SENSORIAL EVALUATION OF 26 HIGHBUSH BLUEBERRY VARIETIES IN ROMANIA

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Abstract

Among many blueberry growers and general consumers perception, often are cross-cutting issues. The quality of the fruits depends on many factors such as variety, area were fruits are produced (environmental conditions), ripening and harvest time, producing technology etc. Of course many other influencing factors could intervene during the picking time till consumption of fruits and affects the fruit appearance, firmness, colour or other internal or external parameters. Besides all these reasons, the final consumer has particular demands and preferences which stays at the base of their choices. In 2017, a tasting session with 26 blueberry varieties cultivated in Romania were evaluated by different categories of consumers. Cultivar tested were: 'Coville', 'Chandler', 'Azur', 'Darrow', 'Blueray', 'Legacy', 'Simultan', 'Brigitta', 'Augusta', 'Spartan', 'Vital', 'Pemberton', 'Delicia', 'Reka', 'Toro', 'Berkeley', 'Denise blue', 'Duke', 'Safi'r, 'Lax', 'Hannah's choice', 'Bluecrop', 'Patriot', 'Nelson', 'Bluetta', 'Pink lemonade'. All these varieties were evaluated against fruit size, skin colour, firmness, juciness, taste and flavor. 'Coville' and 'Chandler' performed better as general total score. 'Chandler' and the Romanian variety 'Augusta' remarked by large fruits and were appreciated accordingly. 'Coville' and 'Blueray' showed good appearance of the skin colour since the most firm fruits were noticed at 'Legacy'. Most tasty and aromatic fruits were scored for 'Coville'.

Key words: Vaccinium corymbosum L., organoleptic assessment, consumer preferences.

INTRODUCTION

As many other fruits, blueberries are subject of organoleptic analysis (Polashock J. et al.). General consumers perception is of great interest when it comes to retailers and influences the fresh fruit market. But, even with the latest perfomant lab equipments (Saftner R. et al., 2008) the consumers preference is stil a cross-cuting issue. It was demonstrated that major traits of the varieties that influence the positive perception of fruits quality are the taste, fruit size, color and flavor (Gilbert J.L. et al., 2015).

Indeed, the quality of the fruits depends on many factors such as area were fruits are produced (environmental conditions), ripening and harvest time, producing technology etc. Many other influencing factors could intervene during the picking time till consumption of fruits and affects the fruit appearance, firmness, colour or other internal or external parameters. Besides all these reasons, the final consumer has particular demands and preferences which stays at the base of their choices (Yue C. and Wang J., 2017). Evaluation of blueberries traits is a continuously process required by the breeders, producers and consumers. Many studies were conducted in this regard (Itle R.A. and NeSmith D.S., 2017) trying to emphasize which is the best solution and what varieties are most suitable for a specific regions, countries or consumer preference.

Therefore, the main objective of the present study was to investigate the general consumers preference in Romania for the fresh blueberry fruits since the last 10-15 years, the blueberry consumption increase worldwide very fast.

A subsequent goal was also to decelate the consumers preference regarding each criteria of assessment. This could be also relevant for the breeders when they decide to release new varieties on the market.

MATERIALS AND METHODS

In July 17, 2017, a tasting session with different 26 blueberry varieties cultivated in Romania (pot crop system), Dambovita county were evaluated by different categories of consumers: students, professors, researchers, farmers and regular people. Also it was a balanced distribution between young, mid age and elder people as long as male/female participation.

The blueberry varieties tested were: 'Coville', 'Chandler', 'Azur', 'Darrow'. 'Bluerav'. 'Legacy', 'Simultan', 'Brigitta', 'Augusta', 'Spartan', 'Vital', 'Pemberton', 'Delicia'. 'Reka', 'Toro', 'Berkeley', 'Denise blue', 'Duke', 'Safir', 'Lax', 'Hannah's choice', 'Bluecrop', 'Patriot', 'Nelson', 'Bluetta', 'Pink lemonade'. Seven of them are Romanian varieties and the other 19. international blueberry varieties (Figure 1).



Figure 1. The 26 blueberry varieties in the scene of reviewers (17.07.2017)

All these varieties were evaluated against six criteria: fruit size (1...5), skin color (1...5), firmness (1...3), juiciness (1...3), taste (1...7) and flavor (1...5). From the total of 28 points,

10 points have been allocated to the fruit appearance (fruit size plus skin color), 6 points to consistence/texture (firmness and juiciness) and 12 points to taste (taste and flavour). The varieties were reviewed by 25 assessors delivering at the end the sheets with the scores for each analysed item.

RESULTS AND DISCUSSIONS

In the first step, all the scores were summed and the varieties ranked from the highest value to the lowest one.

The overall chart highlight 'Coville' variety that gathered 23.18 points out of maximum 28 points (Figure 2) followed closer by 'Chandler' with 22.43 total points.

Both varieties showed very large fruits and confirms the appreciation of general consumers for the higher size of the fruits.

Nevertheless, the appearance of this particular two varieties was enhanced by the silver pruin of the skin and the freshness look.

At the bottom of the list, was sitated a novel blueberry variety 'Pink lemonade' with pinkish and aromatic fruits that did not comply with the consumers expectation.

'Bluetta' as a early variety was overripened at the time of consumption and therefore has registered less points for most of the criteria.

It is remarkable the presence of two Romanian blueberry varieties ('Azur' and 'Simultan') in the top 10 most appreciated ones by evaluators.



Figure 2. The overall total scores of the tested blueberry varieties

In relation with the fruit size, blueberry varieties ranged between 1.86 at the 'Pink lemonade' and 4.68 points at 'Chandler' out of the maximum 5 points foreseen in this criteria. For only 0.04 points less, the Romanian variety

'Augusta' followed the first variety in the class (Figure 3). Together with 'Azur' situated in the third position indicate that national varieties also could be reliable on the international competitive market.



Figure 3. The ranking list of the blueberry varieties according to the fruit size

In the overall appearance perception, the color of the fruits skin is very significant. Thus, a proeminent uniform blue of the blueberries skin is an advantage for the varieties like 'Coville', 'Blueray' or 'Safir' (Figure 4).



Figure 4. The arch of the blueberry varieties ranked by skin color total scores

The fruits firmness is nowadays, beside the shelf life of the product, more and more desired in the fresh consumption. In this respect we assist at a different rank of the blueberry varieties when it comes to a crispy pulp. In the top of the list, 'Legacy' confirms the texture preference of the evaluators and the literature too (Strik B.C. et al., 2017). 'Reka' and the Romanian variety 'Delicia' took an upper position in the ranking list, next by 'Chandler' and 'Duke', varieties that are well known for their firm fruits (Figure 5).



Figure 5. The variability of pulp firmness for the 26 blueberry varieties

The consistence of the fruits is direct influenced by the variety, harvest time, postharvest storage conditions and many other factors that intervene in the process. Therefore, the values registered by the varieties tested in the same day are in a flesh juiciness stage according to their postharvest evolution. Even so, it were remarked old varieties like 'Darrow' or 'Brigitta' next by four Romanian blueberry varieties: 'Vital', 'Lax', 'Simultan' and 'Azur'. Except few varieties like 'Toro', 'Nelson', 'Patriot', 'Bluetta' and 'Pink lemonade', al the other varieties did not vary too much in the scores given by the evaluators (Figure 6).



Figure 6. The juiciness spectrum of the 26 blueberry varieties

Taste is imediately after appearance the most important trait of the fruit assessed by the consumer.

It is definetely one of the criteria and reason for the consumer to return and taste again. It represents the path to remember the name of the variety when the client wants to buy again. In this regard, a special attention was payed by the breeders trying to match the consumer preference. The results obtained in our tasting session restore the performance of an old blueberry variety, famous for taste and medium to large fruits, namely 'Coville'. It convinced in a significant and evident way by gathering no less than 5.36 points (Figure 7) out of the maximum 7 followed at some distance by 'Augusta' and 'Azur' with the same score (4.68 points). Both are Romanian varieties less popular that other foreign varieties. 'Augusta' performed better due to its special and particular taste and flavor.



Figure 7. The ranking of all 26 bluebery varieties according to the consumers taste preference

The flavor of the fruits (Figure 8) completes the taste and inprint the consumer memory. As many regular and unadvised consumer, the taste results are similar with the flavor one. As

it was expected, the first two varieties 'Coville' and 'Augusta' were assigned as most flavored varieties recording the highest scores.



Figure 8. Consumers preference range for the blueberry flavor assessed in the tasting session

It is again remarkable the fact that 'Coville' detached in a significant way from the second position also for this item analysed. Another Romanian blueberry variety ('Simultan') remains in the top preference of the consumers for the flavor, considered one of this variety major advantage.

CONCLUSIONS

'Coville' and 'Chandler' varieties performed better as overall total score and taste in the consumers preference range.

'Chandler' and the Romanian variety 'Augusta' were remarked for their large fruits.

'Coville' and 'Blueray' showed good appearance of the skin color.

The firmest fruits were noticed at 'Legacy' and 'Reka'.

Most tasty and aromatic fruits were ones from 'Coville' and again 'Augusta'.

High aromatic fruits were positive evaluated at 'Coville', 'Augusta' and 'Chandler'.

Evaluation of the blueberry varieties from the consumers preference point of view has to be understood as a dinamic process and must be periodically repeated.

ACKNOWLEDGEMENTS

This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS-UEFISCDI, project number PN-II-RU-TE-2014-4-0749.

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