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Care and Handling of Container Plants From Storage to Outplanting[®]

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INTRODUCTION

Nursery plants are in a period of high risk from the time they leave the protected environment of the nursery to when they are outplanted. During handling and shipping, nursery stock may be exposed to many damaging stresses, including extreme temperatures, desiccation, mechanical injuries, and storage molds. This is also the period of greatest financial risk, because nursery plants have reached their maximum value right before shipping (Paterson et al., 2001). Adams and Patterson (2004) concluded that improper handling of nursery stock had more impact on plant quality than the type of outplanting tool.

All the information in this paper is included in *The Container Tree Nursery Manual Vol. 7: Seedling Processing, Storage, and Outplanting*. It was published as *Agriculture Handbook 674* by the USDA Forest Service (Landis et al., 2010) (Fig. 1).

Growers go to extremes to produce the highest quality plants and strive to have them at their best when they are sold or shipped to the customer. As plant people, we all know that nursery stock is alive and perishable and so should be treated with utmost care at all times. Unfortunately, customers or people who handle plants after they leave the nursery often don't appreciate this fact. Stressful injuries incurred between lifting from the nursery and outplanting, however, are often not evident until several weeks or even years after planting. Symptoms include browning, chlorosis, poor survival, or decreased growth and are commonly known as "transplant shock" or "check." It can be extremely difficult to pinpoint the exact stress that leads to these symptoms. It is a waste of time and money to produce or purchase high-quality plants only to have them die or grow poorly after outplanting as a result of these unnecessary stresses.

THE CHAIN OF PLANT QUALITY

Nursery plants are at their maximum quality immediately before they are harvested at the nursery, but they then must pass through many hands before being outplanted. Outplanting success is dependent on maintaining plant quality by minimizing stress at each phase of the operation. It is useful to think of plant quality as a chain in which each link represents one of the sequences of events from harvesting and storage at the nursery until planting at the outplanting site (Fig. 2). The cumulative effect of the various stresses can be much greater than any one individual stress. As stress increases, the plant shifts energy from growth to damage repair. Physiological functions are damaged and survival and growth are reduced. These effects are exacerbated further when plants are outplanted on harsh sites.

Each stage in the process represents a link in a chain, and overall plant quality is only as good as the weakest link. It is useful to think of nursery plant quality as a checking account in which all types of abuse or stress are withdrawals. Note that all stresses are cumulative and no deposits can be made — it is impossible to