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Pomegranate Cultivar Trials for Market Expansion in Southern Nevada

Abstract

Producers in Northeast Clark County grow pomegranates mostly for production of value-added products and differentiate their products by flavoring, as they all grow the Wonderful cultivar. Growing different cultivars could create niche products, expand the market, and result in increased sales in addition to expanding the production area by growing cold-hardy cultivars. Field trials of eighteen new (to the area) cultivars were conducted and the public was surveyed for preferences on form of purchase and taste. Combining data from the trials and public testing, four cultivars distinguished themselves as potentially benefiting producers economically: Carolina Venum for higher juice yields, Mollar for its sweetness and fresh eating qualities, Russian 18 for its unique taste and Asperonski for its cold-hardiness, expanding the production area north to Lincoln county.

Introduction

Pomegranates, native to the Mediterranean basin and the Middle East, also thrive in the hot desert climate with sweltering, dry summers and mild winters of the Moapa Valley area of Northeast Clark County, Nevada and are widely grown and marketed here. Multiple local producers (including local FFA youth) sell both the large fresh fruit, jars of differently seasoned jelly, and other value-added products at the two-day Pomegranate Art Festival in November with attendance of 8,000 to 10,000 visitors annually. As in California, the market is dominated by one cultivar: Wonderful. University of Nevada

Extension was given an opportunity to conduct trials at the Logandale Field Station on cultivars not previously grown or marketed in the region. This project was carried out with the expectation that expanding the selection of cultivars available to the public could potentially benefit both established and new specialty crop producers economically.

Methods

Cultivars

In April of 2019, 18 different cultivars of pomegranates were received from Youping Sun at Utah State University.

- Seven of these cultivars were sourced from the former Soviet Union and are considered cold-hardy: Al-Sirin-Nar, Asperonski, Kazake, Kunduzski, Russian 18, Salavatski, and Surh-Anor.
- Seven cultivars were sourced from Texas: Arturo Ivey, Ben Ivey, Carolina Venum, Chiva, De Anda, Larry Ceballos, and Marcelino Lozano.
- The cultivars Mollar and Spanish Sweet were sourced from Spain, Kandahar was sourced from Afghanistan, and Early Wonderful was sourced from the U.S.

Field trials

Planting

Eighty-seven pomegranate cuttings (four or five of each cultivar) were planted into a nursery area at the Logandale Field Station until they could be planted in their permanent location. They were planted in existing soil with no amendments added, in rows running north and south to allow for maximum sun. Cuttings were spaced approximately 13 inches apart in the rows. In March of 2020, the 80 surviving nursery plants were transplanted to their permanent locations in the main field. They were planted with 8 ft spacing between plants in the row and 10 ft spacing between rows.

Irrigation

Each cutting in the nursery area was watered with one gallon of 12-4-8 nutrient fortified water at planting, with the product also supplying 5% manganese and 5% zinc, then watered three times a week by hand with a hose until time of transplantation. The new location had previously been the site of an opuntia experiment where the existing irrigation at 400 mm per year, equivalent to about 15.75 inches of annual rainfall, was utilized. At transplant, an extra four gallons were given to them weekly for two weeks in addition to the drip irrigation to help with establishment. The drip irrigation is delivered through elevated lines to prevent rodent damage to the lines. Annual irrigation is resumed in February or March with leaf break and is suspended every year following harvest. In March of 2023, new lines were installed and the 400 mm emitters were replaced with 2-gallon-per-hour emitters, and the irrigation time was changed to 2 hours every 3 days, or 8 gallons per week. In June of 2023, the irrigation regime was changed again to 6 hours once weekly to allow for the 12 gallons weekly suggested for 4-year-old trees in this area by Bob Morris, professor emeritus.

Pruning and thinning

No thinning has been done to encourage larger fruit. In January of 2023 all cultivars were severely pruned back to four to five main branches for control of numerous suckers, to allow for a lower harvest height, and to increase air circulation.

Fertilizers and pesticides

No fertilizer was applied except the initial application at planting. In June of 2024, two treatments of kaolin clay were applied to all cultivars to reduce predation damage by leaf footed bugs. One application of kaolin clay was done in 2025.

Data

In November of 2020, data recording began on growth measuring each tree's height, width, depth, number of fruits, along with any pertinent notes about individual trees. This

data was recorded yearly prior to harvest. Photographs of each tree were taken prior to harvest annually, as well as after pruning or during the summer occasionally. In 2021, brix measurements were taken from each cultivar. In addition to recording growth measurements, annual measurements of the weight of the fruit harvested from each tree began. In 2022, annual data of the largest and the smallest fruit from each tree was added. In 2024 tree growth measurement was discontinued, concentrating instead on fruit data.

Producer trials

Propagation

In preparation for field trials by producers, in January of 2023, five cuttings of each 18 cultivars were taken. The cuttings were trimmed to 8 to 10 inches, angle cut on the bottom, sprayed with water, and dipped into a rooting hormone. The cuttings were planted into tree cones with a pre-moistened mix of peat moss and sand. The cones were then tented with plastic to maintain moisture and temperature.

Producer information

In Spring of 2024, four producers were recruited who planted a total of 58 cuttings. Prior to planting, informational sessions were held with the producers individually, and the data from the field studies to date was relayed, along with hard copies of the information collected from the literature review to assist with cultivar selection. Two producers are in Alamo in Lincoln County. Alamo experiences significantly colder nights and lower winter temperatures than the Logandale Field Station due to its more than 2000 ft higher altitude. Those producers planted 28 cuttings, two each of the seven cold hardy cultivars, with one producer utilizing flood irrigation and one utilizing drip irrigation. The Alamo producers also replanted an additional 19 cuttings in May of 2025. The other two initial producers are in areas similar to the field test site. One producer is located slightly north of Logandale in Moapa and is using flood irrigation; this producer replanted 13 cuttings in October of 2024. The other producer is located east of Logandale in

Mesquite, Nevada and is using drip irrigation; they replanted eight cuttings in October of 2024. In November of 2024, an additional producer was recruited in the same area as the test field to plant 15 cuttings; he planted part of the cuttings in a greenhouse and some of the cuttings outdoors under shade cloth. Cuttings were also sent to producers in Northern Nevada and in Central Utah.

Public testing

In December of 2021 a sample of 17 cultivars that were not identified by name (16 of the experimental cultivars along with Wonderful as a baseline) were sent out for a pilot taste testing to five extension offices in Nevada. Testers scored the fruit for overall appearance, aril color, sweetness, tartness, bitterness, seed hardness and overall desirability. To reach the public for testing, a booth at the Pomegranate Festival was rented to determine consumer preferences. In November of 2024, a survey was conducted on what pomegranate products consumers preferred to purchase: juice, arils, whole fruits, rind products, or jams and syrups. Consumers were additionally educated on the nutritional benefits of the various products. In November of 2025, attendees were taught that “not all pomegranates are the same” and a taste test with consumers on three specific cultivars that were determined to have the most potential for commercial production was carried out.

Results

Field trials

At the time of the initial planting in the nursery area, seven of the cuttings had minimal or no visible roots and two of those had no visible green growth in addition to four or no roots. Three of the seven recovered by time of transplant, but three others died during that first season. Of the 80 plants transplanted to their permanent location in 2020, 78 are still thriving. Table 1 below shows the summary of fruit production for all cultivars for the entire trial period.

Table 1. Total Fruit Count, Weight and Size for all 18 Cultivars

Year	# of Fruit	Total Fruit Weight lbs	Average Fruit Wt. lbs	Largest Fruit diameter inches
2020	789			
2021	1865			
2022	3,568	1167	0.33	4.1
2023	2,746	291	0.11	2.9
2024	8,244	2378	0.29	4.3
2025	6,270	2599	0.41	4.5

At the last harvest in November of 2025, the Asperonski cultivar had the tree with the largest number of fruit (tree #4), the largest fruit total of the cultivars, as well as the highest average number of fruit for a cultivar. Asperonski tree #1 had the highest fruit weight, the Asperonski cultivar had the highest total fruit weight and the highest average fruit weight of the 18 cultivars.

Table 2. 2025 Harvest Data from the Asperonski Cultivar

Variety	# of Fruit	Fruit Weight lbs	Min Diam inches	Max Diam inches	Average Fruit Wt. lbs
AS 1	204	96.09	1.34	3.94	0.47
AS 2	150	64.19	1.61	4.09	0.43
AS 3	174	75.35	1.77	3.74	0.43
AS 4	247	93.48	1.30	3.82	0.38
Total AS	775	329.11	6.02	15.59	
Average AS	193.75	82.28	1.51	3.90	0.42

Ben Ivey tree #5 had the largest individual diameter fruit at 4.53 in, Kunduski had the largest average diameter for a cultivar at 4.17 in. Larry Ceballos tree #2 had only six fruits, but they weighed a total of 7 lbs., for an average fruit weight of 1.26 lbs. Arturo Ivey had the largest combined cultivar average fruit weight at 0.63 lbs.

No visible infestation of leaf footed bugs was observed at fall harvest in 2024 due to the two applications of the kaolin clay in June. After one application of clay in summer of 2025, in fall there were a small amount of leaf footed bugs, and one cultivar additionally had aphids.

The Brix of the 2-year-old plants in 2021 was measured against an existing Wonderful cultivar at the Logandale Field Station. The Wonderful tested at a brix of 15.79. Four cultivars tested higher: Russian 18 at 16.29, Surh-Anor at 17.54, Chiva at 17.09 and Arturo Ivey at 16.59

Producer trials

The Alamo producers had eight of the 28 cold hardy cuttings survive the first year. Four of those were the Asperonski cultivar with a 100% survival rate. The Moapa producer had all cuttings die over the summer of 2024. The replant in October of 2024 of 13 cuttings had eight survive through till spring of 2025, but those were wiped out by a catastrophic flood event at his location in summer. The Mesquite producer had five of the original 15 cuttings survive the summer of 2024 and with the additional eight cuttings planted in October of 2024, of the total 13, 12 are still viable. For the new local producer who planted 15 cuttings, seven are viable, two in the greenhouse and five outside under shade cloth.

Public testing

In the pilot taste test administered in 2021, Carolina Venum and Arturo Ivey tied for highest overall appearance. Marcelino Lozano scored the highest for aril color. Mollar had the highest score for sweetness and lack of bitterness among all cultivars, including

Wonderful, and scored the highest among the new cultivars for tartness, seed hardness, and overall desirability. At the 2024 Pomegranate Festival we surveyed 514 respondents about the pomegranate products they preferred. Two hundred and ten consumers preferred jams and syrups, 131 preferred whole fruit, 112 preferred to purchase juice, 49 preferred to purchase arils, and 12 consumers preferred to purchase pomegranate rind products. In 2025, 234 consumers participated in our taste test trial of three cultivars. They were asked to choose only one of the three. Forty seven percent of testers preferred B- Mollar, 29% preferred A- Carolina Venum and 24% preferred C- Russian 18.

Discussion

Field trials

The decline in harvest from 2023 was the result of the severe pruning done over the winter. The pruning most severely affected the trees sourced from Texas and the Early Wonderful; those eight cultivars with 35 trees together only had 51 fruit. The seven cold hardy cultivars were less affected with a yield of 1,841 fruit from 32 trees and the cultivar from Afghanistan with 4 trees seemed unaffected at all with yields of 604 fruit.

The decline in harvest for 2025 was the result of operator error when replacing the hose bib timers used to irrigate the field. The previous timers had allowed for 6 hours of irrigation while the new timers maxed out at 4 hours. Neglect to increase irrigation days from once a week to more often, resulted in only 8 gallons weekly instead of 12 to the trees.



Figure 1. Asperonski tree #1: pictures taken prior to harvest annually 2020-2025 and of 2023 severe pruning.

Prior to 2024 we consistently had problems with damaged fruit from leaf-footed bugs as well as many sunburned fruits. Temperatures here at the Logandale Field Station regularly go above 120°F in the summer for extended periods. The yearly low temperature rarely drops below 30°F in the winter, inhibiting reduction of the bug population, as “Cold winters can kill many overwintering adults; however, it requires a low of approximately 21°F for at least six hours to kill about 50% of the exposed population” (Bentley, et al., 2018). The results of the kaolin clay has been inspiring, as it has been a natural, non-toxic solution to the leaf footed bug problem

It is worth mentioning that the cold-hardy varieties seem to be naturally much smaller than the other cultivars; this may lend itself to possible production in greenhouses in colder climates.

Producer trials

All cuttings done for propagation in 2023 developed buds, however, in May when we went to plant cuttings outside, we found that they had not rooted. We then immediately repeated the process using seed starting soil instead of peat moss and sand with the hopes of a fall planting. The success rate was still extremely low. In November of 2023, consultation with Youping Sun and followed his technique using perlite and peat moss at a volumetric ratio of 4 to 1, which produced better results, allowing to distribute cuttings to producers in spring of 2024.

The five producers that took part in the trials were all experienced with vegetable and other fruit production, but this was their first time growing pomegranates. When we did the taste test at the Pomegranate Festival in Fall of 2025, we were able to reach out and garner interest in my new cultivars from the three largest producers of pomegranates here in the Logandale area, expanding trials to those family farms. We have also gotten a request from Gilrease Orchard, the only remaining large farm in the Las Vegas area, for cuttings for trials.

Public testing

Because the large-scale consumer taste test would occur at a public venue with numerous activities, the survey was limited to three cultivars for ease of participation. The cultivars were based on differing standards. Carolina Venum was selected based on its top score in the initial pilot taste test for overall appearance as well as the reported higher juice yield from the Marcelino Nursery farm manager. Mollar was selected because of its sweetness and softness of seed, Russian 18 because of its taste and high brix, not only in these studies, but at trials at Texas A&M where it is known as Texas Red and is a favorite cultivar for growers. Numerous comments from survey takers indicated that they wished they could have chosen more than one cultivar,

as they preferred cultivar B (Mollar) for fresh eating and one of the other cultivars for juice or jelly based on taste alone. Testers enjoyed the taste of the Mollar cultivar but were off-put by the light pink arils, expecting pomegranates to be red inside and out; several inquired before trying them if they were ripe. The Carolina Venum tasted as they expected a pomegranate to taste- sour and hard seeded. Russian 18 was noted by consumers to have a sweet-tart taste as also reported in Texas trials.

Limitations and future research

Future works would consist of using randomized block design to obtain more robust data. Placing the cuttings in a random block pattern and yields. The future research will include 4-gallon per hour emitters and increased irrigation time 3 hours once weekly for a total of 18 gallons per tree per week for the seven-year-old trees and doubling the 20/202/20 fertilizer.

This winter the trees have been pruned, which might increase production.

Future considerations include thinning fruit production by destruction of a percentage of the female flowers after the male flowers have fallen, repeating the brix sampling in mature trees, using a pomegranate juicer and testing the reported extra juice yield of the Carolina Venum cultivar versus the Wonderful cultivar.

Conclusion

Four of the cultivars under trial could potentially benefit both established and new specialty crop producers economically. Asperonski, with its high yields and ability to persist in cold weather climates, may expand production capabilities to more northern areas of the state. Carolina Venum, with its potential for larger juice yields than Wonderful would benefit value added sales as producers use juice to make jelly. The Mollar cultivar, with its sweet flavor profile and soft seeds could not only be sold by producers as a whole fruit fresh product for those that eat the arils but added to the juice of Wonderful to sweeten it. Russian 18, with its 'expected' bright red coloration of both rind and arils, yet a distinctive flavor profile, would appeal to those consumers wanting something just a little different.

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