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EVALUATION OF YIELD AND FRUIT QUALITY OF SEVERAL ECOTYPES OF CORNELIAN CHERRY (*Cornus mas* L.) IN POLISH CONDIOTIONS

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ABSTRACT

Cornelian cherry is a little-known plant that can be grown in Poland both on a commercial and amateur scale. The commercial cornelian cherry plantations should be established using selected cultivars or vegetatively propagated valuable ecotypes, as only this guarantees a uniform yield, maturation and standardization of fruit quality. The experiment was carried out in 2014 and 2015 in the private plantation of cornelian cherry (*Cornus mas* L.) located in Dąbrowica, near Lublin (22.454 N; 51.270 E). The subject of the research were ecotypes No.: 1, 2, 3, 4, 5, 6, 7, 10, 11, 14, 15 obtained as seedlings in 1998. Cornelian cherry plants obtained from seeds differed very much in the yield and quality of fruit. The fruit characteristics for the examined ecotypes ranged to 1.63–2.21g for fruit weight, 1.30–1.61 for fruit shape index, 10.13–15.32% for content of stone, 17.85–22.68% for soluble solids content (SSC), 2.32–3.0% for titratable acidity (TA), 6.59–8.36 for SSC/TA, 54.9–75.97 for vitamin C content. Among the ecotypes studied in terms of external fruit features, ecotypes No. 3 and 4 were distinguished due to the largest fruits (mass and diameter) and relatively small share of the stone in the whole mass of the fruit. However, due to the chemical composition, the fruits of ecotype No. 5 were distinguished by the content of extract, extract to acids ratio, sugar, dry matter, anthocyanins and vitamin C content. These fruits enjoyed 55% strong acceptability among adults. The indicated ecotypes can be used in breeding as well as in nursery for obtaining valuable varieties of cornelian cherry for production in Poland.

Key words: consumer acceptance, fruit size, chemical composition of fruit

INTRODUCTION

Cornelian cherry (*Cornus mas*) is a member of the family Cornaceae, genus *Cornus*, which includes about 40 species which are found mainly in the temperate zone of the northern hemisphere. Its range extends from southern and central Europe to the Caucasus and central Asia [Turnal and Koca 2008]. In the natural state it occurs mainly in mountain forests, in sunny positions or on stony slopes. Larger clusters of these plants can be found in the Aegean, Mediterranean and Black Seas and in North-Eastern Anatolia in Turkey [Ercisli 2004]. In Turkey, the harvest of cornelian cherry fruit grows up to 14 000 tons per year, but mainly from natural locality [Demir and Kalyoncu 2003].

The cornelian cherry grows most often as a shrub, rarely as a tree, with a height of 3 to 9 m, taking spherical or spherical-flattened crowns. A characteristic feature of this species is slow growth and longevity. The final size can reach even after 100 years, and some plant are known in excellent condition, hav-

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ing several hundred years [Bijelić et al. 2012]. The small yellow flowers are gathered in spherical umbels. Flower buds develop first on two-and-three years old wood. From one flower bud develop 15–25 flowers. Flowers appear at the turn of February and March, before the development of leaves. Cornelian cherry requires cross-pollination for good fruiting [Pirlak and Güleryüz 2005]. The berries of cornelian cherry are associated with cherry or plum, as they are juicy drupes with a tart-acid, sometimes sweet-sour taste and a specific aroma. They are sweet and full of maturity and can be eaten immediately after breaking the tree. The fruits of most cornelian cherry cultivars have a dark red colour and olive shape, but you can also find pear-shaped or bottle-like forms in red, pink, yellow and even white. The length of the fruit reaches 20–40 mm, with a width of about 20 mm. The average fruit weight varies from 2.0 to 8.0 g, and the share of stone in fruit is 10–30%. The stone is usually connate with the flesh [Ercisli et al. 2011, Hassanpour et al. 2012]. Most of the varieties studied in the Przemyśl region mature in September and this term was assumed to be typical for the conditions of south-eastern Poland. Early maturing varieties are more suitable for growing in northern Poland, where the growing season is shorter. The average harvesting period for most varieties is 20–30 days, although this period may be extended. It is mainly dependent on climatic conditions prevailing in a given growing season. The varieties of later ripening dogwoods should be chosen for planting in the south of Poland [Piórecki et al. 2010].

The yield from ten years old tree on plantation range from 30–80 kg per plant, while wild shrubs yield on average of 3 to 5 kg [Klimenko 2004]. The first dogwood fruits, depending on the type of nursery material, can be obtained from the 2nd to the 8th year after planting.

The cornelian cherry are commonly used in the kitchens of Iran, the Caucasus, Georgian, Balkan, Ukrainian and Slovak. In these countries, the fruit is eaten fresh and used for the production of jams, jellies, marmalades, pestil (the type of dried marmalade), syrup, various types of drinks, silage imitating olives [Maghradze et al. 2009, Ognjanov et al. 2009].

Cornelian cherry has been important in herbal medicine for thousands of years. Plant extracts from leaves, flowers and fruit were used to relieve throat pain, digestive problems, measles, chickenpox, anemia, rickets, jaundice, kidney diseases (eg, for pyelonephritis), gastric ulcers. Powder from dried fruit and seeds was used for diarrhea and haemorrhoids. The healthy effect of dogwood on the human body may result from the content of vitamin C [Kostecka et al. 2017], anthocyanins [Pantelidis et al. 2007, Gunduz et al. 2013] and iridoids [Kucharska et al. 2011, Kucharska 2012].

The fruits of cornelian cherry, from wild stands, reach a small size and are characterized by low juiciness, especially in the absence of rainfall. Therefore, in recent years, breeders put more emphasis on obtaining valuable cornelian cherry cultivars. The work focuses mainly on obtaining cultivars with high quality of fruits. During the selection, the shape, size and color of the fruit, the size of the stone, as well as plant resistance to frost, growth strength, self-fertility, and ripening are taken into account [Klimenko 2004].

The aim of this study was to assess 11 ecotypes of cornelian cherry growing in south-eastern Poland, in terms of yield and fruit quality.

MATERIAL AND METHODS

The experiment was carried out in 2014 and 2015 in the private plantation of cornelian cherry (*Cornus mas* L.), located in Dąbrowica, near Lublin (22.454 N; 51.270 E). The subject of the research were ecotypes no: 1, 2, 3, 4, 5, 6, 7, 10, 11, 14, 15 obtained as seedlings in 1998. The trees were planted on the southern slope, east-west, in a row at the distance 2.5 m. The collection was found on the brown soil. Organic fertilization was applied before establishing the plantation. The plants were not protected against diseases and pests, and no irrigation was used.

The actual values of average temperature and rainfall in March–October 2014–2015 are given in Table 1.

In the second part of the growing season, at the end of July, a black agrotextile was spread under the shrubs to protect the falling, ripe fruit from contact with the soil. Between the plants, on the agrotextile, the slats were spread out to prevent the mixing of the fruits from individual bushes.

From each ecotype, the fruit was harvested separately every 2–3 days, after falling on an agrotextile, recording when it was the richest yield, and then after

Table 1. Mean air temperature and sums of rainfall during experimental period 2014–2015

Month	Temperature (°C)			Precipitation (mm)		
	2014	2015	many-year averages (1951–2012)	2014	2015	many-year sum (1951–2012)
	mean temperature					
I	–3.0	0.6	–3.7	67.83	51.0	23.4
II	1.2	0.4	–2.8	14.73	14.5	25.
III	6.0	4.7	1.0	47.76	39.1	28.0
IV	9.7	7.8	7.4	50.3	29.2	39.0
V	13.4	12.5	13.0	242.83	115.1	60.7
VI	15.6	16.7	16.3	62.74	18.8	65.9
VII	20.2	19.3	18.0	87.37	47.5	82.0
VIII	17.8	21.9	17.2	93.21	7.4	70.7
IX	14.1	14.7	12.6	30.74	88.4	53.7
X	9.1	6.7	7.6	23.62	60.2	40.1
XI	4.2	4.7	2.6	22.85	41.4	38.2
XII	0.1	3.6	–1.6	52.08	36.0	31.4
Annual mean	9.0	9.5	7.3	796.06	548.6	558.9
Average for vegetative season (III–X)	13.2	13.0	11.6	638.6	405.7	440.1

Table 2. Total yield and harvesting time of examined ecotypes in 2014

Ecotype No.	Total yield (kg/tree)	Harvesting			
		onset	full	end	duration (days)
1	17.76 ab*	28.08	10.09	02.10	35
2	20.42 bc	13.08	25.08	15.09	33
3	13.57 a	29.08	01.09	17.09	19
4	23.73 c	13.08	17.08	15.09	33
5	18.21 ab	13.08	01.09	15.09	33
6	18.8 ab	07.08	25.08	15.09	39
7	32.91 d	12.08	01.09	17.09	36
10	18.6 ab	07.08	22.08	29.08	22
11	19.01 bc	04.08	13.08	22.08	18
14	12.35 a	14.08	01.09	17.09	34
15	13.54 a	13.08	01.09	17.09	35

*Within columns, different letters indicates significant differences at $P < 0.05$

the total yield was determined. On August 28 in 2015, to determine the acceptance of consumers as to cornelian cherry fruits, the study was conducted among two age groups: adults (from 19–80 years) and children (from 7–18 years). Twenty people from each age group were asked for a sensory assessment using a 8 of 50% sulfuric (VI) and 4 cm^3 of ammonium molybdate and mixed thoroughly. Absorbance was measured at λ = 705 nm at room 8.

Titratable acidity (TA) was determined potentiometrically by titrating diluted juice samples to pH 8.1 by 0.01 N NaOH.

Total anthocyanin content was estimated spectrophotometrically with the pH differential absorbance method [Cheng and Breen 1991]. The extracts were diluted with buffer solutions of pH 1 and 4.5. The absorbance was measured at 510 and 700 nm against distilled water control. Total anthocyanins was expressed as mg of cyaniding-3-glucoside equivalents per 100 g of fresh pomace.

All analyses were performed using STATISTICA for Windows 5.5A software and statistical analyses significances of differences were tested by the HSD Tukey's test.

RESULTS AND DISCUSSION

In 2014, the fruits of ecotype no. 11 (04.08) were the earliest ripened, and in 2015 ecotypes no. 4, 10 and 11 (07.08). However, the fruits of ecotypes no. 2 (02.10) were ripening at the latest in 2014 and in 2015, most of the ecotypes was ripening until October. Only ecotype No. 10 completed the fruit ripening 29.09 (Tabs 2 and 3). The examined ecotypes in terms of maturation date can be divided into three groups: early ripening, where full maturation in both seasons was in August (ecotypes no. 2, 4, 10, 11), maturing in the medium term, where full maturation in both seasons was in September (ecotypes no. 3, 5, 7, 14 and 15). And the one of very late maturing genotype was ecotype no 1. The period of ripening and harvesting of cornelian cherry fruits depends on weather conditions (temperature and precipitation), as well as on the cultivar [Piórecki et al 2010]. Comparing the maturation of the tested ecotypes to established Polish cultivars, ecotypes no. 4, 10 and 11 ripening similar to that of 'Dublany' and 'Juliusz', while late maturing Polish varieties are 'Florianka' and 'Podolski' [Kucharska et al. 2011]. Kucharska et al. [2011] reported that the average harvesting period of the Bolestraszyce cultivars was from 20–30 days. In this study the period of harvesting of individual ecotypes in 2014 ranged from 19–39 days and in 2015 from 40–67 days. Uneven ripening of the cornelian cherry is the result of a long flowering period. The results of this experiment indicate that fruit maturation was more dependent on weather conditions than genetic traits. Fruits of cornelian cherry in 2014 ripened on average by 26 days less than in 2015. The average air temperature in both vegetative seasons was higher than the long-term average by about 3 degrees. In contrast, the 2014 season was characterized by excessive rainfall, especially in May. This could reduce the yield, and thus shorten the period of fruit ripening. It turns out that the serious drought in June, July, and especially in August 2015 did not affect the shortening of the fruit ripening period. It is in contrast to data of Inglese et al. [1999] who studying the olive trees stated, that drought greatly reduced fruit growth, yield, enhanced pre-harvest fruit drop and shortened fruit ripening period. Perhaps the cornelian cherry plants are adapted to drought and strong sun exposure, something is evidenced by the ability to settle mountain slopes.

In this experiment, the yield of 16–17-year-old cornelian cherry seedlings were evaluated. In 2015 the yield was about 7 kg higher than in 2014 (Tabs 2 and 3), because of mentioned weather conditions (Tab. 1). Cornelian cherry seedlings start bearing fruit of eight years and every year the fruiting is increasing. Fruiting of cornelian cherries appears annually and abundantly. Yield is depending on the age of the plant: at the age 5– 10 years is 8–25 kg, 15–20 years – 40–60 kg, 25–40 years – 80–100 kg [Klimenko 2004].

The size of the fruit can be described on the basis of parameters such as the weight of a single fruit, their diameter and length. In the present experiment, fruits of the highest weight were characterized by ecotypes no 4, 1, 11 and 3, where the mass of the fruit was within the range 2.10 to 2.21 g (Tab. 4). In Kucharska et al. (2011) research, the biggest fruits were characterized by cultivars whose average weight ranged from 3.25 to 3.46 g ('Podolski', 'Florianka', 'Szafer', 'Dublany' and 'Bolestraszycki'). According to other authors [Gąstoł and Skrzyński 2007, Bieniek et al. 2017], the

Table 3. Total yield and harvesting time of examined ecotypes in 2015

Ecotype No.	Total yield (kg/tree)	Harvesting			
		onset	full	end	duration (days)
1	33.1 cd*	02.09	05.10	24.10	52
2	24.46 b	19.08	31.08	24.10	66
3	22.28 b	19.08	05.09	24.10	66
4	16.44 a	07.08	31.08	13.10	67
5	23.28 b	19.08	13.09	24.10	66
6	29.48 c	31.08	13.09	24.10	55
7	30.04 c	31.08	13.09	24.10	55
10	21,05 b	07.08	19.08	29.09	53
11	37.65 d	07.08	26.08	09.10	63
14	24.88 b	31.08	13.09	09.10	40
15	26.53 bc	31.08	13.09	09.10	40

*Within columns, different letters indicates significant differences at $P < 0.05$

Table. 4. Fruit weight, fruit width, fruit length fruit shape index, stone weight, content of flesh and content of stone of the examined ecotypes (mean of two years)

Ecotype No.	Fruit weight (g)	Fruit width (mm)	Fruit length (mm)	Fruit shape index	Stone weight (g)	Content of flesh (%)	Content of stone (%)
1	2.20 d*	13.53 c	16.28 d	1.46 a–c	0.222 a–c	89.87 d	10.13 a
2	1.63 a	11.63 a	13.70 a	1.40 ab	0.211 a–c	86.73 a–c	13.27 b–d
3	2.10 d	13.33 c	15.40 b–d	1.35 ab	0.223 a–c	89.04 cd	10.96 ab
4	2.21 d	13.70 c	15.59 cd	1.30 a	0.224 bc	89.62 cd	10.38 ab
5	1.73 ab	12.19 ab	14.41 ab	1.40 ab	0.190 a	87.92 b–d	12.08 a–c
6	1.62 a	11.68 a	13.96 a	1.44 ab	0.191 ab	87.68 b–d	12.32 a–c
7	1.54 a	11.67 a	13.74 a	1.39 ab	0.213 a–c	84.68 a	15.32 d
10	1.79 a–c	12.21 ab	15.27 b–d	1.61 c	0.200 ab	88.68 b–d	11.32 a–c
11	2.11 c	13.23 c	15.63 cd	1.41 ab	0.245 c	88.29 b–d	11.71 a–c
14	1.65 ab	11.86 a	14.44 ab	1.49 bc	0.224 bc	86.10 ab	13.90 cd
15	1.96 b–d	13.02 bc	15.14 bc	1.36 ab	0.240 c	86.99 a–d	13.01 a–d

*Within columns, different letters indicates significant differences at $P < 0.05$

weight of a single cornelian cherry fruit, growing in Polish conditions, ranged from 1.2 to 3.78 g. Brindza et al. [2007], studying the cornelian cherry growing in Slovakia, noted the value of the mentioned feature at the level of 0.5 to 3.4 g. The fruits of Ukrainian, Turkish and Georgian cultivars are much larger [Klimenko 2004, Bijelić et al. 2008, Maghradze et al. 2009, Yilmaz et al 2009]. Klimenko [2004] evaluating Ukrainian varieties noted that the average fruit weight varies from 5 to 8 g, while the Turkish authors [Yilmaz et al. 2009] stated from 2 to 9 g.

Cornelian cherry fruits can be more or less elongated, as indicated by the shape index. The larger this parameter, the fruit is more elongated. In this work, the values of the mentioned coefficient were from 1.30 (ecotype no. 4) to 1.61 (ecotype no. 10). Similar values of the shape index from 1.2 to 1.7, are given by other authors [Guleryuz et al 1998, Demir and Kalyoncu 2003, Pirlak et al. 2003].

Another very important physical parameter in evaluating the quality of cornelian cherry fruit is the proportion of the stone in the whole mass of the fruit. This is important for the processing industry, which is interested in the largest proportion of pulp in the fruit and the smallest waste mass during production. In this experiment, the share of the stone mass in the whole fruit mass ranged from 10.13% (ecotype no. 1) to 15.32% (ecotype no. 7). According to the Kucharska et al. [2011] research, the Bolestraszyce cultivars were characterized by a larger share of the stone, reaching even 15.87 and 15.67 in the case of the cultivars: 'Kresowiak' and 'Bolestraszycki'. In the paper of Gąstoł and Skrzyński [2007], the value of described parameter was in the range from 13.7 to 24.0. Whereas the Ukrainian varieties, although characterized by a higher fruit mass, have a smaller share of the stone in the fruit mass: from 7.5 to 11.0 [Klimenko 2004]. Fruits of the cultivars with a high flesh/stone ratio may be a raw material for obtaining the rich in unsaturated fatty acids oil [Bijelić et al. 2008, Kucharska et al. 2009].

The essential features defining consumer and processing usefulness of a given cornelian cherry cultivars, apart from physical parameters, such as the size of the edible part, are chemical properties (Tab. 5). Soluble solids content is one of the basic chemical parameters under which assessed the suitability of raw materials for processing. Crisosto et al. [2003] has proven that in the case of sweet cherries the content of the extract is closely correlated with the feeling of sweetness and richness of taste. In the present experiment, the soluble solids content was from 17.85% (ecotype no. 1) to 22.68% (ecotype No. 5). Cornelian cherry fruits, compared to other, characterized by a high extract. The soluble solids in the research of Szot [2011] on apples of the cv. 'Jonagold' ranged from 11.12% to 12.97%, in pears of the 'Concord' variety [Szot and Wieniarska 2011] from 12.52% to 10.02%, and in blue honeysuckle berries from 9.66% to 11.47% [Szot and Wieniarska 2012]. On the basis of other experiments, it can be assumed that the content of the extract in the dogwood fruits ranged from 11.5% [Pirlak et al. 2003] to 24.1% [Demir and Kalyoncu 2003]. Kucharska et al. [2011] reports that the majority of the extract, (i.e. ¾), are total sugars, which in their research ranged from 10.1% ('Juliusz') to over 16.4% ('Szafer'). Similar results are reported by Turnal and Koca [2008], who in Turkey have determined the concentration of sugar from 7.7 to 15.4%. In this experiment, the lowest sugar content was found in the fruits of ecotype no. 6 (9.44%), and the largest ecotype no. 4 (13.59%).

The taste of ripe cornelian cherry fruits also depends on the ratio of soluble solids content to acids (SSC/TA). In the present experiment, the lowest value of the mentioned feature was characterized by the fruits of ecotype no. 10 (6.59) and the largest ecotype no. 4 (8.36). In the Gunduz et al. [2013] experiment the SSC/TA ratio ranged from 3.7 for slightly yellow to 8.4 in the case of mature fruits.

Fruits of studied ecotypes varied significantly in dry matter content (Tab. 6). The smallest values stated for ecotypes no. 4 and 6 (19.02% and 19.73%) and the highest for ecotypes no. 3 and 5 (24.00% and 24.07%). The dry matter content of cornelian cherry fruit was determined at 20–24% in Ukrainian varieties [Klimenko 2004] and 16–28% in fruit harvested in Turkey [Tural and Koca 2008].

The content of vitamin C determines the high values of healthy fruit. Cornelian cherry is rich in vitamin C whose content ranges from 50 to 100 mg·100 g^{-1} [Pantelidis et al. 2007]. In present study the vitamin C content ranged between 55.27 mg·100 g^{-1}f.w. (ecotype no. 6) to 82.50 mg·100 g^{-1} f.w. (ecotype no. 10. Cornelian cherry contains more vitamin C than a sour cherries. In

Table. 5. Soluble solids content (SSC), titratable acidity (TA), SSC/TA ratio, sugar content of the examined ecotypes (mean of two years)

Ecotype No.	SSC (%)	TA (%)	SSC/TA	Sugar content (%)
1	17.85 a*	2.59 c	6.89 a	11.14 bc
2	21.25 bc	2.64 c	8.04bc	11.85 c
3	19.55 ab	2.72 d	7.19 ab	11.03 bc
4	20.24 a-c	2.42 b	8.36 c	13.59 d
5	22.68 c	2.32 a	9.78 d	14.12 d
6	21.27 bc	2.91 f	7.30 ab	11.31 bc
7	20.68 bc	2.72 d	7.60 a-c	10.71 a-c
10	19.07 ab	2.89 f	6.59 a	9.44 a
11	19.50 ab	2.77 de	7.03 ab	10.24 ab
14	20.56 a-c	3.0 g	6.85 a	11.00 bc
15	20.17 a-c	2.81 e	7.17 ab	10.48 ab

*Within columns, different letters indicates significant differences at $P < 0.05$

Table. 6. Dry matter content, Vitamin C content and total anthocyanin content of the examined ecotypes (mean of two years)

Ecotype No.	Dry matter content (%)	Vitamin C content ($mg \cdot 100g^{-1}$ f.w.)	Total anthocyanin (mg cyaniding-3-glucose equivalents 100 g^{-1} f.w.)
1	21.58 a-c*	62.74 c	98.7 a
2	21.51 a-c	61.7 b	120.1 c
3	24.00 c	68.38 e	140.2 d
4	19.02 a	66.45 d	98.0 a
5	24.07 c	70.90 f	250.1 e
6	19.73 a	55.27 a	103.3 ab
7	22.84 bc	61.6 b	106.7 b
10	21.27 a-c	82.50 h	110.0 b
11	20.10 ab	54.9 a	290.3 f
14	20.64 ab	75.97 g	110.1 a
15	21.41 a-c	70.65 f	120.7 c

*Within columns, different letters indicates significant differences at $P < 0.05$

the study Borowy et al. [2018] among three cultivars of sour cherries, content of vitamin C varied between 17.7– 21.1 $mg \cdot 100\ g^{-1}$ f.w. The human body needs every day delivery of vitamin C and cornelian cherry consumed without processing, is a great source of it.

Recently, the health-promoting importance of athocyanins for human health, has been underlined. In this paper the smallest amount of anthocyanins was determined in fruits of ecotypes no. 4 and 1 (98.0 and 98.7 mg 100 g^{-1} f.w.), and the highest for ecotypes no. 11 and 5 (290.3 and 250.1 e mg 100 g^{-1} fw). Pantelidis et al. [2007] comparing the content of anthocyanins in fruits, stated that it depends on their color. Cornelian cherry cultivars had the highest

Table 7. Acceptance by adults the taste of fruit from individual cornelian cherry ecotypes

Percentage of acceptance	Ecotype No.										
	1	2	3	4	5	6	7	10	11	14	15
Like extremely	0	36	30	9	55	9	9	10	66	0	18
Like slightly	36	36	50	55	45	55	36	50	34	64	28
Neither like nor dislike	46	18	10	18	0	9	18	10	0	18	36
Dislike slightly	18	10	10	18	0	18	28	30	0	0	9
Dislike extremely	0	0	0	0	0	9	9	0	0	18	9

Table 8. Acceptance by children the taste of fruit from individual cornelian cherry ecotypes

Percentage of acceptance	Ecotype No.										
	1	2	3	4	5	6	7	10	11	14	15
Like extremely	40	60	80	40	20	20	40	0	60	25	50
Like slightly	0	40	20	20	20	0	0	67	40	0	25
Neither like nor dislike	20	0	0	40	20	20	20	0	0	0	0
Dislike slightly	40	0	0	0	0	0	0	33	0	25	25
Dislike extremely	0	0	0	0	40	60	40	0	0	50	0

anthocyanin content (223 mg·100 g^{-1} f.w.), followed by blackberry and raspberry × blackberry cultivars. Raspberry, red gooseberry, red currant were characterized by the lowest anthocyanin content (1.3–7.8 mg·100 g^{-1} f.w.).

On the basis of acceptance tests of cornelian cherry flavor, it was found that adults rated the taste of fruits higher than children (Tabs 7 and 8). Adults did not accept the cornelian cherry taste from 9–18% for ecotypes no. 6, 7, 14 and 15. Children at 40–60% did not accept the taste of ecotypes no. 5, 6, 7 and 14. Adults appreciated the taste of ecotypes no. 11 and 5, while children no. 3 and 11.

CONCLUSIONS

Cornelian cherry plants obtained from seeds differ very much in the yield and quality of fruit. The fruit characteristics for the examined ecotypes were ranged 1.63–2.21g for fruit weight, 1.30–1.61 for fruit shape index, 10.13–15.32% for content of stone, 17.85–22.68% for soluble solids content (SSC), 2.32–3.0% for titratable acidity (TA), 6.59–8.36 for SSC/TA, 54.9–75.97 for vitamin C content. Among the ecotypes, studied in terms of external fruit features, ecotypes no. 3 and 4 were distinguished due to the largest fruits (mass and diameter) and a relatively small share of the stone in the whole mass of the fruit. However, due to the chemical composition, the fruits of ecotype No. 5 were distinguished by the content of the extract, the ratio of extract to acids, sugar, dry matter, anthocyanins and vitamin C content. These fruits enjoyed 55% strong acceptability among adults. The indicated ecotypes can be used in breeding as well as in nursery for obtaining valuable varieties of cornelian cherry for production in Poland.

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