Pot Re-Design for Efficient Water Use

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Nature of Work: Georgia has recently experienced a severe water crisis. A proliferation of nurseries requires increasing amounts of water for growing, yet even commercial water use may be limited in coming years.

This study is designed to evaluate nursery pots that have the same amount of drainage area but in a redesigned pattern.

In a conventional 3 gallon pot (Nursery Suppliers) there are 5 drainage outlets which are 0.75 inches in diameter (D). They consist of 4 holes (0.75" D) around the side and one hole (0.75" D) in the bottom of the pot. Other 3 gallon pots may have 6 side holes and one bottom hole (each 0.75" D). In several 15 gallon pots there were 7 drainage holes -- 6 side and 1 bottom (0.75" D).

There seems to be no relationship between the size of currently available pots and the size or configuration of holes in the drainage outlet area.

Study Design: This research proposed to determine if altering the size and distribution of drainage holes has any significant effects on plant growth.

Three treatments were used:

1 - 3 gallon pot, 4 side, 1 bottom drainage holes (0.75" D) control.
2 - 3 gallon pot, 8 side, 2 bottom drainage holes (0.375" D).
3 - 3 gallon pot, 16 side, 4 bottom drainage holes (0.187" D).

Three ornamental species were used:

Ilex X Nellie R. Stevens
Hydrangea macrophylla 'Endless Summer'
Loropetalum chinense var. rubrum 'Ruby'

Liners were planted on April 8 and harvested on November 24 for a growing period of 227 days. This extended time period provided for maximum, root growth to develop within the pot.

Evaluation: There was significantly more top dry weight (TDW) in the 16 side, 4 bottom drainage holes (0.187" Dia) than in the control pots or in the pots with 8 side, 2 bottom drainage holes (0.375" Dia) for *Loropetalum chinense* var. rubrum 'Ruby'. There was no difference in TDW growth of *Hydrangea macrophylla* 'Endless Summer' and *Ilex X 'Nellie R. Stephens'* holly due to treatments.

A pot redesigned with more but smaller holes encourages slower drainage and promotes a more even distribution of the water throughout the pot. The slower exit of water potentially reduces leaching of nutrients and environmental pollution.

Significance to the Industry: With the increasing cost of water a pot designed with smaller but more drainage holes could save on the amount of water and the frequency with which it is applied. The design could reduce watering without changing the soil mix used or adversely affecting the growth of the plants.

Table 1. Top Dry Weight (TDW) of Three Gallon *Loropetalum chinense* var. rubrum 'Ruby'		
Treatment	Mean Dry Weight(g)	Non-Significant Range
Standard 4 side, 1 bottom drainage holes (0.75" D)	134.5	a
8 side, 2 bottom drainage holes (0.375" D)	119.1	a
16 side, 4 bottom drainage holes (0.187" D)	162.6	b

There was significantly more TDW in the 16 side, 4 bottom drainage holes (0.187" D) than in the standard pot or the than in the 8 side, 2 bottom drainage holes (0.375" D) for *Loropetalum chinense* var. rubrum 'Ruby'.

Table 2. Top Dry Weight of Three Gallon *Hydrangea macrophylla* 'Endless Summer'		
Treatment	Mean Dry Weight(g)	Non-Significant Range
Standard 4 side, 1 bottom drainage holes (0.75" D)	92.2	a
8 side, 2 bottom drainage holes (0.375" D)	81.9	a
16 side, 4 bottom drainage holes (0.187" D)	89.4	a

There was no difference in TDW growth of *Hydrangea macrophylla* 'Endless Summer' due to treatments.

Table 3. Top Dry Weight of Three Gallon *Ilex X Nellie R. Stevens'*		
Treatment	Mean Dry Weight(g)	Non-Significant Range
Standard 4 side, 1 bottom drainage holes (0.75" D)	64.5	a
8 side, 2 bottom drainage holes (0.375" D)	69.5	a
16 side, 4 bottom drainage holes (0.187" D)	60.4	a

There was no difference in TDW growth of *Ilex X 'Nellie R. Stephens'* holly due to treatments.