

Several wetlands from the Romanian Black Sea Shore and their specific Plant communities

Marius Făgăraș, Ph.D

“Ovidius” University of Constanta
Faculty of Natural and Agricultural Sciences
Mamaia Bd, No. 124, Constanta, 900527, Romania

ABSTRACT: In the paper we made a general presentation of the most important wetlands from the southern Romanian Black Sea shore and from the south of the Danube Delta. The main vegetation types of these coastal wetlands, their specific plant communities and rare and threatened plant species (in accordance with Romanian Red Lists) are also presented. Some considerations about the phytodiversity of these important areas have been made in the paper.

KEY WORDS: coastal wetlands, plant taxa, plant communities, phytodiversity.

INTRODUCTION

On the Romanian Black Sea shore, in the front of some littoral lakes (Razelm-Sinoe, Tașaul, Corbu, Siutghiol, Techirghiol, Tatalageac, Mangalia) and also on the lower surfaces of maritime sandbanks from the south of the Danube Delta (Chituc, Saele), large moist or swampy sandy areas occur. These wetlands are permanently supplied by the superficial phreatic waters or by the lakes infiltration waters. In these habitat types, mesophilous and hygrophilous plant communities grow and also many rare plant species registered into Romanian Red Lists. As a result of human economical activities from the proximity of the seashore area, especially in the south part of the Romanian coast, the wetlands as well as some specific plant communities and numerous rare plant species are endangered. This fact is regrettable because the most of coastal wetlands are included in the Habitats Directive¹ as habitat types of European interest for conservation.

MATERIAL AND METHODS

The plant species nomenclature follows the Flora Europaea^{2, 3}, Flora of Romania⁴ or Illustrated Romanian Flora⁵. The coastal wetlands and their specific plant communities have been described by personal observations^{6, 7} and on the base of the synthesis book Coenotic structure and ecological characterization of the phytocoenosis of Romania⁸. The sozologic framing of rare (R), vulnerable (V) and endangered (E) plant species mentioned in the paper was done according to the Romanian Red Lists^{9, 10}.

DISCUSSIONS

The main coastal wetlands from the southern Romanian Black Sea shore and the south of the Danube Delta are the following (Fig.1):

- ❖ Herghelie marsh, between Mangalia city and Lake Venus (near Mangalia city);
- ❖ The eastern side of Techirghiol Lake (Ramsar Sit);
- ❖ The seashore area between Mamaia and Năvodari in the proximity of Lake Mamaia;
- ❖ The seashore area between the villages of Corbu and Vadu (near Midia Cape);
- ❖ The western side of Chituc sandbank, along Lake Sinoe;

- ❖ The swampy surfaces of Saele (Istria) sandbank, between Lakes Nuntași, Sinoe and Istria;



Fig. 1 - The important coastal wetlands from the southern Romanian Black Sea shore area

Some of them as Chituc and Saele sandbanks are protected areas, part of the Danube Delta's Biosphere Reserve. Located at the southern proximity of Chituc sandbank (Fig. 1), the seashore area between Corbu and Vadu it's a buffer area of Biosphere Reserve but not under any strict protection rules. Techirghiol Lake is a recent Ramsar sit. Herghelie Marsh, a typical eutrophic marsh from the seashore proximity has a Natural Reserve status beginning with December 8th, 2005.

The comparative phytodiversity (number of plant taxa and plant communities) of these important wetlands from Romanian coastal areas or maritime sandbanks is presented in the table 1.

| Romanian coastal wetlands | Surfaces (hectare) | No. of plant associations | No. of plant taxa |
|---|--------------------|---------------------------|-------------------|
| Herghelie marsh ¹¹ | 100 | 11 | 74 |
| Mamaia-Năvodari seashore area ¹² | 150 | 38 | 254 |
| Corbu-Vadu seacoast area ⁶ | 50 | 24 | 173 |
| Saele sandbank ¹³ | 2400 | 32 | 271 |
| Chituc sandbank ¹⁴ | 7700 | 39 | 287 |

Tab. 1 – The phytodiversity of some important Romanian coastal wetlands

Related to studied wetlands surface, the Corbu-Vadu seashore area (a former sea bay silted up successively with sand) and also the sea coast zone between Mamaia and Năvodari (along the Siutghiol Lake) have a higher phytodiversity then Chituc and Saele sandbanks (Fig. 2). The high diversity of vegetation from these areas is mainly determined by the variety of the habitats: mobile and semi fixed dunes, damp depressions or swampy inter-dunes corridors during the rainy seasons.

On the Chituc and Saele sandbanks, because of large homogenous sandy surfaces, the number of plant species and plant associations related to surface is smaller (Fig. 2).

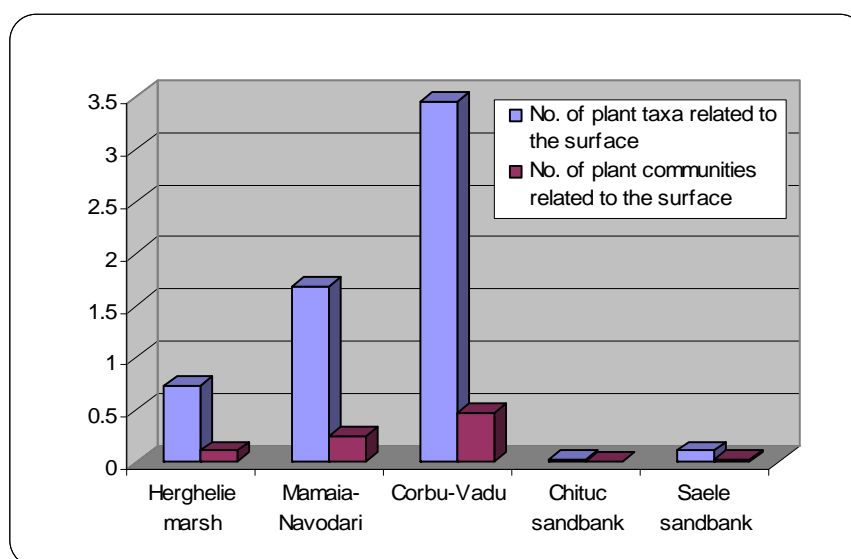


Fig. 2– The number of plant taxa related to the surface of some Romanian coastal wetlands

The sea coast area between Mamaia resort and Navodari city is the most affected by the human activities, especially because the building of some touristic objectives in the sand dunes area. The anthropogenic influences from this coastal zone determined the decline or the destruction of some specifically littoral plant communities and the excessive development of weeds and ruderal plants.

On the moist or swampy low surfaces of the seashore area or maritime sandbanks, the follow vegetation types have been identified:

- ❖ Mesophilous vegetation
- ❖ Typical hygrophilous vegetation
- ❖ Hygro-halophilous vegetation
- ❖ Hydrophilous vegetation

The **mesophilous plant communities** occupy the small surfaces in the seashore area (Mamaia-Năvodari, Corbu-Vadu) behind sand dunes but have a large distribution on the maritime sandbanks (Chituc, Saele). In these habitat types, flooded only in spring, the soil moisture is moderate with a light diminution in the summer period. The soil salinity is low to medium (180-530 mg soluble salt/ 100 g soil).

The main mesophilous plant associations within coastal wetlands are the following: *Carici distantis-Festucetum arundinaceae* Rapaics 1927, *Taraxaco bessarabicae-Caricetum distantis* Wendelbg. 1943, *Scorzonero parviflorae-Juncetum gerardi* (Wenzl. 1933) Wendelbg. 1943, *Agrostetum ponticae* Popescu et Sanda 1973, *Lythro-Calamagrostetum epigei* I.Pop 1968, *Caricetum divisae* Slavnić 1948.

In the frame of this vegetation type grow some rare (R) , vulnerable (V) and endangered (E) plant species, registered in the Romanian Red Lists: *Centaurium spicatum* (E), *Merendera sobolifera* (V), *Lepidium cartilagineum* ssp. *crassifolium* (V), *Orchis laxiflora* ssp. *elegans* (R), *Centaurium erythraea* ssp. *turcicum* (R), *Scorzonera parviflora* (R), *Plantago cornuti* (R), *Samolus valerandi* (R), *Trifolium angustifolium* (R), *Limonium meyeri* (R), *Agrostis gigantea* ssp. *maeotica* (R) and al.

The **hygrophylous plant associations** spread in Herghelie marsh (near Mangalia city), on the edge of the puddles or of the littoral lakes former maritime lagoons (Razelm-Sinoe, Taşaul, Corbu, Siutghiol, Techirghiol, Tatalageac, Mangalia), but also on the permanently swampy low surfaces of the sandy beaches (Mamaia-Năvodari, Corbu-Vadu, Chituc, Saele).

In this habitat type the moisture is excessive most of the year, with a light decrease in summer. The soil humidity from the sandbanks area is maintained by phreatic superficial waters or by the infiltrated lakes waters, given the high permeability of sandy soils. Because the salinization degree of the substrate is small, the hygrophilous plant communities are poor in halophilous species.

The most important hygrophilous plant communities from the coastal wetlands are: *Scirpo-Phragmitetum* W.Koch 1926, *Typhetum angustifoliae* (All.1922) Pign.1943, *Typhetum latifoliae* G.Lang 1973, *Typhetum laxmanni* Nedelcu 1969, *Glycerietum maximae* Hueck 1931, *Schoenoplectetum lacustris* Egger 1933, *Cladietum marisci* Allorge 1922 ex Zobrist 1935, *Eleocharidetum palustris* Schennikov 1919, *Polypogonetum monspeliensis* Morariu 1957.

The **meso-hygro-halophilous** plant association grows in the swampy and strongly salted low beach surfaces (Herghelie marsh, Mamaia-Năvodari, Corbu-Vadu) and maritime sandbanks (Chituc, Saele). The superficial mineralized phreatic waters and the intense evaporation process in the summer period have determined a high salinization degree of the soil. Because of the sandy-clayey texture of the substrate, the rainfall waters bog for a long time in these biotopes.

These coastal habitats are populated by a lot of plant communities rich in halophilous and hygrophilous taxa as follows: *Astero tripolii-Phragmitetum humilis* Krisch (1972) 1974, *Bolboschoenetum maritimi* Egger 1933, *Schoenoplectetum tabernaemontani* Şoo 1947, *Schoenoplectetum triquetri-maritimi* Zonneveld 1960, *Orchido-Schoenetum nigricantis* Oberd. 1957, *Juncetum maritimi* (Rübel 1930) Pign. 1953, *Juncetum littoralis* Popescu, Sanda 1992, *Acorelletum pannonicum* Soó 1939.

From the rare and endangered plant species which grow in the frame of this vegetation type, we mention: *Typha minima* (V), *Limonium meyeri* (V), *Scirpus littoralis* (R), *Polypogon monspeliensis* (R), *Limonium caspium* (R), *Carex extensa* (R), *Sagina nodosa* (R).

The **hydrophilous plant communities** are spread in the littoral lakes (Razelm-Sinoe, Taşaul, Corbu, Mamaia, Techirghiol, Tatalageac, Mangalia), in Herghelie marsh and in the permanently bogged areas within the seashore zone or maritime sandbanks. This vegetation type is made up of floating and submersed plant species, localized especially on the edge of aquatic basins, where the depth of water is small.

In the investigated area, the following hydrophilous plant associations have been identified: *Lemnetum minoris* Soó 1927, *Ceratophylletum demersi* (Soó 1927) Hild. 1956, *Ruppium maritima* (Haquette 1927) Iversen 1934, *Potametum pectinati* Carstnesen 1955, *Zosteretum marinae* Borgensen ex

van Goor 1921, *Myriophyllo-Potametum lucentis* Soó 1934, *Potamogetonum perfoliati* Koch 1926 em. Passarge 1964, *Potamogetonum pectinati* Carstensen 1955, *Najadetum marinae* Fukarek 1961, *Zannichelietum pedicellatae* Nordh. 1954 em. Pott 1992, *Trapetum natantis* V. Karpati 1963.

In these plant communities grow some rare and vulnerable hydrophilous species: *Ruppia maritima* (V), *Hippuris vulgaris* (V), *Sagina maritima* (R), *Najas minor* (R), *Potamogeton compressus* (R).

The conservation of this floristic richness is achieved in acceptable conditions only within protected areas from the south of Danube Delta (Chituc and Saele sandbanks). In the southern Romanian Black Sea shore area (at the south of Midia Cape), especially around big resorts, the wetland's flora and plant communities are seriously affected by intense anthropogenic influences.

CONCLUSIONS

The most important coastal wetlands from the Romanian Black Sea shore (Herghelie marsh, eastern side of Techirghiol Lake, Mamaia-Navodari seashore area, sea coast area between Corbu and Vadu villages, the western side of Chituc sandbank, swampy areas of Saele sandbank) occupy the lower sandy surfaces from the proximity of some littoral lakes, former maritime lagoons.

Because of the high moisture and variable soil salinization, the coastal wetlands shelter a lot of moist habitat types with mesophilous, hygrophilous meso-hygro-halophilous or hydrophilous plant communities and many rare plants registered in the Romanian Red lists.

The phytodiversity of these wetlands is endangered by the human activities from the seashore area or maritime lakes proximity, although the coastal wetlands are included in the Habitats Directive as habitat types of European interest for conservation.

Related to the wetlands surface, the Corbu-Vadu seashore area and the sea coast zone between Mamaia and Navodari have a higher phytodiversity than Chituc and Saele sandbanks.

Among the studied wetlands, the sea coast area between Mamaia resort and Navodari city is the most affected by the human activities, especially because the building of some touristic objectives even in the sand dunes area.

In our opinion, the conservation of the coastal wetlands will be efficient only in the frame of some special protected areas (SPA-s), possibly future Natura 2000 or Ramsar sites.

REFERENCES

1. *** Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, Annex I (Habitats Directive).
2. T.G. TUTIN, V.H. HEYWOOD, N.A. BURGESS, D.M. MOORE, D.H. VALENTINE, S.M. WALTERS & D.A. WEBB (eds): *Flora Europaea*, Vols. 1-5, Cambridge, Cambridge University Press, (1964-1980).
3. T.G. TUTIN, N.A. BURGESS, A.O. CHATER, J.R. EDMONSON, V.H. HEYWOOD, D.M. MOORE, D.H. VALENTINE, S.M. WALTERS & D.A. WEBB (eds., assist. by J.R. AKEROYD & M.E. NEWTON; appendices ed. by R.R. MILL): *Flora Europaea*, 2nd ed., Vol. 1, Cambridge, Cambridge University Press.
4. T. SĂVULESCU (ed.): *Flora of Romania*, Vols. 1-13, Bucharest, Romanian Academy Publishing House, (1952-1976).
5. V. CIOCĂRLAN: *Illustrated Romanian Flora. Pteridophyta & Spermatophyta*, Ceres Publishing House, Bucharest, (2000).
6. M. FĂGĂRAȘ: Contributions at ecological knowledge of flora and plant communities from the Romanian Black Sea shore, Doctoral thesis, "Ovidius" University of Constanta, Faculty of Natural and Agricultural Sciences, Constanta, 258 pp+25 annexes, (2002).
7. M. FĂGĂRAȘ: The conspectus of plant associations from the Romanian Black Sea shore, "Ovidius" University Annals of Natural Sciences, Biology-Ecology Series, Constantza, 7, 133-138, (2003).
8. V. SANDA, A. POPESCU, D. STANCU: Coenotic structure and ecological characterization of the phytocoenosis of Romania, Vergiliu Publishing House, Bucharest, 359 pp., (2001).
9. M. OLTEAN, G. NEGREA, A. POPESCU, N. ROMAN, GH. DIHORU, V. SANDA, S. MIHĂILESCU: The Red List of higher plants from Romania, *Ecological Study and Documents*, Bucharest, 1, 1-52, (1994).
10. G. NEGREAN: The Romanian Red List of plants from grasslands, inclusive endemics and subendemics (*Tracheophyta*) (pg. 30-57), in "Guide for identification and inventorying of Romanian seminatural grasslands", Anca Sârbu (ed.) & Gh. Coldea, I. Sârbu, G. Negrean, "alo București! Publishing House, Bucharest, 58 pp., (2001).
11. I. POP, I. HODIȘAN: The vegetation of the Herghelie marsh of Mangalia (Constanta County), *Botanical Contributions*, Cluj-Napoca, 31-39, (1977).
12. A. POPESCU, V. SANDA: Investigations on the vegetation of maritime sands between Mamaia and Navodari, *Revue Roumaine de Biologie, Serie de Botanique*, 17 (2), 99-111, (1972).
13. C. DRĂGULESCU: Flora and plant communities of Saele-Istria sandbank (Constanta County), *ICPDD Tulcea, Annals of Danube Delta Scientific Institute, Tulcea*, 6 (1), 11-20, (1997).
14. I. SÂRBU, N. ȘTEFAN, J. HANGANU, M. COROI, M. GRIDIU: Vegetation of Chituc sandbank (Danube Delta's Biosphere Reserve, *The Botanical Garden Bulletin, Iași*, 5, 213-230, (1995).