2016 Dry Farming Demonstration Report
OSU Extension Learning Farm @ Oak Creek Center for Urban Horticulture
Amy Garrett, OSU Extension Service, Small Farms Program

Four 10’ x 100’ plots (Irrigated, Low Irrigation, Dry Farmed, and Dry Farmed with biochar compost) were established to do side-by-side comparisons of melons, tomatoes, squash, and potatoes. Treatments were not replicated. Results and data collected are from single plot observations.

**Soil type:** Woodburn Silt Loam

**Soil preparation:**
- Flail mowed cover crop (phacelia and some red clover) on 4/1 and tilled in cover crop on 4/8/16.
- Yard waste compost from Rexius (2 inches) and Calpril lime (50lbs/1000 sq ft or 2 ton/acre) spread on all four plots on 4/20/16.
- Chisel plow then till to incorporate amendments on 4/21/16.
- Final seedbed prep with tiller right before planting each crop.

**Treatments:**

**Irrigated Treatments** (Drip irrigation with ½ gallon pressure regulated emitters at each plant)
- **Irrigated:** 5/30 – 9/9/16 each plant received 25 gallons of water.
- **Low Irrigation:** 5/30 – 9/9/16 each plant received 12 gallons of water.

**Dry Farmed Treatments** (No irrigation applied in the field and top 6 inches of soil kept loose for surface protection or dust mulch)
- **Dry Farmed:** NO SUPPLEMENTAL IRRIGATION APPLIED.
- **Dry Farmed with Biochar Compost:** 1.5 yards of Bokashi biochar compost (compost mixed with 55 gallons of Bokashi) from bioLogical Solutions LLC was also applied on 4/20/17. NO SUPPLEMENTAL IRRIGATION APPLIED.

<table>
<thead>
<tr>
<th>Crops</th>
<th>Irrigated</th>
<th>Low Irrigation</th>
<th>Dry Farmed</th>
<th>Dry Farmed with Biochar Compost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potatoes</td>
<td></td>
<td></td>
<td></td>
<td>Yukon Gold, Yellow Finn</td>
</tr>
<tr>
<td>Winter Squash</td>
<td></td>
<td></td>
<td></td>
<td>Zeppelin Delicata, Stella Blue</td>
</tr>
<tr>
<td>Tomatoes</td>
<td></td>
<td></td>
<td></td>
<td>Early Girl, Big Beef</td>
</tr>
<tr>
<td>Melon</td>
<td></td>
<td></td>
<td></td>
<td>Eel River, Christmas Watermelon</td>
</tr>
</tbody>
</table>
Cultivar selection:

<table>
<thead>
<tr>
<th>Crop</th>
<th>Variety</th>
<th>Seed Source</th>
<th>Description/Why selected?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potato</td>
<td>Yukon Gold</td>
<td>Potato Garden</td>
<td>Early-season variety recommended by Carol Deppe (Fertile Valley Seed)</td>
</tr>
<tr>
<td></td>
<td>Yellow Finn</td>
<td>Potato Garden</td>
<td>Late-season variety reported to yield higher than Yukon Gold when dry farmed</td>
</tr>
<tr>
<td>Winter Squash</td>
<td>Stella Blue</td>
<td>Seed rEvolution Now!</td>
<td>Bred in dry farmed system. Cross between a gray kabocha and sweetmeat squash.</td>
</tr>
<tr>
<td></td>
<td>Zeppelin Delicata</td>
<td>Wild Garden Seed</td>
<td>A favorite variety at the market. Selected to trial in a dry farmed system.</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>Early Girl</td>
<td>Johnny's Seed</td>
<td>Most commonly grown dry farmed tomato in California. Less susceptible to blossom-end rot</td>
</tr>
<tr>
<td></td>
<td>Big Beef</td>
<td>Johnny's Seed</td>
<td>Favorite variety of experienced dry farmer in Veneta, Oregon</td>
</tr>
<tr>
<td>Melon</td>
<td>Eel River</td>
<td>Seed rEvolution Now!</td>
<td>Bred in dry farmed system.</td>
</tr>
<tr>
<td></td>
<td>Christmas Watermelon</td>
<td>Seed rEvolution Now!</td>
<td>Bred in dry farmed system.</td>
</tr>
</tbody>
</table>

Planting:

- **Potatoes** – Planted on 4/29 (2 ft in-row spacing x 10 ft wide bed = 20 sq. ft per plant) and hilled on 5/29 and 7/1/16. Six plants of each cultivar in each treatment plot.
- **Winter Squash** and **Melon** – Direct-seeded on 5/9 in the field. Transplants that were also started in the greenhouse on 5/9, and due to poor germination they were planted in the field on 6/3/16 to fill in the gaps (4 ft in-row spacing x 10 ft wide bed = 40 sq. ft per plant). Three plants of each cultivar in each treatment plot. ‘Stella Blue’ winter squash was the only cultivar that had 100% germination when direct seeded.
- **Tomatoes** – Transplanted in the field on 5/12/16 (3 ft in-row spacing x 10 ft wide bed = 30 sq ft per plant). Four plants of each cultivar in each treatment plot.

Data Collection:

The following data were collected from each plot:

- **Soil moisture**: A 3’ wide x 3’ deep hole was augered in each treatment plot between the potatoes and squash and decagon GS-3 moisture probes were installed a 3 depths (1’, 2’, 3’) in each treatment plot between the potato and squash. 5 probes total in each treatment plot: one at 1’, two at 2’ and two at 3’.
- **Yield**: Number of marketable and unmarketable fruits were weighed and counted for each cultivar.
- **Sensory evaluation**: At the dry farming field day on August 9th, participants ranked dry farmed and irrigated tomatoes in the categories of color, texture, and sweetness.

Results:

2016 was a mild summer compared to the extreme drought in 2015. Treatment plots (irrigated, low irrigation, dry farmed, dry farmed with biochar compost) surprisingly looked very similar throughout the growing season. Differences were seen between treatments in our yield and sensory evaluation data. *Data analysis and graphics by AnOvation Group LLC.*

June 3, 2016
Soil Moisture
Note: Bold line indicates the mean for the two sensors (2’ and 3’).
The battery died in the data logger for the irrigated plot in mid-September.

Moisture sensors were placed about 3 feet away from the row center of all treatment plots, which was the drip line in the irrigated treatments. Placing more sensors in the row or drip line area may have captured treatment differences more clearly.

Yield
Potatoes
For Yellow Finn, the late-season cultivar, the dry farmed treatments yielded more small potatoes than large. For Yukon Gold, the early-season cultivar, there were more large potatoes in all treatments.
Winter Squash

Squash Marketable Yield
Oak Creek OSU Demo 2016

Stella Blue
Zeppelin Delicata

Treatment: Dry Farm, Biochar, Low Irrigation, Irrigated

Stella Blue squash Weight Histograms
Oak Creek OSU Demo
Tomato

Tomato Marketable Yield
Oak Creek OSU Demo 2016

[Graph showing tomato marketable yield by variety and treatment]

[Graph showing frequency distributions of Stella Blue squash weights by treatment]

Weight (lb)
[Graph showing frequency distributions with labels for treatments: Biochar, Dry Farm, Irrigated, Low Irrigation]
The un-irrigated (Dry Farm and Biochar) treatments seemed to hasten maturity. First tomatoes harvested were from these plots.
Melon

Tomato Sensory Evaluation:
The Big Beef and Early Girl were from Oak Creek and the Jory were brought to compare from the North Willamette Research and Extension Center’s dry farming trial.
## 2016 Dry Farming Demonstration

### Summary Table

<table>
<thead>
<tr>
<th>Crop</th>
<th>Variety</th>
<th>Planting Date</th>
<th>Harvest Start Date</th>
<th>Harvest End Date</th>
<th>Planting Density (sqft/plant)</th>
<th>Dry Farm</th>
<th>Biochar</th>
<th>Low Irrig.</th>
<th>Irrigated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potato</td>
<td>Yukon Gold</td>
<td>Tuber for both cultivars planted on 4/9</td>
<td>8/25</td>
<td>8/25</td>
<td>20</td>
<td>4.8</td>
<td>4.3</td>
<td>4.1</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>Yellow Finn</td>
<td></td>
<td>9/30</td>
<td>9/30</td>
<td>20</td>
<td>4.4</td>
<td>6.0</td>
<td>3.6</td>
<td>10.6</td>
</tr>
<tr>
<td>Winter Squash</td>
<td>Stella Blue</td>
<td>Direct seeded on 5/9, 100% germ.</td>
<td>10/1</td>
<td>10/1</td>
<td>40</td>
<td>24.1</td>
<td>41.0</td>
<td>44.7</td>
<td>50.8</td>
</tr>
<tr>
<td></td>
<td>Zeppelin Delicata</td>
<td>Direct seeded on 5/9 with poor germ. Transplants filled in gaps on 6/3</td>
<td>9/28</td>
<td>9/28</td>
<td>40</td>
<td>13.0</td>
<td>7.8</td>
<td>6.2</td>
<td>7.8</td>
</tr>
<tr>
<td>Tomato</td>
<td>Early Girl</td>
<td>Transplant on 5/12</td>
<td>8/12</td>
<td>9/26</td>
<td>30</td>
<td>17.7</td>
<td>12.0</td>
<td>14.9</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>Big Beef</td>
<td></td>
<td>8/12</td>
<td>9/26</td>
<td>30</td>
<td>23.0</td>
<td>20.0</td>
<td>23.4</td>
<td>20.8</td>
</tr>
<tr>
<td>Melon</td>
<td>Eel River</td>
<td>Direct seeded on 5/9 with poor germ. Transplants filled in gaps on 6/3</td>
<td>8/21</td>
<td>9/30</td>
<td>40</td>
<td>11.8</td>
<td>15.2</td>
<td>18.2</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>Christmas Watermelon</td>
<td></td>
<td>8/18</td>
<td>9/27</td>
<td>40</td>
<td>39.8</td>
<td>32.6</td>
<td>34.5</td>
<td>34.2</td>
</tr>
</tbody>
</table>
Dry Farming Resources
OSU Extension Small Farms Dry Farming Demonstration: http://smallfarms.oregonstate.edu/dry-farming-demonstration


Cascadia Drought Group: https://cascadiadroughtgroup.wordpress.com/dry-farming/


Garrett, A. Common misconceptions and key points about dry farming: Case study of dry farmer with more than 40 years of experience. Oregon Small Farm News. Summer 2014, Vol. IX No. 3.


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Join the Dry Farming Collaborative group on Facebook or contact Amy Garrett to join the email list at Amy.garrett@oregonstate.edu or 541-766-3551