

Unit E: Fruit and Nut Production

Lesson 8: Fig Production

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

1. Discuss the history of *Ficus carica*
2. Describe the physical characteristics of the fig tree.
3. Discuss the growth of figs.

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.figweb.org/Interaction/index.htm>
- <http://www.crfg.org/pubs/ff/fig.html>

List of Equipment, Tools, Supplies, and Facilities

Writing surface
PowerPoint Projector
PowerPoint Slides
Samples of figs
Figs to practice propagating
Internet access

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

Breba crop

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.

Provide a few figs for the class to observe. If live samples are not available, then show pictures. Ask the students “Who here has ever had a fig?” Ask them where they got the figs from and to describe the texture. Talk about the importance of the fig to Afghanistan.

Use this approach to move into Objective 1.

Summary of Content and Teaching Strategies

Objective 1: Discuss the history of *Ficus carica*.

(PowerPoint Slide #3)

- I. Ficus carica, or fig, has played an important part in the history of different human cultures.
 - A. Figs are believed to have originated around Western Asia and then spread to the Mediterranean.
 - B. There is evidence that figs have been cultivated for at least 5,000 years.
 - C. In Ancient Greece, figs were so prized that it was illegal to transport them to other areas.
 - D. Because of the fig’s delicate nature, it is difficult to transport to markets.
 1. Most figs are harvested and taken directly to market and sold the same day.

Objective 2: Describe the physical characteristics of the fig tree.

(PowerPoint Slide #4)

- II. The fig can grow 15 meters tall, but more typically to a height of 3 to 9 meters.
 - A. Overall, the tree is wider than it is tall.
 1. Fig wood is weak and decays rapidly.
 - B. The trunk often bears large nodal tumors, where branches have been shed or removed.
 - C. The twigs are pithy rather than woody.

(PowerPoint Slide #5) This slide shows a very old fig tree. Point out the multi branched trunk.

(PowerPoint Slide #6)

- D. The sap contains copious milky latex that is irritating to human skin.
- E. Fig trees often grow as a multiple-branched shrub, especially where subjected to frequent frost damage.
 1. They may be espaliered, but only where roots may be restricted, as in containers.
- F. Fig leaves are bright green, single, alternate and large (to 30 cm in length).
 1. They are deeply lobed with a rough and hairy upper surface and soft hairy on the underside.

(PowerPoint Slide #7)

- G. The tiny flowers of the fig are out of sight, clustered inside the green fruits.

1. Pollinating insects gain access to the flowers through an opening at the top of the cluster.
2. In the case of the common fig the flowers are all female and need no pollination.

(PowerPoint Slide #8)

3. There are 3 other types
 - a. The Capri fig which has male and female flowers requiring visits by a tiny wasp, *Blastophaga grossorum*.
 - i. The wasp is vital to the survival of the fig because it is small enough to fit into the hole to reach the flower cluster.

(PowerPoint Slide #9) This slide shows a picture of fig wasps pollinating a fig.

Students will investigate fig wasps and pollination at the end of this objective.

(PowerPoint Slide #10)

- b. The Smyrna fig, needs cross-pollination by Capri figs in order to develop normally.
- c. The San Pedro fig is intermediate, which means its first crop is independent like the common fig, but its second crop is dependent on pollination.

(PowerPoint Slide #11)

- H. The common fig bears a first crop, called the **breba crop**, in the spring on last season's growth.
 1. The second crop is borne in the fall on the new growth and is known as the main crop.
 2. In cold climates the breba crop is often destroyed by spring frosts.

(PowerPoint Slide #12)

3. The matured "fruit" has a tough peel, often cracking upon ripeness, and exposing the pulp beneath.
4. The interior is a white inner rind containing a seed mass bound with jelly-like flesh.
5. The edible seeds are numerous and generally hollow, unless pollinated.
6. Pollinated seeds provide the characteristic nutty taste of dried figs.

Have the students visit <http://www.figweb.org/Interaction/index.htm> . Allow them to read the information and view the pictures. This is an excellent website that discusses the need for the fig wasp. After viewing the website, discuss with the students what they have learned.

Objective 3: Discuss the growth of figs.

(PowerPoint Slide #13)

- III. Figs require full sun all day to ripen palatable fruits.
 - A. Trees become enormous, and will shade out anything growing beneath.
 1. Repeated pruning to control size causes loss of crop.
 2. The succulent trunk and branches are unusually sensitive to heat and sun damage, and should be whitewashed if particularly exposed.
 3. Roots are greedy, traveling far beyond the tree canopy.
 4. Figs are not a fruit tree for small places.

- a. The fine roots that invade garden beds, however, may be cut without loss to the tree.

(PowerPoint Slide #14)

- B. Young fig trees should be watered regularly until fully established.
 1. In dry climates, water mature trees deeply at least every one or two weeks.
 - a. Desert gardeners may have to water more frequently.
 2. Mulch the soil around the trees to conserve moisture.
 3. If a tree is not getting enough water, the leaves will turn yellow and drop.
 4. Also, drought-stressed trees will not produce fruit and are more susceptible to nematode damage.
 5. Recently planted trees are particularly susceptible to water deficits, often runt out, and die.

(PowerPoint Slide #15)

- C. Fig trees are productive with or without heavy pruning.
 1. It is essential only during the initial years.
 2. Trees should be trained according to use of fruit, such as a low crown for fresh-market figs.
 3. Since the crop is borne on terminals of previous year's wood, once the tree form is established, avoid heavy winter pruning, which causes loss of the following year's crop.

(PowerPoint Slide #16)

4. It is better to prune immediately after the main crop is harvested, or with late-ripening cultivars, summer prune half the branches and prune the remainder the following summer.
5. If radical pruning is done, whitewash the entire tree.

(PowerPoint Slide #17)

- D. Regular fertilizing of figs is usually necessary only for potted trees or when they are grown on sands.
 1. Excess nitrogen encourages rank growth at the expense of fruit production, and the fruit that is produced often ripens improperly, if at all.
 2. As a general rule, fertilize fig trees if the branches grew less than a foot the previous year.
 3. Apply a total of 0.2 to 0.4 kilograms of actual nitrogen, divided into three or four applications beginning in late winter or early spring and ending in July.

(PowerPoint Slide #18)

- E. In borderline climates, figs can be grown out of doors if they are given frost protection.
 1. Plant against a wall or structure which provides some heat by radiation.
 - a. Or grow as a bush, pruning the trunk to near ground level at the end of the second year.
 2. Allow several stems to replace the trunk.
 3. For further protection, erect a frame over the plant, covering and surrounding it with heavy carpet in winter.

(PowerPoint Slide #19)

4. Dormant buds are more susceptible to freezing than wood.

5. Freezing may also create a trunk without live buds; regrowth is possible only from roots.

(PowerPoint Slide #20)

- F. Fig plants are usually propagated by cuttings.
1. Select foot-long pieces of dormant wood, less than 2.5 cm diameter, with two-year-old wood at base.
 2. One-year twigs with a heel of two-year branch at the base may also be used.
 3. Dip the cuttings in a rooting hormone and allow them to callus one week in a moist place at 10-15 C.

(PowerPoint Slide #21)

4. Summer cuttings may also be made, but they do best if defoliated and winterized in refrigeration for 2-3 weeks before potting.
5. Leafy shoots require a mist bed.
6. Particularly rare cultivars may be propagated on rootstocks, or older trees, topworked by whip, cleft or crown grafting, or chip or patch budding.
7. Rooted cuttings should be planted in 6.7 to 9.1 meter squares, depending upon the capacity of the soil and the ultimate size of the tree.

(PowerPoint Slide #22)

8. Keep roots moist until planted.
9. Never transplant or disturb a young tree while it is starting new growth in spring, as this is likely to kill it.
10. Cut the tree back to about 60 cm high upon planting and whitewash the trunk.

(PowerPoint Slide #23)

- G. There are a number of pests that can attack a fig tree.
1. Nematodes, particularly in sandy soils, attack roots, forming galls and stunting the trees.
 2. Dried fruit beetles can enter ripening fruit through the eye and cause damage by introducing fungi and rots.
 - a. They frequently breed in fallen citrus fruits.
 - b. Keep a clean orchard by destroying fallen fruits and do not grow near citrus trees.

(PowerPoint Slide #24)

3. Euryphid mites cause little damage but are carriers of mosaic virus from infected to clean trees.
 - a. Symptoms resemble potassium deficiency--leaves are marbled with yellow spots, and the veins are light colored.
 - b. Symptoms are often not apparent until the tree is older or when it becomes heat or water-stressed.

(PowerPoint Slide #25)

4. Do not purchase infected trees and isolate those which show symptoms.
5. Botrytis causes a blast of branch terminals, which dry out and turn charcoal-like.
 - a. The attack usually starts from half-grown fruits damaged by the first frost of winter, then enters the main stem as a reddish expanding necrotic zone.
 - b. The infection is generally self-controlling and stops in the spring.
 - c. It can be prevented by removing mummies and frost damaged fruits as soon as they are observed.

(PowerPoint Slide #26)

6. Fig canker is a bacterium which enters the trunk at damaged zones, causing necrosis and girdling and loss of branches.
 - a. It usually starts at sunburned areas, so it is important to keep exposed branches whitewashed.
7. Rhyzopus smut attacks ripened fruits on the tree, causing charcoal black coating inside the fruit, and is worst on cultivars with large, open eyes.

(PowerPoint Slide #27)

8. Most ripe fruit losses are from Endosepsis (*Fusarium*) and *Aspergillus* rot which is introduced by insects, even pollinating wasps.
 - a. The fruit appears to burst, or a ropy, mucus-like exudate drains from the eye, rendering the fruit inedible.
 - b. *Penicillium* fungus will attack dried fruits in storage but can be controlled by keeping them dry, or sulfuring before storage.

(PowerPoint Slide #28)

- H. Figs must be allowed to ripen fully on the tree before they are picked.
1. They will not ripen if picked when immature.
 2. A ripe fruit will be slightly soft and starting to bend at the neck.
 3. Harvest the fruit gently to avoid bruising.
 4. Fresh figs do not keep well and can be stored in the refrigerator for only 2 – 3 days.
 5. Some fig varieties are delicious when dried.
 6. They take 4 – 5 days to dry in the sun and 10 -12 hours in a dehydrator.
 7. Dried figs can be stored for six to eight months.

(PowerPoint Slide #29) This slide is a picture of dried figs strung for sale. They were harvested in Afghanistan.

Try to find a full grown fig tree for the students to observe. Have them note the form in which the tree is growing. Is it one single trunk or is it branched? Where will the new fruit develop? Should the tree be pruned?

If a full grown tree cannot be found, try to acquire fig cuttings for the students to propagate.

Review/Summary: Use the student learning objectives to summarize the lesson. Student responses to the questions on **PowerPoint Slide #30** can be used to determine which objectives need to be reviewed.

Application: Have the students determine the best varieties of fig for Afghanistan. Have them prepare a list and include its growth, special characteristics and fruiting habits. Make copies of this list and distribute it to the entire 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 figs originate?
Western Asia
2. Why are figs difficult to grow commercially?
Figs are delicate and difficult to transport to market.
3. Why is the fig wasp so important to the production of figs?
It is small enough to fit inside the hole to reach the flower cluster.
4. How often should mature fig trees be watered?
At least every one or two weeks.
5. How old is the wood on which figs are produced?
One year old.
6. How are figs generally propagated?
Cuttings
7. How will the grower know when the figs are ripe?
A ripe fruit will be slightly soft and starting to bend at the neck
8. What is the breba crop?
The first crop of the year produced by the common fig.

Sample Test

Name _____

Test

Unit E Lesson 8: Fig Production

Part One: Short Answer

Instructions. Provide information to answer the following questions.

1. Where did figs originate?
2. Why are figs difficult to grow commercially?
3. Why is the fig wasp so important to the production of figs?
4. How often should mature fig trees be watered?
5. How old is the wood on which figs are produced?
6. How are figs generally propagated?
7. How will the grower know when the figs are ripe?
8. What is the breba crop?