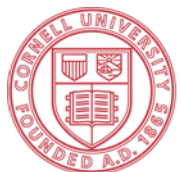




Making the Grade

Grading and Packing Fresh Produce

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Grading/Packing for Wholesale

- Farmer needs to be organized
- Needs to spend the extra time
- Extra cost to meet specific requirements



Can You Afford to Do It?

Cost of production to know if you can make a profit
wholesaling

Profit is what is left after all your costs *including*
paying yourself



Barriers/Opportunities with Wholesaling

- USDA funded project to examine case study on wholesale hurdles vegetable farmers have come across.
- Survey conducted by Robert Hadad Cornell Vegetable Team and Crystal Stewart Eastern NY Commercial Horticulture Team (2017).



Barriers/Opportunities with Wholesaling

- 300 produce farmers surveyed
- 43% weren't wholesaling
- Of those, 1/3 had sold wholesale but left
- 25% of those said it wasn't profitable
- 25% couldn't meet quality grades consistently
- 20% couldn't meet volume requirements consistently



Of Those Who Hadn't Tried Wholesale

- $\frac{3}{4}$ hadn't tried wholesale
- 25% worried about profit
- 10% liked selling retail only
- 10% felt didn't have adequate infrastructure
- 10% didn't have enough labor to meet increased volume needs to sell wholesale
- 10% too much waste of good product to meet wholesale standards



Those Who Wholesale

- 81% ranked security of market as high
- 76% ranked consistency of the market as high
- High rankings given for:
- provided a market for larger volume which improved efficiency,
- they could become more efficient in growing fewer crops,
- diversified from just selling retail (farmers market),
- reduces risk from farmers markets or CSAs.



Asked Questions of Non-wholesalers

- What would it take to get you to try wholesaling (again)?
- To know what is expected ahead of time
- Training – understanding grading & packing
- Learn from others about being more efficient, develop strategies
- Organizing



Buyer Demands

- Satisfying demands
- Product detail(s) that fits their needs
- Consistent size, shape, quantity
- Uniformity from one farm supplier to the next
- Packaging that fits shelf space
- Wash
- Farm food safety – practices & audit/certification



Attributes Affecting Grading and Quality

- Color
- Size
- Texture
- Shape
- Defects and diseases
- Environmental conditions
- Post-harvest handling
- Storage conditions



Other Attributes

- Shelf life
- Flavor
- Specialty requests – buyer has a niche.
- Example - mixed color peppers, off-sizes, etc.



United States Standards and Grades

- <https://www.ams.usda.gov/grades-standards/vegetables>
- Describes differences in size, shape, defects among grades within each crop.
- Allows for tolerances which is a small fraction of the grade to be less than the standard.



Tolerances

- For example: bell peppers, U.S. No. 1
- For off-size. Not more than 10 percent of the peppers in any lot may fail to meet the size specifications *and*
- For defects, not more than a total of 10 percent of the peppers in any lot may fail to meet the requirements of these grades, but not more than one-half of this amount, or 5 percent, shall be allowed for peppers which are seriously damaged, including therein not more than 2 percent for peppers affected by decay affecting calyxes and/or walls.



Bell Peppers

- Market demand can be met through good variety selection. In general there is no distinctive variety that can be identified in the market place. So growers can select varieties that are the most profitable to grow.
- Fruit that are extra large and jumbo size with thick, smooth walls command the highest market price.
- Green fruit are less sweet but shouldn't be sour.
- Ripe fruit have more sugar, vitamin A and ascorbic acid and have a more pleasing taste than green peppers, especially when eaten raw.

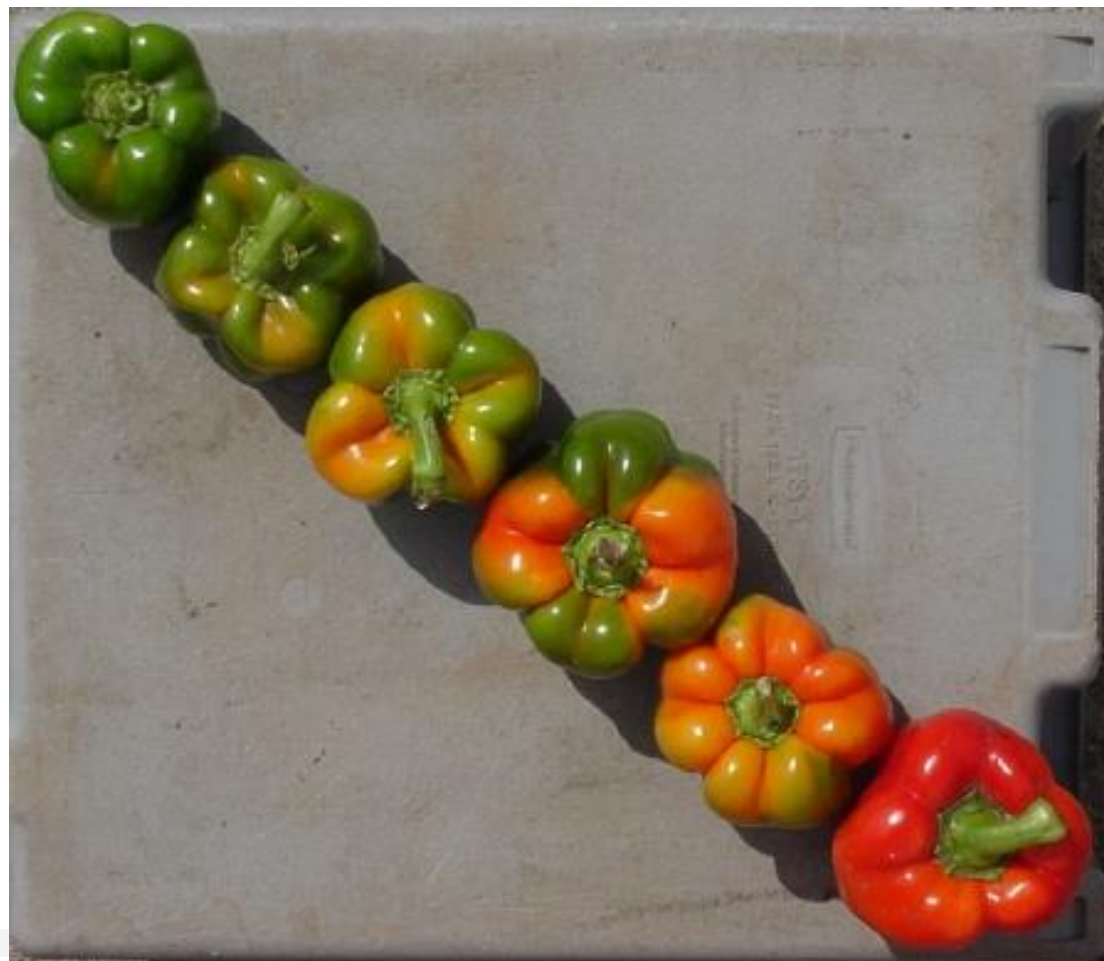


Bell Peppers - Color

- Fruit of many colors when ripe. How fast the color comes in will depend on the variety. The fruit may appear unattractive when the color change takes a long time. Buyers may complain when peppers bought as green begin to ripen.
- Fruit may develop a black pigment when immature in response to cool or cold temperature.
- Ripening takes longer later in the season. Some varieties of pepper are susceptible to a physiological disorder called stip which results in dark spots on ripe fruit.



Color Range for Green Bell





Bell Peppers - Color

- Insect stings or virus infections can affect coloring due to damage to the pigment formation in the wall of the pepper.
- Harvest must be delayed if ripe fruit are to be harvested. Allowing fruit to ripen decreases total yield.
- The longer fruit sits in the field, the more chances of problems.
- Peppers grown to full color should demand higher prices.



Bell Peppers - Size

- There is no taste or eating quality difference associated with the size. Variety selection has the most impact on the average size of the fruit.
- Bell peppers are graded for sale by size and color. Generally there are four sizes: jumbo, extra large, large and medium.
- Typically there is a price drop for each size smaller than jumbo per 1-1/9 bushel carton.



Size

- USSG for bells starts with a minimum diameter and length for fruit in each of the grades of U.S. Fancy, U.S. No. 1, and U.S. No. 2.
- U.S. Fancy: diameter not less 3” and length not less 3.5”
- U.S. No. 1: diameter not less 2.5” and length not less 2.5”
- U.S. No. 2: diameter and length less than 2.5”



Bell Peppers - Shape

- Poor shape gives the appearance of poor quality.
- Variety selection is important. Some more prone to irregular shape. Thin walled varieties are more likely to have poor shape.
- First fruit set is in the crown area at the first branch of the stem. Branches can confine the growing fruit causing it to be distorted. Poor pollination can cause lopsidedness and short fruit, when temperatures are cool. Pollination is best between 60° F and 77° F. Varieties with longer fruit may be an advantage for late production.
- Mechanical damage to the side of young fruit will result in curved and distorted growth.



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Bell Peppers - Texture

- The smoothness of the pepper wall is related to the thickness. The thinner the wall the more likely it will be wavy and have minor gnarling. The flesh must be crisp, not shriveled. Ripe fruit are likely to become flaccid more quickly than green fruit.
- Firmness of peppers is directly related to water loss. The less water loss, the firmer the pepper. Relative humidity during storage should be greater than 95%.

Pepper Shriveling Rating Scale



Weight loss 1 = 2%

2 = 4-5%

3 = 7-8%

4 = %

5 = 15-17%

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Bell Peppers - Defects and Disease

- USSG lists the defects allowed for the various grades.
- Bacterial Spot is the only disease mentioned by name.
- Pepper varieties are available that are resistant to three races of Bacterial Spot. Most of the defective and diseased fruit are left in the field or sorted out in the packing shed.



Defects – decay, scarring, hail damage





Bell Peppers - Defects and Disease

- Sunscald
- Sunscald is caused by intense sunlight on hot days. Poor foliage cover allows the defect to occur. Variety selection may play a role; compact plants may not provide cover as well as more vigorous plants.
- Proper mineral nutrition and water management will help develop the canopy of leaves required to protect the fruit.



Bell Peppers - Defects and Diseases

- Blossom end rot
- Slip or silvering
- Corn borer
- Bruises – harvest and post-harvest



Tomato

- Variety selection is a huge factor that affects quality. Fruit size, firmness, resistance to cracking, shoulder checking, disease susceptibility, shelf life, shape, sugar, acid levels and yield are all traits highlighted within varieties.
- Flavor is determined by the balance between sugar and acid present. The more sugar compared to acid the sweeter and milder the taste. If the acid level is high compared to sugar then the fruit tastes sour.



Tomato

- Fructose and glucose are the main sugars while the acids are citric and malic acid. Sugars increase with maturation especially when the fruit color improves. Maximum acidity occurs with the first pink color and then declines.
- Cloudy weather and high nitrogen decrease sugar. Fruit maturing during longer days have more sugar than fruit maturing late in the season under shorter days. Water stress increases sugar concentration.
- Tomatoes harvested at the mature green stage will have less sugar and more acid than tomatoes harvested near table ripe.



Tomato - Color

- Tomatoes are packed and sold according to amount of color the fruit show. There are six colors specified in the grade standards from mature green to red.
- Lycopene synthesis is reduced at temperatures above 86°F resulting in yellow shoulders on many varieties. Green shouldered varieties seem to be more susceptible than those having uniform ripening.

Score	Class	Description*
1	Green	Entirely light- to dark-green, but mature
2	Breaker	First appearance of external pink, red or tannish-yellow color; not more than 10%
3	Turning	Over 10% but not more than 30% red, pink or tannish-yellow
4	Pink	Over 30% but not more than 60% pinkish or red
5	Light-red	Over 60% but not more than 90% red
6	Red	Over 90% red; desirable table ripeness





Tomato - Size

- Size is not related to eating quality. USSG define size classes for standard tomatoes based on transverse diameter. In the marketplace, sizes are often defined by how many tomatoes fit into one layer of a standard 2-layer tomato box, e.g. the size 6X6 refers to tomatoes of a size that will fit 6 rows of 6 in a box.
- Larger sizes bring higher prices. Varieties and practices that produce large average fruit size will provide a greater return in this market.
- Average fruit size is generally increased when one or more branches (suckers) below the first flower cluster are removed early in the growing season. Increasing plant population tends reduce fruit size but not yield.



Tomatoes Grades

- Grades 1 and 2 tomatoes must be free from sunscald; grade 3 must not have been seriously damaged.
- Grade 1 tomatoes may be “no more than moderately,” and grade 2 tomatoes “not decidedly” - “kidney-shaped, lop-sided, elongated, angular, or otherwise deformed.” Grade 3 fruit may be misshapen, as long as it doesn't interfere with their edibility.
- Grade 1 tomatoes must be fairly smooth, not conspicuously ridged or rough. Grade 2 may be slightly rough, but not “decidedly ridged or grooved.”
- U.S. Combination At least 60% of the tomatoes meet U.S. No. 1 grade requirements, and the rest are No. 2.

Tomato - Shape

- USSG standards for tomato state that misshapen means that the tomato is "decidedly kidney-shaped, lop-sided, elongated, angular or otherwise decidedly deformed."
- Buyers want a pack that is uniform in size and shape; when it is not, the pack may be regarded as having low quality.





Sunscald

Growth cracks, Cat facing, Stink bug feeding



Size

	Tomato diameter greater than*	Tomato diameter not greater than**
Small	2 $\frac{1}{8}$ "	2 $\frac{9}{32}$ "
Medium	2 $\frac{1}{4}$ "	2 $\frac{17}{32}$ "
Large	2 $\frac{1}{2}$ "	2 $\frac{25}{32}$ "
Extra Large	2 $\frac{3}{4}$ "	

*When tomato is held with its greatest diameter parallel to the plane of opening when using a sizing template

** Tomato is held in any position when using sizing template



Tomato – Defects & Diseases

- Many of the defects and diseases affecting the fruit can be graded out in the packing shed and a high quality product can be delivered. Most diseased fruit can be left in the field or graded out.
- Some defects like cracking, puffiness, catfaces and scars have permissible dimensions described in the USSG.

Tomato – Defects & Diseases

- Water management is important in minimizing blossom-end rot and fruit cracking. Lots of loss here.
- Shoulder checking also accounts for high losses. Shoulder checking is very fine cracking of skin of the fruit. It is closely associated with rain, especially after an extended dry period.





Tomato – Defects & Diseases

- Maintaining healthy vines through insects and disease management is critical for high quality fruit.
- Early blight and anthracnose are fungal diseases that affects fruit quality
- Soft rot bacteria such as *Erwinia*



Tomato – Defects & Diseases

- Tomatoes are subject to increased infection due to the porous nature of the stem scar when in dunk tanks.
- Soft rot and other pathogens may enter if the tomatoes are too deep in the tank or are in the tank too long. The dunk tank water shouldn't be more than 10°F higher than the fruit pulp temperature. Tomatoes shouldn't be submerged too deep and only a single layer of fruit in the tank should be maintained.
- Tomatoes shouldn't be in the water more than two minutes.



Zucchini and Summer Squash

- The quality of zucchini and yellow summer squash is often judged largely by appearance and size.
- The traits of a variety influences color and also controls how well a variety performs under pressure of insects, diseases, and stresses which can reduce quality.
- Harvest and postharvest practices have a particularly important role in maintaining quality of these commodities from the field to the consumer.

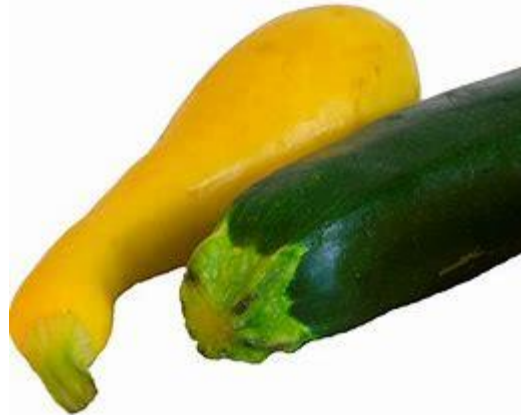


Zucchini - Color

- Zucchini squash varieties vary in color from light to very dark green. Yellow types of zucchini form a niche market.
- Yellow summer squash is usually a pale yellow that darkens as the squash fruit develops. Glossy skin indicates that the squash is not overmature.
- Zucchini will yellow more quickly if exposed to low levels of ethylene during storage.

Zucchini - Texture


- Zucchini and summer squash for commercial market are harvested as immature fruit, while the skin and seeds are tender and the flesh is firm.
- Overmature squash with tough skin or seeds and pithy flesh is unacceptable





Zucchini - Size

- The most desirable size for zucchini and summer squash will vary depending on the market, and may be specified to the nearest 1/4 inch. Generally the size is 7-8” long with a 1.25-1.75” diameter and 20-30 count to fill a box. Whatever the buyer wants uniform size is important for a high quality pack.
- Squash fruit will grow more quickly when moisture is adequate and there are few fruit developing on the plant. Dry conditions and a heavy fruit load will slow the rate of growth.
- Squash grows very quickly so harvest intervals should be timed to maximize the number of fruit of the desired size.



Zucchini - Shape

- Zucchini should be straight and cylindrical with a slight taper towards the stem end.
- Yellow summer squash may be straight or curved, depending on the variety, with a larger blossom end.
- Misshapen squash may develop if pollination is inadequate. When pollination is incomplete the fruit develops unevenly because the ovary wall enlarges more adjacent to fertilized seed.
- One honey bee hive per one or two acres will help insure good pollination as long as male flowers are present.



Grades

- **U.S. No. 1** consists of squash of one variety or similar varietal characteristics, with stems or portions of stems attached, which are fairly young and fairly tender, fairly well formed, firm, free from decay and breakdown, and from damage caused by discoloration, cuts, bruises and scars, freezing, dirt or other foreign material, disease, insects, mechanical or other means.
- Tolerances for size – 5% for squash in any lot which is smaller than any specified minimum size and 10 percent for squash which is larger than any specified maximum size.



Grades

- **U.S. No. 2** consists of squash of one variety or similar varietal characteristics which are not old and tough, but are firm, free from decay and breakdown, and free from damage caused by freezing, and from serious damage caused by discoloration, cuts, bruises, scars, dirt or other foreign material, disease, insects, mechanical or other means.
- Tolerances – 5% for squash in any lot which is smaller than any specified minimum size and 10 percent for squash which is larger than any specified maximum size.



Zucchini – Defects & Diseases

- Skin damage
- Squash is harvested as immature fruit with tender skin and easily scratched, detracting from quality especially for yellow squash.
- Very careful handling is critical in maintaining quality during harvest and packing. Varieties without spines and with an open growth habit make it easier to avoid scratches and abrasions on the fruit during harvest.



Defects



Decay



Sunburn



Scarring



Zucchini – Defects & Diseases

- Virus can affect fruit quality.
- Watermelon mosaic, zucchini yellow mosaic and cucumber mosaic virus can be problems. Yellow squash with even mild infections will show green mottling while mild infections in zucchini may go un-noticed.
- Some varieties have tolerance or resistance to these viruses. Later plantings are more likely to become infected because aphids, which transmit the diseases, are present in greater numbers after midsummer.



Sweet Corn

- The eating quality of sweet corn is judged by its taste and texture.
- Before sweet corn is eaten it is judged by its appearance.
- The in-husk characteristics include how fresh it appears, tip cover, and if there is any evidence of worm or bird damage.
- The husk color, presence of flag leaves and tip fill may be important to some buyers.
- Worm damage is always an issue



Sweet Corn - Color

- Yellow, white and bicolor. The various varieties come in different shades. White corn for example comes in bright white to a cream or ivory. The kernels may appear dull or bright.
- An ear with dark green husk color and medium size flag leaves presents an attractive package to the consumer

Well Developed, well trimmed, of similar
varietal characteristics





Sweet Corn - Size

- The size of ear is small for early varieties and increases with later maturing varieties. The length ranges from 6 inches to 10 inches. The ear diameter varies from 1.5 inches to 2.00 inches. Ears that are 10 inches long with a 2-inch diameter are difficult to pack in bags and crates in the customary 5 dozen count.
- Ear size will be reduced by any condition placing stress on the plant including poor nutrition, drought, excess moisture, weeds, cold temperatures, compacted soils, disease or plant populations that are too high. The plant population should be about 22,000 plants per acre.

Fairly well filled with plumb milky kernels, well covered with fresh husks, at least 6" long





Sweet Corn – Defects & Diseases

- Sweet corn is vulnerable to loss in quality from the environment, disease and insects.
- Stand Establishment in cold soils is an important consideration. Unless enough plants come up uniformly in early plantings the yield will be light and harvest may be inefficient. se corn has better cold soil emergence than sh2 and therefore is used for early plantings.
- Stress on the plant can result in many defects. Varieties that have marginal tip cover will have exposed tips. The exposed tips then result in more bird damage. Dry and hot weather during silk can result in poor tip fill. Hand harvest crews are very much aware if a variety picks hard. Stress will cause a plant that normally has good flag leaves to have poor flags.



Worm injury, insect injury, discoloration, bird damage





Sweet Corn – Flavor

- The amount of sugar in sweet corn depends on the type of corn, the variety, the maturity at the time of harvest and the post harvest handling.
- Brix readings range from 10% to 15% for su corn, 13% to 28% for se corn, and 25% to 35% for sh2 corn.
- Sugars are converted to starch as the corn matures and after harvest. In sh2 corn, this conversion is much reduced, leading to greater retention of sugar content after harvest.



Texture

- The texture of the sweet corn also depends on the type of corn, the variety, and the maturity at the time of harvest.
- The pericarp of su and se corn is similar, while the pericarp of sh2 corn may have a crunchy texture or firmness, depending on variety.
- Within each sweet corn type there is a range of firmness associated with the pericarp; se corn tends to have a more tender pericarp than su corn.
- Kernel size and number creates a visual texture. Early-maturing varieties with fewer rows (12 to 14 rows per ear) and large kernels appear coarse textured compared to the more refined look of a mid-season or main season 18-row corn with smaller kernels.




Other Issues

- Sweet corn harvested too early will have a watery taste and the kernels will resemble blisters. The sugar level will not be high enough. Sweet corn harvested past optimum maturity will be starchy and the kernels will be more like dough instead of milky or creamy. Sh2 corn has a wider window of time during which the crop may be harvested with good quality.
- Sweet corn has a high respiration rate at warm temperatures causing rapid conversion of sugar to starch, and loss of sugars to oxidation. The field heat must be removed as soon as possible to avoid loss of quality. Hydro-cooling or slush ice injection are excellent choices for cooling.



Cantaloupe and Muskmelons

- Field conditions and storage hugely affect the quality.
- Fruit : quality characteristics of melons include soluble solids (sugar as measured by a refractometer), flesh texture, flesh color, flesh thickness and cavity size.
- Buyers and consumers are more concerned about flavor and texture.



Melons - Flavor

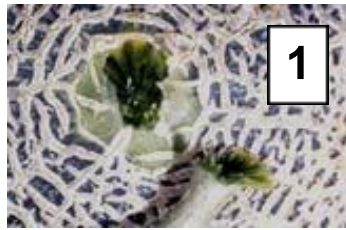
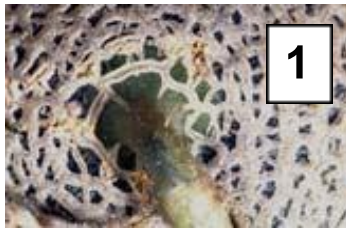
- Sweetness is a major component of flavor. Measurements of soluble solids in muskmelon juice using a refractometer measure its sugar content and hence sweetness. United States Standards for Grades of Cantaloups require that U.S. Fancy melons have at least 11% soluble solids and that U.S. No. 1 have at least 9% soluble solids. Lesser grades have no stated requirement. Muskmelons have a distinctive aroma that contributes to flavor.
- Grower trials are the best indicator of variety flavor performance



Harvesting

- The quality of the flesh texture is related to harvesting muskmelon at 1/2 to full slip.
- Earlier harvest will likely result in flesh that is too firm.
- Harvest past full slip may result in soft or even mushy flesh. Late harvest may also result in water accumulating in the seed cavity.

“Slip” & Cantaloupe Ripeness



1. Full size melon, no slip; “pull” fruit.
2. Slip just starting, near 1/4 slip. Requires high thumb force to push stem from fruit
3. 1/2-3/4 slip; melon can be pushed with moderate thumb pressure from stem.
4. Full slip; stem scar with fresh appearance; stem easily pushed from fruit
5. Slip occurred day prior; very dry stem end; melon may be soft.

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Texture

- Muskmelons are graded for quality by the amount of exterior netting present. This exterior texture is variable among varieties.
- A fruit must be "well netted" to receive a U.S. Fancy or U.S. No.1 grade.
- On 'western' muskmelons netting is denser than on 'eastern' muskmelons and eastern muskmelons have ribs that distinguish them in the market



U.S. No. 1

- Consists of cantaloupe of one type which are mature and have good internal quality but are not overripe or soft or wilted, which are well formed, well netted, and free from decay, wet slip and sunscald, and free from damage caused by liquid in the seed cavity, sunburn, hail, dirt, surface mold or other disease, aphids or other insects, scars, cracks, sunken areas, ground spot, bruises, or mechanical or other means.



U.S, Fancy

- Is all that plus has very good internal quality and is even more uniform in appearance.
- "Good internal quality" means that the combined juice from the edible portion of a sample of cantaloups selected at random contains not less than 9 percent soluble solids (refractometer reading).



Defects and Disease

- Over mature
- Soft
- Wilted
- Sunscald
- Cracked
- Wounds
- Rots



Potatoes U.S. No. 1

- Similar varietal characteristics, except when designated as a mixed or specialty pack;
- Firm; fairly cleaned. fairly well shaped
- Free from freezing, blackheart, late blight, other rots.
- Free from damage by any other cause.
- Size. Not less than 1-7/8 inches in diameter, unless otherwise specified in connection with the grade.



U.S. No. 2

- Most of the list for No. 1 except for
- Not seriously misshapen;
- Size. Not less than 1-1/2 inches in diameter



Sizing

- Jumbo $3 \frac{1}{2}$ " or larger diameter
- Premium $2 \frac{1}{2}$ " – $3 \frac{1}{2}$ " diameter
- A size 40% or more of potatoes are $2 \frac{1}{2}$ " diameter
- B size $1 \frac{1}{2}$ " – $2 \frac{1}{4}$ " diameter range. Also called “new’
- C size less than $1 \frac{1}{2}$ "
- Salt potatoes – generally Size B US grade 2



Packaging

- Used to be very standardized
- Sometimes based on count which goes back to size. Such as 9 count cauliflower – head size is 8” diameter – open faced cauliflower box
- Broccoli in 20lb cartons
- Brussels sprouts 25lb carton
- Green or red cabbage in “cabbage” box $1\frac{2}{3}$ bushel or 50lbs
- Potato bags – 5lb, 10lb, some 4lb, some 3lb plastic



Box Size

- Cucumbers of uniform size $1\frac{1}{9}$ bushel w/ 65-70 count
- “Super” cucumber which fall under US Fancy but greater than 7.5”. go into 24 count box while no greater than 7” can fit 36 count box.
- Green beans fit 24lbs in a “bean crate”
- Buyers dictate carton size based on produce size or weight
- Varies among buyers



Cucumbers

- Quality of color, shape, diameter and length need to meet market demands.
- Fresh market cucumbers or "slicers" have uniform dark green color, small (yellow) ground spot, straight and have relatively blocky ends.



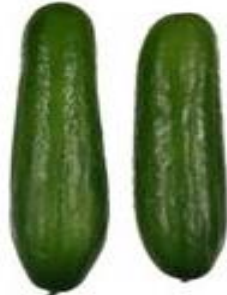
Cucumbers – Color

- Most commercial varieties of slicers are uniformly dark green in color.
- Cucumbers for pickling are lighter in color with stippling.

Cucumber Color Rating Scale



1
Dark green



2
Light green



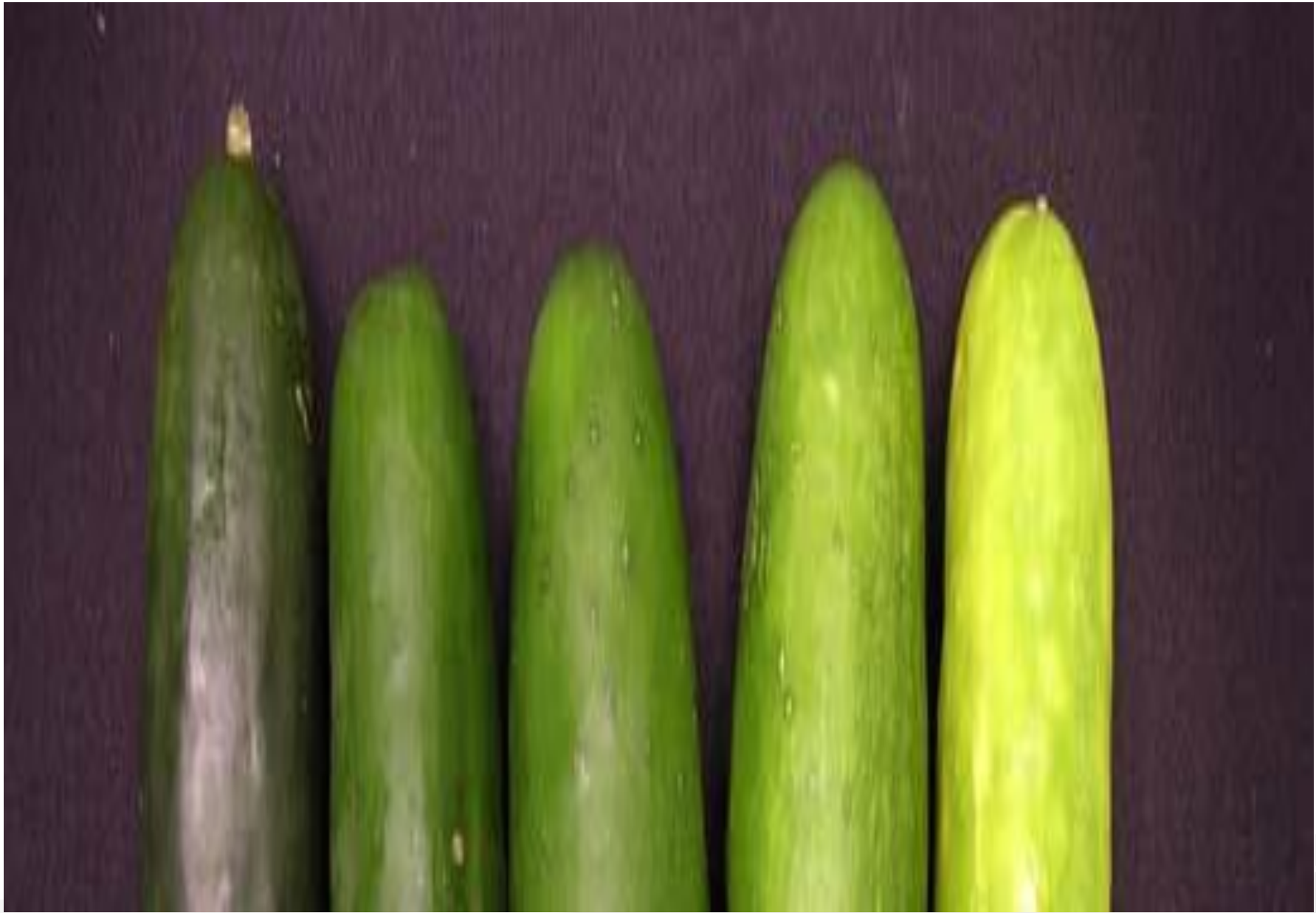
3
Yellowish-green Greenish-yellow



4



5
Yellow





Cucumbers - Color

- The US Standards for Grades (USSG) specify that fruit be "well colored", meaning that not less than 3/4ths of the surface is a medium green or darker color, and that at least a light green color extends to the blossom end on one side of the cucumber.
- Avoid large yellow ground spots (yellow bellies) where the fruit have lain on bare ground and less so on black plastic mulch.
- Dark green coloration is tied to a genetic trait.
- Insufficient nitrogen can result in less color intensity.



Cucumber - Color

- Virus infection can cause a mottling effect in the fruit.
- Many market varieties have resistance to cucumber mosaic virus (cmv)
- Less have resistance to watermelon mosaic virus or zucchini yellow mosaic.
- Over mature fruit have less color intensity. Overmature fruit are not marketable



Cucumber - Size

- Harvested by size. USSG specify that U.S. Fancy fruit must not be greater than 2-3/8 inches in diameter or less than 6 inches long. Most slicers are 7 to 8-1/2 inches long.
- U.S. Large must have a diameter of at least 2-1/4 inches and a length of 6 inches. There is no maximum.
- Overmature “give” to slight pressure of the thumb. The seeds are tough and fibrous, and the pulp is usually watery or jelly-like.



Cucumber - Shape

- Is the other main criteria determining quality.
- The market demands a uniform and well-formed product. USSG standards for "well formed" means that the cucumber is practically straight and not more than very slightly constricted or more than moderately tapered or pointed.
- Misshapen fruit can be the result of some stress such as insufficient water, N and other nutrients or poor pollination. Poor pollination or a nitrogen deficiency can cause fruit to be pointed at the blossom end. A deficiency of potassium may cause a distinct tapering of the stem end of the fruit.
- Weed competition for water can contribute to misshapen fruit. Herbicide injury can reduce vigor of the vines leading to poor quality. Foliar diseases will also reduce vine vigor.



Cucumber – Defects & Diseases

- Diseases will cause defects and reduce shelf life.
- Diseases affecting cucumber fruit include angular leaf spot, scab, belly rot, anthracnose, phytophthora fruit rot, cottony leak and several viruses.
- Most varieties have resistance to scab and cucumber mosaic virus (cmv).
- Very little tolerance to the rest of the diseases.



Cucumbers – Defects & Diseases

- Handling - Cucumber skin is very tender
- Abrasions will leave scars that will reduce the visual quality and shelf life.
- When handling the vines, harvest crews can't be too rough with the vines.
- Stems must be snapped off cleanly so as not rip off any skin of the fruit.



References

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- Purdue Agriculture – Illustrated Guides to Grading Vegetables (photos)
<https://ag.purdue.edu/hla/fruitveg/Pages/gradingguide.aspx>
- UC Davis Produce Quality Rating Scales and Color Charts – Postharvest Technology Center

 Thank You

