# Blueberry Studies
## Kearney Agricultural Center, 2003

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**Plant Size Trial**

For the plant size evaluation study we compared six plant sizes. The purpose of the study is to save the growers money by purchasing smaller plants. For example in an acre with 3 foot plant spacing (1300 plants) a 1gallon plant would cost $2.80 compared to a 2" cell at $1.80. On an acre plot this would save $1,300. The 2" cell, RP5, 3 ½" pot and bare root plants were planted in the field after a year in the green house and the 1 liter and 1 gallon plants were planted in the field after two years in the green house. All plants were transplanted in October of 2001.

**Table 1.** Plant Size Evaluation- O'Neal
Pounds per Plot

| | | |
|---|---|---|
| 1 gal. | 7.69 | a |
| 1 L | 5.37 | a |
| 2" cell | 0 | b |
| 3 1/2" pot | 0 | b |
| Bare root | 0 | b |
| RP 5 | 0 | b |
| CV | | 98.18 |
| LSD | | 3.22 |

**Table 2.** Plant Size Evaluation- O'Neal
Pounds per Acre

| | | |
|---|---|---|
| 1 gal. | 1450 | a |
| 1 L | 1013 | a |
| 2" cell | 0 | b |
| 3 1/2" pot | 0 | b |
| Bare root | 0 | b |
| RP 5 | 0 | b |
| CV | | 98.18 |
| LSD | | 607 |

The 2" cell, 3 ½" pot, bare root and RP5 treatments had no yield the first year because there was no bloom or they were too small for us to allow them to produce a crop. One interesting thing that has surfaced from the study is the difference between the varieties O'Neal and Misty within the same trial. On O'Neal there was no significant difference between the gallon and liter plants whereas on Misty the gallon plants produced about two times as much as the liter plant. Also the 1 gallon Misty plants yielded about three times as much as the 1 gallon O'Neal plants. The varieties O'Neal and Misty were picked because they are the ones most growers are planting. O'Neal is one of the earliest varieties and Misty one of the most common because it is easy to grow and very vigorous.

**Table 3.** Plant Size Evaluation- Misty
Pounds per Plot

| | | |
|---|---|---|
| 1 gal. | 25.65 | a |
| 1 L | 11.70 | b |
| 2" cell | 0 | c |
| 3 1/2" pot | 0 | c |
| Bare root | 0 | c |
| RP 5 | 0 | c |
| CV | | 54.41 |
| LSD | | 4.17 |

**Table 4.** Plant Size Evaluation- Misty
Pounds per Acre

| | | |
|---|---|---|
| 1 gal. | 4840 | a |
| 1 L | 2207 | b |
| 2" cell | 0 | c |
| 3 1/2" pot | 0 | c |
| Bare root | 0 | c |
| RP 5 | 0 | c |
| CV | | 54.41 |
| LSD | | 786 |

**Plant Spacing Trial**

The plant spacing trial was designed to evaluate spacing from 18-48 inches at 6 inch increments. Plant populations range from 990 at 48" to 2,640 at the 18" spacing. The purpose of the study is to increase yield per acre. One pro of increasing plant spacing is that fixed costs will remain the same. Regardless of the number of plants on an acre the amount of mulch and water will not change. Some cons are that the variable costs will increase. Pruning and harvest costs will go up with plant population. The cost of purchasing the extra plants will also increase expenditures.

**Table 5.** Plant Spacing- O'Neal, lbs/plot

| | | |
|---|---|---|
| 24" | 13.60 | a |
| 8" | 12.76 | ab |
| 30" | 10.43 | ab |
| 36" | 8.44 | ab |
| 42" | 7.48 | ab |
| 48" | 5.98 | b |
| CV | | 46.85 |
| LSD | | 6.91 |

**Table 6.** Plant Spacing- O'Neal, lbs/acre

| | | |
|---|---|---|
| 24" | 2567 | a |
| 18" | 2408 | ab |
| 30" | 1967 | ab |
| 36" | 1592 | ab |
| 42" | 1411 | ab |
| 48" | 1127 | b |
| CV | | 46.85 |
| LSD | | 1303 |

The plant spacing study shows significant yield contrast between the Misty and O'Neal varieties. The highest yielding Misty (18") was three times higher than the highest yielding O'Neal (24"). Even the lowest yielding Misty (48") was still higher than the highest yielding O'Neal. Also the Misty plants were more consistent; there was a perfect linear increase in yield with increase in plant population. O'Neal has been very inconsistent (see CV values in Table 5. compared to Table 7.) and hasn't preformed as expected.

**Table 7.** Plant Spacing- Misty, Lbs/Plot

| | | |
|---|---|---|
| 18" | 40.60 | a |
| 24" | 34.58 | ab |
| 30" | 30.18 | bc |
| 36" | 26.80 | cd |
| 42" | 21.29 | de |
| 48" | 17.35 | e |
| CV | | 16.10 |
| LSD | | 6.91 |

**Table 8.** Plant Spacing- Misty, Lbs/Acre

| | | |
|---|---|---|
| 18" | 7660 | a |
| 24" | 6524 | ab |
| 30" | 5694 | bc |
| 36" | 5056 | cd |
| 42" | 4016 | de |
| 48" | 3274 | e |
| CV | | 16.10 |
| LSD | | 1303 |

**Replicated Variety Trial**

Since 1997 we've planted 40 varieties of blueberries. From the 40 varieties eight Southern High Bush varieties were selected for this trial. Within the eight varieties four are early varieties, and the other four are mid-season varieties. The early varieties include O'Neal, Sharp Blue, Misty and Star. The mid-season varieties are Ozark Blue, Jubilee, Southmoon and Legacy. For this trial we are testing for yield and fresh market quality indices and plan to evaluate shelf life of each variety in 2004.

**Table 9.** Replicated Variety Trial, lbs/plot

| | | |
|---|---|---|
| Legacy | 38.63 | a |
| Jubilee | 34.66 | ab |
| Star | 32.01 | b |
| South Moon | 24.92 | c |
| Misty | 23.60 | c |
| Sharp Blue | 22.89 | c |
| Ozark Blue | 12.43 | d |
| O'Neal | 8.85 | d |
| CV | | 17.93 |
| LSD | | 6.53 |

**Table 10.** Replicated Variety Trial, lbs/acre

| | | |
|---|---|---|
| Legacy | 7289 | a |
| Jubilee | 6540 | ab |
| Star | 6039 | b |
| South Moon | 4701 | c |
| Misty | 4453 | c |
| Sharp Blue | 4319 | c |
| Ozark Blue | 2346 | d |
| O'Neal | 1669 | d |
| CV | | 17.93 |
| LSD | | 1232 |

The highest yielding early variety was Star, and the highest yielding mid season variety was Legacy. There is a wide range between the highest and lowest yielding varieties as seen in Tables 9 and 10.

**Mulch Study**

Blueberries are usually grown with wood mulch culture but wood mulch is very expensive and may not always be available. We are evaluating two types of wood mulches and less expensive, more readily available alternatives. We used the variety Star. Wood mulches included pine and almond shells. The alternatives included black plastic, white plastic, a herbicide treatment and an untreated check.

**Table 11.** Mulch Study 2001, lbs/plot

| | | |
|---|---|---|
| White Plastic | 38.30 | a |
| Black Plastic | 35.06 | ab |
| Untreated Check | 30.19 | abc |
| Pine Mulch | 28.18 | bc |
| Almond Shells | 26.90 | bc |
| Herbicide | 24.29 | c |
| CV | | 18.44 |
| LSD | | 8.48 |

**Table 12.** Mulch Study 2001, lbs/acre

| | | |
|---|---|---|
| White Plastic | 7226 | a |
| Black Plastic | 6616 | ab |
| Untreated Check | 5695 | abc |
| Pine Mulch | 5316 | bc |
| Almond Shells | 5075 | bc |
| Herbicide | 4583 | c |
| CV | | 18.44 |
| LSD | | 1600 |

The plastic and untreated check, surprisingly, had higher yields than the wood mulches. This may have occurred because bacteria consumed the Nitrogen to breakdown the organic matter whereas all the nitrogen was entirely available to the white and black plastic treatments as well as the untreated check. It is anticipated that during the next few years the wood mulch treatments will develop greater fertility, porosity for good water

infiltration and develop greater plant vigor. We expect the other plants to decline as they get older, which is what we have seen in previous mulch studies.

**Blossom Removal Study**

In this study we are comparing the removal of the blossoms and how it affects plant vigor and yield over the life of the plant. For treatment one we removed the fruit at year one, and for the other treatment we removed the blossoms at year one and two.

**Table 13.** Blossom Removal Study, lbs/plot

| Removed at... | | |
|---|---|---|
| Year 1 | 18.10 | a |
| Year 1&2 | 0 | b |
| CV | | 20.74 |
| LSD | | 5.97 |

**Table 14**. Blossom Removal Study, lbs/acre

| Removed at... | | |
|---|---|---|
| Year 1 | 3414 | a |
| Year 1&2 | 0 | b |
| CV | | 20.74 |
| LSD | | 1126 |

Tables 15 and 16 show that there is no yield for the year one and two treatment because we took the blossoms off. We do expect a higher yield next year due to observed greater plant vigor.

**Pruning Study**

**Table 15.** Pruning Study, lbs/plot

| | | |
|---|---|---|
| July, 2003 | 23.6 | ns |
| No Pruning | 23.2 | ns |
| Sept. 2002, 2003 | 21.0 | ns |
| CV | | 17.18 |
| LSD | | 7.76 |

**Table 16.** Pruning Study, lbs/acre

| | | |
|---|---|---|
| July, 2003 | 4447 | ns |
| No Pruning | 4380 | ns |
| Sept. 2002, 2003 | 3967 | ns |
| CV | | 17.18 |
| LSD | | 1464 |

The pruning study is evaluating the effect of tipping, removing the fruiting wood, at different times of the year. We have found that there is no significance so far but believe that tipping might help the plants develop stronger, thicker, canes and make it easier to pick.

**Irrigation Study**

**Table 17.** Irrigation- O'Neal Rep. Trial Lbs/plot

| | | |
|---|---|---|
| Single hose: 2L volume | 11.57 | ns |
| Double hose: 2L volume | 8.85 | ns |
| Single hose: 1L volume | 8.63 | ns |
| Double hose: 1L volume | 8.89 | ns |
| CV | 32.41 | |
| LSD | 5.83 | |

**Table 18.** Irrigation- O'Neal Rep. Trial Lbs/acre

| | | |
|---|---|---|
| Single hose: 2L volume | 2182 | ns |
| Double hose: 2L volume | 1669 | ns |
| Single hose: 1L volume | 1628 | ns |
| Double hose: 1L volume | 1677 | ns |
| CV | 32.41 | |
| LSD | 1100 | |

There is little to no information on appropriate irrigation for blueberries in California. Our study was designed to provide information that will eventually help growers with improved irrigation practices. The treatments include single and double hoses with 1 liter volume, and single and double hoses with 2 liter volume.

**Table 19.** Irrigation- W.Half with Misters

| | | |
|---|---|---|
| Single hose: 2L volume | 8.69 | ns |
| Double hose: 2L volume | 10.27 | ns |
| Single hose: 1L volume | 8 | ns |
| Double hose: 1L volume | 10.02 | ns |
| CV | 30.15 | |
| LSD | 5.25 | |

**Table 19.** Irrigation- W.Half with Misters

| | | |
|---|---|---|
| Single hose: 2L volume | 1639 | ns |
| Double hose: 2L volume | 1937 | ns |
| Single hose: 1L volume | 1509 | ns |
| Double hose: 1L volume | 1924 | ns |
| CV | 30.15 | |
| LSD | 990 | |