

## CHAPTER 14

### FRUIT HARVESTING, GRADING AND STORAGE

#### INTRODUCTION

- \*Although a grower may produce healthy plants with a significant fruit load, improper handling and/or storage of the fruit can result in significant losses of fruit and therefore money.
- \*This chapter presents techniques for tomatoes, but also discusses cucumbers and peppers for comparison.

#### FRUIT MAINTENANCE FOR OPTIMUM HARVEST

##### **Tomato**

- \*The initial selection of a tomato (or other crop) variety can be significant as some varieties are predisposed to produce less than optimum fruit under certain conditions. Consult with the seed company for specific details.
  - Ex.: Some tomato varieties are more likely to produce boat shaped fruit.
  - Ex.: Some tomato varieties are sensitive to heat, producing weak stick trusses.
  - Ex.: Some tomato varieties perform better with higher or lower EC.
- \*Remove damaged or imperfect tomato fruit including scarred, boats, blossom end rot, cat faced, etc., so the plant will not waste nutrients on unmarketable fruit. HOWEVER, excessive fruit pruning may require leaf pruning.
- \*Depending on season, light levels, etc., maintain 3-5 tomato fruit per cluster.
  - If too many fruit are left on one cluster, the average size of those fruit may be reduced and nutrients can be diverted from the upper portion of the plant reducing growth and the number and size of the fruit on the trusses above.
  - If only 1 or 2 flowers/fruits appear on upper clusters, as many as 6 fruit may be left on a lower cluster.
  - Rule of thumb: 9-15 fruit per every 3 clusters (depending on season, light levels, health of plant, variety, etc.).
- \*To prevent rotting, fruit should not rest on the floor.
  - The overhead support cables should be high enough for the variety.
  - Horizontal stem supports on the ground can also be used.
- \*If flowers close but do not develop into fruit, or if the fruit remains small and/or dull in appearance remove from the truss. These will not develop properly and will only drain nutrients from the plant.

## **Pepper**

- \*Remove the crown fruit flower (develops at the first branch point – see Chapter 2).  
The plant is usually not large enough to support a fruit at this level as well as set good fruit higher up.
- \*At each branch point 1-2 flowers may develop. Leave only 1 flower.  
However, during winter or times of lowered light, the plant may only be able to maintain 1 flower/fruit every 2 branch points.
- \*Remove damaged fruit including blossom end rot, oddly shaped fruit, sunscald, etc.

## **Cucumber**

- \*In lower light areas the standard practice has been to remove all flowers/fruit up to 80-100 cm above the base of the plant to allow the stem and root systems to develop sufficiently to support subsequent fruit development. (May modify in high light.)
- \*Depending on the season, light levels, etc., leave 1 or 2 flowers/fruit per node.  
In low light the plant may only be able to support a fruit every other node.
- \*Remove damaged or crooked (bent) fruit that will not be “marketable” but will drain nutrients away from other fruit and the plant.

## **HARVESTING**

### **Tomato**

- \*Tomato fruit should be harvested every 3-4 days or 2-3 times per week.
- \*For beef type tomatoes, each fruit should be removed at the abscission zone so that the green stem and green sepals are left on the fruit. This gives the fruit a “home grown” appearance which commands a higher price at the market. It has also become a “trademark” of greenhouse, hydroponic, vine-ripened fruit.
- \*For TOV’s (tomato on the vine or cluster tomatoes) the entire cluster, containing 4-5 fruit, is removed as a unit when most of the fruit are showing color.
- \*Fruit should be harvested when there is color showing.  
Some growers harvest when only a little pinkish color is apparent.  
Other growers wait until the pinkish color is even all the way around the fruit.  
If the fruit will be sold locally and soon after harvest, it can be picked red.  
Some varieties ripen with an orange tinge. Check with the seed supplier.  
REN Gene: Some varieties contain the REN gene (incorporated through traditional breeding techniques, NOT genetic engineering). This gene imparts long shelf life (LSL) and is common now for field and some greenhouse varieties. The fruit from these varieties will begin ripening orange and will remain that way for up to 2 weeks before fully ripening.

## Pepper

- \*Greenhouse hydroponic growers usually grow the colored bell pepper varieties. These peppers will “size” (grow to final size) while they are still green then turn color (yellow, orange or red depending on the variety).
- \*Colored peppers, in a commercial setting, are harvested either as mature green or fully turned but can also be removed when the fruit is about half way turned in color.
- \*As with beef type tomatoes, pepper fruit should be removed at the abscission point.  
CAUTION: The pepper fruit is attached directly to the main stem which is brittle. Hold the main stem firmly while removing the pepper fruit to minimize stem cracking.
- \*The standard for pepper fruit is to harvest once a week but twice a week is common.

## Cucumber

- \*Long cucumber fruit can also be harvested 2-3 times per week.
- \*The young fruit will have small, prickly hairs, ridges along it’s length and a pointed flower end (furthest from the stem). Wait until the fruit fills out and the flower end is somewhat rounded before harvesting.
- \*Cut the cucumber fruit off at the stem.  
CAUTION: Once removed from the plant, the cucumber fruit will begin to lose moisture. Wrap the fruit in plastic for storage or transport.

## FRUIT GRADING

**Tomato** (We use the 1’s/2’s/culls system.)

- \*Beef type tomatoes can be categorized as #1’s, #2’s or culls.  
#1’s = good shape; no or only minor blemishes; equal to or greater than 150 g.  
#2’s = boat shaped; larger blemishes (scars, minor cracking, etc.); any size.  
Culls = large boats, cat face, blossom end rot, cracking, extra smalls, etc.

\*Beef type tomatoes are also categorized by size:

<b>CLASSIFICATION</b>	<b>AVERAGE FRUIT WEIGHT (g)</b>	<b>NUMBER OF FRUIT PER 15 POUND BOX</b>
<b>Jumbo</b>	<b>290 - 320</b>	<b>18 - 22</b>
<b>XL (Extra Large)</b>	<b>219 - 289</b>	<b>25 - 32</b>
<b>L (Large)</b>	<b>180 - 218</b>	<b>35 - 39</b>
<b>M (Medium)</b>	<b>156 - 179</b>	<b>45</b>
<b>S (Small)</b>	<b>135 - 155</b>	<b>52</b>

- \*Beef type tomatoes are placed in single layer boxes containing thin plastic inserts with molded cups to accommodate each fruit.

- \*Sorting and grading of commercial beef type tomatoes is usually done by machine.
  - The tomatoes are brought in from the greenhouse and placed on a conveyor belt.
  - The tomatoes pass under a camera and any defective fruit is ‘tagged’ electronically by workers with special wands.
  - These tagged fruit (sever boats, cat face, scarred, sunscald, etc.) are directed to the cull bins.
  - The other fruit is carried along the conveyor in cups that drop the fruit gently into the appropriate lane according to size and color.
  
- \*Since TOV types tomatoes are picked as a unit on the cluster stem, all of the tomatoes must be #1’s. If a cluster has 5-6 tomatoes and 1 or 2 are not #1’s, they must be removed before packaging.
  - NOTE: Preliminary sorting, grading and boxing of TOV’s is done in the greenhouse by the pickers.
  - NOTE: Boxes for TOV’s are smaller than those for beef type tomatoes, have a thin, flat, cushion layer to protect the fruit and accommodate 7-10 clusters.
  - NOTE: TOV’s may also be packaged in net bags depending on the buyer’s specifications. Many supermarkets prefer cluster packaging to distinguish individual TOV tomatoes that could easily be removed from the cluster from the less expensive field grown tomatoes also available in the store.

### **Pepper**

- \*As with beef type tomatoes, colored peppers can be categorized as #1’s, #2’s and culls.
  - #1’s = good shape and color; no or only minor blemishes
  - #2’s = somewhat oddly shaped; larger blemishes
  - Culls = very oddly shaped; sunscald, withered, blossom end rot, etc.
  
- \*Since peppers are hollow inside, they are usually graded by diameter size rather than by weight: 50-60 mm, 60-70 mm and 70-90 mm.

### **Cucumber**

- \*Cucumber fruit should be sorted by length and should be uniform in each box.
  
- \*Severely crooked (bent) fruit or scarred fruit should be separated out and marketed as #2’s or culls.

## **FRUIT STORAGE**

### **Tomato**

- \*Tomato fruit should be stored in a cold room at between 50° and 65° F.
  
- \*For home use, put not-quite-ripe tomato fruit on the counter, NOT in the refrigerator.
  - Refrigeration will stop the ripening process.
  - When the fruit is sufficiently ripe, it can then be placed in the refrigerator.
  - Also, DO NOT place ripening fruit in direct sunlight.

## **Pepper**

\*Pepper fruit should also be stored in a cold room.

However, even if picked half way turned in color, the color change will continue even in the refrigerator.

\*Do not leave pepper fruit on the counter for long as it will begin to loose water and the skin will wrinkle.

\*Wrap pepper fruit in plastic and store in the refrigerator.

## **Cucumber**

\*Cucumber fruit should be stored in a cold room at 50-55<sup>0</sup>F or can be stored in the refrigerator for up to 2 weeks.

\*Fruit **MUST** be wrapped in plastic to retain water in the fruit. The long cucumber fruit has a thin skin that looses water very quickly after picking if not wrapped.

## **REFERENCE MATERIAL**

- 1. Growing Greenhouse Seedless Cucumbers In Soil And In Soilless Media.** 1994. A.P. Papadopoulos. Agriculture and Agri-Food Canada Publication 1902/E from the Communications Branch, Agriculture and Agri-Food Canada, Ottawa, Ontario, Canada, K1A 0C7. ISBN 0-662-22118-4.
- 2. Growing Greenhouse Tomatoes In Soil And Soilless Media.** 1991. A.P. Papadopoulos. Agriculture and Canada Publication 1865/E from Communications Branch, Agriculture Canada, Ottawa, Ontario, Canada, K1A 0C7. ISBN 0-662-18859-4.
- 3. Peppers As A Commercial Crop: Grower Guide No. 3 – 2<sup>nd</sup> Series.** 1995. Edited by P. Rogers. Grower Books, Nexus Media Limited, Swanley, Kent, BR8 8HY. ISBN 1-899372-03-2.