

Consumer Sensory Evaluation of Sweet Cherry Cultivars in Oregon, U.S.A.

L.E. Long
Oregon State Univ. Ext.
The Dalles, Oregon, USA

J. Turner and C. Seavert
Oregon State University
Mid-Columbia Agri.
Research & Ext. Center
Hood River, Oregon, USA

A. Colonna
OSU Food Innovation Center
Portland, Oregon, USA

Keywords: *Prunus avium*, cherry sensory evaluation, purchase intent, appearance, preference, taste preference, 'Regina', 'Sweetheart', 'Skeena', 'Lapins', 'Bing', 'Kordia', 'Attika'.

Abstract

Six commercially grown sweet cherry (*Prunus avium* L.) cultivars were evaluated in a consumer sensory evaluation in Portland, Oregon on 18 July 2004. Five of the six cultivars were evaluated for taste - 'Regina', 'Sweetheart', 'Skeena', 'Lapins', and 'Bing' - while 'Kordia' ('Attika') was included for visual evaluation only. One hundred ninety-two participants were asked to visually examine 'Bing', 'Sweetheart', and 'Regina' cherries for their preference in color. Cherry size preference was evaluated using 'Bing' fruit at 29.8, 25.4, and 21.4 mm, and shape preference was evaluated using 'Kordia', 'Skeena' and 'Sweetheart'. In addition, participants tasted five cultivars and ranked them according to overall preference. The participants in this pilot evaluation preferred a cherry that was large in size (29.76 mm or larger) and dark in color ('Regina'). Sweet tasting cherries were preferred the most (65 percent) while cherries that lacked flavor or were too sour were preferred the least. 'Regina' rated the highest for overall taste preference. Each cultivar had soluble solids concentrates between 19.1° brix and 22.7° brix, titratable acid between 0.6 and 1.09 g/ 100 ml, with flesh firmness between 291 and 427g/mm.

INTRODUCTION

'Bing' is the most important sweet cherry (*Prunus avium* L.) cultivar grown in the Pacific Northwest, USA. Until recently, it comprised nearly all of the fresh market cherries produced in this region. However, production of other cultivars has recently increased with 'Bing' now comprising 72.4% of the total fresh market sweet cherry production in Wasco County, Oregon in 2004 and 'Lapins', 'Skeena', 'Regina' and 'Sweetheart' combining to comprise 22.3% of the total (Seavert, 2005).

As new cherry orchards are being planted growers must evaluate potential new cultivars based on factors such as ripening window, fruit quality and market acceptance. Knowing the potential receptivity of a cultivar by the consumer will help growers make informed decisions on what to plant.

Four late-season cultivars made up the research block, including 'Lapins', 'Skeena', 'Regina' and 'Sweetheart'. Cultivars were selected by virtue of their popularity among Pacific Northwest growers and were compared to 'Bing' as the standard.

MATERIALS AND METHODS

Six commercially grown sweet cherry cultivars were harvested from orchards in Wasco County, Oregon the week of 11 July 2004. All cultivars were harvested within a three-

day window by harvesting cherries at different elevations. The five cultivars used in the consumer taste test, 'Regina', 'Sweetheart', 'Skeena', 'Lapins', and 'Bing' were evaluated prior to the sensory evaluation for SSC, titratable acid and flesh firmness (Table 1). Flesh firmness was measured by a FirmTech 2 force displacement instrument (BioWorks, Stillwater, Oklahoma). The sixth cultivar, 'Kordia', was used only to determine shape preference.

One hundred ninety-two participants took part in the sensory evaluation on 18 July 2004 conducted in an open market in Portland, Oregon. Each participant was asked a series of preliminary questions that included demographic information and preference for fruit size, shape, color and stem versus stemless cherries.

Representative cherries were attached to a display board and consumers were asked to rank the cherries from most preferred to least preferred. For the color preference 'Bing' represented a medium, 'Regina' a dark and 'Sweetheart' a light colored cherry. For shape preference 'Kordia' represented a cordate cherry, 'Skeena' a blocky cherry and 'Sweetheart' a round cherry. Finally, consumers were asked their preference between a 29.8, 25.4 and 21.4 mm cherry.

Also displayed was an example of a cherry with and without a stem. Consumers were asked if they preferred cherries with stems, without stems or had no preference. They were then asked if they would pay more, the same, less or not purchase a stemless cherry.

Finally, two cherries from each cultivar were placed in small plastic cups and placed on a serving tray. Each consumer was given a tray and asked to taste the cherries as they responded to the questions. During the sampling process cherries were kept between 7° C and 10° C in ice filled, insulated containers. Questions asked included overall liking, taste preference, reason for liking their favorite cherry and reason for disliking their least favorite cherry. The sensory data was collected and analyzed using a data acquisition system called Compusense™.

RESULTS AND DISCUSSION

A total of 192 consumers participated in this study. Of these 59% were female and 41% were male. Participants ranged in age from 10 to over 65, with the majority 18 to 54. (Table 2)

When asked to rank cherries based on color 'Bing' (medium) had the most number of people rank it last and 'Sweetheart' (light) had the most people rank it first. The 'Regina' (dark) ended up being ranked the best overall, however there is no significant difference between the three colors. (Figure 1)

Cherry size preference was evaluated using 'Bing' fruit at 29.76, 25.4, and 21.43 mm. There was a significant difference shown between all three sample sizes. There was a strong preference by consumers for large fruit. Consumers preferred the largest cherry, which received 68% of the #1 ranking. The least favorite was the smallest cherry, which received 78% of the #3 ranking. (Figure 2)

A round cherry, represented by 'Sweetheart', was the shape that consumers preferred least. There was no significant difference between preference for a blocky cherry ('Skeena') and a cordate shape represented by 'Kordia' (Figure 3). Based on these data there seems to be

no justification for buyers to discount cordate cherries such as ‘Kordia’, a practice that has previously taken place (K. Mathison, pers. commun.).

Consumers did show a strong preference for cherries with stems (Figure 4). However, 58% of consumers said that they would pay the same for stemless cherries and 4% said that they would pay more for the stemless product (Figure 5). Although consumers preferred a stem-on product there seems to be a potential, although limited market, for a stemless cherry sold at a profitable price for growers.

‘Regina’ scored the highest in overall liking and was significantly different from the other cultivars. The other four cultivars were not significantly different from one another, however, ‘Bing’ scored the lowest of all varieties (Figure 6).

When asked to rank the cherries from most preferred to least preferred based solely on taste, ‘Regina’ was significantly different from the other cultivars and was ranked #1 by consumers. ‘Bing’ was rated last and was significantly different from the other cultivars. ‘Sweetheart’, ‘Lapins’ and ‘Skeena’ ranked between these other cultivars and were not significantly different from each other, but were significantly different from ‘Regina’ and ‘Bing’. These data were surprising since Oregon growers have considered ‘Regina’ a weak tasting cherry while ‘Bing’ has always been considered to provide an excellent culinary experience.

The most important reason consumers chose the cherry they liked the most was sweetness. Skin color, tartness and texture were not important reasons for preferring a cherry (Figure 7). Lack of flavor and being too sour were the two biggest reasons consumers disliked cherries. Juiciness and not being sour enough were not important reasons for disliking a cherry (Figure 8).

Acknowledgements

The authors wish to thank Astrid Schwarz and Simone Schuster of the Free University of Bolzano, Italy and Stephanie Heater and Mary Mosier of OSU, Mid-Columbia Agriculture Research and Extension Center, for their help with this project.

Literature Cited

Seavert, C. 2004. Wasco County Sweet Cherry Production Results. In Hort Update, OSU Wasco County Extension Service. 2:7.

Tables

Table 1. Quality parameters of fruit used in sensory evaluation survey

Cultivar	Total Soluble Solids Concentration (%)	Titrateable Acid (g/100 ml) ^z	Flesh Firmness (g/mm)
Bing	19.5	0.82	291
Lapins	19.6	0.60	383
Regina	20.2	0.61	348
Skeena	19.1	0.89	375
Sweetheart	22.7	1.09	427

^zg/100 ml malic acid

Table 2. Selected demographic attributes of participants taking part in the consumer sensory evaluation.

Gender	Percent
Female	59
Male	41
Age, years	
10-17	7.4
18-24	17.4
25-34	23.2
35-44	17.9
45-54	20.5
55-64	10.0
65+	3.7

Figures

Figure 1. Percentage of consumers who preferred dark, medium, and light skin color.



Figure 2. Percentage of consumers who preferred large, medium and small fruit size.

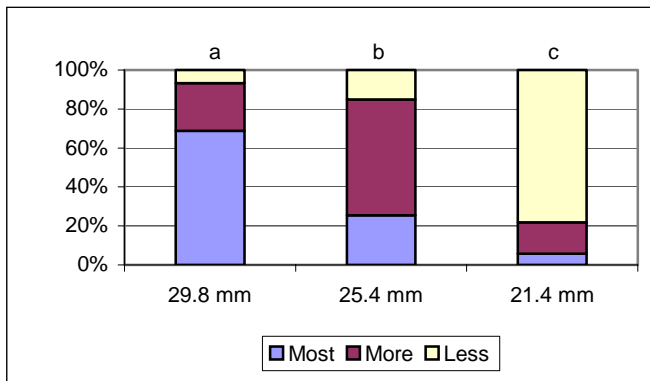


Figure 3. Percentage of consumers who preferred cordate, blocky or round fruit.

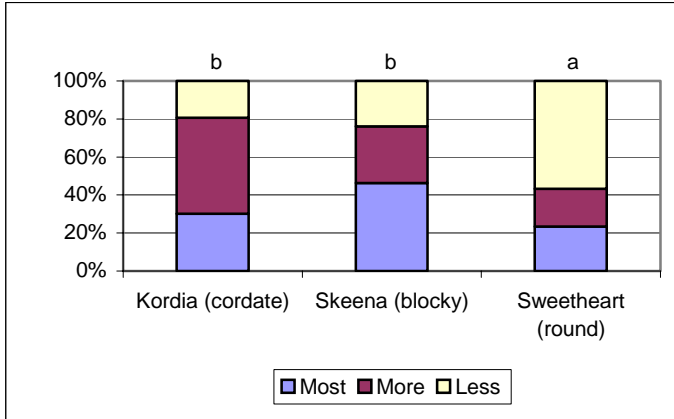


Figure 4. Consumer preference for stem-on or stemless cherries.

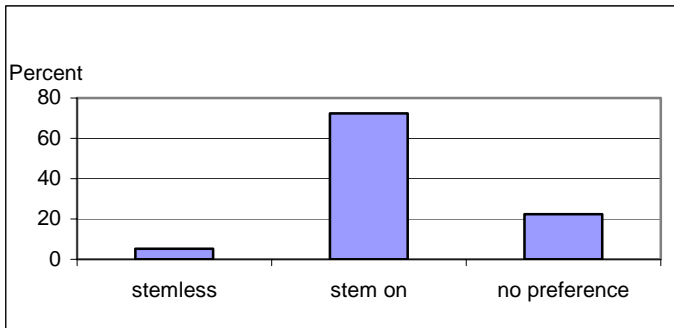


Figure 5. Consumer purchase intent for stemless cherries, expressed as percentage.

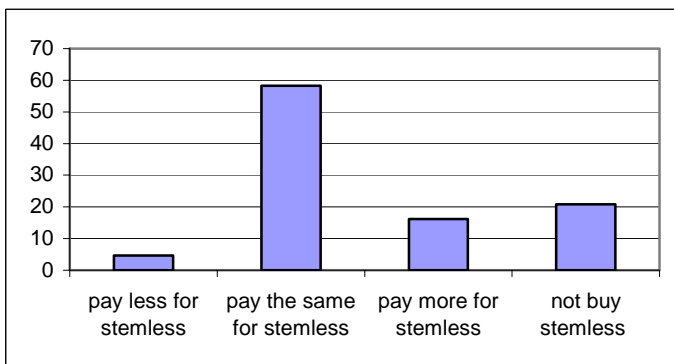


Figure 6. Ranking of cultivars based on overall preference.

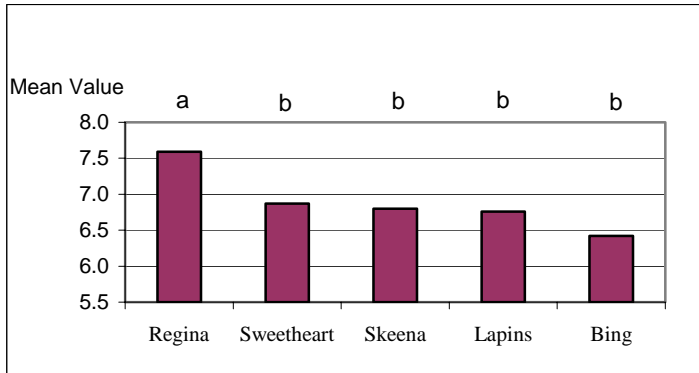


Figure 7. Consumer preference for cultivars based on taste, expressed as a percentage.

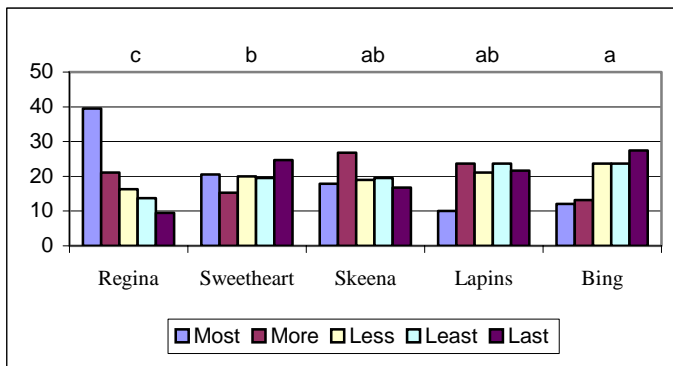


Figure 8. Reason consumers preferred favorite cultivar.

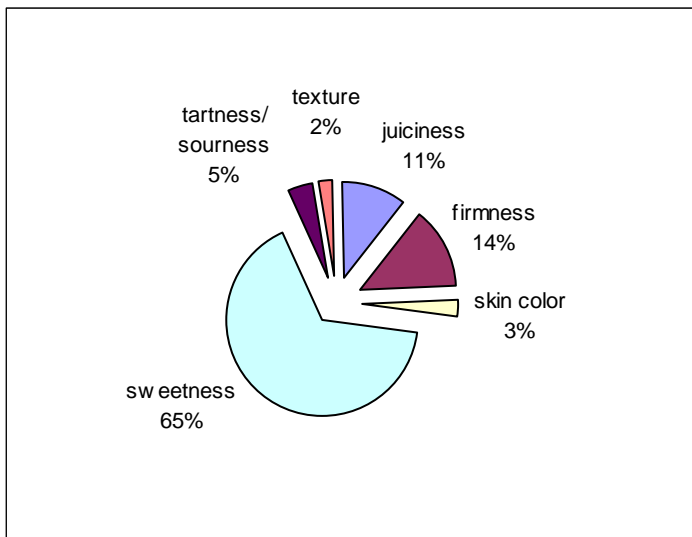


Figure 9. Reason consumers disliked least favorite cultivar.

