

## **MANIPULATING TRANSPLANT MORPHOLOGY TO ADVANCE POST-TRANSPLANT GROWTH AND YIELD IN STRAWBERRY**

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### **ABSTRACT**

Prohexadione-calcium (ProCa, BASF Corp. trade name Apogee and Regalis) is a gibberellin biosynthesis inhibitor which can be used to reduce leaf growth and petiole elongation. This gibberellin biosynthesis inhibitor was applied to ‘Camarosa’ and ‘Sweet Charlie’ strawberry nursery plants in Nova Scotia before they were harvested in the fall and transported to Florida to be transplanted in a winter annual plasticulture strawberry production system.

The aim of transplant morphology modification is to ease the transplantation process in plasticulture fruit fields, and to advance and enhance strawberry fruit yield. Leaves of tall transplants are likely to break during plant harvest in nurseries, which can increase disease susceptibility. Large transplants require ample amounts of overhead irrigation to successfully re-establish in plasticulture. Treated plants are shorter and more compact, they allocate more dry matter to root and less to leaves, which helps with water absorption and, at the same time, reduces whole plant water loss through transpiration. The resulting increase in root to shoot ratio can last until plants are well established after transplantation into plasticulture. A two-year fruit yield study showed that ProCa treatment increased fruit yield in ‘Camarosa’ strawberry plants. Treated plants allocated more biomass to fruits, and untreated plants allocated more to the shoot, especially to leaves, both in number and percentage allocation.

Treated plants are successful in plasticulture because they possess a morphology that can optimize their physiological functions. In addition to modifying strawberry plant morphology, treatment with ProCa alters plant physiology which pre-conditions plants to tolerate water stress. ProCa treatment increases root to shoot ratio and reduces specific leaf area (SLA) in strawberry plants. These effects may be most important to help treated plants to survive a transplant shock. Studies showed (data not shown) ProCa application lowered leaf osmotic potential, and in plasticulture, newly transplanted treated bare-root strawberry plants had a higher water potential and stomatal conductance than their untreated counterparts. ProCa treatment has a positive effect on photosynthesis in strawberry plants which may be related to its effect on SLA. Treated leaves with a lower SLA have higher chlorophyll content on a leaf area basis and increase leaf net photosynthesis. Decreased water stress in plasticulture combined with a strong photosynthetic capacity may improve establishment of bare-root transplants in plasticulture and is likely one of the reasons for the increased fruit production in treated plants.

The application of prohexadione-calcium is effective in manipulating strawberry plant morphology in the Canadian nurseries to produce more robust transplants, resulting in better post-transplant growth, higher fruit yields, earlier fruit production and lower irrigation costs. This has the potential to significantly improve profitability for nursery and fruit producers.

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