Growing Pomegranates in Florida: Establishment Costs and Production Practices

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Introduction

Pomegranates are native to central Asia and are mainly produced in India and Iran. It is highly adaptive to a wide range of climates and soil conditions, and can grow in many geographical regions. In the U.S., California is the major production area. Pomegranates have long been valued for its high nutritional value. Research shows that pomegranates have marked antioxidant, antibacterial, anti-inflammatory, antiviral, and anti-carcinogenic activities, and have efficacy against a series of human diseases (Viuda-Martos et al., 2010). With increasing awareness of the health benefits, consumers have shown growing interests in consuming pomegranate fruits and juices. In Florida, pomegranates are an emerging, alternative crop as major crops are either under tremendous competition pressure (e.g., tomatoes and strawberries) or being threatened by serious diseases (e.g., citrus greening). This study provides a description of pomegranate production practices and preliminary cost estimates to inform investment and production decisions when growers look to diversify and grow pomegranates as a niche crop.

Currently, Florida pomegranate production is still at its early stage with about 150 acres in production (Florida Pomegranate Association, 2017). However, there have been keen interest from growers and those who are planning to grow the crop in the cost of establishment and production. Pomegranate grove care practices include establishment, irrigation, pruning, fertilization, and pest management. This article provides cost estimates on these practices for a mature grove (3+ years old) (Tables 1 and 2). These costs reflect current establishment and cultural practices but do not cover harvest and post-harvest information. The cost data are collected through personal interview with six pomegranate growers in fall 2014. Because the industry is still emerging in Florida, the sample is relatively small due to a small population. But it covered major pomegranate operations. The interviewed growers planted pomegranates for commercial opportunities. As Florida pomegranate production is still in its infancy and production practices vary significantly across growers, the costs described in this study do not intend to be complete but to provide a reference for cost items discussed, which could be useful for those who are looking to invest in pomegranate production.

Establishment

Growers planted the container-grown transplants on a 12'×18' spacing, with 202 trees per acre. A wider spacing of 18'×18' has been used in Georgia and California. Single-trunk trees will require less space, while bushes could develop broader canopies and need more space. Pomegranate cuttings are generally propagated in one-gallon or three-gallon pots in nurseries. One-gallon potted plants are less than one year old and cost $8-12 in 2014, while three-gallon potted plants

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are taller and older and cost $20-25, depending on the varieties. The planting labor cost was estimated at $2 per tree. After the plants are set in the field, pine bark mulch is applied to aid in plant establishment (Figure 1). Mulch could moderate soil temperature, aid in weed control, and add organic matter to the soil. A pine bark strip about 4 feet wide extending down the row will provide a good substrate for surface feeder roots (Williamson et al., 2012). The mulch cost was estimated at $2 per tree.

Figure 1. Mulch application in pomegranate groves

A large number of cultivars grown in California, Georgia and other countries are available for Florida growers, but selecting cultivars which can perform well in Florida in terms of growth, flowering and fruiting is still a challenge. The University of Florida is collaborating with Florida pomegranate growers in experimental trials to identify optimal cultivars suited for Florida. The preliminary results show there are some yield merits in Girkanets, Kazake, Wonderful, Al-sirin-nar and Medovyi Vahsha (Castle and McTeer, 2016).

Table 1. Establishment Costs of Pomegranates in Florida

Items	Value($/acre)
Trees ($)	2,020
Planting labor costs	404
Mulch	404
Irrigation system	800
Installing Irrigation system	400
Total establishment costs	4,028

Irrigation

Irrigation systems are installed during the first year of establishment, right before planting. The most common irrigation system used is drip emitters or micro sprinklers (also known as “micro jets”). Drip emitters discharge 0.5 to 2.0 gallons per hour, while micro sprinklers commonly deliver 7 to 25 gallons per hour (Parsons and Morgan, 2014). Since drip emitters provide low volume irrigation and small coverage for root system, it is appropriate for groves with young trees. When roots of mature trees extend horizontally throughout much of the soil area, more surface coverage will be required because better surface area coverage can optimize yields in Florida's sandy soils (Persons and Morgan, 2014). Alternative methods to increase coverage are to add more drippers per tree or change drip emitters to micro sprinklers (Figure 2). Micro sprinklers could cover a diameter of 5-21 feet. In addition to larger volume irrigation, micro sprinklers could provide cold protection, which has proven effective for citrus (Parsons and Boman, 2013). They are installed at the ground level or on short risers. The establishment cost of irrigation system includes materials costs ($800 per acre) for micro sprinklers and installation labor cost ($400 per acre). The total establishment cost of pomegranate orchards is approximately $4,000 per acre (see Table 1).

The frequency of irrigation depends on several factors, such as temperature, rainfall, type of soil, and age of trees. During the dry season, growers irrigate only once per week for 15-20 minutes for trees less than one year old planted in central ridge sandy soil, and twice per week for about 1 hour each time for trees more than 2 years old. We also observed that some growers never irrigated their trees planted in clay soil because the soil preserves water well. Water use directly affects pomegranate yield and fruit quality. Growers have found that over irrigation might cause fruit split. The optimal irrigation practices for pomegranate trees require further research.

Figure 2. Micro sprinklers

Pruning

Pomegranate trees do not require extensive pruning in the early years. In the first year growers remove suckers originating from below ground. Afterwards, pruning frequency depends on the type of training practiced. Single-trunk trees will need more pruning than bushes. Growers interviewed suggested removing small branches if they are dead, damaged, or crisscrossed. Bushes have broad and tight canopy, and pruning excessive branches helps the interior of the canopy have access to more light. Too many branches might also cause thorns in the branches rubbing against or even damaging the fruit. Some growers also prune branches above the canopy of bushes to avoid not being able to reach the fruit in harvesting. For a more-than-3-year-old grove, growers made regular pruning each year. The trees are lightly pruned in summer and more heavily pruned in spring and winter. It was estimated that 11 were needed to prune one acre of trees in summer, while 32 and 48 hours were needed in spring and winter. The total labor costs were estimated at $722 (assuming the minimum wage was paid). Pruning time varies across the types of training practiced, labor skill and age of trees.

Fertilization

Fertilization is important for pomegranate trees. Young trees are fertilized every 1 to 2 months, and the amount of fertilizer applied increases each year. Trees more than 3 years old receive 3 to 4 nutritional sprays during the year. One practice adopted by a grower is to apply 82 lb/acre nitrogen, 224lb/acre 10-10-10 (nitrogen-phosphorous-potassium) fertilizer, 300lb/acre 8-6-8 fertilizer. Besides fertilizers, foliar micronutrients were also applied each month as a supplement. The fertilization cost of this practice was estimated to be $162 per acre.

Weed Management

Like blueberry growers, pomegranate growers use a system of weed free strips under the trees. A weed-free zone under the trees can reduce the impact of weeds on tree growth (Dittmar and Williamson, 2012). Generally, a strip of 4-5 feet wide is maintained weed free. Turf grass is mowed or chemically controlled on a regular basis. The herbicides are applied with a broadcast sprayer behind a tractor. The weed-free zone is sprayed 2 to 3 times each year, which could occur in March, June, and October. To reduce the chance of herbicide resistance, herbicides could be rotated. One rotation practice adopted by growers is Roundup, Poast mixed with Surflan, Gramoxone mixed with Fusilade and Aim. The estimated cost of this practice was $146 per acre.

Insects and Diseases

Growers need to evaluate the economic risk from pest and disease infestation through scouting and determine pest and disease control strategy. Dipel, Sulfur and other insecticides are applied to control insects. Aphids have been identified as one of the primary pests in pomegranate trees. The application frequency depends on current and expected pest pressure and the lifecycle of

pests. Disease control is important in Florida due to its subtropical, warm and humid climate. Growers have to apply fungicides routinely, in contrast to the occasional application of insecticides. Some diseases found include but are not limited to Cercospora, Botryosphaeria, Anthracnose, and Alternaria leaf blight. Fungicide resistant diseases are a growing concern for growers. Typically, growers made a fungicide application plan prior to the season, in which fungicides that have a different mode of action are alternated each month.

Table 2. Cultural Costs of Pomegranates in Florida

Items	Value($/acre)
Fertilizer	162
Herbicides	146
Pruning	722
Total cultural costs	1,030

Concluding Remarks

Florida pomegranate industry is still in its early stage. Most orchards are small in size, and large scale commercial production is yet to be seen. Growers have shown keen interests in the crop but had little economic information on pomegranate establishment, production, and marketing. The University of Florida has made some progress in breeding and the research of management practices. But many areas are yet to be explored. The information from this study should be used with caution because of the relatively small sample size from a small population. To make informed production decision, growers could also draw on the experiences from other states. California grows most of the nation's commercial pomegranates and has developed a mature cultivation and management system. The neighboring state Georgia has also made significant progress in pomegranate production and management in recent years. Their information could be a useful resource for Florida growers. Growers can also consult the U.S. Department of Agriculture's specialty crops webpage (USDA, 2017) to obtain price information.

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