

Unit E: Fruit and Nut Production

Lesson 6: Production of Pomegranate

Student Learning Objectives: Instruction in this lesson should result in students achieving the following objectives:

1. Discuss the history and production of *Punica granatum*.
2. Discuss the growing conditions preferred by pomegranates.
3. Determine when to harvest pomegranates.
4. Identify common pomegranate varieties of Afghanistan.

Recommended Teaching Time: 3 hours

Recommended Resources: The following resources may be useful in teaching this lesson:

- A PowerPoint has been developed for use with this lesson plan
- <http://www.crfg.org/pubs/ff/pomegranate.html>
- <http://en.wikipedia.org/wiki/Pomegranate>

List of Equipment, Tools, Supplies, and Facilities

Writing surface

PowerPoint Projector

PowerPoint Slides

Samples of pomegranates

Pomegranates to practice propagating

Terms: The following terms are presented in this lesson (shown in bold italics and on PowerPoint Slide #2):

aril

Interest Approach: Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

Ask the students to raise their hand if they have ever eaten a pomegranate. Discuss with the students what a pomegranate looks like and how it tastes. Try to provide samples of various pomegranates of Afghanistan, which will be used throughout the lesson. If samples are not available, provide pictures.

Use this approach to move into Objective 1.

Summary of Content and Teaching Strategies

Objective 1: Discuss the history and production of *Punica granatum*.

(PowerPoint Slide #3)

- I. *Punica granatum* is commonly referred to as pomegranate.
 - A. The pomegranate originated in areas around Afghanistan and the Himalayas in northern India.
 1. Pomegranates have been cultivated and naturalized over the whole Mediterranean region since ancient times.
 2. It is widely cultivated throughout India and the drier parts of southeast Asia, Malaya, the East Indies and tropical Africa.

(PowerPoint Slide #4)

3. The primary commercial growing regions of the world are the Middle East, India and surrounding countries, and southern Europe.
4. The fruit can be eaten out of hand
 - a. Pomegranate fruits are most often consumed as juice and can be juiced in several ways.
 - b. The juice can be used in a variety of ways: as a fresh juice, to make jellies, sorbets or cold or hot sauces as well as to flavor desserts.
 - c. Pomegranate syrup is sold commercially as grenadine.
 - d. The juice can also be made into a wine.

Provide the students with a map and have them point out where the pomegranate developed. If possible, provide the students with samples of pomegranates or pomegranate products.

Objective 2: Discuss the growing conditions preferred by pomegranates.

(PowerPoint Slide #5)

- II. Pomegranates prefer a semi-arid mild-temperate to subtropical climate and are naturally adapted to regions with cool winters and hot summers.
 - A. A humid climate adversely affects the formation of fruit.

1. The tree can be severely injured by temperatures below -11° C.
2. The tree adapts well to container culture and will sometimes fruit in a greenhouse.

(PowerPoint Slide #6)

- B. The pomegranate is a rounded shrub or small tree that can grow to 6 to 9 meters, but more typically to 3.5 to 4.8 meters in height.
1. Dwarf varieties are also known.
 2. Pomegranates are a deciduous tree, but can keep their leaves in some areas.
 3. The trunk is covered by a red-brown bark which later becomes gray.
 - a. The branches are stiff, angular and often spiny.
 - b. There is a strong tendency to sucker from the base.

(PowerPoint Slide #7) This slide shows a picture of a mature pomegranate tree. Point out the multiple branches coming from the trunk about 30 cm off the ground. This will be discussed later in pruning.

(PowerPoint Slide #8)

4. Pomegranates are also long-lived. There are specimens in Europe that are known to be over 200 years of age.
5. Pomegranates become less vigorous after about 15 years.
6. The pomegranate is self-pollinated as well as cross-pollinated by insects.
 - a. Cross-pollination increases the fruit set.
 - b. Wind pollination is insignificant.

(PowerPoint Slide #9)

- C. Pomegranates are nearly round 6 to 12 cm wide fruit is crowned at the base by the calyx.
1. The skin is tough and leathery and usually yellow with pinks and deep reds.
 2. The interior is separated by membranous walls into compartments packed with sacs filled with sweetly acid, juicy, red, pink or whitish pulp or **aril**.
 - a. In each sac there is one angular, soft or hard seed.

(PowerPoint Slide #10) This slide shows a pomegranate on a tree as well as a pomegranate cut in half. Try to show a pomegranate fruit to the class and cut it in half so they can touch the arils and observe the inside of the pomegranate.

(PowerPoint Slide #11)

3. High temperatures are essential during the fruiting period to get the best flavor.
 - a. The pomegranate may begin to bear in 1 year after planting out, but 2-1/2 to 3 years is more common.
 - b. Under suitable conditions the fruit should mature some 5 to 7 months after bloom.

(PowerPoint Slide #12)

- D. Pomegranates should be placed in the sunniest, warmest part of the yard or orchard for the best fruit, although they will grow and flower in part shade.
1. The pomegranate does best in well-drained ordinary soil, but also thrives on calcareous or acidic loam as well as rock strewn gravel.

2. Once established, pomegranates can take considerable drought, but for good fruit production they must be irrigated.
 - a. To establish new plants they should be watered every 2 to 4 weeks during the dry season.
 - b. The plants are tolerant of moderately saline water and soil conditions.

(PowerPoint Slide #13)

3. The trees can be given 56 to 113 gram applications of a nitrogen fertilizer the first two springs, but test the soil to see if any other nutrients are required.
 - a. After that very little fertilizer is needed, although the plants respond to an annual mulch of rotted manure or other compost.

(PowerPoint Slide #14)

4. Plants should be cut back when they are about 60 cm high.
 - a. From this point allow 4 or 5 shoots to develop, which should be evenly distributed around the stem to keep the plant well balanced.
 - b. These should start about 30 cm from the ground, giving a short but well-defined trunk.
 - c. Any shoots which appear above or below should be removed as should any suckers.

(PowerPoint Slide #15)

- d. Since the fruits are borne only at the tips of new growth, it is recommended that for the first 3 years the branches be carefully shortened to encourage the maximum number of new shoots on all sides, prevent straggly development and achieve a strong well framed plant.
- e. After the 3rd year, only suckers and dead branches are removed.

(PowerPoint Slide #16)

5. The pomegranate can be raised from seed but may not exhibit the same characteristics as the parents.
 - a. Cuttings root easily and plants from them bear fruit after about 3 years.
 - b. 30 to 50 centimeters long cuttings should be taken in winter from mature, one-year old wood.
 - c. The leaves should be removed and the cuttings treated with rooting hormone and inserted about two-thirds their length into the soil or into some other warm rooting medium.
 - d. Plants can also be air-layered but grafting is seldom successful.

(PowerPoint Slide #17)

6. Pomegranates are relatively free of most pests and diseases.
 - a. Minor problems are leaf and fruit spot and foliar damage by white flies, thrips, and scale insects.

Have the students propagate pomegranate cuttings. View a full grown pomegranate tree if one is available. Invite a pomegranate grower to come to the class and speak about managing pomegranate trees.

Objective 3: Determine when to harvest pomegranates.

(PowerPoint Slide #18)

- III. The fruits are ripe when they have developed a distinctive color and make a metallic sound when tapped.
 - A. The fruits must be picked before over maturity when they tend to crack open, particularly when rained on.
 - 1. The pomegranate is equal to the apple in having a long storage life.
 - 2. It is best maintained at a temperature of 0 to 5 C. and can be kept for a period of 7 months within this temperature range and at 80 to 85% relative humidity without shrinking or spoiling.
 - 3. The fruits improve in storage, becoming juicier and more flavorful.

Ask the students to make a list of characteristics they look for when purchasing or consuming a pomegranate. Write these on the chalkboard or the computer and PowerPoint projector. Discuss why these characteristics in pomegranates are desirable.

Objective 4: Identify common pomegranate varieties of Afghanistan.

(PowerPoint Slide #19)

Try to provide live samples of any of these varieties. If pomegranates are not in season, provide pictures of the varieties listed.

- IV. There are many native varieties of pomegranate in Afghanistan.
 - A. Sor Kandahari is found around Kandahar.
 - 1. It is circular and red in color with a sour taste.
 - 2. It has an average weight of about 233 grams per fruit.
 - B. Mykosh is found in Kapisa.
 - 1. Mykosh has a brownish, circular protuberant shape, which means it bulges out at the sides.
 - 2. It has a moderate taste which has a balance of sweet and sour and an average weight of 189 grams per fruit.

(PowerPoint Slide #20)

- C. Tashkorghani is found in Nangarhar and Balkh.
 - 1. Tashkorghani pomegranates are circular and brownish and red in color.
 - 2. They are a sour fruit which average about 243 grams per fruit.
- D. Post ghasab is found in Samangan.
 - 1. The fruit is circular in shape and pink in color.
 - 2. It has a moderate taste and an average fruit weight of 257 grams.
- E. Khog Kandahari is found in Nangarhar and Kandahar.
 - 1. It has a circular shape and a red and yellowish color.
 - 2. The fruit is sweet and weights about 234 grams.

Provide students with samples of these Pomegranates. If no samples are available try to show pictures. Ask the students to raise their hand if they have ever eaten any of these pomegranates. Show a map of Afghanistan and have them point out the Provinces where each of these varieties are produced.

Review/Summary: Use the student learning objectives to summarize the lesson. Student responses to the questions on **PowerPoint Slide #21** can be used to determine which objectives need to be reviewed.

Application: Split the class up into groups and assign each group a common pomegranate variety. Have them research their variety and create an informational pamphlet about it. The pamphlet should include a picture, growing information, physical characteristics and any other information important to its production. Make copies of each of the pamphlets to provide to the class.

Evaluation: Evaluation should focus on student achievement of this lesson's objectives. A sample written test is attached.

Answers to Sample Test:

Short Answer

1. Where did pomegranates originate?
The pomegranate originated in areas around Afghanistan and the Himalayas in northern India.
2. What type of soils and drainage are best for pomegranates?
The pomegranate does best in well-drained ordinary soil, but also thrives on calcareous or acidic loam as well as rock strewn gravel
3. Explain the best method for propagating pomegranates.
Cuttings root easily and plants from them bear fruit after about 3 years. Thirty to 50 centimeters long cuttings should be taken in winter from mature, one-year old wood. The leaves should be removed and the cuttings treated with rooting hormone and inserted about two-thirds their length into the soil or into some other warm rooting medium.
4. What is an aril?
The inner sacs filled with juice surrounded by whitish pulp
5. What temperatures are essential during the fruiting period to get the best flavor?
High temperatures
6. Describe a mature pomegranate fruit.
The fruits are ripe when they have developed a distinctive color and make a metallic sound when tapped
7. How long can pomegranates be stored for under optimal conditions?
7 months

Sample Test

Name _____

Test

Unit E Lesson 6: Production of Pomegranate

Part One: Short Answer

Instructions. Provide information to answer the following questions.

1. Where did pomegranates originate?
2. What type of soils and drainage are best for pomegranates?
3. Explain the best method for propagating pomegranates.
4. What is an aril?
5. What temperatures are essential during the fruiting period to get the best flavor?
6. Describe a mature pomegranate fruit.
7. How long can pomegranates be stored for under optimal conditions?