

## AQUATIC AND WETLANDS MACROPHYTES FLORA FROM DAMS OF SIRET RIVER BASIN

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**Key words:** *cormoflora, dam, Siret*

### INTRODUCTION

Vegetation evolution can be followed into an ecosystem with fast successions of environment conditions (dams, deforestation, uncultivated fields).

For dams there are necessary studies at decades intervals.

I've chosen for this study following dams: Rogojești-Siret, Bucecea, Lilieci-Hemeiș, Șerbănești-Bacău II and Bacău I.

### MATERIAL AND METHODS

Dams in this area started ageing due alluvia deposits. Species characteristic for wet environments installed, among them were identified invasive elements and some taxa which requires a special protection program. I've made a floristic note in which I've included only the species which prefers wet environments, I didn't list species from mesophyte grasslands recently installed on the first alluvias.

Studies concerning flora and vegetation on this dams were made by Barabaș N. (1980), Horeanu Cl. et Vițalariu (1989), Monah Felicia (2001).

### Abbreviations and places index

Rogojesti dam: Grămești, Mihăilești;  
Bucecea dam;  
Lilieci- Hemeiș dam;  
Bacău I dam;  
Bacău II- Șerbănești;  
[ ] = reference number;  
! = species found again;

### Species list:

#### PTERIDOPHYTA :

*Equisetum arvense* L. ; *E. ramosissimum* Desf.; Grămești, Lilieci ; *E. telmateja* Ehrh.;

#### SPERMATOPHYTA:

*Agrostis stolonifera* L.; *Alisma lanceolatum* With.; *A. plantago-aquatica* L.; *Alnus glutinosa* (L.) Gaertn.; Lilieci, [1]!, Tamași; *Bolboschoenus maritimus* (L.) Palla [1]!; *Butomus umbellatus* L., Șerbănești-Bacău. Lilieci; *Bidens cernua* L., *B. tripartita* L.; *Calamagrostis pseudophragmites* (Hall.f.) Koel, Grămești, Bucecea; *Calystegia sepium* (L.) R. Br.; *Callitriche palustris* L. em. Druce, Mihăilești-Rogojesti, Bucecea; *Carex acutiformis* Ehrh., Șerbănești-Bacău [1]!; *C. distans*, Grămești; *C. hirta* L. Șerbănești-Bacău, Rogojesti; *C. pseudocyperus* L., Bucecea, Grămești; *C. riparia* Curtis, Grămești; *C. vulpina* L., Rogojesti, Șerbănești-Bacău; *Cephalanthera rubra* (L.) L.C.M., Grămești; *Ceratophyllum demersum* L. ssp. *demersum*, Șerbănești-Bacău, Bucecea; *Microrrhinum minus* (L.) Lange ssp. *minus*, *Cirsium oleraceum* (L.) Scop., Grămești; *C. canum* (L.) All., Mihăilești-Rogojesti; *Cyperus flavescens* L., Șerbănești-Bacău; *C. fuscus* L., Șerbănești-Bacău, [1]!, *C. serotinus* Rottb., Șerbănești-Bacău, Lilieci; *Echinocystis lobata*, Bacău; *Epilobium palustre* L.; *E. hirsutum* L.; *Eupatorium cannabinum* L.; *Eleocharis acicularis* (L.) Roemer et Schultes., Lilieci [1]!; *E. palustris* (L.) Roemer et Schultes, Lilieci, [1]!, Rogojesti; *Elodea canadensis* Michx., Bacău, Lilieci; *Euphorbia esula* L.; *E. palustris* L.; *E. villosa* W. et K., Lilieci, [1]!; *Festuca drymeja* Mert et Koch., Grămești, Bucecea, *Galium palustre* L. ssp. *palustre*, *Glyceria maxima* (Hartm.) Holmbg., Grămești-Rogojesti, Bucecea; *G. notata* Chevall, Șerbănești [1]; *Heracleum sphondylium* L.; *Hydrocharis morsus-ranae* L., Grămești, Bucecea; *Humulus lupulus* L. Lilieci [1]!; *Inula britannica* L.; *I. helenium* L., Rogojesti; *Iris pseudacorus* L., Bacău, Lilieci [1]!; *Juncus articulatus* L.; Șerbănești-Bacău, *J. effusus* L.; *J. inflexus* L.; *J. gerardi* Loisel, Rogojesti,

Lilieci [1]!; *Leersia orizoides* (L.)Swartz., Grămești; *Lemna minor* L., *L. trisulca* L., Lilieci, Grămești, Bucecea, *Lotus tenuis* W.et K., Bucecea; *Lychnis flos-cuculi* L., Rogojești; *Lycopus europaeus* L.; *L. exaltatus* L., Răcăciuni, Rogojești, Bucecea; *Lysimachia nummularia* L.; *L. punctata* L.; *L. vulgaris* L.; *Lythrum salicaria* L.; *L. virgatum* L., Grămești; *Mentha aquatica* L.; *M. arvensis* L., Șerbănești [1]!; *M. longifolia* (L.)Hudson; *M. pulegium* L.; *Myosotis scorpioides* L.; *Myosoton aquaticum* (L.)Moench; *Myricaria germanica* ( L.) Desv.; *Myryophyllum spicatum* L., Bacău, Bucecea; *M. verticillatum* L., Rogojești, Lilieci [1]!; *Najas minor* All., pod Șerbănești-Bacău; *Nasturtium officinalis* R. Br., Șerbănești-Bacău, Lilieci; *Nuphar lutea* (L.)Sibth. et Sm., Mihăilești-Rogojesti, Bucecea [3]!; *Oenanthe aquatica* (L.)Poiret, Rogojesti, Galbeni; *Phalaris arundinacea* L.,Rogojesti, Bucecea; *Phragmites australis* (Cav.) Trin , *Poa palustris* L., Lilieci; *Polygonum amphibium* L.,Rogojesti [4]!; *P. hydropiper* L., *P. lapathifolium* L.; *P. mite* Schrank; *P. persicaria* L.; *Populus alba* L., Lilieci; *P. nigra* L., Lilieci; *Potamogeton crispus* L., Mihăilești, Bucecea; *P. lucens* L., Bacău, Lilieci [1]!; *P. natans* L., Grămești, Rogojesti; *P. pectinatus* L., Mihăilești, Bucecea, Bacău, Lilieci; *P. perfoliatus* L., Grămești, Bucecea, Lilieci; *Potentilla anserina* L., *P. reptans* L., *P. supina* L.; *Ranunculus acris* L. ssp. *acris*, ssp. *friesianus* (Jord.) Rouy et Foucaud, Bucecea; *R. circinatus* Sibth., Bucecea; *R. lingua* L., Grămești; *R. repens* L., *R. sceleratus* L., Bucecea; *Rorippa austriaca* (Crantz) Besser, Rogojesti; *Rubus caesius* L., Lilieci, Șerbănești; *Rumex conglomeratus* Murr., Rogojesti [4]!; *R. crispus* L.; *R. hidrolapathum* Hudson, Mihăilești; *R. obtusifolius* L.; *R. sanguineus* L., Bacău; *Sagittaria sagittifolia* L.; *Salix alba* L., *S. capraea* L.,Grămești; *S. cinerea* L.,Grămești; *S. elaeagnos* Scop., Grămești; *S. fragilis* L., Grămești, Lilieci, Bacău [1]! ; *S. purpurea* L., Lilieci [1]!; *S. triandra* L., Grămești; *S. viminalis* L., Grămești; *Scirpus lacustris* L., Bacău, Lilieci[1]!, Grămești; *S. tabernaemontani* (Gmel)Palla, Lilieci, Șerbănești; *S. triqueter* L., Lilieci, Șerbănești, [1]!; *S. sylvaticus* L., Rogojesti; *Scrophularia umbrosa* Dum.; *Scutellaria galericulata* L.; *Sium latifolium* L., Grămești, Bucecea, Șerbănești; *S. sisarum* L., Rogojesti; *Solanum dulcamara* L.; *Sparganium erectum* L.; *Spirodela polyrhiza* (L.)Sclachen, Bacău; *Stachys palustris* L.; *Symphytum officinalis* L.; *Stratiotes aloides* L., effluent drain Mihăilești, Bucecea [3]!; *Tamarix ramosissima* Ledeb.; *Trifolium hybridum* L.; *T. repens* L.; *Tussilago farfara* L., Grămești; *Typha angustifolia* L.; *T. laxmanii* Lepechin, Lilieci, [1]!, Grămești, Șerbănești; *T. latifolia* L.;

*Triglochin palustre* L., Șerbănești; *Ulmus minor* Miller, Lilieci; *Valeriana officinalis* L., Grămești; *Veronica anagalis-aquatica* L.; *V. beccabunga* L., Șerbănești; *Xanthium italicum* Moretti.

## RESULTS AND DISSCUTIONS

### Bioforms spectrum

Species are divided in following bioforms: Hydrophyta-24.8% from which hidro- helophyta-13.42%;Geophyta-18.1% Hemychryptophyta-35.7%; Therophyta- 10.0%; Phanerophyta-10.1% from which nano- Phanerophyta (shrubs)-2.1%; Chamaephyta-1.3% .

From hydrophyta category were found following species: *Ceratophyllum demersum*, *Elodea canadensis*, *Hydrocharis morsus- ranae*, *Lemna minor*, *L. trisulca*, *Myryophyllum spicatum*, *M. verticillatum*, *Nuphar lutea*, *Oenante aquatica*, *Potamegeton crispus*, *P. lucens*, *P. natans*, *P. pectinatus*, *Ranunculus circinatus*, *Rumex hidrolapathum*, etc.

Hydrophytics are present in all dams. In the canal near Grămești (Suceava county) formed water lilys populations.

In hydro-helophyta category are included: *Alisma platago-aquatica*, *Butomus umbelatus*, *Nasturtium officinalis*, *Phalaris arundinacea*, *Sium latifolium*, *Sium sisarum*, *Ranunculus lingua*, *Sagittaria sagittifolia*, *Stratiotes aloides*, etc.

In geophyta are included: *Carex hirta*, *Cephalanthera rubra*, *Cirsium canum*, *Cyperus seritonus*, *Iris pseudacorus*, *Juncus gerardi*, *J. compressus*, *Scirpus sylvaticus*, etc.

From hemychryptophyta were found: *Calamagrostis pseudophragmites*, *Carex distans*, *Craex vulpina*, *Valeriana officinalis*, *Cirsium oleraceum*, *Epilobium hirsutum*, *Juncus articulatus*, *Juncus effuses*, *Juncus infelixus*, *Lychnis flos-cuculi*, *Poa palustris*, *Potentilla anserina*, *Potentilla supina*, *Scrophularia umbrosa*, *Scutellaria galericulata*, etc.

Therophyta group is represented by wetlands plants like: *Cyperus fuscus*, *C. flavescens*, *Echynocistis lobata*, *Potentilla reptans*, *Ranunculus sceleratus*, *Veronica anagalis-aquatica*, *Glyceria maxima*, *G. notata*, *Lycopus europaeus*, *L. exaltatus*, *Mentha aquatica*, *Najans minor*, etc.

Phanerophyta group has tress adapted to high humitidy conditions like: *Alnus glutinosa*, *Populus alba*, *P. nigra*, *Salix alba*, *S. capraea*, *S. fragilis*, *S. cinerea*, etc. By reducing water volume after a long period of time appear individuals of *Ulmus minor*, this indicates the transition to mesophyte biotope.

From shrubs species, dominating are *Tamarix ramosissima* and *Myricaria germanica*. Upstream dam appeared *Rubus caesius*. (fig. 1)

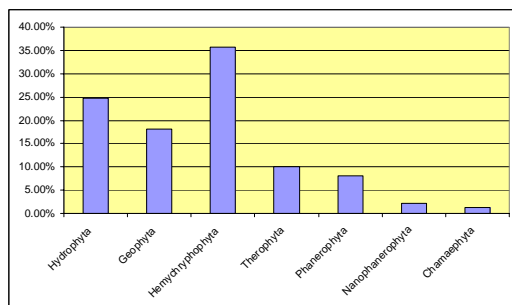


Fig. 1 Bioforms spectrum for cormoflora from wet environments

### Spectrum of geographical elements

The spreading area was noted for each species from the list and the following geographical categories were obtained:

Cosmopolitans 13.7%; Adventives-1.5%; Circumpolars-22.56%; Euroasians-51.4%; from which continental eurasian 5% and mediterranean eurasian-2.2%; european-9.44% from which centraleuropean-0.72% and southeuropean-0.72%; submediterranean - 0.72%; pontic-0.72%.

In wet environments, generally there is a high percentage of composing species, from which we are mentioning: *Equisetum arvense*, *E. telmateia*, *Bolboschoenus maritimus*, *Ceratophyllum demersum*, *Cyperus flavescens*, *Eleocharis palustris*, *Lemna minor*, *Nasturtium officinale*, *Polygonum amphibium*, etc.

Adventive species are represented by *Elodea canadensis* and *Echinocystis lobata*, both in expansion stadium.

Due to lower water temperatures than the soil's temperature, in studied dams circumpolar species are very numerous and a lot of them are frequent in our country. In all dams are present following species: *Agrostis stolonifera*, *Alisma plantago-aquatica*, *Callitriche palustris*, *Carex hirta*, *C. pseudocyperus*, *Eleocharis acicularis*, *Epilobium palustre*, *Galium palustre*, *Glyceria maxima*, *G. notata*, *Juncus articulatus*, *J. gerardi*, *Leersia orizoides*, *Lythrum salicaria*, *Myriophyllum spicatum*, *M. verticillatum*, *Phalaris arundinacea*, *Potamogeton natans*, *Scirpus sylvaticus*, *Veronica anagallis-aquatica*, etc. Scarcely, *Triglochin palustris* develops.

The eurasian species category is differentiated in submediterranean eurasian (*Cyperus serotinus*, *Scirpus triquetus*, *Valeriana officinalis*, *Mentha pulegium*, etc.), mediterranean eurasian (*Cyperus fuscus*), continental eurasian (*Euphorbia palustris*) but the most of them are eurasians.

European geoelements have a small participation. From this group we are mentioning *Iris pseudacorus* frequently spread and *Rubus caesius* which has invading characteristics.

From others geoelements category were identified: *Trifolium hybridum* (atlanto-european), *Rorippa austriaca* (pontic), *Lysimachia nummularia* (Europe, Asia and North America) (fig. 2).

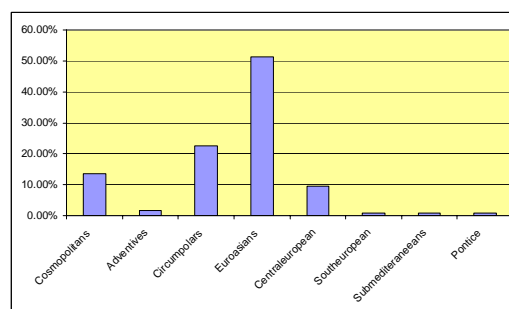


Fig. 2 Spectrum of geographical elements from wet environments

In the protection canal of Rogojești dam, near Mihăilești village there are plant formations with *Nuphar lutea* and *Stratiotes aloides*. In dam upstream I identified a *Ranunculus cirinatus* Sibth population which is considered a rare taxon in Romanian Flora.

Upstream of Șerbănești-Bacău dam was identified a *Cyperum serotinum* population. From taxa with a sporadic spread we mention: *Scirpus triquetus*, *Typha laxmani* Lepechin and others.

In year 2000 at Șerbănești-Bacău bridge and in Bacău I lake there was a great abundance of *Najas minor* which later on disappeared due to the constructions near area.

*Echinocystis lobata* was considered an adventive taxon, rare in Romania. Became also invasive in East of Romania. Grows along rivers side due the fact that is reproducing easily from seeds. From orchids we mention following: *Cephalanthera rubra*, found in area near Mihăilești village. The most dangerous invasive species in *Elodea canadensis*. Invaded in all dams from Siret water course.

## CONCLUSIONS

This list brings a contribution of over 100 taxa. I've identified species with protective, economic and scientific importance.

It is known the fact that this biotope in about one century will develop into a everglade forest.

This degree was made within research program 503/2005 which is situated at almost 50 years since the dams construction began. Additionally, the willow populations are a nesting place for birds and this areas are already protected by bird fauna organizations.

## ABSTRACT

For dams like Rogojești, Bucecea, Bacău I, Bacău II and Lileci-Hemeiș I've inventorized aquatic and palustre cormophyte species.

There is a floristic note with 144 species among where found rare taxa: *Ranunculus circinatus* Sibth, *Cyperus serotinus* Rottb, *Nuphar lutea*( L) Sibth et Sm.

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