

**Notas do Herbário da Estação
Florestal Nacional (LISFA): Fasc.
XVI**

**XXXIII: Ten new syntaxa from the
Miniensean biogeographic subsector
(northwestern Portugal)**

As a result of a five-year phytosociologic survey of natural and semi-natural vegetation of the northwest-portuguese territories included in the Miniense Litoral superdistrict (Miniense subsector, Galaico-Português sector; COSTA *et al.*, 1998), we describe 10 new syntaxa (eight associations and two subassociations) from that territory.

The study area includes the lowland areas (alt.<700m a.s.l.) of Northwest Portugal, a territory that is characterised by an absolute dominance of acid rocks (granites, schists) and by the occurrence of both temperate (in hills and small mountains) and mediterranean (in valleys and along the coast) bioclimates. Human occupation is variable, with large cities (Porto, Braga, Viana do Castelo) along the coast and in the valleys of the main rivers (Minho, Lima, Cávado, Ave, Douro) contrasting with small dispersed settlements in the highest areas. A synthetic revision of natural and semi-natural vegetation from the northernmost part of the Miniense Litoral superdistrict has recently been published by HONRADO *et al.* (2002).

The 10 original syntaxa we now describe range from woodlands (*Narcisso cyclaminei-Alnetum glutinosae*, *Hyperico androsaemi-Quercetum roboris*) to halo-chasmophytic grasslands (*Armerio pubigerae-Festucetum pruinosa*), including

hygrophilic heathlands (*Gentiano pneumonanthe-Genistetum ancistrocarpae*), thyme formations on litosols (*Leucojo autumnalis-Thymetum caespititi*), epiphytic communities (*Neckero pumilae-Polypodietum interjecti*, with subassociations *polypodietosum interjecti* and *davallietosum canariensis*), xerophytic grasslands (*Diantho caespitosifolii-Festucetum duriotaganae*) and perennial nitrophilic vegetation (*Echio rosulati-Picridetum echioidis*, with subassociations *picridetosum echioidis* and *dittrichietosum viscosae*).

Throughout the text and in the tables, names of vascular plant taxa are mostly according to *Flora Iberica* (CASTROVIEJO *et al.*, 1986-2001) as far as issued, AMARAL FRANCO & ROCHA AFONSO (1998) for grasses, and *Flora Europaea* (TUTIN *et al.*, 1968-1980, 1993) for other groups.

Narcisso cyclaminei-Alnetum glutinosae
J. Honrado, P. Alves, R. Pereira & F.B.
Caldas associatio nova. hoc loco

Miniensian riparian *Alnus glutinosa*-woodlands of thermo-mesotemperate and mesomediterranean oceanic areas, frequently including *Fraxinus angustifolia* and *Salix atrocinerea* in the tree layer, and characterised by the regular occurrence of the narrow endemic *Narcissus cyclamineus* [typus associatio: table 1, relevé n. 3].

Differential taxa regarding *Senecioni bayonensis-Alnetum glutinosae* from Northwest Spain are the thermophilic taxa *Fraxinus angustifolia*, *Laurus nobilis*, *Hedera helix* subsp. *canariensis*, *Ruscus aculeatus*, *Arum italicum* and *Thalictrum speciosissimum*. Temperate taxa like *Saxifraga spathularis*, *Luzula henriquesii* and *Euphorbia dulcis* are differential taxa regarding thermophilic west-iberian-atlantic riparian alder

forests (*Scrophulario scorodoniae-Alnetum glutinosae*), which are also distinguished by the regular occurrence of abundant thermophilic mediterranean taxa.

Table 1 - *Narcisso cyclaminei-Alnetum glutinosae* J. Honrado, P. Alves, R. Pereira & F.B. Caldas *ass. nova*.

Relevé n.	1	2	3	4	5	6	7	8
Altitude (m)	150	170	100	40	290	10	65	70
N. of taxa	31	33	33	38	39	42	57	63
Characteristic combination of taxa								
<i>Alnus glutinosa</i>	4	3	4	5	5	5	4	4
<i>Salix atrocinerea</i>	1		1	1	+	1	1	2
<i>Arum italicum</i>	1		1		1	1	1	1
<i>Fraxinus angustifolia</i>		3	1	1	1	+	1	
<i>Hedera canariensis</i>	2	3	3	1		1	1	
<i>Laurus nobilis</i>		1	2	1	+	+	+	
<i>Euphorbia amygdaloides</i>	+		+		1	+		1
<i>Luzula henriquesii</i>			3	1	2	2		
<i>Narcissus cyclamineus</i>			1		2		+	1
<i>Osmunda regalis</i>	+	2		2				+
<i>Quercus robur</i>	1	2	1			1		
<i>Ruscus aculeatus</i>			2	+			+	+
<i>Euphorbia dulcis</i>			1		+	+		
<i>Circaea lutetiana</i>							1	+
<i>Thalictrum speciosissimum</i>					+			+
<i>Saxifraga spathularis</i>				+				
Character taxa of order and class								
<i>Athyrium filix-femina</i>	1	1	1	2	1	2	1	2
<i>Lonicera periclymenum</i>	2	1	1	1	1	1	2	+
<i>Oenanthe crocata</i>	1	1	+	1	+	1	1	1
<i>Rubus ulmifolius</i>	2	1	1	1	+	1	1	1
<i>Viola riviniana</i>	1	1	2	2	1	+	+	1
<i>Ajuga reptans</i>	+	1	1	+	+		1	+
<i>Teucrium scorodonia</i>	1	+	+	1		+	+	+
<i>Heracleum sphondylium</i>	+		+		1	+	+	+
<i>Ranunculus ficaria</i>			1	+	2	+	1	+
<i>Angelica sylvestris</i>	+			+	1		+	+
<i>Dryopteris borreii</i>	+		2	+			+	1
<i>Frangula alnus</i>	1			1		+	1	+
<i>Crataegus monogyna</i>	1	1	1			+		
<i>Polygonatum odoratum</i>					+	+	1	+
<i>Polystichum setiferum</i>	1		1			+	+	
<i>Primula acaulis</i>			2		1		1	+
<i>Rumex acetosa</i>		+			+		+	1
<i>Blechnum spicant</i>	1		+	1				
<i>Brachypodium sylvaticum</i>				1			1	+
<i>Sambucus nigra</i>						1	1	2
<i>Tamus communis</i>	+	1				1		
<i>Acer pseudoplatanus</i>			1				1	
<i>Corylus avellana</i>			+				1	
<i>Dryopteris guanchica</i>							+	+
<i>Asplenium onopteris</i>							+	
<i>Galium broterianum</i>				1				
<i>Hieracium vulgatum</i>				+				
<i>Pyrus cordata</i>	1							
<i>Veronica montana</i>			+					
Companion taxa								
<i>Pteridium aquilinum</i>	+	+	+	1	+	+	+	1
<i>Omphalodes nitida</i>	1	1	1	+	+	+		1
<i>Carex laevigata</i>	+			+	+		+	+
<i>Brachypodium rupestre</i>	2		+		+			+

Table 1 – Cont.

Relevé n.	1	2	3	4	5	6	7	8
Companion taxa								
<i>Carex reuteriana</i>		2	+	2	1			
<i>Digitalis purpurea</i>	+	+					+	+
<i>Silene latifolia</i>				+		+	+	+
<i>Aquilegia dichroa</i>		+				+		+
<i>Cardamine flexuosa</i>		1					+	1
<i>Cardamine pratensis</i>					+		+	1
<i>Dactylis lusitanica</i>				1			+	1
<i>Eupatorium cannabinum</i>						+	+	+
<i>Geranium robertianum</i>		1					+	+
<i>Hyacinthoides hispanica</i>					+	2	1	
<i>Juncus effusus</i>					+	+	+	
<i>Lamium maculatum</i>						+	+	+
<i>Picris longifolia</i>		+		+				+
<i>Prunella vulgaris</i>				1			+	+
<i>Ranunculus repens</i>					+	+	+	
<i>Scrophularia balbisii</i>		1					+	1
<i>Tritonia x crocosmiflora</i>						1	+	+
<i>Adenocarpus lainzii</i>	+			+				
<i>Anthoxanthum amarum</i>					2	1		
<i>Bryonia dioica</i>						+		+
<i>Calystegia sepium</i>							+	+
<i>Carex lusitanica</i>							+	+
<i>Cirsium filipendulum</i>					+	+		
<i>Crepis capillaris</i>		+						+
<i>Galium aparine</i>							+	+
<i>Geranium purpureum</i>		+						+
<i>Holcus mollis</i>					1			1
<i>Iris pseudacorus</i>		1						+
<i>Luzula forsteri</i>		+					+	
<i>Lycopus europaeus</i>							+	+
<i>Myosotis secunda</i>		1						+
<i>Pentaglotis sempervirens</i>					1	+		
<i>Plantago lanceolata</i>					+	+		
<i>Poa annua</i>					1		+	
<i>Polypodium interjectum</i>		+						+
<i>Raphanus raphanistrum</i>					+			+
<i>Rosa sp.</i>	+							+
<i>Stellaria media</i>					+			+
<i>Tradescantia fluminensis</i>						+	1	
<i>Urtica dioica</i>							1	1

Companion taxa in one relevé: **Rel. 1:** *Erica arborea*, *+Ulex minor*; **Rel. 2:** *+Arenaria montana*, *+Galium palustre*, *+Lotus pedunculatus*; **Rel. 3:** *+Stellaria holostea*; **Rel. 4:** *1Agrostis x fouilladei*, *1Antoxanthum odoratum*, *+Juncus bulbosus*, *+Myosotis caespitosa*, *+Potentilla erecta*, *+Sibthorpia europaea*; **Rel. 5:** *+Cirsium palustre*; **Rel. 6:** *2Arisarum vulgare*, *2Oxalis pes-caprae*, *+Peucedanum lancifolium*; **Rel. 7:** *Allium triquetrum*, *+Chelidonium majus*, *+Polygonum hydropiper*; **Rel. 8:** *+Apium nodiflorum*, *+Hypericum undulatum*, *+Mentha suaveolens*, *+Rumex conglomeratus*, *+Rumex obtusifolius*.

Sites: **Rel. 1:** PONTE DE LIMA: Anais, 29TNG3914; **Rel. 2:** SANTO TIRSO: Refojos de Riba de Ave, 29TNG4672; **Rel. 3:** PAREDES DE COURA: Covas, 29TNG2536; **Rel. 4:** PONTE DA BARCA: Entre-Ambos-os-Rios, 29TNG5630; **Rel. 5:** PAREDES DE COURA: River Coura, 29TNG3541; **Rel. 6:** CAMINHA: Âncora, 29TNG1228; **Rel. 7:** VILA NOVA DE GAIA: Alheira de Baixo, 29TNG3848; **Rel. 8:** VILA NOVA DE GAIA: Between Alheira de Aquém and Casal Drijo, 29TNG3947.

Hyperico androsaemi-Quercetum roboris

J. Honrado, I. Rocha, P. Alves & F.B.
Caldas associatio nova hoc loco

Mesotrophic mixed woodlands of

thermo-mesotemperate miniensian areas, predominated by *Quercus robur* and with high species diversity at all strata, typical of deep colluvial soils derived from

Table 2 – Cont.

Relevé number	1	2	3	4	5	6	7	8	9	10	11
Character species of Order and Class											
<i>Polygonatum odoratum</i>					1		+				1
<i>Sambucus nigra</i>				1	+				+		
<i>Stellaria holostea</i>						1			+		1
<i>Holcus mollis</i>										1	1
<i>Ulmus glabra</i>		1						2			
<i>Anemone albida</i>											+
<i>Arenaria montana</i>											1
<i>Hyacinthoides</i> sp.											+
<i>Physospermum cornubiense</i>											1
<i>Ranunculus ficaria</i>											1
Companion taxa											
<i>Teucrium scorodonia</i>	1	1	1	1	+		1	+	+	1	1
<i>Aquilegia dichroa</i>		1	+	1	+	1	1	+	+		1
<i>Geranium robertianum</i>	1		1	1	+		1	+	+	+	1
<i>Omphalodes nitida</i>		1	1	1	1	1	2		+	1	1
<i>Rubus</i> sp.	3		2	2	1		3	2	2	3	3
<i>Tamus communis</i>		1	1	1	1	2	1	1	1		2
<i>Brachypodium rupestre</i>		1	2	1		2	2			1	2
<i>Digitalis purpurea</i>	1	+			+		2	1		+	1
<i>Fragaria vesca</i>		1	1	+		+	1			+	1
<i>Ajuga reptans</i>						+		+	+	2	1
<i>Crataegus monogyna</i>		1	1			1		1			2
<i>Chrysosplenium oppositifolium</i>				1		+			+	+	
<i>Erica arborea</i>					1				+	1	+
<i>Eupatorium cannabinum</i>		+	+				2				1
<i>Heraclium sphondylium</i>				1		1	1			+	
<i>Oenanthe crocata</i>				1		+			+		+
<i>Polypodium interjectum</i>			1					1	+		1
<i>Rumex acetosa</i>				+					+	1	+
<i>Arisarum vulgare</i>					+					+	+
<i>Linaria triornithophora</i>		1			+		1				
<i>Picris longifolia</i>					+		1		+		
<i>Anthoxanthum odoratum</i>								1		1	
<i>Arbutus unedo</i>			1				1				
<i>Asplenium quadrivalens</i>	1				+						
<i>Cardamine flexuosa</i>										+	+
<i>Carex reuteriana</i>									+		+
<i>Cystopteris viridula</i>	+							+			
<i>Pteridium aquilinum</i>					+					1	
<i>Scrophularia balbisii</i>	+						+				
<i>Sibthorpia europaea</i>					+				+		
<i>Silene vulgaris</i>		+				+					

Companion taxa in one relevé: **Rel. 1:** 1*Lotus pedunculatus*, 1*Prunus lusitanica*; **Rel. 2:** +*Malva tournefortiana*, 2*Rubus* cf. *ulmifolius*; **Rel. 3:** +*Cytisus striatus*, 1*Arabis juresii*, +*Myosotis secunda*; **Rel. 5:** +*Tradescantia fluminensis*; **Rel. 7:** +*Geranium colombinum*, 1*Polypodium cambricum*; **Rel. 8:** +*Centaurea rivularis*, +*Epilobium obscurum*, +*Pentaglottis sempervirens*, +*Scrophularia herminii*, 1*Dactylis glomerata* s.l., 1*Poa trivialis*, 1*Scutellaria minor*; **Rel. 9:** +*Ranunculus repens*; **Rel. 10:** 1*Carex pilulifera*; **Rel. 11:** +*Cerastium fontanum*, +*Cirsium palustre*, +*Genista falcata*, +*Hieracium vulgatum*, +*Ulex minor*, 1*Carex leporina*.

Sites: **Rel. 1:** TERRAS DE BOURO: between Gerês and Ermida, Ribeiro Feixa Ferreira, 29TNG7019; **Rel. 2:** TERRAS DE BOURO: Freitas, between EN3 and Ribeiro de Freitas, 29TNG6518; **Rel. 3:** TERRAS DE BOURO: between Covide and Freitas, by Ribeiro de Freitas, 29TNG6519; **Rel. 4:** TERRAS DE BOURO: Freitas, km 70 of EN304, 29TNG6518; **Rel. 5:** TERRAS DE BOURO: S. Bento, below the Sanctuary, 29TNG6616; **Rel. 6:** PONTE DE LIMA: Boalhosa, 29TNG4120; **Rel. 7:** TERRAS DE BOURO, Rio Caldo, 29TNG6616; **Rel. 8:** PONTE DE LIMA: Labrujô, Ponte dos Piscos, 29TNG3732; **Rel. 9:** TERRAS DE BOURO: Freitas, Pontelha, 29TNG6517; **Rel. 10:** TERRAS DE BOURO: Rio Caldo, near Sr dos Passos, 29TNG6714; **Rel. 11:** TERRAS DE BOURO: Rio Caldo, Costa da Igreja, 29TNG6615.

Mesotrophic mixed woodlands occupy a specific area within territorial forest catenae, between oligotrophic oak woodlands (*Rusco aculeati-Quercetum roboris*) and riparian alder forests (*Narcisso cyclaminei-Alnetum glutinosae*). Hazel formations of association *Omphalodo nitidae-Coryletum avellanae* are regarded as secondary woodlands within *Hyperico-Quercetum* teselae.

Gentiano pneumonanthe -Genistetum ancistrocarpa J. Honrado & P. Alves associatio nova hoc loco

Hygrophilic heathlands of highly oceanic lowland (<10m a.s.l.) areas of the Miniense Litoral superdistrict, predominated by *Erica ciliaris*, *Ulex minor*, *Molinia caerulea* and the west-iberian endemic *Genista ancistrocarpa* [typus associatio: table 3, relevé n. 2]. These heathlands are typical of wide, swampy platforms of the valleys of the main rivers in the territory

(Minho, Lima) and are regarded as seral communities within hygrophilic woodland teselae.

These communities can be distinguished from related *Genista ancistrocarpa* heathlands of Southwest Portugal by the occurrence of temperate taxa like *Gentiana pneumonanthe*, *Carex binervis*, *Agrostis capillaris*, *Potentilla erecta* and *Peucedanum lancifolium*.

Leucojo autumnalis -Thymetum caespititii J. Honrado, P. Alves & H. Nepomuceno associatio nova hoc loco

Perennial pioneer formations predominated by the west-iberian thyme *Thymus caespititius*, colonising litosols in highly oceanic xero-thermic coastal and sub-coastal areas of Northwest Portugal. These communities seem to have their optimum on shallow soils derived from schist in sub-coastal hills and small mountains of the Douro Litoral province.

Table 3 - *Gentiano pneumonanthe-Genistetum ancistrocarpa* J. Honrado & P. Alves *ass. nova*.

Relevé n.	1	2	3	4
Altitude (m)	5	5	5	5
N. of taxa	7	9	11	13
Character taxa				
<i>Erica ciliaris</i>	1	3	1	1
<i>Genista ancistrocarpa</i>	2	2	3	2
<i>Potentilla erecta</i>	1	+	1	2
<i>Gentiana pneumonanthe</i>	1	+	2	
<i>Ulex minor</i>	1	4	2	
Companion taxa				
<i>Molinia caerulea</i>	5	1	4	4
<i>Peucedanum lancifolium</i>		+	1	
Bryophytes				
<i>Aulacomnium palustre</i>				2
<i>Sphagnum auriculatum</i>				3

Companion taxa in one relevé: **Rel. 1:** +*Juncus effusus*; **Rel. 2:** 1 *Agrostis capillaris*, 1 *Carum verticillatum*; **Rel. 3:** +*Bidens frondosa*, +*Carex binervis*, +*Frangula alnus* (pl.), +*Quercus robur* (pl.); **Rel. 4:** 2 *Drosera intermedia*, +*Eleocharis multicaulis*, 1 *Hypericum elodes*, 1 *Juncus acutiflorus*, 1 *Lotus pedunculatus*, +*Ranunculus gallaecicus*, 1 *Wahlenbergia hederacea*.

Sites: **Rel. 1:** PONTE DE LIMA: Bertandos, 29TNG2430. **Rel. 2:** VIANA DO CASTELO: S. Simão, 29TNG1915 **Rel. 3:** PONTE DE LIMA: Bertandos, 29TNG2329. **Rel. 4:** PONTE DE LIMA: Bertandos, 29TNG2430.

Differential taxa regarding other associations in the alliance *Sedion anglici* are *Leucojum autumnale* and *Centaurea aristata* subsp. *langeana* [typus associatio: table 4, relevé n. 4]. Other common taxa are *Scilla autumnalis*, *Hypericum linariifolium* and *Agrostis trunctula* subsp. *duriaei*. Frequent bryophytes are *Polytrichum piliferum* Hedw., *Campylopus pilifer* Brid. and *Racomitrium elongatum* (Ehrh.) Frisvoll.

Neckero pumilae -Polypodietum interjecti J. Honrado, H. Hespanhol, C. Vieira, A. Séneca & F.B. Caldas associatio nova hoc loco

polypodietosum interjecti J. Honrado, H. Hespanhol, C. Vieira, A. Séneca & F.B. Caldas subassociatio nova hoc loco

davallietosum canariensis J. Honrado, H. Hespanhol, C. Vieira, A. Séneca & F.B. Caldas subassociatio nova hoc loco

Epiphytic vegetation predominated by ferns and bryophytes, usually colonising old trunks of *Quercus robur* in thermo-mesotemperate and mesomediterranean miniensian areas.

The abundance and diversity of bryophytes and the almost complete absence of seed plants clearly separates this epiphytic vegetation from related communities of rocky environments (*Gymnogrammo-Davallietum canariensis*). Differential taxa regarding the epiphytic association *Pterogonio-Davallietum canariensis* (from Southern Spain) are *Polypodium interjectum* and the atlantic moss *Neckera pumila* Hedw.; other common bryophyte species are *Pterogonium gracile* (Hedw.) Sm., *Hypnum cupressiforme* Hedw. and *H. andoi* A.J.E. Smith [typus associatio: Table 5, relevé n. 8].

Table 4 - *Leucojum autumnalis-Thymetum caespititii* J. Honrado, P. Alves & H. Nepomuceno ass. nova.

Relevé n. Altitude (m) N. of taxa	1 15 6	2 20 8	3 20 10	4 200 13	5 190 15
Character taxa					
<i>Centaurea langeana</i>	1	2	+	2	1
<i>Leucojum autumnale</i>	1	1	1	3	2
<i>Thymus caespititius</i>	4	3	3	3	4
<i>Sedum brevifolium</i>	1	1	2	+	
<i>Agrostis duriaei</i>		1		1	1
<i>Hypericum linariifolium</i>				1	1
<i>Allium sphaerocephalon</i>			+		
<i>Scilla autumnalis</i>				2	
Companion taxa					
<i>Agrostis pseudopungens</i>	2	2	1		
<i>Asparagus aphyllus</i>	+		1		
<i>Avenula reuteri</i>				1	+
<i>Carex pilulifera</i>	1		+		
<i>Logfia minima</i>				1	1
<i>Lotus carpetanus</i>		+	1		
<i>Sedum arenarium</i>		1	2		3
<i>Sesamoides suffruticosa</i>				+	+
<i>Xolantha guttata</i>				2	+

Companion taxa in one relevé: **Rel. 3:** +*Briza maxima*, +*Danthonia decumbens*, +*Davallia canariensis*, +*Leontodon longirostris*; **Rel. 4:** 1*Halimium umbellatum*, +*Jasione montana*; **Rel. 5:** +*Aira praecox*, +*Andryala integrifolia*, 1*Cistus salvifolius*, +*Lithodora prostrata*, 1*Micropyrum tenellum*.

Sites: Rels. 1-3: VIANA DO CASTELO: Montedor, 29TNG1022. **Rels. 4-5:** VALONGO: Santa Justa, 29TNF4259.

In warm lowland areas (usually below 200 meters a.s.l.), *Polypodium cambricum* and *Davallia canariensis* define a thermophilic sub-association [*davallietosum canariensis*; typus subassociatio: table 5, relevé n. 3].

***Dianthus caespitosifolii* -Festucetum duriotaganae** J. Honrado, P. Alves, H. Nepomuceno & F.B. Caldas associatio nova hoc loco

Xerophytic perennial communities predominated by the endemics *Festuca duriotagana* and *Dianthus laricifolius* subsp. *caespitosifolius*, colonising wide crevices of granite outcrops in xerothermic areas of the Minho river valley. Due to floristic, ecologic and

phylogeographic affinities with similar communities from the Douro and Tejo river valleys, we include this new association in the alliance *Festucion duriotaganae*.

Dianthus laricifolius subsp. *caespitosifolius*, a narrow endemic of Northwest Iberian Peninsula, is a character taxon of the new association. *Allium schoenoprasum* var. *duriminium*, *Anarrhinum duriminium*, *Centaurea aristata* subsp. *langeana*, *Coincya monensis* subsp. *cheiranthos*, *Euphorbia esula*, *Inula salicina*, *Rumex induratus* and *Solidago virgaurea* are other character taxa in these formations [typus associatio: table 6, relevé n. 4].

Table 5 - *Neckero pumilae*-*Polypodietum interjecti* J. Honrado, H. Hespanhol, C. Vieira, A. Séneca & F.B. Caldas ass. nova.

Relevés 1-5: *davallietosum canariensis* J. Honrado, H. Hespanhol, C. Vieira, A. Séneca & F.B. Caldas subas. nova;

Relevés 6-8: *polypodietosum interjecti* J. Honrado, H. Hespanhol, C. Vieira, A. Séneca & F.B. Caldas subas. nova.

Relevé n. Altitude (m) N. of taxa Phorophyte	1 190	2 310	3 190	4 140	5 190	6 260	7 610	8 320
	Qr	Qr	Qr	Qr	Qr	Qr	Qr	Qr
Character vascular taxa								
<i>Polypodium interjectum</i>			1			3	3	4
<i>Davallia canariensis</i> (diff. subas.)	4	5	4		4			
<i>Polypodium cambricum</i> (diff. subas.)	1			4				
<i>Umbilicus rupestris</i>						2		
Companion vascular taxa								
<i>Hedera canariensis</i>					1			
Bryophytes								
<i>Pterogonium gracile</i>		1	1	3	1	1	4	1
<i>Hypnum cupressiforme</i>		3		2		4		4
<i>Neckera pumila</i>			1	1	1			1
<i>Homalothecium sericeum</i>				1	1			
<i>Hypnum andoi</i>			4		3			
<i>Porella obtusata</i>	4	1						
<i>Frullania tamarisci</i>							1	
<i>Metzgeria furcata</i>							1	
<i>Radula lindenbergiana</i>								3
<i>Thuidium tamariscinum</i>				3				

Phorophyte: Qr = *Quercus robur*. **Sites:** **Rel. 1:** ARCOS DE VALDEVEZ: Between Soajo and Vilarinho das Quartas, 29TNG6035. **Rel. 2:** PONTE DA BARCA: Cidadelhe, 29TNG6334. **Rel. 3:** ARCOS DE VALDEVEZ: Between Soajo and Vilarinho das Quartas, 29TNG6035. **Rel. 4:** PONTE DA BARCA: Lourido, 29TNG6030. **Rel. 5:** ARCOS DE VALDEVEZ: Between Soajo and Vilarinho das Quartas, 29TNG6035. **Rel. 6:** PONTE DA BARCA: Cidadelhe, 29TNG6234. **Rel. 7:** PONTE DA BARCA: Germil, 29TNG6126. **Rel. 8:** PONTE DA BARCA: Cidadelhe, 29TNG6334.

Table 6 - *Diantho caespitosifolii-Festucetum duriotaganae* J. Honrado, P. Alves, H. Nepomuceno & F.B. Caldas *ass. nova*.

Relevé n.	1	2	3	4	5
Altitude (m)	10	25	10	10	10
N. of taxa	7	8	8	9	12
Character taxa					
<i>Centaurea langeana</i>	1	1	1	1	2
<i>Dianthus caespitosifolius</i>	3	1	2	3	2
<i>Festuca duriotagana</i>	2	3	3	2	3
<i>Sesamoides suffruticosa</i>			+		+
<i>Allium duriminium</i>				1	
<i>Anarrhinum duriminium</i>					+
<i>Coincya recurvata</i>					+
<i>Euphorbia esula</i>				1	
<i>Inula salicina</i>				1	
<i>Rumex induratus</i>				1	
Companion taxa					
<i>Agrostis castellana</i>	2	1	1		1
<i>Solidago virgaurea</i>		+		+	1
<i>Asperula scabra</i>	1	+			
<i>Lepidium heterophyllum</i>			1	+	

Companion taxa in one relevé: **Rel. 1:** +*Biscutella valentina*, 1*Sedum brevifolium*; **Rel. 2:** +*Andryala integrifolia*, 1*Leontodon taraxacoides*; **Rel. 3:** +*Elymus campestris*, 1*Sedum hirsutum*; **Rel. 5:** 1*Cynodon dactylon*, 1*Hypericum linarifolium*, +*Jasione montana*, +*Peucedanum gallicum*.

Sites: **Rel. 1:** MONÇÃO: Bela, rio Minho, 29TNG4758. **Rel. 2:** MELGAÇO: Peso, rio Minho, 29TNG5862. **Rel. 3:** MONÇÃO: Bela, rio Minho, 29TNG4758. **Rel. 4:** MONÇÃO: Bela, rio Minho, 29TNG4758. **Rel. 5:** MONÇÃO: Bela, rio Minho, 29TNG4758.

Echio rosulati-Picridetum echioidis P. Alves & J. Honrado associatio nova hoc loco

picridetosum echioidis P. Alves & J. Honrado subas. nova hoco loco

dittrichietosum viscosae P. Alves & J. Honrado subas. nova hoco loco

Communities of grasses and tall herbs, typical of road-sides and waste areas in miniensian territories (lowland areas of Northwest Portugal and Southwest Galicia), predominated by *Picris echioides*. Other frequent taxa are *Cirsium vulgare*, *Echium rosulatum*, *Foeniculum vulgare* subsp. *piperitum* and *Daucus carota* subsp. *maritimus*.

Differential species regarding *Helminthio-Melilotetum albi* from Northern Spain are the northwest-iberian endemic *Echium rosulatum* and thermophytic taxa like *Foeniculum vulgare*

subsp. *piperitum*, *Daucus carota* subsp. *maritimus*, *Aster squamatus*, *Melilotus indicus*, etc. [typus associatio: table 7; relevé n. 4]. A frequent form of the association, predominated by *Foeniculum vulgare* subsp. *piperitum*, *Daucus carota* subsp. *maritimus*, *Echium rosulatum* and grass species, is related to roadsides where this vegetation is submitted to frequent cutting.

In southern miniensian areas and in neighbouring mediterranean territories of Beira Litoral, the occurrence of *Dittrichia viscosa* subsp. *viscosa*, *Ammi majus* and *Piptatherum miliaceum* define a southern, thermo-mesomediterranean subassociation [*dittrichietosum viscosae*; typus subassociatio: table 7, relevé n. 9].

Armerio pubigerae-Festucetum pruinosae J. Honrado & H. Nepomuceno associatio nova hoco loco

Table 7 - *Echio rosulati-Picridetum echioidis* P. Alves & J. Honrado *ass. nova*.
 Relevés 1-5: *picridetosum echioidis* P. Alves & J. Honrado *subas. nova*;
 Relevés 6-9: *dittrichietosum viscosae* P. Alves & J. Honrado *subas. nova*.

Relevé n.	1	2	3	4	5	6	7	8	9
Altitude (m)	30	190	170	10	10	70	80	70	70
N. of taxa	19	22	25	28	31	16	18	23	23
Character taxa									
<i>Picris echioides</i>	5	4	2	4	3	3	2	4	3
<i>Cirsium vulgare</i>	1	1		2		1	1	+	2
<i>Aster squamatus</i>		1		1		2	2	1	2
<i>Calystegia sepium</i>	+			2			1	+	1
<i>Conyza albida</i>		2	1	2		1	1		2
<i>Daucus maritimus</i>	1	+	+	2				1	2
<i>Echium rosulatum</i>	2	3	3	2	3				2
<i>Foeniculum piperitum</i>	2	+		2	2	3			
<i>Lavatera cretica</i>					+	1	1		
<i>Oenothera biennis</i>		+		+				1	
<i>Verbena officinalis</i>				1		2			1
<i>Lactuca serriola</i>		1						+	
<i>Lactuca virosa</i>	+			2					
<i>Oenothera rosea</i>						1			1
<i>Aster x salignus</i>				+					
<i>Melilotus albus</i>									1
<i>Melilotus indicus</i>								1	
<i>Oenothera glazioviana</i>			1						
<i>Verbascum crassifolium</i>							3		
<i>Verbena bonariensis</i>								2	
Diff. taxa subas.									
<i>Piptatherum miliaceum</i>						2	5		1
<i>Ammi majus</i>						1		2	1
<i>Dittrichia viscosa</i>						2			2
Companion taxa									
<i>Dactylis glomerata</i>		+	2	1	2			1	1
<i>Holcus lanatus</i>			1		1		+	1	1
<i>Sonchus oleraceus</i>		+		+	2	+	1		
<i>Rubus ulmifolius</i>	1		1		1				1
<i>Andryala integrifolia</i>			+	1			1		
<i>Avena lusitanica</i>		+			1				
<i>Chenopodium album</i>		+		1	1				
<i>Coleostephus myconis</i>			2		1			+	
<i>Mentha suaveolens</i>	1				1				
<i>Parietaria judaica</i>	1				1		1		
<i>Rumex obtusifolius</i>		+		1					
<i>Trifolium repens</i>		1		1					2
<i>Bidens frondosa</i>		+		+					
<i>Bromus catharticus</i>				+	+				
<i>Bromus diandrus</i>			1		+				
<i>Cyperus eragrostis</i>						+			1
<i>Galactites tomentosa</i>			1		+				
<i>Hirschfeldia incana</i>						2	2		
<i>Medicago lupulina</i>	+							1	
<i>Paspalum dilatatum</i>								1	1
<i>Phytolacca americana</i>			1	1					
<i>Plantago major</i>				1				+	
<i>Pteridium aquilinum</i>	1							1	
<i>Silene latifolia</i>				+	1				
<i>Solanum nigrum</i>	+				1				
<i>Vulpia myuros</i>		+	1						

Companion taxa in one relevé: **Rel. 1:** 1*Agrostis stolonifera*, 2*Galium aparine*, +*Medicago polymorpha*, +*Oenanthe crocata*, 1*Panicum repens*, 1*Paspalum paspalodes*; **Rel. 2:** 1*Agrostis x foulladei*, +*Chamaemelum mixtum*, 1*Chenopodium ambrosioides*, +*Hordeum leporinum*, +*Lapsana communis*. **Rel. 3:** +*Adenocarpus lainzii*,

1*Anarrhinum bellidifolium*, +*Campanula lusitanica*, 1*Hypochoeris radicata*, 1*Ipomea acuminata*, +*Jasione montana*, +*Melissa officinalis*, 1*Picris longifolia*, +*Senecio lividus*, +*Tolpis barbata*; **Rel. 4:** 1*Bromus hordeaceus*, +*Epilobium parviflorum*, +*Gnaphalium luteoalbum*, +*Polypogon monspeliensis*, +*Pulicaria paludosa*; **Rel. 5:** 1*Achillea millefolium*, +*Calendula arvensis*, 1*Cyperus longus*, 1*Digitaria sanguinalis*, 1*Echinochloa crus-galli*, +*Erodium moschatum*, +*Heracleum sphondylium*, +*Lamium maculatum*, +*Mercurialis ambigua*, 1*Polygonum persicaria*, 1*Ranunculus repens*, 1*Raphanus raphanistrum*; **Rel. 6:** 1*Convolvulus arvensis*, 1*Stenotaphrum secundatum*; **Rel. 7:** 1*Epilobium tetragonum*, 1*Oxalis pes-caprae*, 1*Senecio vulgaris*, 1*Trifolium nigrescens*, 1*Urtica membranacea*; **Rel. 8:** 1*Agrostis castellana*, +*Digitalis purpurea*, +*Lythrum junceum*, 1*Poa trivialis*, 1*Polygonum aviculare*, 1*Polypogon viridis*; **Rel. 9:** 2*Cynodon dactylon*, 1*Lotus pedunculatus*, 1*Rumex conglomeratus*, +*Vicia nigra*.

Sites: **Rel. 1:** VIANA DO CASTELO: Afife, 29TNG1123; **Rel. 2:** BRAGA: Gualtar, 29TNG5102; **Rel. 3:** TERRAS DO BOURO: Vilar da Veiga, 29TNG6814; **Rel. 4:** PONTE DE LIMA: Between Vila Mou and Lanheses, 29TNG2520; **Rel. 5:** VIANA DO CASTELO: Afife, 29TNG1122; **Rel. 6:** PORTO: Campo Alegre, 29TNF3056; **Rel. 7:** PORTO: Bom Sucesso, 29TNF3156 **Rel. 8:** MAIA: Devesa, 29TNF3366; **Rel. 9:** PORTO: Campo Alegre, 29TNG3056.

Table 8 - *Armerio pubigerae-Festucetum pruinosa* J. Honrado & H. Nepomuceno *ass. nova*

Relevé n.	1	2	3	4	5	6	7
Altitude (m)	5	5	5	5	5	5	5
N. of taxa	3	4	5	6	7	7	10
Character taxa							
<i>Festuca pruinosa</i>	5	5	4	5	5	4	4
<i>Armeria pubigera</i>	2	1	+		+	2	
<i>Crithmum maritimum</i>	1	1		+	+	1	
<i>Matricaria maritima</i>		1	4			2	
<i>Silene uniflora</i>					2	2	+
<i>Romulea clusiana</i>				1			+
<i>Spergularia rupicola</i>			+	+			
<i>Anthyllis iberica</i>					+		
Companion taxa							
<i>Stenotaphrum secundatum</i>			+			1	

Companion taxa in one relevé: **Rel.4:** 1*Atriplex* sp., +*Desmazeria marina*; **Rel. 5:** +*Daucus maritimus*, 2*Pulicaria odora*; **Rel. 6:** +*Ammophila arundinacea*; **Rel. 7:** +*Andryala integrifolia*, +*Carlina corymbosa*, 1*Elymus boreo-atlanticus*, +*Euphorbia paralias*, +*Ulex latebracteatus*.

Sites: **Rel. 1:** CAMINHA: Vila Praia de Âncora, 29TNG1029. **Rel. 2:** VIANA DO CASTELO: Montedor, 29TNG1022. **Rel. 3:** VIANA DO CASTELO: Montedor, 29TNG1022. **Rel. 4:** CAMINHA: Vila Praia de Âncora, 29TNG1029. **Rel. 5:** VIANA DO CASTELO: Montedor, 29TNG1022. **Rel. 6:** VIANA DO CASTELO: Montedor-Norte, 29TNG1021. **Rel. 7:** CAMINHA: Vila Praia de Âncora, 29TNG1030.

Perennial halo-chasmophytic grasslands predominated by *Festuca rubra* subsp. *pruinosa*, typical of coastal rocky outcrops, where they represent the second vegetation belt in the aero-halophilic vegetation complex ("micro-geosigmetum"), between the species-poor vegetation of horizontal rock crevices (*Crithmo-Armerietum pubigerae*) and the permanent cushion-shaped heathlands (*Cisto-Ulicetum humilis*).

The northwest-iberian endemic *Armeria pubigera* is a differential taxon of this new association [typus associatio:

table 8, relevé n. 6]. The total number of character species is usually lower than in related syntaxa from Northern Spain.

Syntaxonomical scheme

In the syntaxonomical scheme presented below, vegetation types, classes, orders and alliances are those of Rivas-Martínez *et al.* (2001), except for the alliance *Festucion duriotaganae*.

JUNCETEA MARITIMI Br.-Bl. in Br.-Bl., Roussine & Nègre 1952

Crithmo-Armerietalia Géhu 1964

- Crithmo-Armerion maritimae** Géhu 1968
Crithmo maritimi-Armerietum pubigerae Rivas-Martínez 1978
Armerio pubigerae-Festucetum pruinosa J. Honrado & H. Nepomuceno ass. nova
- ANOMODONTO-POLYPODIETEA Rivas-Martínez 1975
- Anomodonto-Polypodietalia** O. Bolòs & Vives in O. Bolòs 1957
- Bartramio-Polypodium serrati** O. Bolòs & Vives in O. Bolòs 1957
- Gymnogrammo leptophyllae-Davallietum canariensis* Bellot & Casaseca in Casaseca 1959
- Neckero pummillae-Polypodietum interjecti* J. Honrado, H. Hespanhol, C. Vieira, A. Séneca & F.B. Caldas ass. nova
- polypodietosum interjecti* J. Honrado, H. Hespanhol, C. Vieira, A. Séneca & F.B. Caldas subass. nova
- davallietosum canariensis* J. Honrado, H. Hespanhol, C. Vieira, A. Séneca & F.B. Caldas subass. nova
- Pterogonio gracilis-Davallietum canariensis* Pérez-Latorre, Cabezudo & Guerra 2000
- PHAGNALO -RUMICETEA INDURATI (Rivas Goday & Esteve 1972) Rivas-Martínez, Izco & Costa 1973
- Phagnalo saxatilis-Rumicetalia indurati** Rivas Goday & Esteve 1972
- Festucion duriotaganae** Capelo, Aguiar, Penas, J.C. Costa & Lousã 1998
- Diantho caespitosifolii -Festucetum duriotaganae* J. Honrado, P. Alves, H. Nepomuceno & F.B. Caldas ass. Nova
- ARTEMISIETEA VULGARIS Lohmeyer, Preising & Tüxen ex von Rochow 1951
- Artemisienea vulgaris
- Agropyretalia repentis** Oberdorfer, Müller & Görs in Oberdorfer, Görs, Korneck, Lohmeyer, Müller, Philippi & Seibert 1967
- Dauco-Melilotion** Görs 1966
- Echio rosulati-Picridetum echioidis* P. Alves & J. Honrado ass. nova
- picridetosum echioidis* P. Alves & J. Honrado ass. nova
- dittrichietosum viscosae* P. Alves & J. Honrado ass. nova
- Helminthio echioidis-Melilotetum albae* Loidi & C. Navarro 1988
- SEDO-SCLERANTHETEA Br.-Bl. 1955
- Sedo-Scleranthetalia** Br.-Bl. 1955
- Sedion anglici** Br.-Bl. & Tüxen 1952
- Leucojo autumnalis-Thymetum caespititi* J. Honrado, P. Alves & H. Nepomuceno ass. nova
- Sedo anglici-Thymetum caespititii* J. Rodríguez, Ortiz & Pulgar 1996
- Sedo pruinati-Thymetum caespititii* Ortiz, Pulgar & J. Rodríguez 1999
- CALLUNO-ULICETEA Br.-Bl. & Tüxen ex Klika & Hadac 1944
- Ulicetalia minoris Quantin 1935
- Dactylido maritimae-Ulicion maritimi** Géhu 1975
- Cisto salviifolii-Ulicetum humilis* Br.-Bl., P. Silva & Rozeira 1965
- Genistion micrantho-anglicae** Rivas-Martínez 1979
- Gentiano pneumonanthe -Genistetum ancistrocarpae* J. Honrado & P. Alves ass. nova
- QUERCO-FAGETEA Br.-Bl. & Vlieger in Vlieger 1937
- Fagetalia sylvaticae** Pawłowski in Pawłowski, Sokołowski & Wallisch 1928
- Pulmonario longifoliae-Quercion roboris** Rivas-Martínez, Fernández-González, Loidi, Lousã & Penas 2001
- Hyperico androsaemi-Quercetum roboris* J. Honrado, I. Rocha, P. Alves & F.B. Caldas ass. nova
- Omphalodo nitidae-Coryletum avellanae* Amigo, G. Azcárate & Romero 1994
- Quercetalia roboris* Tüxen 1931
- Quercion pyrenaicae** Rivas Goday ex

- Rivas-Martínez 1965
Quercenion robori-pyrenaicae (Br.-Bl., P. Silva & Rozeira 1956) Rivas-Martínez 1975
Rusco aculeati-Quercetum roboris Br.-Bl., P. Silva & Rozeira 1956
Populetales albae Br.-Bl. ex Tchou 1948
Osmundo-Alnion (Br.-Bl., P. Silva & Rozeira 1956) Dierschke & Rivas-Martínez in Rivas-Martínez 1975
Narcisso cyclaminei-Alnetum glutinosae J. Honrado, P. Alves, R. Pereira & F.B. Caldas ass. nova
Scrophulario scorodoniae -Alnetum glutinosae Br.-Bl., P. Silva & Rozeira 1956
Senecioni bayonensis-Alnetum glutinosae Amigo, J. Guitián & F. Prieto 1987
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