

# Fall Planted, Late Maturing Onion Variety Trial Safford Agricultural Center, 1999

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## **Abstract**

*Thirteen late maturing onion varieties were planted in the fall of 1998 and grown in a replicated small plot trial on the Safford Agricultural Center. Bulbs were pulled and the tops removed in early June. Three NuMex varieties, Mesa, Starlite and BRI, produced the best yields. Yields are shown in tabular form together with size distribution and quality characteristics.*

## **Introduction**

Onions have been grown by homeowners and farmers in Graham County in the past. This study was to look at currently available varieties, especially looking for sweet varieties that might produce well in the area. This trial is one of many vegetable crop variety studies conducted at the Safford Agricultural Center in 1998.

## **Materials and Methods**

This variety trial was performed on the Safford Agricultural Center at an elevation of 2954 feet above sea level. Seeds of the thirteen onion varieties were planted in replicated small plot trials. Soil sulfur was worked into the beds and the plots were pre-irrigated to start the remediation process. Cultural practices and inputs are listed below in the crop history.

### *Crop History:*

Soil type: Pima clay loam variant

Previous crop: Vegetables

Experimental design: Randomized complete block with 4 replications

Planting date: 20 October 1998 2 lines per bed

Fertilizer: 400 pounds/ac soil sulfur was applied 3/13, 200 pounds/ac urea applied 5/28

Irrigation: Watered up, furrow irrigated 16 times (ca. 59 inches of water)

Herbicide: None

Insecticide: None

Harvests: 3 June 1999

Bulbs were manually pulled from the ground and the tops were removed with a knife, with all varieties being harvested on the same date. Bulbs were cured on the ground for 11 days when they were graded, weighed and analyzed. Plant populations were also assessed at harvest. An eight pound paper bag was partially filled with jumbo sized bulbs at harvest and stored in a farm shed for 3 months to determine how well they would hold up in storage.

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## Results

Table 1 contains yields in 50 pound bags per acre, the percent by weight of different size fractions and the plant populations. Variability of plots between replications was larger than desired making the statistics of yield not too helpful. Never-the-less, three of the New Mexico varieties had average yields near 800 sacks per acre. These yields were in the same range as the better varieties grown in a previous study at our location (1), but somewhat lower than yields shown by Cramer et.al. (2) in a more recent study in Las Cruces, NM. Yields were very highly correlated with plant populations ( $r = 0.73$ ,  $p = 8.6e-10$ ). This is very evident with the last 3 varieties in the table. The high plant populations with NuMex Sweet Pak and NuMex Vado, appear to have suppressed the number of jumbo bulbs. With higher plant populations it would have been better to have 4 lines per bed instead of the 2 lines used in this study. The percent of bulbs in each size fraction was affected by plant populations but also by variety. For example, FMX 383 and FMX 311 had very similar plant populations, both very low. In both cases, very few small bulbs were produced, but in one case most of the bulbs were jumbo and in the other case an even split between medium and large and slightly less jumbos.

Table 2 gives average bulb weights by size and some quality ratings and measurements on each variety. Average bulb weights were fairly consistent from variety to variety even though some varietal differences were seen. NuMex Dulce seemed to have lighter bulb weight but this was not corroborated by the New Mexico study (2). The average weight of the jumbo bulbs was 10.0 ounces compared with an average marketable bulb weight from the New Mexico study of 16.4 ounces. Firmness ratings were on a scale from 1 to 5 with 1 being hard and 5 being soft. All of the bulbs were in an acceptable range. A small neck rating is more desirable as bulbs can cure quicker and with less chance of deterioration. Single centers are a desirable characteristic on onions. A determination of neck size and the numbers of bulbs with single or multiple centers was done on all the bulbs from one rep only. Since one of the objectives of the study was to evaluate sweet onion production in the area, percent sugar was determined on all varieties using a temperature compensated hand refractometer. These values indicate 4 of the New Mexico varieties were sweeter than the other varieties and 2 of these varieties produced the highest yield in the study.

A small sample of jumbo bulbs were stored in the Ag Center work shop for 3 months after the harvest. Observations made on these bulbs are contained in Table 3. Conditions of storage were not considered ideal for vegetable storage, none-the-less, three of the varieties held their quality very well. These varieties were: NuMex BR1, FMX 257 and FMX 311. It is interesting, however, to note the sugar content by variety and how these values differ from those in Table 2.

Results of the study are positive for the production of a sweet onion in the Safford area.

## References

1. Clark, L.J., F. Harper and L.M. Thatcher. 1986. Onion Variety Trial, Safford Agricultural Center. 1986 Vegetable Report, College of Agriculture, The University of Arizona, Tucson, AZ. Series P-66, pp. 76-79.
2. Cramer, C.S., J.N. Corgan, J.L. Mendoza and M.M. Wall. 1999. 1998-1999 Onion Variety Trials at New Mexico State University. Agricultural Experiment Station Research Report #739. College of Agriculture and Home Economics, New Mexico State University.

**Table 1. Onion yield, size percent and plant populations by variety at the Safford Agricultural Center, 1999.**

Variety	Percent Small <sup>1</sup>	Percent Medium <sup>2</sup>	Percent Large <sup>3</sup>	Percent Jumbo <sup>4</sup>	Yield (sacks/ac)	Plant Population
NuMex Mesa	3.8 ab <sup>5</sup>	15.8 ab	56.6 a	23.9 b	823.5 a	114015 ab
NuMex Starlite	6.3 ab	12.6 b	46.4 ab	34.7 b	822.5 a	125168 a
NuMex BR1	6.8 ab	13.1 b	49.1 ab	31.1 b	773.0 a	121450 a
Ultra	5.8 ab	10.9 b	37.4 ab	45.9 ab	714.3 a	83640 bc
FMX 257	5.4 ab	10.7 b	46.3 ab	37.6 ab	693.0 a	113600 ab
NuMex Dulce	4.6 ab	12.6 b	59.9 a	22.9 b	660.0 a	132088 a
NuMex SweetPak	6.0 ab	12.8 b	63.4 a	17.9 b	653.3 a	140868 a
NuMex Sunlite	5.4 ab	12.8 b	50.7 ab	31.1 b	649.8 a	119858 a
NuMex Crispy	8.2 a	13.1 ab	44.6 ab	31.2 b	573.8 a	118053 ab
NuMex Vado	8.2 a	13.5 b	59.9 a	18.4 b	573.8 a	142068 a
FMX 259	4.8 ab	11.3 b	45.9 ab	38.0 ab	542.5 a	70653 c
FMX 383	1.5 b	12.2 b	21.8 b	64.4 a	215.8 b	13150 d
FMX 311	0.3 b	34.5 a	36.6 ab	28.7 b	142.5 b	14963 d
Average	5.2	14.5	47.6	32.7	607.8	100812.5
LSD(05)	5.6	18.5	25.9	25.2	303.5	32367.5
CV(%)	75.7	88.9	37.9	53.6	34.8	22.4

1. Percent Small = bulbs < 1.75" in diameter

2. Percent Medium = bulbs 1.75" - 2.5" in diameter

3. Percent Large = bulbs 2.5" to 3.25" in diameter

4. Percent Jumbo = bulbs > 3.25" in diameter

5. Values followed by the same letter, within columns, are not significantly different at the 95% level of confidence using Duncan's Multiple Range Test.

**Table 2. Average bulb weights and other characteristics by variety at the Safford Agricultural Center, 1999.**

Variety	Average bulb weight (oz)				Firmness Rating <sup>1</sup>	Neck Rating <sup>2</sup>	Percent Single Center <sup>3</sup>	Percent Sugar <sup>4</sup>
	Small	Medium	Large	Jumbo				
NuMex Mesa	0.91 ab <sup>5</sup>	2.68 cd	5.90 ab	11.5 a	1.5 b	5	90	9.5 a
NuMex Starlite	1.72 ab	2.53 cd	5.93 ab	10.0 a	2.0 a	3	80	9.8 a
NuMex BR1	1.39 ab	2.77 cd	6.08 ab	9.9 a	2.0 a	4	40	6.0 d
Ultra	2.18 a	3.02 bcd	6.13 ab	11.1 a	1.5 b	4	60	10.3 a
FMX 257	0.83 ab	2.54 cd	5.65 b	10.7 a	2.0 a	3	40	6.0 d
NuMex Dulce	0.76 b	2.26 d	5.63 b	9.9 a	2.0 a	4	100	9.5 a
NuMex SweetPak	1.07 ab	2.45 cd	5.33 b	10.2 a	2.0 a	4	100	6.0 d
NuMex Sunlite	0.93 ab	2.50 cd	5.57 b	9.0 a	1.5 b	4	50	7.0 bc
NuMex Crispy	0.98 ab	2.49 cd	5.53 b	10.0 a	1.0 c	4	--	7.0 bc
NuMex Vado	0.93 ab	2.49 cd	5.13 b	10.3 a	1.0 c	4	100	6.5 cd
FMX 259	1.14 ab	3.48 b	6.98 a	10.3 a	1.5 b	2.5	80	7.8 b
FMX 383	0.96 ab	3.11 bc	5.41 b	11.4 a	1.0 c	3.5	100	5.8 d
FMX 311	0.82 ab	4.79 a	5.45 b	6.3 b	1.0 c	5	40	7.0 bc
Average	1.12	2.86	5.75	10.0	1.5	3.8	75.7	7.5
LSD(05)	1.16	0.65	1.12	2.6	0.36	--	--	0.87
CV(%)	72.1	16	13.6	18.3	16.5	--	--	8.1

1. Firmness Rating - 1 = hard, 5 = soft

2. Neck Size Rating - 1 = small, 5 = large

3. Percent Single Centers - all bulbs from one rep were evaluated to determine if they were single centered, the percent single centered are listed.

4. Percent Sugar was determined using a temperature compensated hand refractometer.

5. Values followed by the same letter, within columns, are not significantly different at the 95% level of confidence using Duncan's Multiple Range Test.

**Table 3. Onion color and qualities after 3 months of storage notes by variety at the Safford Agricultural Center, 1999.**

Variety	Color	Firmness Rating <sup>1</sup>	Percent Sugar	Notes
NuMex Mesa	Yellow	2	6.5	Some shrinkage
NuMex Starlite	Yellow	2	6.9	Some shrinkage
NuMex BR1	Yellow	1	7.3	Good
Ultra	Yellow	2	6.9	Some deterioration
FMX 257	Yellow	1	6.2	Good
NuMex Dulce	Yellow	2	7.2	Some shrinkage
NuMex SweetPak	Yellow	2	6.6	Some blackening
NuMex Sunlite	Yellow	2	6.4	Some shrinkage
NuMex Crispy	White	2	8.2	Some shrinkage
NuMex Vado	Yellow	2	7.5	Some shrinkage
FMX 259	Yellow	2	8.1	Some deterioration
FMX 383	Yellow	2	5.1	Some deterioration
FMX 311	Yellow	1	5.7	Good

1. Firmness Rating - 1 = hard, 5 = soft