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THE EFFECT OF FLAT COVERS ON THE QUANTITY AND QUALITY OF ARUGULA YIELD

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Abstract. Arugula is a common name for several leafy vegetable species of the family *Brassicaceae*. *Eruca sativa* and *Diplotaxis tenuifolia* are grown commercially for human consumption. The effect of two types of flat covers, perforated PE film and non-woven PP fabric, on the yield and quality of arugula was determined in the study. A two-factorial experiment was conducted in 2006–2008 in the Experimental Garden of the University of Warmia and Mazury in Olsztyn. The first experimental factor was plant species – *Diplotaxis tenuifolia* and *Eruca sativa.* The second factor was the type of plant cover – perforated PE film with 100 openings per m^2 and non-woven PP fabric with surface density of 17 $g \cdot m^{-2}$. Plants grown without protective cover served as control. Arugula was grown on proper black earth soil of quality class IIIb and cereal-fodder strong complex. Each year, seeds were sown in the middle of April. After planting out in the field, the seedlings were covered with PE film and non-woven PP fabric. The covers were removed after approximately five weeks. Leaves were harvested gradually over the growing season, one to three times from each treatment. The use of PE film and non-woven PP fabric covers had a significant effect on the total and marketable yield of arugula leaves. In 2006–2008, the highest average total yield was obtained from plots covered with perforated PE film. The marketable yield had a higher share of the total yield in *Diplotaxis tenuifolia* and in plots covered with perforated PE film, compared with control plots and plots covered with non-woven PP fabric. The rosettes of *Diplotaxis tenuifolia* consisted of a higher number of leaves, while *Eruca sativa* had longer leaves and higher rosette biomass.

Key words: *Diplotaxis tenuifolia, Eruca sativa,* perforated PE film, non-woven PP fabric, yield

INTRODUCTION

Arugula is a common name for several leafy vegetable species of the family *Brassicaceae*. *Eruca sativa* and *Diplotaxis tenuifolia* are grown commercially for human consumption. The above species differ with respect to biological characteristics and struc-

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ture, yet their properties and uses as well as cultivation methods are identical [Morales and Janick 2002]. Arugula has been grown since Roman times. Once forgotten, it has been only recently discovered again. Today arugula is grown as a leafy vegetable and a spice plant mainly in the Mediterranean region – in southern Europe, Central Asia and in the USA. Arugula leaves can be eaten raw as a salad, added to sandwiches and cottage cheese. Due to its exceptionally strong flavor, arugula is often used in mixed salads, pizzas and spaghetti. It can be served stewed, cooked and fried [Podbielkowski 1989, Esiyok 1997, Silva Dias 1997, Biggs 1998, Wierzbicka 2002, Morales and Janick 2002, Morales et al. 2006].

Apart from its culinary uses, arugula is highly valued for its medicinal and therapeutic properties (stimulating, anti-scurvy, diuretic, speeding the passage of foods through the digestive system) [Pignone 1997]. Arugula leaves contain health-promoting compounds, such as glucosinolates, which play an important role in the prevention of neoplastic diseases, particularly colorectal cancer [Nitz and Schnitzler 2002, D'Antuono et al. 2008].

The structure of vegetable consumption in Poland shows that only a few vegetable species are consumed in larger amounts. Despite their high nutritional value, leafy vegetables are not fully appreciated in our country. In modern culture, leafy vegetables are vital components of a healthy and balanced diet. The total area under vegetable cultivation and the consumption levels of vegetable species, including less popular ones, have been steadily increasing. This is an important consideration since insufficient dietary diversity is one the major factors thought to influence susceptibility to lifestyle diseases [Nalborczyk 1999, Adamczyk 2002, Kawashima and Valente-Soares 2003, Dyduch and Najda 2005].

The objective of this study was to determine the effect of two types of flat covers, perforated PE film and non-woven PP fabric, on the yield and quality of arugula leaves.

MATERIALS AND METHODS

A field experiment was conducted in 2006–2008 in the Experimental Garden of the University of Warmia and Mazury in Olsztyn, by the split-plot method, in three replications. The experimental factors were as follows:

– plant species – *Diplotaxis tenuifolia* (Enza Zaden) and *Eruca sativa* (Hortag Seed Co.),

– the type of plant cover – perforated PE film with 100 openings per m^2 and non-woven PP fabric with surface density of 17 $g \cdot m^{-2}$; plants grown without protective cover served as control.

Arugula was grown on proper black earth soil of quality class IIIb and cereal-fodder strong complex [Systematyka Gleb Polski 1989, Bieniek 1994]. The recommended tillage practices were applied. Prior to sowing, soil nutrient content corresponded to the requirements of leafy vegetable crops adapted to a short growing season. Supplementary fertilization was not applied. Seeds (1.5 g *Eruca sativa* and 1 g *Diplotaxis tenuifolia* per m^2) were sown by hand, between 12 and 14 April. Plot surface area was 1.0 m^2, and row spacing was 20 cm. After planting out in the field, the seedlings were covered with

PE film and non-woven PP fabric. The covers were removed after approximately five weeks. Over the five-week period, soil temperature was measured at a depth of 5 cm and 10 cm using soil thermometers, and the noted values were recorded twice daily, at 8.00 a.m. and 2.00 p.m. The recommended cultivation practices for arugula were applied. Leaves were harvested gradually over the growing season, one to three times from each treatment.

The biometric measurements of plants were performed after harvest. Total and marketable leaf yield was determined for each harvest. Marketable yield comprised all healthy, fully developed and brightly colored leaves.

The results were verified statistically by ANOVA, using Statistica 8.0 software.

Table 1. Selected meteorological data from the growing season
Tabela 1. Wybrane dane meteorologiczne z okresu uprawy

Meteorological data Dane meteorologiczne	Year – Rok	April Kwiecień	May Maj	June Czerwiec	Growing period April–June Okres uprawy kwiecień–czerwiec
Mean daily air temperature Średnia temperatura dobowa powietrza (°C)	2006	7.9	12.5	16.0	12.1
	2007	9.2	13.6	17.6	13.5
	2008	7.7	12.3	16.9	12.3
	mean – średnio	8.3	12.8	16.8	12.6
	multiyear mean 1961–1990 średnio z wielolecia 1961–1990	6.5	12.6	16.1	11.7
Total rainfall Suma opadów (mm)	2006	25.6	89.2	79.2	194.0
	2007	50.8	71.2	77.1	199.1
	2008	31.4	27.0	32.7	91.1
	mean – średnio	35.9	62.5	63.0	161.4
	multiyear mean 1961–1990 średnio z wielolecia 1961–1990	32.8	49.4	83.9	166.1

Weather conditions during the growing season were analyzed based on data provided by the Meteorological Station in Tomaszkowo near Olsztyn (tab. 1). Over the entire experimental period, mean daily air temperatures and mean monthly temperatures during the growing season (April – June) were higher than the long-term averages. Insignificantly lower values were recorded only in May and June 2006 and in May 2008. Precipitation totals and rainfall distribution varied widely between years. In the extremely dry year 2008, the April – June precipitation total was nearly twofold lower than the long-term average for this period. Soil moisture deficits were compensated for by sprinkling irrigation.

RESULTS AND DISCUSSION

The use of PE film and non-woven PP fabric covers caused an increase in soil temperature at a depth of 5 cm and 10 cm. Each year, the highest temperature rise was observed in plots covered with perforated PE film, compared with the control treatment.

Soil temperature increased from 1.7 to 3.6°C at a depth of 5 cm, and from 1.2 to 2.8°C at a depth of 10 cm. The highest soil temperature (21.8°C) was noted in 2008, at 2.00 p.m., at a depth of 5 cm, in plots covered with PE film (tab. 2). The results of previous studies [Siwek 2004, Siwek and Libik 2005, Majkowska-Gadomska 2010] also suggest that flat covers have a beneficial influence on temperature conditions in the formative region of a plant.

Table 2. Mean soil temperature depending on the type of plant cover
Tabela 2. Średnia temperatura gleby w zależności od zastosowanej osłony

Depth Głębokość	Type of plant cover Rodzaj osłony	12.04 – 22.05.2006			13.04 – 21.05.2007			14.04 – 21.05.2008		
		hour of measurement – godzina pomiaru								
		8^{00}	14^{00}	średnio mean	8^{00}	14^{00}	średnio mean	8^{00}	14^{00}	średnio mean
5 cm	PE film folia perforowana	12.0	18.7	15.4	10.9	17.8	14.4	14.5	21.8	18.2
	non-woven PP fabric włóknina	11.1	18.0	14.6	10.1	16.0	13.1	12.9	19.6	16.3
	without cover bez osłony	10.1	17.2	13.7	8.7	16.1	12.4	11.1	18.1	14.6
10 cm	PE film folia perforowana	11.6	17.4	14.5	10.8	17.4	14.1	13.6	19.5	16.6
	non-woven PP fabric włóknina	11.3	16.2	13.8	10.4	15.9	13.2	12.8	19.9	16.4
	without cover bez osłony	10.9	15.6	13.3	9.2	14.8	12.0	11.2	16.4	13.8

The emergence of *Eruca sativa* was observed 5–7 days after sowing in plots covered with perforated PE film, 2–3 days later in plots covered with non-woven PP fabric, and 12–16 days after sowing in plots without protective cover. *Diplotaxis tenuifolia* emerged 2–3 days later than *Eruca sativa*. The leaves of *Eruca sativa* were first harvested between 24 and 28 May in covered plots, and between 30 and 31 May in control plots. On average, *Diplotaxis tenuifolia* reached maturity seven days later than *Eruca sativa*. The use of flat covers speeded up the harvest by three to seven days, depending on the year of study and cover type. This is consistent with the findings of other authors [Siwek and Lipowiecka 2003, Słodkowski and Rekowska 2004, Francke 2005] regarding different vegetable species.

The use of PE film and non-woven PP fabric covers had a significant effect on the total and marketable yield of arugula leaves, which varied widely between years. The lowest total and marketable yield of *Diplotaxis tenuifolia* was obtained in 2007 from plots without cover (0.44 and 0.43 kg · m^{-2}, respectively), and the highest in 2008 from plots covered with PE film (2.34 and 2.13 kg · m^{-2} respectively). The lowest total and marketable yield of *Eruca sativa* was also reported in 2007, for plots covered with non-woven PP fabric (0.63 and 0.62 kg · m^{-2} respectively), while the highest total yield was

Table 3. Total and marketable arugula leaves yield depending on the species and type of plant cover
Tabela 3. Plon ogółem i handlowy liści rukoli w zależności od gatunku i osłony

Species Gatunek	Type of plant cover Rodzaj osłony	Total yield – Plon ogółem kg m^{-2}				Marketable yield – Plon handlowy kg m^{-2}			
		2006	2007	2008	mean for 2006–2008 średnio w latach 2006–2008	2006	2007	2008	mean for 2006–2008 średnio w latach 2006–2008
Diplotaxis tenuifolia Dwurząd wąskolistny	PE film folia perforowana	1.90	0.56	2.34	1.60	1.84	0.55	2.13	1.51
	non-woven PP fabric włóknina	1.17	0.63	2.08	1.29	1.16	0.60	1.90	1.22
	without cover bez osłony	1.79	0.44	1.48	1.24	1.73	0.43	1.33	1.16
	mean – średnio	1.62	0.54	1.97	1.38	1.58	0.53	1.79	1.30
Eruca sativa Rokietta siewna	PE film folia perforowana	1.15	0.73	2.07	1.32	0.87	0.71	1.79	1.13
	non-woven PP fabric włóknina	1.41	0.63	2.00	1.35	0.96	0.62	1.54	1.04
	without cover bez osłony	2.15	0.82	1.63	1.53	1.61	0.80	1.43	1.28
	mean – średnio	1.57	0.73	1.90	1.40	1.15	0.71	1.59	1.15
Mean for type of plant cover Średnio dla rodzaju osłony	PE film folia perforowana	1.52	0.64	2.21	1.46	1.36	0.63	1.96	1.32
	non-woven PP fabric włóknina	1.29	0.63	2.04	1.32	1.06	0.61	1.72	1.13
	without cover bez osłony	1.97	0.63	1.56	1.39	1.68	0.61	1.38	1.22
$LSD_{0,05}$ for – $NIR_{0.05}$ dla									
I – species – gatunku		n.s. n.i.	0.04	n.s. n.i.	n.s. – n.i.	0.21	0.03	0.08	0.05
II – type of plant cover – rodzaju osłony		0.25	n.s. n.i.	0.17	0.11	0.25	n.s. – n.i.	0.10	0.06
I × II – interaction – współdziałania		0.35	0.06	0.24	0.15	0.36	0.06	0.15	0.08

obtained in 2006 in the control treatment (2.15 kg · m^{-2}) and the highest marketable yield was noted in 2008 from plots covered with PE film (1.79 kg · m^{-2}). In 2006–2008, the highest average total yield was obtained from plots covered with perforated PE film. In *Diplotaxis tenuifolia,* a significantly higher yield was noted in plots covered with perforated PE film (1.60 kg · m^{-2}), whereas in *Eruca sativa* in uncovered plots (1.53 kg · m^{-2}). The total leaf yield of *Eruca sativa* was by 25% higher on average than the yield obtained in a previous experiment by Francke [2004] with arugula foraged in the spring. Marketable yield was also considerably affected by specific characters, and it was higher in *Diplotaxis tenuifolia* – 1.3 kg · m^{-2} on average (tab. 3). Słodkowski and Rekowska [2003] also obtained the highest yield of lettuce from plots covered with perforated PE film. In a study by Tendaj and Mysiak [2007], Welsh onions covered with PE film provided the highest yield. Similarly as in the present experiment, the yield of Welsh onions covered with non-woven PP fabric was lower than that reported for uncovered plots.

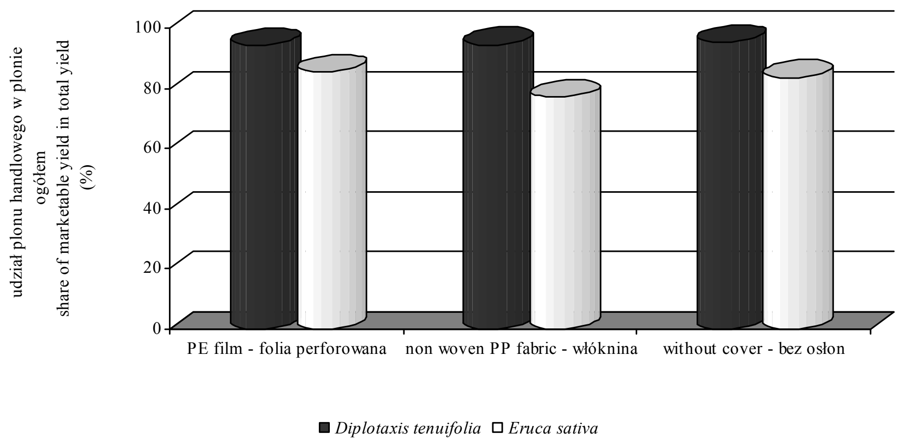

Fig. 1. Share of arugula leaves marketable yield in total yield depending on species and type of plant cover (mean for 2006–2008)
Rys. 1. Udział plonu handlowego liści rukoli w plonie ogółem w zależności od gatunku i rodzaju osłony (średnio w latach 2006–2008)

The marketable yield to total yield ratio was determined by arugula species, cover type and the interaction between both factors (fig. 1, fig. 2). The marketable yield had a higher share of the total yield (by 12.1%) in *Diplotaxis tenuifolia.* The use of perforated PE film had a beneficial influence on the share of marketable yield in total yield (90.4% on average), in comparison with control plots and plots covered with non-woven PP fabric. Similar results were reported by Tendaj and Mysiak [2007] for Welsh onions.

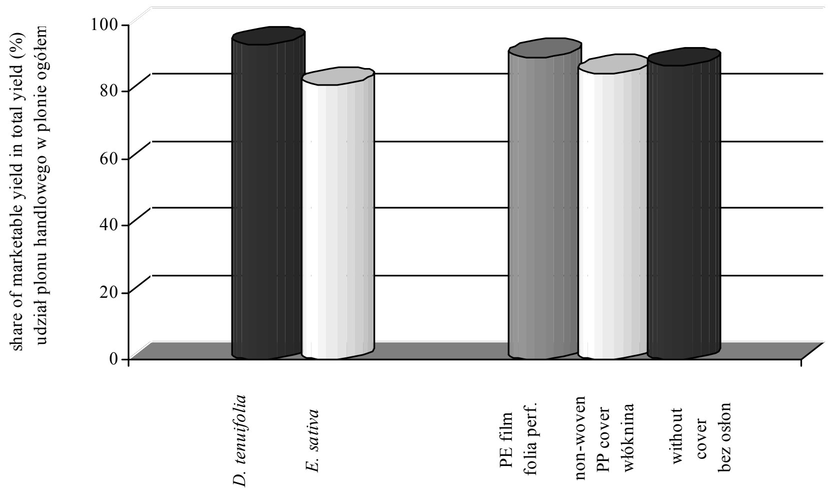

Fig. 2. Share of arugula leaves marketable yield in total yield depending on species and type of plant cover (mean for 2006–2008)
Rys. 2. Udział plonu handlowego liści rukoli w plonie ogółem w zależności od gatunku i rodzaju osłony (średnio w latach 2006–2008)

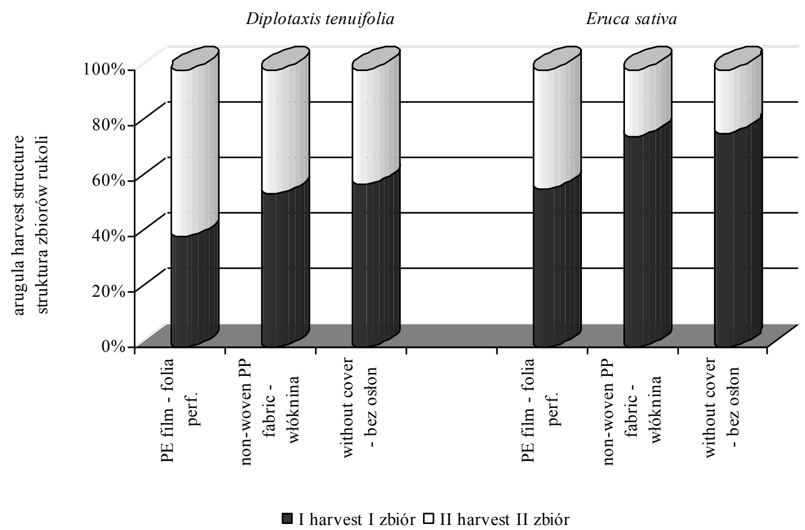

Fig. 3. Arugula leaf harvest structure in year 2006
Rys. 3. Struktura zbiorów liści rukoli w roku 2006

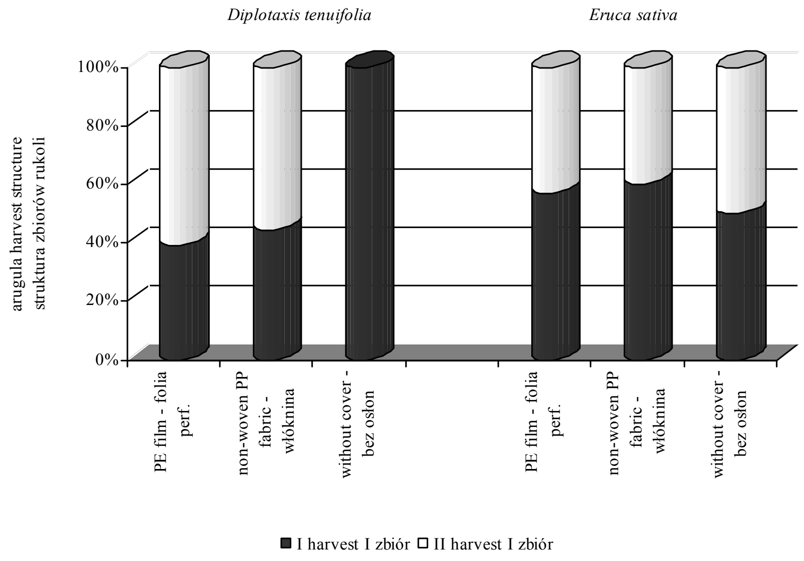

Fig. 4. Arugula leaf harvest structure in year 2007
Rys. 4. Struktura zbiorów liści rukoli w roku 2007

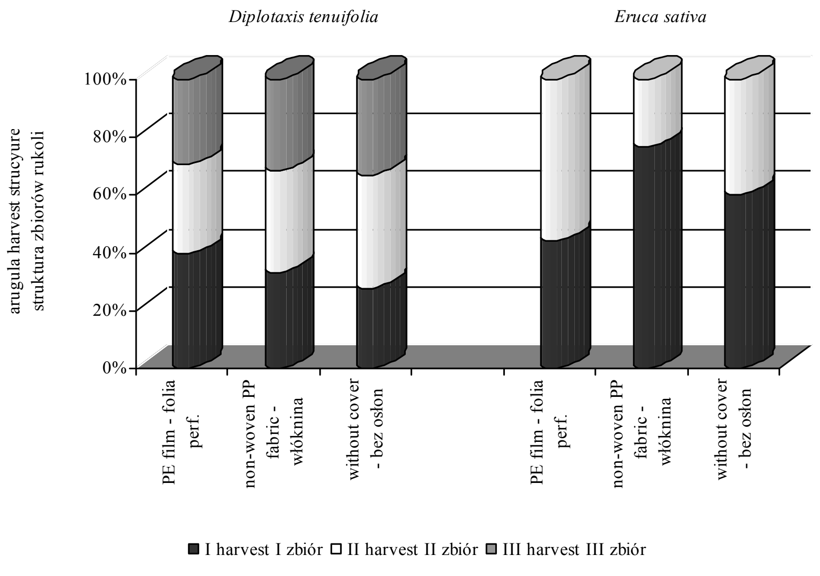

Fig. 5. Arugula leaf harvest structure in year 2008
Rys. 5. Struktura zbiorów liści rukoli w roku 2008

Arugula leaves were harvested twice from each treatment. The only exception was *Diplotaxis tenuifolia* grown in uncovered plots in 2007 (one harvest) and in 2008 in all treatments (three harvests). In *Diplotaxis tenuifolia*, the first harvest accounted for 27.7% to 58.7% of the total leaf yield, except in 2007 in uncovered plots. In *Eruca sativa,* the first harvest accounted for 44.0% to 77.2% of the total leaf yield (figs. 3, 4, 5). Pimpini and Enzo [1997] reported that *Eruca sativa* grown in the open field under commercial production systems in Italy is harvested one to three times, while *Diplotaxis tenuifolia* is harvested once or twice. The first harvest usually accounts for 40% to 50% of the total yield per unit area.

Table 4. Selected biometric characteristics of arugula plants (mean for 2006–2008)
Tabela 4. Wybrane cechy biometryczne roślin rukoli (średnio z lat 2006–2008)

Species Gatunek	Type of plant cover Rodzaj osłony	Number of leaves Liczba liści	Weight of 1 plant Masa 1 rośliny g	Length of leaves Długość liści cm
Diplotaxis tenuifolia Dwurząd wąskolistny	PE film folia perforowana	9.8	2.40	8.61
	non-woven PP fabric włóknina	12.5	3.72	9.07
	without cover bez osłony	11.8	2.60	6.73
	mean – średnio	11.4	2.90	8.13
Eruca sativa Rokietta siewna	PE film folia perforowana	9.4	8.42	10.77
	Non-woven PP fabric włóknina	8.2	7.96	10.84
	without cover bez osłony	8.8	9.37	11.38
	mean – średnio	8.8	8.58	10.99
Mean for type of plant cover Średnio dla rodzaju osłony	PE film folia perforowana	9.6	5.41	9.69
	non-woven PP fabric włóknina	10.3	5.84	9.95
	without cover bez osłony	10.3	5.98	9.05
$LSD_{0,05}$ for – $NIR_{0.05}$ dla				
I – species – gatunku		0.3	1.08	1.04
II – type of plant cover – rodzaju osłony		0.4	n.s. – n.i.	n.s. – n.i.
I × II – interaction – współdziałania		0.6	1.88	1.81

The statistical analysis showed that both experimental factors (arugula species and cover type) had a significant effect on the number of leaves in the rosette per plant (tab. 4). A higher number of leaves was observed in *Diplotaxis tenuifolia* (11.4), in comparison with *Eruca sativa* (8.8). In a study by Słodkowski and Rekowska [2005], *Eruca sativa* produced an average of 6.6 to 9.5 leaves, depending on sowing time. Plants covered with non-woven PP fabric produced a significantly lower number of leaves (9.6) than plants covered PE film and grown in uncovered plots, similarly as in an experiment with Welsh onions, conducted by Tendaj and Mysiak [2007]. Plant weight and leaf length were significantly affected by the specific characters of arugula. Average rosette biomass was nearly threefold higher in *Eruca sativa* than in *Diplotaxis tenuifolia*. The leaves of *Eruca sativa* were by 2.86 cm longer on average than the leaves of *Diplotaxis tenuifolia.*

CONCLUSIONS

1. The use of PE film and non-woven PP fabric covers had a significant effect on the total and marketable yield of arugula leaves. In 2006–2008, the highest average total yield was obtained from plots covered with perforated PE film.

2. The marketable yield had a higher share of the total yield in *Diplotaxis tenuifolia* and in plots covered with perforated PE film, compared with control plots and plots covered with non-woven PP fabric.

3. The rosettes of *Diplotaxis tenuifolia* consisted of a higher number of leaves, while *Eruca sativa* had longer leaves and higher rosette biomass.

REFERENCES

Adamczyk G., 2002. Wybrane aspekty zachowań konsumpcyjnych i wzorców spożycia żywności w polskich gospodarstwach domowych w latach dziewięćdziesiątych. Rocz. AR Poznań 343, Ekon. 1, 31–41.

Bieniek B., 1994. Gleby Ogrodu Doświadczalnego w Kortowie. Maszynopis, Olsztyn.

Biggs M., 1998. Warzywa. Wyd. MUZA SA, Warszawa.

D'Antuono L.F., Elementi S., Neri R., 2008. Glucosinolates in *Diplotaxis* and *Eruca* leaves: Diversity, taxonomic relations and applied aspects. Phytochemistry 69, 187–199.

Dyduch J., Najda A., 2005. Zmiany zawartości suchej masy i kwasu L-askorbinowego w liściach roślin dwu odmian selera naciowego (*Apium graveolens* L. var. *dulce* Mill./Pers.) w zależności od wieku zbieranych roślin i ściółkowania gleby. Zesz. Nauk AR Wrocław, Rolnictwo, 86, 515, 111–119.

Esiyok D., 1997. Marketing and utilization of rocket in Turkey. [In:] Rocket: A Mediterranean crop for the world. Mat. Konf. IPGRI Legnaro (Italy) 13–14 December 1996, 86–87.

Francke A., 2004. Plonowanie rokietty siewnej (*Eruca sativa* L. DC.) w zależności od terminu uprawy i rodzaju gleby. Folia Univ. Agricult. Stein, Agricultura 239(95), 81–86.

Francke A., 2005. Wpływ stosowania osłon płaskich na wielkość i jakość plonu rzodkiewki. Zesz. Nauk. AR we Wrocławiu, Roln. 86, 515, 133–138.

Kawashima L.M., Valente-Soares L.M., 2003. Mineral profile of raw and cooked leafy vegetables consumed in southern Brazil. Food Compos. and Anal., 16(5), 605–611.

Majkowska-Gadomska J., 2010. Badania nad oddziaływaniem bezpośredniego osłaniania roślin i ściółkowania gleby na wzrost, rozwój oraz plonowanie melona (*Cucumis melo* L.). Rozpr. i monogr., Wyd. UWM Olsztyn, 159.

Morales M., Janick J., 2002. Arugula: A promising specialty leaf vegetable. ASHS Press, Alexandria, VA, 418–423.

Morales M., Maynard E., Janick J., 2006. 'Adagio': A slow-bolting arugula. HortSci. 41(6), 1506–1507.

Nalborczyk E., 1999. Rośliny alternatywne rolnictwa XXI wieku i perspektywy ich wykorzystania. Zesz. Probl. Post. Nauk Roln. 468, 17–30.
Nitz G.M., Schnitzler W.H., 2002. Variation der glucosinolatgehalte bei den rucolaarten *Eruca sativa* und *Diplotaxis tenuifolia* in abhängigkeit des erntesschnittes. J. Appl. Bot. 76(3/4), 82–86.
Pimpini F., Enzo M., 1997. Present status and prospects for rocket cultivation in the Veneto region. [In:] Rocket: A Mediterranean crop for the world. Mat. Konf. IPGRI Legnaro (Italy) 13–14 December 1996, 51–66.
Pignone D., 1997. Present status of rocket genetic resources and conservation activities. [In:] Rocket: A Mediterranean crop for the world. Mat. Konf. IPGRI Legnaro (Italy) 13–14 December 1996, 2–12.
Podbielkowski Z., 1989. Słownik roślin użytkowych. PWRiL Warszawa.
Silva Dias J., 1997. Rocket in Portugal: botany, cultivation, uses and potential. [In:] Rocket: A Mediterranean crop for the world. Mat. Konf. IPGRI Legnaro (Italy) 13–14 December 1996, 81–85.
Siwek P., 2004. Warzywa pod folią i włókniną. Wyd. Hortpress, Warszawa.
Siwek P., Libik A., 2005. Wpływ osłon z folii i włókniny w uprawie wczesnej selera naciowego na wielkość i jakość plonu. Zesz. Nauk. AR we Wrocławiu, Roln. 86, 515, 483–490.
Siwek P., Lipowiecka M., 2003. Efektywność ekonomiczna stosowania osłon z tworzyw sztucznych w uprawie ogórków na wczesny zbiór. Folia Hort. Supl. 2, 358–360.
Słodkowski P., Rekowska E., 2003. The effect of covering and cultivation methods on crisp lettuce yields. Folia Hort. 15(1), 19–23.
Słodkowski P., Rekowska E., 2004. Wpływ ściółkowania gleby oraz osłaniania roślin na plonowanie selera korzeniowego uprawianego na zbiór pęczkowy. Folia Univ. Agric. Stetin., Agricult 239(95), 375–380.
Słodkowski P., Rekowska E., 2005. Wpływ terminu siewu nasion na plonowanie rokietty siewnej. Zesz. Nauk. AR we Wrocławiu, Roln. 86, 515, 497–502.
Systematyka Gleb Polski 1989. Rocz. Gleb. 60(3/4), 7–103.
Tendaj M., Mysiak B., 2007. Plonowanie cebuli siedmiolatki (*Allium fistulosum* L.) w zależności od terminu sadzenia rozsady i stosowania płaskich osłon. Annales UMCS, sec. EEE, Horticultura, 17(2), 5–10.
Wierzbicka B., 2002. Mniej znane rośliny warzywne. Wyd. UWM Olsztyn.

OCENA EFEKTYWNOŚCI STOSOWANIA OSŁON PŁASKICH NA WIELKOŚĆ I JAKOŚĆ PLONU RUKOLI

Streszczenie. Rukola (arugula) jest wspólną nazwą kilku gatunków warzyw liściowych z rodziny *Brassicaceae*. W uprawach towarowych na spożycie liści najczęściej spotyka się *Eruca sativa* (Rokietta siewna) i *Diplotaxis tenuifolia* (Dwurząd wąskolistny).W doświadczeniu badano wpływ zastosowania osłon płaskich z folii perforowanej i włókniny na wielkość i jakość plonu rukoli. Dwuczynnikowe doświadczenie przeprowadzono w latach 2006–2008 na polu Ogrodu Doświadczalnego Uniwersytetu Warmińsko-Mazurskiego w Olsztynie. Badanymi czynnikami były: gatunek rośliny – *Diplotaxis tenuifolia* i *Eruca sativa* oraz rodzaj stosowanych osłon – folia perforowana o 100 otworach na 1 m^2, włóknina polipropylenowa o masie 17 g · m^{-2}, bez osłon (obiekt kontrolny). Rukolę uprawiano na glebie typu czarna ziemia właściwa, zaliczonej do klasy bonitacyjnej

IIIb, należącej do kompleksu zbożowo-pastewnego mocnego. Nasiona każdego roku wysiewano około połowy kwietnia. Bezpośrednio po siewie poletka przykrywano osłonami. Zdejmowano je po ok. 5 tygodniach. Liście zbierano systematycznie w miarę ich dorastania, od 1 do 3 razy z każdego wariantu doświadczenia. Osłanianie płaskie folią perforowaną i włókniną wpłynęło istotnie na wielkość plonu ogółem oraz plonu handlowego liści. Średnio w latach 2006–2008 najwyższy plon ogółem liści zebrano z poletek przykrywanych folią perforowaną. Udział plonu handlowego w plonie ogółem był wyższy u *Diplotaxis tenuifolia* oraz w obiektach osłanianych folią perforowaną w stosunku do poletek kontrolnych i przykrytych włókniną. Rozety *Diplotaxis tenuifolia* składały się z większej liczby liści, natomiast u *Eruca sativa* liście były dłuższe a rozety miały większą masę.

Słowa kluczowe: *Diplotaxis tenuifolia, Eruca sativa,* folia perforowana, włóknina, plon

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