U.S. ARMY MEDICAL DEPARTMENT CENTER AND SCHOOL
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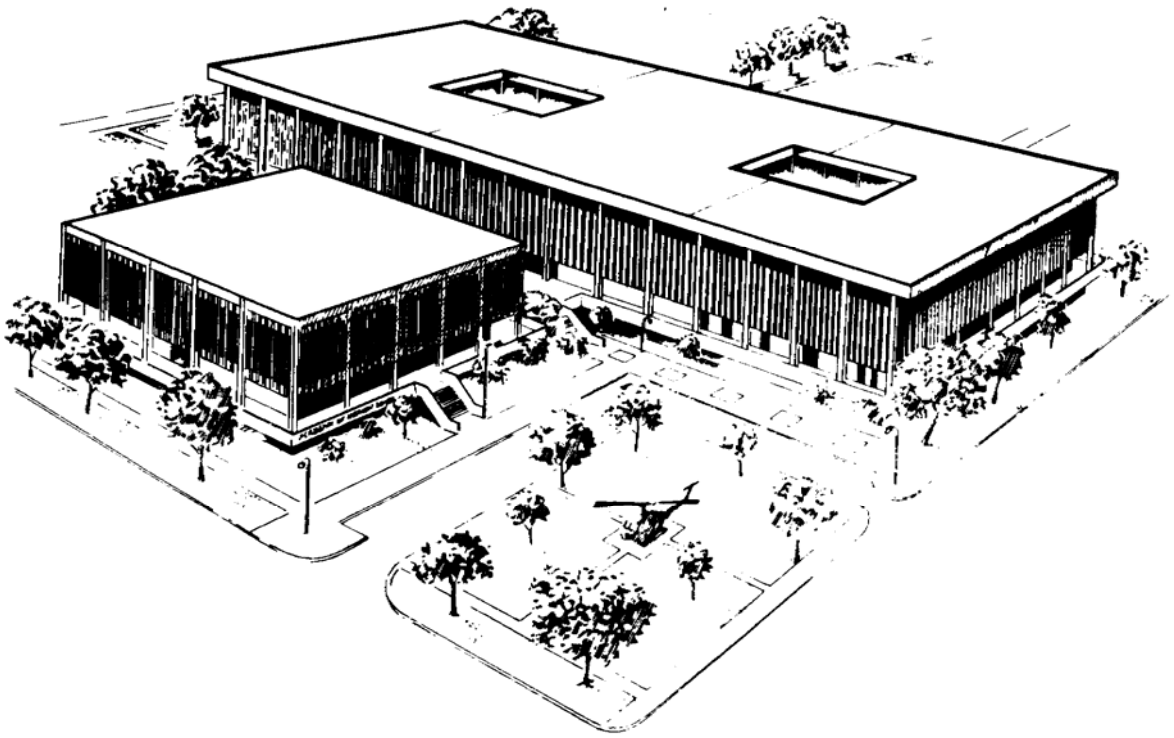

FRESH FRUITS AND VEGETABLES

SUBCOURSE MD0714 EDITION 100

DEVELOPMENT

This subcourse is approved for resident and correspondence course instruction. It reflects the current thought of the Academy of Health Sciences and conforms to printed Department of the Army doctrine as closely as currently possible. Development and progress render such doctrine continuously subject to change.

The subject matter expert responsible for content accuracy of this edition was the NCOIC, Nursing Science Division, DSN 471-3086 or area code (210) 221-3086, M6 Branch, Academy of Health Sciences, ATTN: MCCS-HNP, Fort Sam Houston, Texas 78234-6100.

ADMINISTRATION

Students who desire credit hours for this correspondence subcourse must meet eligibility requirements and must enroll in the subcourse. Application for enrollment should be made at the Internet website: http://www.atrrs.army.mil. You can access the course catalog in the upper right corner. Enter School Code 555 for medical correspondence courses. Copy down the course number and title. To apply for enrollment, return to the main ATRRS screen and scroll down the right side for ATRRS Channels. Click on SELF DEVELOPMENT to open the application and then follow the on screen instructions.

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CLARIFICATION OF TERMINOLOGY

When used in this publication, words such as "he," "him," "his," and "men" 'are intended to include both the masculine and feminine genders, unless specifically stated otherwise or when obvious in context.

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CORRESPONDENCE COURSE OF

THE U.S. ARMY MEDICAL DEPARTMENT CENTER AND SCHOOL

SUBCOURSE MD0714

FRESH FRUITS AND VEGETABLES

INTRODUCTION

A substantial amount of the millions of dollars the military services spend each year on subsistence items is spent on fresh fruits and vegetables. More dollars are spent on meat and dairy products, yet the investment in fresh fruits and begetables is fully as important in providing the soldier with a balanced diet. This subcourse provides an introduction to plant physiology and the military acqauisition process. With the use of the Produce Identification Guide, it facilitates familiarization with the characteristics of a wide range of fresh fruit and vegetables. In addition, it shows common factors related to identity, condition, and quantity, while performing destination or surveillance inspections. It is essential for the veterinary food inspection specialist to be knowledgeable in these areas in order to ensure a fresh supply of fresh fruits and vegetables for the military services.

Subcourse Components :

The subcourse instructional material consists of the following:

Lesson 1, Introduction To Fresh Fruits and Vegetables.
Lesson 2, Identification Of Fresh Fruits.
Lesson 3, Identification Of Fresh Vegetables.
Lesson 4, Identification Of Nuts And Herbs.
Lesson 5, Destination Inspection Of Fresh Fruits and Vegetables.
Lesson 6, Surveillance Inspection Of Fresh Fruits and Vegetables.
Appendix A, Types of Fruits--Botanical Classification.
Appendix B, Terminology Used in the Standards.
Appendix C, General Botanical Terminology--Vegetables and Herbs

Here are some suggestions that may be helpful to you in completing this subcourse:

--Read and study each lesson carefully.
--Complete the subcourse lesson by lesson. After completing each lesson, work the exercises at the end of the lesson, marking your answers in this booklet.

--After completing each set of lesson exercises, compare your answers with those on the solution sheet that follows the exercises. If you have answered an exercise incorrectly, check the reference cited after the answer on the solution sheet to determine why your response was not the correct one.

Credit Awarded:

To receive credit hours, you must be officially enrolled and complete an examination furnished by the Nonresident Instruction Branch at Fort Sam Houston, Texas. Upon successful completion of the examination for this subcourse, you will be awarded 18 credit hours.

You can enroll by going to the web site http://atrrs.army.mil and enrolling under "Self Development" (School Code 555).

A listing of correspondence courses and subcourses available through the Nonresident Instruction Section is found in Chapter 4 of DA Pamphlet 350-59, Army Correspondence Course Program Catalog. The DA PAM is available at the following website: http://www.usapa.army.mil/pdffiles/p350-59.pdf.

LESSON ASSIGNMENT

LESSON 1	Introduction of Fresh Fruits and Vegetables.
TEXT ASSIGNMENT	Paragraph 1-1 through 1-9.
LESSON OBJECTIVES	After completing this lesson, you should be able to:

1-1. Identify the primary metabolic processes of fresh fruits and vegetables.

1-2. Identify how primary metabolic processes affect the storage, transportation, and handling of fresh fruits and vegetables.

1-3. Identify Federal government acquisition procedures.

1-4. Identify the best value selection procedure for fresh fruits and vegetables.

1-5. Identify produce identification method.

SUGGESTION After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

LESSON 1

INTRODUCTION TO FRESH FRUITS AND VEGETABLES

Section I. PLANT CHARACTERISTICS

1-1. GENERAL

Because of the development of new varieties of fruits and vegetables and improvements in equipment, fresh fruits and vegetables (FF&V) are available in substantial supply at all times of the year. More than 100 species of fresh fruits and vegetables can be found during the year at the large terminal markets. However, even with this large number of fruits and vegetables from which to choose, there are problems in supplying the military services with fruits and vegetables at the peak of their harvest quality. Fresh fruits and vegetables are highly perishable. All food inspection personnel have a most important role in getting the best quality product possible to the consumer.

a. **Living Organisms.** At the time of harvest, FF&V are living organisms that are still carrying on life processes. They are respiring, transpiring, producing food, maturing, and ripening. Because celery grows and potatoes and onions sprout during storage is physical evidence that fresh fruits and vegetables are living organisms.

b. **Cells.** Fresh fruits and vegetables are living organisms composed of cells. Cells are the basic structural units of plants and are composed mainly of cellulose. Plant cells have a cell wall. The cell wall encloses the protoplasm, which is the living part of the cell. The ability of plants to convert nonliving materials into living substance (protoplasm) distinguishes plants from nonliving entities.

1-2. PLANT PHYSIOLOGY

Plant physiology is the study of the life processes, growth, and functions of plants. From an understanding of plant physiology, the producer, the Veterinary Food Inspection Specialist, and consumer learn to care for fruits and vegetables during transportation, storage, and distribution. Three of the most important physiological functions that the Veterinary Food Inspection Specialist should be familiar with are photosynthesis, respiration, and transpiration.

a. **Photosynthesis**. Photosynthesis process is a chemical reaction that occurs within the chlorophyll-containing cells of green plants. These cells manufacture food from carbon dioxide and water and release oxygen. Six elements are a part of this reaction.

(1) Water. Water is absorbed from the soil by roots and passed up through the stem and out into the leaf cells where the photosynthesis takes place. Although water is essential to the reaction, very little of the water absorbed from the soil is utilized (only about one percent). Most of it is lost by evaporation through the leaves.

(2) Carbon dioxide. Carbon dioxide (CO_2) used in the photosynthetic process is derived entirely from the air. Green plants ordinarily have abundant light, chlorophyll, and water for photosynthesis, but the supply of carbon dioxide is limited by the low concentration of the gas in the air (0.03 percent to 0.04 percent). Carbon dioxide is considered to be the limiting factor of photosynthesis. It has been shown that with increased amounts of CO_2, the photosynthesis can be increased proportionally to the amounts of CO_2 used.

(3) Energy (light). Energy is required to break up the molecules of water and carbon dioxide and recombine them into new compounds. The energy for this reaction is derived from light; therefore, photosynthesis can take place only in the presence of light.

(4) Chlorophyll. Chlorophyll is the catalyst in the photosynthetic reaction. There is no decrease in the concentration of chlorophyll in the leaves after intense photosynthesis; the pigment is a true catalyst and is not used in the process.

(5) Carbohydrates. Basic carbohydrates are produced during photosynthesis. Glucose, also known as dextrose (grape sugar or corn sugar), is the major carbohydrate produced by the photosynthesis process.

(6) Oxygen. Oxygen is the other product of photosynthesis. A portion of the oxygen formed in this process diffuses outward through the openings in the plant. This liberation of oxygen into the air is the major source of atmospheric oxygen and is the principle method of counterbalancing the oxygen used by the plants and animals in their respiration processes.

NOTE: A general equation for the synthesis of food in photosynthesis is shown below.

PHOTOSYNTHESIS		
START WITH	**ADD**	**GET**
$6\ H_2O$ + $6\ CO_2$ + Energy (Water) (Carbon Dioxide) (Light)	Chlorophyll Enzymes + Temperature	$C_6\ H_{12}\ O_6$ + $6\ O_2$ (Basic Carbohydrates) (Oxygen)

b. **Respiration.** Respiration is a life process that is very important to fruits and vegetables during storage. This process is necessary during storage if fresh fruits and vegetables are to mature, ripen, and remain as living organisms. If the life processes of fresh fruits and vegetables were stopped during storage, the product would begin deteriorating at an extremely fast rate. The shelf life would be shortened, and the

product would not mature and/or ripen to its peak of quality. The respiration process is a chemical reaction occurring in plants.

(1) A general equation for the process is as follows:

THE RESPIRATION PROCESS		
START WITH	**ADD**	**GET**
$C_6 H_{12} O_6$ + 6 O_2 (Basic Carbohydrates) (Oxygen)	Chlorophyll Enzymes + Temperature	6 H_2O + 673 Calories (Water) (Heat

(2) The primary differences between photosynthesis and respiration are shown in figure 1-1.

Item	Photosynthesis	Respiration
Location within plant	Only in cells that contain chlorophyll.	In every living cell, regardless or color.
Time of occurrence	In sunlight or under artificial illumination.	Continuously in darkness or light.
Raw materials	Water; carbon dioxide.	Carbohydrates; oxygen.
Products	Oxygen as by-product; carbohydrates.	Carbon dioxide; water; energy (heat).
Weight of plant	Increases; food produced.	Decreases; food is broken down.
Energy	Energy stored.	Energy released.

Figure 1-1. Comparison between photosynthesis and respiration.

c. **Transpiration.** Transpiration is the loss of water vapor from living tissue. The loss of water vapor in stored fruits and vegetables follows the law of diffusion in that tissues are seeking to establish equilibrium of water vapor with the water vapor contained in the atmosphere.

(1) The chief disadvantage of transpiration is that it causes changes in appearance of fruits or vegetables and leaves them wilted, shriveled, or flabby. As water vapor is lost, the plant cells become less turgid (swollen, inflated), and thus the plant becomes abnormal in appearance.

(2) External factors influencing transpiration are atmospheric humidity, air movement, and air temperature. Internal factors influencing transpiration are size of surface area. Moisture is lost at the surface; therefore, the larger the surface area, the greater the transpiration loss. Presence of heavy cutin layers on products such as apples and pears also help to reduce the rate of transpiration. Cutin layers are composed of a waxy substance that, with cellulose, forms the outer layer of the skin of many plants.

Section II. ACQUISITION OF FRESH FRUITS AND VEGETABLES

1-3. INTRODUCTION

Acquisition procedures for FF&V differ from the acquisition procedures used for other subsistence items. The difference is because of the perishability and the limited growing season of fresh fruits and vegetables. Fresh fruits and vegetables, for the most part, have a shelf life of from a few days to several weeks. The limited shelf life does not allow time for the solicitation and acquisition procedures used for other subsistence. Except for some of the more hardy items, the acquisition and delivery of FF&V usually occur on the same day.

1-4. METHODS OF ACQUISITION

Defense Personnel Support Center (DPSC) procures the majority of FF&V for the military services, for both troop issue and commissary resale. The DPSC has several methods by which to procure FF&V items, for the most part, uses the best-value selection procedure.

a. **Best-Value Selection Procedure.** Under the "best-value selection procedure", the DPSC buyer makes visual comparisons between competitive suppliers and awards the contract to the supplier that has product of best value to the government in terms of price, quality, condition, and other factors. Therefore, under this procedure, the contract is not necessarily awarded to the lowest bidder. Produce purchases are grouped into two major categories, carlot (trucklot) and less-than-carlot (less-than-trucklot), depending on the quantity involved.

(1) Carlot quantity or field buying. The procurement of carlot quantities is also known as field buying. A carlot or trucklot quantity is 20,000 pounds or more, composed of one or more items being procured on a single contract. The term field buying is derived from the fact that a DPSC buyer visits the growing areas or packing facilities before a contract is awarded.

(a) Example. Fresh fruits and vegetables are procured in carlot quantities if they have a reasonable storage life and are used in sufficient quantities to justify volume buying. For example, apples, oranges, pears, cabbage, onions, potatoes, lettuce, and celery are commonly procured in carlot quantities by field buyers.

(b) Buyer receives requirements. For the best-value selection procedure, the DPSC field buyer receives consolidated requirements from the acquiring office headquarters. These requirements specify the types of fresh fruits and vegetables needed, quantity, required delivery dates, and the delivery point.

(c) Buyer solicits bids. After requirements have been received, the DPSC field buyer visits the growing area or packing facilities and solicits bids from all feasible sources in the growing area. As each farm or packing facility is visited, the buyer selects samples and physically examines the product offered to see if the item will meet contract requirements. The price, quantity, quality, name of firm, and other relevant information are recorded on the buyer's worksheet.

(d) Buyer reaches agreement with supplier. The buyer assures that the potential supplier has sufficient quantity of product on hand which meets specific requirements and that there is a complete buyer/seller understanding as to terms and conditions of the contract. Special emphasis is placed on price, grade, condition, maturity, size, and other qualifying factors. Agreement is also reached about the acceptance point where supplies will be inspected for compliance and acceptance.

(e) Buyer awards contract. After all potential suppliers have been canvassed, the contract is awarded to the supplier using the best-value selection procedure.

(2) Less-than-carlot-quantity or street buying. The acquisition of quantities of less than 20,000 pounds is known as less-than-carlot (LCL) or less-than-trucklot (LTL). The term "street buying" is derived from the fact that the DPSC buyer visits a terminal or local market before a contract is awarded.

(a) Example. The DPSC procures in LCL/LTL quantities fresh fruits and vegetables that are considered to have short storage life and procured in small quantities. Strawberries, parsley, eggplant, and rhubarb are commonly procured in less-than-carlot quantities.

(b) Procedure. The DPSC street buyer receives consolidated requirements from the acquiring office. The street buyer then visits the terminal or local markets that are usually located in the metropolitan area. The buyer solicits offers from all qualified sources and uses the best value selection procedure. The same procedures are used by the DPSC street buyer and the DPSC field buyer. In both methods, the buyer visits as many qualified suppliers as practical so as to assure full and free competition, thereby protecting the financial interests of the Government.

b. **Request for Proposal.** Most fresh fruits and vegetables are procured by the carlot and less than carlot methods. A Request for Proposal (RFP) is an alternative method that is available for use. The RFP is a solicitation that lists all essential information. It is printed and mailed out to interested, qualified suppliers, who then submit their offers or bids. All offers are recorded by the acquiring office. The contract is subsequently awarded, based on the lowest quoted bid. The successful bidder must furnish a United States Department of Agriculture (USDA) Certificate of Inspection to substantiate contract compliance. The RFP method is not a best-value selection procedure. Cost is the only factor in the selection procedure. The contract is awarded to the lowest bidder.

1-5. GOVERNMENT INSPECTION PROCEDURES

Although the contract is awarded by the DPSC buyer, the produce is usually not accepted until it arrives at destination, which within CONUS, is usually a DPSC supply point. Several agencies are involved in the inspection of DPSC-acquired FF&V.

a. **Defense Personnel Support Center Buyer Inspection.** The DPSC buyer visually examines the product for quality, condition, and other factors prior to awarding the contract. The buyer also verifies identity of the product at the time of loading and at time of receipt at destination, whenever possible.

b. **United States Department of Agriculture Federal-State Inspection.** The USDA FF&V Standardization Service provides grading service when requested to do so by a vendor. The service is voluntary and must be paid for by the vendor (supplier) requesting it. However, as defined in blanket purchase agreements (BPA) for FF&V, USDA grading is mandatory for some military contracts.

(1) Carlot/trucklot quantities. Whenever carlot quantities are procured, a USDA Grade Certificate must accompany the shipment.

(2) Less-than-carlot/trucklot quantities:

(a) Cold storage delivery. When supplies are to be delivered to DPSC cold storage sites in the continental United States (CONUS), the government purchasing agent must perform an origin inspection. Destination inspection for identity, quality, condition, and quantity may be performed either by the government purchasing agent or military food inspection personnel. The contracting officer reserves the right to require that inspection be performed at the expense of the contractor by the USDA FF&V Standardization Service (Federal/State Inspection).

(b) Direct delivery to consumers. When supplies are to be delivered to military posts, camps, stations, commissary stores, or ports of embarkation for customers overseas, USDA or state inspectors must perform an origin inspection at the expense of the contractor. Destination inspection for identity, quality, condition, and quantity must be performed by military food inspection personnel.

c. **Veterinary Service Inspection.** The extent of inspection required of military food inspection personnel is dependent on the desires of DPSC acquisition personnel and the supply point at which the inspection takes place.

(1) General inspection requirements. In all cases, the Veterinary Food Inspection Specialist is responsible for ensuring that the product delivered is wholesome and fit for consumption. Food inspectors will perform any inspection necessary, before and after acceptance of product. Additional inspection requirements are contained in the blanket purchase agreement (BPA).

(2) Services upon request. Limited destination inspection may be performed on all carlot shipments of FF&V:

(a) At DPSC supply points. Routine destination inspections for quality, condition, and quantity of locally-procured FF&V are performed when requested in writing by the Defense Supply Office (DSO) Chief.

(b) On specific occasions. Routine destination inspections for quality, condition, and quantity of local purchase FF&V, are performed when requested verbally by the DSO Chief and followed up in writing.

Section III. PRODUCE IDENTIFICATION

1-6. INTRODUCTION

Numerous types and varieties of fresh fruits and vegetables are acquired by the military. Many of these fruits and vegetables are easily identified by the Veterinary Food Inspection Specialist, but several are not, and some have never been seen or heard of by the Veterinary Food Inspection Specialist.

1-7. IDENTIFICATION METHODS

a. **Type or Variety.** Identification of fruits and vegetables is usually done by type (for example, apples, oranges, tomatoes). When necessary, variety (for example, Red Delicious apples, cherry tomatoes, crisphead lettuce) must be determined.

b. **Overall Appearance.** Overall appearance is determined by examining quality of color, overall standardized sizes, presence or absence of blemishes, discolorations, and obvious defects.

c. **General Product Characteristics.** When performing the identity examination, general product characteristics such as flesh colors, overall shape, leaf shape, presence or absence of seeds, aroma, and so forth, should be checked simultaneously with overall general appearance and condition.

d. **Specific Product Knowledge.** In order to perform these examinations, inspectors must familiarize themselves with the items they inspect through pictures, narrative description, and working with the items.

1-8. PRODUCE IDENTIFICATION GUIDE

a. **Booklet.** A booklet, Produce Identification Guide, supplements this subcourse. The color pictures in the booklet will assist you in identifying and evaluating various fresh fruits and vegetables. This booklet is published by the Produce Marketing Association, Newark, Delaware. Illustrations referenced in this subcourse can be found in the Produce Identification Guide booklet.

b. **Lessons.** Lessons that follow will include product descriptions that will give distinguishing characteristics and signs of good and poor quality. The sequence of color pictures in the Produce Identification Guide will be used.

1-9. USE OF PRODUCE IDENTIFICATION GUIDE

The color pictures in the Produce Identification Guide are not numbered or lettered. In order to facilitate cross-referencing and enhance learning of the subject matter, each student should letter each color picture in accordance with the following instructions.

a. **Alphabet Lettering of Pictures.** Letter the pictures on each page from a through whatever letter it takes to finish the last picture on the page. Place the letters starting with the picture in the upper left hand corner and then move from left to right on each row until all pictures on the page are lettered.

b. **Checking Your Understanding.** Picture f on page 4 will be of a banana. Picture d on page 13 will be a cucumber-regular. Picture L on page 11 will be a carrot-regular.

Continue with Exercises

EXERCISES, LESSON 1

INSTRUCTIONS: Answer the following exercises by marking the lettered response that best answers the exercise, by completing the incomplete statement, or by writing the answer in the space provided at the end of the exercise.

After you have completed all the exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers. For each exercise answered incorrectly, reread the material referenced with the solution.

1. At the time of harvesting, fresh fruits and vegetables are _____ _____ that are still carrying on the life process.

2. What are the three most important physiological functions of fresh fruits and vegetables?

   _____

   _____

   _____

3. List the six elements involved in photosynthesis.

   _____

   _____

   _____

   _____

   _____

   _____

4. The respiration process should be retarded, but not stopped, during storage. If respiration were stopped, the product would begin deteriorating at a _____ rate.

   a. Slower.

   b. Faster.

SPECIAL INSTRUCTIONS FOR EXERCISES 1 THROUGH 11. In exercises 5 through 11, match the list of characteristics in column A with the physiological process in column B. Match the physiological process by entering the letter identifying the process in the spaces provided in column A. Each physiological process may be used more than once.

COLUMN A (Characteristics)	**COLUMN B (Physiological Process)**
5. Increases weight of product.	a. Photosynthesis.
6. Oxygen is used.	b. Respiration.
7. Occurs in darkness as well as light.	c. Transpiration.
8. Occurs only in cells containing chlorophyll.	
9. Plant cells become less turgid.	
10. Energy is stored.	
11. Follows the law of diffusion.	

12. What is the most common acquisition procedure used by DPSC for fresh fruits and vegetables?

    a. Best-value selection procedure.

    b. Bid-off (auction) selection procedure.

    c. Purchase by specification.

13. A carlot or trucklot quantity is _____ pounds or more.

14. What are the steps of DPSC field buyer must go through in order to acquire fresh fruits and vegetables using the best-value selection procedure?

_____

_____

_____

_____

15. The term "street buying" refers to acquisition of fresh fruits and vegetables in _____than _____quantities.

16. The DPSC buyer verifies identity of the product at the time of ____ and at the time of receipt at _____ whenever possible.

SPECIAL INSTRUCTIONS FOR EXERCISES 17 THROUGH 19. Use the following situation data to answer exercises 17 through 19.

SITUATION: You are a Veterinary Food Inspection Specialist assigned to a DPSC supply point. A truck arrives with a shipment of cucumbers. The manifest states that there are 220 cases, each case weighing 50 pounds, and that the total value of the cucumbers is $3,306.50.

17. What is this shipment considered?

    a. A carlot quantity.

    b. Less than carlot quantity.

18. Is a USDA Grade Certificate normally required for this item?

    a. Yes.

    b. No.

19. The Veterinary Food Inspection Specialist must inspect this shipment at destination for wholesomeness (quality) and for what else?

_____

_____

_____

20. Food inspection personnel employ several methods of produce identification for FF&V. List four:

_____

_____

_____

_____

21. Where and when can military food inspection personnel perform limited destination inspection on all carlot shipments of FF&V when requested in writing?

_____

_____

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES, LESSON 1

1. living organisms. (para 1-1a)

2. Photosynthesis. (para 1-1a)
   Respiration. (para 1-1a)
   Transpiration. (para 1-1a)

3. Water. (para 1-2a (1))
   Carbon dioxide. (para 1-2a (2))
   Energy (light). (para 1-2a (3))
   Chlorophyll. (para 1-2a (4))
   Carbohydrates. (para 1-2a (5))
   Oxygen. (para 1-2a (6))

4. b (para 1-2b)

5. a (figure 1-1)

6. b (figure 1-1)

7. b (figure 1-1) NOTE: Transpiration (c) is also correct because transpiration occurs at all hours. However, transpiration declines under typical night conditions, when the temperature is lower, the wind lessens, and the humidity increases.

8. a. (figure 1-1)

9. c. (para 1-2c)

10. a. (figure 1-1)

11. c. (para 1-2c)

12. a. (para 1-4)

13. 20,000. (para 1-4a(1))

14. Buyer receives requirements. (para 1-4a(1)(b))
    Buyer solicits bids. (para 1-4a(1)(c))
    Buyer reaches agreement with supplier. (para 1-4a(1)(d))
    Buyer awards contract. (para 1-4a(1)(e))

15. less than carlot/trucklot. (para 1-4a(2))

16. loading;.destination. (para 1-5a)

17. b (para 1-4a(2))

18. b (para 1-5b(1))

19. Identity. (para 1-5b(2)(b))
Condition. (para 1-5b(2)(b))
Quantity. (para 1-5b(2)(b))

20. Type of variety. (para 1-7a)
Overall appearance. (para 1-7b)
General product characteristics. (para 1-7c)
Specific product knowledge. (para 1-7d)

21. At DPSC supply points. (para 1-5c(2) (a))
On specific occasions. (para 1-5c(2) (b))

End of Lesson 1

LESSON ASSIGNMENT

LESSON 2	Identification of Fresh Fruits.
LESSON TEXT	Paragraphs 2-1 through 2-38.
LESSON OBJECTIVES	After completing this lesson, you should be able to:

2-1. Identify common terms used in fruit inspection.

2-2. Identify names of varieties of fruits that are of commercial importance.

2-3. Identify distinguishing characteristics of specific fruits.

SUGGESTION After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

LESSON 2

IDENTIFICATION OF FRESH FRUITS

2-1. INTRODUCTION

The purpose of this lesson is to provide information about the kinds of fruits that you can find in produce departments and may be called upon to inspect. Fresh fruits are available throughout the year at prices that the consumer can pay, although the best buys and selections are found during the season in which the item is the most plentiful. Fresh fruits are a healthy food. They provide many nutrients per calorie. They are a rich source of vitamins and minerals. They are low in fat. They have fiber and natural sweetness. In fact, fruits can help to pep up the entire body system. They are a good snack food and consumer demand for fruits is rising.

2-2. GLOSSARY OF FRUIT TERMS

a. **Blossom End.** Blossom end is the opposite end from the stem end. The stem end will have a scar or remains of the stem to identify it. The blossom end is often more rounded than the stem end.

b. **Breakdown of Tissue.** Breakdown of tissue is decomposition or breaking down of cells caused by pressure (bruise) or age (internal breakdown).

c. **Decay.** Decay is decomposition of fruit due to bacteria or fungus infection.

d. **Ground Color.** Ground color is the basic or background color of a fruit before the sun's rays cause the skin to redden. The ground color may be seen beneath and between the red blush of a fruit.

e. **Hard.** The terms hard, firm, and soft are subjective terms used to describe the degrees of maturity or ripeness of a fruit. A hard texture will not give when pressed. A firm texture will give slightly to pressure. A soft texture is, of course, soft to the touch.

f. **Mature Fruit.** Mature fruit is a fruit that is ready to be picked, whether or not it is ripe at this time. Mature fruit are fully developed. If a fruit is picked when mature, it is capable of ripening properly, but if picked when immature, it will not ripen properly.

g. **Netting.** Netting is the vein-like network of lines running randomly across the rind of some melons.

h. **Ripe Fruit.** Ripe fruit is a fruit that is ready to be eaten.

i. **Russeting.** Russeting is a lacy, brownish, blemish-type coating on top of the skin.

j. **Scald.** Scald is a blemish or brownish discoloration, which occasionally develops in the skin of apples or other fruits in cold storage.

2-3. APPLES

a. **General.** There are more than 7000 varieties of apples listed by the USDA, but only 13 varieties are of commercial importance. No one description fits all apples, except that they grow on trees. Apples come in different colors (red, green, golden, mottled, or striped), in different flavors (tart, sweet, or mellow), and have different textures (crisp, hard, juicy, or snappy). Apples measuring about 2-1/2 inches or more in diameter are ideal for general use. Larger apples, 3"inches and up, are perfect for baking.

b. **Varieties of Apples.** Some of the main varieties of apples are illustrated in pictures 1a thru 3e.

(1) The Beacon apple (picture 1a) is characterized by its distinct deep red skin with white flecks. The Beacon apple is smooth, hard, round, and shaped like the Red Rome, see 2-3b(10). The Beacon is relatively uncommon.

(2) The Criterion apple (picture 1e) is tall and firm with green to golden skin.

(3) Golden Delicious apples (picture 2a) comprise 18 percent of the total apple production. Golden Delicious apples resemble the Red Delicious in shape, but are usually a medium size. The skin is usually tender and may be shiny, velvety, and russeted. The flesh is white, often with a yellowish tinge, crisp, fine-grained, juicy, moderately low in acid, mildly aromatic, and very sweet.

(4) The Grannie Smith apple (picture 2b) is increasing in popularity in the United States (US). It has been popular on the European market for several years due to its sweet flavor and crispy texture. The skin color is light green, the shape is round, and it is firm to hard. It is generally available from July to August. Most of the Grannie Smith apples are imported, but orchards have been started in the United States.

(5) The Greening apple (no picture) is also known as the Rhode Island Greening apple. It is medium to very large with a thick, tough, smooth skin. The skin color is yellow or greenish. The flesh is nearly white with a slight tinge of yellow or green. It should be firm, moderately fine grained, crisp, juicy, slightly aromatic, and medium in acid. Although it is not generally eaten out of hand, it is good when fully ripe.

(6) Haralson apples (picture 2c) are red colored, medium sized, and generally considered to be fair to good in quality. They store very well. Generally they are available from September to October.

(7) Jonathan apples (picture 2e) are small and medium sized. They are bright, with a mildly tart, rich flavor. They are excellent for eating or cooking. Coloring may be light red striping over yellow or it may show deeply colored red, darkening to purple.

(8) McIntosh apples (picture 2f) are somewhat flat to round, larger than medium size and have a thin, smooth, easily bruised skin. The skin color varies from red to deep purplish red. The flesh is white or slightly tinged with yellow, sometimes with red veins. It is firm, fine, crisp, tender, very juicy, aromatic, and medium in acid, which becomes mild and sweet when ripe.

(9) Red Delicious apples (picture 2h) are generally medium to large with a thin, tough, smooth skin. The color is brilliant red over yellow with areas of lighter and darker color, striped red to solid red. The flesh is white, fine grained, tender, crisp, juicy, moderately low in acid, and mildly aromatic. One very distinguishing characteristic of the Red Delicious is that it has five points (bumps) on the blossom end of the fruit.

(10) Red Rome apples (picture 3a) are large to medium large. They are thick-skinned, tough, smooth, yellowish or greenish, and more or less mottled with bright red. The flesh is nearly white with a slight tinge of yellow or green, firm, moderately fine grained, crisp, juicy, and slightly aromatic. It is agreeably mild, medium in acid, and excellent for baking.

(11) The Spartan apple (picture 3c) is deeply red, fairly tart, and is excellent for salads and pie.

(12) The Winesap apple (picture 3e) was once a leader in the cider-type apples but is declining in popularity. It is a small to medium apple with a thick, tough, smooth, and glossy skin. The skin is a bright red color. It is indistinctly striped and blotched with very dark purplish-red over a distinctly yellow background with faint bloom and small dots. The flesh is tinged with yellow and red veins that run through the flesh. Winesaps are firm, course, moderately crisp, juicy, and medium in acid.

c. **Good Quality.** Good quality apples have good color for their variety, have a fresh bright appearance, and are firm to the touch. Skins should be smooth and reasonably bruise free.

d. **Poor Quality.** Poor quality apples may have several bruises that eventually end up as decay spots. These apples are too ripe or have been handled improperly. Overripe apples yield to slight pressure on the skin and have a soft, mealy flesh. Big apples tend to mature more rapidly than smaller ones, usually have a mealy or mushy texture when soft, and may become too mellow for best taste enjoyment. Apples affected by freezing temperatures are indicated by internal breakdown and numerous bruised areas. Irregularly shaped tan or brown colors are a result of apple scald. Apple scald affects the appearance of the apples, but usually will not affect eating quality.

2-4. APRICOTS

Apricots (picture 9a) are stone fruits of the genus Prunus, which also includes cherries, nectarines, peaches, plums, and almonds. This genus belongs to the rose family. Fresh apricots have a flavor entirely different from that of the dried variety. Apricots develop their flavor and sweetness on the tree and should be mature and firm when picked. Unlike pears, they do not produce sugar after they are picked, therefore, harvesting is accomplished just before the fruit is fully ripe.

a. Good quality apricots should be mature, plump, of a uniform golden color, and juicy. Ripe apricots will yield to gentle pressure on the skin.

b. Poor quality apricots may be the result of excessive maturity or immaturity. Overly matured fruit is dull looking, soft, shriveled or mushy. Immature fruit is very firm, pale yellow, or greenish yellow.

2-5. AVOCADOS

a. **General.** Avocados were considered a luxury item several years ago but recently have become a common table item. The avocado is the basic ingredient of a popular Mexican-American dish, guacamole. There are more than 700 varieties. Avocados are grown in California and Florida, with California providing more than 75 percent of the avocados consumed in the US Avocados are stone fruits.

b. **Variety in Avocados.** Avocados (pictures 9b, 9c, 9d) vary widely in weight, texture, shape, and thickness of skin. The skin may be thin and smooth, thick and smooth, or leathery and tough, depending on the variety. Color varies from green to purple-black, depending on the type and variety of fruit and the section of the country.

c. **Judging Ripeness.** Avocados are best for eating when they yield to light pressure on the outer rind. Like pears and bananas, they may be purchased slightly under ripe and then ripened at room temperatures. Ripeness is also determined by sticking a toothpick into the fruit at the stem end. If the toothpick flows freely in and out of the fruit, it is ripe and ready to eat. Those purchased for immediate use should be soft and yield to pressure. Those desired for short-term storage should be uniformly firm.

d. **Regular Avocados.** The cocktail avocado (picture 9b) is a small replica of the regular green avocado (picture 9c), except that it does not contain a pit. Maximum length is about 2 1/2 to 3 inches with a width of about 1 to 1 1/2 inches.

e. **Most Common Avocado.** The Hass avocado (picture 9d) is the production leader. Its shape is ovoid. It has a thick skin which protects it from the hot summer sun. Color ranges from emerald green at maturity through black as it becomes ready to eat.

f. **Good Quality.** Good quality avocados should be heavy for their size, bright and fresh appearing, and not bruised. There is no relationship between skin color and flavor or between size and flavor. The appearance of irregular light-brown markings known as scab is superficial and does not affect the flesh.

g. **Poor Quality.** Poor quality avocados are indicated by dark sunken spots, irregular patches, or cracked or broken surfaces. These are all signs of decay.

2-6. BANANAS

a. **General.** Figure 2-1 (Banana plant growth) graphically shows the development and growth of a banana plant from the date of planting, to its full growth and maturity about 14 months later. The banana plant is a rapidly growing perennial which contains the aggregate about 85 percent of water. It is probably the largest terrestrial plant not having a woody stem above ground. The stalk, or trunk, of the plant is really only a compact mass of over-lapping leaf-sheaths. When fully developed, the plant has a palm-like appearance and the leaves are often 8 to 12 feet long and 2 to 3 feet wide. Each plant has from 8 to 20 leaves. The leaves adapt themselves to intense sunshine and shade, collapsing under intense heat to protect the plant from too great an evaporation, and curving upward in wet and moderately cool weather to permit increased evaporation necessary to rapid growth. Banana growers are plagued with sudden floods, heavy wind storms and hurricanes, sometimes with drought, sometimes with insects, and often with soil diseases. Great skill, sound organization, and heavy financial backing are required for success.

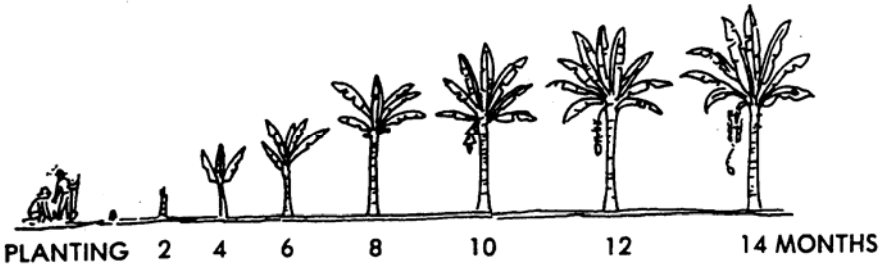


Figure 2-1. Banana plant growth.

b. **The Ripening Process.** Unlike most other fruits, bananas achieve their best eating quality after they are harvested. Bananas are harvested and shipped when mature, but green. Shortly after arrival, they are treated with ethylene gas, which triggers the ripening process. Close control of temperature and humidity will enhance the ripening process, which takes about 3 days.

c. **Storage.** Bananas are very susceptible to chill damage and should not be exposed to temperatures below 55ºF. If stored in a cold environment after ripening, the skin will turn brown, but the flesh will keep for 3-6 days before it too begins to discolor. Bananas are also damaged when exposed to high temperatures. Temperatures above 70^{o}F cause green bananas to become soft, mushy, and a dull yellow in color.

d. **Varieties of Bananas.** There are three main varieties of bananas imported from the tropics.

(1) The Gros Michel banana (no picture) was prominent many years ago but is not as prominent now because of its susceptibility to Panama disease.

(2) The Cavendish banana (picture 9e) is immune to the Panama disease, but is more easily bruised during handling and shipment, and is harder to ripen uniformly. The distinguishing feature is that the banana tips are blunt.

(3) The Manzano banana (picture 9g), or apple banana, has a high sugar content and is a small, blunt-fingered, fruit not more than 3 to 5 inches long.

e. **Consumer Preference.** There are no official US grades for bananas. The brand name is usually more indicative of the product quality. Bananas are usually ordered by color code number, which indicates the stage of ripeness. Common practice is for the numbers to range from 1 to 7. The number 1 denotes a green banana and 7 a yellow-brown (picture 3c). Consumers prefer bananas in the 4 to 7 color range.

f. **Good Quality.**. Good quality bananas are characterized by firmness, bright appearance, and lack of bruises or other injuries. Best eating quality is usually considered to be reached when the solid yellow color is speckled with brown. At this stage, the flesh is mellow and the flavor fully developed. Green-tipped bananas and those with practically no yellow color have not developed their full flavor potential.

g. **Poor Quality.** Poor quality bananas are bruised, have discolored skins, usually a sign of decay, or a dull grayish aged appearance showing the bananas have been exposed to cold before ripening. As a result of chilling before ripening, bananas will not reach good eating quality because the ripening process has been inhibited.

2-7. BANANAS-PLANTAINS

Plantains (picture 9h) are frequently thought of as a large, starchy, acid, and gummy type of banana used for cooking. They are also thought of as not becoming sweet. However, there are bananas that do not sweeten and plantains that do. Most of the plantains imported into the US are of the cooking type and are cooked before reaching full ripeness.

a. Plantains are used frequently as a vegetable rather than a fruit. They are never eaten raw but are normally baked, mashed, or fried as a substitute for potato or as a meat accompaniment.

b. Plantains should not be refrigerated, as this will cause them to become quite soft.

c. Good and poor quality characteristics are the same as those for green bananas. The general appearance of plantains is normally esthetically displeasing due to the common rough skin and lack of luster. These characteristics are normal and should not be considered as poor quality.

2-8. BERRIES

Berries are defined as any fleshy, simple fruit with one or more seeds and a skin. True berries, by definition, include the banana, cranberry, grape, and tomato. Berries as a rule have a short shelf life since they are so susceptible to bruising. Bruising quickly leads to mold and other forms of decay. Two key points to remember about berries are that the strawberry (picture 10h) is the only berry marketed with the cap on. All other berries that are mature and should have the cap removed. Secondly, for best quality and taste, berries should be firm, plump, and be fully colored for the variety.

a. **Blackberries-Dewberries.** Blackberries (picture 10a) and dewberries (no picture) are bright black or dark purple aggregate fruits, seedy and sweet. Dewberries are trailing, ground-running kinds of blackberries, while the blackberry is one of the bush variety of bramble fruits. Boysenberries (picture 10c) are a dewberry-variety, dark, reddish black when fully ripe. Loganberries are a trailing blackberry variety of the Pacific Coast, large, long, and dark-red.

b. **Blueberries.** Blueberries (picture 10b) are the third most popular non-citrus fruit in the US. They are grown primarily in the US and Canada but can be found on almost every continent.

(1) Good quality blueberries should be plump, fresh in appearance, fairly uniform in size, clean, dry, free from debris, and have a good blue color. They may be covered with a more or less silvery bloom, depending on the variety. This bloom is a natural waxy protective coating.

(2) Poor quality blueberries are often the result of excessive storage, which produces a dull lifeless appearance. Shriveling may occur during transportation.

c. **Cranberries.** Cranberries (picture 10d) are an item for which variety is not necessarily important. Although the many varieties of cranberries vary considerably in size and color, they are usually marketed and purchased without regard to their variety. Cranberries keep longer than most berries and are not as easily bruised, but they do require refrigeration.

(1) Good quality cranberries are generally glossy, firm, plump, and lustrous red. Some varieties are dull but should have at least some red color.

(2) Poor quality cranberries are seldom seen, but when noted, are spongy or leaky, shriveled, dull, soft, and sticky.

d. **Currants.** Currants (picture 10e) are of three main varietal types, usually characterized by color. The colors are red, white, and purple-black. The good quality and poor quality characteristics are similar to cranberries. Currants being purchased for use in jelly should be firm and ripe since overripe berries do not "jell" very well.

e. **Raspberries.** Raspberries (picture 10g) have a variety of colors, such as yellow, golden, apricot, amber, black, red, purple, and various shades in between. They are extremely perishable and must be inspected and handled with the utmost diligence.

(1) Good quality raspberries have a clean bright appearance and a uniform, good color for the species. The individual small cells making up the berry should be plump and tender, but not mushy. The berries should be fully ripened and without the stem caps.

(2) Poor quality raspberries are evidenced by leaky, moldy berries. Poor quality raspberries can usually be seen through the ventilated plastic containers in which they are packed. The container should also be observed for wet or spoiled berries.

f. **Strawberries.** Strawberries (picture 10h) are the ultimate berry to many consumers. They vary in size from extremely large to extremely small. Extremes in size usually indicate poor eating quality. The fact that a strawberry is extremely large does not always mean that it is sweet or sweeter than smaller berries. Usually medium to small berries have the best eating quality.

(1) Good quality strawberries should be fresh appearing with a full red color, a bright luster, and firm flesh. The stem cap or crown (the calyx) should be attached. The berries should be dry and clean.

(2) Poor quality strawberries usually will have large uncolored areas or large seedy areas. These berries are poor in flavor and texture. They may have a dull shrunken appearance or softness, which is a sign of overripeness, decay, or mold. Mold spreads rapidly in strawberries. Also be aware of leaky berries, indicated by stained containers.

2-9. CHERIMOYA

The cherimoya (picture 10k) is sometimes called custard apple and also sherbet fruit because of its natural sherbet texture when chilled. The cheriomya is almost heart-shaped, and is light yellowish to dull green in color. When ripe, the fruit will yield to gentle pressure, like a peach. The larger fruit is usually the best, with fairly uniform green color. Surface brown scars do not indicate poor quality. To eat with a spoon, it is cut in halves and quarters. The many seeds are removed as it is eaten.

2-10. CHERRIES

Generally cherries (pictures 10L and 11a) are available from May through July.

a. **Two Classifications.** The two main classifications are sweet and red tart. The sweet cherries are used for dessert fruit while the red tart cherries, also called sour or pie cherries, are used in cooked desserts. Tart cherries have a softer flesh and a lighter red color than the sweet cherries. Tart cherries are generally shipped to processing plants and are sold frozen or canned.

b. **Good Quality.** Good quality sweet cherries should be very dark in color, which is a good sign of flavor and maturity. Varieties, such as the Bing, Black Tartarian, Schmidt, Chapman, and Republican, should range from deep maroon or mahogany red to black, for richest flavor. Lambert cherries should be dark red. Good cherries should also have bright, glossy appearances, plump-looking surfaces, and fresh-looking stems.

c. **Poor Quality.** Poor quality cherries may be overmature and lacking in flavor. Overmaturity is indicated by shriveling dried stems, and a generally dull appearance. Decay is fairly common in sweet cherries, but because of the cherries' normal dark color, decayed areas are often inconspicuous. Soft leaking flesh, brown discoloration, and mold growth are indications of decay.

2-11. COCONUTS

Coconuts in husk (picture 11c) and without husk (picture 11d) are a novelty to most Americans and a necessity in some parts of the world. Annual world production ranges from 26 to 29 billion coconuts. Fresh coconuts that are drained and shelled may be eaten out-of-hand or used as a substitute in recipes calling for dried packaged coconut. To drain a coconut for inspection, the Veterinary Food Inspection Specialist should pierce the three eyes with an ice pick or similar instrument.

a. To shell one, do one of the following:

(1) Hit it all over with a hammer.

(2) Place the coconut in an oven at 350^{o}F for 30 minutes, and shatter the shell with a hammer.

(3) Place it in a freezer for 1 hour, and then shatter the shell with a hammer.

b. Good quality coconuts are heavy for their size and, when shaken, make a sloshing noise as the milk inside moves. The three eyes should be dry and sound with no evidence of mold growth.

c. Poor quality coconuts may not have milk. These should be rejected as spoiled. Also, moldy or wet eyes may indicate past, present, or future deterioration and eventual spoilage of the milk.

2-12. DATES

Dates (picture 11e) are the candy that grows on trees. In the Western Hemisphere, they are grown only in the Coachella Valley of Southern California. They are classified as soft, semi-dry, and dry, depending upon the softness of the fruit. When fully ripe, fresh dates are plump and lustrous with a golden brown color and smooth skin. They are sold pitted or unpitted throughout the entire year. The shelf life of dates is almost indefinite under ideal temperature and humidity conditions. Dates should not be stored near flour, cereal, or any other item that may get infested. Also, they should not be stored near onions, fish, or other odorous items because dates tend to absorb strong odors. Good dates are lustrous brown in color and soft. Drying and hardening are undesirable qualities.

2-13. FIGS

Figs (picture 11g) come in many varieties. They are classified by shape, color of skin, and color of flesh. For example, figs may be round, turbinate (shaped like a top), or pyriform (pear-shaped). Figs should be eaten, sold, or issued as soon after arrival as possible. Ripeness can be determined by the degree of softness to the touch, while overripeness is detected by a sour odor, due to fermentation of the juice. Although most figs are picked mature-green for shipping, they must be tree-ripened to reach their full sugar content and provide proper eating quality.

a. Good quality figs should be ripe to the point of softness, and have characteristic color that ranges from greenish yellow to purple or black, according to their variety.

b. Poor quality figs have a fermented odor and exhibit soft sunken areas of decay.

2-14. GRAPEFRUIT

a. **General.** Grapefruits are picked tree ripe and are ready to eat when delivered. Several varieties exist but the chief distinction is between those that are seedless and those with seeds. Seventy-five percent of the total production has few or no seeds. Another distinction is the color of the flesh. White-fleshed (picture 4c) is the most common, but pink- or red- fleshed varieties (picture 4b) are becoming increasingly popular and available. Ruby Red and Star Ruby are redder and sweeter than other grapefruits. White grapefruits tend to be stronger in flavor than the pink. Russeting does no harm, nor does it matter whether the skin is bronze colored. These appearance factors do not affect quality, so selection is one of personal desire rather than of quality.

b. **Sizes.** Grapefruits commonly come in four sizes, which refer to the number of fruits per box. Figure 2-2 illustrates their relative size. The sizes are #32, #36, #40, and #48. A box of #48 grapefruits would contain 48 grapefruits.

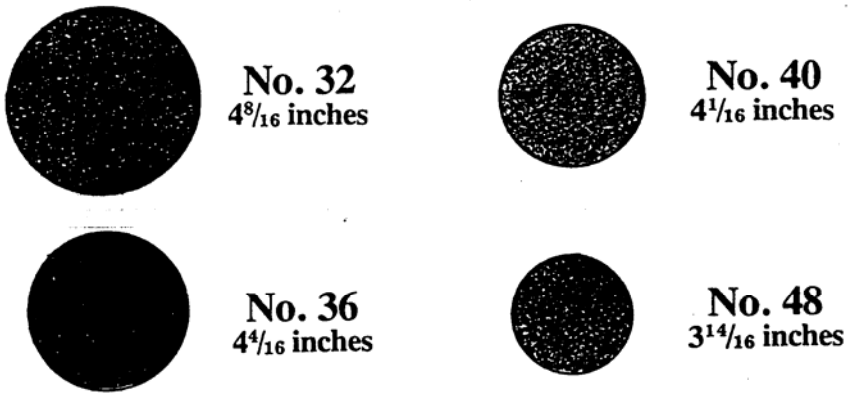


Figure 2-2. Grapefruit sizes.

c. **Good Quality.** Good quality grapefruits are firm, well-shaped (globular), and heavy for their size. Thin-skinned grapefruits have more juice than coarse-skinned ones. Grape-fruits that are pointed at the stem are likely to be thick-skinned. Rough, ridged, or wrinkled skin can also be an indication of thick skin, pulpiness, and lack of juice. Common skin defects such as scale, scars, thorn scratches, or discoloration usually do not affect the eating quality of the fruit.

d. **Poor Quality.** Poor quality qrapefruit are soft, have discolored areas on the skin (especially near the stem end), have water-soaked areas, exhibit loss of brightness, and have a soft tender peel that breaks easily with finger pressure. These are all signs of decay and also results in an objectionable flavor.

2-15. GRAPES

a. **General.** Grapes are grown all over the world except in areas of extreme cold. The four major commercial grape classifications are: table, raisin, wine, and juice grapes. There is also one minor classification, canning grapes. One grape variety may fit into more than one or even all five classifications, for example, the Thompson seedless grape.

b. **Ripe Grapes.** All grapes must be ripe when delivered or purchased, since they will not ripen after they are harvested. Only ready-to-eat grapes are shipped industry wide.

c. **Purchasing by Color.** There are literally thousands of varieties of grapes, but only 40 or 50 have any significance as far as commercial production is concerned. Of these, only 10 or so table varieties are of real importance. Grapes are usually procured by color rather than variety. (For example, the blue-black (picture 11b), green (picture 11L), or red (picture 11k)). The variety is usually not important unless specifically requested.

d. **Good Quality.** Good quality grapes should be well colored, plump, and firmly attached to the stem. They should not be sticky. White or green grapes are sweetest when the color has a yellowish cast or straw color, with a tinge of amber. Red varieties are better when a good red color predominates on all or most of the berries. The stems should be green and pliable so the bunches will hold together.

e. **Poor Quality.** Poor quality grapes may be soft or wrinkled as a result of freezing or drying. Poor quality grapes may also have bleached areas around the stem end, indicating injury. Leaking berries are usually a sign of decay and must be avoided whenever possible.

2-16. GUAVAS

Guavas vary in size, shape, color, and flavor (picture 12a). Flesh color ranges from white to deep pink and skin color from green to yellow.

2-17. HOMLI FRUIT

Homli fruit (picture 4d) should be heavy in relation to its size. Homli fruit have a bronze to rust color with a rough, tight skin. They are shaped like an elongated grapefruit. Good- and poor-quality characteristics are similar to those of oranges.

2-18. KIWI FRUIT

The kiwi fruit (picture 12c) is a native of China and is actually a Chinese gooseberry. It was renamed by merchants from New Zealand after the native bird of that country. Kiwi fruit has gained in popularity and is now grown commercially in California.

a. Externally, they are light brown with a fuzzy suede-like skin. They measure 2-1/2 to 3-1/2 inches in length. The shape is elongated, the skin soft, and the flesh a light green color with tiny black seeds. Their flesh texture is very similar to that of the American gooseberry.

b. Good quality kiwi fruit should be firm when purchased and soft like a pear when eating. The skin should be free of bruises and blemishes, and the color should be consistent over the entire surface. Better fruit is mature but not overripe, clean, and not seriously misshapen. It is free from decay, internal injury, broken skin, and other damages.

2-19. KUMQUATS

Kumquats (picture 4e) resemble an orange, but are smaller. They are normally 1 1/2 inches long and 1 1/4 inches wide and football shaped. The flesh is tart but the skin sweet. Kumquats are used for Christmas table decorations, preserves, jellies, and candied fruits. The entire kumquat may be eaten raw to include the skin. Occasionally, they are displayed with leaves on them to enhance their appearance.

2-20. LEMONS

In general, lemons (picture 4f) are of two types: the acid lemon and the sweet lemon. The sweet lemon is grown as a novelty item. Lemons are routinely bulk packed instead of hand placed in cartons. Color sorting into the yellow, silver, light-green, and dark-green colors can be done by an electric-eye machine at a rate of 40 lemons per second. This automated sorting is accurate but cost prohibitive to most packers. Most packers sort the lemons by utilizing experienced personnel.

a. Good quality lemons should have a rich yellow color, have a reasonably smooth-textured skin with a slight gloss, be heavy for their size, and be firm. Pale or greenish-yellow lemons are very fresh and have a slightly higher acidity. Coarse or rough skin texture indicates that the skin is thick and there is less flesh.

b. Poor quality lemons are darker yellow or dull. Their skins may show signs of shriveling or hardening, which is an indication of age. Those lemons with soft spots, surface mold, and punctures of the skin are probably decaying.

2-21. LIMES

a. **General.** As with lemons, limes (picture 4g) may be sweet or acid. While only acid limes are grown in the US, sweet limes are popular in many other citrus growing areas. Color varies with variety and stage of maturity. A condition called scald results in a purplish or brownish, irregular mottling of the outer skin. In its early stages, scald does not damage the flesh of the lime. Scald is an appearance factor that is undesirable to most consumers.

b. **Good Quality**. Good quality limes should have a glossy skin and be heavy for their size. Domestic limes should be bright green. Yellow limes lack acidity and taste. The Mexican and Key lime is light yellow when ripe and an exception to the "buy them green" rule.

c. **Poor Quality.** Poor quality limes appear dull and dry. These are signs of aging. There is a loss of acid flavor. Soft spots, mold, and skin punctures are evidence of decay.

2-22. MANGOES

a. **General.** Mangoes (picture 12f) are tropical fruits. There are hundreds of varieties of mangoes, but this is generally of no significance when purchasing unless specific sizes are needed. Mangoes have a smooth outer skin, usually green with yellowish to red areas. The red and yellow colors increase as the fruit ripens. The shape is generally round to oval, and the size varies considerably--from half a pound to a full pound. The pulp is yellow, delicate, juicy, and has a flavor that reminds one of apricot and pineapple. When not ripe, it has a flavor like turpentine.

b. **Good Quality.** Good quality mangoes are free of decay, predominantly yellow and red, and very soft.

c. **Poor Quality.** Poor quality mangoes may be wilted or have grayish skin discoloration, pitting or black spots, and/or other signs of decay.

2-23. MELONS

All melons can trace their ancestry back to Asia, as do many other fruits. A general guide to the selection of melons is that the outer skin should be a good color and give off a rich aroma characteristic of the particular type or variety. As an indicator of ripeness, melons should be slightly soft at the blossom end. Melons should never be picked unless they are ripe, since picking inhibits future ripening.

a. **Canary Melons.** Canary melons (picture 7a) have a bright canary yellow rind and are oblong in shape. They must be firm but not hard. Ripeness is generally determined by softness at the ends. The flesh is sweet and white with a tinge of pink around the seed cavity.

b. **Cantaloupe Melons.** Cantaloupe melons (picture 7b) are commonly referred to as muskmelons. However, the term cantaloupe should apply only to one kind of muskmelon. Common usage refers to all muskmelons as cantaloupes.

(1) Good quality cantaloupes display full maturity when the stem is completely gone, leaving a smooth, symmetrical shallow basin on the end. This shallow basin is called a "full slip." The netting should be thick, coarse, and corky. Cantaloupes should be fully matured and firm when delivered. They must be shipped firm so that they arrive in good condition. Even though they must be firm when delivered, they should also be fully ripe, having developed all of their sugar content. They should be ripened at room temperature for 2 to 3 days, which will make the meat softer and juicier.

(2) Poor quality cantaloupes are usually the result of premature harvesting as evidenced by a rough stem end with portions of the stem adhering. Improper or rough handling of cantaloupes past the firm stage will result in bruising and decay. The majority of complaints from consumers are due to the failure of consumers to wait long enough for the cantaloupe to soften before eating.

c. **Casaba Melons.** Casaba melons (picture 7c) are similar in size to the cantaloupe, but are characterized by their large globular shape. They have a tough, deeply ridged, furrowed rind. The rind should be golden yellow when ready to eat. Prior to full ripeness, the rind may be light green to yellow. Ripeness is also indicated by slight softening at the stem end. Ripe melons have soft, creamy-white, sweet, and juicy flesh without any characteristic aroma or odor. Poor-quality melons have dark, sunken, water soaked spots, which usually indicates decay.

d. **Crenshaw Melons.** Crenshaw melons (picture 7d) are a hybrid variety of muskmelon. It is one of the best eating melons marketed. They are usually round at the base and come to a point at the stem end. Crenshaw melons weigh 7 to 9 pounds. The rind color is gold and green. The rind is smooth, with no netting, and little ribbing. The flesh is a bright salmon color, thick, juicy, and extremely tasty when ripe.

(1) Good quality Crenshaw melons have a deep-golden-colored rind, sometimes with lighter shades of yellow in small areas; a surface which yields slightly to moderate thumb pressure, particularly at the blossom end; and a characteristic pleasant aroma.

(2) Poor quality Crenshaw melons may have slightly sunken, water-soaked areas on the rind; which is usually a sign of decay that spreads quickly through the melon.

e. **Honeydew Melons.** Honeydew melons (picture 7h) have outstanding flavor characteristics that make them a prize dessert. They are usually large, weighing from 4 to 8 pounds, bluntly oval in shape, and normally smooth with only occasional traces of surface netting. The rind is firm and ranges from creamy white to creamy yellow, depending on the stage of ripeness. Unlike the cantaloupe, the stem does not separate from the fruit and must be cut off for harvesting.

(1) Good quality, mature honeydew melons have a soft, velvety feel, while ripeness is indicated by a slight softening at the blossom end. A faint but characteristically pleasant fruit aroma and a yellowish-white to creamy rind are desirable.

(2) Poor quality honeydew melons may have a white or greenish-white color and may be hard. A totally smooth feel indicates immaturity. Large, water-soaked bruised areas (signs of injury) and punctures or cuts through the rind will usually lead to decay and are undesirable. Small superficial, sunken spots do not damage the melon for immediate use, but large decayed spots will damage the melon.

f. **Persian Melons.** Persian melons (picture 8b) are muskmelons and closely resemble cantaloupes. However, Persian melons are more nearly round, have finer netting, and are about the same size as honeydew melons. The flesh is thick, fine textured, and orange colored. Their average weight is about 7 pounds and they measure 7 1/2 inches across. The rind is dark green and covered with fine netting. As they ripen, the rind under the netting turns a lighter green and gives with slight pressure. Like other melons, they do not gain sugar after harvesting, so they must be fully mature when harvested or they will never be satisfactory. They must be picked and shipped when firm and must be given time before eating, just like cantaloupes, to soften and become juicy. The good and poor quality characteristics as well as the ripening factors of the Persian melon are the same as for the cantaloupe.

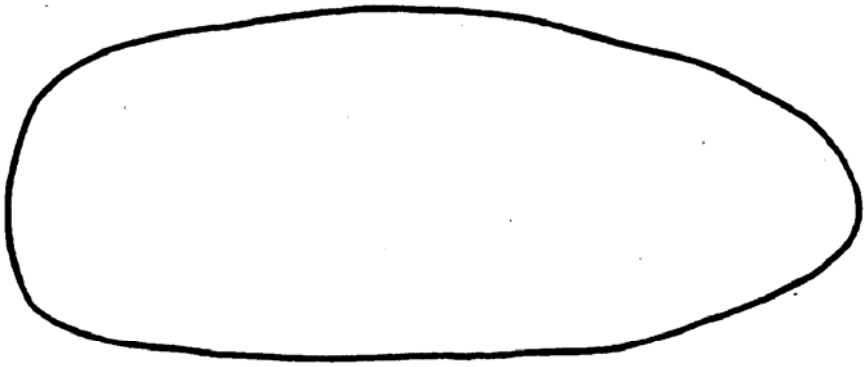
g. **Santa Claus Melons.** Santa Claus melons (picture 8c) are often referred to as the Christmas melon. It has a flesh similar to the honeydew melon, but looks like a small watermelon. The rind color is green, gold, and black.

h. **Spanish Melons.** Spanish melons (picture 8f) are dark green with a smooth rind and oblong shape. They are usually slightly larger than a cantaloupe. The Spanish melon is not commonly procured by the military.

i. **Watermelons.** Watermelons (picture 8g, 8h, 8i) are the king of all the melons. The essential factors for watermelon selection are maturity and size. Judging their quality is extremely difficult unless they are cut in half or quartered. There are two types of watermelons--the long type (figure 2-3) and the round type (figure 2-4).

(1) Good quality watermelons should be relatively smooth. The surface should have a slight dullness, neither shiny nor dull; the ends of the melon should be filled out and rounded; and the underside (belly) should have a creamy color. Larger melons have proportionately more edible flesh. A 30-pound melon is a very popular size. The watermelons should be firm with a juicy, red-colored flesh free of white streaks. The seeds should be dark brown or black.

(2) Poor quality watermelons are evidenced by pale-colored flesh, white streaks, white heart, and/or whitish seeds. These indicate immaturity. Dry, mealy, watery, or stringy flesh are signs of overmaturity or aging after harvest.



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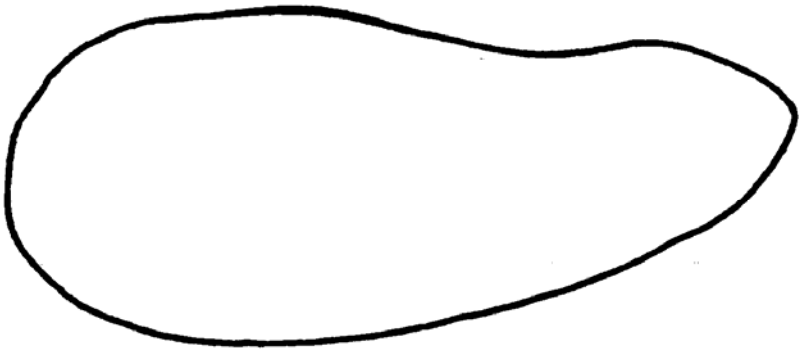

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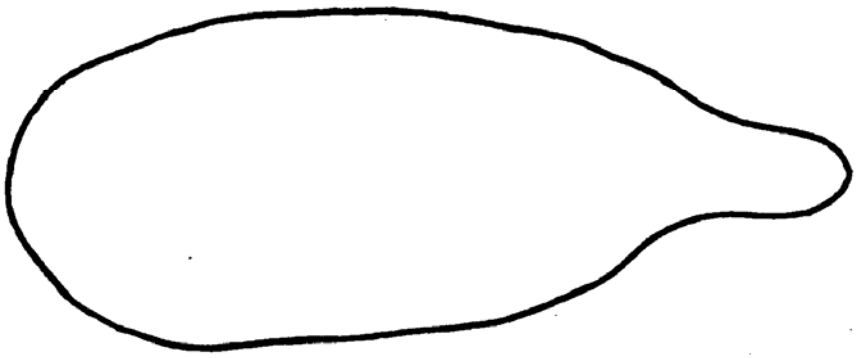
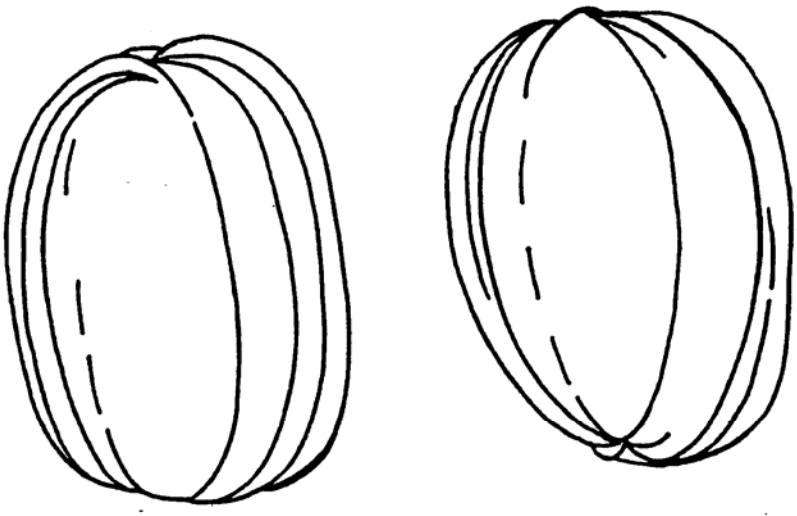


Cull, Not Permissible in U. S. No. 2 Grade

Figure 2-3. Shapes of long type watermelons.



Watermelons of round type illustrated above are permitted in U.S. No. 1 Grade.

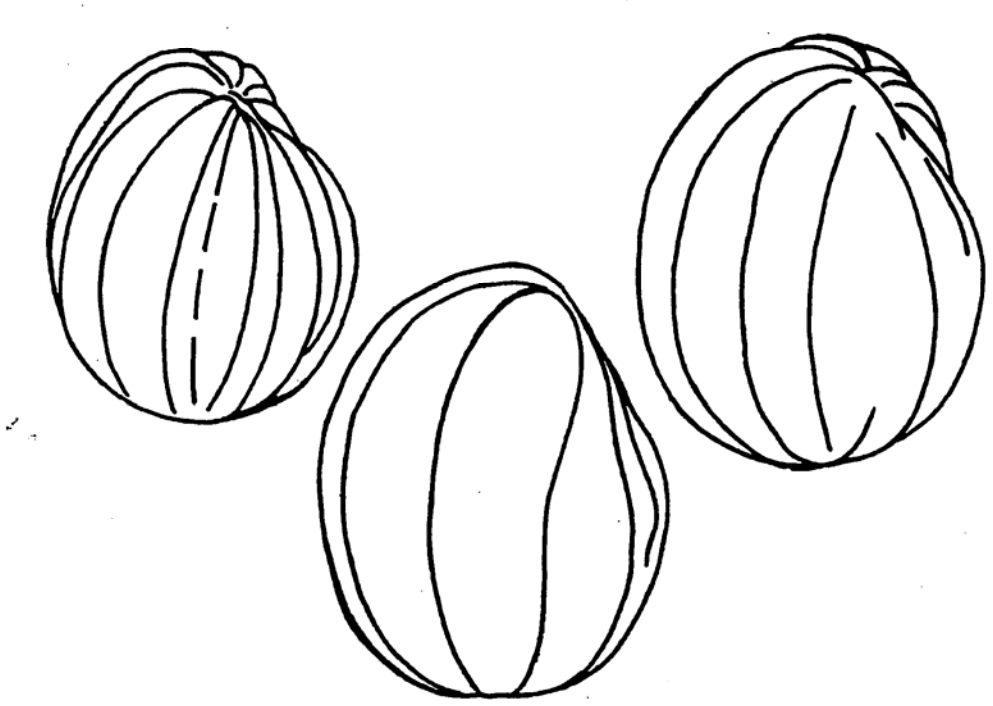


Figure 2-4. Shapes of round type watermelons.

NOTE: Ill-shaped watermelons of round type illustrated above are permitted in US number one Grade.

2-24. NECTARINES

The nectarine (picture 12g) is not a fuzzless peach nor is it a cross between a peach and a plum. The nectarine is a member of the rose family just as are cherries and almonds. The nectarine is, however, closely related to peaches and almonds. Newer varieties have been crossed with peaches in order to develop larger and firmer nectarines. Like the peach, it does not gain sugar after harvest and if not well matured when picked it will be unsatisfactory. Newer varieties are larger, have a bright red external color, yellow flesh, and are characteristically freestone (refer to para 2-27b(1). Because most new varieties have a full red color before they reach maturity, color is not a good indicator of maturity.

a. Good quality nectarines are rich in color, are plump, and will soften slightly along their seam. Most varieties have an orange-yellow ground color between the red areas, but some varieties have a greenish ground color.

b. Poor quality nectarines are usually hard, dull, or slightly shriveled. These are probably immature and of poor eating quality. Among the signs of poor quality are soft overripe fruit and cracked or punctured skin. Russeting or staining of the skin may affect the appearance but not detract from the internal quality.

2-25. ORANGES AND MANDARINS (TANGERINES)

a. **Oranges.** China is the home of the orange. Columbus introduced the seeds to the Americas.

(1) The weight of an orange indicates its juice content. Generally, the heavier an orange is for its size, the better it should be in nutritional and organoleptic terms.

(2) Color is not a sure guide to quality and maturity, much of the Florida and Texas crop has coloring added to the outer skin. The fruit is dipped in, or sprayed with, a harmless vegetable dye solution at the time of packing. This process has no effect on the eating quality of the fruit. Its purpose is purely esthetic. It gives the orange its deep orange color, expected by the consumer.

(3) Varieties of oranges are generally divided into two general classifications, sour and sweet. Sour oranges are not commonly purchased by the military or consumer in the US. Sweet oranges are generally thought of as consisting of four principal kinds:

(a) Common orange (Valencia orange (picture 5e) and the juice orange (picture 5a)). Common oranges are mainly used for juice. Valencias have a tendency, regardless of where grown, to turn from a bright orange hue to a greenish tinge, particularly around the stem end. The quality is not affected since the oranges are amply matured, fully ripe, juicy, and sweet, regardless of the unusual color.

(b) Blood (pigmented) orange (picture 4i). An example of this kind of orange is the ruby.

(c) Acidless orange (no picture). These oranges are grown in some of the Mediterranean areas.

(d) Navel orange (picture 5c). This orange is principally a product of California, but is also grown in Florida and Texas. Notice the navel on the orange in picture 5c.

(4) Good quality oranges, such as the Jaffa (4j) and Valencia (picture 5e), are firm, heavy for their size, and have a fine-textured, bright-colored skin. These oranges have few if any seeds. As stated previously, color is not significant when judging maturity. All oranges are picked mature, depending not only on their color but also on their sugar, acid, and soluble-solids content. Green oranges may be ripe as golden oranges when picked. Sometimes, oranges with a golden color later turn green.

(5) Poor quality oranges are light, puffy, or spongy; usually lack juice; and are of poor flesh content. Very rough skin texture indicates abnormally thick skin and less flesh. Dull, dry skin and spongy texture indicate aging and deteriorated eating quality.

(a) Decay. Soft spots on the surface and discolored, weakened areas of skin around the stem end (button) are indications of decay. Decay is enhanced by cuts or skin punctures.

(b) Russeting. Russeting is often found on Florida and Texas oranges, but not on California oranges. This is a tan, brown, or blackish mottling or speckling over the skin. Russeting has no effect on eating quality and often occurs in oranges with thin skin that may have superior eating quality.

b. **Mandarins.** Mandarins (picture 6f) are smaller than the regular orange.

(1) Mandarins refer to three botanical classifications of oranges. They are:

(a) Satsumas (no picture)

(b) Tangerines (picture 5h)

(c) Miscellaneous hybrids, which include the tangelos (Orlando and Minneola, picture 5b), the tangors (King and Temple, picture 5d), and complex hybrids such as the Robinson, Lee, and Page.

(2) Mandarins (picture 6f) are distinguishable from other oranges, when a mandarin is cut crosswise, it looks identical to an orange in the interior. The segments are arranged in petal fashion and they have a small pulpy core in the center as in the oranges. The primary difference is noticed when the mandarin is peeled. The segments are very compact, and the skin is easily peeled.

(3) Good and poor quality characteristics are basically the same for mandarins as for other oranges. However, the color of mandarins is generally a deeper orange or almost red (notice the color difference between the mandarin (picture 6fj) and the juice orange (picture 5a).

(4) The Temple orange (picture 5d) is classified botanically as a mandarin. The Temple is a hybrid resulting from a cross between a tangerine and an orange. They are generally of a larger size with a slightly rough, red-orange rind. Their shape varies from spherical to slightly flattened. Usually they are firm and juicy with quite a few seeds and have a rich and spicy, sweet-tart flavor.

(5) The Minneola tangelo (picture 5b) is a grapefruit-tangerine cross, but resembles in all characteristics a tangerine. It is still a mandarin. The fruit grows well in desert areas. It has a good size and red-orange appearance. The shape tends to be slightly elongated, often with a small short neck. The pulp is tender and fine textured. The flavor is tart and grapefruit like.

(6) Tangerines (picture 5h) are another type of mandarin. Consumers commonly use the term tangerine for all zipper-skin or slip-skin citrus. In fact, all mandarins, not just tangerines, are characteristically easy to peel. There is a multitude of tangerine varieties. However, the FF&V buyer and consumer identifies the varieties with a rather small deep- orange color; a soft, short neck; and pebbly skin as tangerines. Tangelos are often identified this way and may or may not be further identified as Orlando or Minneola.

2-26. PAPAYAS

Papayas (picture 12h) are native to tropical America, where the plants grow almost like weeds. They are generally bell-shaped, with a neck that resembles the handle of a bell; this is their most outstanding characteristic. Papayas slightly larger than a pear are preferred by most consumers.

a. Good quality papayas are well colored, at least half yellowish, and without a large amount of green. The skin should be smooth, unbroken, and unbruised. It should not show any signs of deterioration or shriveling.

b. Poor quality papayas are more green than yellow and will not yield to slight pressure when held between the palms. Unripe papayas should be ripened at room temperature and then refrigerated and used as soon as possible.

2-27. PASSION FRUIT (GRANADILLA)

Passion fruit (picture 12i) is often called the Purple Granadilla. It grows in South America, Australia and is now being cultivated in California. It is the size and shape of an egg, with a tough purple skin. The flesh is yellow, with many black seeds, and is usually eaten fresh with a spoon. It is also used in cakes, jellies, and processed into a beverage.

a. An offshoot of the granadilla is the Sweet Granadilla. It is not as well known as the Purple Granadilla, although the flavor is generally considered better. Sweet Granadillas are oval shaped, 3 to 6 inches long, and have an orange-brown, tough, leathery skin. The pulp is translucent, yellow-green in color and contains a mass of purple, sweet-acid pulp mixed with flat seeds.

b. One other type of granadilla is the Giant Granadilla which is the largest. It measures 10 inches in length and is oblong. It resembles a short, thick vegetable, yellow-green in color, and contains a mass of purple sweet-acid pulp mixed with flat seeds. Its flavor is inferior to the Purple and Sweet Granadillas.

2-28. PEACHES

a. **General.** There are numerous varieties of peaches (pictures 13, 13b) available all year. They have either white or yellowish flesh. Only the most experienced inspector can distinguish between the different varieties of peaches. Therefore, variety is not an important factor for the Veterinary Food Inspection Specialist.

b. **Types.** What is important is whether or not the peach ordered and delivered is a clingstone or freestone type.

(1) Freestone peaches have pits that separate easily from the flesh when the fruit is mature. This makes them preferable for eating out of hand (fresh) or for freezing.

(2) Clingstone peaches have pits that cling to the flesh very tightly making them inconvenient and undesirable for eating out of hand and are usually used for canning.

c. **Selection for Shipment.** Fully ripe peaches are not harvested, since they are easily damaged in shipment. Therefore, firm, not green, fully mature peaches must be harvested for shipment.

d. **Good Quality.** Good quality peaches should look good and have a "peachy" fragrance. The red color, or blush, on a peach enhances its looks, but the background color should be yellow or at least creamy. They should be fairly firm or just a bit soft upon receipt. For immediate use, peaches should be a deeper reddish-brown color and slightly soft, without bruises.

e. **Poor Quality.** Poor quality peaches may be very firm or hard, with a distinctly green ground color, which probably indicates immaturity. If harvested immature, they will not ripen properly, since the starch will not convert to sugar after harvest. Overripe peaches are indicated by extreme softness and are generally unsuitable for military procurement. Peaches with large flattened bruises, a common defect, will have large areas of discolored flesh underneath and are also unsuitable. Decayed peaches also should not be accepted. Decay starts as a pale tan spot on the skin that expands in a circle and gradually turns darker in color.

2-29. PEARS

a. **General.** There are more than 3000 varieties of pears in the US, but less than a dozen are of commercial importance. Pears are packed and shipped green, because they characteristically develop a finer flavor and smoother texture when ripened off the tree. This is because the sugar content increases after picking, due to the conversion of starch to sugar.

b. **Determining Maturity.** Maturity before picking is best determined by the soluble-solids content, which can be tested with a refractometer. Maturity can also be determined by using a pressure tester. This tester is an instrument consisting of a 5/16-inch-diameter plunger that is applied to a peeled portion of the fruit. The pressure required to penetrate the mature fruit may vary from 10-23 pounds, depending on the area of production and variety of the pear. Usually, the less pressure needed to penetrate, the more mature the fruit.

c. **Ripening.** Pears ripen from the inside out and should not be purchased or held when soft on the outside. At this stage, the inside may be too soft and tasteless. Pears are best for eating when still firm, but not hard. Ripening is best accomplished at room temperature (60^{o} to 65^{o}F) and at a relative humidity of 85 percent to 95 percent. Once ripe, the pears should be stored at a low temperature (as close to 32^{o}F as possible) and in a humid environment, but only briefly, as they should be eaten as soon as possible after ripening is complete.

d. **Storage.** When winter pears are received from storage and they are in a box lined with a polyethylene-sealed bag, the bag should be perforated to admit air when the pears are taken out of cold storage. If the bag is not perforated, the pears will become warm and a harmful level of carbon dioxide may develop. This buildup of carbon dioxide may prevent ripening and coloring.

e. **Main Varieties.** The main varieties of pears are Asian, Bartlett, Anjou, Bosc, Nelis, Comice, and Easter.

(1) The Asian pear or pear-apple (picture 13c) is a varietal type of its own and not a cross between an apple and a pear. It is also called a Japanese pear, Asian pear, Chalea, Oriental pear, and Sholea. The two most prominent varieties are the Yashi and the 20th Century. It is still quite firm. Eating it reveals a crispness somewhat similar to an apple. The shape is likened to a pear. The general appearance is somewhat like the Anjou or Comice pears.

(2) Bartlett pears (yellow skin) (picture 13d) are commonly purchased by the military. This pear is known as the summer pear and is bell-shaped with a fairly thin skin that is a clear yellow when ripe. The flesh is white, smooth, and juicy. They are on the market from July through November. The Bartlett pear is a dessert-quality pear and a good canning pear.

(3) Bartlett pears (red) (picture 13e) have the bell-like shape, size, and qualities of the regular Bartlett. The dark red area turns to a bright crimson as it ripens. It is generally available from August to October.

(4) The Bosc variety (picture 8j) is characterized by a dark yellow skin overlaid with a cinnamon-russet, which may vary in intensity. They are of medium or large size with some yellowish-white flesh, have some grit at the center, have a buttery flavor, and are very juicy. The neck is generally long and tapered. The Bosc is referred to as the "aristocrat of pears."

(5) Comice pears (picture 13g) are medium to large, sometimes extremely large, and tend to be round in shape. The skin is fairly thick, granular, sometimes russeted, and greenish-yellow in color. The flesh is very fine, extremely juicy, melting, and unlike the Bosc, it contains no grit. The Comice variety exemplifies the dessert-quality pear. A later winter variety is the Packham pear (picture 13j). This variety is green, with a bumpy surface, turning to yellow as it ripens.

(6) The Anjou pear (pictures 13h, 13i) is the principal variety of the winter pears. It is generally medium to large in size with a short neck, yellowish-white flesh, and a fairly fine texture with some grit cells at the center, and is juicy with a buttery, spicy, sweet flavor. Unlike some other pears, the stage of ripeness for Anjou pears is not determined by color. It may be yellow, yellowish-green, or green and still be ripe. The breaking point of ripeness occurs when the pear yields to gentle pressure of your thumb at the stem end.

f. **Good Quality**. Good quality pears are those of standard varieties that are firm, free of blemishes, and clean. Generally, big plump pears are the best (see figure 2-5).

g. **Poor Quality**. Poor quality pears show signs of wilting or shriveling, usually accompanied by a dull-appearing skin and slight weakening of the flesh near the stem (an indication of immaturity). These pears will not ripen. The Veterinary Specialist should also look for spots on the sides or blossom ends of the pears. These spots may indicate corky tissue underneath. Also, excessive bruises are not acceptable. See figure 2-6.

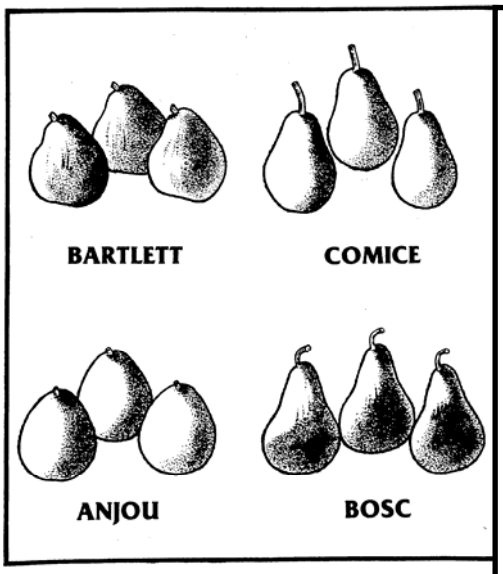


Figure 2-5. Shapes of pears.

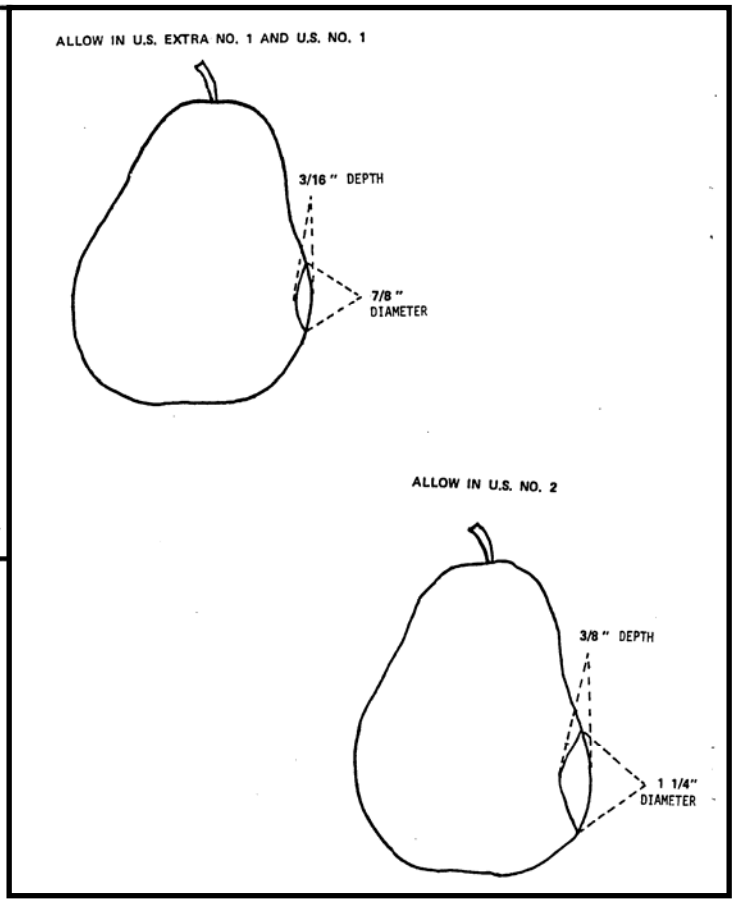


Figure 2-6. Allowable limits of bruises on pears.

2-30. PERSIMMONS

a. **Varieties.** Persimmons come in two major varieties: Hachiya (figure 5f) and the Fuyu (picture 5g).

(1) The Hachiya persimmon (picture 5f) accounts for 90 percent of the persimmons marketed in the US. It is slightly pointed in shape and has a bright orange color. It has a sweet and rich flavor when soft and ripe.

(2) The Fuyu persimmon (picture 5g) has the same bright color as the Hachiya but is flatter in shape.

b. **Ripeness.** Persimmons are often thought of as being astringent in flavor. This notion can be easily acquired if persimmons are eaten before being properly ripened. Hull ripeness cannot be determined by color alone because persimmons attain full skin color before the fruit is ripe. This is the cause for frequent consumer complaints. Persimmons can be ripened by wrapping them in foil and placing them in a freezer overnight. The next morning, the fruit should be thawed at room temperature until soft. The thawed persimmons are then ready to eat and must be used immediately.

c. **Good Quality.** Good quality persimmons are well shaped, plump, smooth, and highly colored. The skin should be unbroken and the stem cap attached.

e. **Poor Quality.** Poor quality persimmons will lack color, have breaks in the skin, stem caps not attached, and have rough skin. If the stem cap is not attached, the fruit is more likely to decay.

2-31. PINEAPPLES

a. **General.** Pineapples (picture 14a) are a tropical fruit and get their name from their shape and appearance, which resembles a pinecone. Pineapples, that are to be used fresh, are packed at the peak of ripeness and flavor. This is necessary because, unlike bananas and pears, pineapples have no starch reserve for conversion into sugar. Therefore, they will not ripen after harvest. Storing pineapples may result in a color change to the shell, usually accompanied by softening, but the pineapple will not become sweeter. The military commonly procures mature green pineapples and these will normally turn yellow to orange within a few days at room temperatures.

b. **Good Quality.** Good quality pineapples should have a bright color, fragrant pineapple odor, and a very slight separation of the eyes or pips (the berry-like fruitlets patterned in a spiral on the fruit core). The crown leaves should have a fresh appearance and be deep green. Mature pineapples are usually dark green, firm, plump, and heavy for their size. As a rule, larger pineapples have a greater proportion of edible fruit. As they ripen, they turn from green to orange and yellow until a fully colored golden yellow, orange yellow, or reddish brown appears, depending on the variety. The color of skin or the ease of removing the crown leaves is not an indicator of ripeness. Only a sugar test using a refractometer is reliable.

c. **Poor Quality.** Poor quality pineapples are indicated by sunken or slightly pointed pips, a dull yellowish-green color, and a dried appearance, which are all signs of immaturity. Bruised fruit exhibits discolored or soft spots, which are susceptible to decay. Decay is also indicated by the presence of mold, unpleasant odor, and eyes that are dark and watery.

2-32. PLUMS

a. **General.** There are more than 2,000 varieties of plums marketed in the world and only experts can distinguish between them. There are two main types--the Japanese varieties and the European varieties. The Japanese plums are medium to large and very juicy; they may have several shapes. None of the Japanese varieties are blue or purple. European varieties are always blue or purple, usually smaller, and oval or roundish. The European varieties are considered to be milder in flavor and have a firmer texture. The purple plum (picture 14e), red plum (picture 14f), and yellow plum (picture 14g) are the most common colors purchased. Other colors are amber, purplish-crimson, bright yellow, red-purple, black red, and many others. Unless specific varieties, colors, or types are requested, the Veterinary Food Inspection Specialist's identity inspection ends when he or she determines that the fruits are indeed plums.

a. **Good Quality.** Good quality plums are indicated by good color for the variety being delivered. They should be in a firm to a slightly soft stage of ripeness.

b. **Poor Quality.** Poor quality plums may have skin breaks, punctures, or brownish discolorations. Immature plums are relatively hard, poorly colored, very tart, and sometimes shriveled. Over maturity is indicated by softness and sometimes by leaking or decaying skin and flesh.

2-33. POMEGRANATES

a. **General.** The "apple with many seeds" is a literal interpretation of the name pomegranate (picture 14b). Pomegranates are about the size of a large apple with a tough hard rind. Pomegranates vary in color from yellow to pink to deep red. Large pomegranates are better because the seeds (kernels) are juicier and better developed. Regardless of their size, all pomegranates have approximately the same number of seeds. The seeds are surrounded by a spongy-soft membrane, which is bitter and not eaten. Only the seed is edible.

b. **Good Quality.** Good quality pomegranates are indicated by juicy seeds and seed cavities, bright color, and fresh appearance.

c. **Poor Quality.** Poor quality pomegranates look hard and dry with an absence of good color characteristic of the variety.

2-34. PRICKLY PEARS

Prickly pears (picture 13k) are the delicious fruit of a species of cactus. They are also known as tuna or Indian figs. They are most abundant during fall and early winter. They range in color from yellow to crimson and have spines that can be easily removed by singeing before the fruit is peeled. Most prickly pears sold in markets have already been de spined. Prickly pears are cut into pieces, or sliced, for eating.

2-35. PRUNES

Only a few varieties of prunes are marketed and they are all very similar. Prunes are actually a variety of plums that are particularly suitable for drying. Fresh, ripe prunes can be separated from the pit like a freestone peach. They are blue-black or purplish black, oval, and firm fleshed. The Italian variety (picture 14d) is the most common prune in the fresh state. Good and poor quality indicators are similar to those for plums.

2-36. QUINCE

Quince (picture 14i) is generally grown for use in jelly-making and preserving. Quinces bruise easily and must be handled carefully. They have a reasonably long storage life if kept in a cool, dry place. Their shape may be round or pear-like and resemble an apple with a misshapen stem end. The yellow skin surface is wooly, and the flavor is more acid-bitter than an apple. It has numerous hard seeds throughout the flesh.

a. Good quality quinces are firm, free from blemishes, and show a pale yellow color when fully ripe. Best-quality quinces are large and smooth.

b. Poor quality quinces are small and knotty, may have blemishes, and are not well colored.

2-37. RHUBARB (PIEPLANT)

a. **General.** A strictly botanical classification of rhubarb (picture 27c) would classify it as a vegetable, but by common use it is classified as a fruit. It is high in acidity and flavor. Rhubarb is frequently referred to as "pieplant." It has a characteristically rich, dark red color with coarse green foliage, and a very tart flavor when field grown. It may be received with or without its leaves. When rhubarb is grown in a hothouse, it has a light pink color, with small leaves, and is almost stringless. It has a milder flavor than field-grown rhubarb, and the tops are usually trimmed prior to sale.

b. **Good Quality.** Good quality rhubarb is fresh, firm, crisp, tender, and either cherry red or pink in color. The stalks should be thick with the younger stalks, those having underdeveloped leaves, being the most tender and delicate in flavor.

c. **Poor Quality.** Poor quality rhubarb will have a dull color and will be flabby or wilted caused by transpiration or age. These are called stale plants.

2-38. UGLI FRUIT

Ugli fruit (picture 6h) is an increasingly popular fruit because of its miserable-looking appearance. It is normally the size of a grapefruit. The peel is extremely rough. The fruit is badly disfigured, and it usually has light-green blemishes which turn orange when the fruit is mature. Ugli fruits are very juicy, with large quantities of pulp, and have a delightful orange-like flavor. The skin tends to be loose and the shape spherical to oblate. Good and poor quality characteristics, disregarding normal ugliness, are the same as for grapefruit.

Continue with Exercises

EXERCISES, LESSON 2

INSTRUCTIONS: Answer the following exercises by marking the lettered response that best answers the exercise, by completing the incomplete statement, or by writing the answer in the space provided at the end of the exercise.

After you have completed all the exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers. For each exercise answered incorrectly, reread the material referenced with the solution.

SPECIAL INSTRUCTIONS FOR EXERCISES 1 THROUGH 7. In exercises 1 through 7, match the definitions in column A with the correct term in column B. Match the term by entering the letter identifying the term in the space provided in column A. Each term may be used only once.

COLUMN A **Definition**	**COLUMN B** **Terms**
1. The end of the fruit that has a scar and is opposite the stem end.	a. Scald.
2. A fruit that is ready to eat.	b. Blossom end.
3. A fruit that is fully developed.	c. Mature fruit.
4. A lacy, brownish, blemish type coating on top of the skin.	d. Russeting.
5. The basic or background color of a fruit.	e. Netting.
6. A blemish, or brownish discoloration, on the skin of apples in storage.	f. Ground color.
7. Network of lines running randomly across the rind of melons.	g. Ripe fruit.

8. Is it true that green oranges may be just as ripe as golden-colored oranges?

   a. Yes.

   b. No.

9. What instrument is best used to test the soluble-solids content of pears?

   a. Psychrometer.

   b. Baby dial thermometer.

   c. Mercurial thermometer.

   d. Refractometer.

10. What variety of pear is bell-shaped and has a fairly thin clear-yellow skin when ripe?

    a. Bartlett.

    b. Anjou.

    c. Bosc.

    d. Comice.

11. The reason persimmons are often considered astringent by the consumer is that they are probably _____.

12. One distinguishing characteristic of the Red Delicious apple is that it has _____ (bumps) on the blossom end of the fruit.

13. Pears achieve best eating quality after they are harvested, if they are allowed to ripen properly. What is another fruit that achieves best eating quality in this way?

    a. Orange.

    b. Banana.

    c. Avocado.

    d. Kiwi fruit.

14. Which of the following berries should be purchased with the stem cap attached?

    a. Blueberries.

    b. Raspberries.

    c. Cranberries.

    d. Strawberries.

15. True or False. Skin defects of grapefruit such as scale, scars, thorn scratches, and discoloration are unsightly and affect the eating quality of the fruit.

    a. True.

    b. False.

16. A new fruit item has arrived at the commissary store. It has a rough skin, looks like a grapefruit, and has a loose skin. Which one of the following is the fruit item?

    a. A lemon.

    b. A kiwi fruit.

    c. An ugli fruit.

    d. A kumquat.

17. When checking cantaloupes for maturity, the food inspector checks the stem end of the fruit. If the stem is completely gone, leaving a smooth symmetrical shallow basin, it is said to have a_____.

18. What color should a mango be that is ready to eat?

    a. Predominantly green.

    b. Predominantly orange.

    c. Predominantly red.

    d. Predominantly yellow and red.

19. What is a fruit that should not be stored near flour or cereal or any other item that may get infested, nor stored with onions, fish, or other odorous items?

    a. Apricot.

    b. Fig.

    c. Date.

    d. Currant.

20. The true indicator of ripeness of pineapples is skin color.

    a. True.

    b. False.

21. Rhubarb that appears to be wilted or flabby probably has been subjected to excessive:

    a. Transpiration.

    b. Respiration.

    c. Photosynthesis.

22. Which one of the following is not a variety of apples?

    a. Grannie Smith.

    b. McIntosh.

    c. Jonathan.

    d. Winesap.

    e. Lambert.

    f. Spartan.

23. Which one of the following is not a variety of cherries?

    a. Bing.

    b. Schmidt.

    c. Haralson.

    d. Chapman.

    e. Republican.

    f. Black Tartarian.

24. Which melon has white flesh?

    a. Canary melon.

    b. Crenshaw melon.

    c. Cantaloupe melon.

    d. Persian melon.

    e. Watermelon.

25. Which variety of orange listed below is a mandarin orange?

    a. Valencia.

    b. Blood.

    c. Navel.

    d. Temple.

    e. Jaffa.

    f. Juice.

26. Are clingstone peaches the preferred type of peach for eating out of hand (fresh)?

    a. Yes.

    b. No.

27. The Hachiya is the most common _____ marketed in the United States.

    a. Plum.

    b. Pomegranate.

    c. Persimmon.

    d. Prune.

    e. Passion fruit.

    f. Pear.

28. The Hass is the most common _____ marketed in the United States.

a. Lime.

b. Banana.

c. Fig.

d. Grapefruit.

e. Avocado.

f. Grape.

29. What is the Criterion a common variety of?

a. Apple.

b. Mandarin orange.

c. Banana.

d. Cherry.

e. Melon.

f. Lemon.

30. What is the Star Ruby a sweeter variety of?

a. Blood orange.

b. Raspberry.

c. Grapefruit.

d. Grape.

e. Plum.

f. Tangerine.

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES, LESSON 2

1. b (para 2-2a)
2. g (para 2-2h)
3. c (para 2-2f)
4. d (para 2-2i)
5. f (para 2-2d)
6. a (para 2-2j)
7. e (para 2-2g)
8. a (para 2-25a(2))
9. d (para 2-29b)
10. a (para 2-29e(2))
11. Not fully ripe (para 2-30b)
12. Five points (bumps) (para 2-3a(9))
13. b (para 2-6b)
14. d (para 2-8f)
15. b (para 2-14c)
16. c (para 2-38)
17. Full slip (para 2-23b(1))
18. d (para 2-22b)
19. c (para 2-12)
20. b (para 2-31a)
21. a (para 2-37c)

22. e (paras 2-3b and 2-10b)

23. c (paras 2-10b and 2-3b)

24. a (para 2-23)

25. d (para 2-25a, b)

26. b (para 2-28b)

27. c (para 2-30a)

28. e (para 2-5e)

29. a (para 2-3b(2))

30. c (para 2-14a)

End of Lesson 2

LESSON ASSIGNMENT

LESSON 3	Identification of Fresh Vegetables.
LESSON TEXT	Paragraphs 3-1 through 3-72.
LESSON OBJECTIVES	After completing this lesson, you should be able to:

3-1. Identify common terms used in vegetable inspection.

3-2. Identify names of varieties of vegetables that are of commercial importance.

3-3. Identify distinguishing characteristics of specific vegetables.

SUGGESTION After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

LESSON 3

IDENTIFICATION OF FRESH VEGETABLES

3-1. INTRODUCTION

The purpose of this lesson is to provide information about the kinds of vegetables that you can find in produce departments and may be called upon to inspect. Fresh vegetables are available throughout the year at prices the consumer can pay, although the best buys and selections are found during the season in which the item is most plentiful. Fresh vegetables contribute to good health because they provide many nutrients per calorie. Americans are eating more vegetables more often and preparing vegetables in a greater variety of ways.

3-2. ALFALFA SPROUTS

Alfalfa sprouts (picture 18a) are gaining tremendously in popularity and are now considered a "normal vegetable." They are sold as either living sprouts or as bagged sprouts. The ideal storage temperature is 34^{o} to 36^{o}F with a relative humidity of 90 percent to 95 percent. The living type has a natural shelf life of up to 1 month, from the farm to consumer.

a. Alfalfa sprouts will show well-colored, green, leafy tops. The green color is a result of their high chlorophyll content. The bagged variety is generally lighter in color because the leaf formation is curtailed when they are packaged.

b. Good quality alfalfa sprouts are considered fresh when they have whitish roots and green leaves. If not watered, the living variety will dry out and turn a brownish color.

3-3. ARTICHOKES-GLOBE ARTICHOKES

The Globe artichoke (picture 18b) is the large, unopened flower bud of a plant belonging to the thistle family. The numerous leaf-like parts making up the bud are called scales. The scales are strong, prickly, and deep cut. Size has little to do with quality or flavor. It is not related to the Jerusalem artichoke (picture 29j).

a. Good quality Globe artichokes should have compact, plump globes that are heavy (in relation to size). These globes should yield slightly to pressure and have large, tightly clinging, green, fresh-looking, fleshy leaf scales.

b. Poor quality Globe artichokes have large areas of brown; they may have spreading scales, which are a sign of age and an indicator that the edible portions will be tough and dry. Bruised areas are usually grayish-black. Also undesirable is evidence of mold growth or worm injury.

3-4. ARTICHOKES--JERUSALEM ARTICHOKES

Jerusalem artichokes (picture 29j) are actually tubers and are the roots of a particular variety of a North American sunflower plant. Another common name for them is sunchokes. Jerusalem artichokes are not related to Globe artichokes (picture 18b), nor do they have anything to do with Jerusalem. They may be cooked or eaten raw. This food is very important for diabetics, because the carbohydrate in the tuber is not a starch and can be eaten without a problem.

a. Good quality Jerusalem artichokes, when cooked, taste like the Globe artichoke. When raw, they are crisp, crunchy, and possess a delicate nutty flavor. They may vary in length up to 3 inches.

b. Poor quality Jerusalem artichokes are indicated by shriveling. This is due to exposure of these sensitive items to air. Protection can be afforded by refrigerating them in a plastic-film bag that will inhibit the transpiration process.

3-5. ASPARAGUS

Asparagus (picture 18c) is a member of the lily family, which also includes such plants as onions, garlic, leeks, lilies, tulips, and gladiola. Varieties of asparagus are few in number and rather insignificant. However, asparagus is classified into two general types based on color. The two types are green and white. The green type, which is commercially more important, has spears that become dark green in sunlight. The white type has light green or whitish spears. The white type should not be confused with white (blanched) asparagus, grown primarily for canning in the US. The green type is usually cut just as soon as the tips of the stalks come above ground, about 8 inches. Because of this factor, it is considered an early spring crop. White asparagus is the same variety, but it is clipped while most of the stalk is still below ground.

a. Good quality asparagus is exhibited by close, compact tips, smooth, round spears, and a fresh appearance. A rich green color should cover most of the spear. Usually, only the green portion of the green asparagus is tender; so this factor is extremely important as a quality factor.

b. Poor quality asparagus may have tips that are open and spread out. The tips may be moldy or decayed. Spears that are ribbed (with ridges up and down or around the spears) are undesirable. All of these factors are signs of aging and mean the product will be tough and have poor flavor. The Veterinary Food Inspection Specialist should also check for sand, as sand grains can lodge between the scales or in the tips of the spears. Even though the asparagus spears are washed, it is very difficult to remove this sand.

3-6. BEAN SPROUTS

Bean sprouts (picture 18d) may be eaten cooked or raw. Regardless of how they are to be eaten, they should have a fresh delicate flavor. Their unusual shape and their crunchy texture make them a novelty-type addition to salads and main dishes. They are widely used in Chinese cooking.

a. Good quality bean sprouts are fresh looking and crisp and have tips that are not dried out. The shorter the bean sprouts, the younger and more tender they are likely to be.

b. Poor quality bean sprouts may be a dull off-color for the variety. They may be soft and wilting or have dry tips.

3-7. BEANS--SNAP BEANS

Both string beans and stringless beans are available. Stringless beans comprise practically all of today's production. Snap beans are sometimes called string beans, and they may be green (picture 18h) or waxy yellow (picture 18j). Some are flat and others are round. Selection is a matter of personal taste, since all are equally good. String beans are available all year long. They are actually immature pods of kidney beans that are picked while the seeds are tiny. They may be of two general types, bush or vining. The vining type is also called a pole bean.

a. Good quality beans, regardless of color or type, will have a fresh, bright appearance, with good color for the variety. Young tender beans with pods in a firm, crisp condition are best. Good fresh beans will snap when broken. The seeds should be small and immature, except in the case of pole beans, which usually have larger seeds. If the seeds are half grown or larger, the pods will tend to be tough, except those of pole beans. Beans should have no strings. The Veterinary Food Inspection Specialist can check for strings by breaking the bean and pulling the two halves gently apart.

b. Poor quality beans usually have wilted or flabby bean pods, serious blemishes, and decay. Over maturity is indicated by thick, tough, fibrous pods and should not be accepted.

3-8. BEANS--VARIETY BEANS

In the bean or legume family, there are a variety of produce available to the consumer. Some have come into general use in the US only recently, while others are traditional in American cooking.

a. **Lima Beans.** Lima beans (picture 18i) are flat and kidney-shaped. The bean itself should be plump, with a tender skin of good green or greenish-white color. There are two varieties, one smaller and one larger. Good quality lima beans have well-filled pods of a dark green color. Poor quality lima beans have flabby pods. Lima beans are native to South America.

b. **Black-eyed Peas.** Black-eyed peas (picture 23j), a popular variety of southern peas or cowpeas may be purchased like snap beans in pods, but usually they are purchased shelled, in dry form. They are easily identified by the black "eye" at the blossom end.

c. **Garbanzo Beans.** Garbanzo beans (picture 18g) are sometimes called chick peas and are widely used in Mediterranean and Spanish-American cooking. These beans are a high-protein food and, along with lima beans, are relatively high in calories.

d. **Lentils.** Lentils (no picture) are grown for the seeds, which are used for food. Lentils are considered to be among the first crop domesticated, probably in the Near East. Lentils are sold in dry form and are divided into two types according to seed size, the larger and the smaller.

e. **Soybeans.** Soybeans (no picture) can be distinguished by their fuzzy pods, which are flatter than those of peas. It is used as a vegetable at the immature bean stage. Soybeans generally have a richer flavor than common beans and are considerably higher in food value.

f. **Fava Beans.** Fava beans (picture 18f) are a comparative newcomer to America. They have a long, round, velvety pod. They resemble the lima bean except they are rounder, with thick, somewhat larger pods. They are held in high esteem by epicures.

3-9. BEANS--DRY BEANS

The form of dry beans may be globular to kidney-shaped. Seed coat colors can be white, yellow, greenish, pink, red, purple, brown, or black, and the color may be solid, stripped, or mottled. Popular dry beans among consumers are: navy beans (white beans), kidney beans (red beans), pinto beans (brown, mottled beans), and black beans. There are no pictures of dry beans in the Produce Identification Guide.

3-10. BEETS

Beets (pictures 19a, 19b, and 19c) are often sold in bunches with the tops still attached. They may also be sold with the tops removed, on the basis of weight. The fall crops are usually sold without the tops. Beets are grown for their fleshy, enlarged top roots. Beets with tops cannot be stored as long as those without tops, since the tops are extremely perishable. Beets are in the same botanical family group as spinach and chard. See Appendix C.

a. Good quality beets are firm and round. They have a slender top root (the large main root) and a rich, deep color. They are smooth over most of their surface. If the beets are bunched, you can judge their freshness by the condition of the tops. Badly wilted or decayed tops indicate a lack of freshness. The roots may be satisfactory if they are firm.

b. Poor quality beets may have elongated shapes. They may have areas around the top surface which are tough, fibrous, and strongly flavored. A wilted, flabby appearance usually indicates excessive exposure to the air and loss of quality.

3-11. BOK CHOY (CHINESE CHARD)

Bok choy (picture 15a), sometimes called white mustard cabbage, resembles chard and celery. It has numerous dark green leaves with white stems that are often topped with a pale yellow flower. The flavor is slightly stronger than that of Chinese cabbage. Bok choy is good as a vegetable or in soups. It is normally purchased as a whole cluster of leaves or just the heart or tender stem cluster with the tough exterior stalks removed. The heart of the bok choy is called choy sun (picture 12j).

a. Good quality bok choy has fresh, well-colored, crisp leaves.

b. Poor quality bok choy may be wilted, discolored, or otherwise decayed. Quality factors are similar to celery.

3-12. BROCCOLI

Broccoli (picture 19d) belongs to the same botanical family as cabbage and mustard greens and is a close relative of cauliflower. It is available all year, but because it grows better in cool weather, it is less abundant in July and August.

a. Good quality broccoli has firm and tender stalks and compact clusters of small flower buds. None of the flower buds should be open enough to show the bright yellow flowers. The bud clusters should be dark green or sage green or even green with a decidedly purplish cast. The stems should not be too thick or tough and should appear green and fresh.

b. Poor quality broccoli exhibits spreading bud clusters, enlarged or open buds, yellowish-green color, or wilted condition. These are generally signs of overmaturity and of remaining too long in the display case. Toughness and woodiness of the stalks and stems also point to age. Noticeably bruised broccoli is unacceptable. Soft, slippery, water-soaked spots on the bud cluster are signs of decay.

3-13. BRUSSELS SPROUTS

Brussels sprouts (picture 19f) are another close relative of the cabbage. They develop as enlarged buds on a tall stem with one sprout appearing where each main leg is attached. The sprouts are cut off and are usually packed in small containers.

a. Good quality brussels sprouts are firm, compact, fresh, have a bright appearance, and good green color. They should be free of blemishes.

b. Poor quality brussels sprouts are puffy, soft, or wilted. They have yellowing leaves, which are a sign of age. Worm-eaten sprouts should be rejected, as well as sprouts with a smudgy, dirty appearance that indicates the presence of aphids.

3-14. CABBAGE

a. **General.** Cabbage belongs to the mustard family, or crucifers, which are important for the minerals and vitamins that they furnish. Cabbage and related vegetables are classified as cole crops (Brassica oleracea), see Appendix C. There are several common varieties of cabbage, but the quality characteristics are generally the same for all types. The major groups are: smooth-leaved green cabbage (picture 15d), crinkly-leaved savoy cabbage (picture 15g), and red cabbage (picture 15f). They are all suitable for any use, but the savoy and red varieties are more in demand for use in slaws and salads. Cabbage is sold fresh (and called new cabbage) or from storage (and called old cabbage).

b. **Types of Cabbage.** Industry generally classifies cabbage as Danish, domestic, pointed red, and savoy. This system seems to be more useful to produce people than the botanical classification.

(1) Danish cabbage is solid-headed, late maturing, cabbage commonly used for storage and late marketing. It is sometimes called Hollander. The head shape is round, oval, or sometimes a bit flattened.

(2) Domestic cabbage is not as compact as the Danish cabbage but is reasonably solid and either flat or round. The leaves are generally crinkled or curled.

(3) Pointed cabbage (no picture) has conical or pointed heads with comparatively smooth leaf surface.

(4) Red cabbage (picture 15f) is known by its red or purple color. The dark red or purple varieties are usually as compact as the Danish. The lighter red varieties are usually only fairly hard and are more like the domestic cabbage.

(5) Savoy cabbage (picture 15g) is a specialty crop grown only in a few states. It has pronounced crumpling of the leaf tissue throughout the heads, and a yellowish-green color.

c. **Celery Cabbage.** Celery cabbage (picture 15h) has a shape similar to celery. It is firm and has a celery-shaped head with flat white stalks. Its leaves have a medium green color and ragged edges.

d. **Chinese Cabbage.** Nappa (Chinese) cabbage (picture 15e) is a novelty cabbage. It has the leaf-shaped appearance of Romaine lettuce, but still resembles cabbage in other respects. It is used principally in oriental cooking and is sometimes used in salads. Its long, oval-shaped head is best when firm, fresh, and well-blanched.

e. **Good Quality.** Good quality cabbage should be characterized by firm heads that are heavy for their size. Outer leaves should be green or red in color (depending on type), reasonably fresh, and free from serious blemishes. The wrapper leaves fit loosely on the head and are usually discarded, but too many loose wrapper leaves cause undesirable waste. Early-crop cabbage may be soft or only firm and is suitable for immediate use if the leaves are fresh and crisp. Cabbage out of storage is usually trimmed of all outer leaves and lacks green color, but is satisfactory if not wilted.

f. **Poor Quality.** Poor quality new cabbage may be wilted or have decayed outer leaves or leaves turning decidedly yellow. Worm-eaten outer leaves often indicate worm injury which penetrates the head. Old cabbage with badly discolored, dried, or decayed leaves is probably overaged. Separation of the stems at the base of the head also indicates excessive age.

3-15. CARROTS AND CARRETTES

Carrots (picture 19h) and carrettes (Baby carrots, picture 19g) are of the parsley family, which also includes dill, caraway, coriander, anise, parsnips, celery, Peruvian carrots (arracacha), and more than 2500 other species. Carrots have worldwide distribution and are native to Southwestern Asia. Carrots are grown for their fleshy roots and are available the year around. Most are marketed when relatively young, tender, well-colored, and mild-flavored--an ideal stage for use as raw carrot sticks. The larger carrots are packed separately and used primarily for cooking and shredding.

a. Good quality carrots should be well-formed, smooth, well-colored, and firm. They may be topped (leaves removed) or still have their leaves.

b. Poor quality carrots may have large, green, sunburned areas at the top, which must be trimmed prior to sale. Carrots that are flabby from wilting or show spots of soft decay are not acceptable. Excessively forked, rough, or cracked carrots are also undesirable.

3-16. CAULIFLOWER--REGULAR AND PURPLE

The name cauliflower (picture 19i) comes from Latin words meaning cabbage flower or stalk flower. It is generally sold with most of the jacket leaves removed and is wrapped in a clear plastic film. The white edible portion is called the curd, and the heavy outer leaf covering is made up of the jacket leaves. The size of the head has no relevance to quality.

a. Good quality cauliflower has a white to creamy-white, compact, solid, clean curd. A slight granular or rice-like texture of the curd will not hurt the eating quality, provided the surface is compact. Small green leaflets should be ignored. When still attached, the jacket leaves will be a good green color if the cauliflower is fresh.

b. Poor quality cauliflower is characterized by curds that are spreading, which are a sign of aging or over maturity. Severe wilting and numerous discolored spots are objectionable on the curd. A smudgy or speckled appearance of the curd is a sign of insect injury, mold growth, or decay; it should be avoided.

3-17. CELERY-REGULAR

Celery is popular for its many uses and its availability all year. Although it is not practical to specify variety when ordering, there are two main varietal groups that the veterinary food inspection specialist should be familiar with. The green, (picture 20a), also called Pascal, is the most common, making up 85 percent or more of the total production. The second group is called the Golden Heart (no picture), and it has a bleached white appearance. Quality characteristics are the same for both groups as well as for the hearts of the stalks (picture 20b). The hearts of the stalks are used primarily for relish trays.

a. Good quality celery should be fresh and crisp. The stalks, which consist of several branches, should have a solid, rigid feel, and the leaflet should be fresh or only slightly wilted. A glossy surface is preferable with stalks of light green or medium green and mostly green leaflets. See figures 3-1 and 3-2. Notice the difference in the thickness of the stalks between celery with well developed lower limit and fairly well developed lower limit.

b. Poor quality celery may be wilted, with flabby upper branches or leaf stems. Celery with pithy, hollow, or discolored centers in the branches is not good. Internal discoloration will show as gray or brown on the inside surface of the large branches near the base of the stalk. Equally objectionable is celery affected by:

(1) Blackheart, of the small center branches.

(2) Insect injury in the center branches or the insides of outer branches.

(3) Long, thick, seedstem in place of the usually small, tender, heart branches.

Figure 3-1. Celery US Extra No. 1.
Well developed lower limit.
Width and thickness of midribs.

Figure 3-2. Celery US No. 1.
Fairly well developed lower limit.
Width and thickness of midribs.

3-18. CELERY ROOT (CELERIAC)

Celery root or celeriac (picture 20c) is cultivated for its root rather than its stalk. The leaves are not eaten. It is grown the same as celery except that no branching is required, as the only part of interest is the corn, the short bulblike fleshy stem. The bulbtype root is a light brown and is used primarily in stews and soups. The bulb can be used as a substitute for cooked potatoes. Good celery root should be small. As it becomes larger, it is less tender and woody.

3-19. CHARD

Green chard (picture 15i), red chard (picture 15j), and Swiss chard (no picture) are from a species of beet that does not develop an enlarged, fleshy root. Chard, spinach, beets are in the goosefoot family. (See Appendix C.) They have large leaves with thickened midribs. Both ribs and leaves are good to eat. The leaves may be used as greens. Like all salad greens, it is important that the leaves be fresh, crisp, and of a good, green color. The ribs (stems) may be cooked like celery. The fiber is very delicate, similar to asparagus.

3-20. CHOY SUN

Choy sun (picture 15b) is the heart of the bok choy (picture 15b). This corresponds to the celery heart (picture 20b), which comes from celery (picture 20a). Choy sun is the heart or tender stem cluster of a bok choy; that is, it doesn't have the tough exterior stalks. It is used as a vegetable and in the preparation of chinese chop suey and chow mein. It has the same quality characteristics as for bok choy.

3-21. CORN-DECORATIVE INDIAN

Decorative Indian corn (picture 20g) is purchased for decorative purposes only and should be inspected on the basis of appearance.

3-22. CORN

Corn is grouped by kernel color. The colors are white (picture 20f), yellow (picture 20e), and bi-color (no picture). There are over 200 varieties of corn grown in the US. Commercially, the most important varieties are yellow hybrids. Commonly, these hybrids are marketed as the Golden Bantam variety, but may be another variety. Whether yellow or white, properly developed corn will have even numbered rows of kernels. Generally, there will be 12 to 14 rows. Fresh sweet corn is available practically every month of the year with heaviest supplies from May to September. Winter supplies come from Florida and California. Fresh corn does not store well and should be used as soon as possible. If stored at all, it should be kept very cold and at a very high relative humidity. This is because the sugar of the corn converts to starch very quickly at high temperatures. For example, if stored at room temperature for 24 hours, approximately 50 percent of its sugar content will be converted to starch.

a. Good quality corn is evidenced by fresh, green-colored husks and kernels that are milky, tender, and sufficiently large so as to leave no space(s) between the rows. The kernels should be firm enough to puncture rather easily when slight pressure is applied by a thumbnail. When punctured, a milky fluid should squirt out which indicates a desirable stage of maturity. The ears should be filled to the tip and no rows should be unfilled.

b. Poor quality corn may be damaged or aged. Damaged or aged corn may be dry and have yellowing of the straw-colored husks. Shrinking or shriveling of the kernels and a starchy rather than milky fluid in the kernels are also signs of poor quality.

3-23. CUCUMBERS

a. **General.** Cucumbers, cukes for short, are divided into four categories based on their use. They are: field grown (no picture), slicing or table varieties, the regular cucumber (picture 20h), pickling varieties (picture 20j), and the forcing or greenhouse types (no picture), which are grown under artificial heat. Cucumbers are commonly washed or brushed, graded for size and defects, and waxed in central packing plants.

The vegetable wax used is edible and helps to retard transpiration and respiration. There are approximately 20 species of cucumbers. There are green, white, and yellow-colored cucumbers. There are long, short, thin, and stubby cucumbers. There are smooth-skinned and rough-skinned cucumbers; and there are early and late-maturing cucumbers.

b. **The European Cucumber.** The European cucumber, also called the English Hydroponic varieties (picture 20i), are lighter green than the field-grown varieties and measure 2 to 2-1/4 inches in diameter by 12 to 20 inches in length. They are larger than the slicing cucumbers, which usually measure up to 2-1/8 in diameter and 6 to 12 inches in length. These European varieties are seedless and are grown in a greenhouse environment without pollinating insects.

c. **Good Quality.** Good quality cucumbers are indicated by firmness, fresh, bright appearance, good shape (see figures 3-3, 3-4, and 3-5), and a good, green color. Some varieties characteristically have a small amount of whitish green at the top and on the ridged seams. This is not a sign of poor quality in these varieties. Soft and immature seeds indicate good quality. Size by itself is not a true quality factor, but it is a consideration as consumers often seek certain sizes for slicing.

d. **Poor Quality.** Poor quality cucumbers may have a dull or yellow color and an overgrown puffy appearance, which is a sign of overmaturity. Wilted, shriveled cucumbers are also considered unacceptable. Even though the affected areas may be trimmed, the remainder of the cucumber is likely to be tough and bitter tasting.

Figure 3-3. Minimum shapes permissible in U.S. Fancy grade cucumbers. cucumbers.

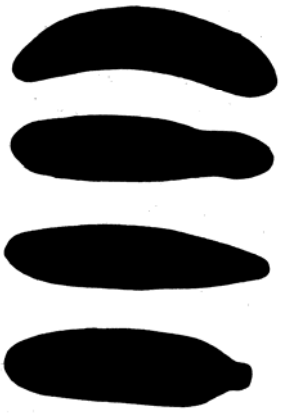


Figure 3-4. Minimum shapes permissible in US No.1 grade

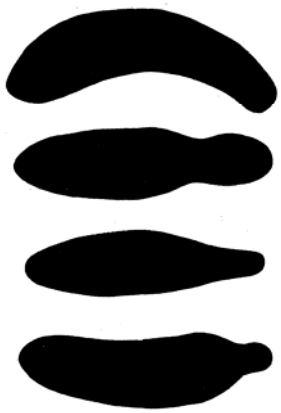


Figure 3-4. Minimum shapes permissible in U.S. No. 2 grade cucumbers.

3-24. EGGPLANT

Eggplants belong to the nightshade family, like tomatoes or potatoes. (See Appendix C.) It is a native to India. There are numerous varieties of eggplants, most distinguished by their external color. These colors include white, purple, purple-black, yellowish-white, red, or striped. The majority of the world's production consists of the dark purple, egg-shaped variety, the regular eggplant (picture 20k). The Japanese eggplant (picture 21a) is smaller and more elongated. The white eggplant (picture 21b) has the appearance of an egg, but is not commonly marketed.

a. Good quality eggplants should be firm and heavy for their size and should have a clean dark purple to purple-black skin. There should be no evidence of scars or cuts. The most popular size is from 3 to 6 inches in diameter.

b. Poor quality eggplants may be wilted, shriveled, soft or flabby, and have a bitter taste. Worm injury is common and, if observed, is a sign of poor quality.

3-25. ENDIVE-BELGIAN ENDIVE/CHICORY

a. **Belgian Endive.** Belgian or French endive (picture 15k) is also referred to as witloof chicory. Production is forced, in special rooms with reduced light. The result is a tightly folded plant that grows upright in a thin, elongated stalk, rather than flat or bushy like regular endive or escarole. It is used raw in salads and has a delicate flavor. It is commonly known as Belgium endive rather than by its true botanical name as a chicory.

b. **Chicory.** Green-leafed chicory (15L), with unblanched heads, is strong-flavored. It is cultured like leaf lettuce, endive, and escarole. It can be used raw in a salad or cooked as a green. The roots, dried, roasted, and ground, are used in blends with coffee.

3-26. GARLIC

Garlic (picture 21c) is a bulbous-rooted perennial plant. Garlic belongs to the same botanical family as onions. The root is a compound bulb consisting of several cloves or smaller sections which are covered with a common skin (membrane). It is similar to an onion but is much more powerful and has a taste that is very distinctive. There are three general types of garlic of commercial significance. They are Italian, Creole, and Tahiti. Creole garlic has large cloves, while the Italian type has small cloves. The cloves of the Italian type have a pinkish color and the strongest flavor. Tahiti garlic has large individual cloves that are generally a darker color. Garlic may be sold in braids (picture 13i).

3-27. GOURDS

Decorative or ornamental gourds (picture 21e) are of little value except as a colorful addition to the holiday table and as room decorations. They are the result of cross-pollination. Their appearance varies in shape, size, color, and surface texture. The one thing that they have in common is that they usually all look like a form of squash.

3-28. GREENS

Greens are most often used for salads, and many are available all year long. They have a high concentration of vitamins and minerals. Greens are sold by the type instead of variety. Lettuce and spinach are the most commonly known. Others include endives, chards, the tops of beets or turnips, and greens from the cabbage family and the mustard family.

a. Good quality greens are best when fresh, young, tender, and green.

b. Poor quality greens may have coarse stems, seedstems, dry or yellowing leaves, poor development, excessive dirt, or insect injury.

3-29. GREENS--TOPS OF ROOT CROPS

a. **Beet Greens.** Beet greens (picture 16b) are harvested from the tops of young sugar beet plants. They are bunched and sold as salad greens. For this use, the color and appearance are important. The tops must be young and tender if they are to be edible. Beet greens are a low-calorie, vitamin-rich item. The best beet tops are those that are thin-ribbed, fresh green, and not wilted or slimy.

b. **Turnip Greens.** Turnip greens (picture 17a) are the tops taken from early-crop turnips, then bunched, and sold. Turnip green quality depends largely on their freshness when purchased. Turnip greens have a high concentration of several vitamins and minerals. Turnip greens are not suitable for storage for more than a week or two after being cut. They vary significantly in appearance depending upon their variety and stage of development. Yellowed or wilted tops are usually signs of old age.

3-30. GREENS-LETTUCE

There are five major types of lettuce. They are the crisphead (picture 14g), butterhead (pictures 14a and 14b), looseleaf (pictures 14j and 14k), cos (picture 15b), and stem (no picture). Lettuce belongs to the same botanical family group as chicory, endive, escarole, and artichokes, the sunflower family. (See Appendix C.)

a. **Crisphead Lettuce.** Crisphead lettuce is the solid-headed kind usually called iceberg lettuce (picture 17e). Ice-berg lettuce is actually only one variety of crisphead lettuce. The heads are usually large, round, and solid. Outer leaves are medium green while inner leaves are generally lighter green or pale green. See figure 3-6.

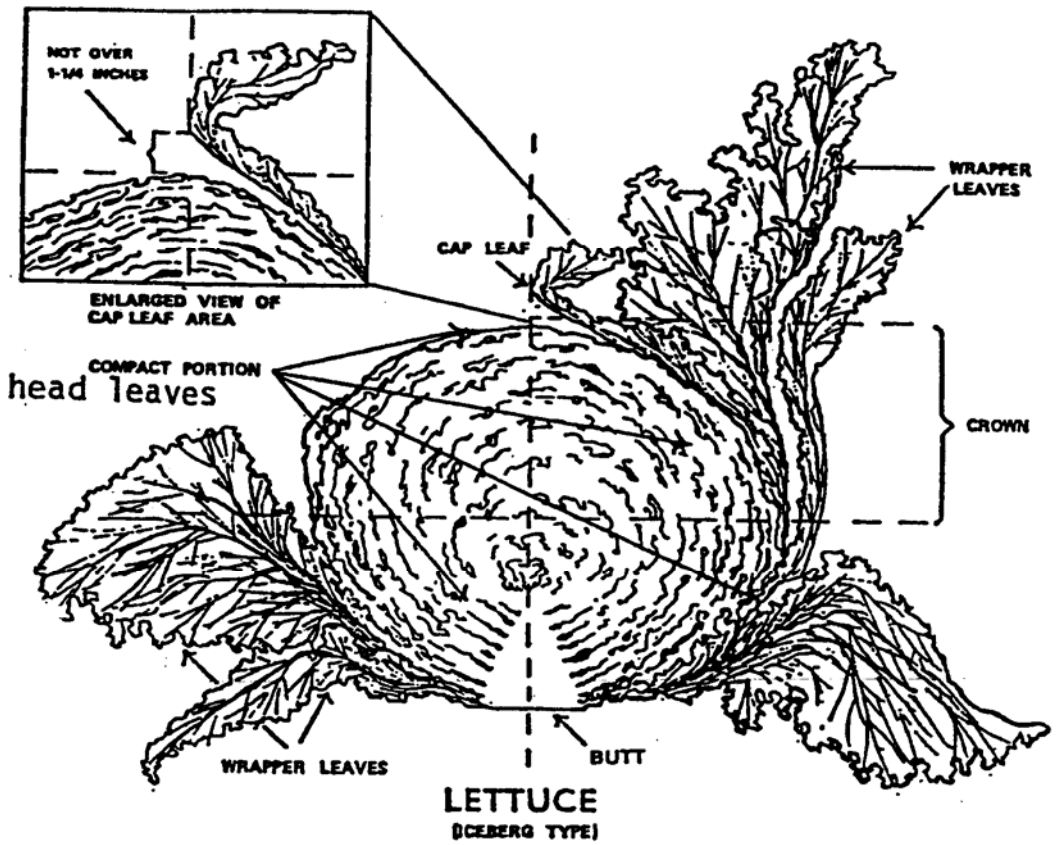
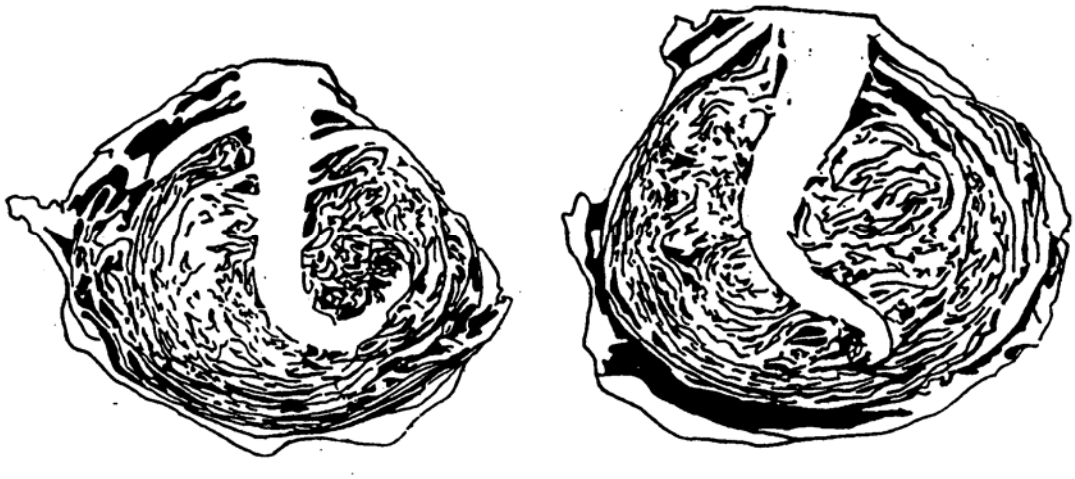


Figure 3-6. Lettuce terminology.

(1) Good quality lettuce heads are firm, but give slightly when squeezed. The leaves should be free from burned or rusty-looking tips and have a general fresh appearance.

(2) Poor quality lettuce heads are lacking in green color and are usually very hard. These are indications of overmaturity. Another indication of poor quality is seedstem development, or overgrown stems. (See figure 3-7.) This can be observed by irregular shapes, wide spaces between base portions of outer leaves, and hard bumps on top. Slight discolorations of the wrapper leaves will usually not hurt the quality of the lettuce, but serious discolorations or soft decay definitely indicates poor quality.



Maximum extent to which head may be affected by seed stem in US No.1 Grade.

Maximum extent to which head may be affected by seed stem in US No.1 Grade.

Figure 3-7. Lettuce seedstem.

b. **Butterhead Lettuce.** Butterhead varieties are numerous, but the most important varieties are the Big Boston (picture 17d), White Boston (no picture), Bibb (picture 17c), and May King (no picture). Butterhead varieties are distinguished by their soft, pliable leaves, which have a delicate buttery flavor. The veins are fine and the ribs less prominent than those of the crisphead varieties.

(1) Big Boston (picture 17d) is the variety often called "Butter-head." The heads are somewhat softer and lighter than iceberg and not as crisp in texture. The head is slightly flat on top and has soft, succulent, light green leaves formed in a rosette pattern in the center.

(2) Bibb lettuce (picture 17c) has a distinct color, flavor, and crispness. The Bibb lettuce was developed by Major John Bibb, a Virginian. The leaves are characteristically a deep, rich, green, blending into a whitish green toward the core. The flavor should be delicate, buttery, and sweet with tender leaves. The heads should be clean, fresh, and tender with no signs of discoloration due to disease or decay. There should be no signs of wilting.

c. **Looseleaf Lettuce.** Green Leaf lettuce (picture 17e) and red leaf lettuce (picture 17h) are looseleaf lettuce types. They are characterized by leaves that are generally broad, tender, succulent, fairly smooth, and varying in depth of color. Red Leaf varieties have leaf tips in varying shades of red. In contrast, Green Leaf varieties are green to green-white in color. These varieties do not form heads, but they have loosely branching leaves. The leaves are pressed together, but only the young leaves at the center of the plant overlap to any observable extent. Good quality is indicated by signs of freshness, including soft, tender, crisp leaves. Wilted heads, brown discolored leaves, and soft decay are all signs of poor quality.

d. **Cos or Romaine Lettuce.** Romaine lettuce (picture 17i) or cos lettuce is characterized by the long, loaf-shaped head and long, narrow leaves. The varieties of romaine are generally divided into the self-closing and loose-closing types. The leaves are coarse appearing, but are tender, sweet, tasty, and usually less bittery than other varieties. The outer leaves are dark green, while the inner leaves are golden yellow. The flavor is considered stronger than that of iceberg lettuce.

e. **Stem Lettuce.** Stem lettuce (no picture) is sold in the United States as celtuce. This variety of lettuce is used in many Chinese dishes or may be boiled, stewed, or creamed. Its flavor is a combination of celery and lettuce, from which it derives its name. Celtuce has an enlarged stem, no solid head, and the leaves are not as palatable as other types of lettuce, except when the plant is young, tender, and generally immature.

3-31. GREENS--ENDIVE AND ESCAROLE

Endive (picture 15L), escarole (picture 16a), and chicory (see paragraph 3-25) are often confused, due to local differences in common name usage throughout the country.

a. **Curly Endive.** Curly endive (picture 15L) grows in a bunchy head with narrow, ragged-edge leaves which curl at the ends. The center of the head is yellowish-white and has a milder taste than the darker green outer leaves, which tend to be slightly bitter. If the center is not the desired white, it can be bleached by the customer by covering it overnight with a damp cloth. Batavian, a broad-leaved endive, does not have curly tips and is often marketed as escarole.

(1) Good quality endive should have fresh-appearing leaves that are young, tender, free of blemishes, and have a good green color.

(2) Poor quality endive may have coarse, fibrous stems, yellowish-green color, and signs of decay or wilting.

b. **Escarole.** The most common varieties of escarole (picture 16a) are medium large, 12 to 15 inches across, with upright to spreading growth. The leaves are deep green, slightly crumpled, and closely bunched, with center leaves producing a well-blanched heart. Good and poor quality factors are the same as for endive and most other leafy green vegetables.

3-32. GREENS--CABBAGE FAMILY

There are four types of salad greens related to the cabbage that are described in the Produce Identification Guide. They are cole crops, in the crucifer or cabbage/mustard family. (See Appendix C.)

a. **Collard Greens.** Collard greens (picture 16c) are best when fresh, crisp, clean, and free from insect injury. Indicators of age are wilting and yellowing of the leaves, which may also indicate other forms of damage. Collard greens are frequently top-iced to enable them to keep their healthy, green color. The leaves are sold bunched, are loaf-shaped, and have a blue-green color. The overall shape reminds one of romaine lettuce (picture 17i). Leaves should be smooth, rather thick and tender, and produce a rosette leaf pattern.

b. **Kale.** Kale greens (picture 16e) and flowering kale greens (picture 16g) are cabbage-like in appearance. They are large, hardy, curly-leafed, green (except for the "flowering" of white leaves in the center) and inexpensive.

(1) Good quality kale is dark green. The Veterinary Food Inspection Specialist should make allowances for a few easily-trimmed, brown-edged leaves. The leaves should be crisp, clean, and free from bruising or crushing.

(2) Poor quality kale may have leaves with coarse, fibrous stems, yellowish-green color, softness, or wilting.

c. **Salad Savoy.** This type of cabbage, salad savoy (picture 17j), is much like crisphead lettuce in general appearance. However, it is darker green, with distinctive leaf veins. It should be firm and fresh.

d. **Red Chicory.** Radiccio de verona (picture 16j), also called red chicory, is similar to miniature red cabbages and brussels sprouts. The red color adds to the eye appeal in salads. The texture is crisp, like radishes.

3-33. GREENS--MUSTARD GREENS

There are two types of salad greens from the cabbage/ mustard family (not cole crops) that are described in the Produce Identification Guide.

a. **Mustard Greens.** Mustard greens (picture 16i) are frequently confused with collard greens (picture 16c). Although the pictures indicate different leaf shapes, they are quite similar. Despite similarity of the leaf characteristics, the two can be readily distinguished. Mustard greens have an outstanding mustard flavor. Good quality mustard greens have leaves that have a good green color and are tender and crisp. Size is important, since prime-quality leaves are 6 to 12 inches long.

b. **Chinese Green Mustard Gui Choy.** Gui choy (picture 16f) is a Chinese green mustard and is also called gai choy. They are usually available all year around and are mainly from California. They are commonly shipped in 35-pound sacks. The bunches are large and have a medium green color. The leaves are crinkly. It has the same good and poor quality characteristics as other leafy items.

3-34. GREENS-SPINACH

Spinach is in the same botanical family group as beets or chard. (See Appendix C.) Spinach (picture 16k) is most often used for salads. Spinach root (picture 15e) with plant stem and oval, smooth leaves is most often used for cooking. There are two distinct types of spinach, and the type is dependent on the seed characteristics. The two types are the prickly-seeded and the smooth- or round-seeded. Varieties of spinach are classified according to the type of leaf. They are savory (wrinkled), semi-savory, and flat-leafed (smooth). Both types of spinach include smooth and savory-leaved varieties. Most of the varieties grown for the market are the round-seeded type (picture 15d). The savory varieties are preferred for fresh marketing, flat-leafed varieties are used in processing, and semi-savory varieties are used for both.

a. Good quality spinach should have fresh, crisp, clean leaves with a good green color. The plants should be well developed and stocky.

b. Poor quality spinach is evidenced by straggly, long stemmed, or overgrown plants with seed stalks. Plants with coarse leaf stems tend to be tough. Also objectionable are wilted, decayed, bruised, yellow, or otherwise discolored leaves. Small, yellowish, underdeveloped heart leaves are natural and should not be considered objectionable.

3-35. GROUND CHERRIES

Ground cherries (picture 11b) are not commonly procured by the military. They have a dry, beige, top-shaped husk, and the berrylike fruit inside is a yellow-green color.

3-36. KOHLRABI

The kohlrabi (picture 17b) is a member of the cabbage family as evidenced by the translation of its German name which means "cabbage turnip." It has an unusual appearance that distinguishes it from other members of the cabbage family. Instead of a head of closely packed leaves, there is a globular swelling of the stem, some 3 or 4 inches in diameter, just above the ground. The best globes are not over 3 inches in diameter and have a very delicate flavor. The leaves of kohlrabi may be also used like spinach and cooked. Good and poor quality of the green leaves will be indicated by the same factors considered for all greens. The kohlrabi stem should be firm and crisp and not too large, similar to turnip characteristics.

3-37. LEEKS

Leeks (picture 21f) belong to the onion family. Leeks are more resistant to cold than more common onions. In appearance, they are similar to green onions or scallions (which are white onions pulled before the bulb forms). Leeks, however, have flat leaves. The white stalk has a diameter of 1-1/2 inches, compared to 1/2 inch diameter for scallions. The length of the leek stalk is usually 6 to 8 inches.

a. Good quality leeks have green, fresh tops and medium-size necks that are well-blanched. Well-blanched means that the white color extends 2 to 3 inches from the base of the bulb. The greens should also appear young, crisp, and tender. Slight bruising of the tops is not an important factor. The aroma and taste should be milder than green onions.

b. Poor quality leeks may be yellowed, wilted, or other-wise damaged. Tops may indicate age. Age may also be evidenced by presence of flabby, tough, and fibrous necks.

3-38. LO BOK (CHINESE TURNIPS)

Lo bok (picture 16h) is often called a Chinese turnip or a Chinese radish. They are generally short, stubby, and off-white to white. Their shape is similar to a potato, and the skin is generally smooth.

3-39. MUSHROOMS

Brown mushrooms (picture 21i) and white mushrooms (picture 21g) are the most common varieties. Mushrooms are commonly considered a plant which can be grown only in darkness to achieve good quality. This is not true, as mushrooms are grown outdoors in countries like China, Japan, and Thailand. The climate in the United States is not suitable for commercial production of mushrooms outdoors; so they are grown in caves or windowless buildings. Variety is not an important factor in mushrooms. More important are freshness, color, and shape. The normal color is white or creamy to solid brown, depending on the producing area. Size is not a reliable indicator of tenderness, but those 3/4 to 3 inches in diameter are usually considered more desirable.

a. Good quality mushrooms should be bright and attractive. Keep in mind that all mushrooms will eventually oxidize and turn dark especially if exposed to room temperatures. The caps should be either closed around the stem or moderately open, with pink or light tan gills. The gills are the numerous rows of paper-thin tissue that may be seen underneath the caps when they are open.

b. Poor quality mushrooms tend to be withered, have an open veil around the base of the cap, and dark, discolored gills. Darkened or spotted mushrooms are not necessarily spoiled but may be bruised instead. Pitted or seriously discolored caps are not desirable.

3-40. MUSHROOMS--ENOKI

The enoki mushroom (picture 22a) only faintly resembles our regular mushroom. It is from Japan and it grows under the snow in its natural state. It looks like a bean sprout with a cap. The color is a pale ivory-white. The stem is the thickness of a matchstick, about 3 to 5 inches long.

3-41. OKRA

Okra (picture 22g), depending on the part of the world you are from, is referred to as gumbo, lady's finger, or quiabo. It is native to Africa. It is available all year and is commonly used in soups or eaten by itself as a vegetable. The name gumbo comes from its natural thickening capability when making gumbos (a type of soup). It is not sold by variety as a rule, but varieties vary a great deal in color and shape. Color may be from bright, dark green to whitish green. Fresh okra should be marketed spineless. The pods may be ridged or smooth and fuzzy. Okra may vary in length up to 8 inches.

a. Good quality okra may be green or white with either long and thin or short and chunky pods. Freshness is essential and this may be determined by the tenderness of the pods. Pods that snap easily or puncture under slight pressure are best. Young tender, fresh, clean pods of small to medium size, ranging from 2 to 4 inches in length, are best.

b. Poor quality okra will have a dull appearance and dry pods, which are usually hard and unpalatable. Shriveled or discolored pods are equally objectionable, since they tend to lack flavor.

3-42. OLIVES-GREEN AND BLACK

Unprocessed green and black olives (picture 22h) are often available in the specialty markets during the months of September through December. Those that are pictured are raw olives produced in California that are to be used for further processing.

3-43. ONIONS

Onions are bulb crops and belong to the Allium genus, or onion family. See Appendix C. Garlic and chives (see paragraph 4-18) also belong to the onion family. Onions grown commercially fall into three general types and two specialty uses. A general description follows. However, for quick reference, market inspectors often divide onions into two groupings: the Bermuda-Granex-Grano (BGG) standards and Other Than Onion standards. The other than onion standards describe small, medium, and large (jumbo) sizes, boilers and picklers.

a. **Types.**

(1) Bermuda-Granex-Grano (BGG) onions. These onions are available during the spring and summer and come from the warmer growing areas. Most have yellow skin (picture 23g) but some have white skin (picture 23f). (The Maui onion (picture 22k) is a regional example of this type, which is popular in Hawaii.) The shape tends to be less round, less symmetrical than other onions, ranging from somewhat flattened to top-shaped. These onions have a mild flavor and are ideal for slicing and eating raw and are also good for cooking. They range from small to large (or jumbo) in sizes. During an inspection, a reference to this type is usually written as Granex-Grano.

(2) Globe onions. These onions are the most common type that are marketed commercially and are considered cooking onions. There are many varieties of Globe onions. This type includes red onions (picture 23c), but many have white skins or yellow skins. Globe onions are strong-flavored and often rather pungent. They are predominantly round to oval. Most Globe onions fall into the medium size range, but, in some cases, the smaller onions are packed and sold separately. They are generally available in quantity during the late summer, fall, and winter.

(3) Spanish onions. Spanish onions (no picture) resemble Globe onions in shape but are usually much larger. Most varieties are yellow but a few varieties are white-skinned. Often called "sweet Spanish," they are mild in flavor and are ideal for slicing or for salads. They are usually packed in medium and large sizes (large = 3 inches or more in diameter).

b. **Specialty Uses.**

(1) Boilers. Boiling onions (picture 22i) may be of any variety, since the category is based upon size. The size of boiling onions is usually 1 to 1-7/8 inches in diameter.

(2) Picklers. Pickling onions (picture 23b) may be of any variety, since this category is based primarily on size. They are usually less than 1 inch in diameter and have a mild flavor. Cocktail onions are also called Pearl onions (picture 23a). They are pickling type onions.

c. **Marketing Characteristics.**

(1) Good quality onions should be hard or firm, be dry, and have small necks. They should be covered with papery outer scale that crackles and be reasonably free from green sunburn spots and other blemishes. Onions should be bright, clean, well-shaped, and have no seedstems. Shape is a variable to some extent unless the onions are purchased for a specific purpose, for example, slicing for hamburgers.

(2) Poor quality onions may exhibit several poor characteristics. Wet or very soft necks usually indicate immaturity or decay. A thick, tough, woody, or open condition of the neck indicates poor quality. A visible portion of the stem indicates seedstem development and is undesirable. Seedstems and onions exhibiting new neck or root growth are undesirable because these growths are usually at the expense of the developed bulb.

3-44. ONION PLANTS AND ONION SETS

Onion plants (no picture) and onion sets (no picture) are not commonly procured by the military. Both are purchased primarily for use in planting. White and yellow

varieties are available and sold in bunches. Onion sets are sold individually or by the pound and will grow into bulb-type onions. The onion plants will grow into the green onion, commonly called a scallion.

3-45. ONIONS-GREEN ONIONS, SCALLIONS, AND SHALLOTS

Green onions, scallions, and shallots are young plants with green-colored tops and blanched stems. The chopped green tops may be used to flavor foods. They may be cut up and put in salads. Some people like to eat the tops as well as the stem. Boiling is a common cooking method when they are used with another vegetable. Shallots and leeks (see paragraph 3-37) are slightly different from green onions and scallions. Sometimes all of these varieties are referred to as green onions, but sometimes they are all called scallions.

a. **Green Onions and Scallions.** Scallions (picture 22j) are any shoots from the onion varieties that are pulled before the bulb had formed. Green onions (picture 22j) are young onions with the bulb just beginning to form.

b. **Shallots.** Shallots (picture 23d) are similar to green onions, but grow in clusters and have practically no swelling at the base. The bulb shape is clove-like, as is garlic. Unlike garlic, the individual clove is covered by a membrane.

c. **Marketing Characteristics.**

(1) Good quality is indicated by green, fresh tops and medium size necks that are well-blanched for at least 2 to 3 inches from the root. They should be young, crisp, and tender.

(2) Poor quality is indicated by yellowing tops and a wilted, dull, or discolored appearance.

3-46. OYSTER PLANT (SALSIFY)

Salsify (picture 32c) is of the sunflower family to which lettuce belongs. It is native to Europe and Asia. In addition to being called oyster plant, it is also known as vegetable marrow and vegetable oyster. It is a hardy, fleshy root that has a flavor similar to oysters. The root is similar to the parsnip in appearance and quality characteristics. The green tops do not resemble parsnips tops but are like heavy grass.

3-47. PARSNIPS

Parsnips (picture 23h) are of the same family as carrots, fennel, parsley, celery, and celeriac. They are grown for their fleshy roots. They are available to some extent all year around, but they are considered a late-winter vegetable. The reason is that the flavor becomes sweeter and more desirable after long exposure to temperatures below 40°F. There are no tops on winter-stored parsnips. They are usually not sold by variety.

a. Good quality parsnips will be smooth, firm, clean, well-shaped, and of small to medium size. They should also be free from decay or other serious blemishes.

b. Poor quality parsnips may have large coarse roots, which will probably be woody and fibrous and have pithy centers. Badly wilted and flabby roots, which will be tough when cooked, are also undesirable.

3-48. PEAS

Peas belong to the legume family, as do beans. (See Appendix C.) Peas have been used as human food as far back as prehistoric times. Consumption of peas in all forms is still a major item, whether fresh, canned, or frozen. The most common marketing strategy for fresh peas is to label almost all peas as fresh peas. These may be of many varieties but are generally three inches long, rounded, and have a medium green color. Peas are for the most part sold for further processing instead of in the fresh state. This is because good quality fresh peas are scarce due to their perishability. Also, it is time consuming to shell fresh peas. Green peas, like sweet corn, tend to lose part of their sugar content unless they are promptly cooled to near 32^{o}F shortly after being picked. If they must be stored, they should be left in the pod until ready for use and kept in a cold, moist environment.

a. **Regular Peas.** Regular peas (picture 24a) are often called green peas or English peas. Peas are a cool season crop and a good nutrient value when fresh.

b. **Sugar Peas/Snow Peas.** Sugar peas or snow peas (picture 23j) are often used when cooking Chinese dishes. They are sometimes called French peas, or sit dow or soot dow. Snow peas are flat peas, 3 to 4 inches long, and approximately an inch wide. The pea itself is extremely small and is often used while in the pod. The pods are crisp when prepared, and the peas add a special flavor.

c. **China Peas.** China peas (picture 24b) are slightly smaller in size than sugar peas and so tender that they are commonly eaten raw. They are about the same size as the regular pea but are flattened.

d. **Marketing Characteristics.**

(1) Good quality peas are at their sweetest, most flavorful stage when fairly large with bright green angular pods that are well-filled and snap readily. The pods should be uniformly green in color and slightly velvety to the touch.

(2) Poor quality peas may have a large proportion of flat and quite empty pods, which is a sign of immaturity. The pods may be noticeably lighter in color and have a swollen appearance; these tend to be too mature and contain tough peas.

3-49. PEPPERS

Peppers belong to the same botanical family as tomatoes, potatoes, and eggplants. (See Appendix C.) They are native to Mexico, Central America, and South America. Peppers of one or more varieties are eaten all over the world in the raw state. The varieties of garden peppers are usually classified into two categories: those that are mild or sweet and those that are hot or pungent. Within these two groups, the possible shapes, varieties, sizes, and color seem limitless. Best quality peppers are well-shaped, thick-walled, and firm, with a uniformly glossy color.

a. **Sweet Peppers/Bell Peppers.** The bell pepper, or California Wonder, is very popular. It may be used in stews or soups, salads, stuffed and baked, deep fried, or with vegetables. It is marketed in a variety of colors.

(1) Green bell peppers. The green bell pepper (picture 24f) is the most commonly-used variety.

(2) Red bell pepper. The red bell pepper (picture 24g) is sometimes diced and mixed with sweet corn or other vegetables.

(3) Gold bell pepper. The gold bell pepper (picture 24e) is sweeter than similar peppers and golden-yellow in color.

(4) Purple bell pepper. The purple bell pepper (picture 24h) is noted for its purple color.

(5) White bell pepper. The white bell pepper (picture 24i) is elongated and not shaped like a bell. The color is white to greenish-white.

b. **Marketing Characteristics of Bell Peppers.** Depending on the stage of maturity desired, bell peppers may be green and immature, red and mature, long with 3 or 4 or some combination of colors. The most popular bell pepper has 4 to 5 lobes and a slight taper toward the bottom, the blossom end.

(1) Good quality bell peppers should be fresh, firm, bright, and thick-fleshed. Color (red, green, or a combination) will depend on personal taste, but the surface should be glossy.

(2) Poor quality bell peppers may have very thin walls, indicated by lightweight and flimsy sides, or be wilted or flabby with cuts or punctures through the walls. Peppers with soft watery or sunken, blister-like spots on the surface are probably undergoing decay. Pale color and soft seeds are signs of immaturity and are undesirable.

c. **Hot Peppers/Chili Peppers.** Chili, Pimento, and Cayenne are varieties of hot peppers which are often dried and sold in strings. Pimento peppers are used in preparing such foods as pimento cheese and the red stuffing for green olives. The cayenne peppers, like the chili peppers, are very hot and are in common use around the world.

(1) Banana peppers. (Banana peppers (picture 24d) have plump, light yellow pods that are banana-shaped and about 2 inches in length.

(2) Exotic hot yellow peppers. Exotic hot yellow peppers (picture 25b) are plump, have a light yellow color, and are carrot-shaped. The pods, when fully mature, average 1-1/2 inches in length.

(3) Green chili peppers. Green chili peppers (picture 25a) are banana-shaped pods about 2 inches in length. They are often dried and sold in strips.

(4) Hot mixed peppers. Hot mixed peppers (picture 25d) are a mixture of hot peppers. They may be red, green, yellow-green, or purple-green in color. The varieties range from the plump to flat and are of various sizes.

(5) Jalapeno peppers. Jalapeno peppers (picture 25f) are small green peppers. They are widely available, especially in restaurants. A jalapeno pepper spices up most bland foods; after one bite, it causes a burning sensation in the mouth. It is commonly purchased by the military and should be inspected for the same quality characteristics as bell peppers.

(6) Red finger peppers. Red finger peppers (picture 25j) are very similar to the yellow banana pepper in shape and length. They have a bright red color. The pepper pods are plump, banana-shaped, and about 2 inches in length.

(7) Romanian peppers. Romanian peppers (picture 26a) are plump, light yellow, carrot-shaped peppers, about 2 inches in length.

(8) Serrano chili peppers. Serrano chili peppers (picture 26b) are widely used in cooking. They are slimmer and hotter than jalapeno peppers.

3-50. POTATOES

a. **General.** The potato is considered by many to be the world's most important vegetable. It is a member of the nightshade family, as are tomatoes, peppers, and eggplants. Potatoes are native to South America. Potatoes are not taproots; they are the enlarged, starchy stem of the plants growing below ground level. The potato has an abundant content of minerals and is a fair source of vitamins. Contrary to popular belief, potatoes are not very fattening. One medium-size potato contains no more calories than a large apple. Potatoes should not be refrigerated, as this will result in an objectionable flavor and cause the desirable starch content to convert to undesirable

sugars. Potatoes are grown in many sizes, shapes, and colors. The flesh may be white, yellow, pink, red, or blue, but only the white-fleshed types are acceptable for marketing in the USA.

b. **Five Types.** Industry classifies potatoes into five basic types: Round White (picture 26g), Russet Burbank (picture 26f), Russet Rural or Round Russet, Round Red (picture 26e), and Long White. The varieties within all of these groups are too numerous to mention and only experts can accurately distinguish between those of similar appearance.

c. **Three Groupings.** Another method is to classify potatoes into three groups: new, general purpose, and baking. However, the distinction between them is not clear-cut and there is much overlapping.

(1) New potato (pictures 26c, 26d) is a term most frequently used to describe potatoes harvested and marketed during the late winter or early spring. The name is also widely used in later crop-producing areas to designate freshly dug potatoes which are not fully matured. New potatoes are usually used for boiling or creaming. They vary in size, shape, and may be red or brown skinned. Since they are immature, they are quite susceptible to excessive skinning and feathering. Some skinning and feathering are allowable, but excessive amounts are undesirable. Feathered areas are likely to turn brown or black, causing the potato to wilt or shrivel at normal room temperature.

(2) General-purpose potatoes (picture 26e) include the majority of supplies offered for sale in the fresh state. These potatoes are available all year, due to air-cooled storage facilities. They are used for boiling, frying, and baking, although many of the more common varieties are not best for baking.

(3) The quality of baking potatoes (picture 26f) is affected by the variety and the area where grown. Baking potatoes are generally long and cylindrical or slightly flattened (see figures 3-8 and 3-9), and have russetted, heavy-netted skin and many well-distributed shallow eyes. The flesh is white. It is good for every purpose but ideal for baking and french fries.

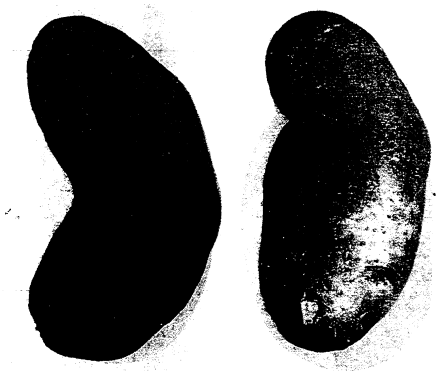


Figure 3-8. Long potatoes, typical shape.

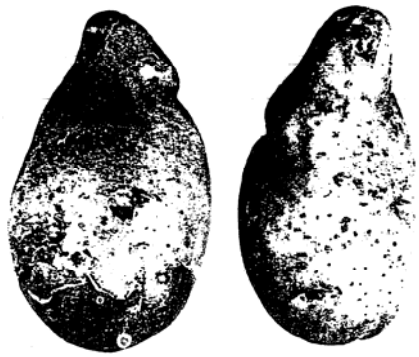


Figure 3-9. Long potatoes, lower limit. US No1, fairly well-shaped.

d. **Seed Potatoes.** Seed potatoes (no picture) are used to produce commercial crops. Some are whole potatoes of 1-1/4" maximum diameter. Some are whole potatoes cut into four pieces, with each piece having one or preferably two eyes. Certified seed potatoes are grown in cool regions where disease symptoms can be seen in the tops of the plants. These are shipped to warmer regions around the world.

e. **Greening.** One common defect of potatoes is known as greening. This defect appears on the surface of the skin and is a result of chlorophyll development in potatoes that have been exposed to either sunlight or artificial light. It is a possible indication of the presence of a colorless chemical called solanin. If the greening has developed far enough, it will cause potatoes to have a bitter taste. The green areas should be peeled or cut away. Since greening is not allowed in US No. 1 potatoes, you should carefully check for it.

f. **Marketing Characteristics.**

(1) Good-quality new potatoes should be well-shaped, firm, and free of blemishes or sunburn (a green discoloration under the skin). Small amounts of skinning are acceptable, but potatoes with large skinned and discolored areas are undesirable. General-purpose and baking potatoes should be reasonably smooth, well-shaped, firm, and free of blemishes, sunburn, and decay. They should also be relatively free of skinned surfaces. (See figures 3-8 through 3-11)

(2) Poor quality potatoes may have large cuts or bruises, and green color. The presence of sprouting and shriveling is undesirable and is evidence of decay.

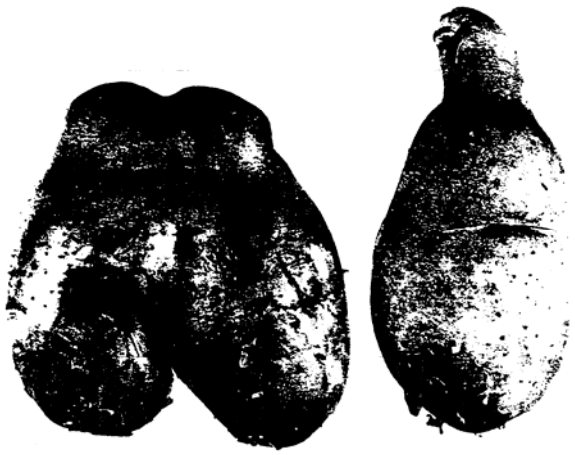


Figure 3-10. Long potatoes, lower limit. U.S. No. 2, not seriously misshapen.

Figure 3-11. Second growth on potatoes.

3-51. POTATOES--SWEET POTATOES

Sweet potatoes are not potatoes. They belong to a different botanical family group, the morning glory family. (See Appendix C.) They are native to Central and South America. Two types of sweet potatoes are available in varying amounts all year: moisted-meated and dry-meated. Moist sweet potatoes (picture 26h) are the most common type. Moist sweet potatoes have orange-colored flesh and are very sweet, while the dry sweet potatoes have a pale-colored flesh and are low in moisture. Sweet potatoes are sometimes called yams. The true yam (pictures 22k and 22L) is not a sweet potato at all but the root of an African and Asian tropical vine not grown commercially in the United States. Some of the varieties of sweet potatoes are the Centennial, Nemogold, Goldrush, Georgia Red, Porto Rico, Jersey (picture 26h), and Velvet. Sweet potatoes should not be refrigerated prior to cooking.

a. Good quality sweet potatoes are well-shaped and firm, with smooth, bright, uniformly colored skins and no evidence of decay.

b. Poor quality sweet potatoes may have wormholes, cuts, grub injury, or any other skin-penetrating injury. Decay is the worst problem and is of three types: wet decay, soft decay, and dry, firm decay. The decay begins at the end of the potato and makes it become discolored and shriveled. Dry rot, in the form of sunken discolored areas, is found in the sides of the potato.

3-52. PUMPKINS

Pumpkins (picture 26i) are purchased on a seasonal basis. They belong to the same botanical family as watermelons, cucumbers, cantaloupes, squash, and gourds. (See Appendix C.) There is no significant distinction between squashes and pumpkins except in the usage of the item (see paragraph 3-62). The season is only about one month long for 80% of the annual supply of pumpkins. Size and shape are not indicators of quality or flavor, but the smaller ones generally result in less waste and have a more tender flesh.

a. Good quality pumpkins should have a good orange-golden color (if they are of the usual type) and have a hard rind. They should be heavy in relation to size and be free of cuts or severe bruises.

b. Poor quality pumpkins may show signs of bruising, softness, decay, or may be off color. Pumpkins without stems are considered substandard.

3-53. RADISHES

Radishes are believed to be native to China. They are plentiful every month of the year. They are grown for their fleshy taproots. Two types of radishes are available: round ones and long ones. The long ones are generally milder than the round ones, except for the oriental winter radish (daikon). Radishes may be red or white or a

combination of red and white. Round radishes vary in size from about an inch in diameter to four inches. Long radishes are from 3 inches to 10 inches long. The most common method of selling radishes is in a plastic bag containing four, six, or eight ounces of topped radishes. An example of the round radish is the red radish (picture 27a). An example of the long radish is the white radish (picture 27b). White radishes may also be round or ball-shaped. The daikon or the oriental winter radish (picture 33a) is white and can be 10 inches long.

a. Good quality radishes are not indicated by condition or color of the leaves alone but in conjunction with the roots. The radishes should be fresh, well-formed, smooth, firm, tender, crisp, mild in flavor, and not show any large number of black spots and pits.

b. Poor quality radishes may be very large or flabby and are likely to have pithy centers. Those with yellow or decayed tops indicate overage. Therefore, the roots should be examined more closely than those with fresh green tops.

3-54. ROOTS--GINGER

Ginger roots (picture 33b) are characteristically gnarled, knobby, and of medium color. Ginger roots are used in fruit salads, meat dishes, vegetable combinations, desserts, and for medicinal purposes, and widely used in Asian cooking. The roots are best when fresh looking and firm. The more delicate flavor of the root is obtained from the little new sprouts that appear on the sides of the ginger root. The roots are commonly grated for use.

3-55. ROOTS--HORSERADISH

Horseradish (picture 33c), also referred to as German mustard, is grown primarily for its root. It is in the same family group as cabbage, turnips, radishes, and mustard. The root looks like a small chunk of a tree trunk. The root is ground up and mixed with vinegar for use as a hot-tasting condiment. The characteristic hot taste is given to it by its pungent, highly volatile oil. The root should have the characteristic aroma and be firm, and free of soft spots or decayed areas. The color is normally dark brown and the surface texture rather rough. The usable part of the root is usually white to creamy-white in color.

3-56. ROOTS--JICAMA

The jicama (picture 33d) is the root of a plant that is native to Mexico and Central America and belongs to the legume family. The plant produces one to several turnip-shaped roots, which may be up to 1 foot in diameter and which contain a high quality starch. The smaller jicama are better since the larger ones may be woody. The young brown-skinned and white-fleshed roots are sweet and watery and are cut into thin slices and eaten raw as a snack food. It is also an excellent substitute for the more expensive water chestnut. Good quality jicama are well shaped and firm. Poor quality jicama may have cuts, bruises, shriveling, or evidence of decay.

3-57. ROOTS--MANIOC OR CASSAVA OR YUCCA

Cassava or manioc (picture 33h) is a root which is an important source of carbohydrates, especially popular in Africa, but also in tropical Asia and America. It is native to tropical Brazil. It is called yucca in Spanish-speaking countries. It is from the same botanical family group as castor beans, milkweed, poinsettias, and rubber trees. Also, the starch derived from the manioc root is used to make tapioca.

3-58. ROOTS-TARO OR DASHEEN

Taro or dasheen (picture 33g) is the root of a plant native to India and Southeast Asia. It is a member of the arum family to which yautia or malanga belongs. The root is high in starch and eaten in Hawaii in the form of poi. The leaves and stems are used as greens. The starch grains found in the root are the smallest in any plant. This makes them readily digestible. Cooked dasheens range in color from purple or violet to a cream shade. Taro roots with a deep violet color are considered to have a better flavor. When buying taro, the entire root should be very firm.

3-59. ROOTS-YAUTIA OR MALANGA

Yautia or malanga (picture 33e) is the root of a plant native to tropical America. It is a member of the arum family to which taro belongs. The root is high in starch and used as a starchy vegetable. It is especially popular in Africa. Both taro and yautia can be shipped long distances. Yautia or malanga can also be used as a greenhouse foliage plant.

3-60. RUTABAGAS

Rutabagas (picture 33f) are white or yellow-fleshed and are grown for their fleshy roots. The yellow-fleshed type is most popular. They are available in the fall and winter, but cold-storage rutabagas are available in the spring as well. The tops are not eaten and are usually removed prior to sale. When present, the tops will show the first signs of deterioration. Storage rutabagas are preferable because they are dipped in an edible hot wax, which increases their storage life. The hot wax decreases wilting caused by transpiration and slows down the respiratory process.

a. Good quality rutabagas are heavy in relation to size, generally have a smooth skin, are round or moderately elongated in shape, and are firm.

b. Poor quality rutabagas may have skin punctures, deep cuts, or decay.

3-61. DRY SHALLOTS

Dry shallots (no picture) are sometimes called eschalots or scallions. They belong to the same family as onions, leeks, chives, garlic, and scallions. Shallots are a gourmet's delight when marketed green. (See paragraph 3-45.) When desired, the

bulb may be cured in the same manner as onions and marketed in a dry form. As with green shallots, they are used in salads, soups, stews, and meat dishes. They smell like garlic and onions, but the aroma is considered much milder.

3-62. SQUASH-INTRODUCTION

a. The botanical family group to which squash belongs (the cucurbits) includes watermelons, cantaloupes, all melons, pumpkins, cucumbers, and gourds. (See Appendix C.) Most all of the varieties of pumpkins and squash are native to Mexico and the Southwest US, and are of one botanical species, curcurbita. Squash are most often used as table vegetables or in stews and may be baked or boiled.

b. The many varieties of squash are divided into two divisions--summer squash and winter (or fall) squash. Despite this general description, many varieties of squash are on the market all year long. Some varieties are marketed in certain regions only and are not known to the customer elsewhere. An example is the delicata squash (picture 28c), which is shaped somewhat like the spaghetti squash and has a sweet, corn-like flavor.

3-63. SQUASH-WINTER SQUASH OR FALL SQUASH

Winter squash, sometimes called fall squash, is marketed when fully mature, as indicated by its characteristic hard, tough rind. Good quality winter squash should be heavy for its size, which indicates a thick wall and more edible flesh. Skin color variations, if only slight, don't affect flavor. Poor quality winter squash is characterized by cuts, punctures, sunken spots, or mold on the rind, which indicates decay. A tender rind on winter squash varieties is undesirable because it is an indicator of poor quality. A description of winter squash varieties follows:

a. **Acorn Squash.** All varieties are shaped like acorns. The flesh is golden to orange in color. They can be stored 3 to 6 months. They are frequently baked and served in the shell. The most common variety is the regular acorn squash (picture 27f), which has a deep dark green color and is about the size of a cantaloupe. It sometimes has a light yellow or orange spot where the squash rested on the ground. There is also the golden acorn squash (picture 27d) of similar size and shape. In smaller sizes, there are the baby acorn squash (picture 27g) and golden baby acorn (picture 27e).

b. **Banana Squash.** A Banana squash (picture 27h) is nearly cylindrical and is moderately tapered at the base and apex. The skin is moderately smooth to slightly wrinkled and pockmarked. The color is pale, olive gray, and while in storage, changes to creamy-pink.

c. **Buttercup Squash.** The buttercup squash (picture 27i) may have a small turban-like cap at the blossom end. The shape is somewhat like a drum, with slightly tapering sides near the apex. Other varieties include the kabocha (picture 28g), which has a greenish-gray skin color, and the orange buttercup (picture 28i), which has an orange skin color and orange flesh.

d. **Butternut Squash.** A butternut squash (picture 27j) is nearly cylindrical, but with a slightly bulbous base. The skin should be creamy-brown or dark yellow, and the shell should be smooth and hard. The flesh is yellow or orange and is fine-grained. The Mediterranean squash (picture 28h) has a butternut shape and is very large. It may be tan to slightly orange in color.

e. **Hubbard Squash.** Hubbard squash (picture 28f) may be of various colors, but all have generally rough, bumpy skins and are about the size of a watermelon.

f. **Spaghetti Squash.** Spaghetti squash (picture 29c) is available from October through December. It is referred to as the dieter's pasta because of its spaghetti-like, yellowish flesh. It is normally pale to light yellow and has a watermelon shape. The stem and shape remind one of an elongated pumpkin.

g. **Turban Squash.** Turban squash (picture 29d) are either dark green or red-orange and easy to recognize because of their shape, which resembles a turban.

3-64. SQUASH-SUMMER SQUASH

Summer squash varieties are those harvested while still immature, when the entire squash is tender and edible. Good quality summer squash is indicated by tenderness, firmness, good varietal development, fresh appearance, and well-formed shape. The skin should be glossy instead of dull and should be neither hard nor tough. (Stale or over mature summer squash has a dull appearance and a hard, tough surface.) Poor quality summer squash is indicated by mature, enlarged seeds and dry, stringy flesh. A description of summer squash varieties follows.

a. **Patty Pan Squash/Scallop Squash.** Patty Pan squash (picture 28j) is also called scallop squash, white scallop squash, or summer squash. Size is generally 3 to 4 inches across. They have a round, bowl-like shape with prominent ribbing (or flaring) on the edge, giving the scalloped appearance. They are marketed all year long. The white type is pale green when young and becomes white later. The skin is smooth to slightly warted, and the flesh is green-tinged. Other varieties include the golden patty pan squash (picture 29a), which is golden in color, and the scalapini squash (picture 29b), which is dark green in color and has more prominent ribbing.

b. **Yellow Summer Squash (Yellow Crookneck or Yellow Straightneck)**. Yellow summer squash varieties are available all year. The yellow crookneck squash (picture 29e) is very popular. The yellow summer squash has a bulbous base and either a straight or a crooked neck. The skin is moderately warted and light yellow at the early stage. The skin turns to a deeper color as it matures. The flesh is a creamy-yellow color.

c. **Zucchini Squash/Italian Squash.** Zucchini squash (picture 29g) is often marketed as Italian squash. It is a widely grown squash and is on the market all year long. It is cylindrical and straight in shape. The skin color is moderately dark green over a ground color of pale yellow. The baby zucchini squash (no picture) is finger-sized.

3-65. SQUASH-VARIETY SQUASH

Some varieties thought of as squash belong to different botanical species than the one that winter or summer squash belong to. They are also marketed for particular ethnic groups.

a. **Chayote Squash.** Chayote squash (picture 28b) is also known as a vegetable pear. It is the fruit of a vine native to southern Mexico and Central America. The immature fruit is harvested (like summer squash). The chayote is a popular food with Hispanic Americans. It is about the size and shape of a pear but has a single large seed. It may be stored at room temperature for 2-4 months. The surface may be smooth or corrugated, and it is often covered with small, soft spines. Good quality indicators include a fiberless flesh, with little or no seed coat around the single, flat seed. If it is deeply wrinkled and fibrous, it is unfit to eat. It should be dark green and hard.

b. **Fu Gua Squash/Balsam Pear.** The fu gua or fu kwa squash (picture 28d) is also called a balsam pear. It is native to the old world tropics. They are popular with Asian-Americans. The green, immature squash is marketed. There are smooth, pebbled protrusions on the surface which give a warty appearance. To reduce a bitter flavor, they are often parboiled after peeling.

3-66. ST. JOHN'S BREAD (CAROB)

St. John's bread (carob) (picture 29h) is not a common vegetable; it resembles cocoa. It is not purchased by the military. It generally has thin, brown-to-black dry pods. The pods are 6 to 8 inches long.

3-67. TAMARILLOS

Tamarillos (pictures 29k, 29L) are tree tomatoes, grown in Mexico and subtropical America. They are oval to egg-shaped, about 2 inches long with a stem attached. Before becoming ripe, they are greenish-purple in color. As they ripen, the color changes to reddish-purple. They are used as a fruit or vegetable, eaten prepared or raw.

3-68. TOMATILLOS

Tomatillos (picture 30a) are commonly known as ground tomatoes. These husk-covered green vegetables grow on vines along the ground. They look like small green tomatoes, but taste like slightly green plums when eaten raw. The skin is thin but unusually tough like a chili pepper. Good quality is indicated by cleanliness, firmness, and a bright green to yellowish-green color. The husks should always be dry.

3-69. TOMATOES

Tomatoes belong to the nightshade family, as do eggplants, chili peppers, and potatoes. (See Appendix C.) Botanically, tomatoes are considered fruits. In the fruit

category, they are considered berries, since they are pulpy and contain one or more seeds that are not stones. The different varieties of tomatoes are: field-grown vine pink, also called vine-ripened (no picture), field-grown mature green (no picture), plum type (picture 30f), cherry type (pictures 30c, 30d), hydroponic (picture 30e), and greenhouse (picture 30e).

a. **Cherry Tomatoes.** Cherry tomatoes (pictures 30c, 30d) are a comparatively high-value crop, with Red Cherry Large being the most popular variety. These tomatoes may grow as large as 2 inches in diameter, but are more often 1 to 1-1/2 inches. They may or may not be marketed with the stem attached.

b. **Hydroponic Tomatoes.** Hydroponic tomatoes (picture 30e) are grown in nutrient solutions with or without an inert medium such as soil to provide mechanical support. They are very similar in appearance to regular salad tomatoes (picture 30b) but are marketed with a stick-on label.

c. **Vine-Ripened Tomatoes.** Tomatoes are one of the fruits and vegetables that gain weight as they mature. Best flavor usually comes from home-grown local tomatoes, since they are the freshest and are fully vine-ripened. The field-grown vine pink is preferable for shipping, since it withstands handling better, and it closely approximates vine-ripened taste.

d. **Quality.** Quality is based on four primary factors.

(1) Color or general appearance.

(2) Firmness and weight of the fruit relative to size.

(3) Internal appearance when sliced.

(4) Flavor.

NOTE: As for size, a small or large tomato may be of equal quality, the choice being a matter of individual preference.

e. **Maturity.** Consumers often complain that the available tomatoes lack taste. This complaint is probably accurate and may be caused by immaturity, improper handling, and/or other problems. Maturity should not be confused with color (ripeness). Tomatoes reach full maturity (development) several days before showing any outward signs of pink or red color. Therefore, a fully mature tomato may be totally green in color. To test for maturity, the Veterinary Food Inspection Specialist should slice a tomato in half cross-sectional. If the seeds are white and can be readily cut with a knife, the tomato is not mature. A jellylike substance, locular jelly, should be present in two or more of the pockets around the seeds if the tomato is mature.

f. **Good Quality.** Good quality tomatoes are well-formed, smooth, well-ripened, and reasonably free from blemishes. Softness in conjunction with rich, red color is usually an indication of ripeness. If less than fully ripe tomatoes are desired, the veterinary food inspection specialist should check for firm texture and color ranging from pink to light red.

g. **Storage Temperature.** Tomatoes should not be refrigerated at all, especially prior to reaching total ripeness. Tomatoes that are not fully ripened will ripen satisfactorily at room temperature. The room should have good air circulation and desirable relative humidity. Once ripened, tomatoes can be held at 50°F or lower, if necessary (figure 3-12).

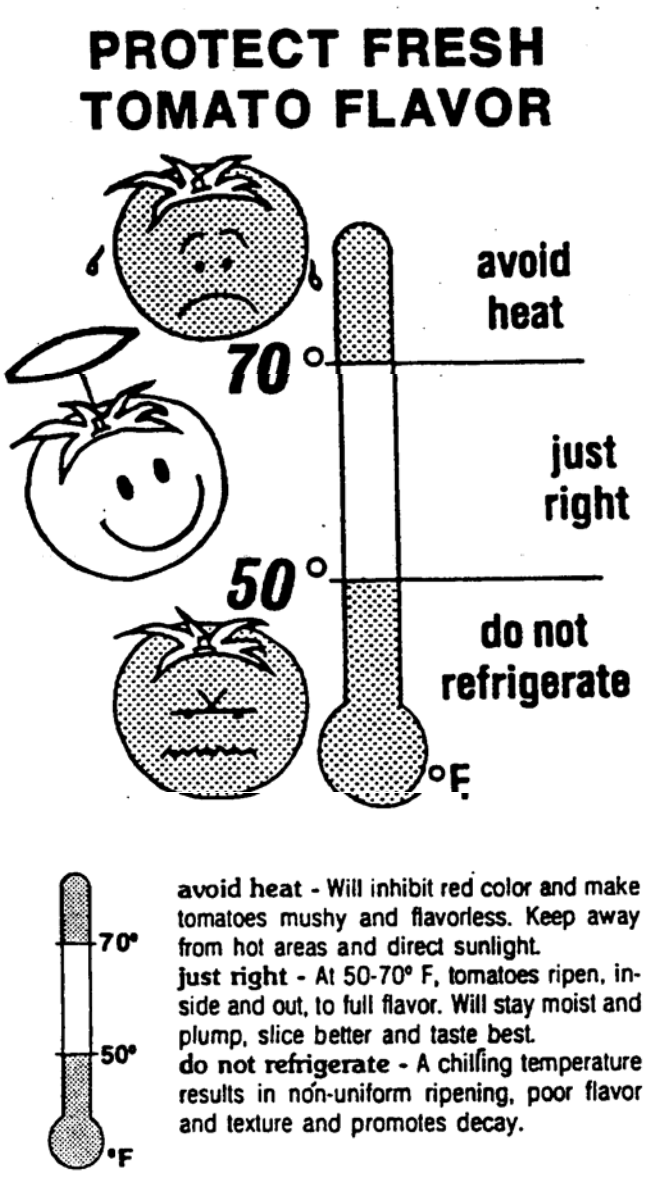


Figure 3-12. Suggested 3-69 storage temperature for tomatoes. .

h. **Poor Quality.** Poor quality tomatoes may be overripe and bruised. Such tomatoes are soft and watery. Tomatoes with sunburn or with green or yellow color near the stem scar are also considered poor quality. Also undesirable are growth cracks, which are deep cracks around the stem scar, decayed fruit, which will have soft, water-soaked spots, depressed areas, or surface mold, and excessive puffiness. (See figure 3-13).

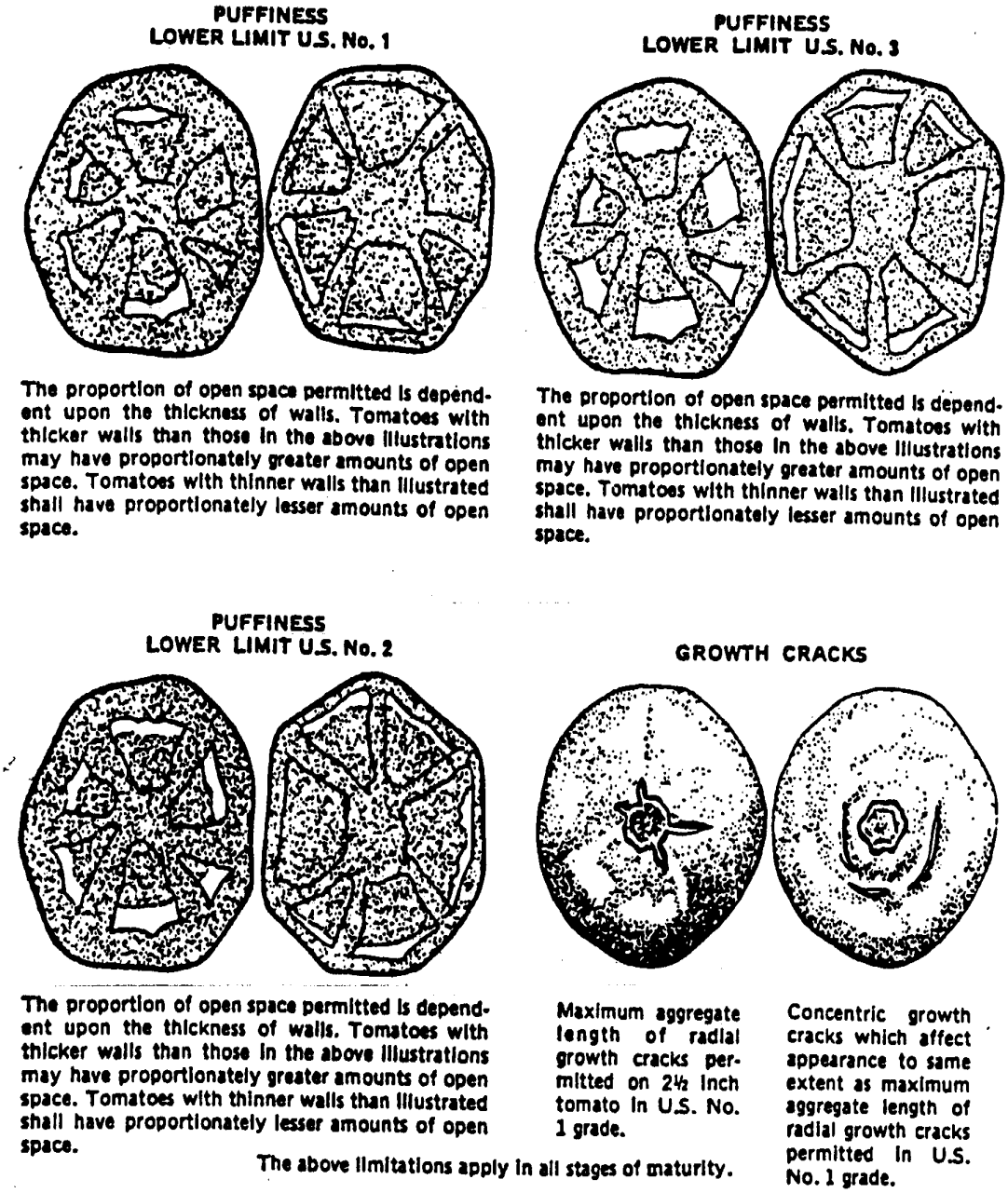


Figure 3-13. Tomato defect limitations for puffiness and growth cracks.

3-70. TURNIPS

Turnips belong to the same family group as mustard greens, cabbage, broccoli, radishes, and rutabagas. Turnips (picture 30h) are grown for their fleshy roots. They are generally sold with the tops removed. Baby white turnips (picture 30g) are smaller in size than regular turnips. The most popular turnips have white flesh and a purple top, with reddish-purple tinting of the upper surface. They have much the same nutrient characteristics as rutabagas. Raw turnips are used in salads. White turnips are especially good in soups and stews. Yellow turnips are most often mashed.

3-71. WATER CHESTNUTS

Water chestnuts (picture 30i) are standard ingredients in many Chinese dishes. Water chestnuts are from a tropical Asian aquatic plant in the sedge family. The skin should be a chestnut-brown color and flaky. The crisp, white, apple-like flesh is both sweet and starchy. They are generally marketed when 1 3/16" in diameter or larger.

3-72. YAMS

Yams are the tubers of an African and Asian tropical vine of the Dioscorea family. Yams are a staple food crop of Central Africa and Southeast Asia. They do not belong to the same family as sweet potatoes, although their appearance is similar. Regular yams (no picture) are about the size of a regular potato, but with golden skin. Red yams (picture 30j) are similar in size but the skin is red in color. Yams are moist when cooked and have flesh that is more orange in color than a true sweet potato. The overall characteristics of quality are the same as for sweet potatoes, except that the skin is characteristically rougher.

Continue with Exercises

EXERCISES, LESSON 3

INSTRUCTIONS: Answer the following exercises by marking the lettered response that best answers the exercise, by completing the incomplete statement, or by writing the answer in the space provided at the end of the exercise.

After you have completed all the exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers. For each exercise answered incorrectly, reread the material referenced with the solution.

1. Which of the following items marketed for salads has a high chlorophyll content, according to the lesson?

   a. Carrots.

   b. Lettuce.

   c. Alfalfa sprouts.

   d. French endive.

   e. Mushrooms.

   f. Radishes.

2. Select the vegetable with close, compact tips and smooth, round spears.

   a. Baby beets.

   b. Baby carrots.

   c. White baby turnips.

   d. Asparagus.

   e. Green beans.

3. Which varieties of cabbage are more in demand for use in slaws and salads?

    a. Green cabbage.

    b. Red cabbage.

    c. Savoy cabbage.

    d. Items "a" and "b" above.

    e. Items "b" and "c" above.

4. Which vegetable is really the large, unopened flower bud of a plant belonging to the thistle family?

    a. Globe artichoke.

    b. Broccoli.

    c. Jerusalem artichoke.

    d. Cauliflower.

5. According to the lesson, which beans are a high-protein food used in Mediterranean and Spanish-American cooking?

    a. Lentils.

    b. Garbanzo beans.

    c. Soybeans.

    d. Black-eyed peas.

    e. Fava beans.

6. Which of the dry beans commonly used in Southwestern American cooking listed below are brown and mottled?

    a. Pinto beans.

    b. Kidney beans.

    c. Soybeans.

    d. Navy beans.

    e. Black beans.

7. When inspecting snap beans, what do thick, tough, fibrous pods indicate?

    a. Well-formed shape.

    b. Overmaturity.

    c. Firm, crisp condition.

8. Which vegetable is often sold in bunches with the tops still attached?

    a. Turnips.

    b. Rutabagas.

    c. Ginger.

    d. Parsnips.

    e. Beets.

9. Which of the following root vegetables should be well-formed, smooth, well-colored, and firm to indicate good quality?

    a. Beets.

    b. Radishes.

    c. Potatoes.

    d. Carrots.

    e. Horseradish.

10. Which vegetable is considered to be of good quality when the curd is creamy-white, compact, solid, and clean?

    a. Cabbage.

    b. Cauliflower.

    c. Brussels sprouts.

    d. Endive or escarole.

    e. Celery.

11. Fresh corn, if in good condition, should exhibit all of the following EXCEPT:

    a. Green-colored husks.

    b. Milk-stage kernels.

    c. Straw-colored husks.

    d. Ears filled to tip.

12. What vegetable has a green variety that makes up 85 percent or more of the total US production?

    a. Celery.

    b. Leaf lettuce.

    c. Chili peppers.

    d. Romaine lettuce.

    e. Summer squash.

13. Which vegetable has both round and long varieties available?

    a. Sweet potatoes.

    b. Cucumbers.

    c. Radishes.

    d. Pumpkins.

    e. Beets.

14. Which vegetable or vegetables have hydroponic varieties?

    a. Squash.

    b. Cucumbers.

    c. Tomatoes.

    d. "a" and "c" above.

    e. "b" and "c" above.

15. Which vegetable, when grown in the United States, is not normally grown outdoors?

    a. Endive.

    b. Mushrooms.

    c. Cucumbers.

    d. Tomatoes.

    e. Cassava.

16. What are five types of cabbage?

    _____

    _____

    _____

    _____

    _____

17. What are three types of onions?

    _____

    _____

    _____

18. What are two specialty uses for onions?

    _____

    _____

19. What are five bulb crops of the Allium or onion family?

_____

_____

_____

_____

_____

20. What are five common types of hot/chili peppers?

_____

_____

_____

_____

_____

21. Based on usage, there are three category groups of potatoes. What are they?

_____

_____

_____

22. What are two types of sweet potatoes available?

_____

_____

23. What are five types of lettuce?

_____

_____

_____

_____

_____

24. What are six non-starchy vegetables that are sold for their fleshy, enlarged taproots.

_____

_____

_____

_____

_____

_____

25. What are four defect limitations in tomatoes?

_____

_____

_____

_____

26. Is the white potato the enlarged underground stem of the potato plant?

    a. Yes.

    b. No.

27. What is the solid-headed variety of lettuce most often called iceberg?

    a. Looseleaf.

    b. Cos.

    c. Butterhead.

    d. Stem.

    e. Crisphead.

28. What is the diameter of white stalks of leeks in inches?

    a. 1/2.

    b. 1-1/2.

    c. 2.

    d. 1-3/16.

29. Which variety of onion has a clove-like bulb shape as does garlic?

    a. Green onion.

    b. Scallion.

    c. Leek.

    d. Shallot.

    e. Chives.

30. Do packing plants normally dip cucumbers in edible vegetable wax before marketing them?

    a. Yes.

    b. No.

31. Do sweet potatoes belong to the same botanical family as baking potatoes?

    a. Yes.

    b. No.

32. What vegetable, when marketed fresh, is generally 3 inches long, rounded, and has a medium green color?

    a. Baby zucchini squash.

    b. Green chili pepper.

    c. Green beans.

    d. Green peas.

33. A common defect of U.S. No. 1 potatoes is known as greening. What potentially harmful chemical is this a possible indication of called?

    a. Russet.

    b. Chlorophyll.

    c. Solanin.

    d. Sunburn.

34. Cole crops (members of Brassica oleracea) belong to the crucifer family, or mustard family, which is important for the minerals and vitamins they furnish. Which of the following vegetables are not cole crops?

    a. Cabbage.

    b. Broccoli.

    c. Kale greens.

    d. Collard greens.

    e. Mustard greens.

    f. Brussels sprouts.

35. Which of the following roots can be eaten raw as a snack food?

    a. Taro.

    b. Jicama.

    c. Cassava.

    d. Ginger.

    e. Horseradish.

36. What is the storage temperature in Fahrenheit for tomatoes that are not fully ripened?

    a. 50^{o} to 70^{o}.

    b. 40^{o} to 50^{o}.

    c. 60^{o} to 80^{o}.

    d. 50^{o} to 60^{o}.

    e. 60^{o} to 70^{o}.

37. Which squash is a winter (or fall) squash?

a. White scallop.

b. Italian.

c. Yellow crookneck.

d. Patty pan.

e. Acorn.

38. Which squash is a summer squash?

a. Turban.

b. Buttercup.

c. Zucchini.

d. Butternut.

e. Banana.

39. When the entire squash is tender and edible and the seeds are immature, what category of squash is it?

a. Winter or fall.

b. Summer.

c. Variety.

40. What vegetable has two main varieties, Pascal and Golden Heart?

    a. Radishes.

    b. Sweet potatoes.

    c. Okra.

    d. Celery.

    e. Kale.

41. Which of the following vegetables is not a standard ingredient in Asian cooking?

    a. Celery.

    b. Bean sprouts.

    c. Radishes.

    d. Water chestnuts.

    e. Mushrooms.

    f. Ginger.

42. You are inspecting Green onions or scallions. They have fresh green tops and are well-blanched. How many inches from the root should they have?

    a. 4 or 5.

    b. 3 or 4.

    c. 2 or 3.

    d. 1 or 2.

43. What is the diameter of pickling onions in inches?

    a. Less than 3 inches, but more than 2 inches.

    b. Less than 1-7/8 inches, but more than 1-1/2 inches

    c. Less than 1-1/2 inches, but more than 1 inch.

    d. Less than 1 inch.

44. Which type of garlic has smaller cloves and has the strongest flavor?

    a. Italian.

    b. Creole.

    c. Tahiti.

45. Which vegetable flesh is more orange in color?

    a. Sweet potatoes.

    b. Yams.

46. Sunchokes are roots of a particular type of North American sunflower plant. What are they are also known as?

    a. Cassava or manioc.

    b. Malanga or yautia.

    c. Globe artichokes.

    d. Oyster plant or salsify.

    e. Jerusalem artichokes.

47. Which of the following vegetables is not native to Latin America?

a. Sweet peppers.

b. Pumpkins.

c. Lima beans.

d. Okra.

e. Squash.

f. Tomatoes.

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES, LESSON 3

1. c (para 3-2)

2. d (para 3-5)

3. e (para 3-14)

4. a (para 3-3)

5. b (para 3-8c)

6. a (para 3-9)

7. b (para 3-7)

8. e (para 3-10)

9. d (para 3-15)

10. b (para 3-16)

11. c (para 3-22)

12. a (para 3-17)

13. c (para 3-53)

14. e (paras 3-23b, 3-69b)

15. b (para 3-39)

16. Danish.
    Domestic.
    Pointed.
    Red.
    Savoy. (para 3-14b)

17. Bermuda-Granex-Grano (BGG).
    Globe.
    Spanish. (para 3-43a)

18. Boilers.
    Picklers. (para 3-43b)

19. Onions
Leeks
Shallots or scallions
Garlic
Chives. (paras 3-43, 3-45, 3-37)

20. Jalapeno
Serrano
Banana
Green chili
Red finger
Exotic hot yellow
Hot mixed
Romanian. (para 3-49c)

21. New
General purpose
Baking. (para 3-50c)

22. Moist-meated
Dry-meated. (para 3-51)

23. Crisphead
Butterhead
Looseleaf, Cos or Romaine, Stem. (para 3-30)

24. Beets
Carrots
Parsnips
Radishes
Rutabagas
Turnips. (paras 3-10, 3-16, 3-47, 3-53, 3-60, 3-70)

25. Bruised fruit
Growth cracks
Puffiness
Sunburn
Decayed fruit
Overripe fruit (para 3-69h, fig 3-13)

26. a(para 3-50a)

27. e (para 3-30a)

28. b (para 3-37)

29. d (para 3-45b)

30. a (para 3-23a)

31. b (para 3-51)

32. d (para 3-48)

33. c (para 3-50e)

34. e (para 3-33)

35. b (para 3-56)

36. a (fig 3-12, page 3-42)

37. e (para 3-63a)

38. c (para 3-64c)

39. b (para 3-64)

40. d (para 3-17)

41. a (para 3-17, also paras 3-6, 3-39, 3-40, 3-53, 3-54, 3-71)

42. c (para 3-45c)

43. d (para 3-43b(2))

44. a (para 3-26)

45. b (para 3-72)

46. e (para 3-4)

47. d (para 3-41)

End of Lesson 3

LESSON ASSIGNMENT

LESSON 4	Identification of Nuts and Herbs
LESSON ASSIGNMENT	Paragraphs 4-1 through 4-31.
LESSON OBJECTIVES	After completing this lesson, you should be able to: be able to:

4-1. Identify common terms used in inspection of nuts or herbs.

4-2. Identify names of nuts or herbs that are of commercial importance.

4-3. Identify distinguishing characteristics of specific nuts or herbs.

SUGGESTION After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

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LESSON 4

IDENTIFICATION OF NUTS AND HERBS

Section I. NUTS

4-1. GENERAL

Nuts are the seeds of nut trees. These trees grow slowly and live a long time. Trees of the walnut, the filbert, and pecan may continue to produce nuts for more than a hundred years. The outside covering of most nuts is the rind or shell. Inside is the softer part of the nut, called the "meat" but more often the "kernel." Inspection of nuts is not required by the USDA while in the shell, but all nuts are subject to FDA standards. The FDA has authority to seize and condemn nuts found unfit for human consumption. Nuts are generally purchased in packages. This makes them inconvenient to inspect, although inspection is essential if meat quality is to be determined.

4-2. GOOD QUALITY NUTS

Good quality nuts, regardless of variety, are those with clean bright shells that are not dull, dirty, or stained. They should not be cracked or broken. They should be well-shaped for the variety. Also important is the weight of the individual nut, which should be heavy for its size. This means that it is likely to contain a good, meaty kernel.

4-3. ALMONDS

Almonds (picture 34a) are botanically stone fruits, just like peaches and plums. Since consumers only use the seed (stone), it is accepted as a nut. On the tree, almonds look like small green peaches. When ripe, the hulls open revealing the nut inside. There are two general types, bitter-tasting and sweet. The bitter-tasting type is used for flavoring extract, and the sweet type is usually used for fresh consumption, often as a snack food. Almonds are ellipsoid (teardrop) in shape and have a soft yellowish-tan shell.

4-4. BRAZIL NUTS

Brazil nuts (picture 34b) are also seeds of a fruit. It is a round fruit that resembles a coconut. It has a 4- to 6-inch diameter, brittle crust, and a tough woody shell on the inside. This fruit or pod may contain from 12 to 30 nuts. The nuts are three-sided, and are the size and shape of an orange section. The shells measure 1-1/2 to 2 inches in length and contain a white, solid, quite oily meat or kernel. The trees grow wild in dense forests in South America and they are not raised on tree farms.

4-5. CASHEWS

Cashews (no picture) are the fruit of a tropical American tree, believed to have originated in Brazil. It is of the same family as the mango and the pistachio. The trees bear clusters of pear-shaped fruit called "cashew apples." These apples are juicy, soft, and eaten as a fruit in the countries where they are grown. The kernel of the cashew nut is protected by a double shell. The cavity between the inner and outer shell is filled by an oily liquid used in making phenolic resins noted for their antifriction properties. This potentially harmful oily substance is dissipated by heat and the roasted cashew can be eaten without the slightest danger. The cashew kernel is kidney-shaped and about an inch in length. The kernel is of fine texture and has a delicate and distinct flavor. It is primarily a snack food.

4-6. FILBERTS (HAZELNUTS)

Filberts (hazelnuts) (picture 34d) are grown in clusters close to the stem of the trees. The husks are thin and have a leaf-like covering with a fringed outer edge. The husks are forced open at the first frost, and the nuts generally fall to the ground. Hazelnuts are round or oval, and have a flat end where they were fastened to the tree. After they are picked and washed, they are then exposed to sulphur fumes, which bleach them to an amber color. The meat is considered sweet and should be firm.

4-7. MACADAMIA NUTS

Macadamia nuts (picture 34e) are also known as Queensland nuts and Australian nuts. Macadamia nuts are the edible seeds of silk-oak trees, which are also known as maroochie nut trees. They are shiny and round, have extremely hard shells, (which are tough to crack), and are covered by thick husks. When the nuts are fully ripe, the husk splits open and releases them. The meat is used almost exclusively as a dessert-type nut and is very valuable. The macadamia shell is about 1 inch in diameter and is extremely difficult to crack. Therefore, these nuts are seldom sold in their shells. The flavor resembles that of a Brazil nut, but is milder and more delicate.

4-8. MIXED NUTS

Mixed nuts (picture 34f) are a mixture of nut varieties. Mixed nuts are an oddity because their price is very unstable. This is because the mixture of nut varieties results in several component item prices that fluctuate frequently. If a packer wishes to change the proportion of the nut varieties in a package, the price could easily be affected. Consumers are generally not aware of the mix standards or ideal combinations. It is expected that percentage markings on individual bags will soon be required because of this problem.

4-9. PEANUTS

Peanuts (picture 34g) are botanically related to beans and peas. They belong to the legume family. Peanuts originated in South America. It is more like a pea than a nut, but it is called a nut due to its flavor and oil content. The oil that can be pressed out of crushed peanuts is used as cooking oil, for peanut butter, and in other products. The distinguishing feature of the peanut is that its fruit matures below the soil surface. Peanuts have the softest shells of any of the nuts. They are generally about 1 inch long with ridges and have an irregular oval shape. They are also known as the goober peas, ground peas, and ground nuts.

4-10. PECANS

Pecans (picture 34h) are probably a species of the hickory and related to the walnut family. They are native to North America and pecan growing is an important business throughout the southern part of the US. Pecans grow in clusters, in husks that usually split as the nuts ripen. The shell is rather dull before being commercially polished. Some of the varieties have a round shape but most have an oval shape. Pecans are commonly used in baking.

4-11. PISTACHIOS

The Pistachio (picture 34i, 34j) is the stone or seed of the pistachio tree, which grows in climates that have dry, hot summers and cold winters. The red fruit, generally about 1/2 inch long, grows in bunches. Inside are the seeds or kernels we call pistachio nuts. The natural color of the shell is grayish-white, but often, imported nuts are dyed red. The long, greenish seed is used as flavoring in cooking, candies, ice cream, and is popular as a snack food. Commercial tree farms in California are now beginning to supply the U.S. market. Iran and Turkey are the principal producers of pistachio nuts.

4-12. SUNFLOWER SEEDS

Sunflower seeds (picture 34k) are the seeds from the sunflower plant grown across the United States. The kernels may be extracted from the hull by cracking the hull with finger pressure or between the teeth. Recently, the seed kernels have become a popular snack food and are packaged already shelled.

4-13. WALNUTS

There are several varieties of walnuts: There are black walnuts, hickory nuts, butternuts, and English walnuts. Only the English walnuts, originally imported from Europe, are in large, commercial production. The other nut trees are native to North America and can be found in woods growing wild, and planted in parks and yards. English walnuts (picture 34L) have rough golden-tan shells, are generally oval, and split easily into halves. The kernel flesh is white, clear, and clean. Normal color of the kernels is dependent upon the exposure of the nut to sunshine. The darker kernels

have received more sunshine, and are generally preferred since they tend to have a richer, more flavorful taste. If the color of the inside kernel is a dingy gray, that means oiliness and possibly rancid kernels.

Section II. HERBS

4-14. GENERAL

Herbs are the fragrant and flavorsome leaves of low-growing shrubs and plants. They can be used either fresh or dry in cooking. Sometimes, they are called condiment herbs. The usual pronunciation of the word herb is "erb". Small pots of herbs can be purchased in many grocery stores.

4-15. ANISE

Anise (picture 31a) is related to sweet fennel or finocchi, and is a member of the parsley/carrot botanical family. (See Appendix C.) Its appearance is similar to celery, but its flavor is spicy and more like licorice. Anise may be used raw as a snack, in a salad, or braised and steamed in a way appropriate for celery. Good quality stalks should be fresh, clean, crisp, solid, and of characteristic color. The bulb should be well-developed, and the plant tender. If bulbs show extensive brown areas or if the tops have a yellow and brown appearance, these are signs of age or damage from rough handling.

4-16. BASIL

Basil (picture 31c) has leaves that vary in size according to the variety. The leaves are either green or red-purple. Basil belongs to the mint botanical family. Leaves should be picked when young and before the plant starts to bloom.

4-17. CHERVIL

Salad chervil (picture 31d) is a leafy vegetable, which is a member of the parsley family. Chervil is used in soups, salads and is good in blends, as are chives, parsley, and summer savory. One variety, called parsnip chervil, is served with its roots cooked like parsnips.

4-18. CHIVES

Chives (picture 31e) are herbs grown for their value in cooking, and as a home plant. Chives belong to the alliums, or onion family. The plants have pretty, round, purple flower heads. Chives grow 5 to 12 inches tall, and they like full sun. It is the spike, or leaves, that are diced and added to salads, omelettes, or sauces. It is a mild herb and blends well with foods.

4-19. CILANTRO/CORIANDER

Cilantro (picture 31f) is the Spanish name for coriander. It is also called Chinese parsley. The plant is a member of the parsley family, and is widely grown around the world. The primary source of production in the US is in the state of Kentucky. The ripe seeds of the coriander plant are used as a spice and seasoning. Cilantro, as used in Mexico, is the parsley-like leaf of the coriander plant. It has a yeasty flavor that lingers on the tongue. It is also used as a substitute for parsley, but in lesser quantities, as it is strong. Good quality cilantro has a good, green color, and fresh, unwilted leaves.

4-20. DILL

Dill (picture 31g) is a member of the parsley/carrot family. It is used to flavor soups, processed meats, sausages, and bologna, as well as in pickle preparation. It develops into a 3- or 4-foot tall plant. Dill plants have bluish-green, finely-divided, feathery leaves, and flat clusters of small, yellowish flowers. The flowers are used for flavoring foods. Good and poor quality characteristics are the same as for any fresh, green salad item.

4-21. LEMON GRASS

Lemon grass (picture 31h) is a tropical plant grown around the world. It is used in Asian and Caribbean cooking. The grass-like stalks are used in soups and to flavor other dishes.

4-22. MARJORAM

Marjoram (picture 31i) is a member of the mint family. (See Appendix C.) The plant is erect, branching, sun-loving, and grows about 12 inches tall. It has fragrant leaves and small, whitish flowers. It may be used fresh or dried with soups, stews, meat, and vegetables.

4-23. MINT

Mint (picture 32a) grows 1 or 2 inches high. It grows best in part shade, and it likes moist soil. There are many types of mint, but the most widely used is spearmint. Check for quality as you would for any green leafy item.

4-24. OREGANO

Oregano (picture 32b) is a member of the mint family and is a variety of marjoram. The plant is erect, branching, with fragrant leaves, and purplish-pink blossoms. The leaves have a sharper flavor than marjoram, and are widely used in Italian, Mexican, and Spanish cooking.

4-25. PARSLEY

Parsley (picture 32d) is a member of the parsley/carrot family. It likes moderate summer temperatures, and grows 6 to 8 inches tall. It is used as a garnish, and for mild flavoring (blending with foods). There are two types: the curly leaved (picture 32d) and the plain leaved (no picture).

a. Good quality parsley should have a healthy, green color, preferably dark all over. Parsley should be crisp and firm. The curly type should be springy and bounce back from slight pressure between your fingers.

b. Poor quality parsley may be yellowish or have significant wilting, both signs of age. If leaves are slightly wilted, they might be utilized by trimming the stem ends and placing the stems in cold water. Black leaves, which indicate decay, are unacceptable.

4-26. ROSEMARY

Rosemary (picture 32e) is a member of the mint family. It can grow 3 to 6 feet high. The leaves and the pale blue flowers are very fragrant. The leaves are long and narrow, about 3/16 of an inch across and about 1-1/2 inches long. The fragrance is somewhat like pine needles and camphor. It is considered a pungent herb, like sage and winter savory.

4-27. SAGE

Sage (picture 32f) grows about 1-1/2 to 2 inches tall and has woolly-gray leaves. It is used for seasoning meats and dressings. Sage is a more pungent herb.

4-28. SAVORY

Savory (picture 32g) belongs to the mint family and is used with meats, fish, soups, or vegetables. Summer savory (picture 32g), and winter savory (no picture), are both low-growing plants with very small, green leaves and small flowers that are pale-lilac in color. Summer savory is used for blending with foods, like chives or parsley. Winter savory is more pungent and is used like rosemary or sage.

4-29. TARRAGON

Tarragon (picture 32i) belongs to the sunflower botanical family. (See Appendix C.) The plants are multi-branched with narrow, twisted leaves. They grow best in part shade and grow to about 2 feet high. Young leaves and tips of stems are used fresh in salads, in vinegar and salad dressings, or when cooking fish.

4-30. THYME

Thyme (picture 32j) belongs to the mint family. It has small, grayish, evergreen leaves, growing to about 6 inches high. Thyme is used with fish, meats, and stews. The two most common varieties are English thyme, which has broader leaves, and French thyme, which has narrower leaves.

4-31. WATERCRESS

Watercress (picture 17k) is an aquatic plant, usually grown in ponds and springs in limestone regions. It has a long stem and small thick leaves with a pungent flavor. There are several plants that resemble watercress, but the true watercress belongs to the cabbage/mustard family. (See Appendix C.). Watercress is usually purchased in bunches, and is used raw in salads, combined with other greens, or used as a garnish. Good quality watercress should have a fresh, bright green color, and crisp stems. Wilted, bruised, or yellowed leaves are signs of age or poor handling.

Continue with Exercises

EXERCISES, LESSON 4

INSTRUCTIONS: Answer the following exercises by marking the lettered response that best answers the exercise, by completing the incomplete statement, or by writing the answer in the space provided at the end of the exercise.

After you have completed all the exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers. For each exercise answered incorrectly, reread the material referenced with the solution.

1. When inspecting nuts, which of the following characteristics indicates good quality in relation to weight?

   a. Well-shaped for the variety.

   b. Clean with bright shells.

   c. Heavy for their size.

   d. Not cracked or broken.

2. What is another name for filberts?

   a. Hazelnuts.

   b. Ground nuts.

   c. Macadamia nuts.

   d. Butternuts.

   e. Hickory nuts.

3. Which of the nuts listed below is believed to have originated in the dense forests of Brazil?

    a. Almonds.

    b. Macadamia nuts.

    c. Pistachios.

    d. Black walnuts.

    e. Cashews.

4. Which of the following nuts is native to North America?

    a. Brazil nut.

    b. Pecan.

    c. English walnut.

    d. Peanut.

    e. Pistachio nut.

5. Which of the following nuts is most popular as a snack food?

    a. Pecans.

    b. English walnuts.

    c. Filberts.

    d. Sunflower seeds.

    e. Hickory nuts.

6. What is another name for peanuts?

    a. Queensland nuts.

    b. Butternuts.

    c. Goober peas.

    d. Mixed nuts.

    e. Cashews.

7. Which one of the following herbs is not in the parsley/carrot botanical family?

    a. Anise.

    b. Chervil.

    c. Dill.

    d. Cilantro.

    e. Watercress.

8. Which one of the following herbs is not in the mint botanical family?

    a. Savory.

    b. Tarragon.

    c. Rosemary.

    d. Oregano.

    e. Basil.

    f. Thyme.

9. Which of the following herbs is considered a pungent herb?

    a. Chives.

    b. Summer savory.

    c. Parsley.

    d. Sage.

    e. Chervil.

10. Which one of the following herbs is used both for its seeds and for its leaves?

    a. Coriander.

    b. Lemon grass.

    c. Parsley.

    d. Mint.

    e. Thyme.

11. Which herb is widely used as a garnish?

    a. Fennel.

    b. Chives.

    c. Parsley.

    d. Mint.

    e. Dill.

12. Which of the following herbs is widely used in Mexican, Spanish, and Italian cooking?

    a. Marjoram.

    b. Savory.

    c. Rosemary.

    d. Basil.

    e. Oregano.

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES, LESSON 4

1. c (para 4-2)
2. a (para 4-6)
3. e (para 4-5)
4. b (para 4-10)
5. d (para 4-12)
6. c (para 4-9)
7. e (para 4-31)
8. b (para 4-29)
9. d (paras 4-27, 4-28)
10. a (para 4-19)
11. c (para 4-25)
12. e (para 4-24)

End of Lesson 4

LESSON ASSIGNMENT

LESSON 5 Destination Inspection of Fresh Fruits and Vegetables.

LESSON ASSIGNMENT Paragraphs 5-1 through 5-20.

LESSON OBJECTIVES After completing this lesson, you should be able to:

5-1. Identify the four grade classifications for fresh fruits and vegetables acquired by DPSC.

5-2. Identify inspection factors for grading FF&V.

5-3. Identify common condition factors of selected FF&V.

5-4. Identify the DPSC Form 1930, USDA Federal-State Inspection certificate, and other documents included in the Inspection Data Packet.

5-5. Identify inspection procedures for determining identity of product.

5-6. Identify terminology related to classifying defects of FF&V.

5-7. Calculate percent condition defects by count and by weight.

5-8. Identify methods to determine quantity of product.

SUGGESTION After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

LESSON 5

DESTINATION INSPECTION OF FRESH FRUITS AND VEGETABLES

Section I. GRADES AND INSPECTION FACTORS OF FRESH FRUITS AND VEGETABLES

5-1. INTRODUCTION

a. The majority of FF&V acquired by DPSC are US Number One grade. This grade comprises approximately 50 percent of a crop and is of good, average quality. But what does US Number One grade mean? How is a grade assigned? Why should food inspectors be concerned with such matters if the grades are established by USDA graders already?

b. The US Standards for Grades of FF&V have been developed by the USDA to establish a yardstick of product quality. Use of these grade standards is normally voluntary since the grading service is paid for by interested suppliers of FF&V. This lesson will cover the procurement (destination) inspection of FF&V, from assembling an inspection data packet to reporting results.

5-2. GRADES OF FRESH FRUITS AND VEGETABLES

a. **Definition.** The grade of FF&V refers to the sum of characteristics of the commodity, to include quality and condition factors at the time of inspection. Key points to be elaborated are the differentiations between quality and condition, and the phrase "at the time of inspection."

b. **Four-Grade Classification.** Under the Uniform Grade Nomenclature Act, effective 1 July 76, each US Standard for Grades of FF&V (82 of which now exist) will contain only four grade classifications. Each US Standard has grades that are unique to that item because of grade and size requirements.
Examples of the four most common grades are listed below.

(1) United States Fancy--This grade represents premium quality produce.

(2) United States Number One--This grade represents the chief trading grade of a product. Approximately 50 percent of a given crop should qualify for this grade, which represents good, average quality.

(3) United States Number Two.--This grade is assigned to produce in the intermediate quality range, but is considerably superior to US Number Three.

(4) United States Number Three--This grade represents the lowest-quality product practical to pack under commercial conditions.

c. **Standardized Marketing.** Standardization of grades follows the concept of the grading service program, which is to ensure an orderly, efficient, standardized method of marketing FF&V. In addition to the US standards, various industrial groups have developed individual standards for certain fresh fruits and vegetables. These will not be affected directly by the Uniform Grade Nomenclature Act.

5-3. INSPECTION FACTORS

The grading of FF&V is based upon two primary factors, quality and condition. Other factors taken into consideration when assigning a US grade to FF&V are variety, maturity, chemical composition (for specified items), and size or quantity.

a. **Quality Factors.** Quality factors are those permanent (inherent) characteristics such as shape, flavor, texture, and overall appearance. These permanent characteristics are not subject to change during transit or storage. These characteristics determine the product's relative degree of excellence. The color of apples and the maturity of lettuce can be classified as quality factors.

b. **Condition Factors.** Condition means those factors that are subject to change during transit or storage. They refer to defects of a progressive nature, such as disease or decay. The condition may have occurred after the items were packed, and they are likely to progressively worsen with time. For example, in the case of cabbage or lettuce, the outer leaves may yellow in transit or storage, so, the yellow color is a condition factor.

(1) Distinguishing quality factors from condition factors. Figure 5-1 is a list of condition factors for various FF&V items. Those factors marked with an asterisk (*) should be classified as quality factors when the inspector is reasonably sure that they did not occur after the product was packed. In making this type decision, the inspector must consider several variables such as maturity, preparation for packing, including grading and washing, and so forth, the pack, the time since packed, temperature and humidity to which the product was exposed, and any other conditions which may have affected the product after it was packed.

LIST OF CONDITION FACTORS

APPLES::
- Ammonia injury
- * Apple maggot injur
- Bitter pit
- Calyx injury
- * Fruit spot
- * Heat injury
- Internal breakdown
- Internal browning
- Jonathan spot
- Mold in stem or calyx basin
- * Scab (storage)
- Scald
- Soft scald
- Soggy breakdown
- * Stem punctures
- Sunburn (delayed)
- Watercore

APRICOTS
- California blight
- Brown discoloration around pit
- Ground color

ANISE:
- Color of tops
- Discoloration of bulbs

ARTICHOKES:
- Black tips of scales
- Discoloration of scales from field freezing
- * Spreading

ASPARAGUS
- * Broken tips
- Growth of tips (shooting)
- Spreading of tips

AVOCADOS:
- Darkening of flesh
- Discoloration of skin

BANANAS:
- Chilling injury
- Color scars

BEANS, LIMA:
- * Downy mildew
- * Overmaturity
- * Pod blight
- Russetting
- Seed spotting
- Seed stickiness
- Sprouted seeds
- * Yeast spot

BEANS, SNAP:
- Bacterial blight
- Bacterial spot
- Bacterial wilt
- Flabbiness
- Halo blight
- * Overmaturity
- * Tenderness
- Wilting
- Russetting

BEETS:
- Color of tips
- Discoloration of tops
- Firmness of roots
- New top growth

BERRIES: (Blackberries, Raspberries):
- Leaking
- Surface mold

* Should be classified as quality factors when the food inspector is reasonably sure that they did not occur after the product was packed.

Figure 5-1. List of condition factors (continued).

LIST OF CONDITION FACTORS	
BROCCOLI Alternaria leaf spot * Aphids Blackleaf speck Curd discoloration * Fuzziness * Riciness * Ring spot Shattering of jacket leaves Spreading Yellow jacket leaves Yellowing of outer leaves BRUSSELS SPROUTS: Leaf spot Yellowing of outer leaves CABBAGE Alternaria leaf spot * Aphids Blackleaf speck * Bursting * Leaf separation from stem Yellowing of outer leaves Tipburn CANTALOUPES: Fresh cracks : Ground color Low temperature breakdown Mold in stem scar Surface mold Free liquid and loose seeds	CARROTS: * Broken roots Brown, black, or yellow tops New top growth Wilting and flabbiness of roots Wilting of tops CAULIFLOWER: Blackleaf speck Opening of flower buds Spreading of heads Yellowing of flower buds Yellowing of leaves CELERY: * Bacterial blight Blackheart * Brown stem Color of tops * Early blight Flabbiness * Late blight on leaves or stems * Pithiness Wilting CHERRIES: California blight Cracking Drying of stems * Fruit fly injury Scald
* Should be classified as quality factors when the food inspector is reasonably sure that they did not occur after the product was packed.	

Figure 5-1. List of condition factors (continued).

LIST OF CONDITION FACTORS	
CITRUS: Brown stain Color (limes) * Creasing (color added) * Dryness Oil spotting Membranous stain Petca (pitting in lemons) Pox Skin breakdown * Softness * Sprouted seeds Stylar end breakdown (limes) Watery breakdown * Water spot CORN: Color of husks Discolored kernels * Overmaturity of kernels Shriveling of kernels Live worms CRANBERRIES: Chilling injury Smothering Softness CUCUMBERS Bacterial spot Flabbiness Low-temperature breakdown Scab Shriveled ends Wilting Yellowing	EGGPLANT Flabbiness ENDIVE: Reddish discoloration of hearts Tip burn ESCAROLE: Discoloration of margins of leaves Reddish discoloration of hearts GARLIC: Dampness Loose cloves Shattering Splitting of outer sheath Sprouting Surface mold * Waxy breakdown GRAPES: Color of stems Cracking Crushed berries Dry, brittle stems Moldy stems Raisining Shattering Soft berries Split berries (Concord) Sulphur dioxide injury Wet berries Wilting HORSERADISH ROOTS: Flabbiness New top growth
* Should be classified as quality factors when the food inspector is reasonably sure that they did not occur after the product was packed.	

Figure 5-1. List of condition factors (continued).

LIST OF CONDITION FACTORS	
KALE: * Aphids Drooping of leaves Yellowing LETTUCE: * Aphids * Broken midribs * Brown blight * Marginal browning * Mildew Red butts or midribs Russet spotting * Tip burn Spotted wilt and related diseases MELONS (Honeydew and Honeyball): Brown discoloration of rind Low temperature breakdown Cracks, unhealed Surface mold Liquid in seed cavity Loose seeds MUSHROOMS: Discolored caps Opening of caps Spots (sunken areas) NECTARINES: Discoloration of flesh around pit Ground color	OKRA: Dark discoloration of pods Yellowing Wilting ONIONS Black mold Breakdown Curing Dampness Discoloration by chemicals New neck growth New root growth * Peeling * Pink color Smudge Sprouting * Sunscald Wet necks PARSLEY: Yellowing Wilting PARSNIPS: Yellowing Wilting PEACHES: California blight Discoloration around pit Discoloration from brushing injury Ground color * Undersize when not more than 1/16"
* Should be classified as quality factors when the food inspector is reasonably sure that they did not occur after the product was packed.	

Figure 5-1. List of condition factors (continued).

LIST OF CONDITION FACTORS

PEARS:

- Ammonia injury
- Calyx injury
- Core breakdown
- Ground color
- * Scab (storage)
- Scald
- Silicate injury
- Skin discoloration
- Smothering injury
- Overmaturity
- Low temperature injury
- Anjou cork spot

PEAS:

- Bacterial blight
- Brown or black calyxes
- Downy mildew damage
- * Overmaturity
- * Splitting of skin of peas
- * Sprouted peas
- Striations following field freezing
- Whitish discoloration from mechanical injury

PEPPERS:

- Dark discoloration
- Flabbiness
- Red color
- Shriveling
- Wilting

PINEAPPLE:

- Color
- Internal breakdownr

PLUMS:

- California blight
- Cracks
- Color
- Discoloration around pit

POTATOES:

- Air cracks
- * Blackherat
- Bruising and chafing next floor racks and walls
- Chemical injury
- Discoloration following skinning or bruising
- * Discoloration of vascular ring
- * Green color (light struck)
- * Internal browning
- Lenticels, sunken
- * Mahogany browning
- * Net necrosis
- Scald
- Smearing with soft rot
- Sprouts
- Surface mold
- Tuber moth damage
- * Wet Breakdown

PRUNES:

- * Shriveled ends

RADISHES:

- Color of tops
- Discoloration of tops
- Flabbiness

* Should be classified as quality factors when the food inspector is reasonably sure that they did not occur after the product was packed.

Figure 5-1. List of condition factors (continued).

LIST OF CONDITION FACTORS	
RHUBARB: Color of tops SHALLOTS: Color of tops SPINACH: * Aphids Budworm injury Small dead, water soaked leaves Yellow leaves due to mildew or white rust SQUASH: Cracking of winter varieties Wilting and flabbiness of summer varieties	TOMATOES: * Blossom end rot Discolored areas * Nailhead spot * Radial cracks Sulphur dioxide injury * Sunburn Virus mottling Yellow color Live worms Shriveling following skin checking TURNIPS: Anthracnose Color of tops New top growth WATERMELONS: Chemical injury Cracked or broken melons Overripeness Sunburn Wall rubs
* Should be classified as quality factors when the food inspector is reasonably sure that they did not occur after the product was packed.	

Figure 5-1. List of condition factors (concluded).

(2) Listing of market diseases. Figure 5-1 lists market diseases that affect specific products during harvesting, grading, packing, transporting, storing, and the various handling operations required to move the product to the ultimate consumer. Two broad groupings are parasitic diseases, caused by fungi, bacteria, and viruses, and nonparasitic diseases, caused by environmental or nutritional factors. Examples of nonparasitic diseases are: blackheart in potatoes caused by a deficiency in oxygen during storage and cracked stem in celery caused by a boron deficiency in the soil during growth. The common names of fruit and vegetable diseases are derived from many sources. Some disease names contain the name of the causative agent, such as black mold, downy mildew damage, and ammonia injury. Other names describe the diseases to which they apply, such as ring rot or scald or membranous stain. Some other disease names include the name of the variety on which they are most common, such Jonathan spot or Anjou cork spot. Diseases caused by insect injury are usually named for the insect that caused the disease, such as tuber moth damage, apple maggot injury, or aphid injury.

(3) Condition defects not included. Some kinds of condition factors, known as condition defects, are not included in figure 5-1. (See figure 5-6.) These include wilting, shriveling, fresh worm damage, freezing injury, or bruising and mechanical injury that occurred after packing. Decays are usually classed as condition factors, except in cases when the decay has progressed to advanced stages, or when development is so slow that they are properly classed with permanent grade defects.

(4) References. Quality and condition factors may be found in the individual FF&V commodity standard and/or the commodity shipping point/market inspection instructions.

c. **Variety Factors.** In some instances a particular variety is specified by the purchaser because that variety:

(1) Stores better, or

(2) Is resistant to certain diseases, or

(3) Is resistant to other condition factors, or

(4) May be more suitable for a particular use.

NOTE: Occasionally, varieties may have differing standard requirements, such as coloring required for particular varieties of apples.

d. **Maturity Factors.** The degree of maturity may be specified by the purchaser because it affects the keeping and shipping quality of the product. Since a ripe product is more easily damaged during shipment or storage, the purchaser may also specify a degree of maturity. An example is tomatoes procured for overseas shipment that are usually procured and shipped in the "green" or "breaker" stage of maturity. "Green" means that the surface of the tomato is completely green in color. "Breaker" means that there is a definite break in color from green to tannish-yellow, pink, or red, on not more than 10 percent of the tomato's surface. There is distinction between the words ripe and mature. Ripe or ripeness indicates fitness for use or the best eating quality. Mature or maturity is a more restrictive term, which means completion of development. Thus, a mature tomato (such as a breaker), a mature apple, or a mature melon may attain full development without being ripe, that is, without being the best quality for eating.

e. **Chemical Composition Factors.** The maturity of some items cannot be determined by outward appearance alone. For example, well-colored oranges are not always mature and sweet, nor are oranges with a green rind always immature and sour. Therefore, objective methods of measurement have been developed for such items to help determine maturity. For example, chemical analysis, mechanical measurement, specific gravity, and light are used in determining the stage of maturity. In many cases these tests are included in the US standards for grades. During the maturation process, the chemical components of fruits and vegetables can be analyzed to determine their stage of maturity. Factors used to measure these changes are starch level, pH, and titratable acid.

f. **Size Factors.** Many standards contain size requirements for various grades. In other instances, a purchaser may request a specific size. Size may be determined by length, diameter, weight, or a combination of one or more of these. It also may be expressed as a certain number of items per unit pack, such as 110-count potatoes, which means that the individual potatoes must have a minimum weight of five ounces and a maximum weight of nine ounces to have 110 potatoes per standard box.

Section II. DESTINATION INSPECTION PROCEDURES FOR FRESH FRUITS AND VEGETABLES

5-4. INTRODUCTION

The purpose of destination inspection of FF&V is to determine if the identity, condition, and quantity of the FF&V being received meet the requirements specified in the blanket purchase agreement for the acquisition of fresh fruits and vegetables. The FF&V must also be inspected for wholesomeness.

a. **Destination Inspections.** Destination inspections are Classes 4 and 8. The bulk of these inspections at most installations is a Class 4. Usually only the basic requirements from the inspection data packet differ between Classes 4 and 8.

b. **Frequency.** These inspections are done when FF&V are delivered to the military services. This is the final inspection before ownership is transferred from the contractor to the Government.

NOTE: The destination inspection to determine identity, condition, and quantity is done simultaneously with the wholesomeness inspection even though they are sequentially listed in this lesson. Paragraphs 5-5 through 5-20 are steps involved in the inspection process. Extent of involvement by the 91R10 Veterinary Food Inspection Specialist is dictated by local SOP.

5-5. INSPECTION DATA PACKET

a. **Assemble Inspection Data Packet.** An inspection data packet (IDP) should be assembled prior to commencing a procurement (destination) inspection of FF&V. From the inspection data packet, the inspector obtains contractual requirements and inspection guidelines. An inspection data packet for destination inspection of fresh fruit and vegetable items normally includes the following documents, as applicable:

(1) Blanket Purchase Agreement (BPA) for acquisition of FF&V.

(2) Defense Personnel Support Center Manual 4155.6, Subsection 218.1.

(3) United States Standard for Grades of FF&V and/or product specifications.

(4) Market Inspection Instructions.

(5) United States Department Agriculture Quick Reference Manual.

(6) Unit standard operating procedure (SOP).

b. **Extract Inspection Requirements.** Requirements of the acquiring agency will dictate the extent of a procurement inspection. The requested inspection may range from an inspection for identification, condition, and quantity of product to an inspection for quality and condition factors. Other requested inspections may be for all contractual requirements. Regardless of extent of requested inspection, the inspection should be conducted in accordance with inspection guidelines furnished by the acquiring agency and other responsible agencies. Modification of the inspection procedures may be necessary for individual acquisition actions. Any modification of inspection procedures should be adequately documented.

c. **Extract Contractual Requirements.** Contractual requirements that are commonly specified for each acquisition action are:

(1) Type of item.

(2) Variety if applicable.

(3) Specific US grade.

(4) Product requirements and allowable defect tolerances.

(5) Size, weight, and/or count per case.

(6) Required stage of maturity.

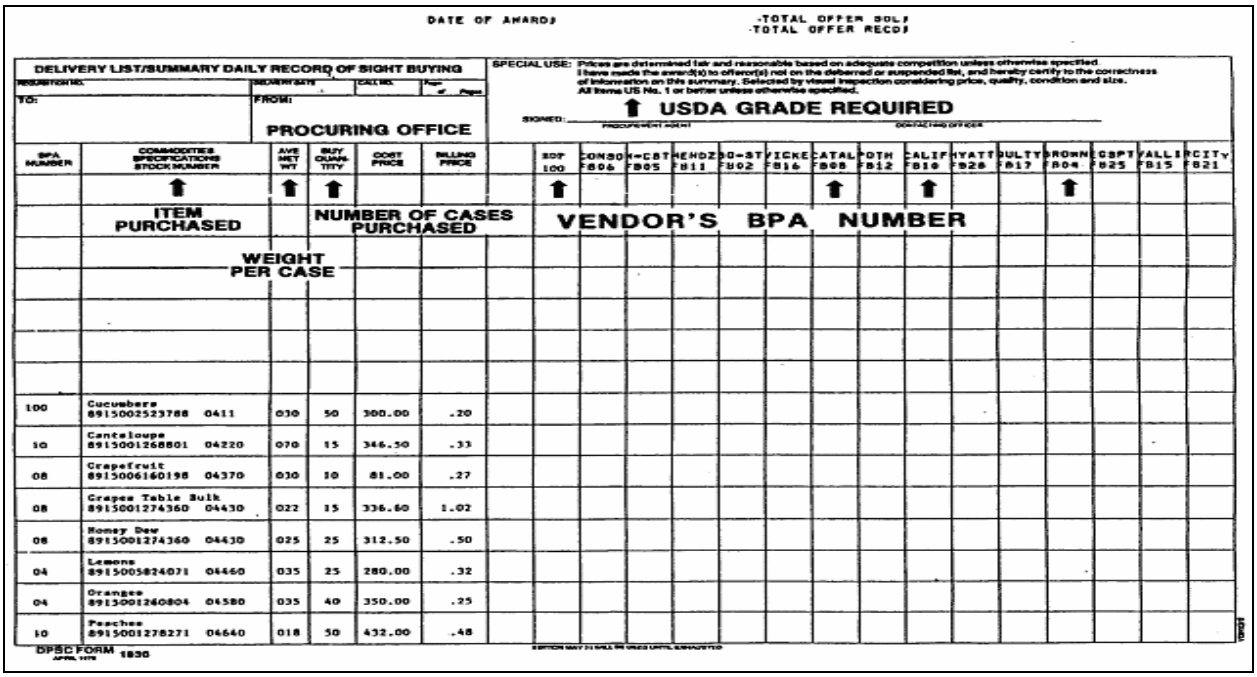
(7) Type of packing and packaging.

(8) Delivery date.

NOTE: Since contractual requirements frequently change, the inspector must review the contractual documents before each delivery. See Subcourse MD0705, Inspection Documents, for procedures in extracting requirements from the inspection data packet.

d. **Review Origin Inspection Documents.** The destination inspector must review documentation required to accompany shipment to insure that a proper origin inspection has been performed. Normally, contractual documents require that FF&V inspected at origin by purchasing personnel (field buyer or street buyer), be indicated on a DPSC Form 1930 or that a USDA Federal-State Inspection Certificate accompanies the shipment. Receipt and review of either of these documents, properly completed, insures that an origin inspection has been performed and should indicate any deviations from contract requirements.

(1) Defense Personnel Support Center Form 1930 (Delivery List/Summary Daily Record of Sight Buying). All FF&V items procured by field buyers or street buyers must be accompanied by DPSC Form 1930. It shall be signed by the PCO and state whether a USDA/state inspection was performed at origin. The DPSC Form 1930, commonly called the "Buy Sheet," is the basic contract for DPSC acquired fresh fruits and vegetables. (See figure 5-2.) With this form, the inspector is able to identify the item purchased, average weight of a case, number of cases purchased, acquiring officer, supplier, and the grade bought. This form is an essential form, not an optional one.



DATE OF AWARD)

-TOTAL OFFER SOL)
-TOTAL OFFER RECD)

DELIVERY LIST/SUMMARY DAILY RECORD OF SIGHT BUYING

REQUISITION NO. | DELIVERY DATE | CALL NO. | Page ___ of ___ Pages

TO:

FROM:

PROCURING OFFICE

SPECIAL USE: Prices are determined fair and reasonable based on adequate competition unless otherwise specified. I have made the award(s) to offeror(s) not on the debarred or suspended list, and hereby certify to the correctness of information on this summary. Selected by visual inspection considering price, quality, condition and size. All items US No. 1 or better unless otherwise specified.

SIGNED: _____ (PROCUREMENT AGENT) _____ (CONTRACTING OFFICER)

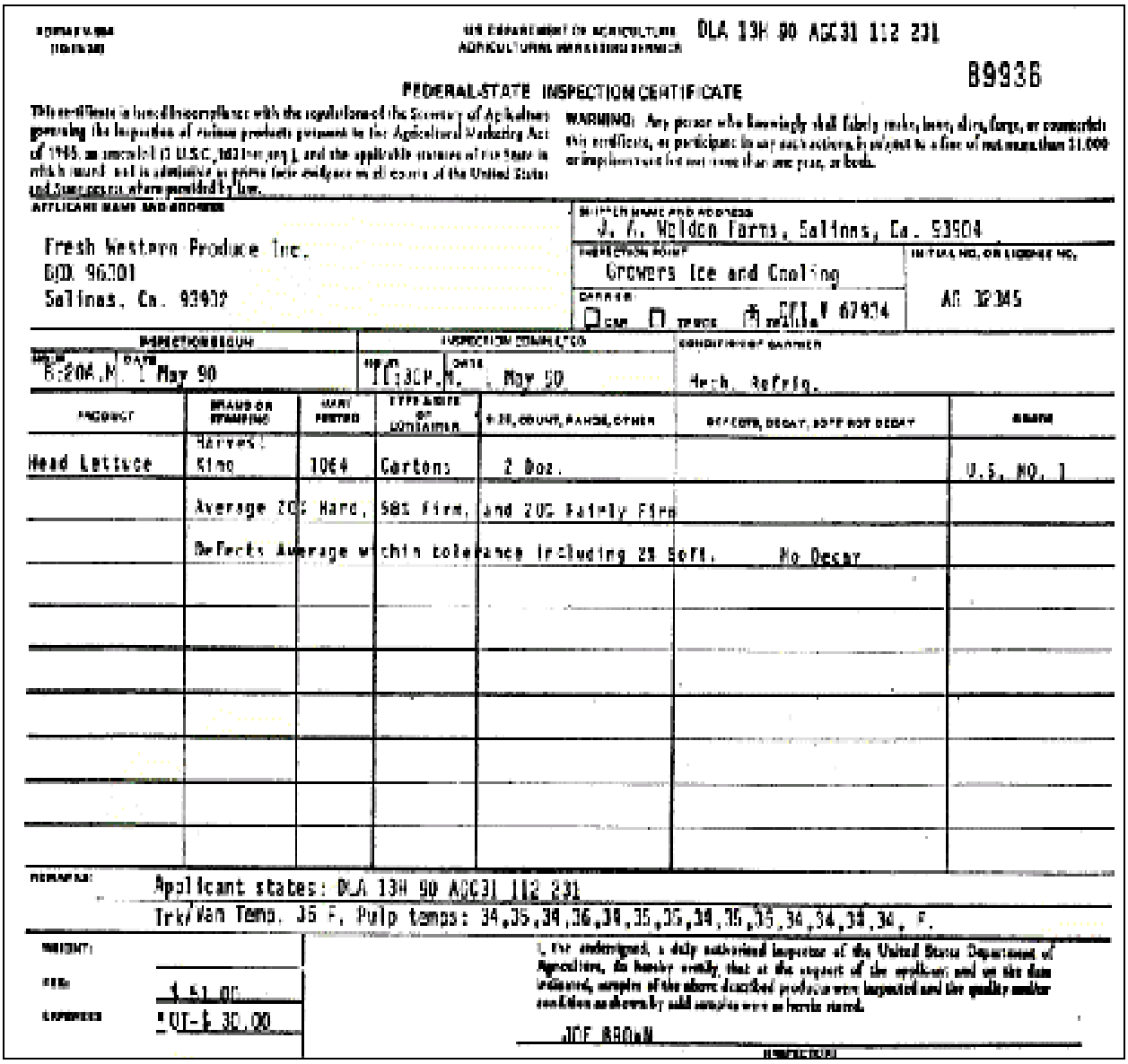
USDA GRADE REQUIRED

BPA NUMBER	COMMODITIES SPECIFICATIONS STOCK NUMBER	AVE NET WT	BUY QUANTITY	COST PRICE	SELLING PRICE		EDP 100	CONSOL F806	H-CST F805	HENDZ F811	SO-ST F802	VICKE F816	CATAL F808	POTH F812	CALIF F810	HYATT F826	BULTY F817	BROWN F804	GSPT F825	VALLE F815	RCITY F821
	⬆	⬆	⬆				⬆						⬆		⬆			⬆			
	ITEM PURCHASED		NUMBER OF CASES PURCHASED				VENDOR'S BPA NUMBER														
	WEIGHT PER CASE																				
100	Cucumbers 8915002523788 0411	030	50	300.00	.20																
10	Canteloupe 8915001268801 04220	070	15	346.50	.33																
08	Grapefruit 8915006160198 04370	030	10	81.00	.27																
08	Grapes Table Bulk 8915001274360 04430	022	15	336.60	1.02																
08	Honey Dew 8915001274360 04430	025	25	312.50	.50																
04	Lemons 8915005824071 04460	035	25	280.00	.32																
04	Oranges 8915001240804 04580	035	40	350.00	.25																
10	Peaches 8915001278271 04640	018	50	432.00	.48																

DPSC FORM 1930

Figure 5-2. DPSC Form 1930.

(2) United States Department Agriculture Federal-State Inspection Certificate. Depending upon the destination and the desires of purchasing personnel, an origin inspection by USDA federal or state inspectors may be required. The BPA states that the acquiring officer may request, or has the option to request, inspection at origin by the USDA. Normally, USDA grading is required for carlot/trucklot quantities. The grade certificate should accompany a less-than-carlot shipment if the acquiring officer has requested USDA grading. (See figure 5-3.) If an inspection for quality and/or condition has been performed by USDA inspectors, a USDA Federal-State Inspection Certificate will be forwarded with the shipment. Current regulations require an official copy of the inspection certificate (not a reproduction) to accompany the shipment if inspection has been accomplished at origin by USDA federal or state inspectors. If the inspection certificate is required but not available, notify the acquisition agency.



DLA 13H 90 AGC31 112 231

B9936

FEDERAL-STATE INSPECTION CERTIFICATE

This certificate is issued in accordance with the regulations of the Secretary of Agriculture governing the inspection of various products pursuant to the Agricultural Marketing Act of 1946, as amended (7 U.S.C. 1621 et seq.), and the applicable statutes of the State in which issued, and is available as prima facie evidence in all courts of the United States and Congress as otherwise provided by law.

WARNING: Any person who knowingly shall falsely make, issue, alter, forge, or counterfeit this certificate, or participate in any such actions, is subject to a fine of not more than $1,000 or imprisonment for not more than one year, or both.

APPLICANT NAME AND ADDRESS
Fresh Western Produce Inc.
BOX 96101
Salinas, Ca. 93912

SHIPPER NAME AND ADDRESS
J. R. Weldon Farms, Salinas, Ca. 93904

INSPECTION POINT
Growers Ice and Cooling

INITIAL NO. OR LICENSE NO.
AR 12345

CARRIER
☐ CAR ☐ TRUCK ☒ AIRLINE FFI # 67974

INSPECTION REQUESTED
TIME 8:20A.M. DATE 1 May 90

INSPECTION COMPLETED
TIME 10:30A.M. DATE 1 May 90

CONDITION OF CARRIER
Mech. Refrig.

PRODUCT	BRAND OR MARKING	NUMBER PACKED	TYPE AND SIZE OF CONTAINER	NET CONTENTS, RANGE, OTHER	DEFECTS, DECAY, ETC. IF NOT DECAY	GRADE
Head Lettuce	Harvest King	1064	Cartons	2 Doz.		U.S. NO. 1
	Average 20% Hard, 50% Firm, and 20% Fairly Firm					
	No Decay: Average within tolerance including 2% Soft.				No Decay	

REMARKS: Applicant states: DLA 13H 90 AGC31 112 231
Trk/Van Temp. 35 F. Pulp temps: 34,35,34,36,34,35,36,34,35,35,34,34,34,34, F.

WEIGHT:

FEES: $ 41.00

EXPENSES: OT-$ 30.00

I, the undersigned, a duly authorized inspector of the United States Department of Agriculture, do hereby certify that at the request of the applicant and on the date indicated, samples of the above described products were inspected and the quality and/or condition as shown by said samples were as herein stated.

JOE BROWN
INSPECTOR

Figure 5-3. USDA Federal-State Inspection Certificate.

5-6. SAMPLING

a. **Terms.** The following terms are defined to aid in the statistical sampling of fresh fruits and vegetables. Local SOP may deviate from these commonly used definitions for FF&V inspection.

(1) Lot. The term lot refers to inspection lot and means any number of containers of the same size and type which contain a fresh fruit or vegetable item of the same type, variety, size, and so forth, from which a sample is to be drawn and inspected to determine conformance with the acceptability criteria.

(2) Lot size. Lot size is the number of individual containers (for example, bags, baskets, boxes, crates) of a single commodity located in the same conveyance.

(3) Sample size. Sample size means any number of sample units to be used for inspection.

(4) Sample unit. Sample unit means an individual shipping container and its entire contents or a portion of the contents of one or more containers of a specified product. For example, a case of cucumbers may contain 70 cucumbers, all of which constitute a single sample unit, but the US standard for carrots identifies the sample unit as 50 individual carrots from one case or bag.

b. **Sample Selection.** In order to secure the appropriate samples for a statistically valid inspection, samples of each product in a shipment must be selected. The inspector selects samples using procedures learned in Subcourse MD0706, Inspection Concepts. Selected samples are normally used for the identity, condition, and quantity determinations.

c. **Standard References.** Defense Personnel Support Center Manual 4155.6, Subsection 218.1, and Table III, Enclosure 1, list the sample size to be used for destination inspection of FF&V. If inspection procedures require internal examination (destructive sampling) of the product, refer to the appropriate Market Inspection Procedures Manual.

d. **Consumer Package.** When consumer-type packages are packed in master containers or shipping cases, the consumer package is the unit for inspection. The contents of two or more of the consumer packages should not be dumped together to form the inspection sample, except when the inspection is based on consumer or other standards which specifically provide that there is no restriction on the percentage of defects permitted in individual packages, provided the average is within the tolerance. However, in the case of such products as cauliflower, lettuce, celery, or other products, when one or a few specimens are sometimes over wrapped in film or packed in film bags, trays, or other such containers, the contents of the master container are considered the unit for inspection. The same is true for tomatoes that are double

wrapped and packed in lugs. (A lug is a box of a specific size, having an inside width of 13-1/2 inches and a depth of from 4-1/4 to 7-1/4 inches, which holds 25 to 40 pounds of fruits or vegetables.)

5-7. CONVEYANCE INSPECTION

At the time samples are selected for inspection, the Veterinary Food Inspection Specialist should inspect the conveyance for sanitation. There are usually no temperature requirements for conveyances carrying FF&V. The main consideration is sanitation, but product and conveyance opening temperatures should be taken to detect temperatures that might adversely affect the product.

5-8. IDENTITY

Inspection for identity is a determination that the product is that specified in the contract and, if inspected at origin, is the same product. This inspection can be accomplished by a survey of inspection stamps, inspection reports, case codes, car numbers, invoices, manifests, and labels. Primary containers should be opened when necessary for examination of the product.

5-9. DETERMINING IDENTITY

On each shipment received, destination inspection for identity is performed by the inspector in the following sequence:

a. **Use Of Inspection Data Packet To Identify Requirements.** The inspector determines requirements for identity, packaging, packing, and markings by utilizing the inspection data packet.

b. **Examination of Documents.** The inspector compares information from the contract, DPSC Form 1930, or the USDA certificate (whichever is applicable) and the vendor's invoice.

c. **Sample Selection.** The inspector selects samples.

d. **Inspection for Packaging, Marking, and Packing Requirements.** The inspector compares information from the vendor's invoice and the USDA certificate or the DPSC Form 1930 with product in shipment. He observes the following:

(1) Container. Container requirements should be extracted from contractual documents. Generally, present acquisition documents specify that new or used, clean, standard containers may be used. Further, standards and specifications usually specify standard pack requirements for specific items. The item description on the case, labels, stamp impressions, lot numbers, and other identifying marks should be observed and compared to origin documents and the requirements extracted from the inspection data packet.

(2) Markings. The Federal Food, Drug, and Cosmetic Act, (approved 25 June 1938), requires the containers of food in packaged form to be marked.

(a) Required markings.

1 The common or usual name of the food.

2 The name of the manufacturer, packer, or distributor.

3 The address (place of business) of the manufacturer, packer, or distributor.

4 An accurate statement of the quantity of contents in terms of weight, measure, or numerical count, or a combination of numerical count and weight or measure.

(b) Methods of marking: Marking requirements, pertaining to all containers, are alike regardless of size. The required information must appear on the label or on the container prominently and with such conspicuousness and in such terms as to render it likely to be read and understood by the ordinary individual under customary conditions of purchase. The required information may appear on tags instead of upon labels printed or stenciled on bags, provided the tags are securely affixed to the bags and that they contain the required information in a conspicuous and legible manner. Normally, military markings are not required unless otherwise stated by one of the contractual documents in the inspection data packet.

(c) Open container requirements: Open containers are subject to the same package-marking requirements as closed containers, except that (1) containers of not more than 1-dry-quart capacity are exempt, and (2) containers of a shipment being sent to a processing plant in another state are exempt when certain conditions are met.

(d) Exceptions: The common or usual name of the food may not be required, in the case of a common fruit or vegetable in an open container or in a container such as an open net bag, since the nature of the contents is obvious.

(e) Net weight markings: The commodity must comply with the marked net weight contents at the time the lot or shipment comes within the jurisdiction of the act.

(f) Grade markings: A grade marking is not required (but must be correct if made). All markings made mandatory by state regulations should be observed.

(g) Misbranding: Instances of misbranding under the Federal Food, Drug, and Cosmetic Act are reported through appropriate established channels. It is also unlawful under the Perishable Agricultural Commodities Act (PACA) to misbrand fresh fruits and vegetables as to grade, size, pack, weight, place of origin, etc.

(3) Method of packing. United States standards contain standard pack requirements for fresh fruits and vegetables. The standard pack requirements usually specify a tightness of pack and a specified arrangement. To aid in inspecting for these requirements, the following information is provided.

(a) Judging tightness of fill. Tightness of fill should be judged when the container is resting on its bottom. Inspectors should also take into consideration whether the package is on a rigid surface or whether it is resting on the ends of other crates that permit the bottom side to become convex (this would make the crate appear slack at the top when, in reality, it is fairly well fitted or well fitted). Most products packed in ice should be judged by the tightness of the product in layers rather than the tightness of packages themselves, determined by the amount of ice in the pack.

(b) Arrangement in layers (place-packed). The following terms refer to the arrangement of fruit in the layers:

1 Straight pack. A pack in which the specimens in the layers above the bottom layer rest directly above the specimens in the layer underneath.

2 Diagonal pack. A pack in which bottom layer fruits are placed so that they are not opposite each other horizontally, but fit partially into the spaces between fruits in the adjacent row. Fruits in the second and any additional layer are not placed directly over those in the next lower layer beneath, but are "nested" between the tops of the fruits in the next lower layer. Thus, the packed fruit is in diagonal rows.

3 Off-set pack. A pack in which alternating space is left at the end of each row in each layer and the specimens above the bottom layer rest upon one specimen in the outside rows and two specimens in the inside rows in the layer beneath.

4 Bridge pack. A pack in which a portion of an additional layer is placed in the package in order to secure a bridge. Common examples are: iceberg type of head lettuce in crates and tomatoes in lugs.

(c) Bulk pack. Bulk pack refers to the filling of containers without the FF&V being place-packed. Items commonly bulk-packed are lemons and potatoes.

e. **Inspection for Identity Requirements.** Next, the inspector opens sample cases to determine if product is that required by the contract. For example, if the contract requires carrots, (Do the cases contain carrots?).

(1) Products are usually purchased by type. Type refers to a group of items showing common traits or characteristics (apples, oranges, turnips, potatoes, or seedless grapes).

(2) Occasionally, specific varieties are required; (for example, Golden Delicious apples, Red Delicious apples, Bartlett pears, Navel oranges, Russet Burbank potatoes, and so forth).

5-10. CONDITION

Shipments are inspected to determine if the product is in the condition required by the contract (for example, fresh, not wilted), if the product is at the required temperature, and also if the packaging (unit container) and packing (shipping container) are in such condition as to protect the product during storage and distribution.

5-11. DETERMINING CONDITION

The Veterinary Food Inspection Specialist conducts an inspection of the product to see if it is in less than excellent condition. Using the sample cases selected for determining identity and quantity, the inspector inspects for condition as follows:

a. **Inspect the Conveyance.** Inspect the conveyance in which the shipment arrived, by using procedures learned in Subcourse MD0694, Basic Food Inspection Procedures.

b. **Inspect Containers.** Inspect the containers to determine if the packaging and packing are as required by contract. Shipping cases will be free of tears, cuts, crushing, and/or damage from water.

c. **Determine Product Temperature**.

(1) Specific product temperatures are not normally required. Temperatures are taken to identify potential problems, such as heat, chill, or freeze injury.

(2) Some FF&V items must be delivered in a chilled state, which means that no ice crystals will be present in the product. Internal temperatures may also be an indicator to estimate suitability for storage and intended use.

(3) The internal temperature of the product is taken as shown in Lesson 4 of Subcourse MD0694.

d. **Inspect for Condition Defects.** See paragraphs 5-12 thru 5-15.

e. **Determine Percentage of Condition Defects.** See paragraph 5-16.

5-12. INSPECTING FOR CONDITION DEFECTS

The inspection for condition defects is a process of sensory evaluation. During this examination, the Veterinary Food Inspection Specialist will examine the product externally and internally for evidence of defects.

a. **External Examination.** Perform an external examination (nondestructive) in order to identify any visible defect. You will detect most condition defects during the external examination. However, an external examination may require cutting of the item to determine the extent of the defect.

b. **Internal Examination.** An internal examination (destructive) may be required by local SOP or commodity standards in order to detect internal defects. An internal defect is a defect that cannot be detected without cutting the item in order to expose the internal surfaces. See figure 5-4.

Figure 5-4. Cutting for internal examination.

5-13. PRODUCT INSPECTION

a. **Use of a System.** Remove the product from the case for inspection. Remember that you have to put every normal product item back where it was. Therefore, note the manner in which the product is arranged in the case so that it may be replaced in a similar manner.

b. **Common Condition Defects.** As items are inspected, normal-appearing items are returned to the case. Abnormal-appearing items are set aside. (See figure 5-5.) Some of the more common condition defects that you should easily notice are:

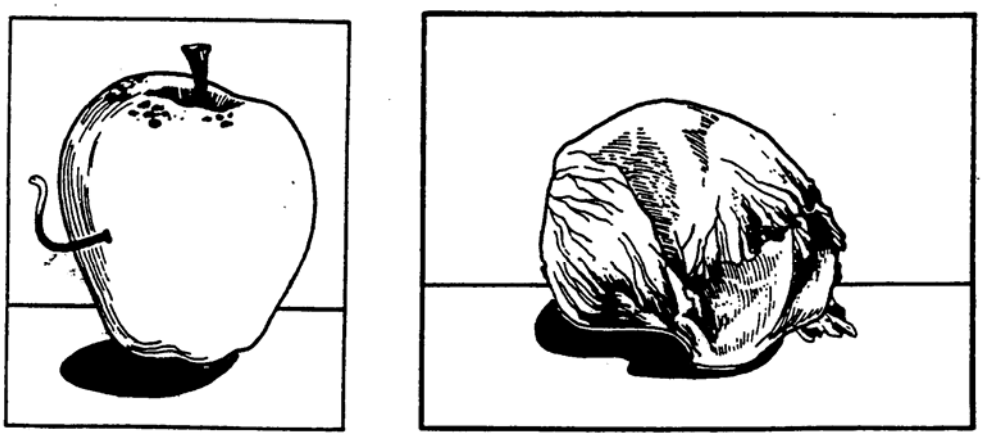


Figure 5-5. Evidence of condition defects.

(1) Decay. Decay is a deterioration or decline of the plant tissues involving decomposition produced by fungi, bacteria, and similar organisms, which is of a complete and progressive nature. Observe the product for lesions, spots, discolored areas, slime, mold, or other manifestations. They are the result of infection, inherent weaknesses, or environmental stress that interfere with product usefulness or normal storage life. However, take care to avoid confusing dead or water soaked tissues with decay as they are often quite similar in appearance. Decayed tissue will disintegrate when rubbed between the fingers, while bruised or water soaked tissue will crumble but will retain a certain amount of body or texture or will roll up into a small particle or a ball.

(2) Mechanical damage. Mechanical damage is usually the result of improper handling, careless or faulty harvesting techniques, improper storage, and/or improper transportation. Mechanical damage is the greatest single cause of loss in fresh fruits and vegetables. External stress (mechanical damage) creates points of entry for insects and microorganisms, which often lead to forms of decay. Observe the product for cuts, bruises, abrasions, blemishes, discoloration, disfiguration, and other obvious mechanically induced defects.

(3) Insect or worm damage. Insect or worm damage often results in decay since it provides an entry for disease-producing organisms. You should look for evidence of live or dead insects or worms on the product. Damage is evidenced if the skin or leaves have been penetrated, if excreta have been deposited, or if portions of the product have been eaten. If live insects or worms are observed on the product, consider it a condition defect since their presence will result in increased damage to the product. See figure 5-6.

CONDITION DEFECTS-- FRESH FRUITS AND VEGETABLES

1. **Mechanical Damage**. Cuts, bruises, abrasions, blemishes, discoloration, disfiguration, and other obvious mechanically induced defects are evidences of mechanical damage. External stress (mechanical damage) is caused by improper handling, careless or faulty harvesting techniques, improper storage, and/or improper transportation.

2. **Insect or Worm Damage**. Insect or worm damage is indicated by penetration of the skin or leaves, deposits of excreta, and/or evidence that the product has been eaten. Also, even if such conditions are not present, consider it a condition defect if you find live or dead insects or worms on the product, since their presence will result in increased damage to the product. Insect or worm damage often furnishes an entry for decay.

3. **Decay**. Evidences of decay are lesions, spots, discolored areas, slime, or mold. Any such manifestations are a result of infection, inherent weakness, or environmental stress that interferes with usefulness or reduces the product's storage life.

4. **Freeze Damage**. Water soaked areas, softening of texture, and a loss of color (usually a glassy or transparent appearance) are indications of freeze damage.

5. **Chill Injury**. Chill injury is indicated by a generalized darkening of color, wrinkled appearance, and sometimes a peeling of the epidermis layer.

6. **Dehydration**. A wilted appearance indicates dehydration of a fruit or vegetable item. For non-leafy items such as apples, potatoes, and carrots, you should look for evidence of a shriveled, wrinkled appearance.

Figure 5-6. Condition defects.

c. **Common Inspection Factors.** Some common inspection factors that must be taken into account during a product examination are as follows:

(1) Cleanness. Consider a fruit or vegetable item dirty if it has more dirt on it than is allowed by the standard. (For example, since apples grown on trees high above the ground, they should be dirt-free.) However, a small amount of dirt is normal on potatoes and carrots which are grown in the ground.

(2) Color. Color should be characteristic of the variety. Color may change because of improper storage or handling temperature. For example, bananas may become a grayish, dull color; celery, cabbage, and lettuce may lose their green color and turn yellow. On some items, the color may indicate ripeness or stage of growth.

Color ranges are sometimes specified for such items as tomatoes and bananas. You will be able to compare the stated ranges with color photographs or charts. Through such experience, you should be able to develop good color judgment.

(3) Shape, texture, firmness, freshness, maturity. Shape, texture, firmness, freshness, and maturity requirements are found in the appropriate commodity standard. These requirements involve very subjective evaluations. As you gain judgment through experience, you will be better able to make these evaluations.

(4) Size. Size refers to measurement of inches in length or diameter, or a weight per item, or other requirement.

d. **Categories for Specific Commodities**. Once the defective items are segregated, they should be further separated into decay, other defects, and size defects. (A more in-depth breakdown of these defects may be required by local SOP.) To be in strict accordance with the US Standard for Grades of Cucumbers, you should use the following defect categories:

(1) Decay.

(2) Other condition defects.

(3) Quality defects.

(4) Size defects for maximum diameter.

(5) Size defects for length.

e. **Determining Classifiable Defects.** After the abnormal product is separated, the inspector should read in the US Standard and the Market Inspection Instructions to determine if the abnormality is a classifiable defect or only an irregularity. Following is an example of the defects classification procedures.

(1) To classify a defect (abnormality), the inspector must first read the grade requirements found in the US Standard. An example is that of Celery Requirements, shown below:

> US Number One consists of stalks of celery of similar varietal characteristics that are fairly well developed, fairly well formed, well trimmed, fairly compact, free from blackheart, free from soft rot, free from damage caused by freezing, growth cracks, horizontal cracks, pithy branches, seed stems, suckers, dirt, doubles, wilting, blight or other disease, insects, mechanical, or any other means.

(2) The above requirements represent a typical example of a grade New Text statement with specific product requirements that define the appearance and characteristics of the product in the lot. The interpretation and description of these stated requirements are most often found in the Definition part of the US Standard. When the US Standard definition is incomplete, the USDA Market Inspection Instructions manuals are written to give specific inspection guidance.

(3) The basic requirements of individual stalks of celery is described as, "of similar varietal characteristics which are fairly well developed, fairly well formed, well trimmed, and fairly compact." The description of these characteristics is found in the US Standard and the Inspection Instructions manual.

(4) Subsequent grade requirements that read "and which is free from blackheart and soft rot" deserve special attention. The phrase "free from" is used to identify those defects that are considered "below grade" requirements any time found, regardless of the amount present on an item. This means that a single spot of soft rot on a stalk of celery would cause the stalk of celery to be classified as defective.

(5) The final description of grade requirements reads, "from damage caused by freezing, growth cracks, mechanical and other means." The words "damage caused by" indicates that an abnormality is not classified as a defect until the abnormality is extensive enough to match the "damage by growth cracks" definition in the US Standard and the Inspection Instructions.

5-14. EXAMINING FOR MATURITY

a. **Mature Contrasted to Ripe.** A distinction needs to be made between the terms mature and ripe. The terms mature and ripe both refer to fullness or completion of growth, but, mature or maturity has a more restricted meaning and simply refers to the completion of development. Ripe or ripeness also indicates the best quality for eating, or fitness for use. Thus, a mature tomato or a mature apple may attain full development without being ripe.

b. **Botanical Meaning and Horticultural Meaning.** The botanical and the horticultural meanings of the terms are not the same. A fruit or vegetable may be fit for use, like eating, which is the horticultural meaning of the word ripe, without being ripe in the botanical sense. Botanically, ripeness is judged by the presence of mature seeds fit for germination. Many so called leafy or green vegetables may be ripe for your purposes without having seeds fit for germination. Some examples are lettuce, cabbage, spinach, snap beans, and cucumbers.

5-15. CLASSIFYING DEFECTS

a. **Experience Required.** Normally, after the defects are segregated into the appropriate categories, they are classified to determine whether they should be scored against the grade. These classifications are for the most part subjective and require experience and product knowledge.

b. Application of Standards to Individual Items. Defects may result in injury, damage, serious damage, or very serious damage to an individual item. These terms are defined in the US Standards and/or Market Inspection Instructions for each commodity, where applicable. The scoring of defects into one of these generalized classifications is always based on the amount of defects present, as defined or allowed for each category.

c. **Standardized Scoring for Each Commodity.** In classifying defects, individual specimens should not be scored on the close basis employed in judging prize products. Nature does not cooperate by producing perfectly formed commodities free of blemishes and defects. Also, the marketing process has not been refined to the point that it is possible to market commercial volumes of product entirely free of blemishes and defects. Therefore, in classifying defects, the inspector must refer to the US. Standards or other specifications to determine the limits of defects permitted.

d. **Terminology Defined.** Defects of commercial importance are listed in the US Standards for the various commodities along with the limits of their severity. Each grade permits a certain amount of quality and condition defects in the various commodities. The following terms used in classifying defects as to their severity, are normally used in the US Standards.

(1) Injury. Injury damage means any specific defect described in the US Standard, or other equally objectionable variation of any one of the defects, any other defect, or combination of defects, which noticeably detracts from the appearance or the edible or marketing quality of the commodity.

(2) Damage. Damage means any specific defect described in the US Standards, or an equally objectionable variation of any one of their defects, any other defect, or any combination of defects, which materially detracts from the appearance or the edible or marketing quality of the commodity.

(3) Serious damage. Serious damage means any specific defect described in the US Standard, or equally objectionable variation of any one of these defects, any other defect, or combination of defects, which seriously detracts from the appearance or the edible or marketing quality of the commodity.

e. **Use of Tables for Guidance.** As a rule, the US Standards require US number one grade products to be free from damage. Therefore, before most defects (other than decay) and some diseases are scored as defective, the defect must meet the requirements of damage and/or the limits specified in the US Standard. To aid in classifying defects, many standards have limits for certain defects specified in a table. The inspector should consult these tables for guidance in classifying defects. Classification of defects is difficult and requires experience. Therefore, it is usually done by a skill level two or higher Veterinary Food Inspection Specialist.

5-16. DETERMINING AMOUNT OF DEFECTS

There are two methods of calculating the amount of condition defects in the inspection lot, based upon the inspection results. The method to be used is determined by how the tolerances for each defect are expressed in the applicable US Standard and/or the SOP.

a. **Count Basis.**

(1) Count all items in the sample case to include defective units.

(2) Divide number of items possessing a scorable defect by the total number of items in sample unit.

(3) Take the quotient to four places to the right of the decimal.

(4) Round off to three places to the right of the decimal.

(5) Multiply by 100.

(6) Add percent sign behind answer.

(7) Example: 120 apples in sample container with 10 apples having defects.)

$$120/10.0000 = 0.0833$$

0.0833 rounds to 0.083

0.083 x 100 = 8.3 percent

b. **Weight Basis.**

(1) Divide the weight of scorable defects by net weight of the sample unit.

(2) Take quotient to four places to the right of the decimal.

(3) Round off to three decimal places to the right of the decimal.

(4) Multiply by 100.

(5) Add percent sign behind answer.

(6) Example: 30 pounds of celery with seven pounds having defects.

$$30 \overline{)\ 7.0000} = 0.2333$$

0.2333 rounds to 0.233

0.233 x 100 = 23.3 percent

5-17. QUANTITY

Inspection for quantity is a determination that the quantity (for example, net weight, size, and/or count per primary container or unit) is as specified in the inspection data packet.

5-18. DETERMINING QUANTITY

a. **Average Net Weight.** Utilizing the procedures learned in Subcourse MD0704, the Veterinary Food Inspection Specialist determines actual net weight. He then adds up the net weight of those items weighed and divides by number weighed (sample size). This will give the inspector the average net weight. The average net weight must meet the minimum net weight specified per container. For supplies purchased for resale, each package must contain at destination no less than the marked net weight as shown on the container.

b. **Size.** If the product is to be inspected for size requirements, then there are several methods that can be used to compare actual size requirements. The method used is dependent upon the item being inspected and type of requirement. (For example, diameter, length, and so forth.). Diameter can be determined by cutting the item or by using sizing rings.

(1) Cutting. The procedure for cutting is explained in the inspection procedures for the item being inspected. An example of such an item is the potato. A potato will be cut along the longitudinal axis. Then, using a ruler, the longest diameter of the cut surface is measured and compared to size requirements.

(2) Using sizing rings. Another method is to use FF&V sizing rings (figure 5-7). These are metal rings of various sizes. The item, such as a potato, is placed on a selected ring. If the item passes through the ring, then the diameter is smaller than required. If the item will not pass through the ring, then the diameter is larger than minimum diameter. When using the rings, the veterinary specialist should not press or force items through the ring. Simply place each item on the ring to make the determination.

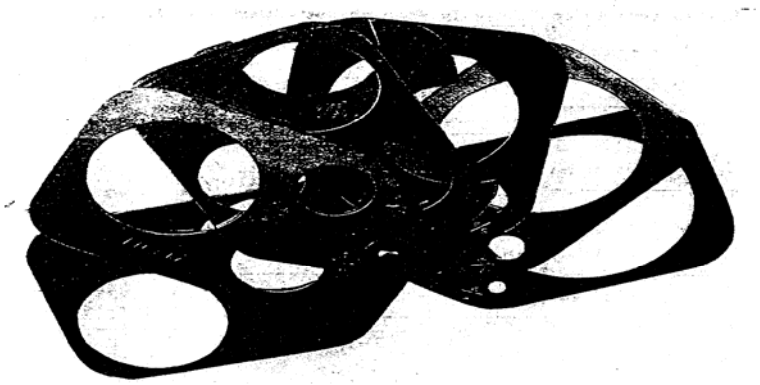


Figure 5-7. Sizing rings for fresh fruits and vegetables.

(3) Using a ruler. Length is usually determined using a ruler. Measurement landmarks are quoted in individual standards and procedures.

c. **Count.** Inspect for count requirements, if applicable. Lemons and apples are examples of items that may be bought by count. (For example, 80 to a container.) The number of items in the sample container is counted and compared with count requirements. The US Standards contain allowable variations from the specified count.

d. **Both Net Weight and Count.** Some items are purchased on both a net weight and count basis. They must therefore be inspected for both requirements. (For example, head lettuce is usually procured 24 heads per case, 35 pounds minimum edible product.) For these items, quantity examination involves a weight determination and count per container.

5-19. REPORTING NONCOMPLIANCES

If any noncompliance is found, the Veterinary Food Inspection Specialist will report and record inspection results in accordance with the local SOP. A form recommended for recording inspection results is DD Form 1234, Report of Inspection of Subsistence Products. See Subcourse MD0704, Inspection Records and Reports, or DPSC Subsistence Inspection Manual, for use of this form.

5-20. DETERMINING DISPOSITION OF SAMPLES

If samples were selected, they will be returned to the accountable office, placed back into the lot, or destroyed in accordance with local SOP. See Subcourse MD0704, Inspection Records and Reports.

Continue with Exercises

EXERCISES, LESSON 5

INSTRUCTIONS: Answer the following exercises by marking the lettered response that best answers the exercise, by completing the incomplete statement, or by writing the answer in the space provided at the end of the exercise.

After you have completed all the exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers. For each exercise answered incorrectly, reread the material referenced with the solution.

1. The majority of the fruits and vegetables procured are graded as US _____. The reason is that this grade comprises approximately_____ percent of a given crop and is of _____, _____ quality.

2. The term grade refers to the _____ of the _____ of the _____, to include _____ and _____ factors at the time of inspection.

3. The Uniform Grade Nomenclature Act (1 June 1976) requires new or revised standards to contain only four grades. What are they?

   _____

   _____

   _____

   _____

4. The two primary grading factors for fresh fruits and vegetables are.

   _____

   _____

5. What is the primary difference between quality and condition factors?

   _____

   _____

SPECIAL INSTRUCTIONS FOR EXCERCISES 6 THROUGH 16. For each listed factor, place an "X" in the space provided to identify if it is a condition or quality factor.

Type	Condition Factor	Quality Factor
6. Mechanical injury		
7. Color of apples		
8. Decay		
9. Shape of cucumbers		
10. Yellowing of lettuce leaves		
11. Bruising		
12.Watercore of apples		
13. Tip burn on cabbage		
14. Wilting of peppers		
15. Freeze injury		
16. Maturity of a head of lettuce		

17. A particular variety of fresh fruits and vegetables may be considered significant by the buyer. The variety may be specified because it:

_____

_____

_____

_____

18. Which of the following is more restrictive?

    a. Maturity

    b. Ripeness

19. A tomato that is completely developed is said to be _____ ,while a tomato that is ready to eat or fit for use is said to _____.

20. Oranges, that are well colored, will always be mature and sweet.

    a. True.

    b. False.

21. Frequently, chemical components of fresh fruits and vegetables must be evaluated to determine maturity. What are some of the factors that can be used to determine the stage of maturity?

_____

_____

_____

22. Size requirements for various grades are expressed and determined by measurement of _____, _____, or_____, or a _____ of one or more of these, or by _____ the number of items per_____ _____.

23. Destination inspection of fresh fruits and vegetables may be either class _____ or class _____.

24. What is a compilation of documents quoting contractual requirements and/or referencing general product information that is normally assembled and used during inspections called?

_____

25. Inspections may range in extent from simple identity to inspections for all terms of the contract. Regardless of the extent of inspection requested, what dictates how it is to be performed?

_____

26. When should an inspection data packet be reviewed for contractual requirements?

    a. Before each delivery.

    b. Once a week.

    c. Once a month.

    d. Once a quarter.

27. A DPSC Form 1930 must accompany all shipments of FF&V.

    a. True.

    b. False.

28. Current regulations authorize reproduced copies of USDA inspection certificates, in lieu of official copies, to accompany shipments.

    a. True.

    b. False.

29. In order to properly perform a sample unit inspection, you must inspect a container and its entire _____or a_____ of the contents of one or more _____ of a specified product.

30. What requirements does the inspection data packet (IDP) specify for fresh-fruits and vegetables containers?

    _____

31. When inspecting for identity, the type of FF&V is checked. Type of FF&V refers to a group of items showing _____ traits or characteristics. An example of FF&V is _____. An example of variety of FF&V is _____.

32. When conducting a condition inspection of FF&V, the Veterinary Food Inspection Specialist performs a(n) _____ examination and a(n) _____ examination for evidence of defects.

33. Lesions, spots, discolored areas, slime, and molds are examples of _____.

34. Decay must not be confused with bruised or water soaked tissue. The recommended way to distinguish between them is to rub the affected plant tissue between the fingers. Usually, decayed tissue will _____, while bruised or water soaked tissue will _____, but retain a certain amount of _____or_____ or will roll up into a small particle or a _____.

35. What are the four common inspection factors that must be taken into account during a product examination?

_____

_____

_____

_____

SPECIAL INSTRUCTIONS FOR EXERCISES 36 THROUGH 41. Match the condition defects in the left-hand column with the term with which it is most nearly associated in the right-hand column

Defects	Terms
36. Dehydration	Abrasions, cuts
37. Chill injury	Shriveling, wrinkling
38. Freeze damage	Evidence of skin penetration
39. Decay	Darkening, peeling skin
40. Insect damage	Glassy look, soft texture
41. Mechanical damage	Mold, slime

42. Defects of FF&V are classified into three primary groups, according to severity of defects. What are they?

_____

_____

_____

43. You have inspected a case of cucumbers and found 5 out of 70 cucumbers to be defective. What is the percent of condition defects rounded to the nearest tenth?

a. 6.9 percent.

b. 7.1 percent.

c. 71.1 percent.

d. 72.1 percent.

44. You have inspected a container that has 50 pounds of lettuce. Six pounds were found to be badly bruised. What is the percent of condition defects rounded to the nearest tenth?

a. 6.9 percent.

b. 8.3 percent.

c. 10.5 percent.

d. 12.0 percent.

45. When an inspector determines whether or not the correct number of cases were delivered, he is inspecting for quantity.

a. True.

b. False.

46. When a product is inspected for size requirements, how can the diameter be determined?

_____

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES, LESSON 5

1. Number one; 50 percent; good, average. (para 5-1a)

2. Sum; characteristics; commodity; quality; and condition. (para 5-2a)

3. United States. Fancy, US Number One, US Number. Two., and U.S. Number Three. (para 5-2b)

4. Quality and condition. (para 5-3)

5. Quality factors are permanent (inherent) characteristics.
   Condition factors are those factors that are subject to change during transit or storage. They refer to defects of a progressive nature, such as disease and decay (paras 5-3a, b)

Type	Condition Factor	Quality Factor
6. Mechanical injury	X (para 5-3b(3))	
7. Color of apples		X (para 5-3a)
8. Decay	X (para 5-3b(3))	
9. Shape of cucumbers		X (para 5-3a)
10. Yellowing of lettuce leaves	X (para 5-3b)	
11. Bruising	X (para 5-3b(3))	
12.Watercore of apples	X (fig 5-1)	
13. Tip burn on cabbage	X (fig 5-1)	
14. Wilting of peppers	X (fig 5-1)	
15. Freeze injury	X para 5-3b(3))	
16. Maturity of a head of lettuce		X (para 5-3a)

17. Stores better, is resistant to certain diseases, is resistant to other condition factors, and may be more suitable for a particular use. (para 5-3c)

18. a (para 5-3d)

19. Mature, ripe. (para 5-3d)

20. b. False. (para 5-3e)

21. Starch level, pH, and titratable acid. (para 5-3e)

22. Length, diameter, weight; combination, counting, unit pack. (para 5-3f)

23. 4, 8. (para 5-4a)

24. Inspection data packet. (para 5-5a)

25. From the acquiring agency and other responsible agencies. (para 5-5b)

26. a. Before each delivery. (para 5-5c)

27. b False. (para 5-5d)

28. b False. (para 5-5d(2))

29. Contents; portion; containers. (para 5-6a(4))

30. New or used, clean, standard containers may be used. (para 5-9d(1))

31. Common, apple, Golden Delicious (para 5-9e(1))

32. External, internal (para 5-12)

33. Decay (para 5-13b(1))

34. Disintegrate, crumble, body, texture, ball. (para 5-13b(1))

35. Cleanness, Color, Shape (texture, firmness, freshness maturity), and Size (para 5-13c)

Defects	Terms
36. Dehydration	Shriveling, wrinkling (figure 5-6; item 6))
37. Chill injury	Darkening, peeling skin (figure 5-6; item 5)
38. Freeze damage	Glassy look, soft texture (figure 5-6; item 4)
39. Decay	Mold, slime (figure 5-6; item 3)
40. Insect damage	Evidence of skin penetration (figure 5-6; item 2)
41. Mechanical damage	Abrasions, cuts (figure 5-6; item 1)

42. Injury, Damage, and Serious damage. (para 5-15d)

43. b. .0714
70/5.0000 = 7.1 percent (para 5-16a)
4.90
100
70
300
280
20

44. d.

$$
\begin{array}{r}
.120 \\
50/6.000 \\
\underline{5.0} \\
100 \\
\underline{100} \\
0
\end{array}
$$

= 12.0 percent (para 5-16b)

45. False. (paras 5-17, 5-18)

46. Cutting, Sizing rings, and Ruler. (para 5-18b)

End of Lesson 5

LESSON ASSIGNMENT

LESSON 6 Surveillance Inspection of Fresh Fruits and Vegetables.

LESSON ASSIGNMENT Paragraphs 6-1 through 6-21.

LESSON OBJECTIVES After completing this lesson, you should be able to:

6-1. Identify environmental factors to consider when checking cold storage facilities.

6-2. Identify the use of psychrometers.

6-3. Identify surveillance inspection requirements and sequence of inspection.

6-4. Identify sample selection factors for inspection for Classes 5, 6, 7, and 9.

6-5. Identify leafy and non-leafy FF&V items and identify the method of calculating percent defectives.

SUGGESTION After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

LESSON 6

SURVEILLANCE INSPECTION OF FRESH FRUITS AND VEGETABLES

Section I. STORAGE OF FRESH FRUITS AND VEGETABLES

6-1. INTRODUCTION

Fresh fruits and vegetables are sometimes kept in warehouses or other storage locations for varying lengths of time before being distributed to troop messes, dining hall, commissaries, or other consumers. Since FF&V are extremely perishable, it is very important to have some understanding of the environmental factors during storage that limit product deterioration.

6-2. COLD STORAGE ROOMS

a. **Temperature Control.** Temperature is a key factor in prolonging the life of FF&V, because it retards the processes of respiration, transpiration, and undesirable photosynthesis, such as sprouting of onions and potatoes. Uniform and constant temperatures in the storage room or area, maintained at the optimum temperature for those commodities, will inhibit microbial growth that leads to decay.

b. **Fresh Fruit & Vegetable Rooms.** Cold storage rooms are designed to store similar items and to separate items with a potential problem of assimilation of odor. The recommended temperatures for these rooms are:

(1) 32-35^{o}F (0-2^{o}C)

(2) 50^{o}F (10^{o}C)

NOTE: There is guidance in the standard regulations concerning FF&V compatibilities and which FF&V need to be stored at 50^{o}F to prevent chill injury at lower temperatures or in the early stages of ripening.

c. **Thermometers.** Each storage room should be equipped with an indicating thermometer and a 24-hour recording thermometer to ensure that the proper temperature is continuously maintained on a 24-hour basis. These instruments must be accurate and in working condition.

6-3. HUMIDITY

Fresh Fruit & Vegetables must be stored in areas with a relative humidity (atmospheric pressure) approximately equal to their water weight percentage. Fresh Fruit & Vegetables have high water content, which is essential to preservation of a fresh, flavorful, and health-filled commodity.

6-4. USE OF PSYCHROMETERS

Older warehouses do not always have dependable cooling equipment. For this reason, food inspection personnel need to know how to use psychrometers to measure relative humidity (atmospheric pressure).

a. **The Sling Psychrometer.** The sling psychrometer is used to measure relative humidity. This instrument has two thermometers, a dry bulb and a wet bulb. Humidity is determined by whirling the psychrometer in the air, then determining the difference between the dry-bulb and the wet-bulb readings. The relative humidity is read directly from a chart that comes with the psychrometer. Since the psychrometer is expensive and fragile, the directions with the instrument must be followed explicitly.

b. **Rules of Maintenance and Use.** The psychrometer functions accurately if certain rules are observed.

(1) The wet-bulb wick must be clean.

(2) The wet-bulb wick must be fastened securely to the thermometer.

(3) The psychrometer must be whirled several times, for at least 10 seconds, until the lowest temperature is attained.

(4) The psychrometer must be placed in its case after each use.

c. **The Portable Psychrometer.** An automatic portable psychrometer may be used to measure humidity. The principle is the same as the sling psychrometer except that the operator does not hold the instrument during its use. This item is available through local purchase.

6-5. AIR CIRCULATION

Proper air circulation prevents the condensation of moisture and carries away the gases given off by fresh fruits and vegetables in their respiratory process. Fresh Fruit & Vegetables respiratory gases include carbon dioxide, ethylene oxide, and heat. Air circulation must be controlled. Too great a velocity will result in excessive transpiration. Too low a velocity may result in damage to the product due to the respiratory gases produced and heat introduced from outside the storage area.

6-6. DECAYING ITEMS

Decaying items must be located by food inspection personnel and removed as soon as possible. If this is not done, the bacteria and molds found in the decaying FF&V will spread to the good FF&V. For this reason, daily inspection is required during storage.

6-7. HANDLING

Rough handling inevitably means a serious loss in quality. Careful handling is the watchword during storage just as it is in preparation for display of fresh fruits and vegetables. In produce departments, even rough handling by the customer may be minimized by arranging the displays so that selections may be made without digging into the displays.

NOTE: For further guidance on the storage of subsistence, see Subcourse MD0717, Storage and Sanitation.

Section II. SURVEILLANCE INSPECTION PROCEDURES FOR FRESH FRUITS AND VEGETABLES

6-8. INSPECTION REQUIRED

a. **Purpose.** The reason for surveillance inspection is to "watch over" government-owned subsistence, in this case, fresh fruits and vegetables. Surveillance inspections are Classes 5, 6, 7, and 9, and are performed to determine if incoming FF&V are wholesome, or if outgoing FF&V are suitable for shipment, issue to consumers, or if the FF&V can be kept longer in storage.

b. **Daily Reports.** Stored FF&V must be given a daily surveillance inspection. Surveillance inspection reports provide sensible and timely recommendations to the responsible, accountable officer or individual. They include the percentage of condition defects. These reports are advisory in nature and may or may not be acted upon. Food inspectors should not become discouraged or less diligent in their inspection when their recommendations are not followed.

NOTE: Paragraphs 6-9 through 6-21 are arranged in the sequence recommended for surveillance inspections.

6-9. CONVEYANCE INSPECTION

For Classes 5 and 6, an inspection of the conveyance used to transport the product must be carried out. For class 7, an inspection of the conveyance may be necessary. For further information on inspection of conveyances, see Subcourse MD0694, Basic Inspection Procedures.

6-10. STORAGE AREA INSPECTION

For class 9 inspections, the storage area must be inspected. However, if you are performing a class 7 inspection, an inspection of a storage area may be necessary. For procedures to be followed in determining whether fresh fruits and vegetables have been stored properly, see Subcourse MD0717, Storage and Sanitation.

6-11. SAMPLE SELECTION

a. **Using Samples for Inspection.** Samples are selected in accordance with the referenced documents. The same sample may be used for both the identity and condition inspections. There is no need to draw separate samples for each inspection.

b. **Sample Selection in Storage Rooms.** Samples should be drawn so as to be representative of the lot, but special attention is paid to obtaining some of the sample units from possible areas of storage stress, such as along warehouse walls, near the ceiling, areas close to cooling coils and doors.

c. **Sample Examination and Selection by Type.** Fresh fruits and vegetables require a daily cursory examination as a minimum. Fresh fruits and vegetables in storage for long periods of time usually require more than a cursory examination. A sample should be taken from each type of product in storage. Type refers to a group of items showing certain traits or characteristics, such as grapes, tomatoes, celery, or peaches.

d. **Sample Units.** The lot size is usually expressed in shipping containers. The sample unit is usually a shipping container. The sample unit is usually the entire contents (100 percent) of one master container (for example, apples, oranges, lettuce) or a portion of the contents of a master container (for example, 20 pounds of potatoes from a 100-pound sack).

e. **Usable Products.** When performing a surveillance inspection, every effort will be made to assure that only serviceable items are shipped and/or received. This may require the inspector to complete a 100 percent inspection, provided the personnel and equipment are available. This applies particularly to Classes 5, 6, or 7 inspections.

f. **Class 9 Inspections.** If performing a Class 9 inspection at a DPSC supply point, the sampling inspection will be in accordance with the provisions of DPSCM 4155.7. (If the inspection is at other than a DPSC supply point, AR 40-656, Veterinary Surveillance Inspection of Subsistence, will be used in conjunction with the local SOP.) DPSCM 4155.7 states that FF&V must be given a daily cursory or scanning examination. If inspection findings reveal evidence of five percent or more deterioration loss, then an additional inspection must be immediately performed to ascertain the degree of deterioration in the entire lot.

6-12. DATE OF RECEIPT

The date of receipt can be determined from the shipping documents (manifest or invoices) and/or inspection reports. The inspector must determine when the product was received in the facility and if proper rotation practices are being practiced. The date of receipt is determined only for products in storage.

6-13. EVALUATING OF PACKING AND PACKAGING

Evaluating the adequacy of packing and packaging is the next procedure to be completed. The inspector will identify any packing and packaging that does not adequately protect the product from damage and/or contamination. It must also be free of rips, cuts, and tears, and damage from crushing or moisture. The packing, if necessary, may be opened to inspect the inner packaging.

6-14. INTERNAL TEMPERATURE CHECK

If there is any indication that the product has been held under improper temperatures, the internal temperatures may be taken. A bimetallic, direct-reading thermometer is used to measure the internal temperature of chilled products. For further information, see Subcourse MD0694, Basic Food Inspection Procedures.

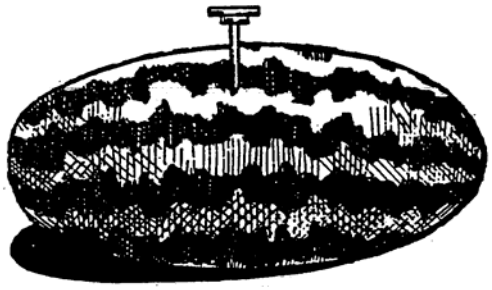


Figure 6-1. Measuring the internal temperature of chilled products.

6-15. LEAFY OR NON-LEAFY PRODUCE ITEMS

For the purpose of a surveillance inspection, a distinction is made between leafy and non-leafy produce items. If the product is determined to be a leafy item, the inspector will establish net weight. If it is a non-leafy item, then all the sample units in the shipping containers are counted.

a. **Leafy Items.** For the purpose of this inspection, leafy items will include such vegetable items as cabbage, celery, lettuce, endive, escarole, cauliflower, broccoli, romaine lettuce, and brussel sprouts. The defective portion of these vegetables can be removed and the good portion can be used.

b. **Non-Leafy Items.** For the purpose of this inspection, non-leafy items will include items such as sweet potatoes, turnips, apples, peaches, pears, plums, nectarines, lemons, limes, grapefruit, avocados, pineapples, cucumbers, eggplant, melons, dry onions, sweet peppers, beets, carrots, squash, corn on the cob, parsnips, rutabagas, bananas, and pumpkins. The defective portion of these fruits and vegetables cannot be removed and still supply the consumer with a usable (eatable) product.

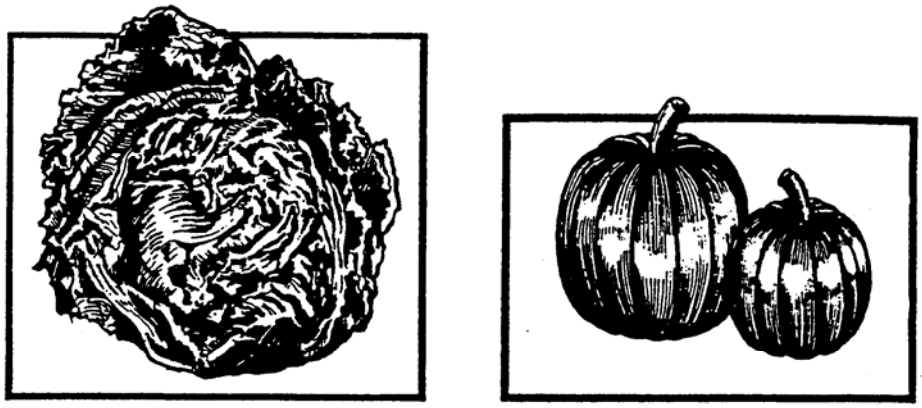


Figure 6-2. Leafy and non-leafy fruits and vegetables.

6-16. IDENTITY INSPECTION

a. The identity requirements include determining that the product is that marked on the container and/or listed on the shipping documents. To do this, it may be necessary to open the product for examination.

b. One factor to be considered in the storage of fresh fruits and vegetables is that those items in storage longest are normally those that are shipped out first. The rule is first in, first out (FIFO).

c. On a Class 5 and a Class 6 inspection, the inspector should assure that those items listed on the shipping documents are those being shipped out or received.

6-17. INSPECTION FOR CONDITION DEFECTS

a. **Sensory Evaluation and Condition Defects.** Condition defects refer to the factors of a fruit or vegetable item that are subject to development, advancement, or other changes in transit and storage. The inspection for condition defects is a process of sensory evaluation. During the sensory evaluation, the inspector examines the product both externally and internally for evidence of condition defects. Most condition defects will be detectable by external examination of the product. However, an external examination may require cutting into the item to determine the extent of the defect, depending on the type of product. In addition, the inspector may be required to cut the item open to expose internal defects that cannot be detected during the external examination.

b. **Arrangement of Product.** When removing the product for inspection, note how the product is arranged (the system of arrangement). The items will have to be replaced in a similar arrangement. Any defects that are found in each sample unit are set aside for later classification.

c. **Condition Defects.** Fresh fruits and vegetables will be inspected for condition defects, to include mechanical damage, insect or worm damage, decay, freezer damage, chill injury, and dehydration. (See figure 5-6 for definition of terms.) Freezing points of FF&V are quoted in DOD 4145.19-R-1. Generally, ice crystals are formed as a result of exposure to temperatures 2^{o} to 3^{o} Fahrenheit below the freezing point. Chill injury can occur in storage if the temperatures are below the minimum accepted storage temperatures. Chill injury is second only to mechanical damage in causing product losses of FF&V. Prolonged variation in humidity may result in the loss of water vapor from living tissue. As little as 3-6 percent moisture loss may result in observable signs, such as wilting or wrinkling.

d. **Classifying Defects**. When classifying defects of FF&V, the inspector should be careful not to call irregularities defective if they were allowed at the time of acquisition. The US Standards and Inspection Instructions Manuals can be used to determine if an abnormality is extensive enough to be called a defect.

6-18. METHODS OF CALCULATING THE PERCENTAGE OF CONDITION DEFECTS

There are two methods to calculate percent defectives: count basis or weight basis. If the product is a non-leafy item, calculate by count. If the product is a leafy item, calculate by net weight. For examples of these methods of calculating the percent defective, see paragraph 5-16.

6-19. STANDARDS FOR PRODUCT QUALITY

During a surveillance inspection, the Veterinary Food Inspection Specialist will normally separate abnormal product into three groups, decay, other condition factors, and quality factors. Quality defects that render the product unusable at a troop dining facility or unsalable at a commissary should be calculated. For this purpose, the Quick Reference Manual of the USDA Agricultural Marketing Service is a helpful guide.

6-20. REPORTING INSPECTION RESULTS

Report any deficiencies to your supervisor and the percent of condition defects. Complete the forms required by local SOP. A deficiency is any defect that affects the usability of the product for its intended purpose. The report should have separate entries for decay defects, condition defects, and quality defects. Three sets of percentages are reported. Decay is the most serious defect of any fruit or vegetable item. The three percentages are averaged to make up the total defectives of the report.

6-21. DETERMINING DISPOSITION OF SAMPLES

After samples are inspected, they will be returned to the accountable officer or placed back into the lot or destroyed in accordance with local SOP. For further information, see in Subcourse MD0704, Inspection Records and Reports.

Continue with Exercises

EXERCISES, LESSON 6

INSTRUCTIONS: Answer the following exercises by marking the lettered response that best answers the exercise, by completing the incomplete statement, or by writing the answer in the space provided.

After you have completed all the exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers. For each exercise answered incorrectly, reread the material referenced with the solution.

1. What are the recommended temperatures in both Fahrenheit and Celsius for FF&V cold storage rooms?_____

2. To ensure that the proper temperature is continuously maintained, each storage room in a cold storage warehouse should be equipped with an _____ thermometer and a _____ recording thermometer.

3. Which of the following are used to measure relative humidity?

   a. Bimetallic thermometers.

   b. Indicating thermometers.

   c. Psychrometers.

   d. Transpiration rates.

   e. Respiration rates.

4. What can too high a relative humidity result in?

   a. Wilting and/or flabbiness only.

   b. Condensation only.

   c. Microbial growth and decay only.

   d. Transpiration only.

   e. Condensation and microbial growth and decay.

5. What can too low a relative humidity result in?

    a. Speeding up the respiration rate only.

    b. Microbial growth and decay only.

    c. Shriveling and/or wrinkling only.

    d. Loss of turgidity only.

    e. More respiratory gases only.

    f. Both shriveling and/or wrinkling, and loss of turgidity.

6. A serious loss of quality may result from _____ _____.

7. Stored FF&V must be given a cursory examination:

    a. Monthly.

    b. Weekly.

    c. Bi-weekly.

    d. Daily.

    e. Upon receiving orders.

8. An inspection of the storage area will be required for:

    a. Class 7 inspections.

    b. Class 9 inspections.

    c. Class 5 inspections.

    d. Class 6 inspections.

    e. Class 8 inspections.

9. An inspection of the conveyance will be required for:

    a. Classes 7 and 9 inspections.

    b. Classes 4 and 8 inspections.

    c. Classes 5 and 6 inspections.

    d. Class 7 inspections.

    e. Class 9 inspections.

10. The date of receipt can be determined by referring to the:

    a. Shipping documents and/or inspection reports.

    b. Date stamped on the product.

    c. Supervisor's instructions.

    d. Local SOP.

    e. Rotation practices.

11. The packaging and the packing are evaluated for:

    a. The date stamped on the product only.

    b. Shipping documents only.

    c. Mechanical damage only.

    d. Rips, cuts, and tears only.

    e. Mechanical damage, rips, cuts, and tears.

12. Leafy items, for the purpose of inspection, include:

    a. Turnips.

    b. Celery.

    c. Cucumbers.

    d. Strawberries.

    e. Pineapples.

13. In non-leafy items, the food inspector establishes the:

    a. Gross weight.

    b. Quality defects.

    c. Net weight.

    d. Count.

    e. Net weight and count.

14. Sensory evaluations are done:

    a. Weekly.

    b. Monthly.

    c. Internally and externally.

    d. Externally.

    e. Internally.

15. When inspecting for mechanical damage, the inspector looks for:

    a. Cuts, bruises, and abrasions.

    b. Discolored areas, slime, or mold.

    c. Slime, cuts, or discolored areas.

    d. Water soaked areas and loss of color.

    e. Darkening and peeling of the skin.

16. The percent of condition defects in stored FF&V will be taken into consideration when:

    a. Performing a destination inspection.

    b. Making recommendations to the accountable officer.

    c. Inspecting for chill injury.

    d. Weighing items.

17. What is done with the defective sample units?

    a. No special action required.

    b. Classified the same as the acceptable units.

    c. Removed entirely from classification.

    d. Set aside for later classification.

18. A deficiency is any defect that affects the:

    a. Disposition of samples.

    b. Surveillance inspection requirements.

    c. Usability of the product for its intended purpose.

    d. Procedures for calculating percent condition defects.

19. Fresh fruits and vegetables that have been in storage longest are normally:

    a. Shipped out last.

    b. Shipped out first.

    c. Stored indefinitely.

    d. Defective.

20. When selecting samples for identity and condition, surveillance inspections use:

    a. The same sample for both inspections.

    b. A different sample for each inspection.

    c. A recognized statistical procedure only.

    d. A 100 percent inspection only.

21. The term "condition defect" refers to the factors of a FF&V item subject to development, advancement, or:

    a. Weekly inspections.

    b. Slow deterioration.

    c. Surveillance inspections.

    d. Changes in transit and storage.

22. In leafy items, establish:

    a. Net weight and count.

    b. Gross weight.

    c. Net weight.

    d. Count.

23. For a class 9 inspection at a DPSC supply point, follow procedures contained in:

    a. DOD 4145.19-R-1.

    b. MIL-STD-105.

    c. Local SOP.

    d. Contract requirements.

    e. DPSCM 4155.7.

24. A case of oranges has a total of 40 pieces of fruit in it that weigh 50 lbs. Five of the oranges were moldy. What is the percent of condition defects?

    _____

25. A crate has a total of 20 heads of cabbage with a weight of 50 lbs. Seven pounds of the cabbage were wilted. What is the percent of condition defects?

    _____

26. From the items listed below, select the item that is taken care of earliest in the sequence of a surveillance inspection.

    a. Evaluating packaging and packing.

    b. Identity inspection.

    c. Inspection for condition defects.

    d. Determining date of receipt.

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES, LESSON 6

1. 32^{o} to 35^{o} F (0-2 ^{o}C) and 50^{o} F (10^{o} C) (para 6-2b)
2. Indicating thermometer; 24-hour recording thermometer. (para 6-1c)
3. c (para 6-4)
4. e (para 6-3)
5. a (paras 6-3; 1-2c(1))
6. Rough handling. (para 6-7)
7. d (para 6-8)
8. b (para 6-10)
9. c (para 6-9)
10. a (para 6-12)
11. e (paras 6-13; 5-13b(2))
12. b (para 6-15a)
13. d (paras 6-15b; 6-18)
14. c (para 6-17a)
15. a (fig 5-6)
16. b (para 6-8b)
17. b (para 6-8b)
18. c (paras 6-11e, 6-17d, 6-19)
19. b (para 6-16b)
20. a (para 6-11a)

21. d (para 6-17a)

22. c (paras 6-15a; 6-18)

23. e (para 6-11f)

24. 12.5 percent

```
     .1250
40/5.0000   = 12.5percent.  (para 5-16a)
  4 0
  1 00
    80
    200
    200
```

25. 14.0 percent

```
     .140
50/7.000   = 14.0 percent.  (para 5-16b)
  5 0
  2 00
  2 00
```

26. d (paras 6-12 through 6-18)

End of Lesson 6

APPENDIX A

Types of Fruits--Botanical Classification

DRUPE. Stone fruit, pit fruit. A drupe is a fleshy simple fruit with a single seed enclosed by a hard, stony pit (peach, cherry, avocado).

BERRY. Berries usually develop from a compound ovary and commonly contain more than one seed. Some fruits that popularly include the word berry in their common names (examples include strawberry, raspberry, and blackberry) botanically are not berries at all. There are two divisions of berries:

a. **TRUE BERRY.** A fruit with a thin skin, one in which the entire tissue surrounding the seed is relatively soft. Typical examples of true berries include tomatoes, grapes, persimmons, peppers, and eggplants.

b. **FALSE BERRY.** Similar to a true berry, can usually be distinguished from the true berries by the remnants of flower parts of their scars that persist at the tip. Examples of false berries include gooseberries, blueberries, cranberries, pomegranates and bananas.

PEPO. A fruit that has a relatively thick rind present. Fruits of the pumpkin family, include pumpkins, cucumbers, watermelons, squashes, and cantaloupes are pepos.

HESPERIDIUM. A berry with a leathery skin containing oils. All members of the citrus family bear hesperidium-type fruits.

POME. Pomes are flesh simple fruits, the bulk of whose flesh comes from the enlarged receptacle that grows up around the ovary. Examples include apples, pears, and quinces.

AGGREGATE FRUITS. Fruits derived from a single flower with many pistils (female organs of the flower). The individual pistils each develop into tiny fruits, but mature as a cluster unit. Examples include raspberries, blackberries and strawberries.

MULTIPLE FRUITS. Fruits derived from several individual flowers in a single cluster. Examples are pineapples and figs.

DRY FRUITS. Examples include beans, peas, grains, nuts, and the seeds of many of the vegetable plants we normally eat (such as carrots and parsley) approximately equal to their water weight percentage. Fresh fruits and vegetables have high water content, which is essential to preservation of a fresh, flavorful, and health-filled commodity.

End of Appendix A

APPENDIX B

Terminology Used in the Standards

BRACT. A structure that is usually leaf-like. In cauliflower, it is the small leaf that grows between the curds or sections.

BUD CLUSTERS. A group of flower buds or curd, seen in broccoli or cauliflower.

BULB. An underground food storage organ that is essentially a modified bud consisting of fleshy leaves, that surround and are attached to a small stem.

CALYX. Collective term for the sepals of a flower (the small, green, leaf-like covers of the flower petals).

CHLOROPHYLL. Green pigments essential to photosynthesis.

ENDOCARP. The inner most layer of a fruit wall.

EXOCARP. The outer most layer of a fruit wall.

FLOWER BUD. A plant bud that produces a flower (an example is an artichoke), or a group of flowers such as in a bud cluster (examples are cauliflower and broccoli).

FRUIT. A mature ovary usually containing seed.

LIGNIN. An organic hardening substance with which certain walls become impregnated (become woody).

LOCULE. A cavity within an ovary, such as a tomato cavity.

MESOCARP. The middle region of the fruit wall that lies between the exocarp and the endocarp.

PEDUNCLE. The stalk of a solitary flower, stem of the fruit.

PERICARP. Collective term for all the layers of a fruit wall.

PETIOLE. The stalk by which a leaf is attached to the stem. A leafstalk such as celery or rhubarb.

SEPAL. A unit of the calyx that frequently resembles a reduced leaf. Sepals often function in protecting the unopened flower bud.

TUBER. A swollen, fleshy underground stem, such as seen in a potato.

TURGID. Firm or swollen because of internal water pressures resulting from osmosis.

TURGOR PRESSURE. Pressure within a cell resulting from uptake of water.

End of Appendix B

APPENDIX C

General Botanical Terminology--Vegetables and Herbs

Bulbs, Tops, Fruits, Non-starchy Roots, and Herbs

a. **Alliums (Onion Family)**

onion	garlic	chive
leek	shallots	callion

b. **Chenopods (Goosefoot Family)**

beets	spinach	Chinese chard (bok choy)
beet greens		chard

c. **Composites (Sunflower Family)**

lettuce	artichoke	sunflower seeds
endive	chicory	tarragon
escarole	oyster plant	

d. **Crucifers (Cabbage/Mustard Family)**

(1) Cole Crops (Brassica Oleracea)

cabbage	broccoli	brussels sprouts	cauliflower
kale	kohlrabi	collard greens	

(2) Other Crucifers

turnip	turnip greens	Chinese cabbage
rutabaga	mustard greens	Chinese green mustard
radish	horseradish	(bok choy)
watercress	oriental winter radish	

e. **Cucurbits (Squash/Gourd Family)**

cucumber	winter squash	watermelon	muskmelon
gherkin	summer squash	cantaloupe	
chayote	pumpkin	honeydew	

f. **Legumes (Pea/Bean Family)**

snap bean	garbanzo	bean sprout	peanut
navy bean	lentil	fava bean	English pea
pinto bean	lima bean	soy bean	snow pea
kidney bean	black bean	china pea	black-eyed pea

g. **Solanaceous Fruits (Nightshade/Potato Family)**

tomatillo (husk tomato)	eggplant	sweet pepper (bell pepper)
tamarillo (tree tomato)	tomato	hot pepper (chili pepper)

h. **Umbellifers (Parsley/Carrot Family)**

carrot	parsnip	parsley	dill	coriander (cilantro)
celery	anise	chervil	fennel	

i. **Assorted Vegetables**

asparagus (lily family)	mushroom (fungi family)
okra (cotton family)	bamboo shoot (grass family)
ginger (ginger family)	alfalfa sprout (grass family
water chestnut (sedge family)	

j. **Mint Family**

mint	marjoram	sage
basil	oregano	winter savory
thyme	rosemary	summer savory

Starchy Roots, Tubers and Fruits

a. White (Irish) Potato (Solanaceous/Nightshade Family)

b. Sweet Potato (Morning Glory Family)

c. Yam (Dioscorea Family)

d. Cassava/Manioc (Euphorbia Family)

e. Taro and Yautia (Arum Family)

f. Jerusalem Artichoke/Sunchoke (Sunflower Family)

g. Jicama (Legume Family)

h. Sweet Corn (Grass Family)

i. Plaintain/Starchy Banana (Banana Family)

End of Appendix C