

## The situation of *Centaurea marschalliana* Spreng. (Asteraceae: Centaureinae) population from "Movila lui Burcel" natural reserve (Vaslui county, Romania) and the negative impact in this protected area of religious buildings raised up inside the site

<sup>1</sup>Emilian I. Pricop, <sup>2</sup>Bogdan M. Negrea, <sup>1</sup>Iulian Gherghel, and <sup>1</sup>Irinel E. Popescu

<sup>1</sup>"Alexandru Ioan Cuza" University, Faculty of Biology, Bd. Carol I 20a, 700505 Iași, Romania, EU.; <sup>2</sup>"Ștefan cel Mare" University, Faculty of Forestry Suceava, University Street no. 13, 720229 Suceava, Romania, EU; Corresponding author: Emilian Pricop: pricopemilian@yahoo.com

**Abstract.** The aim of this study is to present the additional information on the taxonomy, biology, ecology of *C. marschalliana* in Romania and the population status from "Movila lui Burcel" natural reserve. We present also the negative impact of religious buildings raised up inside this protected area.

**Key Words:** Steppe plant species, *Centaurea marschalliana*, natural reserve, negative human impact, "Movila lui Burcel".

**Rezumat.** *Centaurea marschalliana* Spreng. (Asteraceae: Centaureinae), este încă prezentă în Rezervația Naturală "Movila lui Burcel" - Jud. Vaslui (România). Prezenta notă prezintă informații adiționale legate de taxonomia, biologia și ecologia speciei *C. marschalliana* în România și prezintă situația populației acestei specii din Rezervația Movila lui Burcel.

**Cuvinte cheie:** Specii stepice de plante, *Centaurea marschalliana*, Movila lui Burcel, România, influență negativă antropică.

**Introduction.** "Movila lui Burcel" (Burcel's hump) is a botanical reserve of about 12 ha, maximum altitude 391 m, elevation 300-391 m, situated in Vaslui county, near Miclești (Lat. 46°50', Long. 27°47'). The natural reserve is situated on two hills with accentuated inclination of 15-25° that contributed to the flowing of the rainfalls. The weather is excessive continental with warm summers and cold winters, the average annual temperature being 9.2°C and the average of precipitations is under 500 mc. The microclimatic conditions are arid, with strong sunstroke and blowing winds.

The site represents a Vest-Pontic steppe grassland with xerophytic plant species like *Stipa lessingiana*, *Stipa capillata*, *Festuca valesiaca*, *Centaurea orientalis*, *Taraxacum serotinum*, *Agropyron cristatum* etc. Here we can found *Echium russicum*, an European protected taxon, but also another rare or vulnerable plants: *Allium moschatum*, *Agropyron cristatum* ssp. *pectinatum*, *Astragalus vesicarius* ssp. *pseudoglaucus*, *Astragalus dasyanthus*, *Centaurea marschalliana*, *Crocus reticulatus*, *Centaurea orientalis*, *Centaurea rutifolia* ssp. *jurineifolia*, *Dianthus capitatus*, *Dichanthium ischaemum*, *Eleagnus angustifolia*, *Galium octonarium*, *Hyacinthella leucophaea*, *Salvia nutans*, *Stipa lessingiana*, *Taraxacum serotinum*, *Teucrium polium* ssp. *capitatum*. A total of 290 plant species had been identified in this reserve (Sârbu et al 2007).

**Material and Method.** The data were obtained by direct observation during an entomological expedition organized in period 1-4 June 2010 by the last author.



Fig. 1. *Centaurea marschalliana* Spreng.: a, b, c, d, e, f – the flowering plants with normal divided leaves and entire leaves (d-many flowering plant individuals growing together); g, h – the habitat of the first population (P1); i, j – the habitat of the second population (P2); k, l – “Movila lui Burcel” Reserve (maps of the area and roads; P1 – first plant population, P2 – second plant population)

“Movila lui Burcel” site has been inspected on 1 June 2010. We inspect the impact of human activities on the site, especially by the construction of a monastery. Plants of

*Centaurea marschalliana* were particularly observed and numbered the individuals from the site.



Fig. 2 The Orthodox Church and other religious buildings raised up on the top of the "Movila lui Burcel" natural reserve

**Results and Discussion.** Degradation of Movila lui Burcel Reserve: In the past, because of the degradation of this botanical reserve, some specialists believed that *C. marschalliana* had been lost but we found that this species still exists. The main degradation causes of this stepic habitat are related to the construction of the monastery complex on the territory of "Movila lui Burcel" Botanical Reserve (Fig. 1 g, h, Fig. 2), the tourism and the plantation and cultivation of *Robinia pseudacacia* (Fig. 1g, h, i, j) on the main areas of this reserve, plantation that is expanding and has a negative impact over the stepic plant species (Fig. 1).

*Centaurea marschalliana* Spreng. (Fig. 1 a, b, c, d, e, f) (= *Psephellus marschallianus*) is a rare and vulnerable species in the Romanian flora (Oltean et al 1994), attached to a specific habitat of stepic and pontic meadows. General description: *C. marschalliana* is a perennial plant species of about 15-30 cm high. Leaves long, petiolate, pinnatisect, with grey hairs; some leaves undivided or lyrate. Caulis is not erect. Anthodium have about 3–4 cm in diameter, involucre 10–15 mm in diameter, usually ovate. Bracts triangular. Appendages of the middle bracts elongated, brown, with 3–4 short fimbriae (up to 1 mm) on each side. Flowers pink. Achenes - 4 mm long; pappus - 1,5 mm long. Phenology: Flowering April to June, fruiting June to July. At the population sites of Movila lui Burcel Reserve, 3 to 7 flowering plant individuals of *C. marschalliana* are grouped – growing together, forming a united group (Fig. 1c,d,f); the plant individuals do not grow solitary.

The chromosomal number of *Centaurea marschalliana* look to be  $2n = 20$  but the  $x = 8, 9, 10, 11, 12$  show the necessity of more investigations (Băra et al 2003).

General distribution: Bulgaria, Moldova, Romania, Russia and Ukraine (Bancheva, 2008).

Distribution in Romania: Region-Dobrogea: Zebil (Istria), Region-Galați: Pechea, Region-Iași: Bârlad, Region-Suceava: Bosanci at Frumoasa (now Moara) (Prodan & Nyárády, 1964); Suceava (Bosanci, Dragoiasa), Botoșani, Iași (Valea Lunga), Vaslui, Galați (Băneasa, Oancea, Pechea, Roscani, Văleni) (Chifu et al., 2006); Tulcea county: Slava Rusă (Ciocârlan, 2006); Tulcea, Galați, Vaslui and Suceava county (Ciocârlan,

2009); Grajduri (Iași county) (Croci, 2009); Galați county: Pechea, Oancea, Chinejii basin, Roșcani, Băneasa, Vlădești, Vaslui county: Băcani, Mânjești on Crasna hill, "Movila lui Burcel" reserve area, Satu Nou-Solești on Poștei hill, Bârlad on Dealul Mare, Mitoc, Iași county: Valea Lunga-Holboca, Suceava county: "Ponoare" reserve area, "Frumoasa" reserve area, Dragomirna, Constanța county: Adamclisi, Tulcea county: Babadag plateau, Zebil, Măgurele, Slava Rusă (Oprea 2005).

Important contributions: Bancheva (2008), Chifu et al (2006), Ciocarlan (2009), Dostál (1976), Klokov (1963), Korotchenko et al (2009), Oltean et al (1994), Oprea (2005), Prodan & Nyárády (1964), Sarbu et al (2007).

"Movila lui Burcel" have the status of natural reserve from 1973 by the decision 220/1973 of Popular Council of Vaslui County and the decision 129/1994 of the same institution. The importance of this area was recognized at national level by including as natural protected area in the law nr. 5/2000, the local administrator being the authorities of Miclăști township. Unfortunately an orthodox monk obtained on 14 September 1995 the permission from the Iași Romanian Academy subsidiary for emplacement an electrified Christian cross inside the natural reserve and a statue of Stefan the Great, this area being connected with an ancient legend of a poor man that received this hill from the great medieval ruler. In the decision signed by the president of the Iași Romanian Academy subsidiary was postulated that "the two art objectives don't affect the flora and vegetation from the zone", this being a grave negative decision that starts the decline of this area. The same monk, on the basis of an address from 14 September 1995, obtained on 19 September 1995 a decision number 886 from the Governmental Agency for Environment Protection from Vaslui that permit the emplacement of the two "art objectives" and also of a small Orthodox Church (!) and a wood sculptured gate. On 4 October 1995 the Local Council of Miclăști township with the decision number 665 give to the "Stefan the Great Monastery" an area of 2.500 square meters inside the reservation for three years, being mentioned also the "annexes" of the monastery (!!). On 6 June 2000, the same president of the Iași Romanian Academy subsidiary signed favorable a decision for giving to the monastery an area of 2.000 square meters inside the natural reserve (!!!). In the meantime was planted a small forest with *Robinia pseudacacia* inside the natural reserve (!!!!) that was an ecological crime, destroying all the original vegetation in the area with this forest. On 17 May 2005 the County Council of Vaslui gives the decision number 17 that approved the plan of the buildings the church inside the natural reserve (!!!!!).

Although the study area is part of the forest-steppe region, however this area has vegetation with a steppe characteristic, such as reservations "Valea lui David" (David's Valley) or "Valea Ilenei" (Ilenei Valley) and other areas with similar vegetation ("Dealul lui Dumnezeu (God's hill) Natura 2000 site) from the Iași county (Popescu & Davideanu 2009). The primary steppe in Romania is now considered missing, as this one was mainly a steppe with grasses (Gramineae). From the secondary steppe, which contains also many dicotyledonous, still exists in the southern part of Romania only isolated patches under a major anthropogenic pressure. Noteworthy is that in the European Union only in Romania the steppe region is present. In this context, these areas with steppe vegetation must be treated with the utmost responsibility to identify and preserve undiscovered, rare or unique species for the European Union. The major threat to these areas is to plough them and replacing with crops, in which case the specific biodiversity of these areas is carried out practically all. For areas which have been declared as natural reserves, the situation is not unfortunately very good. There are natural reservations that have a large number of owners, often on small areas. On "Movila lui Burcel" natural reserve the religious phenomenon is the one that have a major negative impact on this rare steppe flora and fauna.

**Conclusions.** Populational status of *C. marschalliana*: On the territory of "Movila lui Burcel" Reserve we have found 2 populations. The first and the smallest one (P1) of about 60 individuals is on the first hill, near the main monastery complex, and it is very vulnerable because of the expanding construction sites, the touristic impact and the *Robinia pseudacacia* forest; the second population and the largest one (P2) of about 80

individuals is near the top of the second hill but it is very vulnerable also because of the constructed road to open access to the second monastery monument.

**Acknowledgements.** This paper was supported partially by the project POSDRU/88/1.5/S/47646 co-funded by the European Social Fund through the Sectoral Operational Programme - Human Resources and Development 2007-2013.

## References

- Bancheva S., 2008 Taxonomic revision and population status of *Psephellus marschallianus* (Centaureinae, Asteraceae) in Bulgaria, Sofia, 2008, Phytologia Balcanica **14**(1):57-60.
- Băra I. I., Rugină R., Băra C. I., 2003 The chromosomal number for rare species from Romania, Analele Științifice ale Univ. "Al. I. Cuza" Iași, Secțiunea II, Genetică și Biologie Moleculară **4**:62-70.
- Croci A. N., 2009 [Evaluation of active principles in propolis from Israel and Romania]. University of Medicine and Pharmacy "Gr. T. Popa", Iași, Faculty of Pharmacy, Rezumatul tezei de doctorat, Iași, p. 1-73. [In Romanian]
- Chifu T., Mânzu C., Zamfirescu O., 2006 [Flora and vegetation of Moldova (România)]. Editura Universității "Alexandru Ioan Cuza", Iași, vol. I and II. [In Romanian]
- Ciocârlan V., 2006 Contributions to the knowledge of some rare plant species in the Flora of Romania, Buletinul Grădinii Botanice Iași, Tom 13, p. 76-78.
- Ciocarlan V., 2009 [Illustrated Flora of Romania, Pteridophyta et Spermatophyta, The Third Edition - Revised]. Editura Ceres, Bucharest. [In Romanian]
- Dostál J., 1976 *Centaurea L.* - In: Tutin T. G. et al (eds), *Flora Europaea*. Vol. 4, pp. 254-301. Cambridge University Press, Cambridge.
- Klokov M. V., 1963 [*Centaurea*, podrod 6. *Heterolophus* (Cass.) Dobrocz]. In: Bobrov E. G. & Cherepanov S. K. (eds), *Flora USSR*, Vol. 28, pp. 463-472. Acad. Sci. URSS, Moskva & Leningrad. [In Russian]
- Korotchenko I. A., Mala Yu. I., Fitsailo T. V., 2009 Syntaxonomy of steppe vegetation of the extreme north of steppe of right bank Dnieper Region of The Ukraine, Scientific Herald of Chernivtsy University. Biology (Biological Systems). - Vol. 1, Issue 1. - Chernivtsy: Chernivtsy National University, p. 74-85.
- Oltean M., Negreanu G., Popescu A., Roman N., Dihoru G., Sanda V., Mihăilescu S., 1994 [Red List of superior plants in Romania, Studii, Sinteze, Documentații de Ecologie, 1]. Acad. Rom. Inst. Biol., Bucharest. [In Romanian]
- Oprea A., 2005 [Critical Checklist of Vascular Plants of Romania]. "Al. I. Cuza" Iași University Press, 668 pp. [In Romanian]
- Popescu I. E., Davideanu A., 2009 Conservation status of protected or rare invertebrates from the border area Romania - Republic of Moldova. AES Bioflux **1** (1):43-53.
- Prodan I., Nyárády E. I., 1964 *Centaurea L.* - In: Nyárády, E.I. (ed.), *Fl. Republ. Socialist. Romania*. Vol. 9, pp. 785-951. Editura Academiei Republicii Socialiste Romania, Bucharest. [In Romanian]
- Sârbu A., Sârbu I., Oprea A., Negrean G., Cristea V., Gheorghe C., Cristurean I., Popescu G., Oroian S., Tănase C., Bartók K., Gafta D., Anastasiu P., Crișan F., Costache I., Goia I., Marușca T., Oțel V., Sămărghișan M., Hențea S., Pascale G., Răduțoiu D., Baz A., Boruz V., Pușcaș M., Hirițiu M., Stan I., Frink J., 2007 Important Plant Areas (IPA-s) in Romania. Editura Victor B Victor, Bucharest, 397 pp. [In Romanian]

Received: 30 June 2010. Accepted: 30 July 2010. Published online: 30 July 2010.

Authors:

Emilian Pricop, "Alexandru Ioan Cuza" University, Faculty of Biology, Bd. Carol I 20a, 700505 Iași, Romania, EU. Second and personal address: Argeș Street, No 8, Zip. code 610 053, Cartier Țărăncuța, Piatra Neamț, Neamț, Romania, EU, pricopemilian@yahoo.com;

Bogdan Mihai Negrea, "Ștefan cel Mare" University, Faculty of Forestry Suceava, University Street no. 13, 720229 Suceava, Romania, EU. Second and personal address: Prof. Leca Morariu Sreet, Bl. D3, No 24 Ap 13, Zip. code 720174, Suceava, Romania, EU, bogdannm@yahoo.com;

Iulian Gherghel, "Alexandru Ioan Cuza" University, Faculty of Biology, Bd. Carol I 20a, 700505 Iași, Romania, EU.

Irinel Eugen Popescu, Department of Animal Biology, Faculty of Biology, "Al. I. Cuza" University, Bd. Carol I no. 11, 700506 Iasi, Romania, E-mail: irinellus@yahoo.com

How to cite this article:

Pricop E., Negrea B.-M., Gherghel I., Popescu I. E., 2010 The situation of *Centaurea marschalliana* Spreng. (Asteraceae: Centaureinae) population from "Movila lui Burcel" natural reserve (Vaslui county, Romania) and the negative impact in this protected area of religious buildings raised up inside the site. AES Bioflux **2**(1):91-96.