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GROWTH AND YIELDING OF SWEET CHERRY TREES GRAFTED ON NEW BIOTYPES OF *Prunus mahaleb* (L.)

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Abstract. In the years 2011–2013 growth and yielding of four cultivars of sweet cherry trees: Burlat', 'Regina', 'Summit' and 'Vanda' were evaluated. All of them were grafted on new Mahaleb rootstocks obtained through softwood cuttings selected from a population of German seedlings of 'Alpruma' type in comparison with Mazzard seedling. Additionally an analysis of genetic variability of newly studied biotypes of Mahaleb was conducted. The biggest trunk cross-sectional area had trees on seedlings of Mazzard and Mahaleb No.1, No.4 and No.5, and the smallest on Mahaleb No. 2, No. 3 and No. 6. The biggest volume of the crown had trees growing on Mazzard and the smallest on Mahaleb No. 2 and No. 6. Bigger crowns were also created by the trees of 'Burlat' and 'Summit' cultivars, and smaller 'Regina' and 'Vanda'. Trees budded on Mazzard had fruits which were slightly lighter in comparison to Mahaleb rootstocks. Regina and Summit outstood other cultivars in terms of weight of fruits. The biggest sum of crops was obtained from trees budded on Mahaleb No. 6 and No. 2, and the smallest on Mazzard and Mahaleb No. 1 and No. 4. The most productive were 'Vanda' and 'Summit'. The biggest productivity index was obtained for rootstocks of Mahaleb No. 6, No. 2, No. 3 and No. 5. For Mazzard and and Mahaleb No. 1 the value of this index was the smallest. Of all examined cultivars the best results was Vanda, then Summit. The analysis of electrophoretic profiles conducted with PCR-RAPD method showed a big genetic similarity between Mahaleb No. 2 and No. 6 and a big variability of the remaining biotypes of Mahaleb among each other. Out of six examined biotypes, Mahaleb No. 2 and No. 6 turned out to be the most productively valuable. Trees of sweet cherry on these rootstocks had the weakest growth, had relatively many flowers and fruits and were characterized with the biggest productivity index.

Key words: Mahaleb, new rootstocks, cultivar, sweet cherry, growth, yielding, genetic variability

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INTRODUCTION

In Poland the most often used rootstock for cultivation of sweet cherry trees is Mazzard (*Prunus avium* L.). It is physiologically compatible with all cultivable cultivars of sweet cherries and it easily propagates from seeds. However maiden trees in nursery and trees buded on this rootstock grow strongly [Świerczyński and Stachowiak 2012a, b], they give big crowns, they enter the fructification period late and they do not fruit too abundantly. Another species which found its application as a rootstock in sweet cherry trees cultivation is Mahaleb (*Prunus mahaleb* (L.)). It can be propagated from seeds and vegetatively [Garcia et al. 2007]. The trees of sweet cherry growing on Mahaleb are better prepared for light and dry soils, and their root system is more frost resistant. Some cultivars of sweet cherries grow weaker on this rootstock, they crop well, have bigger fruits and ripe 2–3 days earlier [Grzyb et al. 2005]. In such countries as Bulgaria, Estonia, France, Turkey, Ukraine and Hungary most of cultivable cultivars of sweet cherry trees is produced on Mahaleb [Misirli et al. 1996, Lanauskas et al. 2004, Sansavini and Lugli 2008, Seker 2008]. However some researchers question the validity of Mahaleb use as rootstocks for sweet cherry cultivars because of the possibility of the occurrence of physiological incompatibility [Webster and Looney 1996, Grzyb 2004, Vegvari et al. 2008].

The aim of this experiment was ascertainment of usefulness of newly obtained biotypes of Mahaleb as rootstocks for cultivation of selected sweet cherry trees cultivars.

MATERIALS AND METHODS

The experiment was conducted in the years 2011–2013 in the Rural Experimental Station in Baranowo belonging to University of Life Science in Poznan. The objects of the study were sweet cherry trees in the sixth, sevenths and eights year of cultivation. The cultivars 'Burlat', 'Regina', 'Summit' and 'Vanda' were growing on six new biotypes of Mahaleb marked as No. 1, No. 2, No. 3, No. 4, No. 5 and No. 6 were propagated vegetatively through softwood cuttings. Seedlings coming from free pollination of German 'Alpruma' type of Mahaleb. Trees growing on 'Alkavo' type of Mazzard obtained from seeds constituted a control group in this orchard experiment.

The experiment was set up in a random, complete blocks design, in four replications with 3 trees on one plot. Sweet cherry trees on Mazzard rootstock were planted in spacing of 5 × 4 m, and on Mahaleb in spacing of 4 × 3 m. These two groups of plants grew in the same place.

The trees were cultivated in soil belonging to the fourth soil quality class. Ground water level stayed at the depth of about 180 cm. The content of floatable fraction in the arable layer was 12%. The soil was characterized by a high content of phosphorus, potassium, magnesium and calcium in the arable layer and in the subsoil with right ratio of K : Mg, alkaline pH 7.2 value and salinity within the range of the norm.

Due to frost at the beginning of May (2011 year) and frequent rain in 2012–2013 weather conditions were not favourable for pollination of trees in their blooming period. Also no bees were deliberately introduced into the orchard.

In the vegetative period, in years 2011–2013 the trees were fertilized with ammonium sulphate in a dosage of 60 kg N·ha^{-1}. Mechanical fallow land was kept between the rows. Also in the rows of trees in belts 1m wide a herbicide fallow (Roundup 360 SL 3 l·ha^{-1} + Chwastox 360 SL 2 l·ha^{-1}, (based on 2.4 D) was provided.

During the experiment the following measurements and observations were carried out: the circumference of the trunk (cm) was measured with a measuring tape 30 cm above the ground, the width of the crown measured in two directions, along and across rows (cm), number of flowers and fruits set on the tree counted according to Bac recommendations [1958]. Fruits were collected in their high ripening season. Fruits from each tree were weighed and counted individually and on this basis the yield of fruits from a tree (kg) and mass of one fruits were calculated. Later a calculation of a productivity index of trees for 1 cm^2 of cross sectional area of the trunk was conducted.

Two-factor variance analysis was used to calculate the results of the experiment. A separate analysis was carried out for each individual feature. Percentage values were transformed using Bliss. Difference in significance among combinations was estimated on the basis of confidence intervals using Duncan's test, with probability level $\alpha = 0.05$.

Genetic variability of biotypes of Mahaleb were studied using PCR-RAPD method enabling detection of DNA differentiation, elaborated on the basis of polymerase chain reaction method [Wiersma et al. 2001, Wünsch et al. 2004, Zhou et al. 2005, Ulubas 2007, Seker 2008]. Plant material for DNA studies constituted young leaves taken from the upper part of shoots at the end of April 2011. The method used in the studies relied on DNA amplification with the use of RAPD markers. Amount of DNA needed for one reaction was 10–25 ng. A commercial set of starters of OPERON company (series OPL and UBC) was used.

RESULTS AND DISCUSION

In the experiment the strongest growth was observed for studied cultivars of sweet cherry trees growing on Mazzard rootstock. It is in compliance with reports of Kloutvor [1991], and also Godini et al. [2008]. The tested biotypes of Mahaleb rootstocks No. 2, No. 3 and No. 6 significantly diminished the cross-sectional area of sweet cherry trees (tab. 1). A similar opinion was expressed by Hrotkó et al. [2009], who observed a weaker growth of 'Carmen' sweet cherry cultivar on rootstocks of Hungarian selection of Mahaleb ('Magyar' and 'Korponay'). However on other biotypes of Mahaleb ('Cema', 'Egervar' and 'Bogdany') they grew as strongly as on standard 'SL64'. These results are also confirmed by earlier reports on diversified influence of Mahaleb on the growth of sweet cherry trees [De Salvador et al. 2005, Hilsendegen 2005, Bujdoso and Hrotkó 2007, Usenik et al. 2008]. On the other hand in the experiment of Balmer [2008] the trees of 'Regina' sweet cherry cultivar budded on 'SL405' grew very strongly and they had the biggest cross-sectional area of the trunk among all studied rootstocks. Independently from used rootstocks the trees of 'Burlat' had the biggest cross-sectional area of a trunk, and 'Vanda' the smallest. Chełpiński [2007] has another opinion. In his experiments 'Vanda' cultivar, independently from used rootstocks had the biggest trunk cross-sectional area.

Table 1. The trunk cross-sectional area of sweet cherry trees depending on rootstock and cultivar (cm^2) – autumn 2013

Rootstock	Cultivar				Mean for rootstock
	Burlat	Regina	Summit	Vanda	
Mazzard cherry 'Alkavo'	44.6 lm *	46.3 m	39.3 i–l	36.5 f–k	41.7 c
Mahaleb No. 1	41.5 k–m	38.3 h–k	39.3 i–l	34.1 c–j	38.3 b
Mahaleb No. 2	34.2 c–j	28.4 a–c	31.2 a–g	27.1 a	30.2 a
Mahaleb No. 3	36.1 e–k	29.8 a–e	33.9 b–j	29.4 a–d	32.3 a
Mahaleb No. 4	39.0 h–l	36.7 f–k	35.3 d–k	32.8 a–h	36.0 b
Mahaleb No. 5	40.2 j–l	34.9 d–j	37.2 g–k	30.7 a–f	35.8 b
Mahaleb No. 6	33.2 a–i	29.0 a–d	31.4 a–g	27.7 ab	30.2 a
Mean for cultivar	38.4 c	34.8 b	35.4 b	31.2 a	F emp. 0.87

* Means followed by the same letters are not significantly different at the level of $\alpha = 0.05$

As far as this feature is concerned, the biggest volume of a crown was characteristic for trees budded on Mazzard rootstock, and the smallest one was observed for trees growing on Mahaleb No. 2 and No. 6, which results did not differ significantly among one another. Also the cultivar influenced the volume of the crown. The biggest volume of the crown was found for the trees of 'Burlat' and 'Summit' cultivars, the smallest for 'Regina' and 'Vanda' (tab. 2).

Table 2. The volume of crown of sweet cherry trees depending on rootstock and cultivar (m^3) – autumn 2013

Rootstock	Cultivar				Mean for rootstock
	Burlat	Regina	Summit	Vanda	
Mazzard cherry 'Alkavo'	16.5 e–h *	19.6 ij	20.4 j	16.0 e–h	18.1 c
Mahaleb No. 1	17.0 e–i	15.5 e–h	17.6 f–j	15.1 e–h	11.3 b
Mahaleb No. 2	11.1 d	5.1 a	8.2 bc	9.7 cd	8.5 a
Mahaleb No. 3	15.4 e–h	14.3 e	17.8 g–j	14.6 ef	15.5 b
Mahaleb No. 4	16.2 e–h	14.7 e–g	17.1 e–i	14.0 e	15.5 b
Mahaleb No. 5	15.9 e–h	15,.0 e–h	18.0 h–j	15.6 e	16.1 b
Mahaleb No. 6	14.3 e	6.7 ab	7.4 a–c	7.5 a–c	9.0 a
Mean for cultivar	15.2 b	13.0 a	15.2 b	13.2 a	F emp. 4.21

* For explanation, see table 1

According to many authors [Simon et al. 2004, Bujdoso and Hrotkó 2005, Hrotkó 2007, Gratacos et al. 2008, Stachowiak 2012] sweet cherry trees budded on weakly growing rootstocks flower and yield more abundantly in comparison with trees on strongly growing rootstocks. These opinions are confirmed also by the results of the present experiment (tab. 3). The best result was obtained for Mahaleb No. 6. On the trees of Mazzard rootstocks there were significantly fewer flowers than on Mahaleb rootstocks. 'Vanda' and 'Summit' bloomed most intensively, and the smallest number of flowers was found on 'Burlat' and 'Regina' (tab. 3).

Table 3. The number of flowers of sweet cherry trees depending on rootstock and cultivar. Mean value for the years 2011–2013

Rootstock	Cultivar				Mean for rootstock
	Burlat	Regina	Summit	Vanda	
Mazzard cherry 'Alkavo'	5278.7 a *	3773.0 b	5873.0 h	5809.0 h	5183.3 a
Mahaleb No. 1	3723.0 b	6106.0 i	5441.0 g	7805.0 m	5771.3 c
Mahaleb No. 2	4467.0 d	2974.0 a	5584.0 g	8974.0 o	5499.8 b
Mahaleb No. 3	4457.0 d	5535.0 g	7547.0 l	7719.0 m	6314.5 e
Mahaleb No. 4	4182.0 c	4689.0 e	3800.0 b	9209.0 p	5470.0 b
Mahaleb No. 5	4152.0 c	6380.0 i	6739.0 k	7801.0 m	6268.0 e
Mahaleb No. 6	6142.0 i	5276.0 f	4793.0 e	8503.0 n	6178.5 d
Mean for cultivar	4628.7 a	4961.9 b	5683.9 c	7974.3 d	F emp. 417.0

* For explanation, see table 1

The biggest amount of fruits was collected from trees budded on Mahaleb No. 6, No. 2 and No. 3. Crops given by trees growing on Mazzard and Mahaleb No. 5 were worse with the result being in one statistic group. Significantly the least fruits were calculated on threes of Mahaleb No. 1 and No. 6. Among studied cultivars the most fruits were taken from trees of 'Vanda' and 'Summit', and the least from 'Regina' (tab. 4). Similar results for the mentioned cultivars were obtained by Chełpiński [2007] and Stachowiak [2012].

The biggest percentage of fruits set to the number of flowers was obtained for trees budded on Mahaleb No. 6, No. 2 and for Mazzard. These two biotypes of Mahaleb may have a bigger physiological compatibility with the studied cultivars of sweet cherry trees in comparison with the remaining ones. These remaining combinations did not differ significantly in results among each other (tab. 5).

According to De Salvador et al. [2005], Grzyb et al. [2008], Wociór [2008] a root-stock affects the weight of a fruit. In the experiment it was observed that fruits with the biggest weight were obtained from trees budded on the biotype of Mahaleb No. 4, No. 1 and No. 2. The smallest mass had fruits from trees on rootstocks of Mazzard, which result did not differ from Mahaleb No. 3, No. 5 and No. 6. Fruits with the biggest mass were collected from trees of ‘Regina’, and the smallest from ‘Vanda’ and ‘Burlat’ (tab. 6). Obtained results are similar to those obtained by Stachowiak [2012]. Also in the experiment conducted in the south of Italy De Salvador et al. [2005] collected fruits with the biggest mass from trees of ‘Lapins’ growing on Mahaleb type ‘Magyar’ and ‘SL64’. It can be concluded that biotypes of Mahaleb coming from different scientific centres can positively influence the mass of sweet cherry fruits.

Table 4. The number of fruits of sweet cherry trees depending on rootstock and cultivar. Mean value for the years 2011–2013

Rootstock	Cultivar				Mean for rootstock
	Burlat	Regina	Summit	Vanda	
Mazzard cherry ‘Alkavo’	1529.7 i *	905.0 bc	1586.0 i	1917.0 i	1484.4 b
Mahaleb No. 1	931.0 bc	1038.0 cde	1308.0 fgh	2209.0 k	1371.5 a
Mahaleb No. 2	1474.0 hi	815.0 ab	1173.0 def	3589.0 m	1762.8 d
Mahaleb No. 3	1203.0 ef	1052.0 cde	1776.0 i	2316.0 k	1586.8 c
Mahaleb No. 4	1293.0 fg	694.0 a	996.0 bcd	2579.0 j	1390.5 a
Mahaleb No. 5	1204.0 ef	906.0 bc	1085.0 cde	2730.0 j	1481.3 b
Mahaleb No. 6	1150.0 def	1272.0 fg	1428.0 ghi	3571.0 m	1855.3 e
Mean for cultivar	1255.0 b	954.6 a	1336.0 c	2701.6 d	F emp. 44.19

* For explanation, see table 1

Table 5. The percentage of fruits set in ratio to flowers of sweet cherry trees depending on rootstock and cultivar. Average for years 2011–2013

Rootstock	Cultivar				Mean for rootstock
	Burlat	Regina	Summit	Vanda	
Mazzard cherry ‘Alkavo’	29.9 h–k *	23.9 ef	27.0 f–i	33.0 jk	28.4 b
Mahaleb No. 1	25.0 e–h	17.0 bc	24.0 ef	28.3 f–j	23.4 a
Mahaleb No. 2	33.0 jk	27.4 f–j	21.0 c–e	40.0 lm	30.1 bc
Mahaleb No. 3	27.0 f–i	18.9 b–d	23.4 d–f	30.0 h–k	24.7 a
Mahaleb No. 4	31.0 i–k	14.8 ab	26.2 e–i	28.0 f–j	24.7 a
Mahaleb No. 5	29.0 f–j	12.6 a	16.1 ab	35.0 kl	22.5 a
Mahaleb No. 6	35.0 kl	24.1 e–g	29.8 g–k	42.0 m	32.5 c
Mean for cultivar	29.9 c	19.6 a	23.8 b	33.6 d	F emp. 4.71

* For explanation, see table 1

Table 6. The mass of one fruit of sweet cherry trees depending on rootstock and cultivar, (g). Mean value for the years 2011–2013

Rootstock	Cultivar				Mean for rootstock
	Burlat	Regina	Summit	Vanda	
Mazzard cherry 'Alkavo'	6.2 a *	8.6 e–g	7.7 c–e	6.2 a	7.2 a
Mahaleb No. 1	7.2 a–c	9.5 g	8.3 d–f	6.3 ab	7.8 b
Mahaleb No. 2	7.4 b–d	8.3 d–f	8.5 e–g	6.6 a–c	7.7 b
Mahaleb No. 3	7.0 a–c	9.0 fg	6.9 a–c	6.7 a–c	7.4 ab
Mahaleb No. 4	7.0 a–c	9.3 fg	8.3 d–f	6.8 a–c	7.9 b
Mahaleb No. 5	6.9 a–c	7.7 c–e	9.0 fg	7.0 a–c	7.6 ab
Mahaleb No. 6	7.0 a–c	7.7 c–e	8.4 d–g	6.9 a–c	7.5 ab
Mean for cultivar	7.0 a	8.6 c	8.2 b	6.7 a	F emp. 2.97

*For explanation, see table 1

Table 7. The sum of the yield of sweet cherry trees depending on rootstock and cultivar, (kg). For the years 2011–2013

Rootstock	Cultivar				Mean for rootstock
	Burlat	Regina	Summit	Vanda	
Mazzard cherry 'Alkavo'	28.5 d–h *	23.3 a–c	36.6 i	35.6 i	31.0 a
Mahaleb No. 1	20.1 a	29.5 f–h	32.5 g–i	41.9 j	31.0 a
Mahaleb No. 2	32.7 hi	20.2 a	29.8 f–h	71.0 n	38.4 c
Mahaleb No. 3	25.1 c–e	28.3 d–g	36.5 i	46.5 k	34.1 b
Mahaleb No. 4	27.1 c–f	19.2 a	24.7 b–d	52.5 l	30.9 a
Mahaleb No. 5	24.9 b–d	20.8 ab	29.2 e–h	57.2 m	33.0 b
Mahaleb No. 6	44.9 jk	29.3 e–h	35.9 i	73.8 n	46.0 d
Mean for cultivar	29.0 b	24.4 a	32.2 c	54.1 d	F emp. 34.6

* For explanation, see table 1

A rootstock has a decisive influence on yielding of trees [Robinson et al. 2008, Sitarek et al. 2008]. It was also confirmed in this experiment. The biggest cumulative crop from a tree was obtained from Mahaleb No. 6 and No. 2. On Mazard and Mahaleb No. 4 and No. 1 the crop was significantly the smallest (tab. 7). Weak yielding of trees on Mazzard is also reported by Grzyb et al. [2005, 2008]. However, in experiments of other authors [Simon et al. 2004, Godini et al. 2008] it was confirmed that trees growing on Mahaleb 'SL64' of 'Lapins' yielded the best. Out of all studied cultivars in the present experiment the best crop of fruits was collected from 'Vanda', then 'Summit'. 'Regina' gave the worse crop (tab. 7). De Salvador et al. [2005] obtained the biggest crop for 'Lapins' on the rootstock of Mahaleb type 'Magyar' and 'SL64'. The same cultivar gave the best yield in the experiment of Godini [2008] on the rootstock of Mahaleb type'SL64'. These results may suggest that sweet cherry trees should be cultivated on slightly stronger growing rootstocks e.g. SL64.

The ratio of productivity index to a cross sectional area of the sweet cherry tree trunk was significantly higher on Mahaleb No. 6, No. 2, No. 3, No. 5 and No. 4 in comparison with Mazzard rootstock (tab. 8). The result obtained for Mahaleb No. 1 did not differ from the control rootstock. It proves that this index is not positively correlated to the power of growth, which was also confirmed by other authors [Balmer 2008, Godini et al. 2008, Grzyb et al. 2008, Hrotkó et al. 2009]. It was influenced by better yielding and a weaker growth of trees on Mahaleb biotypes, except for Mahaleb No. 1.

Table 8. The index of productivity of sweet cherry trees depending on rootstock and cultivar ($kg \cdot cm^{-2}$)

Rootstock	Cultivar				Mean for rootstock
	Burlat	Regina	Summit	Vanda	
Mazzard cherry 'Alkavo'	0.639 a–d *	0.514 ab	0.936 f–h	0.975 gh	0.765 a
Mahaleb No. 1	0.484 a	0.770 de	0.827 e–g	1.229 jk	0.828 ab
Mahaleb No. 2	0.956 gh	0.711 c–e	0.955 gh	2.620 n	1.310 e
Mahaleb No. 3	0.697 c–e	0.967 gh	1.173 ij	1.720 l	1.138 d
Mahaleb No. 4	0.695 c–e	0.523 ab	0.670 b–e	1.600 l	0.872 b
Mahaleb No. 5	0.620 a–d	0.596 a–c	0.785 d–f	1.860 m	0.966 c
Mahaleb No. 6	1.352 k	1.049 hi	1.143 ij	2.660 n	1.550 f
Mean for cultivar	0.778 a	0.733 a	0.926 b	1.809 c	F emp. 30.21

* For explanation, see table 1

Differences in this index of productivity applied also to cultivars. The highest productivity index was shown by 'Vanda' and 'Summit'. For 'Burlat' and 'Regina' the smallest one was observed. The results are in accordance with the results of Rozpara [2008] studies, in which 'Vanda' and 'Summit' had the highest productivity index, and 'Regina' much smaller. Another opinion was expressed by Kolev and Dzhuvinova [2008] who obtained the highest productivity index for 'Regina', and the smallest for 'Summit'. However, it is also the matter of a choice of right pollinating cultivar for 'Regina', which was not present in the examined experiment.

The analysis of electrophoretic profiles (fig. 1, 2, 3) using PCR-RAPD method showed a big genetic differentiation of the studied biotypes of Mahaleb. Diagrams of genetic similarity and dissimilarity were prepared on their basis. They showed that only No. 2 and No.6 pair is genetically the closest (fig. 4, 5). Remaining Mahaleb trees are placed in another order and are differently connected.

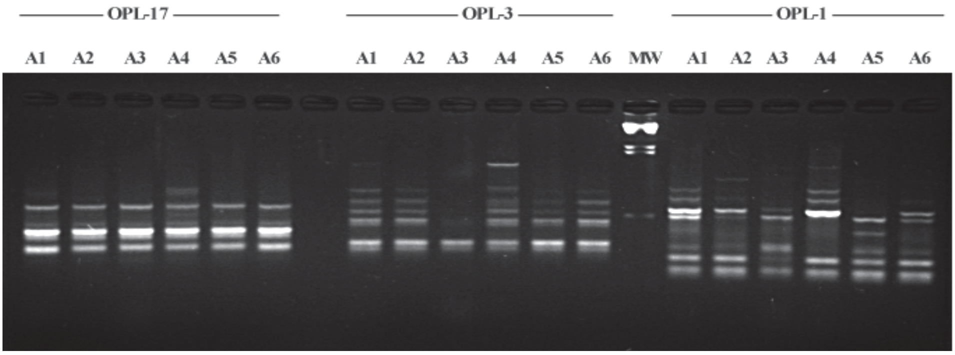

Fig. 1. The model of stripes of Mahaleb biotypes obtained using primers: OPL-17, OPL-3 and OPL-1 (phot. B. Siemieniako)

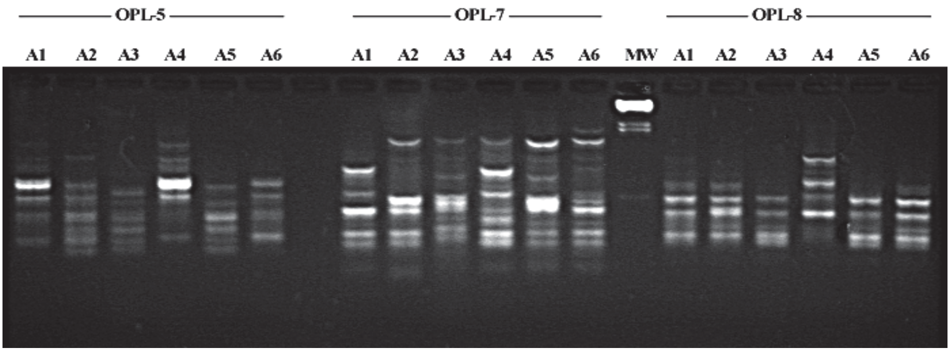

Fig. 2. The model of stripes of Mahaleb biotypes obtained using primers: OPL-5, OPL-7 and OPL-8 (phot. B. Siemieniako)

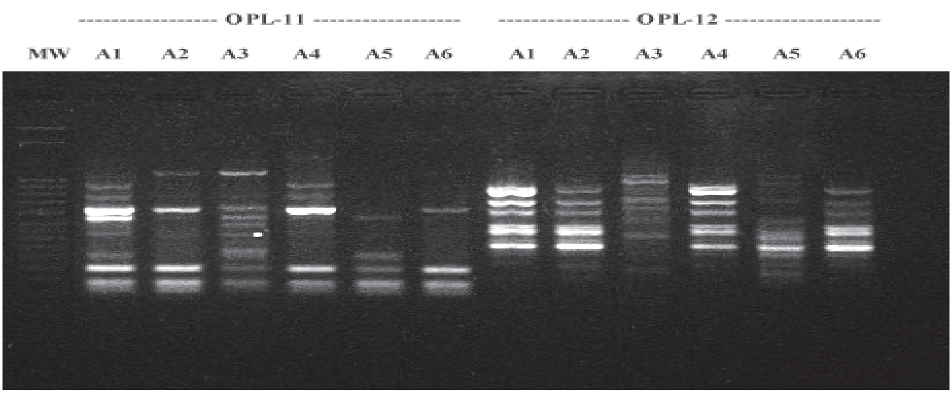

Fig. 3. The model of stripes of Mahaleb biotypes obtained using primers: OPL-11 and OPL-12 (phot. B. Siemieniako)

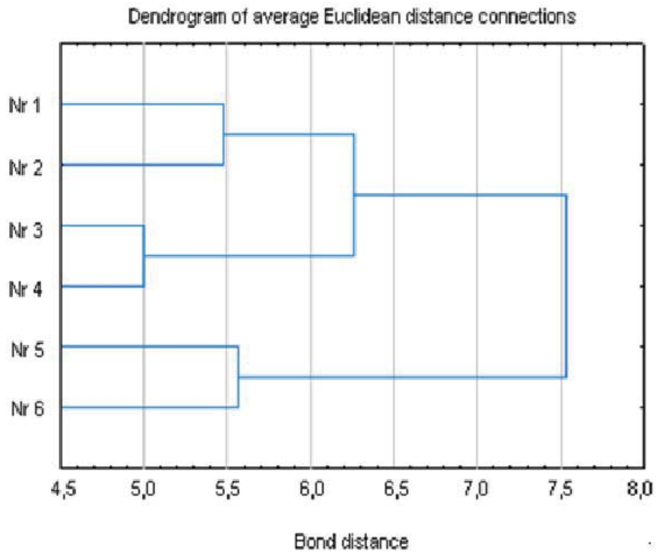

Fig. 4. Dendrogram of genotypic similarity produced using average Euclidean distance connections on the basis of the analysis of electrophoretic profiles of 6 DNA samples of Mahaleb obtained by PCR-RAPD method using primers from OPL (1–20) group (B. Siemieniako)

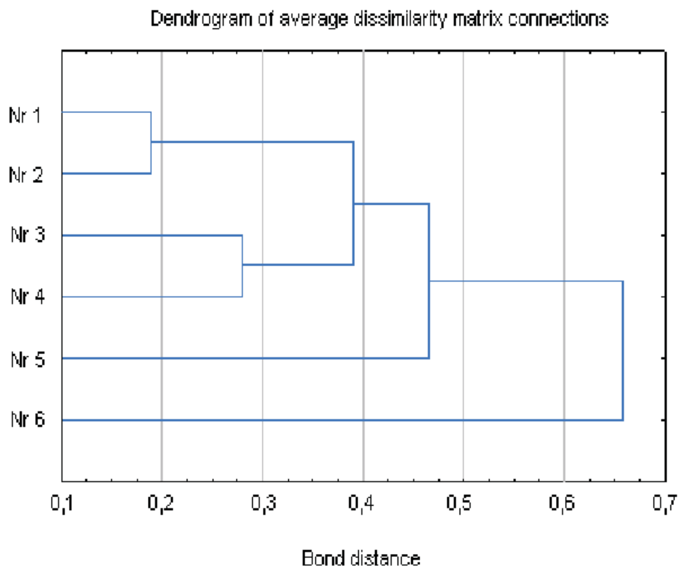

Fig. 5. Dendrogram of genotypic diversity produced using the method of average dissimilarity matrix connections on the base of the analysis of electrophoretic profiles of 6 DNA samples of Mahaleb obtained by PCR-RAPD method using primers from OPL (1–20) group (B. Siemieniako)

The obtained results confirm that Mahaleb trees No. 2 and No. 6 in most observations of studied features are either identical or very similar. In an orchard they can be distinguished by a weaker growth of cultivars budded on them and by a high productivity index.

CONCLUSIONS

1. Out of consider biotypes, Mahaleb No. 2 and No. 6 are the most valuable. Trees growing on these rootstocks have the smallest vigour of growth, the biggest number of fruits and the highest productivity index.

2. Trees of 'Burlat' have the highest value of the studied parameter of growth, and 'Vanda' the smallest one. The most fruitful are 'Vanda' and 'Summit'. Of all cultivars the best is 'Vanda', and next 'Summit'.

3. Conducted analysis of electrophoretic profiles using PCR-RAPD method shows a big genetic similarity between Mahaleb No. 2 and No. 6, and big differentiation of the remaining Mahaleb biotypes.

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WZROST I PLONOWANIE DRZEW CZEREŚNI SZCZEPIONYCH NA NOWYCH BIOTYPACH (*Prunus mahaleb* (L.))

Streszczenie. W latach 2011–2013 oceniono wzrostu i plonowania drzew czterech odmian czereśni: Burlat, Regina, Summit i Vanda. Wszystkie one rosły na nowych podkładkach antypki otrzymanych za pomocą sadzonek pędowych zielnych wyselekcjonowanych z populacji siewek niemieckiej antypki 'Alpruma' w porównaniu z siewkami czereśni ptasiej. Dodatkowo wykonano analizę zmienności genetycznej nowo badanych biotypów antypki. Największym polem przekroju poprzecznego pnia charakteryzowały się drzewa na podkładkach czereśni ptasiej oraz antypki nr 1, 4 i 5, a najmniejszym antypki nr 2, 6 i 3. Największą objętość korony uzyskały drzewa rosnące na czereśni ptasiej, a najmniejszą na antypkach nr 2 i 6. Największe korony tworzyły drzewa odmiany Burlat i Summit, a najmniejsze Regina i Vanda. Drzewa okulizowane na czereśni ptasiej miały owoce o trochę mniejszej wadze w porównaniu z podkładką antypki. Z odmian pod względem wagi owocu wyróżniały się Regina i Summit. Największą sumę plonów uzyskano z drzew okulizowanych na antypkach nr 6 i 2, najmniejszą na czereśni ptasiej, antypkach nr 1 i 4. Najbardziej plonotwórczą były odmiany Vanda i Summit. Najwyższy współczynnik intensywności plonowania uzyskano dla podkładek antypki nr 6, 2, 3 i 5. Dla czereśni ptasiej i antypki nr 1 uzyskano najmniejszą wartość badanego parametru. Z badanych odmian najlepsza była Vanda, a następnie Summit. Wykonana analiza profili elektroforetycznych metodą PCR-RAPD wykazała duże podobieństwo genetyczne pomiędzy antypkami nr 2 i 6 oraz duże zróżnicowanie pozostałych biotypów antypki pomiędzy sobą. Z sześciu przebadanych biotypów, antypki nr 2 i 6 okazały się najbardziej wartościowe. Drzewa czereśni na tych podkładkach najsłabiej rosły, zawiązywały stosunkowo dużo kwiatów i owoców oraz cechowały się największym współczynnikiem intensywności plonowania.

Słowa kluczowe: antypka, nowe podkładki, odmiana, czereśnia, zróżnicowanie genetyczne

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