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101 Ways to Try to Grow Arabidopsis: What Pot Size Worked the Best in This Study?

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Purdue Methods:



What pot size worked the best in this study?

Short answer:

3" square (7cm wide x 7cm deep x 7cm high)

Results:

Our images show clearly that plants in the 72-cell trays and 201 "half flats" have more chlorosis and often die when irrigation trays are kept full of fertilizer solution compared to plants in 3" square pots or 4" square pots. Likewise, more purpling and stress-related flowering resulted in the trays kept full of clear water. Plants died in the middle of the 72-cell tray kept full of fertilizer solution, while surviving near the tray edges; a pattern we have observed in our facility before.

Discussion:

With proper care, just about any size container can be used for Arabidopsis. 3" square pots seem an appropriate compromise for ease-of-growing and scalability, with 3-6 plants per pot recommended for growth to maturity (no data). Though not tested in our study, 3601 cellpacks (36 individual cells per tray) are a cheaper alternative to a 3" square pot, and have similar volume and shape. They are not as stable as a pot if separated from the other cells, however.

A general rule of thumb: The smaller the container, the better grower you need to be. That is because the smaller the container, the less "forgiving" a root environment is. The same soilless mix, watering and fertilizing can result in drastically different plant growth depending on just the pot size and shape. Small container volumes are more likely to dry out and are less buffered against change in nutrient status or pH. Shallow containers—such as when soilless mix is placed in a planting tray or "flat" without pots or cell packs—have a high perched water table (zone of saturation) relative to same soil mix in a tall container. A high perched water table causes root environment to become anaerobic. Root diseases are more likely under these conditions. Also, certain nutrients such as iron become unavailable, resulting in yellowing of young leaves and flower stems.



Figure 1. From left to right: (Inside the white “display tray”) 4-inch pot, 3-inch pot, 3601 cell, 201 Half-flat. (Back) 72-cell tray.

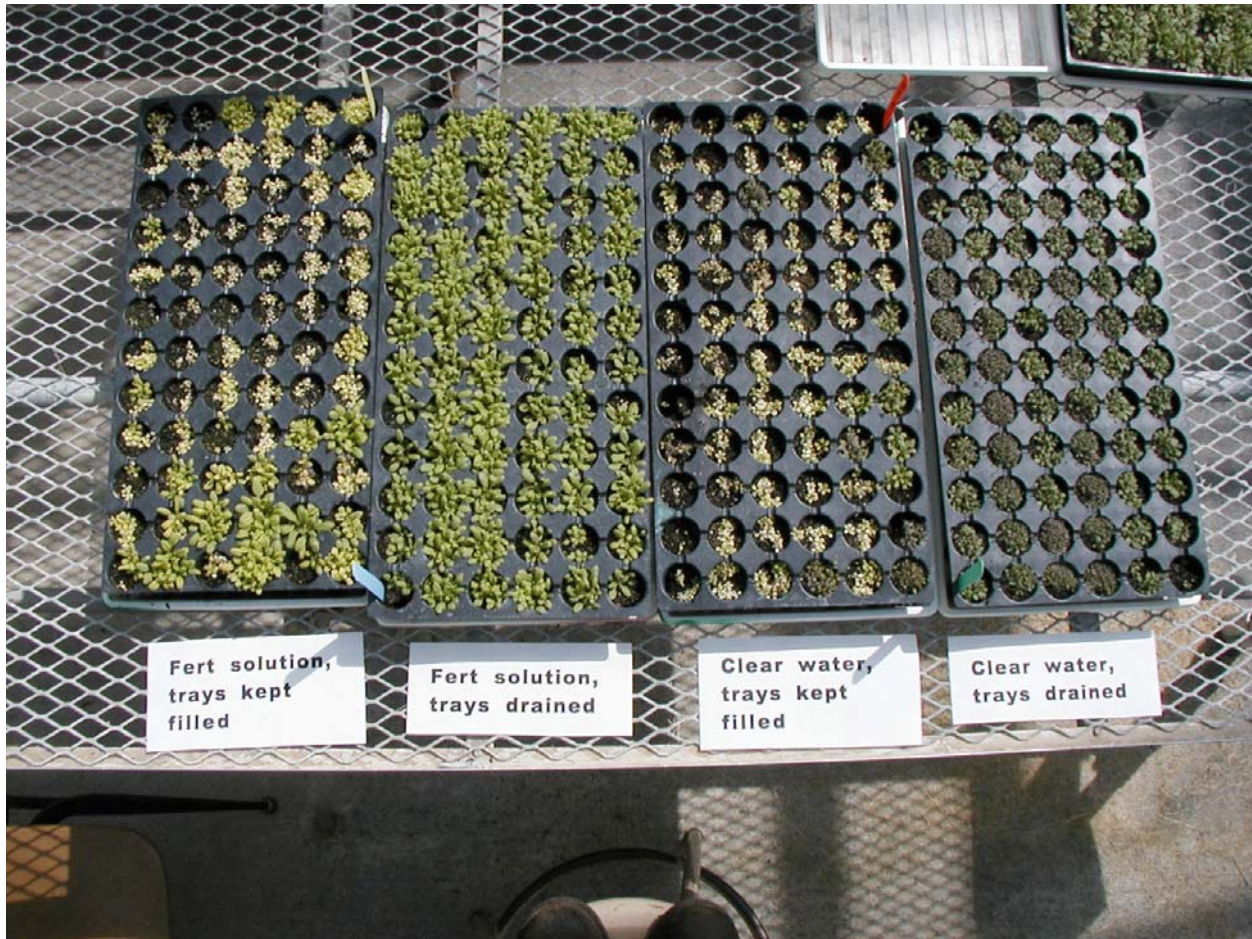


Figure 2. 72-cell tray under four water/fertilization treatments. Note chlorosis and plant death in some treatments.



Figure 3. 201 Half-flats under four water/fertilization treatments. Note chlorosis and purpling in some treatments.



Figure 4. 3-inch pots under four water/fertilization treatments. Note chlorosis and purpling in some treatments.



Figure 5. 4-inch pots under four water/fertilization treatments. Note far fewer symptoms than other containers.