Acta Botanica Barcinonensia

53 (2010-2011)

DEPARTAMENT DE BIOLOGIA VEGETAL

Universitat de Barcelona

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Universitat de Barcelona
Publicacions i Edicions de la Universitat de Barcelona

Data de publicació	febrer de 2012
ISSN	0210-7597
Dipòsit legal	B-26.876-1983
Impressió	Gráficas Rey

Acta Bot. Barc. 53: 113-189 Barcelona, 2010-2011

Syntaxonomic conspectus of the vegetation of Catalonia and Andorra. II: Ruderal communities

J.M. Ninot[1], X. Font[1], R.M. Masalles[1] & J. Vigo[1]

ABSTRACT

This paper deals with plant communities settling on ruderalized sites, such as crop fields, edges of roads or paths, forest clearings, river banks, and other disturbed areas. We report all the phytosociological associations and subassociations recorded from Catalonia and Andorra, as the second part of a general vegetation survey, started with Ninot *et al*. (2000). For each community, we provide the correct name and usual synonyms, its typification (where appropriate), all the references including relevés, and the most outstanding features of its structure, species composition, ecology, distribution and diversity. Moreover, associations and subassociations are ordered in a syntaxonomic scheme. Syntaxonomic ranks are considered in a fairly broad, conservative sense. This classification established 156 associations and 6 informal community types, which correspond to the classes *Oryzetea sativae*, *Stellarietea mediae, Sisymbrietea officinalis, Artemisietea vulgaris, Cakiletea maritimae, Saginetea maritimae, Pegano-Salsoletea vermiculatae, Bidentetea tripartitae, Polygono-Poetea annuae, Rudero-Manihotetea utilissimae* and *Epilobietea angustifolii.*

Complementarily, we propose corrections of names when appropriate, and eventually formalize the description of a few syntaxa.

Key words: Phytosociology, plant associations, weeds, Mediterranean, Medioeuropean, Alpine

Introduction

After several decades of phytosociological research at various geographical levels, syntaxonomic surveys are a useful scientific step both as an improvement in our understanding of vegetation structure and function, and as a basic ground for the correct land management and conservation. In the first aspect, a comprehensive survey like that here presented may serve as a data set from which to produce conspecta or syntheses at broader geographical scales, as a base for setting ecological vegetation studies, and as a starting point for the revision of syntaxa. In the field of land management, characterizing each plant association in terms of structure, ecology and distribution, and trying to precise its correct name and typus is a good base for drawing

[1] Departament de Biologia Vegetal, Universitat de Barcelona. Av. Diagonal 643, E-08028 Barcelona. E-mail: jninot@ub.edu

the vegetation catalogues needed in the application of the European conservation directives and related technical issues.

After the first part of the Conspectus of the vegetation of Catalonia and Andorra (Ninot *et al*. 2000), we include in this second issue the plant communities related to disturbance regimes, thus settling on a wide habitat scope, from fields or river banks to forest clearings or ruderalized mountain grasslands. According to the data gathered – more than 3,000 relevés (Font *et al*. 2011a) – and to the current syntaxonomic treatments, we compile the basic information on this vegetation in terms of 156 associations (plus 6 informal plant communities), classified in the following 11 vegetation classes: *Oryzetea sativae*, *Stellarietea annuae, Sisymbrietea officinalis, Artemisietea vulgaris, Cakiletea maritimae, Saginetea maritimae, Pegano-Salsoletea vermiculatae, Bidentetea tripartitae, Polygono-Poetea annuae, Rudero-Manihotetea utilissimae* and *Epilobietea angustifolii.*

Study area

The study area includes the autonomous territory of Catalonia and the state of Andorra (c. 32,500 sq km); only communities recorded in this area are considered, although complementary data from very neighbouring zones are sometimes included. This area is in the north-eastern corner of the Iberian Peninsula, and lies between the eastern half of the Pyrenees to the north, the mediterranean coast to the south-east and the driest areas of the Ebro basin to the west (Fig. 1). Mainly mediterranean in character, the area includes landscapes ranging from dry, meridional maquis (*Oleo-Ceratonion*) domains to those of the mild montane slopes (closely resembling those found in Medio-European areas); while upland areas are typified by alpine landscapes of Pyrenean glacial cirques and summits.

Relief features rise from sea level to more than 3,000 m a.s.l. in the Pyrenees. The main mountain systems are the Pyrenees, which include the main chain and a number of parallel pre-Pyrenean ranges, and the Catalanidic system, which runs parallel to the coast and includes several peaks rising above 1,000 m (Montseny, 1,712 m; Ports de Beseit, 1,447 m). Other major orographic features include the Transversal system, which links the Montseny area with the eastern Pyrenees, and a series of plateaus stretching south from the pre-Pyrenees to the South Catalanidic mountains. The plains may be grouped into four systems: coastal (mainly very narrow), pre-littoral (part of the Catalanidic system, which is split in two parallel ranges), central basins (partly coinciding with the plateaus, with altitudes mainly between 200 and 600 m) and the Sicoric plain (which is the eastern part of the Iberian depression, at 150-500 m a.s.l.).

Two main basins dominate the area: the Ebro basin, including the lower course of this river and some of its main affluents (Segre, Noguera Pallaresa, Noguera Ribagorçana); and those basins extending from the eastern Pyrenees or the Catalanidic ranges to the Mediterranean sea (Fluvià, Ter, Tordera, Besòs, Llobregat, Foix, Gaià and Francolí). Pyrenean rivers have a fairly constant, nivo-pluvial regime, whereas the others are characterized by more irregular regimes. There are also a number of small coastal ravines and "rambles" where water flows only occasionally.

Physiographic complexity gives rise to a marked diversity in local and regional climates, which range from arid mediterranean (in the southern and western lowlands), with long periods of summer drought, to humid high mountain (in the Pyrenees), with high rainfall and low temperatures. Intermediate types include mild mediterranean (in the northern littoral areas), sub-atlantic and sub-mediterranean (in most of the mountain areas). In general, two climatic gradients can be distinguished; dryness and mean temperatures increasing north to south (in part, due to a decrease in altitude) while continentality increases from the coast westwards. Annual rainfall ranges from 400 mm to more than 1,500 mm, and mean annual temperature from 18 °C (on the southern coast) to less than 3 °C (in the alpine belt).

Substrata are mainly lime materials (hard limestone, conglomerate, marl), but acidic outcrops (slate, granite, sandstone) occur in large areas, mainly in the axial Pyrenees and in the northern half of the Catalanidic system. Other substrata, such as gypsum, salt soils (both coastal and inland), volcanic materials and sandy beaches complete a highly diverse ensemble.

Given this diversity of climate, altitude and substrate conditions, Catalonia not unsurprisingly boasts a rich flora (more than 3,200 broad species of higher plants) and one of the most varied European landscapes, in spite of its size. Mediterranean, Medio-European (= Eurosiberian) and Boreo-alpine elements abound in its flora, and other more specific groups (Atlantic, Pontic, Iranoturanian, etc.) are well represented. Zonal vegetation includes mediterranean maquis (both thermophilous and continental), Aleppo pinewoods, sclerophyllous woodlands (holm-oak and cork-oak forests), deciduous woodlands (dry and acidophilous oak forests, beechwoods, ashwoods, etc.), non-mediterranean coniferous woodlands (forests of Salzmann pine, Scots pine, mountain pine, silver fir) and alpine pastures.

The distribution of plant communities reveals two main features: altitude zonation and physiographic sectors. The altitude gradient, which is the dominant factor, may be described throughout most of the mountain areas by using the alpine-type vegetation belts: Alpine, subalpine, montane and submontane, each of which can be subdivided to include humid and dry variants. All these belts have non-mediterranean landscapes: Alpine and subalpine belts, commonly referred to as high mountain, are Boreo-alpine, whereas montane and submontane belts are predominantly Medio-European, although submontane is mainly sub-mediterranean and includes some mediterranean units in its driest areas. In the southernmost mountains, however, Medio-European communities are obscured by dominant mediterranean vegetation types even at medium altitudes, and consequently their corresponding belts are frequently referred to as mediterranean mountain. Low altitude areas mainly provide habitats for mediterranean vegetation, and are included here as lowlands.

We follow a sectorialization of Catalonia formerly proposed by Bolòs and set in several floristic and biogeographic works (e.g., Bolòs & Vigo 1984-2001, Bolòs *et al*. 2005; see fig. 1). It might be summarized as follows:

1) Pyrenees. These include several ranges with interspersed valleys and basins. The axial ranges (1a & 1b; mainly siliceous) roughly mark the northern boundary of Catalonia, while in the south lie the pre-Pyrenean ranges (1c & 1d; mainly

calcareous). Longitudinally, the Cerdanya depression defines the Central Pyrenees (1a & 1c; westwards) and the Eastern Pyrenees (1b & 1d; eastwards). The climate ranges from dry sub-mediterranean to alpine and atlantic.

2) Ruscinic territory. Littoral lowland in the north-eastern corner, surrounded by mountain areas. Main substrata are granite and alluvia, and the climate is clearly mediterranean, frequently windy.

3) Olositanic territory. Roughly corresponding to the Transversal system, and comprising chiefly limestone and volcanic materials. Climates are humid and range from mild mediterranean to sub-atlantic.

4) Catalanidic territory. This stretches along the coast and includes the Catalanidic mountain system and the associated plains. It may be split into three sections, defined

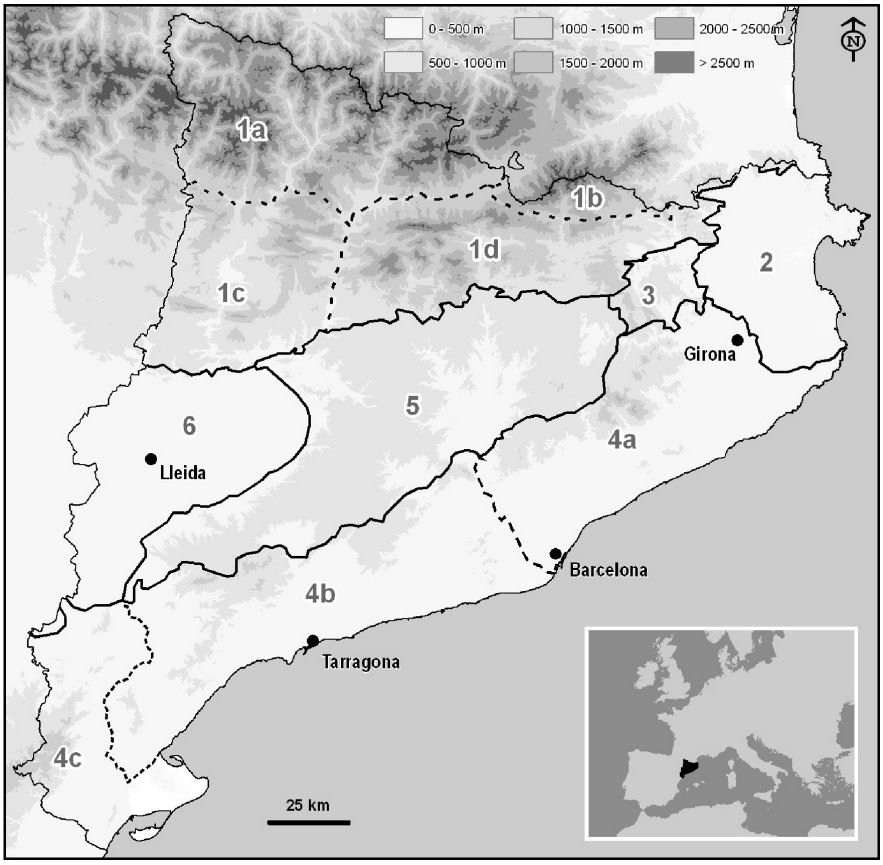

Figure 1. Location and sectorialization of the survey area, Catalonia and Andorra. **1**, Pyrenees (**1a** & **1b**, axial Pyrenees; **1c** & **1d**, pre-Pyrenees; **1a** & **1c**, Central Pyrenees; **1b** & **1d**, Eastern Pyrenees); **2**, Ruscinic territory; **3**, Olositanic territory; **4**, Catalanidic territory (**4a**, North Catalanidic terr.; **4b**, Central Catalanidic terr.; **4c**, South Catalanidic terr.); **5**, Ausosegarric territory; **6**, Sicoric territory.

by the rivers Llobregat and Ebro: North (4a; with mild mediterranean to sub-atlantic climatic types), Central (4b; mainly calcareous and with mediterranean to sub-mediterranean climates) and South (4c; also calcareous but with drier climates).

5) Ausosegarric territory. This includes the central high plateaus and the central basins. Lime outcrops are dominant, and gypsum is present in places. The climate ranges from mediterranean to sub-mediterranean, though always with a continental tendency.

6) Sicoric territory. This eastern part of the Ebro basin has mainly silty-clay and limestone substrata, and includes gypsum and salt soils. The climate is continental dry mediterranean.

Compilation and organization of the conspectus

This, the second part of the Conspectus, began with a complete bibliographic retrieval using the Data Bank of Biodiversity of Catalonia (BDBC, Font *et al*. 2011a), and the «Sistema de Información de la Vegetación Ibérica y Macaronésica» (SIVIM, Font 2011b). We compiled information on associations by applying largely the criteria used by the primary authors in describing and discussing them. Only in cases of conflicting interpretation did we apply our own criterion, using the most appropriate rank and syntaxa. We include in small characters a few plant communities not formally described, or associations based on poorly defined assemblages.

The Conspectus deals primarily with associations and subassociations, which we have sought to handle accurately, both in terms of definition and nomenclature, following the International Code of Phytosociological Nomenclature (ICPN, Weber *et al.* 2000). Although the description of new syntaxa is far from our aim, we propose corrections of names when necessary, and eventually formalize the description of a few syntaxa where invalid descriptions have been found in the literature. Also, we designe lectotypi for syntaxa described from the study area and not typified yet, and try to complete the syntaxa names with the addition of taxa epithets, following the recommendation 10C of the ICPN. Setting a syntaxonomic scheme is our secondary objective, for which we have taken into account previous syntaxonomic syntheses (e.g. Mucina *et al*. 1993, Rivas-Martínez *et al.* 2001, 2002, Bardat *et al.* 2004, Rivas-Martínez 2011) though maintaining a fairly conservative criterion at places. In each alliance, associations are sorted according their year of publication.

The information gathered for each association is divided into five short headings: a) Typification (when described from Catalonia or nearby areas), b) Data (references including relevés from the survey area), c) Structure (short comment on structure and composition, including main species), d) Ecology (substrata, bioclimate, dynamics) and e) Distribution (in the study area, in terms of vegetation belts and physiographic territories). Two complementary paragraphs are added where necessary: f) Variability (which accounts for the recognized subassociations) and g) Comments (short notes on syntaxonomic aspects). In the nomenclature of taxa cited in this paper we follow Bolòs *et al.* 2005.

The data referenced for each association may be easily complemented by visiting the webs BDBC and SIVIM (Font *et al*. 2011a, 2011b), where the interested reader will find an up-to-date list of references for each association, and also the transcription of each published relevé.

Results and discussion

ORYZETEA SATIVAE Miyawaki 1960
CYPERO DIFFORMIS-ECHINOCHLOETALIA ORYZOIDIS O. Bolòs et Masclans 1955
ORYZO SATIVAE-ECHINOCHLOION ORYZOIDIS O. Bolòs et Masclans 1955

Oryzo sativae-Echinochloetum cruris-galli Sóo ex Ubrizsy 1948 **paspaletosum distichi** (Koch) Carretero 1989

[*Cypero difformis-Ammannietum coccineae* O. Bolòs et Masclans 1955, syn. syntax. (lectotypus: Bolòs & Masclans 1955, *Collect. Bot.* 4: 417-419, tab. 1, rel. 5; Pals, 6 m, Ruscinic terr.); designed in Bolòs 1997a: 209; *Oryzo-Cyperetum difformis* Koch 1954]

Data: Bolòs & Masclans (1955), Carretero (1987, 1989), Gesti (2006), Royo (2006), Sanz (2001).

Structure: Weed community formed by therophytes and helophytes, some of which were originally tropical, like *Cyperus difformis*, *Ammannia coccinea* or *Echinochloa crus-galli* (subsp. pl.). It develops chiefly from the end of spring to the beginning of autumn.

Ecology: Rice fields, under thermal mediterranean climate.

Distribution: The only known Catalonian rice field community, it develops in the littoral areas devoted to this cultivation (Ebro delta and Empordà; disappeared from the Llobregat delta); it also occurs in the inner Sicoric territory.

Echinochloo cruris-galli-Ecliptetum prostratae O. Bolòs 1988

Holotypus: Bolòs 1988, *Acta Bot. Barc.* 37: 26, tab. 1, rel.1 (Buda islet, 10 m, Ebro delta).

Data: Bolòs (1988), Curcó (2000), Royo (2006).

Structure: Therophytic species-poor, small carpets presided by the neophyte *Eclipta prostrata*, and including other hygrophylous weeds such as *Echinochloa crus-galli* or *Ranunculus sceleratus*.

Ecology: Wet ground at the edge of paddies, seasonally flooded.

Distribution: Only known through few data from the Ebro delta and the Sicoric territory.

STELLARIETEA MEDIAE Tüxen, Lohmeyer et Preising ex von Rochow 1951
APERETALIA SPICAE-VENTI J. Tüxen et Tüxen in Malato-Beliz, J. Tüxen et Tüxen 1960
SCLERANTHION ANNUI (Kruseman et Vlieger) Sissingh in Westhoff, Dijk et Passchier 1946

Scleranthetum annui Braun-Blanquet 1915

Data: Bolòs (1959, 1983), Carreras (1993), Carreras *et al.* (1993, 1998), Carrillo & Ninot (1992), Sanz (2001), Vigo (1996), Vilar (1987), Viñas (1993).

Structure: Segetal community dominated by calcifuge species, some of them weeds (like *Scleranthus annuus*, *Veronica triphyllos, Bunias erucago, Viola tricolor* subsp. *arvensis* or *Centaurea cyanus*) and other opportunists (*Trifolium arvense, Alyssum alyssoides*, etc.).

Ecology: Cereal (and forage) crop fields extensively cultivated in non-irrigated, oligotrophic soils.

Distribution: Pyrenees and North Catalanidic territory, in the submontane and montane belts.

Airo cupanianae-Papaveretum rhoeadis O. Bolòs 1959

Lectotypus: Bolòs 1959, *Pais. veg. Selva Vic*: 94, rel. 1 (Santa Coloma de Farnés, 100 m, N Catalanidic terr.); designed in Bolòs 1997a: 204.

Data: Bolòs (1959), Franquesa (1995, sub *Secalion*), Nezadal (1989, sub *Cnico-Papaveretum*), Vilar (1987).

Structure: Relatively rich weed community (with *Anthemis arvensis, Aphanes arvensis, Viola tricolor* subsp. *arvensis, Raphanus raphanistrum*, etc.) including as differentials some calcifuge oportunists (like *Aira cupaniana, Arabidopsis thaliana* and *Silene gallica*).

Ecology: Cereal fields on siliceous soils, under mild mediterranean conditions.

Distribution: North Catalanidic and Ruscinic territories, in lowlands and in the submontane belt.

CENTAUREETALIA CYANI Tüxen ex von Rochow 1951

CAUCALIDION PLATYCARPI Tüxen ex von Rochow 1951 nom. mut. Rivas-Martínez et al. 2002

[*Caucalidion lappulae* Tüxen ex von Rochow 1951]

Violo arvensis-Legousietum hybridae O. Bolòs 1959

Lectotypus: Bolòs 1959, *Pais. veg. Selva Vic*: 149, rel. 3 (Tona, 620 m, NE Ausosegarric terr.); designed in Carreras *et al.* 1998: 397.

Data: Bolòs (1959, 1983), Conesa (2001), Devis (2006), Soriano (2001), Vives (1964, sub *Bunio-Galietum tricornis* Braun-Blanquet 1936).

Structure: Weed community including *Polygonum convolvulus, Galium tricornutum, Viola tricolor* subsp. *arvensis, Legousia hybrida, Centaurea cyanus, Ranunculus arvensis*, etc.

Ecology: Cereal fields extensively cultivated in non-irrigated, lime-rich soils, in the submontane and montane belts.

Distribution: Eastern and Central pre-Pyrenees, and neighbouring territories (Ausosegarric, etc.).

Variability: Two subassociations have been described.
- **legousietosum hybridae** Conesa 2001 (= **typicum**) is the most extended form, typical of the submontane belt and related to mediterranean *Roemerion hybridae*.
- **aperetosum interruptae** Conesa et Recasens in Conesa 2001. Holotypus: Conesa 2001, *Fl. veg. serres marg. prepirin.*: 608, tab. 57, rel. 2 (Peralba, 920 m, C pre-Pyrenees). It occurs in the montane belt, and includes a few species indicating poorer soils (like *Apera interrupta*).

Androsaco maximae-Iberidetum amarae Rivas Goday et Borja 1961
Data: Álvarez de la Campa (2004).
Structure: Cereal weed community with *Iberis amara, Bifora radians, Bupleurum rotundifolium, Androsace maxima*, etc., transitional to mediterranean *Roemerion hybridae*.
Ecology: Non-irrigated fields with winter cereals, on limestone soils.
Distribution: Central and South Catalanidic territories, in the submontane belt.

Kickxio spuriae-Nigelletum gallicae Fanlo 1988
Holotypus: Fanlo 1988, *Acta Bot. Barc*. 37: 168, tab. 1, rel. 1 (Santa Cilia de Jaca, 650 m, C Pyrenees).
Data: Carrillo & Ninot [1992, sub *Adonido-Iberidetum amarae* (All.) Tüxen 1950], Nezadal (1989), Sanz (2001).
Structure: Short weed community ending its development after harvesting, under the summer drought. Besides generalist weeds, it includes *Kickxia spuria, Nigella gallica, Euphorbia falcata* and *Galeopsis angustifolia*, as particular species.
Ecology: Cereal fields extensively cultivated in non-irrigated, lime-rich soils.
Distribution: Central pre-Pyrenees, in the submontane belt.
Variability: Two subassociations are known.
- **typicum**
- **bupleuretosum rotundifolii** Fanlo ex Ninot, X. Font, Masalles et Vigo, subass. nova. Holotypus: Fanlo 1988, *Acta Bot. Barc*. 37: 168, tab. 1, rel. 17 (Badaguás, 850 m, C Pyrenees). It includes *Iberis amara, Androsace maxima,* etc., and makes the transition to mediterranean (hotter, drier) conditions.

Biforo radiantis-Centaureetum cyani Vigo, Carreras, Carrillo et I. Soriano in Carreras et al. 1998
Holotypus: Carreras *et al*. 1998, *Acta. Bot. Barc.* 45: 402-404 (Tartera, 1180 m, E Pyrenees).
Data: Carreras *et al*. (1998), Soriano (2001).
Structure: Weed community relatively rich and luxuriant, with *Bupleurum rotundifolium, Bifora radians, Conringia orientalis, Agrostemma githago, Adonis aestivalis*, etc. Indeed, it includes some species become very rare in most cereal crop areas.
Ecology: Cereal fields mostly cultivated for forage (without or with low herbicide weed control), developing in eutrophic soils.

Distribution: In the montane (and submontane) belt of the Eastern Pyrenees (la Cerdanya, etc.).

ROEMERION HYBRIDAE Braun-Blanquet ex Rivas-Martínez, Fernández-González et Loidi 1999
[*Secalion* Braun-Blanquet 1931, art. 2b, 8]

Polycnemo arvensis-Linarietum spuriae Braun-Blanquet in Braun-Blanquet, Gajewski, Wraber et Walas 1936
Data: A. Bolòs (1950), Bolòs (1983, 1996), Bolòs & Masalles 1983), Gesti (2006, sub *Secalion* p.p.), Viñas (1993).
Structure: Short, low density cereal-weed community, well developed after harvesting and including *Polycnemum arvense* s.l., *Polygonum aviculare* subsp. *bellardii, Euphorbia falcata, Linaria spuria, Coronilla scorpioides*, etc.
Ecology: Fields on marl or lime, with low permeable, calcareous soils, under mild mediterranean conditions.
Distribution: Lowlands of Olositanic and North and Central Catalanidic territories.
Variability: Two subassociations have been found.
- **typicum**
- **delphinietosum halterati** O. Bolòs et Masalles 1983. Holotypus: Bolòs & Masalles 1983, *Mem. full Banyoles*: 98 (Santa Pau, 420 m, Olositanic terr.). Only know from the Olositanic territory, under wet mediterranean climate.

Alopecuro myosuroidis-Galietum spurii O. Bolòs 1956
Lectotypus: Bolòs 1956, *Collect. Bot*. 5: 206-209, tab. 18, rel. 1 (la Llagosta, 60 m, N Catalanidic terr.); designed in Bolòs 1997a: 205.
Data: Álvarez de la Campa (2004), Bolòs (1956).
Structure: Cereal weed community including *Alopecurus myosuroides* and some plants like *Galium aparine* subsp. *spurium, Veronica hederifolia* or *Lamium amplexicaule,* related to *Solano-Polygonetalia* communities.
Ecology: Cereal fields with rather humid soils (more or less irrigated), in mild mediterranean conditions.
Distribution: Catalanidic and Olositanic (and Sicoric) territories, in lowlands and in the submontane belt.

Roemerio hybridae-Hypecoetum penduli Braun-Blanquet et O. Bolòs 1954
[*Malcolmio africanae-Hypecoetum penduli* Nezadal 1989 p.p.]
Holotypus: Braun-Blanquet & Bolòs 1954, *Collect. Bot.* 4(2): 241-242 (la Sarda, 300 m, Monegros).
Data: Bolòs (1996), Braun-Blanquet & Bolòs (1958), Conesa (1986, 1991, 2001), Escuer (1998), Nezadal (1989, sub *Malcolmio-Hypecoetum*), Sans (1990).
Structure: Weed community including particular Papaveraceae and Brassicaceae, such as *Hypecoum procumbens* subsp. *grandiflorum, Roemeria hybrida, Biscutella auriculata, Malcolmia africana, Eruca vesicaria* subsp. *sativa*, etc.

Ecology: Fields of winter cereals (and forage crops) under dry, continental mediterranean climate, in eutrophic, calcium-rich soils.
Distribution: Sicoric territory and surrounding areas, in the lowlands.

Centaureo collinae-Galietum valantiae O. Bolòs 1962
[*Centaureo collinae-Galietum verrucosi* O. Bolòs 1962, nom. mut. propos. Ninot, X. Font, Masalles et Vigo, art. 45]
Lectotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 85, rel. 1 (Sitges , 20 m, C Catalanidic terr.); designed in Bolòs 1983: 71.
Data: Álvarez de la Campa (2004), Bolòs (1962, 1967, 1983, 1996), Casasayas & Masalles (1994), Gesti (2006, sub *Secalion* p.p.), Masalles (1983, 1988), Ninot *et al.* (2009), Royo (2006).
Structure: Cereal weed community dominated by *Papaver rhoeas, Galium verrucosum* (= *G. valantia*)*, Hypecoum procumbens, Coronilla scorpioides, Vicia peregrina,* etc., and including some plants of dry mediterranean grasslands.
Ecology: Fields of winter cereals, in calcareous soils under mediterranean conditions.
Distribution: Catalanidic, Ruscinic and Ausosegarric territories, from lowlands to moderate elevations.
Variability: Three subassociations have been recognized.
- **galietosum verrucosi** O. Bolòs 1962 (= **typicum**), a thermophilous mediterranean, relatively rich community.
- **legousietosum hybridae** O. Bolòs 1983. Holotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 85, rel. 7 (Sant Cugat del Vallès, 150 m, N Catalanidic terr.). Submontane community transitional to *Violo-Legousietum*.
- **papaveretosum hybridi** O. Bolòs et Masalles 1983, corr. nom. Álvarez de la Campa 2004 [*herniario cinereae-papaveretosum hybridae* O. Bolòs et Masalles 1983, nom. illeg., art. 34c]. Holotypus: Masalles 1983, *Flora veget. Conca Barberà*: 214, tab. 2, rel. 4 (Vimbodí, 520 m, Ausosegarric terr.). mediterranean continental community, relatively poor, with *Centaurea scabiosa* and *Herniaria cinerea*.

Lolio temulenti-Filaginetum arvensis O. Bolòs 1967
Holotypus: Bolòs 1967 *Mem. R. Acad. Cienc. Art. Barc.* 38: 54-55 (Prades, 1000 m, C Catalanidic terr.), sub "*Lolio-Filaginetum arvensis* ass. nova prov."
Data: Bolòs (1967).
Structure and ecology: Weed community with *Filago arvensis* and *Lolium temulentum*, developed in siliceous soils.
Comment: Further information would be needed to consider this association, since no data are known after the type relevé.

SOLANO NIGRI-POLYGONETALIA CONVOLVULI (Sissingh) O. Bolòs 1962
DIPLOTAXION ERUCOIDIS Braun-Blanquet in Braun-Blanquet, Gajewski, Wraber et Walas 1936

Amarantho delilei-Diplotaxietum erucoidis Braun-Blanquet in Braun-Blanquet, Gajewski, Wraber et Walas 1936

[*Diplotaxietum erucoidis* Braun-Blanquet 1936]

Data: Álvarez de la Campa (2004), A. Bolòs (1950), Bolòs (1959, 1962, 1967, 1996), Casasayas & Masalles (1994), Masalles (1983, 1988), Conesa (1991, 2001), Forcadell (1999), Gesti (2006), Llansana (1976), Masalles (1983), Molero (1976), Nezadal (1989), Ninot *et al.* (2009), Romo (1989), Royo (2008), Sans (1990).

Structure: Open weed community mostly including medium-sized therophytes, more or less adapted to drough, like *Diplotaxis erucoides, Calendula arvensis, Heliotropium europaeum, Chenopodium album, Amaranthus retroflexus* (incl. var. *delilei*), *Reseda phyteuma, Convolvulus arvensis*, etc. Both the species composition and the community structure are variable through the year, with greater development in spring and autumn.

Ecology: Extensive fields of woody crops (olive, almond or carob orchards, vineyards, etc.), where the cultivated trees or shrubs make a light, open canopy; on eutrophic, mostly calcareous soils, ploughed seasonally, under mediterranean conditions.

Distribution: General, except in the Pyrenees, from lowlands to moderate elevations.

Variability: A very diversified association, where ten subassociations have been recognized.

- **equisetetosum ramosissimi** O. Bolòs 1959. Lectotypus: Bolòs 1962, *Pais. veg. Selva Vic*: 91-92, rel. 1 (Maçanes, 50 m, N Catalanidic terr.); designed in Bolòs 1997a: 210. Differentiated by *Equisetum ramosissimum* and *Setaria* spp., it occurs on relatively humid soils.
- **diplotaxietosum erucoidis** O. Bolòs 1962. Lectotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 87, rel. 9 (Castelldefels, 10 m, S Catalanidic terr.); designed in Bolòs 1997a: 210. Very general in the Central and South Catalanidic territory, it is a relatively thermophilous and species-rich community.
- **alyssetosum maritimi** O. Bolòs 1962. Holotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 87, rel. 12 (Sant Just Desvern, 100 m, N Catalanidic terr.). Typical of semi-abandoned fields, it includes some pauciennials (like *Alyssum maritimum, Centaurea aspera* or *Lepidium graminifolium*) instead of the most opportunistic ruderals.
- **euphorbietosum segetalis** O. Bolòs 1967. Lectotypus: Bolòs 1962, *Mem. R. Acad. Cienc. Art. Barc.* 724: 193-195, tab. 20, rel. 8 (Amposta, 15 m, S Catalanidic terr.); designed in Bolòs 1997a: 210. Thermophilous community found in the southern littoral areas, mainly in fields with lower disturbance regime; it includes *Euphorbia segetalis, Stachys ocymastrum, Hedypnois rhagadioloides* and *Convolvulus althaeoides*, as main differentials.
- **silenetosum rubellae** O. Bolòs 1967. Lectotypus: Bolòs 1962, *Mem. R. Acad. Cienc. Art. Barc.* 724: 193-195, tab. 20, rel. 3 (Benicàssim, 10 m, S Catalanidic terr.); designed in Bolòs 1997a: 210. Thermophilous community developping in citric orchards, sometimes irrigated, which is differentiated by *Silene rubella* and *Oxalis pes-caprae.*
- **ptychotidetosum saxifragae** O. Bolòs 1967. Lectotypus: Bolòs 1967, *Mem. R. Acad. Cienc. Art. Barc.* 724: 193-195, tab. 20, rel. 11 (el Bruc, 250 m, C Catalanidic terr.); designed in Bolòs 1997a: 210. Only known through the typus relevé.

- **senecietosum gallici** Molero 1984, nom. nov. Ninot, X. Font, Masalles et Vigo [*meliloto-senecietosum gallici* Molero 1984, nom. illeg., art. 34c]. Holotypus: Molero 1984, *Butll. Inst. Cat. Hist. Nat.* 51: 147, tab. 4, rel. 7 (Gratallops, 340 m, C Catalanidic terr.). Described from schist soils, it includes as calcifuge differentials *Senecio gallicus, Melilotus neapolitana, M. indica*, etc.
- **centaureetosum scabiosae** O. Bolòs 1996. Holotypus: Bolòs 1996, *Mem. R. Acad. Cienc. Art. Barc.* 930: 32-33, rel. 2 (Esblada, 680 m, Ausosegarric terr.). Found in sourthern Catalonia, in transitional areas between littoral and continental, it includes *Centaurea scabiosa, Cirsium arvense* and *Equisetum ramosissimum*, which indicate relatively mild soils.
- **medicaginetosum littoralis** Royo 2008. Holotypus: Royo 2008, *Toll Negre* 10: 34-35, tab. 6, rel. 5 (Freginals, 220 m, S Catalanidic terr.). Community developed in the southern areas, in fields subject to herbicide use and no plouging, which promotes some small, precocious therophytes (*Medicago littoralis, M. minima, M. rigidula, Trigonella monspeliaca,* etc.).
- **urticetosum urendis** Royo 2008. Holotypus: Royo 2008, *Toll Negre* 10: 33, tab. 5, rel. 3 (Ulldecona, 160 m, S Catalanidic terr.). Described from lowlands of southern Catalonia, it corresponds to particularly manured orchards, and includes *Urtica urens, Veronica polita, Stellaria media,* etc.

Eragrostio majoris-Chenopodietum botryos Braun-Blanquet in Braun-Blanquet, Gajewski, Wraber et Walas 1936 **brassicetosum fruticulosae** O. Bolòs 1967

Lectotypus: Bolòs 1967, *Mem. R. Acad. Cienc. Art. Barc.* 724: 196, tab. 21, rel. 2 (el Bruc, 500 m, C Catalanidic terr.); designed in Bolòs 1997a: 210.

Data: Bolòs (1959, 1967, 1983), Franquesa (1995), Gesti (2006), Ninot *et al*. (2009), Viñas (1993).

Structure: Weed community formed by medium-sized therophytes, some of which calcifuge like *Brassica fruticulosa, Chrysanthemum segetum, Rumex acetosella, R. bucephalophorus* or *Chenopodium botrys,* together with more generalist ruderals.

Ecology: Vineyards and tree orchards with lime-poor soils (formed on slate or granite), under maritime mediterranean conditions.

Distribution: Ruscinic and North and Central Catalanidic territories (and neighbouring areas), from lowlands to moderate elevations.

Sorgho halepensis-Erucastretum nasturtiifolii O. Bolòs 1996

Holotypus: Bolòs 1996, *Mem. R. Acad. Cienc. Art. Barc.* 930: 33-34, rel. 3 (Calaf, 600 m, Ausosegarric terr.).

Data: Bolòs (1996).

Structure: Open weed community similar to *Amarantho-Diplotaxietum*, but poorer, lacking thermophilous species, and dominated by *Erucastrum nasturtiifolium*.

Ecology: Fields with woody crops (olive or almond orchards, vineyards), on lime-rich soils, ploughed seasonaly, under subcontinental mediterranean conditions.

Distribution: Ausosegarric territory and neighbouring areas, in moderate elevations.

Variability: Two subassociations have been found.
- **calenduletosum arvensis** O. Bolòs 1996 (= **typicum**).
- **salsoletosum kali** O. Bolòs 1996. Holotypus: Bolòs 1996, *Mem. R. Acad. Cienc. Art. Barc.*

930: 33-34, rel. 4 (Cervera, 510 m, Ausosegarric terr.). Community in which *Salsola kali* indicates brackish soils.

Trago racemosi-Linarietum simplicis Royo 2008

Holotypus: Royo 2008, *Toll Negre* 10: 38-40, tab. 9, rel. 7 (la Galera, 180 m, S Catalanidic terr.).

Data: Royo (2008).

Structure: Open, short weed community mainly formed by winter therophytes, chiefly *Linaria arvensis* subsp. *simplex* and subsp. *micrantha, Lamium amplexicaule, Tragus racemosus, Reseda phyteuma, Herniaria cinerea, Euphorbia peplus, Urtica urens,* etc.

Ecology: Olive, carob or almond orchards, in non-ploughed fields which become superficially coarse through clay leaching, under thermal mediterranean climate.

Distribution: South Catalanidic territory, in maritime lowlands.

Spergulario salinae-Diplotaxietum erucoidis Carretero et Boira 1984

Holotypus: Carretero & Boira 1984, *Doc. Phytosoc*. 8: 121, tab. 2, rel. 1 (El Grao de Moncófar, Valencian terr.).

Data: Carretero & Boira (1984).

Structure: Similar to *Amarantho-Diplotaxietum*, but poorer and with a few halophytes such as *Spergularia salina*.

Ecology: Woody crops in brackish soils, in littoral, thermal lowlands.

Comment: The only record is a sole, poor relevé from the Ebro delta, which could be also included in *Amarantho-Diplotaxietum erucoidis* or in *Poo-Urticetum urentis*.

FUMARION WIRTGENII-AGRARIAE Brullo in Brullo et Marcenò 1985

Citro-Oxalidetum pedis-caprae O. Bolòs (1967) 1975

[*Urtico-Smyrnietum olusatri citro-oxalidetosum* O. Bolòs 1967]

Lectotypus: Bolòs 1967, *Mem. R. Acad. Cienc. Art. Barc.* 724: 199, tab. 25, rel. 2 (Benevites, 30 m, Valencian terr.); designed in Bolòs 1975: 484.

Data: Royo (2006).

Structure: Weed assemblage mostly developing through winter and spring, generally dominated by the alien *Oxalis pes-caprae*, and including other weeds general in mediterranean fields and edges (*Poa annua, Diplotaxis erucoides, Senecio vulgaris, Mercurialis annua, Fumaria capreolata,* etc.).

Ecology: Citric orchards and field edges, generally irrigated, in thermal mediterranean conditions.

Distribution: Lowlands of the South Catalanidic territory, under maritime influence.

Poo annuae-Arabidopsietum thalianae Carretero and Boira 1983

Holotypus: Carretero & Boira 198, *Lazaroa* 4: 26-27, tab. 1, rel. 5 (Serratella, Valencian terr.).

Data: Royo (2006).

Structure: Open therophytic community formed by *Arabidopsis thaliana, Poa annua* subsp. *annua, Lamium amplexicaule, Senecio vulgaris,* etc., blooming in early spring.
Ecology: Orange fields, in coarse soils superficially decarbonated.
Distribution: Lowlands of the South Catalanidic territory.

Poo annuae-Urticetum urentis Carretero et Aguilella 1995
[*Poo annuae-Diplotaxietum erucoidis* Carretero et Aguilella 1995, syntax. syn. (holotypus: Carretero & Aguilella 1995, *Flora veg. Valencia*: 180, tab. 31, rel. 10 (Valencia)]
Holotypus: Carretero & Aguilella 1995, *Flora veg. Valencia*: 179, tab. 30, rel. 12 (Valencia).
Data: Royo (2008).
Structure: Carpets of *Urtica urens* and *Poa annua* subsp. *annua,* with other weeds (*Capsela bursa-pastoris* subsp. *rubella, Diplotaxis erucoides, Lamium amplexicaule, Veronica hederifolia,* etc.), developing from autumn to spring.
Ecology: Orange orchards and similar fields, with watered soils (mostly through drip irrigation) and moderately trampled, in littoral lowlands.
Distribution: South Catalanidic territory.

PANICO-SETARION Sissingh in Westhoff, Dijk et Passchier 1946

Digitario sanguinalis-Galinsogetum parviflorae Tüxen et Becker 1942
Data: Folch (1979), Masalles (2008).
Structure: Weed community with *Galinsoga parviflora* (frequently dominant) and other weeds.
Ecology: Irrigated kitchen-gardens under mediterranean or sub-mediterranean climate.
Distribution: Scatered through North and Central Catalanidic, Ausosegarric and pre-Pyrenean territories, in the lowlands and in the submontane belt.
Variability: Two local subassociations were distinguished.
- **euphorbietosum prostratae** Folch 1979. Holotypus: Folch 1979, *Butll. Inst. Cat. Hist. Nat*. 44: 92-93, tab. 1, rel. 2 (Roda de Ter, 440 m, Ausosegarric terr.).
- **fumarietosum officinalis** Folch 1979. Holotypus: Folch 1979, *Butll. Inst. Cat. Hist. Nat*. 44: 92-93, tab. 1, rel. 4 (Cambrils, 25 m, C Catalanidic terr.).

Setario glaucae-Echinochloetum colonae Bolòs 1956
Lectotypus: A. Bolòs 1950, *Veg. Com. barc*.: 78-79, rel. 1 (Sant Boi de Llobregat, C Catalanidic terr.); designed here.
Data: Álvarez de la Campa (2004), A. Bolòs (1950), Bolòs (1962), Casasayas & Masalles (1994), Conesa (1990a, 1991, 2001), Escuer (1998), Gesti (2006), Ninot *et al*. (2009), Pino (1995), Royo (2006).
Structure: Irregular community developed together with herbaceous crops, or in orchards, formed by a rather diverse assemblage of weeds. Among these, stand out a number of species showing their optimum development in summer, like

Echinochloa colona, Setaria glauca, S. verticillata, Portulaca oleracea, Amaranthus retroflexus, Digitaria sanguinalis and *Cyperus rotundus*, which are accompanied by more ubiquitous weeds (*Stellaria media, Chenopodium album, Sonchus oleraceus, Urtica urens, Poa annua*, etc.).
Ecology: Irrigated kitchen-gardens or similar fields, with fertile soils, under mediterranean conditions.
Distribution: Catalanidic, Ruscinic and Sicoric territories, in the lowlands.

Euphorbio nutantis-Digitarietum sanguinalis O. Bolòs et Masalles 1983
Holotypus: Bolòs & Masalles 1983, *Mem. full Banyoles*: 99 (El Sallent de Santa Pau, 360 m, Olositanic terr.).
Data: Bolòs (1983), Bolòs & Masalles (1983), Conesa (1990a, 1991, 2001), Carreras *et al*. (1997), Devis (2006), Soriano (2001), Villegas (1993), Viñas (1993).
Structure: Irregular weed community made by tender-leaved ruderals common in mild fields, like *Digitaria sanguinalis, Setaria viridis, Mercurialis annua, Portulaca oleracea, Stellaria media, Polygonum persicaria, Cirsium arvense*, etc.
Ecology: Irrigated maize or alfalfa fields, or kitchen-gardens, growing in fertile soils and under sub-humid mediterranean to sub-atlantic climates with more or less cold winter.
Distribution: Pre-Pyrenees and Olositanic and North Catalanidic territories, in the submontane and basal belts.

Setario pumilae-Rumicetum obtusifolii Masalles et Sans 1988
Holotypus: Masalles & Sans 1988, *Annales ANPP* 3: 414-415 (La Portella, 240 m, Sicoric terr.).
Data: Conesa (1990a, 1991, 2001), Masalles & Sans (1988), Pino (1995), Sanz (2001).
Structure: Dense weed assemblage formed by ruderals common in irrigated fiels (*Setaria pumila, Echinochloa crus-galli, Digitaria sanguinalis, Portulaca oleracea*, etc.) and typically by meso-hygrophylous perennials of hedges and other open, trampled sites, like *Rumex obtusifolius, R. crispus, Plantago major, Paspalum distichum, Bromus catharticus,* etc.
Ecology: Irrigated fruit orchards where the weed control is mainly done through mowing, and alfalfa or hay fields, under thermal continental mediterranen conditions.
Distribution: Sicoric, Ausosegarric (and Central Catalanidic) territories, in the lowlands.

Convolvulo arvensis-Cyperetum rotundi Carretero et Aguilella ex Ninot, X. Font, Masalles et Vigo, ass. nova
Holotypus: Carretero & Aguilella 1995, *Flora veg. Valencia*: 184, tab. 35, rel. 2 (Valencia).
Data: Royo (2006).
Structure: Weed community chiefly formed by the geophytes *Cyperus rotundus* and *Convolvulus arvensis,* and including other generalist ruderals (like *Portulaca oleracea, Amaranthus blitoides, A. retroflexus,* etc.).

Ecology: Fruit orchards and kitchen-gardens, under low intense cultivation regime (including scarce irrigation), even fallows, under thermal littoral mediterranen conditions.
Distribution: An association described from Valencia, reaching the southern plains of the Catalanidic territory.

POLYGONO CONVOLVULI-CHENOPODION POLYSPERMI Koch 1926

Veronico agrestis-Chenopodietum hybridi O. Bolòs et Vigo in O. Bolòs 1983
[*Veronico-Chenopodietum hybridi* O. Bolòs et Vigo in Vigo 1979 nom. inval., art. 2d]
Holotypus: Vigo 1979, *Butll. Inst. Cat. Hist. Nat*. 44: 84-86, rel. 10 (Lés, 610 m, C Pyrenees); designed in Bolòs 1983: 149.
Data: Bolòs (1983) Carrillo & Ninot (1992), Vigo (1979), Villegas (1993).
Structure: Weed community dominated by summer ruderals, mostly soft-leaved, like *Chenopodium hybridum, Stellaria media, Veronica agrestis, Lamium amplexicaule, Polygonum persicaria, Chenopodium album,* etc.
Ecology: Kitchen-gardens with fertile, moist soils (generally irrigated), in areas under atlantic climate.
Distribution: Central Pyrenees (and a few areas of Olositanic and North Catalanidic territories), in the submontane and montane belts.

Chenopodietum albo-polyspermi O. Bolòs et Vigo in Ninot, X. Font, Masalles et Vigo, ass. nova
[*Chenopodietum albo-polyspermi* O. Bolòs et Vigo in Vigo 1979 nom. inval., art. 2d]
Holotypus: Vigo 1979, *Butll. Inst. Cat. Hist. Nat*. 44: 84-86, rel. 5 (Ribes de Freser, 1000 m, E Pyrenees).
Data: Vigo (1979).
Structure: Weed community formed by summer ruderals, mainly *Chenopodium polyspermum, C. album, Mentha arvensis, Stellaria media, Convolvulus arvensis,* etc.
Ecology: Kitchen-gardens with fertile, irrigated soils, in humid mountain areas.
Distribution: Eastern Pyrenees, in the submontane and montane belts.

SISYMBRIETEA OFFICINALIS Gutte et Hilbig 1975
CHENOPODIETALIA MURALIS Braun-Blanquet in Braun-Blanquet, Gajewski, Wraber et Walas 1936
CHENOPODION MURALIS Braun-Blanquet in Braun-Blanquet, Gajewski, Wraber et Walas 1936

Chenopodietum muralis Braun-Blanquet in Braun-Blanquet, Gajewski, Wraber et Walas 1936
Data: Álvarez de la Campa (2004), A. Bolòs (1950), Bolòs (1962, 1996), Bolòs & Marcos (1953, sub *Chenopodion muralis*), Bolòs & Masalles (1983), Bolòs & Vigo (1984), Braun-Blanquet & Bolòs

(1958), Cardona (1980), Conesa (1986, 1990a, 1991, 2001), Cortina *et al.* (1988), Curcó (2000), Escuer (1998), Franquesa (1995, sub *Chenopodion muralis*), Gesti (2006), Ninot *et al.* (2009), Royo (2006), Vives (1964).

Structure: Forb community formed by medium-sized to robust therophytes, mainly Chenopodiaceae. In this opportunist community, the dominance of one or another species is very variable from place to place, and also through the seasons of the year (many of the plants develop from late summer to winter, and others in spring and early summer). The most general species are *Chenopodium album, C. murale, Amaranthus retroflexus, Urtica urens* and *Sisymbrium irio*.

Ecology: Strongly ruderalized sites under mediterranean climate with relatively moist soils, such as surroundings of buildings and path margins.

Distribution: Very general in all the lowlands, where ruderal sites occur.

Variability: Two subassociations have been recorded.

- sisymbrietosum irionis Braun-Blanquet in Braun-Blanquet, Rousine et Nègre 1952 (= **typicum**) is the most general, and might be divided into several variants.

- bassietosum scopariae Braun-Blanquet et O. Bolòs 1958 [*kochietosum scopariae* auct.; *Chenopodio albi-Kochietum scopariae* (Peris et Esteso) Carretero et Aguilella 1995, syntax. syn.].

Lectotypus: Braun-Blanquet & Bolòs 1958, *Anales Aula Dei* 5: 67, tab. 9, rel. 7 (Casp, 350 m, Ebro basin); designed in Bolòs 1997a: 208. It occurs in dry lowlands (Sicoric, South Catalanidic and Ausosegarric territories), and includes some differentials typical of the continental plains of the Ebro basin, chiefly *Kochia* (= *Bassia*) *scoparia* subsp. *densiflora* (erroneously named *Bassia reuteriana* in Braun-Blanquet & Bolòs 1958, according to Bolòs 1997a).

Amarantho-Chenopodietum ambrosioidis (Braun-Blanquet) O. Bolòs 1967

[*Chenopodietum muralis* facies of *Chenopodium abrosioides* Braun-Blanquet 1936; *Chenopodietum muralis chenopodietosum ambrosioidis* O. Bolòs et Molinier in O. Bolòs 1962 p.p.]

Lectotypus: Bolòs 1962 *Pais. veg. barcel.*: tab. 59, rel. 21 (Barcelona, 150 m); designed in Bolòs 1997a: 205.

Data: Álvarez de la Campa (2004), A. Bolòs (1950), Bolòs (1962) sub *Chenopodietum muralis* (according to Bolòs 1967); Conesa (1986), Curcó (2000), Forcadell (1999), Rovira (1986), Royo (2006).

Structure: Therophytic forb community mainly formed by Chenopodiaceae. The species composition being very variable depending on the site and on the season, the most general or significant taxa are *Chenopodium album, C. ambrosioides, Amaranthus muricatus, A. blitoides, Xanthium spinosum* and *Conyza bonariensis.*

Ecology: It settles on very ruderalized soils, generally next to buildings or to frequented paths, in rather dry, warm sites.

Distribution: Lowlands of the Catalanidic territory.

Variability: Three subassociations have been described.

- chenopodietosum ambrosioidis O. Bolòs 1967 (= **typicum**) is known from dry sites, and typically includes *Chenopodium ambrosioides, Oryzopsis miliacea* and *Alyssum maritimum.*

- amaranthetosum muricati O. Bolòs (1962) 1967. Lectotypus: Bolòs 1962, *Pais.*

veg. barcel.: tab. 59, rel. 8 (Barcelona, 25 m); designed in Bolòs 1997a: 208. Differentiated by *Amaranthus muricatus, A. blitoides, Atriplex tatarica* and *Xanthium spinosum*, this is seemingly a thermophilous and less ruderal community.

- atriplicetosum tataricae (Braun-Blanquet) Ninot, X. Font, Masalles et Vigo, comb. nov. [*Chenopodietum muralis atriplicetosum* Braun-Blanquet in Braun-Blanquet et al. 1952].

Lectotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 59, rel. 15 (Martorell, 50 m, C Catalanidic terr.); designed here. Differentiated by *Atriplex tatarica* (sometimes dominant) and a few halophytes, it occurs in brackish soils, mainly in coastal locations.

Atriplicetum patulo-prostratae O. Bolòs et Masalles 1983 nom. corr. hoc loco

[*Atriplicetum patulo-hastatae* O. Bolòs et Masalles 1983, art. 43]

Holotypus: Bolòs & Masalles 1983, *Mem. full Banyoles*: 39 (Porqueres, 175 m, Olositanic terr.).

Data: Bolòs & Masalles (1983), Conesa (2001).

Structure: Populations of *Atriplex prostrata* (= *A. hastata* auct.), including *Atriplex patula, Chenopodium album*, etc.

Ecology: It is found in ruderalized, brackish soils.

Distribution: The only references come from Sicoric and Olositanic lowlands.

Atriplici roseae-Salsoletum ruthenicae Rivas-Martínez 1978

Holotypus: Rivas-Martínez 1978, *Acta Bot. Malac*. 4: 78, tab. 2, rel. 4 (Pinto, Madrid).

Data: Conesa (2001).

Structure: Therophytic community formed by xerophilous Chenopodiaceae, especially *Atriplex rosea* subsp. *rosea, Salsola kali* subsp. *ruthenica* and *Chenopodium opulifolium*.

Ecology: Ruderalized path margins or slopes and other marginal lands, under dry, continental mediterranean climate.

Distribution: Typical of inner dry, continental plains of the Iberian peninsula, it just reaches the western part of the Sicoric lowland.

Astero squamati-Amaranthetum viridis Carretero 1993

[*Chenopodio albi-Conyzetum bonariensis* Carretero 1994, syntax. syn. (holotypus: Carretero 1994, *Ecología* 8: 197, tab. 3, rel. 1; Valencia); *Chenopodio albi-Conyzetum sumatrensis* Carretero 1994, syntax. syn. (holotypus: Carretero 1994, *Ecología* 8: 199, tab. 4, rel. 6; Valencia); *Asteretum squamati* Carretero 1994, syntax. syn. (holotypus: Carretero 1994, *Ecología* 8: 200, tab. 5, rel. 1; Valencia)].

Holotypus: Carretero 1993, *Fol. Bot. Misc*. 9: 55, tab. 2, rel. 2 (Valencia).

Data: Carretero (1994), Curcó (2000), Gesti (2006), Royo (2006).

Structure: A rather dense, species-poor community formed by diverse arrangements of generalist ruderals, such as *Aster squamatus*, *Conyza sumatrensis, Chenopodium album, Amaranthus retroflexus, A. viridis, Paspalum distichum, Cynodon dactylon, Bidens subalternans* and *Picris echoides*.

Ecology: Old fields, orchard edges, path verges and interstices of pavements, under warm mediterranean conditions but where soils do not become very dry in summer, when the community mainly develops.

Distribution: It is known from the lowlands under maritime influence (Ruscinic and Catalanidic territories).
Variability: Two ecological subassociations have been recorded.
- typicum [*Asteretum squamati typicum*], general in the association area, developing in normal substrata.
- atriplicetosum prostratae (Carretero) Ninot, X. Font, Masalles et Vigo, comb. nova. Holotypus: Carretero 1994, *Ecología* 8: 200, tab. 5, rel. 9 (Valencia), sub *Asteretum squamati atriplicetosum prostratae* Carretero 1994. It occurs in slightly salty soils of littoral plains, and is differentiated by halophytes like *Atriplex prostrata* or *Aster tripolium*.
Comment: As many of the species cited above are short-living invaders, showing noticeable shifts between years and sites, we consider this association (and those cited as synonyms) should be taken in a broader sense than previous authors (Carretero 1993, 1994; etc.) did. Thus, we include all of them into the firstly published name (*Astero-Amaranthetum*), where their singularity is just based on the dominance of one or another neophyte. They should be taken as mere dynamic forms of the same association, for which even the subassociation range appears to be inappropriate. Nevertheless, the two ecological subassociations distinguished within *Asteretum squamati* may be retained, and thus combined into *Astero-Amaranthetum viridis.*

Chenopodio albi-Conyzetum canadensis Carretero 1994 **picridetosum echioidis** Carretero 1994
Holotypus: Carretero 1994, *Ecología* 8: 195, tab. 1, rel. 10 (Vizcaya).
Data: Carretero (1994).
Structure: A herbaceous community formed by generalist ruderals, from which the neophyte *Conyza canadensis* is dominant, whereas *Chenopodium album, Lactuca serriola, Verbena officinalis* and *Cirsium arvense* are sparse. A few meso-hygrophytes (*Picris echioides*, *Polygonum persicaria* and *Echinochloa crus-galli* differenciate the subassociation *picridetosum*.
Ecology: Old fields and other waste lands with humid soil, under sub-mediterranean or mild mediterranean climates.
Distribution: It is only known from the pre-Pyrenees (a sole relevé), but may be widespread in the northern part of the area.
Comment: A weakly defined association. Compared with *Astero-Amaranthetum viridis* it shows less mediterranean character and includes more long-living ruderals.

Sisymbrio irionis-Lavateretum creticae (M.B. Crespo et Mateo) Carretero et Aguilella 1995
Holotypus: Crespo & Mateo 1988, *Acta Bot. Barc*. 37: 98, tab. 2, rel. 1 (Solares, Valencian terr.).
Data: Royo (2006).
Structure: Irregular community including *Malva parviflora, Lavatera cretica, Sisymbrium irio, Urtica urens, Lolium rigidum,* etc.

Ecology: Non-irrigated orchards (olive, almont, caroub trees) under low intensive care and thermal mediterranean climate.
Distribution: A meridional association reaching the sourthernmost littoral plains of the Catalanidic territory.

ALLION TRIQUETRI O. Bolòs 1967

Urtico membranaceae-Smyrnietum olusatri O. Bolòs et Molinier 1958
Lectotypus: A. Bolòs 1950, *Veg. com. barcel.*: 71, rel. 1 (Besós river, Badalona); designed in Bolòs 1997b: 89.
Data: A. Bolòs (1950, sub "Ass. prov., *Smyrnium olusatrum* and *Urtica caudata*"), Franquesa (1995), Gesti (2006).
Structure: Dense forb association formed by broad-leaved, tender ruderals, mainly *Smyrnium olusatrum, Urtica membranacea, U. dioica, Galium aparine, Mercurialis annua* and *Parietaria officinalis* subsp. *judaica.* The community develops from mid winter to spring, and vanishes from the end of this season onwards.
Ecology: It forms strips along irrigation channels and similar sites with humid ruderalized soil, under sub-humid maritime mediterranean climate.
Distribution: From Central Catalanidic to Ruscinic littoral plains.
Variability: Two weakly differentiated subassociations have been recorded.
- **urticetosum membranaceae** O. Bolòs, Molinier et P. Montserrat 1970 (= **typicum**; *sambucetosum ebuli* O. Bolòs 1997, nom. superfl.), clearly nitrophilous and including abundant *Urtica membranacea* and other ruderals.
- **smyrnietosum olusatri** O. Bolòs, Molinier et P. Montserrat 1970. Lectotypus: Bolòs *et al.* 1970, *Acta Geobot. Barc.* 5: 132-134, tab. 29, rel. 6 (Migjorn Gran, 30 m, Minorca); designed in Bolòs 1997b: 89. Seemingly less nitrophilous, it is more or less dominated by *Smyrnium olusatrum.*

Brassico fruticulosae-Carduetum tenuiflori O. Bolòs et Vigo 1984
Holotypus: Bolòs & Vigo 1984*, Sist. nat. illes Medes*: 181-182, tab. 5, rel. 3 (Meda Gran, 50 m, Ruscinic terr.).
Data: Bolòs & Vigo (1984).
Structure: Assemblage of ruderals (*Carduus tenuiflorus, Brassica fruticulosa, Stellaria media, Borago officinalis, Galium spurium*, etc.), most of them therophytic, which develops through winter to spring, and dries out from late spring.
Ecology: Coastal areas nitrified by sea birds.
Distribution: It is found in the Medes islets.
Variability: Two ecological subassociations are known.
- **carduetosum tenuiflori** O. Bolòs et Vigo 1984 (= **typicum**). A community dominated by *Brassica fruticulosa* or *Carduus tenuiflorus,* which settles on drier places.
- **boraginetosum officinalis** O. Bolòs et Vigo 1984. Holotypus: Bolòs & Vigo 1984, *Sist. nat. illes Medes*: 181-182, tab. 5, rel. 11 (Meda Gran, 60 m, Ruscinic terr.). It occurs on milder slopes, and includes *Borago officinalis* abundant to dominant.

***Galium aparine* and *Torilis neglecta* community**

Data: Álvarez de la Campa (2004).

Structure: Tall herbaceous community built up by more or less sciophilous, tender plants, mainly *Parietaria officinalis* subsp. *judaica*, *Galium aparine* subsp. *aparine, Veronica hederifolia, Fumaria capreolata* and *Torilis arvensis* subsp. *neglecta.*

Ecology: Mild, moderately shaded clearings and hedges of forests, or path margins, frequently in riparian habitats of mediterranean character.

Distribution: Known from the South Catalanidic territory, in the basal and submontane belts, and probably also present in other mediterranean areas.

ONOPORDION CASTELLANI Braun-Blanquet et O. Bolòs 1958 corr. Rivas-Martínez et al. 2002

Nicotiano glaucae-Onopordetum micropteri O. Bolòs 1957 corr. Alcaraz in Rivas-Martínez et al. 2002

[*Nicotiano glaucae-Onopordetum macracanthi* O. Bolòs 1957, art. 43]

Lectotypus: Bolòs 1957, *Collect. Bot.* 5: 551, rel. 2 (Elx, S Valencian terr.); designed in Bolòs 1997a: 216.

Data: Álvarez de la Campa (2004, sub *Nicotiana glauca* populations), Royo (2006).

Structure: Irregular community dominated by *Nicotiana glauca* or *Onopordum macracanthum* subsp. *micropterum,* and including other generalists of open habitats (*Oryzopsis miliacea*, *Asphodelus fistulosus, Alyssum maritimum,* etc.).

Ecology: Path slopes and other marginal lands with disturbed soils, in dry, thermal sites.

Distribution and comment: An association typical of semi-arid southeastern Iberian areas, it has been recorded from the Ebro delta and nearby littoral plains (South Catalanidic territory), on the basis of impoverished, species-poor forms.

Onopordetum castellani Braun-Blanquet et O. Bolòs 1958 corr. Rivas-Martínez et al. 2002

[*Onopordetum arabici* Braun-Blanquet et O. Bolòs 1958]

Lectotypus: Braun-Blanquet & Bolòs 1958, *Anales Aula Dei* 5: tab. 6, rel. 2 (Gesa, 240 m, Monegros); designed in Loidi & Biurrun 1996: 170.

Data: Bolòs (1960), Conesa (2001).

Structure: Community formed by big, sparse thistles (*Carduus bourgeanus, Onopordum corymbosum* or *O. nervosum* subsp. *castellanum*) and a lower layer of xerophilous ruderals, such as *Artemisia herba-alba*, *Bromus rubens, Plantago albicans* or *Hordeum murinum* subsp. *leporinum*.

Ecology: Dry path margins, fallows or other marginal lands, in most cases heavily ruderalized through herd frequentation.

Distribution: It is only found in the inner, lowland area of Catalonia (Sicoric territory), under semi-arid or dry continental mediterranean climate.

MESEMBRYANTHEMION CRYSTALLINI Rivas-Martínez, Wildpret, Del Arco, O. Rodríguez, Pérez de Paz, García Gallo, Acebes, T.E. Díaz et Fernández-González 1993

Gasouletum crystallino-nodiflori O. Bolòs 1957

Lectotypus: Bolòs 1957, *Collect. Bot*. 5(2): 543, rel. 2 (Alacant, 10 m); designed in Bolòs 1997a: 213.

Data: Royo (2006).

Structure: Open, irregular community presided by the creeping succulent *Mesembryanthemum nodiflorum*, and including *Beta patellaris, Kochia scoparia, Frankenia pulverulenta* and other xero-halophytes.

Ecology: It forms small, sparse spots on rocky coastal shelves and path margins, affected by salt spray and seabird manuring.

Distribution: A meridional association just reaching the southern littoral of the Catalanidic territory.

THERO-BROMETALIA (Rivas Goday et Rivas-Martínez ex Esteve) O. Bolòs 1975

RESEDO LANCEOLATAE-MORICANDION ARVENSIS F. Casas et M.E. Sánchez 1972

[*Carrichtero-Amberboion* (Rivas Goday et Rivas-Martínez 1963, nom. inval., art. 3b, 34]

Moricandio arvensis-Carrichteretum annuae O. Bolòs 1957

Lectotypus: Bolòs 1957, *Collect. Bot*. 5(2): 544-550, rel. 6 (Elx, 50 m, Valencia region); designed in Bolòs 1997a: 216.

Data: Álvarez de la Campa (2004), Bolòs (1957), Royo (2006).

Structure: A very open, therophytic community in which the cruciferae *Carrichtera annua* and *Moricandia arvensis* may be abundant. Other scarcer components are *Asphodelus fistulosus, Eruca vesicaria* and *Salsola vermiculata*.

Ecology: Path margins and fallows, in dry places, under dry mediterranean climate.

Distribution: Southern lowlands of the Catalanidic and Sicoric territories.

TAENIATHERO-AEGILOPION GENICULATAE Rivas-Martínez et Izco 1977

Astragalo sesamei-Poetum bulbosae Rivas Goday et Ladero 1970 nom. inv. Rivas- Martínez et al. 2002

[*Poo bulbosae-Astragaletum sesamei* Rivas Goday et Ladero 1970]

Data: Álvarez de la Campa (2004), Royo (2006).

Structure: Short, species-rich grassland frequently dominated by *Poa bulbosa,* and including subnitrofilous therophytes (mainly *Anthemis arvensis, Medicago rigidula, Astragalus sesameus, Bromus hordeaceus, Aegilops geniculata*, etc.) and some perennials (like *Taraxacum* gr. *laevigatum* or *Dactylis glomerata* subsp. *hispanica*). Its development takes place from autumn to spring, and most species dry out from early summer onwards.

Ecology: It covers small patches like shrubland clearings, path margins or other marginal areas, moderately ruderalized, with calcareous, seasonaly mild soils.
Distribution: South Catalanidic territory, in the submontane and basal belts, mainly facing to the inner Ebro basin.

Medicagini rigidulae-Aegilopetum geniculatae Rivas-Martínez et Izco 1977
Holotypus: Rivas-Martínez & Izco 1977, *Anales Inst. Bot. Cavanilles* 34: 368-369, tab. 2, rel. 2 (Loeches, Madrid).
Data: Álvarez de la Campa (2004), Bolòs (1996), Conesa (2001), Mayoral (1992), Molero (1984), Ninot *et al*. (2009), Royo (2006), Sans (1990), Sans & Masalles (1988).
Structure: Therophytic grassland built up by a rather diverse assemblage mostly developing from late winter to spring; subnitrophilous grasses (*Bromus rubens, B. madritensis, Aegilops geniculata, A. triuncialis, Koeleria phleoides, Avena sterilis*) and legumes (*Medicago minima, M. orbicularis, Coronilla scorpioides, Astragalus hamosus*) stand as main groups.
Ecology: It settles on flat or gentle surfaces, in eutrophic soils which become very dry in summer, occurring in path margins, fallows and old fields, where it may remain as an early stage of the secondary succession for a few years. Due to its pioneering character, its species composition is rather variable from site to site.
Distribution: It is found on the inner plains and low mountains under dry mediterranean climate, from southern pre-Pyrenees to South Catalanidic and Ausosegarric territories.
Variability: Four subassociations occur in the area.
- **typicum**, which was described from central Spain and reaches the Central Catalanidic mountains, at medium altitudes.
- **vulpietosum ciliatae** Sans et Masalles 1988 corr. nom. Álvarez de la Campa 2004 [*desmazerio-vulpietosum ciliatae* Sans et Masalles 1988, nom. illeg.]. Holotypus: Sans & Masalles 1988, *Acta Bot. Barc.* 37: 348-351, tab. 1, rel. 8 (Omells de na Gaia, 500 m, Ausosegarric terr.). A community particular of the lowlands of the Ausosegarric and Sicoric territories. Its main floristic difference is the presence of *Desmazeria rigida, Avena barbata* and *Crepis vesicaria* subsp. *haenseleri,* and the absence or rarity of other taxa (such as *Aegilops triuncialis, Medicago rigidula, Astragalus hamosus, Crepis foetida*, etc.).
- **marrubietosum supini** Álvarez de la Campa 2004. Holotypus: Álvarez de la Campa 2004, *Veg. mass. Port*: 299, tab. 54, rel. 16 (la Sénia, 1220 m, S Catalanidic terr.). Found in the montane and submontane belts, it includes some mountain differentials like *Marrubium supinum, Bromus tectorum* or *Carduus nigrescens*, and is devoid of thermophilous taxa.
- **santolinetosum squarrosae** O. Bolòs ex Ninot, X. Font, Masalles et Vigo, subass. nova [*santolinetosum* O. Bolòs 1996, nom. inval., art. 3o]. Holotypus: Bolòs 1996, *Mem. R. Acad. Cienc. Art. Barc.* 930: 44, rel. 1 (la Llacuna, 620 m, Ausosegarric terr.). It corresponds to low scrubs of *Santolina chamaecyparissus* subsp. *squarrosa* with sparse taxa of the association and higher syntaxa. It occurs in path margins and slopes subject to shep grazing but to low soil disturbance, in the Ausosegarric territory.

Torilido nodosae-Scandicetum australis Izco 1978

Data: Guàrdia & Ninot (1991).

Structure: Therophytic formation of small, subnitrophilous herbs such as *Scandix australis, Bromus rubens, B. madritensis, Poa bulbosa, Sherardia arvensis, Medicago minima* and *Aegilops geniculata*.

Ecology: It develops as small carpets in path margins and gaps of scrubs, rooting in flat, clay, calcareous (even slightly gypsaceous) soils, in grazed areas and under semi-arid or dry continental mediterranean climate.

Distribution: It has been only identified in the lowlands of the Sicoric territory.

Trifolio cherleri-Taeniatheretum capitis-medusae Rivas-Martínez et Izco 1977 **trifolietosum hirti** Molero 1984

Holotypus: Molero 1984, *Butll. Inst. Cat. Hist. Nat.* 51: 150-151, tab. 6, rel. 3 (Prades, 760 m, C Catalanidic terr.).

Data: Molero (1984).

Structure: Therophytic, rather diverse community formed by small, subnitrophilous herbs, mainly *Aegilops geniculata, Trifolium hirtum, T. campestre, Medicago minima, Convolvulus cantabrica, Vulpia ciliata* and *Bromus hordeaceus*.

Ecology: Flat or gentle surfaces on slate, such as old fields or open pasture areas, rooting in loam-sandy soils eutrophized by herds, and under continental, low mountain mediterranean climate.

Distribution: It is only known from the Central Catalanidic territory (Prades mountains).

Aegilopo geniculatae-Carthametum lanati O. Bolòs 1996

Holotypus: Bolòs 1996, *Mem. R. Acad. Cienc. Art. Barc.* 930: 45-47, rel. 3 (Sant Martí de Brufaganya, 730 m, Ausosegarric terr.).

Data: Bolòs (1996).

Structure: Open herbaceous community frequently dominated by the thistle *Carthamus lanatus*, and including other broad-niche or subnitrophilous species, like *Aegilops geniculata, Avena barbata, A. sterilis, Anthemis arvensis* or *Eryngium campestre*.

Ecology: Path margins and old fields under strong grazing pressure, settling on calcareous, eutrophic substrata, in low mountain areas under continental mediterranean climate.

Distribution: Recorded from the Ausosegarric territory, and likely also occurring in other inner mediterranean areas.

Orlayo grandiflorae-Aegilopetum geniculatae Romo ex Rivas-Martínez et Izco in Rivas-Martínez et al. 2002

[*Aegilopo-Orlayetum grandiflorae* Romo 1989, nom. inval., art. 5]

Holotypus: Romo 1989, *Arx. Secc. Cièn.*. 90: 410, tab. 16, rel. 2 (pont de Montanyana, 535 m, C pre-Pyrenees).

Data: Romo (1989), Sanz (2001).
Structure: Ephemeral community blooming in early summer, with *Aegilops geniculata, Orlaya grandiflora, Bromus hordeaceous,* etc.
Ecology: Slopes between fields and path margins, in calcareous, eutrophic substrata.
Distribution: Submontane areas of dry, continental pre-Pyrenees

ECHIO PLANTAGINEI-GALACTITION TOMENTOSAE O. Bolòs et Molinier 1969

Galactito tomentosae-Echietum plantaginei Molinier 1937
Data: Franquesa (1995), Gesti (2006).
Structure: Dense, tall herbaceous community of *Galactites tomentosa, Echium plantegineum, Avena barbata, Malva sylvestris* and other ruderals or opportunists, which develops in late winter and spring.
Ecology: Edges of fields and paths, fallows and other waste areas with deep, fertile soil.
Distribution: It occurs in the northern maritime lowlands (Ruscinic territory).

Bromo madritensis-Galactitetum tomentosae O. Bolòs, Molinier et P. Montserrat 1970
Lectotypus: Bolòs *et al.* 1970, *Acta Geobot. Barc.* 5: 128, rel. 2 (Barcelona, 170 m); designed in Bolòs 1997a: 207.
Data: Bolòs *et al.* (1970), Royo (2006).
Structure: Community of *Galactites tomentosa* and *Bromus madritensis* including other subnitrophilous therophytes or paucienials, mainly *Avena barbata, A. sterilis, Urospermum picroides, Hordeum murinum* subsp. *leporinum* and *Lotus ornithopodioides*.
Ecology: Road margins and slopes, rooting in fertile, mild soils.
Distribution: It is known from the maritime lowlands of the Catalanidic territory.

Trifolietum angustifolio-campestris O. Bolòs et Masalles 1983
Holotypus: Bolòs & Masalles 1983, *Mem. full Banyoles*: 99 (Sallent de Santa Pau, 370 m, Olositanic terr.).
Data: Álvarez de la Campa (2004), Bolòs (1996), Bolòs & Masalles (1983), Gesti (2006), Royo (2006).
Structure: Light, low herbaceous community formed by an assemblage of plants from subnitrophilous to opportunist character, mainly therophytes, such as *Trifolium angustifolium*, *T. campestre* (both more or less abundant), *Bromus hordeaceus, Medicago minima, Cynodon dactylon, Dactylis glomerata* subsp. *hispanica, Plantago lanceolata*, etc.
Ecology: It covers small surfaces, frequently just stripes, along paths or field edges, rooting in mild, undisturbed soil.

Distribution: Lowlands and moderate elevations, under sub-humid mediterranean climate, in the Ruscinic, Olositanic, Catalanidic and Ausosegarric territories.
Variability: three subassociations are known.
- **typicum**, which corresponds to the described community, occurs in the maritime areas.
- **medicaginetosum minimae** O. Bolòs 1996. Holotypus: Bolòs 1996, *Mem. R. Acad. Cienc. Art. Barc.* 930: 48, rel. 1 (Motclar, 620 m, Ausosegarric terr.). An impoverished, ill-defined form found in the inner area of the association, devoid of *Trifolium angustifolium* and including *Santolina chamaecyparissus* subsp. *squarrosa*.
- **trifolietosum arvensis** Álvarez de la Campa 2004. Holotypus: Álvarez de la Campa 2004, *Veg. mass. Port*.: 301, tab. 56, rel. 4 (Horta de Sant Joan, 750 m, S Catalanidic terr.). Community found in acidic substrata of South Catalanidic mountains, including as main differentials *Trifolium arvense, T. glomeratum* and *Andryala integrifolia.*

Crepido bursifoliae-Plantaginetum lagopodis Carrillo, Ninot, Pino et Sans 1992
Holotypus: Carrillo *et al.* 1992, *Fol. Bot. Misc*. 8: 176-178, tab. 1, rel. 7 (Santa Coloma de Cervelló, 40 m, C Catalanidic terr.).
Data: Álvarez de la Campa (2004), Carrillo *et al*. (1992), Royo (2006).
Structure: Low, diverse pasture mainly formed by subnitrophilous species. Among them, the dominance is mostly shared by *Medicago truncatula, Crepis bursifolia, Plantago lagopus, Bromus madritensis, Koeleria phleoides, Medicago minima, Leontodon taraxacoides* subsp. *hispidus, Filago pyramidata, Cynodon dactylon, Urospermum dalechampii* and *Galactites tomentosa*.
Ecology: Abandoned fields and other marginal lands with deep, good soil, though becoming very dry in summer, in most cases under a moderate grazing regime.
Distribution: Maritime lowlands from Barcelona southwards, in the Central and South Catalanidic territory.

Plantagini lagopodis-Trifolietum cherleri Franquesa 1995
Holotypus: Franquesa 1995, *Pais. veg. cap Creus*: 329-332, tab. 19, rel. 3 (Torre del Sastre, 180 m, Ruscinic terr.).
Data: Franquesa (1995), Gesti (2006), Zeller (1958, sub *Plantago lagopus* and *Trifolium scabrum* community).
Structure: Short pasture dominated by therophytes, mostly subnitrophilous. It includes mainly *Plantago lagopus, Trifolium cherleri* and *Paronychia argentea*, and also *Urospermum dalechampii, Bromus hordeaceus, Alyssum maritimum*, *Tolpis barbata, Ornithopus compressus, Dactylis glomerata* subsp. *hispanica*, etc.
Ecology: Flat or gentle surfaces, in schist, shallow soils, more or less acidic and ruderalized through grazing and fire regime. The strong dryness of the soil from late spring forces the community to a winter to spring development.
Distribution: It is known from the northeastern, maritime lowlands (Ruscinic territory).
Variability: A rather variable association in terms of density and species composition, it has been subdivided into three ecological subassociations.

- trifolietosum cherleri Franquesa 1995 (= **typicum**) is the general subassociation in moderately ruderalized, dry soils, and frequently contains abundant *Poa bulbosa*.
- stipetosum capensis Franquesa 1995. Holotypus: Franquesa 1995, *Pais. veg. cap Creus*: 333-336, tab. 20, rel. 9 (cap de Creus, 120 m, Ruscinic terr.). Settling on drier soils, is differentiated by therophytes of dry places, mainly *Stipa capensis* (at places very abundant), *Crucianella angustifolia, Trigonella gladiata, Plantago psyllium*, etc.
- trifolietosum nigrescentis Franquesa 1995. Holotypus: Franquesa 1995, *Pais. veg. cap Creus*: 337-339, tab. 21, rel. 2 (cap de Creus, 160 m). It occurs in moister soils, and includes mesic species such as *Vulpia muralis, Gaudinia fragilis, Moenchia erecta* and *Lotus angustissimus*.

Lepidio drabae-Brometum diandri O. Bolòs 1996

Holotypus: Bolòs 1996, *Mem. R. Acad. Cienc. Art. Barc.* 930: 49, rel. 3 (les Borges Blanques, 300 m, Ausosegarric terr.).

Data: Álvarez de la Campa (2004), Bolòs (1962, sub *Hordeetum leporini brometosum* p.p.; 1996), Royo (2006, sub *Convolvulo arvensis-Cardarietum drabae* Carretero et Aguilella 1995, p.p.).

Structure: Dense, tender herbage mainly formed by *Bromus diandrus, B. madritensis, Lepidium draba, Hordeum murinum* subsp. *leporinum, Avena barbata* and *Foeniculum vulgare* subsp. *piperitum*.

Ecology: Field edges and path margins, in deep, fertile soils which remain moist in winter and spring, and dry out in early summer, which forces a primeval development of the community.

Distribution: Ausosegarric and Catalanidic territories.

Variability: Two subassociations have been distinguished.

- **typicum**, which corresponds to the described community; it is very close to *Hordeetum leporini brometosum gussonei*.
- toriletosum neglectae Álvarez de la Campa 2004. Holotypus: Álvarez de la Campa 2004, *Veg. mass. Port*: 297-298, tab. 52, rel. 8 (Horta de Sant Joan, 360 m, S Catalanidic terr.). It is a slightly sciophilous community, differentiated by *Torilis arvensis* subsp. *neglecta* and *Lactuca serriola.*

Foeniculo piperiti-Helichrysetum stoechadis Ninot, Quadrada et Carrillo 2009

Holotypus: Ninot *et al*. 2009, *Misc. Aqualat*. 13: 114-119, tab. 18, rel. 13 (la Pobla de Claramunt, 340 m, C. Catalanidic terr.).

Data: Ninot *et al*. (2009).

Structure: Diverse assemblage of wide spectrum herbs, including subnitrophilous taxa, such as *Dactylis glomerata* subsp. *hispanica*, *Foeniculum vulgare* subsp. *piperitum, Chondrilla juncea*, *Urospermum dalechampii*, *Sonchus tenerrimus, Plantago lanceolata, Trifolium campestre* and *Oryzopsis miliacea*, together with some sub-shrubs like *Helicrhysum stoechas* or *Plantago sempervirens*.

Ecology: Old fields under low disturbance regime, such as extensive grazing, on gently sloping areas with moderately dry and fertile soils.

Distribution: Central Catalanidic territory, from lowlands to moderate altitudes.

BROMO-ORYZOPSION MILIACEAE O. Bolòs 1970

[*Bromo madritensis-Piptatherion miliacei* O. Bolòs 1970 nom. mut. propos. Rivas-Martínez 2011]

Inulo viscosae-Oryzopsietum miliaceae O. Bolòs 1957

[*Dittrichio viscosae-Piptatheretum miliaceae* O. Bolòs 1957 nom. mut. propos. Rivas-Martínez 2011; incl. *Soncho tenerrimi-Lobularietum maritimae* Carretero et Aguilella 1995]

Lectotypus: A. Bolòs 1950, *Veg. com. barcel*.: 74-75, rel. 1 (Vallvidrera, 225 m, Barcelona); designed in Bolòs 1979, *Phytocoenologia* 2: 142.

Data: Álvarez de la Campa (2004), A. Bolòs (1950), Bolòs (1962, 1970, 1996), Bolòs & Vigo (1984), Cardona (1980), Conesa (1991, 2001), Cortina *et al.* (1988), Curcó (2000), Forcadell (1999), Gesti (2006), Losa (1975), Ninot *et al*. (2009), Royo (2006).

Structure: Community dominated by the subshrub *Inula viscosa* and the perennial grass *Oryzopsis miliacea*, and including in a lower stratum some diversity of other subnitrophilous taxa, such as *Alyssum maritimum, Bromus madritensis, Koeleria phleoides, Dactylis glomerata* subsp. *hispanica* and *Plantago lagopus*.

Ecology: It settles on open, slightly ruderalized areas, mostly with deep soil, though rather dry in summer, such as road margins and slopes, old fiels and other waste lands.

Distribution: Mediterranean lowlands under maritime influence (Catalanidic and Ruscinic territories), reaching sparsely the inner plains (Ausosegarric and Sicoric territories).

Variability: Two subassociations have been described.

- **typicum**, very general in the area.

- **saturejetosum nepetae** O. Bolòs 1970 [*saturejetosum glandulosae* O. Bolòs 1970, nom. corr. propos. Ninot, X. Font, Masalles et Vigo, art. 43]. Lectotypus: Bolòs 1970, *Vegetatio* 21: 54, tab. 1, rel. 6 (Monaco, 100 m); designed in Bolòs 1997a: 214). Known from the Ruscinic territory, it includes the differentials *Diplotaxis tenuifolia* and *Satureja calamintha* subsp. *glandulosa* (= subsp. *nepeta* auct.), and is devoid of some thermophilous, meridional taxa.

Comment: We take the association described as *Soncho tenerrimi-Lobularietum maritimae* (holotypus: Carretero & Aguilella 1995, *Flora veg. Valencia*: 175, tab. 26, rel. 7) as dynamic, early stages of *Inulo-Oryzopsietum*. Also, we relate to the same association a few relevés identified as extreme representatives of *Oryzopsio miliaceae-Ballotetum hirsutae* O. Bolòs 1075 by Royo (2006).

Alysso maritimi-Verbascetum boerhavii O. Bolòs et Vigo 1984

Holotypus: Bolòs & Vigo 1984, *Sist. nat. illes Medes*: 177, rel. 1 (Meda gran, Ruscinic terr.).

Data: Bolòs & Vigo (1984).

Structure: *Verbascum boerhavii* sparse community with *Alyssum maritimum, Carduus tenuiflorus, Brassica fruticulosa,* etc.

Ecology: Ruderalized patches on south-facing, rocky littoral slopes.

Distribution: Only recorded from the Medes islets (Ruscinic territory), it might be found in other littoral, dry areas.

Comment: A poorly characterized association, only known by two short relevés.

SISYMBRIETALIA OFFICINALIS J. Tüxen ex Matuszkiewicz 1962
HORDEION LEPORINI Braun-Blanquet in Braun-Blanquet, Gajewski, Wraber et Walas 1936

Hordeetum leporini Braun-Blanquet in Braun-Blanquet, Gajewski, Wraber et Walas 1936

[*Carduo-Hordeetum leporini* auct., "Ass. à *Hordeum murinum* et *Carduus tenuiflorus"* Braun-Blanquet 1931]

Data: Álvarez de la Campa (2004), Bolòs (1959, 1960, 1962, 1996), Bolòs & Masalles (1983), Braun-Blanquet & Bolòs (1958), Conesa (1991, 2001), Cortina *et al.* (1988), Franquesa (1995), Gesti (2006), Llansana (1976), Ninot *et al*. (2009), Romo (1989), Rovira (1986), Royo (2006), Viñas (1993), Vives (1964).

Structure: Dense grassland generally dominated by *Hordeum murinum* subsp. *leporinum*, and including other ruderals such as *Bromus* spp., *Koeleria phleoides, Malva sylvestris, Anacyclus clavatus, Erodium ciconium, Carduus tenuiflorus, C. pycnocephalus,* etc. Much of these species are winter annuals, thus the community develops mainly from winter to late spring, and then dries out.

Ecology: Path margins and other surfaces subject to moderate ruderalization and trampling, with dry soils.

Distribution: A very common association occurring in the mediterranean areas under sub-humid or continental climates, thus absent from the Pyrenees and from the southern, maritime lowlands.

Variability: It is diversified into seven subassociations, some of which territorial, other ecological.

- malvetosum sylvestris Braun-Blanquet in Braun-Blanquet, Roussine et Nègre 1952 (= **typicum**). The most general subassociation, it stretches from the northeastern areas to the inner lowlands and to the southern mediterranean mountains, on eutrophic, carbonated soils.

- brometosum gussonei O. Bolòs 1962. Lectotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 61, rel. 7 (Llobregat delta, 10 m, C Catalanidic terr.); designed in Bolòs 1997a: 214. It is found in littoral plains with mild soil, and includes *Bromus diandrus* subsp. *diandrus* (= *B. gussonei*).

- crepidetosum setosae Bolòs et Masalles 1983. Holotypus: Bolòs & Masalles 1983, *Mem. full Banyoles*: 39 (el Collell, 300 m, Olositanic terr.). Occurring in sub-humid areas, it includes some species of mesophilous character (such as *Bromus sterilis* and *Crepis setosa*), and lacks others typical of dry areas (*Erodium ciconium, Anacyclus clavatus*, etc.).

- echietosum plantaginei O. Bolòs 1962, nom. nov. Ninot, X. Font, Masalles et Vigo [*alysso-echietosum* O. Bolòs 1962, nom. illeg., art. 34c]. Lectotypus: Bolòs 1962: 107, tab. 61, rel. 2 (Santa Coloma de Gramanet, 50 m, N Catalanidic terr.); designed in Bolòs 1997a: 214. It is found from Barcelona northwards, on siliceous, mild substrata, and is differentiated by *Echium plantagineum, Alyssum maritimum* and *Crepis bursifolia*.

- malvetosum neglectae Braun-Blanquet et O. Bolòs 1958. Lectotypus: Braun-Blanquet & Bolòs 1958*, Anales Aula Dei* 5: 71-73, tab. 11, rel. 14 (Huesca, 450 m); designed in Bolòs 1997a:

214. This subassociation occurs in the inner, dry continental Ebro basin, and is differentiated by some xerophytes, and also through the absence or rarity of *Erodium ciconium, Sisymbrium officinale, Echium plantagineum*, etc.

- onopordetosum illyrici Franquesa 1995. Holotypus: Franquesa 1995, *Pais. veg. cap Creus*: 369-370, tab. 41, rel. 8 (Sant Tomàs del Pení, 400 m, Ruscinic terr.). A thistle formation with abundant to dominant *Onopordum illyricum* and *Carthamus lanatus*, found in Cap de Creus.

- trifolietosum nigrescentis O. Bolòs 1959. Holotypus: Bolòs 1959, *Arx. Secc. Cièn*. 23: 89-90 (Breda, 900 m, N Catalanidic terr.). This subassociation is known from the acidic, sub-mediterranean areas of la Selva, and includes calcifuge species like *Trifolium nigrescens, T. arvense* and *Silene gallica*.

Asphodelo fistulosi-Hordeetum leporini O. Bolòs 1956

Lectotypus: A. Bolòs 1950, *Veg. com. barcel.*: 72-74, rel. 4 (Barcelona, 120 m); designed in Bolòs 1997a: 206.

Data: Álvarez de la Campa (2004), A. Bolòs (1950, sub "Ass. prov."), Bolòs (1962), Cardona (1980), Curcó (2000), Forcadell (1999), Gesti (2006), Rovira (1986), Royo (2006).

Structure: Grass formation of *Hordeum murinum* subsp. *leporinum* containing other ruderals more or less thermophilous or of meridional character, like *Asphodelus fistulosus*, *Alyssum maritimum, Hirschfeldia incana Plantago lagopus, Anacyclus valentinus* or *Lamarckia aurea*. It shows a winter to early spring phenology, much of its species being winter therophytes.

Ecology: Path margins, old fields and other marginal lands, in trampled soils.

Distribution: Typical of areas with temperate winter, it is found in the lowlands under maritime climate.

Variability: Two subassociations are known.

- hordeetosum leporini O. Bolòs 1962 (= **typicum**), which corresponds to the described community, is general in the whole area of the association.

- chrysanthemetosum coronarii Álvarez de la Campa 2004. Holotypus: Álvarez de la Campa 2004, *Veg. mass. Port*: 295-296, tab. 46, rel. 8 (Mas de Barberans, 330 m, S Catalanidic terr.). This is a rather luxuriant community in spring, when *Chrysanthemum coronarium* dominates.

- onopordetosum illyrici O. Bolòs 1962. Lectotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 60, rel. 11 (Barcelona, 60 m); designed in Bolòs 1997a: 206. It corresponds to an over-grazed community, dominated by *Onopordum illyricum*.

SISYMBRION OFFICINALIS Tüxen, Löhmeyer et Preising in Tüxen 1950

Sisymbrio officinalis-Asperuginetum procumbentis Rebholz 1931

Data: Carreras (1993), Carreras *et al.* (1997), Conesa (2001), Vigo (1996).

Structure: Community formed by intricated, decumbent populations of *Asperugo procumbens*, with other ruderals of dry sites, such as *Capsella bursa-pastoris, Bromus sterilis* and *Malva neglecta*.

Ecology: Areas frequented by shepherds, as those surrounding corrals, shelters and associated paths, with manured soil.
Distribution: It typically occurs in the Pyrenees, in the montane belt, but some impoverished forms have been recorded from continental lowlands (Sicoric territory).

Hordeetum murini Libbert 1933
[*Bromo sterilis-Hordeetum murini* auct.]
Data: Álvarez de la Campa (2004), Bolòs (1960, 1967, 1983), Carreras (1993), Carreras *et al.* (1993, 1997), Carrillo & Ninot (1992), Devis (2006), Rosell (1987), Soriano (2001), Vigo (1996), Villegas (1993).
Structure: Low, dense grassland normally dominated by *Hordeum murinum* subsp. *murinum*, and including other ruderals adapted to moderately dry sites, such as *Bromus sterilis, Sisymbrium officinalis, Malva neglecta* or *Capsella bursa-pastoris*.
Ecology: Path margins and sorroundings of villages and farms, settling on ruderalized, slightly trampled substrata, mainly under sub-mediterranean conditions that lead to drying out through summer.
Distribution: Pyrenees and neighbouring areas, and South Catalanidic mountains, mainly in the submontane belt.
Variability: Two subassociations have been distinguished.
- typicum, general in the Pyrenean area.
- marrubietosum supini O. Bolòs et Vigo in O. Bolòs 1967. Lectotypus: Bolòs 1967: *Mem. R. Acad. Cienc. Art. Barc*. 724: 69, tab. 26, rel. 1 (Fredes, 1230 m, S Catalanidic terr.); designed in Bolòs 1997a: 207. It is a meridional form of the association, differentiated by *Marrubium supinum, Bromus tectorum* and *B. madritensis*.

Erigeronto canadensis-Lactucetum serriolae Lohmeyer in Oberdorfer 1957
[*Conyzo canadensis-Lactucetum serriolae* auct.]
Data: Soriano (2001), Vigo (1996).
Structure: An open, erect herbaceous community mainly formed by *Lactuca serriola, Conyza canadensis, Chenopodium album* and *Melilotus alba*, showing summer maximum development.
Ecology: It settles on path margins or slopes, old fields and other waste lands, rooting in rather dry soils, under sub-mediterranean climate.
Distribution: It is only recorded from eastern Pyrenees, though it may occur in other mountain areas.

Anthrisco caucalidis-Geranietum lucidi O. Bolòs et Vigo in O. Bolòs 1967 **urticetosum dioicae** (= **typicum**)
[Groupement à *Urtica dioica* et *Antrhiscus scandicina* Braun-Blanquet et O. Bolòs 1950].
Lectotypus: Braun-Blanquet & Bolòs 1950, *Collect. Bot*. 2: 334, rel. 2 (Cardó, 925 m, C Catalanidic terr.); designed in Bolòs 1997a: 205.
Data: Álvarez de la Campa (2004), Braun-Blanquet & Bolòs (1950), Conesa (2001), Molero (1976), Rovira (1986), Royo (2006).

Structure: Irregular formation of tender, slightly ruderal annuals and pauciennials, such as *Anthriscus caucalis, Geranium lucidum, G. robertianum* s.l., *Stellaria media* and *Urtica dioica*.
Ecology: Sheltered places frequented by sheep or game, such as cliff feet or entries of caves, in mediterranean mountains.
Distribution: South and Central Catalanidic territory, and southern pre-Pyrenees, at medium altitudes.

Bromo sterilis-Sisymbrietum macrolomae Ninot, Soriano et Vigo in Ninot, Guàrdia, X. Font et Carrillo 1999

[*Bromo-Sisymbrietum macrolomae* Ninot, Soriano et Vigo in Vigo 1996, nom. inval., art. 3g).
Holotypus: Vigo 1996, *Pobl. veg. Ribes*: 178-179 (el Casot, 920 m, E Pyrenees).
Data: Soriano (2001), Vigo (1996).
Structure: Irregular formation of ruderals from which *Sisymbrium orientale* subsp. *macroloma* stands out owing to its dominance and singularity; other taxa are *Bromus sterilis, Elymus caninus, Ballota nigra* subsp. *foetida* and *Oryzopsis miliacea*.
Ecology: A singular community occuring in cave entries or cliff feet, traditionally used as shepherd shelters, or frequented by wild herbivores; under sub-mediterranean conditions.
Distribution: Pre-Pyrenees, in the submontane and montane belts.

ARTEMISIETEA VULGARIS Lohmeyer, Preising et Tüxen ex von Rochow 1951
CARTHAMETALIA LANATI Brullo in Brullo et Marcenò 1985
SILYBO MARIANI-URTICION Sissingh ex Braun-Blanquet et O. Bolòs 1958

[*Urtico piluliferae-Silybion mariani* Sissingh ex Braun-Blanquet et O. Bolòs 1958 nom. inv. et mut. propos. Rivas-Martínez 2011]

Silybo mariani-Urticetum piluliferae Braun-Blanquet in Braun-Blanquet, Gajewski, Wraber et Walas 1936

[*Urtico piluliferae-Silybetum mariani* Braun-Blanquet in Braun-Blanquet et al. 1936, nom. mut. propos. Rivas-Martínez 2011]
Holotypus: Braun-Blanquet et al. 1936, *Prodr. Group. Vég*. 3: 16-17 (Tossa, Catalanidic terr.).
Data: Álvarez de la Campa (2004), A. Bolòs (1950), Bolòs (1960, 1962, 1967, 1996), Conesa (1991, 2001), Cortina *et al.* (1988), Curcó (2000), Franquesa (1995), Gesti (2006), Llansana (1976), Ninot *et al.* (2009), Rovira (1986), Royo (2006), Sanz (2001), Vives (1964).
Structure: Dense, tall thistle formation, frequently dominated by *Silybum marianum*, and including other robust ruderals such as *Carduus tenuiflorus, Artemisia verlotiorum, Cynoglossum creticum, Ballota nigra* subsp. *foetida*, and *Rumex pulcher*. It grows into a luxuriant aspect during spring, and dries out from the end of this season.
Ecology: Moderately ruderalized areas with deep, moist soils, such as path margins, orchard edges or ashore river banks, usually as small spots or stripes, under mediterranean climate.
Distribution: Very general in the lowlands of all the territories.
Variability: A widespread association in the mediterranean areas, where six subassociations have been differentiated.

- silybetosum mariani Braun-Blanquet in Braun-Blanquet, Roussine et Nègre 1952 (= **typicum**), which corresponds to the described community, is found sparsely in the milder areas of the association range.
- brometosum sterilis O. Bolòs 1962, nom. nov. Ninot, X. Font, Masalles et Vigo [*arctio-brometosum sterilis* O. Bolòs 1962, nom. illeg., art. 34c]. Holotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 68, rel. 4 (Montcada i Reixac, 60 m, N Catalanidic terr.). It is found as understorey in plantations of deciduous trees, in the sub-humid North Catalanidic territory, and includes *Bromus sterilis, Arctium minus* and *Rubus ulmifolius*.
- onopordetosum acanthii O. Bolòs 1960 [*atriplici-onopordetosum* auct.]. Lectotypus: Bolòs 1960, *Anales Inst. Bot. Cavanilles* 18: 221, tab. 15, rel. 2 (Agramunt, 350 m, Sicoric terr.); designed in Bolòs 1997a: 222. A transitional community to Pyrenaean *Onopordion acanthii*, it occurs in the southern pre-Pyrenees and in Sicoric and Ausosegarric northern parts, and is differentiated by *Onopordum acanthium, Malva neglecta* and *Descurainia sophia*.
- euphorbietosum helioscopiae O. Bolòs 1962, corr. nom. Álvarez de la Campa 2004 [*boragini-euphorbietosum helioscopiae* O. Bolòs 1962, nom. illeg., art. 34c]. Lectotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 68, rel. 5 (Gavà, 40 m, C Catalanidic ter.); designed in Bolòs 1997a: 222. It grows in dry places, and includes *Borago officinalis, Euphorbia helioscopia* and *Anacyclus valentinus*.
- artemisietosum verlotiorum O. Bolòs 1962, nom. nov. Ninot, X. Font, Masalles et Vigo [*mentho-artemisietosum verlotiorum* O. Bolòs 1962, nom. illeg., art. 34c]. Lectotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 68, rel. 1. (Montcada i Reixac, 50 m, N Catalanidic terr.); designed in Bolòs 1997a: 222. Occuring in humid soils, this community includes as differentials *Artemisa verlotiorum, Mentha rotundifolia* and *Torilis arvensis*.
- carduetosum tenuiflori O. Bolòs 1960, nom. nov. Ninot, X. Font, Masalles et Vigo [*rumici-carduetosum* O. Bolòs 1960, nom. illeg., art. 34c]. Lectotypus: Braun-Blanquet & Bolòs 1958, *Anales Aula Dei* 5 5: 64, tab. 7, rel. 4 (Cartuja Baja, Zaragoza, 190 m); designed in Bolòs 1997a: 222. It is found in irrigated fields of the inner lowlands (Sicoric territory), and includes some xero-thermophilous ruderals, such as *Hordeum murinum* subsp. *leporinum, Carduus tenuiflorus* and *Sisymbrium irio*.

Centaureo pullatae-Cynaretum cardunculi O. Bolòs 1957
Lectotypus: Bolòs 1957, *Collect. Bot.*. 5: 552-553, rel. 4 (Denia, S Valencian terr.).
Data: Royo (2006).
Structure: Tall formation dominated by the cardoon *Cynara cardunculus,* and including also some generalist ruderals (*Oryzopsis miliacea, Carduus tenuiflorus*, etc.).
Ecology: Margins of paths or fields with deep, mild soil.
Distribution: Typical of the Valenciat territory, this associations reaches the southernmost littoral plains of the area studied, under thermal mediterranean climate.

Artemisio annuae-Conietum maculati Pino 2000
Holotypus: Pino 2000, *Acta Bot. Barc*. 46: 182-183, tab. 1, rel. 7 (Barcelona, Llobregat river).
Data: Pino (2000).
Structure: Tall, dense forb community mainly dominated by the neophytes *Artemisia annua, A. verlotiorum, Aster squamatus, Rumex cristatus* and *R. palustris*, and also

by other ruderals such as *Conium maculatum* (probabl. var. *barceloi*)*, Anacyclus valentinus* or *Rumex obtusifolius*.
Ecology: River banks subject to flooding in autumn and to some drought in summer.
Distribution: It is known from the lower curse of the rivers Llobregat and Besós, in the Catalanidic territory.

ONOPORDETALIA ACANTHII Braun-Blanquet et Tüxen ex Klika et Hadač 1944
ONOPORDION ACANTHII Braun-Blanquet in Braun-Blanquet, Gajewski, Wraber et Walas 1936

Onopordetum acanthii Braun-Blanquet in Braun-Blanquet, Gajewski, Wraber et Walas 1936
Data: Álvarez de la Campa (2004), Braun-Blanquet (1948), Carreras (1993), Carreras et al. (1997), Carrillo & Ninot (1992), Devis (2006), Soriano (2001), Vigo (1996).
Structure: Irregular community dominated by robust forbs, mainly *Onopordum acanthium, Hyosciamus niger, Urtica dioica, Artemisia absinthium, Cirsium vulgare,* and *Reseda luteola*. It may include a lower level of broad-niche ruderals, such as *Hordeum murinum* subsp. *murinum, Convolvulus arvensis, Polygonum aviculare* or *Daucus carota*. The opportunism of these plants, a number of them being biennials, makes the community rather variable from year to year.
Ecology: Path margins and slopes and other ruderal sites, normally frequented by herds, in mountain areas. The soils are in most cases disturbed, and become rather dry in summer, when the community reaches its maximum development.
Distribution: Pyrennes (and South Catalanidic mountains), in the montane and submontane belts.

Salvio aethiopis-Marrubietum supini O. Bolòs 1956
Lectotypus: Bolòs 1956, *Collect. Bot.* 5(1): 209-210, tab. 19, rel. 1 (Fredes, 1230 m, S Catalanidic terr.); designed in Bolòs 1997a: 220.
Data: Álvarez de la Campa (2006), Bolòs (1956).
Structure: An irregular formation of *Marrubium supinum, Salvia aethiopis, Onopordum acaule, O. acanthium, Rumex pulcher, Tordylium maximum*, etc.
Ecology: Disturbed ground, in areas frequented by shep or other herbivores.
Distribution: It is known from the South Catalanidic territory, in the submontane belt.

Verbasco pulverulenti-Cirsietum costae O. Bolòs et Masalles 1983
Holotypus: Bolòs & Masalles 1983, *Mem. full Banyoles*: 99 (el Sallent, 400 m, Olositanic territory).
Data: Bolòs & Masalles (1983).
Structure: Irregular thistle formation of *Cirsium richteranum* var. *costae, C. vulgare, Verbascum pulverulentum, Carthamus lanatus* and other xerophilous ruderals and opportunists.

Ecology: Path margins and slopes, farm sorroundings and similar sites, in sub-humid mediterranean areas.
Distribution: It has been only recorded from the Olositanic territory.

Carduo nutantis-Cirsietum richteriani Loidi 1983 **carduetosum carlinifolii** I. Soriano 2001

Holotypus: Soriano 2001, *Acta Bot. Barc.* 47: 268-269, tab. 28, rel. 8 (Gréixer, 1700 m, E pre-Pyrenees).
Data: Soriano (2001).
Structure: Thistle community mainly formed by *Cirsium eriophorum* subsp. *richterianum, C. vulgare, Carduus defloratus* subsp. *carlinifolius, C. nutans, Cynoglossum officinale* and *Urtica dioica*.
Ecology: It occurs in ruderalized sites of mountain pastures, frequently next to springs, or to resting places of herds.
Distribution: It is known from the eastern Pyrenees, in the high montane and subalpine belts.

Onopordetum acauli (Braun-Blanquet) Vigo et Carreras in Carreras et al. 1997

[*Onopordetum acanthii* subass. à *Onopordon acaule* Braun-Blanquet 1948]
Holotypus: Braun-Blanquet 1948, *Vég. alp. Pyr. Orient.*: 144 (serra de Cadí, 1850 m, E pre-Pyrenees).
Data: Braun-Blanquet (1948), Carreras *et al*. (1997).
Structure: A particular association standing out by the great rosettes with clustered capitula at the ground level of *Onopordum acaule*. Moreover, it includes *Urtica dioica, Cynoglossum officinale, Verbascum thapsus*, etc.
Ecology: Strongly disturbed ground through herd frequentation, in dry mountain areas, in the form of small patches.
Distribution: Subalpine belt of the eastern Pyrenees.

Echinopo sphaerocephali-Artemisietum absinthii Vigo et Carreras in Carreras et al. 1997

Holotypus: Carreras *et al*. 1997, *Acta Bot. Barc*. 44: 198-199, tab. 4, rel. 3 (Adraén, 1300 m, E pre-Pyrenees).
Data: Carreras *et al.* (1997).
Structure: Forb community dominated by *Artemisia absinthium* and including other tall ruderals more or less xerophilous, such as *Reseda luteola, Echinops sphaerocephalus* and *Onoprodum acanthium*.
Ecology: Dry path margins and slopes, in mountain areas.
Distribution: Only recorded from the pre-Pyrenees, in the montane belt, but perhaps present in the whole Pyrenean area.

Carduo nigrescentis-Verbascetum montani (O. Bolòs) Ninot, X. Font, Masalles et Vigo, stat. nov.

[*Verbascetum blattario-thapsi* O. Bolòs et Masalles 1983 *verbascetosum montani* O. Bolòs 1996]
Holotypus: Bolòs 1996, *Mem. R. Acad. Cienc. Art. Barc.* 930: 53 (la Llacuna, 650 m, Ausosegarric terr.).
Data: Álvarez de la Campa (2004), Bolòs (1996), Carrillo & Ninot (1992, sub *Onopordetum acanthii* p.p.), Vigo (1996, sub *Verbascetum crassifolii* ass. prov.), Royo (2006).

Structure: Irregular forb formation, generally dominatd by *Verbascum thapsus* subsp. *montanum* and including several opportunists and broad-niche species, like *Verbascum lychnitis, Rubus ulmifolius, Carduus nigrescens, Erucastrum nasturtiifolium, Satureja vulgaris,* etc.
Ecology: Forest clearings, path margins and slopes, from moderate altitudes to montane landscapes.
Distribution: Pyrenees and Ausosegarric and South Catalanidic territories.
Variability: Two subassociations are known.
- **typicum**, found in the mediterranean landscapes of the Ausosegarric and South Catalanidic territories, most frequently as forest clearings or edges.
- **echietosum vulgaris** Ninot, X. Font, Masalles et Vigo, subass. nova [*Verbascetum crassifolii* Vigo 1996 ass. prov.]. Holotypus: Vigo 1996, *Pobl. Veg. Ribes*: 365, tab. 113, rel. 2 (Espinosa, 1420 m, E Pyrenees). It has been recorded from the submontane and montane belts of the Pyrenees, settling on dry slopes and road margins, as indicated by the occurrence of ruderals such as *Echium vulgare* subsp. *vulgare, Reseda luteola, Artemisia absinthium,* etc.

Resedo luteolae-Carduetum nutantis Sissingh 1950
Data: Carreras *et al.* (1997), Vigo (1996).
Structure: A thistly community of *Carduus nutans, Cirsium vulgare, Onopordum acanthium, Cynoglossum officinale*, etc.
Ecology: Recently disturbed ground, frequently at the side of forest paths.
Distribution: It has been recorded from the eastern Pyrenees, in the submontane and montane belts.
Comment: Only two relevés are known as having been tentatively classified under this association. More data are needed to assess the presence of this syntaxon in the area.

DAUCO CAROTAE-MELILOTION ALBI Görs 1966

Tanaceto vulgaris-Artemisietum vulgaris Sissingh 1950
[*Tanaceto-Artemisietum* (Braun-Blanquet) Tüxen 1942, art. 2b]
Data: Bolòs (1960, 1996), Carreras *et al.* (1997), Soriano (2001), Vigo (1996).
Structure: Dense herbage dominated by *Tanacetum vulgare*, which includes other tall perennials, from ruderals to broad-niche opportunists: *Artemisia vulgaris, Silene latifolia* subsp. *alba, Daucus carota, Dactylis glomerata* subsp. *glomerata, Sambucus ebulus, Pastinaca sativa* subsp. *sylvestris*, etc.
Ecology: Road margins and similar marginal sites, with deep, fertile, moist soil, in mountain areas.
Distribution: Restricted to the eastern Pyrenees, in the submontane and montane belts, some impoverished examples reach the Ausosegarric territory.

Dauco carotae-Picridetum hieracioidis Görs 1966
Data: Vigo (1979, sub *Brachypodio-Melilotetum* p.p.; 1996).
Structure: Irregular community of broad-niche taxa, ranging from ruderals to

opportunists: *Picris hieracioides*, *Daucus carota* (both more or less abundant), *Dactylis glomerata, Plantago lanceolata, Pastinaca sativa* subsp. *sylvestris, Artemisia vulgaris*, etc.
Ecology: Road margins, abandoned fields and other waste lands.
Distribution: Recorded from the eastern Pyrenees, in the submontane and montane belts.

Nepetetum latifoliae Vigo 1975
Lectotypus: Vigo 1975, *Anales Inst. Bot. Cavanilles* 32: 962-964, tab. 4, rel. 1 (Campelles, 1300 m, E Pyrenees); designed here.
Data: Vigo (1975).
Structure: Forb community of *Nepeta latifolia, Urtica dioica, Artemisia vulgaris, Orinagun vulgare, Geranium pyrenaicum, Pastinaca sativa* subsp. *sylvestris*, etc.
Ecology: Path margins with dry, slightly ruderalized soil, in open sites.
Distribution: Montane belt of the eastern Pyrenees.

Brachypodio phoenicoidis-Melilotetum albae O. Bolòs et Vigo in O. Bolòs et Masalles 1983
[*Brachypodio-Melilotetum albae* O. Bolòs et Vigo in Vigo 1979, nom. inval., art. 3o]
Holotypus: Bolòs & Masalles 1983, *Mem. full Banyoles*: 44 (el Collell, 270 m, Olositanic terr.).
Data: Bolòs (1996), Bolòs & Masalles (1983), Carreras (1993), Carreras *et al.* (1993, 1997), Carrillo & Ninot (1992), Conesa (2001), Molero & Vigo (1981), Ninot *et al.* (2009), Soriano (2001), Vigo (1979, 1996), Villegas (1993).
Structure: Tall herbaceous community normally dominated by *Melilotus alba*, and rather diverse, formed by broad-niche taxa like *Daucus carota, Picris hieracioides, Echium vulgare, Artemisia vulgaris, Melilotus officinalis, Pastinaca sativa* subsp. *sylvestris*, etc.
Ecology: Typical of road margins, settling on dry, moderately ruderal soils.
Distribution: It is common in the Pyrenees and neighbouring mountains, and reaches the Sicoric and Ausosegarric lowlands.
Variability: Two subassociations are known.
- **typicum**, which occurs in the Pyrenees and neighbouring sub-humid areas, in the submontane and montane belts.
- **brachypodietosum phoenicoidis** Conesa 2001. Holotypus: Conesa 2001, *Fl. veg. serres marg. prepirin.*: 586, tab. 43, rel. 1 (Congost de Camarasa, 290 m, C pre-Pyrenees). This is a mediterranean, lowland community, impoverished in character taxa and including some *Brachypodietalia phoenicoidis* plants (*Centaurea aspera, Ononis spinosa*, etc.).

ARCTION LAPPAE Tüxen 1937

Lamio albi-Conietum maculati Oberd. 1957
Data: Vigo (1996).
Structure: Tall herbaceous community dominated by *Conium maculatum* and *Urtica dioica*, containing other ruderals such as *Malva sylvestris, Arctium lappa* or *Rumex obtusifolius*.

Ecology: It occurs next to polluted waters, such as drainage channels of dunghills or farmyards.
Distribution: Only recorded from the eastern Pyrenees, in the submontane belt (a mere relevé).

Balloto foetidae-Arctietum minoris O. Bolòs 1959
[*Arctio minoris-Urticetum dioicae* O. Bolòs et Masalles 1983, syntax. syn.; non *Balloto-Arctietum* Sissingh 1946]
Lectotypus: Bolòs 1959, *Pais. veg. Selva Vic*: 154-155 (Tona, 650 m, Ausosegarric terr.); designed in Bolòs & Masalles 1983: 41.
Data: Álvarez de la Campa (2004), Bolòs (1959, 1960, 1996), Carreras (1993), Carreras *et al.* (1997), Carrillo & Ninot (1992), Conesa (2001), Devis (2006), Molero & Vigo (1981), Royo (2006), Sanz (2001), Soriano (2001), Vigo (1996), Villegas (1993).
Structure: Dense, tall forb community mainly built up by robust, perennial herbaceous ruderals. The main components are *Urtica dioica* (in most cases dominant), *Arctium minus, Artemisia vulgaris, Galeopsis tetrahit, Galium aparine, Dactylis glomerata* subsp. *glomerata, Rumex crispus, Ballota nigra* subsp. *foetida* and *Geranium pyrenaicum.*
Ecology: It occurs in ruderalized sites whith mild, deep soil, generally in road margins or next to buildings, in humid mountain areas.
Distribution: The typical forms of this association are found in the submontane and montane belts of the Pyrenees and neighbouring mountains (Olositanic, Ausosegarric territories); but some impoverished forms reach lowlands (even in the Sicoric territory) in clearings of alluvial forests.
Variability: Regional and ecological variability might be considered. Bolòs (1983) reported two subassociations (invalid): *ballotetosum foetidae* (= *typicum*) and *chaerophylletosum temulenti*, the second less nitrophilous, transitional to *Galio-Alliarion*.

Arctio minoris-Artemisietum vulgaris Oberdorfer ex Seybold et Müller 1972
Data: Vigo (1996).
Structure: Luxuriant forb community of *Arctium lappa, Rumex obtusifolius, Artemisia vulgaris, Rubus caesius*, etc.
Ecology: Disturbed areas with fertile, humid soil.
Distribution: It is only recorded from the eastern Pyrenees, in the submontane belt (a mere relevé).

Parietario judaicae-Chelidonietum majoris O. Bolòs et Masalles 1983
Holotypus: Bolòs & Masalles 1983, *Mem. full Banyoles*: 99 (Santa Pau, 490 m, Olositanic territory).
Data: Álvarez de la Campa (2004), Bolòs & Masalles (1983), Conesa (2001), Royo (2006).
Structure: Forb community built by scio-nitrophilous plants, mainly *Chelidoium majus, Parietaria vulgaris* subsp. *judaica, Urtica dioica, Galium aparine* and *Taraxacum officinale* s.l.

Ecology: It forms small patches in shadowed ruderal sites, particularly at the foot of buildings and walls, or in small clearings, frequently rooting in rocky surfaces.
Distribution: Reported from the Catalanidic, Olositanic and Sicoric territories, and probably widespread.

***Rumex obtusifolius* and *Malva sylvestris* community**
Data: Vigo (1996).
Structure: A forb community dominated by the named species, and including other meso-higrophylous ruderals (*Lolium perenne, Chaerophyllum aureum, Urtica dioica*, etc.)
Ecology: Edges of mountain meadows, in contact with irrigation channels.
Distribution: Recorded from the submontane belt of the eastern Pyrenees.

RUMICION PSEUDALPINI Rübel ex Scharfetter 1938 corr. Loidi et Biurrun 1996

Chenopodio boni-henrici-Taraxacetum pyrenaici Braun-Blanquet 1948
Lectotypus: Braun-Blanquet 1948, *Vég. alp. Pyr. Orient*.: tab. 18, rel. 10 (vall d'Eina, 2100 m, E Pyrenees); designed in Loidi & Biurrun 1996: 170).
Data: Braun-Blanquet (1948), Carreras *et al.* (1997), Carrillo & Vigo (1984, sub *Rumici-Chenopodietum boni-henrici* p.p.), Soriano (2001).
Structure: Dense community frequently dominated by *Urtica dioica* or by *Chenopodium bonus-henricus*, which contains *Lamium album, Gagea fistulosa, Sisymbrium austriacum* subsp. *chrysanthum, Geranium pyrenaicum*, etc.
Ecology: Ruderalized sites in high mountain pastures, mainly in resting places of cattle or other herbivores, next to springs or folds.
Distribution: Eastern Pyrenees, in the subalpine and low alpine belts.

Chenopodio boni-henrici-Rumicetum pseudalpini Carrillo et Vigo 1984 corr. Rivas-Martínez et al. 2002
[*Rumici alpini-Chenopodietum boni-henrici* Carrillo et Vigo 1984, art 42, 43]
Holotypus: Carrillo & Vigo 1984, *Collect. Bot.* 15: 148-149, tab. 1, rel. 8. (Boí valley, 1880 m, C Pyrenees).
Data: Braun-Blanquet (1948, sub. *Chenopodio-Taraxacetum* p.p.), Carreras *et al.* (1993), Carrillo & Vigo (1984 p.p.).
Structure: Dense forb community frequently dominated by *Rumex pseudalpinus,* and including *R. longifolius, Chenopodium bonus-henricus*, *Poa supina, Urtica dioica*, *Dactylis glomerata* subsp. *glomerata,* etc.
Ecology: It occurs in the form of patches within high mountain pastures, in the places strongly ruderalized by herds, such as their resting places or surroundings of folds or springs.
Distribution: Subalpine and low alpine belts of the Central Pyrenees.

***Aconitum napellus* community**
Data: Carrillo & Vigo (1984, sub *Rumici-Chenopodietum boni-henrici* p.p.), Vives (1964).

Structure: Forb community dominated by the noticeable *Aconitum napellus* subsp. *vulgare,* and including both ruderals (*Urtica dioica, Cirsium eriophorum, Chenopodium bonus-henricus*) and plants of the surrounding grasslands.
Ecology: It occurs as small patches in mountain pastures, where herd disturbance and manuring occurs.
Distribution: It has been reported from the subalpine belt of the Pyrenees (also from the Aragon Pyrenees: Ninot *et al*. 1999).

CONVOLVULETALIA SEPIUM Tüxen ex Mucina 1993
CONVOLVULION SEPIUM Tüxen ex Oberdorfer 1957
[*Calystegetalia sepium, Calystegion sepium* nom. mut. propos. Rivas-Martínez et al. 2002]

Arundini donacis-Convolvuletum sepium Tüxen et Oberdorfer ex O. Bolòs 1962
[*Calystegio sepium-Arundinetum donacis* Tüxen et Oberdorfer ex O. Bolòs 1962, nom. mut. et inv. propos. Ninot, X. Font, Masalles et Vigo]
Lectotypus: Tüxen & Oberdorfer 1958, *Verff. Geob. Inst. Rübel Zürich* 32: 85, tab. 30 (Llobregat delta, 15 m); designed in Bolòs 1997a: 206.
Data: Álvarez de la Campa (2004), Bech & Hernàndez (1976), Bolòs (1962, 1996), Bolòs *et al*. (1988), Conesa (1990a, 1991, 2001), Curcó (2000), Franquesa (1995), Gesti (2006), Rovira (1986), Royo (2006), Tüxen & Oberdorfer (1958, sub *Cynanchum acutum* - *Convolvulus sepium*, Ass. prov.).
Structure: In most cases, *Arundo donax* populations supporting a noticeable lianoid component, which may include *Calystegia sepium* (= *Convolvulus sepium*; at places dominant), *Humulus lupulus, Rubus ulmifolius, R. caesius* or *Cynanchum acutum*. Sometimes there is also a disperse herb layer (of *Aster squamatus, Artemisia verlotiorum*, *Verbena officinalis*, etc.).
Ecology: Margins of irrigation channels or seasonal streams or rivers, or humid slopes between fields, under mediterranean climate.
Distribution: It is general in the lowlands of all the area, excluding the Pyrenees.

Ipomoeo sagittatae-Cynanchetum acuti Costa, Boira, Peris et Stübing 1986
Holotypus: Costa *et al.* 1986, *Ecol. Medit.* 12: 96, tab. 15, rel. 1 (Valencia).
Data: Royo (2006).
Structure: Fringe herbage formed by the lianoid *Ipomoea sagittata, Calystegia sepium* and *Cynanchum acutum,* generally supported by *Arundo donax* or *Phragmites communis*.
Ecology: Margins of ponds or channels, in fertile soils, rich in litter.
Distribution: It has been reported from the Ebro delta and nearby plains, in the South Catalanidic territory.

Oenothero glaziavionae-Asteretum pilosi O. Bolòs et Masalles 1983 corr. Bolòs, J.M. Montserrat et Romo 1988
[*Oenothero suaveolentis-Asteretum lanceolati* O. Bolòs et Masalles 1983]
Holotypus: Bolòs & Masalles 1983, *Mem. full Banyoles*: 43 (Bescanó, 100 m, N Catalanidic terr.).
Data: Bolòs & Masalles (1983), Bolòs *et al.* (1988).

Structure: Tall herbage mainly built up by neophytes, the dominant species being *Aster pilosus* or *Solidago altissima*. Other components are *Oenothera biennis* s.l. (mainly *O. glazoviana*), *Helianthus tuberosus, Artemisia verlotiorum, Paspalum dilatatum*, etc.
Ecology: River banks and humid road margins, under sub-humid mediterranean climate.
Distribution: It is known from the northeastern lowlands (Ruscinic and North Catalanidic territories).

Oenothero biennis-Helianthemetum tuberosi O. Bolòs, J.M. Montserrrat et Romo 1988

Holotypus: Bolòs *et al.* 1988, *Acta Bot. Barc.* 37: 43, tab. 6, rel. 2 (Organyà, 550 m, C pre-Pyrenees).
Data: Bolòs *et al.* (1988), Devis (2006).
Structure: Tall herbage dominated by *Helianthus tuberosus* and including other hygronitrophilous taxa, like *Oenothera biennis* subsp. *biennis*, *Elymus repens, Pastinaca sativa* subsp. *sylvestris* or *Artemisia vulgaris*.
Ecology: Deforested, open river banks, somewhere slightly shadowed by *Populus* or other trees.
Distribution: It is found in the pre-Pyrenees and neighbouring areas, at low altitudes.

Cirsio ferocis-Epilobietum hirsuti O. Bolòs 1996 corr. Rivas-Martínez et al. 2002

[*Cirsio monspessulani-Epilobietum hirsuti* O. Bolòs 1996]
Holotypus: Bolòs 1996, *Mem. R. Acad. Cienc. Art. Barc.* 930: 52, rel. 1 (Santa Perpètua, 570 m, Conca de Barberà).
Data: Álvarez de la Campa (2004), Bolòs (1996), Conesa (1991, 2001 sub *Artemisio-Epilobietum* p.p.), Devis (2006, sub *Artemisio-Epilobietum*), Ninot *et al.* (2009, sub *Artemisio-Epilobietum*), Royo (2006).
Structure: A poor community dominated by *Epilobium hirsutum*, and including other hygrophytes such as *Calystegia sepium, Cirsium monspesulanum* subsp. *ferox, Lythrum salicaria* and *Althaea officinalis*.
Ecology: River and stream banks, in the form of small patches, in slightly shadowed sites.
Distribution: Widespread in mediterranean and sub-mediterranean areas, from the pre-Pyrenees southwards.

Artemisio vulgaris-Epilobietum hirsuti Vigo in Biurrun, García Mijangos, Benito et Fernández-González 2008

[*Artemisio-Epilobietum hirsuti* Vigo 1979, nom. inval., art. 3o]
Holotypus: Vigo 1979, *Butll. Inst. Cat. Hist. Nat*. 44: 78-80, rel. 1 (Ribes de Freser, 890 m, E Pyrenees).
Data: Carreras (1993), Devis (2006), Soriano (2001), Vigo (1997).
Structure: Tall herbage mainly formed by *Epilobium hirsutum* (more or less dominant), *Saponaria officinalis, Pastinaca sativa* subsp. *sylvestris, Urtica dioica, Mentha longifolia* and *Artemisia vulgaris*. It may include some neophytes, such as *Solidago altissima* or *Helianthus tuberosus*.
Ecology: River banks and channel margins, replacing alder woods or other riparian forests.

Distribution: It is found in the Pyrenean area, mainly in the submontane and montane belts.

***Symphytum officinale* community**
Data: Vigo (1996).
Structure: *Symphytum officinale* populations, which include other nitrophilous forbs, such as *Chaerophyllum aureum, Pastinaca sativa* subsp. *sylvestris, Galium aparine* and *Urtica dioica*.
Ecology: Margins of channels or streams, in slightly ruderalized sites.
Distribution: It was recorded from the eastern Pyrenees, in the submontane belt.

BROMO RAMOSI-EUPATORION CANNABINI O. Bolòs et Masalles 1983

Melandrio albae-Eupatorietum cannabini O. Bolòs 1962
[*Sileno albae-Eupatorietum cannabini* O. Bolòs 1962, nom. mut. propos. Ninot, X. Font, Masalles et Vigo, art. 45]
Lectotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 73, rel. 1 (Sant Cugat del Vallès, 300 m, N Catalanidic terr.); designed in Bolòs & Masalles 1983: 60.
Data: Álvarez de la Campa (2004), Bolòs (1962), Soriano (2001), Villegas (1993), Viñas (1993).
Structure: Tall forb community dominated by *Eupatorium cannabinum,* and including species such as *Lapsana communis, Bromus ramosus, Arctium minus, Epilobium hirsutum*, etc.
Ecology: Clearings of meso-hygrophilous forests, under mild mediterranean conditions.
Distribution: Olositanic, Catalanidic and eastern pre-Pyrenean territories, in the basal and submontane belts.

Lithospermo officinalis-Saponarietum officinalis O. Bolòs et Masalles 1983
Holotypus: Bolòs & Masalles 1983, *Mem. full Banyoles*: 59 (Santa Pau, 350 m, Olositanic terr.).
Data: Bolòs & Masalles (1983).
Structure: Populations of *Saponaria officinalis* with *Lithospermum officinale, Eupatorium cannabinum, Brachypodium sylvaticum*, etc.
Ecology: Clearings and edges of riparian forests.
Distribution: The only relevé is known from the Olositanic territory, though the association may occur in other mountainous or sub-humid mediterranean landscapes.

GALIO APARINES-ALLIARIETALIA PETIOLATAE Görs et Müller 1969
GALIO-ALLIARION PETIOLATAE Oberdorfer et Löhmeyer in Oberdorfer, Görs, Korneck, Löhmeyer, Müller, Philippi et Seibert 1967

Alliario petiolatae-Chaerophylletum temuli Lohmeyer 1949
Data: Álvarez de la Campa (2004), Carreras (1993), Carreras *et al*. (1993, 1997), Font *et al.* (1988), Soriano (2001), Villegas (1993), Viñas (1993).

Structure: Forb community formed by *Chaerophyllum temulum* (more or less dominant)*, Urtica dioica, Stellaria holostea, Alliaria petiolata, Geum urbanum,* etc.
Ecology: Small clearings, hedgerows, path margins, etc., in shadowed places with eutrophic soils, related to mesic deciduous forests.
Distribution: Pyrenees and neighbouring mountains (and South Catalanidic range), in the submontane and montane belts.
Variability: Three subassociation have been described.
- typicum, dominated by *Chaerophyllum temulum*, found sparsely in the most humid Pyrenean valleys.
- alliarietosum petiolatae (Lohmeyer) X. Font et Ninot in X. Font, Ninot, Perdigó et Vigo 1988 [*Alliarietum petiolatae* Lohmeyer in Oberdorfer et al. 1967]. More or less dominated by *Alliaria petiolata*, and poorer in alliance character taxa, it is the most extended subassociation.
- galeopsietosum tetrahit Ninot et Vigo in X. Font, Ninot, Perdigó et Vigo 1988.
Holotypus: Font *et al*. 1988: *Acta Bot. Barc*. 37: 212-214, tab. 7, rel. 11 (Arties, 1250 m, C Pyrenees).
Dominated by *Galeopsis tetrahit* and including other scio-nitrophilous species (like *Urtica dioica, Galium aparine,* etc.) it is found in more ruderalized places, in the axial Pyrenees.

Salvio glutinosae-Euphorbietum villosae O. Bolòs 1956 corr. O. Bolòs et Masalles 1983
[*Salvio-Euphorbietum pilosae* O. Bolòs 1956, art. 43]
Lectotypus: Bolòs 1956, *Collect. Bot*. 5: 214-216, tab. 20, rel. 3 (les Preses, 500 m, Olositanic terr.); designed in Bolòs & Masalles 1983: 59
Data: Bolòs (1956), Font *et al.* (1988), Villegas (1993), Viñas (1993).
Structure: Luxuriant community formed by *Euphorbia villosa, Salvia glutinosa, Chaerophyllum aureum, Urtica dioica, Eupatorium cannabinum, Brachypodium sylvaticum, Geum urbanum,* etc.
Ecology: Small clearings or path margins, in moderately disturbed sites of mesic deciduous forests, with humiferous, mild soils.
Distribution: Eastern Pyrenees and Olositanic territory, under sub-maritime climates, in the submontane and basal belts.
Variability: Two subassociation are known.
- fragarietosum vescae O. Bolòs 1956 (= **typicum**).
- pastinacetosum sylvestris O. Bolòs 1956. Lectotypus: Bolòs 1956, *Collect. Bot*. 5: 214-216, tab. 20, rel. 10 (Santa Pau, 700 m, Olositanic terr.); designed in Bolòs & Masalles 1983: 59. It occurs in slighter ruderalized sites, and includes *Pastinaca sativa* subsp. *sylvestris* and *Urtica dioica* as main differentials.

Dipsacetum pilosi Tüxen in Oberdorfer 1957
Data: Font *et al.* (1988).
Structure: Tall herbaceous community dominated by *Dipsacus pilosus,* and including *Urtica dioica, Galium aparine, Lapsana communis, Torilis japonica*, etc.
Ecology: Clearings of meso-hygrophilous forests, such as alder groves, in shadowed places, frequently with sandy, poorly structured soils.

Distribution: Humid valleys of the axial Pyrenees, in the submontane and montane belts.

Urtico dioicae-Lamietum maculati O. Bolòs et Masalles 1983
Holotypus: Bolòs 1983, *Veg. Montseny*: 109 (Sant Bernat del Montseny, 850 m, N Catalanidic terr.).
Data: Bolòs (1983), Bolòs & Masalles (1983), Font *et al*. (1988), Soriano (2001).
Structure: Dense herbaceous community mainly formed by *Lamium maculatum* and *Urtica dioica,* with other mesophytes like *Geranium robertianum* subsp. *robertianum, Galium aparine, Lapsana communis, Stellaria holostea*, etc.
Ecology: Hedges and clearings of meso-hygrophilous forests, hedgerows, and other partly shadowed places, with mild, fertile soil.
Distribution: Humid areas of the Pyrenean, Olositanic and North Catalanidic territories, in the submontane and montane belts.

Lapsano communis-Sisonetum amomi O. Bolòs et Masalles 1983
Holotypus: Bolòs & Masalles 1983, *Mem. full Banyoles*: 102 (el Sallent de Santa Pau, 420 m, Olositanic terr.).
Data: Álvarez de la Campa (2004), Bolòs (1996), Bolòs & Masalles (1983), Conesa (2001), Ninot *et al*. (2009), Royo (2006).
Structure: Herbaceous formation of *Sison amomum*, with *Brachypodium sylvaticum*, *Galium aparine, Lapsana communis,* etc.
Ecology: Small forest clearings and hedges with fertile soil, under mild mediterranean conditions.
Distribution: Mediterranean areas from the pre-Pyrenees southwards, in lowlands and in the submontane belt.

Sileno dioicae-Geranietum phaei Romo 1986
Holotypus: Romo 1986, *Collect. Bot*. 16: 400-401, tab. 2, rel. 8 (Alòs d'Isil, 1550 m, C Pyrenees).
Data: Romo (1986).
Structure: Dense, diverse community formed by several forbs, namely *Chaerophyllum aureum, Geranium pheaum, Stellaria holostea, Vicia sepium, Alliaria petiolata, Geum urbanum*, etc.
Ecology: Edges of hazel groves, clearings of fir forests and similar sites, with moist, eutrophic soil.
Distribution: Central Pyrenees, between the montane and subalpine belts.
Comment: Association described through a rather heterogeneous table, transitional between *Galio-Alliarion* and *Aegopodion*.

Moehringio trinerviae-Geranietum lucidi Romo 1989
Holotypus: Romo 1989, *Fl. veg. Montsec*: 411-412, tab. 17, rel. 1 (Montsec d'Ares, 1400 m, C pre-Pyrenees).
Data: Devis (2006), Romo (1989), Royo (2006).
Structure: Small herbaceous patches formed by *Geranium lucidum, Urtica dioica, Moehringia trinervia*, etc.
Ecology: Shadowed spots, at the edges of paths or similar places frequented by herds.

Distribution: Found sparsely in the central pre-Pyrenees and in the southern Catalanidic mountains, in the submontane and montane belts.

AEGOPODION PODAGRARIAE Tüxen 1967

Chaerophylletum aurei Oberdorfer 1957
Data: Carreras (1993), Font *et al.* (1988), Soriano (2001), Villegas (1993).
Structure: Dense, forb community dominated by *Chaerophyllum aureum* and including *Lapsana communis, Urtica dioica, Geum urbanum, Dactylis glomerata* subsp. *glomerata,* etc.
Ecology: Open, slightly shadowed places at the edge of meadows and paths —sometimes invading abandoned meadows— , in moist, eutrophic soils.
Distribution: Pyrenees, in the montane and subalpine belts.

Urtico dioicae-Aegopodietum podagrariae Tüxen ex Görs 1968
Data: Font *et al.* (1988), Soriano (2001).
Structure: Dense forb community dominated by *Aegopodium podagraria*, with *Urtica dioica, Galium aparine, Poa trivialis*, etc.
Ecology: Clearings and edges of alder forests and other meso-hygrophylous woods, hedgerows, etc., on moist soils.
Distribution: Very rare in the eastern Pyrenees, in the submontane and montane belts.

Chaerophyllo aurei-Geranietum phaei J. Gil, Perdigó et Vigo in X. Font, Ninot, Perdigó et Vigo 1988
Holotypus: Font *et al*. 1988, *Acta Bot. Barc*. 37: 208, tab. 3, rel. 5 (Arties, 1200 m, C Pyrenees).
Data: Font *et al*. (1988).
Structure: Dense forb community formed by *Geranium pheaum, Chaerophyllum aureum, Galium aparine, Elymus repens, Urtica dioica,* etc.
Ecology: Margins of paths and meadows, in moist, eutrophic –but not ruderalized– soils.
Distribution: Humid areas of the Pyrenees, in the submontane and montane belts.

BALLOTO FOETIDAE-CONION MACULATI Brullo in Brullo et Marcenò 1985
[*Conio maculati-Sambucion ebuli* (O. Bolòs et Vigo) Rivas-Martínez et al. 2002, art. 22]

Urtico dioicae-Sambucetum ebuli (Braun-Blanquet) Braun-Blanquet in Braun-Blanquet, Roussine et Nègre 1952
[*Sambucetum ebuli* auct.]
Data: Álvarez de la Campa (2004), Bolòs (1962, 1983, 1996), Bolòs & Masalles (1983), Carreras (1993), Carreras *et al.* (1993, 1997), Carrillo & Ninot (1992), Conesa (1990a, 1991, 2001), Devis (2006), Gesti (2006), Royo (2006), Soriano (2001), Vigo (1996), Villegas (1993), Vives (1964).
Structure: Tall dense formation of herbaceous perennials, dominated by the clonal

populations of *Sambucus ebulus*. Other taxa frequently included are *Arctium minus, Chaerophyllum aureum, Cuscuta europaea, Urtica dioica, Galium aparine, Artemisia vulgaris* and *Elymus caninus*.

Ecology: Ruderal sites with wet soil, frequently in path margins, in the border of channels or in humid edges of fields.

Distribution: Well represented in the submontane and montane belts of the Pyrenees and neighbouring mountain areas, this association may also occur in mediterranean lowlands southwards to Sicoric and South Catalanidic territories, then secluded to humid sites.

Variability: Three subassociations have been recorded.

- carduetosum tenuiflori O. Bolòs 1983 (= **typicum**; *arctio-sambucetosum* O. Bolòs 1967, nom. illeg.). Typical of mediterranean landscapes, where the lower density of the dominant species allows some therophytes (*Bromus sterilis, Senecio vulgaris, Capsella bursa-pastoris*, etc.) enter the community.

- galietosum cruciatae O. Bolòs 1983. (Holotypus: Bolòs 1983, *Veg. Montseny*: 145; Santa Fe del Montseny, 1100 m, N Catalanidic terr.). It occurs in mountain areas, under wetter climate, and includes as main differentials *Cruciata laevipes* (= *Galium cruciata*), *Torilis japonica, Valeriana officinalis* etc.

Comment: An association of controversial syntaxonomical location, according to different authors (*Arction, Aegopodion, Balloto-Conion*).

Dipsaco fullonum-Cirsietum criniti O. Bolòs 1956

Lectotypus: A. Bolòs 1950, *Veg. com. barcel.*: 71-72 (Santa Creu d'Olorda, 300 m, N Catalanidic terr.); designed in Bolòs 1997a: 210.

Data: Álvarez de la Campa (2004), A. Bolòs (1950, sub "Ass. prov., *Dipsacus silvestris* and *Cirsium vulgare*"), Bolòs (1962, 1983, 1996), Bolòs & Masalles (1983), Conesa (2001), Esteve (1957), Royo (2006).

Structure: Irregular thistle community dominated by *Dipsacus fullonum* and *Cirsium vulgare* subsp. *crinitum,* and including*, Arctium minus, Urtica dioica, Verbena officinalis*, etc.

Ecology: It is found as small patches or stripes in clearings of forests near streams or rivers, rooting in mild, eutrophic soil, in lowlands and in the submontane belt; a successional community soon replaced by thorny hedges or other woody formations.

Distribution: Mediterranean areas, mainly under mild to sub-humid conditions (Ruscinic, Catalanidic, Olositanic and Ausosegarric territories).

CAKILETEA MARITIMAE Tüxen et Preising ex Braun-Blanquet et Tüxen 1952

CAKILETALIA INTEGRIFOLIAE Tüxen ex Oberdorfer 1949 corr. Rivas-Martínez, Costa et Loidi 1992

[*Cakiletalia maritimae* Tüxen ex Oberdorfer 1949, art. 43]

CAKILION MARITIMAE Pignatti 1953

[*Euphorbion peplis* Tüxen 1950, art. 2b]

Hypochoerido radicatae-Glaucietum flavi Rivas Goday et Rivas-Martínez 1959
Data: Bolòs (1962), Royo (2006), Seguí (1994), Vilar (1987).
Structure: Open community where *Glaucium flavum* and *Cakile maritima* are the main components.
Ecology: Ruderalized sites in sand beaches.
Distribution: Sparse and occasional in the low coasts of the Catalanidic territory.

Atriplicetum hastatae-tornabeni O. Bolòs 1962
[*Atriplicetum prostratae-tornabeni* O. Bolòs 1962, nom. mut. propos. Ninot, X. Font, Masalles et Vigo, art. 45]
Lectotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 66, rel. 1 (Llobregat delta, 10 m, C Catalanidic terr.); designed in Bolòs 1997a: 206.
Data: Bolòs (1962), Curcó (1996).
Structure: A community presided by the diffuse *Atriplex rosea* subsp. *tarraconensis* (= *A. tornabenei*) and *Cakile maritima*, and including *Salsola kali, Atriplex prostrata* (= *A. hastata* auct.), etc.
Ecology: Sandy beaches ruderalized by man or by sea birds.
Distribution: Coasts of the Central and South Catalanidic territory.

Salsolo kali-Cakiletum maritimae Costa et Mansanet 1981 nom. mut. Rivas-Martínez et al. 2002
[*Salsolo-Cakiletum aegyptiacae* Costa et Mansanet 1981, art. 45]
Holotypus: Costa & Mansanet 1981, *Anales Jard. Bot. Madrid* 37(2): 280 (el Perellonet, Valencian terr.).
Data: Curcó (1996), Gesti (2006), Royo (2006).
Structure: Low, open community of *Cakile maritima* and *Salsola kali* subsp. *ruthenica*, including at places other ruderals or halophytes (*Xanthium echinatum* subsp. *italicum, Euphorbia peplis, Sporobolus pungens*, etc).
Ecology: It occurs as patches between littoral dunes, or in front of the first dunes, where sea detritus accumulate.
Distribution: Recorded from the northern and southern parts of the coast.

SAGINETEA MARITIMAE Westhoff, Van Leeuwen et Adriani 1962
FRANKENIETALIA PUVERULENTAE Rivas-Martínez ex Castroviejo et Porta 1976
FRANKENION PULVERULENTAE Rivas-Martínez ex Castroviejo et Porta 1976

Spergularietum marinae Molinier et Tallon 1969
Data: Bolòs (1988 p.p.), Curcó (2000), Royo (2006).
Structure: An open community mainly formed by small prostrate annuals, even ephemerophytes; *Spergularia marina* dominates in most cases, accompanied by *Parapholis incurva, Frankenia pulverulenta, Plantago coronopus*, etc.
Ecology: Ruderalized sites in littoral plains, with dry, trampled, brackish soil.
Distribution: It is only known from the Ebro delta (South Catalanidic territory).
Variability: Three subassociations may be distinguished.
- typicum, corresponding to the described community.

- polypogonetosum monspeliensis Curcó 2000. Holotypus: Curcó 2000, *Acta Bot. Barc*. 46: 177, tab. 15, rel. 4 (Ebro delta). It occurs in more humid and ruderalized soils, and includes abundant to dominant *Polypogon monspeliensis*.
- heliotropietosum curassavici Curcó ex Ninot, X. Font, Masalles et Vigo, subass. nova [*Cynodonto-Heliotropietum curassavici* O. Bolòs 1988 p.p.]. Holotypus: Curcó 2000, *Acta Bot. Barc*. 46: 177, tab. 15, rel. 8 (Ebro delta). It appears in dry, moderately trampled sites, and is differentiated by the neophyte *Heliotropium curassavicum*.

Parapholido incurvae-Frankenietum pulverulentae Rivas-Martínez ex Castroviejo et Porta 1976
Data: Royo (2006).
Structure: Open, irregular community formed by *Frankenia pulverulenta, Plantago coronopus, Parapholis incurva, Sphenopus divaricatus,* etc.; since most of the species are winter annuals, the community dries out towards summer.
Ecology: Small surfaces next to paths or other frequented sites, with salt, moderately tramplet soil, frequently as small spots in halophilous scrubs.
Distribution: Only recorded from southern littoral area, in the South Catalanidic territory.

Catapodio spicati-Saginetum maritimae (O. Bolòs et Vigo) Rivas-Martínez in Rivas-Martínez *et al.* 2002
[*Sagino maritimae-Tortelletum flavovirentis* Tüxen et al. 1963 *cerastietosum gussonei* O. Bolòs et Vigo 1984]
Holotypus: Bolòs & Vigo 1984, *Sist. nat. illes Medes*: 201 (Meda gran, 20 m, Ruscinic terr.).
Data: Bolòs & Vigo (1984).
Structure: Short, tiny, ephemeral community with dominant *Sagina maritima* and holding *Cerastium diffusum* subsp. *gussonei, Catapodium rigidum* var. *spicatum, Frankenia pulverulenta*, etc., and some small cushion-shaped mosses.
Ecology: Flat, salt surfaces holding some soil, in small clearings of *Crithmo-Limonion* communities.
Distribution: Only recorded from the Medes islets, next to the northern Catalan coast.

Junco minutuli-Parapholidetum filiformis Perdigó et Papió 1985
Holotypus: Perdigó & Papió 1985, *Collect. Bot.* 16: 223, tab. 8, rel. 2 (Torredembarra, C Catalanidic terr.).
Data: Gesti (2006), Gesti & Vilar (2002), Perdigó & Papió (1985).
Structure: Short, spring-ephemeral carpets showing diverse coverages (25-80%). The most constant taxa are the narrow-leaved therophytes *Parapholis filiformis* (frequently dominant), *Juncus minutulus* and *Sagina maritima*, and other species are *Plantago coronopus, Silene cerastoides, Medicago littoralis*, etc.
Ecology: Small, bare spots in the halophytic low scrubs, with sandy-loamy soils which are seasonally humid and moderately salt.
Distribution: It is found along the coast, except for the southern part.

HORDEION MARINI Ladero, F. Navarro, C. Valle, B. Marcos, Ruiz et M.T. Santos 1984

Plantagini coronopodi-Hordeetum maritimi O. Bolòs et Molinier ex O. Bolòs 1962
Lectotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 81, rel. 2 (Llobregat delta, 5 m, C Catalanidic terr.); designed in Bolòs 1997a: 217.
Data: Bolòs (1962), Curcó (2000), Gesti (2006), Royo (2006).
Structure: Short grass formation developing in winter and spring, in most cases dominated by *Hordeum marinum*, and with *Cynodon dactylon, Lotus corniculatus* subsp. *tenuifolius, Plantago coronopus, Trifolium fragiferum, Parapholis incurva, Juncus compressus*, etc.
Ecology: Moderately trampled, brackish soils of coastal plains, in path verges or in small clearings of halophytic scrub.
Distribution: It occurs along de coast, from the Ebro delta to Aiguamolls de l'Empordà.
Comment: An association transitional between *Frankenion pulverulentae* and *Trifolio-Cynodontion*.

Hordeo marini-Betetum maritimae Curcó 2000
Holotypus: Curcó 2000, *Acta Bot. Barc.* 46: 178, tab. 16, rel. 1 (Ebro delta).
Data: Curcó (2000).
Structure: Rather dense, medium-tall herbaceous community dominated by *Beta vulgaris* subsp. *maritima*, which includes *Atriplex prostrata* var. *salina, Hordeum marinum, Lavatera cretica, Aster squamatus*, etc.
Ecology: Ruderalized sites in littoral areas with moist, deep, brackish soils, like margins of fields or irrigation channels.
Distribution: It has been recorded from the Ebro delta, in the South Catalanidic territory.

PEGANO HARMALAE-SALSOLETEA VERMICULATAE Braun-Blanquet et O. Bolòs 1958
SALSOLO VERMICULATAE-PEGANETALIA HARMALAE Braun-Blanquet et O. Bolòs 1954
SALSOLO VERMICULATAE-PEGANION HARMALAE Braun-Blanquet et O. Bolòs 1954

Soncho tenerrimi-Salsoletum vermiculatae O. Bolòs et Molinier 1958
Lectotypus: Bolòs & Molinier 1958, *Collect. Bot*. 5: 847-850, tab. 31, rel. 2 (Palma, 10 m, Mallorca); designed in Bolòs & Vigo 1984: 184.
Data: Bolòs & Molinier (1958), Bolòs & Vigo (1984), Royo (2006).
Structure: Open scrub dominated by *Salsola vermiculata*, sometimes also by *Atriplex halimus*, including *Camphorosma monspeliaca* and some opportunists or ruderals typical of warm sites (*Alyssum maritimum, Sonchus tenerrimus, Euphorbia terracina*).
Ecology: Dry, rocky slopes subject to direct marine influence through salt spray.
Distribution: It occurs sparsely along all the coast, in rocky areas.

Variability: Two subassociations have been found.
- salsoletosum vermiculatae O. Bolòs et Vigo 1984 (= **typicum**), including thermophilous species such as *Carrichtera annua,* it is found from the Central Catalanidic coast southwards.
- atriplicetosum halimi O. Bolòs et Vigo 1984. Holotypus: Bolòs & Molinier 1958, *Collect. Bot*. 5: 848-849, tab. 31, rel. 5 (Barcelona, 25 m) designed in Bolòs & Vigo 1984: 184. It contains abundant to dominant *Atriplex halimus* and occurs sparsely in the northern part of the area; it covers large areas on relatively moist soils of the Medes islets.

Salsolo vermiculatae-Peganetum harmalae Braun-Blanquet et O. Bolòs 1954 **kochietosum prostratae** O. Bolòs 1960
[*Pegano harmalae-Salsoletum vermiculatae* Braun-Blanquet et O. Bolòs 1954, nom. inv. propos. Rivas-Martínez 2011]
Lectotypus: Bolòs 1960, *Anales Inst. Bot. Cavanilles* 18: 220-222, tab. 13, rel. 2 (Biosca, 460 m, Sicoric terr.); designed in Bolòs 1997a: 220.
Data: Bolòs (1960), Conesa (2001, sub *Salsolo-Artemisietum kochietosum*), Llansana (1976).
Structure: Low, open shrubby formation frequently dominated by the semi-succulent *Kochia prostrata*, and including other xerophilous sub-shrubs (*Salsola vermiculata, Camphorosma monspeliaca*) and forbs (*Marrubium vulgare, Centaurea solstitialis, Carthamus lanatus*).
Ecology: Open, dry, ruderalized areas, such as path margins, fallows or road slopes, in basic, brackish soils.
Distribution and Comment: *Salsolo-Peganetum* is an association typical of the central part of the Ebro depression. The subassociation here referenced, *kochietosum prostratae*, is an impoverished form particular of the western, moderately dry plains of Catalonia (Sicoric territory) which, according to Conesa (2001), could be included in *Salsolo-Artemisietum herbae-albae*.

Salsolo vermiculatae-Artemisietum herbae-albae (Braun-Blanquet et O. Bolòs) O. Bolòs 1967
Lectopypus: Braun-Blanquet & Bolòs 1958, *Anales Aula Dei* 5: tab. 4, rel. 3 (Monegrillo, 370 m, Ebro depression); designed in Bolòs 1997a: 220.
Data: Bolòs (1996), Conesa (1990b, 1991, 2001), Escuer (1998), Rovira (1986).
Structure: Open scrub formed by varying proportions of xerophytic shrubs with semi-succulent, greyish, narrow leaves, such as *Salsola vermiculata, Artemisia herba-alba, Basia prostrata, Camphorosma mosnpeliaca* and *Atriplex halimus*.
Ecology: Slopes, abandoned fiels or other marginal lands, settling on moderately salt, sloping substrata, which become very dry in summer. It is in general subject to herd grazing and browsing.
Distribution: Western plains under dry mediterranean to semi-arid, continental climate.
Variability: Two subassociations are known from the area.
- artemisietosum herbae-albae Conesa 1990 (= **typicum**), from the most continental areas, is normaly dominated by *Salsola vermiculata* and *Artemisia herba-alba*.
- atriplicetosum halimi Conesa 1990. Holotypus: Conesa 1990b, *Fol. Bot. Misc*. 7: 94, tab. 2, rel. 3 (Vall Major, 160 m, Sicoric terr.). It occurs in salt soils, frequently in slopes between

fields, and contains some xero-halophytes like *Atripex halimus* (dominant), *Suaeda vera* subsp. *braun-blanquetii* and *Limonium* spp.

Plantagini albicantis-Capparietum canescentis O. Bolòs 1967 **camphorosmetosum monspeliacae** O. Bolòs 1967

Lectotypus: Bolòs 1967, *Mem. R. Acad. Cienc. Art. Barc*. 724: 201, tab. 28, rel. 4 (Fraga, 200 m, Sicoric terr.); designed in Bolòs 1997a: 217.

Data: Bolòs (1967), Sanz (2001).

Structure: A very open formation of the low shrubs *Capparis spinosa* subsp. *canescens, Camphorosma monspeliaca* and *Artemisia herba-alba*, which includes a few ruderal forbs.

Ecology: Steep south-facing slopes, in rocky, clay soils.

Distribution: Being particular of the semi-arid, central part of the Ebro depression, in Catalonia it is only found in the western lowlands of the Sicoric territory.

Lavatero maritimae-Anagyrietum foetidae Costa et Peris in Esteso, Pérez-Badia et P. Soriano 1988

Data: Royo (2006).

Structure and Comment: A few populations of *Anagyris foetida* or *Lavatera maritima* have been given as extreme representatives of this association.

Ecology and Distribution: Dry slopes and other marginal lands near roads or buildings, near the lower course of the river Ebro, in the South Catalanidic territory.

***Camphorosma monspeliaca* community**

Data: Gesti (2006).

Structure: Low, open scrub dominated by *Camphorosma monspeliaca* subsp. *monspeliaca*, including some xerophilous perennials (such as *Dactylis glomerata* subsp. *hispanica, Salvia verbenaca* or *Lepidium graminifolium*) and therophytes.

Ecology: South-facing, clay slopes, wet or even water-saturated in winter but very dry in summer.

Distribution: Only known from the littoral plain of Aiguamolls de l'Empordà, in the Ruscinic territory.

MEDICAGINI CITRINAE-LAVATERION ARBOREAE O. Bolòs et Vigo 1984

Carduo tenuiflori-Lavateretum arboreae O. Bolòs et Vigo 1984

Holotypus: Bolòs & Vigo 1984, *Sist. nat. illes Medes*: 186-187, tab. 7, rel. 3 (Meda Gran, 30 m, Ruscinic terr.).

Data: Bolòs & Vigo (1984), Franquesa (1995).

Structure: An irregular formation dominated by *Lavatera arborea*, including other species of nitrophilous, thermophilous or halophilous character (*Atriplex halimus, Chenopodium album, Portulaca oleracea, Sonchus tenerrimus*, etc.).

Ecology: Rocky, warm areas of sea shores hosting dense populations of seagulls.

Distribution: It is known from islets off the northern Catalan coast.

Medicagini citrinae-Lavateretum arboreae O. Bolòs, Folch et Vigo in O. Bolòs et Vigo 1984

[*Hyosciamo albi-Lavateretum davaei* Carretero et Boira 1987, syntax. syn.]

Holotypus: Bolòs & Vigo 1984, *Sist. nat. illes Medes*: 185 (els Columbrets, Valencian terr.).

Data: Royo (2006, sub *Hyosciamo-Lavateretum*).

Structure: Community formed by *Hyosciamus albus*, *Parietaria officinalis* subsp. *judaica, Sonchus tenerrimus*, etc.

Ecology: Cliff shelves and other rocky areas in the coast, subject to thermal climate and manuring by seabirds.

Distribution: It is only found in the southernmost littoral plains.

BIDENTETEA TRIPARTITAE Tüxen, Lohmeyer et Preising ex von Rochow 1951
BIDENTETALIA TRIPARTITAE Braun-Blanquet et Tüxen ex Klika et Hadač 1944
CHENOPODION RUBRI (Tüxen ex Poli et J. Tüxen) Kopecký 1969

Polypogono monspeliensis-Nasturtietum officinalis Carretero et Boira 1984

Holotypus: Carretero & Boira 1984, *Doc. Phytosoc*. 8: 124, tab. 4, rel. 2 (Silla, Valencian terr.).

Data: Carretero & Boira (1984), Royo (2006).

Structure: Carpets formed by *Rorippa nasturtium-aquaticum* (= *Nasturtium officinale*), *Polypogon monspeliensis, Apium nodiflorum, Veronica anagallis-aquatica, Juncus buffonius, Aster squamatus,* etc.

Ecology: Flooded rice fields, where the community develops after harvesting, from autumn to spring.

Distribution: Known from southeast and east Iberian littoral, it reaches northwards the Ebro delta.

Comment: An association initially described in the alliance *Glycerio-Sparganion*, which may be also placed in *Chenopodion rubri*.

Soncho oleracei-Polypogonetum monspeliensis Carretero et Boira 1984 **spergularietosum salinae** Carretero et Boira 1984

Holotypus: Carretero & Boira 1984, *Doc. Phytosoc*. 8: 122-123, tab. 3, rel. 10 (la Cava, S Catalanidic terr.).

Data: Carretero & Boira (1984), Royo (2006).

Structure: Community of *Polypogon monspeliensis, Ranunculus trilobus, Spergularia salina* and *Atriplex prostrata,* together with more general weeds (such as *Sonchus oleraceus, Poa annua* subsp. *annua*, *Polygonum aviculare* or *Coronopus didymus*). It develops mainly in winter and spring.

Ecology: Irrigated vegetable fields in littoral plains, rooting in brackish soils.

Distribution: Known from southeast and east Iberian littoral, the Ebro delta is the northernmost location.

Comment: An association difficult to ascribe, transitional between *Chenopodion rubri* and *Solano-Polygonetalia.*

Filaginello uliginosae-Veronicetum peregrinae Molero et Romo 1988

Holotypus: Molero & Romo 1988, *Acta Bot. Barc.* 37: 294, tab. 2, rel. 2 (Coll de Nargó, 504 m, C pre-Pyrenees).

Data: Devis (2006), Molero & Romo (1988).
Structure: Open weed community formed by small therophytes, mainly *Veronica peregrina, Gnaphalium uliginosum* (= *Filaginella uliginosa*)*, Rorippa sylvestris, Chenopodium glaucum, Cyperus fuscus* and *Polygonum persicaria*.
Ecology: Loam alluvia becoming ashore in summer.
Distribution: All the data of the association come from the Oliana dam, in the Central pre-Pyrenees.

Junco gerardi-Crypsietum schoenoidis Molero et Romo 1988
Holotypus: Molero & Romo 1988, *Acta Bot. Barc.* 37: 295, tab. 3, rel. 2 (Salàs de Pallars, 490 m, C pre-Pyrenees).
Data: Molero & Romo (1988).
Structure: Carpets of small therophytes with maximum development in late summer, mainly *Crypsis schoenoides, Juncus compressus* subsp. *gerardi, Rorippa sylvestris* and *Gnaphalium uliginosum,* including sparse ruderals or generalists (*Xanthium echinatum* subsp. *italicum, Aster squamatus,* etc.).
Ecology: Loam alluvia which become ashore in summer.
Distribution: Only known from the Sant Antoni dam, in the Central pre-Pyrenees.
Comment: A very local association, which seems transitional between *Bidentetea* and *Isoeto-Nanojuncetea*.

BIDENTION TRIPARTITAE Nordhagen 1940

Bidentetum tripartitae Koch 1926
Data: Bolòs (1959, 1983), Bolòs *et al.* (1988), Vigo (1996).
Structure: Tall therophytic herbage developing mainly from summer to early autumn. Its main components are *Polygonum hydropiper, P. lapathifolium, P. persicaria, Bidens tripartita* and *B. frondosa*, and includes other broad-niche hygro-nitrophilous taxa (*Ranunculus repens, Rumex obtusifolius, Urtica dioica, Poa annua,* etc.).
Ecology: River banks ashore in summer, frequently in slightly shadowed places; under sub-mediterranean to sub-atlantic climates.
Distribution: Eastern Pyrenees and Olositanic and North Catalanidic territories, at low altitudes.

Spergulario salinae-Ranunculetum scelerati O. Bolòs et Masclans 1955
Lectotypus: Bolòs & Masclans 1955, *Collect. Bot*. 4: 430, tab. 2, rel. 3 (el Prat de Llobregat, S Catalanidic terr.); designed in Bolòs 1997a: 222.
Data: Bolòs (1967), Bolòs & Masclans (1955), Curcó (2000), Gesti (2006), Royo (2006).
Structure: Open weed community of *Ranunculus sceleratus, Chenopodium glaucum, C. album, Coronopus didymus, Echinochloa crus-galli, Poa annua, Spergularia salina, etc.*
Ecology: It occurs on small elevations between paddies or in wet orchards, in littoral plains, sometimes in brackish soils. Its development takes place from summer to autumn, even to winter.

Distribution: Sparse along the coast: Ebro delta, Llobregat delta (seemingly disappeared) and Aiguamolls de l'Empordà.

Xanthio italici-Polygonetum persicariae O. Bolòs 1957
[*Chenopodio ambrosioidis-Polygonetum lapathifolii* Peinado, Bartolomé, Martínez-Parras et Andrade 1988, syntax. syn.]
Lectotypus: Bolòs 1962*, Pais. veg. barcel.*: tab. 75, rel. 3 (Llobregat delta, 20 m); designed in Bolòs 1997a: 224.
Data: Bolòs (1962), Bolòs *et al.* (1988), Conesa (1986, 1990a, 1991, 2001), Escuer (1998), Farràs & Velasco (1994, sub *Paspalo-Agrostidetum*), Franquesa (1995), Molero (1976), Molero & Romo (1988), Ninot *et al.* (2009), Royo (2006).
Structure: Dense weed formation of *Xanthium echinatum* subsp. *italicum* and *Polygonum persicaria*, or sometimes *P. lapathifolium*, and containing sparse *Bidens tripartita, B. frondosa, Echinochloa crus-galli, Aster squamatus*, etc.
Ecology: Silt margins of rivers and dams becoming ashore in summer.
Distribution: Mediterranean lowlands, from the pre-Pyrenees and the Ruscinic territory southwards.
Variability: Three subassociations have been distinguished, two rather general in the area and related to ecological aspects, and the third territorial.
- **polygonetosum persicariae** O. Bolòs 1962 (= **typicum**) is a *Polygonum*-dominated community which makes a lower zone in the river banks, next to the water.
- **xanthietosum italici** O. Bolòs 1962. Holotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 75, rel. 4 (Llobregat delta, 20 m). Dominated by *Xanthium echinatum* subsp. *italicum*, this subassociation develops in upper zones of the river banks, becoming drier in summer.
- **rorippetosum sylvestris** Molero et Romo 1988. Holotypus: Molero & Romo 1988, *Acta Bot. Barc.* 37: 293, tab. 1, rel. 5 (Coll de Nargó, 500 m, C pre-Pyrenees). Differentiated by *Rorippa sylvestris*, it was described from the Central pre-Pyrenean area.

Myosoto aquatici-Bidentetum frondosae O. Bolòs, J.M. Montserrat et Romo 1988
Holotypus: Bolòs *et al*. 1988, *Acta Bot. Barc.* 37: 38-39, tab. 3, rel. 2 (Amer, 180 m, N Catalanidic terr.).
Data: Bolòs *et al* (1988), Conesa (1990a, 2001), Gesti (2006).
Structure: Tall, dense formation typically dominated by *Bidens frondosa*, and including *Myosoton aquaticum, Polygonum mite, P. persicaria, P. lapathifolium, Xanthium echinatum* subsp. *italicum*, some broad-niche opportunists, and a few hygrophytes (*Lytrum salicaria, Lycopus europaeus*, etc.).
Ecology: River banks, normally developing on stony alluvia in summer, when they remain ashore.
Distribution: Sparse in the mediterranean lowlands.
Variability: Two subassociations have been described.
- **polygonetosum mitis** O. Bolòs, J.M. Montserrat et Romo 1988 (= **typicum**) corresponds to the description given, and is found only in the sub-humid, North Catalanidic territory.
- **xanthietosum italici** O. Bolòs, J.M. Montserrat et Romo ex Ninot, X. Font, Masalles et Vigo, subass. nova [*xanthietosum italici* O. Bolòs, J.M. Montserrat et Romo 1988, nom. inval.,

art. 3o]. Holotypus: Bolòs *et al*. 1988, *Acta Bot. Barc.* 37: 38-39, tab. 3, rel. 5 (Vilaür, 30 m, Ruscinic terr.). Poorer in characteristics of alliance and order, and more or less dominated by *Xanthium echinatum* subsp. *italicum*, this subassociation occurs in drier mediterranean areas (Ruscinic and Sicoric territories).

POLYGONO-POETEA ANNUAE Rivas-Martínez 1975
POLYGONO ARENASTRI-POETALIA ANNUAE Tüxen in Géhu, Richard et Tüxen 1972 corr. Rivas-Martínez et al. 1991
SCLEROCHLOO DURAE-CONOPODION SQUAMATI Rivas-Martínez 1975
[*Polygonion avicularis* Braun-Blanquet 1931, art. 8]

Coronopodo procumbentis-Sclerochloetum durae Braun-Blanquet in Braun-Blanquet, Gajewski, Wraber et Walas 1936
[*Sclerochloetum durae* Braun-Blanquet 1931, art. 3o]
Data: Bolòs (1996), Mayoral (1994).
Structure: Short herbaceous community of *Polygonum aviculare* subsp. *aviculare*, *Coronopus squamatus, Sclerochloa dura* and *Cynodon dactylon.*
Ecology: Trampled, seasonally dry, somewhere brackish soils, in mediterranean conditions.
Distribution: Poorly recorded from the Sicoric and Ausosegarric territories, in the lowlands and in the submontane belt.
Comment: This association occurs very impoverished in the area, as the character taxa *Sclerochloa dura* is very rare.

Sclerochloo durae-Polygonetum arenastri Sóo ex Korneck 1969 corr. Mucina 1993
Data: Carreras *et al*. (1997).
Structure: Short grass formation dominated by *Sclerochloa dura*, with *Polygonum aviculare, Lolium perenne, Poa annua* subsp. *annua*, etc.
Ecology: Trampled clay soils, which shift from damp in spring to very dry in summer, in mountain areas.
Distribution: Only recorded from the eastern Pyrenees (a sole relevé).

MATRICARIO MATRICARIOIDIS-POLYGONION ARENASTRI Rivas-Martínez 1975 corr. Rivas-Martínez et al. 1991

Eragrostio minoris-Polygonetum arenastri Oberdorfer 1952
[*Eragrostio-Polygonetum avicularis* Oberdorfer 1952]
Data: Álvarez de la Campa (2004), Carreras *et al*. (1988, 1997), Gesti (2006), Soriano (2001).
Structure: Short herbaceous community dominated by *Polygonum aviculare* s.l., *Plantago major* and *Poa annua* subsp. *annua*; other frequent species are *Capsella bursa-pastoris, Taraxacum officinale* s.l. and *Lolium perenne*.
Ecology: Flat surfaces with trampled, rather dry soil, generally next to paths and buildings, even between cobbles or slabs in old streets or roads.

Distribution: Very general in the montane and submontane belts of the Pyrenees, and sparser in the lowlands of the sub-humid neighbouring territories.
Comment: The community here described corresponds to the typical form ("reine Ausbildung") referenced in Oberdorfer 1983, not to his "*Eragrostis minor* subass.", rich in panicoid grasses, which is given by Mucina 1993 as the normal form of the association. On the other hand, some of the Pyrenean relevés here referenced might be included into *Matricario-Polygonetum arenastri* T. Müller in Oberdorfer 1971 (= *Lolio-Polygonetum* Braun-Blanquet 1930), which is poorly differentiated from *Eragrostio-Polygonetum.*

SCLEROCHLOO DURAE-CORONOPODION SQUAMATI Rivas-Martínez 1975

Poo annuae-Coronopodetum squamati (Oberdorfer) Gutte 1966
Data: Royo (2006).
Structure: Diffuse short carpets made up by *Coronopus didymus, Polygonum aviculare* s.l., *Poa annua* subsp. *annua*, etc., blooming in winter and spring.
Ecology: Trampled, clayish soils, seasonally flooded and very dry in summer; it forms small spots near temporary ponds, or in margins of channels or roads.
Distribution: Frequent in meridional areas of the Iberian peninsula, it reaches the southernmost littoral plains of the Catalanidic territory, around the Ebro delta.

Poo annuae-Coronopodetum didymi Carretero et Aguilella 1995
[*Poo annuae-Spergularietum bocconei* Carretero et Aguilella 1995, syntax. syn.]
Holotypus: Carretero & Aguilella 1995, *Flora veg. Valencia*: 202 (Valencia).
Data: Álvarez de la Campa (2004), Royo (2006).
Structure: Open, short herbaceous community mostly formed by *Poa annua* subsp. *annua*, *Polygonum aviculare* subsp. *aviculare, Coronopus didymus* and *Polycarpon tetraphyllum*, and including other opportunists (*Conyza bonariensis, Herniaria hirsuta, Spergularia rubra*, etc.); it develops from autumn to spring.
Ecology: Trampled, ruderalized soils, mainly in path and road margins, and typically between the pavement slabs of streets.
Distribution: Recorded from the South Catalanidic territory, in the lowlands, it may also be found in other maritime areas.

POLYCARPION TETRAPHYLLI Rivas-Martínez 1975

Schismo barbati-Filaginetum congestae O. Bolòs (1948) 1975
Holotypus: Bolòs 1948, *Collect. Bot*. 2: 63-64 (Montjuïc, 50 m, Barcelona).
Data: Bolòs (1948), Royo (2006).
Structure: A tiny community formed by the small therophytes *Schismus barbatus, Filago congesta, Koeleria phleoides, Polycarpon tetraphyllum*, etc.
Ecology: Trampled, dry, coarse soils, in path margins of the warm mediterranean zone.
Distribution: Sparsely recorded from the Catalanidic lowlands.

Crassulo tillaeae-Saginetum apetalae Rivas-Martínez 1975
Data: Royo (2006).
Structure and Comment: A few small, species-poor populations of *Sagina apetala* subsp. *erecta* (including *Lamium amplexicaule*, *Polycarpon tetraphyllum*, etc.) may be taken as extreme representatives of this association.
Ecology and Distribution: Trampled surfaces near paths or in old fields with sandy soil, in the littoral plains near the Ebro delta, at the South Catalanidic territory.

EUPHORBION PROSTRATAE Rivas-Martínez 1975

Euphorbio-Eleusinetum geminatae O. Bolòs et A. Marcos 1953
[*Eleusino-Euphorbietum prostratae* auct.]
Lectotypus: Bolòs & Marcos 1953, *Collect. Bot*. 3: 371-372, rel. 4 (Barcelona, 60 m, N Catalanidic terr.); designed in Bolòs 1997a: 210.
Data: Bolòs 1962, Bolòs & Marcos (1953), Curcó (2000), Gesti (2006), Royo (2006).
Structure: Short, small carpets mainly built by decumbent to creeping therophytes, most of them neophytes showing summer phenology. The main species are *Euphorbia serpens, E. prostrata, Eleusine tristachya* subsp. *barcinonensis* (= *E. geminata*), *Tribulus terrestris, Digitaria sanguinalis* and *Chenopodium album.*
Ecology: Urban areas, in trampled, dry soils, mainly between paving slabs of streets and in road verges.
Distribution: Littoral areas, sparsely along the coast.
Variability: Three ecological, scarcely differentiated subassociations have been described.
- amaranthetosum deflexi O. Bolòs et A. Marcos 1953 (= **typicum**), which includes some clearly ruderal taxa, like *Amaranthus deflexus, A. muricatus* or *Echballium elaterium*.
- euphorbietosum serpentis O. Bolòs, nom. nov. Ninot, X. Font, Masalles et Vigo [*oxalidi-euphorbietosum serpentis* O. Bolòs 1962, nom. illeg., art. 34c]. Lectotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 63, rel. 1 (Barcelona, 25 m, N Catalanidic terr.); designed in Bolòs 1997a: 210. It includes *Euphorbia serpens, Filago congesta,* etc., and settles on drier sites.
- euphorbietosum prostratae O. Bolòs, nom. nov. Ninot, X. Font, Masalles et Vigo [*portulaco-euphorbietosum prostratae* O. Bolòs 1962, nom. illeg. art. 34c]. Lectotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 63, rel. 4 (Garraf, 20 m, C Catalanidic terr.); designed in Bolòs 1997a: 210. It includes *Euphorbia prostrata, Portulaca oleracea,* etc., and seemingly inhabits moister soils.

Euphorbio serpentis-Alternantheretum caracasanae Costa et Figuerola 1983 corr. Carretero et Aguilella 1995
[*Euphorbio chamaesyces-Alternantheretum caracasanae* Costa et Figuerola 1983]
Holotypus: Costa & Figuerola 1983, *Anales Jard. Bot. Madrid* 40(1): 239, tab. 1, rel. 3 (l'Horta, Valencian terr.).
Data: Royo (2006).
Structure: Short diffuse or reptant community presided by *Alternanthera caracasana,*

and including other neophytes (like *Euphorbia serpens, E. prostrata, Tribulus terrestris*, etc.).
Ecology: Ruderalized, trampled soils in path margins, pavement interstices and other marginal areas, in thermal mediterranean lowlands.
Distribution: It has been only found in littoral areas of the South Catalanidic territory.
Variability: Two ecological, scarcely differentiated subassociations have been described.
- euphorbietosum serpentis Costa et Figuerola 1983 corr. Carretero et Aguilella 1995 (= **typicum**).
- portulacetosum oleraceae Costa et Figuerola 1983. Holotypus: Costa & Figuerola 1983, *Anales Jard. Bot. Madrid* 40(1): 239, tab. 1, rel. 6 (l'Horta, Valencian terr.). It is found in more nitrified soils, such as orchard margins, and includes *Portulaca oleracea* as main differential.

SAGINION PROCUMBENTIS Tüxen et Ohba in Géhu, Richard et Tüxen 1972

Sagino procumbentis-Bryetum argentei Diemont, Sissingh et Westhoff 1940
[*Bryo argentei-Saginetum procumbentis* Diemont, Sissingh et Westh. 1940, nom. inv. propos. Rivas-Martínez et al. 2002]
Data: Bolòs & Masalles (1983).
Structure: Short, irregular community with *Sagina procumbens, Plantago major, Poa annua* subsp. *annua* and *Bryum argenteum* as main species.
Ecology: It forms very small patches in path margins with wet, moderately trampled soil.
Distribution: Only known from the Olositanic territory (a mere relevé), though probably sparse in the montane belt of the Pyrenees.

Rumici acetosellae-Spergularietum rubrae Hülbusch 1973 **scleranthetotum uncinatae** Carreras, Carrillo et Vigo 1988
Holotypus: Carreras *et al.* 1988, *Acta Bot. Barc*. 37: 76, tab. 4, rel. 8 (Aigüestortes, 1800 m, C Pyrenees).
Data: Carreras *et al.* (1988, 1997), Sanz (2001).
Structure: A light, open formation of small herbs, mainly *Spergularia rubra, Herniaria glabra, Polygonum aviculare, Scleranthus uncinatus, S. perennis* and *Paronychia polygonifolia*.
Ecology: Flat areas frequently trampled, with coarse, acidic soil, in mountain areas.
Distribution: Montane and subalpine belts of the Pyrenees.

Veronico serpyllifoliae-Spergularietum rubrae Passarge ex Mucina 1993
Data: Carreras *et al.* (1997).
Structure: Light, low community mainly formed by small annuals or pauciennials, such as *Spergularia rubra, Sagina saginoides, Veronica serpyllifolia* and *Poa annua* subsp. *supina*.

Ecology: Path margins and similar areas, rooting in sandy soils, in the high mountain.
Distribution: Only recorded (a mere relevé) from the subalpine belt of the eastern pre-Pyrenees, though seemingly general in the Pyrenees.

POION SUPINAE Rivas-Martínez et Géhu 1978

Taraxaco dissecti-Poetum supinae Carrillo et Vigo 1984
[non *Plantagini majoris-Poetum supinae* Rivas-Martínez et Géhu 1978]
Holotypus: Carrillo & Vigo 1984, *Collect. Bot*.15: 151, tab. 2, rel. 2 (Núria, 2110 m, E Pyrenees).
Data: Braun-Blanquet (1948, sub. *Chenopodio-Taraxacetum* p.p.), Carreras *et al*. (1988, 1997), Carrillo & Ninot (1992), Carrillo & Vigo (1984), Soriano (2001).
Structure: Short, dense, hemicryptophytic pasture of *Taraxacum dissectum* and *Poa annua* subsp. *supina,* including other ruderals (such as *Chenopodium bonus-henricus, Veronica serpyllifolia* subsp. *humifusa* or *Capsella bursa-pastoris*) and also some sparse taxa of the neighbouring pastures.
Ecology: Trampled, ruderalized areas within mountain pastures, generally in the resting places of domestic or wild herbivores, or in the surroundings of springs.
Distribution: Pyrenees, in the subalpine and low alpine belts.

PLANTAGINETALIA MAJORIS Tüxen et Preising in Tüxen 1950
LOLIO-PLANTAGINION MAJORIS Sissingh 1969

Lolio perennis-Plantaginetum majoris Beger 1930
Data: Álvarez de la Campa (2004), Bolòs (1957, 1959, 1996), Bolòs & Masalles (1983), Carreras *et al.* (1988), Carrillo & Ninot (1992), Conesa (1990a), Devis (2006), Rosell (1978), Soriano (2001), Villegas (1993), Viñas (1993), Vives (1964).
Structure: Short pasture dominated by *Poa annua* subsp. *annua, Plantago major* and *Lolium perenne*, and including also *Trifolium repens, Taraxacum officinale* s.l., *Polygonum aviculare, Potentilla reptans, Dactylis glomerata*, etc. Most of these plants are stoloniferous to ascending perennials, tolerant to trampling.
Ecology: Path margins, meadow edges and similar sites, in moist and moderately trampled soils, under sub-atlantic to sub-mediterranean (or moist mediterranean) climates.
Distribution: Widespread in the montane and submontane belt of the Pyrenees and neighbouring territories (North Catalanidic, Olositanic), and rare in the other mountains and in the sub-humid lowlands, where it only appears in shaded, moist sites.
Variability: Towards the mediterranean areas the association progressively tends to *Trifolio-Cynodontion* communities, from which it incorporates thermophilous taxa such as *Cynodon dactylon, Eragrostis pilosa, Trifolium fragiferum* or *Aster squamatus*. This is expressed in the subass. **taraxacetosum leavigati** Álvarez de la Campa 2004 (Holotypus: Álvarez de la Campa 2004, *Veg. mass. Port*.: 285, tab. 22, rel. 6; Alfara, 1040 m, S Catalanidic

terr.), known from the southern Catalanidic mountains, differentiated from the typical forms by *Taraxacum* gr. *laevigatum* and other mediterranean taxa.

Juncetum macri Diemont, Sissingh et Westhoff ex Tüxen 1950
[*Juncetum tenuis* (Diemont, Sissingh et Westhhoff) Schwickerath 1944]
Data: Carreras *et al.* (1988), Viñas (1993).
Structure: Low herbaceous formation of stoloniferous to rhizomatous mesophilous perennials, such as *Juncus tenuis, Plantago major, Lolium perenne* and *Trifolium repens*.
Ecology: Path margins and edges of meadows, rooting in slightly trampled, seasonally damp soils.
Distribution: A very rare association found in the eastern Pyrenees, in the submontane and montane belts.

PASPALO-AGROSTION VERTICILLATI Braun-Blanquet in Braun-Blanquet, Roussine et Nègre 1952

Paspalo distichi-Agrostietum verticillati Braun-Blanquet in Braun-Blanquet, Gajewski, Wraber et Walas 1936
[*Paspalo-Polypogonetum semiverticillati* auct.]
Data: Álvarez de la Campa (2004), A. Bolòs (1950), Bolòs (1959, 1962), Bolòs & Masclans (1955), Braun-Blanquet & Bolòs (1958), Conesa (1986, 1990a, 1991, 2001), Curcó (2000), Escuer (1998), Franquesa (1995), Gesti (2006), Molero (1976), Royo (2006), Watt & Vilar (1998).
Structure: A species-poor, dense, creeping grass formation, in most cases dominated by *Paspalum distichum*. Other taxa may be *Polypogon viridis* (= *P. semiverticillatus, Agrostis verticillata*), *Aster squamatus, Rumex crispus, Xanthium echinatum* subsp. *italicum, Cynodon dactylon, Agrostis stolonifera, Potentilla reptans,* etc.
Ecology: Damp, trampled soils in the mediterranean lowlands, frequently along paths or channels, or at the edge of irrigated fields.
Distribution: General in lowlands and moderate altitudes, except for the Pyrenees.

Astero squamati-Paspaletum vaginati O. Bolòs 1988
[*Panico-Paspaletum vaginati* O. Bolòs 1967, prov.]
Holotypus: Bolòs 1988, *Acta Bot. Barc*. 37: 29-30, tab. 3, rel. 3 (Ebro delta, S Catalanidic terr.).
Data: A. Bolòs (1950, sub *Bidention*), Bolòs (1967, 1988), Curcó (2000), Royo (2006), Seguí (1994).
Structure: Dense grass formation of *Paspalum vaginatum*, relatively species-poor; it may include *Cyperus laevigatus* subsp. *distachyos, Juncus acutus, Phragmites australis, Aster squamatus*, etc.
Ecology: Humid, brackish, sandy soils, in moderately trampled sites.
Distribution: Deltas of the Ebro and Llobregat rivers.
Variability: Two ecological subassociations have been distinguished.
- juncetosum maritimi O. Bolòs 1988 (= **typicum**), only known from the Ebro delta, includes a few halophytes (*Juncus maritimus, J. acutus, Atriplex portulacoides*).
- asteretosum squamati O. Bolòs ex Ninot, X. Font, Masalles et Vigo, subass. nova [*asteretosum squamati* O. Bolòs 1988, nom. inval., art. 3o]. Holotypus: Bolòs 1988, *Acta Bot. Barc*.

37: 29-30, tab. 3, rel. 8 (Buda islet, Ebro delta). It seems less halophilous, and contains *Aster squamatus, Phragmites australis*, etc.
Comment: A transitional association between the alliances *Paspalo-Agrostion* and *Plantaginion crassifoliae*.

TRIFOLIO FRAGIFERI-CYNODONTION DACTILY Braun-Blanquet et O. Bolòs 1958

Cichorio intybi-Sporoboletum poiretii O. Bolòs 1954
Lectotypus: Bolòs 1954, *Collect. Bot*. 4: 254-255, tab. 2, rel. 1 (Santa Pau, 350 m, Olositanic terr.); designed in Bolòs 1983: 147.
Data: Bolòs (1954, 1959, 1962, 1983), Bolòs & Masalles (1983), Esteve (1957), Gesti (2006), Royo (2006), Villegas (1993).
Structure: Dense, short pasture mainly built by creeping to ascending mesophytes. Main taxa may be some of the following, depending on the site: *Sporobolus poiretii, Cynodon dactylon, Trifolium fragiferum, Cichorium intybus, Lolium perenne, Potentilla reptans*, etc.
Ecology: Flat ground under moderate to strong grazing and trampling pressure, with deep, moist soil. It is found in path verges, gardens or in intensive pasture areas, under sub-mediterranean or mild mediterranean climate.
Distribution: It is known from the Ruscinic, Olositanic, eastern Ausosegarric and North (and South) Catalanidic territories.
Variability: The association has been divided into four ecological subassociations.
- **trifolietosum fragiferi** O. Bolòs, nom. nov. Ninot, X. Font, Masalles et Vigo (= **typicum**; *cynodonto-trifolietosum* O. Bolòs 1959, nom. illeg., art. 34c). Frequently dominated by *Cynodon dactylon*, *Trifolium fragiferum, Sporobolus poiretii, Potentilla reptans*, etc., it occurs in clay, dense soils, in most of the association area.
- **eleusinetosum barcinonensis** O. Bolòs 1959. Lectotypus: Bolòs 1959, *Arx. Secc. Cièn. I.E.C*. 26: 96-97, rel. 2 (Sils, 60 m, N Catalanidic terr.); designed in Bolòs 1983: 147. It appears in acidic, sandy, rather dry soils of the North Catalanidic territory, where is differentiated by *Eleusine tristachya* subsp. *barcinonensis*.
- **rumicetosum crispi** Bolòs 1959. Holotypus: Bolòs 1959, *Arx. Secc. Cièn. I.E.C*. 26: 96-97, rel. 6 (Sils, 60 m, N Catalanidic terr.). It settles on more humid, dense soils, and includes *Plantago major, Potentilla reptans, Rumex crispus* and *Agrostis stolonifera* as main differentials.
- **paspaletosum dilatati** O. Bolòs et Masalles 1983. Holotypus: Bolòs & Masalles 1983, *Mem. full Banyoles*: 47 (Banyoles lake, 170 m, Ruscinic terr.). A low altitude, species-poor community, including *Paspalum dilatatum* and *P. distichum*.
Comment: Another subassociation (*eragrostio-tragetosum,* nom. nud.) is discussed in Bolòs & Masalles 1983, on the basis of a synoptic table; it is known from the Olositanic territory, in dry, light volcanic soils, and includes some therophytic summer grasses (*Tragus racemosus, Eragrostis cilianensis, E. pilosa, Setaria glauca* and *Digitaria sanginalis*).

Trifolio fragiferi-Cynodontetum dactyli Braun-Blanquet et O. Bolòs 1958
Lectotypus: Braun-Blanquet & Bolòs 1958, *Anales Aula Dei* 5: 109, tab. 26, rel. 5 (Vilanova de la Barca, 190 m, Sicoric terr.); designed in Loidi & Biurrun 2000: 134.
Data: Álvarez de la Campa (2004), Bolòs (1959, 1962, 1996), Braun-Blanquet & Bolòs (1958), Conesa (1990a, 1991, 2001), Curcó (2000), Forcadell (1999), Gesti (2006), Ninot *et al*. (2009), Royo (2006).
Structure: Low grass formation in most cases dominated by the creeping *Cynodon dactylon*, and including *Trifolium fragiferum, Aster squamatus, Verbena officinalis, Plantago lanceolata, Trifolium pratense*, etc.
Ecology: Seasonaly humid, trampled soils, frequently at the border of rivers, channels or wet paths, under mediterranean conditions and some grazing pressure.
Distribution: General in mediterranean lowlands (Ruscinic, Ausosegarric, Sicoric and Catalanidic territories).
Variability: Five subassociations have been distinguished.
- **trifolietosum fragiferi** O. Bolòs 1997 (= **typicum**), described from the semiarid Ebro depression, it reaches the western Sicoric plains.
- **agrostietosum stoloniferae** O. Bolòs 1962. Lectotypus: Bolòs 1962, *Pais. veg. barcel*.: tab. 78, rel. 6 (Martorell, 40 m, C Catalanidic terr.); designed in Bolòs 1997a: 223. A subassociation of wetter soils, including *Agrostis stolonifera, Paspalum distichum* and other meso-hygrophilous species.
- **paspaletosum dilatati** O. Bolòs 1962. Lectotypus: Bolòs 1962, *Pais. veg. barcel*.: tab. 78, rel. 11 (Sant Cugat del Vallès, 80 m, N Catalanidic terr.); designed in Bolòs 1997a: 223. It occurs in maritime areas, and includes *Paspalum dilatatum* as main differential.
- **brometosum mollis** O. Bolòs 1962. Holotypus: Bolòs 1962, *Pais. veg. barcel*.: tab. 78, rel. 18 (Castellbisbal?, 40 m, N Catalanidic terr.). Typical of drier soils, where the lower density in perennials allows the occurence of some therophytes (*Bromus hordeaceus, B. madritensis, Anagallis arvensis*, etc.).
- **cichorietosum intybi** Álvarez de la Campa 2004. Holotypus: Álvarez de la Campa 2004, *Veg. mass. Port*: 286, tab. 12, rel. 9 (Mas de Barberans, 290 m, S Catalanidic terr.). Found in less trampled areas than other subassociations, it includes *Cichorium intybus* and other erect perennials (*Dactylis glomerata* subsp. *hispanica, Foeniculum vulgare* subsp. *piperitum,* etc.).

Carici divulsae-Medicaginetum arabicae O. Bolòs 1962
Lectotypus: Bolòs 1962, *Pais. veg. barcel*.: tab. 80, rel. 5 (Torrelles de Llobregat, 100 m, C Catalanidic terr.); designed in Bolòs 1997a: 207.
Data: Álvarez de la Campa (2004), Bolòs (1962), Royo (2006).
Structure: Tender herbaceous community formed by medium-sized therophytes and short-lived perennials, mainly *Medicago arabica* (in most cases dominant), *Geranium rotundifolium, Bromus diandrus* subsp. *diandrus, Carex muricata* subsp. *divulsa, Carduus tenuiflorus*, etc.
Ecology: Small forest clearings or path verges under sub-humid mediterranean climate, in mild soils.
Distribution: Known from the Central and South Catalanidic territories.
Variability: Two poorly defined subassociations have been distinguished.
- **poetosum annuae** O. Bolòs 1962 (= **typicum**), with dominant therophytes (*Poa annua* subsp. *annua, Bromus hordeaceus*, etc.).

- caricetosum chaetophyllae O. Bolòs 1962. Lectotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 80, rel. 2 (Gavà, 230 m, C Catalanidic terr.); designed in Bolòs 1997a: 207. A denser community with abundant *Carex divisa* var. *chaetophylla*.

Lippio nodiflorae-Panicetum repentis O. Bolòs 1957
Lectotypus: Bolòs 1957, *Collect. Bot*. 5: 554-555, rel. 4 (Sueca, Valencian littoral); designed here.
Data: Bolòs (1957, 1962), Royo (2006).
Structure: Short, dense grass carpet of *Panicum repens*, which contains *Cynodon dactylon, Aster squamatus, Xanthium echinatum* subsp. *italicum*, etc.
Ecology: Flat ground in littoral plains, with sandy, trampled, moist soil.
Distribution: It is known from the Llobregat and Ebro deltas, and nearby plains.

Eleusino barcinonensis-Pennisetetum villosi O. Bolòs 1962
Lectotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 83, rel. 1 (Pedralbes, Barcelona, 150 m); designed in Bolòs 1997a: 210.
Data: Bolòs (1962).
Structure: A grass formation dominated by the feathered neophyte *Pennisetum villosum.* The community includes other broad-niche, introduced species, like *Eleusine tristachya* subsp. *barcinonensis, Aster squamatus* and *Crepis bursifolia,* together with *Plantago coronopus, Cynodon dactylon*, etc.
Ecology: Ruderal sites in maritime areas, with dry, moderately trampled soil.
Distribution: It is only known from the lowlands of the North and Central Catalanidic territories.
Variability: Two subassociations have been distinguished.
- pennisetetosum villosi O. Bolòs 1962 (= **typicum**), which corresponds to the described community.
- cynodontetosum dactyli O. Bolòs 1962. Holotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 83, rel. 3 (Barcelona, 130 m); designed in Bolòs 1997a: 210. Dominated by *Cynodon dactylon*, it occurs in compact soils.

Cynodonto dactyli-Heliotropietum curassavici O. Bolòs 1988
[non *Spergularietum marinae heliotropietosum curassavici*]
Holotypus: Bolòs 1988, *Acta Bot. Barc*. 37: 28, tab. 2, rel. 1 (Ebro delta).
Data: Bolòs (1988), Royo (2006).
Structure: Short, open populations of *Heliotropium curassavicum*, including few more taxa, such as *Cynodon dactylon, Aster squamatus, Plantago coronopus* or *Atriplex prostrata.*
Ecology and Distribution: Only known from the Ebro delta and neighbouring plain, in sandy, brackish, trampled soils.
Comment: A poorly defined, local association, defined by the occurrence of *Heliotropium curassavicum*, a neophyte able to cope with different ecological conditions (see *Spergularietum maritimae*).

***Bromus catharticus* community**
Data: Gesti (2006).

Structure: Grassland of *Bromus catharticus,* which includes broad-niche ruderals like *Rumex crispus, Plantago major, Sonchus asper, Poa annua* subsp. *annua*, etc.
Ecology: This has been reported from the littoral plains of the Ruscinic territory (Aiguamolls de l'Empordà) settling on irrigated, trampled fields, forming spots in the moister sites.

RUDERALI-MANIHOTETEA UTILISSIMAE Léonard in Taton 1949
[*Rudero-Manihotetea pantropicalia* auct.]
IPOMOEETALIA PURPUREAE O. Bolòs 1988
LYCIO EUROPAEI-IPOMOEION PURPUREAE O. Bolòs 1988

Ipomoeo purpureae-Lycietum europaei O. Bolòs 1962 nom. mut. Rivas-Martínez et al. 2002
[*Pharbitidi purpureae-Lycietum europaei* O. Bolòs 1962, art. 45]
Lectotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 71, rel. 1 (Barcelona, 15 m, N Catalanidic terr.); designed in Bolòs 1988: 25.
Data: Bolòs (1962), Gesti (2006), Royo (2006).
Structure: Hedge formation typically built up by the thorny shrub *Lycium europaeum*, together with some luxuriant neophytes, mainly the lianoids *Ipomoea* (= *Pharbitis*) *purpurea, I. indica, Boussingaultia cordifolia* and *Araujia sericifera*, or *Arundo donax*.
Ecology: Borders and slopes of fields or paths, under maritime mediterranean climate.
Distribution: It is known from the lowlands of the Ruscinic and Catalanidic territories.
Variability: A rather variable association, in which two subassociations have been established.
- boussingaultietosum cordifoliae O. Bolòs 1962 (= **typicum**), in deep, mild soils, corresponds to the described community.
- opuntietosum ficus-indicae O. Bolòs 1962 [*opuntietosum maximae* O. Bolòs 1962 nom. mut. propos. Ninot, X. Font, Masalles et Vigo]. Holotypus: Bolòs 1962, *Pais. veg. barcel.*: tab. 71, rel. 4 (Martorell, 50 m, C Catalanidic terr.). Settling on slopes with drier soil, in this community stand out the xerophytic neophytes *Opuntia maxima* and *Agave americana.*

EPILOBIETEA ANGUSTIFOLII Tüxen et Preising in Tüxen 1950
ATROPETALIA BELLADONAE Vlieger 1937
ATROPION BELLADONAE Braun-Blanquet ex Aichinger 1933

Epilobio angustifolii-Atropetum belladonnae Braun-Blanquet ex Tüxen 1950
[*Atropetum belladonnae* Braun-Blanquet 1930, art. 2b]
Data: Álvarez de la Campa (2004), Carreras *et al*. (1993, 1995), Carrillo *et al.* (1984), Royo (2006).
Structure: Dense, luxuriant community mainly formed by the forb *Atropa belladona*, and including opportunist forest taxa (*Fragaria vesca, Rubus idaeus,..*) and other broad-niche taxa (*Solanum dulcamara, Taraxacum officinale*,...).
Ecology: Open spots of *Abies alba* or *Fagus sylvatica* forests (cuttings, road margins), linked to eutrophic, humic soils, and under mild weather conditions.

Distribution: Sparsely found in some of the carbonated areas of the montane and subalpine belts of Pyrenees; and very rare (and impoverished) in Central and South Catalanidic mountains.

Verbascetum blattario-thapsi O. Bolòs et Masalles 1983

Holotypus: Bolòs & Masalles 1983, *Mem. full Banyoles*: 100 (serra de Finestres, 700 m, Olositanic terr.).

Data: Bolòs (1983), Bolòs & Masalles (1983), Villegas (1993).

Structure: Tall, diverse herbaceous community frequently dominated by *Verbascum thapsus*; it contains other tall forbs as are *Cirsium arvense*, *Cirsium vulgare, Urtica dioica, Stachys alpina* and *Eupatorium cannabinum*, as well as *Fragaria vesca* and *Salix caprea* tillers.

Ecology: Recent forest cuttings, settling on eutrophic disturbed soils, where it is early substituted by bramble formations.

Distribution: It is known from the Olositanic and North Catalanidic territories, in the submontane and montane belts.

CARICI PILULIFERAE-EPILOBION ANGUSTIFOLII Tüxen ex von Rochow 1951

[*Epilobion agnustifolii* auct.]

Epilobietum montano-angustifolii Carrillo, Ninot et Vigo 1984

Holotypus: Carrillo *et al*. 1984, *Lazaroa* 5: 100, tab 1, rel. 11 (Aiguamòg, 1700 m, C Pyrenees).

Data: Carreras (1993), Carreras *et al*. (1995), Carrillo *et al*. (1984), Carrillo & Ninot (1995), Soriano (2001), Viñas (1993).

Structure: Tall, dense herbaceous community dominated by *Epilobium angustifolium* and containing other opportunists (*Fragaria vesca*, *Epilobium montanum, Rubus idaeus*, tillers of *Salix caprea*,...).

Ecology: Pioneer association of forest cuttings in acid substrata, related to *Pinus sylvestris*, *Pinus mugo* subsp. *uncinata, Abies alba* and *Fagus sylvatica* forests.

Distribution: Subalpine and montane belts of the Pyrenees.

Aknowledgements

We are indebted to all phytosociologists who have been recording vegetation relevés in the study area during the last half century, frequently with low concern from scientific agencies. This paper has greatly benefited from the databanks BDBC, long supported by the Environment Department of the Catalan Government, and SIVIM, funded by the Spanish Ministry of Education and Science through two national projects (CGL2006-13421-C04/BOS and CGL2009-13317-C03/ BOS).

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Rebut / Received: XI-2011

Apendix: Associations treated and of syntaxonomic novelties

Alphabetical list of the association names treated, with the corresponding page. Those in italics are considered synonyms.

Adonido-Iberidetum amarae 120
Aegilopo geniculatae-Carthametum lanati 136
Aegilopo-Orlayetum grandiflorae 136
Airo cupanianae-Papaveretum rhoeadis 139
Alliarietum petiolatae 154
Alliario petiolatae-Chaerophylletum temuli 154
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Alphabetical list of the new syntaxa and new names given and proposed

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Amarantho-Chenopodietum ambrosioidis atriplicetosum tataricae, comb. nova
Astero squamati-Amaranthetum viridis atriplicetosum prostratae, comb. nova
Astero squamati-Paspaletum vaginati asteretosum squamati, subass. nova
Atriplicetum prostratae-tornabeni, nom. mut. propos.
Calystegio sepium-Arundinetum donacis, nom. mut. et inv. propos.
Carduo nigrescentis-Verbascetum montani, stat. nov.
Carduo nigrescentis-Verbascetum montani echietosum vulgaris, subass. nova
Centaureo collinae-Galietum verrucosi, nom. mut. propos.
Chenopodietum albo-polyspermi, ass. nova
Cichorio intybi-Sporoboletum poiretii trifolietosum fragiferi, nom. nov.
Convolvulo arvensis-Cyperetum rotundi, ass. nova
Euphorbio-Eleusinetum geminatae euphorbietosum prostratae, nom. nov.
Euphorbio-Eleusinetum geminatae euphorbietosum serpentis, nom. nov.
Hordeetum leporini echietosum plantaginei, nom. nov.
Inulo viscosae-Oryzopsietum miliaceae saturejetosum glandulosae, nom. corr. propos.
Ipomoeo purpureae-Lycietum europaei opuntietosum maximae nom. mut. propos.
Kickxio spuriae-Nigelletum gallicae bupleuretosum rotundifolii, subass. nova
Medicagini rigidulae-Aegilopetum geniculatae santolinetosum squarrosae, subass. nova
Myosoto aquatici-Bidentetum frondosae xanthietosum italici, subass. nova
Sileno albae-Eupatorietum cannabini O. Bolòs 1962, nom. mut. propos.
Silybo mariani-Urticetum piluliferae artemisietosum verlotiorum, nom. nov.
Silybo mariani-Urticetum piluliferae brometosum sterilis, nom. nov.
Silybo mariani-Urticetum piluliferae carduetosum tenuiflori, nom. nov.
Spergularietum marinae heliotropetosum curassavici, subass. nova