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EFFECT OF THE KIND OF GROWING MEDIUM AND TRANSPLANT GRAFTING ON THE CHERRY TOMATO YIELDING

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Abstract. The most popular and efficient growing medium in soilless crop are rockwool but researches try to introduce as well other growing media to horticultural practice. Nowadays cherry tomato is a widespread typ grown under greenhouse conditions and grafting can be a resource let to obtain cultivars with a higher fruit yielding. Two tomato cultivars: typical cherry ones as 'Dasher' with red skin and 'Organza' with yellow skin were grown in the years 2008–2009. Half of the plants were grafted on the stock of 'Maxifort '.Tomatoes were cultivated on organic media such as coconut fiber slabs, wood fiber slabs and rockwool slabs. Grafting increased yielding of cherry tomato in particular cultivated on coconut fiber and wood fiber slabs. The grafting plants of 'Dasher' cultivar produced much more fruit than not grafted ones. The increase of fruit weight as a result of grafting was observed in 'Organza' cultivar. Grafted plants of 'Organza' had significantly less fruit with BER than not grafted ones. 'Dasher' yielded considerably less than 'Organza'. 'Dasher' produced the highest yield at the begining of harvest time. The yielding of 'Organza' was at the same level during the entire harvest time. Early yield of both cultivars was the highest on the wood fibre slabs with grafted plants. The growing media used in the experiment – coconut fiber and wood fiber, proved their suitability in tomato soilless cultivation.

Key words: coconut fiber, wood fiber, rockwool, stock

INTRODUCTION

Soilless plant cultivations are popular in vegetable crops production because of their important advantages [Gäredal and Lundegärdh 1997, Jensen 1999]. The most popular and efficient growing medium in soilless crop are rockwool slabs. Problems with rockwool slabs utilization after completing the growing cycle stimulate researches to introduce other, more environment friendly, growing media to horticultural practice. Wood

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fiber and coconut fiber are especially promising as environment friendly growing substrates [Gruda and Schnitzler 2004, Urrestarazu et al. 2008].

The application of grafting began towards the end of 1920, initialy to limit the effects of soil pathogens such as *Fusarium oxysporum* [Ke and Salveit 1988]. The cultivated area of grafted tomato plants has increased in recent years. According to the recent studies, grafting was a useful technique to enhance nutrient uptake, increase yields, avoid diseases and improve stress tolerance because of the vigorous root system of rootstocks [Lee 1994, Santa-Cruz et al. 2002, Chen et al. 2003, Bletsos 2006, Ahmedi et al. 2007, Erismann et al. 2008, Martinez-Rodriguez et al. 2008, Johkan et al. 2009]. He et al. [2009] suggest that grafting increases salt tolerance of tomato by the improvement of photosynthesis and enhancement of antioxidant enzyme activity. Furthermore, grafting effect on the tomato salinity response depends on the shoot genotype [Santa-Cruz et al. 2002]. One of the main objective of grafting is to obtain cultivars with a higher fruit production and quality [Lee 1994, Fernandez-Garcia et al. 2002].

Nowadays cherry and other tomato is a widespread type of table tomato, grown in northen Europe mostly under greenhouse conditions.

The aim of this work was to compare the yielding of cherry tomato cultivars in relation to growing medium and grafting.

MATERIAL AND METHODS

The experiment was carried out at Warsaw University of Life Sciences at the greenhouse with controlled microclimate in the 2008 and 2009 year. Two tomato cultivars: typical cherry ones as 'Dasher' with red skin and 'Organza' with yellow skin were used in the study. Half of the plants were grafted on the stock of 'Maxifort'.

Tomato seeds were germinated in rokwool plugs. Grafting of one part of plants was performed when seedling developed 1–2 leaves using the procedure as it is done in horticultural in practice. After the graft was established, grafted and non-grafted seedlings were transfered to rokwool pots. When the first truss was visible grafted and non-grafted plants were transplanted on three different type of growing medium slabs. Tomatoes were cultivated on organic mediums such as coconut fiber slabs (manufacturer: Ceres Intern.), wood fiber slabs (Steico S.A.) and rockwool slabs (Grodan BV), commonly used as the standard growing medium for tomato. Slabs dimensions in all the cases were 100 × 15 × 7.5 cm (length × width × height). The plants were trained on a single stem up a string according to the high wire system for long extend growing cykle with a mean density of 2.7 plants m^{-2} over the entire greenhouse. Tomatoes were fertigated by a computer controlled drip-irrigation system and fertilized with similar rates of macro- and micro-nutrients, according to the levels recommended for tomato. The amount of the nutrient supply ranged from 70 to 200 cm^3 per plant and was adjusted to the plant growth phase, light conditions as well as growing medium. Nutrients concentration in the solution, EC (electro-conductivity) and pH were continuously controlled and kept at uniform levels for all experimental objects. The concentration of nutrients (in $mg \cdot dm^{-3}$) was as follows: $N\text{-}NO_3$ – 210, P – 60, K – 340, Mg – 50,

Ca – 200, Fe – 2, Mn – 0.6, B – 0.3, Cu – 0.15, Zn – 0.3, Mo – 0.05. The experiment was established in random design, in three replicates, with 8 plants in each.

At harvest fruits were collected to determine their yield and quality. Dynamic of tomato yielding, marketable, unmarketable, fruit with blossom end rot (BER) and total yield were investigated. The number and average weight of fruit were determined, too. In the greenhouse, EC, pH of the nutrient solutions in the growing slabs were recorded weekly and the volume of the influx nutrient solutions were recorded daily throughout all growing period. The EC and pH were measured using a mesurement hand instrument DGT-Volmatic.

Data obtained were subjected to the analysis of variance (ANOVA), and Tukey's HSD test was used to show which values differ significantly at $\alpha = 0.05$.

RESULTS AND DISCUSSION

The mean data of EC and pH of the nutrient solutions in the growing slabs showed very close the quality for compared combinations. The level of EC ranged from 4.19 $dS \cdot m^{-1}$ for rockwool slabs with grafting plants to 3.55 $dS \cdot m^{-1}$ for wood fiber slabs with no grafting plants (tab. 1). In each combination growing medium and grafted plants a litle higher level of EC was observed than in the case of non grafted ones. This value of EC should not have a negative influence on tomato yield. Mitchell et al. [1991] reported that the limit of EC which allowed well fertilised plants is within the range from 1.6 to 3.1 $dS \cdot m^{-1}$. The threshold of EC above which the yield losses up to 50% according to Maas and Hoffman [1977] is 7.6 $dS \cdot m^{-1}$ and to Li et al. [2001] – 6 $dS \cdot m^{-1}$. Other threshold values and rates of decrease were attributed to different cultivars [Agong et al. 2003]. An unexpectedly high pH was found in the case of wood fiber slabs both with grafted and not grafted plants (tab. 1). The probable reason was the use at the beginning of crop cycle (during first month) the monopotassium phosphate to supply phosphorus in nutrients solution to irrigate wood fiber slabs instead of phosphoric acid as phosphates used for other media. However, no physiological desorders such as characterystic symptoms of lack of any minerals elements on plant growing on wood fibre medium was observed.

Tabela 1. EC and pH of the nutrient solutions in the growing slabs (2008–2009)
Tabela 1. EC i pH roztworu pożywek w matach uprawowych (2008–2009)

Growing medium Podłoże	Grafting Szczepienie	pH	EC $mS \cdot cm^{-1}$
Rockwool Wełna mineralna	grafted – szczepione	6.59	4.19
	not grafted – nieszczepione	6.62	3.92
Coconut fiber Włókno kokosowe	grafted – szczepione	6.42	3.87
	not grafted – nieszczepione	6.45	3.73
Wood fiber Włókno drzewne	grafted – szczepione	7.00	3.75
	not grafted – nieszczepione	6.96	3.55

Table 2. Yielding of tomato cultivated on different growing medium with and without grafting in depend on cultivar (2008–2009)
Tabela 2. Plonowanie pomidora uprawianego na różnych podłożach ze szczepieniem i bez w zależności od odmiany (2008–2009)

Growing medium Podłoże	Grafting Szczepienie	Cultivar 'Dasher' – Odmiana 'Dasher'					Cultivar 'Organza' – Odmiana 'Organza'				
		total yield plon całkowity	marketable yield plon handlowy	weight of marketable fruit masa owocu handlowego	unmarketable fruit owoce poza wyborem	BER	total yield plon całkowity	marketable yield plon handlowy	weight of marketable fruit masa owocu handlowego	unmarketable fruit owoce poza wyborem	BER
		$kg \cdot m^{-2}$		g	$kg \cdot m^{-2}$		$kg \cdot m^{-2}$		g	$kg \cdot m^{-2}$	
Rockwool Wełna mineralna	graft. – szcz.	12.27 b*	11.50 b	12.36 b	0.68 b	0.09 a	30.28 a	27.86 a	57.05 bc	1.94 b	0.47 b
	ngraft. – nszcz.	12.27 b	11.56 b	12.16 b	0.62 b	0.08 ab	29.56 ab	27.11 ab	57.58 b	1.87 bc	0.58 a
Coconut fiber Włókno kokosowe	graft. – szcz.	13.74 a	12.45 a	12.32 b	1.23 a	0.07 b	29.84 a	27.80 a	60.56 a	1.72 c	0.32 c
	ngraft. – nszcz.	12.33 b	11.68 b	12.49 b	0.56 b	0.06 b	30.86 a	28.52 a	57.62 b	2.02 ab	0.31 c
Wood fiber Włókno drzewne	graft. – szcz.	13.13 ab	12.37 a	12.50 ab	0.69 b	0.07 b	30.77 a	28.44 a	59.19 ab	2.07 ab	0.26 c
	ngraft. – nszcz.	12.67 b	11.96 ab	13.03 a	0.69 b	0.05 b	28.14 b	25.64 b	55.19 c	2.23 a	0.26 c
Mean Średnia	rockwool wełna min.	12.27 a	11.53 a	12.26 a	0.65 a	0.09 a	29.92 a	27.48 a	57.31 a	1.90 a	0.53 a
	coconut fiber włókno kok.	13.04 a	12.06 a	12.41 a	0.91 a	0.06 a	30.35 a	28.16 a	59.09 a	1.87 a	0.32 b
	wood fiber włókno drz.	12.90 a	12.16 a	12.76 a	0.69 a	0.06 a	29.46 a	27.04 a	57.19 a	2.15 a	0.26 b
Mean Średnia	graft. – szcz.	13.05 a	12.11 a	12.39 a	0.87 a	0.07 a	30.29 a	28.03 a	58.93 a	1.91 a	0.35 a
	ngraft. – nszcz.	12.42 a	11.73 a	15.56 a	0.64 a	0.06 a	29.52 b	27.09 b	56.80 b	2.04 a	0.39 a
Mean Średnia	2008	12.76 a	11.72 a	11.98 b	0.96 a	0.07 a	29.03 b	26.20 b	54.37 b	2.43 a	0.40 a
	2009	12.71 a	12.11 a	12.97 a	0.54 b	0.06 a	30.79 a	28.92 a	61.36 a	1.52 b	0.34 a
Mean – Średnia		12.73	11.92	12.48	0.75	0.07	29.91	27.56	57.86	1.98	0.37

* Means followed by the same letters are not significantly different for $p < 0.05$
* Średnie oznaczone tymi samymi literami nie różnią się istotnie dla $p < 0,05$

Table 3. The number of fruit of tomato cultivated on different growing medium with and without grafting in depend on cultivar (2008–2009)
Tabela 3. Liczba owoców pomidora uprawianego na różnych podłożach ze szczepieniem i bez w zależności od odmiany (2008–2009)

Growing medium Podłoże	Grafting Szczepienie	Cultivar 'Dasher' – Odmiana 'Dasher'				Cultivar 'Organza' – Odmiana 'Organza'			
		number of fruit, No.·m^{-2} – liczba owoców, szt.·m^{-2}							
		total yield plon całkowity	marketable yield plon handl.	unmarketable fruit owoce poza wyb.	BER	total yield plon całkowity	marketable yield plon handl.	unmarketable fruit owoce poza wyb.	BER
Rockwool Wełna mineralna	graft. – szcz.	1030.8 b*	931.0 b	91.4 b	8.4 a	553.8 a	490.9 ab	52.2 b	10.7 ab
	ngraft. – nszcz.	1041.2 b	951.4 b	83.2 b	6.6 ab	539.3 a	471.7 ab	53.5 b	14.1 a
Coconut fiber Włókno kokosowe	graft. – szcz.	1120.0 a	1011.0 a	102.5 b	6.5 ab	514.7 b	461.81 b	45.4 c	7.5 b
	ngraft. – nszcz.	1025.9 b	935.8 b	84.3 b	5.8 b	554.7 a	495.5 a	52.2 b	7.0 b
Wood fiber Włókno drzewne	graft. – szcz.	1138.2 a	990.6 ab	139.6 a	8.0 ab	540.9 a	480.4 ab	53.9 b	6.6 b
	ngraft. – nszcz.	1019.3 b	917.7 b	94.8 b	6.3 b	535.6 ab	465.2 b	58.8 a	11.6 ab
Mean Średnia	rockwool wełna min.	1036.0 a	941.2 a	87.3 a	7.5 a	546.6 a	481.3 a	52.9 a	12.4 a
	coconut fiber włókno kok.	1073.0 a	973.4 a	93.4 a	6.2 a	534.7 a	478.6 a	48.8 a	7.3 a
	wood fiber włókno drz.	1078.8 a	954.2 a	117.2 a	7.1 a	538.3 a	472.9 a	56.3 a	9.1 a
Mean Średnia	graft. – szcz.	1096.3 a	977.6 a	111.2 a	7.6 a	536.5 a	477.7 a	50.5 a	8.3 a
	ngraft. – nszcz.	1028.8 a	937.0 b	87.4 a	6.3 a	543.2 a	477.4 a	54.8 a	10.9 a
Mean Średnia	2008	1130.7 a	977.9 a	144.3 a	8.5 a	558.5 a	482.6 a	64.5 a	11.4 a
	2009	994.4 b	934.6 b	54.3 b	5.3 b	521.2 b	472.6 a	40.9 a	7.8 a
Mean – Średnia		1062.6	956.3	99.3	6.9	539.9	477.6	52.7	9.6

* Means followed by the same letters are not significantly different for $p < 0.05$
* Średnie oznaczone tymi samymi literami nie różnią się istotnie dla $p < 0,05$

The results of the experiment show that the yield of tomato depended on the cultivar and were different in the each year of study. Mean total and marketable yield in the year 2008 and 2009 'Dasher' cultivar was 12.73 kg and 11.92 kg·m^{-2} and 'Organza' 29.91 kg and 27.56 kg·m^{-2} respectively (tab. 2). The year of cultivation affected mean weight and the number of fruit in both compared cultivars (tabs. 2 and 3). That is why it can be said that better growing conditions for the tomato yielding in central Poland were observed in the year 2008 than 2009. It was proved that the productivity of greenhouse tomato is strongly influenced by the total radiation upon the crop [de Koning 1994, Cockshull et al. 1992].

The data showed a positive effect of grafting on tomato yielding but significant effect was observed only with 'Organza' cultivar. Furthermore the grafted plants of 'Dasher' produced much more fruit than not grafted ones but their weight was similar. However, the response of 'Organza' cultivar as scion on the Maxifort rootstok also showed a significant increase of tomato fruit weight and in consequence the gain of marketable and total yield. Grafted plants of 'Organza' had too less fruit with BER than not grafted ones (tabs 2 and 3). It can be explained according to Ruiz et al. [1997] who claims that a vigorus root system of a rootstok is often capable of absorbing water and nutrients more efficiently than scion roots. The main general objective of using rootstocks is to increase scion growth and development rate, yield and fruit quality [Venema

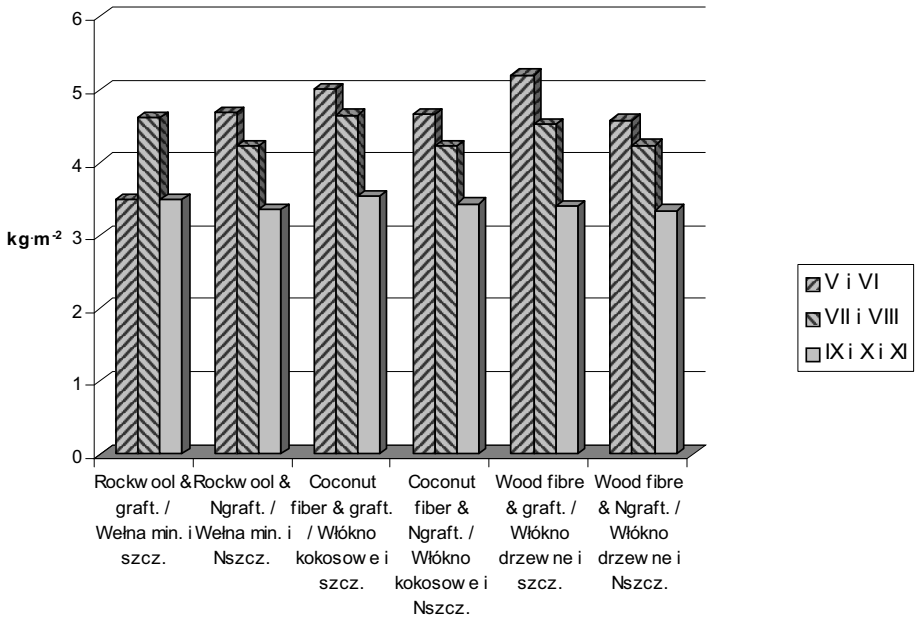

Fig. 1. The dynamics of the cultivar 'Dasher'yielding in the three periods of harvest time in depend on growing medium and grafting (2008–2009)

Ryc. 1. Dynamika plonowania odmiany 'Dasher' w trzech okresach plonowania w zależności od podłoża i szczepienia (2008–2009)

et al. 2008]. Different rootstocks and scions genotype show variations in responses of tomato to stress conditions during the cultivation [Lee 1994, Ruiz et al. 1997, Santa-Cruz et. al. 2002].

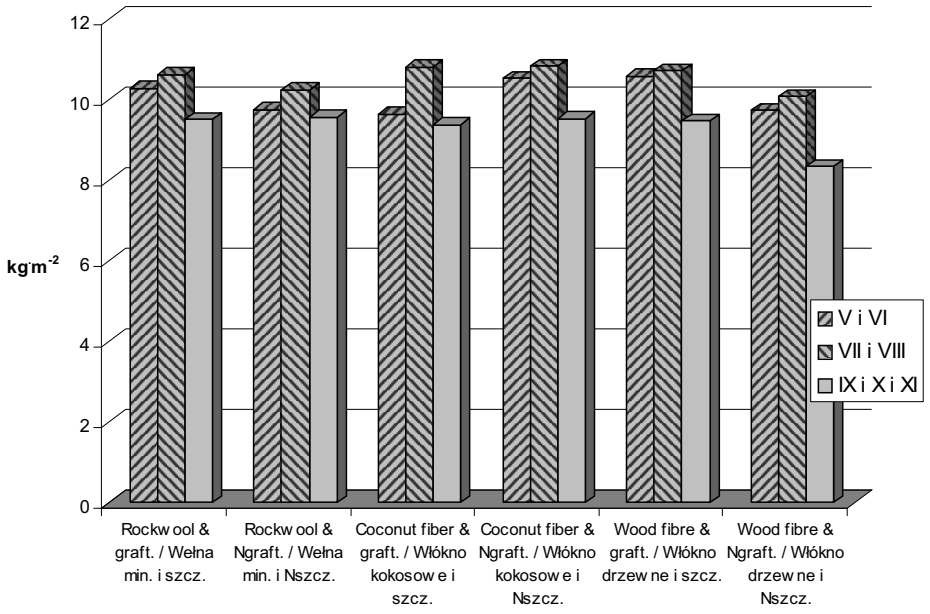

Fig. 2. The dynamics of the cultivar 'Organza' yielding in the three periods of harvest time in depend on growing medium and grafting (2008–2009)

Ryc. 2. Dynamika plonowania odmiany 'Organza' w trzech okresach plonowania w zależności od podłoża i szczepienia (2008–2009)

There were no significant effects of the growing mediums on the mean total yield of tomato during the entire year (tabs 2 and 3). However, a higer mean weight of cv. 'Dasher's' fruit usually was obtained on wood fiber slabs than on others. Marketable and total yields of tomato and the number of harvested fruit were the highest in a combinations with grafted plants especially on the organic growing mediums. Cultivar Organza produced the highest weight of marketable fruit from grafted plants growing on coconut fiber slabs, but the lowest one from not grafted plants growing on wood fiber slabs. 'Organza' was characterised by a higher sensitivity than 'Dasher' to physiological disorders such as BER (tabs 2 and 3).

Comparing the yielding of the investigated cultivars is presented as a sum of yieldings obtained in three periods: at the beginning of yielding (IV, V and VI), at the full of yielding (VII and VIII) and in the autumn (IX, X and XI) (figs 1 and 2). The highest yielding in the first period 'Dasher' cultivar obtained in the combination on wood fibre with grafting (5.20 kg·m^{-2}) and on coconut fibre with grafting (5.00 kg·m^{-2}). On the other hand, the remaining combinations with the 'Dasher' cultivar had lower yielding.

Grafted plants of 'Organza' cultivar grown on wood fibre also produced the highest yield of fruit in the first period (10.59 kg·m^{-2}), however, the differences were not significant. The average total yielding of tomato counted from the beginning of yield until the end of June amounted to 4.60 kg·m^{-2} for 'Dasher' cultivar and 10.09 kg·m^{-2} for 'Organza' cultivar, the yield gathered in July until the end of August was 4.41 kg·m^{-2} and 10.55 kg·m^{-2}, respectively, while in the autumn months from September to the end of November it was respectively 3.42 kg·m^{-2} i 9.29 kg·m^{-2}.

CONCLUSIONS

1. There was observed a positive effect of grafting on tomato yielding. The grafting plants of 'Dasher' cultivar produced much more fruit than not grafted ones. The increase of fruit weight as a result of grafting was observed in 'Organza' cultivar. Grafted plants of 'Organza' had significantly less fruit with BER than not grafted ones

2. The yield with 'Dasher' was considerably lower than with 'Organza'. 'Dasher' produced the highest yield at the begining of harvest time. The yielding of 'Organza' is at the same level during the entire harvest time.

3. Early yield of both cultivars was the highest on the wood fibre slabs with grafted plants. All the three growing media used in the experiment – coconut fiber, wood fiber and rockwool, proved their suitability in tomato soilless cultivation.

REFERENCES

Agong S.G., Kingetsu M., Yoshida Y., Yazawa S., Masuda M., 2003. Response of tomato genotypes to induced salt stress. J. Afr. Crop Sci. 11 (2), 133–142.

Ahmedi W., Nawaz M.A., Iqbal M.A., Khan M.M., 2007. Effect of different rootstocks on plant nutrient status and yield in Kinnow mandarin (*Citrus reticulata* Blanco). Pak. J. Bot. 39, 1779–1786.

Bletsos F.A., 2006. Grafting and calcium cyanamide as alternatives to methyl bromide for greenhouse eggplant production. Scientia Hort. 107, 325–331.

Chen G., Fu X., Lips S.H., Sagi M., 2003. Control of plant growth resides in the shoot, and not in the root, in reciprocal grafts of *flacca* and wild-type tomato (*Lycopersicon esculentum*), in the presence and absence of salinity stress. Plant and Soil 256, 205–215.

Cockshull K.E., Graves C.J., Cave C.R.J., 1992. The influence of shading on yield of glasshouse tomatoes. J. Hort. Sci. 67 (1), 11–24.

de Koning A.N.M., 1994. Development and dry matter distribution in glasshouse tomato: a quantitative approach. Ph.D. Dissertation. Wageningen Agricultural University, Wageningen, 240 pp.

Erismann N.D., Machado E.C., Tucci M.L.S., 2008. Photosynthetic limitation by CO_2 diffusion in drought stressed orange leaves on three rootstocks, Photosynth. Res., 96, 163–172.

Fernandez-Garcia N., Martinez V., Cerda A., Carvajal M., 2002. Water and nutrient uptake of grafted tomato plants grown under saline conditions. J. Plant Physiol. 159, 899–905.

Gäredal L., Lundegärdh B., 1997. A test system with limited beds for evaluation of growing methods, applied to ecologically cultivated greenhouse tomatoes (*Lycopersicon esculentum* Mill.) Biol. Agri. and Hort. 14, 291–301.

Gruda, N. and W.H. Schnitzler, 2004. Suitability of wood fiber substrates for production of vegetable transplants. II. The effect of wood fiber substrates and their volume weights on the growth of tomato transplants. Sci. Hortic. 100, 333–340.

He Y., Zhu Z., Yang J., Ni X., Zhu B., 2009. Grafting increases the salt tolerance of tomato by improvement of photosynthesis and enhancement of antioxidant enzymes activity. Env. Exper. Botany 66, 270–278.

Jensen, M.H., 1999. Hydroponic worldwide. Acta Hortic., 481, 819–729.

Johkan M., Mitukuri K., Yamasaki S., Mori G., Oda M., 2009. Causes of defoliation and low surival rate of grafted sweet pepper plants. Scientia Hort. 119, 103–107.

Ke D., Salveit M.E., 1988. Plant hormone interaction and phenolic metabolism in the regulation of russet spotting in iceberg lettuce. Plant Physiol. 88, 1136–1140.

Lee J.M., 1994. Cultivation of grafted vegetables. I. Current status, grafting methods, and benefits. Hortic. Sci. 29, 235–239.

Li Y.L., Stanghellini C., Challa H., 2001. Effect of electrical conductivity and transpiration on production of greenhouse tomato (*Lycopersicon esculentum* L.). Sci. Hortic. 88, 11–29.

Martinez-Rodriguez M.M., Estan M.T., Moyano E., Garcia-Abellan J.O., Flores F.B., Campos J.F., Al-Azzawi M.J., Flowers T.J., Bolarin M.C., 2008. The effectiveness of grafting to improve salt tolerance in tomato when an 'excluder' genotype is used as scion. Env. Exper. Botany 63, 392–401.

Maas E.V., Hoffman G.J., 1997. Crop salt tolerance-current assessment. J. Irrig. Drain. Div. 103, 115–134.

Mitchell J.P., Shennan C., Grattan S.R., May D.M., 1991. Tomato fruit quality under water deficit and salinity. J. Am. Soc. Hortic. Sci. 116, 215–221.

Ruiz D., Martinez V., Cerda A., 1997. *Citrus* response to salinity, growth and nutrient uptake. Tree Physiol. 17, 141–150.

Santa-Cruz A., Martinez-Rodriguez M.M., Perez-Alfocea F., Romero-Aranda R., Bolarin M.C., 2002. The rootstock effect on the tomato salinity response depends on the shoot genotype. Plant Science, 162, 825–831.

Urrestarazu M., Guillén C., Mazuela P.C., Carrasco G. 2008. Wetting agent effect on physical properties of new and reused rockwool and coconut coir waste. Sci. Hort. 116, 104–108.

Venema J.H., Dijk B.E., Bax J.M., Van Hasselt Ph.R., Elzenga J.T.M., 2008. Grafting tomato (*Solanum lycopersicum*) onto the rootstock of a high-altitude accession of *Solanum habrochaites* improves suboptimal-temperature tolerance. Env. Exper. Botany, 63, 359–367.

WPŁYW RODZAJU PODŁOŻA I SZCZEPIENIA ROZSADY NA PLONOWANIE POMIDORA CHERRY

Streszczenie. W uprawach bezglebowych wełna mineralna jest najbardziej popularnym i wydajnym podłożem, ale naukowcy próbują do praktyki ogrodniczej wprowadzać także inne podłoża. Obecnie w warunkach szklarniowych rozprzestrzenia się uprawa pomidora cherry, a szczepienie może być zabiegiem pozwalającym uzyskać wysokie plonowanie odmian. W latach 2008 i 2009 uprawiano dwie odmiany pomidora: 'Dasher' – odmianę typu cherry o czerwonej skórce i 'Organza' – o żółtej skórce. Połowę roślin szczepiono na podkładce Maxifort F_1. Pomidory uprawiano na podłożach organicznych, takich jak włókno kokosowe i włókno drzewne oraz na wełnie mineralnej. Szczepienie zwiększyło plonowanie pomidora cherry, szczególnie uprawianego na matach z włókna kokosowego

i z włókna drzewnego. Szczepione rośliny odmiany ‘Dasher’ produkowały znacznie więcej owoców niż nieszczepione. U odmiany ‘Organza’, jako wynik szczepienia, obserwowano zwiększenie masy owoców. Szczepione rośliny odmiany ‘Organza’ miały istotnie mniej owoców z BER w porównaniu z nieszczepionymi. Odmiana ‘Dasher’ zdecydowanie słabiej plonowała niż ‘Organza’. ‘Dasher‘ produkowała wyższy plon na początku okresu owocowania. Plonowanie odmiany ‘Organza’ było bardzo wyrównane w ciągu całego okresu zbiorów. Najwyższy plon wczesny u obu odmian zebrano z roślin szczepionych i uprawianych na matach z włókna drzewnego. Uzyskane wyniki potwierdzają przydatność zastosowanych w doświadczeniu podłoży – włókna kokosowego i włókna drzewnego w bezglebowej uprawie pomidora.

Słowa kluczowe: włókno kokosowe, włókno drzewne, wełna mineralna, podkładka

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