ACTA SCIENTIARUM POLONORUM *Acta Sci. Pol., Hortorum Cultus 11(1) 2012, 27-37*

# GROWTH, YIELDING AND TREE SURVIVABILITY OF SEVERAL APRICOT CULTIVARS ON MYROBALAN AND 'WANGENHEIM PRUNE' SEEDLINGS

Ireneusz Sosna, Maria Licznar-Małańczuk
Wrocław University of Environmental and Life Sciences

**Abstract.** Strong vigour of apricot trees can be reduced by using the proper rootstock. Rootstock affects not only vigour but high and quality of yield and the lifespan of the trees as well. In autumn of 2006, the experiment with new apricot cultivars grafted on Myrobalan and 'Wangenheim Prune' seedlings was established at the Fruit Experimental Station near Wrocław. Trees of 'Morden 604' (as a control), 'Goldrich', 'Harlayne', 'Hargrand', 'Darina', 'Sirena' and 'Kompakta' cvs. were planted in four replications with two trees per plot. In comparison to Myrobalan seedling rootstock, the trees grafted on 'Wangenheim Prune' seedlings grew significantly weaker. The most vigorous genotypes were 'Morden 604' (control), whereas the least vigorous was 'Kompakta'. Up to the 5$^{th}$ year after planting, the highest total yield was recorded for 'Morden 604' and 'Hargrand' on Myrobalan seedlings. Significantly higher yields gave trees on Myrobalan seedling rootstock. The rootstock had no influence on mean fruit weight. In the autumn of 2010, most of dead trees was observed with 'Darina', especially on 'Wangenheim Prune' seedlings.

**Key words:** *Prunus armeniaca*, rootstocks, cropping, fruit quality, healthiness

## INTRODUCTION

In Poland apricot is a species cultivated in orchards rather rarely. This is caused by low yields as a result of weather conditions in winter and early spring. Flower buds are often frozen during winter time, especially after long period of time with higher temperature in January and February. Flowers and sometimes fruitlets can be also damaged by frosty days in a spring. Therefore more intensive searching was undertaken for selection of new cultivars characterized by late flowering, high yields of good quality, intermediate sized trees and good adaptability to cool climate of Poland [Licznar-Małańczuk and Sosna 2005a].

Corresponding author – Adres do korespondencji: Ireneusz Sosna, Department of Horticulture, Wrocław University of Environmental and Life Sciences, Pl. Grunwaldzki 24a, 50-363 Wrocław, e-mail: ireneusz.sosna@up.wroc.pl

Apricot trees grow very strong, which makes it difficult to harvests, pruning and chemical protection. Strong vigour of apricot trees can be reduced by using a proper rootstock. Rootstock affects not only vigour, but height and quality of yield and the lifespan of the trees as well. Good knowledge of the growth vigour which different rootstocks induce in apricot cultivars is of great importance for determining the appropriate scheme of planting and distances between the trees [Dimitrova 2002]. Interaction between the cultivar and rootstock appears to be an interesting strategy for cultivar adaptation to different climatic areas [Egea at al. 2004].

Worldwide, a lot of different rootstocks from *Prunus* divaricata Ledeb., Prunus *domestica* L.*, Prunus insititia* L.*, Prunus persica* (L.) (Batsch) Stockes and also *Prunus amygdalus* Stockes origin have been introduced in apricot cultivation [Knowles et al. 1994, Reinten et al. 2009, Monney et al. 2010]. However, the most popular are apricot seedlings (*Prunus armeniaca* L.) [Nasir et al. 2001, Vachůn 2001, Son and Küden 2003, Rahnemoun et al. 2005]. In Poland Myrobalan seedling (*Prunus divaricata* Ledeb.) is still the most popular rootstock in plum and apricot orchards. Apricot trees on this rootstock grow very strong and sometimes grafting incompatibility can be observed. Physiological incompatibility between scion cultivars and *Prunus divaricata* Ledeb. rootstock is very often expressed by rapid death of trees few years after being planted in the orchard or their easy break down at the graft union [Grzyb et al. 1996]. Besides of *Prunus divaricata* Ledeb., also 'Wangenheim Prune' seedlings (*Prunus domestica* L.) have some relevance in Polish apricot nursery production. This rootstock has a tendency to suppress growth vigour while has good influence on productivity of plum trees and fruit size, as well [Sosna 2002, Blažek et al. 2005]. However, according to Grzyb et al. [1996], 'Wangenheim Prune' seedlings are not suitable for apricot cultivars mainly due to high mortality of trees and poor yields.

The aim of this study was evaluation of several new apricot cultivars on Myrobalan and 'Wangenheim Prune' rootstocks in the climatic conditions of Wrocław region.

## MATERIAL AND METHODS

The experiment was established at the Fruit Experimental Station in Samotwór near Wrocław in autumn of 2006. One-year-old trees of several new apricot cultivars – 'Morden 604' (as a control), 'Goldrich', 'Harlayne', 'Hargrand', 'Darina', 'Sirena' and 'Kompakta' grafted on Myrobalan (*P. divaricata* Ledeb.) and 'Wangenheim Prune' (*P. domestica* L.) seedlings were planted in a spacing of 4 × 4 m (625 trees per hectare). Trees of 'Kompakta' cv. due to weak growth were budded only on Myrobalan rootstock. The experiment was carried out in a randomised block design, in four replications, with two trees per plot. All of the trees were trained in the form of an almost natural canopy. Herbicide fallow was maintained in tree rows, with grassy strips between them. Plant protection was carried out in accordance to the current recommendations of the Orchard Protection Program. In 2007–2010, there were recorded the following parameters: tree growth, phenology and blooming intensity, harvest time, yield, fruit weight and tree survival, separately for each tree. Trunk cross-sectional area (TCSA) was calculated based on diameter (first two years) or circumference measured 30 cm

above the soil level. In autumn 2010 tree height and crown width in two directions were recorded. Volume of crown was calculated using a formula for perpendicular volume. Blooming intensity was estimated visually in 0–5 scale (0 – tree without flowers; 5 – very abundant flowering tree). Fruit size was estimated as mean weight of 25 fruits per tree of 2009–2010. In 2008 and 2011 on the trees was too little fruit.

The results of the experiment were analysed statistically, using the analysis of variance. Significant differences at $\alpha = 0.05$ were calculated using Fisher's multiple range t-test [Stanisz 2007].

## RESULTS AND DISCUSSION

Based on the 4$^{th}$ years study it can be found, that the growth of trees depended on both the cultivar and the rootstock (tab. 1). In comparison to Myrobalan seedling rootstock, the trees grafted on 'Wangenheim Prune' seedlings grew significantly weaker. Similar results were obtained by a number of researchers [Grzyb et al. 1996, Dimitrova 2002, Rozpara and Grzyb 2003, Sitarek and Jakubowski 2006, Sottile et al. 2006, Sitarek and Bartosiewicz 2010]. In foreign studies were estimated other *Prunus domestica* L. cultivars. Strong growth of apricot trees grafted onto Myrobalan rootstock also confirmed Monney et al. [2010]. In the experiment by Rahnemoun et al. [2005], apricot cvs. on the same rootstock grew strong but were approximately 20% smaller than on seedlings of apricot. In own research the most vigorous genotypes were 'Morden 604', 'Goldrich' and 'Sirena', whereas the least vigorous was 'Kompakta' cultivar. These results connected with strong growth of 'Morden 604' cv. are similar to those reported by Licznar-Małańczuk and Sosna [2005b] as well as Sitarek and Bartosiewicz [2010]. 'Compacta' is spur type cultivar, thus it characterized by the natural weak growth. In the experiment carried out, rootstock did not significantly affect the calculated crop efficiency coefficient (fruit yield per 1 cm$^2$ of tree trunk cross-sectional area), which was also confirmed by Grzyb et al. [1996] in their research. Only in 'Hargrand' cv. on Myrobalan this index was significantly higher. In Italian investigation [Sottile et al. 2006], trees on 'Penta' seedlings (*P. domestica* L.) had a lower yield efficiency compared to Myrobalans. In turn in Turkish experiment [Son and Küden 2003], cultivars grafted on the apricot seedling rootstocks presented greater CEC than on Myrobalans seedlings.

The apricot trees started blooming and yielding in the 2$^{nd}$ year after planting (tab. 2 and 3). More abundant flowered trees on 'Wangenheim Prune' seedlings, but first crops due to spring frosts were very low – 0.1–0.3 kg per tree (the highest yields gave 'Kompakta' – 0.5 kg). Trees on *Prunus domestica* L. seedlings usually bloomed one day earlier than on Myrobalans. It is not beneficial because it poses a greater risk of spring frost. Besides, flower buds of smaller trees grafted on this rootstock can be more damaged by winter and spring frosts. Over the first four years of the experiment, blossoming time varied by about half a month. The cultivars that bloomed the earliest were 'Morden 604', 'Goldrich' and 'Harlayne' while the late bloom was 'Sirena'. Similar results were obtained by Szalay and Szabo [1999] as well as Licznar-Małańczuk and Sosna [2005a]. On the contrary, in the Spanish studies 'Goldrich' was included in the latest flowering [Alburquerque et al. 2004]. In 2009, there were no significant differences between esti-

Table 1. Vegetative growth and crop efficiency coefficient (CEC) of several apricot cultivars depending on rootstock
Tabela 1. Wzrost wegetatywny i współczynnik plenności dla kilku odmian moreli w zależności od podkładki

| Cultivar<br>Odmiana | Rootstock<br>Podkładka | Total number of shoots per tree<br>Łączna liczba pędów (szt. drz.$^{-1}$) | Total lenght of shoots (cm·tree$^{-1}$)<br>Łączna długość pędów (cm·drz.$^{-1}$) | Trunk cross-sectional area<br>Pole przekr. poprz. pnia (cm$^2$) | Volume of crown<br>Objętość korony (m$^3$) | CEC<br>Współczynnik plenności (kg·cm$^{-2}$)<br>2007–2010 |
|---|---|---|---|---|---|---|
| | | 2007–2008 | | Autumn – jesień 2010 | | |
| 'Wczesna z Morden'<br>'Morden 604' | Wangenheim Prune<br>Węgierka Wangenheima | 79.6 ef* | 2004 b-d | 43.8 bc | 17.0 b-d | 0.29 a-c |
| | *P. divaricata* ałycza | 107.5 g | 3391 f | 80.7 f | 40.5 e | 0.29 a-c |
| 'Goldrich' | Wangenheim Prune<br>Węgierka Wangeneima | 49.1 ab | 1620 a-c | 33.7 ab | 10.3 ab | 0.25 ab |
| | *P. divaricata* ałycza | 60.3 a-c | 2646 e | 66.9 e | 19.6 d | 0.21 a |
| 'Harlayne' | Wangenheim Prune<br>Węgierka Wangenheima | 45.8 a | 1256 a | 29.3 a | 10.0 a | 0.27 a-c |
| | *P. divaricata* ałycza | 75.5 c-e | 2162 c-e | 52.8 cd | 18.9 d | 0.32 b-d |
| 'Hargrand' | Wangenheim Prune<br>Węgierka Wangenheima | 53.3 ab | 1242 a | 24.5 a | 8.4 a | 0.31 a-c |
| | *P. divaricata* ałycza | 98.9 g | 2556 de | 46.8 cd | 19.3 d | 0.42 d |
| 'Darina' | Wangenheim Prune<br>Węgierka Wangenheima | 52.9 ab | 1233 a | 30.2 a | 10.6 ab | 0.27 a-c |
| | *P. divaricata* ałycza | 77.3 de | 2132 c-e | 42.7 bc | 17.7 cd | 0.36 cd |
| 'Sirena' | Wangenheim Prune<br>Węgierka Wangenheima | 62.9 b-d | 1452 ab | 31.9 ab | 9.6 a | 0.34 b-d |
| | *P. divaricata* ałycza | 95.8 fg | 2656 e | 57.1 de | 20.4 d | 0.28 a-c |
| 'Kompakta' | *P. divaricata* ałycza | 71.0 c-e | 1775 a-c | 47.2 cd | 11.2 a-c | 0.30 a-c |

*Means indicate by the same letter do not significantly differ at $P \leq 0.05$ according to Fisher's t-test
*Średnie oznaczone tą samą literą nie różnią się istotnie przy $P \leq 0,05$ wg testu t-Fishera

Table 2. Full bloom date and blooming intensity of several apricot cultivars depending on rootstock
Tabela 2. Data pełni kwitnienia oraz obfitość kwitnienia drzew kilku odmian moreli w zależności od podkładki

| Cultivar<br>Odmiana | Rootstock<br>Podkładka | Full bloom date (day/month)<br>Data pełni kwitnienia (dzień/miesiąc) | | | Blooming intensity (scale 0–5)<br>Obfitość kwitnienia (skala 0–5) | | |
|---|---|---|---|---|---|---|---|
| | | 2008 | 2009 | 2010 | 2008 | 2009 | 2010 |
| 'Wczesna z orden'<br>'Morden 604' | Wangenheim Prune<br>Węgierka Wangenheima | 28–29.03 | 10.04 | 13–15.04 | 3.7 e-g* | 3.3 bc | 2.5 cd |
| | *P. divaricata* ałycza | 28–31.03 | 11.04 | 14–16.04 | 1.7 a | 3.3 bc | 3.3 d |
| 'Goldrich' | Wangenheim Prune<br>Węgierka Wangeneima | 30.03–2.04 | 10.04 | 15–16.04 | 3.9 fg | 3.5 c | 1.5 ab |
| | *P. divaricata* ałycza | 31.03–4.04 | 11.04 | 16–17.04 | 2.0 ab | 3.0 bc | 2.5 cd |
| 'Harlayne' | Wangenheim Prune<br>Węgierka Wangenheima | 30.03–2.04 | 10–11.04 | 16.04 | 3.3 ef | 2.3 a | 1.9 a-c |
| | *P. divaricata* ałycza | 31.03–3.04 | 11–12.04 | 16–17.04 | 2.3 ac | 2.7 ab | 2.6 cd |
| 'Hargrand' | Wangenheim Prune<br>Węgierka Wangenheima | 2–4.04 | 12.04 | 17.04 | 3.0 c-e | 3.2 bc | 1.4 ab |
| | *P. divaricata* ałycza | 3–5.04 | 13.04 | 17–18.04 | 1.6 a | 3.2 bc | 2.5 cd |
| 'Darina' | Wangenheim Prune<br>Węgierka Wangenheima | 1–3.04 | 13.04 | 16–17.04 | 2.3 a-c | 3.2 bc | 1.2 a |
| | *P. divaricata* ałycza | 2–4.04 | 14.04 | 17–18.04 | 1.7 a | 3.3 bc | 1.9 a-c |
| 'Sirena' | Wangenheim Prune<br>Węgierka Wangenheima | 5–6.04 | 15.04 | 19.04 | 3.1 de | 2.9 a-c | 1.5 ab |
| | *P. divaricata* ałycza | 6–7.04 | 15.04 | 19–20.04 | 2.5 b-d | 3.4 c | 2.2 bc |
| 'Kompakta' | *P. divaricata* ałycza | 31.03–1.04 | 10–11.04 | 14–16.04 | 4.4 g | 5.0 d | 2.2 bc |

*see Table 1 – patrz tabela 1

Table 3. Yielding of several apricot trees depending on rootstock
Tabela 3. Plonowanie drzew kilku odmian moreli w zależności od podkładki

| Cultivar<br>Odmiana | Rootstock<br>Podkładka | Yield (kg·tree$^{-1}$)<br>Plon (kg·drzewo$^{-1}$) | | | | Cumulative yield<br>Suma plonu (kg·tree$^{-1}$)<br>2008–2011 |
|---|---|---|---|---|---|---|
| | | 2008 | 2009 | 2010 | 2011 | |
| 'Wczesna z Morden'<br>'Morden 604' | Wangenheim Prune<br>Węgierka Wangenheima | 0.1 ab* | 9.3 a-c | 3.2 a | 0.0 a | 12.6 a-d |
| | *P. divaricata* ałycza | 0.0 a | 14.4 d | 9.1 b | 0.1 a | 23.6 f |
| 'Goldrich' | Wangenheim Prune<br>Węgierka Wangeneima | 0.2 bc | 7.4 a-c | 0.7 a | 0.0 a | 8.3 ab |
| | *P. divaricata* ałycza | 0.2 bc | 10.8 b-d | 2.8 a | 0.8 c | 14.6 c-e |
| 'Harlayne' | Wangenheim Prune<br>Węgierka Wangenheima | 0.1 ab | 5.6 a | 2.1 a | 0.0 a | 7.8 a |
| | *P. divaricata* ałycza | 0.1 ab | 10.1 a-d | 6.7 b | 0.6 bc | 17.5 de |
| 'Hargrand' | Wangenheim Prune<br>Węgierka Wangenheima | 0.3 c | 6.4 ab | 1.0 a | 0.0 a | 7.7 a |
| | *P. divaricata* ałycza | 0.2 bc | 11.9 cd | 7.6 b | 0.0 a | 19.7 ef |
| 'Darina' | Wangenheim Prune<br>Węgierka Wangenheima | 0.1 ab | 7.0 ab | 1.2 a | 0.1 a | 8.4 ab |
| | *P. divaricata* ałycza | 0.2 bc | 12.0 cd | 3.1 a | 0.3 ab | 15.6 d-e |
| 'Sirena' | Wangenheim Prune<br>Węgierka Wangenheima | 0.2 bc | 9.2 a-c | 1.3 a | 0.0 a | 10.7 a-c |
| | *P. divaricata* ałycza | 0.0 a | 14.1 d | 2.0 a | 0.0 a | 16.1 d-e |
| 'Kompakta' | *P. divaricata* ałycza | 0.5 d | 10.6 b-d | 3.1 a | 0.1 a | 14.3 b-e |

*see Table 1 – patrz tabela 1

Table 4. Harvest time, mean fruit weight and number of dead trees of several apricot cultivars depending on rootstock
Tabela 4. Daty zbioru, średnia masa owocu i liczba wypadów kilku odmian moreli w zależności od podkładki

| Cultivar<br>Odmiana | Rootstock<br>Podkładka | Harvest time (day/month)<br>Daty zbioru owoców (dzień/miesiąc) | | | Mean fruit weight<br>Średnia masa owocu (g)<br>2009–2010 | Number (%) of dead trees<br>Liczba (%) wypadów<br>Autumn – jesień 2010 |
|---|---|---|---|---|---|---|
| | | 2008 | 2009 | 2010 | | |
| 'Wczesna z Morden'<br>'Morden 604' | Wangenheim Prune<br>Węgierka Wangenheima | 11.07 | 17–20.07 | 13–16.07 | 42 ab* | 1 (12.5%) |
| | *P. divaricata* ałycza | 11.07 | 17–24.07 | 13–20.07 | 42 ab | 1 (12.5%) |
| 'Goldrich' | Wangenheim Prune<br>Węgierka Wangeneima | 11.07 | 17–20.07 | 16.07 | 65 de | 1 (12.5%) |
| | *P. divaricata* ałycza | 11–13.07 | 17–24.07 | 16–20.07 | 66 de | 1 (12.5%) |
| 'Harlayne' | Wangenheim Prune<br>Węgierka Wangenheima | 21.07 | 28–30.07 | 20.07 | 46 b | 1 (12.5%) |
| | *P. divaricata* ałycza | 21.07 | 28–31.07 | 20–23.07 | 41 ab | 0 |
| 'Hargrand' | Wangenheim Prune<br>Węgierka Wangenheima | 23.07 | 4–6.08 | 23.07 | 70 e | 0 |
| | *P. divaricata* ałycza | 23.07 | 4–6.08 | 23–30.07 | 72 e | 1 (12.5%) |
| 'Darina' | Wangenheim Prune<br>Węgierka Wangenheima | 25.07 | 6–9.08 | 30.07 | 59 cd | 4 (50%) |
| | *P. divaricata* ałycza | 25–28.07 | 6–13.08 | 30.07–3.08 | 62 cd | 2 (25%) |
| 'Sirena' | Wangenheim Prune<br>Węgierka Wangenheima | 28.07 | 8–10.08 | 3.08 | 58 c | 2 (25%) |
| | *P. divaricata* ałycza | 28.07 | 8–13.08 | 3–6.08 | 58 c | 1 (12.5%) |
| 'Kompakta' | *P. divaricata* ałycza | 11–13.07 | 17–24.07 | 16–20.07 | 36 a | 2 (25%) |

*see Table 1 – patrz tabela 1

mated rootstocks in blooming intensity. One year later, after severe winter (minimum temperature about -21°C in January) with warmer periods all cultivars bloomed better on strong growing Myrobalan rootstock but significant differences were calculated only with 'Goldrich' and 'Hargrand' cvs. In the third decade of April 2010, temperature dropped down to -4°C destroying more flowers and fruitlets. As a result of this all cultivars yielded poorly.

In the first five years of the experiment, larger crops were harvested only once. In 2008 and 2010, flowers were damaged by spring frosts in the first and in the second decade of April, respectively (about minus 4°C). In 2011, fruitlets were frozen after spring frosts at the beginning of May (the lowest temperature minus 5°C). Up to the 5th year after planting, significantly higher yields gave trees on Myrobalan seedlings (tab. 3). Similar results were recorded by Egea et al. [2004] and Sitarek et al. [2001] with plum trees. According to Grzyb et al. [1996], no significant differences in crops between these rootstocks were observed. In Son and Küden [2003] experiment, fruit yields for all estimated cultivars were higher from trees on apricot seedlings compared to Myrobalan rootstok. In own research the highest total yields was recorded for 'Morden 604' and 'Hargrand' on Myrobalan seedling, while on 'Wangenheim Prune' rootstock – 'Morden 604' and 'Sirena'. The obtained results are comparable with the data published by Grzyb et al. [1996] as well as Licznar-Małańczuk and Sosna [2005a]. Vachůn [2001] reports that 'Hargrand' started to yield in the fourth year after planting and its productivity was moderate. This cultivar is characterized by a high tendency to biennial bearing, too. In this experiment, the cultivar with the lowest total yield, especially on Myrobalan rootstock, was 'Goldrich', which was also confirmed by Alburquerque et al. [2004] in their research.

Ripening time depended mainly on cultivar (tab. 4). On both rootstocks harvests started at the same time but on 'Wangenheim Prune' seedlings it finished earlier. Besides, in years with poor yields (2008, 2010) it was a one-time harvesting. In Turkish studies, dates of maturation were earlier on grafted apricot seedlings than those on Myrobalan rootstocks [Son and Küden 2003]. 'Morden 604', 'Kompakta' and 'Goldrich' were the earliest ripening cultivars. The apricot cultivars which ripened the latest were 'Darina' and 'Sirena'. 'Hargrand' was a medium-late. This is in agreement with the results of Lopez and Brunton [2000]. According to Alburquerque et al. [2004], under southern Spain climate conditions, 'Goldrich' belonged to the latest ripening cultivars.

The rootstock had no influence on mean apricot weight (Tab. 4). Similar results were obtained in plum experiments [Sitarek et al. 2001, Rozpara and Grzyb 2003, Grzyb and Sitarek 2007]. By contrast, other scientists found that trees on 'Wangenheim Prune' seedlings produced smaller fruits [Sitarek and Bartosiewicz 2010]. In foreign experiments, fruits from trees on Myrobalan rootstocks had smaller weight than on apricot seedlings [Son and Küden 2003, Egea et al. 2004]. Fruit weight depended on the cultivar and on crop load. Fruits were smaller in the year in which the productivity was high. 'Hargrand' had significantly largest fruit (mean weight 70–72 g), which was also reported in other studies [Lopez and Brunton 2000, Licznar-Małańczuk and Sosna 2005a]. 'Kompakta', 'Harlayne', and 'Morden 604' trees produced significantly the smallest sized apricots (36–46 g). 'Morden 604' also tended to drop fruits before harvest.

Tree longevity depended on the rootstock and on the cultivar used (tab. 4). According to Vachůn [2002], *Pseudomonas syringae* and *Leucostoma* cincta are the main causes of precocious tree decline. Four years after planting, dead trees on both rootstocks were observed. More of these trees were recorded on *Prunus domestica* L. rootstocks. Obtained results were confirmed by other researchers [Grzyb et al. 1996, Sitarek and Bartosiewicz 2010]. In Iranian experiment [Rahnemoun et al. 2005], trees on Myrobalan seedlings were characterized by their good health status. In the autumn of 2010, the highest number of dead trees was observed with 'Darina', especially on 'Wangenheim Prune' seedlings. Survivability of 'Harlayne' and 'Hargrand' cvs. trees was the best. In the experiments by Vachůn [2002] as well as Licznar-Małańczuk and Sosna [2005b], 'Hargrand' trees were susceptible to bark and wood diseases and precocious declined.

## CONCLUSIONS

1. In the vicinity of Wrocław, yielding of apricot trees was primarily determined by weather conditions. Up to the fifth year after planting, larger crops were harvested only once.
2. Based on the preliminary results from this study, usage 'Wangenheim Prune' seedlings as rootstocks for apricot cultivars implies the risk of too strong growth suppress, poor yielding and precocious decline of trees.
3. Taking into account the yield and quality of fruit, 'Hargrand', 'Darina' and 'Sirena' cvs. especially on Myrobalan rootstocks may be recognized as a suitable for apricot commercial orchards.

## REFERENCES

Alburquerque N., Burgos L., Egea J., 2004. Influence of flower bud density, flower bud drop and fruit set on apricot productivity. Sci. Hort. 102, 397–406.

Blažek J., Vávra R., Hlušičová I., 2005. Fruit evaluation of new plum cultivars in a trial at Holovousy in 2000–2004. Vědecké Práce Ovocnářské 19, 7–22.

Dimitrova M., 2002. Evaluation of some plum rootstocks as rootstock for apricot in the orchard. Acta Hort. 577, 311–314.

Egea J., Ruiz D., Martinez-Gómez P., 2004. Influence of rootstock on the productive behaviour of 'Orange Red' apricot under Mediterranean conditions. Fruits 59(5), 367–373.

Grzyb Z.S., Sitarek M., 2007. Preliminary results on the influence of seedling and clonal rootstocks on tree growth and yield of two plum cultivars. Acta Hort. 732, 267–270.

Grzyb Z.S., Zdyb H., Sitarek M., 1996. Wpływ różnych podkładek na zdrowotność, siłę wzrostu i owocowanie moreli. Zesz. Nauk. ISiK – Skierniewice 3, 55–62.

Knowles S.E., McLaren G.F., Glucina P.G., Alspach P., 1994. Performance of 'Sundrop' apricot on 23 rootstocks. New Zealand J. Crop Hort. Sci. 22, 419–430.

Licznar-Małańczuk M., Sosna I., 2005a. Evaluation of several apricot cultivars and clones in the Lower Silesia climatic conditions. Part I: Blossoming of trees, yield and fruit quality. J. Fruit Ornam. Plant Res. 13, 39–48.

Licznar-Małańczuk M., Sosna I., 2005b. Evaluation of several apricot cultivars and clones in the Lower Silesia climatic conditions. Part II: Vigor, health and mortality. J. Fruit Ornam. Plant Res. 13, 49–57.
Lopez G.P., Brunton G.J., 2000. Performance of apricot cultivars in the northwest area of the region of Murcia. J. Experiment. Fruticul. 21, 163–170.
Monney P., Evéquoz N., Christen D., 2010. Alternative to Myrobalan rootstock for apricot cultivation. Acta Hort. 862, 381–384.
Nasir M.A., Nawaz M.Z., Baksh A., Summrah M.A., 2001. Standardization of rootstock for apricot in the Pothohar Track. J. Biol. Sci. 1(5), 368.
Rahnemoun H., Dejampour J., Khorshidi M.V., 2005. Evaluation of some iranian apricot cultivars grafted on 'Saint Julian A', myrobalan and almond rootstocks. Pładawodstwo 17(2), 149–152.
Reinten E., Stassen P., Wooldridge J., 2009. Apricot rootstock research in South Africa. SA Fruit J. 8(4), 60–63.
Rozpara E., Grzyb Z.S. 2003. Growth, yielding and fruit quality of new german plum cultivars grafted on two rootstocks. Folia Hort. Supl. 2, 192–194.
Sitarek M., Bartosiewicz B., 2010. Wstępna ocena wzrostu i owocowania moreli szczepionych na kilku podkładkach. Mat. XLVI Ogóln. Nauk. Konf. Sadow. Skierniewice 29–30 września, 141.
Sitarek M., Jakubowski T., 2006. Bud-take and maiden tree parameters of two apricot cultivars budded on different seedling rootstocks. Sodininkyste ir Darzininkyste 25(3), 47–51.
Sitarek M., Grzyb Z.S., Kołodziejczak P., 2001. Effect of rootstocks on growth and yield of plum trees. J. Fruit Ornam. Plant Res. 9(1–4), 19–24.
Son L., Küden A., 2003. Effects of seedling and GF-31 rootstocks on yield and fruit quality of some table apricot cultivars grown in Mersin. Turk. J. Agric. For. 27, 261–267.
Sosna I., 2002. Growth and cropping of four plum cultivars on different rootstocks in south western Poland. J. Fruit Ornam. Plant Res. 10, 95–103.
Sottile F., Monde M., Impallari F., 2006. Vegetative and reproductive behaviour of young apricot trees cv. 'Ninfa' as affected by rootstock. Acta Hort. 717, 79–82.
Stanisz A., 2007. Przystępny kurs statystyki. StatSoft Kraków.
Szalay L., Szabo Z., 1999. Blooming time of some apricot varieties of different origin in Hungary. Inter. J. Hort. Sci. 5(1–2), 16-20.
Vachůn Z., 2001. Yield potential of new apricot cultivars and hybrids within the first eight years after planting. Zahradnictví – Hort. Sci. (Prague) 28(2), 41–46.
Vachůn Z., 2002. Evaluation of precocious decline of new apricot (*Prunus armeniaca*) cultivars and seedlings in the first eight years after planting. Acta Univ. Agri. Sylvi. Mendel. Brune. 50(1), 33–44.

## WZROST, PLONOWANIE I PRZEŻYWALNOŚĆ DRZEW KILKU ODMIAN MORELI NA SIEWKACH AŁYCZY I 'WĘGIERKI WANGENHEIMA'

**Streszczenie.** Silny wzrost drzew moreli można osłabić, stosując odpowiednią podkładkę. Podkładka wpływa nie tylko na wzrost, ale również na wysokość i jakość plonu oraz żywotność drzew. Jesienią 2006 r. w Stacji Badawczo-Dydaktycznej w miejscowości Samotwór pod Wrocławiem założono doświadczenie z oceną wartości produkcyjnej kilku nowych odmian moreli na siewkach ałyczy oraz 'Węgierki Wangenheima'. Drzewa odmian

‘Wczesna z Morden’ (kontrola), ‘Goldrich’, ‘Harlayne’, ‘Hargrand’, ‘Darina’, ‘Sirena’ i ‘Kompakta’ (ze względu na słaby wzrost tylko na ałyczy) posadzono w czterech powtórzeniach, po dwa drzewa na poletku. W porównaniu z morelami na ałyczy, drzewa na siewkach Węgierki rosły istotnie słabiej. Najsilniejszym wzrostem wegetatywnym charakteryzowała się odmiana ‘Wczesna z Morden’ (kontrola), natomiast najsłabszym ‘Kompakta’. Do piątym roku po posadzeniu najwięcej owoców zebrano z drzew odmian ‘Wczesna z Morden’ i ‘Hargrand’ na ałyczy. Istotnie lepiej plonowały morele na siewkach ałyczy. Podkładka nie miała wpływu na średnią masę owocu. Jesienią 2010 r. najwięcej wypadów odnotowano u ‘Dariny’, zwłaszcza na siewkach Węgierki.

**Słowa kluczowe:** *Prunus armeniaca*, podkładki, plonowanie, jakość owoców, zdrowotność

Accepted for print – Zaakceptowano do druku: 25.10.2011