

# Market Fruit Quality Study

## Continuing Project; Year 2 of 2

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*Cooperators: CAC Merchandising Unit, CA Avocado Handlers, Retail Distributors*

## Objective

Evaluate from the time of harvest through retail purchase where quality losses can occur in the 'Hass' avocado.

## Summary

This was a cooperative effort coordinated through the PRC Postharvest Subcommittee chaired by Dana Thomas (Index Fresh). During the current year we have worked with the CAC Merchandising group in setting up protocols for store sampling for fruit quality. The PI has met with the 3 CAC merchandisers for individual training. Additionally, group training has also occurred. We also made two trips to a major retailer and worked with them to identify sources of fruit losses at both the retail and distribution level. This information is available through Jan Delyser (CAC). The forms which we have used this season are attached to this report.

**What did we learn?** We feel that the major source of loss at the retail level is due to a combination of over-ripe fruit and loss of fruit quality due to mechanical injury (internal bruising) and postharvest decay. We will continue to work with the CAC Merchandising staff to implement remedial actions.

## Assessment of Avocados at the Retail Level

### PROCEDURE

#### AT RETAIL STORE

- 1) Purchase 10 Ripe or nearly ripe fruit at **random** from store display.
  - a) Note general condition of fruit on display: Excellent, Very Good, Good, Fair, Poor.
  - b) Record approximate percentage of ripe fruit on display.

#### AT EVALUATION LOCATION

- 1) Number each fruit with paint pen
- 2) Rate the “ripeness” of individual fruit using 7-point New Zealand scale. If fruit is not “eating” ripe (score = 5) hold fruit at ambient conditions until fruit reaches “eating” ripeness.

#### **If “ripe”**

- 1) Record date that fruit is ripe and days from purchase date (0, 1, 2, etc.)
- 2) Skin color when ripe (1 – 6).
- 3) Evaluate the external appearance of individual fruit.
  - a) Blemishes
  - b) Shivel
  - c) External symptoms of decay
- 4) Evaluate the internal appearance of individual fruit.
  - a) Note if flesh of fruit appears dry, creamy or watery
  - b) Note if there is any “off” odor to fruit
  - c) Note if the seed is germinated or if excessive flesh is adhering to the seed
  - d) Flesh discoloration not associated with bruising
  - e) Vascular browning (originating from base of seed) and if the bundles appear stringy
  - f) Internal bruising (in seed cavity, below peel or both)
- 5) Evaluate for presence of signs of internal decay.
  - a) Stem end rot
  - b) Vascular streaking originating from stem end; may be associated with stem end rot
- 6) Peel one half of the fruit and evaluate.
  - a) Ease of peeling (Easy, Slightly Difficult, Moderately Difficult, Extremely Difficult)
  - b) Bruising under the peel
  - c) Body rot

Date: \_\_\_\_\_ Variety: \_\_\_\_\_

Store name: \_\_\_\_\_ Location: \_\_\_\_\_ Time of day: \_\_\_\_\_

Evaluator: \_\_\_\_\_

**Condition of Fruit Display:**

Excellent	V. Good	Good	Fair	Poor
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**Approximate % of fruit on display that is “Ripe” or “Nearly Ripe”**

0 – 20%	21 – 40%	41 - 60%	61 – 80%	81 – 100%
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**At time of purchase and External Appearance when “Ripe”:**

Fruit #	Label	Fruit Size	Firmness at purchase (0 – 7)	Eval. Date	Ripe Date	Days from Purchase	Firmness at “ripe” (0 – 7)	Skin Color (1 – 6)	Overall External Appearance (0 – 3)	Shrivel (0 – 3)	Ext. symptoms of decay (Yes/No)
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

Date: \_\_\_\_\_ Variety: \_\_\_\_\_

Store name: \_\_\_\_\_ Location: \_\_\_\_\_ Time of day: \_\_\_\_\_

Evaluator: \_\_\_\_\_

### Internal Appearance, Decay and Peeling

Fruit #	Flesh appearance (1 – 3)	Odor (Y/N)	Seed Germ. (Y/N)	Flesh Sticking to Seed > 1/8" (Y/N)	Flesh Disc (0 – 3)	Vascular Browning (0 – 3)	Stringy (Y/N)	Internal Bruising (0 – 3)	Bruising Location (seed, peel, both)	Stem End Rot (0 – 3)	Vascular Streaking w/ SER (0 - 3)	Ease of peeling (0 – 3)	Bruising under peel (0 – 3)	Body Rot (0 – 3)
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														

## **Rating Scales:**

### **External Evaluations**

**Firmness (0 – 7 in half point increments):** 0 = **Very hard**. No “give” in the fruit; 1 = **Rubbery**, slight “give” in the fruit; 2 = **Sprung**, can feel the flesh deform 2 – 3 mm (break) under extreme finger force, very rubbery; 3 = **Softening**, can feel 2-3 mm deformation with moderate finger pressure; 4 = **Near Ripe**. 2 – 3 mm deformation achieved with slight finger pressure, fruit deforms with extreme hand pressure; 5 = **Ripe or eating soft**, whole fruit deforms with moderate hand pressure; 6 = **Slightly over-ripe**, whole fruit deforms with slight hand pressure; 7 = **Over-ripe**. Flesh feels almost liquid.

**Skin Color (1 – 6 in half point increments):** 1 = Emerald green; typical of freshly harvest fruit; 2 = forest green; fruit is not shiny; 2.5 = hint of black; 3 = 20% colored black/purple on green; 3.5 = 40% colored black/purple on green; 4 = 60% colored black/purple on green; 4.5 = 80% colored black/purple on green; just a hint of background color of green left on fruit; 5 = purple over 100% of peel surface; 5.5 = purple/black and 6 = black over 100% of surface area.

**Overall External Appearance (0 – 3):** Combination of external discoloration and lenticel/nodule damage as described in NZ Assessment Manual. Discount damage due to insect or wind abrasion if possible. 0 = none; 1 = slight damage or discoloration, approx. 10% of fruit affected; 2 = Approx. 25% affected; 3 = Approx. 50% or more affected.

**Shrivel (0 – 3):** 0 = none; 1 = Slight shriveling; not extending down sides of fruit; 2 = Moderate shrivel, extending down shoulders somewhat; 3 = Severe shriveling.

**External Symptoms of Decay (Yes/No):** Does the fruit show any signs of decay on peel either at stem end or on the body of the fruit?

### **Internal Evaluations**

**Flesh Appearance (0 – 3 in half point increments):** Does the flesh when the fruit is freshly cut appear watery (=1); creamy (2) or dry (3)?

**Odor (Yes/No):** When the fruit is first cut can you detect any rancid odor to the fruit?

**Seed Germination (Yes/No):** Do you see any signs of seed germination ranging from seed cracking to root extending into flesh?

**Flesh Sticking to Seed (Yes/No):** When you pull apart the fruit, does the flesh in excess of about 1/8 to 1/4” attached to seed?

**Flesh Discoloration = Diffuse Discoloration in NZ Assessment Manual) (0 – 3):** 0 = none; 1 = One or 2 small areas of discoloration, approx. 10% of fruit affected; 2 = Approx. 25% affected; 3 = Approx. 50% or more affected.

**Vascular Browning (0 – 3): This is vascular browning originating from the base of the seed not the stem end.** 0 = none; 1 = One or 2 dark vascular strands, approx. 10% of fruit affected; 2 = Approx. 25% affected; 3 = Approx. 50% or more affected.

**Stringy (Yes/No):** Do the vascular bundles appear stringy; that is distinct and rope-like?

**Internal Bruising (0 – 3):** 0 = none; 1 = One or 2 small areas of discoloration, approx. 10% of fruit affected; 2 = Approx. 25% affected; 3 = Approx. 50% or more affected. Symptom expression can vary with bruising but generally is irregularly shaped and darkened area.

**Bruising Location:** If a bruise is present do you observe associated with the peel, seed cavity or both?

**Stem End Rot (0 – 3 in half point increments):** 0 = None; 1 = Just discernible; approx. 5% flesh affected; 2 = Approx. 25% affected; 3 = Approx. 50% or more affected.

**Vascular Streaking (Yes/No): This is vascular bundles originating from the stem end and typically associated with stem end rot.** 0 = none; 1 = One or 2 dark vascular strands, approx. 10% of fruit affected; 2 = Approx. 25% affected; 3 = Approx. 50% or more affected.

**Ease of Peeling (0 – 3):** 0 = EASY, no difficulty in peeling; peel easily separates from flesh, inside surface of peel clean; 1 = SLIGHTLY DIFFICULT, some difficulty in peeling with either flesh adhering to peel or some breakage due to peel being brittle; 2 = MODERATELY DIFFICULT with either flesh adhering to peel and/or breakage of peel; 3 = EXTREMELY DIFFICULT; virtually impossible to peel fruit.

**Bruising under the Peel (0 – 3): If when peeling the fruit you observe bruising symptom rate as for internal bruising.** 0 = none; 1 = One or 2 small areas of discoloration, approx. 10% of fruit affected; 2 = Approx. 25% affected; 3 = Approx. 50% or more affected.

**Body Rot (0 – 3 in half point increments):** 0 = none; 1 = a few small rots, approx. 5% of flesh affected; 2 = Many small rots or several large rots, approx. 25% of the flesh affected; 3 = > 50% of the flesh affected.

