

## Yield Quality and Bruise Susceptibility for Selected Russet Varieties

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### **Introduction:**

Several Russet varieties were recently released for fresh market with higher yield potential, improved disease resistance, and lower input requirements compared to Russet Norkotah. However, many of these new varieties are more susceptible to shatter bruise, white-knot bruise, or blackspot bruise. Grower experience with these new varieties has been mixed. Some growers experienced excellent results and few problems, while others experienced significant crop loss due to bruising and storage rot. This study compared several Russet varieties yield and bruise susceptibility.

### **Trial Information**

|                                  |   |
|----------------------------------|---|
| <b>Location:</b>                 | Intermountain Research and Extension Center, Tulelake, CA         |
| <b>Soil Type:</b>                | Tulebasin mucky silty clay loam                                   |
| <b>Planting Date:</b>            | May 14 <sup>th</sup> , 2015                                       |
| <b>Harvest Date:</b>             | September 23, 2015  |
| <b>Harvest Pulp Temperature:</b> | 56  |
| <b>Irrigation:</b>               | Solid-set sprinklers  |
| <b>Plot Size:</b>                | 2 rows (6 ft) wide by 20 ft long                                  |
| <b>Vine Kill Date:</b>           | September 2 <sup>nd</sup> and 9 <sup>th</sup> , 2015              |
| <b>In-Row Seed Spacing:</b>      | 10 inches   |
| <b>Number of Replications:</b>   | 4   |
| <b>Fertilizer per Acre:</b>      | 204 N-40 P205-110 K20-34 S  |
| <b>Seed Treatment:</b>           | Fir Bark Dust, Maxim 4FS  |
| <b>Weed Control:</b>             | Prowl H <sub>2</sub> O & Roundup (pre-emergence), Outlook, Matrix |
| <b>Insecticides:</b>             | Admire Pro (in-furrow), Vydate                                    |

**Fungicides:** Quadris, Endura, Omega, Bravo Weatherstick, Tanos, Tattoo, Curzate

**Vine Kill Method:** Rolling vines followed by two applications of Reglone

## **Methods**

Tuber yield and defects were evaluated on 11/5, 12/22, 2/5/2016 and 3/31. Tubers were stored in controlled storage at 46°F. Blackspot and white-knot bruise were evaluated during each session from. Ten tubers were evaluated at both evaluation times. Blackspot bruise was evaluated using an abrasive peel method. Samples were peeled in a Hobart peeler for 30 seconds, then incubated for 24 hours at 60-70°F. Potatoes were then separated into 5 categories based on enzymatic discoloration.

## **Results**

Vine kill date did not have a significant influence on yield or tuber bruising, so data from all vine kill dates for each variety were combined for analysis. Varieties differed in their yield and bruise susceptibility at harvest (Tables 1 and 2). TX296 Norkotah, ATTX91137-1RU had the highest total yield and US# 1 yield of the trial (Table 1). GemStar Russet, Teton Russet, and Russet Norkotah also produced high yields. Varieties with the largest tuber size included ATX91137-1RU and TX296 Norkotah. Classic Russet has historically produced similar or higher yields than GemStar Russet and Russet Norkotah in IREC trials, but Classic Russet yields were low this year for an unknown reason.

GemStar Russet and AC00395-1RU had the most severe lenticel scarring, while Russet Norkotah and Canela Russet had the least (Tables 2). COTX09052-2RU, TX296 Norkotah, and Russet Norkotah had the most severe black spot bruising at harvest (Figure 1). Interestingly, black spot bruise appeared to increase for several varieties including Classic Russet, Canela Russet, GemStar Russet, and Teton Russet after being stored for 60 days, while Russet Norkotah black spot bruising appeared unchanged (Figure 1). White Knot was evaluated 60 days after harvest with no significant incidence for all varieties and therefore was not reported. See Figure 2 for entry pictures and comments.

**Table 1. Russet Tuber Yield and Size Characteristics**

| Variety                   | Total Yield       | US #1's    | 2's       | < 4 oz    | Culls    | Stand           | Average Tuber Size | Tubers Per Plant |
|---------------------------|-------------------|------------|-----------|-----------|----------|-----------------|--------------------|------------------|
|                           | ----- CWT/A ----- |            |           |           |          | %               | ounces             | #                |
| ATTX91137-1RU             | 514               | 329        | 140       | 34        | 12       | 98              | 8.1                | 6.0              |
| AO3158-2TE                | 515               | 443        | 33        | 35        | 4        | 96              | 8.1                | 6.1              |
| AO1010-1                  | 467               | 389        | 20        | 55        | 4        | 99              | 6.3                | 7.0              |
| Canela Russet             | 293               | 210        | 30        | 46        | 8        | 49 <sup>1</sup> | 6.1                | 9.4              |
| Teton Russet              | 454               | 309        | 82        | 50        | 13       | 89              | 7.0                | 6.8              |
| Russet Norkotah           | 472               | 396        | 32        | 31        | 12       | 97              | 7.9                | 5.7              |
| Classic Russet            | 428               | 311        | 73        | 34        | 10       | 94              | 7.6                | 5.6              |
| GemStar Russet            | 447               | 332        | 59        | 49        | 8        | 91              | 6.8                | 6.6              |
| Mercury Russet            | 401               | 310        | 46        | 32        | 13       | 90              | 7.6                | 5.4              |
| AC00395-2RU               | 466               | 381        | 30        | 52        | 3        | 96              | 6.6                | 6.8              |
| CO03276-5RU               | 506               | 397        | 10        | 92        | 7        | 97              | 5.4                | 8.9              |
| <b>Average</b>            | <b>451</b>        | <b>346</b> | <b>50</b> | <b>46</b> | <b>8</b> | <b>90</b>       | <b>7.0</b>         | <b>6.7</b>       |
| <b>95% Conf. Interval</b> | <b>32</b>         | <b>29</b>  | <b>19</b> | <b>9</b>  | <b>4</b> | <b>6</b>        | <b>0.4</b>         | <b>0.9</b>       |

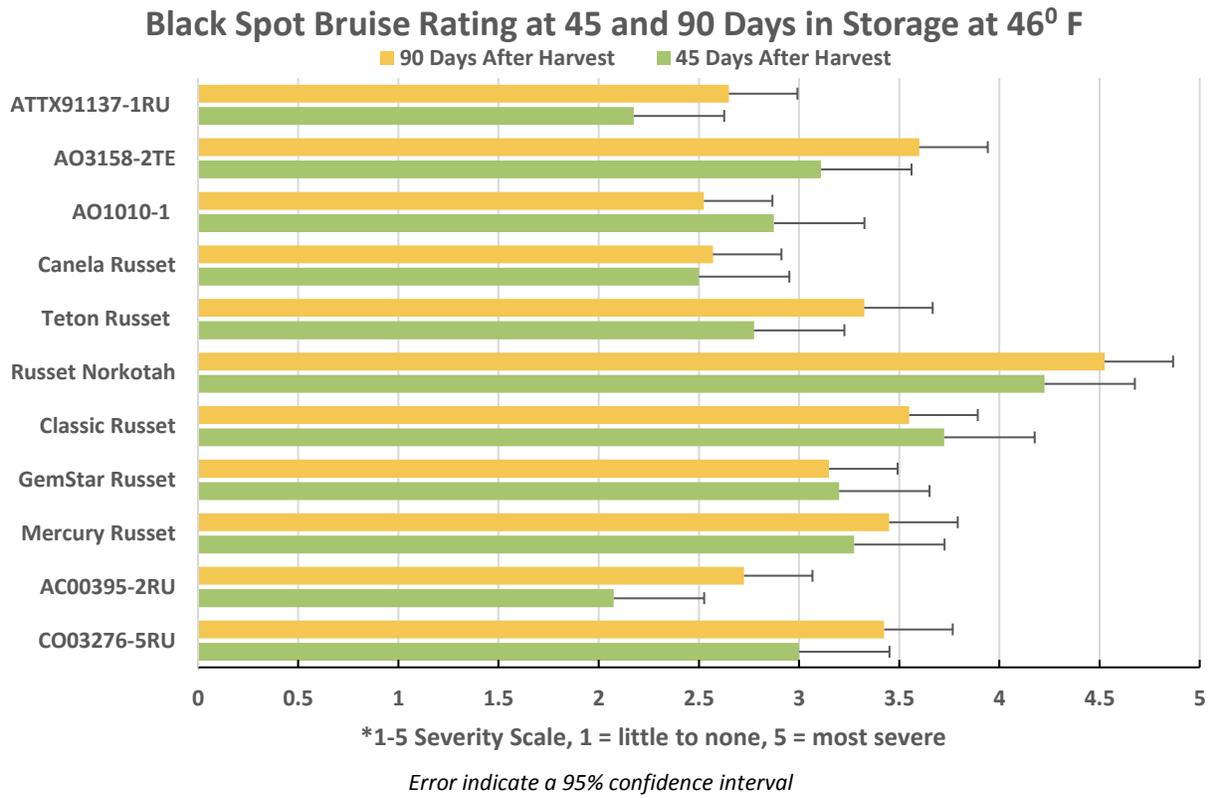
<sup>1</sup>Canela Russet had an unknown problem with the stand.

**Table 2. Russet Internal & External Defects at Harvest**

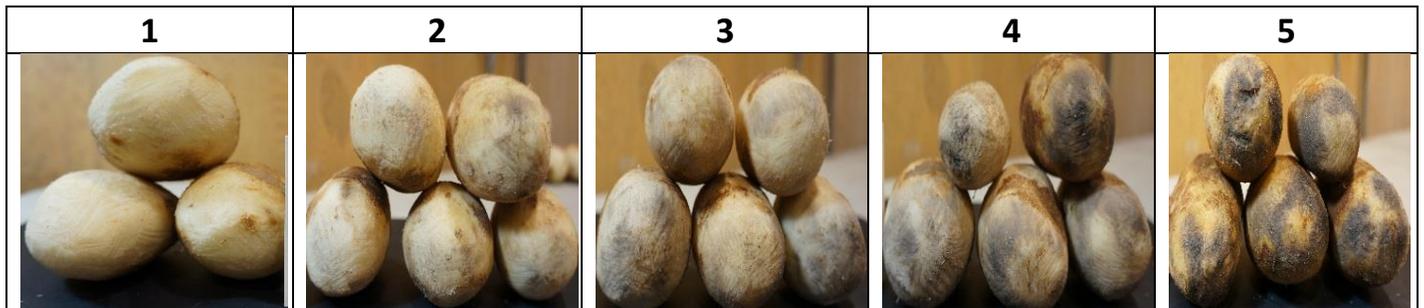
| Variety                   | % Breakdown of Culls of Total Tuber Count |                |            |                   | External Skin Evaluations |                                    |                                 |                  |
|---------------------------|---|----------------|------------|-------------------|---------------------------|------------------------------------|---------------------------------|------------------|
|                           | Knob %                                    | Growth Crack % | Green %    | Irregular Shape % | Skinning <sup>1</sup> 1-5 | Lenticel Scarring <sup>1</sup> 1-5 | Shatter Bruise <sup>1</sup> 1-5 | Specific Gravity |
| ATTX91137-1RU             | 0.8                                       | 14.1           | 0.6        | 4.8               | 3.4                       | 3.5                                | 3.8                             | 1.074            |
| AO3158-2TE                | 0.9                                       | 3.0            | 0.1        | 2.7               | 3.4                       | 3.0                                | 3.8                             | 1.085            |
| AO1010-1                  | 0.6                                       | 0.8            | 0.2        | 2.7               | 3.4                       | 2.1                                | 3.8                             | 1.086            |
| Canela Russet             | 1.6                                       | 1.0            | 1.7        | 4.8               | 3.3                       | 4.3                                | 3.9                             | 1.081            |
| Teton Russet              | 2.5                                       | 8.5            | 0.5        | 4.2               | 3.4                       | 2.1                                | 3.8                             | 1.075            |
| Russet Norkotah           | 3.5                                       | 0.7            | 0.6        | 3.6               | 3.9                       | 4.1                                | 4.0                             | 1.067            |
| Classic Russet            | 3.3                                       | 1.3            | 1.3        | 3.0               | 3.8                       | 3.4                                | 3.6                             | 1.084            |
| GemStar Russet            | 4.4                                       | 0.5            | 2.0        | 4.6               | 3.8                       | 4.0                                | 3.8                             | 1.082            |
| Mercury Russet            | 1.7                                       | 8.2            | 0.7        | 2.9               | 3.9                       | 3.8                                | 3.8                             | 1.073            |
| AC00395-2RU               | 0.0                                       | 2.3            | 0.8        | 1.9               | 2.9                       | 2.6                                | 4.1                             | 1.099            |
| CO03276-5RU               | 1.3                                       | 0.4            | 0.7        | 0.6               | 4.0                       | 2.8                                | 4.0                             | 1.079            |
| <b>Average</b>            | <b>1.9</b>                                | <b>4.2</b>     | <b>0.8</b> | <b>3.2</b>        | <b>3.5</b>                | <b>3.2</b>                         | <b>3.8</b>                      | <b>1.080</b>     |
| <b>95% Conf. Interval</b> | <b>1.1</b>                                | <b>2.2</b>     | <b>0.7</b> | <b>1.7</b>        | <b>0.3</b>                | <b>0.5</b>                         | <b>0.4</b>                      | <b>0.004</b>     |

<sup>1</sup>10 tuber sampled at harvest. Based on a 1-5 scale, 1 = most severe, 5 = no incident

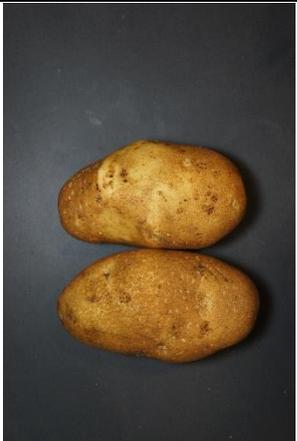
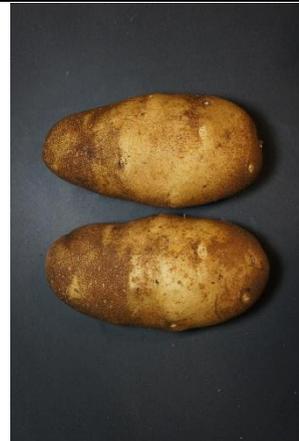
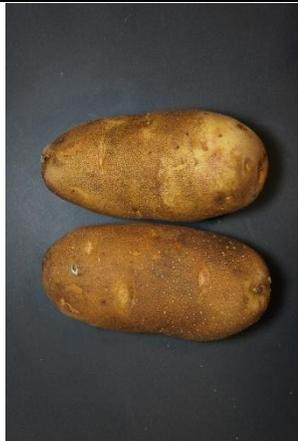
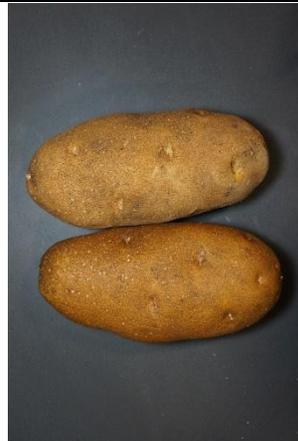
**Figure 1.**



### Black Spot Bruise Evaluation Test Rating Scale After Abrasive Peeling



**Figure 2. Russet Entry Pictures**

| Entry   |   |  |  |
|---|---|--|--|
| <b>ATTX91137-1RU</b>  | <b>AO3158-2TE</b>   | <b>AO1010-1</b>  | <b>Canela Russet</b>   |
|    |    |    |   |
| <b>Teton Russet</b>   | <b>Russet Norkotah</b>  | <b>Classic Russet</b>  | <b>GemStar Russet</b>  |
|   |   |   |  |
| <b>Mercury Russet</b>   | <b>AC00395-2RU</b>  | <b>CO03276-5RU</b>   |  |
|  |  |  |  |