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Phytosociological study of *Hirschfeldia incana* (L.) Lagraze-Fossat (Cruciferae) communities in mainland Greece

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Using numerical analysis, the phytosociological study of *Hirschfeldia incana* communities in mainland Greece allowed their classification into the *Rapistro rugosi-Hirschfeldietum incanae* ass. nov., a new subnitrophilous association of the *Hordeion leporini* alliance. Three subassociations were distinguished (*anthemidetosum incrassatae, hedypnoidetosum creticae* and *cardarietosum drabae*), the distribution of which seems to depend on latitudinal alteration of rainfall. The new association has its optimum growth in habitats with moderate human influence, specifically in abandoned cultivations and wastelands. With respect to its floristic composition, the *Rapistro rugosi-Hirschfeldietum incanae* is close to anthropogenic vegetation with a high degree of naturalness, particularly to the therophytic, subnitrophilous vegetation of the *Thero-Brometalia* (*Stellarietea mediae*) and the perennial, subnitrophilous vegetation of *Carthametalia lanati* (*Artemisietea vulgaris*).

Key words: vegetation, anthropogenous, *Hirschfeldia incana*, cruciferae, *Hordeion leporini*, Mediterranean, Balkan, Greece

Introduction

Continuous and extensive human interference with the natural environment of Greece since ancient times has resulted in the present-day landscape consisting of mostly man-made habitats exhibiting different degrees of degradation. While vegetation of rural habitats is comparatively well known by now in Greece after five decades of research (e.g., OBERDORFER 1954; WALTHER 1969; HORVAT et al. 1974; LAVRENTIADES 1979; FERRO and SCAMMACCA 1983; BERGMEIER 1989, 1990; BOLÒS et al. 1996), that of urban and industrial habitats has been less studied.

In this paper, the first in a series devoted to the anthropogenous vegetation of Greece, the subnitrophilous communities of *Hirschfeldia incana* (L.) Lagr.-Foss. are analysed phytosociologically. These communities are very common in lowland areas of the Greek mainland where they chiefly colonize wastelands, abandoned cultivations, and roadsides.

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Hirschfeldia incana is an annual to biennial crucifer up to 1.5 m tall, usually divaricately branched with the potential to turn, in the mature state, to a tumble-weed with high individual seed production. It flowers from April to June and shows a certain variability in hairiness and size of siliqua and beak. *Hirschfeldia* Moench is a small genus taxonomically near to *Erucastrum* C. Presl and consisting of 3 species, two of them very localized in N Africa and Socotra (GÓMEZ CAMPO 1993; see also MABBERLEY 1998). The recent proposal to sink *Hirschfeldia* into synonymy (SNOGERUP and SNOGERUP 2002), with *Brassica geniculata* (Desf.) Snogerup et B. Snogerup as the correct name for *Hirschfeldia incana* under *Brassica* L., is not followed here since future general acceptance of this nomenclatural change is yet unpredictable.

Generally a thermophilous and nitrophilous species, *Hirschfeldia incana* is distributed in W, SC and SE Europe and around the Mediterranean Sea, extending to SW Asia (DAVIS 1965, GREUTER et al. 1986). Giving rise to an only short-lived seed bank it has spread as an often casual adventive to warm-temperate regions all over the world (OBERDORFER 2001). In Greece it occurs throughout the country at altitudes from sea level to c. 500 m (see map in STRID and TAN 2002).

Materials and methods

Field work for the present study has been carried out, in 1995–2002, in about twenty localities of mainland Greece at altitudes ranging from sea level to 350m. Forty-five vegetation relevés were sampled by us. A few published relevés by BRANDES (2001b) from the Ionian Island of Corfu (Fig. 1) were added for synoptic evaluation. These Greek localities belong to the Thermo-Mediterranean (C & S Greece) and Meso-Mediterranean vegetation belts (N Greece) and are placed in the semi-arid, sub-humid and humid bioclimatic belts. Geological substrates are mainly alluvial deposits and limestones (Tab. 1).

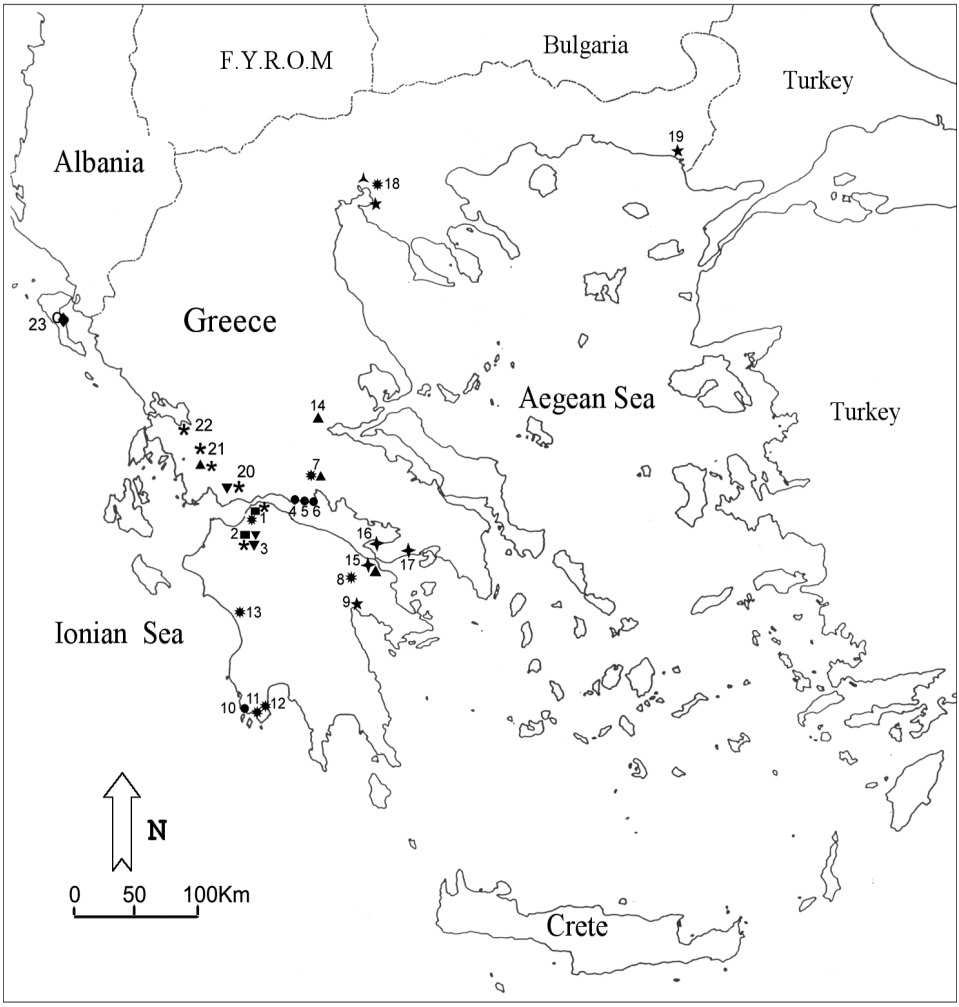
Additional published relevés relating to the phytocoenological status of *Hirschfeldia incana*, from various areas of the Central and W Mediterranean (Sicily, Mallorca, Central Spain) and the Canary Islands (Tenerife), have been included in our study (see Tab. 2) in order to gain a chorologically broader database for a more rational and detailed approach to the syntaxonomical position of *Hirschfeldia incana* communities.

All relevés were taken from representative *Hirschfeldia incana* populations using the Braun-Blanquet method (BRAUN-BLANQUET 1964). Numerical analysis (ordination) was used to interpret the communities studied. The relevé groups were created by the Correspondance Factor Analysis (BENZÉCRI et al. 1976) method, where only the presence or absence of plant species was taken into consideration (ROUX 1997). A total of 110 vegetation relevés were analysed, 104 of which proved to be statistically capable of forming the groups presented in the final constancy table (Tab. 3). Table 3 and the phytocoenological table of Greek *Hirschfeldia incana* communities (Tab. 4) were made using the software SORT 4.0.

To evaluate the sum effect of past and present human impact on the vegetation of each relevé, the nine-step hemeroby scale according to CHRONOPOULOS and CHRISTODOULAKIS (2000) was used.

The nomenclature of vascular plants follows STRID and TAN (1997, 2002), GREUTER et al. (1984, 1986, 1989), and TUTIN et al. (1968–1980, 1993). For the nomenclature of

syntaxa and the assessment of the diagnostic value of single vascular plant taxa the works of RIVAS-MARTÍNEZ et al. (2001), JULVE (1993), DIAZ-GONZÁLEZ and FERNÁNDEZ (1994), and the International Code of Phytosociological Nomenclature (WEBER et al. 2000) were taken into consideration.



1. Patras
2. Platanovrisi
3. Chalandritsa
4. Ag. Spyridon
5. Eratini
6. Galaxidi
7. Amfissa
8. Argos
9. Nafplion
10. Methoni
11. Finikounda
12. Koroni
13. Zacharo
14. Lamia
15. Korinthos
16. Loutraki
17. Megara
18. Thessaloniki
19. Alexandroupolis
20. Kefalovriso
21. Agrinion
22. Amfilochia
23. Mt. Pantokrator-Corfu

Fig. 1. Map of localities and their corresponding syntaxa. For syntaxa symbols, see Table 2.

Tab. 1. Bioclimatic (according to MAVROMMATIS 1980) and geological data (according to BORNOVAS and RONDOGIANNI-TSIAMBAOU 1983) of the Greek localities. Q_2 = Emberger's pluviothermic quotient; m = lowest mean temperature of the coldest month.

Locality	Geological substrate	Closest meteorological station	Q_2	m	Bioclimatic Type
Patras	Alluvial deposits	Patras	92.2	+6.4	Sub–humid / temperate
Platanovrisi	Limestones	–//–			
Chalandritsa	–//–	–//–			
Ag. Spiridon	–//–	Galaxidi	75.1	+6.2	Sub-humid (limits with semi-arid) / temperate
Eratini	–//–	–//–			
Galaxidi	–//–	–//–			
Amfissa	Alluvial deposits	–//–			
Argos	–//–	Nafplion	59.7	+5.2	Semi-arid / temperate
Nafplion	–//–	–//–			
Methoni	Marine deposits & Flysch	Methoni	135.0	+8.4	Sub-humid / hot
Finikounda	Limestones	–//–			
Koroni	–//–	–//–			
Zacharo	Alluvial deposits	Kyparissia	128.4	+7.3	–//– / –//–
Lamia	–//–	Lamia	65.8	+3.7	Semi-arid / temperate
Korinthos	–//–	Korinthos	55.2	+6.0	–//– / –//–
Loutraki	–//–	–//–			
Megara	–//–	Athens	52.7	+6.2	–//– / –//–
Thessaloniki (Retziki)	Lacustrine & terrestrial deposits	Thessaloniki	54.6	+1.9	Semi-arid / cold
Thessaloniki (Finikas)	Alluvial deposits	–//–			
Alexandroupolis	–//–	Alexandroupolis	60.0	+1.8	–//– / –//–
Kefalovriso	–//–	Mesolongi	101.3	+6.6	Sub-humid / temperate
Agrinion	–//–	Agrinion	102.8	+3.2	–//– / –//–
Amfilochia	Limestones	Arta	121.0	+3.8	–//– / –//–
Mt. Pantocrator-Corfu	–//–	Corfu	157.8	+6.3	Humid / temperate

Tab. 2. Data of communities studied

Region	Syntaxon or community/Alliance	Total number of relevés	Symbols in Fig. 1	Source	Original table and relevé number
Tenerife	*Bromo-Hirschfeldietum incanae* Oberd. ex Lohmeyer 1975/ *Hordeion leporini*	7	–	RIVAS-MARTÍNEZ et al. 1993	Tab. 30, rel. 1–7
	Bromo-Hirschfeldietum incanae Oberd. ex Lohmeyer 1975	5	–	LOHMEYER 1975	Tab. 4, rel. 20–24
	Hirschfeldia-Hordeum murinum community/ Hordeion leporini	1	–	OBERDORFER 1965	Tab. 3, rel. 78
	Galactito tomentosae-Brachypodietum distachyi Rivas- Martinez et al. 1993/ *Echio plantaginei-Galactition tomentosae* O. Bolòs et Molinier 1969	5	–	RIVAS-MARTÍNEZ et al. 1993	Tab. 31, rel. 1, 6, 8–10
C. Spain	*Rapistro rugosi-Sisymbrietum crassifolii* Rivas-Martinez 1978/ *Hordeion leporini*	11	–	RIVAS- MARTÍNEZ 1978	Tab. 4, rel. 1–11
Mallorca/ Spain	*Resedo albae-Chrysanthemetum coronarii* O. Bolòs et Molinier 1958/ *Hordeion leporini*	3	–	BRANDES 2001a	Tab. 1, rel. 4, 8, 12
Sicily	*Malvo parviflorae-Chrysanthemetum coronarii* Ferro 1980/ *Hordeion leporini*	6	–	BRULLO 1983	Tab. 1, rel. 2–4, 8–10
	Hordeo-Sisymbrietum orientalis Oberd. 1954/ *Hordeion leporini*	5	–	BRULLO 1983	Tab. 4, rel. 2, 7–9, 11
	Chrysanthemo-Silybetum mariani Brullo 1983/ *Hordeion leporini*	5	–	BRULLO 1983	Tab. 11, rel. 1–5
Greece	*Rapistro rugosi-Hirschfeldietun incanae* ass. nov./ *Hordeion leporini*			this study	
	a. *anthemidetosum incrassatae*	6	■	this study	
	b. *hedypnoidetosum creticae*	6	✸	this study	

Tab. 2. – continued

Region	Syntaxon or community/Alliance	Total number of relevés	Symbols in Fig. 1	Source	Original table and relevé number
	c. *cardarietosum drabae*	5	★	this study	
	d. *'typicum'*	4	●	this study	
	Resedo albae-Chrysanthemetum coronarii O. Bolòs et Molinier 1958 *erucetosum sativae* subass. nov. / *Hordeion leporini*	8	✦	this study	
	Hirschfeldia incana community/ Transition between *Hordeion leporini* and *Onopordion illyrici* Oberd. 1954	7	✻	this study	
	Silybum marianum community/ Transition between *Hordeion leporini* and *Onopordion illyrici* Oberd. 1954	5	▲	this study	
	Silybum marianum-Notobasis syriaca community / *Onopordion illyrici* Oberd. 1954	4	▼	this study	
	Onopordetum illyrici Oberd. 1954/ *Onopordion illyrici* Oberd. 1954	6	⅄	OBERDORFER 1954	Tab. 19, rel. 310a, 319, 324, 337, 343, 383
	Verbascum pulverulentum-Echium italicum community/ Onopordion illyrici Oberd. 1954	5	O	BRANDES 2001b	Tab. 1, rel. 1–5
	Verbascum macrurum-Tyrimnus leucographus community/ *Onopordion illyrici* Oberd. 1954	6	◆	BRANDES 2001b	Tab. 3, rel. 1–6

Results

Ordination

The elaboration of phytosociological data on Greek and other Mediterranean communities with *Hirschfeldia incana* (Tab. 2) using Correspondance Factor Analysis, allowed the clear distinction of eight groups within the Greek relevés (Fig. 2). The distribution of the

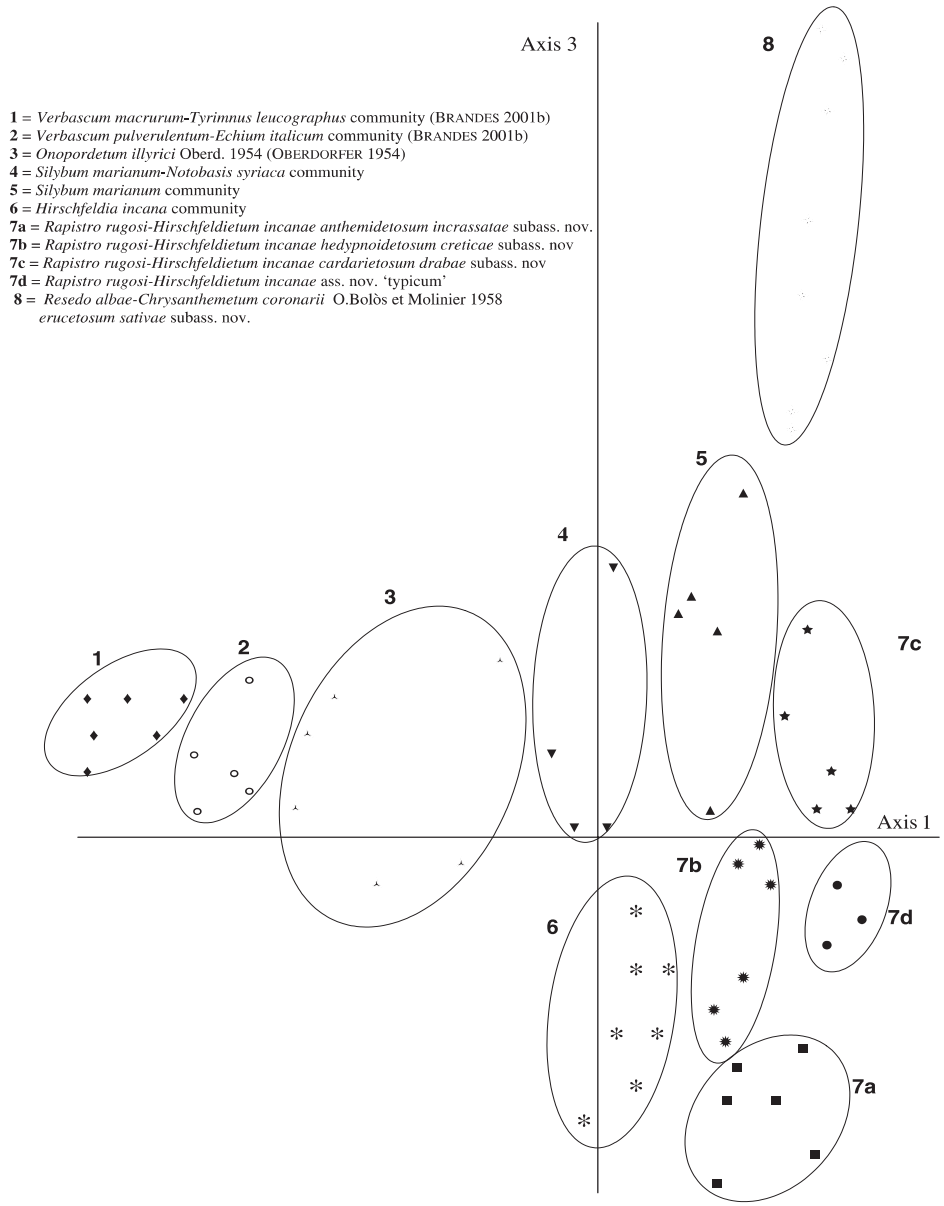


Fig. 2. AFC-ordination diagram of the Greek relevés.

relevé/community groups 1–8 on axes 1 and 3 in figure 2 reflects both their syndynamics and their approximate local bioclimatic conditions. Perennial, subnitrophilous communities of the alliance *Onopordion illyrici* Oberd. 1954 (*Carthametalia lanati* Brullo in Brullo and Marcenò 1985, *Artemisietea vulgaris* Lohmeyer, Preising and Tüxen ex von Rochow 1951) are located to the left of axis 1. Annual, nitrophilous communities of the alliance *Hordeion leporini* Br.-Bl. in Br.-Bl., Gajewski, Wraber and Walas 1936 corr. O. Bolòs 1962 are located to the right of axis 1. Communities of sub-humid habitats are generally sited to the bottom of axis 3, while communities of semi-arid habitats are located to the top of axis 3. Finally, cluster 7 is divided to the four relevé subclusters (7a–d) in Fig. 2 which represent the following syntaxa: subcluster 7d corresponds to the typical subassociation of the *Rapistro rugosi-Hirschfeldietum incanae* ass. nov., while subclusters 7a, 7b and 7c correspond to the subassociations *anthemidetosum incrassatae*, *hedypnoidetosum creticae* and *cardarietosum drabae*, respectively.

Syntaxonomy and floristic differentiation

The *Rapistro rugosi-Hirschfeldietum incanae* ass. nov. (relevé 54, Tab. 4, serves as the holotypus for that name) is characterized by the species *Hirschfeldia incana*, *Rapistrum rugosum* (*Cruciferae*) and *Medicago orbicularis, M. minima*, *Astragalus hamosus*, *Melilotus indicus* (*Leguminosae*).

The above mentioned association belongs clearly to the alliance *Hordeion leporini* Br.-Bl. in Br.-Bl., Gajewski, Wraber and Walas 1936 corr. O. Bolòs 1962, as indicated by the presence of *Anacyclus clavatus*, *Carduus pycnocephalus* s.l., *Chrysanthemum coronarium*, *Hordeum murinum* subsp. *leporinum*, *Phalaris minor*, *Plantago lagopus*, and *Rostraria cristata*. It also belongs to the order *Sisymbrietalia officinalis* J. Tüxen in Lohmeyer et al. 1962 em. Rivas-Martínez, Báscones, T.E. Díaz, Fernández-González and Loidi 1991, with characteristic taxa such as *Avena sterilis* subsp. *ludoviciana, Bromus madritensis, Lolium rigidum*, and *Medicago polymorpha,* and the class *Stellarietea mediae* Tüxen, Lohmeyer and Preising ex von Rochow 1951, with charactereristic taxa such as *Anagallis arvensis, Calendula arvensis, Lavatera cretica*, *Stellaria media* (see Tables 3 and 4).

Within the *Rapistro rugosi-Hirschfeldietum incanae* three subassociations, besides the typical subasssociation, can be differentiated:

a) anthemidetosum incrassatae subass. nov. (relevé 35, Tab. 4, serves as the holotypus for that name) with differential species such as *Anthemis arvensis* subsp. *incrassata*, *Aegilops neglecta*, *Petrorhagia dubia, Scorpiurus muricatus,* and *Trifolium lucanicum*;

b) hedypnoidetosum creticae subass. nov. (relevé 42, Tab. 4, serves as the holotypus for that name), which is differentiated by the presence of *Hedypnois cretica*, *Aegilops triuncialis, Trifolium scabrum*, *Ononis viscosa* ssp. *breviflora,* and *T. tomentosum*;

c) cardarietosum drabae subass. nov. (relevé 48, Tab. 4, serves as the holotypus for that name) with differential species such as *Cardaria draba*, *Anthemis altissima*, *Sinapis arvensis*, *Lactuca serriola,* and *Phalaris paradoxa* (Tab. 4).

Ecology, distribution and syndynamics

The *Rapistro rugosi-Hirschfeldietum incanae* grows in wastelands, abandoned cultivations, and at the fringes of cultivated habitats (e.g., olive groves), and along roadsides in both urban and rural areas of the Thermo- and Meso-Mediterranean vegetation belt. It

thrives from end of April to mid-June with its optimum growth in mid-May. Even in its dry state from July onwards, the association keeps forming an important vegetation structure beyond the middle of autumn chiefly due to the tumble-weed character of the divaricately growing, intricate "bushes" of the main edificator species Hirschfeldia incana and Rapistrum rugosum. The association grows on anthropogenic soils with disturbed horizons and a superficial layer of organic matter. Geologically, various alluvial and limestone substrates are preferred (Tab. 1).

The typical subassociation (Tab. 4, community 7d) is well represented in the southern coastal area of Central Greece around Galaxidi (Fig. 1, localities 4–6). In the climatic diagram of Emberger-Sauvage, this area appears to be on the border between the sub-humid and semi-arid bioclimatic belts (MAVROMMATIS 1980).

The *Rapistro rugosi-Hirschfeldietum incanae* grows in moderately to strongly disturbed habitats, which correspond to a hemeroby amplitude ranging from 6 (b-eu- to a-euhemerobic) to 7 (a-euhemerobic) (Tab. 4) according to the nine-step hemeroby scale (see CHRONOPOULOS and CHRISTODOULAKIS 2000). The typical subassociation has its ecological optimum in habitats (abandoned cultivations or wasteland) of hemeroby degree 6 (see relevés 51–54, Tab. 4). The arithmetic mean of the hemeroby degrees of all relevés of the *Rapistro rugosi-Hirschfeldietum incanae* (rel. 34–54, Tab. 4) is also approximately 6.

The subassociation *Rapistro rugosi-Hirschfeldietum incanae anthemidetosum incrassatae* prefers the sub-humid bioclimatic belt with mild winters and is distributed in the NW Peloponnese and around the city of Patras (Fig. 1). The decrease in cover of *Rapistrum rugosum* and the presence of a plenty (17) of differential taxa belonging to the orders *Thero-Brometalia* and *Carthametalia lanati* characterize this subassociation. It has a mean hemeroby value of 6.5 (Tab. 4).

Its transition to the less nitrophilous order *Thero-Brometalia* is certified by the presence of differential taxa such as *Petrorhagia dubia, Scorpiurus muricatus, Trifolium angustifolium, T. lappaceum* and *T. lucanicum.* In addition, the influence of the alliance *Onopordion illyrici* Oberd 1954 and the order *Carthametalia lanati* Brullo in Brullo and Marcenó 1985 is shown clearly by the differential species *Carthamus lanatus*, *Onopordum illyricum*, *Picnomon acarna*, *Scolymus hispanicus* and *Verbascum sinuatum* (Tables 3 and 4).

In the more humid locations of SW Greece, and at altitudes up to c. 300m, the subassociation *Rapistro rugosi-Hirschfeldietum incanae anthemidetosum incrassatae* gives way to the *Hirschfeldia incana* community (group 6, Tables 3 and 4). This community represents a transition from the *Hordeion leporini* alliance to the *Onopordion illyrici* alliance. This transition is evidenced by the reduction in cover and abundance, or even lack, of the characteristic taxa of the *Rapistro rugosi-Hirschfeldietum incanae* (i.e. *Rapistrum rugosum*, *Medicago minima*, *Melilotus indicus,* and *Astragalus hamosus*) and also the increase in cover of *Onopordum illyricum*.

The subassociation *Rapistro rugosi-Hirschfeldietum incanae hedypnoidetosum creticae* is found mainly in S Greece (SW Peloponnese) in the sub-humid bioclimatic zone with warm winters. It avoids habitats with intense human influence (mean hemeroby value 5.8; Tab. 4) and grows on wastelands and by roadsides far away from urban zones on warm, sunny, mainly S and SW facing slopes.

Tab. 3. Constancy table of all communities studied. 1: *Verbascum macrurum-Tyrimnus leucographus* community (Greece) (BRANDES 2001b), 2: *Verbascum pulverulentum-Echium italicum* community (Greece) (BRANDES 2001b), 3: *Onopordetum illyrici* Oberd. 1954 (Greece) (OBERDORFER 1954), 4: *Silybum marianum-Notobasis syriaca* community nov. (Greece), 5: *Silybum marianum* community (Greece), 6: *Hirschfeldia incana* community (Greece), 7a: *Rapistro rugosi-Hirschfeldietum incanae anthemidetosum incrassatae* subass. nov. (Greece), 7b: *Rapistro rugosi-Hirschfeldietum incanae hedypnoidetosum creticae* subass. nov. (Greece), 7c: *Rapistro rugosi-Hirschfeldietum incanae cardarietosum drabae* subass. nov. (Greece), 7d: *Rapistro rugosi-Hirschfeldietum incanae* ass. nov. "typicum" (Greece), 8a: *Resedo albae-Chrysanthemetum coronarii* O. Bolòs et Molinier 1958 *erucetosum sativae* subass. nov. (Greece), 8b: Resedo albae-Chrysanthemetum coronarii O. Bolòs et Molinier 1958 (Mallorca) (BRANDES 2001a), 8c: *Resedo albae-Chrysanthemetum coronarii* O. Bolòs et Molinier 1958 *silybetosum mariani* subass. nov. propos. (Sicily) (described in BRULLO (1983) as *Chrysanthemo-Silybetum mariani* Brullo 1983), 8d: *Resedo albae-Chrysanthemetum coronarii* O. Bolòs et Molinier 1958 *malvetosum parviflorae* subass. nov. propos. (Sicily) (described in BRULLO (1983) as *Malvo parviflorae-Chrysanthemetum coronarii* Ferro 1980), 8e: *Resedo albae-Chrysanthemetum coronarii* O. Bolòs et Molinier 1958 *sisymbrietosum orientale* subass. nov. propos. (Sicily) (described in BRULLO (1983) as *Hordeo-Sisymbrietum orientalis* Oberd. 1954), 9: *Bromo-Hirschfeldietum incanae* Oberd. ex Lohmeyer 1975 (Tenerife) (RIVAS-MARTÍNEZ et al. 1993), 10: *Rapistro rugosi-Sisymbrietum crassifolii* Rivas-Martinez 1978 (C. Spain) (RIVAS-MARTÍNEZ et al. 1993), 11: *Galactito tomentosae-Brachypodietum distachyi* Rivas- Martinez et al. 1993 (Tenerife) (RIVAS-MARTÍNEZ et al. 1993).

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a	8b	8c	8d	8e	9	10	11
Number of relevés summarized	6	5	6	4	5	7	6	6	5	4	8	3	5	6	5	7	11	5
Character- and differential- taxa of communities and associations																		
Tyrimnus leucographus	IV	.	IV	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Verbascum macrurum	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orlaya grandiflora	V	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Polypogon monspeliensis	V	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Bromus alopecuroides	IV	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Asphodelus ramosus	IV	.	.	.	.	I	.	.	.	.	.	1	.	.	.	.	.	.
Crepis rubra	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hordeum bulbosum	III	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Acanthus spinosus	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Echium italicum	IV	V	IV	.	.	III	III	II	III	1	.	.	.	.	.	.	.	.
Verbascum pulverulentum	.	V	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Tab. 3. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a	8b	8c	8d	8e	9	10	11
Number of relevés summarized	6	5	6	4	5	7	6	6	5	4	8	3	5	6	5	7	11	5
Bromus rigidus	.	IV	.	.	.	.	.	.	.	.	.	.	.	.	.	II	.	II
Scrophularia canina bicolor	.	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vicia tetrasperma	.	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Satureja nepeta	.	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Smyrnium perfoliatum	.	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypericum spruneri	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lavatera punctata	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Onopordum illyricum	.	.	V	1	.	IV	III	I	.	.	.	.	.	V	.	.	.	.
Hordeum murinum murinum	.	.	V	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Peganum harmala	.	.	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Centaurea calcitrapa	.	.	III	.	.	I	.	.	.	.	.	.	.	.	.	.	.	II
Marrubium peregrinum	.	.	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Capparis spinosa	.	.	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Character- and differential- taxa of communities and associations																		
Tribulus terrestris	.	.	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Erysimum diffusum agg.	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Diplotaxis tenuifolia	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Eryngium creticum	.	.	I	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Centaurea diffusa	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Notobasis syriaca	.	.	I	4	.	I	I	III	.	1	I	.	I	.	.	. .	.	
Silybum marianum	.	.	I	4	V	II	II	.	II	.	III	.	V	.	III	.	.	.
Bromus diandrus	.	.	.	.	V	.	.	.	I	.	.	.	.	.	.	.	III	.
Medicago arabica	.	.	.	.	IV	.	.	.	.	.	.	.	.	.	.	.	.	.

Tab. 3. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a	8b	8c	8d	8e	9	10	11
Number of relevés summarized	6	5	6	4	5	7	6	6	5	4	8	3	5	6	5	7	11	5
CA																		
Hirschfeldia incana	V	V	V	4	III	V	V	V	V	4	II	.	IV	V	V	III	IV	IV
Rapistrum rugosum	.	.	.	.	I	I	V	IV	V	4	.	.	.	.	.	.	V	I
Astragalus hamosus	.	.	.	.	.	.	II	V	III	2	I	.	.	.	.	.	.	.
Melilotus indicus	.	.	.	.	.	III	IV	I	IV	2	.	.	.	.	.	.	.	.
Medicago minima	.	.	.	.	.	I	IV	V	III	3	.	.	.	.	.	.	.	.
Medicago orbicularis	.	.	.	1	I	III	V	IV	V	3	I	.	.	.	.	.	.	.
DS																		
Anthemis arvensis incrassata	.	.	.	1	.	I	V	I	.	.	.	.	.	.	.	.	.	.
Trifolium lucanicum	.	.	.	.	.	I	V	I	.	.	.	.	.	.	.	.	.	.
Scorpiurus muricatus	.	.	.	.	.	.	IV	I	.	1	.	.	.	.	.	.	.	I
Aegilops neglecta	.	.	.	.	.	.	IV	.	.	.	.	.	.	.	.	.	.	.
Phleum subulatum subulatum	.	.	.	2	.	II	IV	.	.	.	I	.	.	.	.	.	.	.
Trifolium angustifolium	.	.	.	.	.	II	IV	.	.	.	I	.	.	.	.	.	.	.
Anagallis foemina	.	.	.	.	.	.	III	.	I	.	.	.	.	.	.	.	.	.
Filago eriocephala	.	.	.	.	.	.	III	.	.	.	.	.	.	.	.	.	.	.
Cnicus benedictus	.	.	.	.	.	.	III	.	.	.	.	.	.	.	.	.	.	.
Bituminaria bituminosa	.	.	.	.	.	I	III	.	.	.	.	.	.	.	.	.	.	I
Securigera cretica	.	.	.	.	.	.	II	.	.	.	.	.	.	.	.	.	.	.
Trifolium lappaceum	.	.	.	.	.	I	III	.	.	.	.	.	.	.	.	.	.	.
Securigera securidaca	.	.	.	.	.	I	III	I	.	.	.	.	.	.	.	.	.	.
Petrorhagia dubia	.	.	.	.	.	III	III	I	.	.	.	.	.	.	.	.	.	.
Melilotus neapolitanus	.	.	.	.	.	I	II	.	.	.	.	.	.	.	.	.	.	.
Silene nocturna	.	.	.	1	.	.	II	I	.	.	I	.	.	.	.	.	.	.

Tab. 3. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a	8b	8c	8d	8e	9	10	11
Number of relevés summarized	6	5	6	4	5	7	6	6	5	4	8	3	5	6	5	7	11	5
DS																		
Hedypnois cretica	.	.	.	.	.	II	II	V	.	1	.	.	.	IV	IV	I	.	III
Trifolium scabrum	.	.	.	.	.	II	II	V	.	.	I	.	.	II	.	.	.	I
Trifolium tomentosum	.	.	.	.	.	.	.	IV	.	.	.	.	.	.	.	.	.	.
Aegilops triuncialis	I	I	.	.	.	.	.	IV	I	.	.	.	.	.	.	.	.	.
Ononis viscosa breviflora	.	.	.	.	.	.	.	II	.	.	.	.	.	.	.	.	.	.
DS																		
Cardaria draba	.	.	.	.	I	.	.	.	V	.	.	.	.	.	.	.	.	.
Anthemis altissima	.	.	.	.	.	.	I	.	V	.	.	.	.	.	.	.	.	.
Sinapis arvensis	.	.	.	.	.	.	.	I	IV	.	.	.	.	.	.	.	.	.
Lactuca serriola	.	.	.	.	.	.	II	.	IV	.	II	.	.	.	.	I	.	.
Phalaris paradoxa	.	.	.	.	.	.	I	.	IV	.	.	.	.	.	.	.	.	.
Medicago ciliata	.	.	.	.	.	.	.	.	III	.	.	.	.	.	.	.	.	.
Character- and differential- taxa of communities and associations																		
CA																		
Chrysanthemum coronarium	.	.	.	.	IV	.	II	V	I	2	V	3	V	V	V	.	.	.
Reseda alba	.	.	.	.	.	.	.	.	.	.	V	3	III	V	III	.	.	.
Sonchus oleraceus	III	.	.	.	.	.	II	.	.	.	V	1	V	V	IV	IV	.	.
Beta vulgaris maritima	.	.	.	.	.	.	.	.	.	.	III	1	IV	II	II	I	.	.
Scolymus maculatus	.	.	.	.	.	.	.	.	.	.	.	.	II	V	III	.	.	.
DA																		
Galactites tomentosa	.	I	I	.	.	.	.	.	.	.	.	1	V	V	V	V	.	V
Malva nicaeensis	.	.	.	.	.	.	.	I	I	.	.	.	.	IV	III	.	.	.

Tab. 3. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a	8b	8c	8d	8e	9	10	11
Number of relevés summarized	6	5	6	4	5	7	6	6	5	4	8	3	5	6	5	7	11	5
Stipa capensis	.	.	.	.	.	I	.	I	.	.	.	.	.	V	III	.	.	.
Melilotus sulcata	.	.	.	.	.	.	.	.	.	.	.	.	.	IV	IV	.	.	.
Silene colorata	.	.	.	.	.	.	I	.	.	.	.	.	.	V	III	.	.	.
DS																		
Eruca sativa	.	.	.	.	.	.	.	.	.	.	V	.	.	.	.	.	.	.
Urtica pilulifera	.	.	I	.	.	.	.	.	.	.	V	.	.	.	.	.	.	.
Cynara cardunculus	.	.	.	.	II	.	.	I	.	.	IV	.	.	.	.	.	.	.
Sinapis alba alba	.	.	.	.	II	.	III	I	II	2	V	.	.	.	.	.	.	.
Galium aparine	.	.	.	3	I	.	.	.	I	.	V	.	I	.	III	I	.	.
Solanum elaeagnifolium	.	.	.	.	.	.	.	.	.	.	III	.	.	.	.	.	.	.
Papaver hybridum	.	.	.	.	.	.	.	.	.	.	III	.	.	.	.	.	II	.
Ecballium elaterium	.	.	.	.	.	.	.	.	.	.	III	.	.	.	.	.	I	.
Amaranthus deflexus	.	.	.	.	.	.	.	.	.	.	I	.	.	.	.	.	.	.
Sonchus tenerrimus	.	.	.	.	.	.	.	.	.	.	I	2	.	.	.	.	.	.
DS																		
Conyza bonariensis	.	I	.	.	.	.	.	.	.	.	I	.	IV	.	II	.	.	I
Picris echioides	.	.	.	.	.	.	.	.	III	.	.	.	IV	.	.	I	.	.
Erodium malacoides	.	.	.	.	.	I	II	.	.	.	.	3	V	.	.	I	.	I
Geranium molle s.l.	.	.	.	1	.	.	.	.	.	.	I	.	III	.	.	I	.	.
Conyza canadensis	.	.	.	.	.	.	.	.	.	.	.	.	II	.	.	.	.	.
Solanum nigrum	.	.	.	.	.	.	.	.	.	.	.	.	II	.	.	.	.	.
Urtica urens	.	.	.	.	.	.	.	.	.	.	.	.	II	.	.	.	.	.

Tab. 3. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a	8b	8c	8d	8e	9	10	11
Number of relevés summarized	6	5	6	4	5	7	6	6	5	4	8	3	5	6	5	7	11	5
DS																		
Malva parviflora	.	.	.	.	.	.	III	.	.	.	I	.	.	V	.	III	.	I
Centaurea nicaeensis	.	.	.	.	.	.	.	.	.	.	.	.	.	V	.	.	.	.
Oxalis pes-caprae	.	.	.	.	.	.	.	.	.	.	.	1	.	V	.	.	.	.
Scabiosa maritima	II	.	.	.	.	.	.	.	.	.	.	2	.	IV	.	.	.	.
Ferula communis	.	.	.	.	.	.	.	.	.	.	.	.	.	V	.	.	.	.
Borago officinalis	.	.	.	.	.	.	.	.	.	.	.	.	II	V	.	.	.	.
Opopanax chironium	.	.	.	.	.	.	.	.	.	.	.	.	.	IV	.	.	.	.
Bromus scoparius	.	.	.	.	.	.	.	.	.	.	.	.	.	III	.	.	.	.
Rumex bucephalophorus	.	.	.	.	.	.	.	.	.	.	.	.	.	IV	.	.	.	.
Fedia cornucopiae	.	.	.	.	.	.	.	.	.	.	.	.	.	III	.	.	.	.
Reseda lutea	.	.	.	.	.	.	III	.	.	.	.	.	.	V	.	.	.	.
Hypericum triquetrifolium	.	.	.	.	.	.	III	.	.	.	I	.	.	V	.	.	.	.
Vicia sativa	.	.	.	.	.	.	.	.	.	.	.	.	II	III	.	.	.	.
Thapsia garganica	.	.	.	.	.	.	.	.	.	.	.	.	.	II	.	.	.	.
Character- and differential- taxa of communities and associations																		
DS																		
Sisymbrium orientale	.	.	III	.	.	.	.	.	I	.	.	.	.	.	V	.	.	.
Medicago polymorpha	.	.	.	.	.	.	.	.	.	.	.	.	.	.	V	.	.	.
Lobularia maritima	.	.	.	.	.	.	.	.	.	.	.	.	.	.	IV	.	.	.
Parietaria judaica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	IV	.	.	.
Sisymbrium irio	.	.	.	.	.	.	.	.	.	.	I	.	I	.	IV	.	.	.
Polycarpon tetraphyllum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	IV	II	.	II

Tab. 3. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a	8b	8c	8d	8e	9	10	11
Number of relevés summarized	6	5	6	4	5	7	6	6	5	4	8	3	5	6	5	7	11	5
Chenopodium murale	.	.	.	.	.	.	.	.	.	.	.	1	I	.	IV	.	.	.
Cynodon dactylon	.	.	II	.	.	.	.	.	.	.	.	.	.	.	III	.	.	.
Sisymbrium crassifolium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	V	.
Lithospermum arvense	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	IV	.
Alyssum minus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	III	.
Euphorbia serrata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	III	.
Scandix pecten-veneris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	III	.
Roemeria hybrida	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II	.
Holosteum umbellatum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II	.
Carduus tenuiflorus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II	.
Phlomis herba-venti	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II	.
Mantisalca salmantica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II	.
Brachypodium distachyon	.	.	.	.	.	I	.	I	.	.	.	.	.	.	.	.	.	V
Silene gallica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	IV
Vulpia myuros	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	III
Trifolium arvense	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II
Bidens pilosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II
Scorpiurus vermiculatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II
Trifolium glomeratum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II
Crepis bursifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II
Papaver somniferum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II
Fumaria muralis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Stachys arvensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I

Tab. 3. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a	8b	8c	8d	8e	9	10	11
Number of relevés summarized	6	5	6	4	5	7	6	6	5	4	8	3	5	6	5	7	11	5
Vicia disperma	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Convolvulus althaeoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.	I
Trifolium subterraneum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Phagnalon saxatile	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Character-taxa of the alliance *Hordeion leporini*																		
Hordeum murinum leporinum	III	II	IV	1	V	IV	IV	IV	V	4	V	3	IV	V	V	V	IV	I
Rostraria cristata	.	.	III	2	II	IV	III	IV	I	2	V	.	III	V	IV	.	.	I
Carduus pycnocephalus s.l.	V	V	IV	4	V	I	III	IV	III	4	II	1	V	IV	IV	.	.	.
Plantago lagopus	.	.	.	2	I	II	IV	V	III	4	II	2	.	V	III	II	I	V
Phalaris minor	.	.	.	1	III	I	III	III	IV	2	III	.	.	.	.	.	.	.
Trifolium pallidum	.	.	.	.	I	I	I	I	.	.	.	.	.	.	.	.	.	.
Trifolium nigrescens s.l.	.	.	.	.	.	V	V	.	I	.	.	.	I	III	.	.	.	.
Scorzonera laciniata	.	.	.	.	.	.	.	I	.	.	.	.	.	V	IV	.	V	.
Anacyclus clavatus	.	.	.	.	II	.	II	II	II	1	II	.	II	V	IV	.	V	.
Erodium ciconium	.	.	.	.	.	.	.	I	.	.	.	.	.	I	.	.	I	.
Asphodelus fistulosus	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Vicia villosa eriocarpa	.	.	.	.	I	II	IV	II	II	.	I	.	.	.	.	.	I	.
Crepis foetida commutata	.	.	.	3	I	II	IV	.	.	.	II	.	.	.	.	.	.	.
Crepis foetida foetida	.	.	.	.	.	I	.	II	.	1	I	.	.	.	.	.	V	.
Character-taxa of the order *Sisymbrietalia officinalis*																		
Lolium rigidum	III	I	II	3	IV	IV	V	V	V	4	III	1	V	V	V	III	III	II
Bromus sterilis	.	.	.	2	I	I	I	I	.	.	.	.	V	IV	II	.	.	.
Medicago polymorpha	.	.	.	.	II	V	IV	V	IV	3	II	3	V	IV	.	II	.	III

Tab. 3. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a	8b	8c	8d	8e	9	10	11
Number of relevés summarized	6	5	6	4	5	7	6	6	5	4	8	3	5	6	5	7	11	5
Lotus ornithopodioides	.	.	.	.	.	I	V	III	.	4	.	.	III	.	.	.	.	.
Catapodium rigidum	.	I	.	1	I	I	III	III	.	3	III	.	III	.	.	.	.	.
Avena barbata	IV	I	I	.	.	I	.	II	I	.	.	3	.	IV	V	IV	I	IV
Plantago afra	I	.	.	1	.	II	II	I	.	3	.	.	II	III	.	.	.	.
Sisymbrium officinale	.	I	.	.	.	.	I	I	II	3	.	.	IV	III	IV	.	.	.
Malva sylvestris	III	IV	I	.	II	III	V	II	II	1	.	.	I	V	V	.	.	.
Bromus madritensis	III	.	.	4	II	IV	II	III	IV	4	I	2	V	V	V	.	.	.
Avena sterilis	V	IV	.	1	V	III	V	V	III	3	IV	.	IV	I	IV	.	II	.
Bromus intermedius	.	.	.	2	I	III	II	I	.	3	.	.	.	.	.	.	.	.
Bromus hordeaceus s.l.	.	.	.	.	.	I	.	.	.	1	.	.	IV	V	III	I	.	II
Matricaria chamomilla	.	.	.	.	I	V	V	III	4	V	.	.	.	.	.	.	.	.
Trigonella corniculata	.	.	.	.	.	.	I	II	.	1	.	.	.	.	.	.	.	.
Erodium moschatum	.	.	.	.	.	.	.	.	.	4	.	1	.	.	.	III	.	.
Lamarckia aurea	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	I	.
Bunias erucago	.	.	.	.	.	.	I	.	I	.	.	.	.	.	.	.	.	.
Trifolium resupinatum	.	.	.	1	.	II	I	I	.	.	I	.	.	.	.	.	.	.
Character-taxa of the order *Thero-Brometalia* and *Echio-Galactition* alliance																		
Hypochaeris achyrophorus	.	.	.	1	.	II	III	II	.	.	I	.	.	III	.	.	.	.
Reichardia picroides	.	.	.	1	.	I	.	I	.	.	.	.	.	IV	.	.	.	.
Echium plantagineum	.	I	.	.	.	.	I	I	I	.	.	.	V	V	V	III	.	III
Anchusa italica	.	.	.	1	I	.	III	III	.	1	.	.	.	.	.	.	IV	.
Bromus rubens	.	.	.	.	.	.	.	.	.	.	.	.	.	IV	II	.	V	.
Pallenis spinosa	.	.	.	.	.	I	I	I	.	.	.	.	.	V	.	.	.	.

Tab. 3. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a	8b	8c	8d	8e	9	10	11
Number of relevés summarized	6	5	6	4	5	7	6	6	5	4	8	3	5	6	5	7	11	5
Lotus edulis	.	.	.	.	.	.	.	II	.	1	.	.	.	V	.	.	.	.
Bromus tectorum	.	.	I	.	.	.	.	.	.	.	.	.	I	IV	.	.	II	.
Knautia integrifolia	.	III	.	.	.	II	II	I	.	3	.	.	.	.	.	.	.	.
Trifolium cherleri	.	.	.	1	.	.	I	I	.	.	.	.	.	.	.	.	.	.
Medicago rigidula	.	.	.	.	.	.	I	I	.	.	.	.	.	.	.	.	.	.
Medicago truncatula	.	.	.	.	.	I	I	I	.	2	I	.	.	IV	.	.	.	.
Bellardia trixago	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Bromus chrysopogon	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Trifolium stellatum	.	.	.	1	.	II	I	I	.	.	.	.	.	.	.	.	.	I
Vulpia ciliata	V	III	.	.	.	I	III	.	.	.	.	.	.	IV	.	.	.	.
Onobrychis caput-galli	.	.	.	1	.	I	II	I	.	.	.	.	.	.	.	.	.	.
Cynosurus echinatus	.	I	.	2	.	III	I	II	.	.	.	.	.	.	.	.	.	.
Trifolium campestre	.	.	.	1	.	IV	IV	III	.	.	.	.	.	.	.	I	.	II
Dasypyrum villosum	IV	V	II	3	.	IV	III	II	.	.	.	.	.	.	.	.	.	.
Tordylium apulum	IV	I	.	2	I	II	II	I	.	.	.	.	.	II	.	.	.	.
Character-taxa of the class *Stellarietea mediae*																		
Torilis nodosa	.	.	III	1	I	III	II	.	I	3	I	.	.	.	.	.	.	.
Convolvulus arvensis	.	.	.	.	II	.	IV	I	III	2	.	1	.	.	.	.	III	.
Papaver rhoeas	I	.	.	.	I	I	III	I	III	.	II	.	.	IV	.	.	IV	.
Sonchus asper asper	.	.	.	1	I	II	II	II	III	2	II	.	.	.	.	.	.	.
Capsella bursa-pastoris	.	.	.	.	.	.	I	I	III	3	II	.	.	.	.	.	.	.
Calendula arvensis	.	.	.	.	.	.	.	III	I	3	V	.	.	IV	.	.	.	I
Sherardia arvensis	.	.	.	.	.	.	III	.	.	.	.	.	.	.	.	I	.	I

Tab. 3. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a	8b	8c	8d	8e	9	10	11
Number of relevés summarized	6	5	6	4	5	7	6	6	5	4	8	3	5	6	5	7	11	5
Senecio vulgaris	.	.	.	.	.	II	V	V	V	4	IV	.	II	.	.	.	.	.
Stellaria media	.	.	.	.	.	I	V	V	V	4	V	.	.	.	III	.	.	.
Urospermum picroides	.	I	.	1	I	III	II	.	.	.	.	1	I	IV	.	.	.	.
Anagallis arvensis	.	.	.	.	.	.	III	III	I	4	.	.	.	.	.	.	.	I
Lavatera cretica	.	.	.	.	I	.	III	II	II	4	III	2	.	.	.	III	.	.
Raphanus raphanistrum s.l.	.	.	.	.	.	.	.	.	.	1	.	.	I	IV	II	.	I	.
Mercurialis annua	.	.	.	.	.	.	.	.	.	.	.	.	IV	II	II	I	.	I
Euphorbia helioscopia	.	.	.	.	.	.	I	.	I	2	I	.	II	III	III	.	.	.
Euphorbia peplus	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.
Chenopodium album	.	.	.	.	.	.	.	.	.	.	I	.	II	.	III	.	.	.
Capsella rubella	.	.	.	.	.	.	.	.	.	.	.	.	.	.	III	.	IV	.
Character-taxa of the order *Carthametalia lanati*																		
Carthamus lanatus	V	I	I	4	I	III	III	II	.	.	.	.	II	III	.	.	.	.
Scolymus hispanicus	I	III	V	4	II	III	IV	I	.	.	I	.	.	.	.	.	.	.
Picnomon acarna	.	.	II	2	.	I	III	I	.	.	.	.	.	.	.	.	.	.
Carlina corymbosa graeca	II	I	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Character-taxa of the class *Artemisietea vulgaris*																		
Piptatherum miliaceum s.l.	I	III	.	4	IV	II	III	III	I	.	V	2	III	IV	III	.	.	.
Foeniculum vulgare	.	.	.	.	.	II	IV	.	.	.	.	.	.	IV	.	.	.	.
Verbascum sinuatum	.	II	.	.	.	III	IV	I	.	.	I	.	.	III	.	.	.	.
Ballota nigra uncinata	.	.	.	1	I	.	.	.	.	.	.	.	.	.	.	.	.	.
Dittrichia viscosa	.	II	.	.	I	.	II	.	.	.	.	1	III	.	.	.	.	.
Eryngium campestre	III	.	I	.	.	.	III	.	.	1	I	.	.	.	.	.	.	.

Tab. 3. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a	8b	8c	8d	8e	9	10	11
Number of relevés summarized	6	5	6	4	5	7	6	6	5	4	8	3	5	6	5	7	11	5
Cichorium intybus	.	I	IV	.	.	II	III	I	.	.	.	.	I	.	.	.	.	.
Picris sprengeriana	IV	V	.	2	.	III	II	III	.	1	.	.	.	.	.	.	.	.
Centaurea solstitialis	V	V	V	3	.	I	V	III	III	2	.	.	.	.	.	.	.	.
Daucus carota s.l.	.	I	I	.	.	.	III	.	.	2	I	1	I	IV	.	.	.	.
Stachys cretica	IV	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Marrubium vulgare	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Companions																		
Rumex pulcher s.l.	II	III	I	3	II	I	II	.	.	.	.	.	II	III	II	.	.	I
Vinca major	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dactylis glomerata s.l.	I	I	.	.	.	II	.	.	.	.	.	.	.	.	.	.	.	.
Ammi majus	.	.	1	.	.	.	.	II	.	.	.	1	II	.	.	.	.	.
Chondrilla juncea	.	II	.	1	.	II	III	III	.	.	.	.	.	.	.	.	.	.
Clematis flammula	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Phlomis fruticosa	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Urginea maritima	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Spartium junceum	I	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Urtica dioica	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Mentha longifolia	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Clematis vitalba	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cynoglossum creticum	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lagurus ovatus	.	I	.	.	.	.	.	.	.	.	I	.	.	.	.	.	.	.
Medicago sativa	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rubus ulmifolius	IV	III	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.

Tab. 3. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a	8b	8c	8d	8e	9	10	11
Number of relevés summarized	6	5	6	4	5	7	6	6	5	4	8	3	5	6	5	7	11	5
Plantago lanceolata	IV	IV	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Anthemis chia	V	IV	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sarcopoterium spinosum	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hymenocarpus circinnatus	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crupina crupinastrum	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lomelosia brachiata	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Delphinium peregrinum	.	.	.	1	.	I	I	.	.	.	I	.	.	.	.	.	.	.
Alcea pallida cretica	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.
Stachys spinulosa	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.
Sonchus asper glaucescens	.	.	.	.	I	III	.	.	I	.	.	.	.	.	.	.	.	.
Diplotaxis erucoides	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.	.	.	.
Lepidium graminifolium	.	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.
Centaurium erythraea s.l.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.
Sideritis purpurea	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.
Convolvulus elegantissimus	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.
Gaudinia fragilis	.	.	.	.	.	II	.	.	.	.	.	.	.	.	.	.	.	.
Hypochaeris radicata	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.
Hypochaeris cretensis	.	.	.	.	.	II	I	.	.	.	.	.	.	.	.	.	.	.
Anthyllis vulneraria s.l.	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Arundo plinii	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Crepis setosa	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Dittrichia graveolens	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Plantago coronopus	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Tragopogon porrifolius	I	.	.	.	.	.	II	I	.	.	.	.	.	.	.	.	.	.

Tab. 3. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a	8b	8c	8d	8e	9	10	11
Number of relevés summarized	6	5	6	4	5	7	6	6	5	4	8	3	5	6	5	7	11	5
Nigella damascena	.	.	.	.	.	I	II	.	.	.	I	.	.	.	.	.	.	.
Filago pyramidata	.	.	I	.	.	.	III	II	.	.	I	.	.	.	.	.	.	.
Geranium rotundifolium	.	I	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Orlaya daucoides	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Medicago coronata	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Scrophularia lucida	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Anchusa hybrida	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Arenaria leptoclados	.	.	.	.	.	.	II	.	.	.	.	.	.	.	.	.	.	.
Misopates orontium	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Crepis hellenica hellenica	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Plantago bellardii	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Trifolium dalmaticum	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.
Tripodion tertraphyllum	.	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.
Orobanche minor	.	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.
Hippocrepis ciliata	.	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.
Briza maxima	.	.	.	.	.	I	.	I	.	3	.	.	.	.	.	.	.	.
Salvia verbenaca	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	I
Orobanche ramosa s.l.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
Linum usitatissimum	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
Silene vulgaris s.l.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.
Torilis arvensis s.l.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Aegilops geniculata	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.	.	.	.
Aster squamatus	.	.	.	.	.	.	.	.	.	.	.	.	II	.	II	.	.	.
Polygonum aviculare s.l.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II	.	.	.

Tab. 3. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a	8b	8c	8d	8e	9	10	11
Number of relevés summarized	6	5	6	4	5	7	6	6	5	4	8	3	5	6	5	7	11	5
Spergularia fimbriata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.	.
Poa annua	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.	.
Lupinus angustifolius	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.	.
Avena fatua	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.	.
Achyranthes aspera	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.	.
Vicia lutea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.	.
Cyperus longus badius	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.	.
Rumex crispus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.	.
Veronica hederifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.
Tragopogon crocifolius	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.
Reseda phyteuma	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.
Lamium amplexicaule	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.
Brassica nigra	.	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	I	.
Ranunculus arvensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.
Erodium botrys	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.
Chamaemelum mixtum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.
Centranthus ruber	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Allium ampeloprasum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Oxalis corniculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I
Pteridium aquilinum	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhagadiolus stellatus	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Melilotus officinalis	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.
Medicago monspeliaca	.	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.

Tab. 4. Phytosociological table of *Hirschfeldia incana* communities in Greece, with selected, closely related communities added for comparison. 1: *Verbascum macrurum-Tyrimnus leucographus* community (BRANDES 2001b), 2: *Verbascum pulverulentum-Echium italicum* community (BRANDES 2001b), 3: *Onopordetum illyrici* Oberd. 1954 (OBERDORFER 1954), 4: *Silybum marianum-Notobasis syriaca* community, 5: *Silybum marianum* community, 6: *Hirschfeldia incana* community, 7a: *Rapistro rugosi-Hirschfeldietum incanae anthemidetosum incrassatae* subass. nov. (holotypus: rel. 35), 7b: *Rapistro rugosi-Hirschfeldietum incanae hedypnoidetosum creticae* subass. nov. (holotypus: rel. 42), 7c: *Rapistro rugosi-Hirschfeldietum incanae cardarietosum drabae* subass. nov. (holotypus: rel. 48), 7d: *Rapistro rugosi-Hirschfeldietum incanae* ass. nov. "typicum" (holotypus: rel. 54), 8a: *Resedo albae-Chrysanthemetum coronarii* O. Bolòs et Molinier 1958 *erucetosum sativae* subass. nov. (holotypus: rel. 62).

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a
Number of relevé	123456	78911 01	111111 234567	1122 8901	22222 23456	2223333 7890123	333333 456789	444444 012345	44445 67890	5555 1234	55555666 56789012
Mean hemeroby degree				5.3	6.8	5.9	6.5	5.8	7.0	6.0	7.3
Differential taxa of *Verbascum macrurum-Tyrimnus leucographus* comm.											
Verbascum macrurum	.1..+2	.....	.....	....	.....	.....	.....	.....	.....	....	.....
Tyrimnus leucographus	11.1+.	.....	+.++.+	....	.....	.....	..+...	.....	.....	....	.....
Bromus alopecuroides	.2.111	.....	.....	....	.....	.....	.....	.....	.....	....	.....
Crepis rubra	11.+..	.....	.....	....	.....	.....	.....	.....	.....	....	.....
Asphodelus ramosus	+1.1.+	.....	.....	....	.....	...+...	.....	.....	.....	....	.....
Polypogon monspeliensis	1.1+11	.....	.....	....	.....	.....	.....	.....	.....	....	.....
Hordeum bulbosum	..+1.1	+....	.....	....	.....	.....	.....	.....	.....	....	.....
Orlaya grandiflora	111++.	+....	.....	....	.....	.....	.....	.....	.....	....	.....
Acanthus spinosus	1.....	.....	.....	....	.....	.....	.....	.....	.....	....	.....
Differential taxa of *Verbascum pulverulentum-Echium italicum* comm.											
Echium italicum	+.212.	32111	.++++.	....	.....	+.1..+.	1.++..	.+..+.	.+.++	..+.	.....
Verbascum pulverulentum	.....	112++	.....	....	.....	.....	.....	.....	.....	....	.....
Bromus rigidus	.....	2111.	.....	....	.....	.....	.....	.....	.....	....	.....
Scrophularia canina ssp. *bicolor*	.....	2+1..	.....	....	.....	.....	.....	.....	.....	....	.....

Tab. 4. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a
Number of relevé	123456	78911 01	111111 234567	1122 8901	22222 23456	2223333 7890123	333333 456789	444444 012345	44445 67890	5555 1234	55555666 56789012
Vicia tetrasperma	.....	.++1.	.....	....	.....	.....	.....	.....	.....	....	.....
Satureja nepeta	.....	...1+	.....	....	.....	.....	.....	.....	.....	....	.....
Smyrnium perfoliatum	.....	.+.+.	.....	....	.....	.....	.....	.....	.....	....	.....
Hypericum spruneri	.....	..+..	.....	....	.....	.....	.....	.....	.....	....	.....
Lavatera punctata	.....	....+	.....	....	.....	.....	.....	.....	.....	....	.....
Character and differential taxa of *Onopordetum illyrici*											
Onopordum illyricum	.....	.....	434452	...1	.....	..+43+.	+.+..+	....+.	.....	....	.....
Hordeum murinum ssp. *murinum*	.....	.....	4113+.	....	.....	.....	.....	.....	.....	....	.....
Sisymbrium orientale	.....	.....	+.++..	....	.....	.....	.....	.....	...+.	....	.....
Centaurea calcitrapa	.....	.....	+.+.+.	....	.....	.+....	.....	.....	.....	....	.....
Peganum harmala	.....	.....	+++...	....	.....	.....	.....	.....	.....	....	.....
Marrubium peregrinum	.....	.....	.+1...	....	.....	.....	.....	.....	.....	....	.....
Capparis spinosa	.....	.....	++....	....	.....	.....	.....	.....	.....	....	.....
Tribulus terrestris	.....	.....	++....	....	.....	.....	.....	.....	.....	....	.....
Erysimum diffusum agg.	.....	.....	+.....	....	.....	.....	.....	.....	.....	....	.....
Diplotaxis tenuifolia	.....	.....	+.....	....	.....	.....	.....	.....	.....	....	.....
Eryngium creticum	.....	.....	+.....	.+.+	.....	.....	.....	.....	.....	....	.....
Centaurea diffusa	.....	.....	..+...	....	.....	.....	.....	.....	.....	....	.....
Differential taxa of *Silybum marianum-Notobasis syriaca* comm. and *Silybum marianum* comm.											
Notobasis syriaca	.....	.....	1.....	++1+	.....	...+...	..+...	.+11..	.....	+...	.+.....
Silybum marianum	.....	.....	.+....	5451	25552	+....+1	..+...	.....	.++..	....	+354....
Bromus diandrus	.....	.....	.....	....	+111+	.....	.....	.....	+....	....	.....

Tab. 4. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a
Number of relevé	123456	78911 01	111111 234567	1122 8901	22222 23456	2223333 7890123	333333 456789	444444 012345	44445 67890	5555 1234	55555666 56789012
Medicago arabica	.....	.....	.....	....	11.++	.....	.....	.....	.....	....	.....
Character taxa of the order *Carthametalia lanati*											
Carthamus lanatus	1+1.+1	...2.	..+...	+1+2	+....	...11+.	..+.1+	...++.	.....	....	.....
Scolymus hispanicus	.....+	1.2.3	1+11+1	1+++	.++..	+..1+..	+.+++2	...+..	.....	....	...+....
Picnomon acarna	.....	.....	...++.	1+..	.....	.....+.	+.+..+	..+...	.....	....	.....
Carlina corymbosa ssp. *graeca*	...2+.	...1.	+.....	....	.....	.....	.....	.....	.....	....	.....
Character taxa of the class *Artemisietea vulgaris*											
Piptatherum miliaceum s.l.	..+...	..222	.....	1+11	.++11	...1.++	..+.+2	.+1+..	.+...	....	++.+++..
Foeniculum *vulgare*	.....	.....	.....	....	.....	+.+...+	+..+++	.....	.....	....	.....
Verbascum sinuatum	.....	...11	.....	....	.....	..+.1+.	+.+++1	.+....	.....	....	.....+..
Ballota nigra ssp. *uncinata*	.....	.....	.....	+...	...+.	.....	.....	.....	.....	....	.....
Dittrichia viscosa	.....	..1.1	.....	....	.+...	.....	+....+	.....	.....	....	.....
Eryngium campestre	...11+	.....	.....+	....	.....	.....	+...12	.....	.....	...+	......+.
Cichorium intybus	.....	.2...	.+++.+	....	.....	+...+.+	..+..+	+.....	.....	....	.....
Picris sprengeriana	.1+.11	11121	.....	.+.1	.....	+.+..2.	..2..1	.111..	.....	+...	.....
Centaurea solstitialis	.11112	+1232	+1++.+	+1.1	.....	+.....	++11+1	.+1+..	.+.++	.++.	.....
Daucus carota s.l.	.....	....+	...+..	....	.....	.....	.++++.	.....	.....	1.+.	.+.....
Stachys cretica	1++..1	1..2.	.....	....	.....	.....	.....	.....	.....	....	.....
Character taxa of *Rapistro-rugosi-Hirschfeldietum incanae* ass. nov.											
Hirschfeldia incana	333322	22222	2332+3	+++4	5..++	3541352	454551	423335	14331	+555	..++..+.
Rapistrum rugosum	.....	.....	.....	....	3	3.....2	.1++++	.431.+	32214	4333	.....
Medicago minima	.....	.....	.....	....	.....	...+..2	1111+.	11+.12	..+++	1.+1	.....

Tab. 4. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a
Number of relevé	123456	78911 01	111111 234567	1122 8901	22222 23456	2223333 7890123	333333 456789	444444 012345	44445 67890	5555 1234	55555666 56789012
Astragalus hamosus	.....	.....	.....	....	.....	.....	..+.+.	1+1.12	..+11	.++.	1
Melilotus indicus	.....	.....	.....	....	.....	.12..+.	2+1++.	1.....	1.+12	.++.	.....
Medicago orbicularis	.....	.....	.....	...1	+....	1.1..1+	21++.1	4.2+.2	1++11	.222	+.....
Differential taxa of *Rapistro-rugosi-Hirschfeldietum incanae anthemidetosum incrassatae* subass. nov.											
Anthemis arvensis ssp. *incrassata*	.....	.....	.....	.+..	.....	....+..	22112+	....+.	.....	....	.....
Trifolium lucanicum	.....	.....	.....	....	.....	..2....	211112	..1...	.....	....	.....
Scorpiurus muricatus	.....	.....	.....	....	.....	.....	++122.	..1...	.....	1...	.....
Aegilops neglecta	.....	.....	.....	....	.....	.....	.2+31+	.....	.....	....	.....
Anagallis foemina	.....	.....	.....	....	.....	.....	.1+12.	.....	....+	....	.....
Filago eriocephala	.....	.....	.....	....	.....	.....	.++.11	.....	.....	....	.....
Cnicus benedictus	.....	.....	.....	....	.....	.....	.+.++.	.....	.....	....	.....
Bituminaria bituminosa	.....	.....	.....	....	.....	.....1.	+.++..	.....	.....	....	.....
Securigera cretica	.....	.....	.....	....	.....	.....	+...+.	.....	.....	....	.....
Trifolium lappaceum	.....	.....	.....	....	.....	.....+.	+.+1+.	.....	.....	....	.....
Securigera securidaca	.....	.....	.....	....	.....	..+....	+.+1..	..1...	.....	....	.....
Phleum subulatum ssp. *subulatum*	.....	.....	.....	.+1.	.....	+..1...	+1+.+2	.....	.....	....	1.....1.
Trifolium angustifolium	.....	.....	.....	....	.....	.1...1.	1+++1.	.....	.....	....	1
Petrorhagia dubia	.....	.....	.....	....	.....	...+11.	++++..	.+....	.....	....	.....
Malva parviflora	.....	.....	.....	....	.....	.....	..+++.	.....	.....	....	.....1..
Differential taxa of *Rapistro-rugosi-Hirschfeldietum incanae hedypnoidetosum creticae* subass. nov.											
Hedypnois cretica	.....	.....	.....	....	.....	1..+...	.1.1..	+121++	.....	..+.	.....
Trifolium scabrum	.....	.....	.....	....	.....	1....1.	..2..1	++11+1	.....	....	.....+

Tab. 4. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a
Number of relevé	123456	78911 01	111111 234567	1122 8901	22222 23456	2223333 7890123	333333 456789	444444 012345	44445 67890	5555 1234	55555666 56789012
Trifolium tomentosum	.....	.....	.....	....	.....	.....	.....	.++11+	.....	....	.....
Aegilops triuncialis	.+....	....+	.....	....	.....	.....	.....	+.+.+1	.....	....	.....
Ononis viscosa ssp. *breviflora*	.....	.....	.....	....	.....	.....	.....	.++...	.....	....	.....
Differential taxa of *Rapistro-rugosi-Hirschfeldietum incanae cardarietosum drabae* subass. nov.											
Cardaria draba	.....	.....	.....	....	1	.....	.....	.....	++111	....	.....
Anthemis altissima	.....	.....	.....	....	.....	.....	.....+	.....	1+211	....	.....
Sinapis arvensis	.....	.....	.....	....	.....	.....	.....	..+...	11+.+	....	.....
Lactuca serriola	.....	.....	.....	....	.....	.....	.+..+.	.....	1+++.	....	+..+.+..
Phalaris paradoxa	.....	.....	.....	....	.....	.....	..+...	.....	++.++	....	.....
Medicago ciliaris	.....	.....	.....	....	.....	.....	.....	.....	.1++.	....	.....
Picris echioides	.....	.....	.....	....	.....	.....	.....	.....	.+.++	....	.....
Character taxa of *Resedo albae-Chrysanthemetum coronarii*											
Chrysanthemum coronarium	.....	.....	.....	....	1+1.1	.....	..1...	.111++	1....	.11.	41215344
Reseda alba	.....	.....	.....	....	.....	.....	.....	.....	.....	....	1++++112
Sonchus oleraceus	...+++	.....	.....	....	.....	.....	...1.1	.....	.....	....	+11+111+
Beta vulgaris ssp. *maritima*	.....	.....	.....	....	.....	.....	.....	.....	.....	....	+.+..+++
Differential taxa of *Resedo albae-Chrysanthemetum coronarii erucetosum sativae* subass. nov.											
Eruca sativa	.....	.....	.....	....	.....	.....	.....	.....	.....	....	+1.+11+2
Urtica pilulifera	.....	.....	....+.	....	.....	.....	.....	.....	.....	....	.++1++++
Cynara cardunculus	.....	.....	.....	....	.+1..	.....	.....	1	.....	....	+2.+.+++
Sinapis alba ssp. *alba*	.....	.....	.....	....	1+...	.....	.+..++	1	11...	..++	2.211++1
Galium aparine	.....	.....	.....	111.	...1.	.....	.....	.....	1....	....	.+12+++1

Tab. 4. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a
Number of relevé	123456	78911 01	111111 234567	1122 8901	22222 23456	2223333 7890123	333333 456789	444444 012345	44445 67890	5555 1234	55555666 56789012
Solanum elaeagnifolium	.....	.....	.....	....	.....	.....	.....	.....	.....	....	..++.+++
Papaver hybridum	.....	.....	.....	....	.....	.....	.....	.....	.....	....	...++.++
Ecballium elaterium	.....	.....	.....	....	.....	.....	.....	.....	.....	....	.+++.+.+
Amaranthus deflexus	.....	.....	.....	....	.....	.....	.....	.....	.....	....	..+.+...
Character taxa of the alliance *Hordeion leporini*											
Hordeum murinum ssp. *leporinum*	..1.12	11...	1.+1+.	3111	32122	32.12.2	+.3.+1	2.+21.	24222	2111	22212112
Plantago lagopus	.....	.....	.....	.1.1	.+...	..11...	+2.121	++1133	.1.11	1123	.1..11..
Rostraria cristata	.....	.....	1+.+..	.+.1	.++..	+1.11..	1111..	.+2.+2	.1...	.1+.	11+11+12
Carduus pycnocephalus s.l.	333343	22221	+.++1.	+11+	11+1+	.1.....	..++++	1.21+.	.1+.1	111+	..+.+...
Phalaris minor	.....	.....	.....	..+.	1.1.1	..+...1	+.1..+	.2++..	.1112	.+1.	1.1+...1
Vicia villosa ssp. *eriocarpa*	.....	.....	.....	....	...+.	..1+...	1.+++1	++....	..+.+	....	+.....
Anacyclus clavatus	.....	.....	.....	....	.1+..	.....	+...+.	...+.1	+1...	+...	+....12.
Crepis foetida ssp. *commutata*	.....	.....	.....	12.3	1....	2.1....	1+21.2	.....	.....	....	....+1+.
Trifolium pallidum	.....	.....	.....	....	+....	.2.....	.....+	.1....	.....	....	.....
Trifolium nigrescens s.l.	.....	.....	.....	....	.....	.21+21.	1+.+12	.....	...1.	....	.....
Crepis foetida ssp. *foetida*	.....	.....	.....	....	.....	.....1.	.....	..1.1.	.....	...+	1
Scorzonera laciniata	.....	.....	.....	....	.....	.....	.....	+.....	.....	....	.....
Erodium ciconium	.....	.....	.....	....	.....	.....	.....	+.....	.....	....	.....
Character taxa of the order *Sisymbrietalia officinalis*											
Sisymbrium officinale	.....	...+.	.....	....	.....	.....	...+..	....+.	+..+.	.1+1	.....
Malva sylvestris	..11.+	.32++	...+..	....	+..+.	.+.++.+	2+++++	+...+.	..+1.	..+.	.....
Lolium rigidum	..11.1	+....	...+.+	++2.	+1+2.	+111..+	121211	1211+.	12212	1111	2....111

Tab. 4. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a
Number of relevé	123456	78911 01	111111 234567	1122 8901	22222 23456	2223333 7890123	333333 456789	444444 012345	44445 67890	5555 1234	55555666 56789012
Medicago polymorpha	.....	.....	.....	....	2..+.	122+.12	1+.1.1	1.1212	11.22	1.12	3.....1+
Bromus madritensis	1..11.	.....	.....	112+	11...	.1.21+1	1	311...	1.121	+111	....1..1
Avena sterilis ssp. *ludoviciana*	1112.1	12+.2	.....	+...	11111	..+1.+1	.+++11	+212+.	111..	2.11	+11111.1
Matricaria chamomilla	.....	.....	.....	....	.....	+...+..	++1+1+	+++.++	+.1.1	++++	1+++1.21
Catapodium rigidum	.....	....+	.....	.+..	+....	+.....	.+11.1	.1+1..	.....	1++.	.+1.1.12
Lotus ornithopodioides	.....	.....	.....	....	.....	.....1.	++1+1+	.111..	.....	1+1+	.....
Plantago afra	.....	....+	.....	.+..	.....	...2.2.	....1+	.2....	.....	.1+2	.....
Bromus intermedius	.....	.....	.....	11..	+....	.++1...	..+..1	.+....	.....	.++1	.....
Avena barbata	11.11.	...1.	1	....	.....	....1..	.....	...1.1	.+...	....	.....
Bromus sterilis	.....	.....	.....	11..	1....	..+....	+.....	.1....	.....	....	.....
Trifolium resupinatum	.....	.....	.....	...1	.....	.1..1..	..1...	....1.	.....	....	.....+
Chondrilla juncea	.....	11...	.....	...+	.....	.+..+.1	+.++.3	++...1	.....	....	.....
Trigonella corniculata	.....	.....	.....	....	.....	.....	1.....	.1.1..	.....	2...	.....
Erodium moschatum	.....	.....	.....	....	.....	.....	.....	.....	.....	++++	.....
Character taxa of the order *Thero-Brometalia*											
Trifolium cherleri	.....	.....	.....	...1	.....	.....	.+....	.1....	.....	....	.....
Trifolium stellatum	.....	.....	.....	...+	.....	.++....	1	+.....	.....	....	.....
Trifolium campestre	.....	.....	.....	...+	.....	..21+1+	.+1.12	+.+.+.	.....	....	.....
Onobrychis caput-galli	.....	.....	.....	...+	.....	....+..	.21...	+.....	.....	....	.....
Hypochaeris achyrophorus	.....	.....	.....	...1	.....	...11.2	...++1	.1...2	.....	....	.1.....
Tordylium apulum	+1.+.+	.+...	.....	+..1	...+.	1.1...1	+1....	1	.....	....	.....
Vulpia ciliata	11.121	.11.1	.....	....	.....	.....+.	1+++..	.....	.....	....	.....

Tab. 4. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a
Number of relevé	123456	78911 01	111111 234567	1122 8901	22222 23456	2223333 7890123	333333 456789	444444 012345	44445 67890	5555 1234	55555666 56789012
Cynosurus echinatus	.....	...+.	.....	1..+	.....	+...1+.	..1...	.+.+..	.....	....	.....
Lotus edulis	.....	.....	.....	....	.....	.....	.....	.+1...	.....	..+.	.....
Medicago truncatula	.....	.....	.....	....	.....	....+..	.1....	1	.....	..++	+.....
Medicago rigidula	.....	.....	.....	....	.....	.....	.+....	...1..	.....	....	.....
Echium plantagineum	.....	....+	.....	....	.....	.....	2	....+.	.+...	....	.....
Dasypyrum villosum	221..1	31222	..+..1	1+.+	.....	1.+22..	..++.+	11....	.....	....	.....
Anchusa italica	.....	.....	.....	...+	.+...	.....	+..++.	.+.+.1	.....	+...	.....
Knautia integrifolia	.....	.2+1.	.....	....	.....	..++...	...1+.	1	.....	.+++	.....
Galactites tomentosa	.....	1	..+...	....	.....	.....	.....	.....	.....	....	.....
Bellardia trixago	.....	.....	.....	....	.....	.....	+....	.....	.....	....	.....
Bromus tectorum	.....	.....	..+...	....	.....	.....	.....	.....	.....	....	.....
Reichardia picroides	.....	.....	.....	...+	.....	....+..	.....	..+...	.....	....	.....
Pallenis spinosa	.....	.....	.....	....	.....	+.....	..+...	..+...	.....	....	.....
Character taxa of the class *Stellarietea mediae*											
Senecio vulgaris	.....	.....	.....	....	.....	.+..1+.	1111++	111++1	++111	11+1	++1+..11
Stellaria media	.....	.....	.....	....	.....	.....+.	211211	1+1111	1121+	1++1	1111+111
Papaver rhoeas	+.....	.....	.....	....	....+	+.....	.++..+	+.....	..+++	....	.+....++
Urospermum picroides	.....	...+.	.....	.+..	.+...	..++.+.	...+.+	.....	.....	....	.....
Sonchus asper ssp. *asper*	.....	.....	.....	.+..	.+...	.+...1+	.....+	..1.+.	1.++.	.++.	.+....+1
Capsella bursa-pastoris	.....	.....	.....	....	.....	.....	..+...	....+.	..11+	.++1	.....1++
Sherardia arvensis	.....	.....	.....	....	.....	.....	.+1.1.	.....	.....	....	.....
Anagallis arvensis	.....	.....	.....	....	.....	.....	.1.11.	.11..1	1	+11+	.....

Tab. 4. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a
Number of relevé	123456	78911 01	111111 234567	1122 8901	22222 23456	2223333 7890123	333333 456789	444444 012345	44445 67890	5555 1234	55555666 56789012
Calendula arvensis	.....	.....	.....	....	.....	.....	.....	...111	..1..	.++1	1+111++1
Lavatera cretica	.....	.....	.....	....	..+..	.....	.+.11.	.1.1..	1+...	1111	.++.1..+
Torilis nodosa	.....	.....	+.+.+.	.1..	1....	1++....	..1..1	.....	..+..	.++1	..1.....
Convolvulus arvensis	.....	.....	.....	....	+..1.	1	.1.11+	+....	.1.1+	+.+.	.....
Euphorbia helioscopia	.....	.....	.....	....	.....	.....	...1..	.....	..+..	.++.	.....1+
Erodium malacoides	.....	.....	.....	....	.....	..+...+	+....	.....	.....	....	.....
Euphorbia peplus	.....	.....	.....	....	.....	.....	.....	.....	.....	..+1	.....
Raphanus raphanistrum s.l.	.....	.....	.....	....	.....	.....	.....	.....	.....	...+	.....
Companions											
Rumex pulcher s.l	....+1	2+.+.	.....+	+.++	++...	+.....	..+..+	.....	.....	....	.....
Dactylis glomerata s.l.	.+....	+....	.....	....	.....	..+.+..	.....	.....	.....	....	.....
Anthemis chia	222222	.+1++	.....	....	.....	.....	.....	.....	.....	....	.....
Rubus ulmifolius	+112..	.11.2	.....	....	.....	.....	.....	.....	.....	....	.....
Plantago lanceoloata	+.111.	212.+	.....	....	.....	.....	.....	.....	.....	....	.....
Silene nocturna	.....	.....	.....	...+	.....	.....	.1...1	....+.	.....	....	.....+.
Clematis flammula	...11.	.....	.....	....	.....	.....	.....	.....	.....	....	.....
Filago pyramidata	.....	.....	.....+	....	.....	.....	..+.1+	..1..+	.....	....	.....1.
Sonchus asper ssp. *glaucescens*	.....	.....	.....	....	....+	+...++.	.....	.....	+....	....	.....
Briza maxima	.....	.....	.....	....	.....	.....1.	.....	.+....	.....	.+++	.....
Delphinium peregrinum	.....	.....	.....	..+.	.....	+.....	....+.	.....	.....	....	.....+.
Nigella damascena	.....	.....	.....	....	.....	1.....	....++	.....	.....	....	.....+.
Reseda lutea	.....	.....	.....	....	.....	.....+	+...+.	.....	.....	....	.....

Tab. 4. – continued

Community/Group	1	2	3	4	5	6	7a	7b	7c	7d	8a
Number of relevé	123456	78911 01	111111 234567	1122 8901	22222 23456	2223333 7890123	333333 456789	444444 012345	44445 67890	5555 1234	55555666 56789012
Hypericum triquetrifolium	.....	.....	.....	....	.....	.....	+...+1	.....	.....	....	.....+.
Ammi majus	.....	.....	...+..	....	.....	.....+	.....	...+.+	.....	....	.....
Tragopogon porrifolius	+.....	.....	.....	....	.....	.....	....++	+.....	.....	....	.....
Melilotus neapolitanus	.....	.....	.....	....	.....	1	.+....	.....	.....	....	.....
Arenaria leptoclados	.....	.....	.....	....	.....	.....	.+...1	.....	.....	....	.....
Malva nicaeensis	.....	.....	.....	....	.....	.....	.....	.....+	+....	....	.....
Lagurus ovatus	.....	...+.	.....	....	.....	.....	.....	.....	.....	....	.+.....
Stipa capensis	.....	.....	.....	....	.....	..+...	.....	..+...	.....	....	.....
Hypochoeris cretensis	.....	.....	.....	....	.....	...+1..	+.....	.....	.....	....	.....
Bunias erucago	.....	.....	.....	....	.....	.....	+.....	.....	1	....	.....
Conyza bonariensis	.....	..+..	.....	....	.....	.....	.....	.....	.....	....	.....+..
Geranium molle ssp. *molle*	.....	.....	.....	..+.	.....	.....	.....	.....	.....	....	.+.....
Sixalix atropurpurea ssp. *maritima*	....++	.....	.....	....	.....	.....	.....	.....	.....	....	.....
Sisymbrium irio	.....	.....	.....	....	.....	.....	.....	.....	.....	....	....++..
Cynodon dactylon	.....	.....	11....	....	.....	.....	.....	.....	.....	....	.....
Rhagadiolus stellatus	.....	.....	.....	++..	.....	.....	.....	.....	.....	....	.....
Gaudinia fragilis	.....	.....	.....	....	.....	..+1...	.....	.....	.....	....	.....
Geranium rotundifolium	.....	.+...	.....	....	.....	.....	1	.....	.....	....	.....

Companions only present in one relevé:
Phlomis fruticosa 1, *Spartium junceum* 6, *Urginea maritima* 6, *Vinca major* ssp. *major* 7, *Mentha longifolia* 8, *Urtica dioica* 8, *Clematis vitalba* 10, *Cynoglossum creticum* 10, *Medicago sativa* 11, *Sarcopoterium spinosum* 21, *Hymenocarpos circinnatus* 21, *Crupina crupinastrum* 21, *Lomelosia brachiata* 21, *Melilotus officinalis* 25, *Centaurium erythraea* 31, *Sideritis purpurea* 31, *Convolvulus elegantissimus* 31, *Hypochaeris radicata* 31, *Alcea pallida* ssp. *cretica* 32, *Stachys spinulosa* 32, *Anthyllis vulneraria* s.l. 34, *Arundo plinii* 34, *Bromus chrysopogon* 34, *Crepis setosa* 34, *Misopates orontium* 35, *Crepis hellenica* ssp. *hellenica* 35,

Plantago bellardii 35, *Trifolium dalmaticum* 35*, Silene colorata* 35, *Dittrichia graveolens* 38, *Plantago coronopus* 38, *Marrubium vulgare* 39, *Orlaya daucoides* 39, *Medicago coronata* 39, *Scrophularia lucida* 39, *Anchusa hybrida* 39, *Lepidium graminifolium* 40, *Brachypodium distachyon* 41, *Tripodion tetraphyllum* 41, *Orobanche minor* 41, *Çippocrepis ciliata* 41, *Brassica nigra* 43, *Medicago monspeliaca* 43, *Bromus hordeaceus* ssp. *divaricatus* 51, *Orobanche ramosa* s.l. 51, *Linum usitatissimum* 51, *Silene vulgaris* s.l. 54, *Salvia verbenaca* 54, *Chenopodium album* 60.

A. Relevés taken from literature (see also Table 2)

Rel. 1-6: Corfu (Mt. Pantocrator) (see BRANDES 2001b: Tab. 3). Rel. 7-11: Corfu (see BRANDES 2001b: Tab. 1). Rel. 12-17: Thessaloniki (see OBERDORFER 1954: Tab. 19)

B. Localities and dates of this study's original relevés and site data in the sequence of: habitat, surface (m^2), altitude (meters above sea level), inclination (%), aspect, coverage (%), hemeroby degree.

Rel. 18: 1 Km W of village Platanovrisi, 30.6.02, roadside, 25m^2, 200m, 15%, S, 100%, 6. Rel. 19: 2 Km outside village Chalandritsa, 30.6.02, roadside, 25m^2, 280m, 3%, S, 90%, 5. Rel. 20: Kefalovriso village (near the town of Mesolonghi), 7.6.02, wasteland, 15m^2, 20m, W, 100%, 5. Rel. 21: Chalandritsa village, 30.6.02, wasteland, 40m^2, 300m, 3%, SW, 100%, 5. Rel. 22: Amfissa, 25.5.99, olive-grove, 50 m^2, 180m, 3%, S, 100%, 7. Rel. 23: Korinthos (outskirts), 3.6.02, roadside, 15 m^2, 20m, 0%, NE, 100%, 6. Rel. 24: Korinthos (near Isthmos), 3.6.02, wasteland, 40 m^2, 80m, 3%, E, 100%, 7. Rel. 25: Agrinion (northern outskirts), 7.6.02, wasteland, 30 m^2, 80m, 5%, NW, 90%, 7. Rel. 26: Lamia (10 Km north of the city), 9.5.99, fallow fields, 35m^2, 10m, 2%, E, 100%, 7. Rel. 27: Chalandritsa village, 30.6.02, abandoned cultivations, 15m^2, 270m, 5%, E, 100%, 6. Rel. 28: Agrinion (northern outskirts), 7.6.02, wasteland, 25m^2, 70m, 5%, NW, 100%, 6. Rel. 29: Patras (Rio), 15.5.95, abandoned olive grove, 50m^2, 68m, 5%, N, 100%, 6. Rel. 30: Kefalovriso village, 7.6.02, wasteland, 40m^2, 20m, 3%, W, 100%, 5. Rel. 31: Agrinion (northern outskirts, near Acheloos river), 7.6.02, roadside, 10m^2, 30m, 3%, NW, 100%, 5. Rel. 32: Amfilochia (5Km westwards), roadside, 50m^2, 3m, 3%, NW, 100%, 6. Rel. 33: Amfissa, 25.5.99, wasteland, 50m^2, 185m, 3%, S, 100%, 7. Rel. 34: Patras (Rion), 16.5.95, wasteland, 40m^2, 67m, 5%, N, 100%, 6. Rel. 35: Patras (Rion), 14.5.95, wasteland, 40m^2, 60m, 5%, NW, 90%, 7. Rel. 36: 3 Km NW of village Platanovrisi, 30.6.02, wasteland, 30m^2, 200m, 5%, SE, 100%, 6. Rel. 37: Patras (University campus), 14.5.95, wasteland, 45m^2, 60m, 5%, NW, 90%, 8. Rel. 38: Patras (University campus), 15.5.95, olive-grove, 40m^2, 62m, 3%, N, 100%, 6. Rel. 39: Patras (southern suburbs), 5.6.95, wasteland near macchie vegetation, 50m^2, 135m, 10%, NW, 85%, 6. Rel. 40: Thessaloniki (Regiki), 7.5.99, wasteland, 25m^2, 350m, 15%, SW, 100%, 7. Rel. 41: Zacharo (10 Êm southwards), 22.6.01, roadside, 25m^2, 10m, 30%, W, 90%, 6. Rel. 42: Finikounda (5 Km. eastwards), 20.6.01, roadside, 30m^2, 60m, 2%, S, 95%, 6. Rel. 43: Koroni (10 Km westwards), 21.6.01, roadside, 20m^2, 90m, 10%, SE, 100%, 5. Rel. 44: Patras (Riganokampos), 16.5.99, wasteland, 8m^2, 160m, 5%, SW, 85%, 6. Rel. 45: Argos (15Km northwards), 1.6.01, roadside, 50m^2, 105m, 3%, E, 100%, 5. Rel. 46: Nafplion (Nea Kios), 1.6.01, wasteland on debris, 30m^2, 3m, 10%, SE, 100%, 8. Rel. 47: Nafplion (Nea Kios), 1.6.01, wasteland near the beach, 50m^2, 2m, 0%, E, 100%, 7. Rel. 48: Thessaloniki (Finikas), 7.5.99, wasteland, 25m^2, 15m, 2%, SE, 85%, 7. Rel. 49: Alexandroupolis (eastern suburbs), 2.5.99, wasteland, 25m^2, 25m, 3%, SE, 95%, 7. Rel. 50: Alexandroupolis (northern outskirts), 2.5.99, 25m^2, 20m, 5%, S, 100%, 6. Rel. 51: Eighth km Methoni-Finikounda, 20.6.01, roadside near the beach, 25m^2, 2m, 2%, S, 100%, 6. Rel. 52: Galaxidi, 3.5.01, abandoned cultivations, 25m^2, 20m, 5%, SÅ, 100%, 6. Rel. 53: Agios Spiridon, 3.5.01, abandoned cultivations, 30m^2, 10m, 3%, S, 100%, 6. Rel. 54: Eratini, 28.4.01, olive grove, 25m^2, 50m, 5%, E, 100%, 6. Rel. 55: Korinthos (8 Km westwards), 3.6.02, roadside, 25m^2, 20m, 5%, E, 100%, 8. Rel. 56: Loutraki (entrance of town), 3.6.02, wasteland on debris, 25m^2, 5m, 0%, NW, 100%, 8. Rel. 57: Megara (outskirts), 3.6.02, wasteland, 45m^2, 50m, 0%, S, 100%, 6. Rel. 58: Megara, 3.6.02, roadside, 15m^2, 45m, 3%, S, 100%, 7. Rel. 59: Megara (western outskirts), 3.6.02, wasteland, 25m^2, 40m, 0%, S, 100%, 7. Rel. 60: Megara (centre), 3.6.02, roadside, 20m^2, 45m, 3%, S, 90%, 8. Rel. 61: Korinthos (suburbs), 3.6.02, wasteland, 30m^2, 10m, 3%, E, 80%, 7. Rel. 62: Loutraki (outskirts), 3.6.02, abandoned olive grove, 25m^2, 3m, 3%, N, 80%, 7.

The influence of thermophilous perennial formations of the order *Carthametalia lanati* is obvious and confirmed by the presence of *Notobasis syriaca, Carthamus lanatus*, and *Picnomon acarna*. Lastly, the influence of the order *Thero-Brometalia* is weak, as proved by the presence of the differential taxa *Hedypnois cretica* and *Trifolium scabrum*.

The subassociation *Rapistro rugosi-Hirschfeldietum incanae cardarietosum drabae* grows in the lowlands of eastern Greece and shows a clear ecological preference for the semi-arid bioclimatic zone with mild winters (SE Greece) (Fig. 1, locality 9; Tab. 4, relevés 46–47), and cold winters (N Greece) (Fig.1, localities 18–19; Tab. 4, relevés 48–50). Apart from its more draught-tolerant character, it is ecologically differentiated from the other two subassociations by of its stronger nitrophily as evidenced by its presence in more disturbed habitats (mean hemeroby value = 7, see Tab. 4).

Discussion

The study of *Hirschfeldia incana* communities in mainland Greece showed that they physiognomically constitute a very characteristic type of anthropogenic vegetation, which is widespread in lowlands from S to NE Greece. The newly described association *Rapistro rugosi-Hirschfeldietum incanae*, as distinguished according to ordination and classification methods, is certified by its unique and diagnostic floristic composition and is being found under the same ecological conditions over a wide geographical range.

Three subassociations can be discerned, based on floristic differences linked to different specific ecological conditions. We think it preferable to rank these separate syntaxa as subassociations of a single association in order to avoid a too excessive fragmentation of the vegetation system. The synchorology of the three subassociations is correlated to the climatic gradient from the subhumid bioclimate of W Greece to the semiarid climate of E Greece. Moreover, the occurrence of these subassociations depends also on differences in human impact and on exposure to different radiation rates.

Even though the subnitrophilous species *Hirschfeldia incana* is widely distributed in the Mediterranean region and occurs, to a various extent, also in other perennial or annual communities of the classes *Stellarietea mediae* and *Artemisietea vulgaris*, it is clear from the classification tables (Tabs. 3, 4) that *Hirschfeldia incana* reaches its optimum in coverage in the annual association *Rapistro rugosi-Hirschfeldietum incanae*. *Rapistrum rugosum,* along with other diagnostic species of this association, also shows a great constancy and clearly differentiates the *Rapistro rugosi-Hirschfeldietum incanae* from other communities compared by us (see synopsis, Tab. 3).

The syndynamical position of the *Rapistro rugosi-Hirschfeldietum incanae* is made clear when its position in relation to other known Mediterranean communities of the same alliance (*Hordeion leporini*) is considered, particularly those dominated by *Chrysanthemum coronarium* that occur on roadsides or more frequently disturbed wastelands. The *Resedo albae-Chrysanthemetum coronarii* O. de Bolòs and Molinier 1958 belongs here, found in Greece on the island of Cephallonia and in the city of Athens by BOLÒS et al. (1996), and by the present authors in the area between Athens and Korinth (group 8a, Tabs. 3 and 4). The *Rapistro rugosi-Hirschfeldietum incanae* succeeds the pioneer association *Resedo albae-Chrysanthemetum coronarii*, which colonizes building plots or roadsides. Furthermore, in the present study, we distinguished the new subassociation *Resedo albae-*

-*Chrysanthemetum coronarii* O. de Bolòs and Molinier 1958 *erucetosum sativae* subass. nov. (holotypus: rel. 62, Tab. 4). This is a typical nitrophilous and xerophilous community, differentiated clearly by species such as *Eruca sativa*, *Urtica pilulifera*, *Cynara cardunculus*, *Sinapis alba* ssp. *alba*, *Galium aparine* and *Solanum elaeagnifolium*. In SE Greece, this subassociation results from degradation of *Hirschfeldia incana* communities due to increased human influence, for example in cases where abandoned fields are turned into roadsides or building plots.

It should be mentioned that the synoptic table reveals that the syntaxa *Malvo parviflorae-Chrysanthemetum coronarii* Ferro 1980 (Tab. 3, group 8d), *Hordeo-Sisymbrietum orientalis* Oberd. 1954 (Tab. 3, group 8e), *Chrysanthemo-Silybetum mariani* Brullo 1983 (Sicily, BRULLO 1983) (Tab. 3, group 8c; see also Tab. 2) appear to be subassociations of the *Resedo albae-Chrysanthemetum coronarii*. Further research is needed to clarify the phytosociological status of *Chrysanthemum coronarium* communities in the Mediterranean area.

Two other Mediterranean communities of the *Hordeion leporini* alliance related to the *Rapistro rugosi-Hirschfeldietum incanae*, but clearly distinguished from it, have been analysed and included in the synoptic table. These are the *Bromo-Hirschfeldietum incanae* Oberdorfer ex Lohmeyer 1975 (Tenerife, RIVAS-MARTÍNEZ et al. 1993; Tab. 3, group 9) and the *Rapistro rugosi-Sisymbrietum crassifolii* Rivas-Martínez 1978 (Central Spain, RIVAS--MARTÍNEZ 1978; Tab. 3, group 10). Especially the latter associaton stands floristically very far from the *Rapistro rugosi-Hirschfeldietum incanae* as it is strongly differentiated by the presence of species with a Western Mediterranean distribution, such as *Sisymbrium crassifolium*, and *Carduus tenuiflorus*. The ecological characteristics of the above-mentioned associations in common with *Rapistro rugosi-Hirschfeldietum incanae* are their moderate nitrophily and their occurrence in similar biotopes, such as abandoned cultivations or wastelands of the Thermo- and Meso-Mediterranean vegetation belt.

Concerning the floristic affinities to communities of other orders or classes, the *Rapistro rugosi-Hirschfeldietum incanae* is close to anthropogenous vegetation with a high degree of naturalness, in particular to the therophytic, subnitrophilous vegetation of the *Thero-Brometalia* (*Stellarietea mediae*) and the perennial, subnitrophilous vegetation of the *Carthametalia lanati* (*Artemisietea vulgaris*). In these orders *Hirschfeldia incana* also participates as a companion species with significantly high cover values. The transition between the *Carthametalia lanati* (*Onopordion illyrici*) and the *Sisymbrietalia officinalis* (*Hordeion leporini*) is represented by the sequence of communities/group from 1 (*Verbascum macrurum-Tyrimnus leucographus* community) to 8a (*Resedo albae-Chrysanthemetum coronarii erucetosum sativae*) in table 3. This transition corresponds to a gradual degradation process shown by: a) a steady decline in abundance and cover of the subnitrophilous, perennial taxa, b) an increase of annual nitrophilous taxa, c) a decline in altitude, d) the transition from Meso-Mediterranean to Thermo-Mediterranean vegetation, and e) a gradient to more urbanized areas.

In the westernmost, Makaronesian part of its primary distribution range, the syntaxonomical position of *Hirschfeldia incana* is yet unclear. Rivas-Martinez et al. (1993) report it from Tenerife (Canary Islands) as a companion species in the *Galactito tomentosae--Brachypodietum distachyi* Rivas-Martinez et al. 1993 of the alliance *Echio plantaginei--Galactition tomentosae* O. Bolòs et Molinier 1969. According to the syntaxonomical outline of the Canary Islands by HOHENESTER and WELSS (1993), *Hirschfeldia incana* has a

major diagnostic significance in the alliance *Hordeion leporini* Br.-Blanq. 1947 (syn. *Bromo-Hirschfeldion incanae* Lohm. 1975).

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