

RESULTS REGARDING THE DECORATIVE VALUE OF SOME *EREMURUS* TAXA CULTIVATED IN THE CONDITIONS OF IASI, ROMANIA

REZULTATE PRIVIND VALOAREA DECORATIVĂ A UNOR TAXONI DE *EREMURUS* CULTIVAȚI ÎN CONDIȚIILE DE LA IAȘI, ROMÂNIA

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Abstract. *Eremurus* species are widespread in Central Asia and the Middle East and are commonly known as desert candle or foxtail lily because of beautiful inflorescences (racemes) long, cylindrical, with brightly colored flowers (white, pink, orange, yellow, golden yellow etc.). Several species of *Eremurus* and their hybrids are growing for garden design or as long lasting cut flower, in big bouquets. Although they are less known in Romania, these plants can be used very well, being perennial, with good resistance to cold and drought. In this study is analyzed the ornamental potential of three hybrids *Eremurus* x *isabellinus* ('Cleopatra', 'Pinokkio' and 'Romance'), in north east of Romania conditions. Some biometric indicators reveal that the *Eremurus* hybrids analyzed are characterized by floral stems over 100 cm high (116.8-148.7 cm), inflorescences with lengths of approx. 50 cm and diameter of plants 70-80 cm. The three hybrids ensure a flowering period of approx. one month (May 24-June 22).

Key words: *Eremurus* x *isabellinus*, morphological characters, ornamental value

Rezumat. Speciile de *Eremurus* sunt răspândite în Asia Centrală și în Orientul Mijlociu și sunt cunoscute în mod obișnuit sub numele de lumânarea deșertului sau coada vulpii, datorită frumoaselor inflorescențe (raceme) lungi, cilindrice, cu flori viu colorate (alb, roz, portocaliu, galben, galben-auriu etc.). Mai multe specii de *Eremurus* și hibrizii lor se cultivă pentru designul grădinilor sau ca flori tăiate, cu durată lungă de păstrare, în buchete mari. Deși sunt mai puțin cunoscute în România, aceste plante pot fi valorificate foarte bine, fiind perene, rezistente la frig și secetă. În acest studiu este analizat potențialul ornamental la trei hibrizi *Eremurus* x *isabellinus* ('Cleopatra', 'Pinokkio' and 'Romance'), în condițiile din NE României. O serie de indicatori biometrici relevă faptul că hibrizii de *Eremurus* analizați se caracterizează prin tulpini florale de peste 100cm înălțime (116,8-148,7 cm), inflorescențe cu lungimi de aprox. 50 cm și diametrul plantei de 70-80 cm. Cei trei hibrizi asigură o perioadă de înflorire de aprox. o lună (24 mai-22 iunie).

Cuvinte cheie: *Eremurus* x *isabellinus*, caractere morfologice, valoare ornamentală

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INTRODUCTION

Eremurus (foxtail lilies, desert candles) are members of the family Liliaceae (Asphodelaceae) from the rocky meadows of semi-desert regions of Central Asia and the Middle East (Naderi Safar *et al.*, 2009).

These plants are herbaceous perennials, with fleshy roots, linear basal leaves and small flowers in dense racemes (Șelaru, 2007; <https://www.rhs.org.uk>). Because it is native to drier regions, it does not require a lot of water and prefer a full-sun environment in a well-drained spot.

The species commonly grown as ornamental are *E. himalaicus*, *E. robustus* and *E. stenophyllus*, but there are many hybrids very important especially for garden. *Eremurus* is a novel commercially important specialty cut flower (Ahmad *et al.*, 2014).

Hybrids *Eremurus* x *isabellinus* R.Vilm. (named in honor of Archduchess Isabella of Austria), derived from the crossing of *E. stenophyllus* with *E. olgae* (Vilmorin, 1905). *E. olgae* Regel. has linear grey-green leaves and produces racemes of white-pink stellate flowers from May to August; reach heights of 70-150 cm (https://en.hortipedia.com/wiki/Eremurus_olgae). *E. stenophyllus* (Boiss. & Buhse) Baker has stellate yellow flowers and leaves of 30-40 cm; height of floral stems is 90-150 cm.

The main aim of this study was to determine the ornamental potential of three *Eremurus* cultivars (hybrids *Eremurus* x *isabellinus*), in north east of Romania conditions.

MATERIAL AND METHOD

This experiment was conducted in 2016-2017. Objects of a research were *Eremurus* cultivars growing in Iasi conditions (north east of Romania), in experimental field of the University of Agricultural Sciences and Veterinary Medicine. The present study comprised of three cultivars of *Eremurus*: 'Cleopatra', 'Pinokkio' and 'Romance'.

'Cleopatra' (fig. 1a) has peach-orange flowers and orange anthers, bluish-green leaves in early and midsummer (<https://www.rhs.org.uk>).

'Pinokkio' (fig. 1b) has erect stems, to 1.5 m tall, with elegant orange-yellow flowers and burnt orange anthers (<https://www.rhs.org.uk>).

'Romance' (fig. 1c) has tall, stately spires of salmon pink flowers that appear as strap-like green foliage begins to die back.

The characters analyzed were: length and width of leaves, diameter of plants, height of floral stems, length and diameter of inflorescences. Also, the flowering period was recorded. Each cultivar analyzed was an experimental variant and as a control was considered the average of experience. The data was processed using analysis of variance (randomized design with three replications) by testing the difference between variants with LSD test (Săulescu and Săulescu, 1967). The symbols used to indicate the significance of the differences from the control are: ns=insignificant; o/x=negative/positive significant difference; oo/xx=negative/positive distinct significant difference; ooo/xxx=negative/positive very significant difference.

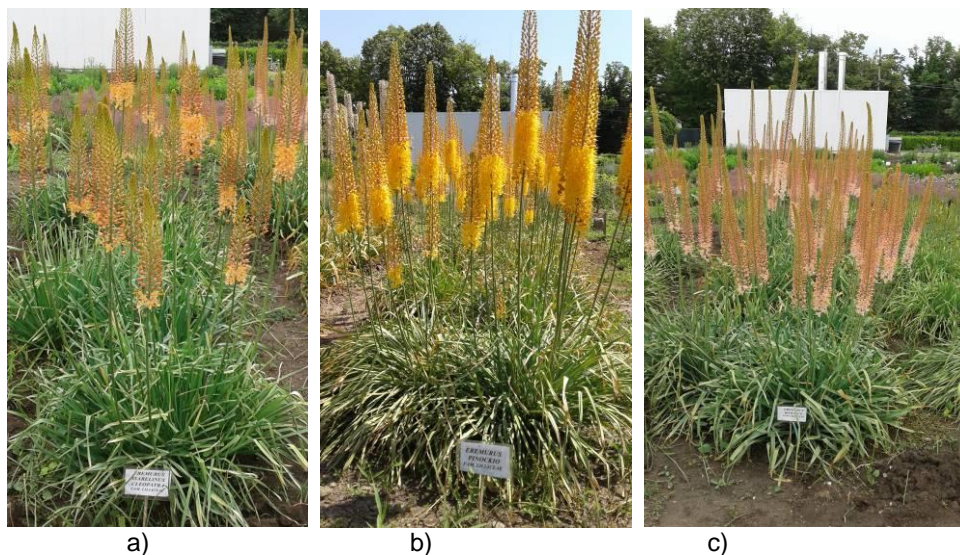


Fig. 1 *Eremurus* cultivars: a) 'Cleopatra'; b) 'Pinokkio'; c) 'Romance' (original)

RESULTS AND DISCUSSIONS

In table 1 are present the biometric indicators of leaves, floral stems and inflorescences of *Eremurus* cultivars analyzed.

Table 1

Biometrics of *Eremurus* cultivars

Parameter	Cultivar		
	'Cleopatra'	'Pinokkio'	'Romance'
Length of leaves (cm)	73.0	48.5	60.5
Width of leaves (cm)	1.4	1.2	1.6
Diameter of plants (cm)	80.7	73.9	85.6
Height of floral stems (cm)	148.7	116.8	135.5
Length of inflorescences (cm)	48.8	44.6	56.7
Diameter of inflorescences (cm)	7.8	7.6	7.4

Values of biometric determinations were compared with the average of experience, considered as control. The statistically assured differences were registered at the length of leaves, diameter of the plants, height of floral stems and length of inflorescence. In tables 2 and 3 are presented the results for these characters and the statistical significances.

The length of leaves exceeds 70 cm la cv. 'Cleopatra' (73 cm) and the differences are very significant positive compared to the control. For cv. 'Pinokkio'

the differences are very significant negative (Table 2). The diameter of the plants varies between 73.9 cm and 85.6 cm, with lower values at cv. 'Pinokkio' (tab. 2).

Table 2

Comparative analysis of length of leaves and diameter of plants

Variant (Cultivar)	Length of leaves (cm)		Diameter of plants (cm)	
	Relative value (%)	Differences (\pm) and significance of differences	Relative value (%)	Differences (\pm) and significance of differences
'Cleopatra'	120.26	12.3 ^{xxx}	100.75	0.6 ^{ns}
'Pinokkio'	79.90	-12.2 ⁰⁰⁰	92.26	-6.2 ⁰⁰
'Romance'	99.67	-0.2 ^{ns}	106.87	5.5 ^{xx}
Average (control)	100.00	-	100.00	-

LSD 5% = 2.7;
LSD 1% = 4.5;
LSD 0.1% = 8.5

LSD 5% = 2.3;
LSD 1% = 3.9;
LSD 0.1% = 7.3

The height of floral stems varies between 116.8 cm and 148.7 cm. Compared to the average of the experience (control), the results are statistically assured (distinct significant differences), with the exception of the cv. 'Romance'. The largest height of floral stem (148.7 cm) was related to cv. 'Cleopatra' and the shortest (116.8 cm) was for cv. 'Pinokkio' (tab. 3).

Table 3

Comparative analysis of length of height of floral stem length of inflorescence

Variant (Cultivar)	Height of floral stem (cm)		Length of inflorescence (cm)	
	Relative value (%)	Differences (\pm) and significance of differences	Relative value (%)	Differences (\pm) and significance of differences
'Cleopatra'	111.20	15.0 ^{xx}	97.60	-1.2 ^{ns}
'Pinokkio'	87.36	-16.9 ⁰⁰	89.00	-5.5 ⁰
'Romance'	101.35	1.8 ^{ns}	113.40	6.7 ^{xx}
Average (control)	100.00	-	100.00	-

LSD 5% = 8.5;
LSD 1% = 14.0;
LSD 0.1% = 26.2

LSD 5% = 3.8;
LSD 1% = 6.3;
LSD 0.1% = 11.8

Maximum inflorescence height (56.7 cm) was for cv. 'Romance' while the minimum height (44.6 cm) was recorded for cv. 'Pinokkio'. The mentioned cultivars had positive distinct significant differences, respectively negative significant differences compared to the control (tab. 3). The values for this

character were closer to the control for cv. 'Cleopatra', so the differences were insignificant (tab. 3).

An important characteristic when designing a garden is to choosing plants and gardeners should consider the flowering period. Generally, *Eremurus* plants bloom in April-June and has a relatively short flowering period. In the studied hybrids, flowering begins around 24-26 May and ends on June 20-22 (tab. 4). Flowering stages analyzed are:

- flowering (first flower buds are opening);
- full flowering (most of flowers are opened);
- end of flowering (no more new buds are opening and the fruits appear at the base of inflorescence).

Table 4

Evaluation of flowering period of *Eremurus* cultivars

Calendar (Month/ day)		'Cleopatra'	'Pinokkio'	'Romance'
May	24			○
	25			○
	26	○		○
	27	○		⊗
	28	○		⊗
	29	⊗		⊗
	30	⊗	○	⊗
June	31	⊗	○	⊗
	1	⊗	○	⊗
	2	⊗	○	⊗
	3	⊗	⊗	⊗
	4	⊗	⊗	⊗
	5	⊗	⊗	⊗
	6	⊗	⊗	⊗
	7	⊗	⊗	⊗
	8	⊗	⊗	⊗
	9	⊗	⊗	⊗
	10	⊗	⊗	⊗
	11	⊗	⊗	⊗
	12	⊗	⊗	⊗
	13	⊗	⊗	⊗
	14	⊗	⊗	⊗
15	⊗	⊗	⊗	
16	⊗	⊗	φ	
17	φ	⊗	φ	
18	φ	⊗		
19	φ	⊗		
20		φ		
21		φ		
22		φ		

Legend: ○ - flowering; ⊗ - full flowering; φ - end of flowering

The first to bloom are cultivars 'Romance' and 'Cleopatra'. 'Pinokkio' blooms a week later. The flowering period of these *Eremurus* hybrids is approximately three week (tab. 4).

CONCLUSIONS

1. The hybrids of *Eremurus x isabellinus* were found interesting and could be candidates for ornamental design in garden or inside, as cut flowers.

2. Floral stems have a height of over 100 cm (116.8-148.7 cm); the largest height was related to cv. 'Cleopatra' (148.7 cm) and the shortest (116.8 cm) was for cv. 'Pinokkio' (116.8 cm).

3. Maximum inflorescence height (56.7 cm) was for cv. 'Romance' while the minimum height (44.6 cm) was recorded for cv. 'Pinokkio'.

4. The three hybrids ensure a flowering period of approx. one month (May 24 - June 22); 'Romance' and 'Cleopatra' are the first to bloom and 'Pinokkio' blooms a week later.

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