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ANALYSIS OF YIELDING AND SELECTED BIOMETRIC PARAMETERS OF THE FRUIT OF SEVERAL HOT PEPPER (*CAPSICUM ANNUUM* L.) CULTIVARS

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ABSTRACT. Hot pepper cultivars: ‘Cyklon’, ‘Orkan’, ‘Wulkan’, ‘Chillina’ and ‘Devilla’ were cultivated in mineral soil and raised peat (v:v = 4:1) in pots of 5 dm³ volume. Yields and biometric parameters of fruit were compared. On the basis of the analyses measurements, the cultivars: ‘Chillina’ and ‘Devilla’ were found highly usable for cultivation in Polish conditions.

Key words: hot pepper, cultivars, yielding, biometric parameters of the fruit

Introduction

At present, in Poland, there is an increasing demand for herbaceous and seasoning plants because of the modern trend towards healthy nutrition (**Wagner et al.** 2001).

The fruit of hot pepper (syn. hot paprika, annual paprika) both in fresh and dried form are used for seasoning purposes (**Rumińska** 1981, **Wagner et al.** 2001, **Kujawski** and **Golcz** 2003). They also represent a valuable raw material for the pharmaceutical industry (**Kujawski** and **Golcz** 2003) supplying components for many herbal preparations and homeopathic drugs (**Wagner et al.** 2001).

The aim of the present studies was the evaluation of the yielding and the biometric parameters of several hot pepper cultivar fruit.

Material and methods

Pot experiment was carried out in an unheated greenhouse on the area of the Experimental Station “Marcelin”, the Agricultural University of Poznań. Five cultivars of

hot pepper were grown: three Polish cultivars and two foreign ones whose seeds originated from different seed companies:

- ‘Cyklon’ – Seed Cultivation Plant W. Legutko, Smolic;
- ‘Orkan’ – Horticultural Seed Production Plant, Gołębiew (PlantiCo);
- ‘Wulkan’ – The Research Institute of Medicinal Plants, Plewiska near Poznań;
- ‘Chillina’ and ‘Devilla’ – by Bruinsma Seeds.

The experiment was established in one-factor system, random design, in six replication (one plant represented one replication).

The seedlings of hot pepper were prepared in a heated greenhouse. The seeds were sown in the third decade of March. After the development of cotyledones, the seedlings were planted out into 8 cm diameter rings filled with peat substrate. In mid-May, an equalized seedling material with 8-10 well formed leaves and properly developed root system were planted individually into the permanent place in pots of 5 dm³ volume. The seedling production period lasted 55 days.

The substrate consisted of a mixture of mineral soil (arable layer of grey-brown podsollic soil) with raised peat in 4:1 proportion enriched with macro- and micro-components.

Prior to vegetation, the following fertilization was applied (g·dm⁻³) of substrate: 0.32 N in the form of NH₄NO₃; 0.10 P using granulated triple superphosphate; 0.40 K as 1/2 KCl + 1/2 K₂SO₄; 0.08 Mg in the form MgSO₄ and 0.10 of microelements in the form of Polichelate LS-7. In top dressing (the full of fructification), a single dose of 0.16 g N·dm⁻³ of substrate in the form of Ca(NO₃)₂ was applied.

During the vegetation, the hot pepper plants were not cut. Irrigation, protection against diseases and pests were carried out according to the accepted principles.

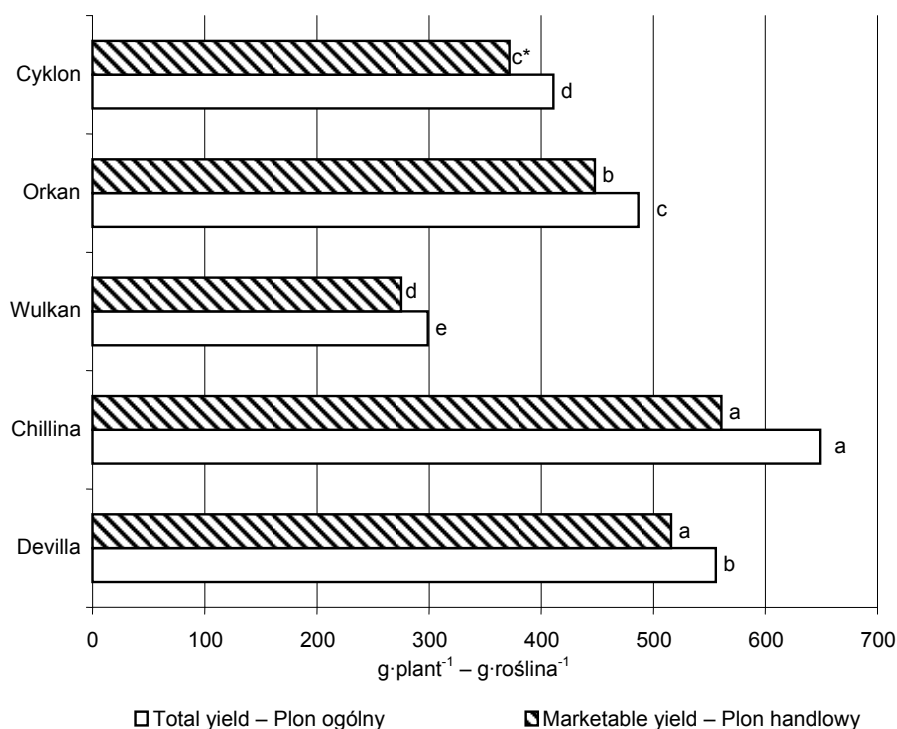
In the third decade of August, fruit were harvested once in the phase of the physiological maturity. The yield of total and marketable fresh matter was determined (g·plant⁻¹). The marketable yield means fruit with size and shape typical of the given cultivar without any visible disease symptoms. The total number of fruit and marketable fruit from 1 plant (in pcs.) and the mass of a single fruit (in g) were determined as well. The fruit were measured biometrically (20 fruit of every cultivar chosen randomly from each repetition): the length and width (in the upper part at petiole – cm) and fruit wall thickness (mm).

Statistical analyses were carried out using Duncan’s test at the significance level of $\alpha = 0.05$.

Results and discussion

In our experiments, the cultivars of hot pepper differed regarding the total and the marketable yields (Fig. 1), what was also found by **Skapski** (1955). The significantly highest yield of fresh fruit was collected in cultivar ‘Chillina’, and the least yield was obtained in cv. ‘Wulkan’.

The particular cultivars were characterized by a high participation of marketable yield in the total one. The highest yield was given by cv. ‘Deville’ (92.8%), cv. ‘Orkan’ (92.4%), cv. ‘Wulkan’ (92.1%); slightly lower yield was recorded in cv. ‘Cyklon’ (90.7%) and cv. ‘Chillina’ (86.3%). The mean share of marketable yield in the total one



*Means followed by the same letters are insignificantly different.

*Średnie oznaczone tymi samymi literami nie różnią się istotnie.

Fig. 1. Total and marketable yield of fruit fresh mass of several hot pepper cultivars
Ryc. 1. Plon ogólny i handlowy świeżej masy owoców kilku odmian papryki ostrej

of hot pepper cultivars: 'Cyklon' and 'Orkan' grown in the field, was lower than the result obtained in our own studies and were 79.5% and 70.4% respectively (**Buczkowska** 2001).

Table 1 shows, and it was confirmed by other authors (**Węglarz** 1994, **Buczkowska et al.** 2000) that tens of fruit were set on one plant, but as many as 25% of fruit were out of selection.

The cultivars of hot pepper were characterized by fruit of small mass (on the average 20.5 g) which is comparable with results of other studies (**Buczkowska et al.** 2000, **Buczkowska** 2001). Cultivar 'Chillina' was distinguished by a significantly higher mass of a single fruit (25.8 g) and cv. 'Wulkan' showed the smallest mass (12.5 g).

The analysis of the biometric parameters of fruit (Table 1, Fig. 2 and 3) showed statistically significant differences in the number and in the mass of fruit as well as in the coefficient of shape. The thickness of fruit wall was similar in the studied cultivars.

Table 1

Biometric parameters of the fruit of several hot pepper cultivars
Parametry biometryczne owoców kilku odmian papryki ostrej

Parameter Parametr	Cultivar – Odmiana				
	Cyklon	Orkan	Wulkan	Chillina	Devilla
Number of fruit total (pcs·plant ⁻¹) Liczba owoców ogółem (szt.·rośl. ⁻¹)	22 b*	26 a	29 a	29 a	27 a
Number of marketables fruit (pcs·plant ⁻¹) Liczba owoców handlowych (szt.·rośl. ⁻¹)	18 b	22 a	22 a	22 a	23 a
Weight of marketable fruit (g) Masa owocu handlowego (g)	21,0 b	20,8 b	12,5 c	25,8 a	22,4 b
Length of fruit (cm) Długość owocu (cm)	9,25	10,50	8,25	14,25	11,00
Width of fruit (cm) Szerokość owocu (cm)	3,25	2,75	3,00	2,25	2,85
Shape coefficient (length/width) Współczynnik kształtu (długość/szerokość)	2,85 c	6,23 b	5,63 b	8,25 a	6,93 b
Thickness of fruit pericarp (mm) Grubość ścianki owocu (mm)	2-3 a	2-3 a	2-2,5 a	2-3 a	2-3 a

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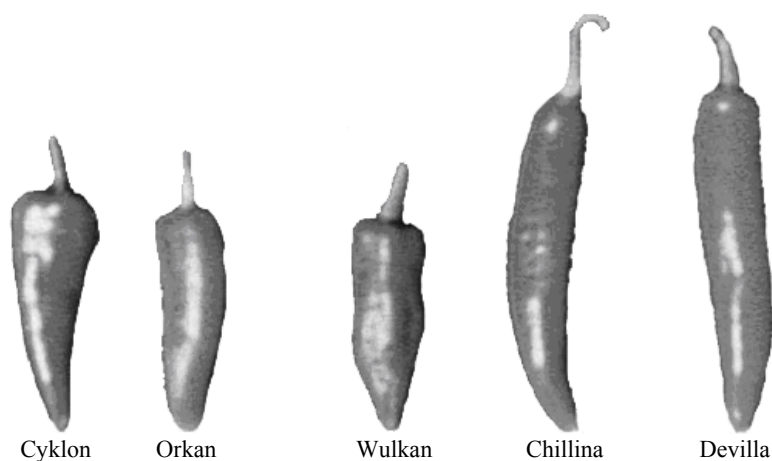


Fig. 2. Shape of fruit of several hot pepper cultivars
 Ryc. 2. Kształt owoców kilku odmian papryki ostrej

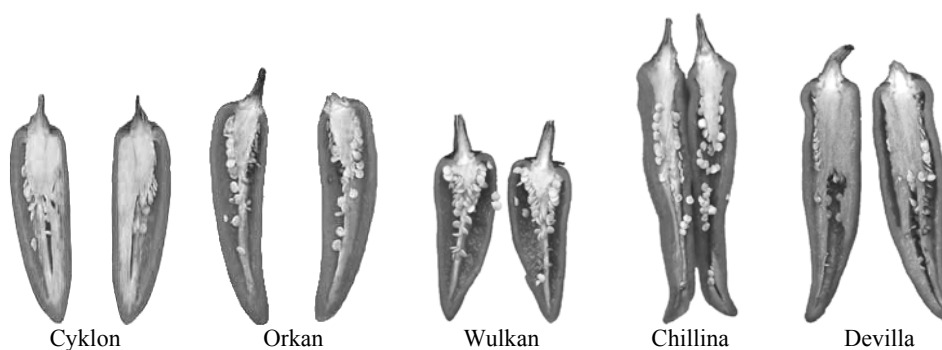


Fig. 3. Longitudinal section of hot pepper fruit
Ryc. 3. Przekroje owoców papryki ostrej

Conclusions

Foreign cultivars of hot pepper ‘Chillina’ and ‘Devilla’ gave a greater total and marketable yield of fruit than the Polish cultivars ‘Orkan’, ‘Cyklon’ and ‘Wulkan’. The cultivar ‘Chillina’ was distinguished by the greatest mass of a single fruit and by significant fruit length to fruit width proportions.

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ANALIZA PLONOWANIA I WYBRANYCH PARAMETRÓW
BIOMETRYCZNYCH OWOCÓW KILKU ODMIAN PIEPRZOWCA ROCZNEGO
(*CAPSICUM ANNUUM* L.)

S t r e s z c z e n i e

Odmiany papryki ostrej: 'Cyklon', 'Orkan', 'Wulkan', 'Chillina' i 'Devilla' uprawiano w glebie mineralnej z torfem wysokim (4:1) w wazonach o objętości 5 dm³. Porównywano plon i parametry biometryczne owoców papryki. Na podstawie analizowanych cech stwierdzono dużą przydatność odmian 'Chillina' i 'Devilla' do uprawy w warunkach Polski.