Determining biocontainers' carbon footprint

April 28 2014

Many efforts to reduce the environmental impacts associated with commercial horticulture production have failed to influence the general public. For example, one recent study showed that the use of organic fertilizers offered no significant marketing advantage to producers of floral crops. In contrast to the promotion of organic products, the use of biocontainers (plant material-based, biodegradable pots) as alternatives to conventional plastic containers has been shown to resonate with many consumers.

The authors of a new study say that, despite the positive public perception of biocontainers' environmental benefits as alternatives to petroleum-based plastic pots, the impact of biocontainers on commercial greenhouse sustainability has not been thoroughly evaluated. The researchers offer a first look at the overall sustainability of biocontainers as part of a greenhouse production system. "Our work adopted a grower's perspective and focuses on the environmental impacts of container use during the plant production phase," explained Andrew Koeser, corresponding author of the study published in *HortScience* (March 2014).

The team's "cradle-to-gate" study compared the secondary impacts that occur during the greenhouse production of plants grown in biocontainers. The life cycle assessment data for the study was obtained from interviews, published literature, propriety data sources, direct metering at the greenhouse facility, and original findings from a series of university greenhouse experiments. The authors noted that their work also offers an initial screening of commercially available biocontainers

that could be used in future life cycle assessments that focus on manufacturing inputs and environmental impacts.

A conventional plastic container and nine types of biocontainers (bioplastic, coir, manure, peat, bioplastic sleeve, slotted rice hull, solid rice hull, straw, and wood fiber) were included in the life cycle assessments for greenhouse petunia production. The impacts were presented in terms of contribution to the carbon footprint or global warming potential (GWP) of a single finished plant in a 10-cm-diameter container.

Results showed that a traditional plastic container accounts for approximately 16% of overall carbon dioxide equivalents emissions during petunia production. However, electrical consumption for supplemental lighting and irrigation during plug production proved to be the leading source of CO_2e emissions (more than 47%) in the model system. Differences in GWP when considering secondary impacts associated with the various biocontainers were minor, especially when compared with the other elements of production.

The researchers said that their results demonstrate that biocontainers could potentially be as sustainable as, or more sustainable, than plastic pots "once pot manufacturing and end-of-life data are considered". They emphasized that use of more efficient supplemental lighting sources may ultimately have the greatest impact on overall global warming potential for the production system assessed.

"Although biocontainers have been linked to reduced performance in plant growth, filling speed, shipping success, and irrigation demand trials, these differences do not have a dramatic effect on production sustainability from a global warming potential perspective," said the authors. "These results should be encouraging for growers and manufacturers looking to increase sustainability through the use and

development of biocontainers."

More information: The complete study and abstract are available on the ASHS *HortScience* electronic journal web site: hortsci.ashspublications.org/c … nt/49/3/265.abstract

Provided by American Society for Horticultural Science