

DISCUSSIONS REGARDING THE CHOROLOGY OF SOME SPECIES FROM OLTENIA, ROMANIA

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Abstract. This paper presents some issues related to the chorology of some vascular plants in the area of Oltenia, on the basis of actual information in the specific literature and on the basis of the practical data on the field too, all collected by the authors of this work. The corroboration of the information from the literature with those from the field has resulted in the reconsideration of the status of these taxa on the territory of Oltenia. For some species, a broadening of the area is observed (e.g. *Cirsium creticum*), and, on the contrary, for others, we can observe the disappearance from certain stations mentioned in the specific literature (e.g. *Rindera umbellata*, *Plantago maxima*), which is explained by the advanced stage of ruderalisation of big areas and by the quick climate changes. All things considered, we have to take into account that the areas where there are valuable species from a scientific point of view must be protected, and all the required mechanisms must be used to this purpose.

Keywords: chorology, Oltenia, vascular plants.

Rezumat. Discuții referitoare la corologia unor specii din Oltenia, România. În prezenta lucrare se fac câteva discuții referitoare la corologia unor plante vasculare cu areal pe teritoriul Olteniei, pe baza datelor existente în literatura de specialitate și a celor concrete din teren, colectate de autorii prezentei lucrări. Coroborarea informațiilor din literatură cu cele din teren, a condus la reconsiderarea statutului acestor taxoni pe teritoriul Olteniei. Pentru unele specii se constată o lărgire a arealului (ex. *Cirsium creticum*) iar pentru altele dimpotrivă dispariția din stațiuni certe menționate în literatura de specialitate (ex. *Rindera umbellata*, *Plantago maxima*), fapt explicabil prin stadiul avansat de ruderalizare al unor mari suprafețe și prin schimbările climatice tot mai accentuate din ultimii ani. Toate aceste considerente ne determină să considerăm că arealele unde se află specii valoroase din punct de vedere științific trebuie să fie protejate folosind pentru realizarea acestui deziderat toate mecanismele necesare.

Cuvinte cheie: corologie, Oltenia, plante vasculare.

INTRODUCTION

In the last 55 million years, the Earth has faced continuous cooling, and the global climate has shifted from greenhouses to ice deposits, the so-called “Neozoic cooling”, after the name of the geological era in which it took place. The most recent Neozoic period is the Quaternary, defined by the fluctuating climate of the glacial and interglacial stages. The last epoch of the Quaternary is the Holocene, our current interglacial period, a period that follows a warming process after the last glaciation that ended about 11,000 years ago (DARTNELL, 2019).

Man has accelerated this natural process of global warming through activities that have led to the development of human society as a whole, bringing into the atmosphere huge amounts of greenhouse gases, especially CO₂. The current concentration of CO₂ of 410 ppm appears to be higher, by approximately 42% than any levels of the past 1.5 million years (VAN DYKE & LAMB, 2020). Global temperatures and atmospheric CO₂ increases have been correlated, such that, since 1901, nearly every measured location on Earth, terrestrial and aquatic, has experienced some level of temperature increase (IPCC 2013; VAN DYKE & LAMB, 2020). The Intergovernmental Panel of Climate Changes (IPCC) reported that the global mean surface temperature has increased approximately 1° C (0,8-1,2°) above preindustrial level (IPCC 2018; VAN DYKE & LAMB, 2020).

Moreover, in an analysis carried out by us on the evolution of the average temperature in Oltenia, in the period 2011-2019, starting from the climatic data recorded by the Climatic Research Unit (<https://www.climateurope.eu/>), we observed an increase in annual average temperatures, at the level of all the considered localities, with values up to 1,2 degrees C (unpublished article).

Global climate change is a fact, without any doubts, accelerating the extinction of species by reducing species fitness and population sizes, increasing environmental stochasticity, the frequency of catastrophes, and demographic and genetic stochasticity (FRANKHAM et al., 2017). It modifies the areas of the species and favours the spread of pathogens and invasive species, representing the greatest threat to biodiversity.

In recent times, climate change has had a huge impact on the distribution of vascular plant species in this part of the country.

Information regarding the chorology of different spontaneous plants within Oltenia can be found in numerous specialized works (BUIA & PĂUN, 1958a, 1958b; RĂDUȚOIU & COSTACHE, 2009; RĂDUȚOIU & STAN, 2019), in monographs elaborated by different researchers from the University of Craiova (PĂUN, 1964; POPESCU, 1974; MALOȘ, 1977; COSTACHE, 2005; NICULESCU, 2006; RĂDUȚOIU, 2006) and by other researchers (ROMAN, 1974; MATACĂ, 2005), or in the fundamental works on flora, which were elaborated by various botanists (GRECESCU, 1898; PRODAN, 1939; BELDIE, 1977; BELDIE, 1979; CIOCĂRLAN, 2000; CIOCĂRLAN, 2009; SÂRBU et al., 2013).

By comparing the existing data in the specialized literature with the information collected by the authors in the field over time, some differences have been noticed with respect to some species.

MATERIAL AND METHODS

Oltenia is a region with a very high floristic potential, being located in the southwestern part of Romania. Due to its diversified climatic conditions, fragmented relief and extreme variety of soil types, the region induces favourable conditions for the installation of a diversified flora and vegetation.

During the present research, numerous field trips were conducted in different areas of Oltenia in order to collect as much information as possible regarding the distribution area of vascular plant species. The data thus obtained were compared with those existing in the specialized literature and, where obvious differences were noticed or new stations were identified, thorough research was conducted with the aim of explaining the presence of plants outside their area (e.g. *Asplenium scolopendrium* Linnaeus 1753), the disappearance of other plants from sampling locations certainly mentioned in the field literature (e.g. *Rindera umbellata*, Waldstein & Kitaibel, 1805; Bunge, 1851), or with the aim of mentioning new stations for valuable taxa from the zoological viewpoint (e.g. *Cirsium creticum* (Lamarck 1789) D'URV 1822). The names of the authors and the publication years related to the species approached in the present paper are found in the monumental work entitled *Flora României* (ȘĂVULESCU T. et al., 1952 -1976).

The chorology data were determined with the Essentials GPS and the photos for some species were taken with a Panasonic camera.

RESULTS AND DISCUSSIONS

The accumulation and processing of numerous data regarding the chorology of certain species of vascular plants in the flora of Oltenia allowed the authors to notice some obvious differences as compared to the information present in the field literature; starting from this context, we conducted some discussions that we present in the present paper. Among the species analysed in this paper, the following are worth mentioning: *Asplenium scolopendrium*, *Aldrovanda vesiculosa*, *Cirsium creticum*, *Plantago maxima*, *Rindera umbellata*, *Trifolium ornithopodioides*, *T. subterraneum*.

Asplenium scolopendrium Linnaeus 1753 (*Phyllitis scolopendrium* (Linnaeus 1753) Newm. 1844) represents the only full-leaf fern in the Romanian flora and it is known from rocky, calcareous and shadowed areas in the mountainous region (GRINȚESCU, 1952). It was identified by the authors of the present paper in an abandoned well on the outskirts of Pielești settlement (Dolj County) (coordinates: N 44.332516 and E 23.993736, 188 m altitude). No specialized work mentions this plant in areas characterized by such low altitudes. From our point of view, the presence of this species outside its natural spreading area may be due to either to certain natural phenomena (the transportation of spores by wind – which represents an unlikely situation, given the very long distance between the identification place and the natural spreading area of the plant), or artificially, involuntarily by humans (the stone used in the construction of the fountain originated in the mountainous region and had fern spores on it). It is to be noticed the fact that this plant has vegetated for a long time, the well not being functional present.

Aldrovanda vesiculosa Linnaeus 1753 - It represents a taxon included in the IUCN red list (BILZ et al., 2011). It also is a protected taxon at European level (Council Directive 92/43 / EEC 1992, Annex II). It has an irregular distribution, with a better representation in Central and Eastern Europe (Bulgaria, France, Germany, Switzerland, Hungary, Yugoslavia, Italy, Poland, Romania, Russia). The presence of this species in Austria is uncertain (WEBB, 1964). It is only mentioned at the level of the plain region, characterized by stagnant, shallow waters, with a muddy bottom (PRODAN, 1939; ȚOPA, 1955; BELDIE, 1977; SĂRBU et al., 2013; SĂRBU, 2015).

In the past, in Oltenia (located in the southwestern part of Romania), this species formed associations with a good representation in the Danube meadow, as well as in the meadow of the Jiu river, near Craiova (PĂUN & POPESCU, 1969; PĂUN & POPESCU, 1972). In recent times, climate change has contributed to the drying up of many ponds in which this species used to grow. The research conducted in recent years has led to the conclusion that this plant has disappeared from the water bodies in which it had been mentioned (the pond named *Balta cu Dubă*, the ponds located between Dobrești settlement and the Jiu river). By taking into consideration the climate changes, as well as the strong anthropogenic influences on the habitats where this plant grows, we can state that this plant will disappear from the southwestern part of Romania in the future.

Cirsium creticum (Lam. 1789) D'URV 1822. It is mentioned as an endangered (DIHORU & NEGREAN, 2009) or a rare plant (CIOCĂRLAN, 2000; CIOCĂRLAN, 2009). The studies conducted over the last 20 years have led to the identification of this plant in many settlements (COSTACHE, 2004, 2011; RĂDUȚOIU & COSTACHE, 2009; RĂDUȚOIU & STAN, 2019). At present, numerous specimens have been identified in some sampling locations (e.g. Fratoșița - Dolj County). As such, the authors consider that this taxon is sporadic in the southwestern part of the country.

Colchicum arenarium Waldst. et Kit 1805. It represents an endangered species (DIHORU & NEGREAN, 2009), being known in Oltenia on the Desnațui river valley, near Lipovu settlement (ZAHARIADI, 1956), as well as near the water body named Lacul Popii, located south-south-east of Desa settlement. From the first resort, this plant disappeared. Because of the severe synanthropization of the meadows in the area, this plant disappeared from the first station mentioned above.

Echinocystis lobata (Michx 1803) Torr. et Gray 1888 - It represents a taxon native to North America, which is mentioned as a rare species in the flora of our country. It was currently identified on the territory of Oltenia, in the Jiu river meadow, near the Secui settlement, in the form of several specimens, as well as in the Danube meadow, near the

Rast port, where it became invasive (Fig. 1). For the future, the authors consider that this species will be present in the meadows of the main rivers crossing the southern part of Oltenia, where it will produce obvious changes within the floristic composition of these areas.

Plantago maxima Juss. ex Jacq 1787. It is mentioned in Oltenia, in the muddy meadows located within the Coțofenii din Față settlement (BUIA & POPESCU, 1952; DIHORU & NEGREAN, 2009). It was not found there any more. One of the main causes that led to the disappearance of this plant from the sampling location mentioned above is the lack of precipitations.

Rindera umbellata (Waldst. et Kit 1851) Bunge. 1805. It is an endangered species, which was initially mentioned in Oltenia by BUIA & PĂUN (1960) under the name of *Rindera sisestii* and as a new plant for science. It was described on the basis of some specimens found on the sands between Craiova and Cernele settlements. The detailed analysis conducted on these surfaces during almost two decades led us to the conclusion that this plant is no longer present in the area. The anthropogenic activities represent the main factor that contributed to the disappearance of the plant. At the level of Oltenia, this species is still known only from Stârmina Hill, towards Rogova and Vânjuleț settlements (GRINȚESCU, 1960; BUIA & PĂUN, 1960).

Salvia sclarea Linnaeus 1753. It is known as a spontaneous plant only in the southern part of Romania. In Oltenia, it is mentioned in the dry areas between Maglavit and Ciuperceni settlements (BUIA & MALOȘ, 1963). Following the field trips conducted in different areas of the Oltenia Plain, we found that this species is frequently cultivated as an ornamental plant (e.g. Șitoaia, Rast, Ghidici, Poiana Mare, Băilești, Galicea Mare, Boureni, Catane settlements), from where it becomes sub-spontaneous. The extension of the area of this taxon will be enabled by the species' preferences for dry soils, as well as by the continuous aridization of the southern part of Oltenia.

Trifolium ornithopodioides Linnaeus 1753 - It is a critically endangered species mentioned in Oltenia, in the salted meadows of Gighera, Piscu Sadovei and Căciulești settlements. For the near future, the forage importance of this plant places it at risks of disappearance from most of the known sampling points mentioned in the field literature (BUIA & MALOȘ, 1963; BUIA et al., 1965). The presence of this plant in the Piscu Sadovei and Căciulești settlements is dubitable, as no representative of this species is found at present.

Trifolium subterraneum Linnaeus 1753 – It was initially mentioned in Oltenia by BUIA et al., (1963, 1965), in Gighera, where it formed compact phytocenoses, which were grouped in an independent association (e.g. *Trifolietum subterranei* (BUIA et al., 1965) by the researchers of that time. The species was not found any more, the main reasons for the disappearance being connected to the strong anthropogenic impact exerted on these halophilous meadows, i.e. the irrational, aggressive grazing (with sheep, horses, cattle, geese) that took place during the whole vegetation period. Therefore, urgent measures are required in order to restore these areas.

CONCLUSIONS

This paper deals with 10 species of vascular plants in which differences were observed compared to what was known from the literature. In some there were discussions about chorology (eg *Asplenium scolopendrium*, *Cirsium creticum*), in others in their presence in certain resorts (eg *Rindera umbellata*, *Plantago maxima*) and in others rare in the flora of our country, the invasive potential on which have it in the places where it is installed. Where appropriate, the causes that led to these changes (area, disappearance or extension) are also specified.

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