

PARTIAL RESULTS REGARDING THE BEHAVIOR OF SOME ORNAMENTAL VARIETIES OF *IPOMOEA BATATAS* CULTIVATED WITHIN THE ECOLOGICAL CONDITIONS OF IAȘI

REZULTATE PARȚIALE PRIVIND COMPORTAREA UNOR SOIURI ORNAMENTALE DE *IPOMOEA BATATAS* CULTIVATE ÎN CONDIȚIILE ECOLOGICE DIN IAȘI

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Abstract. The genus *Ipomoea* includes annual and perennial species, some of which are cultivated for ornamental purposes. *Ipomoea batatas* is a perennial species, grown as an annual in unprotected conditions. In this paper, the behavior of four cultivars of *I. batatas* ('Rusty Red', 'Midnight Lace', 'Light Green' and 'Purple Hearts'), cultivated in the experimental field of the discipline of Floriculture at the Iasi University of Life Sciences, Romania, was evaluated. Observations and determinations made after 35 days of establishment of cultures revealed differences between cultivars in terms of number of leaves/plant, shoots length and leaf size. The highest number of leaves and the longest shoots were recorded on the variety 'Rusty Red', while the variety 'Midnight Lace' stood out for the largest size of the leaves.

Key words: sweet potato, ornamental cultivars, morphological characters.

Rezumat. Genul *Ipomoea* cuprinde specii anuale și perene, unele dintre ele cultivate în scop ornamental. *Ipomoea batatas* este o specie perenă, cultivată ca anuală în condiții neprotejate. În această lucrare s-a evaluat comportarea a patru soiuri ornamentale de *I. batatas* ('Rusty Red', 'Midnight Lace', 'Light Green' și 'Purple Hearts'), cultivate în câmpul experimental al disciplinei de Floricultură din cadrul Universității de Științele Vieții din Iași, România. Observațiile și determinările efectuate după 35 de zile de la înființarea culturilor au evidențiat diferențe între soiuri în ceea ce privește numărul de frunze/plantă, lungimea lăstarilor și dimensiunea frunzelor. Numărul cel mai mare de frunze și lăstarii cei mai lungi s-au înregistrat la soiul 'Rusty Red', în timp ce soiul 'Midnight Lace' s-a remarcat prin dimensiunea cea mai mare a frunzelor.

Cuvinte cheie: batat, cultivare ornamentale, caractere morfologice.

INTRODUCTION

Ipomoea batatas L.(Lam.) is a member of the *Convolvulaceae* family and belongs to the *Ipomoea* L. genus together with other 13 genus closely related (Austin, 1978; Austin, 1987; McDonald and Austin, 1990). Evidence has been found near

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the centers of diversity in Peru and Mexico, suggesting the existence of the sweet potato for at least 10000 years and its cultivation for about 5000 years.

Ipomoea genus includes about 400 annual and perennial species, often with tuberous roots, of which a few annual species with fickle stems are cultivated for ornamental purposes. All species of *Ipomoea* are thermophilic plants and bloom profusely in summer, when they have lot of heat (Șelaru, 2007).

I. batatas is a fickle plant, perennial in origin, with tuberous roots, crawling stems up to 6-7 m long, petiolate leaves, cleft towards the base, and white, pink or lilac flowers. It is native to Central America and is cultivated mainly as a food plant for its tuberous roots (Sirbu and Paraschiv, 2005).

I. batatas is an important crop worldwide because it produces the highest amount of edible energy per hectare (Khoury *et al.*, 2015) and also provides an important source of nutrients, namely vitamin A, calcium and iron (Kays & Kays, 1998). Sweet potato shows amazing morphological variation in leaf shape across the approximately 6000 documented cultivars (Huaman, 1987). Ornamental forms of *I. batatas* include over 500 cultivars. Available in a wide range of shapes, sizes and colours, some sweet potato varieties grow in a compact form, while others grow as vines, with stems that can reach 3 m or more in one growing season. The twisted and cylindrical stems spread quickly on the ground (Norman *et al.*, 1995), and the leaves can be rounded, reniform, cordate, triangular, hastate, and moderately or deeply lobed (Huaman, 1991). The leaves are usually horizontal, prostrate (Brown, 1992), arranged spirally and alternately on the stem. Some cultivars may show variation in leaf shape on the same plant (Huaman, 1997).

MATERIAL AND METHOD

In this paper, the behavior of some ornamental cultivars of *Ipomoea batatas*, cultivated in field conditions, in the north-eastern area of Romania, was evaluated.

Four varieties of *I. batatas* were used, respectively 'Rusty Red' (lobed leaves, green with ruby-red notes); 'Midnight Lace' (deeply lobed, black-purple leaves); 'Light Green' (cordate leaves of light green color) and 'Purple Hearts' (cordate leaves of purple color) (fig. 1, a-d).



Fig. 1. Cultivars of *I. batatas* studied: a) 'Rusty Red'; b) 'Midnight Lace'; c) 'Light Green'; d) 'Purple Hearts' (original)

The experience was monofactorial, the experimental factor being represented by the cultivar, with four gradations, thus resulting in four experimental variants: V₁ - 'Rusty Red', V₂ - 'Midnight Lace', V₃ - 'Light Green' and V₄ - 'Purple Hearts'. The organization of the experiences was done in randomized blocks with three repetitions.

The experimental crops were established on 04.08.2022, in the experimental field of the Floriculture, within the Iasi University of Life Sciences. Planting was done in rows, 80 cm between rows and 40 cm between plants per row (fig. 2).



Fig. 2. Aspect from the experimental field (original)

Observations and determinations were made 35 days after the establishment of cultures and focused on the following biometric indices: number of branches per plant, length of shoots, number of leaves, length and width of leaves. The results were compared with the average of the variants, and the interpretation was made using the analysis of variance, with the "LSD" test (Săulescu & Săulescu, 1967), the control being the average of the experimental variants.

RESULTS AND DISCUSSIONS

The observations and determinations made aimed to identify the way in which the four ornamental sweet potato varieties develop in the ecological conditions of NE Romania and, at the same time, the decorative impact of the plants during the growing season. Since this plant decorates by means of the port and the leaves in a varied range of colors and shapes, the study focused on determining the length of the shoots, the number of leaves and their sizes.

Regarding the length of the branches (table 1), cv. 'Rusty Red' (V₁), which exceeded the average by 69.82%, while cv. 'Purple Hearts' (V₄) recorded values 44.49% below those of the control.

Table 1

The length of the branches

Variants	Length (cm)	% face to average	Difference (+-)	Significance
V ₁ ('Rusty Red')	77.1	169.82	31.7	XXX
V ₂ ('Midnight Lace')	38.4	84.58	-7.0	00
V ₃ ('Light Green')	40.7	89.65	-4.7	0
V ₄ ('Purple Hearts')	25.2	55.51	-20.2	000
Average	45.4	100.00	0.0	control

LSD_{5%}= 4.5 cm; LSD_{1%}= 6.9 cm; LSD_{0,1%}= 11.0 cm

Thus, the plants from V₁, with the longest branches, recorded very significantly positive differences, and those from V₄ recorded very significantly negative results. In the V₂ and V₃ variants, the values were lower than the control, the differences being negative, respectively distinctly significant and significant.

The number of leaves per plant was another monitored indicator, which in cv. 'Rusty Red' (V₁) registered very significantly positive differences, with values 54.24% higher than the average (table 2). As with branch length, V₄ ('Purple Hearts') had very significantly negative results, having the lowest number of leaves per plant, with values of only 58.99% of the mean.

Table 2

Variants	Number of leaves	% face to average	Difference (+-)	Significance
V ₁ ('Rusty Red')	272.7	154.24	95.9	XXX
V ₂ ('Midnight Lace')	176.8	90.33	-17.1	0
V ₃ ('Light Green')	170.3	96.32	-6.5	ns
V ₄ ('Purple Hearts')	104.3	58.99	-72.5	000
Average	176.0	100.00	0.0	control

LSD_{5%}= 12.6 pc; LSD_{1%}= 19.1 pc; LSD_{0,1%}= 30.7 pc

Regarding the size of the leaves (length and width of the lamina), greater differences between the variants were at the level of width, the values being between 9.8 cm and 13.8 cm, with differences compared to the control statistically ensured at V₁ and V₂ (table 3). The width of the lamina showed greater differences, from 7 cm (V₄) to 13.2 cm (V₂), the values closest to the control and with insignificant differences being in the case of the V₃ variant.

Table 3

Variants	Leaf length (cm)				Leaf width (cm)			
	Abs. val.	% face to average	Diff.	Signif.	Abs. val.	% face to average	Diff.	Signif.
V ₁ ('Rusty Red')	9.8	84.48	-1.8	00	8.4	87.5	-1.2	00
V ₂ ('Midnight Lace')	13.8	118.97	2.2	XX	13.2	137.5	3.6	XXX
V ₃ ('Light Green')	11.2	96.55	-0.4	ns	9.7	101.0	0.1	ns
V ₄ ('Purple Hearts')	11.5	99.14	-0.1	ns	7.0	72.9	-2.6	000
Average	11.6	100.00	0	control	9.6	100.0	0.0	control

LSD_{5%} = 1.1 cm

LSD_{1%} = 1.7 cm

LSD_{0,1%} = 2.7 cm

LSD_{5%} = 0.6 cm

LSD_{1%} = 0.9 cm

LSD_{0,1%} = 1.5 cm

To better highlight the shape of the leaves, the ratio between the length and width of the lamina was calculated. The ratio was very close to 1 (1.05) in cv. 'Midnight Lace' (V₂), which indicates an almost round shape. At cv. 'Purple

Hearts' (V₄), the higher value of the ratio (1.65) indicates a more elongated shape of the lamina. Variants V₁ and V₃ had intermediate values (1.15 – 1.17) (fig. 3).



Fig. 3. The ratio between the length and width of the leaf lamina

Figure 4 shows in detail the leaves from the four sweet potato cultivars.

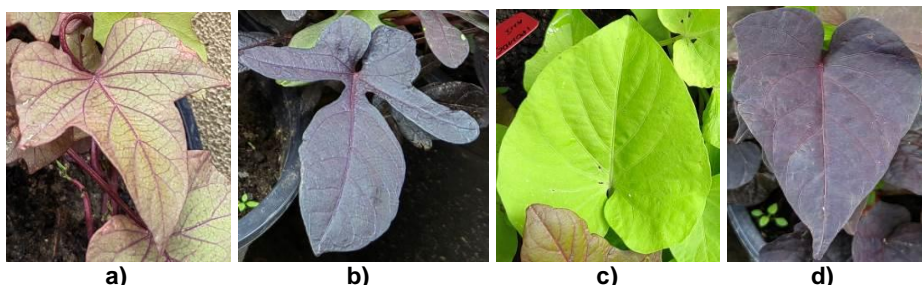


Fig. 4. Types of leaf forms: a) 'Rusty Red'; b) 'Midnight Lace'; c) 'Light Green'; d) 'Purple Hearts' (original)

CONCLUSIONS

1. In the conditions of unprotected cultivation in the NE area of Romania, the four cultivars of *I. batatas* studied were distinguished by morphological characters that correspond to a special ornamental value.

2. 'Rusty Red' was highlighted by a higher vegetative growth, expressed by longer branches and a higher number of leaves/plant. The larger number of leaves was correlated with their smaller size.

3. The shortest branches and the lowest number of leaves/plant were recorded at cv. 'Purple Hearts'.

4. 'Midnight Lace' was highlighted by the largest leaves.

5. The morphological characteristics of sweet potato plants (the color and shape of the leaves, the degree of branching and the length of the branches, the number and length of the leaves) represent special decorative elements and can be highlighted in different types of outdoor floral arrangements (spots of color, decorative containers, borders, etc.).

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