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## Electronic Appendix 5. List of diagnostic, constant and dominant species of the distinguished associations.

Criteria for diagnostic species:  $\phi$  coefficient  $\times 100 \geq 20$ , frequency  $\geq 20\%$ , frequency not higher than 50% in more than one association, Fisher's exact test  $P < 0.001$ . Criterion for constant species: frequency  $\geq 50\%$ . Criteria for dominant species: cover  $\geq 25\%$  in at least 5% of relevés.

### 1. *Lithospermo purpureo-caerulei-Quercetum* Michalko 1957

Diagnostic species: *Erysimum odoratum* 62.9, *Helianthemum nummularium* agg. 52.9, *Melica ciliata* 50.9, *Quercus pubescens* agg. 49.0, *Oryzopsis virescens* 47.1, *Carex humilis* 46.9, *Scabiosa ochroleuca* 45.8, *Quercus pubescens* agg. (E3) 43.0, *Sedum sexangulare* 42.9, *Stachys recta* 42.8, *Potentilla arenaria* agg. 41.2, *Asperula cynanchica* 39.9, *Allium flavum* 39.7, *Bupleurum falcatum* 39.1, *Arabis turrita* 39.1, *Berberis vulgaris* 38.8, *Sanguisorba minor* 36.5, *Teucrium chamaedrys* 36.2, *Rhamnus cathartica* 35.7, *Acosta rhenana* 35.3, *Cornus mas* (E2) 34.7, *Origanum vulgare* 34.4, *Jovibarba globifera* 34.4, *Sorbus aria* 33.9, *Galium glaucum* 33.7, *Campanula glomerata* agg. 33.0, *Achillea millefolium* agg. 32.5, *Cornus mas* 32.3, *Inula ensifolia* 32.2, *Securigera varia* 31.3, *Sorbus aria* (E2) 30.3, *Fraxinus excelsior* 30.2, *Berberis vulgaris* (E2) 30.0, *Cerasus mahaleb* 29.8, *Anthericum ramosum* 29.5, *Veronica teucrium* 29.4, *Rosa species* 28.2, *Allium senescens* subsp. *montanum* 28.0, *Salvia pratensis* 27.6, *Sorbus aria* (E3) 26.3, *Sesleria albicans* 21.9, *Arabis hirsuta* agg. 21.4, *Inula conyzia* 20.8, *Corylus avellana* 20.2

Constant species: *Vincetoxicum hirundinaria* 89, *Teucrium chamaedrys* 88, *Cornus mas* (E2) 88, *Quercus pubescens* agg. (E3) 86, *Tithymalus cyparissias* 83, *Quercus pubescens* agg. 70, *Securigera varia* 69, *Galium glaucum* 67, *Cornus mas* 63, *Carex humilis* 60, *Crataegus monogyna* 58, *Crataegus monogyna* (E2) 58, *Rosa species* 57, *Brachypodium pinnatum* 57, *Anthericum ramosum* 57, *Sorbus aria* 56, *Erysimum odoratum* 55, *Festuca rupicola* 53, *Pyrethrum corymbosum* 52, *Acer campestre* 52

Dominant species: *Quercus pubescens* agg. (E3) 63, *Carex humilis* 21, *Brachypodium pinnatum* 20, *Vincetoxicum hirundinaria* 7, *Melica uniflora* 7, *Cornus mas* (E2) 7, *Festuca rupicola* 6

### 2. *Seslerio albicantis-Quercetum pubescentis* Chytrý 1994

Diagnostic species: *Asperula tinctoria* 72.5, *Potentilla heptaphylla* 71.7, *Leontodon incanus* 66.8, *Carex humilis* 65.8, *Hippocrepis comosa* 60.5, *Arabis hirsuta* agg. 60.0, *Sesleria albicans* 56.3, *Galium pumilum* agg. 53.4, *Dorycnium pentaphyllum* agg. 49.6, *Acinos alpinus* 48.4, *Chamaecytisus hirsutus* 44.0, *Bromus monocladus* 43.8, *Sorbus aria* (E2) 42.8, *Polygala amara* agg. 42.6, *Lotus corniculatus* 42.6, *Juniperus communis* 42.2, *Sorbus torminalis* 41.0, *Teucrium montanum* 38.8, *Thalictrum minus* 38.7, *Leontodon hispidus* 38.6, *Epipactis atrorubens* 37.8, *Campanula rotundifolia* agg. 36.9, *Thymus praecox* 35.6, *Inula ensifolia* 35.6, *Primula veris* 34.9, *Epipactis helleborine* agg. 32.7, *Sorbus aria* (E3) 32.6, *Viburnum lantana* 30.1, *Tithymalus epithymoides* 29.6, *Asarum europaeum* 29.6, *Oryzopsis*

*virescens* 29.5, *Salvia pratensis* 28.6, *Sorbus torminalis* (E3) 25.7, *Melampyrum cristatum* 25.6, *Inula hirta* 23.3, *Pilosella bauhini* 23.0, *Festuca pallens* 22.3, *Helianthemum nummularium* agg. 22.1, *Fragaria moschata* 20.5, *Campanula glomerata* agg. 20.3

Constant species: *Teucrium chamaedrys* 96, *Vincetoxicum hirundinaria* 94, *Quercus pubescens* agg. (E3) 91, *Cornus mas* (E2) 88, *Pimpinella saxifraga* 85, *Carex humilis* 80, *Potentilla heptaphylla* 78, *Symphytum tuberosum* agg. 76, *Asperula tinctoria* 74, *Sorbus aria* 71, *Genista pilosa* 70, *Galium mollugo* agg. 68, *Tithymalus cyparissias* 67, *Brachypodium pinnatum* 67, *Sorbus torminalis* 63, *Hieracium murorum* 63, *Crataegus monogyna* (E2) 63, *Cornus mas* 62, *Arabis hirsuta* agg. 62, *Rosa species* 61, *Pyrethrum corymbosum* 61, *Dorycnium pentaphyllum* agg. 59, *Securigera varia* 58, *Melittis melissophyllum* 58, *Ligustrum vulgare* (E2) 58, *Leontodon incanus* 56, *Primula veris* 55, *Brachypodium sylvaticum* 54, *Sorbus aria* (E2) 52, *Ligustrum vulgare* 51

Dominant species: *Quercus pubescens* agg. (E3) 76, *Carex humilis* 21, *Brachypodium pinnatum* 21, *Sesleria albicans* 17, *Quercus cerris* (E3) 12, *Vincetoxicum hirundinaria* 6, *Melica uniflora* 6, *Laser trilobum* 6

### **3. *Fraxino orni-Quercetum pubescentis* Klika 1938**

Diagnostic species: *Achillea nobilis* 58.8, *Cota tinctoria* 53.5, *Poa pannonica* subsp. *scabra* 53.3, *Pilosella bauhini* 48.6, *Festuca pseudodalmatica* 48.0, *Fraxinus ornus* (E3) 47.4, *Lactuca viminea* 45.5, *Trifolium alpestre* 43.1, *Fraxinus ornus* (E2) 42.2, *Myosotis arvensis* 42.1, *Carex praecox* 40.2, *Vicia hirsuta* 39.9, *Verbascum phoeniceum* 36.2, *Thymus pannonicus* 36.1, *Campanula bononiensis* 35.3, *Ajuga genevensis* 33.3, *Seseli osseum* 30.9, *Rosa canina* agg. (E2) 25.1, *Quercus cerris* (E2) 24.9, *Fragaria viridis* 24.9

Constant species: *Trifolium alpestre* 83, *Veronica chamaedrys* agg. 79, *Teucrium chamaedrys* 79, *Quercus cerris* (E3) 79, *Tithymalus cyparissias* 76, *Poa pratensis* agg. 72, *Pilosella bauhini* 72, *Securigera varia* 69, *Quercus cerris* 69, *Galium glaucum* 62, *Quercus pubescens* agg. (E3) 59, *Ajuga genevensis* 52

Dominant species: *Quercus cerris* (E3) 45, *Quercus pubescens* agg. (E3) 28, *Fraxinus ornus* (E3) 17, *Quercus petraea* agg. (E3) 7, *Fraxinus ornus* (E2) 7, *Festuca heterophylla* 7, *Brachypodium pinnatum* 7

### **4. *Euphorbio-Quercetum* Knapp ex Hübel 1959**

Diagnostic species: *Waldsteinia geoides* 41.9, *Glechoma hederacea* agg. 29.7, *Sorbus torminalis* (E3) 29.2, *Crataegus laevigata* (E2) 27.5, *Campanula rapunculoides* 26.5, *Lathyrus vernus* 22.0, *Sorbus torminalis* 21.3, *Bromus benekenii* 21.2

Constant species: *Cornus mas* (E2) 89, *Vincetoxicum hirundinaria* 76, *Pyrethrum corymbosum* 72, *Acer campestre* 69, *Ligustrum vulgare* 68, *Ligustrum vulgare* (E2) 67, *Veronica chamaedrys* agg. 65, *Quercus petraea* agg. (E3) 65, *Melica uniflora* 64, *Clinopodium vulgare* 62, *Quercus pubescens* agg. (E3) 58, *Fragaria vesca* 58, *Crataegus monogyna* (E2) 55, *Lithospermum purpureocaeruleum* 52, *Cornus mas* 52, *Dactylis polygama* 51

Dominant species: *Quercus pubescens* agg. (E3) 43, *Quercus petraea* agg. (E3) 39, *Melica uniflora* 27, *Cornus mas* (E2) 18, *Quercus cerris* (E3) 10, *Brachypodium pinnatum* 6

### **5. *Quercetum pubescenti-roboris* (Zólyomi 1957) Michalko et Džatko 1965**

Diagnostic species: *Prunus spinosa* (E2) 51.2, *Ulmus minor* (E2) 50.5, *Cruciata laevipes* 50.1, *Dictamnus albus* 47.2, *Pulmonaria mollis* s. lat. 46.2, *Agrimonia eupatoria* 43.1, *Euonymus europaeus* (E2) 41.8, *Viola odorata* 40.0, *Ranunculus polyanthemos* 38.9, *Allium scorodoprasum* 38.7, *Ulmus minor* (E3) 37.7, *Viola suavis* 36.5, *Galium aparine* 36.5, *Inula salicina* 36.2, *Quercus robur* agg. (E2) 35.3, *Carex michelii* 35.2, *Arum alpinum* agg. 33.7, *Rhamnus cathartica* (E2) 33.3, *Vicia pisiformis* 33.2, *Polygonatum latifolium* 32.3, *Ulmus minor* 30.8, *Hypericum hirsutum* 30.2, *Robinia pseudacacia* (E2) 29.7, *Carex muricata* agg. 27.2, *Chaerophyllum temulum* 25.2, *Campanula bononiensis* 22.8, *Fragaria viridis* 21.4, *Rosa canina* agg. (E2) 21.0, *Quercus cerris* (E2) 21.0, *Rosa gallica* 20.8

Constant species: *Ligustrum vulgare* (E2) 94, *Poa pratensis* agg. 88, *Geum urbanum* 88, *Poa nemoralis* 84, *Acer campestre* (E2) 84, *Clinopodium vulgare* 78, *Quercus cerris* (E3) 75, *Prunus spinosa* (E2) 75, *Lithospermum purpureocaeruleum* 72, *Acer campestre* 72, *Viola hirta* 69, *Veronica chamaedrys* agg. 69, *Pulmonaria mollis* s. lat. 69, *Tithymalus cyparissias* 62, *Galium aparine* 62, *Carex michelii* 62, *Quercus cerris* 59, *Carex muricata* agg. 59, *Dactylis polygama* 56, *Quercus robur* agg. (E3) 53, *Melica uniflora* 53, *Crataegus monogyna* (E2) 53, *Agrimonia eupatoria* 53

Dominant species: *Quercus cerris* (E3) 50, *Quercus robur* agg. (E3) 31, *Quercus pubescens* agg. (E3) 12, *Acer campestre* (E2) 12, *Quercus petraea* agg. (E3) 9, *Lithospermum purpureocaeruleum* 6, *Ligustrum vulgare* (E2) 6

### **6. *Convallario-Quercetum roboris* Soó (1958) 1971**

Diagnostic species: *Viola mirabilis* 44.6, *Ulmus minor* 37.6, *Arum alpinum* agg. 37.0, *Chaerophyllum temulum* 36.0, *Polygonatum latifolium* 35.5, *Ulmus minor* (E3) 34.9, *Stachys sylvatica* 34.9, *Acer campestre* (E3) 34.7, *Clematis vitalba* 32.4, *Alliaria petiolata* 30.4, *Galium odoratum* 27.6, *Geranium robertianum* 27.0, *Bromus benekenii* 25.6, *Ulmus minor* (E2) 24.5, *Viola odorata* 22.3, *Galium aparine* 20.7, *Convallaria majalis* 20.2

Constant species: *Acer campestre* 81, *Brachypodium sylvaticum* 78, *Geum urbanum* 76, *Ligustrum vulgare* 72, *Cornus mas* (E2) 71, *Acer campestre* (E2) 68, *Melica uniflora* 64, *Quercus cerris* (E3) 62, *Ligustrum vulgare* (E2) 58, *Crataegus monogyna* 57, *Acer campestre* (E3) 57, *Crataegus monogyna* (E2) 54, *Quercus robur* agg. (E3) 51, *Quercus petraea* agg. (E3) 51

Dominant species: *Quercus cerris* (E3) 35, *Melica uniflora* 28, *Quercus robur* agg. (E3) 24, *Quercus petraea* agg. (E3) 18, *Cornus mas* (E2) 14, *Lithospermum purpureocaeruleum* 8, *Acer campestre* (E2) 8

### **7. *Carici fritschii-Quercetum roboris* Chytrý et Horák 1997**

Diagnostic species: *Festuca rubra* agg. 76.7, *Carex fritschii* 73.9, *Arrhenatherum elatius* 69.5, *Peucedanum oreoselinum* 69.4, *Anthoxanthum odoratum* 67.6, *Agrostis capillaris* 67.1, *Frangula alnus* (E2) 66.8, *Cerastium arvense* 66.0, *Viola canina* 65.3, *Festuca ovina* agg. (F.

*guestfalica*) 62.0, *Iris variegata* 61.8, *Luzula campestris* agg. 56.6, *Quercus robur* agg. 56.4, *Carex caryophyllea* 55.0, *Pulmonaria angustifolia* 54.8, *Polygonatum odoratum* 54.3, *Lysimachia vulgaris* 54.3, *Molinia caerulea* agg. 52.2, *Calamagrostis epigejos* 51.2, *Carex pallescens* 49.3, *Potentilla alba* 49.0, *Mycelis muralis* 48.2, *Agrostis vinealis* 47.2, *Frangula alnus* 46.8, *Hieracium umbellatum* 45.7, *Carex supina* 44.8, *Moehringia trinervia* 41.4, *Rubus sect. Rubus* 39.5, *Thesium linophyllum* 38.5, *Campanula patula* 38.3, *Galium verum* agg. 38.2, *Clinopodium vulgare* 37.4

Constant species: *Clinopodium vulgare* 100, *Tithymalus cyparissias* 92, *Quercus robur* agg. (E3) 92, *Polygonatum odoratum* 92, *Festuca rubra* agg. 92, *Veronica chamaedrys* agg. 83, *Poa pratensis* agg. 83, *Brachypodium sylvaticum* 83, *Agrostis capillaris* 83, *Festuca ovina* agg. 75, *Arrhenatherum elatius* 75, *Quercus robur* agg. 67, *Peucedanum oreoselinum* 67, *Mycelis muralis* 67, *Luzula campestris* agg. 67, *Frangula alnus* (E2) 67, *Vincetoxicum hirundinaria* 58, *Silene nutans* 58, *Rubus sect. Rubus* 58, *Pimpinella saxifraga* 58, *Hylotelephium maximum* agg. 58, *Hieracium murorum* 58, *Galium verum* agg. 58, *Fragaria vesca* 58, *Dactylis polygama* 58, *Carex fritschii* 58, *Carex caryophyllea* 58, *Calamagrostis epigejos* 58, *Betonica officinalis* 58, *Anthoxanthum odoratum* 58

Dominant species: *Quercus robur* agg. (E3) 67, *Convallaria majalis* 8

#### **8. *Sorbo torminalis-Quercetum* Svoboda ex Blažková 1962**

Diagnostic species: *Carex digitata* 32.7, *Lathyrus vernus* 32.3, *Galium schultesii* 32.1, *Luzula luzuloides* 30.6, *Cruciata glabra* 30.1, *Hieracium sabaudum* 28.2, *Poa nemoralis* 26.7, *Campanula persicifolia* 26.1, *Carex montana* 24.7, *Hypericum montanum* 23.6, *Festuca heterophylla* 23.0, *Quercus petraea* agg. (E2) 22.4, *Campanula rapunculoides* 20.3

Constant species: *Quercus petraea* agg. (E3) 100, *Poa nemoralis* 87, *Veronica chamaedrys* agg. 85, *Quercus petraea* agg. 82, *Lathyrus niger* 69, *Clinopodium vulgare* 67, *Galium schultesii* 62, *Campanula persicifolia* 61, *Astragalus glycyphyllos* 60, *Hieracium murorum* 58, *Fragaria vesca* 57, *Cruciata glabra* 55, *Hieracium sabaudum* 53, *Melittis melissophyllum* 52, *Carpinus betulus* 52

Dominant species: *Quercus petraea* agg. (E3) 90, *Poa nemoralis* 27, *Quercus cerris* (E3) 8, *Melica uniflora* 8, *Carex montana* 6

#### **9. *Genisto pilosae-Quercetum petraeae* Zólyomi et al. ex Soó 1963**

Diagnostic species: *Luzula luzuloides* 73.3, *Linaria genistifolia* 73.2, *Dalanum ladanum* 73.1, *Cardaminopsis arenosa* agg. 64.5, *Steris viscaria* 61.4, *Avenella flexuosa* 56.8, *Pilosella cymosa* 55.1, *Digitalis grandiflora* 53.8, *Rosa canina* agg. 52.2, *Acetosella multifida* agg. 50.8, *Festuca pallens* 50.6, *Galium glaucum* 48.6, *Quercus petraea* agg. 48.1, *Allium senescens* subsp. *montanum* 46.9, *Myosotis sylvatica* 46.7, *Fagus sylvatica* 44.9, *Hieracium laevicaule* 44.6, *Polypodium vulgare* 43.8, *Asplenium septentrionale* 41.7, *Verbascum densiflorum* 39.6, *Pilosella officinarum* 34.3, *Pseudolysimachion spicatum* 33.6, *Hylotelephium maximum* agg. 33.2, *Poa nemoralis* 32.5, *Quercus petraea* agg. (E2) 32.3, *Silene vulgaris* 31.3, *Genista tinctoria* 30.6

Constant species: *Quercus petraea* agg. 100, *Quercus petraea* agg. (E3) 100, *Genista pilosa* 100, *Veronica chamaedrys* agg. 95, *Poa nemoralis* 95, *Rosa canina* agg. 90, *Luzula*

*luzuloides* 90, *Steris viscaria* 85, *Linaria genistifolia* 85, *Galium glaucum* 85, *Cardaminopsis arenosa* agg. 85, *Hypericum perforatum* 75, *Hylotelephium maximum* agg. 75, *Digitalis grandiflora* 70, *Dalanum ladanum* 65, *Carpinus betulus* 65, *Vincetoxicum hirundinaria* 60, *Quercus petraea* agg. (E2) 60, *Genista tinctoria* 60, *Fallopia convolvulus* 60, *Fagus sylvatica* 55, *Allium senescens* subsp. *montanum* 55

Dominant species: *Quercus petraea* agg. (E3) 85, *Luzula luzuloides* 40, *Melampyrum pratense* 10, *Genista pilosa* 10, *Avenella flexuosa* 10, *Festuca pseudodalmatica* 5, *Festuca pallens* 5, *Festuca ovina* agg. 5

#### **10. *Melico pictae-Quercetum* (Mikyška 1944) Klika 1957**

Diagnostic species: *Carex montana* 41.6, *Quercus robur* agg. 38.9, *Ranunculus auricomus* agg. 36.1, *Quercus robur* agg. (E2) 32.7, *Lysimachia nummularia* 31.3, *Potentilla alba* 30.0, *Vicia sepium* 28.6, *Viola riviniana* 27.3, *Carpinus betulus* (E3) 25.3, *Polygonatum multiflorum* 24.9, *Melampyrum pratense* 23.4, *Betonica officinalis* 23.4, *Scrophularia nodosa* 23.2, *Viola reichenbachiana* 22.7, *Serratula tinctoria* 22.7, *Heracleum sphondylium* 21.2

Constant species: *Veronica chamaedrys* agg. 80, *Carpinus betulus* (E2) 71, *Quercus robur* agg. (E3) 69, *Poa nemoralis* 67, *Fragaria vesca* 67, *Betonica officinalis* 59, *Carex montana* 57, *Clinopodium vulgare* 55, *Symphytum tuberosum* agg. 53, *Lathyrus niger* 53, *Carpinus betulus* 51

Dominant species: *Quercus robur* agg. (E3) 55, *Carex montana* 18, *Quercus petraea* agg. (E3) 16, *Quercus cerris* (E3) 10, *Poa nemoralis* 10, *Carpinus betulus* (E2) 6, *Brachypodium pinnatum* 6

#### **11. *Quercetum petraeo-cerridis* Soó ex Máthé et Kovács 1962**

Diagnostic species: *Vicia cassubica* 47.0, *Lychnis coronaria* 44.7, *Quercus cerris* (E2) 41.5, *Veronica officinalis* 34.9, *Dianthus armeria* 34.5, *Torilis japonica* 33.1, *Hypericum hirsutum* 29.9, *Prunus spinosa* (E2) 28.0, *Acer tataricum* 26.0, *Acer tataricum* (E2) 25.7, *Cruciata glabra* 24.8, *Hieracium sabaudum* 24.4, *Pyrus communis* agg. (E2) 23.9, *Rubus* sect. *Rubus* 23.2, *Agrostis capillaris* 23.0, *Agrimonia eupatoria* 22.2, *Fragaria viridis* 21.2, *Rosa gallica* 21.0, *Verbascum austriacum* subsp. *chaixii* 20.7, *Cerasus avium* 20.1

Constant species: *Quercus cerris* (E3) 94, *Veronica chamaedrys* agg. 81, *Poa pratensis* agg. 81, *Quercus cerris* 78, *Poa nemoralis* 77, *Tithymalus cyparissias* 76, *Ligustrum vulgare* (E2) 75, *Clinopodium vulgare* 73, *Quercus petraea* agg. (E3) 69, *Quercus cerris* (E2) 63, *Viola hirta* 60, *Astragalus glycyphyllos* 56, *Veronica officinalis* 54, *Quercus petraea* agg. 53, *Hypericum perforatum* 53, *Festuca rupicola* 52, *Geum urbanum* 51

Dominant species: *Quercus cerris* (E3) 80, *Quercus petraea* agg. (E3) 22, *Poa pratensis* agg. 15, *Poa nemoralis* 8, *Festuca rupicola* 5