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Colorado State University

# Agricultural Experiment Station

*College of Agricultural Sciences*

*Department of Horticulture and Landscape Architecture*

*Department of Soil and Crop Sciences*

*Extension*

# Arkansas Valley Research Center 2009 Reports

# COLORADO STATE UNIVERSITY

Agricultural Experiment Station

## Arkansas Valley Research Center – 2009 Reports

Editor: Michael Bartolo, Manager, Arkansas Valley Research Center

*Funding Provided by the Colorado Agricultural Experiment Station*

**Acknowledgements:**

The projects described in this report would have not been possible without the hard work and dedication of Kevin Tanabe, Lane Simmons, and Jeff Davidson. We also would like to thank Ray Muniz and the student hourly workers for their efforts. We appreciate the support of numerous growers, community members, on-campus faculty and staff, and graduate students who have contributed greatly to the operation of the Research Center.



Cover: Cantaloupe grown in drip irrigation trials.

# Arkansas Valley Research Center
Rocky Ford, Colorado

## Staff

| | |
|---|---|
| Michael Bartolo | Manager, (Horticulture) |
| Lane Simmons | Research Associate |
| Kevin Tanabe | Research Associate |

## Cooperators

Lee Sommers, Director, CSU Agricultural Experiment Station

Frank Johnson, Associate Director, CSU Agricultural Experiment Station

Gary Peterson, Department Head, Soil and Crop Sciences

Steve Wallner, Department Head, Horticulture and Landscape Architecture

Ardell Halvorson, Soil Scientist, USDA-ARS

Jerry Johnson, Crop Scientist, C.S.U., Department of Soil and Crop Sciences

Scott Haley, Wheat Breeder, C.S.U., Department of Soil and Crop Sciences

Kevin Larson, Crop Scientist, C.S.U., Plainsman Research Center

Jim Hain, Research Associate, C.S.U., Department of Soil and Crop Sciences

Curtis Reule, Soil Scientist, USDA-ARS

Howard Schwartz, Plant Pathologist, C.S.U., Dept. of BSPM

Lorenz Sutherland, Soil Scientist, USDA-NRCS

Whitney Cranshaw, Entomologist, C.S.U., Dept. of BSPM

Dale Straw, Colorado Division of Water Resources

Tom Ley, Colorado Division of Water Resources

Jim Valliant, CSU Extension and Agricultural Experiment Station

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| | 2010 | Dan Genova, 33200 South Rd, Pueblo, CO 81006 |

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| Regional | Joel Plath, 2200 Bonforte Blvd, Pueblo, CO 81001-4901 |
| NRCS | John Knapp, 29563 Road 18, Rocky Ford, CO 81067 |
| | Lorenz Sutherland, 318 Lacy, La Junta, CO 81050 |

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**FIELD CROPS**



**VEGETABLE CROPS**

# Alfalfa Variety Performance Test at Rocky Ford - 2009

Michael E. Bartolo[1]

**Summary**

The 2009 results of Colorado State University's alfalfa variety test at Rocky Ford are presented below in Table 1. Plots were planted on August 10, 2007 and data for 2009 are for the second year of a three-year testing period. The field is furrow-irrigated and appropriate measures were taken to maintain the plots in a pest-free condition. The summer of 2009 was fairly normal and harvest conditions were generally good for all cuttings.

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Table 1. Forage yields of 15 alfalfa varieties at the Arkansas Valley Research Center at Rocky Ford in 2009.

| Variety | Source | 1st Cut June 4 | 2nd Cut July 15 | 3rd Cut Aug 25 | 4th Cut Oct 5 | Total | 2-yr Total |
|---|---|---|---|---|---|---|---|
| | | ---------- tons per acre ---------- | | | | | |
| Magnum VI | Dairyland Seed Co. | 2.95 | 2.75 | 2.01 | 1.01 | 8.74 | 15.23 |
| Medalist | Intermountain Farmers | 2.84 | 2.45 | 2.19 | 1.09 | 8.59 | 15.00 |
| Masterpiece | JR Simplot Co | 2.79 | 2.42 | 2.14 | 1.15 | 8.51 | 14.95 |
| WL 363HQ | W-L Research | 2.80 | 2.37 | 2.17 | 1.22 | 8.58 | 14.92 |
| FSG 5285F | Allied Seed | 2.61 | 2.25 | 2.09 | 1.14 | 8.09 | 14.89 |
| LegenDairy 5.0 | Croplan Genetics | 2.64 | 2.41 | 2.21 | 1.10 | 8.37 | 14.74 |
| 5454 | Pioneer | 2.66 | 2.34 | 1.98 | 1.02 | 8.02 | 14.63 |
| Integra 8400 | Wilbur-Ellis Co. | 2.76 | 2.24 | 2.19 | 1.14 | 8.34 | 14.56 |
| Oneida | Cornell University | 2.59 | 2.50 | 2.03 | 1.06 | 8.20 | 14.54 |
| Vernal | USDA-WI AES | 2.88 | 2.36 | 2.09 | 1.08 | 8.41 | 14.51 |
| Lariat | JR Simplot Co | 2.65 | 2.42 | 1.99 | 1.10 | 8.18 | 14.40 |
| CW 500 | Producer's Choice | 2.58 | 2.58 | 1.98 | 1.15 | 8.30 | 14.47 |
| PGI 424 | Producer's Choice | 2.54 | 2.40 | 1.90 | 1.08 | 7.93 | 14.27 |
| Ameristand 407TQ | America's Alfalfa | 2.76 | 2.10 | 2.07 | 1.09 | 8.03 | 14.25 |
| WL 343 HQ | W-L Research | 2.58 | 2.18 | 1.89 | 1.11 | 7.76 | 13.79 |
| Average | | 2.71 | 2.40 | 2.06 | 1.10 | 8.27 | 14.61 |
| CV (%) | | 12.05 | 10.29 | 8.74 | 5.42 | 6.18 | |
| LSD (0.1) | | 0.39 | 0.29 | 0.21 | 0.07 | 0.61 | |

*Yields were calculated on an air-dry basis.

**Site Information:** Elevation 4178 ft
Soil: Rocky Ford Silty Clay Loam
Precipitation - April 1, 2009 to Sept 30, 2009 = 7.81 inches
Last Spring Frost – April 8, 2009 / First Fall Frost – October 2, 2009

# Winter Wheat Variety Trial

Jerry Johnson, Scott Haley, Kevin Larson
and Michael Bartolo
Colorado State University

| Variety | Yield | Test Weight | Height | Lodging | BYDV |
|---|---|---|---|---|---|
| | bu/ac | lb/bu | in | scale 1-9* | scale 1-9** |
| Aspen | 107.0 | 55.5 | 35 | 2 | 4 |
| Settler CL | 106.2 | 58.5 | 36 | 1 | 1 |
| Thunder CL | 105.9 | 56.1 | 37 | 4 | 2 |
| CO04393 | 105.7 | 59.0 | 37 | 5 | 3 |
| TAM 111 | 101.9 | 59.3 | 38 | 4 | 3 |
| Keota | 100.7 | 58.2 | 40 | 4 | 1 |
| Jagalene | 100.5 | 58.0 | 38 | 3 | 4 |
| CO04499 | 95.8 | 58.6 | 40 | 6 | 2 |
| Hitch | 94.1 | 56.4 | 36 | 4 | 4 |
| Prairie Red | 91.6 | 56.6 | 34 | 8 | 1 |
| Ripper | 91.1 | 54.5 | 35 | 6 | 3 |
| NuDakota | 90.5 | 55.3 | 36 | 3 | 6 |
| Bond CL | 89.2 | 56.1 | 38 | 5 | 3 |
| Armour | 88.3 | 55.6 | 32 | 5 | 2 |
| Anton | 85.9 | 58.7 | 38 | 4 | 4 |
| Danby | 85.6 | 57.7 | 38 | 9 | 3 |
| OK Rising | 81.7 | 56.7 | 36 | 1 | 3 |
| Fuller | 80.3 | 55.7 | 35 | 6 | 4 |
| Yuma | 79.5 | 55.7 | 36 | 5 | 6 |
| CO03W054-2 | 79.0 | 56.3 | 37 | 8 | 3 |
| TAM 112 | 78.7 | 58.1 | 36 | 8 | 2 |
| AP00x0100-51 | 78.4 | 54.9 | 36 | 3 | 4 |
| Ankor | 77.3 | 54.5 | 37 | 7 | 3 |
| Mace | 76.4 | 55.9 | 37 | 2 | 5 |
| Bill Brown | 76.2 | 56.7 | 34 | 7 | 6 |
| Hawken | 70.9 | 54.3 | 31 | 6 | 5 |
| Hatcher | 62.3 | 54.9 | 34 | 8 | 3 |
| CO03064-2 | 61.7 | 54.9 | 37 | 6 | 7 |
| **Trial Average** | **87.2** | **56.5** | **36** | **5** | **4** |
| $LSD_{(0.30)}$ | 4.7 | | | | |
| Harvest date: | 7/13/2009 | | Planting date: | 10/7/08 | |

# 2009 Irrigated Corn Variety Performance Trial at Rocky Ford

*Jerry Johnson, Michael E. Bartolo, and Jim Hain*

| Hybrid | Yield | Grain Moisture | Test Weight | Plant Height | Plant Population | Lodging |
|---|---|---|---|---|---|---|
| | bu/ac | % | lb/bu | in | plants/ac | % |
| Croplan 6168 | 297.6 | 17.5 | 58.9 | 93.3 | 34848 | 3.7 |
| Triumph 1536 H | 267.4 | 16.6 | 58.6 | 90.7 | 32670 | 1.3 |
| Mycogen 2T789 | 274.6 | 16.4 | 58.6 | 92.3 | 32670 | 3.3 |
| Mycogen 2T804 | 296.2 | 16.6 | 58.9 | 91.3 | 34122 | 2.3 |
| LG Seeds 2V732 | 288.6 | 16.2 | 58.0 | 89.7 | 36300 | 1.3 |
| Triumph 7514X | 278.2 | 16.9 | 57.7 | 87.7 | 34848 | 1.7 |
| LG Seeds 2619VT3 | 291.1 | 16.7 | 57.5 | 93.0 | 36000 | 0.3 |
| LG Seeds 2642VT3 | 297.2 | 17.0 | 57.2 | 91.3 | 35574 | 0.7 |
| Syngenta NK N72K-GT/CB/LL | 296.2 | 17.6 | 56.7 | 95.0 | 34848 | 3.7 |
| Syngenta NK N74C-3000GT | 286.2 | 17.1 | 57.9 | 93.7 | 34848 | 0.0 |
| Triumph 1305X | 259.8 | 16.0 | 58.0 | 89.0 | 35574 | 2.0 |
| **Average** | **284.8** | **16.8** | **58.0** | **91.5** | **34755** | **1.8** |
| $LSD_{0.30}$ | 16.5 | | | | | |
| $LSD_{.05}$ | 32.3 | | | | | |

$LSD_{0.30}$ is the most useful for producers using these results to select a variety but some collaborators find $LSD_{0.05}$ useful.

Experimental Design: randomized complete block, 3 replications.

Harvested Plot size: 5' x 30'

**Site Information**

| | |
|---|---|
| Collaborator: | Arkansas Valley Research Center (Mike Bartolo) |
| Soil type: | Rocky Ford silty clay |
| Previous Crop: | Alfalfa |
| | |
| Planting Date: | 4/30/2009 |
| Irrigation: | furrow |
| Fertilization: | N-P-K (202-104-0) lb/ac |
| Herbicide: | Dicamba |
| Insecticide: | Comite II |

# Corn Glyphostate Antagonism Trial

Michael Bartolo and Jeff Davidson
Arkansas Valley Research Center
Colorado State University

Corn used for grain or silage is an important crop in the Arkansas Valley and other regions of the state. The majority of the corn grown in the Arkansas Valley is genetically-modified and often contains resistance to the herbicide glyphosate. Glyphosate-resistant or "Round-up Ready" corn has proven to be an important component of a successful weed control program. Although glyphosate is a valuable tool in corn production, there has been some concern that, under certain circumstances, glyphosate applications may depress yields. Because of this potential, this study was conducted to determine the effect of glyphostate applications on corn grain yield on two different corn hybrids. In addition, the effects of a commercially available foliar fertilizer, sprayed in conjunction with glyphosate, were also assessed.

Overall, there was not a significant ($p=0.1$) decrease in grain yield by the application of glyphosate compared to an unsprayed control. Conversely, the unsprayed controls had lower yields in both varieties. The addition of a commercially available foliar fertilizer did not improve yields when applied in combination with glyphosate. However, when sprayed alone, the foliar fertilizer did improve yield above the unsprayed control.

## *METHODS*

This study was conducted with conventional tilled, furrow-irrigated corn on a calcareous Rocky Ford silty clay loam soil at Colorado State University's Arkansas Valley Research Center (AVRC) in 2009. The Center is located near Rocky Ford, Colorado. The plot area had previously been in alfalfa during 2008. The corn hybrid CROPLAN 6818 (114 days) was planted on April 30, 2009 at a seeding rate of about 32,000 seeds per acre. A single line of corn was planted on top of the bed with a 30 inch row spacing (furrow to furrow). Conventional corn production practices were used throughout the course of the season. Irrigation was by gravity-flow furrows with water being applied to every other furrow (every 60 inches). One or two spray treatments were applied depending on the treatment, occurring on June 12 and June 24 at the V3 and V7 stage of corn development, respectively. All materials were applied with a hand-held sprayer (2 gal. capacity) in water (30 gal per acre). A randomized complete block design with 4 replications was used. Each plot was 4 beds wide (10 feet) and 36 feet long. The corn was harvested at full black layer maturity on October 31.

*Table 1: Yield (bu/acre) of corn grown for grain following applications of glyphosate and foliar fertilizers. All yields were adjusted to a grain moisture content of 15.5%.*

| Treatment | Rate | Yield bu/acre (adjusted to 15.5 % moisture and a bu. weight of 58.8 lbs) |
|---|---|---|
| Unsprayed Control (Conventional) | - | 276.6 |
| Roundup Weather Max +<br>Class Act NG | 22 fl oz/a<br>2.5% v/v | 287.8 |
| AGM 07027 (Conventional) | 1 qt/a | 274.2 |
| Roundup Weather Max +<br>Class Act NG +<br>AGM 07027 | 22 fl oz/a<br>2.5% v/v<br>1 qt/a | 282.7 |
| Roundup Weather Max +<br>Class Act NG +<br>AGM 07027 +<br>AGM 08005 | 22 fl oz/a<br>2.5% v/v<br>1 qt/a<br>3.2 fl oz/a | 272.2 |
| Roundup Weather Max +<br>Class Act NG<br>***12 Days Later***<br>Roundup Weather Max +<br>Class Act NG +<br>AGM 07027 | 22 fl oz/a<br>2.5% v/v<br><br>22 fl oz/a<br>2.5% v/v<br>1 qt/a | 286.1 |
| Roundup Weather Max +<br>Class Act NG | 66 fl oz/a<br>2.5% v/v | 301.8 |
| Roundup Weather Max +<br>Class Act NG +<br>AGM 07027 | 66 fl oz/a<br>2.5% v/v<br>1 qt/a | 284.6 |
| Roundup Weather Max +<br>Class Act NG<br>***12 Days Later***<br>Roundup Weather Max +<br>Class Act NG +<br>AGM 07027 | 22 fl oz/a<br>2.5% v/v<br><br>66 fl oz/a<br>2.5% v/v<br>1 qt/a | 275.9 |
| lsd(0.1) | | 11.6 |

*This work was generously supported by Winfield Solutions under the direction of Mr. Joe Bush.*

# Corn Fallow Trial

Jim Valliant and Mike Bartolo
Arkansas Valley Research Center
Colorado State University

Water sales in the Arkansas River Valley of Colorado have been on a "buy and dry" basis for many years. Agricultural water rights have been sold to cities on the front range and the previously irrigated land removed from production. These lands revert to dry land production and, in the arid environment of Southeastern Colorado, have limited agricultural productivity. In many instances, these lands have serious erosion and weed problems.

An alternative to water sales is the temporary leasing of agricultural waters to the cities, particularly in times of drought. Water leases give the shareholders a new crop, "water", and provide additional revenue. In a leasing program, land is not permanently dried up but is fallowed or set aside from irrigation for a number of years, depending on the conditions of the lease.

Leasing of agricultural waters could improve the economic stability of the agricultural-dependent communities of the Arkansas Valley. Growers could keep much of their land under production, fallowing only the necessary acres to meet the needs of the leasing agreements. Several ditch companies have already leased water and others are looking at the possibility of leasing water collectively as a group (Super Ditch). At this time, however, it is not clear how fallowing will affect yields, nutrients needs, ability to come back into production, and overall economics. This study attempts to address those issues.

**Methods**

This study was conducted with conventional tilled, furrow-irrigated corn on a calcareous Rocky Ford silty clay loam soil at Colorado State University's Arkansas Valley Research Center (AVRC) starting in 2007. The Center is located near Rocky Ford, Colorado. The plot area had previously been in corn during 2006. The corn hybrid RX752RR/YGPL (Dekalb) was planted in late April in each year. The crop was seeded at a rate of about 32,000 seeds per acre. A single line of corn was planted on top of a bed with a 30 inch row spacing (furrow to furrow). Conventional corn production practices were used throughout the course of the season. Irrigation was by gravity-flow furrows with water being applied to every other furrow (every 60 inches). The trial was

arranged in a complete block design with four replications. Starting in 2007, one treatment was planted to corn and the remaining three treatments were fallowed. In each subsequent year, one additional treatment was planted to corn. Fallowed treatments were managed to maintain low weed growth and prevent soil erosion. The sequence of treatments are described in the table below:

| Treatment | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|
| 1. | corn | corn | corn | corn |
| 2. | fallow | corn | corn | corn |
| 3. | fallow | fallow | corn | corn |
| 4. | fallow | fallow | fallow | corn |

Grain yields were collected in October or November of each season. Yield samples were taken within each treatment plot and assessed for total weight, moisture content, and grain bushel weight. In addition to yield, soil nutrient status was monitored via soil samples taken at depths of 0-8", 8-16", and 16-24". All production practices, including the practices and costs necessary to maintain the fallowed lands, were recorded.

## Results

*Table 1: Yield (bu/acre) of corn grown for grain following different fallowing periods. All yields were adjusted to a grain moisture content of 15.5%.*

| Treatment | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|
| | | *Yield Bu/acre* | | |
| 1. | **187.1** | **232.8** | **204.4** | corn |
| 2. | *fallow* | **233.0** | **205.1** | corn |
| 3. | *fallow* | *fallow* | **204.7** | corn |
| 4. | *fallow* | *fallow* | *fallow* | corn |
| *lsd(0.1)* | | *38.72* | *14.3* | |

## Discussion

Through the 2009 season, no significant yield differences have been realized as a result of either one or two years of fallowing compared to a continuously cropped treatment. After two years of fallowing, fertilizer applied during the 2007 season was still available for a crop grown in 2009.

Specific fertility and production costs data will be presented in subsequent reports.

# Onion Variety Trial

*Mike Bartolo*
*Arkansas Valley Research Center*
*Colorado State University*

**PRODUCTION INFORMATION**

***Plots -*** *Planted 20' long X 2 rows on beds spaced 30" on centers. Rows were spaced 10" apart on top of the bed. Plants were hand-thinned to an in-row spacing ~3". Yield was determined from an 8' bed section (8' X 2 rows) of the plot. Each plot was replicated four times in the trial.*
***Planted*** *- March 16th, 2009*
***Fertilizer*** *- 104 lbs. $P_2O_5$/A and 22 lbs N/A as 11-52-0 - preplant. ~ 100 lbs. N/A residual (in top 18") and 34 lbs N as 46-0-0 supplied via irrigation water.*
***Weed Control*** *- Roundup on April 8th ; Goaltender, Trigger, and Prowl-$H_20$ on May 6th ; Goal 2E, Starane Ultra, and Outlook on May 20th ; Trigger and Crop Oil on June 1st ; Goal 2E, Prowl-$H_20$, Dual Magnum on June 16th ; Dual and Goaltender on July 13th ; Hand weeded 2 times*
***Insect Control*** *– Movento on June 27th ; Azadirect on July 13th ; Azadirect on July 24th*
***Disease Control****- Dithane and Champ on July 24th*
***Irrigation*** *– The plots were irrigated multiple (12) times via gravity-flow furrows. The amount of irrigation water (consumptive use) was approximately 30" and seasonal precipitation was 7.95".*
***Harvest*** *– September 14th*
***Grade*** *– October 23rd*

***Comments***

*The 2009 season was good for onion production with ample irrigation water and relatively normal growing conditions. No disease problems were detected. Specifically, there was no Iris Yellow Spot Virus or Xanthomonas detected in the plots. The plots escaped any significant storm damage. Thrips populations were moderate and were fairly easy to control. Please contact Mike Bartolo at the Arkansas Valley Research Center (phone: 719-254-6312; e-mail: michael.bartolo@colostate.edu) for additional information.*

# *ONION VARIETY TRIAL*

***Arkansas Valley Research Center, Colorado State University, Rocky Ford, Colorado, 2009***

| *Variety* | *Source* | *Maturity (% tops down) 9-1* | *Colossals > 4" %* | *Jumbos 3"-4" %* | *Medium 2.25"-3" %* | *Pre-Pack 1.75"-2.25" %* | ***Total Market. CWT/A*** | *Culls %* | *Total Weight CWT/A* |
|---|---|---|---|---|---|---|---|---|---|
| X-Y201 | Waldow | 22 | 18.1 | 61.7 | 12.3 | 0.9 | **737.7** | 7.1 | 797.7 |
| X-Y202 | Waldow | 12 | 17.2 | 69.8 | 8.2 | 0.7 | **736.2** | 4.1 | 766.7 |
| Mesquite | D. Palmer | 15 | 16.1 | 65.8 | 10.6 | 0.1 | **723.1** | 7.3 | 778.1 |
| Tequila | D. Palmer | 20 | 16.0 | 67.8 | 10.5 | 0.7 | **712.8** | 5.0 | 749.2 |
| Maverick | Bejo | 55 | 6.1 | 68.5 | 17.5 | 1.4 | **700.2** | 6.4 | 747.1 |
| T-433 | Takii | 10 | 6.1 | 80.2 | 7.9 | 0.8 | **696.9** | 4.9 | 734.0 |
| Cometa (W) | Nunhems | 22 | 6.1 | 76.4 | 15.8 | 0.7 | **674.6** | 1.1 | 682.3 |
| Oracle (03-207) | Crookham | 32 | 1.1 | 82.3 | 13.6 | 0.5 | **667.6** | 2.5 | 683.3 |
| Morpheus (03-209) | Crookham | 30 | 10.8 | 72.3 | 12.2 | 0.6 | **665.3** | 4.1 | 694.8 |
| Colorado 6 | Burrell | 10 | 7.9 | 62.8 | 16.5 | 2.5 | **648.0** | 10.3 | 723.1 |
| Legend | Bejo | 25 | 2.1 | 70.3 | 20.7 | 1.0 | **645.2** | 5.9 | 684.4 |
| Advantage (05-N5) | Crookham | 10 | 7.7 | 70.9 | 12.9 | 0.6 | **640.3** | 7.8 | 695.3 |
| Arcero | Nunhems | 12 | 0 | 79.5 | 18.0 | 1.5 | **637.6** | 1.0 | 644.1 |
| White Cloud (W) | Crookham | 60 | 1.1 | 69.5 | 17.3 | 1.8 | **630.5** | 10.3 | 703.0 |
| OLYX06-25 | Crookham | 10 | 8.7 | 71.1 | 14.7 | 0.8 | **630.0** | 4.7 | 661.0 |
| Pandero | Nunhems | 25 | 16.8 | 73.3 | 5.0 | 0.8 | **620.2** | 4.1 | 646.9 |
| The Rock | Crookham | 17 | 7.3 | 78.3 | 11.0 | 0.2 | **613.1** | 3.2 | 633.3 |
| Joaquin | Nunhems | 10 | 14.4 | 72.5 | 6.7 | 0.2 | **610.4** | 6.2 | 654.5 |
| Delgado | Bejo | 25 | 2.4 | 78.1 | 14.0 | 1.4 | **603.8** | 4.1 | 630.0 |
| NUN7606ON | Nunhems | 45 | 2.7 | 75.4 | 19.6 | 1.0 | **598.4** | 1.4 | 606.6 |

| *Variety* | *Source* | *Maturity (% tops down) 9-13* | *Colossals > 4" %* | *Jumbos 3"-4" %* | *Medium 2.25"-3" %* | *Pre-Pack 1.75"-2.25" %* | ***Total Market. CWT/A*** | *Culls %* | *Total Weight CWT/A* |
|---|---|---|---|---|---|---|---|---|---|
| OLYX00-23 | Crookham | 45 | 0 | 69.1 | 25.4 | 2.7 | **588.0** | 2.8 | 604.9 |
| Ranchero | Nunhems | 42 | 4.8 | 74.6 | 10.7 | 1.5 | **579.3** | 8.3 | 633.3 |
| Western Giant | Sakata | 87 | 3.3 | 42.1 | 34.7 | 5.0 | **556.5** | 14.8 | 651.8 |
| Vaquero | Nunhems | 57 | 1.3 | 65.0 | 25.4 | 2.2 | **553.8** | 6.1 | 589.1 |
| Granero | Nunhems | 55 | 0 | 75.2 | 22.6 | 0.8 | **548.3** | 1.4 | 554.8 |
| Calibra | Bejo | 67 | 0 | 66.3 | 25.0 | 2.2 | **539.0** | 6.4 | 576.1 |
| Crockett | Bejo | 10 | 0 | 63.6 | 29.8 | 1.3 | **535.8** | 5.3 | 566.3 |
| X-Y441 | Waldow | 42 | 0 | 62.1 | 25.3 | 3.8 | **518.4** | 8.7 | 567.9 |
| DPS2052 (W) | D. Palmer | 30 | 0 | 56.9 | 30.5 | 2.8 | **485.7** | 9.9 | 538.0 |
| Sarape Café | D. Palmer | 42 | 0 | 58.2 | 32.2 | 0.9 | **484.6** | 8.7 | 531.4 |
| Gunnison | Bejo | 65 | 0 | 37.0 | 56.4 | 5.1 | **433.4** | 1.2 | 440.0 |
| Talon | Bejo | 55 | 0 | 31.2 | 59.4 | 3.7 | **432.9** | 5.7 | 460.0 |
| OLRH06-91 (R) | Crookham | 20 | 1.9 | 41.1 | 40.2 | 1.9 | **388.2** | 15.0 | 459.0 |

**lsd (0.1) =** **89.7**

W) = white-skinned, (R ) = red-skinned, all other yellows

# Onion Thrips Tolerance Trial

*Whitney Cranshaw*
*Mike Bartolo*
*Colorado State University*

Trials were conducted at the Arkansas Valley Research Center in Rocky Ford, CO. Individual plots consisted of 50-row ft of seeded onions in 4-row beds at 5-ft centers. Each cultivar was replicated four times in a randomized complete block design. Subplots were established within each plot, so that one half of the area was treated to control thrips, the other half remaining untreated. Thrips treatments consisted of a mixture of fipronil (Regent) and spirometrastat (Movento), which had been identified as the most effective treatments at that site in previous season. Applications were made 12 June, repeated 3 July. Excellent control (>5 thrips/plant) was maintained on these treated plots through the end of July when last observations were made (July 24).

Two counts of thrips were made (table below), each by counting the number of thrips on 10 plants in the center of untreated areas.

| | **19 June*** | **10 July*** |
|---|---|---|
| 1. Cometa | 133.5 ab | 243.5 abc* |
| 2. White Wing | 132.0 ab | 202.3 abcd |
| 3. Salsa | 136.5 a | 339.25 ab |
| 4. Red Bull | 120.0 ab | 303.5 abc |
| 5. Red Wing | 138.0 a | 316.75 ab |
| 6. Talon | 104.0 abc | 353.75 a |
| 7. Tioga | 91.0 abc | 206.75 abcd |
| 8. Gunnison | 100.0 abc | 259.0 abcd |
| 9. Arcero | 99.5 abc | 153.0 abcde |
| 10. Ranchero | 105.0 abc | 166.50 abcd |
| 11. Calibra | 127.0 ab | 126.25 abce |
| 12. X-202 (Tequila) | 103.5 abc | 103.75 bcde |
| 13. Sedona | 135.3 a | 234.75 abc |
| 14. OLYSOS5N5 | 100.3 abc | 64.25 de |
| 15. Colorado 6 | 114.3 ab | 51.25 e |
| 16. T-433 | 64.5 bc | 78.25 de |
| 17. Tamara | 63.0 c | 91.00 cde |
| 18. Granero | 129.3 ab | 155.25 abcde |
| 19. Oro Blanco | 140.5 a | 47.25 e |
| 20. Vaquero | 106.0 abc | 101.0 bcde |

Original means presented
Analysis used log transformation

**Yield and market class distribution of onion receiving full (sprayed) or no thrips control in 2009.**

| *Variety* | *Spray Treatment* | *Colossals ∃4" %* | *Jumbos 3"-4" %* | *Medium 23"-3" %* | *Pre-Pack 1:"-23" %* | ***Total Market. Weight 50 lb. bags/A*** | *Culls %* | *Total Weight 50 lb. bags/A* | *Percent Yield Increase Due to Spray Control* |
|---|---|---|---|---|---|---|---|---|---|
| **Colorado 6** | Spray | 4.1 | 74.0 | 17.5 | 1.3 | **1457.0** | 2.9 | 1499.5 | **4.5** |
| | None | 13.0 | 69.8 | 11.9 | 0.7 | **1393.9** | 4.3 | 1455.9 | |
| **Red Bull** | Spray | 0 | 82.6 | 5.1 | 0.2 | **782.9** | 11.9 | 889.7 | **36.7** |
| | None | 0 | 30.6 | 49.4 | 0.4 | **572.8** | 19.3 | 708.9 | |
| **Granero** | Spray | 8.2 | 64.4 | 22.7 | 0.7 | **1306.8** | 3.7 | 1359.0 | **1.6** |
| | None | 0 | 57.8 | 38.9 | 1.2 | **1286.1** | 1.9 | 1308.9 | |
| **Cometa** | Spray | 2.9 | 82.0 | 8.5 | 0.6 | **1601.9** | 5.8 | 1706.4 | **16.5** |
| | None | 3.2 | 82.0 | 13.9 | 0.3 | **1375.4** | 0.4 | 1381.9 | |
| **Gunnison** | Spray | 0 | 45.3 | 48.8 | 2.2 | **1089.0** | 3.5 | 1128.2 | **16.0** |
| | None | 0 | 11.0 | 81.9 | 4.0 | **938.7** | 2.8 | 967.0 | |
| **Mesquite (X-202)** | Spray | 14.2 | 65.0 | 17.2 | 1.2 | **1542.0** | 2.2 | 1577.9 | **0.2** |
| | None | 9.1 | 82.7 | 5.5 | 0.3 | **1538.7** | 2.1 | 1574.6 | |
| **OLYS 05-N5** | Spray | 0 | 83.0 | 15.4 | 0.5 | **1742.4** | 0.9 | 1758.7 | **20.5** |
| | None | 1.1 | 71.7 | 21.8 | 0.3 | **1446.1** | 4.8 | 1521.3 | |
| **Arcero** | Spray | 4.3 | 64.9 | 27.7 | 0.7 | **1347.0** | 2.2 | 1379.7 | **20.5** |
| | None | 0 | 62.6 | 32.9 | 0.6 | **1117.3** | 3.7 | 1163.0 | |

**Onion yield response to full (sprayed) or no thrips control in 2008 and 2009.**

| *Variety* | *Spray Treatment* | ***Total Market. Weight 50 lb. bags/A 2008*** | ***Total Market. Weight 50 lb. bags/A 2009*** | *Percent Yield Increase Due to Spray Control* ***2008*** | *Percent Yield Increase Due to Spray Control* ***2009*** | *Percent Yield Increase Due to Spray Control* ***2 year Ave****.* |
|---|---|---|---|---|---|---|
| **Colorado 6** | Spray | **1265.4** | **1457.0** | **(-2.1)** | **4.5** | **2.4%** |
| | None | **1292.6** | **1393.9** | | | |
| **Red Bull** | Spray | **708.8** | **782.9** | **28.4** | **36.7** | **32.5%** |
| | None | **552.0** | **572.8** | | | |
| **Granero** | Spray | **1396.0** | **1306.8** | **38.4** | **1.6** | **20.0%** |
| | None | **1008.4** | **1286.1** | | | |
| **Cometa** | Spray | **971.2** | **1601.9** | **18.4** | **16.5** | **17.4%** |
| | None | **820.0** | **1375.4** | | | |
| **Gunnison** | Spray | **855.8** | **1089.0** | **39.8** | **16.0** | **27.8%** |
| | None | **612.0** | **938.7** | | | |
| **Mesquite (X-202)** | Spray | **1325.2** | **1542.0** | **(-3.3)** | **0.2** | **(-1.5)%** |
| | None | **1371.0** | **1538.7** | | | |
| **OLYS 05-N5** | Spray | **1474.4** | **1742.4** | **9.0** | **20.5** | **14.7%** |
| | None | **1352.4** | **1446.1** | | | |
| **Arcero** | Spray | **1030.0** | **1347.0** | **0.6** | **20.5** | **10.5%** |
| | None | **1023.6** | **1117.3** | | | |

# Effect of Water Quality on Cantaloupe Yield and Quality

Mike Bartolo
Arkansas Valley Research Center
Colorado State University

Cantaloupe is an important vegetable crop grown in the Arkansas Valley of Colorado. Starting in the early 1990's, cantaloupes were increasingly produced using intensive production methods like drip irrigation and plastic mulches. Today, the majority of cantaloupes are grown with these two components of plasticulture. To facilitate the use of drip irrigation, growers have relied upon ground water pumped from shallow alluvial wells as the source of irrigation water. Unlike surface waters, ground water is relatively free of particulates and is available on a more timely and reliable basis. Unfortunately, ground waters also contain much higher amounts of dissolved salts making the electrical conductivity ($EC_w$) of ground water approximately 3 times higher than that of surface waters.

The purpose of this study was to determine how the use of ground water affects the yield and quality of cantaloupe grown with intensive production practices. Crop, water, and soil characteristics were monitored in treatment irrigated with both surface and ground waters.

### *Methods*

This study was conducted at the Arkansas Valley Research Center (AVRC) in Rocky Ford. Beds, 45 inches wide and 60 inches between centers, were shaped in early April. Drip lines were placed 1-2 inches from the center of the bed at a depth of 3 inches. The beds were covered with black embossed plastic mulch (Mechanical Transplanter) on May 5th using a one-bed mulch layer.

The study was designed as a randomized complete block with four replications. The test site irrigation system was plumbed so that four plots would receive water derived from a surface source (Rocky Ford Ditch) and four plots would receive water from a shallow alluvial well located at the AVRC. Throughout the experiment, both water sources were delivered to the test site in equal quantities and the timing of each application was identical (Table 1). Soil water potential was monitored with Watermark sensors placed at depths of 9 and 18 inches. An irrigation event was initiated when soil water potential reached 30 cb at both depths.

On May 19th, the cantaloupe variety *"Athena"* was sown in holes in the plastic mulch down the center of the bed at an in-row spacing of 18 inches. Melons were harvested starting on August 17th. At harvest, the soluble

solid content (% brix) of six randomly selected melons was sampled from each plot using a digital refractometer. Melons were considered marketable if they weighed over 3 lbs. and were free of any physical defects.

In addition to fruit and water characteristics, changes in soil salinity were monitored in the treatments. Soil samples were taken at depths of 0-6", 6-12", 1-2', 2-3', and 3-4' before irrigation commenced and after harvest. Samples were taken in two locations in the bed; in the middle of the bed (seed-row) and outside of the production bed (furrow). Salinity of the saturated paste extract was estimated using a 1:1 (w:w) extract of the soil using distilled water. Specifically, 50 g of soil was mixed with with 50 g of distilled water. The mixture was placed on a rotary shaker overnight and filtered the next day (Whatman 1). The conductivity of the resulting filtrate ($EC_f$ ) was measured and converted to the conductivity of the saturated paste extract ($EC_e$) using the following predetermined equation:

$[EC_e = (EC_f)(2.104) + 0.0039]$.

***Results and Discussion***

Irrigation water from the shallow alluvial well had 2-3 times higher electrical conductivity and individual chemical components than irrigation water derived from a surface source (Table 2). Despite these differences, there was not a significant difference in yield or fruit quality (as measured by percent brix) between cantaloupes that were irrigated with the two different water sources (Table 3). Although, average fruit size and number were slightly greater in cantaloupes irrigated with the surface water, these differences were not statistically significant (P>.05).

As anticipated, soil salinity ($EC_e$) was greater in the treatment irrigated with well water (Figures 1 and 2). Salinity was generally greater in the surface layers.

***Table 1:*** *Timings and amounts of irrigation water delivered to treatments. Plots irrigated with surface and well waters were irrigated at the same time and received the same volumes.*

| DATE | gals/acre | ACRE-IN Applied | | DATE | gals/acre | ACRE-IN Applied |
|---|---|---|---|---|---|---|
| 25-May | 11559.32 | **0.425** | | 13-Jul | 13752 | **0.506** |
| 17-Jun | 15906.48 | **0.585** | | 15-Jul | 7181.6 | **0.264** |
| 23-Jun | 16578.8 | **0.610** | | 17-Jul | 22194.2 | **0.817** |
| 26-Jun | 17350.44 | **0.638** | | 20-Jul | 21048.2 | **0.775** |
| 29-Jun | 19405.6 | **0.714** | | 24-Jul | 20505.76 | **0.755** |
| 1-Jul | 14531.28 | **0.535** | | 31-Jul | 21850.4 | **0.804** |
| 4-Jul | 18824.96 | **0.693** | | 4-Aug | 6715.56 | **0.247** |
| 7-Jul | 9550 | **0.351** | | 10-Aug | 7082.28 | **0.260** |
| 10-Jul | 9550 | **0.351** | | | | |
| | | | | **SEASON TOTAL** | | **9.338** |

***Table 2**: Chemical characteristics of ground and surface waters.* Analysis at AVRC, ** EPA analysis at Arkansas River.*

| *Component* | *Groundwater** | *Surface*** |
|---|---|---|
| Calcium | 283 ppm | 111 ppm |
| Sodium | 133 ppm | 64 ppm |
| Hardness - CaCO3 | 1022 ppm | 420 ppm |
| Sulfate | 1053 ppm | 365 ppm |
| Specific Conductance | 2.77 ds/m | 1.00 ds/m |
| TDS | 1764 ppm | 720 ppm |

***Table 3:** Yield, yield components, and quality (%brix) of cantaloupe grown with surface and ground water.*

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| Treatment Water Source | % Brix | Fruit Number per acre | Average Fruit Weight | Marketable Yield (lbs/acre) |
|---|---|---|---|---|
| Surface | 11.37 | 10,527 | 4.89 | 51,499 |
| Well | 11.16 | 10,164 | 4.75 | 48,361 |
| lsd(.05) | ns | ns | ns | ns |

***Figure 1**: Estimated salinity of the saturated paste extract ($EC_e$) prior to the initiation of irrigation (May, 2009). Soil samples were taken at depths of 0-6", 6-12", 1-2", 2-3', 3-4'. Samples were taken in the center of the production bed adjacent to the drip line and at the edge of the plastic mulch near the bed furrow*

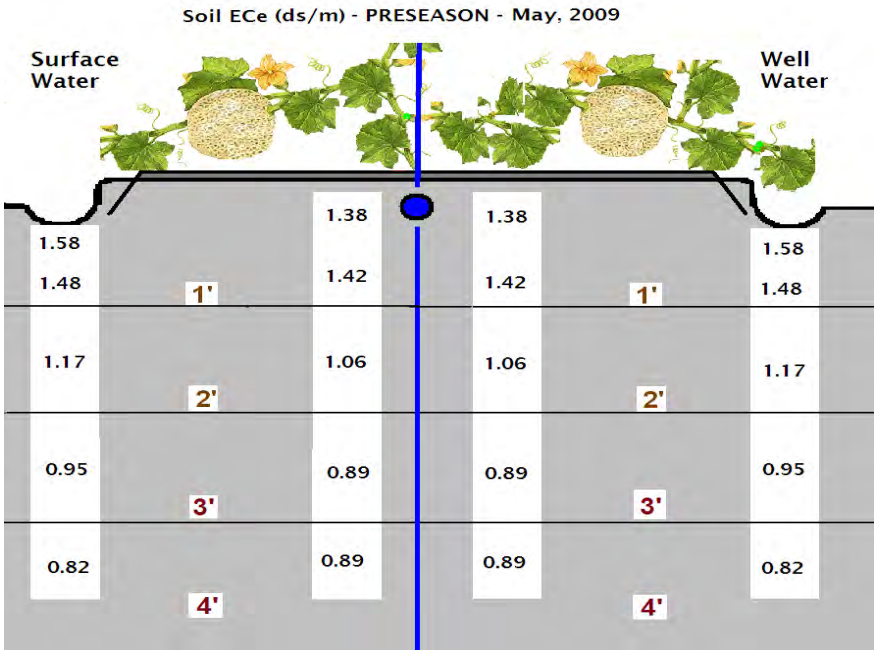
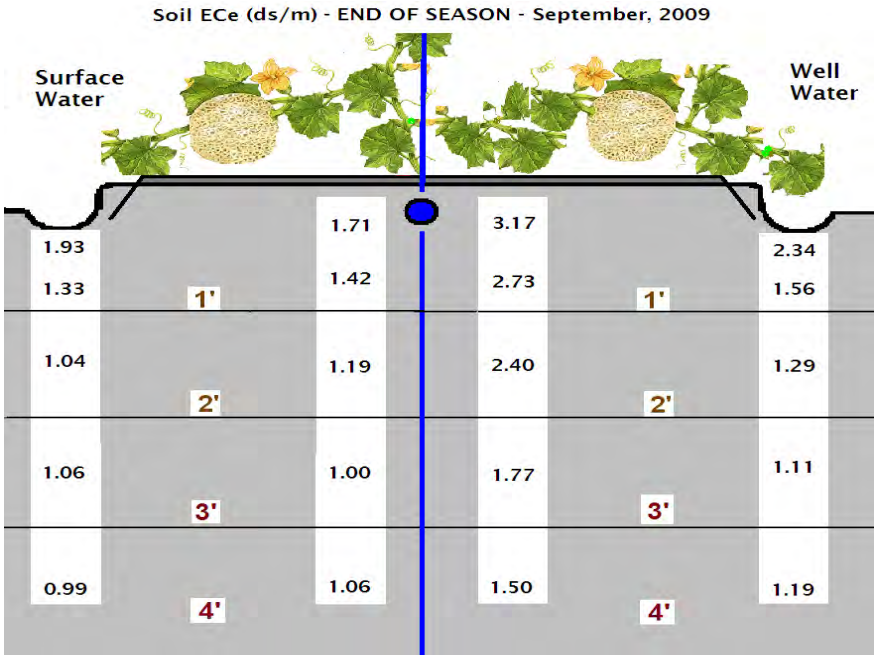


***Figure 2**: Estimated salinity of the saturated paste extract ($EC_e$) at the end of the growing season (September, 2009). Soil samples were taken at depths of 0-6", 6-12", 1-2", 2-3', 3-4'. Samples were taken in the center of the production bed adjacent to the drip line and at the edge of the plastic mulch near the bed furrow*



# Effect of Water Quality on Watermelon Yield and Quality

Mike Bartolo
Arkansas Valley Research Center
Colorado State University

Watermelon is an important vegetable crop grown in the Arkansas Valley of Colorado. In the past decade, much of the watermelons produced in the Valley have been grown with intensive production practices like drip irrigation and plastic mulches. To facilitate the use of drip irrigation, growers have relied upon ground water pumped from shallow alluvial wells as the source of irrigation water. Unlike surface waters, ground water is relatively free of particulates and is available on a more timely and reliable basis. Unfortunately, ground waters also contain much higher amounts of dissolved salts making the electrical conductivity ($EC_w$) of ground water approximately 3 times higher than that of surface waters.

The purpose of this study was to determine how the use of ground water affects the yield and quality of watermelon grown with intensive production practices. Crop, water, and soil characteristics were monitored in treatments irrigated with both surface and ground waters.

### *Methods*

This study was conducted at the Arkansas Valley Research Center (AVRC) in Rocky Ford. Beds, 45 inches wide and 60 inches between centers, were shaped in early April. Drip lines were placed 1-2 inches from the center of the bed at a depth of 3 inches. The beds were covered with black embossed plastic mulch (Mechanical Transplanter) on May 5th using a one-bed mulch layer.

The study was designed as a randomized complete block with four replications. The test site irrigation system was plumbed so that four plots would receive water derived from a surface source (Rocky Ford Ditch) and four plots would receive water from a shallow alluvial well located at the AVRC. Throughout the experiment, both water sources were delivered to the test site in equal quantities and the timing of each application was identical (Table 1). Soil water potential was monitored with Watermark sensors placed at depths of 9 and 18 inches. An irrigation event was initiated when soil water potential reached 30 cb at both depths.

On May 19th, the watermelon variety *Stars and Stripes*, an elongated seeded type, was sown in holes in the plastic mulch down the center of the bed at an in-row spacing of 3 feet. Watermelons were harvested starting on August 17th. At harvest, the soluble solid content (% brix) of four randomly selected watermelons was sampled

from each plot using a digital refractometer. Watermelons were considered marketable if they weighed over 12 lbs and were free of any physical defects.

In addition to fruit and water characteristics, changes in soil salinity were monitored in the treatments. Soil samples were taken at depths of 0-6", 6-12", 1-2', 2-3', and 3-4' before irrigation commenced and after harvest. Samples were taken in two locations in the bed; in the middle of the bed (seed-row) and outside of the production bed (furrow). Salinity of the saturated paste extract was estimated using a 1:1 (w:w) extract of the soil using distilled water. Specifically, 50 g of soil was mixed with with 50 g of distilled water. The mixture was placed on a rotary shaker overnight and filtered the next day (Whatman 1). The conductivity of the resulting filtrate ($EC_f$ ) was measured and converted to the conductivity of the saturated paste extract ($EC_e$) using the following predetermined equation:

$[EC_e = (EC_f)(2.104) + 0.0039$

***Results and Discussion***

Irrigation water from the shallow alluvial well had 2-3 times higher electrical conductivity and individual chemical components than irrigation water derived from a surface source (Table 2). Despite these differences, there was not a significant difference in yield or fruit quality (as measured by percent brix) between watermelons that were irrigated with the two different water sources (Table 3). Although, average fruit size and number were slightly greater in watermelons irrigated with the surface water, these differences were not statistically significant (P>.05).

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| 10-Jul | 9550 | **0.351** | | | | |
| | | | | **SEASON TOTAL** | | **9.338** |

***Table 2****: Chemical characteristics of ground and surface waters.* Analysis at AVRC, ** EPA analysis at Arkansas River.*

| *Component* | *Groundwater** | *Surface*** |
|---|---|---|
| Calcium | 283 ppm | 111 ppm |
| Sodium | 133 ppm | 64 ppm |
| Hardness - CaCO3 | 1022 ppm | 420 ppm |
| Sulfate | 1053 ppm | 365 ppm |
| Specific Conductance | 2.77 ds/m | 1.00 ds/m |
| TDS | 1764 ppm | 720 ppm |

***Table 3:*** *Yield, yield components, and quality (%brix) of watermelon grown with surface and ground water.*

| Treatment Water Source | % Brix | Fruit Number per acre | Average Fruit Weight | Marketable Yield (lbs/acre) |
|---|---|---|---|---|
| Surface | 10.22 | 4257 | 17.03 | 54,237 |
| Well | 10.22 | 3943 | 16.82 | 52,310 |
| lsd(.05) | ns | ns | ns | ns |

***Figure 1**: Estimated salinity of the saturated paste extract ($EC_e$) prior to the initiation of irrigation (May, 2009). Soil samples were taken at depths of 0-6", 6-12", 1-2", 2-3', 3-4'. Samples were taken in the center of the production bed adjacent to the drip line and at the edge of the plastic mulch near the bed furrow*

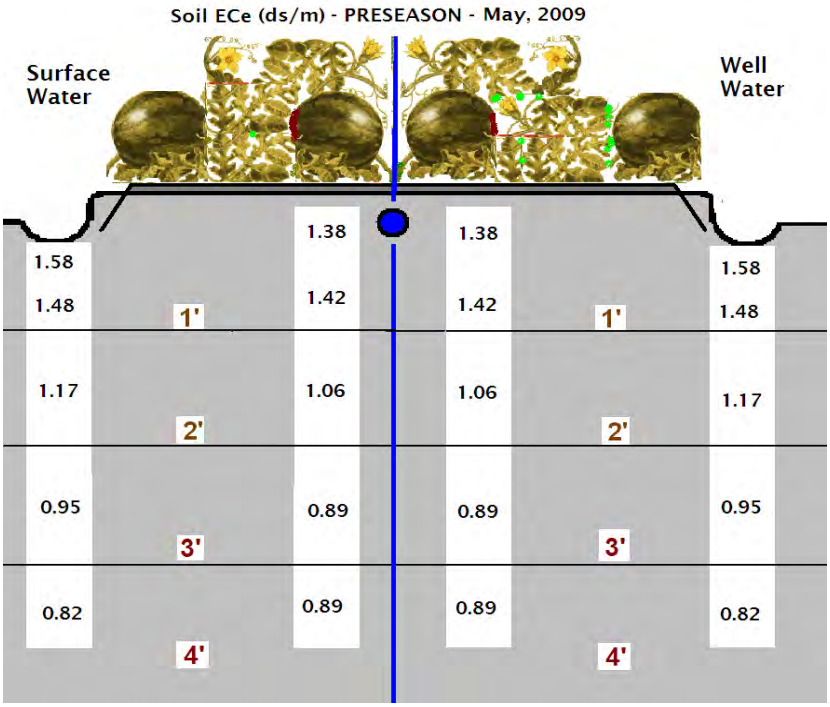
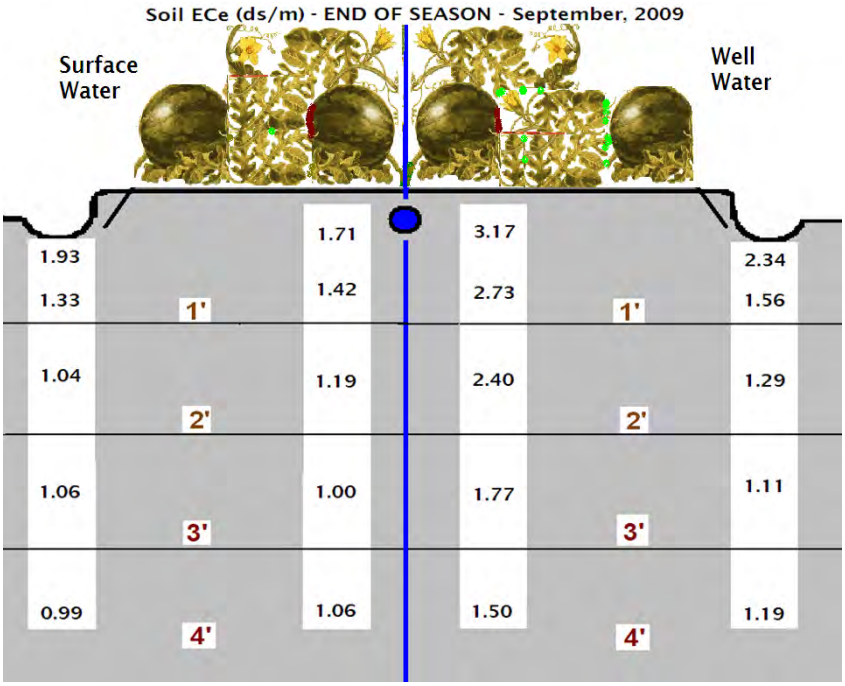



***Figure 2**: Estimated salinity of the saturated paste extract ($EC_e$) at the end of the growing season (September, 2009). Soil samples were taken at depths of 0-6", 6-12", 1-2", 2-3', 3-4'. Samples were taken in the center of the production bed adjacent to the drip line and at the edge of the plastic mulch near the bed furrow*



# Organic Seed Production Trial

Mike Bartolo
Arkansas Valley Research Center
Colorado State University

The Arkansas Valley has a long and successful history of vegetable seed production and at one time, provided a significant portion of the cucurbit seeds used in the United States. Although seed production has diminished from its historical levels, there is still a sizable amount of conventional seed production in the Valley. In recent years, there has been a dramatic increase in organic vegetable production. Accordingly, demand for organic vegetable seed is growing rapidly as the USDA National Organic Program requires organic farmers to use certified organic seed when available. With this potential, there is the opportunity to reestablish the seed production industry in the Arkansas Valley.

This project had three main objectives:

1. *Identify optimum cultural techniques and varieties for the production of high quality organic watermelon, melon, and pepper seed.*

2. *Identify potential yields of organically produced watermelon, melon, and pepper seed.*

3. *Assist and educate growers on how to adopt and comply with organic production methods and requirements*.

***Methods***

This study was conducted at the Arkansas Valley Research Center (AVRC) in Rocky Ford. The Center has a four acre site that has completed the transition into organic production. In late April, one acre of the organic field was furrowed into 30 inch beds (on center). The remainder of the field was seeded to buckwheat as a cover crop. Three test plots were direct seeded: a mixed melon trial containing 10 varieties and three replications, a watermelon trial containing 15 varieties and two replications, and a pepper trial containing 19 varieties with two replications.

Irrigation was supplied by gravity-flow furrows during the course of the season. Pest control and other management practices were implemented as needed. Cost analyses of all production practices will be outlined in a subsequent report. At harvest, yield estimates were taken from each trial. A representative sample of seed was extracted from a crop subsample to determine estimated seed yields.

## Outreach Activities

A field day was conducted at the Arkansas Valley Research Center on August 31, 2009. Over 40 participants (photo to the right) learned about production practices and other issues related to organic seed production. Participants included growers, seed company representatives, and staff from the Organic Seed Alliance.

## Results

| *Variety* | *Source* | *Ave Melon Weight (lbs)* | *Average Seed Yield per Melon (g)* | *Fresh Yield per Acre (lbs)* | *Raw* Seed Yield per Acre (lbs)* |
|---|---|---|---|---|---|
| Orange Flesh | B | 2.93 | 15.22 | 28,810 | 332 |
| Sharlyn | SOC | 2.79 | 21.37 | 28,047 | 478 |
| Sharlyn Melon | SS | 2.80 | 24.79 | 21,780 | 427 |
| Eel River | SOC | 3.79 | 22.35 | 21,096 | 275 |
| Eindor | SOS | 2.82 | 22.19 | 24,339 | 426 |
| Huerfano Bliss | DH | 3.52 | 19.84 | 43,596 | 533 |
| Golden Honeymoon | B | 4.05 | 25.44 | 31,175 | 432 |
| Burrell's Jumbo | B | 1.77 | 11.60 | 15,514 | 227 |
| PMR 45 | B | 1.78 | 10.52 | 15,615 | 208 |
| Hale's Jumbo | B | 2.04 | 13.52 | 16,383 | 233 |
| lsd(0.1) | | 0.80 | 2.64 | 10,002 | 113 |

Fresh and raw seed yield of 10 mixed melon varieties grown with organic production methods at CSU's Arkansas Valley Research Center.

B= Burrell's Seeds, SOS= Seeds of Change, SS= Siskiyou Seeds, DH= Dan Hobbs

*Raw seed was washed and dried but not milled or tested for germination.

**This project would like to acknowledge the generous support of CSU Specialty Crops Program, Organic Seed Alliance, Natural Resource Conservation Service, and CSU Agricultural Experiment Station.**

*Fresh and raw seed yield** of 15 watermelon varieties grown with organic production methods at CSU's Arkansas Valley Research Center.*

| *Variety* | *Source* | *Ave Melon Weight (lbs)* | *Average Seed Yield per Melon (g)* | *Fresh Yield per Acre (lbs)* | *Raw* Seed Yield per Acre (lbs)* |
|---|---|---|---|---|---|
| Legacy | B | 10.90 | 65.07 | 24,927 | 510 |
| Desert King | SOC | 11.76 | 73.26 | 30,753 | 620 |
| W909-4 | OSA | 13.10 | 77.46 | 27,818 | 730 |
| Wilson Sweet | OSA | 8.76 | 35.66 | 28,640 | 225 |
| W909-1 | OSA | 13.86 | 58.80 | 38,507 | 587 |
| W909-3 | OSA | 15.66 | 70.80 | 43,505 | 798 |
| Navajo Red | NMOCC | 5.96 | 33.50 | 21,442 | 143 |
| Sweet Dakota Rose | SOC | 7.33 | 28.76 | 25,155 | 151 |
| Blacktail | OSA | 7.50 | 29.60 | 23,277 | 159 |
| Monticello Gold | NMOCC | 9.80 | 34.03 | 32,016 | 240 |
| W909-2 | OSA | 13.23 | 65.00 | 43,233 | 619 |
| W912 | OSA | 6.50 | 47.50 | 19,111 | 222 |
| Charleston Grey- #133 | B | 13.10 | 45.93 | 40,657 | 433 |
| Crimson Sweet | B | 7.96 | 20.60 | 20,821 | 118 |
| Sugar Baby | B | 6.46 | 20.90 | 23,239 | 97 |

B= Burrell's Seeds, SOS= Seeds of Change, NM= State of New Mexico Organic Commodity Commission, OSA= Organic Seed Alliance

*Raw seed was washed and dried but not milled or tested for germination.

**Values are an average of two replicates. No statistical analysis was conducted.

*Fresh and raw seed yield** of 9*** pepper varieties grown with organic production methods at CSU's Arkansas Valley Research Center.*

| *Variety* | *Source* | *Fresh Yield per Acre (lbs)* | *Raw* Seed Yield per Acre (lbs)* |
|---|---|---|---|
| Santa Fe Grande | B | 22,052 | 826 |
| Big Jim | B | 19,602 | 468 |
| Sandia | B | 18,676 | 733 |
| Isleta | NMOCC | 13,068 | 890 |
| Joe Parker | B | 32,071 | 229 |
| Corno Di Toro | SOC | 28,640 | 607 |
| Mosco | CSU | 21,997 | 536 |
| California Wonder | B | 23,086 | 104 |
| Sweet Tangerine | SOC | 21,780 | 404 |

B= Burrell's Seeds, SOS= Seeds of Change, NM= State of New Mexico Organic Commodity Commission, CSU=Colorado State University

*Raw seed was washed and dried but not milled or tested for germination.

**Values are an average of two replicates. No statistical analysis was conducted.

*** Ten other varieties (CSU experimental lines) were included in the trial but not evaluated for yield.

# Cantaloupe Foliar Nutrient and Growth Regulator Trial

Michael Bartolo
Arkansas Valley Research Center
Colorado State University

Cantaloupe is an important vegetable crop in the Arkansas Valley grown on over 2,000 acres. Cantaloupes grown in the Valley are renowned for their high quality. Nonetheless, improving the yield and sugar content is a constant goal of producers. This study was conducted to examine the response of cantaloupe to several commercially available fertilizers and growth regulators applied to the foliage starting at the time of first bloom. A late infestation of powdery mildew severely reduced the functional leaf area at start of harvest. Although fruit number and size did not seem to be affected, fruit sugar content (% brix) was dramatically reduced in all treatments. As result, sugar levels are not reported in this document.

Several products, alone or in combination, significantly improved yields compared to an untreated control.

## MATERIALS AND METHODS

This study was conducted at the Arkansas Valley Research Center (AVRC) in Rocky Ford. Beds, 45 inches wide and 60 inches between centers, were shaped in early April. Drip lines were placed 1-2 inches from the center of the bed at a depth of 3 inches. The beds were covered with black embossed plastic mulch on April 29th using a one-bed mulch layer.

The study was designed as a randomized complete block with four replications. On June 1st, the cantaloupe variety *Athena*, a slightly sutured eastern shipping type, was sown in holes in the plastic mulch down the center of the bed at an in-row spacing of 18 inches. Foliarly-applied fertilizers were applied initial at the first bloom stage (July 18). All products were delivered with a hand-held sprayer. Cantaloupes were harvested starting on September 1st. Cantaloupes were considered marketable if they weighed over 3 lbs and were free of any physical defects.

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Treatment combinations and timing of applications for foliarly-applied fertilizers and growth regulators

| # | Treatment | Rate Per Acre | Stage First Bloom<br><br>July 18, 2009 | Stage First Bloom + 14 days<br><br>July 31, 2009 | Stage First Bloom + 28 days<br><br>Aug. 13, 2009 |
|---|---|---|---|---|---|
| 1. | Untreated Control | - | | | |
| 2. | MKP | 5 lbs | Yes | Yes | No |
| 3. | MI ZMB | 1 qt | Yes | No | No |
| 4. | MKP<br>MI VC | 5 lbs<br>1 qt | Yes<br>Yes | No<br>No | No<br>No |
| 5. | MKP<br>MI VC<br>Ascend | 5 lbs<br>1 qt<br>3.2 oz | Yes<br>Yes<br>Yes | Yes<br>Yes<br>Yes | Yes<br>Yes<br>No |
| 6. | MI ZMB<br>Ascend<br>MKP | 1 qt<br>3.2 oz<br>5 lbs | Yes<br>Yes<br>No | Yes<br>Yes<br>No | Yes<br>No<br>Yes |
| 7. | MI VC | 1 qt | Yes | Yes | No |

**RESULTS**

| # | Treatment | Fruit Number per Acre | Average Fruit weight (lbs) | Yield per Acre (lbs) |
|---|---|---|---|---|
| 1. | Untreated Control | 13,068 ab | 3.23 ab | 42,587 bc |
| 2. | MKP | 12,487 b | 3.29 ab | 40,852 c |
| 3. | MI ZMB | 13,576 ab | 3.28 ab | 44,438 bc |
| 4. | MKP<br>MI VC | 14,737 a | 3.51 a | 51,458 a |
| 5. | MKP<br>MI VC<br>Ascend | 14,084 ab | 3.35 ab | 47,298 ab |
| 6. | MI ZMB<br>Ascend<br>MKP | 14.084 ab | 3.38 ab | 47,712 ab |
| 7. | MI VC | 14,592 a | 3.17 b | 46,253 abc |
| lsd (0.1) | | 1,789 | 0.32 | 6,073 |