

## THE ACTUAL STATE OF THE PSAMOPHILIC FLORA AND VEGETATION IN THE OLTENIA REGION (ROMANIA)

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**Abstract.** The psamophilic flora and vegetation in Oltenia has a good representation in the southern part of the region. Significant areas are occupied by plants characteristic for these places. Few data can be found starting with the beginning of the 20<sup>th</sup> century (PRODAN, 1925), but a thorough study of psamophilic flora and vegetation in Oltenia started after 1930s. The flora and vegetation diversity of these places is reflected by the numerous specialty works published over time by various botanists from the University of Craiova. The influence of the anthropogenic factor in the last years has led to a change in flora and vegetation composition. In some areas some taxa, with high zoological value, have disappeared: *Cyperus hamulosus* BIEB, 1808, *Fimbristylis bisumbellata* (FORSSK) BUBANI, 1850; *Rindera umbellata* (WALDST et KIT) BUNGE, 1851; *Jasione montana* LINNAEUS 1753 etc. or phytocoenoses of some associations edified by rare species: *Achilleo ochroleucaae-Secalietum sylvestris* Mititelu et al. 1973; *Violo hymettiae-Cynodontetum* CĂRȚU, 1973; *Digitario sanguinalis – Molluginetum cervianae* (BORZA, 1963; PUȘCARU SOROCEANU et al., 1963; *Bassio laniflorae - Brometum tectorum* (SOÓ, 1929; BORHIDI, 1996). The conservation of these places is strictly necessary if we take into account the disappearance or change of the area of plants characteristic for sandy lands. If we add the zoo-anthropogenic influence that has been manifested more and more in recent years, we can see the need to protect these.

**Keywords:** flora, sandy soils, Oltenia, vegetation.

**Rezumat. Stadiul actual al florei și vegetației psamofile din regiunea Oltenia (România).** Flora și vegetația psamofilă a Olteniei are o bună reprezentare în partea de sud a acesteia. Suprafețe apreciabile sunt ocupate de plante caracteristice acestor locuri. Date sporadice găsim încă de la începutul secolului 20 (PRODAN, 1925), însă studiul amănunțit al florei și vegetației psamofile din Oltenia a început după anii 1930. Diversitatea floristică și de vegetație a acestor locuri este reflectată în numeroasele lucrări de specialitate publicate de-a lungul timpului de diverși botaniști de la centrul universitar craiovean. Influența factorului antropoc din ultimii ani a condus la schimbarea compoziției floristice și de vegetație. Din unele suprafețe au dispărut taxoni cu valoare zoologică ridicată: *Cyperus hamulosus*, *Fimbristylis bisumbellata*, *Rindera umbellata*, *Jasione montana* etc. sau fitocenoze ale unor asociații edificate de specii rare: *Achilleo ochroleucaae - Secalietum sylvestris* Mititelu et al. 1973; *Violo hymettiae-Cynodontetum* CĂRȚU, 1973; *Digitario sanguinalis – Molluginetum cervianae* (BORZA, 1963; PUȘCARU SOROCEANU et al. 1963; *Bassio laniflorae - Brometum tectorum* (SOÓ, 1929; BORHIDI, 1996). Conservarea acestor locuri este de strictă necesitate dacă ținem cont de dispariția sau schimbarea arealului plantelor caracteristice terenurilor nisipoase. Dacă la acestea se mai adaugă și influența zoo-antropogenă manifestată din ce în ce mai pregnant în ultimii ani, ne putem da seama de necesitatea protejării acestor suprafețe.

**Cuvinte cheie:** floră, locuri nisipoase, Oltenia, vegetație.

### INTRODUCTION

The sands and sandy soils in Romania occupy an appreciable area of about 500.000 ha, meaning over 2% of the country's territory (Fig. 1). Almost 1/3 of this area is occupied by mobile and semi-mobile sands, undeveloped or weakly developed, poor in nutrients and with low water retention capacity.

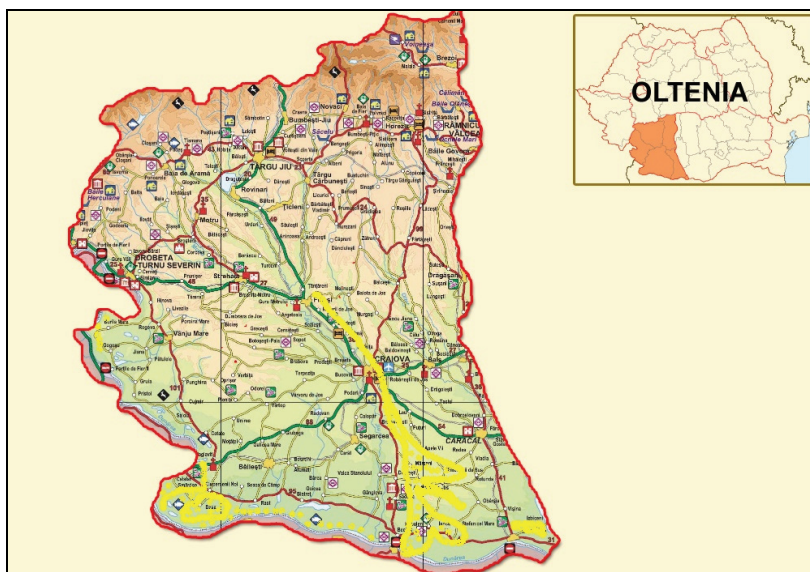


Figure 1. Map of Oltenia with the marking of the areas occupied by the sandy lands (processing from the Internet).

The largest sandy areas are found in the west and southwest part of Romanian Plain, being known as the sands in southern Oltenia (about 200,000 ha).

PRODAN (1939) places these sands according to their position on the Danube sands.

Among the first works that treat psamophilic species in Romania are "The Sands Flora in Romania", elaborated by the illustrious professor Iuliu Prodan (1925). This paper also lists 548 vascular species, some of these being characterized. The first agricultural researches on the sands in Romania were carried out between 1932-1935, by Gh. Ionescu-Sisești, N. Hulpoi and C. Coculescu at the School of Agriculture from Poiana Mare – Dolj County.

After about 20 years, the teachers from the Agronomic Institute of Craiova, in Tâmbuști village – Dolj County, resumed the studies.

Since 1970, research has been carried out to improve the sands at SCCC PN Dăbuleni.

With regard to these lands, there is data from Oltenia in the monumental paper work named Flora R.P.R.-R.S.R. (SĂVULESCU et al. 1952-1976). BUIA et PĂUN (1958) have published the paper work named Spontaneous plants on the sands from the left part of Jiu River. The same authors published in 1964 the paper named Flora and vegetation of the sands from the left side of Jiu River and M. Păun published in 1967 the paper named Materials for sands flora from Danube Elbow, Oltenia Region.

In 1972, PAUN and POPESCU published the paper named La végétation de sables de la courbure du Danube (Olténie).

In 1985 PĂUN & POPESCU presented data regarding the psamophilic flora and vegetation in Oltenia.

## MATERIAL AND METHODS

The material was collected only in the case of specimens whose identification was not possible in the field or were missing from the herbarium of the University of Craiova (CRA).

The taxa identification was made on dry preserved material or on living material using taxonomic sources BELDIE Al. 1977, 1979; CIOCĂRLAN V. 2000, 2009; SĂVULESCU T. & al., 1952 -1976; TUTIN et al., 1964-1980; SĂRBU et al. 2013).

Most of the botanical plants and sites were iconographed. For rare species, GPS coordinates have been taken.

## RESULTS AND DISCUSSIONS

As a result of our research in the 15 years since we have been following these psamophilic species, we can say that there are some differences from what is known in literature.

The differences consist of:

- the disappearance of some rare taxa;
- new contributions are added to the chorology of some rare species;
- the disappearance of some species from some localities mentioned in some specialty work papers is noted;
- some discussions are made about associations with typical psamophilic species;
- conservation measures are proposed for the areas occupied by rare species or by the associations with reduced area.

### Disappeared taxa from the mentioned places in Oltenia, in scientific literature

*Cyperus hamulosus*: was mentioned in the interdunes from Fântâna Obedeau. It was not identified again.

*Fimbristylis bisumbellata*: was mentioned in the interdunes from Obedeau Fountain. It was not identified again.

*Viola hymettia* BOISS. et HELDR. 1855: Obedeau Interdunes, Malu Mare, Ciurumela Forest. It was not identified in any of these localities.

*Rindera umbellata* – mentioned at the SW border of Craiova. It was not identified in any location.

*Jasione dentata* (DC.) HAL. 1902 (*J. janke* NEILR. 1870) – between Balta Craioviței, Cernele, Troaca and Afumați; between Malu Mare and Secui, Apele Vii, Marotin, Tâmburești.

*Alyssum montanum* LINNAEUS 1753 subsp. *gmelinii* (JORDAN) HEGI et E. SCHMID 1919 – is mentioned in the specialty literature from Fântâna Obedeau, Craiova. It was not identified again.

*Asperula orientalis* BOISS. et HOHEN. 1843 – mentioned in Tâmburești and Balta Craioviței. It was not identified again in any of these stations. There is no herbarium material.

*Tragopogon floccosus* WALDST. et KIT. 1805 – mentioned only in Apele Vii. It was not identified again.

### Disappeared species from the Obedeau Dunes:

*Equisetum arvense* LINNAEUS 1753, *E. palustre* LINNAEUS 1753, *Dryopteris thelypteris* (LINNAEUS 1753) A. GRAY 1848, *Salvinia natans* (LINNAEUS 1753) ALL. 1785, *Kochia laniflora* (GMEL.1774) BORB. 1900, *Salsola ruthenica* ILJIN 1934, *Mollugo cerviana* (LINNAEUS 1753) SER. in DC. 1824, *Cerastium semidecandrum* LINNAEUS 1753, *C. pumilum* CURT. 1777, *Holosteum umbellatum* LINNAEUS 1753, *Arenaria serpyllifolia* LINNAEUS 1753, *Herniaria incana* LAM. 1789, *H. glabra* LINNAEUS 1753, *Silene conica* LINNAEUS 1753, *S. otites* (LINNAEUS 1753) WIB. 1799 var. *effusa* OTTH 1824, *S. o.* subsp. *parviflora* (EHRH.) HAY. 1927, *Gypsophila*

*muralis* LINNAEUS 1753, *Tunica prolifera* (LINNAEUS 1753) SCOP. 1772, *Euphorbia seguieriana* NECK. 1770, *E. virgata* WALDST. et KIT. 1805, *Descurainia sophia* WEBB et BERTHEL. 1836, *Alysum montanum* subsp. *gmelini*, *A. alysoides* LINNAEUS 1753, *A. desertorum* STAPF 1886, *Erophila verna* A. MEY. 1839, *Lepidium ruderales* LINNAEUS 1753, *Nasturtium officinale* R. BR. 1939, *Viola kitaibeliana* ROEM. et SCHULT. 1819, *V. hymettia*, *Potentilla arenaria*, *Trigonella monspeliaca*, *Medicago lupulina*, *M. falcata*, *M. sativa*, *M. minima*, *M. rigidula*, *Trifolium campestre* SCHREB. 1804, *T. repens* LINNAEUS 1753, *T. arvense* LINNAEUS 1753, *Vicia striata* M. BIEB. 1808, *V. lathyroides* LINNAEUS 1753, *Lythrum hyssopifolia* LINNAEUS 1753, *Malva neglecta* WALLR. 1824, *Tribulus terrestris* LINNAEUS 1753, *Eryngium campestre* LINNAEUS 1753, *Hottonia palustris* LINNAEUS 1753, *Heliotropium europaeum* LINNAEUS 1753, *Myosotis micrantha* PALL. 1817, *Datura stramonium* LINNAEUS 1753, *Gratiola officinalis* LINNAEUS 1753, *Veronica beccabunga* LINNAEUS 1753, *Prunella vulgaris* LINNAEUS 1753, *Lamium purpureum* LINNAEUS 1753, *Mentha pulegium* LINNAEUS 1753, *Plantago indica* LINNAEUS 1753, *Menyanthes trifoliata* LINNAEUS 1753, *Scabiosa argentea* LINNAEUS 1753, *Filago arvensis* LINNAEUS 1753, *Gnaphalium luteo-album* LINNAEUS 1753, *Xanthium spinosum* LINNAEUS 1753, *Anthemis ruthenica* M. BIEB. 1808, *A. arvensis* LINNAEUS 1753, *Achillea ochroleuca*, *A. setacea* WALDST. et KIT. 1802, *Matricaria recutita* LINNAEUS 1753, *Senecio vernalis* WALDST. et KIT. 1800, *Xeranthemum cylindraceum* SIBTH. et SM. 1813, *Centaurea calcitrapa* LINNAEUS 1753, *Centaurea arenaria* M. BIEB. 1803 subsp. *borystenica* (GRUNER) DOSTÁL 1868, *Carthamus lanatus* LINNAEUS 1753, *Chondrilla juncea* LINNAEUS 1753, *Lactuca serriola* TORNER 1756, *Hieracium hoppeanum* SCHULT. 1814, *Gagea pusilla* (SCHMIDT 1794) J. A. et J. H. SCHULT 1829, *Ornithogalum refractum* KIT. 1813, *Muscari racemosum* (LINNAEUS 1753) MILL. 1768, *Juncus bufonius* LINNAEUS 1753, *Cyperus flavescens* LINNAEUS 1753, *C. hamulosus*, *C. fuscus* LINNAEUS 1753, *Scirpoides holoschoenus* (LINNAEUS 1753) SOJÁK 1972, *Fimbristylis bisumbellata*, *Carex hirta* LINNAEUS 1753, *Bromus commutatus* SCHRAD. 1806, *B. squarrosus* LINNAEUS 1753, *B. tectorum* LINNAEUS 1753, *Vulpia myuros* (LINNAEUS 1753) GMEL. 1806, *Sclerochloa dura* (LINNAEUS 1753) P. BEAUV. 1812, *Poa annua* LINNAEUS 1753, *P. compressa* LINNAEUS 1753, *Catabrosa aquatica* (LINNAEUS 1753) P. BEAUV. 1812, *Elymus repens* (LINNAEUS 1753) GOULD. 1947, *Dasypyrum villosum* (LINNAEUS 1753) P. CANDARGY 1901, *Hordeum murinum* LINNAEUS 1753, *H. hystrix* ROTH 1797, *Agrostis stolonifera* LINNAEUS 1753, *Tragus racemosus* (LINNAEUS 1753) ALL. 1785.

#### **Chorology data for the rare taxa in Romanian psamophilous flora**

##### ***Achillea ochroleuca* Ehrh.**

Is known from: Ghindeni, Dunele Obedeau, Apele Vii, Celaru, Dăbuleni, Ogrin, Ciupercenii Vechi.

New locality: Sadova – Dolj (Fig. 2).

##### ***Jasione montana* L.**

Is quoted from: Ghindeni and Celaru.

New location: Adunații de Geormane, next to the Victoria Lake (Fig. 3).

##### ***Alkanna tinctoria* Tausch**

It is known from: Dăbuleni, Ciupercenii Noi-Desa (Fig. 4), Nebuna, Tunarii Vechi.

Following the investigation made in these points we can say that the presence of this plant is only certain in the protected area Ciupercenii Noi-Desa. In the rest of the mentioned points in the literature, this plant species has not been found again.



Figure 2. *Achillea ochroleuca* from Sadova (original).



Figure 3. *Jasione montana* from Victoria Lake – Dolj county (original).



Figure 4. *Alkanna tinctoria* from Ciuperceii Noi-Desa (original).

***Bassia laniflora*** (S.G: Gmelin) A.J. Scott

It is known from Malu Mare, Secui, Ghindeni, Apele Vii localities and from Obedeanu Dunes.

It has been identified on the sands from the west part of Craiova, on the outskirts of Sadova (Fig. 5) and in the protected area Ciuperceii Noi-Desa.

***Mollugo cerviana*** (L.) Ser.

It is mentioned in the Oltenia psamophilous flora starting with 1925 by I. Prodan. Further, Buia Al. & Păun (1958, 1964), Păun M. & Popescu Gh. 1985 mentioned its presence on the sands from the left side of the Jiu River: Cernele, Malu Mare, Ghindeni, Secui, Teasc, Bratovoesti, Daneți, Mârșani, Apele Vii, Tâmburești, Rojiște, Ogrin, Dăbuleni, Ianca. It missed on the sands from the Danube Elbow and more recently from Dunes.

Although scientific literature stipulates that this plant species forms phytocoenosis framed by the specialists to *Digitario sanguinalis* – *Molluginetum cervianae* (Borza 1963) Pușcaru Soroceanu et al. 1963 (*Molluginetum cervianae oltenicum* Borza 1961), today it seems that these surfaces have been replaced in most of the cases by the phytocoenosis of *Plantaginetum arenariae* associations (Buia et al. 1960) Păun et Popescu 1972 (*Plantaginetum indicae* (Păun 1964)).



Figure 5. *Bassia laniflora* on the outskirts of Sadova (original).

The species has been found only as isolated specimens.

***Silene borystenica*** (Gruner) Walters

It is known from sandy places at the west part of Craiova. It has been identified on the outskirts of Sadova (Fig. 6) and in the protected area Ciupercenii Noi-Desa.



Figure 6. *Silene borystenica* from sandy places in Sadova (original).

***Erodium hoefftianum*** C.A. Meyer subsp. *neilreichii* (Janka) Soó

It is mentioned by Buia and Păun on the sands around Craiova. It has been identified by us in the western part of Craiova and on the sands from Dăbuleni.

***Herniaria hirsuta*** L.

It is known from: Calafat, Vârciorova, Gura Văii, Svinița – Tricule, Dubova.

It has been identified on the sands from the outskirts of Ciupercenii Vechi.

***Secale sylvestre*** Host – Ciupercenii Vechi, near Calafat.

In different specialty papers floristic lists of these sandy soils are mentioned (405 species on the sands from the left side of Jiu River and 355 species on the sands from the Danube Elbow or 560 species with 55 typical psamophilous (Păun & Popescu, 1985)) with numerous rare taxa (20). Their number has been reduced either by their disappearance

from certain areas or by the change in their conservation status (ex. *Polygonum arenarium* (Fig. 7), *Euphorbia seguieriana*, *Syrenia cana*, *Viola kitaibeliana*, *Helicrysum arenarium*, *Crepis foetida* subsp. *rhoeadifolia*, *Potentilla arenaria*, *Scirpoides holoschoenus* etc.).

On the sands from Oltenia, forests occupy insignificant areas. Scientific literature mentions the remains of forest near Amărăștii de Jos. This has *Quercus pedunculiflora* in the floral composition, as a wood species (Fig. 8). Besides this, there are many shrubs and herbaceous species.



Figure 7. *Polygonum arenarium* on the outskirts of Sadova (original).



Figure 8. The physiognomy of the woods *Quercus pedunculiflora* from Ciupercenii Vechi – Dolj county (original).

As rare shrubs, the greyish oak has been identified in Mârșani, Daneți, Tâmburești and Ogrin.

A good representation of these silvosteppe forests is found at the outskirts of Ciupercenii Vechi. Otherwise the tree vegetation is represented today by some rests of acacia plantations or black pin, areas that have escaped from people cutting.

Psamophilic herbaceous vegetation in Oltenia is classified in various associations by different authors: Buia & Păun (1964) mentions 51 associations; Cîrțu (1973) 14 associations; Păun & Popescu (1985) – 13 associations. Some of these have rare species in compositions who often give the name of association: *Achillea ochroleuca* (*Achilleo ochroleucae-Secalietum sylvestris*); *Viola hymettia* (*Violo hymettiae-Cynodontetum*), *Mollugo cerviana* (*Digitario sanguinalis-Molluginetum cervianae*), *Bassia laniflora* (*Bassio laniflorae-Brometum tectorum*).

As a result of the researches carried out in the last 15 years, we can say that the vegetation of the grassy layer has undergone some changes, i.e. the disappearance of the phytocenosis of some associations by replacing them with others.

The associated phytocenosis edified by *Mollugo cerviana* has disappeared from some points mentioned in scientific literature (ex. Obedeaneu Dunes, Craiovița). Otherwise, this species is found as isolated specimens.

*Viola hymettiae-Cynodontetum* is mentioned from the interfluvial Jiu-Desnățui (Obedeaneu, Gângiova, Jiu Meadow, Radovan) or on the sands from the left side of Jiu River as *Viola kitaibeliana* with *Viola hymettia* Association.

No phytocoenoses of this association have been identified in any of these sites. They have been replaced with those edified by *Plantago arenaria* (Fig. 9).



Figure 9. Areas dominated by *Plantago arenaria* from Oltenia (original).

Phytocoenoses of the *Tribulo - Tragetum* association were identified in large areas Soos et Timar 1954.

Findings in the floral composition of the *Mollugo cerviana* and *Cynodon dactylon* species enable us to say that this vegetation has replaced the one edified by *Mollugo cerviana* and evolves towards the one dominated by *Cynodon dactylon*.

## CONCLUSIONS

The sands in Southern Oltenia are made up of two distinct areas, one located on the left of the Jiu River, and the second on the western terraces of the Danube.

The flora and vegetation of these landscapes shelters many rare elements in Romania: *Cyperus hamulosus*, *Fimbristylis bisumbellata*, *Rindera umbellata*, *Jasione montana* etc. or phytocoenosis of some associations edified by rare species: *Achilleo ochroleucae-Secalietum sylvestris*; *Viola hymettiae-Cynodontetum*, *Digitario sanguinalis-Molluginetum cervianae*, *Bassio laniflorae-Brometum tectorum*.

After consulting the specialized literature, numerous modifications have been found regarding the reduction of the area or the disappearance of some species or vegetal associations, the identification of some new places for some rare psamophilous taxa in Romania's flora (ex. *Silene borystenica*, *Achillea ochroleuca*) or by disappearance of some plant association (ex. *Viola hymettiae-Cynodontetum*).

Human activity has also materialized in the establishment of acacia plantations and trees curtains for protection (*Robinia pseudacacia*), greyish oak (*Quercus pedunculiflora*), to control deflation in all the sandy areas of the country.

The cuts of protection curtains made from acacia plantations have caused, at some times, true sand storms.

To avoid these unpleasant situations and to limit the spread of the anthropic factor, the extension of the anthropic factor should be limited and this area should be monitored by the Environmental Protection Inspectorate by means of periodic inspections.

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