

# 2017 SARATOGA HORTICULTURAL RESEARCH ENDOWMENT FINAL REPORT

## September 13, 2018

**Project: Evaluating new landscape rose introductions for sustainability in California**

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### Introduction

As Californians move ahead with transforming the urban landscape to a more sustainable model than in past decades, the search for plants that are low-maintenance and low-input continues. Although personal preferences for plant aesthetics may vary, surveys have consistently shown that people like color in the garden with lots of flowers (Kendal, et al., 2012). Roses may have fallen out of favor in some landscaping and gardening circles because of their reputation for being disease-prone and high-maintenance, there are still many who find roses desirable garden plants. Roses fall into several classifications and breeding in more recent years has focused on producing disease-resistant, pest-tolerant, lower-water roses in the “landscape” or “shrub” class, unlike their fussy hybrid tea relatives (Leus, 2005; Whitaker & Hokanson, 2009). In addition, many of these landscape or shrub roses bloom either continually or repeatedly from April to frost, providing a rich pollen resource for beneficial insects. In the UC Landscape Plant Irrigation Trials (UCLPIT), we have evaluated 10 roses over the years, (with seven more in the trials now), and found that most will perform very well on moderate and some even on low-water regimes as defined by the Water Use Classification of Landscape Species (WUCOLS; <http://ucanr.edu/sites/WUCOLS/>). This PI spoke on the UCLPIT roses in July 2017 at the International Society of Horticultural Science’s Symposium on Rose Research and Cultivation in Anger, France, and can attest that almost all the breeding projects presented from around the world were focused on pest and disease resistance and repeat bloom.

Most people who garden with roses prefer those that are disease-resistant with abundant and repeat blooming flowers (Waliczek et al., 2015). One study showed that people are willing to pay a premium for ornamental landscape plants that are labeled as “certified” water-conserving or disease-resistant (Harter, 2012). Until 2012, the All-American Rose Selections organization provided the results of collected evaluations of rose cultivars from around the country, although these were not “low-input” trials. Rose trials to find regionally appropriate cultivars on low or no-inputs have been performed by a variety of researchers in places ranging from Texas to Florida, and even Italy (Giorgioni, 2007; Mackay, et al. 2008, Mangandi et al., 2013), testifying to the

demand for information on this genus. The downturn in the economy led AARS to close, and in its place two separate organizations formed to fill the gap. The American Rose Trials for Sustainability (ARTS) was formed by a coalition of rose breeders, researchers, and extension scientists and is the more scientifically rigorous of the two in its design and execution (<http://www.americanrosetrialsforsustainability.org/>).

Plant performance trials are a critical step in the introduction and promotion of new plants, but most ornamental plant trials use a high maintenance regimen (fertilizer, pest control, and ample water) to remove all outside obstacles to plant performance (Plant Trials Database, 2017). The ARTS protocols require none of these interventions so that the performance of the entries may be evaluated on a no-maintenance, no-chemical input, and minimal irrigation regime. The recommended irrigation level is in the “moderate” WUCOLS range, or 50% of what a cool-season turfgrass would require. A critical feature of these trials that distinguishes it from other rose trials is the attention to randomized block plot layouts and enough repetitions for centralized statistical analysis of the data. Additionally, where other trials may divide the country into six regions at most, ARTS uses the Köppen climatic classification system which recognizes nine climatic zones for rose growing in the continental U.S. The trial plot at the UCCE Learning Landscape in Stockton is now the site for the Mediterranean climate region.

## **Materials and Methods**

Turfgrass was removed from a 225'-long 16'-wide lawn area in late October. Soil samples were sent for analysis. Pursuant to those results, we requested the landscape contractor to include the incorporation of sulfur (at 25 lbs./1000ft<sup>2</sup>) to lower the pH and 3" of organic compost to increase the organic matter and improve structure. The existing spray irrigation was removed and converted to drip stubs. The central pathway was covered with cardboard sheeting. The entire area was covered in chipped wood mulch and the conversion was completed in November. We attached two 0.6/0.7 (id/od) polyethylene lines to ball valves at the head of each of the two rows.

The planting layout was sent by the ARTS coordinator in January. The plot was laid out in two rows with three blocks and 20 plants per block. Metal stakes labeled with the block number and the cultivar code were installed to mark the spacing. Each plant was provided a ring of ¼" internal emitter drip tubing with four emitters per plant (one on each side) delivering a total of 2.4 gph. Most roses were planted with the help of volunteer UC Master Gardeners and local rose club members by February 23, with the final two cultivars going in mid-April. (Cooperators in the northeast were unable to make shipments due to extreme weather conditions.) Extra roses to be used in the case of early mortality were potted up and held; one cultivar was replaced in two blocks in early May. A sign explaining the project was placed at each end of the plot next to the sidewalk. Ratings were taken twice monthly beginning the first week of May. Subsequent ratings will be from April to November 2019.

## **Results and Discussion**

In January, I trained the volunteers who wanted to collect data. I created a manual with pictures of pests, disease symptoms, and descriptions of the other rating criteria to serve as a guide when rating. Due to the number of volunteers, I was able to create four teams of 2-3 raters. We are rating twice a month, in the first and third week, which allows us to better capture the bloom cycle. As PI, I have reserved one block to rate twice a month myself, while each team rates

one block in either the first or third week of the month. The ratings are quite comprehensive; a copy is included in the Appendix.

With the November ratings we will have completed our first year as the Mediterranean climate zone test garden for the American Rose Trials for Sustainability. When the ratings from 2019 are finalized, the data from these roses will be tabulated to see how well they performed over the entire trial period. It has been rewarding to see how well some of the cultivars have performed even in their first year with our brutal July weather. Every rose has at least one rep still blooming now in September. We anticipate that several of these will be receiving some level of honors from ARTS, the Local Artist Regional Award, if not the Master Rose title. Photos of the conversion process, the early plantings, and the trial now can be found in the Appendix and were recently posted on the ARTS Facebook page with credit given to Saratoga Horticultural for funding. <https://www.facebook.com/AmericanRoseTrialsforSustainability/>

Staff and visitors to the Robert J. Cabral Agricultural Center (where the trial is located) have consistently and frequently comment on how much they enjoy seeing the roses and watching them grow through this summer. They all agree that it is a much more worthwhile use of the space than turfgrass. This has been great affirmation that the information we will be able to provide on the best performers will be welcome and useful to the gardening public in our area, as well as to the industry as a whole.

## References

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## APPENDIX



Figure 1. Strips of turfgrass 6' wide were cut out of the turf. The 4' strip down the middle was scalped and subsequently sprayed with glyphosate.



Figure 2. Soil amendments were tilled in thoroughly.



Figure 3. Commercial grade cardboard was laid over the remnants of the turfgrass to create the center path.

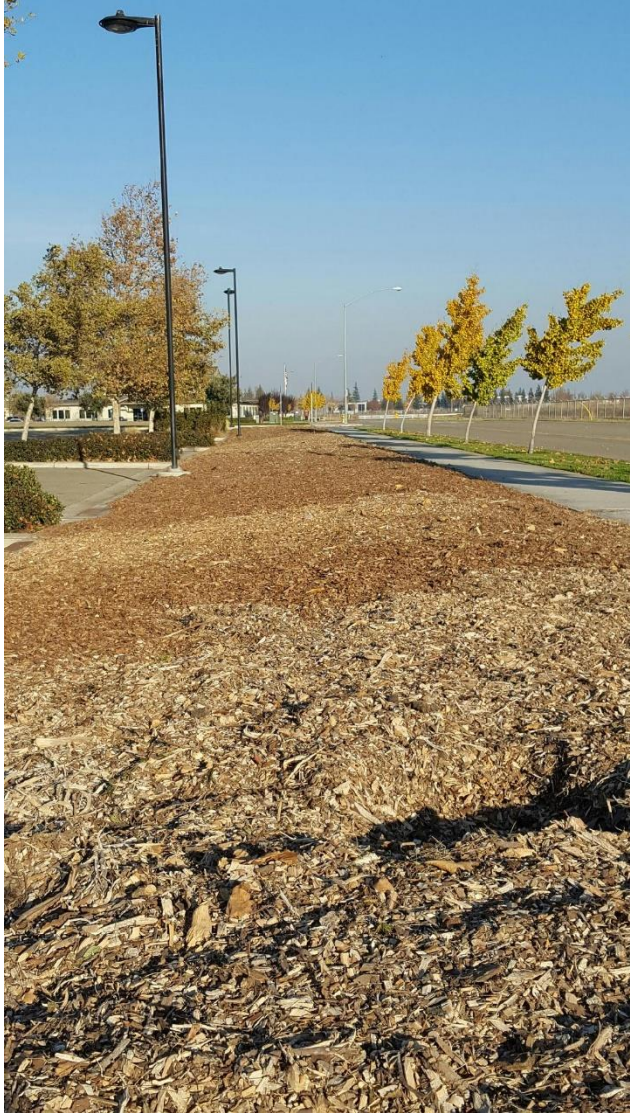


Figure 4. The entire area was covered with a 3" mulch layer of chipped hardwood tree trimmings.



Figure 5. Planting holes being prepared.



Figure 6. Rose trial Year 1 in mid-September 2018.

**American Rose Trials for Sustainability Monthly Evaluation Form** (this is generally done in an online format)

Name of Evaluator(s): \_\_\_\_\_ Trial Site: \_\_\_\_\_

Block #: \_\_\_\_\_ Date: \_\_\_\_\_ Six Digit Plant Treatment # (e.g. 2016-05): \_\_\_\_\_

<p><b>1. Foliage Retention:</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> no leaf loss</li> <li><input type="radio"/> 1-10% leaf drop</li> <li><input type="radio"/> 10-25% leaf drop</li> <li><input type="radio"/> 25-50% leaf drop</li> <li><input type="radio"/> 50-75% leaf drop</li> <li><input type="radio"/> &gt;75% leaf drop</li> <li><input type="radio"/> Plant is Dead</li> </ul>	<p><b>1a. Heat Tolerance:</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> No heat damage noticed</li> <li><input type="radio"/> 1-10% of foliage is damaged by heat</li> <li><input type="radio"/> 10-25% of foliage is damaged by heat</li> <li><input type="radio"/> 25-50% of foliage is damaged by heat</li> <li><input type="radio"/> 50-75% of foliage is damaged by heat</li> <li><input type="radio"/> &gt;75% of foliage is damaged by heat</li> </ul>	<p><b>2. Chlorosis:</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> None</li> <li><input type="radio"/> 1-10% of foliage affected</li> <li><input type="radio"/> 10-25% of foliage affected</li> <li><input type="radio"/> 25-50% of foliage affected</li> <li><input type="radio"/> 50-75% of foliage affected</li> <li><input type="radio"/> &gt;75% of foliage affected</li> </ul>
<p><b>2a. Type of Chlorosis:</b></p> <p>(Only answer this question if chlorosis is present. Please select the description which best describes the appearance of the chlorosis on this rose)</p> <ul style="list-style-type: none"> <li><input type="radio"/> Interveinal chlorosis- yellowing only between the veins of the leaf</li> <li><input type="radio"/> Whole leaf chlorosis- the entire leaf is yellow</li> <li><input type="radio"/> Speckled chlorosis- appears as very small yellow specks throughout the leaf</li> <li><input type="radio"/> Spotted or blotched chlorosis- appears as a yellow spot or larger blotch (multiple spots or blotches on a single leaf are possible)</li> <li><input type="radio"/> Other:</li> </ul>		
<p><b>2b. Area Affected by Chlorosis:</b></p> <p>(Only answer this question if chlorosis is present)</p> <ul style="list-style-type: none"> <li><input type="radio"/> Lower foliage only</li> <li><input type="radio"/> Interior foliage only</li> <li><input type="radio"/> Outer foliage only</li> <li><input type="radio"/> Sporadic</li> <li><input type="radio"/> Overall- even dispersal throughout plant</li> <li><input type="radio"/> Other:</li> </ul>		<p><b>2c. Cause of Chlorosis:</b></p> <p>(Only answer if chlorosis is present.)</p> <p>If known please indicate cause of chlorosis:</p>
<p><b>3. Disease Infection:</b></p> <p>(As a rose may exhibit symptoms of more than one type of disease, please use this field to assess only the most significant infection.)</p> <ul style="list-style-type: none"> <li><input type="radio"/> None</li> <li><input type="radio"/> 1-10% of foliage infected</li> <li><input type="radio"/> 10-25% of foliage infected</li> <li><input type="radio"/> 25-50% of foliage infected</li> <li><input type="radio"/> 50-75% of foliage infected</li> <li><input type="radio"/> &gt;75% of foliage infected</li> </ul>	<p><b>3a. Primary Disease Type:</b></p> <p>(Please indicate which disease is rated above. For additional more minor infections use the following comments section.)</p> <ul style="list-style-type: none"> <li><input type="radio"/> N.A. (not applicable)- No Disease Present</li> <li><input type="radio"/> Black Spot</li> <li><input type="radio"/> Downy Mildew</li> <li><input type="radio"/> Leaf Spot (e.g. <i>Anthraco</i>nose or <i>Cercospora</i>)</li> <li><input type="radio"/> Powdery Mildew</li> <li><input type="radio"/> Rose Rosette</li> <li><input type="radio"/> Rust</li> <li><input type="radio"/> <i>Alternaria</i> petal blight (this is strictly a floral disease but is included here)</li> <li><input type="radio"/> Other:</li> </ul>	
<p><b>Comments on Disease Infection:</b></p>		

**4. Insect and Mite Damage:**

- None
- 1-10% of foliage affected
- 10-25% of foliage affected
- 25-50% of foliage affected
- >75% of foliage affected

**4a. Insect and Mite Damage Type:**

(Only answer if insect or mite damage is present.)

- Munched margins- leaf edges have been chewed
- Large central foliage holes- holes that are larger than a period- are present inside the body of the leaflets (not at the edge)
- Small central foliage holes- small pin holes are present inside the body of the leaflets (not at the edge)
- Skeletonized leaves present- area of tissue between veins within the leaflets have been eaten
- White to brown flecks, characteristic of mite damage, are present on leaves
- Flower buds are being aborted before they open with a browning or chew mark at the transition zone
- Other:

**4b. Pest type:**

(Please select only those pests which are currently visible.)

- Rose Midge
- Japanese Beetle
- Rose Chafer
- Aphids
- Spider Mites
- Thrips
- Chili Thrips
- Rose Sawfly
- Other:

**5. Growth Habit Type:**

(Please select the growth habit type which best describes this rose)

- Upright
- Broad/Bushy
- Drooping/Creeping
- Climbing

**5a. Growth Habit Quality:**

How well does this rose exemplify the growth habit type selected above?

- Outstanding
- Really Nice
- Nice
- Undesirable

**Comments on Growth Habit:**

**5b. Dead Canes:**

- No Dead Canes Present- No portion of the rose is dead
- Dead Canes Present- At least one cane or branch is dead or partially dead and remains on the rosebush

**6a. Extent and Cause of Dead Canes:**

**6b. Winter Injury:**

- No winter dieback (100% live, overwintered stem tissue)
- Virtually no winter dieback (90% or more live, overwintered stem tissue)
- Good (>75% but <90% live, overwintered stem tissue)
- Half Hardy (50-75% live, overwintered stem tissue)
- Less than Half Hardy (>25% but <50% live, overwintered stem tissue)
- Barely Alive (Alive, up to 25% live, overwintered stem tissue)
- Dead (No live, overwintered stem tissue present)

**7. Bloom Coverage:**

- Absolutely covered with blossoms (75-100% of foliage masked by blossoms)
- An abundance of blossoms (50-75% of foliage masked by blossoms)
- A significant number of blossoms (25-50% of foliage masked by blossoms)
- Only a few blossoms (<25% of foliage masked by blossoms)
- No blossoms (no full blooms present, do not count buds or spent flowers)



**7a. Flower Shape:**

(Please select the flower shape type which best describes this rose.)

- Simple- Flat Shape
- Open Shape
- Pointed Shape
- Cup Shape
- Rosette Shape
- Quartered Shape
- Round Shape
- Not Applicable- No blooms present
- Other:

**7b. Flower Shape Quality:**

How well does this rose exemplify the flower shape type selected above?

- Outstanding
- Nice
- Undesirable
- Not Applicable- No blooms present

**8. Fragrance:**

- VeryFragrant- possesses a strong fragrance, easily noticed
- Slightly Fragrant- Possesses fragrance, though not strong or easily noticed, it is pleasant
- None- No fragrance perceptible by this evaluator
- N.A. (not applicable)- No blooms present

**9. Spent Petal/Calyces:**

(Please select the option which best describes the current condition of this rose.)

- no spent petals or calyces observed
- many calyces without petals remain, undergoing transformation into hips- calyx tissue retains color and is obviously alive and healthy
- a few petals remain on some of the calyces (newly forming hips)- These petals appear as brown papery appendages
- a substantial number (more than 25%) of petals remain on the calyces
- many calyces without petals remain on the plant as dark dried-up appendages, giving the plant a "messy" appearance
- spent flowers remain on the plant as unsightly brown masses

**Comments on Spent Petals:**

**10. Hip Formation:**

- Retains ornamental hips-sets attractive hips with a nice clean look. Hips noticeably enhance the overall aesthetic appearance of the plant.
- Does not retain hips- Apparently self-deadheading, almost all spent calyces have dropped.
- Retains hips but are not ornamental- Hips do not add to the overall attractiveness of the plant
- N.A. (not applicable)- Too early in the season for hips to form

**11. Overall Landscape Appeal/ General Impression:**

On a scale from 0 to 10, what is your overall impression of this rose? (Please refer to the evaluation protocol for a discussion on generating this score.)

**General Comments:**

(Please use reverse side for additional space)



Figures 7 and 8. A couple of great performers so far with clean foliage and abundant blooms in mid-September 2018