

THE BEHAVIOUR IN CROP OF SOME SPECIES WITH ORNAMENTAL FEATURES FROM SPONTANEOUS FLORA OF ROMANIA

COMPORTAREA ÎN CULTURĂ A UNOR SPECII CU POTENȚIAL ORNAMENTAL DIN FLORA SPONTANĂ A ROMÂNIEI

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Abstract. *In the paper are presented the preliminary results of a study which have as a main goal the introduction in crop of some certain species from the spontaneous flora of NE and E area of Romania. The analysed species belonged to Liliaceae family (*Allium ursinum L., Lilium martagon L., Polygonatum multiflorum (L.) All., Polygonatum latifolium (Jacq.) Desf.*). In comparison with their behaviour in natural eco-system were analyzed the main phenophases, enlighten the ornamental characters. The obtained results show a very good adaptability in crop of species *Allium ursinum L.* and of species from kind *Polygonatum. Lilium martagon L.* show a small tendency of decreasing of certain ornamental characters (dimension and number of flowers per plant).*

Key words: spontaneous flora, ornamental potential, adaptability.

Rezumat. *În lucrare sunt prezentate rezultatele preliminare ale unui studiu care are ca obiectiv principal introducerea în cultură a unor specii identificate în flora spontană din zona de NE și E a României. Speciile analizate aparțin familiei Liliaceae: *Allium ursinum L., Lilium martagon L., Polygonatum multiflorum (L.) All., Polygonatum latifolium (Jacq.) Desf.* Comparativ cu comportarea în ecosistemul natural, s-au analizat principalele fenofaze, cu evidențierea caracterelor ornamentale reprezentative. Rezultatele obținute au evidențiat o adaptare bună în cultură a speciilor *Allium ursinum L.* și a speciilor din genul *Polygonatum.* În cazul speciei *Lilium martagon L.* s-a înregistrat o ușoară tendință de diminuare a anumitor caractere ornamentale (dimensiunea și numărul florilor pe plantă).*

Cuvinte cheie: flora spontană, potențial ornamental, adaptabilitate.

INTRODUCTION

Plants with decorative potential from the spontaneous flora offer a valuable source of germplasm to enrich the assortment of species used in landscape design and floriculture. Those plants have as a supplementary advantage the adaptability features to local and regional conditions, fact which allows having new opportunities on ornamental flowers market.

Capitalization of biologic and ornamental potential of the spontaneous flora from N-E area of Romania was a main target for some research and education institutions, which identify and cultivate in collections such plants, but many of them

remained at the level of “collection plants” without being promoted in ornamental plants nurseries.

The aim of the present paper is to put in light some species from spontaneous flora brought in collection and studied in aim to maintain their ornamental features in “ex situ” conditions, so to be able to establish if could be recommended for cropping.

MATERIAL AND METHOD

Research was carried out in the experimental field of Floriculture Discipline from USAMV Iași. Biologic material was represented by species from Liliaceae family (*Allium ursinum*, *Lilium martagon*, *Polygonatum latifolium*, *Polygonatum multiflorum*, *Polygonatum officinalis*), with natural habitat in Moldova area (Iași, Vaslui and Neamț counties) and brought in collection in the autumn of 2008. All five species are herbaceous plants, from perennial geophyte category.

Crop establishment was realised in October, with vegetative material (bulbs and rhizomes) gathered from spontaneous flora, and the observations took place during vegetation period in 2009. In table 1 are presented in a synthesis the main data regarding biologic material, its source and the date of experimental crop establishment.

Table 1

Source and synthetic data regarding crop establishment

Nr. crt.	Specie	Source of material	Biologic material	Date of experimental crop establishment
1	<i>Allium ursinum</i>	Dobrovăț forest Iași, Neamț	Bulbs	20.10.2008
2	<i>Lilium martagon</i>	Bârnova forest Iași, Neamț	Bulbs	16.10.2008
3	<i>Polygonatum latifolium</i>	Dobrovăț forest Iași, Vaslui	Rhizomes	20.10.2008
4	<i>Polygonatum multiflorum</i>	Dobrovăț forest Iași, Vaslui	Rhizomes	20.10.2008
5	<i>Polygonatum officinale</i>	Dobrovăț forest Iași, Vaslui	Rhizomes	20.10.2008

Experimental crops were placed in blocks with variations superimposed linear bunk, each variant represented specie.

The proposed methodology for evaluations of the analysed taxons had as base the following:

- phenologic studies to establish vegetation period;
- quality biometric studies (analyse of the phenotypic expression by using index of plant and flower morphology, plants' waist and diameter, aspect, compactness, number of flowers per plant etc.);
- studies regarding plants' multiplication capacity, to establish the optimal variants for multiplication of the material, as a main aim in promoting the valuable taxons.

Multiplication capacity of the plants in crop conditions was analysed both for vegetative methods (bulbs and rhizomes), and also for seed multiplication.

In the case of using seeds as multiplication material, was tested the classical method, sowing was realised in field and in greenhouse, and also the modern methods with obtaining explants from seeds germinated “*in vitro*”.

For “*in vitro*” germination, the utilised seeds were gathered from their natural habitat. Their sterilization was made by treatment with Topsisin for 10 minutes, followed by three washes with distillate water and a treatment with a solution of calcium hypochlorite (10-15 min.). After these operations, under the laminar flow hood were effectuated three washes with sterile water, the seeds were immersed in alcohol 70% (around 1 min.), and before passing on the germination medium were washed only once with sterile water. Inoculation was realised on a MS solid medium (Murashige-Skoog). Until seeds germination, the vials were kept at dark, at temperature of 24⁰C, and after germination were passed in vegetation chamber, light intensity conditions of 30 μmol/m²/sec., temperature 25 ± 1⁰C and photoperiod of 16 hours light/8 hours dark.

RESULTS AND DISCUSSIONS

Plants brought in crop were monitories during vegetation period, having in view, first of all, a series of morphologic features which defines them as ornamental plants (decorative organs, colour of the flowers, growing method etc.). *Allium ursinum* and species of *Polygonatum* grow under the form of bushes and decorates both by flowers and also through the rich foliage. *Lilium martagon* present as the main decorative part the flowers, at which could be attached the elegant port. Data regarding plants’ behaviour in crop conditions appreciated through the recorded biometric measurements for some features (waist, growing characteristics and plants’ port) and through some specific ornamental features (flowers’ colour, plants’ port) are presented in table 2.

In the first year of vegetation in “*ex situ*” conditions plants manifested a relatively good level of adaptability, their growing and development parameters being very close to the ones from originate habitat. At *Lilium martagon* was recorded a decrease tendency of plants’ vigour (lax aspect of the bushes, reduced height, decreases of flower number and leaf).

Table2

Morphologic observations effectuated in 2009

Nr crt	Specie	Life cycle	Port	Flowers' colour	Decorative part*	Observations
1	<i>Allium ursinum</i>	perennial	bush	white	L, FI,	normal
2	<i>Lilium martagon</i>	perennial	erect	rose with purples patches	P, FI	lax
3	<i>Polygonatum latifolium</i>	perennial	bush	white	FI, L	normal
4	<i>Polygonatum multiflorum</i>	perennial	bush	white-green	FI, L	normal
5	<i>Polygonatum officinalis</i>	perennial	bush	white	FI, L	normal

*Decorates through: P - port; L - leaf; FI - colour of flowers.

The effectuated biometric measurements on plants' height and on number of flowers were compared with the ones recorded at the plants in their originate habit.

A tendency remarked at all species is the one of reducing plants' waist, but the differences aren't significant at *Allium ursinum* (mean height of cultivated plants being of 22.8 cm, in comparison with 26.3 cm in natural habitat), at *Polygonatum latifolium* (30.7 cm face to 33.6 cm), at *Polygonatum multiflorum* (26.7cm face to 34.9cm) and at *Polygonatum officinale* (20.5cm face to 25.8cm). But at *Lilium martagon*, were recorded negative significant differences at the plants brought in collection, by reducing the height with around 30% (fig. 1).

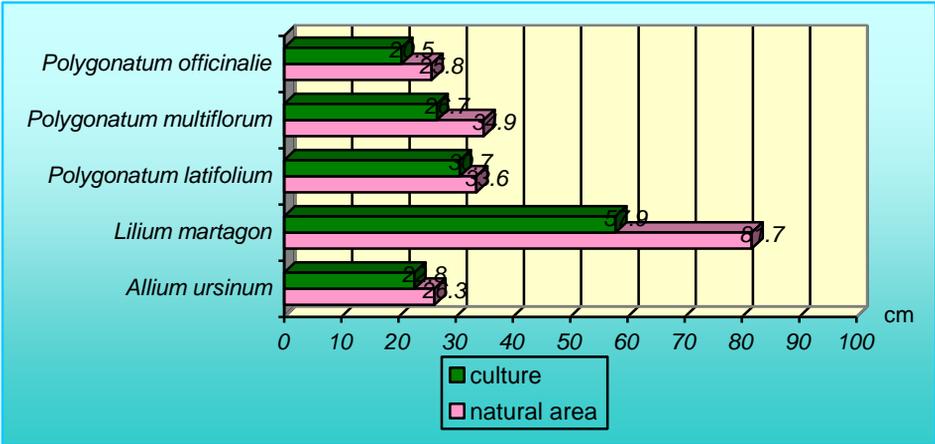


Fig. 1. Plants' height

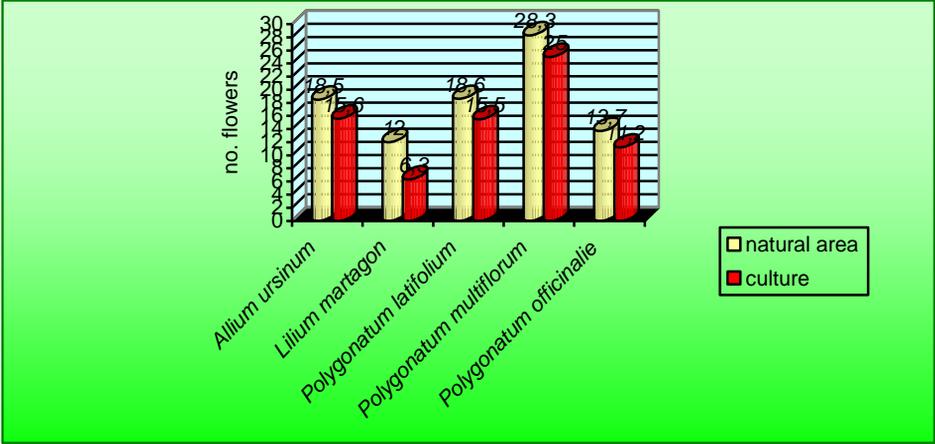


Fig. 2. Number of flowers

Also as regarding the flowering capacity the obtained results showed a decrease of the flowers number at the plants from collection, being different for each of them (fig. 2). So, at *Allium ursinum* the mean number of flowers in inflorescence decreased with around 15%, at *Polygonatum latifolium* with about

11%, at *Polygonatum multiflorum* with 12%, and at *Polygonatum officinalis* with 18%. At these species the recorded differences were non-significant. At *Lilium martagon*, the number of flowers reduced to one half determined negative significant differences.

Tracking the flowering period, in experimental field, could be observed that the studied species cover almost the same decoration period as in natural habitat, decorating from spring till the beginning of summer. Could be remarked a light delay of flowering (with around 5-8 days) in crop conditions (table 3).

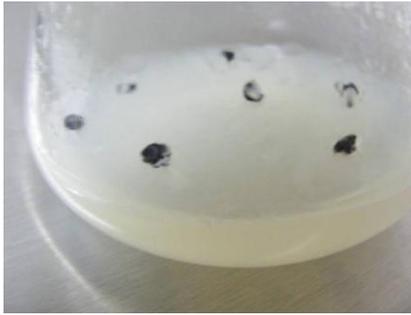
Table 3

Flowering period of the studied species

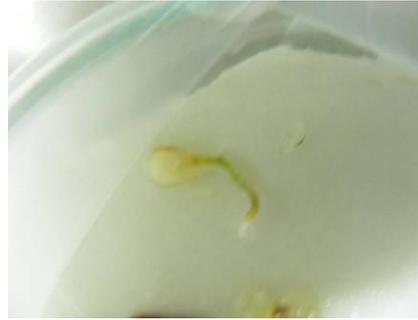
Month	Decade	Specie	IV			V			VI			VII			VIII			IX		
			1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
			<i>Allium ursinum</i>	natural area																
	crop																			
<i>Lilium martagon</i>	natural habit																			
	crop																			
<i>Polygonatum latifolium</i>	natural area																			
	crop																			
<i>Polygonatum multiflorum</i>	natural area																			
	crop																			
<i>Polygonatum officinale</i>	natural area																			
	crop																			

Research regarding multiplication capacity of the plants by different methods is a starting point in establishing the optimum variants for material multiplication, having as main aim to promote the valuable taxons. Vegetative multiplication through subterranean organs, used in autumn of 2008 for establish the experimental field, is the simple method and with the best results, over 95% from the used biologic material (bulbs, rhizomes) assured the starting in vegetation in the next year.

Due to the weak results obtained at seed germination in conditions of conventional crop (direct sowing in field or seedling producing), especially at *Allium ursinum* and *Lilium martagon*, we tested also “in vitro” multiplication methods. At these species we recourse at aseptic germination of seeds, to obtain vegetal material needed for starting “in vitro” cultures. Also in this case the results were unsatisfactory, in conditions in which *Lilium martagon* seeds germinated in a rate of only 42.7% and the ones of *Allium ursinum* didn’t germinate, the suspected causes being the composition of culture medium, maturation degree of the seeds or their storage conditions, aspects which will be clarified in our future research. In figure 3 are presented photos with seeds in “in vitro” mediums (at 15 days from inoculation).



a). *Allium ursinum*



b). *Lillium martagon*

Fig. 3 (a-b). Seeds on “in vitro” culture mediums

CONCLUSIONS

At all the studied species the main decorative element is represented by flowers or inflorescences. Subsidiary plant height, number of stem ramifications, dimensions, shape and layout mode of leaf is other ornamental characters, which justify the introduction in crop of these species.

The study of taxons behaviour in crop conditions shows a good adaptability of them, and biometric features which were recorded and correlated during all the period of growing and development of the plants will be at the base of technologic crop recommendations for each specie.

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