

Table A1 Collembola species with abbreviations used in PCA (Fig. 2), and classification of taxonomic group, life form and reproductive mode (unkn. – unknown; parth. – parthenogenetic).

Species	Abbreviation	Taxonomic group	Life form	Reproductive Mode
<i>Allacma fusca</i> (Linnaeus, 1758)	<i>All_fusc</i>	Sminthuridae	atmobiote	sexual
<i>Arrhopalites pygmaeus</i> (Wankel, 1860)	<i>Arr_pygm</i>	Arrhopalitidae	hemiedaphic	sexual
<i>Arrhopalites sp./juv.</i> Börner, 1906		Arrhopalitidae	hemiedaphic	sexual
<i>Ballistura cf. hankoi</i> (Stach, 1959)		Isotomidae	epedaphic	unkn./sexual
<i>Brachystomella parvula</i> (Schaeffer, 1896)		Brachystomellidae	hemiedaphic	unkn./sexual
<i>Ceratophysella armata</i> (Nicolet, 1842)	<i>Cera_arm</i>	Hypogastruridae	epedaphic	sexual
<i>Ceratophysella bengtssoni</i> (Ågren, 1904)		Hypogastruridae	epedaphic	sexual
<i>Ceratophysella denticulata</i> (Bagnall, 1941)	<i>Cera_den</i>	Hypogastruridae	epedaphic	sexual
<i>Ceratophysella gibbosa</i> (Bagnall, 1940)		Hypogastruridae	epedaphic	sexual
<i>Ceratophysella luteospina</i> (Stach, 1920)		Hypogastruridae	epedaphic	sexual
<i>Ceratophysella sp./juv.</i> Börner, 1932	<i>Cera_sp</i>	Hypogastruridae	epedaphic	sexual
<i>Ceratophysella succinea</i> (Gisin, 1949)		Hypogastruridae	epedaphic	sexual
<i>Cryptopygus garretti</i> (Bagnall, 1939)		Isotomidae	epedaphic	sexual
<i>Desoria violacea</i> (Tullberg, 1876)	<i>Deso_vio</i>	Isotomidae	epedaphic	sexual ¹⁾
<i>Deuteraphorura inermis</i> (Tullberg, 1871)	<i>Deut_ine</i>	Onychiuridae	euedaphic	sexual ¹⁾
<i>Deuterosminthurus pallipes</i> (Bourlet, 1842)		Bourletiellidae	epedaphic	unkn./sexual
<i>Deuterosminthurus sp.</i> Börner, 1901		Sminthuridae	epedaphic	unkn./sexual
<i>Dicyrtoma fusca</i> (Lubbock, 1873)		Sminthuridae	atmobiote	sexual
<i>Dicyrtomina minuta</i> (Nicolet, 1842)		Dicyrtomidae	atmobiote	sexual
<i>Dicyrtomina ornata</i> (Nicolet, 1842)	<i>Dicy_orn</i>	Dicyrtomidae	atmobiote	sexual
<i>Entomobrya cf. multifasciata</i> (Tullberg, 1871)		Entomobryidae	atmobiote	sexual
<i>Entomobrya corticalis</i> (Nicolet, 1842)		Entomobryidae	atmobiote	sexual
<i>Entomobrya marginata /lanuginosa</i> (Tullberg, 1871)	<i>Ent_marg</i>	Entomobryidae	atmobiote	sexual
<i>Entomobrya quinquelineata</i> Börner, 1901		Entomobryidae	atmobiote	sexual
<i>Entomobryidae juv.</i>	<i>Ent_juv</i>	Entomobryidae	atmobiote	sexual
<i>Folsomia brevicauda</i> Agrell, 1939		Isotomidae	hemiedaphic	sexual
<i>Folsomia fimetaria</i> (Linnaeus, 1758)		Isotomidae	hemiedaphic	sexual
<i>Folsomia juv.</i>		Isotomidae	hemiedaphic	sexual
<i>Folsomia ksenemani</i> Stach, 1947		Isotomidae	hemiedaphic	sexual
<i>Folsomia litsteri</i> (Bagnall, 1939)		Isotomidae	hemiedaphic	sexual
<i>Folsomia quadrioculata</i> (Tullberg, 1871)	<i>Fols_qua</i>	Isotomidae	hemiedaphic	sexual
<i>Folsomia spinosa</i> (Kseneman, 1936)	<i>Fols_spi</i>	Isotomidae	hemiedaphic	parth. ²⁾

<i>Friesea claviseta</i> Axelson, 1900		Neanuridae	epedaphic	sexual
<i>Friesea mirabilis</i> (Tullberg, 1871)	<i>Fries_mi</i>	Neanuridae	epedaphic	sexual
<i>Friesea truncata</i> Cassagnau, 1958		Neanuridae	epedaphic	sexual
<i>Gisianus flammeolus</i> (Gisin, 1957)		Katiannidae	epedaphic	unkn./sexual
<i>Hymenaphorura juv.</i> Bagnall 1948		Onychiuridae	euedaphic	unkn./sexual
<i>Hypogastrura burkilli</i> (Bagnall, 1940)		Hypogastruridae	epedaphic	sexual
<i>Hypogastrura purpurascens</i> (Lubbock, 1868)	<i>Hyp_purp</i>	Hypogastruridae	epedaphic	unkn./sexual
<i>Hypogastrura sahlbergi</i> (Reuter, 1895)		Hypogastruridae	epedaphic	unkn./sexual
<i>Isotoma hiemalis</i> Schött, 1893		Isotomidae	epedaphic	sexual
<i>Isotoma juv. (cf. viridis)</i>		Isotomidae	epedaphic	sexual
<i>Isotomidae</i>	<i>Isotom</i>	Isotomidae	hemiedaphic	unkn./sexual
<i>Isotomiella minor</i> (Schäffer, 1896)	<i>Iso_mino</i>	Isotomidae	euedaphic	parth. ³⁾
<i>Isotomurus palustris</i> (Muller, 1776)		Isotomidae	epedaphic	sexual
<i>Lepidocyrtus curvicolis</i> Bourlet, 1839	<i>Lepi_cur</i>	Entomobryidae	epedaphic	sexual
<i>Lepidocyrtus cyaneus</i> Tullberg, 1871	<i>Lepi_cya</i>	Entomobryidae	epedaphic	parth. ³⁾
<i>Lepidocyrtus juv.</i> Bourlet, 1839	<i>Lepi_juv</i>	Entomobryidae	epedaphic	sexual
<i>Lepidocyrtus lanuginosus</i> (Gmelin, 1788)	<i>Lepi_lanu</i>	Entomobryidae	epedaphic	sexual
<i>Lepidocyrtus lignorum</i> (Fabricius, 1793)	<i>Lepi_lig</i>	Entomobryidae	epedaphic	sexual
<i>Lepidocyrtus violaceus</i> (Geoffroy, 1762)	<i>Lepi_vio</i>	Entomobryidae	epedaphic	sexual
<i>Lipothrix (Sphyrotheca) lubbocki</i> (Tullberg, 1872)	<i>Lipo_lub</i>	Sminthuridae	epedaphic	sexual
<i>Megalothorax minimus</i> Willem, 1900	<i>Mega_min</i>	Neelidae	euedaphic	parth. ⁴⁾
<i>Mesaphorura italica</i> (Rusek, 1971)		Tullbergiidae	euedaphic	parth. ⁵⁾
<i>Mesaphorura jarmilae</i> Rusek, 1982		Tullbergiidae	euedaphic	unkn./parth.
<i>Mesaphorura macrochaeta</i> Rusek, 1976	<i>Mesa_mac</i>	Tullbergiidae	euedaphic	parth. ⁶⁾
<i>Mesaphorura sp.</i> Börner, 1901	<i>Mesa_sp</i>	Tullbergiidae	euedaphic	unkn./parth.
<i>Mesaphorura sylvatica</i> (Rusek, 1971)	<i>Mesa_syl</i>	Tullbergiidae	euedaphic	parth. ⁷⁾
<i>Mesaphorura tenuisensillata</i> Rusek, 1974		Tullbergiidae	euedaphic	parth. ⁸⁾
<i>Mesaphorura yosii</i> (Rusek, 1967)	<i>Mesa_yos</i>	Tullbergiidae	euedaphic	unkn./parth.
<i>Metaphorura affinis</i> (Börner, 1903)		Tullbergiidae	euedaphic	parth. ⁶⁾
<i>Micanurida forsslundi</i> Gisin, 1949		Neanuridae	euedaphic	unkn./sexual
<i>Micranurida cf. sensillata</i> (Gisin, 1953)		Neanuridae	euedaphic	unkn./sexual
<i>Micranurida granulata</i> (Agrell, 1943)	<i>Micra_gr</i>	Neanuridae	euedaphic	unkn./sexual
<i>Micranurida juv.</i> Börner, 1901		Neanuridae	euedaphic	unkn./sexual
<i>Micranurida pygmaea</i> Börner, 1901	<i>Micra_py</i>	Neanuridae	euedaphic	parth. ⁹⁾
<i>Micraphorura absoloni</i> (Börner, 1901)	<i>Micra_ab</i>	Onychiuridae	euedaphic	parth. ^{10), 11)}
<i>Neanura muscorum</i> (Templeton, 1835)	<i>Nean_mus</i>	Neanuridae	hemiedaphic	parth. ³⁾
<i>Neelides minutus</i> (Folsom, 1901)		Neelidae	euedaphic	parth. ¹²⁾
<i>Neonaphorura duboscqi</i> (Denis, 1932)		Tullbergiidae	euedaphic	unkn./sexual

<i>Neotullbergia ramicuspis</i> (Gisin, 1953)		Onychiuridae	euedaphic	sexual
<i>Oncopodura crassicornis</i> Shoebbotham, 1911		Oncopoduridae	euedaphic	unkn./sexual
<i>Orchesella bifasciata</i> (Bourlet, 1839)		Entomobryidae	atmobiotic	sexual
<i>Orchesella cf. flavescens</i> (Bourlet, 1839)		Entomobryidae	atmobiotic	parth. ³⁾
<i>Paratullbergia callipygos</i> (Börner, 1902)	<i>Para_cal</i>	Tullbergiidae	euedaphic	parth. ^{6), 11)}
<i>Paratullbergia macdougalli</i> Bagnall, 1936		Tullbergiidae	euedaphic	unkn./parth.
<i>Paratullbergia sp.</i> Womersley, 1930	<i>Parat_sp</i>	Tullbergiidae	euedaphic	unkn./parth.
<i>Parisotoma notabilis</i> (Schaeffer, 1896)	<i>Pari_not</i>	Isotomidae	hemiedaphic	parth ³⁾
<i>Proisotoma minima</i> (Absolon, 1901)		Isotomidae	epedaphic	parth ⁹⁾
<i>Proisotoma minuta</i> (Tullberg, 1871)	<i>Prois_mi</i>	Isotomidae	epedaphic	sexual ¹⁾
<i>Protaphorura armata</i> (Tullberg, 1869)	<i>Prota_ar</i>	Onychiuridae	euedaphic	parth ⁵⁾
<i>Protaphorura aurantiaca</i> (Ridley, 1880)		Onychiuridae	euedaphic	sexual
<i>Protaphorura fimata</i> (Gisin, 1952)	<i>Prota_fi</i>	Onychiuridae	euedaphic	sexual
<i>Protaphorura quadricellata</i> (Gisin, 1947)	<i>Prota_qu</i>	Onychiuridae	euedaphic	sexual
<i>Protaphorura sp.</i> Absolon, 1901	<i>Prota_sp</i>	Onychiuridae	euedaphic	sexual
<i>Pseudachorutes cf. dubius</i> Krausbauer, 1898		Neanuridae	epedaphic	sexual
<i>Pseudachorutes subcrassus</i> Tullberg, 1871		Neanuridae	epedaphic	sexual
<i>Pseudanurophorus binoculatus</i> Kseneman, 1934		Isotomidae	hemiedaphic	parth. ¹⁾
<i>Pseudosinella alba</i> (Packard, 1873)	<i>Pseud_al</i>	Entomobryidae	euedaphic	sexual
<i>Pseudosinella decipiens</i> Denis, 1924		Entomobryidae	euedaphic	unkn./sexual
<i>Pseudosinella immaculata</i> (Lie-Pettersen, 1896)		Entomobryidae	euedaphic	unkn./sexual
<i>Pseudosinella ksenemani /denisi</i> (Gisin, 1954)		Entomobryidae	euedaphic	unkn./sexual
<i>Sminthuridae juv.</i>		Sminthurididae	epedaphic	unkn./sexual
<i>Sminthurides sp.</i> Börner, 1900		Sminthurididae	epedaphic	unkn./sexual
<i>Sminthurinus aureus</i> (Lubbock, 1862)	<i>Sminth_a</i>	Katiannidae	epedaphic	sexual/both
<i>Sminthurinus niger</i> (Lubbock, 1868)	<i>Sminth_n</i>	Katiannidae	epedaphic	sexual ³⁾
<i>Sminthurinus sp. juv.</i> Börner, 1901	<i>Sminthur</i>	Katiannidae	epedaphic	unkn./sexual
<i>Sminthurus viridis</i> (Linnaeus, 1758)	<i>Sminth_v</i>	Sminthuridae	epedaphic	unkn./sexual
<i>Sphaeridia pumilis</i> (da Gama, 1964)	<i>Sphae_pu</i>	Sminthurididae	epedaphic	sexual ³⁾
<i>Stenaphorura denisi</i> (Bagnall, 1935)	<i>Stena_de</i>	Tullbergiidae	euedaphic	parth ^{7), 11)}
<i>Stenaphorura quadripina</i> (Börner, 1901)		Tullbergiidae	euedaphic	sexual
<i>Supraphorura furcifera</i> (Börner, 1901)	<i>Supra_fu</i>	Onychiuridae	euedaphic	unkn./sexual
<i>Tomocerus baudoti</i> Denis, 1932		Tomoceridae	epedaphic	sexual
<i>Tomocerus flavescens</i> (Tullberg, 1871)	<i>Tomo_fla</i>	Tomoceridae	epedaphic	sexual
<i>Tomocerus minor</i> (Lubbock, 1862)	<i>Tomo_mino</i>	Tomoceridae	epedaphic	sexual

<i>Tomocerus minutus</i> (Tullberg, 1876)	<i>Tomo_minu</i>	Tomoceridae	epedaphic	sexual
<i>Tomocerus vulgaris</i> (Tullberg, 1871)	<i>Tomo_vul</i>	Tomoceridae	epedaphic	sexual
<i>Tullbergia simplex</i>	<i>Tulb_si</i>	Tullbergiidae	euedaphic	parth ⁶⁾
<i>Willemia anophthalma</i> Börner, 1901		Hypogastruridae	euedaphic	parth ⁹⁾
<i>Willemia aspinata</i> Stach, 1949		Hypogastruridae	euedaphic	parth ³⁾
<i>Xenylla sp.</i> Tullberg, 1869		Hypogastruridae	epedaphic	unkn./sexual
<i>Xenylla grisea</i> Axelson, 1900		Hypogastruridae	epedaphic	sexual ¹³⁾

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References for classification of life form

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Table A2 Repeated measures GLM for differences in the abundance of parthenogenetic and sexual Collembola as influenced by region (Explo), forest type (Forest) and year (Date). Parthenogenetic – species that were observed to have parthenogenetic populations; Sexual – species with sexual reproduction; Complete parth. and Complete sex. - including “unknown/parthenogenetic” and “unknown/sexual” species, respectively, from Table A1. Significant effects are marked in bold.

	DF	Parthenogenetic		Sexual		Complete parth.		Complete sex.	
		F	p	F	p	F	p	F	p
Between subject effects									
Explo	2	1.08	0.351	1.82	0.177	0.44	0.645	1.98	0.153
Forest	3	4.05	0.014	0.56	0.647	5.65	0.003	0.51	0.681
Explo*Forest	6	1.18	0.341	1.58	0.181	0.87	0.527	1.51	0.204
Error	36								
Within subject effects									
Date	1	9.59	0.004	1.18	0.285	18.14	0.0001	1.60	0.214
Date*Explo	2	7.65	0.002	5.55	0.008	11.08	0.0002	5.03	0.012
Date*Forest	3	1.02	0.397	1.30	0.290	2.33	0.091	1.30	0.289
Date*Explo*Forest	6	0.58	0.741	0.56	0.758	0.92	0.492	0.53	0.783
Error	36								

Table A3 Regression weights for paths in structural equation models for Collembola abundance at a) T1 and b) T2 and c) and d) for abundance of only parthenogenetic and sexual Collembola at T1, respectively. Estimate – estimate of regression weight, S.E. – standard error for estimate, C.R. – critical ratio for regression weight, P – level of significance for regression weight, *** - P< 0.001. For the respective structural equation models see Fig. 4 a), b), c) and d).

a) T1		Estimate	S.E.	C.R.	P
pH soil	← ForMI	.005	.181	.027	.979
fung/bact litter	← ForMI	-.718	.293	-2.447	.014
fung/bact litter	← pH_soil	.924	.244	3.791	***
CN ratio litter	← fung/bact litter	.784	.573	1.368	.171
litter (g/cm ²)	← ForMI	.141	.060	2.338	.019
litter (g/cm ²)	← pH soil	.025	.054	.464	.642
litter (g/cm ²)	← fung/bact litter	-.091	.029	-3.139	.002
CN ratio litter	← pH soil	-.844	1.121	-.753	.452
C _{mic} soil	← pH soil	513.449	46.805	10.970	***
C _{mic} soil	← ForMI	6.270	56.334	.111	.911
summe_ind	← fung/bact litter	2125.608	2813.986	.755	.450
summe_ind	← litter (g/cm ²)	47931.214	12488.027	3.838	***
summe_ind	← C _{mic} soil	-.378	13.162	-.029	.977
summe_ind	← pH soil	-18051.671	8242.627	-2.190	.029
summe_ind	← CN ratio litter	-446.179	622.902	-.716	.474

b) T2		Estimate	S.E.	C.R.	P
pH soil	← ForMI	-.144	.193	-.747	.455
fung/bact litter	← ForMI	-.355	.200	-1.771	.077
fung/bact litter	← pH soil	.351	.150	2.344	.019
CN ratio litter	← fung/bact litter	.813	.826	.984	.325
litter (g/cm ²)	← ForMI	.006	.017	.376	.707
litter (g/cm ²)	← pH_soil	-.065	.013	-5.006	***
CN ratio litter	← pH soil	-.839	1.145	-.732	.464
C _{mic} soil	← pH soil	445.878	78.076	5.711	***
C _{mic} soil	← ForMI	67.753	104.260	.650	.516
litter (g/cm ²)	← fung/bact litter	.003	.012	.262	.793
summe_ind	← litter (g/cm ²)	52085.806	53425.213	.975	.330
summe_ind	← C _{mic} soil	18.077	8.591	2.104	.035
summe_ind	← pH soil	3581.515	7084.716	.506	.613
summe_ind	← fung/bact litter	-2111.746	4321.431	-.489	.625
summe_ind	← CN ratio litter	-1501.520	753.980	-1.991	.046

c) T1 parth.		Estimate	S.E.	C.R.	P
pH soil	← ForMI	.019	.175	.106	.916
fung/bact litter	← ForMI	-.717	.289	-2.481	.013
fung/bact litter	← pH soil	.914	.240	3.807	***
C _{mic} soil	← pH soil	526.086	49.066	10.722	***
C _{mic} soil	← ForMI	-38.905	59.084	-.658	.510
CN ratio litter	← fung/bact litter	.783	.571	1.372	.170
litter (g/cm ²)	← ForMI	.139	.058	2.410	.016
litter (g/cm ²)	← pH_soil	.029	.052	.565	.572
litter (g/cm ²)	← fung/bact litter	-.087	.028	-3.053	.002

CN ratio litter	←	pH soil	-1.660	1.828	-.908	.364
CN ratio litter	←	C _{mic} soil	.002	.003	.602	.547
Parth Coll.	←	fung/bact litter	379.930	2211.579	.172	.864
Parth Coll.	←	litter (g/cm ²)	36104.836	9730.269	3.711	***
Parth Coll.	←	C _{mic} soil	-5.622	9.249	-.608	.543
Parth Coll.	←	pH soil	-11153.273	6038.875	-1.847	.065
Parth Coll.	←	CN ratio litter	165.826	475.213	.349	.727

d) T1 sex.			Estimate	S.E.	C.R.	P
pH soil	←	ForMI	.012	.177	.066	.947
fung/bact litter	←	ForMI	-.707	.295	-2.399	.016
fung/bact litter	←	pH soil	.885	.243	3.641	***
CN ratio litter	←	fung/bact litter	.613	.566	1.083	.279
litter (g/cm ²)	←	ForMI	.138	.057	2.413	.016
litter (g/cm ²)	←	pH soil	.022	.051	.430	.667
litter (g/cm ²)	←	fung/bact litter	-.089	.028	-3.226	.001
CN ratio litter	←	pH soil	-.593	1.082	-.548	.584
C _{mic} soil	←	pH soil	526.692	48.708	10.813	***
C _{mic} soil	←	ForMI	-39.182	59.046	-.664	.507
Sexual Coll.	←	fung/bact litter	2946.534	1419.855	2.075	.038
Sexual Coll.	←	litter (g/cm ²)	10190.887	6463.087	1.577	.115
Sexual Coll.	←	C _{mic} soil	4.096	6.046	.678	.498
Sexual Coll.	←	pH soil	-7170.213	3911.652	-1.833	.067
Sexual Coll.	←	CN ratio litter	-1004.070	308.113	-3.259	.001