

QUALITATIVE CHARACTERISTICS OF INTRODUCED PEACH VARIETIES IN HERZEGOVINA

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Summary

The paper presents three year research on qualitative characteristics of introduced peach varieties: Maycrest, Spring Lady, Rich Lady and Elegant Lady, and standard variety Springcrest in Herzegovina. The varieties were described according to the method of the International Board for Plant Genetic Resources (IBPGR), including subjective assessment. The highest marks for attractive fruit were given to the varieties Rich Lady and Elegant Lady, that are characterized by extremely large fruit, attractive blush colour, and easy stone adherence. Early and medium ripening varieties (Maycrest and Springcrest) are characterized by extremely firmness of flesh which provides greater transportability. The highest stone cracking was found for variety Maycrest, the lowest was noticed for Elegant lady, while the other varieties have medium stone cracking (mark 5). Concerning stone adherence, clingstone was found for the varieties Maycrest and Springcrest, semi-freestone was noticed for the variety Spring Lady, while varieties Rich Lady and Elegant Lady had free stones, actually it is completely free from flesh, characteristic which is highly appreciated by consumers.

Key words: peach, fruit, flesh, stone

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Introduction

Taking into account the total fruit production in the world, peach is in eight place and it is in third place in Bosnia and Herzegovina. Total world production of peach in 2012, was 21.083.151 t (FAOSTAT 2014), and out of that number China has production of 12.000.000 t or 56,92%.

Modern market trends that define production parameters of this fruit type are globalization and need for supply with fruit through the year, big variety of products and integral concept of production of healthy safe food, large diversity of products and integral concept of production of healthy safe food. Such market demands are putting tasks before breeding programmes aiming creation of new varieties that would offer longer harvest season of fruits of higher quality with controlled use of plant protection. Special attention is on diversification of pomological features, better fruit storing and modifications of crown architecture in order to adjust trees in programmes to grow in dense plantings. As a result of breeding activities, a variety was created which has perfects fruit features and technological developmen that provide realization of its full genetic potential.

Today, fruit quality has fundamental value for acceptance of peach and nectarine varieties by consumers due to big market competition (Crisosto & Crisosto 2005, Crisosto *et al.* 2006b, Iglesias & Echeverría 2009).

Skin appearance (colour and without damages), texture, taste and content of sugar and acids are key factors which determine quality of fresh peach and nectarine (Badenes *et al.* 2006). All these parameters may act independently of each other, therefore they have to be studied as whole and their relation between each other in order to improve selection of production goals.

Previous researches carried out for peach (Byrne *et al.* 1991, Génard *et al.* 1994, Esti *et al.* 1997, Génard *et al.* 1999) revealed connection between some pomological features that refer to fruit quality.

Material and method

Research was carried out at three the most important locations of peach cultivation in Bosnia and Herzegovina (Mostar, Čapljina and Stolac) during three vegetative seasons: 2009, 2010 and 2011. Materials used for research were newly introduced peach varieties: Maycrest, Spring lady, Elegant lady, Rich lady, and standard variety Springcrest. Rootstock for examined varieties is GF 677. Highly intensified agro-technical and pomotechnical treatment has been carried out in the examined orchards (soil cultivation, fertilization, plant protection). The experiment was set in the accordance to the "Method of randomized block experiment", with 5 trees for every variety, at every location, actually 75 trees in total. Planting distance was 4 x 2,5 m, tee for was slender spindle.

Total fruit analyses in examined varieties were carried out on random sample of 50 fruits for every particular parameter. The following quality parameters were examined: fruit attractiveness, ground and red over colour, skin pubescence, skin cracking suspectability. The following flesh features were analysed: colour, firmness, texture and taste. Stone analyses comprehended: form, cracking and stone adherence to flesh.

International peach descriptor "Descriptor list for peach" IBPGR, by Bellini *et al.* (1984) was used for determination of qualitative fruit features.

Results and discussion

Fruit appearance

Peach fruit quality is determined by a collection of internal and external features that are mutually complemented in their expression, and they significantly influence on satisfaction and acceptance of some varieties by their consumers.

Fruit attraction is collection of external features which leaves visual effect on consumer. From external features fruit attractiveness is influenced by a shape and size of fruit, ground and red over skin colour, skin pubescence, and from internal factors flesh firmness, texture and taste.

Through ripening of peach fruit, additional skin colour is developed over the ground colour, and it can vary from blush to red colour of various intensity (Byrne *et al.*, 1991; Delwiche & Baumgardner, 1985). These changes are happening probably due to chlorophyll degradation (green), unmasking of carotenoids (yellow, orange) (Cory & Schlimme, 1988) and synthesis of anthocyanin (red, purple) in fruit skin.

Red colour is determined with the influence of genetic and ecological factors. Intensity of red colour is under the influence of light availability within the crown (Bible & Singha, 1993; Correlli Grappadelli & Coston, 1991; Day *et al.*, 1989; Erez & Flore, 1986; Marini, 1985).

Results of the fruit assement of examined varieties of peach is presented in the Table 1.

Table 1. Appearance of fruit of examined cultivars of peach, IBPGR, 2009-2011.

Variety	Fruit attractiveness	Ground colour of skin	Red over colour	Skin pubescence	Skin cracking susceptibility
Maycrest	5	5	6	5	5
Springcrest	5	5	6	5	3
Spring Lady	7	5	6	5	3
Rich Lady	7	6	9	3	7
Elegant Lady	9	5	7	3	7

Analysing marks given for fruit attractiveness, presented in the table 1. It may be concluded that all the examined varieties have high marks and it goes from fair (5) for varieties Maycrest and Springcrest, good (7) for Spring Lady and Rich Lady, and excellent (9) for variety Elegant Lady.

Based on the presented classification, it may be seen that the most of examined varieties have yellow (5) as skin ground colour, except the variety Rich-Lady which has yellow-orange (6) as skin ground colour.

Table 1., also shows that varieties of early and mid season harvest maturity (Maycrest, Springcrest and Spring Lady) have medium red – red over colour (6), variety Elegant Lady has mostly red (7), while Rich Lady has red-wine (9) colour.

Further checking of IBPGR results, shows that varieties Maycrest, Springcrest and Spring Lady have intermediate pubescence (5), while the varieties Rich Lady and Elegant Lady have poor pubescence (3).

Varieties Springcrest and Spring Lady have low skin cracking susceptibility, variety Maycrest medium, and varieties Rich Lady and Elegant Lady high degree of skin cracking susceptibility, which has to be taken into consideration during determination of harvet time and the way of transport.

Skin colour is the one that mostly attract attention of consumers, and it is caused by pigments located in cells of epidermis and parenchyma. Yellow and amber colour originates from products of changed chlorophyll, carotene and their derivatives. Pink and all tones to red colour originate from anthocyan dissolved in cell fluid.

Skin ground colour may be yellow, greenish, green-yellow, yellow-greenish and orange cover with redness on certain parts or on the entire surface. Concerning the red colour is dominant over the yellow and white colour.

Features of fruit flesh

Flesh analyses comprehended: colour, firmness, texture and taste is presented is by table 2. Ground colour of flesh may go from light greenish to less or more intensive yellow, white or red in tones. The most of peach varieties are divided to white and yellow in the accordance with colour of fruit flesh. White and yellow colour of peach fruit flesh is the most popular and they are basic criteria for classification of peach varieties due to extreme significance of this feature.

White colour of flesh is monogenic and dominant comparing to yellow. Red colour around a stone is dominant.

Table 2. Features of fruit flesh of examined peach varieties, IBPGR, 2009-2011

Variety	Colour of flesh	Firmness of flesh	Texture of flesh	Taste of flesh
Maycrest	4	7	5	5
Springcrest	5	7	5	7
Spring Lady	5	5	7	9
Rich Lady	6	7	5	9
Elegant Lady	5	5	7	9

Reviewing the results presented in the table 2., it may be concluded that all examined peach varieties have yellow-greenish to yellow-orange flesh colour. Maycrest variety yellow-greenish ground colour of flesh, Rich Lady has yellow-orange, while the other varieties have yellow ground colour of flesh.

Table 2., also presents that varieties Maycrest, Springcrest and Rich Lady have fine flesh, while varieties Spring Lady and Elegant Lady have intermediate flesh firmness.

Varieties Maycrest, Springcrest and Rich Lady have intermediate texture, while varieties Spring Lady and Elegant Lady have fine texture.

Based upon the classification of examined varieties presented in the table 2., it is obvious that variety Maycrest has fine taste (5), variety Springcrest good (7), while varieties Spring Lady, Rich Lady and Elegant Lady have excellent taste (9).

Various tones of red colour of skin and flesh of fruit of peach come from anthocyan. Peach fruit, besides table use, is also used a lot for processing into different juices, jams,.... Dark colour of these products is appearing due to the activity of phenoloxidase and anthocyan degradation (Tešović et al., 1996).

Stone features of examined peach varieties

Size and shape of stone may be used as descriptive characteristic of varieties (Jakubowski & Lewandowska 2004). Shape of fruit stone is ovoid and it varies from variety to the variety. (Quilot *et al.*, 2004).

Table 3. presents stone features in the accordance with the International descriptor IBPGR.

Table 3: Stone features of examined peach varieties

Variety	Shape of stone	Cracking of stone	Stone adherence
Maycrest	4	7	3
Springcrest	4	5	3
Spring Lady	4	5	2
Rich Lady	4	5	1
Elegant Lady	4	1	1

It is visible in the Table 3., that all the examined varieties have elongated shape, as classified by IBPGR with 4.

It can also be concluded, that variety Elegant Lady has very low cracking predisposition, and actually inconsiderable number of cracked stones were registered for this variety. Medium cracking predisposition was noticed for varieties Springcrest, Spring Lady and Rich Lady, while high level of cracked stone has been registered for the variety Maycrest at all the location within the researched period.

Checking the classification results, it is obvious that clingstone was registered for the varieties Maycrest and Springcrest, semi-freestone for the variety Spring Lady, while varieties Rich Lady and Elegant Lady have freestones, completely free from flesh, characteristic appreciated by consumers.

Conclusion

Analysing assessments of qualitative features of fruit of the examined peach varieties, it may be concluded that all the examined peach varieties have high assessment for fruit attractiveness. Especially variety Elegant Lady has excellent marks for its extremely attractive fruit. (9).

Through the results of IBPGR classification of examined varieties, it is obvious that all the varieties have high marks related to flesh features. (colour, texture, firmness and taste).

According to the stone cracking susceptibility, variety Elegant Lady has extremely low susceptibility, varieties Springcrest, Spring Lady and Rich have a low susceptibility, while medium was registered for the variety of Maycrest, at all the locations within the examined period. Based upon the conducted research, it may be concluded that all the examined varieties were adapted to the specific conditions of sub-mediterranean Herzegovina and by their qualitative-quantitative characteristics they fulfil required demands of modern market, therefore they may be recommended to famers to be used in practice.

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