

This slide set was designed to supplement the guide, pictured at right and described below, with additional photos to illustrate product quality and provide additional information from quality control specialists on proper presentation and packing of product.

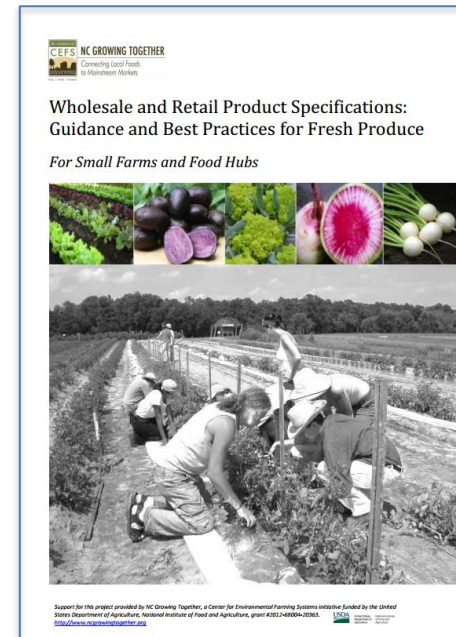
***Wholesale and Retail Product Specifications:
Guidance and Best Practices for Fresh Produce***

The guide, downloadable here:

<http://www.cefs.ncsu.edu/ncgt/wholesale-and-retail-product-specs-2.pdf>

was developed to assist individual growers and grower-based distributors and food hubs by (1) outlining a clear set of descriptive guidelines for quality, size, labeling, packaging and USDA grade classification and (2) providing guidance on how to improve the presentation of produce in the marketplace in order to enhance sales to retailers and wholesalers.

The guide was specifically created to assist growers in meeting product specifications of the NC Growing Together* project partners. The pack sizes here are the most commonly used, but are subject to change. It is recommended that growers contact buyers directly to confirm specifications.



The written guide, available along with other resources for producers here: www.ncgrowingtogether.org/for-producers was prepared by Trish Tripp, Wholesaler Liaison, NC Growing Together project and reviewed by L. George Wilson, Ph.D., Professor, Horticultural Science Department, North Carolina State University.

*NC Growing Together is a Center for Environmental Farming Systems initiative to support supply chain connections between small and mid-size growers and mainstream wholesale and retail markets. For more information see: ncgrowingtogether.org. The initiative is funded by the United States Department of Agriculture, National Institute of Food and Agriculture, grant #2013-68004-20363.



Asparagus – Green

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| General Characteristics: | Quality asparagus will be dark green with a tightly closed and compact tip. Early season asparagus can exhibit more of a purple tinged tip and a paler, apple green stalk. The asparagus should be sized fairly consistently within the case. |
| Harvest Guidance: | |
| <ul style="list-style-type: none"> • Daily, early morning harvest is recommended. • Break off the stalk near the soil surface, taking care to not break the crown of the plant buried beneath the spear. The asparagus should break fairly easy when ready to harvest. If needed you may need to break the asparagus off higher, moving further away from the woody part of the plant. • Harvested stalks should be 8-11" in length with a stem diameter that should be over 1/4"; It is recommended that you avoid woody stems. • Harvest into sturdy clean containers placing the cut end of the spears in 1" cool potable water. • Keep in shaded area. | |
| Postharvest Guidance: | |
| Pre-Cooling | Rapid hydro-cooling is recommended; Keep stalks standing upright in 1" of water; Keep shaded |
| Washing/Processing | Trim spears to uniform height; gently rinse with potable water as needed |
| U.S. #1 Size/Appearance | 8"-11" stalks with closed bracts; grade by stem diameter in 2 distinct sizes; Unless otherwise specified, requires a 1/2 inch minimum diameter. |
| Packing | Wholesale: 24 x 1 lb. banded bunches (upright) 1 1/9 bushel box Retail: 24 x 1 lb. banded bunches (upright) 1 1/9 bushel box |
| Optimal Storage | Temp 32° F – 35° F; Humidity 95-99% |
| Shelf Life | 14-21 days |



Beans, Green or Snap

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| General Characteristics: | Quality/ripe beans should be relatively straight and snap easily when bent. Immature beans will appear thin and very dark in color while over-mature beans appear very plump and pale in color, which are not marketable. |
| Harvest Guidance: | |
| <ul style="list-style-type: none">• Early morning harvest is recommended every 2-4 days• Typically harvested 15-18 days following full bloom• Harvest when the pods are firm, crisp and fully elongated, but before the seed within the pod has developed significantly• Keep stem end intact when harvesting• Harvest when dry• Keep in shaded area | |
| Postharvest Guidance: | |
| Pre-Cooling | Forced air, room cooling; <i>Caution: Beans are sensitive to chilling injury.</i> |
| Washing/Processing | If washing is needed air dry completely; Fans may be used. |
| U.S. #1 Size/Appearance | 4-6" in length, free of damage, firm, tender and fairly straight; Clean; Any russetting will increase when product is kept at room temperature, so any russetting is considered a defect and will not be graded as U.S.#1. |
| Packing | Wholesale: 25 - 30 lb. - 1-1/9 Bushel Box Retail: 25 - 30 lb. – 1-1/9 Bushel Box; loose or 5-5lb. bags |
| Optimal Storage | Temp 40° – 45° F; Humidity 95% - 100% (<i>chill sensitive</i>) |
| Storage Life | 10-14 days |



Beans, Green or Snap

“ The darker the bean and fuller the color the better; that said many produce managers in retail grocery destinations will return dark beans because they believe the beans suffer from freezer damage.”

-Quality Control Inspector,

NC Growing Together partner wholesaler

Bell Pepper

Red, Yellow & Green

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| General Characteristics: | Quality bell peppers should be of uniform shape, size and color typical of the variety. Peppers should also be sweet. |
| Harvest Guidance: | |
| <ul style="list-style-type: none">• Early morning harvest is recommended• Harvest when dry• Use clean knife or clippers to cut stem• Cut stem short | |
| Postharvest Guidance: | |
| Pre-Cooling | Rapid cooling to no lower than 45° F. Forced air or room cooling. |
| Washing/Processing | Brush clean if needed |
| U.S. #1 | Good green or red color, correct size (approx. 3" diameter and 3 ½ inch length) fairly good shape, firm bright skin, free from defects; Colored peppers should have at least 50% intended coloration. Tolerance 10% (5% for serious damage and 2% for decay) |
| Size/Appearance | |
| Packing | Wholesale: Green bell; 25 lb. -1 1/9 bushel wax box (36 ct minimum) Colored bell; 5/9 bushel wax box Retail: Green bell; 1 1/9 bushel wax box (36 ct minimum) w/PLU stickers; Colored bell 5/9 bushel wax box w/PLU stickers |
| Optimal Storage | Temp 45° F – 48° F; Humidity 90-95% (<i>chill sensitive</i>) |
| Shelf Life | 2-3 weeks |



Pictures: “Place Pack” (top) vs. “Loose Pack” (bottom).

Bell Pepper

Red, Yellow & Green

“ We want 20 ct and 45 ct, packed in an 11lb or 1.19 bushel box. Also, specify with buyer if we want "place packed", 12 to a layer, or "XL loose packed", usually can fit up to 55 bell peppers. ”

-Produce Buyer, NCGT Partner

“At different parts of the season, our buyers might try and demand larger sized peppers, for example we usually requests a 45ct; however, in summer when the peppers are big, we demand a 36ct. ”

-QC Personnel, NCGT Partner

Cabbage

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| General Characteristics: | Quality cabbage will be crisp and firm with a good green color and compact head. Should be easy to harvest and should not have loose leaves intact. |
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Harvest Guidance:

- Harvesting can take place any time of day.
- Harvest large, tight un-split heads free of insects or decay.
- 1 to 2 wrapper leaves (some buyers require 3-4) should be left to protect the head.
- The wrapper leaves can have insect damage as long as the head does not.
- Keep in shaded area.

Postharvest Guidance:

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| Pre-Cooling | Forced air, room cooling |
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| Washing/Processing | Cleaning is not recommended. |
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| U.S. #1 Size/Appearance | Heads should be firm, tight and heavy for its size with the absence of insects and dirt and free of decay. Cut several cabbages in half to ensure it is worm free. Tolerance is 10% (2% for soft decay). Stems should be cut to not extend more than ½ inch beyond the point of attachment of the outermost leaves. <i>Tip: The heads are crisp and fresh if they squeak when rubbed together.</i> |
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| Packing | Wholesale: 45-50 lbs. packed in 1 3/4 or 1 7/8 bushel waxed cabbage containers or 50 lb. cabbage bag. Retail : 50 lb. wax box |
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| Optimal Storage | Temp 32 – 35 F; Humidity 98-100% |
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| Shelf Life | 1-6 months |
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Picture: Cabbage with 3 wrapper leaves.

Cucumbers

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| General Characteristics: | Quality cucumbers are oblong in shape, with small tubercles. Slicing cucumbers should be dark green, firm and glossy with good color and free from decay and sunscald. If yellowing occurs, the fruit is overripe and the seeds become hard, which should be avoided. |
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Harvest Guidance:

- Harvest throughout the day, every other day
- Harvest when dry to reduce disease risks
- Avoid twisting and turning the fruit
- Keep in shaded area

Postharvest Guidance:

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| Pre-Cooling | Forced-air, room cooling (Avoid chilling injury) |
| Washing/Processing | Wash only if needed; Use brush washer |
| U.S. #1 Size/Appearance | Large: Minimum 2 1/4 inches in diameter and 6 to 8 inches in length (minimum of 6"). Straight, Good green color, good shape, no shrivel or sunken ends, no pitting; Tolerance 10% (1% for decay). |
| Packing | Wholesale: 40 lb. - 1 1/9 bushel wax box; 20 lb. - 5/9 bushel waxed carton Retail: 24 ct. wax cartons |
| Optimal Storage | Temp 50° F – 55 ° F; Humidity 95% (<i>chill sensitive</i>) |
| Shelf Life | 14 days or less |



Picture: Cucumber “no no”;

“An inspector shouldn’t be able to fit a pencil underneath the cuke”

-QC Personnel, NCGT partner

Greens - Cooking

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| General Characteristics: | Quality greens' leaves should be of similar varietal characteristics, fresh, fairly tender and clean, free from decay, discoloration, freezing injury, and of characteristic color for the variety or type of greens. |
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Harvest Guidance:

- Early morning harvest is recommended
- Snap leaves off the stalks quickly, leaving long stalks on the leaves
- Harvest when dry
- Field bunching is fine, however they must be bunched at least 4 inches up the stalk where the leaf starts.
- Keep in shaded area

Postharvest Guidance:

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| Pre-Cooling | Rapid hydro-cooling or icing. |
| Washing/Processing | Gently wash with water; triple wash |
| Size/Appearance | Mature, tender leaves with good green color free of damage debris |
| Packing | Wholesale: 24 ct (1 lb. bunches) 1 1/9 bushel wax leafy greens box (to avoid tightly packing, alternate side-to-side as your are packing (best practice is to pack four groups of six) Retail: 24 ct (1 lb. bunches) 1 1/9 bushel wax leafy greens box (to avoid tightly packing, alternate side-to-side as your are packing (best practice is to pack four groups of six) |
| Optimal Storage | Temp 32° F – 33° F; Humidity 95-98% |
| Shelf Life | 2 weeks (3 weeks for kale) |



Pictures: Collard whole plant bunches, 2 plants per bunch.

Greens - Cooking

Eg. Industry Spec



“ Kale should be 16# net weight; it should average 7 stems per bunch, sold at 24ct in a 1.35 bushel box, other box types may be acceptable.”

- Produce Buyer, NCGT Partner

Lettuce

General Characteristics: Quality lettuce should have crisp leaves loosely arranged on the stalk with the tops of the leaves bright green or similar varietal characteristics.

Harvest Guidance:

- Early morning harvest is recommended
- All damaged or discolored leaves should be removed
- Use clean sharp knife cutting above ground (wipe if it comes into contact with soil)
- Cut open heads to ensure there is not tip burn, russett spotting or decay
- Pack in ax box with cut end up, at an angle, 2 deep to avoid damage to outer leaves
- Keep in shaded area

Postharvest Guidance:

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| Pre-Cooling | Hydro-cooling |
| Washing/Processing | Wash to remove debris (hydro-cooling) |
| U.S. #1 | Must have similar varietal characteristics, fresh, green, and free from decay, russet spotting and doubles. Free from tip burn, downy mildew, freezing, and discoloration. 4-6" in length, free of damage, firm, straight |
| Size/Appearance | |
| Packing | <p>Wholesale: Leaf Lettuce: 24-28 lb. (24 ct.) cartons; Iceberg: 24 count cartons; Butterhead/Boston: 24 ct.. cartons; Bibb/greenhouse grown: 12 ct. (in clamshell).</p> <p>Retail: Leaf Lettuce: 24-28 lb. (24 ct.) cartons; Iceberg: 24 count cartons; Butterhead/Boston: 24 ct. cartons; Bibb/greenhouse grown: 12 ct. cartons (in clamshell).</p> |
| Optimal Storage | Temp 32° F; Humidity 98% - 100% |
| Shelf Life | 1-2 weeks (3 weeks for 'living' Bibb lettuce) |



Pictures: 24 ct of Romaine (top), Green Leaf (middle), bibb (bottom)

Lettuce

Industry Advice



“ Our local growers have to look out for downy mildew; it’s one of the top reasons we reject lettuce.”

- QC Inspector, NCGT Partner



Pictures: Downy Mildew on leaf lettuce

Potatoes

General Characteristics: Quality potatoes will be fairly well shaped, skin will resist abrasion and be free of damage and sprouts (reds, whites and yellows) and will be brightly colored.

Harvest Guidance:

- Early morning harvest is recommended.
- Harvest potatoes after vines have died for potatoes that will be placed in storage to allow them to cure in the ground
- Be careful not to damage potatoes when digging
- If harvesting new potatoes, hand dig and gently wash (tender skin)

Postharvest Guidance:

Pre-Cooling N/A

Washing/Processing Wash and remove dirt and debris (do not wash potatoes for storage; if they are extremely dirty, wipe off excess dirt or clay with single use towel)

Size/Appearance Firm, free from damage, skin is in good condition, fairly uniform size depending on variety. Size A – greater than 1 7/8". Not more than 3% of any lot may be smaller than the required or specified minimum size except that a tolerance of 5% shall be allowed for potatoes packed to meet a minimum size of 2 1/4" in diameter or 5-oz. or more in weight. Not more than 10% may be larger than any required or specified maximum size for US#1 grade standard.

Packing **Wholesale:** 50 lb. minimum loose packed in 1 1/9 bushel potato box; packed by count in 50 lb. 1 1/9 bushel potato box
Retail: 5 or 10 lb. plastic or paper bags in box or bin equivalent to 50 lbs.

Optimal Storage Curing: 1-2 weeks at 68° F; Humidity 80-100% (min. decay)
Storage: 45° F - 50° F; Humidity 95-100%; Avoid light!

Shelf Life 2-12 months



Pictures: 50 lb potato box (top), 50 lb bag (middle); 5 lb bag (bottom).

Sweet Corn

General Characteristics: Quality sweet corn has uniform size and color (yellow, white or bicolor); sweet, plump, tender, well-developed kernels; fresh, tight, green husks and free from insects and injury. Sweetness is the most important factor in consumer satisfaction.

Harvest Guidance:

- Early morning harvest is recommended
- Keep in shaded area or put directly in cooler (sensitive to overheating)
- Can be iced in the field
- Can be field packed
- Husks do not protect corn from bruising, so do not toss.
- The faster corn is cooled, the sweeter it will be.

Postharvest Guidance:

Pre-Cooling Icing or rapid hydro-cooling
Note: Avoid dehydration; wetting down husks can assist with this if forced air must be used.

Washing/Processing Wash only if needed.

Size/Appearance Well trimmed and well developed for variety; Husks should be fresh and green; Kernels should be well filled, plump and milky with the stalks trimmed. Free from damage or decay. Cob must be at least 5" in length and stalk must be less than 6" (most markets prefer shorter stalk). Tolerance is 10% (2% for decay)

Packing **Wholesale:** 1 bushel wood crate 48 ears per crate
Retail: 1 bushel wood crate 48 ears per crate

Optimal Storage Temp 32°F – 35°F; Humidity 95-99%

Shelf Life 4-6 days



“When it comes to stalk size, the most important thing is that 48 ears of well-sized corn fit in the crate. The length of the stalk will depend on the size of the ear of the corn.”

- Produce Buyer, NCGT Partner

Winter squash

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| General Characteristics: | Quality winter squash should be fully mature, with hard rinds and, except for some striped varieties, with solid external color. |
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Harvest Guidance:

- Early morning harvest is recommended
- Harvest whenever the fruits have turned a deep, solid color and the rind is hard
- Harvest when dry
- Cut with pruning clippers, leaving short stem attached
- Use caution to not scratch other squash with the stem
- Keep in shaded area

Postharvest Guidance:

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| Pre-Cooling | Room-cooling |
| Washing/Processing | Wipe clean or mechanical brush |
| Size/Appearance | Fairly uniform size for the variety, well-matured and not broken or cracked; rind should resist thumbnail pressure verifying it is free from soft rot or wet breakdown. Tolerance is 10% (2% for soft rot or wet breakdown or serious damage by dry rot) |
| Packing | Wholesale: 35 - 45 lb. - 1 1/9 bushel box Retail: 800-900 lb. bulk container |
| Optimal Storage | Curing 85°F -95°F Temp 50°F -55°F; Humidity 50-70% |
| Shelf Life | 2-3 months |



Tomatoes

General Characteristics: Quality tomatoes have a firm, turgid appearance, uniform and shiny color, without signs of mechanical injuries, shriveling or decay.

Harvest Guidance:

- Early morning harvest is recommended
- Harvested once color has started to develop
- Pack stem side down
- Allow tomatoes to ripen further indoor when temperature are high
- Communicate with the buyer on the maturity desired (Stage 1 - mature green, Stage 2 - pink, Stage 3 - ripe)
- Avoid harvesting when wet and keep in shaded areas

Postharvest Guidance:

Pre-Cooling Forced air or room cooling

Washing/Processing Wash only if necessary.

Size/Appearance Firm with good color, fairly uniform size and shape, 60 - 90% of the tomato's surface is not green, pinkish to red color. Free from decay, freezing injury and sunscald. Tolerances are 10% for grade requirements (5% for defects causing very serious damage and 1% for being soft or affected by decay). Sizes: Medium - 2.23-2.78"; Large - 2.5-2.78"

Packing **Wholesale:** Field grown -25 lb tomato box, loose; Greenhouse grown (heirlooms)- 10lb flat box (single layer)
Retail: Field grown -25 lb tomato box tray packed w/PLU labels
Green house grown- 10 lb flat box- PLU labels

Optimal Storage Optimal storage temperatures depend on the maturity stage of the tomatoes. Temp 66°F -70°F (ripening); 48°F-50°F (red tomatoes); 58°F -60°F (mature green); 90% to 95% humidity (*chill sensitive*).

Shelf Life Green: 21-28 days; pink/red: 7-14 days; red: 2-4 days



"We want heirloom tomatoes not quite green, but not quite ripe; they rot too fast. They should be a little hard to the touch."

"We prefer 20# and 10# boxes of tomatoes. 10# boxes should be one single layer 4x4 or 4x6, packed calyx down; 20# boxes should be two rows; we prefer a cushion between rows."

- QC Personnel, NCGT Partner

Watermelons

“ Local growers need to look out for hollow heart and over-ripeness.”

- QC Personnel, NCGT Partner



Pictures: Hollow heart (top), overripe (bottom)

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For Small Farms and Food Hubs

