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GROWTH AND YIELD OF GARDEN ROCKET (*Eruca sativa.* Mill.) AFFECTED BY NITROGEN AND POTASSIUM FERTILIZATION

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Abstract. We studied the effect of differentiated nitrogen-potassium fertilization upon the growth, yield and chemical composition of garden rocket leaves grown in unheated greenhouse in autumn. Two nitrogen doses were applied (0.3 and 0.6 g dm^{-3}) in the form of calcium saltpeter and two doses of potassium (0.3, 0.6 and 0.9 g dm^{-3}) in the form of chloride and sulfate. The increased amounts of nitrogen and potassium generally contributed to the increase of fresh leaf weight yield. Plants nourished with KCl had larger concentrations of L-ascorbic acid, chlorine and calcium, whereas the contents of protein, sugars in total, as well as sulfates were smaller, as compared to plants nourished with K_2SO_4.

Key words: garden rocket, fertilization, yield of fresh weight, chemical composition of leaves

INTRODUCTION

Garden rocket (*Eruca sativa* Mill.) is grown in Europe mainly under shields, to obtain fresh, aromatic leaves. The rocket producers are mainly focused on information concerning the manner of plant nutrition and yield quantity and quality, strictly related to it. Nitrogen and potassium, as basic plant nutrients, are also indispensable elements in human nutrition. Both nitrogen and potassium are taken by plants in large amounts, as compared with other nutrients. These elements are necessary for all plants to produce yield and form its qualitative features that are advantageous for consumption and processing. Some vegetables, especially those with short vegetation period, have a natural ability to accumulate proportionally significant amounts of nitrates. We refer to excessive accumulation of these compounds when their uptake is greater than the possibility of their reduction. This occurs, among others, when there is light deficiency, or small precipitation intensity [Paschold 1989, Sady et al. 1995]. Main nitrate accumulation

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factors, besides small light intensity, include the applied dose of fertilizer nitrogen [Chen et al. 2004, Santamaria et al. 1997]. The application of large doses of nitrogen fertilization not always leads to the increase of crop plant yields, and most often it enhances the accumulation of nitrates in their edible parts. Ceylan and others [2002] obtained the greatest rocket leaf yield, applying N at the dose of 300 kg ha^{-1}, at the same time the largest amounts of III and V nitrates were found in the leaves of examined plants at the dose of 500 kg ha^{-1}.

The uptake of nitrogen by plants in the form of anion NO_3^- and cation NH_4^+ is related to the mutual influence of other nutrients upon the inorganic nitrogen connections. One of the basic conditions for good use of soil nitrogen is good soil abundance in phosphorus and potassium. Hanafy et al. [2000] demonstrated that applying double dose of phosphorus and potassium contributed to the decrease of nitrate concentrations, even at a large nitrogen dose. Similarly, other authors [Ali et al. 1985, Wu and Wang 1995, Zong et al. 1997] proved that the increase of potassium fertilization affects the decrease of nitrate accumulation in the yield of certain vegetables. In the glasshouse cultivation of vegetables the kind of potassium salt, used as a fertilizer, is of crucial importance. Borowski et al. [2000] found that the intensity of net photosynthesis at fertilizing tomato plants with K_2SO_4 was greater as compared to KCl. Besides, other authors [Nurzyński 1976, 1986a, 1986b, 2005; Nurzyński and Michałojć 1998; Nurzyński et al. 1980, 1982a, 1982b] demonstrated that applying KCl and K_2SO_4 did not significantly affect the yields of tomato, cucumber, lettuce and other plants, but it substantially differentiated the contents of particular nutrients in the growing mediums and leaves, despite the fact that fertilization with N, P, K, Ca and Mg remained on the same level. Only anions connected with potassium were different. The authors of works listed above emphasize that the leaves of plants nourished with K_2SO_4 contained more nitrates and less Ca, Mg, Mn and Mo, as compared to KCl fertilization, which results from antagonistic effect of sulfates upon the uptake of molybdenum.

The objective of the study presented in this paper was to define the effect of differentiated nitrogen-potassium fertilization upon the growth of rocket, amount of fresh leaf weight yield and the chemical composition of plants in autumn glasshouse cultivation.

MATERIAL AND METHODS

The studies were conducted in the years 2004–2005 in an unheated detached glasshouse belonging to the Experiment Farm of the University of Life Sciences in Lublin, located in northern-southern direction in autumn period. The plants were grown in pots of the capacity of 2 dm^3, filled with peat limed with fertilizer chalk in the amount of 4.0 g dm^3 peat to pH 6.2, mixed with clayey-sandy soil (surface soil – arable layer) in the volume proportion of 9:1. We applied fertilization expressed in g dm^{-3} of the substratum: N – 0.3, 0.6 and 0.9 in the form of calcium saltpeter: K – 0.3 and 0.6 in the form of KCl and K_2SO_4, P – 0.4 g dm^{-3} as superphosphate 20% P, Mg – 0.2 g dm^{-3} as magnesium sulfate and microelements: 8.0 Fe, 5.1 Mn, 13.3 Cu, 0.74 Zn, 1.6 B, 3.7 Mo. Rocket seeds from the Italian seed manufacturer Landen were sown at the beginning of September, leaving 3 plants in each pot. Each series comprised 8 repetitions (24 plants).

The plants were watered as the need arose, 1–2 times a day, with the same amount of water. Harvesting was conducted after 55–60 days of vegetation, shearing whole leaf rosettes. We defined the fresh yield weight, number of leaves in a rosette and the plant height. Immediately after harvest we determined the contents of dry matter, total sugars and monosaccharides in the above-ground parts of the plants (by means of the Luff-Schoorl method), as well as the contents of L-ascorbic acid (using Tillmans's method). Having dried the plant material in the temperature of 70°C and having minced it we determined N-total contents (by means of Kjeldahl's method, on the automatic Kjel-Foss apparatus), we also determined the contents of $N\text{-}NH_4$ and $N\text{-}NO_3$ (using Bremners distillation method, modified by Starck), and we also colorimetrically determined chlorine with $AgNO_3$, as well as sulfates with $BaCl_3$. After dry-burning in the temperature of 550°C the following were determined: phosphorus – colorimetrically with ammonium vanadomolybdate, calcium and potassium by means of atomic absorption method. After harvest, we determined 0.03 M CH_3COOH: $N\text{-}NH_4$ and $N\text{-}NO_3$, phosphorus, potassium, calcium and magnesium in the growing medium extract, using the same methods as in the plant material. We determined the growing medium reaction pH potentiometrically in H_2O, salt concentration in the growing medium (EC) – conductometrically. We worked out the results statistically, using the method of variance analysis for double cross classification, assessing the significance of differences by means of Tukey confidence intervals and making LSD calculations at the significance level of $\alpha = 0.05$.

RESULTS

The applied nitrogen doses significantly affected the quantity and quality of rocket yield (tab. 1). The plants fed with a larger nitrogen dose had significantly bigger fresh weight yield (20.1 g per pot) than plants fed with smaller doses of this nutrient (17.5 g per pot). However, the mean height of rocket plants was significantly bigger when a smaller dose of nitrogen was applied, than in the case of feeding plants with a smaller dose of this component. No significant changes were found in the mean number of rocket leaves, depending on the amount of the applied nitrogen. We demonstrated a significant effect of nitrogen dose upon the contents of protein, L-ascorbic acid, total sugars and monosaccharides in the examined plants (tab. 1). The plants fed with a larger dose of nitrogen accumulated significantly more protein and less L-ascorbic acid, total sugars and monosaccharides, as compared to the remaining ones.

It was demonstrated that there was no significant effect of the kind of applied potassium fertilizer upon the yield quantity, mean height and number of examined plants, as well as upon the contents of dry matter, protein, L-ascorbic acid and sugars (tab. 1). The differentiated potassium doses (the means from objects of both potassium fertilizers), however, significantly affected the quantity of rocket yield. The highest yield (19.5 g per pot) was obtained with the application of mean K dose, and the differences between the yields of plants fed with the second and third dose of potassium were statistically insignificant. No significant affect of potassium dose was found upon the mean height and number of rocket leaves, as well as upon the contents of protein and monosaccha-

Table 1. The effect of nitrogen and potassium fertlization on the yield of garden rocket in autumn cultivation (mean from 2004–2005)
Tabela 1 Wpływ nawożenia azotowo-potasowego na plon rokietty siewnej w uprawie jesiennej (średnio z 2004–2005)

Fertilization Nawożenie			Yield of fresh weight (g pot^{-1}) Plon świeżej masy (g wazon^{-1})	Plant height Wysokość rośliny (cm)	Number of leaves (per plant) Liczba liści (z rośliny)	Dry matter Sucha masa (%)	Protein Białko (%s.m.)	In fresh weight W świeżej masie		
Kind of fertilizer Rodzaj nawozu	dose dawka g N dm^{-3}	dose dawka g K dm^{-3}						L-ascorbic acid Kwas L-askorbinowy (mg 100g^{-1})	Total sugars Cukry ogółem (%)	Monosaccharides Cukry redukujące (%)
KCl	0.3	0.3	18.4	14.5	7.3	9.7	34.9	243.2	1.07	0.38
		0.6	21.0	15.2	8.4	10.0	34.9	198.8	1.26	0.37
		0.9	15.6	18.0	8.6	10.2	34.8	169.9	1.09	0.43
	0.6	0.3	19.0	16.6	8.7	9.6	36.1	201.7	1.27	0.25
		0.6	19.9	15.0	7.6	8.2	35.8	167.0	0.93	0.21
		0.9	19.2	14.9	8.4	11.0	35.3	135.7	1.03	0.33
Mean – Średnio			18.9 a	15.7 a	8.2 a	9.8 a	35.3 a	185.2 a	1.11 b	0.33 a
K_2SO_4	0.3	0.3	16.9	18.5	9.9	9.1	35.4	188.6	1.68	0.41
		0.6	15.3	16.6	8.9	9.5	35.3	178.0	1.21	0.46
		0.9	17.8	17.9	8.3	10.2	35.4	150.9	1.53	0.30
	0.6	0.3	18.7	15.4	8.7	9.8	36.9	169.5	0.98	0.37
		0.6	21.8	16.5	8.6	10.8	36.1	178.7	1.05	0.25
		0.9	21.8	14.6	8.7	10.2	37.2	167.0	0.95	0.28
Mean –Średnio			18.8 a	16.7 a	8.9 a	9.9 a	36.1 a	172.1 b	1.23 a	0.35 a
Mean for N dose Średnio dla dawki N	0.3		17.5 b	16.9 a	8.6 a	9.8 a	35.2 a	187.4 a	1.31 a	0.39 a
	0.6		21.1 a	15.5 b	8.5 a	9.9 a	36.3 a	169.9 b	1.04 b	0.28 b
Mean for K dose Średnio dla dawki K		0.3	18.3 *b*	16.3 *a*	8.7 *a*	9.6 *b*	35.8 *a*	200.8 *a*	1.25 *a*	0.35 *a*
		0.6	19.5 *a*	15.8 *a*	8.4 *a*	9.6 *b*	35.5 *a*	179.4 *b*	1.11 *b*	0.32 *a*
		0.9	18.6 *ab*	16.4 *a*	8.5 *a*	10.4 *a*	35.7 *a*	155.9 *c*	1.15 *b*	0.34 *a*

Means followed by the same letter are not significantly different at $\alpha = 0.05$
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Table 2. The effect of nitrogen and potassium fertlization on the chemical composition of rocket leaves (mean from 2004–2005)
Tabela 2. Wpływ nawożenia azotowo-potasowego na skład chemiczny liści rokietty (średnio z 2004–2005)

Fertilization – Nawożenie			% of dry matter – % suchej masy							
Kind of fertilizer Rodzaj nawozu	Dose Dawka g N dm^{-3}	Dose Dawka g K dm^{-3}	N-total N-og	$N-NO_3$	$S-SO_4$	Cl	P	K	Ca	Mg
KCl	0,3	0,3	5.59	0.97	0.68	1.13	0.57	5.30	3.19	0.36
		0,6	5.59	1.11	0.70	1.39	0.56	6.26	3.79	0.44
		0,9	5.57	1.06	0.68	1.61	0.57	5.73	2.85	0.33
	0,6	0,3	5.77	0.99	0.62	1.40	0.52	5.63	3.50	0.34
		0,6	5.72	1.01	0.66	1.38	0.51	5.48	3.10	0.36
		0,9	5.64	0.98	0.61	1.39	0.56	6.67	3.63	0.39
Mean – Średnio			5.65 a	1.02 a	0.66 b	1.39 a	0.55 a	5.85 a	3.35 a	0.37 a
K_2SO_4	0,3	0,3	5.67	1.20	0.79	0.82	0.61	5.57	2.98	0.35
		0,6	5.65	1.03	0.67	0.81	0.59	6.76	3.31	0.32
		0,9	5.66	0.98	0.67	0.82	0.52	6.07	2.93	0.28
	0,6	0,3	5.90	1.06	0.70	0.78	0.56	6.26	3.83	0.43
		0,6	5.78	1.00	0.78	1.00	0.52	5.68	2.99	0.39
		0,9	5.95	0.98	0.77	0.93	0.57	6.06	3.26	0.36
Mean – Średnio			5.77 a	1.04 a	0.73 a	0.86 b	0.58 a	6.07 a	3.22 a	0.36 a
Mean for N dose Średnio dla dawki N	0,3		5.62 b	1.06 a	0.70 a	1.10 a	0.57 a	5.95 a	3.18 b	0.35 a
	0,6		5.80 b	1.00 a	0.69 a	1.15 a	0.56 a	5.97 a	3.39 a	0.38 a
Mean for K dose Średnio dla dawki K		0,3	5.73 a	1.06 a	0.70 a	1.03 b	0.57 a	5.69 b	3.38 a	0.37 a
		0,6	5.69 a	1.04 a	0.70 a	1.15 a	0.55 a	6.05 a	3.30 a	0.38 a
		0,9	5.71 a	1.00a	0.68 a	1.19 a	0.56 a	6.13 a	3.17 b	0.34 a

Means followed by the same letter are not significantly different at $\alpha = 0.05$
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Table 3. The nutrients content (mg dm^{-3}), pH_{H2O} and EC (mS cm^{-1}) of the growing medium (mean from 2004–2005)
Tabela 3. Zawartość składników pokarmowych w podłożu (mg dm^{-3}), pH_{H2O} i EC (mS cm^{-1}) (średnio z 2004–2005)

Kind of fertilizer Rodzaj nawozu	Dose Dawka g N dm^{-3}	Dose Dawka g K dm^{-3}	$N-NH_4$	$N-NO_3$	$N-NH_4$ + $N-NO_3$	$S-SO_4$	Cl	P	K	Ca	Mg	pH	EC
KCl	0.3	0.3	11	240	251	180	260	240	103	1599	222	5.67	1.81
		0.6	22	207	229	200	420	210	356	1453	208	5.73	1.77
		0.9	26	232	258	190	720	210	709	1278	204	5.81	2.37
	0.6	0.3	21	297	318	202	220	245	146	1575	184	5.67	2.30
		0.6	22	350	372	200	500	245	355	1649	168	5.53	2.18
		0.9	15	357	362	195	800	225	543	1666	177	5.58	2.41
Mean – Średnio			15 b	281 b	296 b	195 b	487 a	229 a	552 a	1537 b	194 b		2.14 a
K_2SO_4	0.3	0.3	15	182	197	205	65	220	115	1897	209	5.84	1.49
		0.6	28	218	246	232	45	240	398	1959	294	5.83	2.08
		0.9	18	261	279	330	50	225	694	2452	366	5.92	2.49
	0.6	0.3	20	398	419	265	60	225	101	2215	264	5.71	2.11
		0.6	21	406	427	265	65	225	391	1620	250	5.69	2.28
		0.9	22	379	402	312	55	220	584	2492	277	5.68	2.76
Mean – Średnio			21 a	307 a	328 a	268 a	53 b	226 a	547 a	2106 a	277 a		2.20 a
Mean for N dose Średnio dla dawki N	0.3		18 a	223 b	241 b	223 a	260 b	224 a	579 a	1773 b	250 a		2.00 b
	0.6		19 a	365 a	383 a	240 a	283 a	231 a	520 b	1890 a	220 b		2.34 a
Mean for K dose Średnio dla dawki K		0.3	17 b	279 b	296 b	213 b	151 c	233 a	241 c	1822 b	220 b		1.93 b
		0.6	23 a	295 ab	319 ab	224 b	258 b	230 a	575 b	1670 c	230 b		2.08 b
		0.9	20 ab	307 a	325 a	257 a	406 a	220 a	832 a	1972 a	256 a		2.51 a

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rides. Significantly the greatest dry matter contents (10.4%) were found in plants fed with the largest potassium doses, as compared to other plants. The concentrations of protein and monosacchaides, in turn, was the greatest in plants fed with the smallest dose of potassium. Increasing the applied potassium dose caused significant decrease of the amount of L-ascorbic acid. Rocket fed with the smallest potassium dose had significantly the largest content of this nutrient (200.8 mg 100 g^{-1} fresh weight) and the largest total concentration of sugars (1.25% fresh weight), with reference to the remaining ones.

We found a significant influence of the kind of applied potassium fertilizer upon the concentration of mineral components (tab. 2). Rocket fed with potassium sulfate contained significantly more nitrogen in total, sulfates and potassium than plants fed with KCl, which revealed significantly the largest contents of chlorine and calcium. The concentrations of $N-NO_3$, P and Mg did not significantly depend upon the applied form of potassium. No significant effect of potassium dose was found upon the total content of nitrogen in rocket leaves. However, the differentiation of potassium doses significantly affected the contents of nitrates, chlorine, potassium, calcium and magnesium. As the potassium doses increased, the concentrations of $N-NO_3$ decreased (only in objects with K_2SO_4), and the concentrations of Ca and Mg decreased as well. Significantly the largest amounts of potassium were found in plants fed with the largest doses of K. We demonstrated lack of significant influence of potassium dose upon the contents of sulfates (also when K_2SO_4 was applied), and phosphorus The concentration of sulfates was the smallest when the largest dose of K was applied, whereas the concentration of phosphorus was the smallest with the average K dose. The increasing doses of KCl significantly influenced the increase of chlorine contents in rocket leaves. No significant differences were found between mean concentration of this component in plants fed with average and the largest potassium dose.

The applied potassium doses differentiated the contents of mineral components in the examined plants to a small extent (tab. 2). Significantly larger contents of total nitrogen, calcium and magnesium were found in plants fed with a larger dose of nitrogen than the plants getting less of that component. No significant effect of applied nitrogen upon the contents of nitrates was found.

We revealed a significant effect of differentiated nitrogen-potassium fertilization upon the chemical composition of growing medium after plant harvesting (tab. 3). In the objects with K_2SO_4 we found significantly larger concentrations of ammonium, nitrate and mineral nitrogen concentrations, as well as significantly larger concentrations of calcium and ammonium sulfates, as compared to KCl. The contents of chlorine in the growing medium was very differentiated and it depended on the kind and dose of applied potassium fertilizer as well as on the nitrogen dose. At the application of larger nitrogen dose we also found in the growing medium significantly more nitrate and mineral nitrogen, chlorine, potassium, calcium and magnesium. No significant effect of the kind of applied potassium fertilizer was demonstrated upon the reactions and concentrations of nutrients in examined growing media after plant harvesting (tab. 3). The growing medium fertilized with K_2SO_4 had larger pH and EC values, as compared to KCl. The increased dose of the applied nitrogen affected the decrease of pH value and increase of ion concentration (EC). The increased potassium dose, in turn, did not differentiate the pH values, only causing the increase of EC values.

DISCUSSION

The yield of fresh rocket weight significantly depended upon the dose of applied nitrogen and potassium. The increase of nitrogen dose caused a significant increase of yield, which was also demonstrated in the previous paper [Nurzyńska-Wierdak 2001]. The increased amount of applied potassium caused the increased yield of examined plants, but only at 0.6 g dm^{-3}. Further increasing of potassium doses diminished the yield of fresh rocket weight. This dependence is confirmed by results of the studies conducted in the spring period [Nurzyńska-Wierdak 2006b]. Similarly, El-Bassiony [2006] demonstrated the increase of fresh leaf weight and total yield of onion under the influence of increased potassium dose. The application of potassium in the form of KCl and K_2SO_4 did not differentiate the quantity of rocket yield and the contents of dry matter, protein, total sugars and monosaccharides. This is confirmed by Nurzyński's conclusion [2005], that potassium is equally well taken up by plants from those fertilizers.

Potassium plays an important role in the formation of protein compounds in plants. Its presence intensifies the process of nitrate reduction. The examined rocket plants accumulated less nitrates in their leaves under the influence of increased potassium dose, however the differences were not statistically significant. Hanafy et al. [2000] report that the application of double potassium and phosphorus doses in rocket cultivation contributed to the decrease of nitrate concentrations even at a large dose of nitrogen. Similarly, other authors [Ali et al. 1985, Wu and Wang 1995, Zong et al. 1997] claim that the increase of potassium fertilization affects the decrease of nitrate accumulation in the yields of certain vegetables.

The concentration of $N\text{-}NO_3$ in the leaves of the examined rocket plants did not significantly depend on the kind of applied potassium fertilizer, although less of these compounds were found in plants nourished with KCl. Nurzyński [2005] reports that plants fed with potassium chloride accumulate less nitrates and more molybdenum, as compared to potassium sulfate. Nitrate and chloride anions, as univalent, balance out, so the more chlorides there are, the less nitrates. Substantial accumulation of sulfates in the growing medium causes increased concentration of nitrates in plants, which results from their impaired ability of reduction and further processing. The presented paper demonstrates that as a result of nourishing plants with K_2SO_4 , after harvesting there remained significantly more $N\text{-}NH_4$, $N\text{-}NO_3$, $N\text{-}NH_4$+ $N\text{-}NO_3$, $S\text{-}SO_4$, Ca and Mg in the growing medium, and significantly less chlorine, as compared to KCl. Simultaneously, the application of potassium in the form of KCl and K_2SO_4 did not significantly affect the contents of macrocomponents and nitrates in plant leaves, except the obvious differences in the contents of sulfates and chlorine. This can probably be justified by appropriate concentration of nutrients in the growing medium (EC), slightly larger in the objects with K_2SO_4, allowing for correct uptake of water, as well as micro- and macroelements by plants. When analyzing the chemical composition of growing medium after plant harvesting, one can notice that the EC values were affected to the greatest extent by potassium and nitrate ions. Similar dependences were demonstrated by Golcz et al. [2008]. As Nurzyński [2005] reports, high chloride concentration in the growing medium does not cause a significant increase of EC values. This is confirmed by results of the presented studies, where at chloride mean contents in growing medium of 487 g dm^{-3} the

EC value was 2.14 and did not significantly differ from the EC value of the growing medium, containing chloride merely 53 g dm^{-3} (objects with K_2SO_4).

The nutritional value of examined rocket plants, related to the participation of dry matter and concentrations of monosaccharides, total sugars, protein, L-ascorbic acid and mineral components, significantly depended upon the applied fertilization. Together with the increase of nitrogen dose, the contents of dry matter, protein, N-total, Cl, K, Ca and Mg, though the differences were not always statistically significant. The concentrations of L-ascorbic acid, monosaccharides and total sugars, however, were significantly smaller as an effect of the increased nitrogen dose, which confirms the results of previous studies [Nurzyńska-Wierdak 2001, 2006a, b], the results obtained by Vyas et al. [1995], as well as by Golcz and Kozik [2004]. The increased potassium fertilization, applied in the presented studies, caused a significant decrease of L-ascorbic acid in rocket leaves, which confirms the results of previous studies concerning rocket growing in spring [Nurzyńska-Wierdak 2006b]. However, different results were obtained by Golcz and Kozik [2004]. These authors demonstrated that together with the increase of potassium dose the vitamin C contents increases in pepper fruit. This can be explained by differences in the course of physiological processes in the examined vegetative and generative plant organs. Total sugars concentration in the examined rocket leaves significantly depended on the applied potassium dose and it was the largest at the smallest dose. Similarly, Venkatesan et al. [2005], studying the effect of various potassium sources and doses upon the quality of potassium leaves, demonstrated that the smallest potassium dose, applied in the form of K_2SO_4 was sufficient for increasing biochemical parameters. Lin et al. [2004] in turn, demonstrated a significant effect of potassium dose upon the quality of melon fruit. These authors report that with the potassium application of 240 mg dm^{-3} growing medium the greatest concentrations of total sugars and vitamin C were obtained, which improved the taste and smell of the examined fruit.

CONCLUSIONS

1. Fresh leaf weight yield of the rocket grown in autumn significantly depended upon the applied nitrogen and potassium doses.
2. The potassium applied in the forms of KCl and K_2SO_4 was equally well taken in by rocket plants. No significant difference in fresh leaf weight yield of the rocket fed with KCl and K_2SO_4 was found.
3. The contents of L-ascorbic acid, total sugars and monosaccharides decreased as an effect of increased nitrogen and potassium doses. In the objects with KCl a significantly larger L-ascorbic acid concentration was found in rocket leaves, as compared to K_2SO_4.
4. The applied fertilization did not significantly differentiate the nitrate contents in the leaves of examined plants.
5. Increased chloride concentration in the growing medium after the application of KCl did not cause a significant increase of EC values, as compared with K_2SO_4.

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WZROST I PLON ROKIETTY SIEWNEJ (*Eruca sativa* Mill.) POD WPŁYWEM NAWOŻENIA AZOTOWO-POTASOWEGO

Streszczenie. Badano wpływ zróżnicowanego nawożenia azotowo-potasowego na wzrost, plon i skład chemiczny liści rokietty siewnej uprawianej w szklarni nieogrzewanej w okresie jesiennym. Zastosowano dwie dawki azotu (0,3 i 0,6 g dm^{-3}) w formie saletry wapniowej oraz trzy dawki potasu (0,3; 0,6 i 0,9 g dm^{-3}) w postaci chlorku potasu i siarczanu potasu. Zwiększanie ilości azotu i potasu przyczyniało się na ogół do zwiększania plonu świeżej masy liści. Rośliny żywione KCl charakteryzowały się większą koncentracją kwasu L-askorbinowego, chloru i wapnia, natomiast mniejszą zawartością białka, cukrów ogółem i siarczanów w porównaniu z roślinami żywionymi K_2SO_4.

Słowa kluczowe: rokietta siewna, nawożenie, plon świeżej masy liści, skład chemiczny liści

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