in-store watering costs. Other growers have reported that reductions in water use on Celcote treated crops has led to savings in labour and fertiliser costs as well as direct savings in water costs.

Celcote can be used on a range of crop types from bedding plants and hanging baskets to container-grown fruit crops. Rates of use vary between 1 and 2 kg·m<sup>-3</sup>. The lower rates are used for growing media with a low air-filled porosity and the higher rates for composts with more than 40% bark or coir and a high AFP.

Celcote<sup>®</sup> is a registered trademark of Certis Europe BV.

