RESEARCH ARTICLE (Open Access)

The Study of Pomological Characteristics of Cherry Cultivars

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Abstract

Traditional cherry cultivars represent important plant genetic resources. The aim of this study was to assess and analyze the pomological characteristics of five cherry accessions, AGB 3196, AGB 3194, AGB 3201, AGB 3244, AGB 3169, at the national collection of fruit trees, in Valias, using UPOV Code and cherry descriptors. During the vegetation period of the years 2018 and 2019 there were characterized and evaluated the following characteristics: tree habitat brunches, tree vigor, season of flowering and maturity, fruit size, fruit shape, fruit flesh color, flesh juiciness, ratio sugar/acid, length of fruit stalk, stone size, stone shape. The results were statistically processed. The pomological characteristics that were studied revealed that these accessions are unique. The accessions AGB 3194 and AGB 3201 were evaluated with the best characteristics for the fruit quality. The results of the present research provide the establishment of a database with pomological data and assist the gene bank to analyze and to achieve better knowledge of the accessions conserved ex –situ, which could be useful both for scientists and growers.

Keywords: accession; cherry; genetic resources.

1. Introduction

The sweet cherry is one of the important fruit crops grown in our country. In Albania, the cultivation of cherries is widespread due to the good climatic conditations and well known for it's commercial value and family consumption[1][2]. The sweet cherries are rich in many phytochemicals components, such as flavonoids and phenolic compounds, which provide protection against chronic diseases through multiple effects, including the antioxidant effect. They have many benefits for health. [5,7,8, 9]

The presence of anthociyanins, one of the important pigments is associated with attractive, colorful and flavorful fruits.[3] The other physicochemical characteristics, such as fruit weight, color, acidity, and firmness, are important quality atributes of cherries that have been studied previously.[6] The most cultivated native cultivars in our country are: Dollmas, Belica-s and Zhitoma [1] The sweet cherry accessions collected in different areas of our country and preserved at the national collection of fruit tree in Valias Experimental Base (Gene Bank) represent interesting local genotypes. They were created in the past centuries and are well acclimatized and conserved by the local population and now are an asset of national importance. In this collection are conserved 65 cherry accessions. The diversity is expressed by the peculiarities and characteristics that distinguish these accessions. The genetic variability conserved in this collection is important for improvement genetic work in the future. The characterization, evaluation and sustainable use of them are a duty of Gene Bank in order to be an approach for improvement genetic work and expand their cultivation. So it was undertaken our study in order to characterize five cherry accessions AGB 3196, AGB 3194, AGB 3201, AGB 3244, AGB 3169.

2. Material and Methods

Accessions, AGB 3196, AGB 3194, AGB 3201, AGB 3244, AGB 3169 object of this study were planted in 2011. They are healthy plants in full production. They

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are traditional cultivars of south and east Albania. The accessions AGB 3194 and AGB 3196 were explored and collected in Leskovik, AGB 3201 in Skrapar, AGB 3169 in Tirana and AGB 3244 in Petran (Permet) (Table 1) These accessions during the years 2018-2019 were characterized and evaluated according to UPOV Code, cherry descriptors and guidelines set by International Board of Plant Genetic Resources (Schmidt et al., 1985). The evaluation of bio-morphological characteristics of these cherry accessions, according to vegetation development was performed and specifically were determined the tree vigor, tree habitat brunches, season of flowering and maturity, fruit size, fruit shape, fruit flesh color, flesh juiciness, ratio sugar/acid, length of fruit stalk, stone size, stone shape[4]. The tree vigour was considered as the overall abundance of vegetative growth (UPOV). [Cherry Descriptors, 1985]. At full maturity when fruit has typical taste and firmness, according to Meier (2001) were collected the samples of 30 fruits from each accession. The weight of each fruit (g) was determined by using digital scale and manual caliber for diameter (mm). The sweetness of the fruit were measured in cherry juice obtained using a home blender by refractometer expressed as degrees Brix. The total acidity of the fruit was measured by titration with 0.1 N NaOH.

3. Results and Discussion

The study based on field observations and laboratory evaluations determined the main pomological characteristics according to the criteria approved by International Board of Plant Genetic resources of five cherry accessions conserved in Albanian Gene Bank. The phenological characteristics of five cherry accessions were given in (Table 1). The time of beginning of flowering results earlier in AGB 3169 and mid-season in AGB 3194, AGB 3201, AGB 3244, AGB 3165 while the time of beginning of harvesting results mid-season in AGB 3169 and AGB 3196 and late in AGB 3194, AGB 3201, AGB 3244. Based on the data presented on the table 2 the vegetative growth is considered medium to AGB 3169 and high to AGB 3194, AGB 3201, 3196 , AGB 3244 while tree habitat branches is spreading to AGB 3194, AGB 3201, AGB 3169 and upright to AGB 3196, AGB 3244. The statistically analyses of the average of fruit weight and fruit size considered as very important characteristics for commercial market [10] showed that AGB 3194 and AGB 3244 have large fruit, AGB 3169 has medium fruit and AGB3201 and AGB 3196 have small fruit. Shape of fruit is cordate to AGB 3194, AGB 3196 and kidney shape to AGB 3201, AGB 3169, AGB 3244. The length of the stalk is medium to AGB 3196, AGB 3194, AGB 3169 while is long to AGB 3201 and AGB 3244. The skin color is more diverse. It is black to AGB 3194, vermilion to AGB 3201 and AGB 3169, while yellow to AGB 3196 and vermilion on yellow ground colour to AGB3244 (Table 2). Sugar content results above 15°Brix to all accessions. Taste as sugar/acid ratio were varied from acid in the AGB3196, AGB 3169, AGB 3244 to intermediate in AGB 3194 and 3201. Eating quality as combination of tasty, aroma and flavor were good to 3194 and 3201. Firmness that is an important characteristic for long distance transportation is good for AGB 3201, AGB 3169, AGB 3196, AGB 3244 and high for AGB 3194. (Table 3)
High morphological variability among these accessions revealed that they are unique. The analyses of eating quality descriptors selected AGB3194 dhe AGB 3201 as good accessions.

Table 1. The phenological characteristics of five cherry accessions

Accession Code	Accession Name	Origin	Time of beginning of flowering	Time of beginning of harvesting
AGB 3194	Belicë e zezë	Leskovik	5	7
AGB 3201	Belicë e kuqe	Skrapar	5	7
AGB 3196	Belicë e bardhë	Leskovik	5	5
AGB 3169	Qershi e kuqe e Tiranës	Tiranë	3	5
AGB 3244	E kuqja e Petranit	Përmet	5	7

Time of beginning of flowering: 3=early; 5=mid-season; Time of beginning of harvesting: 5=mid-season;7=late

Table 2. The pomological characteristics of five cherry accessions

Accession Code	Tree vigour	Tree habit	Fruit size	Fruit shape	Length of stalk	Fruit skin colour
AGB 3194	7	5	7	5	5	7
AGB 3201	7	5	3	1	7	4
AGB 3196	7	3	3	5	5	1
AGB 3169	5	5	5	1	5	4
AGB 3244	7	3	7	1	7	3

Tree vigour: 5=medium; 7=strong; tree habit: 3=upright; 5=spreading; fruit size: 3=small; 5=medium; 7=large; fruit shape: 1=kidney-shaped ; 5=cordate; length of stalk: 5= intermediate; 7=long; fruit skin colour: 1= yellow; 3= vermilion on yellow ground colour; 4=vermilion; 7=black;

Table 3. The fruit characteristics of five cherry accessions

Accession Code	Fruit flesh colour	Ratio stone size/fruit size	Firmness	Sugar/acidity	Eating quality
AGB 3194	5	5	7	5	7
AGB 3201	1	3	5	5	7
AGB 3196	1	3	5	3	5
AGB 3169	1	3	5	3	3
AGB 3244	2	5	5	3	3

Fruit flesh colour:1=cream white- cream yellow; 2=pink; 5=black-red. ratio stone size/fruit size: 3 =small; 5= medium; firmness: 5= intermediate; 7= high; Sugar/acidity: 3=acid; 5=intermediate; eating quality: 3= poor; 5= fair; 7=good.

4. Conclusions

The sweet cherry accessions, AGB 3196, AGB 3194, AGB 3201, AGB 3244, AGB 3169 conserved at national collection of fruit trees, Albanian Gene Bank were characterized and evaluated according to UPOV Code, cherry descriptors and guidelines set by International Board for Plant Genetic Resources (Schmidt et al., 1985). The determining of their bio-morphological characteristics creates a good data base for their accurate recognition, the opportunity to later compare their changes, homonyms, synonyms and identification for wider use. The results showed high morphological variability among these accessions revealed that they are unique. The analyses of eating quality descriptors selected AGB 3194 and AGB 3201 as the good cultivar. The results of this study makes it possible to fulfill the characterization database to checked by the interested institutions, farmers, other gene banks.

5. References

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