

GROWTH AND YIELDING OF FIVE CULTIVARS OF SOUR CHERRY TREES ON DIFFERENT ROOTSTOCKS IN ORCHARD

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Abstract. *Growth and yielding of five cultivars of sour cherry trees on two rootstocks were observed in the experiment, which was executed in the years of 2001-2006. The growth of the trees was presented in TCSA. All examined cultivars grew much stronger on F 12/1 rootstock comparing to Mazzard seedling rootstock. The growth of all cultivars was stronger than the growth of 'Łutówka'. A total yield of fruits was evaluated for each cultivar in the five following years. The yield of 'Lucyna' on both rootstocks was higher than the crop coming from 'Łutówka'. Additionally, an average mass of one fruit and the taste of all cultivars were evaluated. 'Dradem' had the biggest average mass of one fruit and 'Sabina' the smallest. The fruit of 'Dradem' and 'Lucyna' were the tastiest.*

INTRODUCTION

Poland is one of the main producers of sour cherry fruit in the world. The production of the fruit of this species amounted to 130 000 tons on average in the last years (Kubiak 2000).

It is commonly known that genetic factors, among others the rootstock, affect the growth (Ugolik and Hołubowicz 1988, 1989, 1990, Jadczuk 1994, Hrotkó and Simon 1996, Hrotkó et al.1996), and yielding of sour cherry trees (Schmidt et al.1983, Ludders 1986, Tylus et al.1986, Jadczuk et al. 1992, Jadczuk 1994, Anderson et al.1996, Hrotkó et al.1996).

In Poland there are very few cultivars of sour cherry trees that count productively. To check their usefulness for a commercial production in Wielkopolska region's conditions an appropriate experiment was executed in Agricultural Experimental Station belong to Agriculture University of Poznań.

MATERIAL AND METHODS

The experiment was carried out in 2001-2006. The trees were planted in spring of 2001 in a 4x2 m spacing. The orchard trial was set up in four replications, with 6 trees per plot. Each cultivars: 'Łutówka' 'Diament', 'Dradem', 'Lucyna' and 'Sabina' were grown on two rootstocks: Mazzard seedling and F 12/1. The increase in TCSA (Trunk cross-sectional area) was calculated after five years; this was a measure of tree vigour in the orchard. The yield of fruit harvested were registered for each plot in 2002 to 2006 and from these date mean fruit mass calculated on the basis of randomly checked samples a mass of 100 fruits. The CEC (Cropping efficiency coefficient) was calculated as a ratio of cumulative yield for 2002-2006 to TCSA at the

end of the 2006 season. The colour of the juice and the taste of fruit were defined in a four-grade scale (5- very good, definitely dessert fruit; 4- good, sweet-sour fruit, tasty; 3- satisfactory, sour fruit; 2- unsatisfactory, fruit too sour).

The significance of differences in a two-factor variance analysis was evaluated in Duncan test on the probability level $\alpha = 0.05$.

RESULTS AND DISCUSSIONS

The power of growth of the examined trees, expressed by TCSA was very differentiated (table 1). The growth of every cultivar was stronger when they were growing on F 12/1. The control cultivar 'Łutówka', which was growing the weakest in comparison with all examined sour cherry trees cultivars, also grew stronger on F 12/1 rootstock. Similarly, a stronger growth of 'Łutówka' on F 12/1 rootstock was obtained by Borkowska (1998) in the seventh year after planting. A quite opposite result was obtained by Ugołik and Hołubowicz (1988, 1989). In their experiments they found that a bigger TCSA characterized the trees of 'Łutówka' on Mazzard seedling. Among all evaluated sour cherry trees the trees of 'Lucyna' on both rootstocks, were growing significantly stronger. It is consistent with a pomological description of this cultivar made by Grzyb and Rozpara (1998). The trees of 'Sabina' were growing significantly weaker than 'Lucyna', which also supports the opinion expressed by Grzyb and Rozpara (1998). The trees of 'Lucyna' and 'Sabina', because of their strong growth, should be planted in a bigger spacing than 'Łutówka'. A medium power of growth characterized the trees of 'Dradem' and 'Diament'. The results of growth of the trees of 'Diament' and 'Dradem', expressed by TCSA correspond with the data published by Maćkowiak (1995). Comparing the growth of these two cultivars no stronger growth of 'Diament' on F 12/1 was observed in the discussed experiment, while it was found by Maćkowiak (1995).

Total crop of particular cultivars in 2002-2006 is shown in (table 1). Cultivar 'Łutówka' yielded a little bit better on F 12/1 rootstock. It is consistent with Borkowska observation (1998), who also obtained better yield of 'Łutówka' on this rootstock. Comparing to 'Łutówka', a significantly bigger total crop from a tree on the same rootstocks was obtained from 'Lucyna'. It confirms the opinion of Grzyb and Rozpara (1998), who recommend this cultivar for commercial planting. Yielding of the other cultivars, which were the subject of the studies, did not differ significantly from 'Łutówka' in the range of the same rootstocks. Cultivar 'Sabina', who yielded on the same level than 'Łutówka', which makes the first one preferable for amateur cultivation. The applied rootstocks did not affect the yielding of the examined cultivars.

CEC of the individual cultivar did not differ significantly, as far as the applied rootstock is concerned (table 1). It does not confirm Borkowska's experiment (1998), where a better CEC was found for Mazzard seedling. None of the new sour cherry tree cultivars exceeded 'Łutówka' in this coefficient.

The highest CAC obtained by the control cultivar was mainly caused by a small TCSA of this cultivar. The closest CEC to 'Łutówka' had 'Diament'. 'Diament' budded on Mazzard seedling rootstock is suitable for intensive sour cherry orchards. It should be planted in the same spacing as 'Łutówka'. Taking into consideration the results of the obtained CAC of 'Sabina' and 'Lucyna', really worse from 'Łutówka', they can be recommended for less intensive sour cherry orchards

The biggest average mass of one fruit was obtained for 'Dradem' (6.4 g). The mass was similar to the one found by Maćkowiak (1995). He obtained also a similar result of a one fruit mass for 'Diament' cultivar. Among the examined cultivars fruit of 'Lucyna' had an average mass, the same as 'Łutówka' fruit (5.2 g), 'Sabina' fruit mass was the smallest (5.0 g).

The best taste characterized the fruit of 'Dradem'(5). High estimation of the taste of 'Dradem' fruit pulp has confirmed the opinion of Maćkowiak (1995), who recognized this cultivar as an outstandingly dessert one. A very good taste characterized the fruit of 'Lucyna', which confirms a productive value of this cultivar. The fruit of 'Diament'(4) and 'Sabina'(4) were worse in taste, but the worst taste characterized 'Łutówka' (3).

Juice colour from 'Lucyna' and 'Sabina' fruit was similar to 'Łutówka' fruit juice. 'Diament' juice was lighter than the one from 'Łutówka' but 'Dradem' was described as a typical "glass" with light-red colour.

Table 1

The growth and yield of five sour cherry cultivars on two rootstocks

Cultivar	Rootstock	TCSA in 2002 (cm ²)	Total crop in kg/tree (1998-2002)	CAC (kg/cm ²)
Łutówka	Mazzard seedling	45.4 a *	44.8 a	0.99 d
	F 12/1	48.5 ab	49.1 abc	1.01 d
Diament	Mazzard seedling	54.6 b	50.3 abcd	0.92 cd
	F 12/1	63.3 c	55.8 cd	0.88 cd
Dradem	Mazzard seedling	62.4 c	47.4 ab	0.77 bc
	F 12/1	64.9 c	50.8 abcd	0.79 bc
Lucyna	Mazzard seedling	92.2 f	54.1 bcd	0.58 a
	F 12/1	104.9 g	56.3 d	0.53 a
Sabina	Mazzard seedling	73.3 d	50.6 abcd	0.69ab
	F 12/1	80.0 e	53.8 bcd	0.67 ab

* Means values marked with the same letters are not significantly different at p = 0.05

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