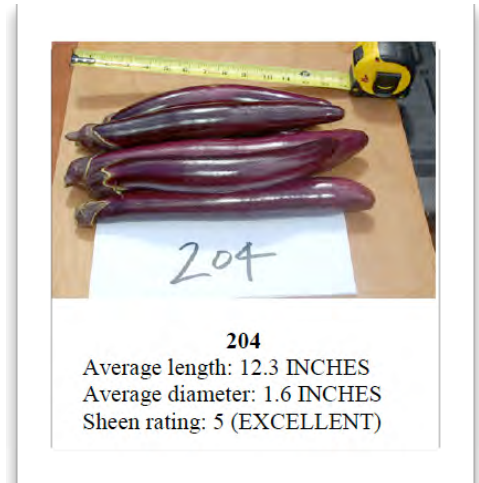


Fruit and Vegetable Quality: It Matters!

Ted Radovich

Quality is a measure of how much the end-user values a product. **Product quality is very important to growers because it determines marketable yield and can affect price.**

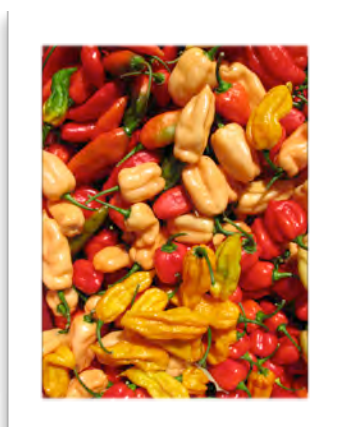
Because quality can be subjective, objective market standards have been developed for many commodities that define what is “marketable” and establishes “grades” of marketable produce and other commodities. These grades vary with commodity but are generally based on physical attributes. In fruits and vegetables these characteristics include maturity, size, shape, color and the absence of damage and other defects. Let’s take long eggplant as an example. The highest quality eggplant (Hawaii Fancy or Grade AA) are straight, uniform in color and shiny, with firm flesh, no dark brown seeds and no scarring on the fruit. Fruit that deviate slightly from these standards may be graded as Hawaii No. 1 (Grade A) or Hawaii No. 2 (Grade B). In other commodities quality may be based on other attributes such as fat content in beef (marbling) or oil content in avocados.



The ideal characteristics for quality grades will vary with commodity, so it is important to be aware of market standards for each commodity that you are growing. Hawaii state grades and market standards are available from the Hawaii Department of Agriculture (HDOA, <http://hawaii.gov/hdoa/qad/comm/>).

Market grades are not the only measure of quality. Flavor is generally the most important quality attribute for consumers, which is why markets frequently have fresh cut or prepared samples of their products out to share with shoppers. The perception of flavor is a complex interaction of tastes (e.g. sweet, bitter), textures (e.g. smooth, crisp) and aromas (e.g. fruity). Despite this complexity, there are often one or two dominant characteristics that override other attributes to influence flavor. In avocado, creamy texture is a primary determinant of good flavor quality (Barber et al., 2008, <http://www.ctahr.hawaii.edu/oc/freepubs/pdf/EI-15.pdf>).

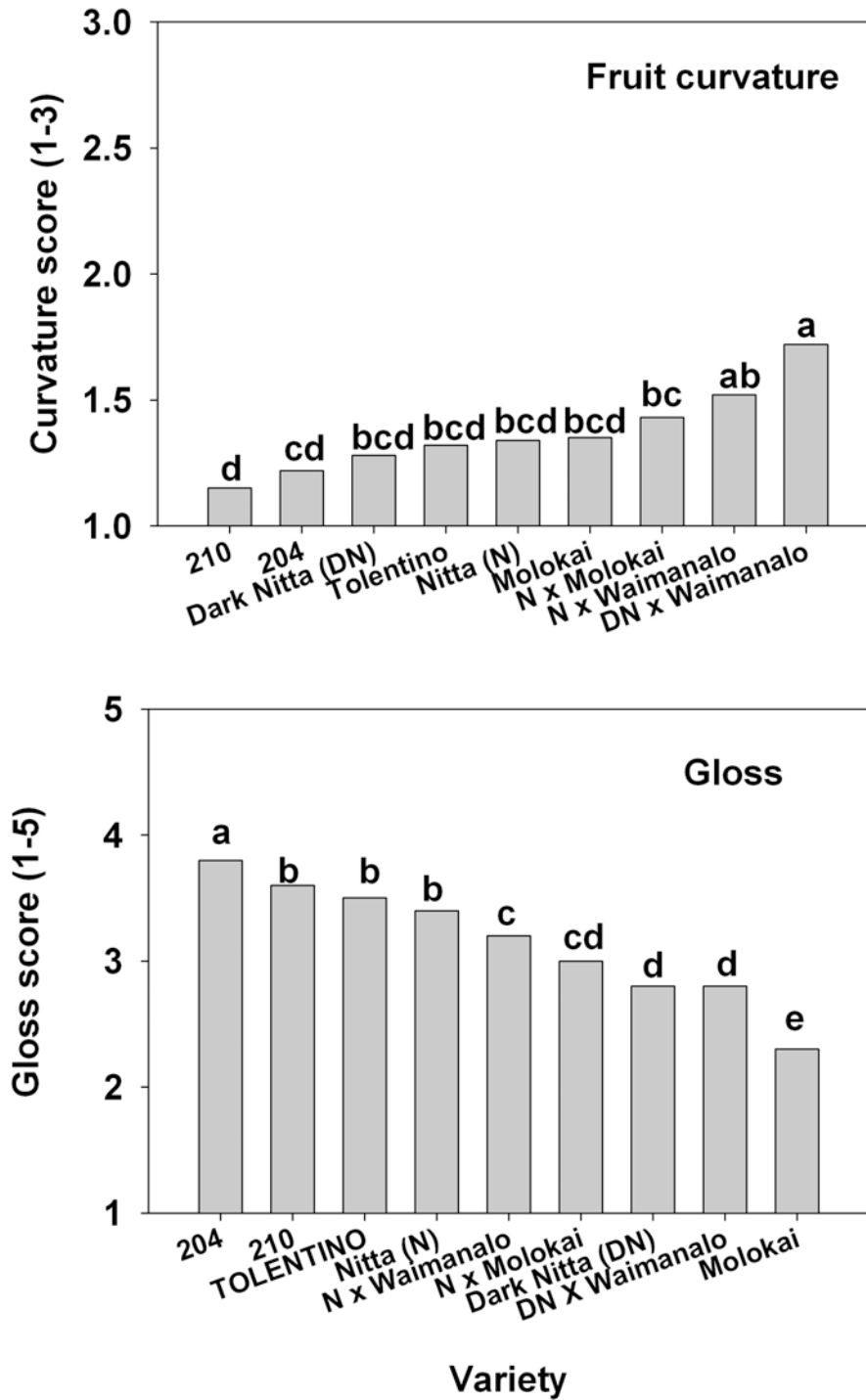
Since avocado texture is closely related to oil content, Hawaii-grown avocados must have a minimum oil content of 12% to achieve Hawaii Fancy (Grade AA) or Number 1 (Grade A) status (HDOA, <http://hawaii.gov/hdoa/qad/comm/AR-41-27.pdf>). In other commodities, flavor attributes may not be regulated by state or federal standards, but are important in setting industry standards for quality. Many of these flavor attributes have a chemical basis that can be objectively measured. These include pungency in chile pepper, cabbage and onion, as well as sweetness in fruit.



The absence of harmful substances is also an important indicator of quality, especially in products consumed raw like fresh produce.

Figure 1.

Quality scores of organic eggplant grown 2008-2009 at the Waimanalo Experiment Station. Low curvature scores indicate straight fruit. High gloss score indicates shiny fruit. Values are means of 40 fruit for each variety. Means with the same letter are not significantly different from each other ($\alpha = 0.05$).



Recent food safety concerns are a highly relevant example. Testing for food safety is available and guidelines are continuing to be developed to improve the safety of our food (Hollyer et al, 2009, <http://www.ctahr.hawaii.edu/oc/freepubs/pdf/FST-36.pdf>).

What can growers do to manage the quality of their produce? One of the first steps farmers can take to ensure good quality is variety selection. For example, there are numerous Hawai'i eggplant varieties that vary significantly in their yield and quality characteristics (Sugano and Fukuda, 2008, http://www.ctahr.hawaii.edu/fac/images/oahu_news_aug_2008.pdf). Recent variety trials at the Waimanalo Experiment Station organic plots confirmed similar differences among varieties in quality (Figure 1). Variety trials are therefore a crucial tool for growers to decide which varieties to plant. A list of on-line replicated and observational variety trials conducted in Hawai'i are provided at the end of the article. Some growers in Hawai'i conduct their own variety trials. For information on how to conduct on-farm variety trials, refer to On-farm Variety Trials: A Guide for Organic Vegetable, Herb, and Flower Producers: Organic Seed Alliance. (<http://www.seedalliance.org/uploads/pdf/OVTguide.pdf>)

Other things growers can do to improve produce quality include:

- Know your crop and your market.
- Manage your crop to avoid stress (pest, water, nutrient, heat etc).
- Follow good agricultural practices (GAP) for food safety.
- Store, package and ship your products appropriately.

Finally, many growers will label their products to highlight characteristics of their products that may be appealing to consumers. For example, the HDOA Hawai'i Seals of Quality program (<http://hawaii.gov/hdoa/add/soq/SOQPgrmHist>) certifies a product has a Hawaii point of origin, is 100% grown in Hawaii (fresh produce) and follows Hawaii State export standards/laws and trade association guidelines.

Variety trials

Various Vegetables (UH 1998-2009): <http://www2.hawaii.edu/~hector/Vegetable.html>

Various Vegetables (HARC 1996): <http://www.harc-hspa.com/Publications/DC13.pdf>

Various Vegetables (UH prior to 1995):

http://www.extento.hawaii.edu/kbase/resource/cultivarhi_trial.htm

Other germplasm evaluations: <http://www.ctahr.hawaii.edu/ctahr2001/PIO/FreePubs.asp>

Asparagus (HARC): <http://www.harc-hspa.com/Publications/VEG2.pdf>

Eggplant Variety Trial (2008 UH CTAHR): <http://www.ctahr.hawaii.edu/fac/images/eggplant%20varieties.pdf>

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