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STUDY ABOVE MELON CULTIVATION IN POLAND

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The influence of agricultural practices - foliar fertilization, mulching, planting seedlings in terms of yield and quality of melon when grown in Poland. A study of six varieties.

Keywords: *foliar fertilization, mulching, agro-date, yield and quality.*

The goods cultivation of melon in Poland is being conducted to the little scale. Mostly it is planting for pleasure in home and home-grown gardens. High thermal and light requirements of melon are a barrier reducing the possibility of popularizing it cultivation in Poland. Melon is a plant of the continental climate, which is characterized by a hot, sunny and dry summer (Bouwkamp et al. 1978). On the climate of eastern Poland in the large degree affects the polar-continental air mass as compared to the rest part of the country.

The average annual temperature here amounted to 7.5 ° C, the annual sum of precipitations about 450-600 mm. Changes of weather conditions observed in a last few decades over the summer period caused increase the air temperature and simultaneous decrease precipitation. Such conditions are suitable for the cultivation of melon (Michalska and Kalbarczyk 2005).

Lack of cultivars suitable for cultivation under the climatic conditions of Poland has for many years been an obstacle to the spread of melon cultivation. Since 1990, several new valuable cultivars bred in Poland have been added to the Polish National List of Varieties of Vegetable Plants.

For 12 years Department of Horticulture, the Siedlce University of Natural Sciences and Humanities, is carrying out research above the agrotechny of melon. The aim of the studies it is elaborate the appropriate cultivation methods of melon under the climatic conditions of central-eastern Poland. It is estimate a usefulness of Polish and foreign cultivars and an influence of different agrotechny treatments e. g. covering, soil mulching with synthetic material, cutting, foliar feeding on the yield level and selected components of nutritive value of melon fruits.

The first study in the Department of Horticulture regarding a usefulness of few melon cultivars for cultivation under the weather conditions of Poland. It was investigated 9 melon cultivars (‘Pacstart’, ‘Yupi’, ‘Gattopardo’, ‘Polydor II’, ‘Seledyn’, ‘Legend’, ‘Charentais F_1’, ‘Melba’, ‘Fiesta’). Among the examined cultivars the highest marketable yield produced ‘Yupi’, ‘Seledyn’, ‘Pacstart’ and

‘Gattopardo’, however, the highest content of nutritive components was found in the fruit of ‘Pacstart’, ‘Yupi’ and ‘Legend’.

Foliar feeding

For further study selected six the most valuable in terms of yielding and nutritive value cultivars. In the study carried out in 2005-2007 to evaluate an effect of foliar application of Florovit (0,25%) and Ekolist-Warzywa (0,5%) + Urea (0,1%) on the yield level and quality of selected melon cultivars (‘Pacstart’, ‘Yupi’, ‘Seledyn’, ‘Polydor II’, ‘Gattopardo’, ‘Legend’). Florovit and Ekolist-Warzywa are popular horticultural liquid fertilizers containing macro- (N, P, K, Ca, Mg) and micro-elements (Mg, B, Cu, Fe, Mn, Mo, Zn). The total yield was achieved from Florovit and Ekolist-fertilized plants did not differ significantly. A higher total yield was achieved from Florovit-fertilized plants compared with control object (tab. 1).

Table 1

Effect of foliar feeding on the melon yield (mean for year 2005-2007)

Cultivar	Kind of foliar feeding							
	I*	II*	III*	mean	I*	II*	III*	mean
	Total yield ($kg \cdot m^{-2}$)				Total number of fruit ($fruit \cdot m^{-2}$)			
Pacstart	2.40	2.77	2.62	2.60	3.21	3.30	3.69	3.40
Yupi	2.94	3.19	3.10	3.08	3.39	3.45	3.42	3.42
Gattopardo	2.81	2.83	3.04	2.89	3.95	4.17	3.99	4.04
Polydor II	1.98	2.06	1.85	1.96	2.98	3.23	2.94	3.05
Seledyn	2.84	3.12	2.93	2.96	3.48	3.77	3.69	3.65
Legend	1.90	2.21	2.00	2.04	2.41	2.56	2.48	2.48
Mean	2.48	2.70	2.59	2.59	3.24	3.42	3.37	3.34
$LSD_{0,05}$ for:								
kind of foliar feeding	0.19				n.s.			
cultivar	0.37				0.46			

I* - control, II* - Florovit, III* - Ekolist+Urea

Foliar feeding with Ekolist contributed to significant decrease total sugars and monosaccharides content compared with control object. However, both investigated fertilizers did not cause any changes in the dry matter and ascorbic acid content in melon fruit (tab. 2).

Irrespective of the kind of foliar feeding, most dry matter was produced by ‘Pacstart’, total sugar and monosaccharides by ‘Yupi’ and ascorbic acid by ‘Legend’. In the studies of many authors foliar feeding did not have an influence on the biological value of vegetables. In turn, found that supplemental foliar feeding of potassium during fruit development and maturation can improve melon fruit quality by increasing firmness, sugar content, and ascorbic acid and beta-carotene levels.

Table 2

Effect of foliar feeding on the selected components of nutritive value of melon (mean for year 2005-2007)

Cultivar	Kind of foliar feeding							
	I*	II*	III*	mean	I*	II*	III*	mean
	Dry matter (%)				Ascorbic acid (mg·100 g^{-1} f.m.)			
Pacstart	5.29	5.40	5.25	5.31	16.90	17.79	17.40	17.36
Yupi	5.40	5.14	5.32	5.28	17.23	17.39	17.29	17.31
Gattopardo	4.81	4.71	4.60	4.70	17.36	16.44	16.92	16.91
Polydor II	4.81	4.69	4.65	4.72	16.64	16.68	16.93	16.75
Seledyn	4.57	4.32	4.57	4.49	16.72	17.18	17.68	17.20
Legend	5.24	5.05	5.14	5.14	17.91	17.64	17.99	17.85
Mean	5.02	4.88	4.92	4.94	17.13	17.19	17.37	17.23
$LSD_{0,05}$ for:								
kind of foliar feeding	n.s.				n.s.			
cultivar	0.27				0.86			
	Total sugar (% f.m.)				Monosaccharides (% f.m)			
Pacstart	4.25	4.32	4.07	4.21	0.99	1.05	0.96	1.00
Yupi	4.43	4.09	4.22	4.25	1.18	1.08	1.14	1.14
Gattopardo	3.70	3.57	3.47	3.58	0.97	0.95	0.88	0.93
Polydor II	3.82	3.61	3.47	3.63	0.95	0.92	0.90	0.92
Seledyn	3.35	3.31	3.45	3.37	0.79	0.79	0.81	0.80
Legend	4.15	4.11	4.12	4.13	1.01	0.96	0.89	0.95
Mean	3.95	3.83	3.80	3.86	0.98	0.96	0.93	0.96
$LSD_{0,05}$ for:								
kind of foliar feeding	0.15				0.05			
cultivar	0.24				0.11			

Soil mulching

In 2006-2008 was carried out the study regarding the effect of soil mulching with synthetic material (black polyethylene film, black polypropylene nonwoven and black polypropylene fabric) on the fruit yield and quality as well as selected components of nutritive value of two melon cultivars – Polish ‘Seledyn’ and Dutch ‘Yupi’. It was found that ‘Seledyn’ produced significantly higher early and total fruit yield, a higher number of fruit in the early yield and the fruit was characterized a higher mean weight than ‘Yupi’ (tab. 3).

However, ‘Yupi’ fruit had significantly more dry matter, total sugars, monosaccharides and ascorbic acid as compared to ‘Seledyn’ (tab. 4). Soli mulching did not have a significant influence on the melon yield, however, it was noticed a tendency to a little increase of yield on the black polypropylene nonwoven mulched soil (tab. 3).

Table 3

Effect of soil mulching on the total yield and parameters of early yield of melon (mean for year 2006-2008)

Investigated parameters	Cultivar	Mulches				Mean
		control	polyethylene film	polypropylene nonwoven	polypropylene fabric	
Total yield ($kg \cdot m^{-2}$)	Seledyn	3.83	4.38	4.12	4.04	4.09
	Yupi	3.45	2.93	3.88	3.75	3.50
	mean	3.64	3.65	4.00	3.90	3.80
$LSD_{0,05}$ for: cultivar = 0.29; kind of cover = n.s.						
Early yield ($kg \cdot m^{-2}$)	Seledyn	1.65	1.59	1.48	1.48	1.55
	Yupi	1.39	1.09	1.00	1.06	1.14
	mean	1.52	1.34	1.24	1.27	1.34
$LSD_{0,05}$ for: cultivar = 0.30; kind of cover = n.s.						
Number of fruit in early yield ($fruit \cdot m^{-2}$)	Seledyn	1.03	1.02	0.87	1.03	0.99
	Yupi	1.03	0.92	0.63	0.69	0.82
	mean	1.03	0.97	0.75	0.86	0.90
$LSD_{0,05}$ for: cultivar = 0.10; kind of cover = n.s.						
Mean weight of marketable fruit (kg)	Seledyn	1.67	1.66	2.32	1.84	1.87
	Yupi	1.38	1.08	1.29	1.41	1.29
	mean	1.52	1.37	1.81	1.62	1.58
$LSD_{0,05}$ for: cultivar = 0.28; kind of cover = n.s.						

Black foil significantly increase early and very early yield of vegetables, which probably resulted from the increased soil temperature. Studies by Romić et al. (2003) confirmed the favourable effect of mulches on early melon yield. In the studies by Wierzbicka (1999), black film mulch reduced the marketable yield of lettuce compared with the control. In both the cultivars examined, higher nutrient contents were determined in the fruit grown using black film mulching (tab. 4).

Table 4

Effect of soil mulching on the selected components of nutritive value of melon (mean for year 2006-2008)

Investigated parameters	Cultivar	Mulches				Mean
		control	polyethylene film	polypropylene nonwoven	polypropylene fabric	
Dry matter (%)	Seledyn	4.05	4.80	4.03	4.13	4.25
	Yupi	5.56	5.55	5.18	5.44	5.41
	mean	4.75	5.18	4.61	4.79	4.83
$LSD_{0,05}$ for: cultivar = 0.16; kind of cover = 0.52						
Total sugar (% f.m.)	Seledyn	2.46	2.64	2.42	2.34	2.47
	Yupi	3.85	4.69	4.35	3.89	4.19
	mean	3.15	3.66	3.38	3.12	3.33
$LSD_{0,05}$ for: cultivar = 0.29; kind of cover = 0.23						
Monosaccharides (% f.m.)	Seledyn	0.65	0.76	0.70	0.69	0.70
	Yupi	0.80	1.00	0.84	0.83	0.86
	mean	0.72	0.88	0.77	0.76	0.78
$LSD_{0,05}$ for: cultivar = 0.04; kind of cover = 0.06						
Ascorbic acid ($mg \cdot 100\ g^{-1}$ f.m.)	Seledyn	16.20	17.20	16.06	16.93	16.60
	Yupi	18.68	18.81	18.22	18.33	18.51
	mean	17.44	18.01	17.14	17.63	17.55
$LSD_{0,05}$ for: cultivar = 0.23; kind of cover = 0.77						

Agrotechny dates

In 2008-2010 was carried out a field experiment, which the aim was to investigate if under the conditions of central-eastern Poland is possible to forcing the date of melon seedlings planting and how it influence on the yield level and quality of fruits. The seedlings of melon cv 'Charentais' was planted in three dates: 4th of June – traditionally date of melon planting, 15th and 25th of May – dates forcing by 10 and 20 days. After planting the plants were agrotextile covered, which was removed: after 4 weeks, after 8 weeks and directly before fruit harvest. Specimens grown without covering served as the control. It was found that melons planted at 15th and 25th of May produced significant higher yield than planted at 4th of June (tab. 5).

More dry matter, total sugars, ascorbic acid and iron contained the fruits from plants were planted in May than in June (tab. 6). The length of plant covering did not influence on the yield level. Significantly the lowest yield was harvested from the control object without cover (tab. 5).

Table 5

Effect of agrotechny dates on the melon yield (mean for year 2008-2010)

Investigated parameters	Date of seedlings planting	Date of agrotextile removing				Mean
		control	4 weeks after planting	8 weeks after planting	before harvest	
Marketable yield (kg·m^{-2})	15.05	0.26	2.89	2.97	2.94	2.27
	25.05	0.41	2.84	2.82	3.01	2.27
	04.06	0.44	2.55	2.31	2.31	1.90
	mean	0.37	2.76	2.70	2.75	2.15
$LSD_{0,05}$ for: date of planting = 0.31; date of cover removing = 0.57						

Covering (irrespective of the length) contributed to significantly increase ascorbic acid content in the fruit. It was found that more monosaccharides contained the fruit from plants were covered by 8 weeks, however, the highest content of iron were characterized the fruits were covered until harvest (tab. 6).

Table 6

Effect of agrotechny dates on the selected components of nutritive value of melon (mean for year 2008-2010)

Investigated parameters	Date of seedlings planting	Date of agrotextile removing				Mean
		control	4 weeks after planting	8 weeks after planting	before harvest	
Dry matter (%)	15.05	6.00	6.15	6.12	5.79	6.02
	25.05	5.91	5.96	6.13	5.85	5.96
	04.06	5.68	5.70	5.81	5.72	5.73
	mean	5.86	5.94	6.02	5.79	5.91
$LSD_{0,05}$ for: date of planting = 0.17; date of cover removing = n.s.						
Total sugar (% f.m.)	15.05	5.41	5.41	5.27	5.17	5.31
	25.05	5.66	5.44	5.48	5.44	5.50
	04.06	5.26	4.86	5.43	5.25	5.20
	mean	5.44	5.24	5.40	5.29	5.34
$LSD_{0,05}$ for: date of planting = 0.27; date of cover removing = n.s.						
Monosaccharides (% f.m.)	15.05	2.14	2.13	2.25	1.92	2.11
	25.05	2.10	2.12	2.30	2.12	2.16
	04.06	2.05	2.10	2.32	2.29	2.19
	mean	2.10	2.12	2.29	2.11	2.16
$LSD_{0,05}$ for: date of planting = n.s.; date of cover removing = 0.19						
Ascorbic acid (mg·100 g^{-1} f.m.)	15.05	15.47	16.27	16.48	16.26	16.12
	25.05	15.91	16.68	16.95	16.85	16.60
	04.06	15.54	16.11	16.52	16.33	16.13
	mean	15.64	16.36	16.65	16.48	16.28
$LSD_{0,05}$ for: date of planting = n.s.; date of cover removing = 0.59						
Iron (mg·100 g^{-1} f.m.)	15.05	0.61	0.55	0.57	0.63	0.59
	25.05	0.50	0.51	0.53	0.63	0.54
	04.06	0.52	0.56	0.50	0.62	0.55
	mean	0.54	0.54	0.53	0.63	0.56
$LSD_{0,05}$ for: date of planting = 0.05; date of cover removing = 0.07						

Biesiada (2008) indicated that the application of flat covers contributed to decrease dry matter, total sugars and monosaccharides content, but had little effect on the level of vitamin C in edible parts of kohlrabi. Plants covered in the studies by Rekowska (2011) caused increase of dry matter and total sugars content in lettuce stem and at the same time lower content of L-ascorbic acid, comparing to the method of cultivation in non-covered field.

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Едіта Костерна, Анна Занієвич-Бажковська, Іоланта Франчик, Роберт Роза. Удосконалення прийомів вирощування дині в Польщі.

Виявлений вплив агроприемов – позакореневі підгодівлі, мульчирование ґрунту, строки посадки розсади на врожай і якість дині при вирощуванні в Польщі. Вивчено шість коштовних сортів.

Ключові слова: позакореневі підгодівлі, мульчирование ґрунти, агротехнічні дати, урожайність, якість.

Эдита Костерна, Анна Заниевич-Бажковска, Иоланта Франчик, Роберт Роза. Совершенствование приемов выращивания дыни в Польше.

Выявлено влияние агроприемов – внекорневые подкормки, мульчирование почвы, сроки посадки рассады на урожай и качество дыни при выращивании в Польше. Изучено шесть ценных сортов.

Ключевые слова: внекорневые подкормки, мульчирование почвы, агротехнические даты, урожайность, качество.