

## New Proposals on Portuguese Vegetation (II)

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**Abstract:** Pinto-Gomes, C., Paiva-Ferreira, R. & Meireles, C. *New Proposals on Portuguese Vegetation (II)*. *Lazaroa* 31: 59-65 (2010).

As a consequence of the geobotanical studies that have been developed in west and southern areas of the Iberian Peninsula, four new phytosociological associations are proposed, integrated in the perennial mesophytic grasslands of *Stipo giganteae-Agrostietea castellanæ* (*Serratulo flavescens-Celticetum giganteae*, *Armerio macrophyllae-Celticetum giganteae*, *Centaureo rothmaleranae-Celticetum giganteae*, and *Centaureo coutinhoi-Dactyletum lusitanici*). For each proposed unit, besides its syntaxonomical fitting, we present its ecological diagnosis and the serial and catenal context, as well as its patrimonial value.

**Key-words:** Phytosociology, Iberian Peninsula, perennial grasslands.

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Em consequência dos estudos geobotânicos que se têm vindo a desenvolver no oeste e sul da Península Ibérica, propõem-se quatro novas associações vegetais no âmbito dos arrelvados vivazes mesofíticos da *Stipo giganteae-Agrostietea castellanæ* (*Serratulo flavescens-Celticetum giganteae*, *Armerio macrophyllae-Celticetum giganteae*, *Centaureo rothmaleranae-Celticetum giganteae* e *Centaureo coutinhoi-Dactyletum lusitanici*). Para cada unidade proposta, para além do seu enquadramento sintaxonómico, apresenta-se a respectiva diagnose ecológica e o contexto serial e catenal, bem como o valor patrimonial que encerra.

**Palavras chave:** Fitossociologia, Península Ibérica, arrelvados vivazes.

### INTRODUCTION

Continuing the studies developed by the University of Évora Geobotanical Group, several plant communities of high originality are presented. Thus, as a corollary, we present four new herbaceous perennials associations that integrate the dynamics of cork oak, holm oaks and oaks, distributed in central and southern Portugal. In methodological terms, the plant material was identified using preferably CASTROVIEJO & *al.* (1986-2005), COUTINHO (1939), FRANCO (1971, 1984), FRANCO & AFONSO (1994, 1999), SAMPAIO (1988), TUTIN *et al.* (1964-1980), VALDES *et al.* (1987) and specifically for

*Celtica* VÁZQUEZ & BARKWORTH (2004). In terms phytosociological nomenclature the method developed by BRAUN-BLANQUET (1965) and GÉHU & RIVAS-MARTÍNEZ (1981) was followed.

### PHYTOSOCIOLOGICAL ANALYSIS

*Serratulo flavescens-Celticetum giganteae* C. Pinto-Gomes & R. Paiva-Ferreira *ass. nova hoc loco* (Table 1, *holotypus* rel. 4).

*Diagnosis.* Cespititious oceanic thermomediterranean dry to subhumid perennial grasslands, over deep limy substrata (typical of dolomitic

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	20	18	34	25	21	29	
Altitude (m.a.s.l.)	20	18	34	25	21	29	
Area (sq.m)	100	100	100	100	100	100	
Cover (%)	80	80	70	70	70	70	
Exposure	-	-	S	S	S	S	
Slope (o)	-	-	4	2	2	2	
Vegetation height (m)	1,5	1,5	1,5	1,5	1,5	1,5	
Number of <i>taxa</i>	24	23	19	19	15	16	
Number	1	2	3	4	5	6	7
<b>Characteristic <i>taxa</i></b>							
<i>Celtica gigantea</i>	4	4	3	4	3	3	V
<i>Bupleurum rigidum</i> subsp. <i>paniculatum</i>	2	2	1	2	1	+	V
<i>Arrhenatherum album</i>	1	+	+	2	2	+	V
<i>Serratula flavescens</i>	1	1	+	1	2	2	V
<i>Dactylis hispanica</i>	2	2	1	1	.	+	V
<i>Thapsia villosa</i>	.	1	1	1	+	2	IV
<i>Asphodelus aestivus</i>	.	.	.	1	+	+	II
<b>Other <i>taxa</i></b>							
<i>Carex halleriana</i>	+	+	1	+	+	1	V
<i>Chamaerops humilis</i>	+	+	1	+	+	1	V
<i>Phlomis lynchitis</i>	+	+	1	+	+	+	V
<i>Gladiolus illyricus</i>	+	+	.	1	+	1	IV
<i>Brachypodium phoenicoides</i>	+	1	.	1	+	2	IV
<i>Eryngium dilatatum</i>	1	1	.	+	.	2	III
<i>Allium roseum</i>	.	.	+	+	+	+	III
<i>Phlomis purpurea</i>	+	+	1	.	.	.	II
<i>Sanguisorba minor</i> subsp. <i>spachiana</i>	+	1	.	.	.	.	II
<i>Melica minuta</i>	1	1	.	.	.	.	II
<i>Galium concatenatum</i>	+	.	+	.	.	.	II
<i>Genista algarbiensis</i>	+	.	+	.	.	.	II
<i>Urginea maritima</i>	+	.	+	.	.	.	II
<i>Asperula hirsuta</i>	1	.	.	+	.	+	II
<i>Rhamnus oleoides</i>	+	.	.	+	.	+	II
<i>Clematis flammula</i>	+	.	.	+	.	.	II
<i>Teucrium pseudochamaepitys</i>	+	.	.	+	.	.	II
<i>Salvia sclareoides</i>	.	+	+	.	.	.	II

Other *taxa*: *Macrochloa tenacissima* + in 1 and 5; *Aristolochia baetica* and *Carlina corymbosa* + in 1; *Ulex argenteus*, *Phillyrea angustifolia*, *Arbutus unedo*, *Cistus monspeliensis* and *Ceratonia siliqua* +, *Centaurium erythraea* and *Iris xiphium* 1 in 2; *Plantago lanceolata*, *Ornithogalum narbonense*, *Atractylis gummifera* and *Asphodelus ramosus* + in 3; *Scilla peruviana* + in 4.

Localities: 1: Cerro da Cabeça; 2: Tavira; 3: Loulé; 4: Between Faro and Olhão (near Via do Infante), *holotypus* *ass.*; 5: near Fonte Benémola; 6: Salir; 7: synthetic relevé.

"terra rossa" soils more or less profound), exclusive of the Algarvian sector. In the list of flora, some Portuguese endemic characteristic species of these southern territories can be noted, such as *Serratula flavescens*, as well as the presence of several *Stipo giganteae-Agrostietea castellanæ taxa* (*Arrhenatherum album*, *Dactylis hispanica*,

*Bupleurum rigidum* subsp. *paniculatum* and *Thapsia villosa*). This association is geovicariant of *Avenulo occidentalis-Celticetum giganteae* R. Paiva-Ferreira in Pinto-Gomes, Paiva-Ferreira & Meireles 2007 (this last one exclusive to the Ribatagan-Sadensean and Dividing Portuguese sectors).

*Serial considerations.* *Lategraminetum* of *Quercus alpestris-broteroi* S. and *Rhamnus oleoidis-Quercus rotundifoliae* S. This association is frequently in mosaic with sclerophytic brushwoods: *Asparagus albi-Rhamnus oleoidis* Rivas Goday ex Rivas-Martínez 1975, *Sideritis lusitanae-Genistetum algarbiensis* Pinto-Gomes & Paiva-Ferreira 2005 and *Galio concatenati-Brachypodium phoenicoidis* Pinto-Gomes & Paiva-Ferreira 2005.

***Armeria macrophyllae-Celticetum giganteae* R. Paiva-Ferreira, C. Pinto-Gomes & R. Pinto ass. nova hoc loco** (Table 2, *holotypus* rel. 4).

*Diagnosis.* Cespititious oceanic thermomediterranean perennial grasslands, dry to subhumid, typical of plioleistocene sandy soils more or less profound, exclusive of the Algarvean sector. In the list of flora, some Portuguese endemic characteristic species of these southern territories can be noted, such as *Armeria macrophylla*, as well as the presence of several *Stipo giganteae-Agrostietea castellanae* taxa (*Arrhenatherum album*, *Dactylis hispanica* subsp. *lusitana*, *Asphodelus aestivus*, *Thapsia villosa*, *Margotia gummifera* and *Scilla odorata*).

*Seral considerations.* *Lategraminetum* of *Oleo sylvestris-Quercus suberis* S. This association is frequently found in contact with sclerophytic brushwoods of *Coremation albi* Rothmaler 1943, *Ericion umbellatae* Br.-Bl., P.Silva, Rozeira & Fontes 1952, *Stauracanthion boivinii* (Rivas-Martínez 1979) Rivas-Martínez, Fernández-González & Loidi 1999 and *Pistacio lentisci-Rhamnetalia alaterni* Rivas-Martínez 1975 formations.

***Centaureo rothmaleranae-Celticetum giganteae* C. Meireles & C. Pinto-Gomes ass. nova hoc loco** (Table 3, *holotypus* rel. 6).

*Diagnosis.* Siliceous perennial grasslands dominated by *Celtica gigantea*, typical of deep soils with an organic horizon well defined, exclusive of estrelensean supramediterranean territories and surrounding areas with submediterranean influence. It's an association with some similarity to *Arrhenathero baetici-Stipetum giganteae* Rivas-Martínez, Fernández-González & Sánchez-Mata 1986, described for supramediterranean

Carpetanean-leonesean territories, differing significantly from the ecological and floristic points of view. One of the most important differences is the absence of *Arrhenatherum elatius* subsp. *baeticum*, *Thymus bracteatus* and *Armeria arenaria* subsp. *segoviensis*, the last two endemics from Spanish territories. On the other hand, *Centaureo rothmaleranae-Celticetum giganteae* has plants like *Arrhenatherum elatius* subsp. *carpetanum*, *Agrostis x fouilladei* and *Centaurea rothmalerana*, this last one endemic from Serra da Estrela.

*Serial considerations.* *Lategraminetum* of *Holco mollis-Quercetum pyrenaicae* S. This association is frequently found in contact with several communities like *Cytiso striati-Genistetum polygaliphyllae* Rivas-Martínez 1981 or *Phalacrocarpo oppositifolii-Festucetum elegantis* Rivas-Martínez, T.E. Díaz, F. Prieto, Loidi & Penas in E. Puente 1988.

***Centaureo coutinhoi-Dactyletum lusitanici* C. Meireles & C. Pinto-Gomes ass. nova hoc loco** (Table 4, *holotypus* rel. 6).

*Diagnosis.* Mesomediterranean siliceous perennial grassland, typical of deep and well structured substrata (but not hydromorphic), that occurs in the meridional Carpetanean and septentrional Luso-extremadurensian territories, always in strong thermophilic and mediterranean influenced areas. It is a low dense formation, dominated by *Dactylis hispanica* subsp. *lusitana* and *Centaurea coutinhoi*. Can be distinguished from *Sedo-Agrostietum castellanae* by the presence and dominance of *Dactylis hispanica* subsp. *lusitana*, and termophilic taxa like *Centaurea coutinhoi* and *Pimpinella villosa*, among others. Although this new association has *Agrostis castellana*, it is very different from *Gaudinio fragilis-Agrostietum castellanae* since it does not live in places with hydromorphism, even temporarily.

*Serial considerations.* Subserial grassland of *Arisaro-Quercus pyrenaicae* and *Arbuto unedonis-Quercus pyrenaicae* forests. In dry to subhumid territories is included in *Sanguisorbo hybridae-Quercus suberis* S. and *Pyro bourgaeanae-Quercus rotundifoliae* S. This association is frequently found in contact with *Cytiso multiflori-Sarothamnetum eriocarpi* Rivas Goday 1964, *Polygalo microphyllae-Cistetum populifolii* Rivas Goday 1964, *Melico*

Table 2

*Armerio macrophyllae-Celticetum giganteae* R. Paiva-Ferreira, C. Pinto-Gomes & R. Pinto *ass. nova hoc loco*  
(*Agrostio castellanæ-Stipion giganteae, Agrostietalia castellanæ, Stipo giganteae-Agrostietea castellanæ*)

Altitude (m.a.s.l.)	20	20	10	10	10	15	10	
Area (sq.m)	50	50	100	150	60	200	100	
Cover (%)	80	65	70	90	70	80	70	
Orientation	-	-	-	-	-	-	-	
Slope (o)	0	0	0	0	0	0	0	
Vegetation height (m)	1,5	1,5	1,5	1,5	1,5	2	1,5	
Number of <i>taxa</i>	16	15	18	25	19	27	25	
Number	1	2	3	4	5	6	7	8
Characteristic <i>taxa</i>								
<i>Celtica gigantea</i>	4	4	4	5	4	4	4	V
<i>Armeria macrophylla</i>	2	2	2	2	2	1	2	V
<i>Asphodelus aestivus</i>	1	2	+	1	2	3	2	V
<i>Thapsia villosa</i>	1	1	1	1	2	1	2	V
<i>Scilla odorata</i>	1	2	1	1	.	1	+	V
<i>Arrhenatherum album</i>	.	+	1	2	2	2	+	V
<i>Margotia gummifera</i>	1	.	.	.	+	1	2	III
<i>Serratula monardii</i>	.	.	.	.	.	.	1	I
Other <i>taxa</i>								
<i>Cytisus grandiflorus</i> subsp. <i>cabezudoi</i>	+	+	.	+	+	+	+	V
<i>Chamaerops humilis</i>	+	+	+	.	.	+	+	IV
<i>Cistus libanotis</i>	+	.	.	+	+	+	+	IV
<i>Lavandula sampaioana</i> subsp. <i>lusitanica</i>	+	.	.	+	+	+	+	IV
<i>Halimium calycinum</i>	+	.	+	+	.	1	+	IV
<i>Iris xiphium</i>	.	.	1	1	1	1	1	IV
<i>Thymus albicans</i>	+	+	.	.	+	+	.	III
<i>Stauracanthus genistoides</i>	+	+	.	.	.	+	+	III
<i>Halimium halimifolium</i>	.	.	+	+	+	+	.	III
<i>Urginea maritima</i>	.	.	+	+	.	1	+	III
<i>Asparagus aphyllus</i>	.	+	.	.	.	+	+	III
<i>Thymus lotocephalus</i>	.	+	.	1	.	.	2	III
<i>Ulex argenteus</i> subsp. <i>subsericeus</i>	.	.	+	1	+	.	.	III
<i>Iberis ciliata</i> subsp. <i>welwitschii</i>	+	.	.	.	.	+	.	II
<i>Dianthus broteri</i> subsp. <i>hinoxianus</i>	.	1	.	.	.	2	.	II
<i>Gladiolus illyricus</i>	.	.	.	.	1	.	+	II
<i>Aristolochia baetica</i>	.	.	+	+	.	.	.	II
<i>Pycnocomon rutifolium</i>	.	.	+	+	.	.	.	II
<i>Ulex australis</i> subsp. <i>welwitschianus</i>	.	.	.	.	.	+	+	II
<i>Dittrichia viscosa</i> subsp. <i>revoluta</i>	.	.	.	+	.	+	.	II
<i>Centaurea aspera</i> subsp. <i>stenophylla</i>	1	.	.	.	+	.	.	II
<i>Corynephorus canescens</i> var. <i>maritimus</i>	+	.	.	.	.	.	+	II
<i>Malcolmia lacera</i> subsp. <i>gracilima</i>	.	+	.	.	.	+	.	II
<i>Tuberaria major</i>	.	.	.	.	1	.	+	II
<i>Arisarum vulgare</i>	.	.	1	+	.	.	.	II
<i>Euphorbia baetica</i>	.	.	.	1	+	.	.	II
<i>Rhamnus oleoides</i>	.	.	.	+	.	+	.	II
<i>Scilla monophyllus</i>	.	.	.	.	.	+	+	II

Other *taxa*: *Aetheorhiza bulbosa* and *Rubia peregrina* subsp. *longifolia* + in 3; *Carlina corymbosa*, *Corrigiola litoralis* and *Orobanche gracilis* + in 4; *Ruta chalepensis* + in 5; *Pulicaria odora* + in 6; *Hyparrhenia hirta* subsp. *pubescens* + in 7.

Localities: 1: Açoteias (Albufeira); 2: Pinhal de Belmonte (Olhão); 3: Quinta de Marim (Olhão); 4: Parque Natural da Ria Formosa Burreau (Olhão), *holotypus* *ass.*; 5: Ludo (Faro); 6: Pontal (Faro); 7: Gambelas (Faro); 8: synthetic relevé.

Table 3  
*Centaureo rothmaleranae-Celticetum giganteae* C. Meireles & C. Pinto-Gomes *ass. nova hoc loco*  
 (*Festucion merinoi, Agrostietalia castellanæ, Stipo giganteae-Agrostietea castellanæ*)

Altitude (1=10 m.)	110	137	118	95	120	104	
Area (sq.m)	400	300	300	150	100	400	
Cover (%)	95	90	95	85	90	95	
Orientation	O	S	E	O	E	E	
Slope (o)	25	18	20	30	30	20	
Vegetation height (m)	1,5	1,5	1,5	1,5	1,5	1,5	
Number of taxa	19	19	14	19	20	26	
Number	1	2	3	4	5	6	7
Characteristic taxa							
<i>Celtica gigantea</i>	4	4	5	4	4	4	V
<i>Centaurea rothmalerana</i>	2	1	1	1	1	2	V
<i>Agrostis x fouilladei</i>	2	1	2	1	.	2	V
<i>Arrhenatherum carpetanum</i>	2	1	1	2	.	2	V
<i>Rumex acetosella</i> subsp. <i>angiocarpus</i>	.	.	+	1	.	1	III
<i>Festuca elegans</i> subsp. <i>merinoi</i>	.	2	.	.	2	.	II
<i>Sanguisorba verrucosa</i>	.	.	.	+	+	.	II
<i>Armeria beirana</i>	+	.	.	1	.	.	II
<i>Malva tournefortiana</i>	.	.	.	.	+	.	I
<i>Avenula sulcata</i>	.	+	.	.	.	.	I
<i>Dactylis glomerata</i> subsp. <i>lusitanica</i>	.	.	.	.	.	+	I
Other taxa							
<i>Hypericum linarifolium</i>	1	.	+	+	1	+	V
<i>Agrostis truncatula</i>	1	+	1	+	.	2	V
<i>Sesamoides suffruticosa</i>	1	.	+	+	.	1	V
<i>Hypochoeris radicata</i>	+	.	.	+	+	1	IV
<i>Jasione sessiliflora</i>	1	+	.	.	+	1	IV
<i>Deschampsia flexuosa</i> subsp. <i>iberica</i>	+	1	.	+	.	+	IV
<i>Halimium alyssoides</i>	.	1	.	.	2	+	III
<i>Lotus corniculatus</i> subsp. <i>carpetanus</i>	+	+	.	.	+	.	III
<i>Allium sphaerocephalon</i>	+	+	.	.	.	+	III
<i>Erica australis</i> subsp. <i>aragonensis</i>	.	1	+	2	.	.	III
<i>Digitalis purpurea</i> subsp. <i>carpetana</i>	.	.	+	+	.	1	III
<i>Jasione montana</i>	.	.	1	+	.	+	III
<i>Viola langeana</i>	.	+	+	.	.	+	III
<i>Coincya monensis</i> subsp. <i>orophila</i>	+	.	.	.	+	.	II
<i>Arenaria montana</i>	.	+	.	.	2	.	II
<i>Cytisus multiflorus</i>	.	.	.	2	1	.	II
<i>Clinopodium vulgare</i>	+	.	.	+	.	.	II
<i>Dianthus lusitanicus</i>	.	+	.	+	.	.	II
<i>Corynephorus canescens</i> var. <i>montana</i>	.	+	.	.	.	+	II
<i>Genista florida</i> subsp. <i>polygaliphylla</i>	.	.	+	.	.	+	II
<i>Poa bulbosa</i>	+	.	.	.	.	+	II
<i>Phalacrocarpon oppositifolium</i>	.	+	+	.	.	.	II

Other taxa: *Festuca summilusitana* 1, *Digitalis thapsi* and *Silene nutans* + in 1; *Luzula lactea* + in 2; *Lactuca serriola* + in 4; *Erica arborea* 1, *Anarrhinum bellidifolium*, *Cytisus striatus*, *Lactuca viminea*, *Linaria saxatilis*, *Quercus pyrenaica* and *Sedum hirsutum* + in 5; *Pteridium aquilinum* 1, *Carduus carpetanus*, *Festuca ampla*, *Holcus gayanus*, *Silene latifolia* and *Teucrium salviastrum* + in 6.

Localities: 1: Albergães; 2: Albergaria; 3: Vale Mourisco; 4: Manteigas: S. Pedro, near Lameiras; 5: Manteigas: near Carvalheira; 6: Albergães, *holotypus* *ass.*; 7: synthetic relevé.

Table 4  
*Centaureo coutinhoi*-*Dactyletum lusitanici* C. Meireles & C. Pinto-Gomes *ass. nova hoc loco*  
 (*Agrostion castellanæ*, *Agrostietalia castellanæ*, *Stipo giganteae*-*Agrostietea castellanæ*)

	530	630	550	540	650	280	
Altitude (m.a.s.l.)	530	630	550	540	650	280	
Area (sq.m)	25	2	15	16	20	20	
Cover (%)	90	80	85	90	98	80	
Orientation	S	SE	SO	S	N	SE	
Slope (o)	25	0	5	8	20	20	
Vegetation height (m)	30	30	30	30	30	30	
Number of <i>taxa</i>	17	12	19	18	15	20	
Number	1	2	3	4	5	6	7
<b>Characteristic <i>taxa</i></b>							
<i>Dactylis hispanica</i> subsp. <i>lusitanica</i>	5	2	4	5	4	4	V
<i>Centaurea coutinhoi</i>	2	4	2	2	.	2	V
<i>Agrostis x fouilladei</i>	1	2	2	1	3	.	V
<i>Malva tournefortiana</i>	.	1	1	.	.	1	III
<i>Agrostis castellanæ</i>	.	.	1	1	.	1	III
<i>Sanguisorba verrucosa</i>	.	.	2	+	.	2	III
<i>Euphorbia oxyphylla</i>	.	.	+	+	+	.	III
<i>Thapsia minor</i>	.	.	.	+	1	+	II
<i>Thapsia villosa</i>	.	.	.	.	.	+	I
<i>Centaurea ornata</i>	.	.	.	.	.	1	I
<i>Asphodelus aestivus</i>	.	.	.	.	.	1	I
<i>Rumex acetosella</i> subsp. <i>angiocarpus</i>	.	1	.	.	.	.	I
<b>Other <i>taxa</i></b>							
<i>Daucus carota</i>	1	.	+	2	+	+	V
<i>Lactuca viminea</i>	+	.	+	+	+	+	V
<i>Hypochoeris radicata</i>	+	+	+	.	+	+	V
<i>Cistus ladanifer</i>	+	1	.	.	1	+	IV
<i>Lotus corniculatus</i> subsp. <i>carpetanus</i>	.	.	1	1	2	.	IV
<i>Cytisus multiflorus</i>	1	.	.	.	+	+	III
<i>Pimpinella villosa</i>	+	.	.	2	.	+	III
<i>Lavandula sampaijana</i>	.	.	.	1	1	+	III
<i>Anarrhinum bellidifolium</i>	.	+	.	.	+	+	III
<i>Lithodora prostrata</i>	.	.	+	+	+	.	III
<i>Hypericum perforatum</i>	+	.	+	.	.	+	III
<i>Melica ciliata</i> subsp. <i>magnolii</i>	1	.	.	+	.	.	II
<i>Plantago lanceolata</i>	+	2	.	.	.	.	II
<i>Helichrysum stoechas</i>	.	.	.	1	1	.	II
<i>Pteridium aquilinum</i>	.	.	+	2	.	.	II

Other *taxa*: *Quercus rotundifoliae* + in 4 and 6; *Armeria beirana*, *Crataegus monogyna* and *Lactuca virosa* 1, *Lepidium heterophyllum* and *Rumex induratus* + in 1; *Cistus inflatus* and *Rumex acetosa* 1, *Arrhenatherum elatius* subsp. *bulbosum* + in 2; *Quercus pyrenaica* 1, *Aristolochia paucinervis*, *Clinopodium vulgare*, *Daphne gnidium* and *Fraxinus angustifolia* + in 3; *Lonicera periclymenum* subsp. *hispanica* + in 4; *Hypericum linarifolium* + in 5; *Quercus suber* and *Allium sphaerocephalon* + in 6.

Localities: 1: Guarda: Valhelhas, S. Miguel; 2: Manteigas: Sameiro, near the village; 3: Manteigas: Vale de Amoreira, near Quinta do Cabecinho; 4: Guarda: Valhelhas, Serra Rachada; 5: Manteigas: Vale de Amoreira, near the village; 6: Idanha-a-Nova, Proença-a-Velha, Malhadas Velhas, *holotypus ass.*; 7: synthetic relevé.

*magnolii*-*Celticetum giganteae* Rivas-Martínez ex Peinado & Martínez-Parras 1985, *Gaudinio fragilis*-*Agrostietum castellanæ* Rivas-Martínez & Belmonte 1986, *Trisetum ovati*-*Agrostietum truncatulae*

Rivas Goday 1958, *Pterosparto lasianthi*-*Ericetum aragonensis* Rothmaler 1954 em. Rivas-Martínez 1979 and *Festuco amplae*-*Cynosuretum cristati* Rivas-Martínez ex Fuente 1986.

## CONCLUDING REMARKS

Four new associations are proposed as a contribution to the knowledge of *Stipo giganteae-Agros-*

*tietea castellanae* grasslands. All of them are rich in endemic plants and integrate the 6220 pseudo-steppe with grasses and annuals of the *Thero-Brachypodietea* (Annex I, Directive 92/43/EEC) priority habitat.

## SYNTAXONOMICAL SCHEME

- STIPO GIGANTEAE-AGROSTIETEA CASTELLANAE* Rivas-Martínez, Fernández-González & Loidi 1999.  
*Agrostietalia castellanae* Rivas Goday in Rivas-Martínez, Costa, Castroviejo & E. Valdés 1980  
*Agrostio castellanae-Stipion giganteae* Rivas Goday ex Rivas-Martínez & Fernández-González 1991  
*Serratulo flavescens-Celticetum giganteae* C. Pinto-Gomes & R. Paiva-Ferreira *ass. nova*  
*Armerio macrophyllae-Celticetum giganteae* R. Paiva-Ferreira, C. Pinto-Gomes & R. Pinto *ass. nova*  
*Centaureo coutinhoi-Dactyletum lusitanici* C. Meireles & C. Pinto-Gomes *ass. nova*  
*Festucion merinoi* Rivas-Martínez & Sánchez-Mata in Rivas-Martínez, Sánchez-Mata & Fernández-González 1986 corr. Rivas-Martínez & Sánchez-Mata 2002  
*Centaureo rothmaleranae-Celticetum giganteae* C. Meireles & C. Pinto-Gomes *ass. nova*

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