

Zukal D., Novák P., Duchoň M., Blanár D. & Chytrý M. (2020) Calcicolous rock-outcrop lime forests of east-central Europe. – *Preslia* 92: 191–211.

Electronic Appendix 2. – Species groups and selection criteria of the formal definition of CROLFs and individual associations and subassociations within CROLFs expressed using the formal language for vegetation classification systems described by Tichý et al. 2019, *Journal of Vegetation Science* 30: 5–17. Species groups and definitions can be used as an expert system in JUICE software.

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### Tilia
  Tilia cordata
  Tilia platyphyllos
  Tilia tomentosa

### Not-tilia-trees
  Abies alba
  Acer campestre
  Acer opalus
  Acer platanoides
  Acer pseudoplatanus
  Betula pendula
  Carpinus betulus
  Carpinus orientalis
  Castanea sativa
  Fagus sylvatica
  Fraxinus excelsior
  Fraxinus ornus
  Larix decidua
  Malus sylvestris
  Picea abies
  Pinus nigra
  Pinus sylvestris
  Prunus avium
  Prunus padus
  Pyrus communis
  Quercus cerris
  Quercus frainetto
  Quercus ilex
  Quercus petraea agg.
  Quercus pubescens agg.
  Quercus robur
  Quercus rubra
  Sorbus aria agg.
  Sorbus aucuparia
  Sorbus torminalis
  Ulmus glabra
  Ulmus minor

### Crolf-trees
  Acer platanoides
  Carpinus betulus
  Fagus sylvatica
  Fraxinus excelsior
  Fraxinus ornus
  Quercus petraea agg.
  Sorbus aria agg.
  Tilia cordata
  Tilia platyphyllos
  Tilia tomentosa

### Not-crolf-trees
  Abies alba
  Acer campestre
  Acer opalus
  Acer pseudoplatanus
  Betula pendula
  Carpinus orientalis
  Castanea sativa
  Larix decidua
  Malus sylvestris
  Picea abies
  Pinus nigra
  Pinus sylvestris
  Prunus avium
  Prunus padus
  Pyrus communis
  Quercus cerris
  Quercus frainetto
  Quercus ilex
  Quercus pubescens agg.
  Quercus robur
  Quercus rubra
  Sorbus aucuparia
  Sorbus torminalis
  Ulmus glabra
  Ulmus minor

### Hygrophilous trees
  Alnus glutinosa
  Alnus incana
  Betula pubescens
  Fraxinus angustifolia
  Prunus padus
  Salix alba
  Salix euxina
  Ulmus laevis

### Acidophytes
  Avenella flexuosa
  Calamagrostis arundinacea
  Calamagrostis villosa
  Festuca ovina agg.
  Luzula luzuloides
  Maianthemum bifolium
  Melampyrum pratense
  Melampyrum sylvaticum
  Vaccinium myrtillus
  Vaccinium vitis-idaea
  Veronica officinalis

### Calciphytes
  Aconitum anthora
  Allium flavum
  Anthericum ramosum
  Arabis hirsuta agg.
  Berberis vulgaris
  Brachypodium pinnatum
  Buglossoides purpureocaerulea
  Bupleurum falcatum
  Campanula rotundifolia
  Cornus mas
  Cotoneaster integerrimus
  Fourraea alpina
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Galium glaucum
Geranium sanguineum
Inula ensifolia
Melica ciliata
Origanum vulgare
Polygonatum odoratum
Primula veris
Seseli libanotis
Seseli osseum
Teucrium chamaedrys
Thymus praecox
Vincetoxicum hirundinaria

Carpinion-species
Alliaria petiolata
Impatiens parviflora
Galium aparine
Galium sylvaticum
Melica uniflora
Parietaria officinalis
Pulmonaria officinalis agg.
Smyrniium perfoliatum
Stellaria holostea

Nitrophytes
Aconitum lycoctonum
Alliaria petiolata
Geranium robertianum
Lamium galeobdolon
Lunaria rediviva
Mercurialis perennis
Urtica dioica

Rock-outcrop-specialists
Allium lusitanicum
Arabidopsis arenosa
Asplenium ceterach
Asplenium ruta-muraria
Asplenium trichomanes
Aurinia saxatilis
Cystopteris fragilis
Draba aizoides
Festuca pallens
Hylotelephium maximum
Jovibarba globifera
Leontodon incanus
Polypodium vulgare agg.
Primula auricula
Pseudoturritis turrita
Saxifraga cuneifolia
Saxifraga paniculata
Saxifraga rosacea subsp. sternbergii
Scrophularia heterophylla subsp.
laciniata
Sedum album
Selaginella helvetica
Sempervivum marmoreum
Sesleria caerulea
Sesleria heuflerana ssp. heuflerana
Sesleria heuflerana ssp. hungarica
Sesleria rigida
Sesleria sadlerana ssp. sadlerana
Sesleria sadlerana ssp. tatrae

Rock-outcrop-specialists-base-rich
Allium lusitanicum
Arabidopsis arenosa
Asplenium ceterach
Asplenium ruta-muraria
Aurinia saxatilis
Draba aizoides

Festuca pallens
Jovibarba globifera
Leontodon incanus
Primula auricula
Pseudoturritis turrita
Saxifraga cuneifolia
Saxifraga paniculata
Saxifraga rosacea subsp. sternbergii
Scrophularia heterophylla subsp.
laciniata
Sedum album
Selaginella helvetica
Sempervivum marmoreum
Sesleria caerulea
Sesleria heuflerana ssp. heuflerana
Sesleria heuflerana ssp. hungarica
Sesleria rigida
Sesleria sadlerana ssp. sadlerana
Sesleria sadlerana ssp. tatrae

Sesleria
Sesleria caerulea
Sesleria heuflerana ssp. heuflerana
Sesleria heuflerana ssp. hungarica
Sesleria rigida
Sesleria sadlerana ssp. sadlerana
Sesleria sadlerana ssp. tatrae

Til-Fra
Aconitum anthora
Calamagrostis varia
Cardamine bulbifera
Galium intermedium
Poa stiriaca
Sesleria heuflerana ssp. hungarica

Til-Fra-typic
Euonymus verrucosus
Euphorbia amygdaloides
Galium intermedium
Glechoma hirsuta
Waldsteinia geoides

Til-Fra-eupho
Achillea distans
Carex humilis
Euphorbia epithymoides
Origanum vulgare
Spiraea media

Til-Fra-arabi
Arabis alpina
Asplenium viride
Clematis alpina
Sesleria heuflerana ssp. hungarica
Valeriana tripteris

Spi-Til
Doronicum columnae
Melampyrum bihariense
Spiraea chamaedryfolia
Tilia tomentosa

Spi-Til-typic
Asarum europaeum
Calamagrostis arundinacea
Clematis alpina
Spiraea chamaedryfolia

Spi-Til-tilie
Asplenium ceterach

Potentilla chrysantha
Quercus cerris
Tilia tomentosa

Ses-Til

Allium lusitanicum
Aurinia saxatilis
Clematis recta
Cornus sanguinea
Cyclamen purpurascens
Festuca ovina agg.
Fourraea alpina
Galium sylvaticum
Genista tinctoria
Inula conyzae
Scabiosa ochroleuca
Sedum album
Seseli osseum
Sesleria caerulea

Ses-Til-typic

Allium flavum
Dianthus praecox
Festuca pallens
Galium mollugo agg.
Jovibarba globifera
Melica ciliata
Prunus mahaleb
Sedum album
Seseli osseum
Viola alba

Ses-Til-campa

Cyclamen purpurascens
Festuca ovina agg.
Galium sylvaticum
Peucedanum cervaria
Picea abies
Polygala chamaebuxus
Veronica teucrium

5 T CROLF

(((<#TC Tilia GR15> AND <#TC Crolf-trees GR #TC Not-tilia-trees EXCEPT #TC Crolf-trees>) AND (<#TC Sesleria GR05> OR (<#02 Rock-outcrop-specialists-base-rich> OR (<#03 Rock-outcrop-specialists> AND <#02 Calciphytes>)))) NOT (<#SC Not-tilia-trees GE50> OR (<#SC Not-crolf-trees GE25> OR (<#01 Hygrophilous trees> OR (<#SC Nitrophytes GE25> OR (<#TC Carpinion-species GE10> OR (<#03 Acidophytes> OR <#TC Acidophytes GR05>))))))

6 T1 Tilio-Fraxinetum

(((<#TC Tilia GR15> AND <#TC Crolf-trees GR #TC Not-tilia-trees EXCEPT #TC Crolf-trees>) AND (<#TC Sesleria GR05> OR (<#02 Rock-outcrop-specialists-base-rich> OR (<#03 Rock-outcrop-specialists> AND <#02 Calciphytes>)))) AND <#02 Til-Fra>) NOT (<#SC Not-tilia-trees GE50> OR (<#SC Not-crolf-trees GE25> OR (<#01 Hygrophilous trees> OR (<#SC Nitrophytes GE25> OR (<#TC Carpinion-species GE10> OR (<#03 Acidophytes> OR (<#TC Acidophytes GR05> OR <#01 Spi-Til>))))))

7 T1a Tilio-Fraxinetum-typicum

(((<#TC Tilia GR15> AND <#TC Crolf-trees GR #TC Not-tilia-trees EXCEPT #TC Crolf-trees>) AND (<#TC Sesleria GR05> OR (<#02 Rock-outcrop-specialists-base-rich> OR (<#03 Rock-outcrop-specialists> AND <#02 Calciphytes>)))) AND (<#02 Til-Fra> AND <#02 Til-Fra-typic>)) NOT (<#SC Not-tilia-trees GE50> OR (<#SC Not-crolf-trees GE25> OR (<#01 Hygrophilous trees> OR (<#SC Nitrophytes GE25> OR (<#TC Carpinion-species GE10> OR (<#03 Acidophytes> OR (<#TC Acidophytes GR05> OR (<#01 Spi-Til> OR (<#02 Til-Fra-eupho> OR <#02 Til-Fra-arabi>))))))

7 T1b Tilio-Fraxinetum-euphorbietosum

(((<#TC Tilia GR15> AND <#TC Crolf-trees GR #TC Not-tilia-trees EXCEPT #TC Crolf-trees>) AND (<#TC Sesleria GR05> OR (<#02 Rock-outcrop-specialists-base-rich> OR (<#03 Rock-outcrop-specialists> AND <#02 Calciphytes>)))) AND (<#02 Til-Fra> AND <#02 Til-Fra-eupho>)) NOT (<#SC Not-tilia-trees GE50> OR (<#SC Not-crolf-trees GE25> OR (<#01 Hygrophilous trees> OR (<#SC Nitrophytes GE25> OR (<#TC Carpinion-species GE10> OR (<#03 Acidophytes> OR (<#TC Acidophytes GR05> OR (<#01 Spi-Til> OR (<#02 Til-Fra-typic> OR <#02 Til-Fra-arabi>))))))

7 T1c Tilio-Fraxinetum-arabidetosum

(((<#TC Tilia GR15> AND <#TC Crolf-trees GR #TC Not-tilia-trees EXCEPT #TC Crolf-trees>) AND (<#TC Sesleria GR05> OR (<#02 Rock-outcrop-specialists-base-rich> OR (<#03 Rock-outcrop-specialists> AND <#02 Calciphytes>)))) AND (<#02 Til-Fra> AND <#03 Til-Fra-arabi>)) NOT (<#SC Not-tilia-trees GE50> OR (<#SC Not-crolf-trees GE25> OR (<#01 Hygrophilous trees> OR (<#SC Nitrophytes GE25> OR (<#TC Carpinion-species GE10> OR (<#03 Acidophytes> OR (<#TC Acidophytes GR05> OR <#01 Spi-Til>))))))

6 T2 Spiraeo-Tilietum

(((<#TC Tilia GR15> AND <#TC Crolf-trees GR #TC Not-tilia-trees EXCEPT #TC Crolf-trees>) AND (<#TC Sesleria GR05> OR (<#02 Rock-outcrop-specialists-base-rich> OR (<#03 Rock-outcrop-specialists> AND <#02 Calciphytes>)))) AND <#01 Spi-Til>) NOT (<#SC Not-tilia-trees GE50> OR (<#SC Not-crolf-trees GE25> OR (<#01 Hygrophilous trees> OR (<#SC Nitrophytes GE25> OR (<#TC Carpinion-species GE10> OR (<#03 Acidophytes> OR <#TC Acidophytes GR05>))))))

7 T2a Spiraeo-Tilietum-typicum
((((<#TC Tilia GR15> AND <#TC Crolf-trees GR #TC Not-tilia-trees EXCEPT #TC Crolf-trees>) AND
(<#TC Sesleria GR05> OR (<#02 Rock-outcrop-specialists-base-rich> OR (<#03 Rock-outcrop-specialists>
AND <#02 Calciphytes>)))) AND (<#01 Spi-Til> AND <#02 Spi-Til-typic>)) NOT
(<#SC Not-tilia-trees GE50> OR (<#SC Not-crolf-trees GE25> OR (<#01 Hygrophilous trees> OR (<#SC
Nitrophytes GE25> OR (<#TC Carpinion-species GE10> OR (<#03 Acidophytes> OR (<#TC Acidophytes GR05>
OR <#02 Spi-Til-tilie>))))))

7 T2b Spiraeo-Tilietum-tilietosum
((((<#TC Tilia GR15> AND <#TC Crolf-trees GR #TC Not-tilia-trees EXCEPT #TC Crolf-trees>) AND
(<#TC Sesleria GR05> OR (<#02 Rock-outcrop-specialists-base-rich> OR (<#03 Rock-outcrop-specialists>
AND <#02 Calciphytes>)))) AND (<#01 Spi-Til> AND <#02 Spi-Til-tilie>)) NOT
(<#SC Not-tilia-trees GE50> OR (<#SC Not-crolf-trees GE25> OR (<#01 Hygrophilous trees> OR (<#SC
Nitrophytes GE25> OR (<#TC Carpinion-species GE10> OR (<#03 Acidophytes> OR (<#TC Acidophytes GR05>
OR <#02 Spi-Til-typic>))))))

6 T3 Seslerio-Tilietum
((((<#TC Tilia GR15> AND <#TC Crolf-trees GR #TC Not-tilia-trees EXCEPT #TC Crolf-trees>) AND
(<#TC Sesleria GR05> OR (<#02 Rock-outcrop-specialists-base-rich> OR (<#03 Rock-outcrop-specialists>
AND <#02 Calciphytes>)))) AND <#02 Ses-Til>) NOT
(<#SC Not-tilia-trees GE50> OR (<#SC Not-crolf-trees GE25> OR (<#01 Hygrophilous trees> OR (<#SC
Nitrophytes GE25> OR (<#TC Carpinion-species GE10> OR (<#03 Acidophytes> OR (<#TC Acidophytes GR05>
OR (<#02 Til-Fra> OR <#01 Spi-Til>))))))

7 T3a Seslerio-Tilietum-typicum
((((<#TC Tilia GR15> AND <#TC Crolf-trees GR #TC Not-tilia-trees EXCEPT #TC Crolf-trees>) AND
(<#TC Sesleria GR05> OR (<#02 Rock-outcrop-specialists-base-rich> OR (<#03 Rock-outcrop-specialists>
AND <#02 Calciphytes>)))) AND (<#02 Ses-Til> AND <#02 Ses-Til-typic>)) NOT
(<#SC Not-tilia-trees GE50> OR (<#SC Not-crolf-trees GE25> OR (<#01 Hygrophilous trees> OR (<#SC
Nitrophytes GE25> OR (<#TC Carpinion-species GE10> OR (<#03 Acidophytes> OR (<#TC Acidophytes GR05>
OR (<#02 Til-Fra> OR <#01 Spi-Til>))))))

7 T3b Seslerio-Tilietum-campanuletosum
((((<#TC Tilia GR15> AND <#TC Crolf-trees GR #TC Not-tilia-trees EXCEPT #TC Crolf-trees>) AND
(<#TC Sesleria GR05> OR (<#02 Rock-outcrop-specialists-base-rich> OR (<#03 Rock-outcrop-specialists>
AND <#02 Calciphytes>)))) AND (<#02 Ses-Til> AND <#02 Ses-Til-campa>)) NOT
(<#SC Not-tilia-trees GE50> OR (<#SC Not-crolf-trees GE25> OR (<#01 Hygrophilous trees> OR (<#SC
Nitrophytes GE25> OR (<#TC Carpinion-species GE10> OR (<#03 Acidophytes> OR (<#TC Acidophytes GR05>
OR (<#02 Til-Fra> OR (<#01 Spi-Til> OR <#02 Ses-Til-typic>))))))

Electronic Appendix 3. – A list of species aggregates used in this study.

Achillea millefolium agg.: *A. millefolium* agg., *A. collina*, *A. pannonica*

Arabis hirsuta agg.: *A. hirsuta* agg., *A. hirsuta*

Arenaria serpyllifolia agg.: *A. serpyllifolia* agg., *A. serpyllifolia*

Carex muricata agg.: *C. muricata* agg., *C. muricata*

Carduus defloratus agg.: *C. collinus*, *C. crassifolius*, *C. defloratus*

Dianthus carthusianorum agg.: *D. carthusianorum* agg., *D. carthusianorum*

Epipactis helleborine agg.: *E. helleborine* agg., *E. helleborine*

Festuca ovina agg.: *F. ovina* agg., *F. ovina*

Festuca valesiaca agg.: *F. valesiaca*, *F. pseudodalmatica*

Galium mollugo agg.: *G. mollugo* agg., *G. mollugo*, *G. album* s.str., *G. album* s.lat.

Galium pumilum agg.: *G. pumilum*, *G. austriacum*, *G. valdepilosum*

Polypodium vulgare agg.: *P. vulgare* agg., *P. interjectum*, *P. vulgare*

Pulmonaria officinalis agg.: *P. officinalis* agg., *P. obscura*, *P. officinalis*

Quercus petraea agg.: *Q. petraea* agg., *Q. dalechampii*, *Q. petraea*, *Q. polycarpa*

Quercus pubescens agg.: *Q. pubescens* agg., *Q. pubescens*, *Q. virgiliana*

Ranunculus auricomus agg.: *R. auricomus* agg., *R. fallax*

Senecio nemorensis agg.: *S. nemorensis* agg., *S. germanicus*, *S. ovatus*

Sorbus aria agg.: *S. aria* agg., *S. aria*, *S. hazslinszkyana*, *S. hybrida* agg., *S. pekarovae*

Veronica chamaedrys agg.: *V. chamaedrys* agg., *V. chamaedrys*, *V. vindobonensis*

Veronica hederifolia agg.: *V. hederifolia*, *V. sublobata*

Viola riviniana agg.: *V. reichenbachiana*, *V. riviniana*

Electronic Appendix 4. – Overview of the sources of relevés used in this study including their source in the case of previously published relevés or the name of the author(s) in the case of unpublished relevés. Few unspecified records of altitude were determined approximately based on the site description (here indicated by ~). The sources are sorted by countries and then by the year of recording.

Country	Area	Altitude	No. of relevés	Year(s) of recording	Source
Austria	Wienerwald Mts (Lower Austria)	~320	1	1989	Reichenberger 1990
	Gaming town surroundings (Lower Austria)	450	1	–	Hametner 1991
	Fugnitz and Thaya river valleys (Lower Austria)	320–350	3	1992	Chytrý & Vicherek 1995
	Wienerwald Mts (Lower Austria)	340	1	1996	Willner W. (unpubl., EVA)
	Wienerwald Mts (Lower Austria)	350	1	–	Wallnöfer 1998
	Traunsee lake surroundings (Upper Austria)	600–780	2	1999	Fischer 2000
	Wienerwald Mts (Lower Austria)	514	1	2011	Staudinger M. (unpubl., EVA)
	Wachau valley (Lower Austria)	310–507	3	2017	Zukal D., Novák P., Duchoň M.
	Wienerwald Mts (Lower Austria, Vienna)	270–560	7	2018	Zukal D., Novák P. (unpubl.)
Hainburg hills (Lower Austria)	340–370	2	2018	Zukal D., Novák P. (unpubl.)	
Czech Republic	Bohemian Karst (central Bohemia)	430	1	–	Samek 1964
	Pavlovské vrchy hills (southern Moravia)	330	1	–	Horák 1969
	Moravian Karst (central Moravia)	470	1	1974	Unar 1975
	Moravian Karst (central Moravia)	~340	1	–	Horák 1979
	Dyje river valley (southern Moravia)	460	1	1993	Tichý 1997
	Oslava and Rokytá river valleys (southern Moravia)	240–300	4	1994	Chytrý & Vicherek 1996
	Bohemian Karst (central Bohemia)	~280	1	1985	Kubíková et al. 1997
	Bohemian Karst, Křivoklát area, Džbán Mts (central Bohemia), Moravian Karst, Javoříčko Karst (central Moravia), Pavlovské vrchy hills (southern Moravia)	250–490	19	1991–1996	Chytrý & Sádlo 1998
	Central Moravia	330–480	3	2016–2017	Novák & Zukal 2017
	Štramberk Karst (north-eastern Moravia)	445–480	5	2016–2017	Zukal & Novák 2017
	Chřiby Mts (eastern Moravia)	350	1	2018	Novák P. (unpubl.)
	Moravian Karst (central Moravia)	370–405	3	2018	Zukal D. (unpubl.)
	Chvojnice river valley (southern Moravia)	355	1	2018	Zukal D. (unpubl.)
Hungary	Bükk Mts (northern Hungary)	~640–820	4	–	Zólyomi B. (unpubl., EVA)
	Börzsöny Mts (northern Hungary)	500	1	1997	Nagy 2004
	Bükk Mts, incl. Lázberci Landscape Protection Area (northern Hungary)	282–818	13	2017	Zukal D., Duchoň M. (unpubl.)
	Pilis Mts, Gerecse Mts (Central Transdanubia), Bükk Mts (northern Hungary)	380–790	6	2018	Zukal D., Novák P. (unpubl.)
Poland	Wyżyna Krakowsko-Częstochowska upland (southern Poland)	265–430	5	2019	Zukal D., Novák P. (unpubl.)
Romania	Apuseni Mts (north-western Romania), Suceava Region (northern Romania)	350–885	31	2018	Zukal D., Novák P., Duchoň M. (unpubl.)
Slovakia	Slovak Karst (central Slovakia)	380–600	8	1971–1974	Šomšák & Háberová 1979
	Slovak Karst (central Slovakia)	580–660	5	1983–1984	Háberová et al. 1985
	Veľká Fatra Mts (western Slovakia)	950	1	1993	Uhlířová et al. 1999
	Strážovské vrchy Mts (western Slovakia)	600	1	2002	Micháľková 2005
	Muránska planina Mts (central Slovakia)	493–888	22	2001–2009	Kliment et al. 2010
	Strážovské vrchy Mts (western Slovakia)	260–765	4	2011–2012	Duchoň 2013
	Muránska planina Mts, Slovak Karst, Rimavská kotlina basin, Slovenský raj Mts (central Slovakia)	235–935	27	2002–2014	Blanár D. (unpubl.)
	Strážovské vrchy Mts, Považské podolie basin, Malá Fatra Mts (western Slovakia)	260–770	5	2012–2018	Duchoň M. (unpubl.)
	Strážovské vrchy Mts, Biele Karpaty Mts (western Slovakia)	470–650	5	2018	Zukal D. (unpubl.)
	Malé Karpaty Mts, Tribeč Mts (western Slovakia)	230–526	6	2018	Zukal D., Novák P. (unpubl.)
	Pieniny Mts (northern Slovakia)	710	1	2019	Zukal D., Novák P., Duchoň M.
Humenské vrchy Mts (eastern Slovakia)	265–325	2	2019	Zukal D., Novák P., Duchoň M.	

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Electronic Appendix 5. – Shortened synoptic table of subassociations. Percentage frequencies of diagnostic species (shaded) and other most frequent species of the distinguished subassociations are shown. Diagnostic species are sorted by decreasing *phi* value and the others by decreasing frequency. Species with *phi* > 0.25 are considered as diagnostic, species with *phi* > 0.50 as highly diagnostic (in bold), but species with a constancy ratio lower than 1.5, those with non-significant Fisher's exact test ($p < 0.01$) or those occurring in less than three relevés of the given subassociation are excluded from the lists of diagnostic species. Note that diagnostic species of each subassociation were determined within the association, not in the context of the other associations. Abbreviations: TiF – *Tilio platyphylli-Fraxinetum excelsioris* (typ = *T.-F. typicum*, eup = *T.-F. euphorbietosum*, ara = *T.-F. arabidetosum*), SpT – *Spiraeo chamaedryfoliae-Tilietum cordatae* (typ = *S.-T. typicum*, til = *S.-T. tilietosum*), SeT – *Seslerio caeruleae-Tilietum cordatae* (typ = *S.-T. typicum*, cam = *S.-T. campanuletosum*).

Association	TiF			SpT		SeT	
	typ	eup	ara	typ	til	typ	cam
Number of relevés	31	22	5	17	9	40	20
<i>Tilio-Fraxinetum typicum</i>							
<i>Waldsteinia geoides</i>	52	-	-	18	33	3	-
<i>Stellaria holostea</i>	58	9	-	24	44	3	15
<i>Glechoma hirsuta</i>	45	-	-	6	44	8	10
<i>Viburnum lantana</i>	45	5	-	24	44	23	25
<i>Cruciata glabra</i>	45	9	-	12	33	3	-
<i>Tilio-Fraxinetum euphorbietosum epithymoidis</i>							
<i>Origanum vulgare</i>	6	77	-	-	-	30	5
<i>Securigera varia</i>	23	91	-	41	22	53	20
<i>Euphorbia epithymoides</i>	-	64	-	12	44	5	5
<i>Teucrium chamaedrys</i>	23	82	-	12	33	45	30
<i>Anthericum ramosum</i>	16	73	-	6	11	53	60
<i>Melampyrum nemorosum</i>	19	73	-	-	-	8	25
<i>Spiraea media</i>	3	55	-	6	22	-	-
<i>Achillea distans</i>	-	50	-	-	11	8	-
<i>Valeriana stolonifera</i> subsp. <i>angustifolia</i>	13	59	-	88	78	15	10
<i>Carex humilis</i>	-	41	-	12	11	5	10
<i>Thalictrum minus</i>	-	41	-	12	-	8	10
<i>Veronica austriaca</i>	-	36	-	-	-	3	-
<i>Polygonatum odoratum</i>	35	82	20	29	22	45	45
<i>Aconitum anthora</i>	48	86	20	47	44	5	-
<i>Asperula tinctoria</i>	-	23	-	-	-	8	15
<i>Aster amellus</i>	-	23	-	6	-	5	15
<i>Dianthus carthusianorum</i> agg.	-	23	-	24	11	15	-
<i>Geranium sanguineum</i>	3	27	-	-	11	5	15
<i>Tilio-Fraxinetum arabidetosum alpinae</i>							
<i>Saxifraga paniculata</i>	-	-	100	41	11	23	10
<i>Valeriana tripteris</i>	6	5	100	41	-	10	-
<i>Lonicera xylosteum</i>	10	18	100	24	11	20	30
<i>Sorbus aucuparia</i>	3	5	80	24	-	10	15
<i>Sesleria heuflerana</i> subsp. <i>hungarica</i>	3	5	80	-	-	3	-
<i>Pimpinella major</i>	-	14	80	-	-	3	10
<i>Arabis alpina</i>	-	-	60	-	-	-	-
<i>Scabiosa columbaria</i>	-	-	60	6	-	3	-
<i>Clematis alpina</i>	3	23	80	47	-	3	-
<i>Spiraeo-Tilietum typicum</i>							
<i>Asarum europaeum</i>	26	5	-	82	-	8	-
<i>Calamagrostis arundinacea</i>	6	-	-	53	-	-	-
<i>Fagus sylvatica</i>	23	27	60	53	-	35	50
<i>Spiraea chamaedryfolia</i>	-	-	-	88	33	-	-
<i>Spiraeo-Tilietum tilietosum tomentosae</i>							
<i>Tilia tomentosa</i>	-	-	-	-	100	-	-

<i>Clematis vitalba</i>	6	14	-	-	67	25	15
<i>Crataegus monogyna</i>	19	23	-	24	89	5	25
<i>Quercus cerris</i>	3	-	-	6	67	-	5
<i>Potentilla chrysantha</i>	-	-	-	6	67	-	-
<i>Asplenium ceterach</i>	-	-	-	-	56	3	-
<i>Sorbus torminalis</i>	29	18	-	6	56	10	20
<i>Lathyrus niger</i>	6	5	-	-	44	3	5
<i>Ligustrum vulgare</i>	29	23	-	-	44	20	15
<i>Seslerio-Tilietum typicum</i>							
<i>Galium mollugo</i> agg.	42	91	80	47	78	80	15
<i>Festuca pallens</i>	10	41	20	12	-	55	-
<i>Sedum album</i>	6	23	20	-	-	48	-
<i>Hylotelephium maximum</i>	65	91	100	82	100	83	30
<i>Seseli osseum</i>	10	18	-	-	11	50	5
<i>Melica ciliata</i>	16	27	-	12	-	35	-
<i>Asplenium ruta-muraria</i>	32	86	60	53	89	70	25
<i>Allium flavum</i>	10	5	-	12	22	33	-
<i>Asplenium trichomanes</i>	97	91	100	100	100	88	50
<i>Allium lusitanicum</i>	-	18	-	-	-	38	5
<i>Vincetoxicum hirundinaria</i>	77	95	40	88	89	93	60
<i>Seslerio-Tilietum campanuletosum rapunculoidis</i>							
<i>Galium sylvaticum</i>	-	-	-	-	-	5	50
<i>Cyclamen purpurascens</i>	-	-	-	-	-	13	55
<i>Melica nutans</i>	45	45	40	41	22	18	60
<i>Amelanchier ovalis</i>	-	-	-	-	-	-	30
<i>Polygala chamaebuxus</i>	-	-	-	-	-	-	30
<i>Acer pseudoplatanus</i>	13	23	40	24	-	8	40
<i>Berberis vulgaris</i>	23	23	-	24	22	28	65
<i>Taxus baccata</i>	-	-	-	-	-	-	20
Species diagnostic for two subassociations							
<i>Hedera helix</i>	48	5	-	18	89	33	30
<i>Melica uniflora</i>	42	9	-	6	56	30	10
<i>Sesleria caerulea</i>	-	27	-	-	-	55	95
<i>Tilia cordata</i>	39	64	40	94	22	25	65
Other frequent species (f ≥ 50%)							
<i>Campanula rapunculoides</i>	97	91	80	88	67	55	45
<i>Tilia platyphyllos</i>	100	77	100	6	33	88	65
<i>Campanula persicifolia</i>	87	73	80	82	78	58	55
<i>Arabidopsis arenosa</i>	90	82	80	76	89	55	25
<i>Carex digitata</i>	68	45	80	82	89	58	50
<i>Poa nemoralis</i>	55	68	80	82	89	50	45
<i>Lactuca muralis</i>	81	55	40	53	56	63	35
<i>Sorbus aria</i> agg.	71	86	100	6	22	48	60
<i>Pseudoturritis turrata</i>	71	73	60	47	44	53	25
<i>Corylus avellana</i>	29	50	40	76	44	63	70
<i>Cornus mas</i>	77	50	20	35	89	43	40
<i>Digitalis grandiflora</i>	65	86	80	53	67	28	30
<i>Fraxinus excelsior</i>	52	68	-	53	11	55	50

Electronic Appendix 6. – Boxplots comparing environmental variables between associations and subassociations. Note that *Tilio-Fraxinetum arbidetosum* was excluded from the comparison of subassociations as only two out of five relevés had their values specified. Abbreviations: TiF – *Tilio platyphylli-Fraxinetum excelsioris* (typic = *T.-F. typicum*, eupho = *T.-F. euphorbietosum*), SpT – *Spiraeo chamaedryfoliae-Tilietum cordatae* (typic = *S.-T. typicum*, tilie = *S.-T. tilietosum*), SeT – *Seslerio caeruleae-Tilietum cordatae* (typic = *S.-T. typicum*, campa = *S.-T. campanuletosum*).



