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Physico-chemical and antioxidant properties of new sweet cherry cultivars from Iaşi, Romania

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Abstract. Fruit samples analyzed in this paper were harvested in 2008 and 2009 from seven new sweet cherry cultivars, namely 'Cetăţuia', 'Cătălina', 'Bucium', 'Golia', 'Maria', 'Ştefan', 'Tereza', as well as from the cultivar 'Boambe de Cotnari', which is most widespread in the Iaşi area, in North-Eastern Romania. The period from flowering to full maturity was between 56–76 days. 'Cetăţuia' and 'Cătălina' were the earliest cultivars, while 'Boambe de Cotnari' and 'Maria', the latest ripening ones. Fruit width ranged between 17.0 mm and 23.0 mm and fruit weight ranged from 3.9 g and 7.4 g, but statistical differences between 'Boambe de Cotnari', 'Bucium', and 'Maria' were non-significant. Soluble solids content in different cultivars was between 14.5 °Brix and 17.8 °Brix. The lowest values were recorded in 'Golia' and 'Ştefan', and the highest, in 'Boambe de Cotnari'. The lowest values of reducing sugar content were in cultivars 'Golia' and 'Bucium' (9.5 g 100 g^{-1} fresh fruit), while 'Ştefan' and 'Cetăţuia' had the highest reducing sugar content (12.2 g 100 g^{-1} fresh fruit). Titratable acidity was between 0.5 and 0.9 g malic acid 100 g^{-1} fresh fruit, 'Cătălina' and 'Golia' having the lowest values, while 'Tereza' and 'Bucium' had the largest. The antioxidant capacity of fruits, expressed as mg ascorbic acid 100 mL^{-1} fruit's methanolic extract, ranged between 4.2 (in 'Bucium') and 18.6 (in 'Ştefan'). There was a non-significant relationship between the number of days from full bloom until fruit maturation and chemical properties.

Key words: sweet cherry, cultivar, physico-chemical properties, antioxidant capacity

INTRODUCTION

Sweet cherry tree is a species with a great economic importance, due to the nutritional, technological and commercial value of its fruits (Budan & Grădinariu, 2000; Pérez-Sánchez et al., 2010). The nutritional importance especially depends on the chemical composition, which represents a major source of antioxidant compounds (Serrano et al., 2005; Coşofreţ et al., 2006; Beceanu, 2008; Usenik et al., 2008). Therefore consumers have had an increasing interest in this fruit in recent years (Battino et al., 2004; Šimunić et al., 2005; Beceanu & Sîrbu, 2007; Khanizadeh et al., 2007; Sîrbu et al., 2008a). In Romania, of the total fruit production in 2006, sweet cherries represent 7.92%; 96.3% of the production is provided by private plantations (Statistical Yearbook of Romania, 2008). Regarding the trade in sweet cherries, the largest quantity of imports to Romania is from Turkey, where production is earlier and has a lower market price; Russia is the Romania's export partner (Statistical Yearbook of Romania, 2008).

In the Iaşi area of North-Eastern Romania, the most known cultivars of sweet cherry are 'Boambe de Cotnari', an autochthonous cultivar, 'Van' and 'Stella', the last two from the foreign assortment.

As a result of breeding experiments at the Fruit Growing Research Station Iaşi over the last fifteen years, some new cultivars of sweet cherries were obtained, with valuable qualitative and productive traits, with different periods of fruit ripening and various destinations of valorisation.

Physico-chemical properties of the sweet cherry fruit depend on the culture area (Raimondo et al., 2006), year of harvest (Simard & Charlot, 2000; Petre et al., 2007; Sîrbu et al., 2008a) or cultivar (Saunier, 1996; Simčič et al., 1998; Serrano et al., 2005; Roselli et al., 2006; Sîrbu et al., 2008b; Kalyoncu et al., 2009; Long et al., 2008). The increasing demand for natural antioxidants justifies the search for new sources; the sweet cherry has high values of antioxidant content (Mohamed et al., 2007; Pellegrini et al., 2007; Rababah et al., 2011; Prvulović et al., 2011).

In this paper we aimed to determine some physico-chemical and antioxidant properties of seven of the newest sweet cherry cultivars recently obtained at Fruit Growing Research Station Iaşi, in comparison with 'Boambe de Cotnari', a widespread cultivar in the region. We also aimed to find the relationships between the studied physico-chemical parameters and the period of maturation of these cultivars.

MATERIALS AND METHODS

Using fruit samples harvested in 2008–09, we analysed the commercial maturity of seven new sweet cherry cultivars ('Cetăţuia', 'Cătălina', 'Bucium', 'Golia', 'Maria', 'Ştefan' and 'Tereza'), using the cultivar 'Boambe de Cotnari' as control. All these cultivars are cultivated in the experimental field of Fruit Growing Research Station Iaşi, on mahaleb as rootstock, at a distance of 5 × 4 m, without irrigation and without a support system for the crown. For each cultivar we determined the number of days from full bloom until harvest, as well as some physical and chemical properties: fruit width, weight, stone percentage, soluble solids content, reducing sugar content, titratable acidity, and antioxidant capacity.

Physical properties. We determined the fruit dimension (i.e. width, in millimeters), weight (g) and the stone weight (g) using 15 fruits for each cultivar, in three repetitions (from three different trees). For determining the weight of fruits and dry stones we used an electronic balance (Radwag, 0.01 g sensitivity). The fruit per stone ratio was calculated on the basis of their weight.

Chemical properties. Reducing sugar content (RSC) was determined by the Schoorl method (Ghimicescu 1977). Titratable acidity (TA) was determined by neutralization with sodium hydroxide solution 0.1 N, to the point of equivalence, using thymolphthalein as the indicator (Ghimicescu 1977). Soluble solids content (SSC) was determined with the refractometrical method using a Zeiss hand refractometer.

The antioxidant capacity (AC) of the fruits, expressed as mg ascorbic acid equivalent 100 mL^{-1} methanolic fruit extract, was determined through the antioxidant capacity in the water solutions method (ACW) using the Photochem system (Analytik Jena AG, U.S.A.). For this purpose, we harvested 15 fruits in three repetitions from each cultivar, at commercial maturity, which were immediately frozen and stored at -20 °C until analysis. From these samples we made an extract through crushing the fruit in cold conditions and then put it in contact firstly with 100 mL 5:1 methanol-HCl solution, and then with another 50 mL 100:1 methanol-HCl solution.

The extract was desiccated at 35 °C into rotary evaporator Heildolph type VV Micro at 300 rotations per minute and subsequently the volume was adjusted up to 100 mL by adding acidified water up to pH 2. Fruit extract samples were kept until the analysis in anoxic conditions at -40 °C. Samples were filtered to remove the suspension and dilutions were prepared in 1:10 to 1:50 ratio with a solvent of Analitik Jena AG kit. For each measurement, the dilutions were previously homogenized. The volume of diluted fruit extract sample was 10µL. The pipetting scheme according to ACW method is presented in Table 1. The diluted samples were analyzed by Photochem system and the antioxidant capacity of fruits was determined by PCLsoft software system.

Table 1. Pipetting scheme to antioxidant capacity in water solutions (ACW) method using Photochem system (R1, R2, R3 = reagents from Analitik Jena AG kit; SL = work solution).

Reagent	R1	R2	R3-SL*	R4-SL*	Sample
Blank	1500 µL	1000 µL	25 µL	0	0
Calibration	1500 µL - x	1000 µL	25 µL	x	0
Determination ACW sample	1500 µL - y	1000 µL	25 µL	0	y

The system enables the quantification of antioxidant capacity of water-soluble substances based on photochemiluminescence (PCL). This includes photochemical excitation to generate free radicals (superoxide anion radicals) followed by luminescence detection (Popov & Lewin, 1994). The free radicals generated by the optical excitation of the photosensitizer substance are partly eliminated by the reaction of antioxidants in the sample to be analyzed.In a measurement cell, the luminescence of the detection substance (luminol) generated by the remaining radicals is measured and thus the quantity of antioxidants present in the sample is determined in equivalents to ascorbic acid (Popov & Lewin, 1994).

The statistical interpretation of experimental data. The program XLSTAT (version 2011) was used for the statistical analyses. The differences between cultivars were tested by *Duncan* test ($p \leq 0.05$). The relationship between the number of days from full bloom to maturity (NDFBM) and the physico-chemical properties were calculated by the *Pearson* test ($p \leq 0.05$), using square root transformed values (after adding 0.5 to each value). The testing of correlation coefficient significance was done by *F*-test (Ceapoiu 1968).

RESULTS AND DISCUSSION

The fruit ripening period of cultivars taken under study was between 25 May and 20 June (average 2008–09). The earliest cultivars were 'Cetăţuia' and 'Cătălina' and the latest was 'Boambe de Cotnari'.

Table 2. Days from full bloom until harvest in studied period (NDFBM = number of days from full bloom until maturity; SD = standard deviation).

Cultivar	**NDFBM 2008–2009** (average ± SD)
'Bucium'	69 ± 5
'Cătălina'	63 ± 15
'Maria'	73 ± 8
'Golia'	71 ± 7
'Cetăţuia'	56 ± 13
'Tereza'	70 ± 5
'Boambe de Cotnari'	76 ± 11
'Ştefan'	69 ± 5

The period from flowering to maturity was between 56 and 76 days (Table 2), 'Cetăţuia' and 'Cătălina' recorded the lowest values and 'Boambe de Cotnari' and 'Maria' recorded the highest values.

Table 3. Physical properties of some sweet cherry cultivars (SD = standard deviation. Different letters after the number corresponds with statistically significant differences for P 5% - *Duncan* test).

Cultivar	**Average 2008–2009 ± SD**				
	Fruit width (mm)	Fruit weight (g)	Stone weight (g)	Stone percentage (%)	Fruit : stone ratio (g g^{-1})
'Bucium'	23.0 ^{a} ± 1.1	7.0 ^{ab} ± 0.6	0.4 ^{a} ± 0.1	5.0 ^{a} ± 1.0	20.6 ^{a} ± 4.2
'Cătălina'	19.9 ^{d} ± 0.8	5.9 ^{d} ± 0.9	0.3 ^{ab} ± 0.0	4.5 ^{abc} ± 0.5	22.4 ^{a} ± 2.3
'Maria'	22.9 ^{a} ± 1.7	6.9 ^{ab} ± 1.0	0.2 ^{c} ± 0.0	2.9 ^{d} ± 0.2	34.6 ^{a} ± 2.3
'Golia'	21.1 ^{b} ± 1.7	6.1 ^{cd} ± 1.4	0.2 ^{bc} ± 0.1	3.6 ^{cd} ± 0.1	27.8 ^{a} ± 0.7
'Cetăţuia'	17.0 ^{e} ± 1.1	3.9 ^{e} ± 1.1	0.1 ^{c} ± 0.0	3.0 ^{d} ± 0.28	33.2 ^{a} ± 3.1
'Tereza'	20.4 ^{cd} ± 0.1	5.8 ^{d} ± 0.4	0.3 ^{a} ± 0.0	4.9 ^{a} ± 0.2	20.3 ^{a} ± 0.9
'Boambe de Cotnari'	22.9 ^{a} ± 0.1	7.4 ^{a} ± 0.1	0.3 ^{ab} ± 0.1	3.7 ^{bcd} ± 0.8	28.0 ^{a} ± 6.2
'Ştefan'	21.2 ^{b} ± 0.9	6.7 ^{bc} ± 0.9	0.3 ^{a} ± 0.1	4.9 ^{ab} ± 1.9	22.2 ^{a} ± 8.4

Physical properties of fruits (i.e. width and weight, stone weight, stone percentage, and fruit:stone ratio) are presented as mean values with standard deviation in Table 3. Width ranged between 17–23 mm and weight ranged between 3.9–7.4 g.

The biggest fruits were found in cultivars ‘Bucium’, ‘Boambe de Cotnari’ and ‘Maria’. They do not differ significantly in properties, but do differ significantly in relationship with all other varieties. In contrast, ‘Cetăţuia’ had significantly smaller fruit as against all other cultivars.

The stone size of the studied sweet cherry cultivars ranged from 0.1–0.4 g, while stone percentage was between 2.9–5.0%. The lowest value was recorded for ‘Cetăţuia’ and the higher for ‘Bucium’, but differences among ‘Bucium’, ‘Cătălina’, ‘Tereza’ and ‘Ştefan’ were statistically non-significant.

Fruit:stone ratio was between 20.3 and 34.6. The lowest values were recorded by ‘Tereza’ and ‘Bucium’ and the highest by ‘Maria’ and ‘Cetăţuia’.

Chemical properties of fruits as average values with standard deviation are presented in Table 4. Soluble solids content was between 14.5 °Brix (at ‘Golia’ and ‘Ştefan’) and 17.8 °Brix (at ‘Boambe de Cotnari’). ‘Bucium’, ‘Cătălina’, ‘Maria’, ‘Cetăţuia’ and ‘Tereza’ did not differ significantly from ‘Boambe de Cotnari’.

Table 4. Chemical properties of the sweet cherry cultivars (SD = standard deviation; SC = soluble solids content; RSC = reducing sugars content; TA = titratable acidity; AC = antioxidant capacity. Different letters after the number corresponds with statistically significant differences for *P* 5% - *Duncan* test).

Cultivar	**Average 2008–09 ± SD**				
	SSC (ºBrix)	RSC (g glucose equivalent 100 g^{-1} fresh fruit)	TA (g malic acid 100 g^{-1} fresh fruit)	RSC : TA ratio	AC (mg ascorbic acid equivalent 100 mL^{-1} extract)
‘Bucium’	15.6 ^{ab} ± 0.4	9.5 ^{a} ± 0.1	0.9^{a} ±0.2	11.4 ^{a} ±2.1	4.2 ^{a} ±2.6
‘Cătălina’	15.7 ^{ab} ± 0.1	11.3 ^{a} ± 2.4	0.5 ^{c} ±0.2	17.9 ^{a} ±2.5	6.7 ^{a} ±3.5
‘Maria’	16.4 ^{ab} ± 0.3	11.6 ^{a} ± 0.1	0.8 ^{ab} ±0.2	15.4 ^{a} ±3.1	7.8 ^{a} ±1.8
‘Golia’	14.5 ^{b} ± 1.6	9.9 ^{a} ± 1.6	0.6 ^{c} ±0.1	16.8 ^{a} ±0.2	7.6 ^{a} ±1.8
‘Cetăţuia’	15.7 ^{ab} ± 1.6	12.1 ^{a} ± 3.2	0.6 ^{c} ±0.1	19.3 ^{a} ±3.5	9.6 ^{a} ±1.3
‘Tereza’	16.4 ^{ab} ± 0.6	10.8 ^{a} ± 1.8	0.9 ^{a} ±0.1	12.9 ^{a} ±2.9	12.1 ^{a} ±1.7
‘Boambe de Cotnari’	17.8 ^{a} ± 2.1	11.5 ^{a} ± 3.8	0.7 ^{b} ±0.1	16.2 ^{a} ±7.4	15.0 ^{a} ±1.9
‘Ştefan’	14.5 ^{b} ± 1.1	12.2 ^{a} ± 2.7	0.8 ^{ab} ±0.1	15.8 ^{a} ±4.5	18.6 ^{a} ±2.4

Reducing sugars content was between 9.5 and 12.2 g glucose equivalent 100 g^{-1} fresh fruit. Lowest values were recorded for ‘Golia’and ‘Bucium’ while ‘Ştefan’ and ‘Cetăţuia’ recorded the highest. However, differences between cultivars were non-significant statistically. Titratable acidity varied significantly between 0.5 and 0.9 g malic acid 100 g^{-1} fruit weight, ‘Cătălina’ and ‘Golia’ having the lowest values and ‘Tereza’ and ‘Bucium’ the highest. Reducing sugar content : titratable acidity ratio was between 11.4–19.3, the lowest values being recorded for ‘Tereza’ and ‘Bucium’ and the highest for ‘Cetăţuia’ and ‘Cătălina’, which are very early cultivars. The antioxidant capacity of fruit extract ranged between 4.2 and 18.6 mg ascorbic acid 100 mL^{-1} extract, the highest values being determined at ‘Bucium’ and ‘Cătălina’ and the lowest at ‘Boambe de Cotnari’ and ‘Stefan’. Differences between cultivars were non-significant statistically.

Correlations of the number of days from full bloom to maturity (NDFBM) and the physico-chemical properties of the fruits of cultivars studied were tested and correlation index values (r) were included in Table 5.

Table 5. Relationships (r) between number of days from full bloom to maturity (NDFBM) and physico-chemical properties of fruit’s sweet cherry cultivars. The testing of correlation coefficient significance was done by *F*- test; ns = non-significant, * = significant ($p \leq 0.05$), ** = distinct significant ($p \leq 0.01$), *** = very significant ($p \leq 0.001$).

Physical properties	R	Chemical properties	r
Fruit width	0.904 **	RSC	-0.275 ^{ns}
Fruit weight	0.893 **	SSC	0.314^{ns}
Stone weight	0.538 ^{ns}	TA	0.482 ^{ns}
Stone percentage	0.324 ^{ns}	RSC : TA	-0.493 ^{ns}
Fruit : stone ratio	-0.093 ^{ns}	AC	0.201^{ns}

We found that there was a significant positive relationship between NDFBM and fruit width ($r = 0.904$, $F = 26.88$, $p = 0.0020$) and also between NDFBM and fruit weight ($r = 0.893$, $F = 23.75$, $p = 0.0028$), which means that the higher the NDFBM, the higher the dimension. Positive correlations were also recorded between NDFBM and stone size, stone percentage, SSC, TA and antioxidant capacity but were non-significant. In contrast, fruit:stone ratio, RSC and RSC:TA ratio were negatively correlated with NDFBM, but non-significant.

At the international level, cherry cultivars with large fruits (in both width and weight) are increasingly valued (Lichev et al., 2004; Long et al., 2008). According to Apostol (2005), in Hungary, sweet cherry fruits of 23–25 mm width (e.g. ‘Sandor’ or ‘Rita’) are considered of medium size, and those between 27–32 mm width (e.g. ‘Carmen’, ‘Aida’) are large to very large. The cited author reported that some new sweet cherry cultivars from Hungary range in size from 23–32 mm. In Spain, Tudela et al. (2005) reported new sweet cherry with fruits up to 25 mm width, while Millan & Charlot (2005) showed those in France range in size from 26–30 mm.

Lichev et al. (2004), assessing the weight of fruits of the latest sweet cherry cultivars introduced in Bulgaria, found that cultivars with the heaviest fruits were ‘Celeste’ and ‘Regina’ of 10.0 g and 9.9 g respectively, while some cultivars considered most common in the Bulgarian assortment had smaller fruits (e.g.: ‘Lapins’ – 7.6 g, ‘Bigarreau Burlat’ – 8.4 g, and ‘Van’ – 7.6 g). However, some new sweet cherry cultivars with a medium weight are also reported nowadays from Estonia, i.e. ‘Iputj’ (6.5 g) and ‘Jurgita’ (6.0 g) (Jänes et al., 2010).

In this context, some cultivars investigated in this paper can be considered among cultivars with small fruits (e.g. ‘Cetăţuia’, ‘Cătălina’, ‘Tereza’, ‘Golia’), while the others (e.g. ‘Maria’, ‘Bucium’, ‘Boambe de Cotnari’) are of medium width and weight.

At very early and early cultivars (e.g. ‘Bigarreau Burlat’, ‘Rivan’, ‘Muncheberger fruhe’), fruit weight is generally lower, ranging between 2 g and 5.5 g (Petre, 2006; Radičević et al., 2011). Therefore these cultivars are admitted into the first category of quality with fruits at least 16 mm in width and a weight of at least 5 g (Beceanu & Benea, 2001). This is also the case of some cultivars studied in this paper (e.g. ‘Cetăţuia’, and ‘Cătălina’). However, Simard (2005) showed that some early cultivars like ‘Primulat Ferprim’, ‘Earlise Rivedel’ have an average size of 24–27 mm. According to UNECE Standard (2007), a fruit of 26 mm in width is admissible into the first quality category, regardless of the ripening period.

It was found that there is no positive relationship between fruit and stone dimension (Webster & Looney, 1996; Neri et al., 2005). However, Webster & Looney (1996) show that the stone volume is proportional to the total volume of fruit and ranges from 7.2% in ‘Napoleon’ to 10.6% in ‘Spanish Yellow’. Neri et al. (2005), show that the fruit:stone ratio was very high in the ‘Summit’ 23 g g^{-1}, ‘Durone Nero II’ 22 g g^{-1}, ‘Sweet Heart’ 17 g g^{-1} and ‘Ferovia’ 15.5 g g^{-1} and the lowest value is determined in ‘Adriana’ 5.5 g g^{-1}. The values we recorded have intermediate values compared with previous similar studies.

SSC recorded with the refractometrical method depends on the cultivar. For instance, according to Webster et al. (1996), ‘Bing’ had a content of 19–20 °Brix, while ‘Lambert’ had 18–19 °Brix, and ‘Van’ about 15 °Brix, although all these cultivars had the same conditions in orchards from Washington State, USA. Neri et al. (2005), in two years study of ten sweet cherry cultivars from the Italian varieties, shows that the highest value of SSC was recorded at ‘Van’ and ‘Durone Nero II’, which had more than 18 °Brix, while ‘Celeste’ had the lowest value (13.2 °Brix). San Martino et al. (2008) recorded values SSC over 20 °Brix at some cultivars as ‘Sweetheart’ (21.0 °Brix), ‘Kordia’ (20.0 °Brix) and ‘Van’ (21.9 °Brix) while ‘Lapins’ and ‘Bing’ had lower values (16.8 °Brix and 15.5 °Brix, respectively). The values recorded in our study were intermediate compared with previous similar studies.

The reducing sugar content (RSC) is also different depending upon cultivars. Some sweet cherry cultivars are known to have high RSC values (over 11%): ‘Bigarreau Esperen’, ‘Hedelfinger’, ‘Germersdorf’ (Gherghi et al., 2001). In our study, RSC values had intermediate levels (9.5–12.2 g glucose equivalent 100 g^{-1} fresh fruit), in relation to previous similar studies (Gherghi et al., 2001, Radičević et al., 2011). ‘Ştefan’, ‘Cetăţuia’ and ‘Maria’ recorded higher values compared with ‘Boambe de Cotnari’, the cultivar taken as control. According to Radičević et al. (2011), titratable acidity (TA) ranges between 0.3–0.7 g malic acid 100 g^{-1} fruit weight in sweet cherries and depends on the cultivar and climatic conditions of the year.

Values found by us partially overlap with those indicated above, ranging between 0.5–0.9 g malic acid 100 g^{-1} fruit weight. The new cultivars ‘Tereza’ and ‘Bucium’ recorded statistically significantly higher values compared with ‘Boambe de Cotnari’, a widespread Romanian cultivar. Tudela et al. (2005) found that acidity can increase during ripening and Neri et al. (2003) consider that the maturity index could be at values of acidity 0.96 meq 10 mL^{-1} in ‘Bigarreau Burlat’ and 1.31 meq 10 mL^{-1} to ‘Van’. RSC:TA ratio determines the taste of fruit for fresh consumption so it is important to know the optimal values of this parameter for each cultivar (Webster et al., 1996). In some sweet cherry cultivars from Serbia, the RSC:TA ratio ranged from 28.3 at ‘Regina’ to 16.4 at ‘Bigarreau Burlat’ (Radičević et al., 2011). The values in this report obtained from cultivars we studied are somewhat lower (between 11.4 and 19.3) than those above mentioned, but ‘Cetăţuia’ and ‘Cătălina’ are more valuable compared with ‘Bigarreau Burlat’ in this regard.

Antioxidant capacity is strongly influenced by fruit type (depending on species and cultivar within the species), the cultivation system, climatic conditions, but the duration and the technique of preservation of fruits are crucial (Battino et al., 2004). Antioxidant capacity is also determined by the biochemical characteristics of each cultivar. In addition, Vangdal & Slimestad (2006) showed that the values of antioxidant capacity can be very different in the same cultivar according to the methods of determination used. Usenik et al. (2008) analyzed the antioxidant capacity of 13 cherry cultivars expressed as ascorbic acid equivalent and registered values between c 8.0–17.2 mg 100 g^{-1} fruit weight, the highest content being in 'Bigarreau Burlat' and the lowest in 'Lala Star'. Among the cultivars in our study, two had the highest antioxidant capacity, namely 'Ştefan', a new cultivar (18.6 mg ascorbic acid equivalent 100 mL^{-1} extract) and 'Boambe de Cotnari' from the traditional assortment (15.0 mg ascorbic acid equivalent 100 mL^{-1} extract).

The antioxidant capacity of sweet cherries is superior compared with apples or pears but has much lower values than species with small fruits such as the strawberry, raspberry or blueberry (Battino et al., 2004; Serrano et al., 2005; Coşofreţ et al., 2006; Khanizadeh et al., 2007; Koca & Karadeniz, 2009).

CONCLUSIONS

Our research results showed a great variability in the physico-chemical properties between sweet cherry cultivars. Among eight investigated sweet cherry cultivars the following provide a wide range of valuable characteristics: 'Cetăţuia' and 'Cătălina' for very early ripening time, 'Ştefan' for high level of antioxidant capacity and 'Bucium' and 'Boambe de Cotnari' for large fruit size. A highly significant relationship has been observed between the number of days from full bloom until fruit maturation and fruit size. Chemical properties and antioxidant capacity are specific to each cultivar and are non-significant in relationship to the number of days from full bloom until fruit maturation.

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