

CONTRIBUTIONS TO THE FLORA AND VEGETATION OF THE ENVIRONS OF BALASSAGYARMAT (HUNGARY)

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The authors provide new floristical data of well-defined localities, mostly along the water-courses and those of high groundwater level, within the administrative boundaries of the town of Balassagyarmat, Nógrád county, Hungary, with brief site descriptions and assessments of the naturalness of the vegetation of 12 sites. The authors refer to the results of former surveys concerning the area, and discuss the changes in the flora and vegetation during the past decades. The main source of degradation is the sinking groundwater table and the drying-out of the area, coupled with effects of commercial forestry activity and other forms of human influence.

Key words: alder woodlands, Balassagyarmat, flora, Ipoly river, Nyírjes stream, vegetation

INTRODUCTION

This paper is based on botanical surveys conducted independently by the two authors, but as they both worked in the Ipolyszögi Égerláp, they join in the publication of the results.

The survey and evaluation of the state of the (almost) natural and seminatural (partly degraded, disturbed) vegetation within the administrative borders of Balassagyarmat (a town with about 20,000 inhabitants in North Hungary) was started in 1999. Within the larger area, the botanical study of the Ipolyszögi Égerláp, a national level conservation area, was carried out in 1998–1999 and in 2000–2001 based on two different commissions. The main goal was to make a botanical and conservational assessment to provide basic data for the preparation of an environmental program of the local municipality. This paper comprises floristical data as well as short descriptions and evaluations of the vegetation of the areas (with two exceptions) along the water-courses, those of high groundwater level and flooded, along the Nyírjes stream and Ipoly river, and of alder swamp woodlands east of the village of Ipolyszög (Ipolyszögi Égerláp protected area).

FORMER SURVEYS IN THE REGION

It was back in 1955 when Imre Máthé (MÁTHÉ 1956) in his inaugural lecture at the Hungarian Academy of Sciences said that "the Neogradense flora district is still lacking an intense and systematic botanical exploration". His statement holds true even today. Looking at the surroundings of Balassagyarmat from floristical point of view, they have been even less researched than some of the greater areas of the flora district, such as the Börzsöny, the Cserhát and the Gödöllői-dombság. The developments of the past 50(–100) years brought serious losses in the (semi)natural landscape of the above-mentioned region, as in the whole country, and there has been growing demand for a survey of the present state of the flora and vegetation. It was thus clear that on judging the "potential" or "original" vegetation one can only rely on guesses based on early data like those of Borbás, who – about a hundred years ago – was collecting plants nearby Litke in swamps and mires, or relevés of MÁTHÉ and KOVÁCS (see below) who sampled sedge communities which might not be there today.

Early floristical data concerning the Neogradense flora district include János Kunszt's enumeration (KUNSZT 1878) mainly from the environs of Losonc (present name in Slovakia is "Lučenec"). Data from Vince Borbás (BORBÁS 1876, 1877, 1878) are restricted to the vicinity of Ipoly-Litke (today: Litke) with a few exceptions only. Ádám Boros, who 60 years ago visited the alder swamp woodlands near Ipolyszög, recorded 28 specimens (BOROS 1944). In his geobotanical review Zoltán Kárpáti mentions two species occurring most likely in the surveyed area (*Ranunculus flammula* in the riparian galleries along Ipoly river e.g. at Ipolyszög and *Acorus calamus* in the ponds near Ipolyszög) (KÁRPÁTI 1952). In the two papers of Margit Kovács and Szaniszló Priszter providing floristical data (KOVÁCS and PRISZTER 1956, 1957), there are 9 species occurring in the area (indicated locality names are Balassagyarmat and Ipolyszög).

Researches carried out in the area by Imre Máthé and Margit Kovács are of synbotanical nature. The data of Máthé's two relevés (MÁTHÉ 1956), sampled in *Caricetum gracilis* stands and *Festucetum pratensis* associations, designated with the locality name "Balassagyarmat" are mingled among others and as being part of the integrated data matrix they are not recoverable today. One of Máthé's relevés, made certainly in the area in concern, appears in Kovács's study (KOVÁCS 1957) but the species with constancy No. "I" are mixed with the similar ones so they are also lost for any subsequent floristical comparison. The greatest number of floristical data (250 taxa) are found in a paper by KOVÁCS and MÁTHÉ (1967) which discusses the vegetation of the flood plains of the Ipoly river. With high probability, and in some cases certainly, the sites of their relevés made in 11 associations, des-

ignated with the locality names Balassagyarmat, Ipolyszög and Ipolyszög-Újkővár, are within the borders of our area surveyed.

Valuable recent data have been accumulated by Imre Nagy, a biology teacher and naturalist knowledgeable of the area. He lists several species from the Ipolyszögi Égerláp disappeared recently (NAGY 1994) (see Table 1). As summarised by him, in the middle of the 80s alarming changes occurred in the area. Important euhydrophyte habitats have been destroyed, dried-out reed beds and those of large sedges had been overgrown by weeds, the fens and meadows have become willow mire woodlands, and although the alder swamp woodland still stands, it started to dry out and shows disadvantageous changes in its vegetation. Floristical data provided by Miklós Csapó (CSAPÓ 1978) partly correspond with those of Nagy.

Recently, two environmental studies made by the ÖKO Rt. Corporation (based in Budapest, I. Attila út 16) dealt with the surroundings of Balassagyarmat (GERGELY *et al.* 1994, RÁTH *et al.* 1994). The relevés published in these studies evaluating the former changes in the environmental circumstances of the Ipoly river and in the area influenced by it, include floristical data from the alder swamp woodlands of the Ipolyszögi Égerláp and from the dry grasslands nearby. Although these contain valuable floristical data, they have no phytosociological merit because of the lack of cover values and table headings.

Of the most recent data it should be highlighted that *Dryopteris dilatata* was found at site No. 11 by Gergely Király and János Bölöni in 1997 (in FARKAS 1999).

All floristical data of the publications mentioned above are listed in Table 1.

METHODS OF SURVEY AND ANALYSIS

The majority of the surveyed area (Fig. 1) is almost flat, the elevation is about 140 m. This area belongs to the Middle Ipoly valley, which is part of the Balassagyarmat basin microregion in the Nógrád basin mesoregion. The remaining parts, basically lying around the upper and middle reaches of the Nyírjes stream are somewhat hilly. The elevations vary between 180 m (at the Nyírjes stream sources, at the southeastern end of site No. 6 and at the southern end of site No. 7) and 140 m further down. In larger geographical scale, this area is part of the Northern Cserhát microregion in the Cserhátvidék mesoregion.

The parent material is mostly alluvial deposit (river gravel, sand and clayey drift) and loess, respectively.

The Ipolyszögi Égerláp, comprising about 100 hectares, was declared as a local (county level) nature conservation area in 1975, and later by the municipality of the town of Balassagyarmat in 1990. Seven years later it became part of the then established Duna-Ipoly National Park. The majority of the Nyírjes stream catchment area and its surroundings are also protected by the decrees of the municipality, just like certain parts of the flood plains of the Ipoly river including even areas of stagnant water (Fig. 1).

Although the primary task was not to make a complete floristical exploration, during the field-work (1999) we recorded the species on several dozens of sites as comprehensively as possible. One site though, the Ipolyszögi Égerláp, is relatively well surveyed since we made vegetation mapping as well.

To provide a more complete picture of the flora and vegetation, the following enumeration combines our own survey data with those of earlier publications (Table 1). To record and communicate all observations possible in a concise way we chose the table format with the following reasoning. 1) Should we give a combined species list, much information at disposal on the individual sites would have been lost; 2) should we give all records according to individual sites, we would have to compose an unnecessarily large table in which case 3) we would not have been able to incorporate earlier data. In the present way, we could save space while making sure that no location data were lost.

The nomenclature follows the FLORA database 1.2 (HORVÁTH *et al.* 1995).

For the vegetation assessment, to determine and estimate the naturalness or degree of degradation, we used the scales given by Ferenc Németh and Tibor Seregélyes (NÉMETH and SEREGÉLYES 1989).

The sites surveyed and described are numbered as shown on the map (Fig. 1).

RESULTS

In the following concise descriptions of the vegetation of the sites, and in our assessment of the degree of their degradation, we overview the dominant and characteristic species existing in the stands of different associations or vegetation types; we also draw attention to selected species of special merit, especially the protected ones. The species lists registered in the sites are in Table 1.

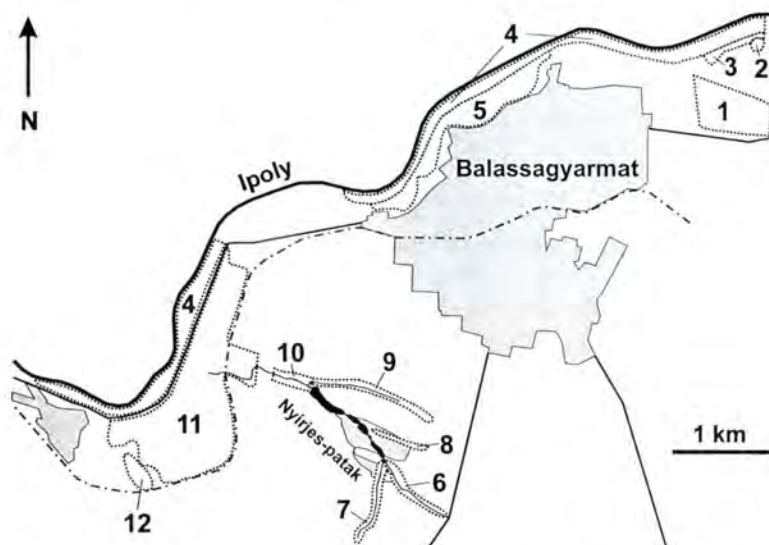


Fig. 1. Map of the environs of Balassagyarmat with the numbers of the surveyed sites.

Table 1 (continued)

Sites	1	2	3	4	5	6	7	8	9	10	11	SÉ	ÖÉ	B	K	N	C	KA	K1	K2	K3	K4	K5	K7	K8	K9	KB	KC	K6	P	M	12	ÖS
<i>Anthriscus cerefolium</i> (L.) Hoffm.																																	
subsp. <i>trichosperma</i> (Spr.) Arc.						+	+																										+
<i>Anthriscus sylvestris</i> (L.) Hoffm.							+							+																			+
<i>Apera spica-venti</i> (L.) P. B.																																	+
<i>Arabidopsis thaliana</i> (L.) Heynh.																																	+
<i>Arctium lappa</i> L.				+						+																							+
<i>Aristolochia clematitis</i> L.														+																			+
<i>Arrhenatherum elatius</i> (L.) J. et C. Presl	+			+	+					+																							+
<i>Artemisia campestris</i> L.		+																															+
<i>Artemisia vulgaris</i> L.										+																							+
<i>Asclepias syriaca</i> L.	+		+	+	+																									+			+
<i>Asparagus officinalis</i> L.		+																															+
<i>Aster x lanceolatus</i> Willd.																																	+
<i>Astragalus glycyphyllos</i> L.																																	+
<i>Athyrium filix-femina</i> (L.) Roth						+	+		+	+			+																				+
<i>Atriplex acuminata</i> W. et K.																																	+
<i>Ballota nigra</i> L.																																	+
<i>Barbarea striata</i> Andr.										+																							+
<i>Barbarea vulgaris</i> R. Br.																																	+
<i>Batrachium trichophyllum</i> (Chaix) van den Bosch																+	+																+
<i>Berteroa incana</i> (L.) DC.	+			+																													+
<i>Berula erecta</i> (Huds.) Coville						+	+		+			+								+	+	+			+								+
<i>Berula pendula</i> Roth																																	+
<i>Bidens tripartita</i> L.				+					+		+																						+
<i>Bostrychia ischaemum</i> (L.) Keng																																	+
<i>Brachypodium sylvaticum</i> (Huds.) R. et Sch.					+	+				+	+																						+
<i>Brija media</i> L.												+																					+
<i>Bromus commutatus</i> Schrad.																										+							+
<i>Bromus erectus</i> Huds.				+																													+
<i>Bromus inermis</i> Leyss.				+	+	+																											+
<i>Bromus mollis</i> L.																																	+
<i>Bromus sterilis</i> L.																																	+
<i>Bromus tectorum</i> L.																																	+
<i>Bryonia dioica</i> Jacq.																																	+
<i>Butomus umbellatus</i> L.				+								+		+								+											+
<i>Calamagrostis canescens</i> (Weber) Roth																												+					+
<i>Calamagrostis epigeios</i> (L.) Roth	+	+	+	+	+					+																							+
<i>Caltha palustris</i> L.						+	+	+	+	+	+	+	+	+				+	+				+	+	+	+		+					+
<i>Calystegia sepium</i> (L.) R. Br.	+									+	+	+						+	+				+	+	+	+		+					+
<i>Campanula patula</i> L.																																	+
<i>Campanula rotundifolia</i> L. (agg.)																																	+
<i>Capsella bursa-pastoris</i> (L.) Medik.																																	+
<i>Cardamine amara</i> L.						+	+	+	+	+			+																				+
<i>Cardamine pratensis</i> L.												+						+	+				+	+	+								+
<i>Carduus acanthoides</i> L.				+														+															+
<i>Carduus crispus</i> L.												+																					+

Table 1 (continued)

Sites	1	2	3	4	5	6	7	8	9	10	11	SÉ	ÖÉ	B	K	N	C	KA	K1	K2	K3	K4	K5	K7	K8	K9	KB	KC	K6	P	M	12	ÖS	
<i>Anthemis ruthenica</i> M. B.																														+		+		
<i>Anthriscus caucalis</i> M. B.																														+				
<i>Carex acutiformis</i> Ehrh.	+			+	+	+	+	+	+	+	+	+	+								+													
<i>Carex disticha</i> Huds.																						+			+					+				
<i>Carex elata</i> All.											+		+				+	+	+		+	+						+	+					
<i>Carex elongata</i> L.											+	+	+				+	+	+										+					
<i>Carex flacca</i> Schreb.				+	+												+	+	+										+					
<i>Carex gracilis</i> Curt.												+																						
<i>Carex hirta</i> L.	+			+	+	+												+	+		+		+		+		+	+	+		+	+	+	
<i>Carex lepidocarpa</i> Tausch												+															+							
<i>Carex melanostachya</i> Willd.																								+										
<i>Carex panicea</i> L.																									+						+			
<i>Carex praecox</i> Schreb.					+																													
<i>Carex pseudocyperus</i> L.												+		+			+	+	+		+						+					+		
<i>Carex remota</i> Jusl.							+	+	+	+			+					+	+	+														
<i>Carex riparia</i> Curt.	+			+			+					+	+	+						+														
<i>Carex vesicaria</i> L.											+						+	+	+		+	+								+				
<i>Carex vulpina</i> L.												+					+	+					+	+	+	+		+	+					
<i>Centaurea jacea</i> L. incl. subsp. <i>subjacea</i>					+	+																						+					+	
<i>Centaurea macroptilon</i> Borb. subsp. <i>oxylepis</i> ? (W. et Gr.) Soó																																		
<i>Centaurea micranthos</i> S. G. Gmel.																																		
<i>Centaurea pannonica</i> (Heuff.) Simk.	+				+																												+	+
<i>Centaureum erythraea</i> Rafn.					+	+																												
<i>Cerastium brachypetalum</i> Desp.																																		+
<i>Cerastium fontanum</i> Baumg.																																		+
<i>Cerasus avium</i> (L.) Mönch																																		+
<i>Cherophyllum temulum</i> L.							+	+				+																						+
<i>Chelidonium majus</i> L.						+	+	+				+		+																				+
<i>Chenopodium album</i> L.																																		+
<i>Chondrilla juncea</i> L.																																		+
<i>Chrysanthemum leucanthemum</i> L.																																		+
<i>Chrysosplenium alternifolium</i> L.											+																							+
<i>Cichorium intybus</i> L.						+																												+
<i>Cicuta virosa</i> L.																										+		+						
<i>Circaea lutetiana</i> L.						+	+	+		+																								
<i>Cirsium arvense</i> (L.) Scop.				+	+	+						+																						+
<i>Cirsium canum</i> (L.) All.						+																												+
<i>Cirsium oleraceum</i> (L.) Scop.							+				+	+					+	+																+
<i>Cirsium vulgare</i> (Savi) Ten.					+																													+
<i>Clematis integrifolia</i> L.					+																													+
<i>Clematis vitalba</i> L.					+																													+
<i>Clinopodium vulgare</i> L.					+																													+
<i>Colchicum autumnale</i> L.				+	+																													+
<i>Conium maculatum</i> L.																																		+
<i>Convolvulus arvensis</i> L.																		+																+

Table 1 (continued)

Sites	1	2	3	4	5	6	7	8	9	10	11	SÉ	ÖÉ	B	K	N	C	KA	K1	K2	K3	K4	K5	K7	K8	K9	KB	KC	K6	P	M	12	ÖS
<i>Cornus mas</i> L.						+																											
<i>Cornus sanguinea</i> L.				+		+			+	+	+	+	+																				
<i>Corylus avellana</i> L.							+																										+
<i>Corynephorus canescens</i> (L.) P. B.																																	+
<i>Crataegus monogyna</i> Jacq.						+	+		+																								+
<i>Crataegus oxyacantha</i> L.																																	+
<i>Crepis setosa</i> Hall. f.					+																												+
<i>Cucubalus baccifer</i> L.														+																			+
<i>Cuscuta lupuliformis</i> Krocke															+																		+
<i>Cynodon dactylon</i> (L.) Pers.				+	+																												+
<i>Cynoglossum officinale</i> L.																																	+
<i>Dactylis glomerata</i> L.	+	+		+	+																												+
<i>Dactylorhiza incarnata</i> (L.) Soó																	+																+
<i>Daucus carota</i> L. subsp. <i>carota</i>																																	+
<i>Deschampsia caespitosa</i> (L.) P. B.			+	+	+					+			+	+																			+
<i>Descurainia sophia</i> (L.) Webb																																	+
<i>Digitaria sanguinalis</i> (L.) Scop.																																	+
<i>Dipsacus laciniatus</i> L.				+																													+
<i>Dryopteris carthusiana</i> (Vill.) H. P. Fuchs s.str.						+	+		+	+	+	+	+	+																			+
<i>Dryopteris dilatata</i> (Hoffm.) A. Gray							+				+																						+
<i>Dryopteris filix-mas</i> (L.) Schott						+	+					+																					+
<i>Echinochloa crus-galli</i> (L.) P. B.			+																														+
<i>Echinochloa lobata</i> (Michx.) Torr.				+						+	+	+																					+
<i>Eleocharis palustris</i> (L.) R. et Sch.																					+		+	+	+				+			+	
<i>Epilobium montanum</i> L.																							+		+	+	+						+
<i>Epilobium parviflorum</i> Schreb.			+										+																				+
<i>Equisetum arvense</i> L.				+		+	+		+	+	+																						+
<i>Equisetum fluviatile</i> L. incl. var. <i>limosum</i>											+	+						+	+		+						+		+				+
<i>Equisetum palustre</i> L.												+						+						+	+	+		+					+
<i>Equisetum ramosissimum</i> Desf.												+						+															+
<i>Eragrostis pilosa</i> (L.) P. B.																																	+
<i>Erechtites hieracifolia</i> (L.) Raf.												+																					+
<i>Erigeron acris</i> L.																																	+
<i>Erigeron canadensis</i> L.																																	+
<i>Eriophorum angustifolium</i> Honckeney																											+						+
<i>Eryngium campestre</i> L.					+																												+
<i>Euonymus europaea</i> L.						+	+		+	+																							+
<i>Eupatorium cannabinum</i> L.						+			+			+	+																+				+
<i>Euphorbia cyparissias</i> L.											+																						+
<i>Euphorbia esula</i> L.																																	+
<i>Fallopia convolvulus</i> (L.) A. Löve													+																				+
<i>Festuca gigantea</i> (L.) Vill.						+																											+
<i>Festuca pratensis</i> Huds.		+		+	+												+																+
<i>Festuca pseudovina</i> Hack.		+			+	+																					+						+
<i>Festuca rubra</i> L.		+	+																														+
<i>Festuca rupicola</i> Heuff.			+		+	+																											+

Table 1 (continued)

Sites	1	2	3	4	5	6	7	8	9	10	11	SÉ	ÖÉ	B	K	N	C	KA	K1	K2	K3	K4	K5	K7	K8	K9	KB	KC	K6	P	M	12	ÖS	
<i>Ficaria verna</i> Huds.						+			+	+			+																				+	
<i>Filipendula ulmaria</i> (L.) Maxim.									+	+		+		+				+									+	+						
<i>Filipendula vulgaris</i> Mönch			+																															
<i>Fragaria vesca</i> L.							+																										+	
<i>Frangula alnus</i> Mill.				+			+			+	+	+	+					+										+						
<i>Fraxinus angustifolia</i> Vahl subsp. <i>pannonica</i> Soó et Simon										+	+	+	+	+																				
<i>Fraxinus excelsior</i> L.									+																								+	
<i>Fraxinus pennsylvanica</i> Marsh.																																	+	
<i>Fumaria parviflora</i> Lam. var. <i>schrammii</i> Aschers.																														+			+	
<i>Fumaria schleicheri</i> Soy.-Will.																																	+	
<i>Galeobdolon luteum</i> Huds.									+	+																								+
<i>Galeopsis pubescens</i> Bess.																																	+	
<i>Galium aparine</i> L.						+	+			+			+																				+	
<i>Galium boreale</i> L.		+	+	+	+																												+	
<i>Galium elongatum</i> C. Presl							+																										+	
<i>Galium mollugo</i> L.				+	+	+				+		+																					+	
<i>Galium palustre</i> L. incl. var. <i>scabrum</i>										+	+		+					+		+	+	+	+	+	+	+	+	+	+				+	
<i>Galium uliginosum</i> L.																									+									
<i>Galium verum</i> L.				+	+																												+	+
<i>Genista tinctoria</i> L.		+																																
<i>Geranium pusillum</i> Burm. f.																																	+	
<i>Geranium robertianum</i> L.						+				+																							+	
<i>Geum urbanum</i> L.					+	+	+			+	+		+																				+	
<i>Glechoma hederacea</i> L.				+	+	+			+	+	+		+																		+	+		
<i>Glyceria fluitans</i> (L.) R. Br.										+		+		+																				
<i>Glyceria maxima</i> (Hartm.) Holmberg	+									+	+	+	+	+		+	+	+		+	+	+	+	+	+		+							
<i>Glyceria plicata</i> Fr.						+															+	+		+										
<i>Gratiola officinalis</i> L.				+										+										+										
<i>Helianthus decapetalus</i> L.				+																														
<i>Heracleum sphondylium</i> L.				+	+																												+	
<i>Hieracium pilosella</i> L.																																	+	
<i>Holcus lanatus</i> L.																																+	+	
<i>Hottonia palustris</i> L. incl. f. <i>deminuta</i> Simk. in Bezdek											+						+	+	+	+	+	+								+				
<i>Humulus lupulus</i> L.	+				+	+			+	+	+		+	+				+	+				+										+	
<i>Hydrocharis morsus-ranae</i> L.												+		+			+	+	+	+	+	+								+				
<i>Hypericum perforatum</i> L.	+			+	+							+		+			+	+	+	+	+	+											+	+
<i>Hypochoeris radicata</i> L.																																	+	
<i>Inula britannica</i> L. incl. var. <i>viridis</i> Wahlbg.		+			+																												+	
<i>Inula salicina</i> L.						+																												
<i>Iris pseudacorus</i> L.			+	+	+					+	+	+	+				+	+			+	+	+	+							+			
<i>Iris variegata</i> L.		+																																
<i>Jasione montana</i> L.																																	+	+
<i>Juglans regia</i> L.																																	+	
<i>Juncus articulatus</i> L.	+																								+									

Table 1 (continued)

Sites	1	2	3	4	5	6	7	8	9	10	11	SÈ	ÖE	B	K	N	C	KA	K1	K2	K3	K4	K5	K7	K8	K9	KB	KC	K6	P	M	12	ÖS
<i>Juncus effusus</i> L.	+								+	+		+																					+
<i>Knaulia arvensis</i> (L.) Coult.			+		+	+																											+
<i>Koeleria cristata</i> (L.) Pers.																																	+
<i>Koeleria glauca</i> (Schkuhr) DC.																																	+
<i>Lactuca quercina</i> L.																																	+
<i>Lactuca serriola</i> L.																																	+
<i>Lamium maculatum</i> (L.) L.						+					+	+																					+
<i>Lamium purpureum</i> L.																																	+
<i>Lapsana communis</i> L.																																	+
<i>Lathyrus pratensis</i> L.					+								+																				+
<i>Lathyrus tuberosus</i> L.																																	+
<i>Lemna minor</i> L.	+					+				+			+					+	+	+	+		+										+
<i>Lemna trisulca</i> L.																		+	+	+	+		+										+
<i>Leontodon autumnalis</i> L.																																	+
<i>Lepidium campestre</i> (L.) R. Br.																																	+
<i>Lepidium ruderale</i> L.																																	+
<i>Ligustrum vulgare</i> L.							+	+																									+
<i>Linaria genistifolia</i> (L.) Mill.																																	+
<i>Linaria vulgaris</i> Mill.					+																												+
<i>Lolium perenne</i> L.																																	+
<i>Lotus corniculatus</i> L.																											+		+				+
<i>Lucula campestris</i> (L.) Lam. et DC.																																	+
<i>Lychnis flos-cuculi</i> L.					+							+						+								+							+
<i>Lycopus europaeus</i> L.												+							+		+						+						+
<i>Lycopus exaltatus</i> L.									+					+																			+
<i>Lysimachia nummularia</i> L.																			+			+			+	+	+	+	+		+		+
<i>Lysimachia vulgaris</i> L.	+			+	+				+		+	+		+				+	+			+								+			+
<i>Lythrum salicaria</i> L.	+				+						+	+	+	+	+		+	+			+	+		+	+	+			+				+
<i>Lythrum virgatum</i> L.				+	+							+	+	+	+	+	+	+		+	+		+	+	+	+			+				+
<i>Matricaria chamomilla</i> L.																																	+
<i>Medicago lupulina</i> L.																																	+
<i>Melandrium album</i> (Mill.) Garcke																																	+
<i>Melilotus albus</i> Desr.																																	+
<i>Melilotus officinalis</i> (L.) Pall.																																	+
<i>Mentha aquatica</i> L.																						+					+		+				+
<i>Mentha arvensis</i> L.																						+		+			+		+				+
<i>Mentha longifolia</i> (L.) Nath.																										+							+
<i>Molinia coerulea</i> Mönch																																	+
<i>Morus alba</i> L.																																	+
<i>Muscari comosum</i> (L.) Mill.																																	+
<i>Mycelis muralis</i> (L.) Dum.							+																										+
<i>Myosotis arvensis</i> (L.) Hill																																	+
<i>Myosotis palustris</i> (L.) Nath. incl. subsp. <i>laxiflora</i> (Rehb.) Soó							+	+			+																						+
<i>Myosotis sparsiflora</i> Mikan							+					+																					+
<i>Myosoton aquaticum</i> (L.) Mönch							+					+	+																				+

Table 1 (continued)

Sites	1	2	3	4	5	6	7	8	9	10	11	SÉ	ÓÉ	B	K	N	C	KA	K1	K2	K3	K4	K5	K7	K8	K9	KB	KC	K6	P	M	12	ÖS
<i>Myosurus minimus</i> L.												+																					
<i>Myriophyllum verticillatum</i> L.														+																			
<i>Nuphar lutea</i> (L.) Sm.																	+	+															
<i>Oenanthe aquatica</i> (L.) Poir.											+	+							+		+												
<i>Oenanthe fistulosa</i> L.																																	
<i>Oenothera biennis</i> L.																														+			
<i>Onopordum acanthium</i> L.																																	+
<i>Orchis laxiflora</i> Lam.																	+																
<i>Ornithogalum boucheanum</i> (Kunth) Asch.						+																											+
<i>Ornithogalum umbellatum</i> L.																																	+
<i>Oxalis dillenii</i> Jacq.																																	+
<i>Oxalis fontana</i> Bunge																																	
<i>Padius avium</i> Mill.						+	+	+		+	+																						
<i>Papaver rhoeas</i> L.																																	+
<i>Paris quadrifolia</i> L.							+	+		+																							+
<i>Pastinaca sativa</i> L.						+																											+
<i>Peplis portula</i> L.																																	+
<i>Petrorhagia prolifera</i> (L.) Ball et Heyw.																																	+
<i>Petroselinum hortense</i> Hoffm.																																	+
<i>Peucedanum alsaticum</i> L.						+																											
<i>Peucedanum oreoselinum</i> (L.) Mönch				+																													
<i>Phalaroides arundinacea</i> (L.) Rauschert				+	+						+	+																					
<i>Phleum phleoides</i> (L.) Karsten				+																													
<i>Phragmites australis</i> (Cav.) Trin.	+											+	+	+			+	+	+		+					+							
<i>Physalis alkekengi</i> L.																																	+
<i>Picris hieracioides</i> L.						+																											
<i>Pimpinella saxifraga</i> L.			+																														
<i>Pinus sylvestris</i> L.								+																									+
<i>Plantago lanceolata</i> L.					+	+																											+
<i>Plantago major</i> L.						+																										+	+
<i>Plantago media</i> L.					+																												
<i>Poa angustifolia</i> L.	+		+	+																													+
<i>Poa bulbosa</i> L.																																	+
<i>Poa palustris</i> L.												+	+									+	+		+	+						+	
<i>Poa pratensis</i> L.																											+						+
<i>Poa trivialis</i> L.																																	+
<i>Polygonatum latifolium</i> (Jacq.) Desf.						+	+																										
<i>Polygonatum multiflorum</i> (L.) All.						+																											
<i>Polygonum amphibium</i> L.																																	
<i>Polygonum hydropiper</i> L.																						+											
<i>Polygonum lapathifolium</i> L.																																	
<i>Populus alba</i> L.						+																	+				+						
<i>Populus x canadensis</i> Mönch						+																											+
<i>Populus x canescens</i> (Ait.) Sm.							+																										+
<i>Portulaca oleracea</i> L.																																	+
<i>Potamogeton crispus</i> L.																																	+

Table 1 (continued)

Sites	1	2	3	4	5	6	7	8	9	10	11	SÉ	ÖÉ	B	K	N	C	KA	K1	K2	K3	K4	K5	K7	K8	K9	KB	KC	K6	P	M	12	ÖS
<i>Potentilla anserina</i> L.				+																			+		+			+					
<i>Potentilla argentea</i> L.																																+	+
<i>Potentilla impolita</i> Wahlb.	+	+		+																													
<i>Potentilla reptans</i> L.	+			+																						+						+	
<i>Prunella vulgaris</i> L.																										+					+	+	
<i>Prunus domestica</i> L.																																+	
<i>Prunus serotina</i> Ehrh.													+																			+	
<i>Prunus spinosa</i> L.		+		+	+	+	+				+																					+	
<i>Pyrus communis</i> L.																																+	
<i>Pyrus pyraeaster</i> Burgsd.																																+	
<i>Quercus petraea</i> (Mattuschka) Lieblein																																+	
<i>Quercus robur</i> L.		+				+																										+	
<i>Quercus rubra</i> L.																																+	
<i>Ranunculus acris</i> L.				+								+						+								+	+		+		+		
<i>Ranunculus flammula</i> L.														+	+						+	+					+				+		
<i>Ranunculus lingua</i> L.											+										+												
<i>Ranunculus polyanthemus</i> L.				+	+																												
<i>Ranunculus repens</i> L.						+	+		+	+	+	+	+										+	+	+	+	+	+		+	+	+	
<i>Ranunculus sceleratus</i> L.											+	+																				+	
<i>Raphanus raphanistrum</i> L. f. <i>carneus</i> (Schw. et Kte.) Thell.																														+		+	
<i>Reynoutria japonica</i> Houttuyn													+																			+	
<i>Rhamnus catharticus</i> L.																																+	
<i>Ribes nigrum</i> L.						+	+		+	+		+																				+	
<i>Ribes rubrum</i> L. incl. subsp. <i>sylvestre</i> (Lam.) Syme						+	+		+	+	+	+																				+	
<i>Ribes uva-crispa</i> L.									+																							+	
<i>Robinia pseudo-acacia</i> L.		+					+	+		+	+	+					+															+	
<i>Rorippa amphibia</i> (L.) Bess.																					+	+	+								+		
<i>Rorippa austriaca</i> (Cr.) Bess.																																+	
<i>Rosa canina</i> L.				+							+																					+	
<i>Rubus caesius</i> L.	+			+	+	+	+		+	+	+							+	+												+	+	
<i>Rubus discolor</i> Wh. et N.																	+															+	
<i>Rubus idaeus</i> L.							+		+																							+	
<i>Rumex acetosa</i> L.	+			+																						+	+					+	+
<i>Rumex acetosella</i> L.																																+	
<i>Rumex crispus</i> L.																																+	
<i>Rumex hydrolapathum</i> Huds.											+		+					+		+												+	
<i>Rumex palustris</i> Sm.											+																						
<i>Rumex patientia</i> L.																	+																
<i>Sagittaria sagittifolia</i> L.																																	
<i>Salix alba</i> L.			+		+	+				+	+	+	+				+																
<i>Salix caprea</i> L.																	+															+	
<i>Salix cinerea</i> L.	+			+							+	+	+	+			+	+	+		+						+	+					
<i>Salix fragilis</i> L. incl. var. <i>discolor</i> Kem.	+									+	+	+				+	+	+										+	+				
<i>Salix purpurea</i> L.												+					+	+															
<i>Salix triandra</i> L.																	+	+	+										+				

Table 1 (continued)

Sites	1	2	3	4	5	6	7	8	9	10	11	SÉ	ÖE	B	K	N	C	KA	K1	K2	K3	K4	K5	K7	K8	K9	KB	KC	K6	P	M	12	ÖS
<i>Salix viminalis</i> L.												+																					
<i>Salvia nemorosa</i> L.					+																												
<i>Salvia pratensis</i> L.		+																															
<i>Sambucus ebulus</i> L.				+	+	+											+															+	
<i>Sambucus nigra</i> L.				+	+	+	+	+	+	+	+	+	+				+																
<i>Sanguisorba officinalis</i> L.				+	+																												
<i>Saponaria officinalis</i> L.				+											+																		+
<i>Scabiosa ochroleuca</i> L.	+			+																													+
<i>Scirpus sylvaticus</i> L.							+		+			+						+															
<i>Scleranthus annuus</i> L.																																	+
<i>Scrophularia nodosa</i> L.				+								+																					
<i>Scrophularia umbrosa</i> Dum.						+						+																					
<i>Scutellaria huxifolia</i> L.												+																					
<i>Sedum maximum</i> (L.) Hoffm.																																+	+
<i>Senecio erraticus</i> Bert. subsp. <i>barbareifolius</i> (W. et Gr.) Beger																															+		
<i>Senecio jacobaea</i> L.																																+	
<i>Senecio vulgaris</i> L.																																+	
<i>Serratula tinctoria</i> L.		+	+		+																												
<i>Seseli annuum</i> L.																																+	
<i>Setaria viridis</i> (L.) P. B.																																+	
<i>Silene otites</i> (L.) Wibel																																+	+
<i>Sium latifolium</i> L.												+			+																		
<i>Solanum dulcamara</i> L.	+							+			+	+	+					+			+												
<i>Solidago gigantea</i> Ait. subsp. <i>serotina</i> (Ait.) McNeill				+	+	+				+				+				+														+	+
<i>Sorbus aucuparia</i> L.														+																		+	
<i>Sparganium erectum</i> L.	+							+		+								+		+													
<i>Spirodela polyrrhiza</i> (L.) Schleiden																	+	+	+														
<i>Stachys palustris</i> L.	+			+							+	+		+							+							+					
<i>Stachys sylvatica</i> L.						+				+																							
<i>Stellaria graminea</i> L.																																+	
<i>Stellaria media</i> (L.) Vill.						+					+																					+	
<i>Stellaria palustris</i> Ehrh.												+									+	+		+	+						+		
<i>Stenactis annua</i> (L.) Nees												+																				+	
<i>Symphytum officinale</i> L.				+	+	+					+	+	+					+			+							+			+		
<i>Symphytum officinale</i> L. subsp. <i>uliginosum</i> (Kern.) Nym.																					+				+		+				+		
<i>Tanacetum vulgare</i> L.	+		+	+	+																											+	
<i>Taraxacum officinale</i> Weber																															+	+	
<i>Taraxacum palustre</i> (Lyons) Simons																																+	
<i>Thalictrum lucidum</i> L.			+	+	+									+																			
<i>Thalictrum simplex</i> L.												+																					
<i>Thymus glabrescens</i> Willd.																																	+
<i>Thymus pannonicus</i> All.	+																															+	
<i>Tilia cordata</i> Mill.																																+	

Table 1 (continued)

Sites	1	2	3	4	5	6	7	8	9	10	11	SÉ	ÖÉ	B	K	N	C	KA	K1	K2	K3	K4	K5	K7	K8	K9	KB	KC	K6	P	M	12	ÖS
<i>Torilis japonica</i> (Houtt.) DC.																																+	
<i>Tragopogon dubius</i> Scop.																																+	
<i>Tragopogon orientalis</i> L.					+																											+	
<i>Trifolium arvense</i> L.		+		+	+																											+	
<i>Trifolium hybridum</i> L.														+										+		+						+	
<i>Trifolium medium</i> L.					+																											+	
<i>Trifolium pratense</i> L.																										+						+	
<i>Trifolium repens</i> L.																																+	
<i>Triticum aestivum</i> L. emend. Fiori et Paol.																																+	
<i>Tussilago farfara</i> L.																																+	
<i>Typha angustifolia</i> L.									+																							+	
<i>Typha latifolia</i> L.	+		+		+							+						+										+				+	
<i>Ulmus glabra</i> Huds.										+																						+	
<i>Ulmus laevis</i> Pall.					+	+			+			+																				+	
<i>Urtica dioica</i> L.	+			+	+	+	+	+	+	+	+	+	+	+			+	+										+				+	
<i>Utricularia vulgaris</i> L.																					+											+	
<i>Valeriana dioica</i> L.							+		+																							+	
<i>Valerianella locusta</i> (L.) L'Herminier																																+	
<i>Verbascum phlomoides</i> L.					+																											+	
<i>Veronica chamaedrys</i> L. subsp. <i>vindobonensis</i> M. Fischer				+	+																											+	
<i>Veronica dillenii</i> Cr.																																+	
<i>Veronica hederifolia</i> L.							+																									+	
<i>Veronica longifolia</i> L.											+	+																				+	
<i>Veronica prostrata</i> L.																																+	
<i>Veronica scutellata</i> L.											+																					+	
<i>Veronica spicata</i> L.		+																														+	
<i>Viburnum opulus</i> L.						+	+		+	+	+	+	+	+				+														+	
<i>Vicia angustifolia</i> L.																																+	
<i>Vicia cracca</i> L.																									+	+						+	
<i>Vicia grandiflora</i> Scop.																																+	
<i>Vicia hirsuta</i> (L.) S. F. Gray																																+	
<i>Viola arvensis</i> Murr.																																+	
<i>Viola sylvestris</i> Lam.																																+	
<i>Viscaria vulgaris</i> Bernh.		+																														+	

Site No. 1

Elevation: 140 m. This is a low area with depressions and excavated pits of varying size with some open water surface. It is covered by marsh vegetation which appears almost natural though a bit characterless. Patches of reed and bulrush (*Typha* spp.) beds are alternating with stands of non-tussock large sedges depending on the depth of the open water. Weeds appear mainly along tracks. At somewhat higher elevations, patches of disturbed lowland meadow develop, hardly associated with any phytosociological category.

Site No. 2

Elevation: 140–145 m. This is a small hump rising a few metres above its flat surroundings covered with considerably degraded vegetation. As remnants of a former, “original” vegetation, there are a few mature *Quercus robur* trees on its northern side. The rest of the site is largely a young *Robinia pseudo-acacia* plantation with *Prunus spinosa* scrub and some patches of grassland. On treeless spots and partly below the thin *Robinia* plantation we recorded numerous species characteristic to the natural looking slope steppe grasslands – regionally considered to be “good ones” – such as *Asparagus officinalis*, *Filipendula vulgaris*, *Genista tinctoria*, *Peucedanum oreoselinum*, *Phleum phleoides*, *Potentilla impolita*, *Salvia pratensis*, *Veronica spicata*, *Viscaria vulgaris* and even a protected species of steppe woodlands, *Iris variegata*, of which we noticed numerous polycormons. It is worth mentioning additional characteristic species like *Galium boreale*, *Inula britannica* var. *viridis*, *Serratula tinctoria* found at the edges of the site.

Site No. 3

Elevation: 140 m. South from the embankment of the Ipoly river (outside the flood area) strongly degraded, tall herb meadows are found, infected with numerous weed species (e.g. *Calamagrostis epigeios*, *Agropyron repens*) partly because of overall disturbance and partly as the habitat is getting drier. Species of the once characteristic wetland environment can only be found sporadically or in small patches. Some of the species so characteristic in marshes, beds of non-tussock large sedges, *Molinia* and lowland eutrophic meadows are represented by a few specimens only (e.g. *Butomus umbellatus*, *Epilobium parviflorum*, *Iris pseudacorus*, *Lythrum virgatum*, *Carex riparia*, *C. flacca*, *Colchicum autumnale*, *Deschampsia caespitosa*, *Festuca pratensis*, *Galium boreale*, *Serratula tinctoria*, *Agrostis stolonifera*), while others (e.g. *Alisma plantago-aquatica*, *Phalaroides arundinacea*, *Carex acutiformis*) occur in large masses. Under the only group of trees (*Salix*

alba) there is a small stand of *Carex acutiformis* in a water-logged depression where, interestingly, two weed species typical in dry habitats, *Asclepias syriaca* and *Calamagrostis epigeios*, do also occur. Presumably, there were even drier periods in the area during which these plants could settle in.

Site No. 4

Elevation: 140 m. Different parts of the strongly degraded grasslands lying between the bank and the Ipoly river dam are of different physiognomy and their species composition varies according to their history of disturbance and management. Three main types of these grasslands may be distinguished: 1) degraded, more or less wet, mesophilous grassland (probably originating from eutrophic (hay) meadows); 2) degraded, more or less dry, pasture-like grassland; 3) semidry to dry, tall herbaceous ruderal vegetation (probably originating from ruderal riverine communities).

The smaller or larger patches of these grassland types often alternate with each other with a markedly sharp edge, but sometimes with transitional stands occupying a more or less wide belt (for example, in places where the dominance of *Bromus erectus* and *B. inermis* is taken over by *Festuca pseudovina* and *Cynodon dactylon*).

The trends of dynamism in the grassland composition may be well illustrated by a not-too-rare phenomenon of the presence of certain mesophilous species. E.g. stunted individuals of *Sanguisorba officinalis*, *Lythrum virgatum*, *Lysimachia vulgaris*, *Symphytum officinale*, *Carex acutiformis*, *C. flacca*, *Centaureum minus*, *Iris pseudacorus*, *Stachys palustris*, *Angelica sylvestris* as "reminders" or "relics" of plant communities, existed here previously, try to survive now with great struggle mingled in a grass (or better to say, weed) community composed mainly by *Agropyron repens* and *Calamagrostis epigeios*, etc.

The meadows (being scythed in some places up to the present) which occupy the wetter sites are mostly dominated by *Bromus erectus* (in some locations where over-sowing has been practised, *Bromus inermis* is codominant). Besides these, *Arrhenatherum elatius*, *Alopecurus pratensis*, *Poa pratensis*, *Dactylis glomerata* are additional species playing important role in composing the communities. In these degraded grasslands, inhabited mainly by very common species, *Galium boreale* (quite frequent in some sites) or *Gratiola officinalis* are plants worthy of mentioning. The only protected plant (being found so far) is *Clematis integrifolia* which occurs in about half a dozen locations within the site (only 1 to 10 individuals at each location). Numerous weeds and disturbance tolerating species are spreading quite visibly (e.g. *Agropyron repens*, *Rubus caesius*, *Xanthium* sp., *Bi-*

dens tripartitus, *Cirsium arvense*, *Solidago gigantea*, *Urtica dioica*, *Arctium lappa*, etc.); at some locations *Calamagrostis epigeios* is found in large amounts. Mainly on the edges of the meadows and along the drainage ditches various shrubs are coming up (e.g. *Amorpha fruticosa*, *Frangula alnus*, *Rosa canina* and *Salix cinerea*).

The patches of dry degraded grasslands, variable in size, are composed more or less of the same common species as the grasslands of wetter habitats, however, these areas are dominated by *Festuca pseudovina* and *Cynodon dactylon*. *Calamagrostis epigeios* is frequent in the dry grasslands, too.

In the semidry/dry areas covered by tall herb ruderal vegetation *Agropyron repens* and *Calamagrostis epigeios* are the most characteristic species. Beside these, *Rubus caesius* and *Asclepias syriaca* also form large patches in many places. Sporadically, spontaneously colonising shrubs can be detected.

In the narrow strip of fragmented riverine white willow woodland which follows the Ipoly river *Echinocystis lobata* is very frequent with locally dense stands of *Helianthus decapetalus*.

Site No. 5

Elevation: 140 m. In its position, this site and the main features of its vegetation are similar to that of No. 3. It shows the picture of a once rich and now disintegrating plant community. In the strongly degraded grasslands common (and phytosociologically indifferent) species are dominant and the area is infected by large masses of weed (*Asclepias syriaca* enters the *Carex acutiformis* stand here, too). Interestingly, in some parts of the site degraded fragments of swamps, large sedge communities, *Molinia* meadows, mesophilous (lowland eutrophic) meadows – which existed here previously – can be found, or at least their character species (e.g. *Iris pseudacorus*, *Alopecurus pratensis*, *Angelica sylvestris*, *Cirsium canum*, *Galium boreale*, *Lychnis flos-cuculi*, *Sanguisorba officinalis*, *Serratula tinctoria*, *Inula salicina*, etc.) are present in varying quantities.

Remnants of riparian woodlands (strongly degraded fragments of riverine willow-poplar and oak-elm-ash stands) along the stagnant water-like portions of the cut bends of the Ipoly river are important in the site. In these *Salix alba*, *Populus alba*, *P. canescens* are frequent, at some locations *Padus avium* and *Ulmus laevis* represent the oak-elm-ash woodlands, accompanied by scattered specimens of *Alnus glutinosa* everywhere. *Acer negundo* marks the degradation in the tree layer and *Amorpha fruticosa* plays the same role in the shrub layer though it is not common here yet. In the herbaceous layer *Rubus caesius*, *Urtica dioica*, *Humulus lupulus*, *Chelidonium majus*, etc. are dominant, while the “original” communities

are represented by only a few species, although some of them being frequent (e.g. *Aegopodium podagraria*, *Brachypodium sylvaticum*, *Circaea lutetiana*, *Geum urbanum*, *Glechoma hederacea*, *Heracleum sphondylium*, *Lamium maculatum*, *Veronica chamaedrys*).

Site Nos 6–11

The plant communities that follow the Nyírjes stream and those situated in its lower reaches (Ipolszögi Égerláp) are in close connection with each other.

The water supply of the Ipolszögi Égerláp is not only provided by the stream, but also by the groundwater of the river terrace, nurtured by local warm springs (and – to some extent – from the occasional floods of the Ipoly river). However, water engineering causes obvious drying in the area and as the process of degradation continues the once native vegetation is unable to function properly in the ecosystem. Human (water engineering) activity started almost a hundred years ago by 1) digging draining ditches within the territory of the Ipolszögi Égerláp, later 2) damming up the water of the Nyírjes stream, 3) deepening the bed of the stream at the middle reaches below the ponded back fish-stews, 4) canalisation of the riverway of the Ipoly river in 1968 and 5) the deepening of the river bed by about 2 metres afterwards. On top of these, the floods pass down quickly and, consequently, the groundwater table of the nearby areas has been sinking gradually. The development of the road and railway systems has also contributed to the drying out of the area, since the alder swamp woodlands of the Ipolszögi Égerláp had been locked within banks.

The upper and middle reaches of the Nyírjes stream are lined by submontane stream ash-alder woodlands, gradually replaced in the lower reaches by alder swamp woodlands. (The degraded vegetation in the close proximity of the fish ponds was not studied in detail; those plant communities vary by locations and contain only the most common swamp plants, reed beds, etc.).

Site No. 6

Elevation: 165–180 m. One of the arms of the Nyírjes stream, coming from southeast, is running in a small valley bordered with gentle slopes. The flat bottom of the valley is relatively narrow, varying from about 3 to 10 metres across, and its water supply partly comes from very small springs oozing from the side in several spots (one of them is the Segítő Szűz Mária spring). The stream ash-alder wood (*Aegopodio-Alnetum* V. Kárpáti, I. Kárpáti et Jurko 1961) lining the streamlet is

somewhat poor in species, however, it still can be regarded as an almost natural stand with only moderately degraded sections in some places.

In the tree layer *Alnus glutinosa* dominates with sporadic occurrence of *Padus avium* and *Salix alba*. The shrub layer (being quite dense at the upper reaches) is dominated by *Sambucus nigra*, mingled with *Euonymus europaeus*, *Viburnum opulus*, *Rubus caesius*, *Ribes rubrum*, and (especially at the higher reaches) with *Cornus sanguinea* and *Ligustrum vulgare*. A few specimens of the protected *Ribes nigrum* have also been observed. The herbaceous layer is dominated by *Ficaria verna*, accompanied by *Carex remota*, *C. acutiformis*, the protected *Dryopteris carthusiana* (30–50 specimens) and *Urtica dioica*. In addition, *Cardamine amara*, *Caltha palustris* and *Angelica sylvestris* occur in the waterlogged parts of the site. Of the Fagetalia species, *Paris quadrifolia* exists in masses at the upper reaches of the stream valley; *Athyrium filix-femina* and *Stachys sylvatica* occur throughout the site, while *Circaea lutetiana*, *Polygonatum multiflorum*, *Myosotis sparsiflora*, etc. are found sporadically.

The degradation of the site, the relative poorness of its flora and the high (although not dominant) presence of *Sambucus nigra*, *Rubus caesius*, *Urtica dioica* and *Galium aparine* can be attributed to the stress from the (perhaps overpopulated) stock of game and the proximity of large-scale agricultural activity.

Site No. 7

Elevation: 165–180 m. The arm of the Nyírjes stream joining from the south runs in a rather narrow valley bordered by relatively steep hillsides, so much that the alder trees are literally standing in lines of 1 or 2 in the stream ash-alder wood (*Aegopodio-Alnetum*). The upper part of the valley is a bit wider (up to 15 m at some places) allowing the formation of a broader stand.

The extremely narrow strip of the valuable vegetation of this site is similar to that of the arm of southeast direction (site No. 6): somewhat poor in species but appears almost natural. Both the shrub and herb layers are thinner than those in site No. 6, but the species composition is similar. In the shrub layer, the dominant *Sambucus nigra* is accompanied by *Acer negundo* at some places, while *Padus avium* and *Euonymus europaeus* are not rare. Of the protected *Ribes nigrum* 50–100 individuals can be found on a long section of the streamside, along with *Ribes rubrum*, *Viburnum opulus* and *Frangula alnus*. In the herb layer *Carex remota*, *C. acutiformis*, *Cardamine amara*, *Caltha palustris*, the protected *Dryopteris carthusiana* (30–50 individuals), *Athyrium filix-femina*, *Angelica sylvestris* are frequent. The protected *Dryopteris dilatata* (1–10 specimens) and *Paris quadrifolia* was found on one spot; *Circaea lutetiana* has scattered occurrence.

Some species penetrating from the adjoining stands of *Robinia pseudo-acacia* include *Chelidonium majus*, *Anthriscus cerefolium* subsp. *trichosperma*, *Chaerophyllum temulum*, *Urtica dioica* indicating a certain level of degradation, as none of them exist here in larger masses. However, the alien *Acer negundo* is rather frequent.

Site No. 8

Elevation: 160–170 m. The very narrow and deep, ditch-like valley bordered with quite steep hillsides – an earlier arm of the Nyírjes stream – is almost dry recently. The valley is surrounded by holiday resorts from both sides, so the area suffers from great environmental stress which revealed by the high level of degradation. Problem sources include depositing garbage, walking across the vegetation, planting ornamental flowers, etc. The plant community is a very strongly degraded ash-alder woodland, where some of the species typical for the community are still present (e.g. *Carex remota*, *C. acutiformis*, *Cardamine amara*, *Caltha palustris*).

Site No. 9

Elevation: 145–170 m. The brooklet – the northernmost arm of the Nyírjes stream – flows in a gentle downslope of a relatively broad valley. Rooting in waterlogged soil, the stream ash-alder wood (*Aegopodio-Alnetum*) of almost natural state occupies the deposited, flat bottom of the valley in a 10 m wide strip showing transitional features toward the alder swamp woodland (*Angelico sylvestris-Alnetum glutinosae* Borhidi in Borhidi and Kevey 1996) certainly because of the wide spreading, slowly moving water.

Besides *Alnus glutinosa*, which dominates the tree layer *Fraxinus excelsior*, *F. angustifolia* subsp. *pannonica* and *Acer pseudoplatanus* occur sporadically. In the shrub layer *Viburnum opulus*, *Sambucus nigra* and the protected *Ribes nigrum* (50–100 specimens) are the most typical, *Ribes rubrum* and *Padus avium* are sporadic, while *Rubus idaeus*, *Cornus sanguinea*, and *Euonymus europaeus* occur at the edges. Along the streamsides, the herb layer is dominated by *Carex acutiformis* and *Cardamine amara*. *Caltha palustris*, *Valeriana dioica*, *Cirsium oleraceum*, *Carex remota*, *Filipendula ulmaria* are also frequent in this habitat. The majority of the protected *Dryopteris carthusiana* (100–200 individuals) grows at the less waterlogged edges of the site. The Fagetalia species, such as *Athyrium filix-femina*, *Galeobdolon luteum*, *Circaea lutetiana* are only represented by relatively few specimens.

Passing along the eastern two thirds section of the valley upwards to its head, the site gets drier and the vegetation becomes more and more degraded until the alder stand eventually disappears. Above the only crossing road within the site, in the dammed-up water *Typha angustifolia*, *Lemna minor*, *Sparganium erectum* are found. Among the notable species, *Carex remota* exists here, but (while moving upwards) as the ash-alder woodland gets thinner and poorer in species, hardly any other “good” species occur. In general, *Carex acutiformis* dominates the herb layer; further up nitrophytes, mostly *Urtica dioica* and *Sambucus nigra* take over. Finally, even the alder specimens get poorer and poorer until they give up and disappear.

Site No. 10

Elevation: 145 m. Down from the confluence of the different arms of the Nyírjes stream its valley widens out. Before the streambed was recently deepened, the stream-water could spread out and nourish a larger area by its slow waterflow; this is no longer the case. Those former ecological conditions were needed to support the even now existing submontane stream ash-alder wood (*Aegopodio-Alnetum*), a good, almost natural stand, well representing the association. It differs markedly from the stands seen towards the upper reaches of the stream – which is attributed to the differences in water supply.

The upper tree layer is dominated by *Alnus glutinosa*. In the lower tree layer *Padus avium* and, mainly at the edges, *Salix alba* and *Salix fragilis* are frequent, while *Ulmus laevis* and *U. glabra* are sporadical. In the shrub layer *Sambucus nigra*, *Viburnum opulus* and *Frangula alnus*, while in the drier parts of the site numerous *Quercus-Fagetea* species, e.g. *Euonymus europaeus* and *Cornus sanguinea* are observed. The protected *Ribes nigrum* (10–100 specimens) also occur here, besides *Ribes rubrum* represented by a similar number of specimens.

In major parts of the site four *Fagetalia* species dominate in the herb layer: *Ficaria verna*, *Aegopodium podagraria*, *Galeobdolon luteum*, *Lamium maculatum*; additional *Fagetalia* species worth mentioning are *Paris quadrifolia*, *Athyrium filix-femina*, *Stachys sylvatica*, *Glechoma hederacea*.

Along the streamsides and in the waterlogged places riverine (and partly swamp) woodland species – *Caltha palustris*, *Cardamine amara*, *Chrysosplenium alternifolium*, and *Dryopteris carthusiana* (100–200 specimens), *Cirsium oleraceum*, *Filipendula ulmaria*, *Carex acutiformis*, etc. – take over. Thus, the vegetation of this habitat – with slowly streaming or almost stagnant water – is regarded as a good, almost natural alder swamp wood (*Angelico sylvestris-Alnetum glutinosae* Borhidi in Borhidi and Kevey 1996).

Mainly near the southern edge of the site, degraded patches of vegetation were observed, these are typically dominated by *Galium aparine*, *Urtica dioica*, *Lamium maculatum*, *Glechoma hederacea*.

Site No. 11

Elevation: 138–140 m. Most of the lower parts of the Ipolyszögi Égerláp nature conservation area is covered by alder swamp wood (*Carici elongatae-Alnetum* Koch 1926) as well as willow mire wood (*Calamagrosti-Salicetum cinereae* Soó et Zólyomi in Soó 1955), large sedge (*Caricetum gracilis* Almquist 1929, *Caricetum ripariae* Soó 1928), *Glyceria* (*Glycerietum maximae* Hueck 1931) and reed beds (*Phragmitetum communis* Soó 1927) also of remarkable extension, and complexes of all these, respectively. There are patches of riverine willow-poplar wood of various sizes. The areas 0.5–1 metre higher than all these are occupied by a different type of alder swamp wood (*Angelico sylvestris-Alnetum glutinosae* = *Carici acutiformis-Alnetum* Dostál (1933) Soó 1963). In general, most of these plant communities are moderately degraded, however, almost natural and strongly degraded fragments are also present. The two main sources of degradation are the drying out of the area and the damage caused by wild animals (e.g. large rooting places of wild boar, grazing, dunging, trampling). The vegetation is characterised by the limited number of the species usually not frequent but typical for the community (so called “colouring” species) besides the constant and stand forming elements of the plant communities. In other words, these stands are relatively poor in species, while the proportion of phytosociologically common species, weeds and nitrophytes is high.

In the stands of *Carici elongatae-Alnetum* the canopy layer is almost exclusively dominated by *Alnus glutinosa*, while *Fraxinus angustifolia* subsp. *pannonica* and *Salix alba* occur only sporadically. In the shrub layer *Sambucus nigra* is characteristic, which indicates degradation; *Viburnum opulus* and *Frangula alnus* are also frequent, while *Salix fragilis* and *Salix cinerea* appear mainly at the edges of the stands. *Ribes rubrum* and the protected *Ribes nigrum* (10–20 specimens) are found in a few spots.

Most of the alder swamp woodlands (*Carici elongatae-Alnetum*) are of sedge dominated type, with the dominant species of the herb layer *Carex acutiformis* and *C. riparia*, as well as *C. vesicaria*. In some places all mentioned *Carex* beds are replaced by *Glyceria maxima* stands. The sporadic occurrence of *Carex elongata* and *Dryopteris carthusiana* is characteristic for the present state of the vegetation here. The majority of rare tussocks of *Carex elata* are decaying, etc. There are even more strongly degraded fragments of the vegetation with masses of weed species

like *Bidens tripartitus* and *Cirsium arvense* or with masses of nitrophytes like *Rubus idaeus*, *Urtica dioica* and *Sambucus nigra*.

Protected plants recorded in the site live almost exclusively in the stands of the swollen-foot alders: *Dryopteris carthusiana* and *Ranunculus lingua* (number of specimens: order of tens for each of these), while *Hottonia palustris* or *Hottonia palustris* f. *deminuta* occur in greater numbers (the number of specimens vary year by year depending on the water supply; – order of hundreds or thousands). The records of not protected but relatively rare “species of merit” include *Myosurus minimus*, *Stellaria palustris*, *Poa palustris*, *Equisetum fluviatile*, *Scutellaria hastifolia*, *Veronica longifolia*, *Thalictrum simplex*, *Carex pseudocyperus*.

Weeds (*Bidens tripartitus*, *Cirsium arvense*) infected and considerably degraded parts also exist with masses of *Rubus idaeus*, *Urtica dioica* and *Sambucus nigra*.

The species of the swamp woodlands (*Alnetea* species) are practically missing from the alder swamp wood (*Angelico sylvestris-Alnetum glutinosae*) and the proportion of the *Phragmitetea* species is smaller, while those of the most common riverine woodlands (*Alno-Padion* species) are characteristic. The level of degradation and the proportion of the weeds and nitrophytes are similar to those of the alder swamp woods (*Carici elongatae-Alnetum*) here.

The two associations of alder swamp woodlands (*Carici elongatae-Alnetum* and *Angelico sylvestris-Alnetum glutinosae*) are in close relationship as adjacent members of the same successional series, and the transformation from *Carici elongatae-Alnetum* into *Angelico sylvestris-Alnetum glutinosae* as well as the degradation is accelerated by the years of drought. The herbaceous species composition of these stands – presently more similar to the physiognomy of *Carici elongatae-Alnetum* – show gradual enrichment with species characteristic of the riverine gallery forests (*Salicion albae*, *Alnion incanae* ≈ “*Alno-Padion*” formerly). This transitional state between the two alder swamp associations were defined as lesser pond sedge-alder swamp woodlands (*Carici acutiformis-Alnetum*) by KEVEY and ALEXAY (1996) who reported on similar processes taking place in the woods of Szigetköz (western Hungary).

Site No. 12

Elevation: 140–151 m. A strongly degraded form of the treeless sand vegetation, developing regularly on alluvial deposits at higher elevation, is observed south–southwest from the site No. 11 (Madách-tanya, Kender-föld). The characteristic species in this acidophilous sand steppe include *Corynephorus canescens*, *Koeleria glauca*, *Festuca pseudovina*, *Petrorhagia prolifera*, *Veronica dillenii*,

Jasione montana, *Campanula rotundifolia*, *Hypochoeris radicata*, *Anthemis ruthenica*, etc. Besides the (temporarily stabilised) secondary steppe patches there are pioneer stands which exhibit a relatively early phase of regeneration. After some of the traditional former land uses, such as grazing and scything had been discontinued, we see obvious changes in the plant composition of the grasslands. By now big masses of weeds and phytosociologically indifferent species occupied the site, e.g. *Calamagrostis epigeios*, *Carex hirta*, *Poa angustifolia*, *Arrhenatherum elatius*, *Cynodon dactylon*. The spread of aggressive adventive weeds, among them *Ambrosia artemisiifolia*, *Asclepias syriaca*, *Erigeron canadensis*, *Stenactis annua* is also considerable.

CONCLUSIONS

Until recently no systematical botanical exploration in the surroundings of Balassagyarmat was carried out. The majority of the floristical data collected earlier is a result of phytosociological surveys made at larger scale. Our recent survey of the remnants of the original vegetation began with recording the species and evaluate the state of the vegetation in 1998. The majority of the area consists of arable land and tree plantation (mainly with introduced species). A smaller portion of the study area is covered by almost natural, seminatural or secondary vegetation.

The upper reaches of the Nyírjes stream run in narrow valleys and are lined by stream ash-alder woods (*Aegopodio-Alnetum*) of almost natural state (site Nos 6 and 7). 77 species were listed here, included three protected ones, *Ribes nigrum* (50–100 specimens), *Dryopteris carthusiana* (50–150 individuals), *Dryopteris dilatata* (1–10 specimens). Despite the buffer zone is lacking around these county level nature conservation areas, the sites are relatively free from weeds, thanks to the significant differences between the alder woods and the surrounding habitats. The major actual threat to these stands today is commercial forest management. To ensure the undisturbed survival of these communities, all forestry activity should be managed with the priority placed on conservation.

Along the middle reaches of Nyírjes stream almost natural submontane stream ash-alder woods (*Aegopodio-Alnetum*) and alder swamp woods (*Angelico sylvestris-Alnetum glutinosae*) occupy the widened valley (site Nos 9 and 10). Among the 62 listed taxa there are two protected ones, *Ribes nigrum* (100–150 specimens) and *Dryopteris carthusiana* (200–300 specimens). These county level nature conservation sites are surrounded with tree plantations (established with introduced species) and holiday resorts practically adjacent to the conservation land.

The greatest actual threat to these stands is commercial forestry activity, which should be altered to ensure their natural development.

The about 100-hectare Ipolyszögi Égerláp (part of the Duna–Ipoly National Park) is a country level nature conservation area lying around the lower reaches of the Nyírjes stream (site No. 11). Most of its plant cover is alder swamp wood (*Carici elongatae-Alnetum*), being moderately degraded in general sense (combining strongly degraded and almost natural patches). This is a consequence of the area's drying out (worsened by the fluctuations of the water supply). Willow mire woods (*Calamagrosti-Salicetum cinereae*), large sedge (*Caricetum gracilis*, *Caricetum ripariae*), *Glyceria* (*Glycerietum maximae*) and reed beds (*Phragmitetum communis*) and complexes of all these, respectively, also cover remarkable parts of the site. There are patches of riverine willow-poplar woods and the areas 0.5–1 metre higher than all these, are occupied by a different type of alder swamp woods (*Angelico sylvestris-Alnetum glutinosae* = *Carici acutiformis-Alnetum*).

In the Ipolyszögi Égerláp 115 plant taxa were recorded. The difficulty in comparing our data with those registered formerly derives from the fact that matching the exact localities of earlier collections and those of ours is almost impossible. However, it is worth turning our attention to the remarkable differences. Completed our surveys, we cannot prove or confirm the presence of the following species mentioned in the literature: *Acorus calamus*, *Alisma lanceolatum*, *Allium angulosum*, *Batrachium trichophyllum*, *Carex disticha*, *Eleocharis palustris*, *Lemna trisulca*, *Myriophyllum verticillatum*, *Nuphar lutea*, *Orchis laxiflora*, *Peplis portula*, *Polygonum amphibium*, *Ranunculus flammula*, *Rorippa amphibia*, *Sagittaria sagittifolia*, *Utricularia vulgaris*. The list speaks for itself; perhaps some species have escaped our notice. Yet the species list provides a clear evidence of the drying out of the area and shows changes in the composition of the plant cover. At the same time, this experience determines the tasks of maintenance and rehabilitation of the habitat, supported by observations (*e.g.* spread of weeds, damage caused by wild animals) referring to the need of increasing the water supply (to recover the water level used to be decades before) in order to avoid further degradation. To ensure the survival of the stands, wrong forestry practices – especially clear-cutting – should be stopped (otherwise, especially in dry years, weed invasion or other irreversible change may be the result).

Small populations of five protected species occur in the site: *Ribes nigrum* (10–20 specimens), *Carex elongata* (10–50 polycormons), *Dryopteris carthusiana* (10–100 specimens), *Ranunculus lingua* (10–50 specimens), *Hottonia palustris* (orders of hundreds or thousands, depending on the water supply and changing in numbers per year; in dry years the terrestrial form, *Hottonia palustris* f. *deminuta* is present).

Strongly degraded or seminatural grasslands were observed in a narrow strip along the Ipoly river (within the flood area or at some places outside the dam, also including portions of the cut bends of the river) (site Nos 3, 4, 5) and in one site a little farther from the riverine marsh vegetation (site No. 1). In this roughly 100-hectare area 128 species were recorded. The number of taxa is obviously very low, even considering that the area is not surveyed very thoroughly; this indicates the uniformity of the vegetation as a consequence of the drying out of the area and other, unfavourable influences causing degradation. The mesophilous grasslands and semidry pasture-like grasslands originate from swamps, large sedge communities, *Molinia* meadows, mesophilous (lowland eutrophic) meadows which existed here previously, having then much better water supply (as indicated by a few persistent species). However, several taxa (and also their habitats) mentioned in the literature have disappeared by now, due to environmental changes, e.g. *Acorus calamus*, *Calamagrostis canescens*, *Cicuta virosa*, *Eriophorum angustifolium*, *Oenanthe fistulosa*, *Senecio erraticus*, *Taraxacum paludosum*. The only protected species recorded in several locations is *Clematis integrifolia* (10–50 specimens).

At last, it is worth mentioning a little hump of barely 1-hectare, covered with considerably degraded steppe (site No. 2). The habitat, as a balk between stretches of cultivated land conserved the remnants of a formerly rich vegetation. The only protected species living here is *Iris variegata* (1–10 polycormons).

* * *

Acknowledgements – We are grateful for the associates of the IPOLYUNIO organisation: to Szilárd GYENES (secretary) and Vilmos Nagy for organising the botanical survey and supporting the project in all respects. We also thank Miklós CSAPÓ and Imre NAGY for their floristical data provided for this publication.

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(Received: 29 June, 2004)