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Compatibility of Biocontainers in Commercial Greenhouse Crop Production

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Summary. Despite consumer interest in biocontainers, their use in commercial greenhouse production remains limited. Previous research indicates that a perceived incompatibility of biocontainers with current production systems may be a barrier to their widespread adoption. This article investigates two potential areas of concern for growers looking to adopt biocontainers as part of their production process: 1) the ability of biocontainers to withstand the rigors of a semimechanized commercial production process, and 2) biocontainer performance under three different irrigation methods (i.e., hand, ebb-and-flood, and drip irrigation). In the two studies presented here, 'Florida Sun Jade' coleus (*Solenostemon scutellarioides*) was evaluated to match measures of container resiliency with plant performance. Results indicate that plants grown in biocontainers were of equal size and quality as those grown in conventional plastic containers within each of the irrigation types tested. However, some biocontainers were more prone to damage during crop production, handling, and shipping.

Market research has shown that environmentally conscious consumers are willing to pay more for products developed by companies that incorporate sustainable business practices (Blend and van Ravenswaay, 1999; Thompson and Kidwell, 1998; Yue et al., 2011). Beyond the acceptance of premium pricing, green consumers have shown loyalty to businesses that embrace their environmental ideals (Yue and Tong, 2009). When one looks at issues of sustainability and horticultural sales, container type is consistently listed among the top factors having a positive impact on consumer product perception (Dennis et al., 2010; Hall et al., 2010; Yue et al., 2011). As a highly visible symbol of past production processes, container type has generated more interest than "behind the scenes" practices such as organic fertilizer or efficient greenhouse space usage (Yue et al., 2011). Similar results were found in the work by Hall et al. (2010), who found that container type outweighed all other purchasing considerations—including price and carbon footprint. These findings have led researchers to state that consumers are more interested in making the pots sustainable than the plants themselves (Yue et al., 2011).

Despite this consumer interest, biocontainers as a whole have yet to be widely embraced by the greenhouse and nursery industry. Hall et al. (2009) found that over 22% of growers surveyed indicated that they had used biocontainers in their operations. Of the remaining 78% that participated in the study, only 6% noted that they would like to add biocontainers to their current production processes (Hall et al., 2009). Similarly, research by Dennis et al. (2010), reported that 12% of greenhouse growers acknowledged prior use of peat pots in their operations. Within this 12%, respondents estimated that peat pots comprised less than 3% of their total container consumption (Dennis et al., 2010). These figures support a general consensus that the widespread use of biocontainers has been largely limited by their higher cost and perceived limitations (Helgeson et al., 2009; Kuehny et al., 2011).

Conventional plastic containers remain popular given their ability to provide consistent performance (e.g., comparable wet/dry strength, compatibility with equipment) in production systems. This effectively removes one of the many possible variables a grower must contend with when attempting to produce a uniform crop of high-quality plants. The price of plastic still remains relatively inexpensive and economically accessible to ornamental crop growers (Evans and Hensley, 2004; Helgeson et al., 2009). For its cost, plastic is strong, lightweight, and versatile. These properties make it fully compatible with mechanized production processes and ideal for shipping (Evans and Hensley, 2004; Hall et al., 2010; Helgeson et al., 2009).

Given the reliability of plastic, growers—especially growers with large operations—are hesitant to move toward any container that they feel may pose a risk to their crop or be difficult to implement in their existing production practices (Dennis et al., 2010; Hall et al., 2009). Despite this aversion to risk, greenhouse growers (in contrast with nursery growers and nursery/greenhouse growers) ranked issues of compatibility as a minor barrier, indicating that perhaps flexibility in production practices, equipment, and crops may allow for greater adoption of biocontainers (Dennis et al., 2010).

Although some published research has quantified biocontainer resistance

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Units

To convert U.S. to SI, multiply by	U.S. unit	SI unit	To convert SI to U.S., multiply by
0.3048	ft	m	3.2808
2.54	inch(es)	cm	0.3937
0.0044	lbf	kN	224.8089
1.6093	mile(s)	km	0.6214
28.3495	oz	g	0.0353
1	ppm	$mg \cdot L^{-1}$	1
(°F – 32) ÷ 1.8	°F	°C	(°C × 1.8) + 32