ASPECTS REGARDING THE "EX SITU" PROPAGATION OF SOME WILD PLANTS IN ORDER TO INTRODUCE THEM INTO THE CULTURE

ASPECTE PRIVIND ÎNMULȚIREA "EX SITU" A UNOR PLANTE SĂLBATICE, ÎN VEDEREA INTRODUCERII LOR ÎN CULTURĂ

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Abstract. *This paperwork presents aspects of seed propagation of wild plants with ornamental characters, in order to introduce them into the culture. There were studied three species of wild flora identified in the Curvature Sub-Carpathians, Buzau county (Centaurea orientalis L. Melica ciliata ssp. ciliata L. and Silene nutans ssp. nutans). The experimental cultures were established using as planting material transplanted seedling and untransplanted seedling. The experiences aimed not only the best option for crop establishment, but also keeping the ornamental character. The results obtained showed that for Centaurea orientalis and Melica ciliata ssp. ciliata it can be used both transplanted seedling and untransplanted seedling, while for Silene nutans ssp. nutans transplanted seedling should be avoided, given the sensitivity of this species to transplanting.*
Key words: wild plants, ornamental value, *Centaurea, Silene, Melica,* seeds propagation.

Rezumat. *Lucrarea prezintă aspecte privind înmulțirea prin semințe a unor plante sălbatice cu caractere ornamentale, în vederea introducerii lor în cultură. Au fost studiate trei specii identificate în flora spontană din zona Subcarpaților de Curbură din județul Buzău (Centaurea orientalis L., Melica ciliata* ssp. *ciliata* L. *şi Silene nutans* ssp. *nutans), specii la care s-au înființat culturile experimentale utilizând ca material săditor răsad repicat şi nerepicat. Experiențele au urmărit nu numai varianta optimă de înființare a culturilor, ci şi păstrarea caracterelor ornamentale. Rezultatele obținute au demonstrat faptul că la Centaurea orientalis şi Melica ciliata ssp. ciliata se poate folosi atât răsad repicat, cât şi nerepicat, în timp ce la Silene nutans ssp. nutans se recomandă evitarea repicării răsadului, având în vedere sensibilitatea acestei specii la transplantare.*
Cuvinte cheie: plante sălbatice, valoare ornamentală, *Centaurea, Silene, Melica,* înmulțire prin semințe.

INTRODUCTION

In spontaneous flora can be found many ornamental plants with special properties that can be successfully used into the culture, provided to establish an appropriate culture technology and in particular, the effective propagation methods that meet certain requirements imposed by this species.

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Introduction of wild plants in culture aims, on the one hand, recovery and conservation of wild flora biodiversity, and on the other hand, expanding the range of native ornamental plants. In recent years, similar studies have been conducted on the value of ornamental plants from the spontaneous flora of Romania, especially in the south and southeast (Draghia et al, 2010, 2011; Chelariu et al, 2010, 2011). In this paperwork it is analyzed the ability of copying and maintaining the ornamental performance of three wild plant species identified in the SE of Romania: *Centaurea orientalis* L., *Melica ciliata* ssp. *ciliata* L. şi *Silene nutans* ssp. *nutans* L. The studied species are interesting because of the morphology of the flowers, the form and the arrangement of the leaves and stems.

Centaurea orientalis L. (sin. *C. rubescens* Besser) of the family Asteraceae is one of the perennial species of the genus, being particularly prevalent in Southern Europe (Wagenitz and Hellwig, 1996; Greuter et al. 2001, cited by Koutecky, 2007). In Romania it can be found in the sunny and dry steppe zones (Ciocârlan, 2000). It is an herbaceous plant with erect edged stems, simple or slightly branched in top, with a hight of 1 - 1.5 m. Leaves are 1-2 times pinnate divided and are green or pale greenish skin and shiny on the bottom. The flowers are grouped in globular flowering heads, creamy - yellow, 20-25 mm diameter (Ciocârlan, 2000).

Melica ciliata ssp. ciliata L. (bead) is a perennial and herbaceous plant, from Poaceae family, widespread in Romania from the steppe to the beech floor. It has a fasciculate root and erect stem, smooth, high of 10 - 100 cm. The leaves are linear, rigid, without prominent median rib. Upper leaf sheaths and lamina are smooth. Panicle is erect, one-sided and lax. It blooms in May-June (Ciocârlan, 2000).

Silene nutans ssp. *nutans* L. (pigeon crop) from *Caryophyllaceae* family is a perennial, herbaceous plant, often spread in Romania in grasslands of the steppe to the beech forest. Strain reaches 30-60 cm tall, the bottom is with small hairs, wrinkled. The leaves are pubescent, the flowers are hermaphrodite, with yellowish-white petals. It blooms in May-June (Ciocârlan, 2000).

MATERIAL AND METHOD

The experiments were conducted in the experimental field of Floriculture discipline at the University of Agricultural Sciences and Veterinary Medicine.

Establishment of experimental variants was conducted with seeds collected from three plant species of wild flora identified in Buzau (Plaiul Nucului and Pâcle - Mud Volcanoes):

- *Centaurea orientalis* L. (sin. *C. rubescens* Besser), Asteraceae family (fig. 1), with the natural habitat in Pâcle (Mud Volcanoes);
- *Melica ciliata* ssp. *ciliata* L. (fig. 2), Poaceae family, with the natural habitat at Plaiul Nucului;
- *Silene nutans* ssp. *nutans* L. (fig. 3), the Caryophyllaceae family with the natural habitat at Plaiul Nucului.

a) b)

Fig. 1 – *Centaurea orientalis*: a) stem with leaves; b) inflorescence (original)

a b

Fig. 2 – *Melica ciliata* ssp. *ciliata*: a) root b) inflorescence (original)

a) b)

Fig. 3 – *Silene nutans* ssp. *nutans:* plants in natural habitat (Draghia, 2010); b) plants in culture (original)

The two natural areas from which biological material is used in experiments geographically belong to the Subcarpathians from Buzau County. The Pacle zone (village Berca) is at an altitude of approx. 300 m, where there is average rainfall of between 400- 600 mm. The studied ecosystem was the natural grasslands near Mud Volcanoes on clay soils with low fertility. Plaiul Nucului plateau from Lopatari village, is located on Slănic Valley at an altitude of approx. 800 m, with average annual rainfall of 700-800 mm. Plants were found in a forest ecosystem (pine forest), characterized by the presence of districambosol soil medium textured, acid reaction and medium to low fertility.

Table 1

Experimental scheme

Species	Variant	Specification
Centaurea orientalis L.	V_1	untransplanted seedling
	V_2	transplanted seedling
Melica ciliata ssp. *ciliata* L.	V_1	untransplanted seedling
	V_2	transplanted seedling
Silene nutans ssp. *nutans* L.	V_1	untransplanted seedling
	-	-

Experimental scheme (table 1) followed the seedlings production of the three wild species for breeding "ex situ" in Iasi conditions. For each species were used two experimental variants: with untransplanted seedling (V_1) and with transplanted seedling (V_2). Exception is *Silene nutans* ssp *nutans* that had only one experimental variant and it was established with transplanted seedling (V_1), because plants haven't resisted on transplanting.

The experiments setting up was conducted in the spring of 2011. It was sown in the greenhouse, in vane pockets, in a substrate composed of peat and garden soil, the volumetric ratio being 1:3 for *Centaurea orientalis* and 1:1 for *Silene nutans* and *Melica ciliata*. Greenhouse temperature was 16-18 ^{0}C. From the plants obtained were built two variants. Sowing and planting in field of the seedlings obtained in the two experimental variants was done on the same date. The experiments were organized in randomized blocks with three repetitions.

The dates regarding experimental crops establishing are presented in table 2.

Table 2

Dates rergarding experimental cultures establishing

Species	No. of seeds sown	Sowing date	Date of emergence	Date of transplantation	Date of field planting
Centaurea orientalis	70	23.03.2011	26.03.2011	14.04.2011	31.05.2011
Melica ciliata ssp. *ciliata*	100	23.03.2011	28.03.2011	18.04.2011	31.05.2011
Silene nutans ssp. *nutans*	20	23.03.2011	1.04.2011	22.04.2011	31.05.2011

Observations and measurements made targeted different aspects of plant behavior under "ex situ" conditions: seed germination (germination faculty and germination time), young plants ability to withstand transplanting, height growth dynamics of plants and their flowering ability depending on the seed used to set up cultures.

RESULTS AND DISCUSSIONS

Aspects regarding seed germination (germination faculty and germination time) highlights a number of differences between species. Largest differences were recorded in terms of percentage of germination, which ranged from 67% to *Melica ciliata* ssp. *ciliata* and 25% in *Silene nutans* ssp. *nutans* (fig. 4).

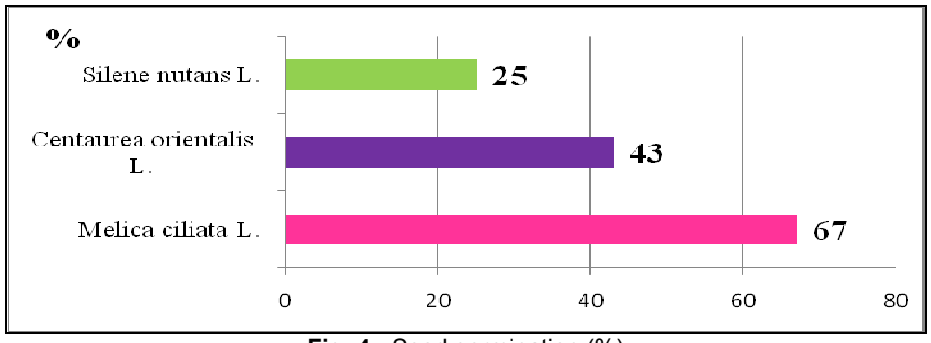

Fig. 4 - Seed germination (%)

Germination time was between 3 and 7 days: *Centaurea orientalis* germinated in 3 days, *Melica ciliata* ssp. *ciliata* in 5 days and *Silene nutans* ssp. *nutans* in 7 days (table 2).

There was pursued height growth dynamics for the plants both from untransplanted seedling and the transplanted seedling, according to the experimental scheme. Observations were conducted from April to August. At *Centaurea orientalis* it was observed that untransplanted plants had a dynamic in height growth better than transplanted plants (fig. 5), but the differences were insignificant variations. Similarly behaved *Melica ciliata* ssp. *ciliata* plants (fig. 6).

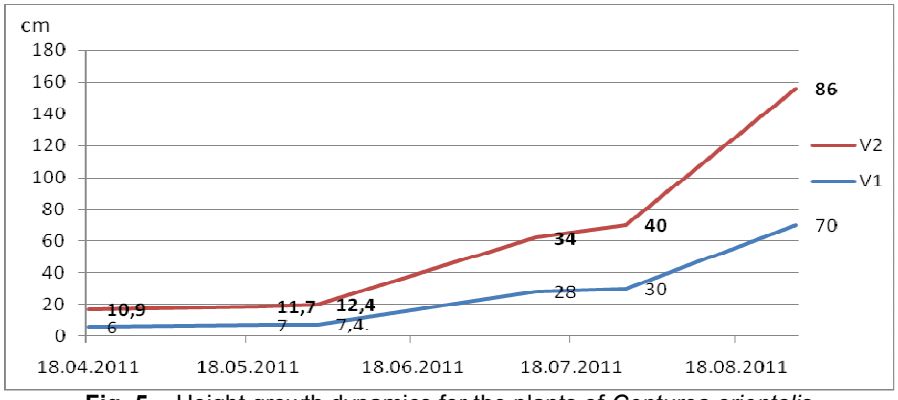

Fig. 5 - Height growth dynamics for the plants of *Centurea orientalis*

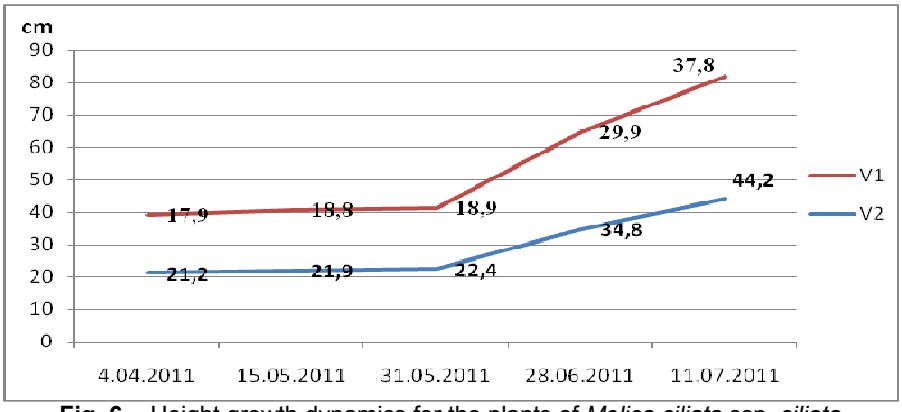

Fig. 6 - Height growth dynamics for the plants of *Melica ciliata* ssp. *ciliata*

The height of *Silene nutans* ssp. *nutans* plants (exclusively obtained from untransplanted seedling) recorded averages of 4 cm (in the first year plants form only a leaves rosette, flowering taking place in the second year).

At the crops established in field were made measurements also regarding the number of inflorescences formed, comparing the two experimental variants (table 3). The differences between the two variants are insignificant the type of seedlings used in establishing cultures for the two species uninfluencing plants ornamental value.

Table 3

Results regarding plants flowering

Species	Var.	Number of infl./plant	% related to control	Differences	Signification
Centaurea orientalis LSD 5%=2,4; LSD 1%= 5,5; LSD 0.1%=17,4 buc.	V_1	13,8	-	-	-
	V_2	15,2	110,14	+1,4	-
Melica ciliata ssp. *ciliata* LSD 5%=0,5; LSD 1%=1,1; LSD 0.1%=3,6 buc.	V_1	5,6	-	-	-
	V_2	6,0	107,17	+0,4	-

CONCLUSIONS

1. The studied plants indicated a good adaptability to climatic conditions in the Iasi area.

2. Best seed germination percentage was recorded by *Melica ciliata* ssp. *ciliata* with 67%, followed by *Centaurea orientalis* 43% and the lowest percentage of germination was recorded by *Silene nutans* ssp. *nutans* (25%).

3. *Silene nutans* ssp. *nutans* don't bear transplanting and consequently it is recommended direct seeding in permanent place or untransplanted seedling production.

4. At *Centurea orientalis* and *Melica ciliata* ssp. *ciliata* both strains height and number of inflorescences sindicated higher values for the plants obtained from untransplanted seedling compared to those obtained from transplanted seedling, but the differences were insignificant. Therefore, for the two species, as seedlings can be used both transplanted seedling and untransplanted seedling.

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