

Tomato Support Systems for Heirloom Varieties

Q: Which tomato training system best keeps disease pressure at bay in an heirloom tomato planting?

A: 2008 was a cold and wet year; not ideal tomato conditions. Each farm generated different results, thus no system was deemed the best for keeping disease at bay due to this on-farm research trial.

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Background

Vegetable farmers who sell their products to a local audience often grow heirloom tomatoes, despite poor disease resistance among many of the heirloom varieties. These vegetables have a strong local market due to their unique appearance, full taste, and poor shipping abilities. Growers who do not use synthetic fungicides in their operations often have high levels of disease present in their heirloom tomato plantings. Copper is often used in chemical-free tomato systems as a fungicide, and is currently approved for certified organic outfits. Alarm has been raised about the impact copper has on the environment, and involved parties are concerned that organic certifying agents may remove copper from the accepted amendment list for organic systems. Growers and researchers are looking for alternatives for their chemical-free systems.

Approach and methods

This demonstration project looked at three different growing structures in an heirloom tomato planting to determine the effect these different growing configurations may have on disease advancement in heirloom tomatoes. Three growing schemes were utilized:

- Cattle panels
 - T-Posts wired to each end plus one in the middle for support
 - The bottom 6-8" of leaves will be removed and 2 leaders will be left per plant
 - Tomatoes are weaved through the panels as they grow
 - Tomato trellis clips (available from Johnny's Selected Seeds) are used to clip the stems to the fence
- Florida stake and weave design
 - Map Key:
 - X=tomato plant at 36" spacing
 - H=hedge post- 5-6" diameter, +/- 10' tall, sunk 2-3' into the ground; could use any heavy-duty wooden post that can withstand the sheer and torque forces at ground level
 - R=3/8" rebar post
 - T=T-post- heavy-duty 8' long
 - H x x x R x x x R x x x T x x x R x x x R x x x T x x x R x x x R x x x H
 - Sisal, poly baling or tomato twine will be weaved through the tomatoes every 12 inches. Suckers are removed from the plants below 12 inches, leaving only the main stem.
- Tomato cages
 - One cage per plant

Each farm utilized 20 plants of Cherokee Purple tomatoes per growing scheme, for a total of 60 Cherokee Purple tomato plants per farm. The tomatoes were started indoors. Tomatoes were sowed on the same date in the greenhouse for each training system (varied farm to farm, but all three started on same

date at each farm), and transplanted to the field on the same date. Plants were spaced 36" apart in the row. Cooperators took data on plant dates, harvest dates, usable yields, unusable yields, total yield, weather, condition of plants weekly, and date plants were removed from field.

Results and discussion

Blue Gate Farm

Jill Beebout and Sean Skeehan of Blue Gate Farm had highest total and marketable yields in the cattle panel system (table 1). However, stake and weave yields were a close second, resulting in no significant yield differences between these two systems.

Blue Gate planted their tomatoes on May 14. They installed cattle panels, three lines on the stake and weave trellis, and tomato cages on June 27. They noted foliage yellowing from water stress on July 18. The first blight appeared low on the plants, in all three systems, on August 1st. Blight seemed to spread evenly between the three systems for the remainder of the growing season.

Blue Gate Farm recorded 32.7 inches of rain from May 14 to September 26 (chart 1). They also sustained a tornado on May 30. Plants were damaged by wind, but no immediate loss was evident. Cold, wet weather resulted in lower than normal yields.

Jill and Sean typically use the stake and weave training system for their tomatoes. They like that the support system maintains strength as the tomatoes get tall. They also like the stake and weave because it is fairly easy to set up and take down, and one person can install the stake and weave system. This was the first year Jill and Sean used cattle panels in their tomatoes. The initial investment was more substantial than stake and weave, and it required two people to install. However, Jill and Sean found maintenance and harvest easy and possibly faster than stake and weave. They are interested in trying this system in a season not racked by rains to see how it performs with healthy plants. Jill and Sean least preferred tomato cages for growing on a commercial scale. They felt that the cages require a lot of storage space. They noted that it was difficult to spot pests in the cages, and that harvest is a challenge.

One Step at a Time Gardens

Jan Libbey and Tim Landgraf of One Step at a Time Gardens harvest ranked, from most to least: stake and weave, cages, and cattle panels (table 2). They only recorded marketable fruit, not their culls. They estimated at least half of their tomatoes were unusable.

One Step at a Time did not get their tomato cages installed due to wet conditions, so the data for the cage component is actually data for sprawled tomatoes. The transplants were put into the ground on May 27, but were small due to cool spring conditions. On September 9, One Step at a Time noted that they had received over twelve inches of rain the past week, and that growth was stalled due to waterlogged soils. On July 7, they noted excessive weeds due to delay in weeding from the heavy June rains. August 4, the plants received damage in the form of broken stems and market fruit due to heavy wind and hail.

One Step at a Time noted the first blight, on all training systems, on September 1. Blight spread and eventually killed the plants on September 29. Jan and Tim observed that there was very little difference between the three systems in terms of tomato size, degree of blight, or any problems on the fruit itself.

Jan and Tim agreed with Blue Gate farm about the installation and maintenance of the three systems. They feel that cages are too space inefficient for a commercial production. This was the first year that had tried the stake and weave, and they are interested in trying it again in a more fruitful year. Jan and Tim noted that it is important to tie up new strings in a timely manner. The panels are Jan and Tim's typical trellis system on the farm. Although upfront work is labor intensive, they feel this system is the least demanding once installed.

Genuine Faux Farm

Total yields for Rob and Tammy Faux of Genuine Faux Farm ranked from cages, to cattle panel, to stake and weave. Marketable yields ranked from cattle panel, to cages, to stake and weave (table 3). Their yields were larger than the other two farms, but cull percentage was very high.

Genuine Faux planted their tomatoes into the ground on May 28. Fields were very wet with temperatures below normal at planting. They noticed blight started in the stake and weave system on August 28. On September 5, there was low to moderate wilt in the cages, moderate in the cattle panels, and prevalent wilt in the stake and weave system.

In the past, tomato cages have been Rob and Tammy's principal training system. They had difficulty with winds blowing plants out of the weave system, leading to more breakage in this system. They also felt that the stake and weave was more time-consuming than the other training systems. Rob and Tammy also noted that it is imperative to stay on top of the weave process, but that is not always plausible in the main season. Rob and Tammy felt the cattle panels were less time-consuming once established, and are interested in trying this system again in the future. They noted that cages take a lot of storage room, and are difficult to remove from the field at the end of the season. Cages create a more difficult harvest, and are prone to falling over or caving in. However, Rob and Tammy felt that cages provide a better canopy for the fruit.

Conclusions

As shown in chart two and three, each farm had different results. Anecdotal remarks on preferred system varied between farms as well. No two farms highly preferred the same training system. The weather was a large factor in tomato vitality this season, so perhaps more noteworthy results would arise if the trial were replicated in a more typical growing season.

Cooperators all had learning curves using systems they had not previously utilized on their farms. Proficiency with one training system over the other may skew the results in favor of the system they are skilled at implementing. Training would be advisable for future projects to ensure conformity between training methods.

Blue Gate Farm and Genuine Faux Farm recorded marketable yield versus overall yield (table 4). For both farms, cattle panels had highest marketable yields, stake and weave came in second, and cages had the lowest percentage of marketable tomatoes. Further study would help determine if there is a correlation between training systems and percentage of marketable yields.

Impact of results

While results weren't significant mathematically, the growers were all introduced to new training systems they feel have potential for their farms.

Results of this trial will be discussed at the 2009 cooperators' meeting. Horticulture participants will decide if they want to pursue a replication of this trial.

Appendix

Table 1.

Blue Gate Yield (lbs)			
	Total	Marketable	% Marketable
Cattle Panel	79.5	58	72.96%
Stake and Weave	78	50.5	64.74%
Cage	65.5	38.25	58.40%

Chart 1.

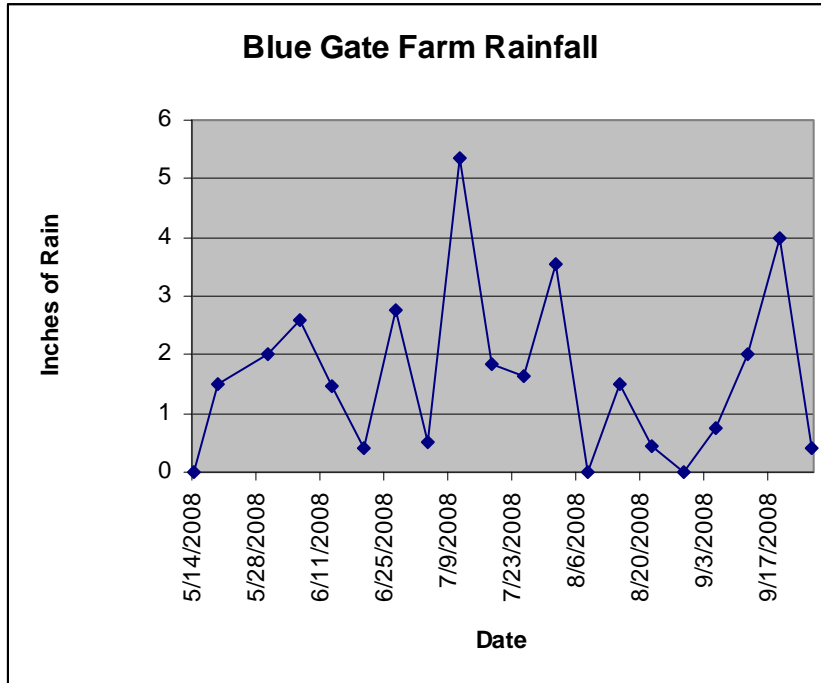


Table 2.

One Step at a Time Yields (lbs)			
	Cattle Panel	Stake and Weave	Cages
24-Aug	5.25	17.5	9.5
31-Aug	10	22	13
7-Sep	10	15.5	12.5
14-Sep	34.5	33	33.25
21-Sep	15	14.75	12
Total	74.75	102.75	80.25

Table 3.

Genuine Faux Yield (lbs)			
	Total	Marketable	% marketable
Cattle Panel	259	106	40.93%
Stake and Weave	119	37	31.09%
Cages	306	78	25.49%

Chart 2.

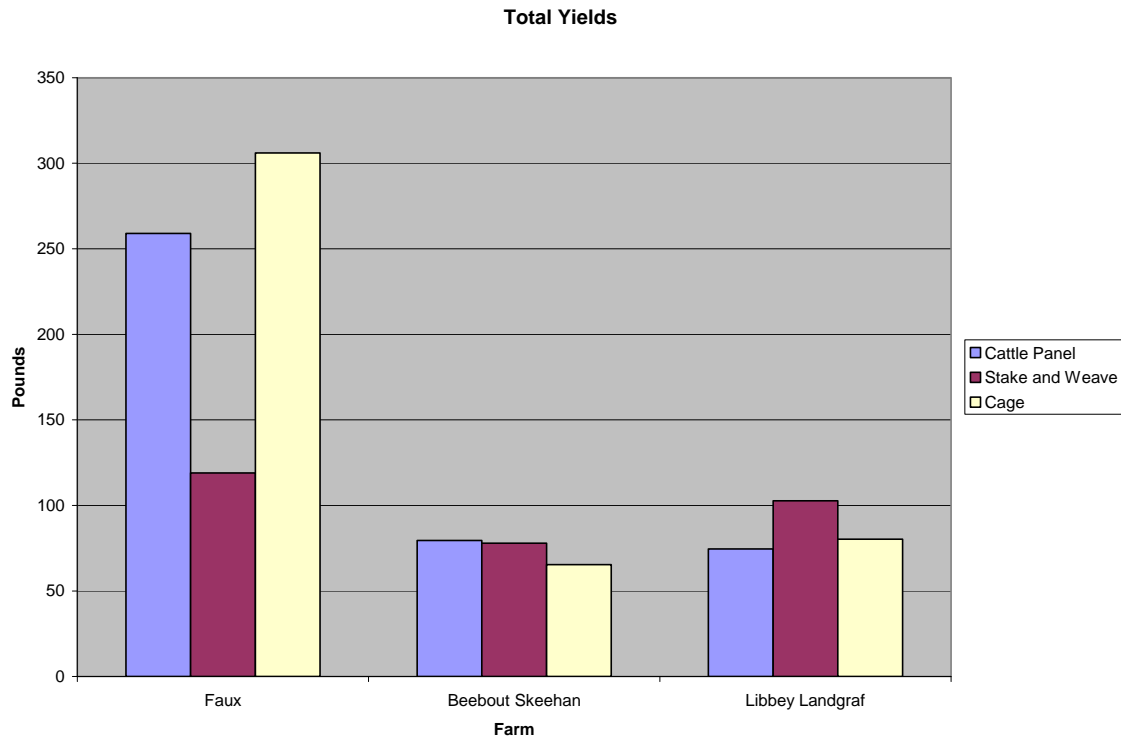


Chart 3.

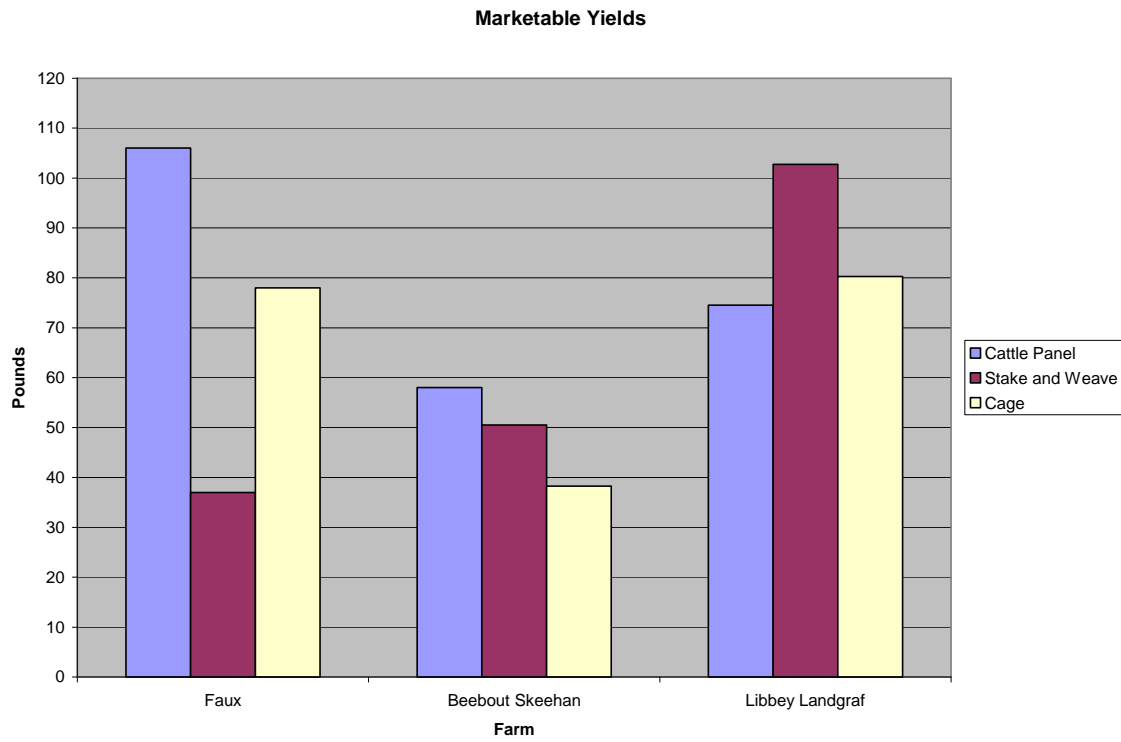


Table 4.

Rate of Marketable Tomatoes		
	Blue Gate	Genuine Faux
Cattle Panel	73%	41%
Stake & Weave	65%	31%
Cage	58%	26%
Overall	66%	32%