



# PERFORMANCE OF ONION CULTIVARS IN THE COLUMBIA BASIN

## TEN YEARS OF CULTIVAR TRIAL RESULTS

**Carrie H. Wohleb, Ph.D.**

Professor / Vegetable and Seed Crops Extension Specialist

WSU Extension, Moses Lake, WA





## WHY DO WE HAVE ONION CULTIVAR TRIALS?

### Onion Cultivars Have Different Traits

- Onion cultivars vary in their responses to day length and temperature, and differ in traits like color and shape, yield, bulb size distribution, storability, and susceptibility to defects, diseases and pests.

### Assess Performance in Trials First

- Improved onion cultivars can mean increased profits. But, before investing in a new cultivar, it should be assessed for regional fitness and trait expression using smaller trials.





## CULTIVARS HAVE DIFFERENT TRAITS

- Yield, Bulb Size & Size Distribution
- Color and Shape
- Days to Maturity
- Pest and Disease Tolerances
- Storability
- Processing Qualities – like single centers

### SOME FACTORS THAT IMPACT CHOICE

- Location
- Length of Growing Season
- Market Timing Strategies
- Fresh vs. Processing Markets
- Domestic vs. Export
- Direct Sales or Storage
- Previous Issues (e.g. pink root disease)



## WSU EXTENSION ONION CULTIVAR TRIAL & STORAGE EVALUATION

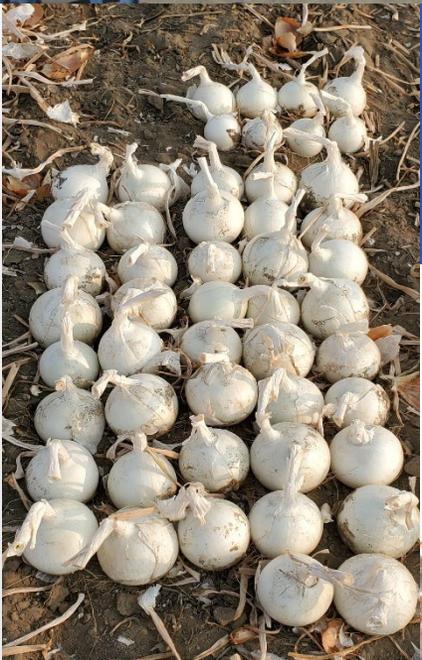


- Initiated by Gary Pelter in 1984.
- 45-60 onion cultivars and experimental lines.
- Cultivars planted in three replicate plots.
- Hosted by a different onion grower each year.
  
- Harvest Evaluations:
  - Yield, Bulb Size Profile, Defects
- Storage Evaluations (after 4 months in storage):
  - Shape, Firmness, Scale Retention, Single Centers, and Various Storage Rots.



## SOME TRIAL HIGHLIGHTS & TRENDS: 1984-2023

- In 40 years, 309 cultivars have been evaluated.
  
- Trial Average for Total Marketable Yield:
  - 1984-1992 – 25.3 T/A
  - 1993-2001 – 33.2 T/A
  - 2002-2012 – 43.8 T/A
  - 2013-2023 – 48.8 T/A
  
- Trial Average for Single Centers:
  - 1984-1992 – 28%
  - 1993-2001 – 40%
  - 2002-2012 – 57%
  - 2013-2022 – 59%





# **PERFORMANCE OF ONION CULTIVARS IN THE COLUMBIA BASIN**

TEN YEARS OF CULTIVAR TRIAL RESULTS: 2013 to 2023

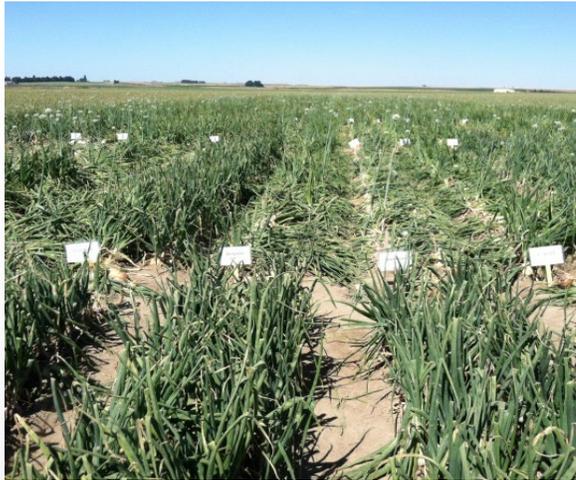




## ONION CULTIVAR TRIAL LOCATIONS: 2013-2023



- 2013 – Hartley Farms
  - Sprinkler, 88” beds, (S Prosser)
- 2014 – Carr Farms
  - Sprinkler, 68” beds, (E Pasco)
- 2015 – Grigg and Sons Farm
  - Sprinkler, 68” beds, (SE Quincy)
- 2016 – Skone & Connors
  - Drip, 68” beds, (NE Othello)
- 2017 – Weyns Farms
  - Drip, 68” beds, (E Othello)
- 2018 – Hartley Farms
  - Sprinkler, 88” beds, (S Prosser)
- 2019 – L&L Ag. Production,
  - Drip, 80” beds, (NW Connell)
- 2020 – Olsen Onion
  - Sprinkler, 34” beds, (E Pasco)
- 2021 – No Trial
- 2022 – Grigg and Sons Farm
  - Sprinkler, 68” beds, (SW Quincy)
- 2023 – Skone & Connors
  - Drip, 68” beds, (E Moses Lake)



## ONION CULTIVAR TRIAL LOCATIONS: 2013-2023

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## ONION CULTIVAR TRIAL ENTRIES: 2013-2023

### 10-YEAR ENTRIES

1. **Arcero** – Nunhems
2. **Highlander** – American Takii
3. **Legend** – Bejo
4. **Montero** – Nunhems
5. **Oloroso** – Nunhems
6. **Purple Haze** – Crookham
7. **Scout** – Crookham
8. **Vaquero** – Nunhems

### 9-YEAR ENTRIES

9. **XP 16000** – Seminis
10. **Anillo** – Nunhems
11. **Frontier** – American Takii
12. **Granero** – Nunhems
13. **Joaquin** – Nunhems
14. **Milestone** – American Takii

### 8-YEAR ENTRIES

15. **Brundage** – Crookham
16. **Hamilton** – Bejo
17. **Marengo** – Nunhems
18. **SV4643NT** – Nunhems
19. **Tamara** – Bejo

### 7-YEAR ENTRIES

20. **Centerstone** – American Takii
21. **Grand Perfection** – American Takii
22. **Red Beret** – Crookham
23. **Red Carpet** – Bejo
24. **Tucannon** – Seminis
25. **White Cloud** – Crookham

### 6-YEAR ENTRIES

26. **Airoso** – Nunhems
27. **Calibra** – Bejo
28. **Cometa** – Nunhems
29. **Crockett** – Bejo
30. **Swale** – Seminis
31. **Traverse** – American Takii

### 5-YEAR ENTRIES

32. **Cruiser** – Hazera
33. **Ranchero** – Nunhems
34. **Redwing** – Bejo
35. **Rhea** – Nunhems
36. **Talon** – Bejo
37. **White Cap** – Crookham



## ONION CULTIVAR TRIAL ENTRIES: 2013-2023



**26**



**6**



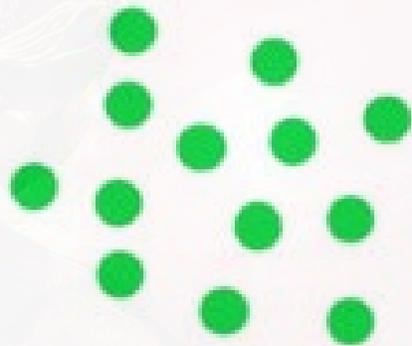
**5**



# **YIELD & SIZE DISTRIBUTION**



OUTLIERS

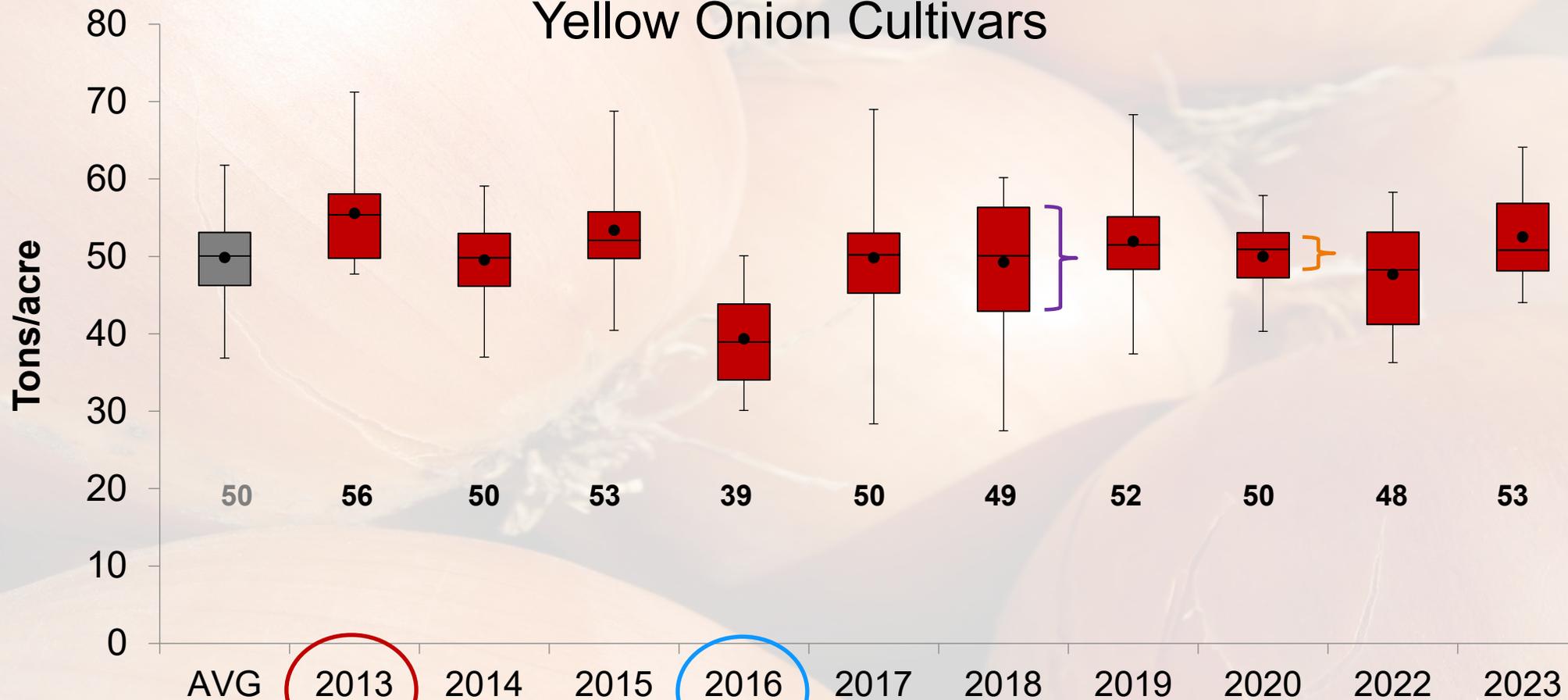




# **26 Yellow Cultivars**

# TOTAL USABLE YIELD: 2013-2023

## Yellow Onion Cultivars



# SIZE DISTRIBUTION

**COLOSSAL (>4")**

**JUMBO (3" - 4")**

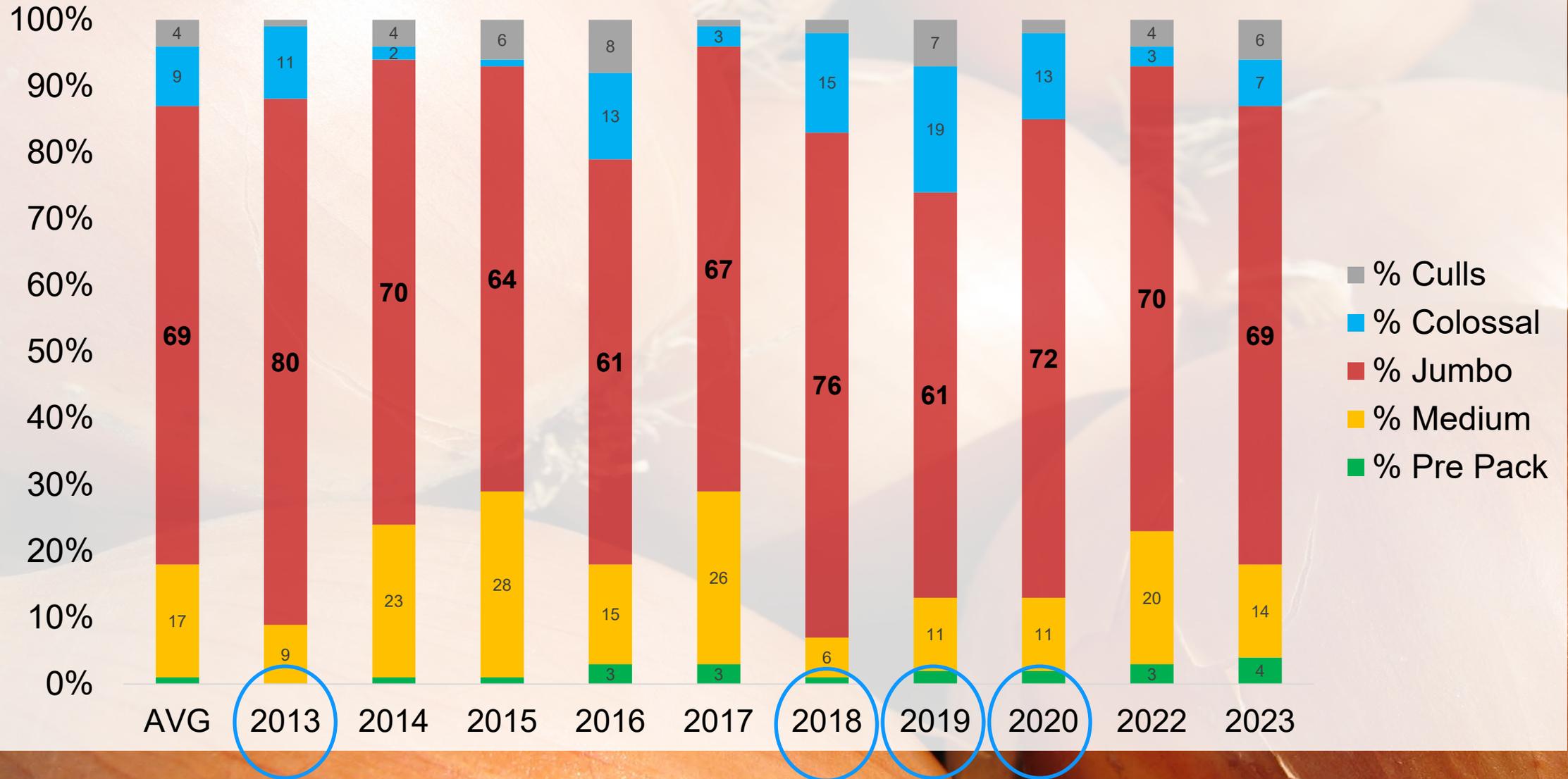
**MEDIUM (2.25" - 3")**

**PRE-PACK (<2.25")**



# ONION SIZE DISTRIBUTION: 2013-2023

## Yellow Onion Cultivars



A wide-angle photograph of an onion field under a cloudy sky. The field is divided into numerous rows of onion plants. In the foreground, several rows of onions are shown with their green tops cut off and lying on the ground. Small white rectangular signs are placed at regular intervals along the rows, likely identifying different experimental treatments. The background shows a flat horizon with some distant trees and a few buildings.

**% TOPS DOWN**

## % TOPS DOWN – RANKED “EARLY” TO “LATE”

<b>Highlander</b>	<b>98.1</b>	<b>a</b>	<b>10-yrs</b>	<b>Legend</b>	<b>34.2</b>	<b>f-k</b>	<b>10-yrs</b>
<b>Traverse</b>	<b>80.3</b>	<b>ab</b>	<b>6-yrs</b>	<b>XP 16000</b>	<b>33.2</b>	<b>e-k</b>	<b>9-yrs</b>
<b>Frontier</b>	<b>77.9</b>	<b>ab</b>	<b>9-yrs</b>	<b>Vaquero</b>	<b>30.8</b>	<b>f-k</b>	<b>10-yrs</b>
<b>Talon</b>	<b>68.1</b>	<b>abc</b>	<b>5-yrs</b>	<b>Anillo</b>	<b>30.0</b>	<b>f-k</b>	<b>9-yrs</b>
<b>Montero</b>	<b>66.2</b>	<b>a-d</b>	<b>10-yrs</b>	<b>Crockett</b>	<b>29.4</b>	<b>e-k</b>	<b>6-yrs</b>
<b>Cruiser</b>	<b>60.8</b>	<b>b-e</b>	<b>5-yrs</b>	<b>Oloroso</b>	<b>25.8</b>	<b>g-k</b>	<b>10-yrs</b>
<b>Calibra</b>	<b>56.9</b>	<b>b-f</b>	<b>6-yrs</b>	<b>Granero</b>	<b>24.8</b>	<b>g-k</b>	<b>9-yrs</b>
<b>Milestone</b>	<b>53.6</b>	<b>b-g</b>	<b>9-yrs</b>	<b>Grand Perfection</b>	<b>24.4</b>	<b>h-k</b>	<b>7-yrs</b>
<b>Scout</b>	<b>51.6</b>	<b>b-h</b>	<b>10-yrs</b>	<b>Arcero</b>	<b>23.1</b>	<b>h-k</b>	<b>10-yrs</b>
<b>Swale</b>	<b>40.6</b>	<b>c-l</b>	<b>6-yrs</b>	<b>Ranchero</b>	<b>21.0</b>	<b>ijk</b>	<b>5-yrs</b>
<b>Tucannon</b>	<b>36.7</b>	<b>f-k</b>	<b>7-yrs</b>	<b>Airoso</b>	<b>17.3</b>	<b>ijk</b>	<b>6-yrs</b>
<b>Centerstone</b>	<b>35.8</b>	<b>d-j</b>	<b>7-yrs</b>	<b>Joaquin</b>	<b>12.6</b>	<b>k</b>	<b>9-yrs</b>
<b>Tamara</b>	<b>34.3</b>	<b>d-k</b>	<b>8-yrs</b>	<b>Hamilton</b>	<b>9.5</b>	<b>jk</b>	<b>8-yrs</b>

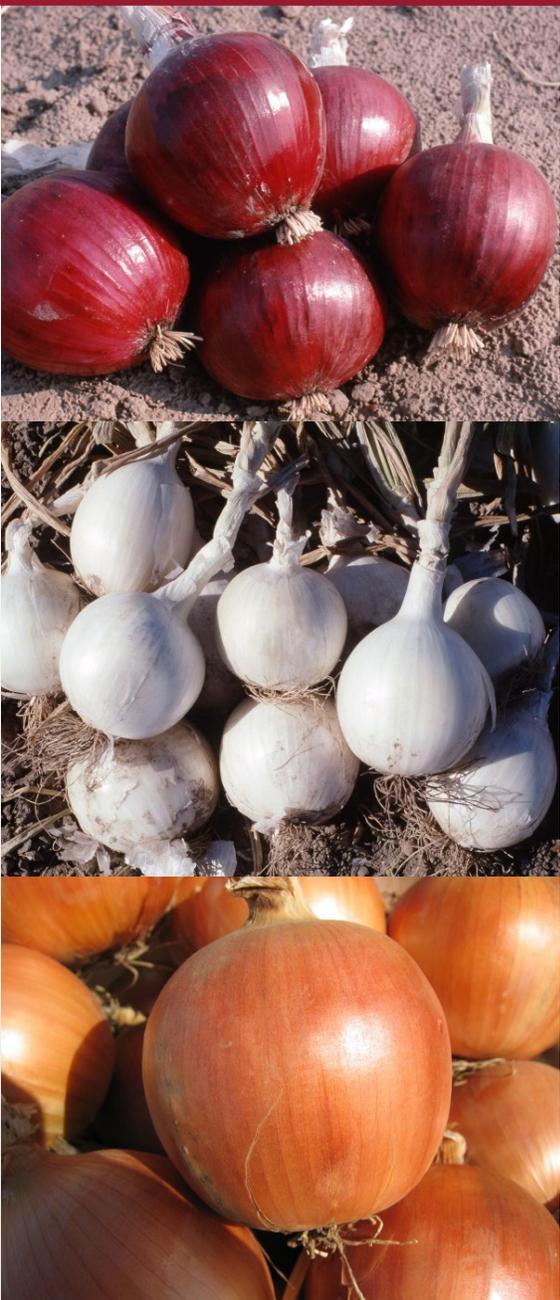
\*Tukey's HSD P=0.05 - SIGNIFICANT YEAR x CULTIVAR INTERACTION

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<b>Frontier</b>	<b>77.9</b>	<b>ab</b>	<b>9-yrs</b>	<b>Vaquero</b>	<b>30.8</b>	<b>f-k</b>	<b>10-yrs</b>
<b>Talon</b>	<b>68.1</b>	<b>abc</b>	<b>5-yrs</b>	<b>Anillo</b>	<b>30.0</b>	<b>f-k</b>	<b>9-yrs</b>
<b>Montero</b>	<b>66.2</b>	<b>a-d</b>	<b>10-yrs</b>	<b>Crockett</b>	<b>29.4</b>	<b>e-k</b>	<b>6-yrs</b>
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<b>Calibra</b>	<b>56.9</b>	<b>b-f</b>	<b>6-yrs</b>	<b>Granero</b>	<b>24.8</b>	<b>g-k</b>	<b>9-yrs</b>
<b>Milestone</b>	<b>53.6</b>	<b>b-g</b>	<b>9-yrs</b>	<b>Grand Perfection</b>	<b>24.4</b>	<b>h-k</b>	<b>7-yrs</b>
<b>Scout</b>	<b>51.6</b>	<b>b-h</b>	<b>10-yrs</b>	<b>Arcero</b>	<b>23.1</b>	<b>h-k</b>	<b>10-yrs</b>
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<b>Tamara</b>	<b>34.3</b>	<b>d-k</b>	<b>8-yrs</b>	<b>Hamilton</b>	<b>9.5</b>	<b>jk</b>	<b>8-yrs</b>

\*Tukey's HSD P=0.05 - SIGNIFICANT YEAR x CULTIVAR INTERACTION

<b>Year</b>	<b>Total Usable (T/A)</b>	<b>% Medium</b>	<b>% Jumbo</b>	<b>% Colossal</b>	<b>% Culls</b>
<b>2013</b>	55.6	9	80	11	1
<b>2014</b>	49.5	23	70	2	4
<b>2015</b>	39.4	28	64	1	6
<b>2016</b>	53.4	15	61	13	8
<b>2017</b>	49.8	26	67	3	1
<b>2018</b>	51.9	6	76	15	2
<b>2019</b>	49.3	11	61	19	7
<b>2020</b>	50.0	11	72	13	2
<b>2022</b>	47.7	20	70	3	4
<b>2023</b>	52.5	14	69	7	6
<b>GRAND MEAN</b>	<b>49.9</b>	<b>17</b>	<b>69</b>	<b>9</b>	<b>4</b>
<b>Year</b>	0.0001	0.0001	0.0001	0.0001	0.0001
<b>Cultivar</b>	0.0001	0.0001	0.0241	0.0001	0.0100
<b>YR x CV</b>	NS	0.0001	NS	0.0001	0.0001



# FACTORS THAT DETERMINE YIELD

## *IS NOT* GROWER MODIFIABLE POTENTIAL YIELD

1. Frost-free Period
2. Day Length
3. Light Intensity  
(Cloudy vs. Sunny)
4. Air Temperatures
5. Soil Temperatures
6. Wind
7. Humidity
8. Soil Types
9. Precipitation

## GROWER MODIFIABLE ACTUAL YIELD

1. **Cultivar Choice**
2. Planting Date
3. Seed Quality
4. Soil pH
5. Soil Tilth
6. Physical Barriers
7. Plant Population
8. Nutrient Supply/Fertility
9. Pests (Diseases, Weeds, Insects & Nematodes)
10. Harvest Date
11. Timeliness of Operations
12. Soil Moisture/Irrigation

## TOTAL USABLE YIELD – RANKED

<b>CULTIVAR</b>	<b>T/A*</b>		<b>StDev</b>	<b>YRS</b>	<b>CULTIVAR</b>	<b>T/A*</b>		<b>StDev</b>	<b>YRS</b>
<b>Ranchero</b>	61.8	a	5.7	5	<b>Crockett</b>	49.8	c-g	6.3	6
<b>Scout</b>	61.2	a	10.1	10	<b>Legend</b>	48.5	d-h	6.8	10
<b>XP 16000</b>	56.9	ab	11.1	9	<b>Talon</b>	47.7	d-i	7.6	5
<b>Montero</b>	56.6	abc	7.6	10	<b>Airoso</b>	47.6	d-i	5.3	6
<b>Granero</b>	53.9	bcd	5.6	9	<b>Calibra</b>	47.5	d-i	9.4	6
<b>Swale</b>	53.2	b-e	6.2	6	<b>Hamilton</b>	46.9	e-i	7	8
<b>Vaquero</b>	53.2	b-e	6.1	10	<b>Oloroso</b>	46.1	f-i	6.2	10
<b>Tucannon</b>	52.9	b-e	9.9	7	<b>Highlander</b>	45.5	ghi	11.3	10
<b>Arcero</b>	52.6	b-f	7.5	10	<b>Cruiser</b>	45.3	ghi	8.4	5
<b>Grand Perfection</b>	51.4	b-g	6.2	7	<b>Centerstone</b>	44.8	ghi	8.3	7
<b>Anillo</b>	51.3	b-g	8.2	9	<b>Milestone</b>	42.7	hij	8	9
<b>Joaquin</b>	50.9	b-g	7.4	9	<b>Tamara</b>	40.8	ij	6.7	8
<b>Traverse</b>	50.3	b-g	8.6	6	<b>Frontier</b>	36.9	j	7.6	9

\*Tukey's HSD P=0.05 - Year x Cultivar Interaction was Not Significant - Average 50 T/A

## TOTAL USABLE YIELD – RANKED

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\*Tukey's HSD P=0.05 - Year x Cultivar Interaction was Not Significant - Average 50 T/A

## TOTAL USABLE YIELD – RANKED – “EARLY CVs”

CULTIVAR	T/A*		StDev	YRS	CULTIVAR	T/A*		StDev	YRS
Ranchero	61.8	a	5.7	5	Crockett	49.8	c-g	6.3	6
Scout	61.2	a	10.1	10	Legend	48.5	d-h	6.8	10
XP 16000	56.9	ab	11.1	9	<b>Talon</b>	<b>47.7</b>	<b>d-i</b>	<b>7.6</b>	<b>5</b>
<b>Montero</b>	<b>56.6</b>	<b>abc</b>	<b>7.6</b>	<b>10</b>	Airosa	47.6	d-i	5.3	6
Granero	53.9	bcd	5.6	9	Calibra	47.5	d-i	9.4	6
Swale	53.2	b-e	6.2	6	Hamilton	46.9	e-i	7	8
Vaquero	53.2	b-e	6.1	10	Oloroso	46.1	f-i	6.2	10
Tucannon	52.9	b-e	9.9	7	<b>Highlander</b>	<b>45.5</b>	<b>ghi</b>	<b>11.3</b>	<b>10</b>
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## TOTAL USABLE YIELD – RANKED – “LATE CVs”

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Grand Perfection	51.4	b-g	6.2	7	Centerstone	44.8	ghi	8.3	7
Anillo	51.3	b-g	8.2	9	Milestone	42.7	hij	8	9
<b>Joaquin</b>	<b>50.9</b>	<b>b-g</b>	<b>7.4</b>	<b>9</b>	Tamara	40.8	ij	6.7	8
Traverse	50.3	b-g	8.6	6	Frontier	36.9	j	7.6	9

\*Tukey's HSD P=0.05 - Year x Cultivar Interaction was Not Significant - Average 50 T/A

## BULB SIZE DISTRIBUTION – RANKED BY JUMBOS

<u>CULTIVAR</u>	<u>% MEDIUM</u>	<u>% JUMBO</u>	<u>% COLOSSAL</u>	<u>CULTIVAR</u>	<u>% MEDIUM</u>	<u>% JUMBO</u>	<u>% COLOSSAL</u>
<b>Granero</b>	11.3 def	<b>76.4 a</b>	7.7 c-f	<b>Milestone</b>	23.8 ab	<b>70.1 ab</b>	2.3 ef
<b>Traverse</b>	13.4 c-f	<b>74.5 ab</b>	5.3 def	<b>Calibra</b>	18.7 b-e	<b>68.7 ab</b>	6.5 def
<b>Arcero</b>	12.0 def	<b>74.4 ab</b>	9.0 c-f	<b>Highlander</b>	19.7 bcd	<b>68.2 ab</b>	6.7 c-f
<b>Crockett</b>	18.9 bcd	<b>74.0 ab</b>	2.1 ef	<b>Tucannon</b>	13.4 c-f	<b>68.0 ab</b>	10.4 b-e
<b>Swale</b>	11.4 def	<b>72.1 ab</b>	10.2 c-f	<b>Vaquero</b>	12.1 def	<b>67.8 ab</b>	14.2 a-d
<b>Talon</b>	22.5 abc	<b>71.6 ab</b>	2.9 ef	<b>Joaquin</b>	14.1 c-f	<b>67.4 ab</b>	9.8 c-f
<b>Anillo</b>	17.3 b-f	<b>71.5 ab</b>	5.0 def	<b>Montero</b>	9.3 ef	<b>65.6 ab</b>	20.1 ab
<b>Tamara</b>	24.1 ab	<b>71.5 ab</b>	0.5 f	<b>Cruiser</b>	26.1 ab	<b>64.6 ab</b>	2.0 ef
<b>Airoso</b>	20.1 bcd	<b>71.3 ab</b>	3.1 ef	<b>Ranchero</b>	7.9 f	<b>63.5 ab</b>	23.9 a
<b>Centerstone</b>	16.9 b-f	<b>71.3 ab</b>	5.6 def	<b>XP 16000</b>	13.0 c-f	<b>63.4 ab</b>	16.4 abc
<b>Hamilton</b>	16.7 b-f	<b>70.6 ab</b>	4.1 ef	<b>Frontier</b>	32.0 a	<b>62.8 ab</b>	0.5 f
<b>Oloroso</b>	19.6 bcd	<b>70.4 ab</b>	4.3 ef	<b>Grand Perfection</b>	11.7 def	<b>61.8 b</b>	17.9 ab
<b>Legend</b>	17.8 b-e	<b>70.1 ab</b>	6.8 c-f	<b>Scout</b>	7.8 f	<b>61.3 b</b>	23.1 a

\*Tukey's HSD P=0.05 - Year x Cultivar Interaction was NOT SIGNIFICANT for % Jumbos - **Average % Jumbos = 69%**

## BULB SIZE DISTRIBUTION – RANKED BY COLOSSALS

<u>CULTIVAR</u>	<u>% MEDIUM</u>		<u>% JUMBO</u>		<u>% COLOSSAL</u>		<u>CULTIVAR</u>	<u>% MEDIUM</u>		<u>% JUMBO</u>		<u>% COLOSSAL</u>	
<b>Ranchero</b>	7.9	f	63.5	ab	<b>23.9</b>	<b>a</b>	<b>Calibra</b>	18.7	b-e	68.7	ab	6.5	def
<b>Scout</b>	7.8	f	61.3	b	<b>23.1</b>	<b>a</b>	<b>Centerstone</b>	16.9	b-f	71.3	ab	5.6	def
<b>Montero</b>	9.3	ef	65.6	ab	<b>20.1</b>	<b>ab</b>	<b>Traverse</b>	13.4	c-f	74.5	ab	5.3	def
<b>Grand Perfection</b>	11.7	def	61.8	b	<b>17.9</b>	<b>ab</b>	<b>Anillo</b>	17.3	b-f	71.5	ab	5.0	def
<b>XP 16000</b>	13.0	c-f	63.4	ab	<b>16.4</b>	<b>abc</b>	<b>Oloroso</b>	19.6	bcd	70.4	ab	4.3	ef
<b>Vaquero</b>	12.1	def	67.8	ab	<b>14.2</b>	<b>a-d</b>	<b>Hamilton</b>	16.7	b-f	70.6	ab	4.1	ef
<b>Tucannon</b>	13.4	c-f	68.0	ab	10.4	b-e	<b>Airoso</b>	20.1	bcd	71.3	ab	3.1	ef
<b>Swale</b>	11.4	def	72.1	ab	10.2	c-f	<b>Talon</b>	22.5	abc	71.6	ab	2.9	ef
<b>Joaquin</b>	14.1	c-f	67.4	ab	9.8	c-f	<b>Milestone</b>	23.8	ab	70.1	ab	2.3	ef
<b>Arcero</b>	12.0	def	74.4	ab	9.0	c-f	<b>Crockett</b>	18.9	bcd	74.0	ab	2.1	ef
<b>Granero</b>	11.3	def	76.4	a	7.7	c-f	<b>Cruiser</b>	26.1	ab	64.6	ab	2.0	ef
<b>Legend</b>	17.8	b-e	70.1	ab	6.8	c-f	<b>Tamara</b>	24.1	ab	71.5	ab	0.5	f
<b>Highlander</b>	19.7	bcd	68.2	ab	6.7	c-f	<b>Frontier</b>	32.0	a	62.8	ab	0.5	f

\*Tukey's HSD P=0.05 - SIGNIFICANT YEAR x CV Interaction for % Colossal - **Average % Colossal = 8%**

## BULB SIZE DISTRIBUTION – RANKED BY MEDIUMS

<u>CULTIVAR</u>	<u>% MEDIUM</u>	<u>% JUMBO</u>	<u>% COLOSSAL</u>	<u>CULTIVAR</u>	<u>% MEDIUM</u>	<u>% JUMBO</u>	<u>% COLOSSAL</u>
<b>Frontier</b>	32.0 a	62.8 ab	0.5 f	<b>Hamilton</b>	16.7 b-f	70.6 ab	4.1 ef
<b>Cruiser</b>	26.1 ab	64.6 ab	2.0 ef	<b>Joaquin</b>	14.1 c-f	67.4 ab	9.8 c-f
<b>Tamara</b>	24.1 ab	71.5 ab	0.5 f	<b>Tucannon</b>	13.4 c-f	68.0 ab	10.4 b-e
<b>Milestone</b>	23.8 ab	70.1 ab	2.3 ef	<b>Traverse</b>	13.4 c-f	74.5 ab	5.3 def
<b>Talon</b>	22.5 abc	71.6 ab	2.9 ef	<b>16000</b>	13.0 c-f	63.4 ab	16.4 abc
<b>Airoso</b>	20.1 bcd	71.3 ab	3.1 ef	<b>Vaquero</b>	12.1 def	67.8 ab	14.2 a-d
<b>Highlander</b>	19.7 bcd	68.2 ab	6.7 c-f	<b>Arcero</b>	12.0 def	74.4 ab	9.0 c-f
<b>Oloroso</b>	19.6 bcd	70.4 ab	4.3 ef	<b>Grand Perfection</b>	11.7 def	61.8 b	17.9 ab
<b>Crockett</b>	18.9 bcd	74.0 ab	2.1 ef	<b>Swale</b>	11.4 def	72.1 ab	10.2 c-f
<b>Calibra</b>	18.7 b-e	68.7 ab	6.5 def	<b>Granero</b>	11.3 def	76.4 a	7.7 c-f
<b>Legend</b>	17.8 b-e	70.1 ab	6.8 c-f	<b>Montero</b>	9.3 ef	65.6 ab	20.1 ab
<b>Anillo</b>	17.3 b-f	71.5 ab	5.0 def	<b>Ranchero</b>	7.9 f	63.5 ab	23.9 a
<b>Centerstone</b>	16.9 b-f	71.3 ab	5.6 def	<b>Scout</b>	7.8 f	61.3 b	23.1 a

\*Tukey's HSD P=0.05 - SIGNIFICANT YEAR x CV Interaction for % Medium - **Average % Medium = 17%**



# **6 Red Cultivars**

## % TOPS DOWN RANKED "EARLY" TO "LATE"

SV4643NT	68.5	a	8-yrs
Purple Haze	35.2	b	10-yrs
Marengo	31.5	bc	8-yrs
Red Beret	22.4	cd	7-yrs
Redwing	21.9	cd	5-yrs
Red Carpet	4.4	d	7-yrs

\*Tukey's HSD  $P=0.05$   
Year x Cultivar Interaction NS

Marengo  
Nunhems USA

Joaquin

Ruby Ring

Trailblazer  
American Taki

## TOTAL USABLE YIELD

CULTIVAR	T/A*		StDev	YRS
<b>SV4643NT</b>	48.4	a	3.7	8
<b>Redwing</b>	45.7	a	5.6	5
<b>Red Carpet</b>	43.8	ab	7.4	7
<b>Marengo</b>	38.7	bc	8.0	8
<b>Purple Haze</b>	37.3	c	6.2	10
<b>Red Beret</b>	36.8	c	7.0	7

\*Tukey's HSD P=0.05, Yr. x Cv. Interaction Not Significant  
Average 42 T/A

## BULB SIZE DISTRIBUTION – RANKED BY JUMBOS

<u>CULTIVAR</u>	<u>% MEDIUM</u>	<u>% JUMBO</u>	<u>% COLOSSAL</u>
<b>Redwing</b>	24.1 bc	<b>71.5</b> a	0.1 b
<b>Red Carpet</b>	25.0 bc	<b>69.6</b> a	1.3 b
<b>SV4643NT</b>	15.4 c	<b>69.1</b> a	10.1 a
<b>Marengo</b>	17.0 c	<b>67.5</b> ab	4.0 b
<b>Red Beret</b>	31.3 ab	<b>56.9</b> bc	3.3 b
<b>Purple Haze</b>	38.0 a	<b>53.6</b> c	2.0 b

\*Tukey's HSD P=0.05, Yr. x Cv. Interactions for % Med, % Jumbo NS

## TOTAL USABLE YIELD

CULTIVAR	T/A*		StDev	YRS
<b>SV4643NT</b>	48.4	a	3.7	8
<b>Redwing</b>	45.7	a	5.6	5
<b>Red Carpet</b>	43.8	ab	7.4	7
<b>Marengo</b>	38.7	bc	8.0	8
<b>Purple Haze</b>	37.3	c	6.2	10
<b>Red Beret</b>	36.8	c	7.0	7

\*Tukey's HSD P=0.05, Yr. x Cv. Interaction Not Significant  
Average 42 T/A

## BULB SIZE DISTRIBUTION – RANKED BY JUMBOS

<u>CULTIVAR</u>	<u>% MEDIUM</u>	<u>% JUMBO</u>	<u>% COLOSSAL</u>
<b>Redwing</b>	24.1 bc	<b>71.5</b> a	0.1 b
<b>Red Carpet</b>	25.0 bc	<b>69.6</b> a	1.3 b
<b>SV4643NT</b>	15.4 c	<b>69.1</b> a	<b>10.1</b> a
<b>Marengo</b>	17.0 c	<b>67.5</b> ab	4.0 b
<b>Red Beret</b>	<b>31.3</b> ab	<b>56.9</b> bc	3.3 b
<b>Purple Haze</b>	<b>38.0</b> a	<b>53.6</b> c	2.0 b

\*Tukey's HSD P=0.05, Yr. x Cv. Interactions for % Med, % Jumbo NS



# 5 White Cultivars

## % TOPS DOWN RANKED "EARLY" TO "LATE"

Rhea	49.5	a	5-yrs
Cometa	47.1	a	6-yrs
White Cloud	32.6	a	7-yrs
Brundage	31.8	a	8-yrs
White Cap	6.2	b	5-yrs

\*Tukey's HSD  $P=0.05$   
Year x Cultivar Interaction NS

Brundage  
Crookham Company

Esteem  
Crookham Company

Granero

Cometa  
Nunhems USA

## TOTAL USABLE YIELD

CULTIVAR	T/A*		StDev	YRS
<b>Brundage</b>	47.4	NS	7.3	7
<b>Cometa</b>	50.6	NS	9.0	6
<b>Rhea</b>	52.9	NS	6.1	5
<b>White Cap</b>	49.3	NS	8.1	5
<b>White Cloud</b>	53.1	NS	10.6	7

\*Tukey's HSD P=0.05, Yr. x Cv. Interaction Not Significant  
Average 50 T/A

## BULB SIZE DISTRIBUTION – ALPHABETICAL

<u>CULTIVAR</u>	<u>% MEDIUM</u>	<u>% JUMBO</u>	<u>% COLOSSAL</u>
<b>Brundage</b>	18.5 a	<b>72.3</b> NS	4.5 c
<b>Cometa</b>	18.5 a	<b>73.4</b> NS	3.1 c
<b>Rhea</b>	18.1 a	<b>73.3</b> NS	4.7 bc
<b>White Cap</b>	15.1 a	<b>68.5</b> NS	10.2 ab
<b>White Cloud</b>	11.8 b	<b>62.2</b> NS	14.8 a

\*Tukey's HSD P=0.05, Yr. x Cv. Interactions for % Med, % Jumbo NS

## TOTAL USABLE YIELD

CULTIVAR	T/A*	StDev	YRS
Brundage	47.4 NS	7.3	7
Cometa	50.6 NS	9.0	6
Rhea	52.9 NS	6.1	5
White Cap	49.3 NS	8.1	5
White Cloud	53.1 NS	10.6	7

\*Tukey's HSD P=0.05, Yr. x Cv. Interaction Not Significant  
Average 50 T/A

## BULB SIZE DISTRIBUTION – ALPHABETICAL

CULTIVAR	% MEDIUM	% JUMBO	% COLOSSAL
Brundage	18.5 a	72.3 NS	4.5 c
Cometa	18.5 a	73.4 NS	3.1 c
Rhea	18.1 a	73.3 NS	4.7 bc
White Cap	15.1 a	68.5 NS	10.2 ab
White Cloud	11.8 b	62.2 NS	14.8 a

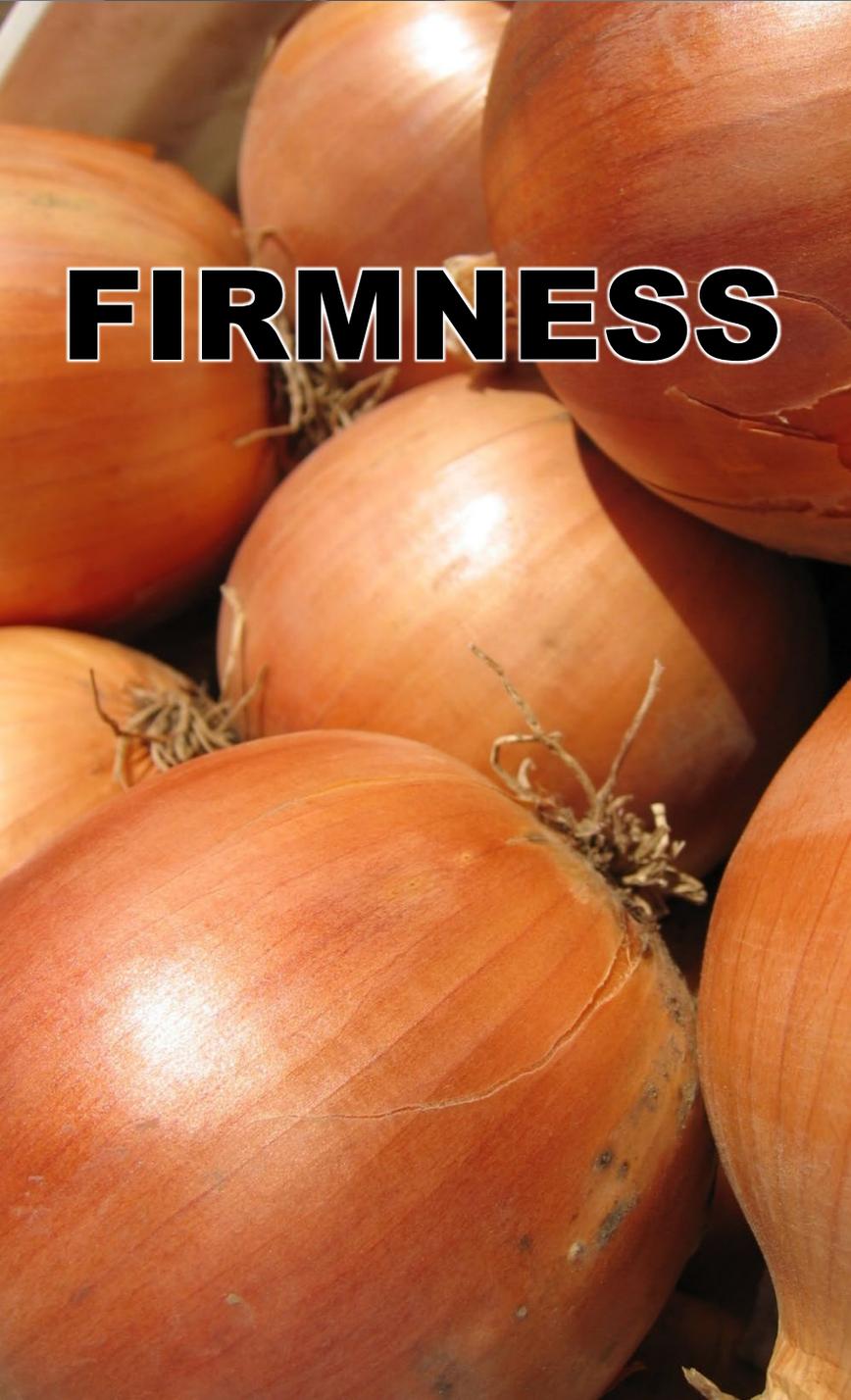
\*Tukey's HSD P=0.05, Yr. x Cv. Interactions for % Med, % Jumbo NS



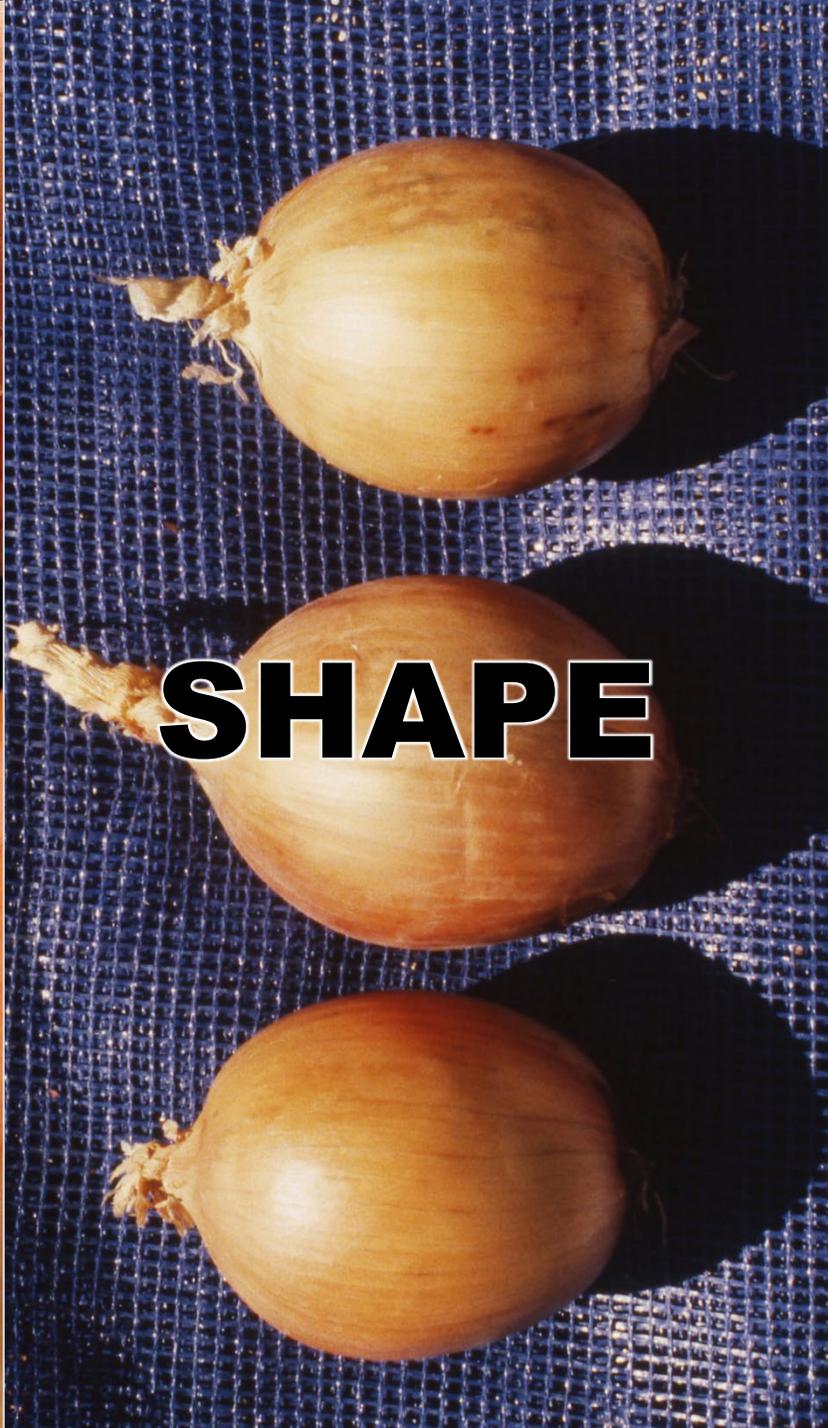
# **STORAGE EVALUATIONS**



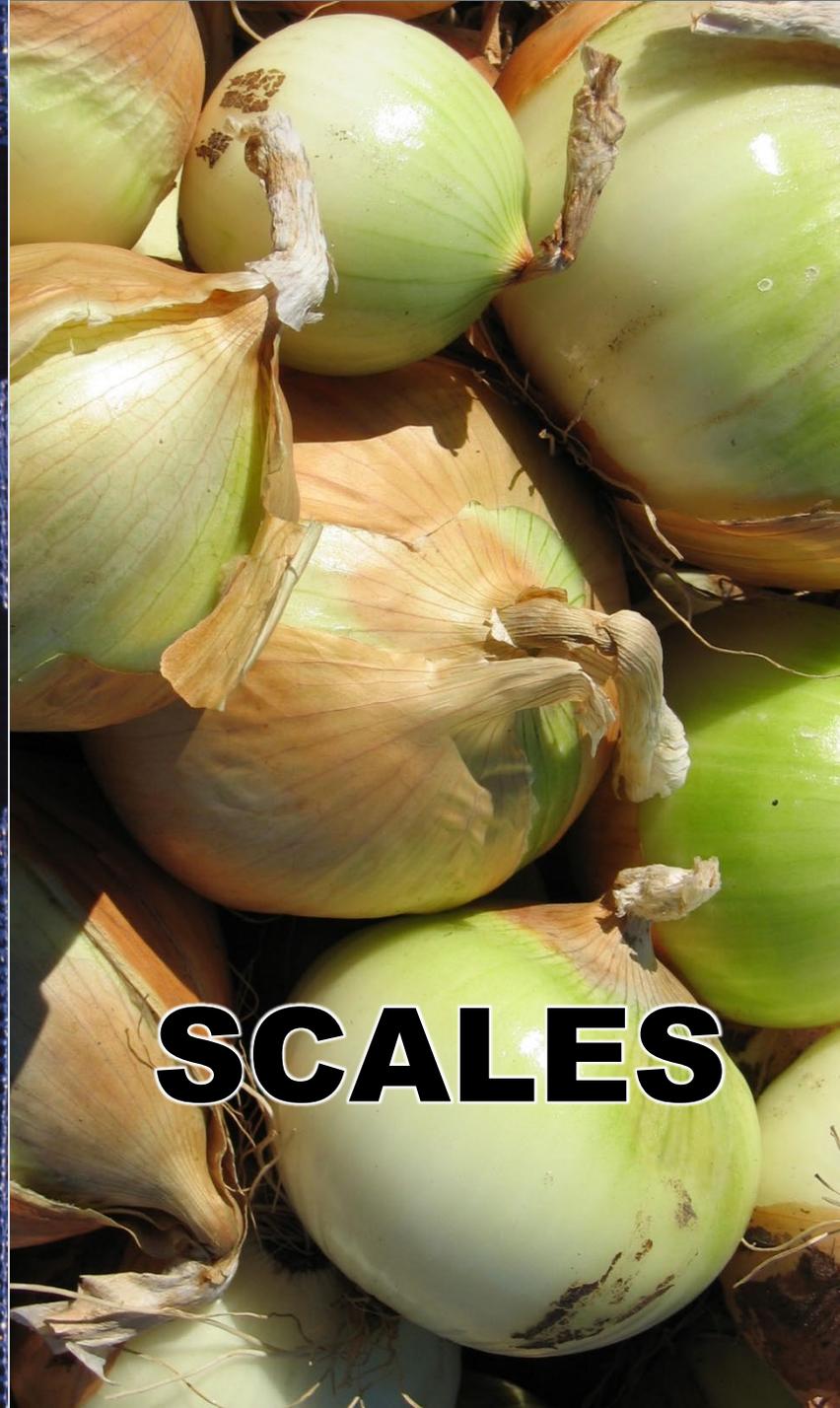
Photo by Casey Crookham



**FIRMNESS**



**SHAPE**



**SCALES**

## QUALITY – RANKED BY SCORE

<u>CULTIVAR</u>	<u>FIRMNESS</u>	<u>SHAPE</u>	<u>SCALES</u>	<u>SCORE</u>
Hamilton	4.6 a	4.0 abc	4.6 ab	13.1
Legend	4.5 a-d	3.9 abc	4.6 a	13.0
Airoso	4.6 ab	4.2 ab	4.1 a-f	12.9
Tamara	4.5 a	3.9 abc	4.5 a-d	12.9
Crockett	4.5 ab	3.9 abc	4.5 abc	12.9
Granero	4.2 a-e	4.2 a	4.3 a-f	12.6
Oloroso	4.0 b-g	4.1 ab	4.6 ab	12.6
Talon	4.4 abc	4.0 abc	4.1 a-f	12.5
Calibra	3.9 b-g	3.9 abc	4.2 a-e	12.1
Tucannon	4.1 a-f	3.7 a-d	4.2 a-g	12.0
Joaquin	3.8 c-g	3.7 a-d	4.1 a-f	11.7
Anillo	3.7 e-i	3.6 a-d	4.2 a-e	11.5
Arcero	3.6 f-j	4.0 abc	3.9 a-h	11.4

<u>CULTIVAR</u>	<u>FIRMNESS</u>	<u>SHAPE</u>	<u>SCALES</u>	<u>SCORE</u>
Cruiser	3.8 d-h	3.6 a-d	3.8 b-i	11.3
Milestone	3.6 f-i	3.8 abc	3.7 e-i	11.2
Swale	3.6 f-i	3.8 a-d	3.7 e-i	11.1
Frontier	3.9 b-g	3.9 abc	3.2 hij	11.1
Vaquero	3.5 f-k	3.7 a-d	3.8 d-i	11.0
Traverse	3.6 e-i	4.0 abc	3.4 hij	11.0
Ranchero	3.3 h-k	3.5 a-d	3.9 c-i	10.7
Centerstone	3.8 d-i	3.5 bcd	3.4 ghi	10.6
Grand Perfection	3.3 g-k	3.4 cde	3.7 d-i	10.4
Montero	3.2 ijk	3.4 bcd	3.5 f-i	10.2
XP 16000	3.0 k	3.2 de	3.2 ij	9.3
Scout	3.0 jk	3.4 bcd	2.7 j	9.2
Highlander	2.1 l	2.7 e	1.7 k	6.4

\*Tukey's HSD P=0.05 , Yr. x Cv. Interactions for Scales Rating Not Significant

## QUALITY – RANKED BY SCORE

<u>CULTIVAR</u>	<u>FIRMNESS</u>	<u>SHAPE</u>	<u>SCALES</u>	<u>SCORE</u>
Hamilton	4.6 a	4.0 abc	4.6 ab	13.1
Legend	4.5 a-d	3.9 abc	4.6 a	13.0
Airoso	4.6 ab	4.2 ab	4.1 a-f	12.9
Tamara	4.5 a	3.9 abc	4.5 a-d	12.9
Crockett	4.5 ab	3.9 abc	4.5 abc	12.9
Granero	4.2 a-e	4.2 a	4.3 a-f	12.6
Oloroso	4.0 b-g	4.1 ab	4.6 ab	12.6
Talon	4.4 abc	4.0 abc	4.1 a-f	12.5
Calibra	3.9 b-g	3.9 abc	4.2 a-e	12.1
Tucannon	4.1 a-f	3.7 a-d	4.2 a-g	12.0
Joaquin	3.8 c-g	3.7 a-d	4.1 a-f	11.7
Anillo	3.7 e-i	3.6 a-d	4.2 a-e	11.5
Arcero	3.6 f-j	4.0 abc	3.9 a-h	11.4

<u>CULTIVAR</u>	<u>FIRMNESS</u>	<u>SHAPE</u>	<u>SCALES</u>	<u>SCORE</u>
Cruiser	3.8 d-h	3.6 a-d	3.8 b-i	11.3
Milestone	3.6 f-i	3.8 abc	3.7 e-i	11.2
Swale	3.6 f-i	3.8 a-d	3.7 e-i	11.1
Frontier	3.9 b-g	3.9 abc	3.2 hij	11.1
Vaquero	3.5 f-k	3.7 a-d	3.8 d-i	11.0
Traverse	3.6 e-i	4.0 abc	3.4 hij	11.0
Ranchero	3.3 h-k	3.5 a-d	3.9 c-i	10.7
Centerstone	3.8 d-i	3.5 bcd	3.4 ghi	10.6
Grand Perfection	3.3 g-k	3.4 cde	3.7 d-i	10.4
Montero	3.2 ijk	3.4 bcd	3.5 f-i	10.2
XP 16000	3.0 k	3.2 de	3.2 ij	9.3
Scout	3.0 jk	3.4 bcd	2.7 j	9.2
Highlander	2.1 l	2.7 e	1.7 k	6.4

\*Tukey's HSD P=0.05 , Yr. x Cv. Interactions for Scales Rating Not Significant

## QUALITY – RANKED BY SCORE “EARLY CVs”

<u>CULTIVAR</u>	<u>FIRMNESS</u>	<u>SHAPE</u>	<u>SCALES</u>	<u>SCORE</u>
Hamilton	4.6 a	4.0 abc	4.6 ab	13.1
Legend	4.5 a-d	3.9 abc	4.6 a	13.0
Airoso	4.6 ab	4.2 ab	4.1 a-f	12.9
Tamara	4.5 a	3.9 abc	4.5 a-d	12.9
Crockett	4.5 ab	3.9 abc	4.5 abc	12.9
Granero	4.2 a-e	4.2 a	4.3 a-f	12.6
Oloroso	4.0 b-g	4.1 ab	4.6 ab	12.6
<b>Talon</b>	<b>4.4 abc</b>	<b>4.0 abc</b>	<b>4.1 a-f</b>	<b>12.5</b>
Calibra	3.9 b-g	3.9 abc	4.2 a-e	12.1
Tucannon	4.1 a-f	3.7 a-d	4.2 a-g	12.0
Joaquin	3.8 c-g	3.7 a-d	4.1 a-f	11.7
Anillo	3.7 e-i	3.6 a-d	4.2 a-e	11.5
Arcero	3.6 f-j	4.0 abc	3.9 a-h	11.4

<u>CULTIVAR</u>	<u>FIRMNESS</u>	<u>SHAPE</u>	<u>SCALES</u>	<u>SCORE</u>
Cruiser	3.8 d-h	3.6 a-d	3.8 b-i	11.3
Milestone	3.6 f-i	3.8 abc	3.7 e-i	11.2
Swale	3.6 f-i	3.8 a-d	3.7 e-i	11.1
<b>Frontier</b>	<b>3.9 b-g</b>	<b>3.9 abc</b>	<b>3.2 hij</b>	<b>11.1</b>
Vaquero	3.5 f-k	3.7 a-d	3.8 d-i	11.0
<b>Traverse</b>	<b>3.6 e-i</b>	<b>4.0 abc</b>	<b>3.4 hij</b>	<b>11.0</b>
Ranchero	3.3 h-k	3.5 a-d	3.9 c-i	10.7
Centerstone	3.8 d-i	3.5 bcd	3.4 ghi	10.6
Grand Perfection	3.3 g-k	3.4 cde	3.7 d-i	10.4
<b>Montero</b>	<b>3.2 ijk</b>	<b>3.4 bcd</b>	<b>3.5 f-i</b>	<b>10.2</b>
XP 16000	3.0 k	3.2 de	3.2 ij	9.3
Scout	3.0 jk	3.4 bcd	2.7 j	9.2
<b>Highlander</b>	<b>2.1 l</b>	<b>2.7 e</b>	<b>1.7 k</b>	<b>6.4</b>

\*Tukey's HSD P=0.05 , Yr. x Cv. Interactions for Scales Rating Not Significant

The image shows two cross-sections of onions on a blue background. The onion on the left has a US quarter coin placed in its center to provide a scale. The onion on the right shows a distinct yellowish-green core. The text 'SINGLE CENTERS' is overlaid in the center of the image.

**SINGLE  
CENTERS**

## % SINGLE CENTERS – RANKED

<b>CULTIVAR</b>	<b>% SINGLES</b>	<b>StDev</b>	<b>YRS</b>	<b>CULTIVAR</b>	<b>% SINGLES</b>	<b>StDev</b>	<b>YRS</b>
<b>Oloroso</b>	<b>87.2</b> a	10.6	9	<b>Cruiser</b>	64.6 b-e	17.8	5
<b>Joaquin</b>	<b>85.1</b> a	13.6	8	<b>Crockett</b>	60.4 c-g	16.8	6
<b>Arcero</b>	<b>84.9</b> a	14.4	9	<b>Grand Perfection</b>	57.9 c-f	21.6	6
<b>Anillo</b>	<b>84.7</b> a	12.0	8	<b>Traverse</b>	57.4 b-f	26.3	5
<b>Airoso</b>	<b>75.9</b> ab	10.9	4	<b>Scout</b>	55.4 d-g	13.2	9
<b>Swale</b>	<b>74.5</b> abc	16.3	6	<b>Talon</b>	48.9 e-h	17.9	5
<b>16000</b>	<b>74.5</b> abc	11.2	9	<b>Tamara</b>	46.5 fgh	21.6	8
<b>Vaquero</b>	<b>74.5</b> abc	17.8	9	<b>Milestone</b>	42.4 gh	17.1	8
<b>Granero</b>	<b>74.0</b> a-d	14.9	8	<b>Centerstone</b>	36.7 hi	12.0	7
<b>Montero</b>	<b>73.9</b> a-d	14.2	9	<b>Calibra</b>	34.9 hi	23.7	6
<b>Hamilton</b>	<b>73.4</b> abc	15.6	7	<b>Legend</b>	34.4 hi	17.8	9
<b>Tucannon</b>	<b>73.2</b> a-d	14.6	6	<b>Frontier</b>	18.7 ij	17.4	8
<b>Ranchero</b>	<b>73.0</b> a-d	12.6	5	<b>Highlander</b>	6.1 j	6.6	8

\*Tukey's HSD P=0.05 , Yr. x Cv. Interactions for % Single Centers were NOT SIGNIFICANT

## % SINGLE CENTERS – RANKED

CULTIVAR	% SINGLES	StDev	YRS	CULTIVAR	% SINGLES	StDev	YRS
Oloroso	87.2 a	10.6	9	Cruiser	64.6 b-e	17.8	5
Joaquin	85.1 a	13.6	8	Crockett	60.4 c-g	16.8	6
Arcero	84.9 a	14.4	9	Grand Perfection	57.9 c-f	21.6	6
Anillo	84.7 a	12.0	8	Traverse	57.4 b-f	26.3	5
Airoso	75.9 ab	10.9	4	Scout	55.4 d-g	13.2	9
Swale	74.5 abc	16.3	6	Talon	48.9 e-h	17.9	5
16000	74.5 abc	11.2	9	Tamara	46.5 fgh	21.6	8
Vaquero	74.5 abc	17.8	9	Milestone	42.4 gh	17.1	8
Granero	74.0 a-d	14.9	8	Centerstone	36.7 hi	12.0	7
Montero	73.9 a-d	14.2	9	Calibra	34.9 hi	23.7	6
Hamilton	73.4 abc	15.6	7	Legend	34.4 hi	17.8	9
Tucannon	73.2 a-d	14.6	6	Frontier	18.7 ij	17.4	8
Ranchero	73.0 a-d	12.6	5	Highlander	6.1 j	6.6	8

\*Tukey's HSD P=0.05 , Yr. x Cv. Interactions for % Single Centers were NOT SIGNIFICANT

## QUALITY RANKED BY SCORE

<u>CULTIVAR</u>	<u>FIRMNESS</u>	<u>SHAPE</u>	<u>SCALES</u>	<u>SCORE</u>
<b>Redwing</b>	4.3 a	3.5 a	4.3 a	12.1
<b>Red Carpet</b>	3.7 b	3.3 a	3.9 ab	10.9
<b>Marengo</b>	3.1 c	3.4 a	3.0 c	9.6
<b>Purple Haze</b>	3.4 bc	2.6 b	3.1 c	9.1
<b>Red Beret</b>	3.2 bc	2.5 b	3.2 bc	8.9
<b>SV4643NT</b>	3.0 c	2.8 ab	3.1 c	8.8

\*Tukey's HSD P=0.05, Yr. x Cv. Interactions for All Rating NS

## % SINGLE CENTERS

<u>CULTIVAR</u>	<u>% SINGLES</u>	<u>StDev</u>	<u>YRS</u>
<b>Purple Haze</b>	66.4 a	10.7	9
<b>Red Beret</b>	56.7 b	17.3	6
<b>Redwing</b>	46.0 bc	14.9	4
<b>Marengo</b>	45.5 bc	15.8	7
<b>Red Carpet</b>	43.7 bc	14.9	6
<b>SV4643NT</b>	35.5 c	15.6	5

\*Tukey's HSD P=0.05 , Yr. x Cv. Interaction NS

## QUALITY RANKED BY SCORE

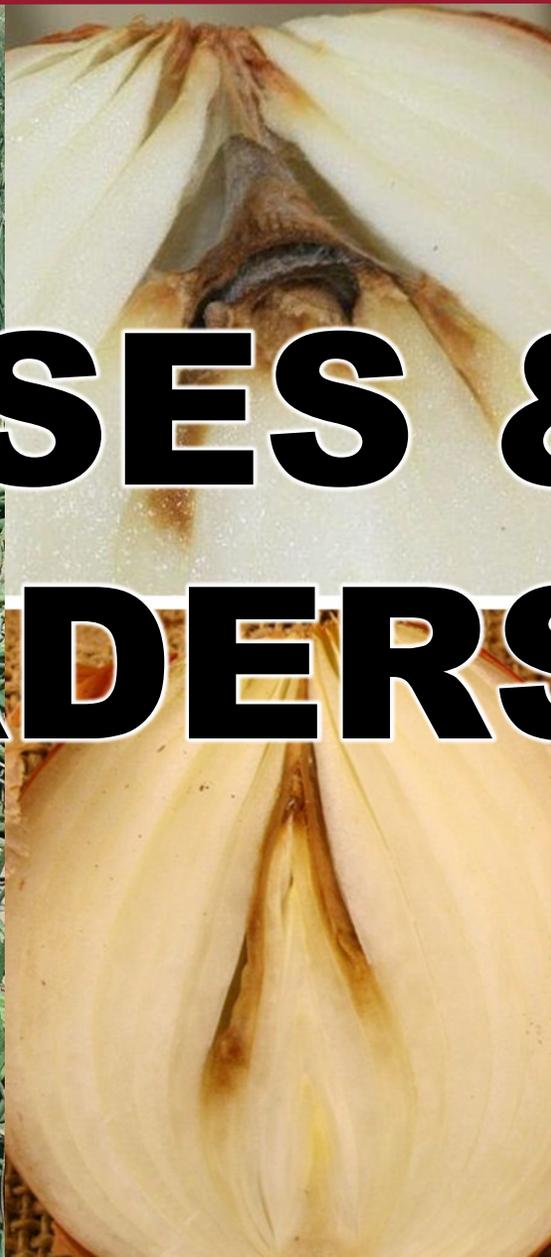
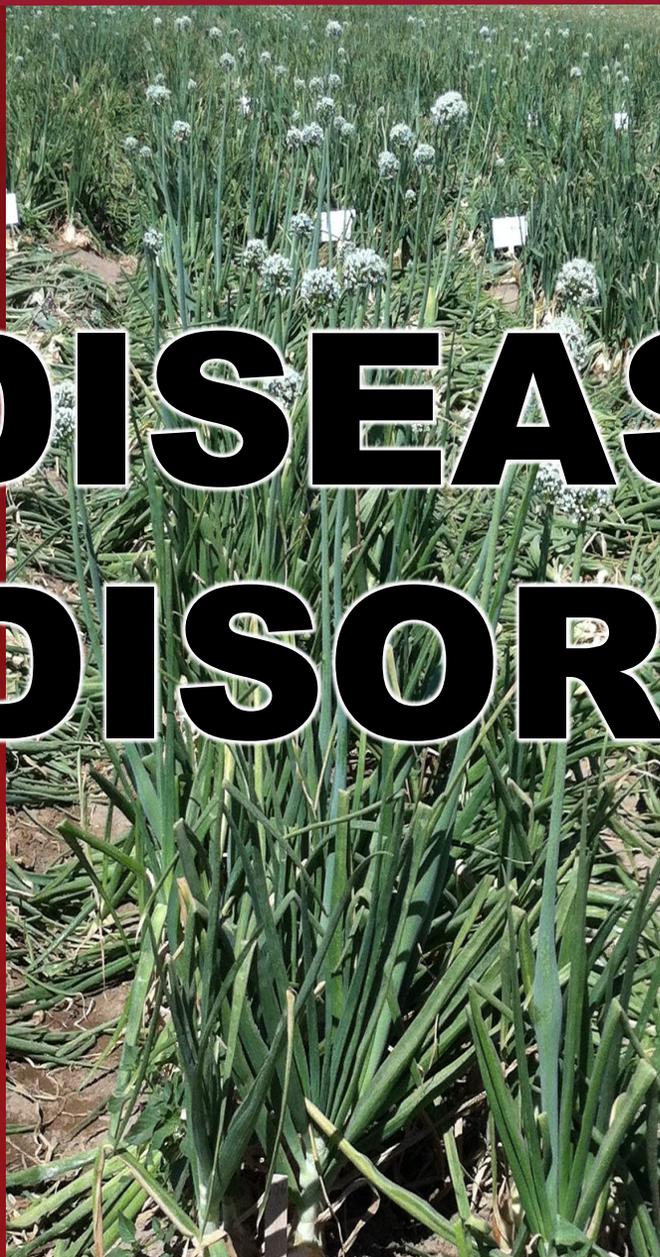
<u>CULTIVAR</u>	<u>FIRMNESS</u>	<u>SHAPE</u>	<u>SCALES</u>	<u>SCORE</u>
Rhea	3.5 NS	4.0 NS	3.5 NS	11.0
White Cap	3.7 NS	3.3 NS	3.6 NS	10.5
Cometa	3.2 NS	3.5 NS	3.2 NS	10.0
Brundage	3.0 NS	3.2 NS	3.3 NS	9.4
White Cloud	3.2 NS	3.2 NS	2.9 NS	9.3

\*Tukey's HSD P=0.05, Yr. x Cv. Interactions for All Rating NS

## % SINGLE CENTERS

<u>CULTIVAR</u>	<u>% SINGLES</u>	<u>StDev</u>	<u>YRS</u>
Rhea	86.7 a	6.0	4
Brundage	81.6 a	9.0	6
Cometa	80.3 a	7.7	5
White Cap	78.1 a	8.6	4
White Cloud	47.6 b	18.0	6

\*Tukey's HSD P=0.05



# DISEASES & DISORDERS



**NECK  
ROT**

## 2016 NECK ROT – YELLOWS, REDS, WHITES RANKED

<u>CULTIVAR</u>	<u>% NECK ROT</u>	
Arcero	0.0	c
Crockett	0.0	c
Legend	0.0	c
Montero	0.0	c
Cruiser	0.7	c
Hamilton	1.6	bc
Ranchero	2.0	bc
Frontier	2.2	bc
Tamara	2.3	bc
Calibra	2.3	bc
Talon	2.7	bc
Tucannon	2.9	bc
Traverse	3.0	bc

<u>CULTIVAR</u>	<u>% NECK ROT</u>	
Granero	3.4	bc
Swale	3.5	bc
Centerstone	3.5	bc
Scout	3.5	bc
Anillo	3.5	bc
Milestone	3.7	bc
Joaquin	4.0	bc
Highlander	5.5	bc
Oloroso	6.6	bc
XP 16000	8.3	abc
Vaquero	11.7	abc
Grand Perfection	17.5	ab
Airoso		

<u>RED CULTIVAR</u>	<u>% NECK ROT</u>	
Purple Haze	0.7	c
Red Carpet	1.3	c
Marengo	3.1	bc
Red Beret	5.3	bc
Redwing		
SV4643NT		

<u>WHITE CULTIVAR</u>	<u>% NECK ROT</u>	
White Cloud	24.0	a
Brundage		
Cometa		
Rhea		
White Cap		

\*Tukey's HSD P=0.05, ONLY 2015 had significant cv. differences for % NECK ROT

## 2016 NECK ROT – YELLOWS, REDS, WHITES RANKED

CULTIVAR	% NECK ROT
Arcero	0.0 c
Crockett	0.0 c
Legend	0.0 c
Montero	0.0 c
Cruiser	0.7 c
Hamilton	1.6 bc
Ranchero	2.0 bc
Frontier	2.2 bc
Tamara	2.3 bc
Calibra	2.3 bc
Talon	2.7 bc
Tucannon	2.9 bc
Traverse	3.0 bc

CULTIVAR	% NECK ROT
Granero	3.4 bc
Swale	3.5 bc
Centerstone	3.5 bc
Scout	3.5 bc
Anillo	3.5 bc
Milestone	3.7 bc
Joaquin	4.0 bc
Highlander	5.5 bc
Oloroso	6.6 bc
XP 16000	8.3 abc
Vaquero	11.7 abc
Grand Perfection	17.5 ab
Airoso	

RED CULTIVAR	% NECK ROT
Purple Haze	0.7 c
Red Carpet	1.3 c
Marengo	3.1 bc
Red Beret	5.3 bc
Redwing	
SV4643NT	

WHITE CULTIVAR	% NECK ROT
White Cloud	24.0 a
Brundage	
Cometa	
Rhea	
White Cap	

\*Tukey's HSD P=0.05, ONLY 2015 had significant cv. differences for % NECK ROT



**DRY**



**SCALE**

Photos By Lindsey du Toit, WSU

# 2015 DRY SCALE – YELLOWS, REDS, WHITES RANKED

<u>CULTIVAR</u>	<u>% DRY SCALE</u>	
<b>Arcero</b>	33.1	cd
<b>Legend</b>	34.6	bcd
<b>Hamilton</b>	36.3	bcd
<b>Joaquin</b>	39.3	bcd
<b>16000</b>	41.8	bcd
<b>Calibra</b>	42.5	bcd
<b>Highlander</b>	43.1	bcd
<b>Centerstone</b>	43.5	bcd
<b>Anillo</b>	45.1	bcd
<b>Grand Perfection</b>	45.3	bcd
<b>Milestone</b>	45.6	bcd
<b>Vaquero</b>	46.0	a-d
<b>Oloroso</b>	48.6	a-d

<u>CULTIVAR</u>	<u>% DRY SCALE</u>	
<b>Swale</b>	48.7	a-d
<b>Montero</b>	51.3	abc
<b>Cruiser</b>	52.3	abc
<b>Scout</b>	58.3	abc
<b>Tamara</b>	61.9	ab
<b>Granero</b>	66.0	a
<b>Frontier</b>	67.1	a
<b>Airoso</b>		
<b>Crockett</b>		
<b>Ranchero</b>		
<b>Talon</b>		
<b>Traverse</b>		
<b>Tucannon</b>		

<u>RED CULTIVAR</u>	<u>% DRY SCALE</u>	
<b>Red Beret</b>	39.9	bcd
<b>Red Carpet</b>	42.0	bcd
<b>Marengo</b>	48.2	a-d
<b>Purple Haze</b>	55.6	abc
<b>Redwing</b>		
<b>SV4643NT</b>		

<u>WHITE CULTIVAR</u>	<u>% DRY SCALE</u>	
<b>Cometa</b>	26.9	d
<b>White Cloud</b>	29.9	cd
<b>Brundage</b>	34.7	bcd
<b>Rhea</b>		
<b>White Cap</b>		

\*Tukey's HSD P=0.05, ONLY 2015 had significant cv. differences for DRY SCALE

# 2015 DRY SCALE – YELLOWS, REDS, WHITES RANKED

CULTIVAR	% DRY SCALE	
<b>Arcero</b>	<b>33.1</b>	<b>cd</b>
<b>Legend</b>	34.6	bcd
<b>Hamilton</b>	36.3	bcd
<b>Joaquin</b>	39.3	bcd
<b>16000</b>	41.8	bcd
<b>Calibra</b>	42.5	bcd
<b>Highlander</b>	43.1	bcd
<b>Centerstone</b>	43.5	bcd
<b>Anillo</b>	45.1	bcd
<b>Grand Perfection</b>	45.3	bcd
<b>Milestone</b>	45.6	bcd
<b>Vaquero</b>	46.0	a-d
<b>Oloroso</b>	48.6	a-d

CULTIVAR	% DRY SCALE	
<b>Swale</b>	48.7	a-d
<b>Montero</b>	51.3	abc
<b>Cruiser</b>	52.3	abc
<b>Scout</b>	58.3	abc
<b>Tamara</b>	<b>61.9</b>	<b>ab</b>
<b>Granero</b>	<b>66.0</b>	<b>a</b>
<b>Frontier</b>	<b>67.1</b>	<b>a</b>
<b>Airoso</b>		
<b>Crockett</b>		
<b>Ranchero</b>		
<b>Talon</b>		
<b>Traverse</b>		
<b>Tucannon</b>		

RED CULTIVAR	% DRY SCALE	
<b>Red Beret</b>	39.9	bcd
<b>Red Carpet</b>	42.0	bcd
<b>Marengo</b>	48.2	a-d
<b>Purple Haze</b>	55.6	abc
<b>Redwing</b>		
<b>SV4643NT</b>		

WHITE CULTIVAR	% DRY SCALE	
<b>Cometa</b>	<b>26.9</b>	<b>d</b>
<b>White Cloud</b>	<b>29.9</b>	<b>cd</b>
<b>Brundage</b>	34.7	bcd
<b>Rhea</b>		
<b>White Cap</b>		

\*Tukey's HSD P=0.05, ONLY 2015 had significant cv. differences for DRY SCALE

# **POWDERY MILDEW**



**MILD**



**MODERATE**



**SEVERE**

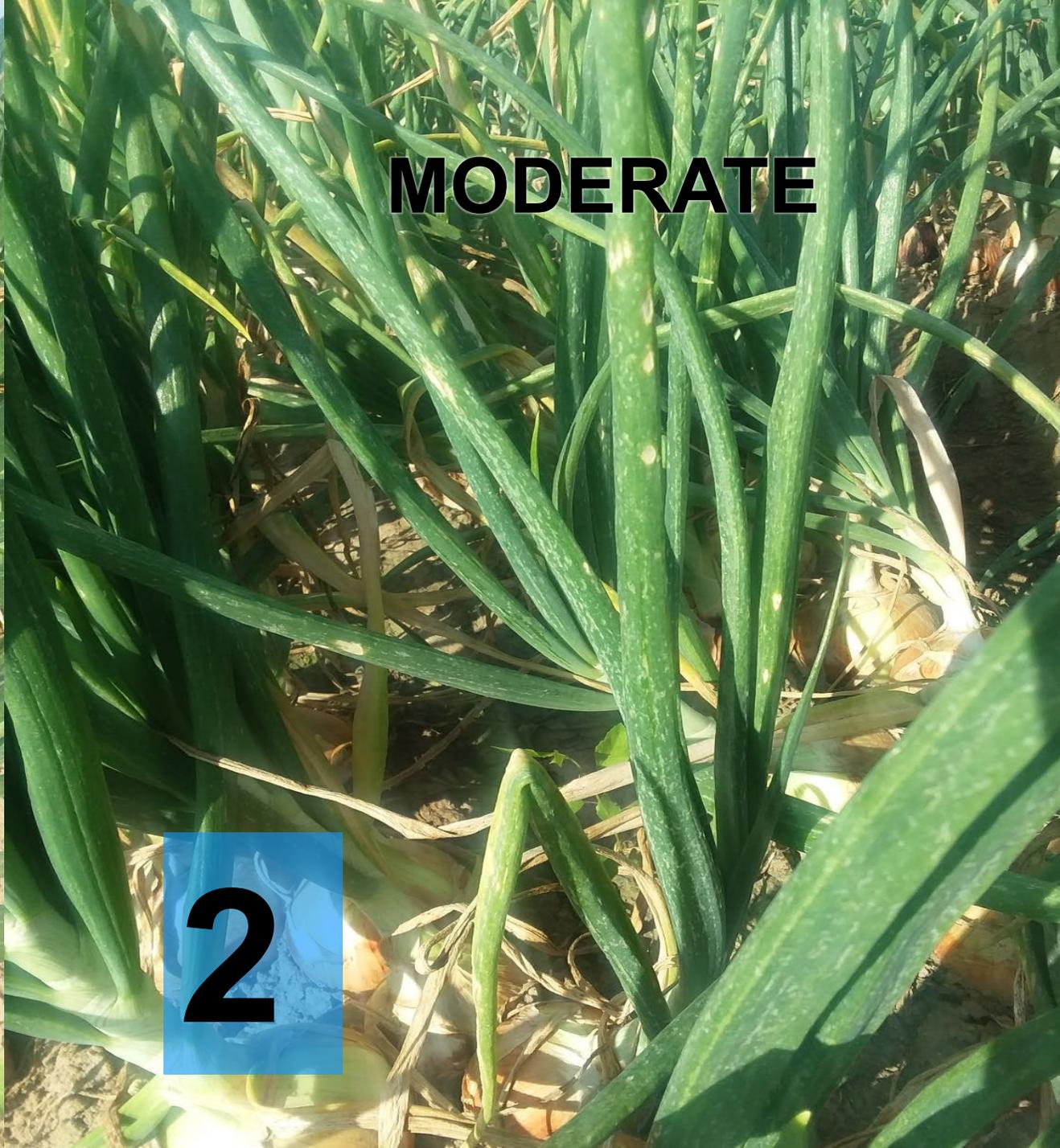
**MILD**



**1**

**MODERATE**

**2**



**SEVERE**

**SEVERE-FUNGUS**

**3**

**4**



# 2019 POWDERY MILDEW – ALL CULTIVARS RANKED

CULTIVAR	RANK 1-4	
<b>Vaquero</b>	1.0	c
<b>Airoso</b>	1.3	c
<b>Grand Perfection</b>	1.3	c
<b>Legend</b>	1.3	c
<b>Tamara</b>	1.3	c
<b>XP 16000</b>	1.7	bc
<b>Frontier</b>	1.7	bc
<b>Hamilton</b>	1.7	bc
<b>Joaquin</b>	1.7	bc
<b>Montero</b>	1.7	bc
<b>Oloroso</b>	1.7	bc
<b>Highlander</b>	1.9	bc
<b>Centerstone</b>	2.0	bc

CULTIVAR	RANK 1-4	
<b>Crockett</b>	2.0	bc
<b>Granero</b>	2.3	abc
<b>Arcero</b>	3.0	ab
<b>Scout</b>	3.0	ab
<b>Tucannon</b>	3.7	a
<b>Anillo</b>		
<b>Calibra</b>		
<b>Cruiser</b>		
<b>Milestone</b>		
<b>Swale</b>		
<b>Talon</b>		
<b>Traverse</b>		

RED CULTIVAR	RANK 1-4	
<b>SV4643NT</b>	1.3	c
<b>Redwing</b>	1.7	bc
<b>Purple Haze</b>	2.0	bc
<b>Marengo</b>	2.3	abc
<b>Red Beret</b>		
<b>Red Carpet</b>		

WHITE CULTIVAR	RANK 1-4	
<b>White Cap</b>	1.7	bc
<b>Brundage</b>		
<b>Cometa</b>		
<b>Rhea</b>		
<b>White Cloud</b>		

\*Tukey's HSD P=0.05, ONLY 2019 had significant cv. differences for POWDERY MILDEW RATING

# 2019 POWDERY MILDEW – ALL CULTIVARS RANKED

CULTIVAR	RANK 1-4	
Vaquero	1.0	c
Airoso	1.3	c
Grand Perfection	1.3	c
Legend	1.3	c
Tamara	1.3	c
XP 16000	1.7	bc
Frontier	1.7	bc
Hamilton	1.7	bc
Joaquin	1.7	bc
Montero	1.7	bc
Oloroso	1.7	bc
Highlander	1.9	bc
Centerstone	2.0	bc

CULTIVAR	RANK 1-4	
Crockett	2.0	bc
Granero	2.3	abc
Arcero	3.0	ab
Scout	3.0	ab
Tucannon	3.7	a
Anillo		
Calibra		
Cruiser		
Milestone		
Swale		
Talon		
Traverse		

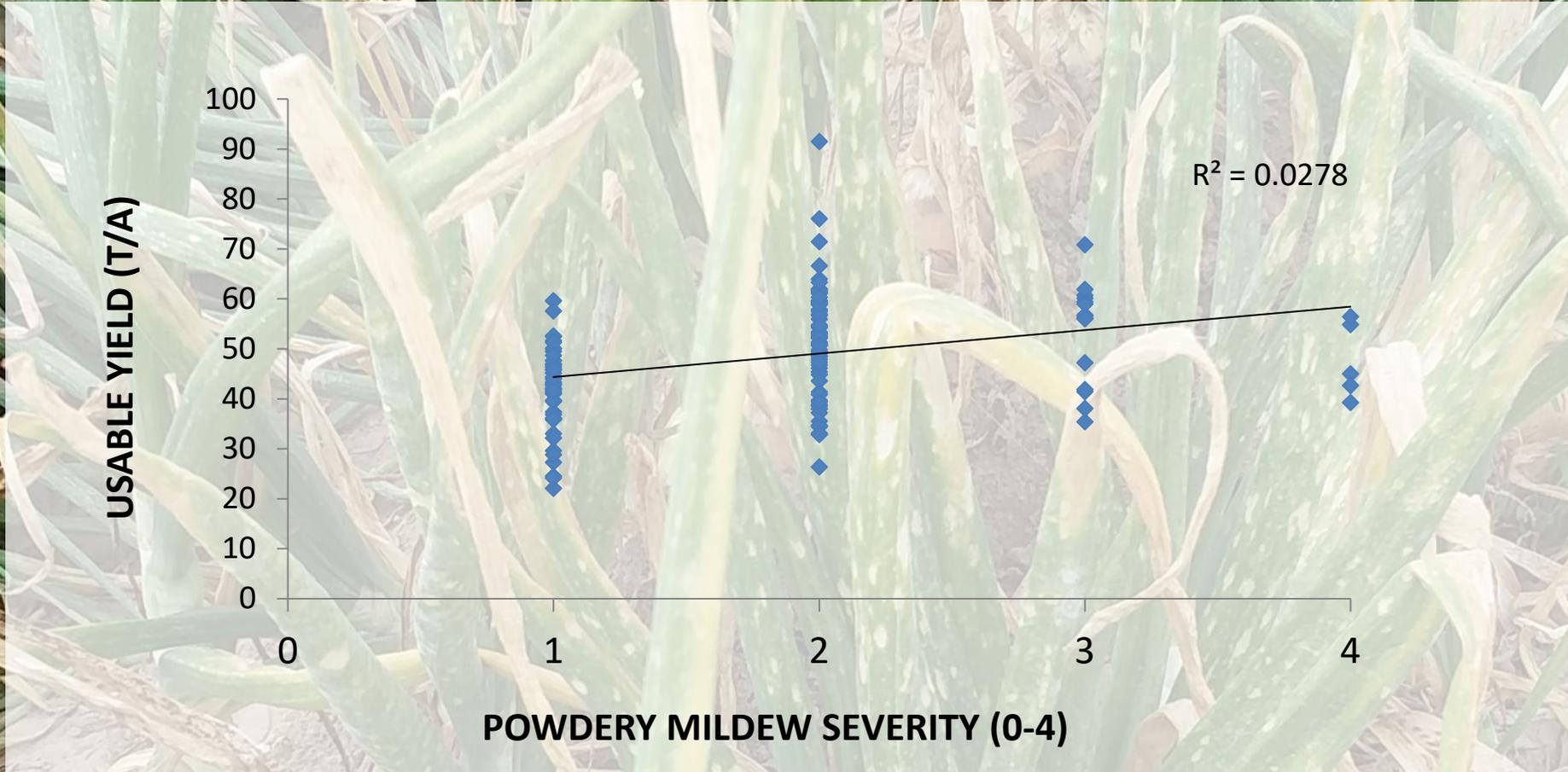
RED CULTIVAR	RANK 1-4	
SV4643NT	1.3	c
Redwing	1.7	bc
Purple Haze	2.0	bc
Marengo	2.3	abc
Red Beret		
Red Carpet		

WHITE CULTIVAR	RANK 1-4	
White Cap	1.7	bc
Brundage		
Cometa		
Rhea		
White Cloud		

\*Tukey's HSD P=0.05, ONLY 2019 had significant cv. differences for POWDERY MILDEW RATING

# 2019 WSU ONION CULTIVAR TRIAL

## POWDERY MILDEW & TOTAL USABLE YIELD





**BOLTERS**

# 2014 BOLTING – ALL CULTIVARS RANKED

CULTIVAR	# BOLTED	
Frontier	0	c
Highlander	0	c
Legend	0	c
Milestone	0	c
Centerstone	0.3	c
Cruiser	0.3	c
Vaquero	0.7	c
Calibra	1.0	c
Oloroso	1.0	c
Talon	1.0	c
Crockett	1.7	c
Arcero	3.3	bc
Anillo	5.0	bc

CULTIVAR	# BOLTED	
XP 16000	6.3	bc
Grand Perfection	6.3	bc
Scout	6.3	bc
Swale	6.3	bc
Montero	7.7	abc
Joaquin	12.3	ab
Airoso		
Granero		
Hamilton		
Ranchero		
Tamara		
Traverse		
Tucannon		

RED CULTIVAR	# BOLTED	
Redwing	0	c
Marengo	0.3	c
SV4643NT	0.3	c
Purple Haze	1.0	c
Red Beret		
Red Carpet		

WHITE CULTIVAR	# BOLTED	
Rhea	0.3	c
Brundage	4.3	bc
Cometa	16.7	a
White Cap		
White Cloud		

\*Tukey's HSD P=0.05

# 2014 BOLTING – ALL CULTIVARS RANKED

CULTIVAR	# BOLTED	
Frontier	0	c
Highlander	0	c
Legend	0	c
Milestone	0	c
Centerstone	0.3	c
Cruiser	0.3	c
Vaquero	0.7	c
Calibra	1.0	c
Oloroso	1.0	c
Talon	1.0	c
Crockett	1.7	c
Arcero	3.3	bc
Anillo	5.0	bc

CULTIVAR	# BOLTED	
XP 16000	6.3	bc
Grand Perfection	6.3	bc
Scout	6.3	bc
Swale	6.3	bc
Montero	7.7	abc
<b>Joaquin</b>	<b>12.3</b>	<b>ab</b>
Airoso		
Granero		
Hamilton		
Ranchero		
Tamara		
Traverse		
Tucannon		

RED CULTIVAR	# BOLTED	
Redwing	0	c
Marengo	0.3	c
SV4643NT	0.3	c
Purple Haze	1.0	c
Red Beret		
Red Carpet		

WHITE CULTIVAR	# BOLTED	
Rhea	0.3	c
Brundage	4.3	bc
<b>Cometa</b>	<b>16.7</b>	<b>a</b>
White Cap		
White Cloud		

\*Tukey's HSD P=0.05



**IN CONCLUSION**





## LIMITS OF THE WSU ONION CULTIVAR TRIALS

- The trial is managed for the surrounding onion crop.
  - Earlier cultivars may get more water than is ideal at the end of the season. Later cultivars may be cut off too early.
- Incidences of diseases and physiological disorders are rare or irregular, so identifying differences in cultivar susceptibility is limited.
- Multi-year assessments can be difficult because entries change each year.
  - Some cultivars are entered for many consecutive seasons, some just a few years, others are entered only once.



WASHINGTON STATE UNIVERSITY  
**WSU**

# **WSU ONION FIELD DAY**

# HARVEST



Photo by Casey Crookham



**STORAGE EVALUATION**

Photo by Casey Crookham

# PNVA CONFERENCE ONION CULTIVAR DISPLAY





*Thanks*

Carrie H. Wohleb, Ph.D.  
Washington State University  
Moses Lake, WA

[cwohleb@wsu.edu](mailto:cwohleb@wsu.edu)

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