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Research on fruit quality of several apple varieties from different sources

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Abstract The characteristics related to the external appearance of the fruit are important because most of the time they are a criterion according to which the consumer opts in choosing a variety. In this research, we aimed to analyze the quality, in terms of size index and fruit mass, three varieties of apples from seven different locations: five locations from the town of Şiria, Arad county, hereinafter Şiria 1, Şiria 2, Şiria 3, Şiria 4, Şiria 5, Lugoj Farm, Timiș county and supermarkets in Arad and Timiș counties. The apple varieties studied were 'Starkrimson', 'Florina' and 'Golden Delicious'. Following the research of the two years of the study, among the seven locations, the most maximum values in terms of size index and fruit mass were obtained in the Şiria 5 location.

Key words

apple,
cv. 'Starkrimson',
cv. 'Florina',
cv. 'Golden Delicious',
index size

In Romania, the apple is cultivated everywhere, from sea level to the premontane areas, where there exists one of the richest and most varied germplasm of this species [2; 1; 7]. In terms of area, on the territory of our country, the apple occupies over 50,000 ha, being the second most cultivated tree species after the plum [15].

Nour et al., 2010 considers that appearance, fruit size, uniformity, color, and freshness, as well as nonvisual attributes such as taste, aroma, flavor, firmness (texture), nutritional value, and health benefits, are components that determine the attractiveness of fruit to consumers. Unfortunately, often the appearance of the fruit is not consistent with its gustatory qualities, smaller fruits obtained in organic orchards having superior chemical and gustatory characteristics to the fruits obtained in the conventional orchard system [14; 9].

Apples are most commonly consumed as fresh fruit, being a true source of carbohydrates, minerals, vitamins, fibers, pectins, etc. which contributes to the health of the human body [5; 3].

Among the factors that influence the chemical composition of fruits, and of course the nutritional value, can be mentioned: genotype, pedoclimatic conditions and the culture techology, fruit maturation, tissue structure [12; 6; 13; 4; 12; 10].

Material and Method

To carry out the study, three varieties of apple were analyzed: `Starkrimson`, `Florina` and `Golden Delicious`, harvesting, on average, 15 fruits from each variety from each location. The apples came from seven different locations, namely: from five locations belonging to the town of Şiria, Arad county, hereinafter referred to as Şiria 1, Şiria 2, Şiria 3, Şiria 4, Şiria 5, from Lugoj Farm, Timiș county, and from supermarkets from Arad and Timiș counties. The working method consisted in determining the biometric characteristics of the fruits, namely: determining the large diameter (D), determining the small diameter (d), determining the height (H) and mass, after which we determined the size index using the formula: $Is = \frac{H+D+d}{3}$.

Results and Discussions

The index size of the apples `Starkrimson` variety (Figure 1) from the seven different locations in 2018 varied between 5.75 cm for those from the Lugoj Farm and 6.85 cm for those from the Şiria 5, while in in 2019, the indicator varied between 5.71 cm for those from the Supermarket and 7.16 cm for those from the Şiria 3.

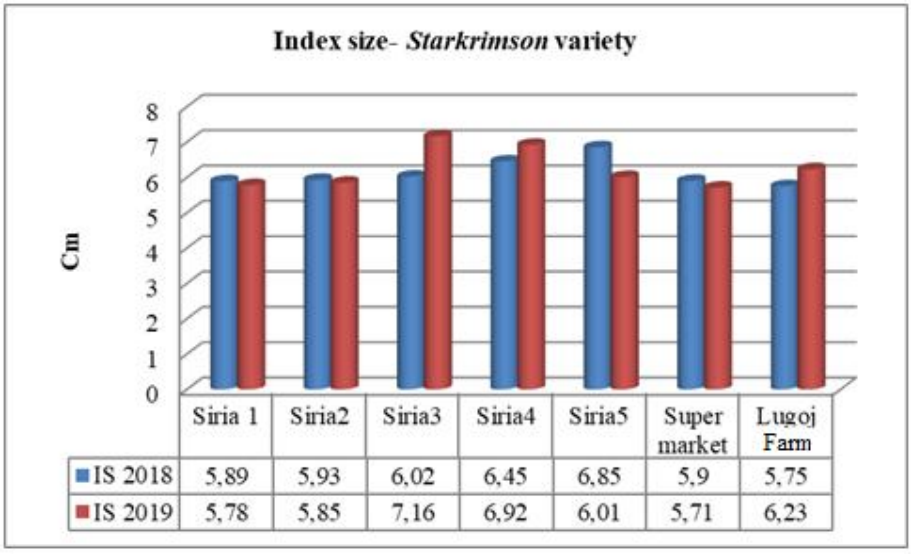

Figure 1. Index size – cv. 'Stakrimson'

Fruit size had higher values in 2018 compared to 2019 in four of the seven locations, while in three locations the fruits were larger in 2019 compared to 2018 (Siria 3, Şiria 4 and Lugoj Farm). Overall, in locations Şiria 3, Şiria 4 and Şiria 5 larger fruits were obtained than those from the Supermarket or even from Lugoj Farm, where the standard cultivation technology for commercial plantations was applied.

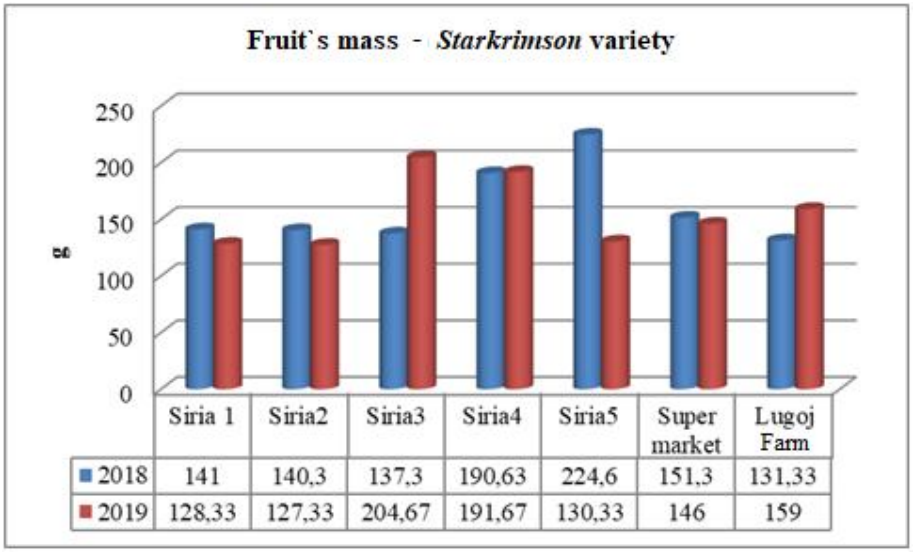

Figure 2. Fruit mass – cv. 'Starkrimson'

The mass of the apples `Starkrimson` variety (Figure 2) in 2018 varied between 131.33 g for those from the Lugoj Farm and 224.6 g for those from the Şiria 5, while in 2019 the mass was between 127.33 g for those from the Siria 2 and 204.67 g to those from the Siria 3.

It can be observed that, from the point of view of the stability, the fruit mass during the two years of experimentation, the fruits of the `Starkrimson` variety from the Şiria 4 recorded a constant and relatively good mass (190.0 g), followed by those from the Supermarket (148.65 g) and from Lugoj Farm (145.16 g). The fruits from locations Şiria 3 and Şiria 5 fluctuated regarding their mass, although on average their mass had values above the experience average (170.98 g and 177.56 g).

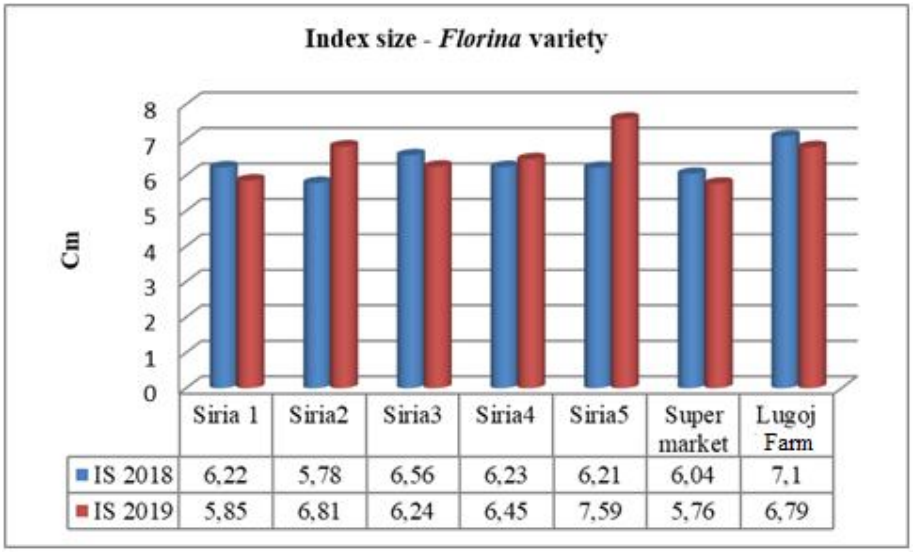

Figure 3. Index size – cv. 'Florina'

The index size of the fruits `Florina` variety in 2018 had values between 5.78 cm for those from the Şiria 2 and 7.1 cm for those from Lugoj Farm, while in 2019, the value of this indicator was between 5.85 cm at fruits from location Şiria 1 and 6.84 cm for those from Şiria 2.

The size of the fruits had higher values in 2018 compared to 2019 in four of the seven locations of origin, the greatest stability in this indicator being observed in those coming from the Lugoj Farm (6.9), followed by those coming from the Şiria 3 (6.4) and those from Şiria 4 (6.34). Regarding the size of the fruits `Florina` variety, those from the Lugoj Farm and those from the Şiria 5 stood out (both with a value of 6.9 cm), although in the latter case, the size variation over the two years of the study was higher.

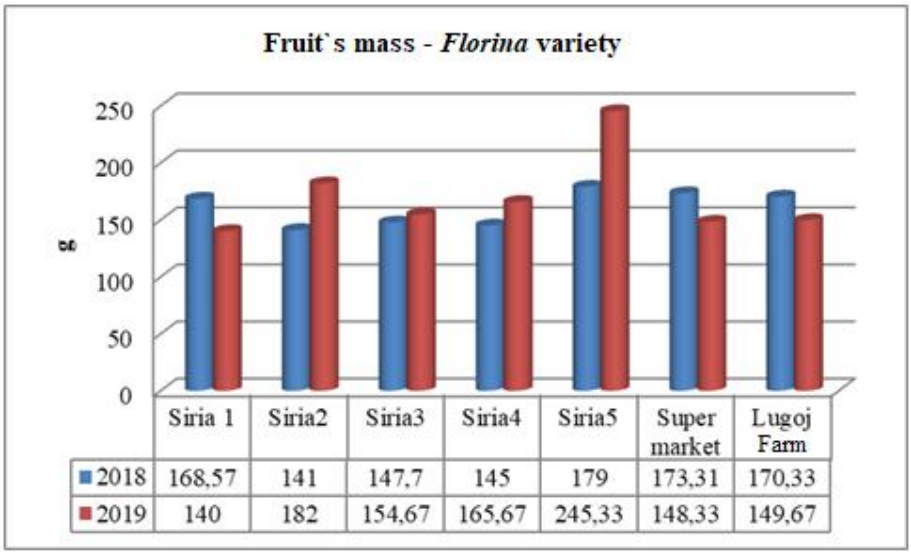

Figure 4. Fruit mass – cv. 'Florina'

The mass of `Florina` apples (Figure 4) in 2018 varied between 141.0 g for those from the Şiria 2 and 179.0 g for those from the Şiria 5 , while in 2019 the mass was between 140.0 g for those from from Şiria 1 and 245.33 g to those from Şiria 5.

From the point of view of the stability, the fruit mass during the two years of experimentation, the fruits of the `Florina` variety from the Şiria 4 (155.33 g) and Şiria 3 (151.18 g) locations recorded a constant but relatively low mass, while the fruits from the Supermarket (160.82 g) and from Lugoj Farm (160 g) had a good mass and fluctuated quite a bit during the two years of experimentation. The biggest variation regarding fruit mass can be observed in the apples from Şiria 5, although in this case, the average over the two years of experimentation is the highest in the experience (212.16 g).

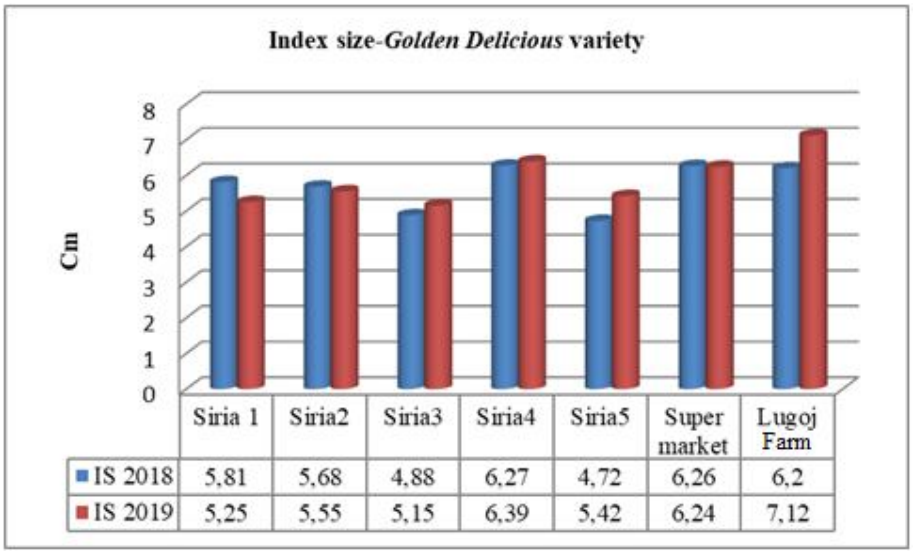

Figure 5. Index size – cv. 'Golden Delicious'

The size index of the `Golden Delicious` variety was in 2018 between 4.72 cm for the fruits from the Şiria 5 land 6.2 cm for those from the Lugoj Farm, while in 2019, the fruit size varied between 5.15 cm at those from the Şiria location 3 and 7.12 cm to those from the Lugoj Farm.

The size of the fruits had higher values in 2019 compared to 2018 in four of the seven locations of origin, the greatest stability in this indicator being observed in those coming from the Şiria 4 (6.31 cm) and from the Supermarket (6.25 cm) . Regarding the size of the fruits `Golden Delicious` variety, those from the Lugoj Farm stood out (6.66 cm), although there was some variation in the parameters, in 2019 here the fruits were reported with a value that exceeded the average of the experience (7.12 cm).

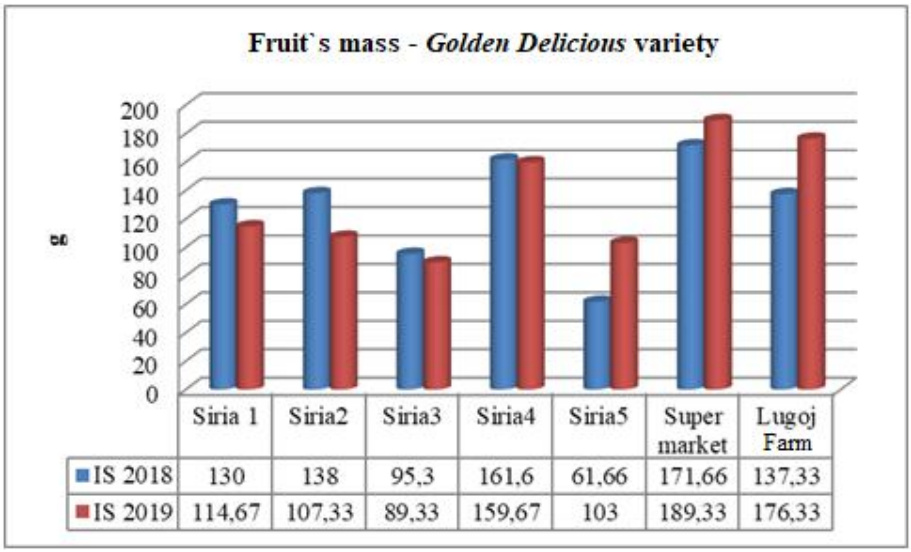

Figure 4. Fuit mass – cv. 'Golden Delicious'

The mass fruit of the `Golden Delicious` variety had quite large oscillations both between the locations of provenance and between the two years of experimentation. In 2018, the value of the indicator was between 95.3 g for the fruits from the Şiria 3 and 171.66 g for those from the Supermarket, while in 2019, the mass varied between 89.33 g for the fruits from the Şiria 3 and 189.33 g for those from the Supermarket. In 2018, fruit mass values were higher in four of the seven locations of origin. The highest stability of the indicator was recorded for the fruits from the Supermarket, which also had the highest mass value (180.49 g) and for those from the Şiria 4 (160.63 g). A high value of fruit mass could also be observed in those from the Lugoj Farm (156.83 g), but here the

difference in values between the two experienced years was quite high (39.0 g).

Conclusions

Following the research carried out in 2018 and 2019, we reached the following conclusions:

In 2018:

- the `Starkrimson` variety, the highest value of the size index was obtained for the apples from the Șiria 5, and the lowest value for the apples from the Lugoj Farm. Regarding the mass of the fruits, the highest value was obtained for the apples from the Șiria 5, and the lowest for the apples from the Lugoj Farm;
- the `Florina` variety, the highest value of the size index was obtained for the apples from the Lugoj Farm, and the lowest value for the apples from the Șiria 2. Regarding the mass of the fruits, the highest value was obtained for apples from Șiria 5, and the lowest value for apples from Șiria;
- the `Golden Delicious` variety, the highest value of the size index was obtained for apples from Șiria 4, and the lowest value for apples from Șiria 5. Regarding the mass of the fruits, the highest value was obtained for the apples from the Supermarket, and the lowest for the apples from the Șiria 5

In 2019:

- the `Starkrimson variety`, the highest value of the size index was obtained for the apples from the Șiria 3, and the lowest value for the apples from the Supermarket. With regard to fruit mass, the highest value was obtained for apples from Șiria 3, and the lowest value for apples from Șiria 2;
- the `Florina` variety, the highest value of the size index was obtained for the apples from the Șiria 5, and the lowest value for the apples from the Supermarket. Regarding the mass of the fruits, the highest value was obtained for apples from Șiria 5, and the lowest value for apples from Șiria 1;
- the `Golden Delicious` variety, the highest value of the size index was obtained for the apples from the Lugoj Farm, and the lowest value for the apples from the Șiria 3. Regarding the mass of the fruits, the highest value was obtained for the apples from the Supermarket, and the lowest value for the apples from the Șiria 3.

In the two years of the study, the most maximum values in terms of fruit size index and mass were obtained at the Șiria 5.

References

[1] Baciu A., 2005. Pomicultură generală. Editura Universitaria, Craiova.

[2] Botu I., Botu M., 2000. Protecția și conservarea biodiversității. Editura Conphys, Rm. Vâlcea.

[3] Boyer, J., & Liu, R. H., 2004. Apple phytochemicals and their health benefits. Nutrition journal, 3(1):1-15.

[4] Drogoudi P., 2011. Effects of position on canopy and harvest time on fruit physico-chemical and antioxidant properties in different apple cultivars. Scientia Horticulturae 129(4):752–760, DOI: 10.1016/j.scienta.2011.05.036

[5] Ferretti, G., Turco, I., & Bacchetti, T., 2014. Apple as a source of dietary phytonutrients: bioavailability and evidence of protective effects against human cardiovascular disease. Food and Nutrition Sciences.

[6] Ghena N., Branişte N., Stănică Fl., 2004. Pomicultură generală, Editura MatrixRom, Bucureşti.

[7] Iordănescu Olimpia Alina, 2008. Pomicultură. Editura Eurobit, Timișoara.

[8] Iordănescu Olimpia, Ersilia Alexa, Roxana Micu, Mariana Atena Poiană, 2012. Bioactive compounds and antioxidant properties of apples cultivars from Romania in different maturity stage. International Journal of Food Agriculture and Environment, Finland 10(1):147-151.

[9] Iordănescu Olimpia Alina, Călin Cristian Constantin, Becherescu Alexandra, Camen Dorin, Scedei Daniela, Băla Maria, 2019. Research concerning the quality of fruits of some ancient apple tree varieties in conditions of western part of Romania, SCIENTIFIC PAPERS-SERIES B-HORTICULTURE, 63(1):129-136.

[10] Tomo MILOŠEVIĆ, Nebojša MILOŠEVIĆ, Jelena MLADENOVIĆ, 2019. Tree vigor, yield, fruit quality, and antioxidant capacity of apple (Malus × domestica Borkh.) influenced by different fertilization regimes: preliminary results, Turkish Journal of Agriculture and Forestry, Turk J Agric For, 43: 48-57.

[11] Nour V., Trandafir I., Ionica M.E., 2010. Compositional characteristics of fruits of several apple (*Malus domestica* Borkh.) cultivars. Not Bot Hort Agrobot Cluj 38:228-233.

[12] Stopar M., 2002. Lower Crop Load for Cv. Jonagold Apples (*Malus×domestica* Borkh.) Increases Polyphenol Content and Fruit Quality, Journal of Agricultural and Food Chemistry 50(6):1643-6, DOI: 10.1021/jf011018b

[13] Veberic R. and F. Stampar, 2005. Quality of apple fruits (*Malus domestica*) from Organic Versus Integrated Production**.** Information and Technology for Sustainable Fruit and Vegetable Production FRUTIC 05. 12. 16 September 2005. Montpellier France

[14] White R., 1999. Biodiversity and Conservation: agriculture. University of Southampton, BS, 307, England

[15] *** https://www.fao.org/faostat/en/#data/QCL