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Classification of Southern Italy *Ostrya carpinifolia* woods

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Abstract
Ostrya carpinifolia woods have been extensively studied in C-Italy, while they lack specific researches and a clear phytosociological scheme in the southern part of the country. We have analyzed original and published relevés from Campania and Calabria regions, and we have compared them with bibliographic data from central Italy. The existing southern Italian *Ostrya*-dominated associations are revised as for their character species and bioclimatic position. Floristic analysis underlines a set of biogeographically relevant species which differentiate these communities from their C-Italian analogous.
A new suballiance *Festuco exaltatae-Ostryenion carpinifoliae* is therefore described within *Carpinion orientalis*, coherently with the framework already adopted for *Quercus cerris* woods. The syntaxon can be subdivided into two associations. *Festuco-Aceretum* includes different types of mixed woods growing at low elevations, in the warm-humid maritime climate of the Campania and Calabria Thyrrenian coasts (mainly in the mesomediterranean belt). *Seslerio-Aceretum obtusati* is the name to be used for *Ostrya*-woods of the mesotemperate and supratemperate belt; a subassociation for more markedly cool and humid woods can be further differentiated (described here as *galietosum laevigati*).
Carpinion orientalis in the Italian peninsula (i.e. not including the Alps) contains now five suballiances: *Lauro-Quercenion* pubescentis, describing termophilous *Quercus pubescens* woods; *Cytiso sessilifolii-Quercenion pubescentis*, referring to comparatively continental *Quercus pubescens* woodlands of the C-Apennines; *Campanulo mediae-Ostryenion*, *Ostrya*-woods restricted to the NW sector of the Peninsula; *Laburno anagyroidis-Ostryenion*, mesophilous *Ostrya*- and mixed-woods of the mesotemperate and supratemperate belts of the N- and C-Apennines; and *Festuco exaltatae-Ostryenion*, *Ostrya*- and mixed-woods of the oceanic mesotemperate and supratemperate belts of the S-Apennines.

Keywords: *Carpinion orientalis*, southern Apennines, syntaxonomy, vegetation classification.

Riassunto
Classificazione dei boschi di Ostrya carpinifolia *nell'Italia meridionale*. Le cenosi forestali ad *Ostrya carpinifolia* localizzate nell'Appennino meridionale non sono state finora oggetto di specifici studi fitosociologici, a differenze di quelle dell'Appennino centro-settentrionale. Nell'ambito del presente lavoro sono state rilevate comunità a carpino nero nella Campania meridionale; i rilievi originali sono stati comparati con tutti i dati disponibili in letteratura per gli ostrieti dell'Italia meridionale. Le associazioni fino ad ora descritte sono state revisionate sulla base della composizione floristica e delle caratteristiche bioclimatiche. Un contingente di specie di rilevante significato biogeografico differenzia queste comunità dagli ostrieti dell'Italia centrale: pertanto, si propone qui una nuova suballeanza *Festuco exaltatae-Ostryenion carpinifoliae* all'interno del *Carpinion orientalis*. Il nuovo syntaxon descrive gli ostrieti e i boschi misti con *Ostrya* degli orizzonti mesotemperato oceanico e supratemperato oceanico del settore tirrenico dell'Italia meridionale, oltre ad alcune formazioni extrazonali presenti nella regione bioclimatica mediterranea per compensazione edafica o topografica. All'interno di questo syntaxon vengono riconosciute due associazioni: *Festuco exaltatae-Aceretum neapolitani* e *Seslerio autumnalis-Aceretum obtusati*. Nell'ambito di quest'ultima associazione viene inoltre descritta una nuova subassociazione (*galietosum laevigati*) per gli ostrieti più mesofili e i boschi misti con *Ostrya* del Cilento.
I boschi del *Carpinion orientalis* dell'Italia peninsulare risultano dunque suddivisi così in cinque suballeanze: *Laburno-Ostryenion, Lauro-Quercenion pubescentis, Cytiso sessilifolii-Quercenion pubescentis, Campanulo mediae-Ostryenion, Festuco exaltatae-Ostryenion.*

Parole chiave: Appennnino meridionale**,** *Carpinion orientalis*, classificazione della vegetazione, sintassonomia.

Introduction

Ostrya carpinifolia Scop. (Hop Hornbeam) plays a very important role in the forest vegetation of Italy (Hofmann, 1982; Bernetti, 1995). Its ability to colonize degraded, shallow soils on limestone slopes, and its capacity to sucker, rendered it a widespread, often dominant species in heavily exploited coppices or in secondary woodlands. It is most common on calcareous soils. On acid substrata (e.g. clayey, pyroclastic or metamorphic rocks) Hop Hornbeam woods are usually rare, probably because *Ostrya carpinifolia* can not successfully compete with other deciduous trees such as *Quercus cerris* or *Quercus petraea* (Bernetti, 1995). As for climatic requirements, *Ostrya carpinifolia* can not grow within strictly Mediterranean bioclimatic conditions (i.e. in sites with a marked summer drought). In Italy, woods dominated by *Ostrya* are often to be found in a sub-Mediterranean context, at the transition between the meso-mediterranean and the meso-temperate belts (bioclimatic belts are used here with reference to the classification proposed by Rivas-Martinez, 1995). Mixed, mesophilous deciduous woods where Hop Hornbeam shares the canopy with other

species (e.g. *Quercus cerris, Acer obtusatum, Fagus sylvatica*), without clearly dominating, have their optimum at altitudes between 700-1100 m, in the meso- and supra-temperate belts.

In Italy, *Ostrya carpinifolia* communities are particularly common in the eastern sector of the Alps and in the central and northern sections of the Apennines, where they constitute an important feature of the landscape (e.g. Hofmann, 1982). The *Ostrya*-dominated forest communities of these areas have been extensively studied from a phytosociological point of view (see e.g.: Avena *et al.*, 1980; Ballelli, *et al.*, 1982; Biondi, 1982; Blasi *et al.*, 1982; Francalancia & Orsomando, 1982; Lausi *et al.*, 1982; Poldini 1982; Ubaldi & Speranza 1982; Poldini 1987; Francalancia 1990; Ubaldi *et al.*, 1995; Di Pietro & Blasi 1997; Blasi *et al.*, 2001). On the other hand, in southern Italy woods of this type are much less common, possibly because limestones are rarer. For this reason, studies dealing with Hop Hornbeam communities of the southern sector of the Apennines (Campania, Basilicata and Calabria regions) are scarce and sometimes lack a clear integration in the existing phytosociological frame (Caputo, 1968; Bonin, 1980; Mazzoleni & Ricciardi, 1995; Maiorca & Spampinato, 1999; Brullo *et al.*, 2001; Corbetta *et al.*, 2004).

The present paper aims at providing a phytosociological revision of the *Ostrya*-dominated communities of the southern Apennines – including also mixed woods where Hop Hornbeam shares dominance with other species. We analyze both our original relevés from Cilento National Park (southern Campania) and all the data published so far from Southern Italy (Fig. 1). The existing syntaxonomical proposals for the southern-Italian Hornbeam forests are reviewed and critically discussed, in order to present a new, more general classification coherent with the revised syntaxonomy of *Quercetalia pubescenti-petraeae* in C- and S-Italy by Blasi *et al.* (2004).

Study area

Most of the original relevés presented in this work were executed on the Monti Alburni, a mountain range with an area of 40,000 hectares, located in the Salerno province (southern part of Campania region) and included in the Cilento National Park. The chain consists mainly of Mesozoic limestones; max. elevation is 1,742 m a.s.l. The main axis is oriented from NW to SE; the NE side of the chain has much steeper slopes than the SW side. Despite the calcareous bedrock, the soils of Monti Alburni often contain an amount of siliceous minerals, due to past pyroclastic eruptions of the Vesuvius. The communities with Hop Hornbeam are found mostly on the NE side. Relevés were conducted at elevations between 580 and 1230 m a.s.l.. As for climate, there are no rain/temperature gauge stations on the NE side of the chain within the same altitudinal zone where the surveyed communities grow. The nearest station is at Polla (444 m a.s.l.), where mean annual temperature and precipitation are 12,7 °C and 991 mm, respectively. Rain-gauge stations are also located at Castelluccio Cosentino (459 m a.s.l.) and San Rufo (620 m a.s.l.), where mean annual precipitation are 1046 and 1316 mm, respectively. It can be reasonably assumed that the surveyed communities are located in the mesotemperate and supratemperate belts, with humid to hyperhumid ombrotype (Rosati, 2002).

The remainder of the original relevés was conducted within the Cilento National Park on mountain sectors outside the Monti Alburni, namely on the Monte Sacro (consisting of flyschoid rocks), the Monte Cervati and the Monte Vesole-Chianello (calcareous). These communities are located in the same climatic belts as the Monti Alburni ones (Rosati, 2002).

Bibliographic data taken into account in this paper come from many different localities of Campania and Calabria regions (see Fig. 1 and above). In most sites limestone formations prevail, except for Aspromonte, where metamorphic rocks dominate, and Campi Flegrei (pyroclastic rocks). On the Amalfi Coast, the limestone bedrock is covered with a thin but edaphically relevant layer of volcanic ashes. The relevés taken from literature were executed at altitudes between 20 and 1,100 m a.s.l., therefore in a wide range of bioclimatic types; most of them, however, belong to the mesotemperate and supratemperate belts.

Data and Methods

Field sampling

Floristic-sociological survey of *Ostrya*-dominated communities was carried out according to the Braun-Blanquet approach (Braun-Blanquet, 1964; Mueller Dombois & Ellenberg, 1974; cf. also Blasi *et al.*, 2005a). A total of 46 relevés were completed on the Monti Alburni during June and July of years 2002-2003, after reconnaisance of the area in order to individuate the location and extension of Hop Hornbeam woods within

the mountain range, and to sample different conditions (aspect, slope, degree of coppice exploitation). Outside the Monti Alburni, *Ostrya* woods in the Cilento NP are less common and only 19 more relevés were executed (Monte Sacro, Monte Cervati and Monte Vesole-Chianello, see above).

Species cover was estimated according to the Braun-Blanquet cover-abundance scale (7 classes, from "r" to "5").

Bibliographic data

The matrix of 65 original relevés was integrated with every published phytosociological table of *Ostrya*-dominated communities from southern Italy we were aware of – namely from the following sources and locations (Fig. 1):

- Caputo (1968, Tab. 1): Taburno-Camposauro Mts. (Campania), 5 relevés;
- Bonin (1980, Tab.11F): M. Cervialto (Campania) and M. La Nuda (Calabria), 5 relevés (in the same paper there are some more relevés of *Ostrya*-communities in Tab. 12F, but we have not included them in our study because they were executed in the same sites we surveyed on the Monti Alburni);
- Mazzoleni & Ricciardi (1995, Tab.1): Campi Flegrei, Amalfi coast, Capri Is. and Cilento coast (Campania), 12 relevés (the original table included 15 relevés, but rel. no. 13-15 were not taken in the present study because they refer to highly disturbed sites with planted *Pinus* and *Castanea*);
- Maiorca & Spampinato (1999, Tab. 5a and Tab. 5b): Argentino Valley (Calabria), 13 relevés;
- Brullo *et al.*, (2001, Tab. 22 and Tab. 24): Aspromonte (Calabria), 20 relevés;
- Corbetta *et al.*, (2004, Tab. 24): M. Cervati (Campania), 10 relevés.

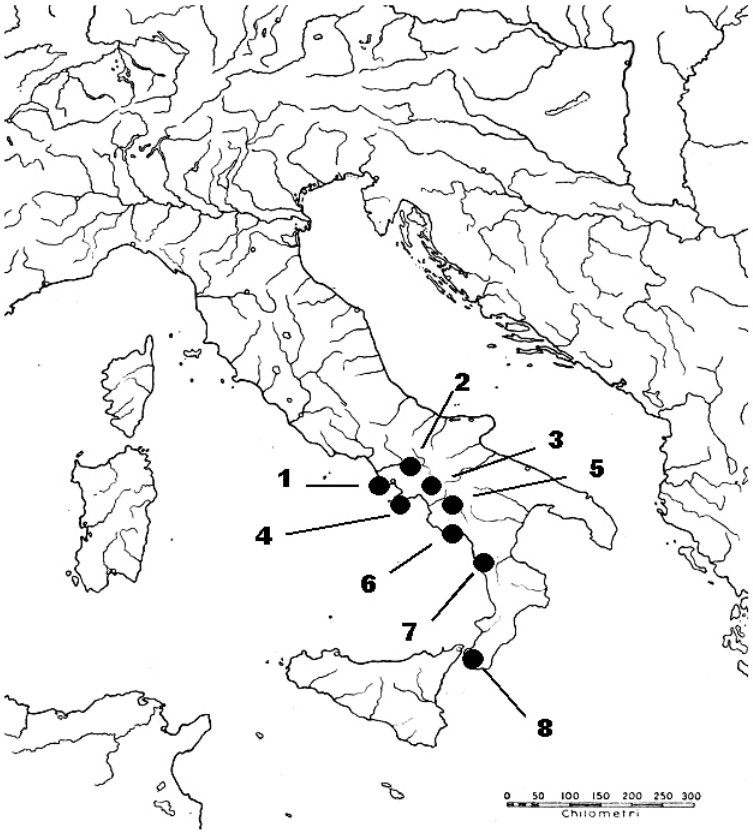

Fig. 1 – Study area, and bibliographic data localities : 1 – Campi Flegrei; 2 – Taburno-Camposauro Mts.; 3 – M. Cervialto (Picentini Mts.); 4 – Amalfi Coast and Capri Is. ; 5 – Alburni Mts.; 6 – M. Cervati, M. Sacro, Cilento Coast and M. Vesole-Chianello; 7 – Argentino Valley and M. La Nuda ; 8 – Aspromonte

The bibliographical data have an uneven geographical distribution; however, this is partly due to the scattered pattern of the southern *Ostrya*-woods range itself.

Furthermore, for comparison purposes 32 relevés from C-Italy, and namely from the Appennino Marchigiano (Umbria-Marche), were added (Ballelli *et al.*,, 1982, Tab.1, rel. no. 13-45). This table was chosen because it contains the type relevé of the association *Scutellario-Ostryetum*, widely distributed in Marche, Umbria, Lazio, Abruzzo and Molise (Ministero dell'Ambiente, 2005) .

Due to taxonomical and nomenclatural problems and changes repeatedly arisen over the years for some critical taxa, and since some Authors did not separate some taxa of difficult recognition in their data, in some instances we were forced to merge two or three species in one line of our table: *Cyclamen repandum/C. hederifolium; Luzula sicula/ L. sylvatica ssp. sieberi/L. sylvatica ssp. sylvatica; Aristolochia pallida/A. lutea; Lamium flexuosum/L. galeobdolon; Geranium robertianum/G. purpureum; Asplenium adiantum-nigrum/ A. onopteris; Polypodium cambricum/P. interjectum/P. vulgare.*

Multivariate analysis

The raw table including both our original relevés and the above mentioned bibliographic data, reaching a total of 162 relevés, was converted into a binary matrix (presence/absence) and analyzed by cluster analysis with the algorithm Euclidean distance contained in SYN-TAX program (Podani, 2001). PCoA ordination was also performed with the same package.

The resulting dendrogram and ordination graphics (Fig. 2 and 3) were used on one hand to analyze the degree of floristical heterogeneity within the southern Apennines *Ostrya*-communities; on the other hand, they also helped to elucidate the relationships and the degree of difference between southern and northern Hop Hornbeam woods.

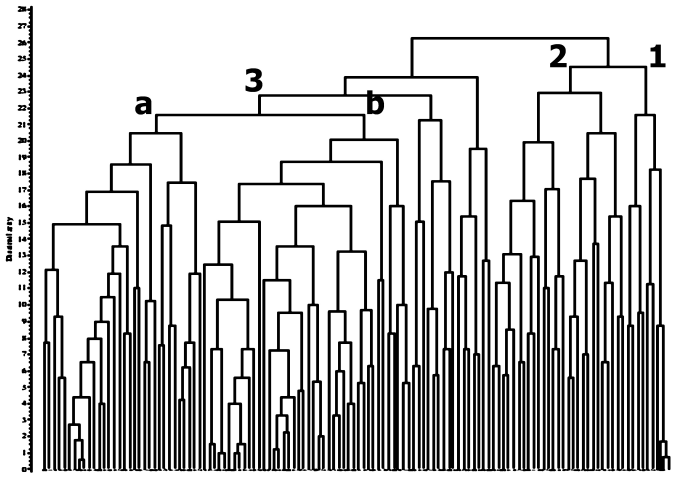

Fig. 2 – Dendrogram of the binary matrix (presence/absence) analyzed by Euclidean distance algorithm and clustered by minimum variance method. Only the 130 relevés from S-Italy are shown. The following clusters can be identified – 1: rel. from Aspromonte (Brullo *et al.*, 2001, tab. 22) ; 2: rel. from Mazzoleni & Ricciardi (1995) and from tab. 5a in Maiorca & Spampinato (1999); 3a: rel. from Cilento NP; 3b: rel. from Alburni Mts

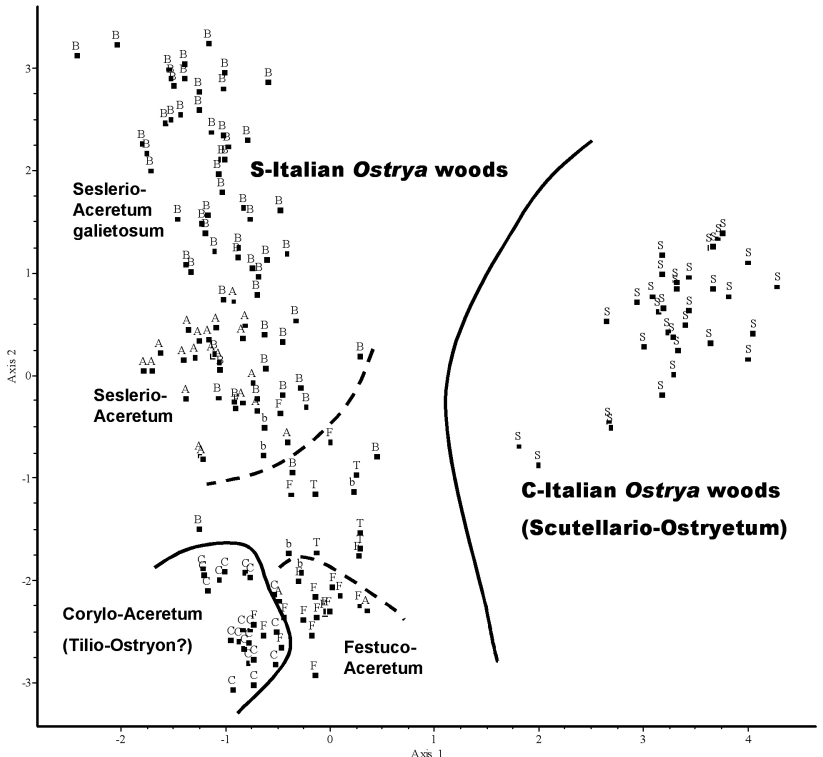

Fig. 3 – PCoA ordination of the whole 162 relevés binary matrix. A: Cilento NP; B: Alburni Mts.; b: rel. from Bonin (1980); C: Aspromonte; F: rel. from Mazzoleni & Ricciardi (1995); S: C-Italian woods; T: Taburno-Camposauro Mts

Tabular presentation and nomenclature

To further clarify the relationships between southern and central/northern *Ostrya*-woods, a synoptic table containing all the *Ostrya*-dominated associations described from the Italian Peninsula (i.e. not including the Alps and the islands) and included in *Carpinion orientalis* was prepared (Tab. 1), differentiating and characterizing alliances, sub-alliances and associations (Mueller Dombois & Ellenberg, 1974) (data for the central and northern communities were taken from the synoptic tables published in Blasi *et al.*, 2004 – where the complete list of species can be found, as the "Other species" section is not shown here for reasons of space).

For reasons of space and clarity, the data concerning the southern Italian communities are shown in the form of synoptic table as well (Tab. 2).

The relevés by Caputo (1968) and by Bonin (1980) due to their "pioneer" character have a very poor species list, so although taken into account in the multivariate analysis were not included in Tab.2.

Nomenclature of the new syntaxa is in accordance with Weber *et al.* (2000). Nomenclature of species follows Conti *et al.* (2005), while to assign species to syntaxa we followed Blasi *at al.* (2004) and references therein.

Tab. 1 - Synoptic table comparing all the *Ostrya* -dominated associations described so far from the Italian peninsula. Columns 1-23 and 27-28 taken from Blasi *et al.* (2004).

Campanulo mediae-Ostryenion carpinifoliae
1 - Fraxino excelsiori-Ostryetum
2 - Orno-Quercetum pubescentis
3 - Plagio-Ostryetum campanuletosum persicifoliae
4 - Plagio- Ostryetum cotinetosum coggygriae
5 - Ostryo-Campanuletum persicifoliae
6 - Asplenio-Ostryetum
7 - Roso caninae-Ostryetum
8 - Knautio drymeiae-Ostryetum sorbetosum ariae
9 - Knautio drymeiae-Ostryetum viburnetosum
Laburno anagyroidis-Ostryenion carpinifoliae
10- Calamagrostio variae-Ostryetum carpinifoliae
11 - Aceri obtusati-Quercetum cerridis
12 - Aceri obtusati-Quercetum cerridis serratuletosum tinctoriae
13 - Aceri obtusati-Quercetum cerridis aceretosum monspessulani
14 - Seslerio italicae-Ostryetum carpinifoliae
15 - Scutellario columnae-Ostryetum carpinifoliae
16 - Melampyro italici-Ostryetum carpinifoliae
17 - Dryopterido filix maris-Ostryetum carpinifoliae
18 - Melittio - Ostryetum carpinifoliae
19 - Corno maris-Ostryetum carpinifoliae
20 - Euphorbio cernuae-Ostryetum carpinifoliae
21 - Daphno laureolae-Quercetum cerridis
22 - Daphno laureolae Quercetum cerridis aceretosum obtusati
23 - Ostryo-Aceretum opulifolii
Festuco exaltatae-Ostryenion carpinifoliae
24- Festuco drymeiae-Aceretum neapolitani
25- Seslerio autumnalis-Aceretum obtusati
26- Seslerio autumnalis-Aceretum obtusati galietosum laevigati
Lauro nobilis - Quercenion pubescentis
27 - Daphno laureolae-Ostryetum carpinifoliae
28 - Asparago acutifolii-Ostryetum carpinifoliae

Column number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
N. of releves	5	7	12	11	4	6	10	32	28	13	16	29	22	9	32	8	12	22	12	15	5	3	20	12	10	46	17	12
Festuco exaltatae-Ostryenion carpinifoliae																												
Festuca exaltata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	100	.	63	.	.
Alnus cordata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8	20	20	.	.
Melittis melissophyllum subsp. albida	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	90	63	.	.
Doronicum orientale	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	54	.	.
Vinca minor	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10	.	.	.
Vinca major subsp. major	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	40	13	.	.
Laburno anagyroidis-Ostryenion carpinifoliae																												
Lilium bulbiferum subsp. croceum	.	.	.	.	.	17	.	41	22	62	88	83	55	44	71	100	.	.	.	93	40	100	35	.	70	85	.	.
Lonicera xylosteum	60	14	.	.	.	17	.	9	.	100	75	86	73	89	93	63	33	23	.	.	.	100	75	.	.	.	.	.
Laburnum anagyroides	.	.	.	.	.	67	40	94	22	62	.	38	.	.	33	63	25	68	75	13	.	.	65	.	.	.	24	.
Carex digitata	.	.	.	.	.	.	.	38	25	77	69	69	59	.	67	75	25	.	.	.	60	67	45	.	.	.	.	.
Digitalis lutea ssp. lutea	.	29	.	.	25	.	.	41	.	54	31	.	.	56	.	.	34	.	8	.	.	.	15	.	.	.	6	.
Bromus ramosus	.	.	.	.	.	.	.	6	.	.	88	83	55	.	29	38	.	.	.	.	.	.	10	.	.	.	.	.
Helleborus bocconei subsp. bocconei	.	.	.	.	.	.	.	.	.	.	63	66	77	78	38	.	.	.	.	.	.	33	95	.	.	.	12	.
Euonymus latifolius	.	.	.	.	.	.	.	.	.	.	.	.	.	.	24	.	25	.	.	7	.	33	65	.	.	22	.	.
Melampyrum italicum	.	.	.	.	.	.	.	9	.	.	.	10	27	.	13	63	.	.	.	.	.	33	.	.	.	.	.	.
Calamintha sylvatica	.	.	.	.	.	.	.	.	.	.	13	7	41	.	73	.	.	.	.	.	.	100	.	.	.	.	.	8
Lilium martagon	.	.	17	.	.	.	.	.	.	.	.	.	.	.	20	.	.	.	.	53	.	33	.	.	.	.	.	.
Bunium bulbocastanum	.	.	.	.	.	.	.	.	.	.	19	.	.	.	.	.	.	23	8	.	.	.	.	.	.	.	.	.
Doronicum columnae	.	.	.	.	.	.	.	.	.	.	.	.	.	22	.	.	.	.	.	67	.	.	.	.	.	15	.	.
Sesleria italica	.	.	.	.	.	.	.	.	.	.	38	.	14	100	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Campanulo mediae-Ostryenion carpinifoliae																											.	.
Acer opalus ssp. opalus	80	14	33	45	50	83	80	100	13	100	.	.	.	.	.	.	25	.	.	.	.	.	65	.	.	.	.	.
Buphtalmum salicifolium	80	57	33	64	.	83	70	3	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lathyrus pratensis	.	.	33	18	25	.	30	28	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11	.	.
Luzula nivea	60	.	58	.	25	.	30	25	6	.	.	.	.	.	.	.	33	.	.	.	.	.	.	.	.	.	.	.
Campanula medium	60	100	42	.	50	100	100	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Knautia drymeia	.	.	.	.	.	.	.	41	50	.	.	.	.	.	.	.	.	.	.	.	.	.	20	.	.	.	.	.
Leucanthemum virgatum	.	.	50	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pulmonaria affinis	.	.	.	.	.	33	20	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lauro nobilis-Quercenion pubescentis																											.	.
Cercis siliquastrum	.	.	.	.	.	.	.	.	.	.	.	7	27	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.
Rosa sempervirens	.	.	.	.	.	.	.	.	.	.	.	7	23	.	.	.	.	.	.	.	.	.	.	8	.	.	53	42
Clematis flammula	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	17	.	.	.	.	33	.	.	.	25
Viburnum tinus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	12	33
Dryopteris pallida	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	33	.	.	.	.	.	.	.	.
Osyris alba	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	20	.	.	.	.	.	.	.
Pistacia terebinthus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8	.	.	.	.	.	.	.	.	.
Anemone hortensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8
species from *Cytiso sessilifolii-Quercenion pubescentis*																												
Cytisophyllum sessilifolius	100	43	.	.	50	17	20	66	72	23	.	21	27	89	42	75	.	64	33	.	.	67	.	33	.	17	.	33
Juniperus oxycedrus	.	43	.	18	.	33	.	.	.	.	.	.	.	.	.	.	.	.	25	.	40	.	.	.	.	.	.	.
Inula conyza	.	.	.	.	.	.	.	.	.	15	.	.	18	.	.	.	.	.	8	20	.	.	.	.	.	.	.	.
Spartium junceum	.	57	.	.	.	67	.	.	.	.	.	.	.	.	.	.	.	5	.	.	.	.	.	.	.	.	.	.
Inula salicina	.	.	.	.	.	.	.	.	25	.	.	.	14	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helianthemum nummularium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	27	.	.	.	.	.	.	.	.	.	.
Carpinion orientalis																												
Ostrya carpinifolia	120	.	92	109	100	100	100	100	63	100	100	100	100	100	100	100	83	91	92	100	60	100	100	92	100	100	100	100
Melittis melissophyllum ssp. melissophyllum	60	43	17	9	75	67	60	44	56	69	63	90	95	22	91	75	.	100	58	73	60	100	80	.	.	.	65	58
Acer opalus ssp. obtusatum	.	.	.	.	.	.	.	.	.	.	100	90	64	89	84	100	.	68	92	87	40	100	.	50	100	98	.	8
Campanula persicifolia	.	14	33	.	.	17	50	.	.	54	.	.	.	.	2	50	.	.	.	27	.	.	5	.	.	30	.	.
Acer monspessulanum	.	.	.	.	.	.	.	.	.	.	.	3	50	.	64	25	.	23	17	27	.	33	.	.	.	4	6	.
Arabis turrita	.	.	.	.	.	.	.	22	6	.	.	.	14	.	22	50	.	18	33	27	.	.	.	.	.	72	.	.
Cnidium silaifolium	.	.	.	.	.	.	.	6	9	.	.	7	41	.	33	.	.	.	.	.	.	.	5	.	80	80	.	.
Sesleria autumnalis	.	14	.	.	75	50	100	.	.	.	.	.	.	.	.	.	75	.	.	93	.	.	.	.	80	63	.	.
Carpinus orientalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11	.	.	.	50	13	100	100	.	8	.	13	.	.

Orchis purpurea	.	.	.	.	.	.	.	.	.	15	94	69	23	22	9	.	.	.	.	.	.	.	50	.	.	.	12	33
Peucedanum verticillare	.	.	.	.	.	.	.	38	22	23	31	7	.	67	.	.	.	.	.	.	.	.	5	.	.	.	.	.
Cotinus coggygria	.	.	.	91	.	.	.	.	9	.	.	17	55	.	33	.	.	.	.	.	.	.	.	.	.	.	.	.
Colutea arborescens	.	.	.	.	.	.	.	.	.	.	.	.	.	22	9	.	.	18	.	.	.	33	.	.	.	.	.	.
Saxifraga rotundifolia	.	.	.	.	25	.	.	.	.	.	.	.	.	.	.	.	8	.	.	.	.	.	.	.	.	35	.	.
Staphylea pinnata	.	.	.	.	.	.	.	.	.	.	.	.	9	.	20	.	.	.	.	.	.	.	.	.	.	2	.	.
Viola hirta	.	.	.	.	.	.	.	78	56	.	.	.	.	.	.	.	.	.	25	.	.	.	.	.	.	.	.	.
Emerus emerus subsp. emeroides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	60	100	.	.	.	.	.	100
Dianthus monspessulanus	.	.	.	.	.	.	.	19	.	.	.	.	.	33	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Silene nemoralis	.	.	.	.	.	.	.	.	.	.	.	.	50	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vicia grandiflora	.	.	.	.	.	.	.	.	.	.	.	.	.	22	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Quercetalia pubescenti-petraeae																													
Fraxinus ornus	100	100	17	73	75	100	100	100	88	100	100	97	100	44	100	100	83	77	100	87	100	100	100	92	80	91	100	100
Quercus pubescens	100	100	58	64	50	83	80	94	81	100	44	86	91	100	87	100	25	5	100	40	100	67	90	42	10	11	82	100
Brachypodium rupestre	40	86	33	9	50	100	90	100	59	77	94	76	77	100	.	75	75	.	33	7	.	.	55	.	.	26	88	.
Quercus cerris	.	57	.	.	50	.	50	91	28	92	100	83	59	22	20	63	8	41	.	7	100	100	95	.	100	52	59	.
Sorbus aria	60	29	42	.	50	33	30	72	.	.	31	7	32	.	91	63	.	32	17	53	20	100	.	.	.	24	.	.
Viola alba subsp. dehnhardtii	.	.	.	.	.	.	.	.	.	92	81	93	95	100	93	63	50	.	8	53	60	100	100	42	90	80	88	100
Buglossoides purpurocaerulea	.	43	.	.	.	17	.	22	56	15	19	59	82	.	60	.	.	32	17	.	60	100	.	17	20	24	18	100
Cornus mas	.	29	.	.	.	.	.	19	16	46	100	83	95	.	91	100	.	32	100	60	60	100	10	.	.	11	12	.
Helleborus foetidus	.	29	8	55	50	.	30	22	28	.	.	.	5	22	38	50	.	59	.	53	.	33	.	.	.	37	12	.
Hypericum montanum	.	43	17	18	75	50	80	22	.	31	.	.	.	.	20	25	.	.	.	13	.	33	.	.	.	35	.	.
Sorbus torminalis	.	14	.	.	.	.	.	.	19	31	19	52	64	.	27	100	8	5	.	.	.	100	80	.	.	48	.	.
Stachys officinalis	.	.	.	.	.	17	.	22	9	.	38	69	73	.	24	25	.	.	.	.	20	100	5	.	60	9	18	75
Sorbus domestica	.	.	.	.	.	.	.	.	.	31	50	62	64	.	29	50	.	.	.	7	60	100	30	.	10	15	53	42
Digitalis lutea ssp. australis	.	.	25	.	100	.	.	.	.	.	.	.	27	.	67	.	33	18	.	60	.	.	15	.	60	63	.	.
Aristolochia lutea	.	57	.	.	.	17	30	.	.	.	.	.	.	.	.	.	.	55	.	93	.	.	.	.	90	22	.	.
Lonicera etrusca	.	.	.	.	.	17	10	.	13	.	.	.	23	.	.	50	.	.	25	60	.	.	.	.	.	.	94	.
Scutellaria columnae	.	.	.	.	.	.	.	.	.	.	.	.	.	.	47	.	.	36	.	33	.	.	.	25	70	48	.	.
Serratula tinctoria	.	.	.	.	.	17	20	.	9	.	.	66	32	.	.	.	.	.	.	.	.	33	10	.	.	.	.	8
Silene italica subsp. italica	.	.	.	.	.	.	.	.	16	31	.	.	.	33	40	.	.	41	25	.	.	100	.	.	.	.	.	.
Arum italicum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	40	.	.	.	.	27	.	.	.	8	.	11	.	.
Lathyrus niger	.	.	.	.	.	.	.	16	16	.	.	52	23	.	.	.	.	.	.	.	.	.	25	.	.	.	.	.
Carex sylvatica	.	.	.	.	.	.	.	.	.	.	13	.	.	.	9	.	.	.	.	.	20	.	.	.	.	2	.	.
Teucrium siculum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	13	.	.	.	.	20	70	.	.
Ptilostemon strictus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	38	.	.	.	.	.	.	.	.	90	24	.	.
Asparagus tenuifolius	.	.	.	.	.	.	.	16	22	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.	.	.	.
Mespilus germanica	.	.	.	.	.	.	.	.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	25	.	.	.	.	.
Veronica chamaedrys	.	.	.	.	.	.	.	.	.	.	.	.	.	44	.	.	.	.	.	.	.	.	.	.	.	50	.	.
Crepis leontodontoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	20	15	.	.
Limodorum abortivum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	4	.	.
Agrimonia eupatoria	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	23	.	.	.	.	.	.	.	.	.	.
species from *Fagetalia sylvaticae*																													
Hepatica nobilis	100	29	8	9	50	.	50	63	63	100	100	69	77	67	80	75	25	45	.	.	60	100	75	.	10	20	.	33
Euphorbia dulcis	80	14	50	36	50	.	20	69	44	77	50	66	14	56	56	.	17	.	.	27	20	.	95	.	.	.	.	.
Epipactis helleborine	.	.	.	.	50	.	.	75	69	38	.	7	.	89	16	88	8	.	8	27	.	67	20	.	30	35	6	25
Fagus sylvatica	40	.	.	.	100	.	.	28	.	23	25	7	5	33	27	50	50	9	17	.	.	.	.	.	10	41	.	.
Geranium nodosum	60	14	33	27	75	.	30	44	9	.	13	21	.	.	.	.	50	.	.	.	.	.	5	.	.	.	.	.
Cephalanthera rubra	.	14	17	.	100	33	50	41	41	.	.	7	.	78	.	25	.	.	.	.	.	.	.	.	.	4	24	.
Sanicula europaea	.	.	.	.	.	.	.	.	.	.	81	83	50	67	53	.	8	.	.	33	.	67	.	.	.	26	.	50
Dactylorhiza maculata	20	.	.	.	.	.	.	6	.	.	94	45	.	.	27	25	8	.	.	.	.	.	.	.	10	52	6	.
Mercurialis perennis	.	14	.	.	.	.	30	.	19	.	.	.	14	.	33	38	.	.	.	40	.	.	.	.	.	4	.	.
Anemone trifolia	.	.	.	.	50	33	40	.	.	.	81	90	73	56	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lathyrus vernus	.	.	.	.	.	.	.	19	3	.	.	24	23	11	.	.	.	5	.	.	20	.	.	.	.	.	6	.
Poa nemoralis	.	.	.	.	25	.	30	.	6	.	.	.	.	.	7	.	17	32	.	.	.	.	.	.	.	7	.	.
Salvia glutinosa	.	.	.	.	50	.	.	.	6	54	13	.	.	.	11	.	33	.	.	.	.	.	.	.	.	.	.	.
Tilia platyphyllos	.	.	.	.	.	.	.	44	.	.	.	.	.	.	20	.	.	.	.	27	.	33	.	.	.	24	.	.
Vicia sepium	.	.	.	.	.	17	.	.	.	.	19	7	.	.	.	.	.	.	.	47	.	.	.	.	10	22	.	.
Arum maculatum	.	.	.	.	.	.	.	.	.	.	.	.	27	.	.	.	.	14	17	13	.	.	.	.	.	7	.	.
Geranium robertianum	.	.	.	27	.	.	.	6	3	.	.	.	.	.	29	.	33	.	.	.	.	.	.	.	.	.	.	.
Acer pseudoplatanus	.	.	.	.	.	.	.	25	.	.	.	.	.	.	.	.	25	.	.	.	.	.	.	.	.	2	6	.
Galium odoratum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11	.	.	.	.	.	40	.	.	.	.	9	.	.
Polygonatum multiflorum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	59	.	27	.	.	.	.	.	41	.	.
Fraxinus excelsior	80	.	.	18	.	.	.	.	.	.	.	.	.	.	.	.	.	18	.	.	.	.	.	.	.	.	.	.
Ulmus glabra	.	.	.	.	.	.	.	.	.	.	.	.	.	.	9	.	.	.	.	.	.	.	.	.	.	4	.	.
Abies alba	.	.	33	.	.	.	.	.	.	.	.	.	.	.	.	.	8	.	.	.	.	.	.	.	.	.	.	.
Acer platanoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	9	.	.	.	.	.	.	.	.	.	.	15	.	.
Anemone nemorosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	27	.	.	10	.	.	.	.	.
Corydalis cava	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	33	.	.	.	.	.	7	.	.
Melampyrum nemorosum	.	.	.	.	25	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	40	.	.	.	.	.	.	.
Loncomelos pyrenaicum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	16	.	.	.	.	13	.	.	.	.	.	.	.	.
Scilla bifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	80	.	.	.	.	.	2	.	.
Sorbus aucuparia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	14	.	.	.	.	.	.	.	4	.	.
Stellaria holostea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	18	.	.	.	.	7	.	.	.	.	.	.	.	.
Adoxa moschatellina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	27	.	.	.	.	.	.	.	.
Asarum europaeum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8	.	.	.	.	.	.	.	.	.	.	.
Cardamine chelidonia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	23	.	.	.	.	.	.	.	.	.	.
Gagea lutea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	47	.	.	.	.	.	.	.	.
Lamium galeobdolon	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	17	.	.	.	.	.	.	.	.	.	.	.
Luzula pilosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	36	.	.	.	.	.	.	.	.	.	.
Querco-Fagetea																													
Viola riviniana+reichenbachiana	.	29	17	18	.	33	40	47	69	85	88	90	82	100	62	88	42	9	67	33	40	67	90	8	30	59	35	67
Corylus avellana	100	14	58	36	75	67	30	94	84	100	25	72	50	100	73	63	67	41	.	.	100	100	95	8	.	4	.	.

Tamus communis	.	57	17	73	.	50	.	34	28	31	88	90	82	67	78	75	25	64	92	27	20	100	30	50	40	59	88	17
Crataegus monogyna	60	71	58	73	25	50	70	84	84	100	94	76	82	89	100	.	75	64	.	93	40	100	95	.	80	39	76	100
Clematis vitalba	.	43	8	64	.	67	30	69	69	31	50	10	32	44	47	25	17	45	.	7	.	.	65	17	40	46	29	42
Emerus majus ssp. majus	100	71	33	82	100	100	90	84	81	100	88	97	86	78	91	75	42	5	75	.	.	.	95	75	.	24	94	,
Daphne laureola	.	.	33	27	75	33	40	9	38	100	25	31	68	67	89	25	100	.	42	.	60	100	65	8	.	87	100	67
Fragaria vesca	.	14	50	36	25	17	70	47	22	92	100	24	45	33	84	63	50	77	.	93	60	100	40	.	.	70	12	17
Hedera helix	.	57	.	45	25	50	30	3	28	69	94	100	.	56	89	50	67	27	.	67	60	100	90	83	.	57	100	100
Acer campestre	60	86	25	18	50	50	60	88	41	85	75	41	68	67	82	63	25	32	.	20	.	100	100	.	.	.	12	8
Festuca heterophylla	.	.	58	36	50	.	.	6	13	46	50	31	36	44	71	63	75	.	.	53	100	100	30	17	70	67	41	.
Melica uniflora	.	.	.	18	.	.	20	13	16	46	50	34	59	44	87	88	67	50	75	47	60	100	30	.	.	65	.	.
Brachypodium sylvaticum	60	.	17	55	50	.	10	.	13	.	.	31	32	.	60	.	.	18	17	73	40	67	5	25	30	41	53	100
Campanula trachelium	.	14	.	.	.	.	30	72	41	54	44	24	14	33	73	88	25	55	42	47	.	67	.	8	30	83	.	42
Cornus sanguinea	.	71	17	91	.	100	30	28	81	23	100	97	82	78	16	75	.	41	100	.	.	67	.	.	.	4	59	75
Castanea sativa	40	.	25	91	25	83	40	63	28	92	.	24	14	.	.	25	92	.	.	.	60	.	45	42	.	50	.	.
Euphorbia amygdaloides	.	43	8	18	.	17	40	3	13	.	.	52	41	11	64	.	.	5	33	20	.	100	30	.	10	83	.	.
Juniperus communis	.	57	17	45	25	17	.	56	72	54	81	55	45	67	40	38	42	5	.	.	20	.	50	.	.	.	82	17
Rosa canina	.	.	.	.	25	.	50	25	28	23	31	10	27	67	82	25	67	9	.	33	.	100	10	.	20	11	35	.
Cephalanthera longifolia	.	14	.	.	50	.	.	41	13	31	31	34	45	33	16	25	.	9	25	.	.	33	.	8	50	15	6	75
Carpinus betulus	60	14	.	.	50	.	.	34	3	54	38	41	23	.	33	38	33	9	.	.	20	67	10	.	.	.	.	.
Cruciata glabra	.	.	.	.	75	.	50	47	25	77	75	66	77	44	78	100	83	.	17	.	60	67	50	.	.	.	76	.
Lathyrus venetus	.	.	.	.	.	.	.	.	.	15	94	69	73	22	69	75	25	68	.	87	.	100	25	50	70	89	.	8
Lonicera caprifolium	.	14	.	.	.	.	.	.	72	23	100	97	68	89	42	50	25	68	.	.	100	100	85	17	.	35	.	75
Lactuca muralis	.	.	17	9	50	.	10	6	3	15	.	.	.	.	16	.	25	14	17	47	.	.	.	33	10	35	.	.
Primula vulgaris	.	.	.	.	.	.	.	41	59	100	94	69	77	100	73	88	33	55	.	.	40	100	90	.	30	74	12	50
Solidago virgaurea	.	14	.	.	.	.	.	72	69	85	100	79	45	78	73	88	17	.	.	13	.	67	60	8	.	24	.	33
Ajuga reptans	.	.	.	.	.	.	.	3	13	31	63	41	55	.	53	50	8	.	.	60	20	33	5	.	40	50	6	58
Cephalantera damasonium	.	.	.	.	50	.	.	28	25	85	31	28	32	89	33	63	.	9	.	20	.	67	65	.	.	15	.	.
Potentilla micrantha	.	.	.	.	.	.	50	63	3	92	19	.	27	.	40	75	33	.	.	40	.	33	5	.	100	54	.	.
Rubus ulmifolius	.	.	.	.	.	.	.	.	.	31	50	38	68	33	.	.	42	41	17	13	.	.	25	8	30	2	53	.
Ruscus aculeatus	.	29	.	.	.	33	.	.	.	.	.	93	82	.	78	.	.	23	58	.	40	67	35	83	20	20	76	67
Viburnum lantana	60	43	8	.	75	33	80	.	81	69	.	3	.	78	4	25	.	.	.	.	.	.	90	.	.	.	.	.
Crataegus laevigata	.	.	.	.	.	.	.	13	3	62	81	62	50	67	18	75	.	.	.	60	.	.	25	.	.	7	24	.
Euonymus europaeus	.	.	.	.	.	.	.	.	.	.	31	38	45	22	58	38	.	.	.	67	40	33	.	42	.	4	29	42
Ligustrum vulgare	.	43	.	.	.	17	30	.	50	.	13	48	41	.	69	.	.	.	.	.	100	100	65	8	.	.	41	.
Prunus avium	.	.	.	18	.	.	.	63	34	92	75	52	41	67	18	25	92	.	.	.	.	.	55	.	.	.	24	50
Rosa arvensis	.	14	.	.	.	.	.	81	81	77	100	76	9	44	.	63	.	.	.	100	.	.	30	.	.	26	.	.
Geum urbanum	.	.	.	.	.	.	.	.	9	.	.	.	32	.	69	.	17	36	.	33	.	100	5	.	20	50	.	.
Luzula forsteri	.	.	.	.	.	.	.	.	.	38	50	14	36	.	42	.	33	.	.	.	20	100	.	8	40	57	.	42
Malus sylvestris	.	.	.	.	.	.	.	88	13	.	19	.	.	33	38	38	8	.	.	.	.	67	5	.	20	17	6	.
Prunus spinosa	.	.	.	.	.	.	.	56	53	.	44	28	68	.	71	25	.	27	.	.	.	100	5	.	.	2	82	25
Symphytum tuberosum	.	.	25	.	25	.	.	.	9	100	.	.	.	44	.	.	8	5	.	.	20	.	30	.	.	61	.	17
Aremonia agrimonoides	.	.	.	.	.	.	.	3	3	.	25	.	.	.	.	38	.	27	17	60	.	.	.	.	20	96	.	.
Hieracium gr. murorum	.	.	42	18	.	33	20	66	44	85	63	34	18	33	33	.	42	9	.	.	40	.	15	.	.	.	6	33
Neottia nidus-avis	.	.	.	.	.	.	.	22	6	54	.	.	.	.	18	25	.	.	.	.	20	100	.	.	30	57	6	.
Pulmonaria apennina	.	.	.	.	.	.	.	.	.	.	38	48	.	11	2	.	25	.	.	.	.	.	55	.	.	30	.	.
Pyrus pyraster	.	.	.	.	.	.	.	66	53	15	38	.	.	44	.	.	8	.	.	.	.	.	.	.	40	30	6	.
Dryopteris filix-mas	20	.	.	.	.	.	30	3	3	.	.	.	.	.	2	.	67	.	.	13	.	.	.	.	.	.	.	.
Genista tinctoria	.	.	.	.	.	.	.	19	6	.	.	.	.	33	.	.	.	.	.	.	20	33	.	.	20	20	.	.
Ilex aquifolium	.	.	.	.	25	.	.	.	.	.	.	.	.	.	11	.	8	.	8	.	40	.	.	.	.	20	.	.
Luzula sylvatica	.	.	.	.	.	.	20	.	.	.	.	.	.	.	27	63	.	27	8	47	.	.	10	.	.	.	.	8
Rubus hirtus	.	.	.	.	.	.	.	.	.	15	.	.	.	.	76	.	58	.	.	87	.	67	.	.	.	89	.	.
Platanthera clorantha	.	.	.	.	.	.	.	16	25	62	19	.	.	.	.	38	.	.	.	.	.	.	.	.	.	15	.	.
Polystichum setiferum	.	.	.	.	.	.	.	.	.	.	.	.	5	.	27	.	.	.	.	7	.	.	.	8	.	13	.	.
Anemone apennina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	16	.	.	77	.	67	.	.	.	.	80	91	.	.
Rubus canescens	.	.	.	27	.	33	.	.	.	.	.	.	9	.	.	.	.	.	.	.	40	33	.	.	.	.	.	.
Cardamine bulbifera	.	.	.	.	.	.	.	.	.	.	.	.	.	.	31	.	.	9	.	.	.	33	.	.	.	24	.	.
Cardamine graeca	.	.	.	.	.	.	.	.	.	.	.	.	.	.	44	.	.	.	.	73	.	33	.	.	.	7	.	.
Cytisus scoparius	.	14	.	.	50	.	.	.	.	.	.	.	.	.	.	.	25	.	.	.	.	.	.	.	.	4	.	.
Hieracium sabaudum	.	.	.	.	.	.	.	3	3	38	.	.	.	.	.	38	.	.	.	.	.	.	.	.	.	.	.	.
Listera ovata	.	.	.	.	25	.	.	.	.	15	81	24	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Platanthera bifolia	20	.	17	.	50	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	20	.	.	.	.	.	18	.
Prunus mahaleb	.	.	.	.	.	17	.	.	3	.	.	.	.	.	22	25	.	.	.	.	.	.	.	.	.	.	.	.
Pyracantha coccinea	.	.	.	.	.	.	.	.	.	.	31	62	.	.	.	.	.	.	.	.	60	.	35	.	.	.	.	.
Ranunculus nemorosus	.	.	.	.	.	.	20	.	.	.	19	.	23	44	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ulmus minor	80	.	.	.	.	.	.	.	.	.	13	10	.	.	4	.	.	.	.	.	.	.	.	.	.	.	6	.
Allium pendulinum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	13	.	.	.	.	80	.	.	.	.	.	67	.	.
Quercus petraea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	13	.	91	.	.	.	.	5	.	.	.	6	.
Ranunculus lanuginosus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	9	.	.	.	.	.	.	.	35	.	.
Aquilegia vulgaris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	18	.	.	.	.	.	.	.	.	.	.	9	.	.
Galanthus nivalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	80	.	.	.	.	.	.	.	.
Aristolochia rotunda	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8	.	.	.	.	.	.	.	.	.
Euonymus verrucosus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	25	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium lachenalii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	20	.	.	.	.	.	.	.	.
Hieracium racemosum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	42	.	.	.	.	.	.	.	.	.	.	.
Rosa agrestis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	100	.	.	.	.	.	.
Rosa gallica	.	.	.	.	.	.	.	.	9	.	.	.	.	.	.	.	.	55	.	.	.	.	.	.	.	.	6	.
Viburnum opulus	.	.	.	.	.	.	.	.	.	.	.	.	18	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Viola odorata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	55	.	.	.	.	.	.	.	.	.	.
species from *Quercetea ilicis*																											.	.
Asparagus acutifolius	.	43	.	.	.	67	.	.	.	.	.	14	73	.	38	.	.	18	58	7	60	.	.	25	.	.	88	100
Rubia peregrina	.	29	.	27	.	50	.	.	.	.	.	14	77	.	249	.	.	.	33	.	20	.	.	75	.	.	82	100
Quercus ilex	.	.	25	.	.	17	.	.	.	.	.	.	36	.	53	.	.	.	25	7	60	.	.	100	.	11	18	50
Cyclamen repandum	.	.	.	.	.	.	.	.	.	.	31	76	86	.	76	.	.	.	25	7	100	100	.	.	.	.	.	100
Rhamnus alaternus	.	.	.	.	.	.	.	.	.	.	.	.	9	.	.	.	.	.	.	.	.	.	.	25	.	.	.	8
Asplenium onopteris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	47	.	.	.	.	.	.	.	.
Ampelodesmos mauritanicus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	25

Tab. 2 - Synoptic table of the S-Italian *Ostrya* -woods (original data and revised bibliographic data).

1: Festuco drymeiae-Aceretum neapolitani (Maiorca & Spampinato 1999, tab 5b and rel. 4-9 from tab 5a);
2: Festuco drymeiae-Aceretum neapolitani (Mazzoleni & Ricciardi 1993, tab 1 rel. 1-12);
3: Seslerio autumnalis-Aceretum obtusati (Corbetta et al. 2004, tab 24);
4:Seslerio autumnalis-Aceretum obtusati (original relevés, Monte Cervati and Monte Vesole-Chianello, Cilento NP);
5:Seslerio autumnalis-Aceretum obtusati galietosum laevigati (original relevés, Monte Sacro, Cilento NP);
6: Seslerio autumnalis-Aceretum obtusati galietosum laevigati (original relevés, Monti Alburni, Cilento NP);

Col. No.	1	2	3	4	5	6
number of relevés	10	12	10	14	5	46
diff. *Festuco-Aceretum*						
Ligustrum vulgare L.	20	8	.	7	.	.
Smilax aspera L.	20	67	.	14	.	.
Lonicera implexa Aiton subsp. implexa	30	33	.	.	.	.
Viburnum tinus L. subsp. tinus	20	50	.	.	.	.
Rhamnus alaternus L. subsp. alaternus	10	25	.	.	.	.
diff. *Seslerio-Aceretum*						
Ptilostemon strictus (Ten.) Greuter	20	.	90	36	20	24
Epipactis helleborine (L.) Crantz s.l.	20	.	30	21	20	35
Silene italica (L.) Pers. s.l.	.	.	70	50	40	46
Quercus cerris L.	.	.	100	100	40	52
Sesleria autumnalis (Scop.) F.W. Schultz	.	.	80	64	60	63
Cnidium silaifolium (Jacq.) Simonk. subsp. silaifolium	.	.	80	36	20	80
Aristolochia lutea Desf.	.	.	90	29	20	22
Lilium bulbiferum L. subsp. croceum (Chaix) Jan	.	.	70	36	.	85
diff. subass. *galietosum laevigati*						
Rumex alpestris Jacq.	.	.	.	7	20	46
Pulmonaria apennina Cristof. & Puppi	.	.	.	.	.	30
Moehringia trinervia (L.) Clairv.	10	.	.	.	.	74
Cardamine bulbifera (L.) Crantz	.	.	.	.	20	24
Galium laevigatum L.	.	.	.	.	60	70
Trifolium patulum Tausch	.	.	.	7	.	24
Festuco-Ostryenion						
Festuca exaltata C. Presl	90	100	.	36	40	63
Alnus cordata (Loisel.) Loisel.	40	8	20	21	80	20
Vinca minor L.	60	.	10	21	60	.
Melittis melissophyllum L. subsp. albida (Guss.) P.W. Ball	50	.	90	93	80	63
Vinca major L. subsp. major	40	.	40	29	20	13
Doronicum orientale Hoffm.	.	.	.	7	20	54
Carpinion orientalis						
Ostrya carpinifolia Scop.	100	92	100	86	100	100
Acer opalus Mill. subsp. obtusatum (Waldst. & Kit. ex Willd.) Gams	100	50	100	71	100	98
Emerus majus Mill. s.l.	30	75	.	64	20	24
Carpinus orientalis Mill. subsp. orientalis	.	8	.	50	20	13
Acer monspessulanum L. subsp. monspessulanum	.	.	.	21	.	4
Arabis turrita L.	.	.	.	36	60	72
Campanula persicifolia L. s.l.	.	.	.	7	20	30
Saxifraga rotundifolia L. subsp. rotundifolia	.	.	.	.	60	35
Pistacia terebinthus L. subsp. terebinthus	.	.	.	7	.	.
Staphylea pinnata L.	.	.	.	.	.	2
sp. from *Teucrio siculi-Quercion cerris* and *Ptilostemono-Quercenion cerris*						
Crepis leontodontoides All.	10	.	20	43	.	15
Teucrium siculum (Raf.) Guss. subsp. siculum	.	.	20	79	.	70
Poa sylvicola Guss.	.	.	30	7	.	9
Oenanthe pimpinelloides L.	.	8	30	29	.	61
Digitalis lutea L. subsp. australis (Ten.) Arcang.	.	.	60	29	20	63
Malus sylvestris (L.) Mill.	.	.	20	7	20	17
Cytisus villosus Pourr.	.	25	.	.	.	37
Silene viridiflora L.	.	.	.	14	20	.
Achillea ligustica All.	.	.	.	14	.	7
Lathyrus jordanii Ten.	.	.	60	50	.	.
Genista tinctoria L.	.	.	20	.	.	20
Ranunculus lanuginosus L.	.	.	.	.	40	35
Echinops ritro L. subsp. siculus (Strobl) Greuter	.	.	30	.	.	.
Silene coronaria (L.) Clairv.	.	.	.	7	.	.
Aristolochia rotunda L. s.l.	.	.	.	7	.	.
Poa nemoralis L. s.l.	.	.	.	.	.	7
Anthoxanthum odoratum L. s.l.	.	.	.	.	.	4
Asperula laevigata L.	.	.	.	.	.	2
Quercetalia pubescenti-petraeae						
Fraxinus ornus L. subsp. ornus	100	92	80	93	100	91
Viola alba Besser s.l.	60	42	90	93	20	80
Scutellaria columnae All. s.l.	40	25	70	7	20	48

Quercus pubescens Willd. subsp. Pubescens	10	42	10	43	.	11
Luzula forsteri (Sm.) DC.	.	8	40	93	40	57
Buglossoides purpurocaerulea (L.) I.M. Johnst.	10	17	20	21	.	24
Cytisophyllum sessilifolium (L.) O. Lang	20	33	.	21	20	17
Clinopodium vulgare L. s.l.	.	.	50	36	.	48
Stachys officinalis (L.) Trevis.	.	.	60	79	20	9
Pyrus communis L.	.	.	40	43	20	30
Sorbus domestica L.	.	.	10	.	20	15
Platanthera chlorantha (Custer) Rchb.	.	.	.	7	20	15
Sorbus torminalis (L.) Crantz	.	.	.	7	.	48
Cephalanthera damasonium (Mill.) Druce	.	.	.	.	.	15
sp. from *Fagetalia sylvaticae*						
Viola reichenbachiana Jord. ex Boreau	70	8	30	36	40	59
Campanula trachelium L. subsp. trachelium	10	8	30	21	20	83
Lactuca muralis (L.) Gaertn.	50	33	10	.	40	35
Daphne laureola L.	50	8	.	21	.	87
Melica uniflora Retz.	40	.	.	57	80	65
Polystichum setiferum (Forssk.) T. Moore ex Woyn.	40	8	.	.	60	13
Ilex aquifolium L.	40	.	.	14	20	20
Luzula sieberi+sylvatica+sicula	.	.	10	7	40	39
Euphorbia amygdaloides L. s.l.	20	.	10	36	20	83
Primula vulgaris Huds. subsp. vulgaris	30	.	30	21	20	74
Arisarum proboscideum (L.) Savi	10	.	.	21	40	4
Rubus hirtus Waldst. & Kit.	.	.	.	43	60	89
Lamium flexuosum Ten.+Lamium galeobdolon	40	.	.	14	.	15
Geranium versicolor L.	40	.	.	.	20	9
Tilia platyphyllos Scop. s.l.	20	.	.	.	40	24
Sanicula europaea L.	90	.	.	7	.	26
Mercurialis perennis L.	70	.	.	14	20	4
Fagus sylvatica L. subsp. sylvatica	20	.	10	.	40	41
Cephalanthera longifolia (L.) Fritsch	.	8	50	50	.	15
Aquilegia vulgaris auct. Fl. Ital.	20	.	.	7	20	9
Ulmus glabra Huds.	10	.	.	.	.	4
Acer cappadocicum Gled. subsp. lobelii (Ten.) Murray	30	.	.	.	60	13
Asperula taurina L. subsp. taurina	10	.	.	.	40	4
Carex sylvatica Huds. subsp. sylvatica	40	.	.	.	20	2
Hepatica nobilis Schreb.	30	.	10	.	.	20
Neottia nidus-avis (L.) Rich.	.	.	30	29	.	57
Dactylorhiza maculata (L.) Soó s.l.	.	.	10	14	.	52
Rosa arvensis Huds.	.	.	.	50	40	26
Sorbus aria (L.) Crantz s.l.	.	.	.	7	20	24
Allium pendulinum Ten.	.	.	.	21	40	67
Thalictrum aquilegiifolium L. subsp. aquilegiifolium	.	.	.	7	20	20
Galium odoratum (L.) Scop.	.	.	.	.	.	9
Calamintha grandiflora (L.) Moench	.	.	.	.	.	7
Acer pseudoplatanus L.	.	.	.	.	.	2
Cardamine chelidonia L.	10	.	.	.	20	.
Loncomelos pyrenaicus (L.) Hrouda ex J. Holub s.l.	.	.	.	7	.	11
Corydalis cava (L.) Schweigg. & Körte subsp. cava	.	.	.	7	.	7
Limodorum abortivum (L.) Sw.	.	.	.	7	.	4
Salix caprea L.	.	.	.	.	20	2
Polygonatum multiflorum (L.) All.	.	.	.	.	40	41
Moehringia muscosa L.	10	.	.	.	.	.
Fraxinus excelsior L. subsp. excelsior	.	.	.	.	20	.
Senecio stabianus Lacaita	.	.	.	.	40	.
Cardamine graeca L.	.	.	.	.	.	7
Euonymus latifolius (L.) Mill.	.	.	.	.	.	22
Saxifraga bulbifera L.	.	.	.	.	.	26
Silene latifolia Poir. subsp. latifolia	.	.	.	.	.	24
Euphorbia corallioides L.	.	.	.	.	.	11
Acer platanoides L.	.	.	.	.	.	15
Arum maculatum L.	.	.	.	.	.	7
Milium effusum L.	.	.	.	.	.	7
Cephalanthera rubra (L.) Rich.	.	.	.	.	.	4
Cystopteris fragilis (L.) Bernh.	.	.	.	.	.	15
Querco-Fagetea						
Lathyrus venetus (Mill.) Wohlf.	100	50	70	64	60	89
Brachypodium sylvaticum (Huds.) P. Beauv. s.l.	60	25	30	36	40	41
Tamus communis L.	90	50	40	57	60	59
Corylus avellana L.	100	8	.	7	20	4
Crataegus monogyna Jacq.	80	.	80	93	60	39
Cyclamen hederifolium Aiton s.l.+ Cyclamen repandum Sm.	60	33	40	21	.	24
Aremonia agrimonoides (L.) DC. subsp. agrimonoides	20	.	20	64	60	96
Festuca heterophylla Lam.	.	17	70	64	80	67
Anemone apennina L. subsp. apennina	.	.	80	36	20	91
Potentilla micrantha Ramond ex DC.	20	.	100	71	40	54
Ajuga reptans L.	30	.	40	50	.	50
Castanea sativa Mill.	.	42	.	7	20	50
Helleborus foetidus L. subsp. foetidus	40	.	.	14	20	37
Euonymus europaeus L.	.	42	.	21	.	4
Geum urbanum L.	.	.	20	21	.	50
Fragaria vesca L. subsp. vesca	20	.	.	29	40	70
Solidago virgaurea L. s.l.	.	8	.	7	40	24

Cornus sanguinea L. s.l.	60	.	.	7	.	4
Lonicera caprifolium L.	.	17	.	36	20	35
Bellis sylvestris Cirillo	.	.	30	14	.	.
Rosa canina L.	.	.	20	.	.	11
Symphytum tuberosum L. subsp. angustifolium (A. Kern.) Nyman	.	.	.	7	.	61
Astragalus glycyphyllos L.	.	8	.	.	.	13
Anthriscus nemorosa (M. Bieb.) Spreng.	.	.	.	7	.	11
Hypericum montanum L.	.	.	.	7	.	35
Cornus mas L.	.	.	.	43	.	11
Crataegus laevigata (Poir.) DC.	.	.	.	14	.	7
Prunus spinosa L. subsp. spinosa	.	.	.	14	.	2
Acer campestre L.	.	.	.	7	.	.
Veronica officinalis L.	.	.	.	.	20	2
Populus tremula L.	.	.	.	.	20	11
Veronica chamaedrys L. s.l.	.	.	.	.	.	50
Lapsana communis L. subsp. communis	.	.	.	.	.	15
Myosotis sylvatica Hoffm. s.l.	.	.	.	.	.	20
sp. from *Quercetea ilicis*						
Quercus ilex L. subsp. Ilex	100	100	.	7	20	11
Rubia peregrina L. s.l.	70	75	.	7	40	.
Asparagus acutifolius L.	20	25	.	43	.	.
Erica arborea L.	.	17	.	7	.	.
Laurus nobilis L.	30	.	.	.	.	.
Phillyrea latifolia L.	20	8	.	.	.	.
Osyris alba L.	10	.	.	.	.	.
Clematis flammula L.	.	33	.	.	.	.
Rosa sempervirens L.	.	8	.	.	.	.
Arisarum vulgare Targ. Tozz.	.	17	.	.	.	.
Myrtus communis L. subsp. communis	.	25	.	.	.	.
Arbutus unedo L.	.	17	.	.	.	.
Teucrium flavum L. s.l.	.	8	.	.	.	.
Other species						
Ruscus aculeatus L.	90	83	20	57	20	20
Clematis vitalba L.	100	17	40	36	40	46
Rubus ulmifolius Schott	50	8	30	7	20	2
Geranium robertianum L.+ Geranium purpureum Vill.	10	.	20	21	40	48
Hedera helix L. s.l.	100	83	.	50	60	57
Asplenium onopterisL.+Asplenium adiantum-nigrum L.	60	50	.	36	20	15
Pteridium aquilinum (L.) Kuhn subsp. aquilinum	60	33	.	14	40	15
Hieracium sp.	70	.	40	21	20	15
Dactylis glomerata L. s.l.	.	.	40	36	20	48
Arum italicum Mill. subsp. italicum	.	8	.	7	.	11
Galium aparine L.	10	.	.	14	20	4
Asplenium trichomanes L. s.l.	10	.	.	29	.	43
Stachys sylvatica L.	.	.	.	14	.	4
Brachypodium rupestre (Host) Roem. & Schult.	.	.	.	36	20	26
Polypodium sp.	10	8	.	.	.	9
Galium lucidum All. s.l.	.	.	40	14	.	15
Calamintha nepeta (L.) Savi subsp. sylvatica (Bromf.) R. Morales	.	.	20	7	.	7
Stellaria media (L.) Vill. s.l.	.	.	.	29	40	13
Asphodeline liburnica (Scop.) Rchb.	.	.	80	29	.	2
Campanula rapunculus L.	.	.	20	7	.	9
Hypochaeris laevigata (L.) Ces., Pass. & Gibelli	10	.	.	.	.	.
Galium mollugo L. subsp. erectum Syme	40	.	.	14	.	.
Teucrium chamaedrys L. s.l.	10	.	.	14	.	.
Ceterach officinarum Willd. s.l.	10	.	.	.	.	20
Vicia ochroleuca Ten. subsp. ochroleuca	10	25	.	.	.	.
Prunella vulgaris L. subsp. vulgaris	30	.	.	7	.	.
Salvia glutinosa L.	20	.	.	.	20	.
Juglans regia L.	10	.	.	.	60	.
Filipendula vulgaris Moench	10	.	.	7	.	.
Phyllitis scolopendrium (L.) Newman subsp. scolopendrium	20	.	.	.	.	.
Anthriscus sylvestris (L.) Hoffm. subsp. Sylvestris	.	8	.	.	20	.
Geranium sanguineum L.	.	.	70	.	.	22
Vicia sepium L.	.	.	10	.	.	22
Silene vulgaris (Moench) Garcke s.l.	.	.	30	.	.	4
Alliaria petiolata (M. Bieb.) Cavara & Grande	.	.	.	7	.	17
Hypericum perforatum L.	.	.	.	7	.	4
Trifolium pratense L. s.l.	.	.	.	7	.	15
Cruciata laevipes Opiz	.	.	.	7	.	4
Ranunculus millefoliatus Vahl	.	.	.	7	.	2
Trifolium ochroleucum Huds.	.	.	.	14	.	4
Arabis sagittata (Bertol.) DC.	.	.	.	7	.	4
Arctium nemorosum Lej.	.	.	.	7	.	4
Agrimonia eupatoria L. s.l.	.	.	.	7	20	.
Symphytum bulbosum K.F. Schimp.	.	.	.	7	20	.
Bryonia dioica Jacq.	.	.	.	7	20	.
Chaerophyllum temulum L.	.	.	.	.	20	9
Poa trivialis L.	.	.	.	.	20	2
Polystichum aculeatum (L.) Roth	.	.	.	.	20	2
Athyrium filix-femina (L.) Roth	.	.	.	.	.	7

Results and discussion

Main clusters identified

The published data concerning the *Ostrya*-communities of Southern Italy can be divided into three main groups, as shown in the dendrogram in Fig. 2.

A first one (cluster n. 1 in Fig.2) is made up of the relevés published by Brullo *et al.,* (2001) in their Tab. 22. These relevés concern peculiar mixed woods rich in fern species, and were executed in the gullies of the NW slopes of the Aspromonte massif (Southern Calabria), on siliceous substrata. These communities were described as *Corylo-Aceretum neapolitani* Brullo, Scelsi & Spampinato 2001, and this association was designated by Brullo *et al.* (2001) as holotypus of the alliance *Tilio pseudorubrae-Ostryon carpinifoliae* Brullo, Scelsi & Spampinato 2001, allegedly a southern-Apenninic vicariant of *Tilio platyphyllis-Acerion pseudoplatani* Klika 1955 (but placed in the *Quercetalia pubescenti-petraeae*[1]). Although *Tilio-Ostryon* is in our opinion of doubtful status, and further studies on S-Italian ravine communities are needed to clarify their syntaxonomical independence, the *Corylo-Aceretum* can not be clearly included in *Carpinion orientalis* anyway. For this reason, although we took these relevés into account in our classification and ordination matrix, they are not shown in our synoptic tables.

For the same reason, also the relevés from Tab. 24 of the same work by Brullo *et al.* (2001), were included in the classification and ordination matrix, but not in our synoptic tables. These relevés were executed in mixed *Quercus ilex-Ostrya carpinifolia-Acer opalus* ssp. *obtusatum* woods of the Aspromonte massif, found on steep N-facing slopes, between 700 and 1,000 m a.s.l. on metamorphic rocks. The dendrogram shows that these relevés are to some degree similar to those of Tab. 22 of the same Authors, who referred their Tab. 24 to the *Festuco drymejae-Aceretum neapolitani* Mazzoleni & Ricciardi 1995; however, the relevés lack the differential species of this syntaxon (as redefined by us, see below). Actually, these mixed woods are reportedly adjacent to the submontane *Quercus ilex* forests (*Teucrio siculi-Quercetum ilicis* Gentile 1969), and feature many species in common with the latter (e.g. *Quercus ilex, Erica arborea, Cytisus villosus, Teucrium siculum*) (see Tab. 4 in Brullo *et al.,* 2001). Therefore, we believe that the relevès of Tab. 24 of Brullo *et al.* (2001) were executed in a transitional community between *Corylo-Aceretum* and *Teucrio-Quercetum ilicis* – and can not be included within *Carpinion orientalis.*

The second and third group (clusters n. 2 and n. 3 in Fig. 2) contain *Ostrya*-dominated communities and mixed woods that clearly feature the characteristic species of the order *Quercetalia pubescenti-petraeae* – although a strong influence of *Fagetalia sylvaticae* elements can be noticed in some columns of the synoptic table (Tab. 2). As for the alliance, the studied communities are to be included in the *Carpinion orientalis* Horvat 1958, due to the frequence of the characteristic species *Ostrya carpinifolia, Acer opalus* ssp. *obtusatum, Sesleria autumnalis, Carpinus orientalis, Emerus majus, Cnidium silaifolium.* An interesting influence of *Teucrio siculi-Quercion cerris* Ubaldi 1988 species (Turkey Oak woods of C- and S-Italy) can, however, be observed in some columns.

At the suballiance level, the floristic composition can not be easily fitted in the framework established by Blasi *et al.* (2004), who divided the alliance *Carpinion orientalis* in the Italian Peninsula (i.e. not including the Alps) into four suballiances: *Lauro-Quercenion pubescentis* Ubaldi 1995, describing termophilous *Quercus pubescens, Carpinus orientalis* and rarely *Ostrya carpinifolia* woods with abundant presence of *Quercetea ilicis* species; *Cytiso sessilifolii-Quercenion pubescentis* Ubaldi 1995, referring to comparatively continental (xerophilous and cold) *Quercus pubescens* woodlands of the central Apennines; *Campanulo mediae-Ostryenion* Ubaldi 1995, restricted to the *Ostrya*-woods of the NW sector of the Peninsula, well differentiated from the phytogeographycal point of view due to the presence of endemic or Ligurian-Provencal taxa; *Laburno anagyroidis-Ostryenion* (Ubaldi, 1995) Blasi, Di Pietro & Filesi 2004, that is mesophilous mixed woods of the sub-montane and lower mountain belt, in geoserial contact with *Fagus sylvatica* forests. Most of the *Ostrya*-dominated communities of N- and C-Apennines belong to *Laburno anagyroidis-Ostryenion,* and Blasi *et al.* (2004) included in this suballiance the Hop Hornbeam woods of S-Italy too.

However, Tab.1 shows that most of the species regarded as characteristic of *Laburno-Ostryenion* (Blasi *et al.,* 2004) are absent or very rare in the southern *Ostrya* woods. On the one hand, our relevés can be considered in agreement with the diagnosis of *Laburno-Ostryenion* from an ecological point of view, as they

[1] Ubaldi (2003) reduced *Tilio-Ostryon* to the rank of suballiance and placed it in the *Doronico-Fagion* (Ubaldi *et al*., 1987) Ubaldi 1995, therefore in the *Fagetalia sylvaticae*

feature a strong influence of *Fagetalia sylvaticae* elements and, at the same time, the presence of some *Quercetea ilicis* taxa – i.e., on the whole, a mesophytic, oceanic, more or less thermophilous character. On the other hand, there is a marked difference in floristic composition as for those species of biogeographic meaning. In fact, southern woods lack e.g. *Lonicera xylosteum, Melittis melissophyllum* ssp. *melissophyllum, Carex digitata*, while are characterised by e.g. *Festuca exaltata, Melittis melissophyllum* ssp. *albida, Doronicum orientale, Ptilostemon strictus, Alnus cordata.* These species either have their northern Italian boundary in Campania or become very rare in the C- and N-Apennines (Pignatti, 1982; Anzalone, 1996; 1998; Conti, 1998, Conti *et al.,* 2005).

A new suballiance for S-Italy *Ostrya* woods

We believe that on the basis of what we discussed above, it is necessary to add a fifth suballiance to the framework proposed by Blasi *et al.* (2004) concerning *Carpinion orientalis* in the Italian Peninsula. We call this new suballiance *Festuco exaltatae-Ostryenion carpinifoliae* and we designate as holotypus the *Seslerio autumnalis-Aceretum obtusati* Corbetta & Ubaldi in Corbetta *et al.* 2004.

As biogeographically differential species (to separate it from the other suballiances within *Carpinion orientalis*), we propose *Festuca exaltata, Melittis melissophyllum* ssp. *albida, Doronicum orientale* and *Alnus cordata.* In addition, *Vinca minor* and *Vinca major* seem to have a differential meaning too – although somewhat weaker.

Festuca exaltata (= *Festuca drymeja* Auct. Fl. Ital.) is a frequent undergrowth species in Southern Italy, where it is found in different forest types such as *Fagus sylvatica, Quercus cerris* and even *Quercus ilex* woods (Mingo & Mazzoleni, 1997). It is frequently observed in southern *Ostrya*-woods as well. It is, on the other hand, extremely rare in Abruzzo and Lazio (Conti, 1998; Anzalone, 1998), and is not found at all in the Northern Apennines (Conti *et al.,* 2005).

Melittis melissophyllum ssp. *albida* is common in *Quercus cerris* woods and other deciduous forest types of Southern Italy, including Hop Hornbeam communities. It is not found north of Abruzzo, where it is rare (Conti, 1998; Conti *et al.,* 2005).

Doronicum orientale is a SE-European species, with a disjunct trans-Adriatic range. It is commonly found in *Fagus sylvatica* woods of southern Italy; it is not found north of southern Lazio, where it is very rare (Anzalone, 1996; Conti *et al.,* 2005). Therefore, it is considered as one of the characteristic species of *Geranio striati-Fagion* Gentile 1970 nom. mut., i.e. the alliance describing the southern-Italian beech forests (Di Pietro *et al.,* 2004). It can also be regarded as a differential species of the southern *Ostrya*-woods towards the C-Italian ones.

Alnus cordata is an endemic species restricted to Southern Italy and Corsica (this unusual type of disjunction is shared with *Pinus nigra* ssp. *laricio,* and

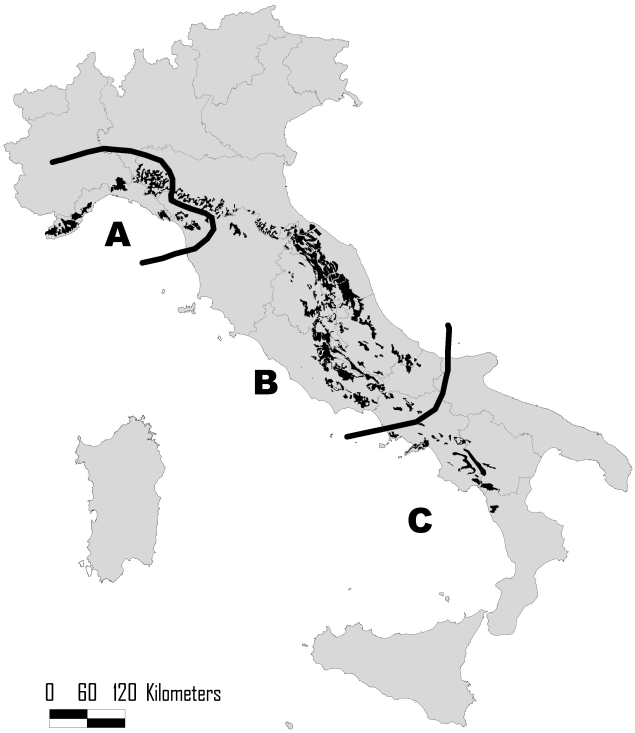

Fig. 4 – Main areas with actual or potential *Ostrya*-woods in the Italian Peninsula (black patches; redrawn from Ministero dell'Ambiente, 2005), and range of their three sub-alliances (A: *Campanulo-Ostryenion*; B: *Laburno-Ostryenion*; C: *Festuco-Ostryenion*). Distribution of *Ostrya*-woods (and of their syntaxa) in the Alps, in Sicily and in Sardinia is not mapped

is perhaps due to Tertiary connections between the Calabrian Arch and Corsica – cfr. Blasi *et al.,* 2005b). Its northern boundary in the Italian Peninsula is in central Campania, while to the south it reaches Aspromonte (Brullo *et al.,* 2001) [i.e. the southernmost tip of mainland Italy, contrary to what reported by *Flora d'Italia* (Pignatti, 1982) where the southern boundary

of this species was placed in Cosenza province]. This tree species has a good ability to colonize disturbed habitats and clearings, therefore it may form pure stands as secondary woods on abandoned fields; it is also frequently found on steep slopes where frequent landslides occur, or in gorges, ravines, etc. It is also a component of most mesophilous mixed woods of the submontane belt of the southern Apennines; it requires a warm-humid climate (Bernetti, 1995).

Vinca minor and *Vinca major* are typically bound to warm-humid habitats: in C-Italy they are mostly found in ravines and other "oceanic" microsites, while in S-Italy they seem to be quite common in zonal forest communities.

The above described combination of species differentiates (within *Carpinion orientalis*) the southern Italian *Ostrya*-communities both from the C- and N-Apennines ones, and from the analogous woods of the Balkan Peninsula (cfr. e.g.: Poldini, 1987; Trinajstic, 1987).

As for its bioclimatic and ecological position, *Festuco-Ostryenion* can be described as including *Ostrya*-dominated and mixed woods of the oceanic mesotemperate and supratemperate belts of the S-Italian Thyrrhenian sector. It includes also *Ostrya*- and mixed-woods found at lower altitudes (mesomediterranean belt) due to edaphic compensation (pyroclastic bedrock near Naples; pyroclastic minerals on limestone bedrock and markedly oceanic bioclimate on the Amalfi coast).

The proposal of a southern suballiance within Italian woods of *Carpinion orientalis* reflects what Blasi *et al.* (2004) proposed for the *Teucrio siculi-Quercion cerris* (the alliance describing the sub-acidophilous *Quercus cerris* woods of the basal plain as well as those of the hilly and submontane belts of the Italian Peninsula), which is divided into two sub-alliances characterised mainly on biogeographical basis: *Teucrio siculi-Quercenion cerris* and *Ptilostemo stricti-Quercenion cerris.* The former refers to the Central Apennines, the latter to the Southern Apennines; the border between the two syntaxa is currently thought to be in Northern Campania and in Molise. Interestingly, as far as it can be understood from the preliminary data published by Caputo (1968), the *Ostrya* woods of Taburno Mts. in Northern Campania are to be referred more to *Laburno-Ostryenion* than to *Festuco-Ostryenion*; therefore, the border between these two suballiances is probably to be placed approximately along the same line dividing *Teucrio-Quercenion* and *Ptilostemo-Quercenion* (Fig. 4).

Subdivision of the *Festuco-Ostryenion* at association level

To our present knowledge, two community types at association level can be identified within *Festuco-Ostryenion*, corresponding to the above mentioned clusters n. 2 and n. 3 in Fig. 2.

The first type is made by the mixed deciduous woods that grow at low elevation, not far from the Thyrrenian sea, in a warm-humid local climate. To this type belong col. 1 and col. 2 of Tab. 2. The former is derived from Tab. 5b and from a part of Tab. 5a of Maiorca & Spampinato (1999), who executed the relevés in the Argentino valley (northern Calabria); the latter from Tab. 1 of Mazzoleni & Ricciardi (1995), who executed the relevés in various localities of the Campania coasts (Campi Flegrei, Capri, Amalfi coast). These woods are characterized by the physiognomic contribution of the evergreen Holm Oak (*Quercus ilex*), as well as by the presence of some *Quercetalia ilicis* species in the undergrowth. The average number of species per relevé is very low. This group of relevés is quite heterogeneous – in particular, the table by Mazzoleni & Ricciardi (1995) comprises different physiognomy types and features a rather diverse floristic composition. However, a coherent bioclimatic and floristic character is shared by this group. Following priority rules, the valid name to identify it as a unitary association is *Festuco drymejae-Aceretum neapolitani* Mazzoleni & Ricciardi 1995.

The *Festuco-Aceretum* was tentatively considered by Blasi *et al.* (2004) as to be included in the *Lauro-Quercenion*, due to the absence of *Laburno-Ostryenion* character species – however, this choice was due to the lack of more general data regarding southern *Ostrya* woods at that time, and it is now clear the need for a different position.

We refer to *Festuco-Aceretum* relevés 4-9 from Tab. 5a of Maiorca & Spampinato (1999), the whole Tab. 5b in the same paper, and rel. 1-11 from Tab. 1 in Mazzoleni & Ricciardi (1995). However, we think that the set of differential species originally proposed by the Authors [*Festuca exaltata* (sub *F. drymeja*), *Acer opalus* ssp. *obtusatum* (sub *A. neapolitanum*), *Vicia ochroleuca, Oenanthe pimpinelloides*], are neither effective to ecologically differentiate the syntaxon from the other associations within *Festuco-Ostryenion*, nor appropriate to unify the different sub-types comprised in this floristically inconstant association. They should then be substituted by the following: *Lonicera implexa*,

Ligustrum vulgare, Rhamnus alaternus, Smilax aspera, Viburnum tinus. This group of termophilous species ecologically differentiates the *Festuco-Aceretum,* i.e. the warm-humid mixed woods with *Ostrya carpinifolia, Quercus ilex* and *Acer opalus* ssp. *obtusatum* of coastal Campania and Calabria, towards the other associations of *Festuco-Ostryenion.* Important species frequently found in the *Festuco-Aceretum* include also *Festuca exaltata, Fraxinus ornus, Lathyrus venetus, Rubia peregrina, Tamus communis, Viola alba,* etc., but none of these species can be considered as a differential taxon, since they are shared with other associations of *Festuco-Ostryenion.*

Incidentally, Maiorca & Spampinato (1999) referred only their Tab. 5a to *Festuco-Aceretum,* while considered their Tab. 5b as an "*Acer neapolitanum-Acer lobelii* aggr.", due to an alleged higher contribution of *Fagetalia* species. However, a closer analysis shows that the ratio between *Quercetalia pubescenti-petraeae* and *Fagetalia* species is the same in the two tables, and the general floral composition is very similar. Only rel. 1-3 of Tab. 5a are actually different, with regard to both flora and elevation (900-1100 m a.s.l., while all the remaining samples are located at 300-400 m); they should then be referred to *Seslerio-Aceretum* (cool *Ostrya*-woods, see below). For this reason, these three relevés were not included in col.1 of our Tab.2.

As for the subassociation *coryletosum avellani* of *Festuco-Aceretum,* described by Maiorca & Spampinato (1999) on rel. 4-9 of their Tab. 5a, it lacks a clear ecological meaning and it seems to be differentiated on the sole basis of *Corylus avellana.*

Finally, as already mentioned above, *Festuco-Aceretum* was also used by Brullo *et al.* (2001, Tab. 24) for some communities surveyed on the Aspromonte, but they have a transitional character and their relation to *Carpinion orientalis* is very doubtful.

The second type (cluster n. 3 in Fig. 2) that emerges from the analysis of the synoptic table (Tab. 2) comprises col. 3-6. The first one of these columns is derivated from Tab. 24 of Corbetta *et al.* (2004) (Monte Cervati, southern Campania). The remaining three columns are derivated by our original relevés – all executed in southern Campania, namely on the Alburni Mts., on the Monte Sacro and on the Monte Cervati and Vesole-Chianello, respectively (southern Campania). All these data concern *Ostrya*-dominated woods and mixed woods of the mesotemperate and supratemperate belts, growing on limestone slopes or on limestone debris (exceptionally on flyschoid slopes, but in this case only in very steep sites). The tree layer is composed mainly by *Ostrya carpinifolia, Acer opalus* ssp. *obtusatum, Fraxinus ornus, Quercus cerris, Sorbus torminalis,* sometimes *Fagus sylvatica, Tilia platyphyllos* and *Alnus cordata.* In the undergrowth, the shrub layer is made mainly of *Pyrus communis* (=*Pyrus pyraster* Auct. Fl. Ital.) and *Crataegus monogyna*, sometimes with *Carpinus orientalis* or *Ilex aquifolium.* The herb layer is often dominated by *Sesleria autumnalis*; among the most frequent or abundant species there are *Anemone apennina, Aremonia agrimonoides, Cnidium silaifolium, Daphne laureola, Euphorbia amygdaloides, Festuca exaltata, Lathyrus venetus, Galium laevigatum, Lilium bulbiferum, Melittis melyssophyllum* ssp. *albida, Rubus hirtus, Teucrium siculum, Viola alba* ssp. *denhardtii.*

If compared with the other types discussed above, these communities are different not only from a bioclimatic perspective (they grow in a cooler bioclimatic context, at higher elevations and not directly exposed to the warm-humid air currents from the sea), but also with regards to both flora (they lack Mediterranean species and contain a significant amount of Fagetalia species) and structure (they feature a characteristic physiognomic contribution of *Sesleria autumnalis* in the undergrowth and of *Quercus cerris* in the tree layer). These woods are then clearly distinct both floristically and ecologically, so we believe they should be recognized at association level. Corbetta et al. (2004) described the *Seslerio autumnalis-Aceretum obtusati,* and this name is to be adopted following priority rule, although it is neither very wisely chosen (this wood type is an "*Ostryetum"* rather than an "*Aceretum*") nor founded on very consistent data [the relevés by Corbetta *et al.* (2004) have a surprisingly low species richness, when compared with the data collected by ourselves in very similar sites within the Cilento district – the analysis of their table let us think that the relevés were executed not far from the road edge, and/or in disturbed or impoverished stands]. The association was originally included by its Authors in the alliance *Melittio-Quercion frainetto* Barbero & Quezel 1976, but Blasi *et al.* (2004) provided a number of reasons to reject the occurence of this alliance in Italy. As character species, the Authors indicated *Sesleria autumnalis, Aristolochia lutea* (sub *A. pallida*), *Lilium bulbiferum* ssp. *croceum* and *Cnidium silaifolium.* Our synoptic table shows that these species can actually be used as diagnostic, providing they are considered "differential" rather than "characteristic". The following

differential species, however, can be added according to our review: *Quercus cerris, Ptilostemon strictus, Epipactis helleborine, Silene italica.*

Although the four synoptic columns we refer to *Seslerio-Aceretum* share common floristic and ecological features, a certain degree of heterogeneity with regard to floral composition does exist. This is shown by the dendrogram as well (Fig. 2, sub-clusters 3a and 3b). The relevés of col. 6 in Tab. 2 (Monti Alburni) and, to a lesser extent, of col. 5 in Tab. 2 (Monte Sacro) show a much heavier contribution of *Fagetalia species*. Therefore, we propose a new subassociation (see Tab. 3) within *Seslerio autumnalis-Aceretum obtusati*, named *galietosum laevigati* (holotypus rel. 27 of Tab. 3). The following species differentiate this mesophilous subassociation (col. 5 and 6 of Tab.2) from the more xerophilous subass. typicum (col. 3 and 4 of Tab. 2): *Cardamine bulbifera, Galium laevigatum, Moehringia trinervia, Pulmonaria apennina, Rumex alpestris.*

Although most of the published relevés concerning the *Seslerio-Aceretum* were executed in the Cilento district (Campania), a few relevés from Maiorca & Spampinato (1999: tab 5a, rel. 1-3) indicate the presence of the association in Calabria, while unpublished relevés (M. Cutini, Rome, pers. comm.) show that *Ostrya*-woods with the same floristic composition occur near Maratea on the Thyrrenian coast of Basilicata. These communities, however, have a significant physiognomic contribution of *Quercus ilex* – so they might be recognized as a distinct variant. Other unpublished data (S. Fascetti, Potenza, pers. comm.) show that *Seslerio-Aceretum* communities occur in some inner sectors of Basilicata as well (namely in the Val D'Agri), while the relevés executed by Bonin (1980) on M. Cervialto (Picentini Mts.) confirm the occurence of the association in Campania region outside Cilento.

Finally, the preliminary relevés executed on M. Taburno (northern Campania) by Caputo (1968) (not shown in the synoptic table) seem to be closer to the central-Apennines communities of *Scutellario-Ostryetum* than to the southern woods. In particular, they lack the differential species of *Festuco-Ostryenion*. The Hop Hornbeam communities of M. Taburno could then be regarded, as discussed above, as the southern edge of *Laburno-Ostryenion* – however, these old relevés have a surprisingly poor species list and lack the differential taxa of the latter suballiance as well, so further field studies would be necessary.

Conclusions

Ostrya-dominated woods and mixed woods with *Ostrya carpinifolia* of Southern Italy show marked differences in floristic composition if compared with the analogous communities of C- and N-Italy.

A set of differential species with a strong biogeographical meaning can be individuated, to define the new suballiance *Festuco exaltatae-Ostryenion*, coherently with the framework already adopted for *Quercus cerris* woods.

To our present knowledge, *Festuco-Ostryenion* can be subdivided into two associations. *Festuco-Aceretum* includes different types of mixed woods growing at low elevations, in the warm-humid maritime climate of the Campania and Calabria Thyrrenian coasts (mainly in the mesomediterranean belt). It hasn't got a clear set of "character species" in a strict sense and it comprises quite an heterogeneous array of communities – however, *Festuco-Aceretum* can be identified on the basis of the presence of many *Quercetalia ilicis* species (and usually the absence of a significant *Fagetalia sylvaticae* share). It might be regarded, therefore, as somehow vicariating the C-Italian *Asparago acutifolii-Ostryetum* Biondi ex Ubaldi 1995. Further studies on the coasts and hills south of Napoli would be necessary to better clarify floristic composition and geographical distribution of this community type. *Seslerio-Aceretum* is the name to be used for *Ostrya*-woods of the mesotemperate and supratemperate belt, clearly differentiated from the communities of lower elevations through a rich group of comparatively mesophilous (and at the same time slightly more continental) species. More markedly cool and humid communities can be further differentiated as a subassociation.

The present work underlines the scarcity of detailed phytosociological studies in Southern Italy, especially when compared to Central Italy: Hop Hornbeam woods are widespread on the coastal as well as the inner hills of Campania region, and are found also in many districts of Basilicata and Calabria – but only very few localities have been studied so far.

Acknowledgements

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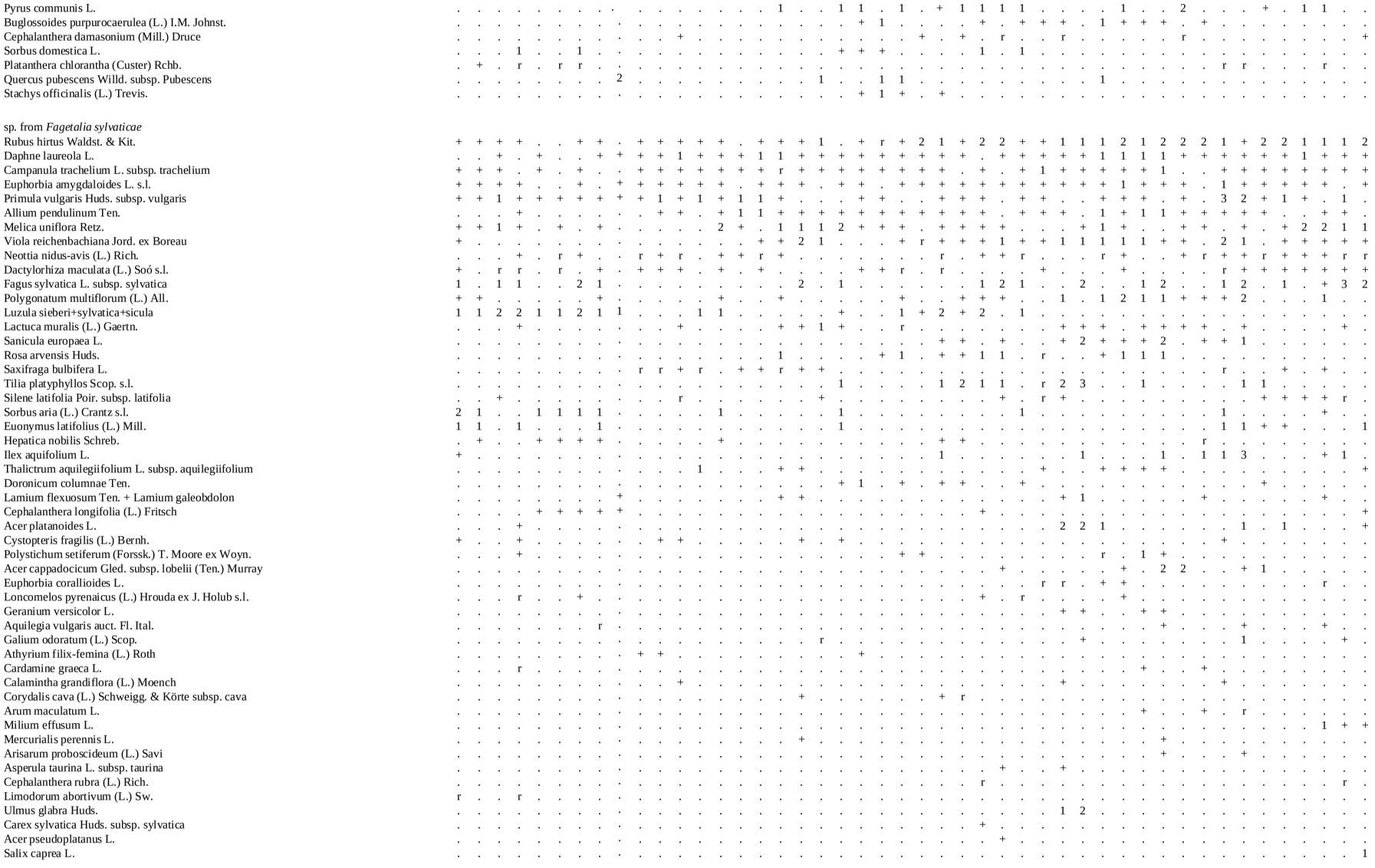
Tab. 3 - *Seslerio autumnalis-Aceretum obtusati galietosum laevigati* subass. nova (*Festuco exaltatae-Ostryenion carpinifoliae*).

rel. no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27*	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
altitude (m)	1125	1020	1000	930	1020	1020	1000	1010	1000	1100	1100	1060	1100	1080	1050	1040	990	1020	1020	1230	800	780	960	1020	1000	1000	930	940	900	780	700	720	880	900	860	900	1080	840	1080	1040	1150	1190	1120	1140	1100	1110
aspect	N	N	NNE	NE	NE	N	NE	NNW	NNW	NE	N	NE	N	N	NE	NE	NE	NW	ENE	NE	NNE	N	NE	NE	N	NNE	NE	E	NE	N	NW	N	W	W	NNW	NW	NNE	NNW	N	NNW	NE	N	NE	NE	N	NE
slope (°)	35	30	30	30	30	30	35	30	35	45	35	30	30	35	35	30	30	35	30	35	30	35	25	40	25	25	25		30	30	30	35	20	25	37	30		15	30	30	30	30	0	0	30	20
Seslerio-Aceretum																																													
Lilium bulbiferum L. subsp. croceum (Chaix) Jan	r	.	+	+	+	.	+	+	.	.	.	+	+	+	+	+	1	+	+	+	+	+	.	+	+	+	+	+	+	+	+	1	+	+	+	+	+	+	+	+	.	+	+	+	+
Sesleria autumnalis (Scop.) F.W. Schultz	4	3	3	2	4	3	3	4	4	4	3	3	3	3	3	3	+	1	2	3	3	.	4	3	4	3	+	.	2	+	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
Quercus cerris L.	.	.	.	2	.	.	.	.	.	.	.	+	.	.	.	+	2	2	.	.	+	1	2	.	2	2	2	3	.	+	+	.	3	2	.	2	3	.	1	.	+	.	2	3	1	2
Silene italica (L.) Pers. s.l.	.	.	.	+	.	.	.	.	.	+	+	+	+	+	+	+	+	+	.	.	+	+	+	.	.	.	.	r	.	.	r	.	.	+	.	.	+	.	+	+	.	.	.	.	.
Epipactis helleborine (L.) Crantz s.l.	.	.	+	.	.	.	r	.	.	.	.	.	r	r	.	.	.	.	.	+	.	.	.	.	.	.	r	.	r	.	r	.	.	.	.	.	.	r	r	.	r	+	+	+	+	+
Ptilostemon strictus (Ten.) Greuter	.	.	.	r	.	.	.	+	.	.	.	.	.	.	.	+	+	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	+	.	+	r	.	.	.	+	.	.	+	.	.
Aristolochia lutea Desf.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	1	+	+	.	+	+	+	.	.	.	+	1	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
galietosum laevigati subass. nova																																													
Moehringia trinervia (L.) Clairv.	.	+	+	+	.	.	.	.	+	+	1	+	.	1	+	1	+	.	+	+	.	.	+	.	+	+	+	+	+	+	.	+	+	.	+	+	.	+	+	+	+	+	+	+	+	+
Galium laevigatum L.	2	1	1	+	1	+	+	1	.	+	.	.	.	+	.	.	+	+	.	.	+	+	1	3	1	+	+	1	.	2	1	+	+	+	+	+	+	.	+	+	+	+	.	.	.	.	.
Rumex alpestris Jacq.	.	.	r	r	.	.	.	.	.	+	+	+	+	.	r	.	+	.	+	+	.	+	+	.	.	r	+	+	.	+	.	.	.	.	r	.	.	+	+	+	+	.	.	.	.	.
Pulmonaria apennina Cristof. & Puppi	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	r	.	+	.	.	.	.	.	r	.	+	+	.	+	+	+	+	.	+	+	+
Trifolium patulum Tausch	.	.	.	+	+	+	+	r	.	+	r	.	+	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Cardamine bulbifera (L.) Crantz	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1	r	+	.	.	.	.	+	+	+	.	.	.	+	+	.	+	.	.	.	.
Festuco-Ostryenion																																													
Festuca exaltata C. Presl	.	1	+	1	1	.	1	.	.	.	+	.	.	.	.	.	1	1	1	1	1	2	.	2	.	.	.	.	1	3	2	1	1	1	+	2	+	+	1	1	2	1	+	.	+	.
Melittis melissophyllum L. subsp. albida (Guss.) P.W. Ball	.	+	+	+	.	.	.	+	.	+	.	+	+	1	+	2	1	1	+	.	+	+	+	+	+	+	+	+	+	.	.	+	+	.	+	+	.	+	.	.	.	.	.	+	r	.
Doronicum orientale Hoffm.	+	+	+	1	.	.	.	.	.	.	.	+	+	+	+	2	+	+	.	.	.	1	.	+	.	.	+	.	.	.	.	.	+	+	+	+	+	1	1	1	.	.	1	+	+	.
Alnus cordata (Loisel.) Loisel.	.	.	.	.	.	1	2	.	.	.	.	.	.	1	.	1	2	.	.	.	.	.	.	.	.	.	+	1	.	.	.	.	.	.	.	.	.	2	3	.	.	.	.	.	.	.	.
Carpinion orientalis																																													
Ostrya carpinifolia Scop.	3	3	3	5	4	4	5	3	5	4	5	5	4	3	5	5	4	4	5	4	4	4	5	5	5	4	3	3	4	4	2	2	4	4	2	4	3	5	4	4	4	5	4	2	3	1
Acer opalus Mill. subsp. obtusatum (Waldst. & Kit. ex Willd.) Gams	2	2	2	2	2	2	2	2	+	1	1	2	2	2	2	2	4	4	1	2	2	2	3	2	3	3	2	2	2	2	3	1	2	3	3	2	2	.	2	3	3	2	2	1	2	1
Cnidium silaifolium (Jacq.) Simonk. subsp. silaifolium	+	+	+	+	+	+	+	+	.	1	+	+	+	+	+	+	+	+	+	+	.	.	.	.	+	+	+	2	+	+	.	+	1	1	.	+	+	.	.	+	+	+	1	1	+	+
Arabis turrita L.	.	.	+	+	.	.	r	r	r	.	.	+	+	+	.	.	1	+	+	+	+	+	+	+	.	.	+	+	.	+	+	.	+	+	+	+	r	r	.	+	+	+	+	+	+	+
Saxifraga rotundifolia L. subsp. rotundifolia	.	.	.	+	.	.	.	.	.	+	+	+	.	+	.	+	.	+	.	+	.	.	.	+	.	.	.	.	.	.	r	.	.	1	.	+	.	+	r	+	+	.	.	.	.	.
Campanula persicifolia L. s.l.	+	+	+	.	+	+	+	.	.	+	+	+	+	+	.	+	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Emerus majus Mill. s.l.	.	.	.	.	+	.	.	+	1	+	.	r	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	1	+	.	.	.	.	.	.	.	1	.	.	.	.	.	.	+
Cytisophyllum sessilifolium (L.) O. Lang	1	1	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.
Carpinus orientalis Mill. subsp. orientalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	2	1	1	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Acer monspessulanum L. subsp. monspessulanum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Staphylea pinnata L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
sp. from *Teucrio siculi-Quercion cerris*																																												
Teucrium siculum (Raf.) Guss. subsp. siculum	+	+	+	+	+	.	.	.	.	+	1	+	1	+	.	r	+	.	1	+	1	1	+	+	.	.	+	+	+	+	.	.	+	+	.	+	.	+	+	+	+	+	+	+	.	.
Digitalis lutea L. subsp. australis (Ten.) Arcang.	.	+	+	+	+	.	+	.	.	+	1	1	+	+	+	1	1	+	+	+	+	+	+	+	+	+	.	+	.	+	+	+	.	.	.	.	.	+	+	.	.	.	+	+	.	.
Oenanthe pimpinelloides L.	+	.	+	+	+	+	.	.	.	+	+	+	+	+	.	.	+	+	+	+	+	+	+	.	+	+	.	+	+	.	.	.	+	+	.	+	r	r	+	.	.	+	.	.	.
Cytisus villosus Pouret	.	.	.	.	+	.	.	.	.	+	+	+	+	+	.	.	.	.	.	.	.	+	.	.	.	.	+	+	.	1	+	r	+	r	.	+	.	.	.	.	.	.	+	1	.	.
Ranunculus lanuginosus L.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	+	+	+	+	.	.	.	.	.	.	.	.	+	+	.	.	+	.	.	.	.	.	+	+	+	+	.	+	.	+	+	+
Genista tinctoria L.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	+	1	+	.	.
Malus sylvestris (L.) Mill.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	1	.	+	.	.	.	.	1	1	.	.	.	.	.	.	.	.	1	.	.
Crepis leontodontoides All.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	+	+	.	+	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Poa sylvicola Guss.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	.	.	.	.	.	.	.	.	.
Poa nemoralis L. s.l.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+
Achillea ligustica All.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	.
Anthoxanthum odoratum L. s.l.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Asperula laevigata L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Quercetalia pubescenti-petraeae																																													
Fraxinus ornus L. subsp. ornus	2	3	3	2	3	2	1	2	4	1	+	+	2	2	.	r	.	+	2	3	2	3	3	2	1	1	2	2	3	3	2	1	3	3	3	3	1	1	.	.	1	1	2	2	1	r
Viola alba Besser subsp. dehnhardtii (Ten.) W. Becker	.	+	+	+	+	+	+	.	+	+	+	+	+	+	1	1	1	+	+	+	+	+	+	+	+	+	+	+	+	+	.	+	+	+	.	.	+	1	+	+	+	.	+	.	.
Luzula forsteri (Sm.) DC.	.	r	.	+	+	.	.	.	+	+	1	1	1	2	2	1	+	+	1	+	+	+	+	.	.	+	+	1	+	.	.	.	.	+	r	.	.	+	.	.	.	.	.	1	+	.	.
Clinopodium vulgare L. s.l.	.	+	.	.	.	+	.	.	.	.	+	+	.	+	.	+	+	.	+	+	+	+	+	+	.	.	.	+	+	r	+	+	.	.	.	.	.	.	.	.	.	+	+	1	.	+
Scutellaria columnae All. s.l.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	+	+	+	1	.	.	+	+	.	+	+	.	.	+	+	.	1	+	.	+	+	+	+	.	.	+	+	1	+	.	.	+	1
Sorbus torminalis (L.) Crantz	3	2	1	.	2	1	.	2	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.	.	1	.	1	1	.	1	.	.	.	2	.	1	2	1	1	2	2	1	+


Pyrus communis L.
Buglossoides purpurocaerulea (L.) I.M. Johnst.
Cephalanthera damasonium (Mill.) Druce
Sorbus domestica L.
Platanthera chlorantha (Custer) Rchb.
Quercus pubescens Willd. subsp. Pubescens
Stachys officinalis (L.) Trevis.
sp. from *Fagetalia sylvaticae*
Rubus hirtus Waldst. & Kit.
Daphne laureola L.
Campanula trachelium L. subsp. trachelium
Euphorbia amygdaloides L. s.l.
Primula vulgaris Huds. subsp. vulgaris
Allium pendulinum Ten.
Melica uniflora Retz.
Viola reichenbachiana Jord. ex Boreau
Neottia nidus-avis (L.) Rich.
Dactylorhiza maculata (L.) Soó s.l.
Fagus sylvatica L. subsp. sylvatica
Polygonatum multiflorum (L.) All.
Luzula sieberi+sylvatica+sicula
Lactuca muralis (L.) Gaertn.
Sanicula europaea L.
Rosa arvensis Huds.
Saxifraga bulbifera L.
Tilia platyphyllos Scop. s.l.
Silene latifolia Poir. subsp. latifolia
Sorbus aria (L.) Crantz s.l.
Euonymus latifolius (L.) Mill.
Hepatica nobilis Schreb.
Ilex aquifolium L.
Thalictrum aquilegiifolium L. subsp. aquilegiifolium
Doronicum columnae Ten.
Lamium flexuosum Ten. + Lamium galeobdolon
Cephalanthera longifolia (L.) Fritsch
Acer platanoides L.
Cystopteris fragilis (L.) Bernh.
Polystichum setiferum (Forssk.) T. Moore ex Woyn.
Acer cappadocicum Gled. subsp. lobelii (Ten.) Murray
Euphorbia corallioides L.
Loncomelos pyrenaicus (L.) Hrouda ex J. Holub s.l.
Geranium versicolor L.
Aquilegia vulgaris auct. Fl. Ital.
Galium odoratum (L.) Scop.
Athyrium filix-femina (L.) Roth
Cardamine graeca L.
Calamintha grandiflora (L.) Moench
Corydalis cava (L.) Schweigg. & Körte subsp. cava
Arum maculatum L.
Milium effusum L.
Mercurialis perennis L.
Arisarum proboscideum (L.) Savi
Asperula taurina L. subsp. taurina
Cephalanthera rubra (L.) Rich.
Limodorum abortivum (L.) Sw.
Ulmus glabra Huds.
Carex sylvatica Huds. subsp. sylvatica
Acer pseudoplatanus L.
Salix caprea L.
sp. from *Quercetea ilicis*
Quercus ilex L. subsp. Ilex
Querco-Fagetea
Aremonia agrimonoides (L.) DC. subsp. agrimonoides
Anemone apennina L. subsp. apennina
Lathyrus venetus (Mill.) Wohlf.
Fragaria vesca L. subsp. vesca
Festuca heterophylla Lam.
Symphytum tuberosum L. subsp. angustifolium (A. Kern.) Nyman
Tamus communis L.
Potentilla micrantha Ramond ex DC.

Ajuga reptans L.	.	+	.	.	+	.	.	.	.	.	.	.	+	.	.	1	1	.	.	.	+	.	+	+	+	+	+	+	.	.	.	.	+	1	.	+	+	+	+	+	.	1	+	+	.	+
Castanea sativa Mill.	+	1	r	.	.	+	.	1	+	.	.	.	.	.	.	.	2	+	.	.	+	r	r	2	r	.	1	.	.	.	1	2	+	.	+	1	.	.	.	.	.	1	1	.	2	3
Veronica chamaedrys L. s.l.	+	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	+	+	.	.	.	.	.	+	.	.	+	+	.	.	+	+	+	+	+	+	.	.	+	+	+	+	+	+	+	+
Geum urbanum L.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	r	+	.	+	+	+	+	+	.	+	.	+	+	.	.	+	.	+	+	+	+	+	+	.	.	+	+	.	+	.	.
Brachypodium sylvaticum (Huds.) P. Beauv. subsp. sylvaticum	.	.	.	.	.	.	.	.	.	2	1	.	+	.	+	+	1	+	+	.	2	1	.	.	.	.	+	+	.	.	.	.	+	+	.	.	+	+	.	.	.	.	+	+	.	+
Crataegus monogyna Jacq.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	.	1	1	1	1	+	.	+	.	.	2	1	.	1	1	.	.	1	.	1	1	.	.
Helleborus foetidus L. subsp. foetidus	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	1	1	+	+	.	.	+	+	.	.	r	.	.	.	.	+	+	.	+	r	r	+	+	.	.	.	.	.	+	.	.
Lonicera caprifolium L.	+	+	+	+	+	+	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	+	1	.	+	1	1	.	+	.	+	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.
Hypericum montanum L.	r	.	r	r	.	.	.	.	.	+	+	+	+	+	r	.	.	.	.	+	+	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	+	+	.	.	.	.
Solidago virgaurea L. s.l.	.	.	.	.	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	+	.	.	.	.	+	+	.	.	.	+
Cyclamen hederifolium Aiton + Cyclamen repandum	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	+	.	+	.	.	r	+	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Myosotis sylvatica Hoffm. s.l.	.	.	.	.	.	.	.	.	.	+	+	+	.	r	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	.
Lapsana communis L. subsp. communis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	.	+	.	.	.	.	.	.	.	+	.	+	+	.
Astragalus glycyphyllos L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	+	.	.	.	.	.	.	+	+	.	+	.	.
Rosa canina L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	+	.	.	1	.	.	1	.	.
Cornus mas L.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Populus tremula L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	+	.	.	.	2	1	2
Anthriscus nemorosa (M. Bieb.) Spreng.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	+	.	.	.	.	+	.	+	.	.
Calamintha nepeta (L.) Savi subsp. sylvatica (Bromf.) R. Morales	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crataegus laevigata (Poir.) DC.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	+	2	.	.	.	.	.	.	.	.
Corylus avellana L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.	.	.	.	.	.
Cornus sanguinea L. s.l.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euonymus europaeus L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
Prunus spinosa L. subsp. spinosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Veronica officinalis L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Other species																																														
Hedera helix L. s.l.	.	+	+	1	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	+	r	+	.	.	2	.	1	1	2	3	2	+	2	2	2	2	1	2	1	2	2	+	.	.
Dactylis glomerata L. s.l.	.	+	.	1	.	+	+	.	.	2	1	1	1	1	+	+	+	.	+	+	2	2	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	1	.	.	.
Geranium robertianum L. + Geranium purpureum Vill.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	+	+	+	+	r	.	.	.	.	.	+	.	.	.	.	+	+	.	+	+	+	+	1	+	.	+	+	+	r	+	+
Clematis vitalba L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	+	+	+	+	+	.	.	1	1	2	+	1	+	+	+	1	.	.	2	2	+	.	+	1
Asplenium trichomanes L. s.l.	.	.	.	+	r	.	.	.	.	+	+	+	.	.	r	r	r	.	.	+	+	+	r	r	.	.	.	.	+	+	r	.	.	.	+	+	.	.	+	.	+	.	.	.	.	.
Brachypodium rupestre (Host) Roem. & Schult.	.	.	1	.	.	1	+	.	.	1	.	+	2	1	.	.	.	.	.	1	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.
Geranium sanguineum L.	.	.	.	r	.	.	.	.	.	.	.	.	+	r	.	.	.	.	.	.	+	+	+	.	.	.	.	+	.	.	.	.	.	r	.	.	.	.	.	.	.	.	+	+	.	.
Vicia sepium L.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	+	.	+	.	.	.	.	.	r	.	+	.	+	.	.	+	1	.	.	.
Ruscus aculeatus L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	2	+	+	2	1	.	2	.	r	.	.	.	.	.	.
Ceterach officinarum Willd. s.l.	.	.	.	+	.	.	.	.	.	+	+	+	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	+	.	.	.
Alliaria petiolata (M. Bieb.) Cavara & Grande	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	+	+	+	+	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Asplenium onopteris L.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	+	+	.	.	.	.	.	.	r	.	.	.	+	.	.	.	.	.
Pteridium aquilinum (L.) Kuhn subsp. aquilinum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	2
Hieracium sp.	.	.	r	.	.	.	+	.	.	.	.	+	.	.	.	.	r	.	.	.	.	+	r	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Galium lucidum All. s.l.	.	+	.	+	.	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Trifolium pratense L. s.l.	.	.	.	.	.	.	.	.	r	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	r	.	.	.	.	.	.	.	.	+	.	+	+	.	.
Stellaria media (L.) Vill. s.l.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.
Vinca major L. subsp. major	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	2	+	1	.	1	.	.	1	.	.	.	.	.	.	.	.
Linaria purpurea (L.) Mill.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	r	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.
Arum italicum Mill. subsp. italicum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r	.	+	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lathyrus pratensis L. s.l.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.
Vicia cracca L.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vicia sp.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	+
Chaerophyllum temulum L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	+	.	.	.	+	.	.	.	.	.	.	.
Cytisus hirsutus L. s.l.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
Campanula rapunculus L.	.	.	.	r	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rosa squarrosa (A.Rau) Boreau	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	+
Polypodium sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	+	.	.	.	+	.	.	.	.	.
Sedum cepaea L.	.	.	.	r	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	r	.	.	.
Stachys sylvatica L.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypericum perforatum L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.
Cruciata laevipes Opiz	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Silene vulgaris (Moench) Garcke s.l.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.
Galium aparine L.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cytisus scoparius (L.) Link subsp. scoparius	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sorbus aucuparia L. s.l.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Trifolium ochroleucum Huds.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Arabis sagittata (Bertol.) DC.	.	.	.	.	.	.	.	.	.	r	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Arctium nemorosum Lej.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cardamine impatiens L. subsp. impatiens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Actaea spicata L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+
Lathyrus grandiflorus Sm.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+

Syntaxonomical scheme

Querco-Fagetea Br.-Bl. & Vlieger in Vlieger 1937
Quercetalia pubescenti-petraeae Klika 1933 corr.
Carpinion orientalis Horvat 1958
Festuco exaltatae-Ostryenion carpinifoliae Blasi, Filibeck & Rosati suball. nova hoc loco
(Holotypus hoc loco designatus: *Seslerio autumnalis-Aceretum obtusati* Corbetta & Ubaldi in Corbetta *et al.*, 2004)
Festuco drymejae-Aceretum neapolitani Mazzoleni & Ricciardi 1995
Seslerio autumnalis-Aceretum obtusati Corbetta & Ubaldi in Corbetta *et al.*, 2004
galietosum laevigati Blasi, Filibeck & Rosati subass. nova hoc loco
(Holotypus hoc loco designatus: rel. 27, Tab. 3)

Appendix 1

"Other species" occurring in only one column of Tab. 2

Col. 1: *Galanthus nivalis* L.; *Rubus canescens* DC.; *Ficus carica* L. – Col. 2: *Brachypodium retusum* (Pers.) P. Beauv.; *Brassica incana* Ten.; *Carex distachya* Desf.; *Primula veris* L. s.l. – Col. 3: *Origanum vulgare* L. s.l.; *Festuca gr. ovina; Colchicum lusitanum* Brot.; *Allium sphaerocephalon* L.; *Bupleurum falcatum* L. s.l. – Col. 4: *Knautia arvensis* (L.) Coult.; *Bromus ramosus* Huds.; *Anemone hortensis* L. subsp. *hortensis; Asphodelus ramosus* L. subsp. *Ramosus; Geranium columbinum* L.; *Geranium dissectum* L.; *Centaurium erythraea* Rafn s.l.; *Physospermum verticillatum* (Waldst. & Kit.) Vis.; *Allium subhirsutum* L.; *Cardamine hirsuta* L.; *Euphorbia peplus* L.; *Fumaria capreolata* L. subsp. *capreolata; Muscari comosum* (L.) Mill.; *Allium flavum* L. subsp. *flavum; Euphorbia characias* L.; *Hypericum perfoliatum* L.; *Orchis provincialis* Balb. ex Lam. & DC.; *Silene latifolia* Poir. subsp. *alba* (Mill.) Greuter & Burdet – Col. 5: *Stellaria holostea* L. subsp. *holostea; Prunus avium* L. subsp. *avium; Quercus petraea* (Matt.) Liebl. subsp. *Petraea;* Melampyrum sp.; *Rhinanthus alectorolophus* (Scop.) Pollich s.l. - Col. 6 : *Arabis hirsuta* (L.) Scop.; *Veratrum nigrum* L.; *Lathyrus pratensis* L. s.l.; *Linaria purpurea* (L.) Mill.; *Cytisus hirsutus* L. s.l.; *Cytisus scoparius* (L.) Link subsp. *scoparius; Doronicum columnae* Ten.; *Vicia cracca* L.; *Rosa squarrosa* (A.Rau) Boreau; *Vicia* sp.; *Sedum cepaea* L.; *Sorbus aucuparia* L. s.l.; *Cardamine impatiens* L. subsp. *impatiens; Picris hieracioides* L. s.l.; *Actaea spicata* L.; *Geranium lucidum* L.; *Lathyrus grandiflorus* Sm.; *Ranunculus ficaria* L. s.l.; *Trifolium medium* L. subsp. *medium; Myosotis ramosissima* Rochel ex Schult. subsp. *ramosissima; Scilla bifolia* L.; *Scrophularia nodosa* L.; *Silene gallinyi* Rchb.; *Taxus baccata* L.; *Trifolium campestre* Schreb.; *Valeriana wallrothii* Kreyer; *Vicia villosa* Roth s.l.; *Asphodelus macrocarpus* Parl. subsp. *macrocarpus; Coeloglossum viride* (L.) Hartm.; *Convolvulus arvensis* L.; *Delphinium fissum* Waldst. & Kit. subsp. *fissum; Dianthus barbatus* L. s.l.; *Holcus mollis* L.; *Lamium album* L. subsp. *album; Lavatera thuringiaca* L. s.l.; *Orchis tridentata* Scop.

Appendix 2

Sporadic species of relevés of Tab. 3

Ril. 8: *Taxus baccata* L. (+); ril. 11: *Trifolium campestre* Schreb. (+); ril. 12: *Arabis hirsuta* (L.) Scop. (+); ril. 13: *Vicia villosa* Roth s.l. (+); ril. 14: *Silene gallinyi* Rchb. (+); ril. 15: *Ranunculus millefoliatus* Vahl (r); ril. 15: *Ranunculus ficaria* L. s.l. (+); ril. 17: *Asphodeline liburnica* (Scop.) Rchb. (+); ril. 17: *Trifolium medium* L. subsp. *medium* (r); ril. 18: *Scilla bifolia* L. (+); ril. 19: *Holcus mollis* L. (+); ril. 20: *Delphinium fissum* Waldst. & Kit. subsp. *fissum* (+); ril. 20: *Dianthus barbatus* L. s.l. (+); ril. 28: *Asphodelus macrocarpus* Parl. subsp. *macrocarpus* (+); ril. 30: *Rubus ulmifolius* Schott (1); ril. 31: *Lavatera thuringiaca* L. s.l. (+); ril. 33: *Orchis tridentata* Scop. (+); ril. 36: *Picris hieracioides* L. s.l. (+); ril. 37: *Veratrum nigrum* L. (+); ril. 37: *Geranium lucidum* L. (+); ril. 37: *Lamium album* L. subsp. *album* (+); ril. 39: *Myosotis ramosissima* Rochel ex Schult. subsp. *ramosissima* (+); ril. 41: *Polystichum aculeatum* (L.) Roth (+); ril. 44: *Valeriana wallrothii* Kreyer (+); ril. 46: *Poa trivialis* L. (+); ril. 46: *Coeloglossum viride* (L.) Hartm. (r); ril. 46: *Convolvulus arvensis* L. (+); ril. 46: *Scrophularia nodosa* L. (+).

Appendix 3

Dates and coordinates (UTM 33, E.D. 50) of relevés of Tab. 3

Rel. 1: 10\06\2003, (x526900; y4488400); rel. 2: 10\06\2003, (x526100; y4488600); rel. 3: 09\06\2003, (x530800; y4486300); rel. 4: 03\06\2003, (x521800; y4490800); rel. 5:

10\06\2003, (x526500; y4488500); rel. 6: 10\06\2003, (x526600; y4488500); rel. 7: 18\06\2003, (x522100; y4490500); rel. 8: 10\06\2003, (x526400; y4488500); rel. 9: 07\05\2003, (x0; y0); rel. 10: 09\06\2003, (x532500; y4485300); rel. 11: 09\06\2003, (x533200; y4485000); rel. 12: 09\06\2003, (x533700; y4484800); rel. 13: 09\06\2003, (x530000; y4486600); rel. 14: 09\06\2003, (x530200; y4486500); rel. 15: 17\05\2003, (x533900; y4484800); rel. 16: 17\05\2003, (x534100; y4484600); rel. 17: 17\05\2003, (x534200; y4484600); rel. 18: 17\05\2003, (x534400; y4484400); rel. 19: 17\05\2003, (x534600; y4484000); rel. 20: 18\06\2003, (x522100; y4490100); rel. 21: 30\05\2003, (x534700; y4485500); rel. 22: 30\05\2003, (x534700; y4485500); rel. 23: 16\05\2003, (x529600; y4487100); rel. 24: 16\05\2003, (x529800; y4486900); rel. 25: 16\05\2003, (x529400; y4487200); rel. 26: 16\05\2003, (x528900; y4487600); rel. 27: 03\06\2003, (x522600; y4490400); rel. 28: 29\05\2003, (x534600; y4482700); rel. 29: 03\06\2003, (x521500; y4490900); rel. 30: 30\05\2003, (x536500; y4484500); rel. 31: 30\05\2003, (x537200; y4485000); rel. 32: 30\06\2003, (x536700; y4484600); rel. 33: 29\05\2003, (x535000; y4483200); rel. 34: 29\05\2003, (x534800; y4482800); rel. 35: 29\05\2003, (x535000; y4483300); rel. 36: 29\05\2003, (x534900; y4482900); rel. 37: 04\06\2003, (x535800; y4482300); rel. 38: 01\06\2003, (x520300; y4489500); rel. 39: 29\05\2003, (x535100; y4482300); rel. 40: 29\05\2003, (x534900; y4482400); rel. 41: 13\06\2003, (x537700; y4481300); rel. 42: 13\06\2003, (x538100; y4481000); rel. 43: 04\06\2003, (x537700; y4481900); rel. 44: 04\06\2003, (x535800; y4482600); rel. 45: 04\06\2003, (x537400; y4482200); rel. 46: 13\06\2003, (x537600; y4481500).

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