

**App. 1.** Extended version of Table 2. Species with the highest fit in partial CCAs and their scores along the first ordination axes. Each column represents a separate partial CCA in which Altitude, Season, Year, and Crop were used in turn as the only explanatory variable while the effects of the other variables were subtracted by defining them as covariables. Low values of scores for respective variables are associated in turn with low altitudes, early season, earlier years and cereal fields.

Altitude Species	Ax 1 score		Season Species	Ax 1 score		Year Species	Ax 1 score		Crop Species	Ax 1 score	
	Fit	Fit		Fit	Fit		Fit	Fit			
<i>Portulaca oleracea</i>	-1.61	0.010	<i>Cerastium brachypetalum</i>	-2.43	0.007	<i>Agrostemma githago</i>	-1.15	0.014	<i>Galeopsis angustifolia</i>	-0.79	0.003
<i>Diphloxia muralis</i>	-1.05	0.009	<i>Tragopogon dubius</i>	-2.03	0.005	<i>Galium tricornutum</i>	-1.14	0.017	<i>Trifolium medium</i>	-0.55	0.003
<i>Senecio pinnatifidus</i>	-0.96	0.057	<i>Gagea pratensis</i>	-1.60	0.006	<i>Ranunculus scordium</i>	-0.93	0.007	<i>Kickxia elatiae</i>	-0.64	0.014
<i>Amaranthus retroflexus</i>	-0.94	0.058	<i>Halostemum unbelatum</i>	-1.53	0.021	<i>Galeopsis ladanum</i>	-0.92	0.013	<i>Cerastium glomeratum</i>	-0.55	0.003
<i>Echinochloa crus-galli</i>	-0.94	0.072	<i>Veronica triphyllos</i>	-1.46	0.034	<i>Plantago media</i>	-0.91	0.016	<i>Agrostis gigantea</i>	-0.54	0.005
<i>Corys canadensis</i>	-0.93	0.038	<i>Veronica triphyllos</i>	-1.41	0.072	<i>Crepis capillaris</i>	-0.91	0.010	<i>Mispopates orontium</i>	-0.53	0.008
<i>Mercurialis annua</i>	-0.91	0.016	<i>Erophila verna</i>	-1.35	0.053	<i>Mysotis discolor</i>	-0.89	0.009	<i>Galeopsis ladanum</i>	-0.51	0.004
<i>Solanum nigrum</i>	-0.89	0.026	<i>Veronica praecox</i>	-1.32	0.014	<i>Mysotis stricta</i>	-0.87	0.029	<i>Tanacetum vulgare</i>	-0.45	0.003
<i>Ajuga reptans</i>	-0.88	0.011	<i>Veronica hederifolia</i>	-1.24	0.201	<i>Rubus fruticosus</i> agg.	-0.85	0.018	<i>Dianthus barbatus</i>	-0.42	0.007
<i>Amaranthus powellii</i>	-0.86	0.010	<i>Thlaspi perfoliatum</i>	-1.23	0.024	<i>Cornifolia orientalis</i>	-0.84	0.014	<i>Apera spica-venti</i>	-0.41	0.025
<i>Gypsophila muralis</i>	-0.85	0.017	<i>Bromus tectorum</i>	-1.10	0.005	<i>Misopates orontium</i>	-0.78	0.017	<i>Phleum pratense</i>	-0.41	0.006
<i>Euphorbia falcata</i>	-0.84	0.021	<i>Mysotis stricta</i>	-1.07	0.044	<i>Stene latifolia</i>	-0.78	0.039	<i>Lolium multiflorum</i>	-0.40	0.003
<i>Reseda luteola</i>	-0.81	0.011	<i>Mysotis minimus</i>	-1.03	0.008	<i>Alchemilla vulgaris</i>	-0.76	0.008	<i>Juncus bufonius</i>	-0.39	0.005
<i>Stachys foetida</i>	-0.80	0.026	<i>Bromus sterilis</i>	-0.89	0.007	<i>Papaver argemone</i>	-0.76	0.028	<i>Euphorbia falcata</i>	-0.38	0.004
<i>Stachys annua</i>	-0.78	0.032	<i>Papaver argemone</i>	-0.84	0.035	<i>Veronica triphyllos</i>	-0.75	0.020	<i>Trifolium arvense</i>	-0.38	0.006
<i>Cardaria draba</i>	-0.78	0.016	<i>Valerianella locusta</i>	-0.78	0.009	<i>Erophila verna</i>	-0.72	0.015	<i>Caucalis platycarpus</i>	-0.38	0.004
<i>Senecio viridiflorus</i>	-0.77	0.031	<i>Mysotis discolor</i>	-0.77	0.006	<i>Veronica triloba</i>	-0.71	0.008	<i>Euphorbia exigua</i>	-0.37	0.022
<i>Kickxia spuria</i>	-0.74	0.019	<i>Arabisopsis thaliana</i>	-0.73	0.065	<i>Gypsophila muralis</i>	-0.67	0.011	<i>Trifolium campestre</i>	-0.37	0.006
<i>Cheopodium hybridum</i>	-0.74	0.024	<i>Lithospermum arvense</i>	-0.70	0.031	<i>Papaver dubium</i>	-0.64	0.012	<i>Consolida regalis</i>	-0.36	0.024
<i>Galiniasa parviflora</i>	-0.72	0.032	<i>Laminium amplexicaule</i>	-0.70	0.118	<i>Veronica opaca</i>	-0.63	0.007	<i>Aphanes arvensis</i>	-0.36	0.012
<i>Arctium tomentosum</i>	-0.71	0.010	<i>Discarumia sophia</i>	-0.70	0.043	<i>Sagina procumbens</i>	-0.63	0.014	<i>Aphanes arvensis</i>	-0.31	0.005
<i>Descurainia sophia</i>	-0.71	0.045	<i>Adonis aestivialis</i>	-0.63	0.018	<i>Spergularia rubra</i>	-0.62	0.007	<i>Adonis aestivialis</i>	-0.29	0.004
<i>Cichorium intybus</i>	-0.68	0.010	<i>Anthemis austriaca</i>	-0.59	0.010	<i>Linaria vulgaris</i>	-0.60	0.025	<i>Stene noctiflora</i>	-0.28	0.020
<i>Anthemis austriaca</i>	-0.65	0.012	<i>Fumaria vallonit</i>	-0.54	0.009	<i>Neslia paniculata</i>	-0.60	0.061	<i>Matricaria recutita</i>	-0.28	0.004
<i>Lactuca serriola</i>	-0.64	0.024	<i>Cornifolia orientalis</i>	-0.53	0.005	<i>Trifolium arvense</i>	-0.60	0.015	<i>Sagina procumbens</i>	-0.28	0.003
<i>Consolida regalis</i>	-0.63	0.072	<i>Cardaria draba</i>	-0.49	0.006	<i>Vicia villosa</i>	-0.58	0.010	<i>Vicia tetrasperma</i>	-0.28	0.015
<i>Veronica poliflora</i>	-0.62	0.065	<i>Laminium purpureum</i>	-0.46	0.068	<i>Hypolepidium maximum</i>	-0.57	0.008	<i>Poa trivialis</i>	-0.28	0.007
<i>Falcaria vulgaris</i>	-0.57	0.009	<i>Papaver dubium</i>	-0.43	0.005	<i>Adonis aestivialis</i>	-0.55	0.013	<i>Stachys annua</i>	-0.28	0.004
<i>Euphorbia exigua</i>	-0.55	0.049	<i>Veronica poliflora</i>	-0.40	0.027	<i>Arenaria serpyllifolia</i>	-0.54	0.039	<i>Centauria cyanus</i>	-0.26	0.012
<i>Microthymum thymus</i>	-0.54	0.017	<i>Thlaspi arvense</i>	-0.38	0.089	<i>Raphanus raphanistrum</i>	-0.53	0.086	<i>Galium spurium</i>	-0.25	0.004
<i>Adonis aestivialis</i>	-0.51	0.012	<i>Ranunculus arvensis</i>	-0.38	0.007	<i>Cardaria draba</i>	-0.51	0.007	<i>Aethusa cynapium</i>	-0.24	0.012
<i>Stene noctiflora</i>	-0.49	0.060	<i>Poa trivialis</i>	-0.38	0.012	<i>Anthemis austriaca</i>	-0.51	0.008	<i>Papaver rhoas</i>	-0.24	0.014
<i>Lathyrus tuberosus</i>	-0.47	0.031	<i>Papaver rhoas</i>	-0.37	0.031	<i>Trifolium campstre</i>	-0.49	0.011	<i>Vicia sativa</i>	-0.24	0.004
<i>Papaver rhoas</i>	-0.45	0.047	<i>Consolida regalis</i>	-0.34	0.021	<i>Valerianella dentata</i>	-0.49	0.025	<i>Vicia sativa</i>	-0.23	0.020
<i>Laminium amplexicaule</i>	-0.39	0.036	<i>Lolium perenne</i>	-0.32	0.006	<i>Lithospermum arvense</i>	-0.45	0.013	<i>Valerianella dentata</i>	-0.22	0.005
<i>Arenaria serpyllifolia</i>	-0.34	0.010	<i>Neslia paniculata</i>	-0.31	0.017	<i>Euphorbia exigua</i>	-0.43	0.029	<i>Daucus carota</i>	-0.20	0.007
<i>Sonchus oleraceus</i>	-0.33	0.019	<i>Fumaria officinalis</i>	-0.31	0.061	<i>Erodium cicutarium</i>	-0.42	0.025	<i>Medicago lupulina</i>	-0.19	0.008
<i>Cheopodium polyspermum</i>	-0.33	0.012	<i>Stellaria media</i>	-0.29	0.062	<i>Sierardia arvensis</i>	-0.42	0.029	<i>Veronica arvensis</i>	-0.19	0.012
<i>Sinapis arvensis</i>	-0.29	0.024	<i>Capsetta bursa-pastoris</i>	-0.27	0.067	<i>Scleranthus annuus</i>	-0.41	0.037	<i>Descurainia sophia</i>	-0.19	0.005
<i>Sonchus asper</i>	-0.29	0.027	<i>Aphanes arvensis</i>	-0.25	0.006	<i>Arabisopsis thaliana</i>	-0.39	0.019	<i>Lathyrus tuberosus</i>	-0.18	0.003
<i>Arenaria serpyllifolia</i>	-0.29	0.011	<i>Galium aparine</i>	-0.25	0.038	<i>Consolida regalis</i>	-0.39	0.027	<i>Anagallis arvensis</i>	-0.17	0.020
<i>Medicago lupulina</i>	-0.28	0.044	<i>Geranium pusillum</i>	-0.24	0.010	<i>Rumex crispus</i>	-0.37	0.038	<i>Lapsana communis</i>	-0.17	0.012
<i>Cheopodium album</i>	-0.24	0.039	<i>Poa annua</i>	-0.21	0.013	<i>Aphanes arvensis</i>	-0.35	0.011	<i>Vicia hirsuta</i>	-0.17	0.008
<i>Anagallis arvensis</i>	-0.19	0.024	<i>Veronica arvensis</i>	-0.21	0.015	<i>Gnaphalium uliginosum</i>	-0.34	0.014	<i>Matricaria discoidata</i>	-0.17	0.003
<i>Fallopia convolvulus</i>	0.10	0.013	<i>Viola arvensis</i>	-0.15	0.030	<i>Laminium amplexicaule</i>	-0.32	0.025	<i>Mysotis arvensis</i>	-0.17	0.023
<i>Viola arvensis</i>	0.12	0.020	<i>Taraxacum sect. Ruderalia</i>	-0.11	0.007	<i>Rumex acetosella</i>	-0.31	0.010	<i>Anthemis arvensis</i>	-0.16	0.006
<i>Galium aparine</i>	0.16	0.016	<i>Mysotis arvensis</i>	-0.08	0.005	<i>Mysotis arvensis</i>	-0.31	0.023	<i>Polygonum aviculare</i>	-0.15	0.022
<i>Campanula rapunculoides</i>	0.25	0.011	<i>Stene noctiflora</i>	0.180008		<i>Sinapis arvensis</i>	-0.28	0.022	<i>Arrhizum patula</i>	-0.15	0.005
						<i>Medicago lupulina</i>	-0.28	0.016	<i>Campanula rapunculoides</i>	-0.14	0.004

**App. 1.** Internet supplement to: Lososová, Z.; Chytrý, M.; Čimulová, Š.; Kropáč, Z.; Otyčková, Z.; Pyšek, P. & Tichý, L. 2004. Weed vegetation of arable land in Central Europe: Gradients of diversity and species composition. *J. Veg. Sci.* 15: 413-420.

App. 1, cont.

Altitude Species	Ax 1 score	Fit	Season Species	Ax 1 score	Fit	Year Species	Ax 1 score	Fit	Crop Species	Ax 1 score	Fit
<i>Rumex crispus</i>	0.28	0.023	<i>Spergula arvensis</i>	0.18	0.005	<i>Lathyrus tuberosus</i>	-0.24	0.008	<i>Tripleurospermum inodorum</i>	-0.13	0.012
<i>Poa annua</i>	0.32	0.030	<i>Avena fatua</i>	0.19	0.008	<i>Avena fatua</i>	-0.23	0.011	<i>Viola arvensis</i>	-0.13	0.022
<i>Myosotis arvensis</i>	0.33	0.089	<i>Sonchus arvensis</i>	0.19	0.012	<i>Aethusa cynapium</i>	-0.22	0.010	<i>Setaria viridis</i>	-0.13	0.022
<i>Agerostis solonchitica</i>	0.33	0.012	<i>Equisetum arvense</i>	0.20	0.009	<i>Viola hirsuta</i>	-0.22	0.014	<i>Avena fatua</i>	-0.12	0.003
<i>Viola hirsuta</i>	0.35	0.036	<i>Chenopodium album</i>	0.21	0.031	<i>Galeopsis tetralix</i>	-0.15	0.009	<i>Fallopia convolvulus</i>	-0.07	0.007
<i>Chenopodium uliginosum</i>	0.36	0.016	<i>Convolvulus arvensis</i>	0.24	0.032	<i>Angallis arvensis</i>	-0.10	0.007	<i>Taraxacum sect. Ruderalia</i>	0.11	0.007
<i>Setaria viridis</i>	0.38	0.032	<i>Daucus carota</i>	0.26	0.011	<i>Myosotis arvensis</i>	0.11	0.009	<i>Capsella bursa-pastoris</i>	0.12	0.013
<i>Persicaria maculosa</i>	0.38	0.032	<i>Persicaria lapathifolia</i>	0.27	0.020	<i>Stellaria media</i>	0.13	0.013	<i>Lamium purpureum</i>	0.12	0.005
<i>Veronica arvensis</i>	0.39	0.051	<i>Persicaria hydropiper</i>	0.28	0.006	<i>Tripleurospermum inodorum</i>	0.13	0.012	<i>Persicaria maculosa</i>	0.14	0.004
<i>Raphanus raphanistrum</i>	0.41	0.052	<i>Mentha arvensis</i>	0.28	0.021	<i>Veronica persica</i>	0.17	0.021	<i>Raphanus raphanistrum</i>	0.14	0.006
<i>Aethusa cynapium</i>	0.42	0.038	<i>Atriplex panula</i>	0.31	0.023	<i>Euphorbia helioscopia</i>	0.17	0.011	<i>Euphorbia helioscopia</i>	0.19	0.014
<i>Viola sativa</i>	0.42	0.063	<i>Aethusa cynapium</i>	0.31	0.020	<i>Veronica arvensis</i>	0.18	0.011	<i>Stellaria media</i>	0.20	0.029
<i>Stachys palustris</i>	0.46	0.042	<i>Persicaria maculosa</i>	0.33	0.024	<i>Persicaria lapathifolia</i>	0.28	0.022	<i>Geranium pusillum</i>	0.21	0.008
<i>Marricaria discoides</i>	0.51	0.031	<i>Erysimum cheiranthoides</i>	0.33	0.009	<i>Taraxacum sect. Ruderalia</i>	0.28	0.045	<i>Geranium pusillum</i>	0.22	0.005
<i>Achillea millefolium</i>	0.51	0.080	<i>Plantago lanceolata</i>	0.34	0.012	<i>Gallium aparine</i>	0.29	0.051	<i>Chenopodium polyspermum</i>	0.22	0.012
<i>Lapsana communis</i>	0.52	0.116	<i>Stachys palustris</i>	0.35	0.023	<i>Echinochloa crus-galli</i>	0.30	0.007	<i>Erodium cicutarium</i>	0.25	0.009
<i>Ranunculus repens</i>	0.53	0.074	<i>Oxalis fontana</i>	0.35	0.010	<i>Lapsana communis</i>	0.32	0.044	<i>Chenopodium album</i>	0.27	0.049
<i>Poa trivialis</i>	0.53	0.025	<i>Anagallis arvensis</i>	0.36	0.086	<i>Sonchus oleraceus</i>	0.33	0.019	<i>Persicaria lapathifolia</i>	0.29	0.023
<i>Potentilla anserina</i>	0.54	0.024	<i>Serratula arvensis</i>	0.38	0.024	<i>Erysimum cheiranthoides</i>	0.34	0.010	<i>Fumaria officinalis</i>	0.32	0.013
<i>Cerastium holosteoides</i>	0.54	0.039	<i>Plantago major</i>	0.38	0.064	<i>Marricaria discoides</i>	0.34	0.014	<i>Lolium perenne</i>	0.42	0.009
<i>Mentha arvensis</i>	0.55	0.075	<i>Medicago lupulina</i>	0.40	0.021	<i>Ranunculus repens</i>	0.34	0.031	<i>Echinochloa crus-galli</i>	0.51	0.021
<i>Persicaria hydropiper</i>	0.64	0.033	<i>Gnaphalium uliginosum</i>	0.41	0.021	<i>Rumex obtusifolius</i>	0.37	0.013	<i>Chenopodium ficifolium</i>	0.51	0.005
<i>Tussilago farfara</i>	0.71	0.053	<i>Microrrhinum minus</i>	0.42	0.010	<i>Chenopodium polyspermum</i>	0.40	0.019	<i>Chenopodium hybridum</i>	0.52	0.012
<i>Galeopsis pubescens</i>	0.72	0.011	<i>Sonchus oleraceus</i>	0.48	0.040	<i>Amaranthus retroflexus</i>	0.41	0.011	<i>Melba neglecta</i>	0.54	0.005
<i>Viola arvensis</i>	0.76	0.036	<i>Trifolium hybridum</i>	0.49	0.006	<i>Lamium purpureum</i>	0.43	0.058	<i>Amaranthus retroflexus</i>	0.60	0.023
<i>Spergula arvensis</i>	0.79	0.094	<i>Galinisoga quadrifida</i>	0.49	0.014	<i>Lactuca hederacea</i>	0.47	0.011	<i>Euphorbia pephus</i>	0.62	0.006
<i>Rumex acetosella</i>	0.81	0.063	<i>Echinochloa crus-galli</i>	0.50	0.021	<i>Agrostis solonchitica</i>	0.51	0.028	<i>Galinisoga parviflora</i>	0.70	0.030
<i>Prunella vulgaris</i>	0.81	0.016	<i>Setaria viridis</i>	0.51	0.014	<i>Geranium dissectum</i>	0.53	0.033	<i>Solanum nigrum</i>	0.71	0.016
<i>Viola septima</i>	0.81	0.010	<i>Chenopodium polyspermum</i>	0.52	0.031	<i>Lactuca serriola</i>	0.55	0.018	<i>Holcicum umbellatum</i>	0.71	0.004
<i>Veronica serpyllifolia</i>	0.83	0.013	<i>Sonchus asper</i>	0.53	0.090	<i>Artemisia vulgaris</i>	0.56	0.028	<i>Bromus sterilis</i>	0.72	0.004
<i>Stellaria graminea</i>	0.88	0.043	<i>Euphorbia exigua</i>	0.54	0.046	<i>Poa trivialis</i>	0.65	0.037	<i>Galinisoga quadrifida</i>	0.74	0.031
<i>Galeopsis tetralix</i>	0.91	0.326	<i>Anagallis foemina</i>	0.57	0.017	<i>Arctium tomentosum</i>	0.69	0.009	<i>Mercurialis annua</i>	0.80	0.012
<i>Veronica chamaedrys</i>	0.94	0.015	<i>Stachys annua</i>	0.58	0.008	<i>Matva neglecta</i>	0.69	0.008	<i>Amaranthus viridis</i>	0.81	0.003
<i>Phleum pratense</i>	0.96	0.031	<i>Gypsophila muralis</i>	0.58	0.008	<i>Leucanthemum vulgare</i>	0.71	0.015	<i>Artemisia vulgaris</i>	0.83	0.005
<i>Agrostis gigantea</i>	1.04	0.020	<i>Ruscus laevis</i>	0.61	0.007	<i>Rubus caesius</i>	0.71	0.011	<i>Amaranthus viridis</i>	0.83	0.003
<i>Hydroleptium maximum</i>	1.06	0.026	<i>Galinisoga parviflora</i>	0.62	0.024	<i>Poa pratensis</i>	0.79	0.023	<i>Atriplex sagittata</i>	0.87	0.006
<i>Leucanthemum vulgare</i>	1.06	0.033	<i>Alyssa chamaedryis</i>	0.67	0.007	<i>Pastinaca sativa</i>	0.83	0.011	<i>Senecio vulgaris</i>	0.89	0.035
<i>Rumex acetosa</i>	1.20	0.047	<i>Amaranthus retroflexus</i>	0.68	0.030	<i>Euphorbia pephus</i>	0.84	0.012	<i>Hibiscus trionum</i>	0.95	0.003
<i>Trifolium hybridum</i>	1.23	0.039	<i>Kickxia spurta</i>	0.71	0.017	<i>Crepis biennis</i>	0.85	0.012	<i>Atriplex oblongifolia</i>	0.97	0.004
<i>Rhinanthus elecrolophus</i>	1.28	0.023	<i>Euphorbia falcata</i>	0.74	0.016	<i>Symphitum officinale</i>	0.91	0.024	<i>Chenopodium glaucum</i>	0.97	0.010
<i>Lathyrus pratensis</i>	1.32	0.028	<i>Misopates orontium</i>	0.75	0.015	<i>Arrhenatherum elatius</i>	0.95	0.011	<i>Urtica urens</i>	1.27	0.008
<i>Holcus mollis</i>	1.32	0.087	<i>Solanum nigrum</i>	0.80	0.021	<i>Aegopodium podagraria</i>	0.96	0.031	<i>Erucastrum gallicum</i>	1.30	0.003
<i>Sanguisorba officinalis</i>	1.38	0.011	<i>Amaranthus hybridus</i>	0.84	0.007	<i>Leonodon autumnalis</i>	1.04	0.009	<i>Eragrostis minor</i>	1.30	0.004
<i>Hypericum maculatum</i>	1.43	0.026	<i>Kickxia elatine</i>	0.86	0.024	<i>Lolium perenne</i>	1.06	0.062	<i>Aristolochia clematitis</i>	1.36	0.004
<i>Festuca pratensis</i>	1.48	0.037	<i>Amaranthus powellii</i>	0.86	0.010	<i>Urtica dioica</i>	1.12	0.026	<i>Amaranthus blitum</i>	1.60	0.004
<i>Agrostis capillaris</i>	1.63	0.033	<i>Setaria pumila</i>	0.87	0.047	<i>Galinisoga quadrifida</i>	1.14	0.073	<i>Coronopus squamatus</i>	1.81	0.004
<i>Lolium temulentum</i>	2.03	0.010	<i>Salsola verticillata</i>	0.88	0.007	<i>Trisetum flavescens</i>	1.19	0.008	<i>Muscari comosum</i>	1.88	0.003
<i>Equisetum sylvaticum</i>	2.07	0.022	<i>Galeopsis angustifolia</i>	1.00	0.006	<i>Chenopodium aroniticum</i>	1.20	0.012	<i>Galga villosa</i>	2.19	0.006
<i>Achenilla vulgaris</i> s. lat.	2.12	0.063	<i>Carduus nutans</i>	1.71	0.007	<i>Trifolium medium</i>	1.25	0.010	<i>Orrhizogalum boucheanum</i>	2.20	0.003
<i>Melampyrum pratense</i>	3.24	0.018	<i>Achillea setacea</i>	1.97	0.006	<i>Persicaria mitis</i>	1.30	0.015	<i>Tragopogon dubius</i>	2.30	0.007
<i>Rumex crispus</i>	3.25	0.011	<i>Scabiosa ochroleuca</i>	2.03	0.007	<i>Cerastium glomeratum</i>	1.37	0.020	<i>Cerastium brachyepetalum</i>	2.43	0.007

App. 1. Internet supplement to: Lososová, Z.; Chytrý, M.; Cimalová, Š.; Kropáč, Z.; Otyčková, Z.; Pyšek, P. & Tichý, L. 2004. Weed vegetation of arable land in Central Europe: Gradients of diversity and species composition. *J. Veg. Sci.* 15: 413-420.