

HYGROPHILOUS HERBACEOUS VEGETATION OF CATALONIA. RETRIEVAL FROM THE DATA BANK FLORACAT

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ABSTRACT - From the data gathered in FloraCat, a synthesis of the herbaceous hygrophilous communities of Catalonia is presented, under the form of a phytocoenological scheme. 100 associations have been considered, as clearly documented through relevés from the area. For each one, the biogeographic character, the frequency or rarity in the area and the level of knowledge is expressed in the same scheme. Most of the associations are rare or very rare in general, and mainly those of Mediterranean character, which represent in most cases tiny spots of particular vegetation within xerophilous landscapes. As for phytocoenological knowledge, Boreo-Alpine communities are more or less well known, whereas data on Mediterranean associations are much more sparse, a half of them being poorly to very poorly known.

KEY WORDS - Phytocoenology, association, data bank, hygrophilous vegetation

INTRODUCTION

In recent years the need for vegetation surveys has become increasingly apparent at all scales, for a number of reasons. Following several decades of geographical research, syntaxonomic surveys are now seen as representing an improvement in our understanding of vegetation, and also a good tool in land management.

In Catalonia, phytocoenological sampling has resulted in more than 14,000 relevés corresponding to 611 estimated associations (Font *et al.*, 1998). As all this data are computerized and available for retrievals, it seems adequate to undertake a comprehensive vegetation conspectus of the area, which is at present being produced (Ninot *et al.*, in press). Such a conspectus is based on a rough analysis of the published or available relevés, and implies both taxonomical and nomenclatural definition of associations and subassociations. As a result, these vegetation units become described in terms of their structure, species definition, ecology, distribution and variability; and also classified in the appropriate syntaxonomical scheme.

In this paper, we summarize a first part of the Conspectus, which corresponds to

the hygrophilous herbaceous vegetation, from the free-floating carpets of *Lemnetea* to the Mediterranean rush communities of *Molinio-Holoschoenion* and including hay meadows and related communities (*Arrhenatheretalia*).

MATERIAL AND METHOD

The data bank FloraCat, created and managed by X. Font at the University of Barcelona, contains all the known relevés of vegetation of Catalonia, plus few thousands more from neighbouring regions (Valencian countries, northern Spain, southern France, Balearic islands; Font & Ninot, 1995). In the area of Catalonia, the distribution of the relevés reveal some irregularities, both at the syntaxonomical and at the geographical aspects (fig. 1; Font *et al.*, 1998). More than 150 associations have been reported by means of 3 or fewer relevés, i.e. a high percentage of syntaxa are very poorly known; and several blank areas, or *terrae ignotae*, have been uncovered. The most sampled areas lie in the northern part of Catalonia, which corresponds to Pyrenean ranges, and also in some mountain areas nearby to Barcelona, connected to the fact that these areas are more diverse and better conserved than lowlands. On the contrary, recent phytocoenological studies referred to Mediterranean lowlands are scarce.

We have focused this survey on the association level. Bibliographic retrieval allowed us to list the associations cited, from which finally only those clearly documented (i.e., as a rule with relevés from the area) have been considered; and also to synthesize into indexes three general aspects for each one: biogeographical character, rarity/abundance and knowledge level.

Three main biogeographic regions have been considered: Mediterranean (M; most of lowlands and some dry, southern mountains), Medio-European (E; humid sub-Montane and Montane belts of the mountains) and Boreo-Alpine (A; high mountain in the Pyrenees).

Rarity/abundance, expressed from RR to CC, is referred both to the frequency of a given association in the whole area and to its dominance in the landscape when present. It cannot take its maximum (CC) for none of the communities here considered.

As for the phytocoenological knowledge, the associations have been classified into four levels, according to the number of relevés of each one and their geographic distribution in relation to its abundance index. Among the four levels considered, I means a very poor knowledge (one or very few relevés available); II, insufficient knowledge (few relevés, often territorially biased; comprehensive syntheses not possible); III, sufficient, fair knowledge (a few tens of relevés); and IV, good to very good knowledge (some tens of relevés, referred to the whole range of the association in Catalonia; sometimes a thorough revision).

RESULT AND DISCUSSION

The result of this survey is summarized in table 1, in which the associations are arranged in a syntaxonomical scheme. A first noticeable aspect is the fair diversity of the herbaceous hygrophilous vegetation in Catalonia. 100 associa-

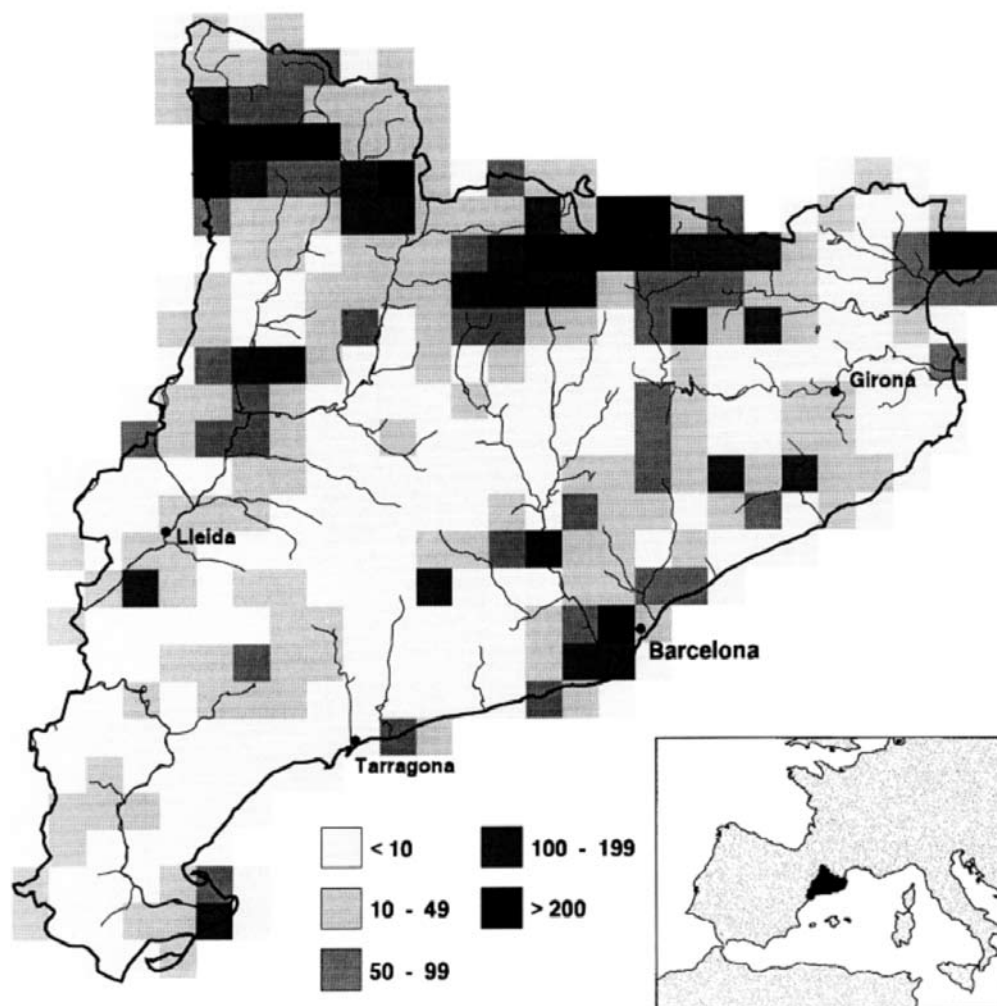


Fig. 1 - Intensity of phytocoenological sampling in Catalonia, expressed from the number of relevés per 10 x 10 UTM square gathered in FloraCat.

tions (most of them diversified into subassociations) have been documented in the area, which means more than 16% of the whole vegetation diversity of Catalonia.

Within the vegetation here considered, a high proportion of communities are rare; half of them have been labeled as RR in the table. As most of the species included in these communities occur only under more or less specific ecological conditions, and given that water resources hold a rising human pressure, these

turns them into threatened or endangered. Mediterranean hygrophilous vegetation is clearly more sparse and rare in lowlands than Alpine and Medio-European analogous communities are in the mountains. Moreover, although no precise data are available, Mediterranean vegetation holds worse conservation degree and stronger threats.

In general, the phytocoenological knowledge of the herbaceous hygrophilous vegetation is low (fig. 2). Especially for the Mediterranean communities, data are scarce or rare, and very often geographically biased. Only one Mediterranean association may be considered well known, and almost the half are documented only through one or very few relevés. This will clearly provide preferent objectives in our research planning. Medio-European vegetation seems better known, as one third of the communities are sufficiently known, and Boreo-Alpine communities are the best studied.

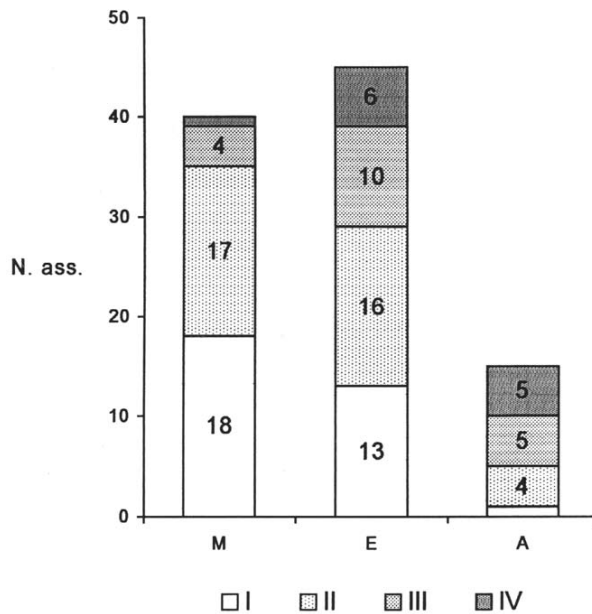


Fig. 2 - Number of associations per biogeographic type (M, Mediterranean; E, Medio-European; A, Boreo-Alpine) and per knowledge level (I, very poor; II, insufficient; III, sufficient; IV, good).

TABLE 1 - PHYTOCOENOLOGICAL SCHEME OF THE HYGROPHILOUS HERBACEOUS VEGETATION IN CATALONIA.

FOR EACH ASSOCIATION THE INDEXES MEAN: BIOGEOGRAPHICAL CHARACTER (M, MEDITERRANEAN; E, MEDIO-EUROPEAN; A, BOREO-ALPINE), RARITY (FROM RR TO CC) AND KNOWLEDGE LEVEL (I, VERY POOR; II, INSUFFICIENT; III, SUFFICIENT; IV, GOOD).

	Egr.	Rar.	Knl.
LEMNETEA MINORIS (Koch & Tx.) Schw. & Tx. 1981			
<i>Lemnetalia minoris</i> (Tx.) Schw. & Tx. 1981			
<i>Lemnion gibbae</i> Tx. & Schw. 1974			
<i>L. emnetum gibbae</i> (Koch) Miyawaki & J. Tx. 1960	M	R	II
<i>Lemnion minoris</i> Koch & Tx. 1954			
<i>L. emnetum minoris</i> (Oberd.) Th. Müller & Görs 1960	E	C	I
<i>Riccio-Lemnion trisulcae</i> (Tx. & Schw.) Schw. & Tx. 1981			
<i>Riccietyum fluitantis</i> Slavnic 1956	M	RR	I
<i>Lemno-Salvinion natantis</i> Schw. & Tx. 1981			
<i>Lemno-Azolletum filiculoidis</i> Br.-Bl. 1952	M	R	I
ZOSTERETEA MARINAE Pign. 1953			
<i>Zosteretalia marinae</i> Bég. 1941			
<i>Zosterion</i> W. Christ. 1934			
<i>Giraudio-Zosteretum noltii</i> Boudouresque et al. 1977	M	RR	I
<i>Cymodoceetum nodosae</i> J. Feldmann 1937	M	R	I
<i>Posidonion oceanicae</i> Br.-Bl. 1952			
<i>Posidonietum oceanicae</i> Funk 1927	M	C	I
POTAMETEA Tx. & Prsg. 1942			
<i>Ruppiaetalia</i> Tx. 1960			
<i>Ruppion maritima</i> Br.-Bl. 1931			
<i>Ruppiaetum maritima</i> Hocquette 1927	M	RR	I
<i>Chaetomorpha-Ruppiaetum</i> Br.-Bl. 1952	M	RR	II
<i>Potametalia</i> Koch 1926			
<i>Potamion pectinati</i> (Koch) Görs 1977			
<i>Potamo-Vallisnerietum</i> Br.-Bl. 1931	M	RR	I
<i>Potamo-Utricularietum</i> Br.-Bl. 1952	M	R	II
<i>Potametum pectinati</i> Carstensen 1955	M	RR	II
<i>Potametum denso-nodosi</i> Bolòs 1957	M	C	III
<i>Zannichellio-Potametum colorati</i> Bolòs & R. Mol. 1997	M	R	II
<i>Potamo-Najadedum marinae</i> Horvatic & Mioev. 1963	M	RR	II
<i>Potamo-Myriophylletum spicati</i> Rivae-G. 1964	M	RR	I
<i>Ra nunculetum baudotii</i> Br.-Bl. 1952	M	RR	I
<i>Ra nunculo-Myriophylletum alterniflori</i> Franquesa 1995	M	RR	II
<i>Ra nunculo-Potametum alpini</i> Ballesteros & Gacia 1991	A	R	II
LITTORELLETEA Br.-Bl. & Tx. 1943			
<i>Littorelletalia</i> Koch 1926			
<i>Littorellion</i> Koch 1926			
<i>Isoceto-Sparganietum borderei</i> Br.-Bl. 1948	A	R	II
<i>Eleocharition acicularis</i> Pietsch 1967			
<i>Ra nunculo-Juncetum bulbosi</i> Oberd. 1957	A	RR	I

MONTIO-CARDAMINETEA Klika & Hadac 1944			
Montio-Cardaminetalia Pawl. 1928			
Cardamino-Montion Er.-Bl. 1925			
Montietum fontanae Er.-Bl. 1915	E	R	II
Montio-Bnetum schleicheri Er.-Bl. 1925	A	RR	III
Saxifagetum aquaticae Er.-Bl. 1948	A	RR	III
Cardaminetum latifoliae Er.-Bl. 1952	A	R	III
Cardamino-Chrysosplenietum oppositifoliae Bolòs 1979	E	RR	I
Cratoneurion commutati Koch 1928			
Cratoneurium falcati Gams 1927	A	RR	II
PHRAGMITI-MAGNO CARICETEA Klika 1941			
Phragmitetalia Koch 1926			
Glycerio-Sparganium Er.-Bl. & Sissingh 1942			
Helosciadietum nodiflori Maire 1924	M	C	III
Catabrosetum aquaticae Ribel 1912	E	RR	I
Glycerietum plicatae Kaulz. 1928	E	R	II
Glycerietum fluitantis Egger 1933	E	RR	I
Acrocadio-Eleocharitetum palustris Bolòs & Vigo 1967	E	C	II
Phragmition communis Koch 1926			
Typhetum latifoliae Lang 1973	E	R	I
Typho-Phragmitetum australe (Tx. & Prsg.) Rivas-M. & al. 1991	M	RR	I
Typho-Schoenoplectetum tabernaemontani Er.-Bl. & Bolòs 1958	M	C	III
Scirpetum maritimi-litoralis Bolòs 1962	M	C	II
Magnocaricion elatae W. Koch 1926			
Cypero-Caricetum otrubae Tx. & Oberd. 1958	M	R	II
Soncho-Cladietum marisci (Er.-Bl. & Bolòs) Cirujano 1980	M	R	II
Irido-Polygonetum serrulati Bolòs 1957	M	R	II
Cladio-Caricetum hispidae Bolòs 1967	M	R	II
Caricetum rostratae Oswald 1923	A	R	II
SCHEUCHZERIO-CARICETEA FUSCAE Tx. 1937			
Carietalia davallianae Er.-Bl. 1949			
Caricion davallianae Klika 1934			
Caricetum davallianae Dutoit 1924	A	R	IV
Carici-Pinguiculetum grandiflorae Er.-Bl. 1948	A	RR	IV
Carici-Eriophoretum latifolii Bolòs & Vives 1956	A	RR	IV
Swertio-Caricetum nigrae Vigo 1984	A	RR	III
Carietalia fuscae Koch 1926			
Caricion fuscae Koch 1926			
Caricetum fuscae Er.-Bl. 1915	A	R	IV
Narthecio-Triphoretum Er.-Bl. 1948	A	R	IV
Sphagno-Ericetum tetralicis Ballesteros & al. ex Ninot <i>et al.</i> in press	E	RR	IV
Calluno-Sphagnetum subnitentis Casanova 1992	A	RR	III
ISOETO-NANOJUNCETEA Westhoff & al. 1946			
Isoetalia Er.-Bl. 1931			
Isoetion Er.-Bl. 1931			
Isoetum delilei Er.-Bl. (1931) 1935	M	RR	I
Isoetum duriei Er.-Bl. (1931) 1935	M	RR	I
Nanocyperion Libbert 1932			
Stellario-Scirpetum setacei (Koch) Libbert 1932	E	R	III
Cyperetum flavescens Aichinger 1933	E	R	II
Gnaphalio-Peploidetum portulae Bolòs 1979	E	RR	I
Hyperico-Cyperetum flavidi Mokro 1984	E	RR	II
Ranunculo-Lythrretum portulae Mokro & Pujadas 1984	M	RR	II
Lythron tribractati Rivas-G. & Rivas-M. 1963			
Isolepido-Lythrretum castellani Rivas-G. 1970	M	RR	II

MOLINIO-ARRHENATHERETEA Tx. 1937			
<i>Arrhenatheretalia elatioris</i> Pawl. 1928			
<i>Cynosurion cristati</i> Tx. 1947			
<i>Cynosuro-T rifolietum repentis</i> Bolòs (1967) 1983	E	C	IV
<i>Caric i-Agro stidietum capillaris</i> Villegas 1997	E	R	II
<i>Arrhenatherion elatioris</i> Br.-Bl. 1952			
<i>Gaudinio-Arr henatheretum</i> Br.-Bl. 1931	M	R	II
<i>T ragopogono-Lolietum multiflori</i> P. Monts. 1957	E	R	IV
<i>Ophioglossu-Arr henatheretum</i> P. Monts. 1957	E	C	III
<i>Malvo-Arr henatheretum</i> Tx. & Oberd. 1958	E	RR	I
<i>Galio-Arr henatheretum</i> Rivas-G. & Borja 1961	E	RR	I
<i>Odontido-T rifolietum pra tensis</i> Bolòs & Masalles 1983	E	RR	I
<i>Rhinantho-T risetum flavescens</i> Vigo 1984	E	C	IV
<i>Gentiano-T risetum flavescens</i> Vigo 1984	E	RR	II
<i>Trisetu-Polygonion bistortae</i> Marshall 1947			
<i>T risetu-Heracleetum pyrenaici</i> Bolòs 1957	E	C	IV
<i>Alchemillo xanthochlorae-T rollietum</i> Vigo, in pres	E	R	III
<i>Molinietalia</i> Koch 1926			
<i>Callunon palustris</i> Tx. 1937			
<i>Cirsietum nivularis</i> Novv. 1928	E	R	III
<i>Juncetum sylvatici</i> Br.-Bl. 1915	E	R	II
<i>Chaerophyllo-Ra nunculetum aconitifolii</i> Oberd. 1952	E	RR	I
<i>Ep ilobio-Juncetum effusi</i> Oberd. 1957	E	R	II
<i>Junco-Caricet um punctatae</i> Bolòs 1959	E	RR	II
<i>Dactylorhizo-Ca ricetum paniculatae</i> Carreras & Vigo 1984	E	R	III
<i>Ra nunculo-Filipenduletum ulmariae</i> Vigo 1975	E	R	III
<i>Chaeropyllo-Valerianrtum pyrenaicae</i> Vigo & Carreras 1984	E	R	II
<i>Molinion caeruleae</i> Koch 1926			
<i>Molinietum caeruleae</i> Koch 1926	E	RR	II
<i>Molinio-Car icetum lepidocarpae</i> Baulies & Romo 1983	E	RR	I
<i>Caric i-Molinietum</i> Carreras & Vigo 1987	E	R	II
<i>Ep ipactidi-Mb linietum</i> Montserrat, Soriano & Vigo 1987	E	R	III
<i>Violion comutae</i> Romo 1986			
<i>Violo-Euph orbietum hybarnae</i> Romo 1986	E	RR	I
<i>Agrostietalia stoloniferae</i> Oberd., Th. Müller & Görs 1967			
<i>Deschampsion mediae</i> Br.-Bl. (1947) 1952			
<i>Deschampsietum mediae</i> Br.-Bl. 1931	M	RR	II
<i>Agrostio-Achil laetum agerati</i> Br.-Bl. 1952	M	R	I
<i>Plantagini-Ja sonietum tuberosae</i> (Bolòs) Bolòs & Masalles 1983	M	R	II
<i>Centauro-Ja sonietum tuberosae</i> Bolòs 1996	M	RR	I
<i>Agrostion stoloniferae</i> Görs 1966			
<i>Ja sonio-Tuss ilaginetum farfarae</i> Vives 1964	E	C	III
<i>Prunello-Agro stietum stoloniferae</i> Bolòs & Masalles 1983	E	C	II
<i>Potentillion anserinae</i> Tx. 1947			
<i>Dactylido-Festucetum arundinaceae</i> Lohm. 1953	E	RR	I
<i>Junco-Menthetum longifoliae</i> Lohm. 1953	E	R	III
<i>Rumici-Agro stietum stoloniferae</i> Moor 1958	E	RR	II
<i>Festuco-Car icetum hirtae</i> Bolòs 1962	E	R	II
<i>Holoschoenetalia</i> Br.-Bl. (1931) 1947			
<i>Molinio-Holoschoenion</i> Br.-Bl. (1931) 1947			
<i>InuloSchoenetum nigricantis</i> Br.-Bl. 1924	M	R	III
<i>GalioJuncetum subnodulosi</i> Br.-Bl. 1931	M	RR	I
<i>Holoschoenetum</i> Br.-Bl. 1952	M	C	IV
<i>Centaureo-Succisetum pra tensis</i> Bolòs 1954	E	R	III
<i>Cirsio-Menthetum longifoliae</i> Bolòs & Vives 1956	E	C	IV
<i>Lysimachio-Holoschoenetum</i> Rivas-G. & Borja 1961	M	RR	I
<i>Mentho-Car icetum loscosii</i> Bolòs (1957) 1967	M	RR	I
<i>Peucedano-Sonchetum aquatilis</i> Bolòs 1957	M	RR	I

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