ANNALS OF THE UNIVERSITY OF CRAIOVA

Series: ✓*Biology*
✓*Horticulture*
✓*Food products processing technology*
✓*Environmental engineering*

Vol. XXIX (LXV) - 2024

CONSIDERATIONS REGARDING THE VASCULAR FLORA OF THE PROTECTED AREA *PREAJBA-FACĂI LACUSTRINE COMPLEX*, DOLJ, ROMANIA

Răduțoiu Daniel[1], Răduțoiu Amira-Vasilica[2*]
[1]University of Craiova, Faculty of Horticulture, Biology and Environmental Engineering Department, Craiova
[2*]Secondary School G. Bibescu, Craiova
* *Correspondence author. E-mail*: amiraradutoiu@yahoo.com

Keywords*: protected area, flora, Preajba, Dolj, Romania.*

ABSTRACT

The objective of the present research was to identify all vascular species of aquatic and marsh plants within the protected area Preajba-Făcăi Lacustrine Complex (Code 2394, Law 5/2000). The area is located in the central-eastern part of Dolj county (Romania), northwards of Preajba settlement and less than 10 km far from the city of Craiova. The authors present a floristic inventory that brings together the aquatic and marsh species within the territory under study, the corresponding distribution in the area being mentioned for each of them. The presence of certain taxa of sociological importance in the flora of Romania (e.g. Cirsium creticum) is noted, while the presence of others in the spontaneous flora of Oltenia (e.g. Vallisneria spiralis) is reconfirmed. Moreover, the authors discuss the influence of the anthropic factor on this area, in conjunction with the effects of climate changes, which are increasingly visible.

INTRODUCTION

The present research relies on the premise that although they are much more homogeneous than the aerial-terrestrial environment, the aquatic and palustrine environments show variations, sometimes over small distances, influencing the composition of the flora or of the aquatic and palustrine plant groups. Thus, certain characteristics of this environment, such as water depth, brightness, salt regime, amount of organic suspensions (so-called eutrophication), temperature, pH can vary, so that the specific composition and plant associations can show seasonal, annual, as well as multi-annual differences.

In addition to the more or less extended changes in the specific composition, these characteristics of the aquatic environment, induced by numerous natural or artificial factors (especially zoo-anthropogenic influences) impact the vitality of some species, their growth and development, sometimes triggering the reduction of the area of some species or even their disappearance.

Although studies on the aquatic and marsh flora within this part of Oltenia were carried out by specialists from the University of Craiova (Buia & Popescu, 1952; Buia & Păun, 1960, 1964; Popescu et al., 2001; Răduțoiu et al. 2004), a detailed research regarding the protected area Preajba-Făcăi Lacustrine Complex is not available in the specialized literature. Studies concerning birds are known from this area (Bălescu, 2015; Bălescu & Ridiche, 2020).

The dam lakes within this complex form a sequence. On certain sectors, they are protected by hilly slopes covered by arable land and pastures. The water surface of these lakes is smaller upstream and gradually increases downstream, at the same time with the depth.

MATERIAL AND METHODS

From an administrative point of view, the territory under study belongs entirely to Dolj county; it represents a component of Malu Mare settlement and it is located in the northern part of the Oltenia Plain, being protected by smooth hills that are included in the Getic Piedmont (Fig. 1.).

From a hydrographic point of view, the area is supplied with water by the Valea Preajba stream, along which there are numerous lakes that house a particular biodiversity. The specialized literature mentions that there are more than 50 springs (Cioboiu, 2014).

The area under study is a nature reserve of national interest, under IUCN category IV. It was designated based on the Romanian legislation regarding the establishment of new protected natural areas (***, 2000).

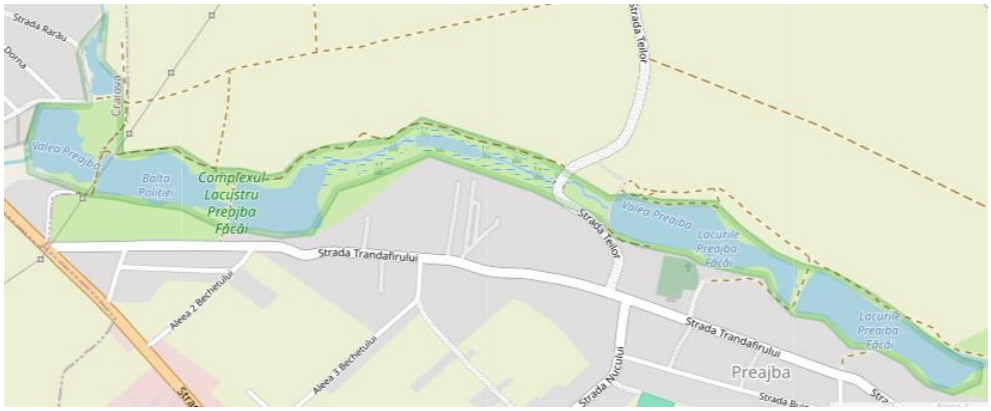

Figure 1. Delimitation of the researched area
(Internet processing)

In the course of the present research, the authors considered that the current state of the lakes, ponds, and swampy areas within the researched territory is a result of the long-term influence of environmental conditions, to which the human action and that of domestic animals were added.

In order to identify the collected material, the authors used the specialized Romanian literature (Beldie, 1977, 1979; Ciocârlan, 2009; Sârbu et al., 2013). The monumental work coordinated by Acad. Tr. Săvulescu (1952-1976) was not ignored either.

RESULTS AND DISCUSSIONS

Numerous species of aquatic and marsh plants were identified during the research undertaken over a period of six years. Although the entire area covers a surface of about 28 ha, the spreading territory of the aquatic and marsh flora is less extensive. The causes that triggered this situation over time are either natural (reduction of water surface) (Fig. 2), or anthropogenic (household waste dumping on

their boundaries) (Fig. 3). In order to enable the observation of the syndynamics of the flora in the area, the study was carried out over a longer period. The following synopsis presents the identified plants.

Figure 2. Decrease of water surface in the area

Figure 3. Anthropogenic impact

Outline of the aquatic and marsh flora of the Preajba-Făcăi Lacustrine Complex
Phyl. Pteridophyta
Cl. Equisetopsida
Fam. Equisetaceae

Equisetum palustre L. – is frequently found in lake 5 and on the marshy lands in the area (Fig. 4); ***E***. ***telmateia*** Ehrh. – frequent, locally abundant (Fig. 5) at the edges of water canals in the territory under study.

Figure 4. *Equisetum palustre* near the lake 5

Figure 5. Surfaces dominated by *E*. *telmateia* along certain water canals in the area

Phyl. Spermatophyta; Cl. Magnoliopsida; Fam. **Ceratophyllaceae: *Ceratophyllum demersum*** L. subsp. ***demersum*** - frequent in stagnant waters, in lakes 2, 7, 8 from the Preajba Lacustrine Complex; submerged, not attached to the substrate; **Fam. Ranunculaceae: *Caltha palustris*** L. – sporadic in marshy places between lakes 2 and 6; ***Ranunculus trichophyllus*** Chaix – sporadic in lakes 2, 7, 8, 9; ***R***. ***repens*** L. – frequent in marshy places in the vicinity of lakes, especially near lake 5; ***R***. ***sceleratus*** L. – appears sporadically at the edge of lake 2 in the Preajba-Făcăi Lacustrine Complex (Fig. 6), on the shore facing the agricultural land and pastures; **Fam. Urticaceae: *Urtica dioica*** L. – is common in swampy places, along

streams with running water, in willow and poplar groves; ***Parietaria officinalis*** L. – sporadic in shady and humid areas on the edges of lakes 2, 7, 8, 9; **Fam. Caryophyllaceae: *Cucubalus baccifer*** L. – rare, in humid places located on the eastern side of the area; ***Myosoton aquaticum*** (L.) Moench – frequent on the edge of the water, in thickets and reeds, at the edge of canals with running water between lakes, in shadier places; ***Saponaria officinalis*** L. – is sporadic on the lakeshores, in marshy places; **Fam. Polygonaceae: *Polygonum lapathifolium*** L. – is common along the water canals between the lakes, throughout the protected area; ***P. hydropiper*** L. – was found in ruderal, marshy areas by the roadside; ***Rumex hydrolapathum*** Huds. – it is present in reed and bulrush thickets, as well as on their edges, in places where the water stagnates for a long time; **Fam. Rosaceae: *Potentilla reptans*** L. – common near lakes, in grassy places, prone to floods; ***Rubus caesius*** L. – frequent in shady, meso-hygrophilous places sheltered by the woody species in the area; **Fam. Fabaceae: *Trifolium fragiferum*** L. subsp. ***bonannii*** (C. Presl) Soják – we find it sporadically (locally frequent) in grassy areas located on the edge of lakes; ***Galega officinalis*** L. – sporadic along the canals and on lakeshores, especially in lake 5 of the Preajba – Făcăi Lacustrine Complex; **Fam. Haloragaceae: *Myriophyllum spicatum*** L. - is frequently found in lake 2 (Fig. 6), where it forms compact phytocenoses. It is attached to the silt of the water by rhizomes and roots; **Fam. Lythraceae: *Lythrum salicaria*** L. – it is common on the water shores, on the edge of the communities edified by *Typha latifolia*, *Sparganium erectum* or *Phragmites australis*; ***L. virgatum*** L. – is found sporadically on the banks of lakes, in marshy areas; **Fam. Onagraceae: *Epilobium hirsutum*** L. - is present especially on the waterfront, in swampy places on the edge of the canals that join the lakes of the Preajba - Făcăi lacustrine complex; ***E. parviflorum*** Schreb. – sporadically grows in the same areas as the previous species; **Fam. Apiaceae: *Berula erecta*** (Huds.) Coville – frequently found along canals with smooth flowing water, located between lakes 2-4 and 6-9 within the researched territory; ***Oenanthe aquatica*** (L.) Poiret. – it is sporadically found in the Jiu meadow, within Preajba settlement and rarely appears in lake number 5 from the Preajba Lacustrine Complex; ***Pastinaca sativa*** L. – frequent, especially in the eastern part of the area; **Fam. Brassicaceae: *Cardamine amara*** L. – prefers swampy places bordering the lakes and those in the immediate vicinity of smoothly flowing water courses; ***Nasturtium officinale*** W. T. Aiton – is present in the same places as *Berula erecta*: clean, smoothly flowing waters; ***Rorippa amphibia*** (L.) Boiss. – sporadic on lake shores, in swampy places and within reed thickets; ***R. palustris*** (L.) Bess. – it is rare in the area under study, in ditches with permanent water; **Fam. Salicaceae: *Salix alba*** L. – it is found on lake fringes and along canals and marshy lands in the researched area, where it forms compact phytocenoses (Fig. 7); ***S. cinerea*** L. - sporadic in marshy places within lakes 1.5; ***S. fragilis*** L. – it coexists with *S. alba* at the edge of lakes, forming almost continuous strips. At the eastern end of the area, they form phytocenoses with a good representation alongside *S. alba*; ***Salix purpurea*** L. - rare in lake 6 and sporadic in lake 5; ****Populus canescens*** (Aiton) Sm. – sporadically between lakes 7-8, in swampy places or on lake fringes; **Fam. Primulaceae: *Lysimachia nummularia*** L. – sporadic in marshy places throughout the area; ***L. vulgaris*** L. – sporadic on the edges of the reed and bulrush thickets of all the lakes in the Preajba-Făcăi Lacustrine Complex.

Figure 6. The "Nib" (Ro: "Penița") from lake no. 2

Figure 7. *Salix alba* in the eastern part of the area

Fam. Menyanthaceae: ***Nymphoides peltata*** (Gmel.) O. Kuntze – frequent in shallow ponds, where it attaches to the silt by using a long, stoloniferous rhizome; **Fam. Oleaceae:** ***Fraxinus angustifolia*** Vahl subsp. ***oxycarpa*** (M. Bieb. ex Willd.) Franco et Rocha Afonso – sporadic on the edges of lakes, as well as in shady and moist areas between lakes 6-7; **Fam. Convolvulaceae:** ***Calystegia sepium*** (L.) R. Br. – this species is present in all communities of *Typha latifolia*, *T. angustifolia* or *Phragmites australis*. It is unavoidable in these habitats; **Fam. Lamiaceae:** ***Lycopus europaeus*** L. – is frequently found in swampy places, on water shores, on the edges of communities edified by *Typha latifolia*; ***Lycopus exaltatus*** L. fil. – sporadic in swampy places within the area under study; ***Mentha aquatica*** L. – frequent in marshy places, especially at lake 6; ***Mentha longifolia*** L. – frequent (sometimes with very high abundance-dominance indices) on the edges of lakes and ditches that connect the lakes; ***Scutellaria galericulata*** L. – sporadic on the edges of lakes; ***Stachys palustris*** L. - was identified in isolated specimens on lakeshores, in swampy places; **Fam. Scrophulariaceae:** ***Gratiola officinalis*** L. – sporadic in humid areas located on the edges of lakes; ***Scrophularia umbrosa*** Dumort. – it is frequent in the territory under study, especially at the edges of ditches with permanent water, in shady and marshy lands and on lake fringes; ***Veronica beccabunga*** L. – is common on the edges of lakes, in marshy areas or along canals with smooth flowing water; ***Veronica catenata*** Pennel – is sporadic in ditches, lake fringes and canals that connect the lakes; **Fam. Solanaceae:** ***Solanum dulcamara*** L. – found sporadically in shady places and inside communities of *Typha latifolia*; **Fam. Rubiaceae:** ***Galium palustre*** L. – sporadic in swampy areas located on the edges of water ditches that interconnect the lakes of the Preajba-Făcăi Lacustrine Complex; **Fam. Dipsacaceae:** ***Dipsacus fullonum*** L. – sporadic (locally frequent) on the edges of reed thickets and bulrush communities; **Fam. Asteraceeae**: ***Bidens frondosus*** L. – sporadic (locally frequent). In some places, they form phytocenoses with a large coverage; ***Bidens tripartita*** L. – frequent along ditches with water and on the edges of lakes, in marshy places and where water stagnates for longer; ***Cirsium creticum*** (Lam.) d'Urv. – found sporadically on the edges of lakes, in marshy places and near ditches with running water, in marshy places next to a Christian shrine, near surfaces dominated by *Cardamine amara*; ***Eupatorium cannabinum*** L. – is sporadic on the edges of lakes, in swampy places and in lake 5; ***Pulicaria dysenterica*** (L.) Bernh. – frequent (locally abundant) in mesophilic and

meso-hygrophilic areas; **Fam. Alismataceae:** ***Alisma plantago-aquatica*** L. – occurs sporadically on the edges of lakes or in marshy places from the former swimming pool; **Fam. Butomaceae:** ***Butomus umbellatus*** L. – sporadic in the reed and bulrush thickets located on lake fringes; **Fam. Hydrocharitaeae**: ***Vallisneria spiralis*** L. – frequent on the edges of lakes located in the eastern part of the area. In Oltenia, this taxon is mentioned from the Danube ponds located at Rast and Bistreț, but it has not been found again (Popescu et al., 2001). The taxon was included on the list of invasive or potentially invasive alien species in Romania. **Fam. Potamogetonaceae:** ***Potamogeton crispus*** L. – frequent in lake number 2, where it occupies almost the entire water table; **Fam. Iridaceae:** ***Iris pseudacorus*** L. – frequent on the edges of lakes, in marshy places; **Fam. Juncaceae:** ***Juncus effusus*** L. – common on the edges of lakes and in the neighboring swampy areas; ***Juncus inflexus*** L. – it cohabits with the previous species, but it has a better representation; **Fam. Cyperaceae:** ***Carex hirta*** L. – frequent in swampy places located on lake fringes and in marshy lands between lakes; ***Carex riparia*** Curtis – is the most widespread species of Carex within the area under study. It is almost ubiquitous on the edges of the lakes inside the area (Fig. 8); ***Carex vulpina*** L. - is sporadic in swampy places located on the edges of lakes; ***Cyperus flavescens*** L. – is a pioneer species that settles on raw alluvium; ***Cyperus glaber*** L. – rare on the periphery of lakes; ***Cyperus longus*** L. – it has a good development in marshy areas near Balta Ciliboaica; ***Schoenoplectus lacustris*** (L.) Palla – is common in the studied area, on the edges of lake, where it cohabits with *Phragmites australis* (Fig. 9);

Figure 8. *Carex riparia* on the edge of the lake 5

Figure 9. *Scirpus lacustris* on the edge of the lake 7

Fam. Poaceae: ***Echinochloa crus-galli*** (L.) P. Beauv. – sporadic on the edges of reed and bulrush thickets in the area; *Leersia oryzoides* (L.) Sw. – sporadic at the edge of the lakes; **Fam. Sparganiaceae**: ***Sparganium erectum*** L. em Rchb. – sporadic (locally frequent) throughout the area; **Fam. Lemnaceae:** ***Lemna minor*** L. – common on the edges of lakes and in ponds between lakes and canals with smoothly flowing water; ***Lemna trisulca*** L. – is common in water rich in organic

suspensions. It was identified on the edge of lake 6; ***Wolffia arrhiza*** (L.) Horkel ex Wimmer. – rare on the edges of lakes 8 and 9, in water rich in organic matter.

The analysis of the humidity index from the taxa identified within the studied area highlights the predominance of palustrine species (Fig. 10), which is explained by the predominance of swampy places. Although the coverage of the water surface is significant, the species of the aquatic flora are poorly represented. It should be noted that the present species have representative populations, being exclusive in certain places (e.g. *Ceratophyllum demersum, Vallisneria spiralis, Potamogeton crispus*).

With respect to the geoelements, it can be observed that the Eurasian elements are followed by the circumpolar and cosmopolitan ones. This latter category populates stagnant waters and swampy lands. The rest of them are poorly represented.

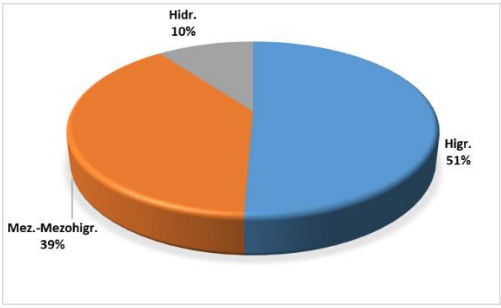

Figure 10. Humidity index spectrum

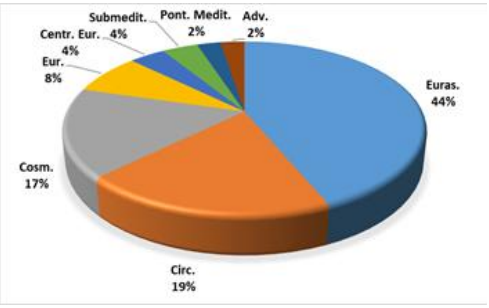

Figure 11. Spectrum of the geoelements

The research conducted by the authors in the area led to the ascertainment that a flora strongly influenced by the anthrogenic factor settles on the edges of these lakes and on marshy lands. Its analysis highlights the presence of non-native invasive or potentially invasive species, which induce obvious changes on the grass layer. Among them we mention: *Phytolacca americana* L., *Ambrosia artemisiifolia* L., *Conyza canadensis* (L.) Cronquist, *Amaranthus retroflexus* L., *Amorpha fruticosa* L., *Bidens frondosus* L., *Datura stramonium* L., *Erigeron annuus* (L.) Pers. subsp. *annuus*, *Euphorbia maculata* L., *Gleditsia triacanthos* L., *Lycium barbarum* L., *Oenothera biennis* L., *Oxalis corniculata* L., *Parthenocissus inserta* (A. Kern.) Fritsch, *Prunus cerasifera* Ehrh., *Robinia pseudoacacia* L., *Solidago gigantea* Aiton, *Sorghum halepense* (L.) Pers., *Xanthium orientale* L. subsp. *italicum* (Moretti) Greuter., *Abutilon theophrasti* Medik., *Ailanthus altissima* (Mill.) Swingle., *Eleagnus angustifolia* L.

Furthermore, the influence of the anthropogenic factor also takes other forms of manifestation, i.e. by burning or cutting vegetation and by dumping household waste, despite the fact that signs prohibiting these actions are placed in the territory under study.

CONCLUSIONS

To conclude, the authors can state that the aquatic and marsh ecosystems within the Preajba-Făcăi Lacustrine Complex display permanent dynamics, with very rapid seasonal, annual and multiannual variations, so that the study of the aquatic and marsh flora and vegetation in the area must be conducted on permanent basis.

If urgent measures are not taken in the future, the area will display the painful picture of dying nature or of nature that changes more often, although these transformations do not favor beauty and sometimes not even the practical use.

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