

CUCUMBERS



Presented by



WIFSS
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CUCUMBERS



This production summary provides an overview of cucumber growing, harvesting, and post harvesting practices. There are some common practices that many large commercial growers use when producing cucumbers, and though there are variations in these practices, having an understanding of the most common methods used will be helpful when carrying out regulatory activities.

By the end of this summary, you will be able to:

1. List the top cucumber producing regions in the US.
2. Identify the most common farming practices used in the production of cucumbers.

INTRODUCTION

Cucumbers are often eaten as a vegetable but they are scientifically considered a fruit as they contain enclosed seeds and develop from a flower. Cucumbers, like cantaloupes, squash, pumpkins and watermelons, are members of the cucurbit family of produce. They are vine crops and can be grown on the ground or on poles or trellises to suspend the fruit.

Cucumbers come in three distinct types: seedless, seeded and mini. There are close to 100 varieties, but common ones include the English, garden, Persian, mini, and lemon. The English cucumber is the longest, is narrow, and is often marketed in a plastic wrap. The skin of English cucumbers is thin and often does not require peeling. In contrast, the garden cucumber has a dark waxy skin. The skin is normally removed by consumers because of its bitter taste. Persian cucumbers are called burpless because they tend to be smaller, sweeter and seedless. The skin is smoother, thinner; and similar to the English variety, does not require peeling. These cucumbers tend to be milder and easier on the digestive system. Kirby cucumbers are the smallest. These mini cucumbers are becoming popular in the marketplace due to consumer preferences. They have a wide variety of skin colors ranging from yellow to dark green. Lemon cucumbers are round and yellow, resembling lemons, but they are sweet, have thin skins, and contain seeds.

There are three distinct uses for cucumbers in the marketplace: fresh whole, fresh sliced, and pickled. Whether it is the English, garden, Persian, mini or lemon variety, fresh whole cucumbers are grown for consumer retail stores. Fresh sliced cucumbers are typically garden variety and are grown for the foodservice sector, which requires uniform

sized slices for packaged salads and restaurant chain salad bars. Pickling cucumbers tend to be smaller and thicker. The best known variety is the bumpy-skinned gherkin.

Cucumbers are produced around the world with the US being the fourth largest producer, after China, India, and Russia. In the US, cucumbers are produced in many states across the country (Fig 1). Production is typically performed for certain markets. Thus, some states specialize in fresh cucumbers, whether they are destined to be marketed whole or sliced, some states specialize in those for pickles, and some produce both. Florida is by far the leading producing state for all types of fresh cucumbers; whereas Michigan is the leading state producing cucumber varieties best suited for pickling. There are more cucumber varieties grown for pickle production, than for all combined fresh markets. To meet US consumer demand year-round, Mexico is the primary importer during the winter months.

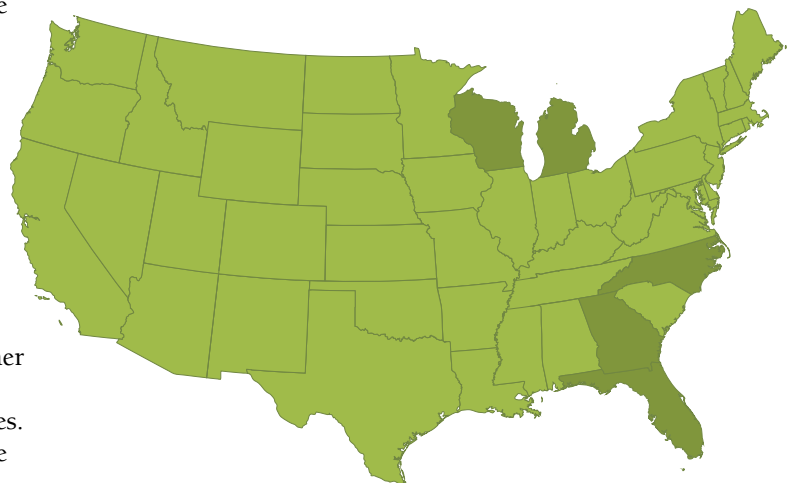


Fig 1 - Top 5 Cucumber Producing States in the US

GROWING

Cucumbers are warm season plants and grow best between 65° to 75°F. The plants do not tolerate prolonged exposure to temperatures below 55°F or above 90°F.

Cucumbers are grown in either fields or green houses. Field grown cucumber plants are typically started as seeds and are either mechanically or hand planted. Many commercial operations train their plants to grow on poles or trellises to keep the fruit suspended. Several training systems are used for trellis growing, but the umbrella system is the most common. In the umbrella system, all the lateral branches are removed as they appear until the main stem reaches a predetermined height. The plant is then allowed to grow more freely so the plant can concentrate on growing fruit, rather than height. Some growers plant bush type varieties and allow the fruit to spread along the ground. To accommodate different harvesting practices, field cucumbers grown for the fresh or sliced market are spaced about 36-72 inches apart versus 8-10 inches for cucumbers grown for pickling.

In contrast to field grown cucumbers, greenhouse cucumbers are normally established as transplants. Greenhouse cucumber plants have very large leaves and grow vigorously. Each plant is provided 5-7 square feet of space and is always grown on a trellis. Greenhouse cucumbers require close monitoring of nutrients to maintain good health and productivity.



Like most commodities, cucumbers do best under certain soil and temperature conditions. Cucumbers can be planted on a wide variety of soil types; however, deep, fertile soils that are well drained with a pH between 6-6.5 are ideal. Poor plant growth and reduced yield can result from soil that is

excessively acidic with pH below 6. To protect the fruit from frost and to control temperatures in the early and late season cucumbers can be grown under plastic row covers. The covers can later be dropped and converted into windbreaks to protect the plants from foot traffic and wind damage.



Weed and pest control are also important management practices to ensure optimum production. Weed control in cucumber production is through a variety of methods including use of cover crops and mulches, cultivation and hand weeding, and applications of herbicides targeting the specific types of common weeds in a particular field. Cucumber plants are susceptible to a variety of insect, bacterial, fungal, and nematode infections. Early identification of such infections or infestations is key to appropriate and rapid control methods. Disease prevention strategies include crop rotation, careful field selection, sanitation, soil treatments and appropriate seed selections. It is a common practice to utilize soil mulches for controlling weeds and protecting from insects as well as modifying soil temperatures, conserving water, and for controlling erosion. Mulches can include peat moss or other organic material. Many commercial operations use plastic covering as a mulch to protect crops. Depending on the effect desired, producers can employ colors such as clear, black, white or aluminum. These colors all have a warming effect on the soil in the evening, but can warm, cool, or have no effect during the daytime.

Irrigation is accomplished either through flooding furrows or direct drip lines laid along the planted rows. Cucumbers require frequent irrigation during the growing period. Too little moisture will affect fruit shape whereas water soaked fields can lead to mildew and other disease problems.

Determining the need for fertilization of cucumber growing areas is generally made through both soil nutrient analysis

(typically done at least 4 months before planting) and plant tissue nutrient analysis. For plant tissue analysis, growing leaves are sampled and analyzed for macro- and micronutrient content. Depending on results of these analyses, needs for fertilization to provide macronutrients such as nitrogen, phosphorus, potassium, calcium, magnesium, and sulfur are determined.

HARVESTING

Growers normally plant from 40,000 to 90,000 plants per acre. Some growers plant as many as 150,000 per acre. Although most cucumbers are picked by hand, the larger operations are mechanically harvested. The time from planting to harvest can be relatively quick in as few as 36-40 days from planting depending on variety and weather conditions. As an approximation, a first harvest date can be predicted by counting forward 8-10 days from the first appearance of fully opened female flowers.

Cucumbers are harvested at a variety of stages, from quite young to mature before seeds reach final maturity and harden. Those that are harvested prior to maturation of seeds are marketed as seedless. Fruit is harvested when uniform length, shape and diameter are reached and before yellowing appears at the blossom end. In general, harvest length is determined by target market. Typical fruit length in English type cucumbers for the fresh whole market is 12-14 inches, garden cucumbers destined for the fresh sliced market are harvested at 7.5 – 8.5 inches, and although no USDA standards exist for mini-cucumbers, these fruits are generally harvested when they reach 5-8 inches in length.



Frequent harvests are necessary because fruits mature quickly. Continued, timely harvest keeps the plants in a productive mode since cucumber plants have a limit to the number of fruits they can support at any one time. Cucumbers destined for the fresh sliced market are hand harvested one to three times per week depending on weather and stage of growth. Pickling cucumbers are generally harvested by hand more frequently or they can be mechanically harvested in larger quantities to free up the land for replanting or rotation to another crop. Cucumbers are inspected in the field prior to harvest for mechanical damage, disease, and cosmetic defects. Unmarketable fruit are pulled from the plants and disked into the soil after harvest is completed.



Total expected yield depends directly on length of harvest period. Yields range from 1 – 3 pounds of fruit per plant per week during the peak harvest period. A normal harvest period of 12 weeks in a well-managed crop can yield a total of 20-25 pounds of fruit per plant.

PACKING

Marketable garden type cucumbers are sorted by size and quality and packed in fiberboard cartons. Size classifications represent the number of cucumbers packed in a standard carton. Fruit is generally graded and sized in farm sheds and packed by counts of 30, 32, 36, 40, 42, or 46 per fiberboard carton. Box weights average about 25-30 pounds. Yields can range from 2-3,000 cartons per acre. Higher yields have been achieved when favorable field and weather conditions prevail.

Thin skinned English cucumbers that are grown in greenhouses are susceptible to water loss and softening after harvest. Each fruit is individually wrapped in a shrink-

wrap film before packing. Shrink-wrapping minimizes moisture loss and extends shelf life. Since each fruit is shrink-wrapped, this crop is very labor intensive and time consuming to produce.



Mini-cucumbers are much less susceptible to water loss and do not require shrink wrapping. Mini-cucumbers are normally bulk packed in small to medium sized waxed boxes appropriate for the target market.

HOLDING

Following harvest, cucumbers are chilled as quickly as possible to remove field heat. Methods for cooling harvested cucumbers include hydrocooling with chilled water and forced-air cooling. Where sophisticated methods of cooling are not possible, drenching of fruit with cold well-water is also used as a way to reduce build-up of respiration heat in bulk containers.

Cucumbers are held in chill rooms, but not below 50°F or the fruit will suffer from pitting and color changes. The fruit is also susceptible to ethylene gas, which is used to ripen green tomatoes. Shippers must be careful not to hold cucumbers near vegetables such as tomatoes, cantaloupes, apples and peaches which emit ethylene gases as they ripen.

CONCLUSION

Having a basic understanding of the way cucumbers are grown, harvested and cooled will provide the basic background information that will be helpful to regulators when completing inspections or investigations in the field.

The agricultural practices described in this production summary are common on most large commercial farms like those found in major cucumber producing regions in the United States. There are undoubtedly variations in these practices depending on the region, operation size and individual grower preferences. This is especially true of farms outside of the U.S.

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