

Growth and yielding of leaf celery (*Apium graveolens* L. var. *secalinum* Alef.) cultivated for two-cut harvest

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Summary

The experiments were carried out in 2004–2005 in The Experimental Farm Felin, Agricultural University in Lublin. The seedling was set into the field on 15 May 2004 and 12 May 2005. The first harvest of leaves was made on 30 July, second – 27 October. Plants were irrigated using dropping lines. Cultivation of leaf celery with no irrigation gave leaf yield at the level of 5.2–6.34 kg/m²; use of irrigation elevated it to 7.70–11.97 kg/m². Closer spacing between leaf celery seedlings caused a significant increase of leaf yield. The highest yield of leaves was obtained from Safir cv.

Key words: leaf celery (*Apium graveolens* L. var. *secalinum* Alef.), spacing, yield, irrigation

There are three cultivated botanical celery varieties: common celery (*Apium graveolens* L. var. *dulce* Mill.), celeriac (*Apium graveolens* L. var. *rapaceum* Mill.) and leaf celery (*Apium graveolens* L. var. *secalinum* Alef.). The latter is used mainly as a spice due to essential oils contents [1]. Leaf celery plants reach 35–60 cm height and produce several tens to over hundred aromatically scented leaves – an excellent material for drying and freezing. Celery harvest for processing is performed twice or three times, depending on weather conditions, namely rainfalls during vegetation period. Irrigation considerably increases celery's yields [2, 3].

There is no cultivation recommendation related to leaf celery in Polish literature, thus agrotechnological study was conducted to evaluate a proper spacing and the influence of irrigation on twice-harvested leaf celery yield.

MATERIAL AND METHODS

Experiments were carried out in 2004–2005 in The Experimental Farm Felin, Agricultural University in Lublin. The seedlings of 2 leaf celery cultivars (Afina and Safir) were produced in greenhouse. Before seedling setting, fertilization at the rate of 120 kg N/ha, 100 kg P₂O₅/ha, and 150 kg K₂O/ha was applied. The seedling was set into the field on 15 May 2004 and 12 May 2005 on 4 m² area plots. The first harvest of leaves was made on 30 July, the second – on 27 October. Plant's height was measured before harvest. Nitrogen nutrition at the level of 40 kg N/ha was applied after every harvest. Plants were irrigated using dropping lines. In May and June, a single water dose corresponded to 15-20 mm of rainfall, later – 25 mm.

Achieved results were statistically processed by means of variance analysis for k-multiple classification. Statistical conclusions were based on multiple Tukey's confidence intervals at significance level of $\alpha=0.05$. Mean values marked with the same letter do not statistically differ from each other.

RESULTS AND DISCUSSION

Results for yielding of two leaf celery cultivars were presented in Tables 1 and 2. As a result of closer spacing between seedlings from 25 × 20 cm to 15 × 20 cm, both cultivars gave significantly higher leaf yields. A positive influence of the factor was manifested both for non-irrigated (Table 1) and irrigated plants (Table 2).

Table 1.

Influence of spacing on leaf yield for non-irrigated plants of two leaf celery cultivars (kg/m²).

cultivar	spacing (cm)	year	harvest		total
			first	second	
Afina	25x20	2004	3.61	4.34	7.95
		2005	2.12	2.90	5.02
		mean	2.86	3.62	6.48 b
	15x20	2004	4.36	6.91	11.27
		2005	1.94	3.78	5.72
		mean	3.15	5.34	8.49 a
Safir	25x20	2004	2.67	4.81	7.48
		2005	3.25	3.56	6.81
		mean	2.96	4.18	7.14 b
	15x20	2004	3.02	5.84	8.86
		2005	2.05	5.93	7.98
		mean	2.53	5.88	8.42 a

Table 2.

Influence of spacing on leaf yield for irrigated plants of two leaf celery cultivars (kg/m²).

cultivar	spacing (cm)	year	harvest		total
			first	second	
Afina	25x20	2004	4.05	4.82	8.78
		2005	3.98	6.29	10.27
		mean	4.01	5.55	9.57 d
	15x20	2004	7.32	7.91	15.23
		2005	4.48	7.63	12.11
		mean	5.90	7.77	13.67 b
Safir	25x20	2004	4.91	4.93	9.88
		2005	4.46	7.60	12.06
		mean	4.48	6.28	10.97 c
	15x20	2004	8.84	8.29	17.13
		2005	5.94	9.34	15.28
		mean	7.39	8.81	16.20 a

Amount and distribution of rainfalls during celery vegetation period exerted great effect in yield size on non-irrigated plants. From May till October 2004, the rainfall sum in Experimental Station Felin was 259.3 mm and it was by 100.4 mm lower than long-term mean for that period. In 2005, the rainfalls deficiency was not so large, but their distribution was more unfavorable, which affected the lower yields. Leaf yields for non-irrigated plants of Afina cv. and Safir cv. was 7.49 kg/m² and 7.78 kg/m², respectively (mean values for both spacing types and both study years, Table 3). The performed study revealed that Safir was a more productive cultivar. Yields of irrigated plants was significantly higher reaching 11.52 kg/m² and 13.58 kg/m², for Afira cv. and Safir cv, respectively. Also irrigation significantly influenced on mean plant height and number of leaves produced (Table 4). Depending on the variety, non-irrigated plants achieved 27.6–29.6 cm of height producing 115.0–129.7 leaves, whereas irrigated ones 46.7–46.7 cm of height and 133.7–142.5 leaves.

Table 3.

Influence of irrigation on total leaf yield for two leaf celery cultivars (kg/m²).

cultivar	year	non-irrigated	irrigated
Afina	2004	9.61	12.05
	2005	5.37	11.19
	mean	7.49 c	11.62 b
Safir	2004	8.17	13.50
	2005	7.39	13.67
	mean	7.78 c	13.58 a

Table 4.

Influence of irrigation on plant height and leaf number for two leaf celery cultivars.

cultivar	year	plant height (cm)		number of leaves per plant	
		non-irrigated	irrigated	non-irrigated	irrigated
Afina	2004	40.0	52.7	125.9	138.9
	2005	19.1	39.5	103.1	128.5
	Mean	29.6 b	46.1 a	115.0 b	133.7 a
Safir	2004	34.4	54.4	134.7	140.5
	2005	21.2	38.9	124.6	144.4
	Mean	27.6 b	46.7 a	129.7 b	142.5 a

A positive impact of irrigation on leaf celery yielding was observed in our own earlier studies [2, 3]. The leaf yield achieved here from non-irrigated plants is comparable to that found by Krug (1991) and in our earlier study in 2001–2002 [5].

CONCLUSION

1. Cultivation of leaf celery with no irrigation gave leaf yield at the level of 5.29 – 6.34 kg/m²; irrigation elevated it to 7.70-11.97 kg/m².
2. Closer spacing between leaf celery seedlings from 25 × 20 cm to 15 × 20 cm influenced on significant increase of leaf yield.
3. Plant irrigation increased the leaf yield by 55.9%, on average. Irrigated plants were taller and were characterized by larger leaf number per plant.
4. The highest leaf yield was achieved from second harvest.

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WZROST I PLONOWANIE SELERA LISTKOWEGO (*APIUM GRAVEOLENS* L. VAR. *SECALINUM* ALEF.) UPRAWIANEGO NA ZBIÓR DWUKROTNY

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Streszczenie

Badania przeprowadzono w latach 2004–2005 w Gospodarstwie Doświadczalnym Felin Akademii Rolniczej w Lublinie. Rozsadę selera listkowego sadzono na polu 15maja 2004 r. i 12 maja 2005 r. Rośliny nawadniano za pomocą linii kroplujących. Pierwszy zbiór liści przeprowadzono 30 lipca, drugi 27 października. Uprawiając selera listkowego bez nawadniania uzyskano plon liści w granicach od 5,29 do 6,34 kg/m² a z zastosowaniem nawadniania 7.70-11.97 kg/m². Zwiększenie gęstości sadzenia rozsady istotnie przyczyniło się do zwiększenia plonu liści. Największy plon liści uzyskano u odmiany Safir.

Słowa kluczowe: seler listkowy (*Apium graveolens* L. var. *secalinum* Alef.), rozstawa sadzenia rozsady, plon, nawadnianie