Is Bigger Better?

by

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While touring transplant production houses this fall, I was struck by something peculiar ... trays holding only 72 to 150 plants! A far cry from the industry standard of 242 plants per tray. At a time when most growers are cutting costs to the bone, why would some growers request tomato transplants 'in cells that add $35 or more to their cost per thousand?

The trend in modern tray design has been to pack more and more cells in tray (i.e. smaller and smaller cell volumes) to increase the number of plants per house. More plants per house means greater efficiency for the transplant production facility.

So why then this move toward bigger cells? Well, the answer is quite clear, ... someone's been doing their homework! Whether it has been noticed first hand in the field or heard or read about, some of you know bigger cells result in better yields.

Let's look at what has been offered over the past 30 years by the scientific community. Table 1 lists nine notable studies where researchers compared growing transplants in cells of varying volume (bigger cell volume means fewer cells per tray). In six of the nine studies, transplants grown in larger cells lead to significantly bigger transplants at planting and increased early and/or total yield. The trend toward higher yield with larger cells was also noted in the trials that did not show statistically based differences.

Table 1. A summary of 30 years of research on containerized vegetable transplant cell volume.

Crop/Yr. [y]	**Cell Volume (Cm^3)**			**Transplant Height (cm)**			**Field Yield (tons/hectare) [x]**		
[v] lbs per head									
[w] lbs early fruit/plant									
[x] tons/hectare x 0.446 = tons per acre									
[z] Contact the author for specifics on any or all the studies listed.									
[y] Not all data is represented in each study for ease of table format and presentation.									
Tomato/1964	2	3	4 inch pots	7	8	12 inch	1	1.4	1.8
Broccoli/1985	04	15	31	3	4	5	12	13	15 total
Tomato/1986	04	19	39	10	20	21	08	09	18 early
Cabbage/1988	08	28	39	10	09	12	1.9	2.1	2.2
Pepper/1988	06	19	39	19	20	22	1.6	2.3	4.3 early
Watermelon/1989	19	39	--	--	--	--	53	57	total
Pepper/1990	05	35	65	12	16	17	64	60	64 total
Watermelon/1993	19	31	66	--	--	--	49	50	52 total
Muskmelon/1996	07	36	70	25	51	69	15	27	33 total

Some researchers have noted that some cultivars respond less dramatically to larger cells, but that the trend was still similar. Also, whether the trays are plastic or Styrofoam the trend remains the same. Field growth of plants grown from larger cells generally showed more rapid development and an ability to resist insects and diseases.

Why is bigger better? Researchers have suggested general reduction in stress like exposure to waterlogging, greater availability of water and fertilizer and unrestricted root growth as possible answers. Three of the trials cited here were carried out in Florida; however the data indicate this phenomenon holds true in Georgia, Indiana, Kentucky, Michigan, Minnesota, Missouri and Israel. We continue to compile data in Florida with trials presently in Palm Beach (pepper) and Hendry (tomato) counties.

Economics may still play a role in the decision to grow transplants in larger cells, especially for crops like pepper where population densities are high. However, in crops such as tomato or watermelon, the increase in yield and earliness should more than cover that small investment up front.

So why not try a few trays of a considerably larger cell size than you are now using in a side by side comparison on your farm. We think you will soon agree that this is one case where bigger is better.