

Appendix 1: Table illustrating the earthworm species determination key

Soortnaam	Ecologische categorie ¹	Pro-stomium ²	Purple-red pigment	Brushes ³	Gland (segment nummers)
<i>Lumbricus terrestris</i>	an	tan	ja	DG	(14)-15-(16)
<i>Lumbricus rubellus</i>	ep	tan	ja	DG	geen
<i>Lumbricus castaneus</i>	ep	tan	ja	DG	geen
<i>Lumbricus festivus</i>		tan	ja	DG	14-16
<i>Lumbricus eiseni</i>		tan	ja	DG	15
<i>Eisenia fetida</i>	ep	epi	ja	DG	15
<i>Eiseniella tetraedra</i>	ep	epi	nee (soms wel)	DG	13
<i>Dendrodrilus rubidus rubidus</i>	ep	epi	ja	WG tot U	15
<i>Dendrodrilus rubidus subrubicundus</i>	ep	epi	ja	WG tot U	15
<i>Dendrodrilus rubidus tenuis</i>	ep	epi	ja	WG	15
<i>Dendrobaena attemsi</i>	ep	epi	dorsaal	U	15
<i>Dendrobaena octaedra</i>	ep	epi	ja	U	15
<i>Dendrobaena pygmaea</i>	ep	epi	nee	WG	(14)-15-(16)
<i>Satchellius mammalis</i>		epi	ja	U	14-16
<i>Aporrectodea longa</i>	an	epi	nee	DG	14-16
<i>Aporrectodea caliginosa f. typica</i>	en	epi	nee	DG	14-16
<i>Aporrectodea caliginosa f. trapezoides</i>	en	epi	nee	DG	14-16
<i>Aporrectodea limicola</i>	en	epi	nee	DG	14-16
<i>Aporrectodea rosea</i>	en	epi	nee	DG	15
<i>Aporrectodea icterica</i>	en	epi	nee	DG	14-16
<i>Aporrectodea oculata</i>	en	tan	nee	DG	14-16
<i>Allolobophora chlorotica</i>	en	epi	nee	DG	14-16
<i>Octolasion cyaneum</i>	en	epi	nee	WG tot U	15
<i>Octolasion lacteum</i>	en	epi	nee	WG tot U	14-16

Clitelum start	Clitelum end	Cilitelum (segment nummers)	Tuberculata pubertatis (segment nummers)	Lengthe (mm)	Number of segments
31,32	37	31,32-37	33-36	90-300	110-180
26,27	32	26,27-32	28-31	40-150	65-150
28	33	28-33	29-32	30-85	80-120
34	39	34-39	(34,35)36-38	50-110	-
24,25	32,(33)	24,25-32,(33)	geen	30-65	75-110
(24),25,26	31,32	(24),25,26-31,32	28-30,31	30-130	80-115
(22),23	26,(27)	(22),23-26,(27)	(23)1/2 23-25(26)	15-80	-
26,27	31,32	26,27-31,32	29-30	25-60	50-107
25,26	31,32	25,26-31,32	28-30	27-90	60-110
25,26,27	30,31,32,33	25,26,27-30,31,32,33	afwezig of 28,29,1/2 29-30,31	20-85	90-120
28	33,34	28-33,34	29,30-32,33	20-50	100-150
27,28,29	33,34	27,28,29-33,34	30,31-33	17-70	70-105
33	37	33-37	geen	20	
31	36	31-36	33-34	-	
27,28	35	27,28-35	(31)32-34	90-160	160-200
26,27,28	34,35	26,27,28-34,35	31,33	40-130	100-250
26,27,28	34,35	26,27,28-34,35	31-33	40-130	100-250
(28)29	35(36)	(28)29-35(36)	33-34	70-90	-
24,25,26	32,33	24,25,26-32,33	29-30,31	25-170	10-170
(32,33,34)35	1/2 - 43(43-1/2,44)	(32,33,34)35-1/2 - 43(43-1/2,44)	(35,36,37)38-41(42,43,44)	60-80	-
(21)22	32	(21)22-32	29-30	35-75	-
28,29	37	28,29-37	31,33,35	30-70	80-130
29	34	29-34	29,30-33,34	50-180	100-160
30	35	30-35	1/2 30,30-34,1/2 35	30-160	85-165

Appendix 2: Table illustrating earthworm data

Plot	Replicate	Density (/m ²)	Biomass (g/m ²)	Plot	Replicate	Density (/m ²)	Biomass (g/m ²)
5	N	72	7,2	26	N	298	11,22
5	SE	164	15,6	26	SE	250	27,2
5	SW	96	a6,18	26	SW	88	19,18
7	N	478	49,9	29	N	712	15,4
7	SE	224	28,92	29	SE	538	14,1
7	SW	324	33,32	29	SW	294	8,04
15	N	102	6,92	36	N	262	6,86
15	SE	140	11,46	36	SE	196	6,5
15	SW	168	10,94	36	SW	392	8,24
17	N	120	2,18	38	N	132	5,96
17	SE	156	2,74	38	SE	158	7,74
17	SW	160	1,94	38	SW	110	4,86
19	N	242	8,08	49	N	84	1,44
19	SE	68	2,82	49	SE	262	5,14
19	SW	106	2,42	49	SW	212	8,66
20	N	236	31,64	51	N	48	0,38
20	SE	226	25,74	51	SE	118	2,38
20	SW	126	10,44	51	SW	48	0,74
25	N	442	16,1	52	N	24	27,62
25	SE	240	4,54	52	SE	42	29,6
25	SW	484	13,18	52	SW	8	2,88

Appendix 3: Table illustrating leaf litterfall data

Litter quality was assessed by ICP analysis on fresh leaves collected in summer 2024.

Nr	Species	N	C	C/N	Al	Ca	Cu	Fe
/	/	[%]	[%]		[mg/kg sample]	[mg/kg sample]	[mg/kg sample]	[mg/kg sample]
5	Thuja plicata	1,230	48,55	39,49		90,12	8965,47	5,31
7	Calocedrus decurrens	1,300	48,22	37,08		111,14	13760,33	3,51
15	Juglans cinerea	2,855	45,11	15,80		161,84	17350,66	9,42
17	Tsuga canadensis	1,767	49,02	27,75		249,63	5943,47	4,12
19	Betula alleghaniensis	2,453	45,93	18,72		114,17	9521,49	9,55
20	Acer saccharinum	3,029	45,87	15,14		113,45	8668,60	10,81
25	Quercus rubra	2,010	46,42	23,10		88,00	9248,32	6,31
26	Tilia americana	2,806	44,39	15,82		120,81	18640,77	6,43
29	Quercus robur	2,905	46,5	16,01		128,77	8555,44	61,61
36	Pinus nigra	1,412	48,61	34,44		365,33	5143,87	3,69
38	Fagus sylvatica	2,561	46,43	18,13		177,82	7492,39	8,41
49	Cryptomeria japonica	1,327	48,04	36,21		95,20	18249,11	6,24
51	Larix kaempferi	2,283	46,83	20,51		193,86	6565,99	5,63
52	Juglans mandshurica	2,687	43,76	16,29		134,64	18365,32	8,05

K	Mg	Mn	Na	P	S
[mg/kg sample]	[mg/kg sample]	[mg/kg sample]	[mg/kg sample]	[mg/kg sample]	[mg/kg sample]
8395,03	1317,92		780,96	66,52	1305,48
5156,04	1704,38		176,14	238,94	1203,34
14272,13	3539,03		1066,06	126,43	1601,96
7175,54	1303,85		1561,82	26,75	1740,78
15011,70	2803,45		4143,93	67,80	1886,04

13828,76	2648,96	2717,46	135,19	2959,36	1565,86
9352,12	1751,94	1582,58	55,42	1393,23	1137,65
16423,60	3334,08	180,07	119,76	3237,10	1331,67
14433,33	1204,11	1198,25	145,28	2996,05	1538,63
4751,46	882,49	799,21	68,55	918,14	653,87
9081,85	1762,04	1372,43	264,16	1260,49	1310,58
5326,74	3013,27	47,66	52,83	1289,15	1413,64
9665,90	1861,06	2008,01	71,09	1614,29	1337,00
21391,45	4111,65	458,38	123,94	1644,27	1392,98

Appendix 4: Table illustrating soil data between 0 and 5 cm

Soil samples were taken at three depths (0-5 cm, 5-10 cm, 10-20 cm), with four replicates per plot combined into one composite sample per depth. Samples were air-dried, crushed, sieved and corrected for residual moisture before laboratory analysis. Particle size analysis was carried out by the La Hulpe laboratory (see Elisa di Francesco's master thesis (2022-2023) for additional information).

Units	g/cm ³	Scale	Scale	cmolc/kg	cmolc/kg	cmolc/kg	cmolc/kg	cmolc/kg	cmolc/kg	cmolc/kg	cmolc/kg	%	%	%
Plot	Bulk_dens	pH H2O	pH_BaCl2	Al	K	Ca	Fe	Mg	Mn	Na	H+	BS	C	N
5	0,883	4,3	3,68	2,843	0,191	0,685	0,121	0,652	0,390	0,000	1,780	24,844	6,42	0,34
7	0,518	5,21	4,74	0,404	0,717	7,544	0,014	2,844	0,305	0,070	0,363	93,583	8,575	0,555
15	0,627	5,51	3,94	3,028	0,577	1,605	0,031	1,527	0,428	0,102	0,882	49,363	4,91	0,4
17	0,558	3,94	3,18	5,896	0,405	0,700	0,728	1,473	0,281	0,157	2,651	24,241	11,74	0,57
19	0,452	3,91	3,22	5,278	0,532	0,304	0,290	1,289	0,387	0,139	3,054	21,371	11,705	0,66
20	0,244	3,83	3,35	3,173	0,668	1,047	0,255	3,027	0,625	0,205	3,738	41,717	19,22	1,06
25	0,632	4,11	3,43	8,545	0,362	0,154	0,364	0,969	0,045	0,112	0,963	14,391	7,66	0,515
26	0,613	5,53	5,3	0,211	0,385	1,997	0,017	2,975	0,154	0,082	0,750	84,992	5,985	0,46
29	0,364	3,95	3,42	3,823	0,739	2,268	0,422	1,902	0,840	0,095	2,974	42,400	12,455	0,74
36	0,609	3,76	3,09	6,005	0,394	0,614	0,494	0,947	0,265	0,006	3,162	17,622	11,595	0,565
38	0,745	4,21	3,51	4,786	0,267	0,571	0,103	0,492	0,223	0,003	1,489	17,521	6,435	0,405
49	0,416	3,95	3,18	7,668	0,173	0,564	0,679	1,889	0,209	0,127	1,751	22,615	24,52	1,065
51	0,448	3,65	2,84	7,259	0,304	0,265	0,742	1,346	0,072	0,161	5,354	14,139	13,09	0,555
52	0,763	5,38	4,73	0,222	0,250	2,432	0,010	3,874	0,169	0,050	0,623	88,664	4,245	0,305

Appendix 5: Table illustrating plot characteristics

The plot characteristics were determined mainly by a forest inventory carried out over an area of 1018 m² (circle with a radius of 18 m), enabling the species present to be identified and the diameter of the trees to be measured.

Units	Coord	Coord	Meter	categ	categ	categ	categ	categ	Years	m ² /ha
id	x	y	Elevation	Soil_type	Genus	Species	Conif	Mycorr	Age_dom_tree	Basal_area
5	159025	165682	117,13	Aba0(b)	Cupressaceae	Thuja plicata	Conif	AM	123	102,4954
7	159093	165828	94,28	Abc0	Cupressaceae	Calocedrus decurrens	Conif	AM	119	79,4178
15	158904	166101	114,95	Aba0(b)	Juglandaceae	Juglans cinerea	Broad	AM	115	28,9596
17	158909	165996	114,03	Aba0(b)	Pinaceae	Tsuga canadensis	Conif	EcT	119	44,5646
19	158996	166071	111,9	Aba0(b)	Betulaceae	Betula alleghaniensis	Broad	EcT	53	29,604
20	159262	166233	100,03	Aba0(b)	Sapindaceae	Acer saccharinum	Broad	AM	121	50,8729
25	159424	166261	92,59	Aba0(b)	Fagaceae	Quercus rubra	Broad	EcT	73	47,3082
26	159630	166476	87,17	Aba0(b)	Malvaceae	Tilia americana	Broad	EcT	73	22,4066
29	160219	166804	89,14	Aba0(b)	Fagaceae	Quercus robur	Broad	EcT	121	32,2907
36	159923	166533	95,58	Aba0(b)	Pinaceae	Pinus nigra subsp. laricio	Conif	EcT	63	50,1228
38	160311	166649	91,96	Aba0(b)	Fagaceae	Fagus sylvatica	Broad	EcT	43	38,7727
49	160458	166557	87,31	Aba0(b)	Cupressaceae	Cryptomeria japonica	Conif	AM	58	75,0903
51	160274	166371	86,39	Aba0(b)	Pinaceae	Larix kaempferi	Conif	EcT	98	37,4268
52	160078	166326	90,34	Aba0(b)	Juglandaceae	Juglans mandshurica	Broad	AM	115	36,848

#/ha	coeficient of variancce	Percentage	Percentage	Percentage	g/m²	g/m²	Percentage	Leaf litterfall/organic layer	1-5 scale	cm²/g
Stem_density	Stratification	Canopy_cover	Shrub_cover	Herb_cover	Org_layer_dry_weight	Leaf_litter	Non_leaf_litter	Leaf_turnover_rate	Shade_tol	SLA
314	0,2567	0,893229	0	0,0733	1135,2	436,8	0,332688	0,384778	4,73	17,82156
265	0,6424	0,927083	0,02	0,2233	687,8	690,3	0,437832	1,003635	3,21	11,34361
363	0,6247	0,958333	0,05	0,63	814,8	456,8	0,24992	0,560628	1,88	47,47253
98	0,4306	0,934896	0,06	0,61	3863,8	460,8	0,371478	0,119261	4,83	28,34711
521	0,4251	0,971354	0	0,1733	262	459,7	0,386635	1,75458	3,17	83,86059
236	0,6718	0,940104	0	0,5467	481,6	406,7	0,253577	0,844477	3,6	59,79615
373	0,7747	0,960938	0,05	0,69	647,6	455,3	0,24556	0,703057	2,75	50,16553
246	0,5554	0,895833	0,315	0,78	336,8	441,2	0,335876	1,309976	3,98	61,75628
275	0,668	0,869792	0,6	0,9567	1128	432,5	0,505183	0,383422	2,45	45,79193
383	0,2383	0,770833	0,15	0,8933	1464,2	545,2	0,279609	0,372354	2,1	13,50258
914	0,6131	0,984375	0,03	0,05	1088	518,8	0,212505	0,476838	4,56	71,90611
521	0,2488	0,867188	0	0,34	2728,2	222,9	0,625532	0,081702	3,17	22,71996
138	0,2603	0,877604	0,01	0,19	6578	314,1	0,343915	0,04775	1,38	23,62074
305	0,9395	0,950521	0,36	0,73	523,8	454,9	0,480818	0,868461	2,75	52,32899

Appendix 6: Descriptive analyses

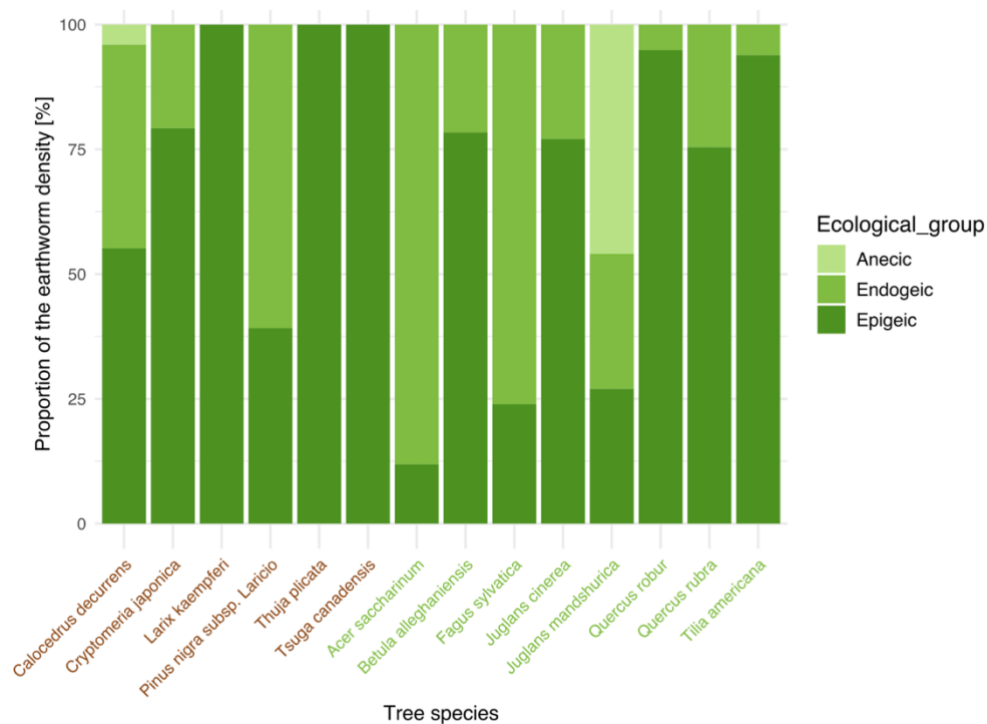


Figure a: Plot representing the proportion of each ecological category (anecic, endogeic and epigeic) in every plot (in percentage of the earthworm density in earthworms/m²)

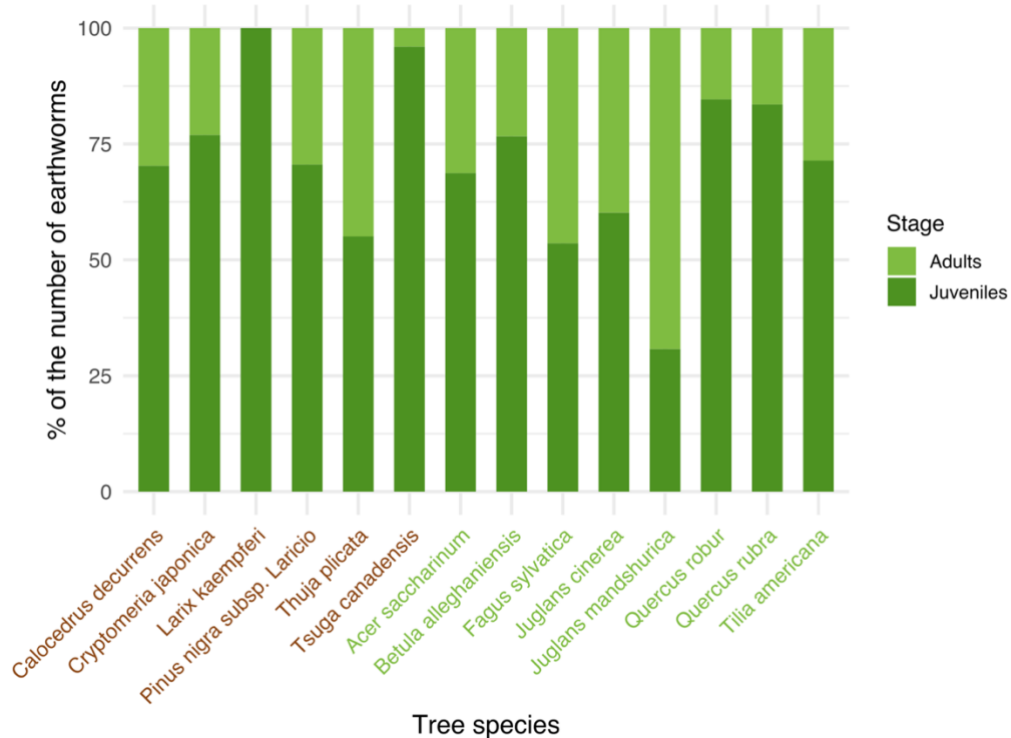


Figure b: Plot showing the proportion of adult and juvenile earthworms in each plot, expressed as a percentage of the total earthworm density (earthworms/m²)

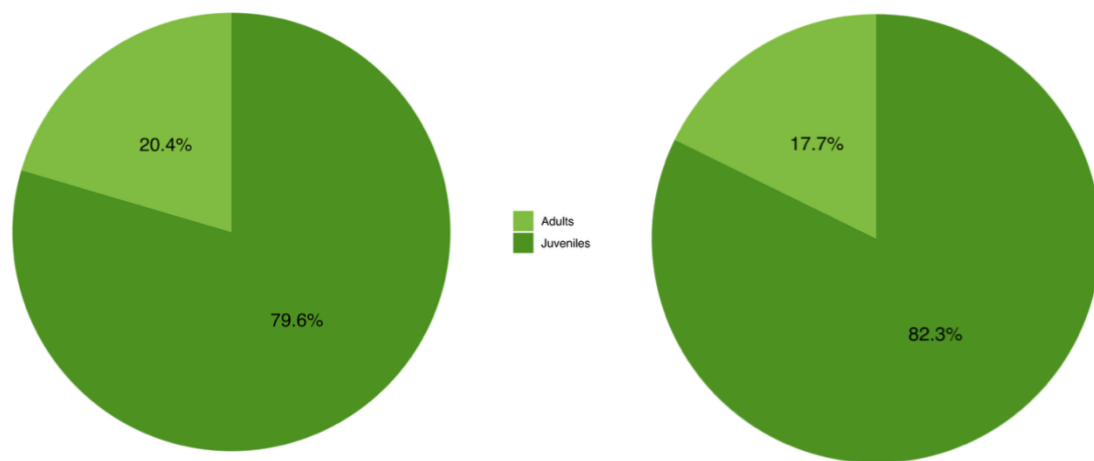


Figure c: Pie charts representing the proportion of each life stage (adult and juvenile) for both tree types, left combined for broadleaved trees, right the coniferous trees with the percentage of occurrence of each ecological category occurrence (based on the earthworm density in earthworms/m²).

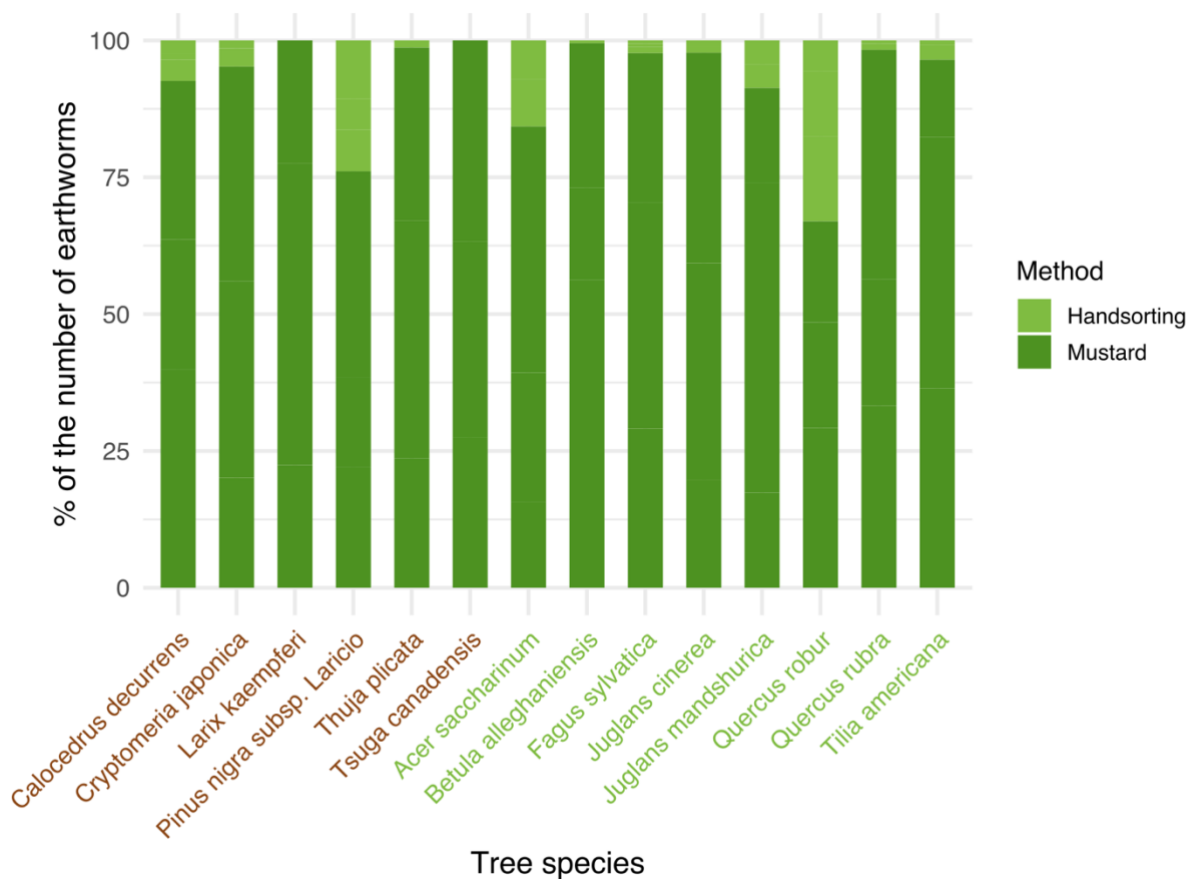


Figure d: Plot showing the proportion of earthworms found using each method (hand sorting and mustard extraction) expressed as a percentage of the total earthworm density (earthworms/m²)

Appendix 7: Linear regressions using the density instead of the biomass

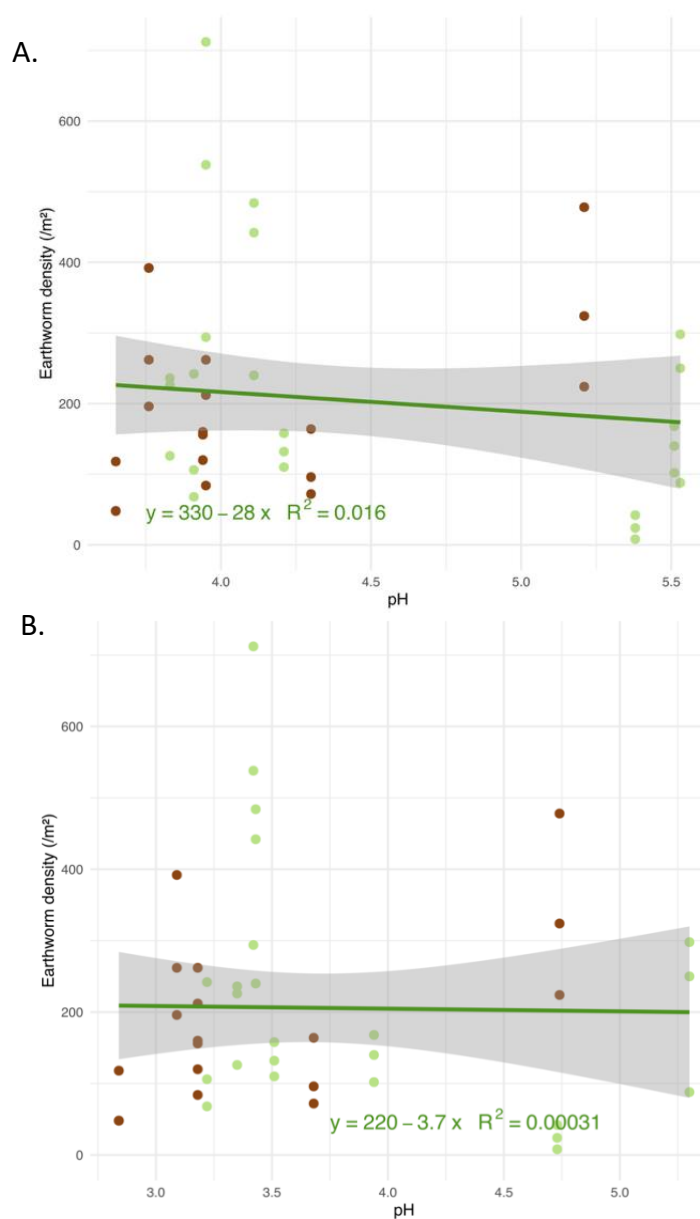


Figure e: (A) Relationship between earthworm density ($/m^2$) and soil pH H_2O (0-5 cm), showing a fitted linear regression (green) and the associated 95% confidence interval (grey area). (B) Relationship between earthworm density ($/m^2$) and soil pH $BaCl_2$ (0-5 cm), showing a fitted linear regression (green) and the associated 95% confidence interval (grey area).

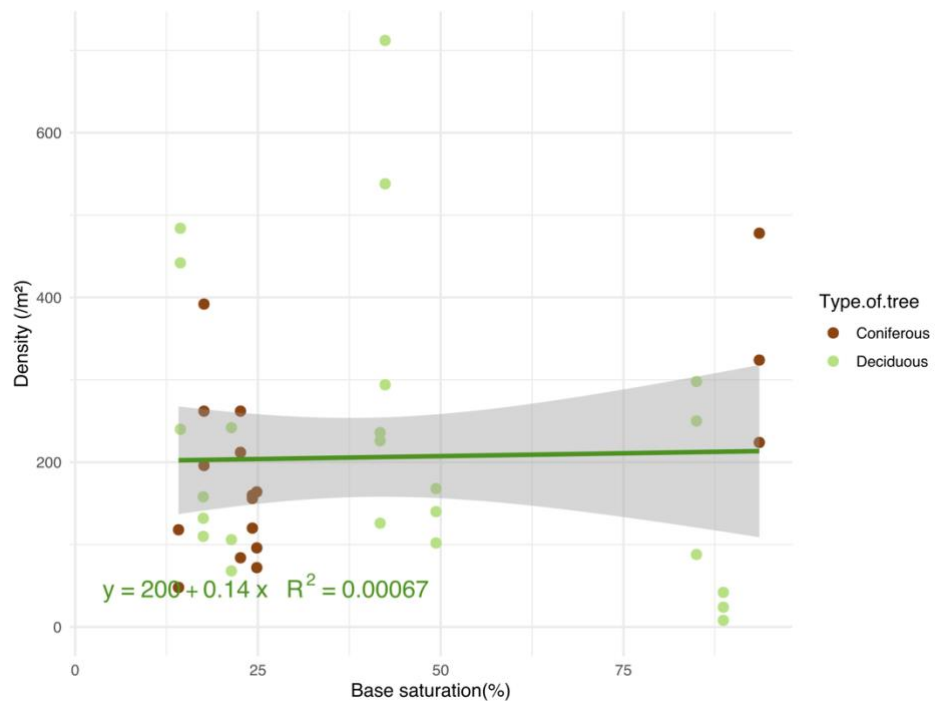


Figure f: Relationship between earthworm density ($/m^2$) and soil base saturation in % (0-5 cm), showing a fitted linear regression (green) and the associated 95% confidence interval (grey area)

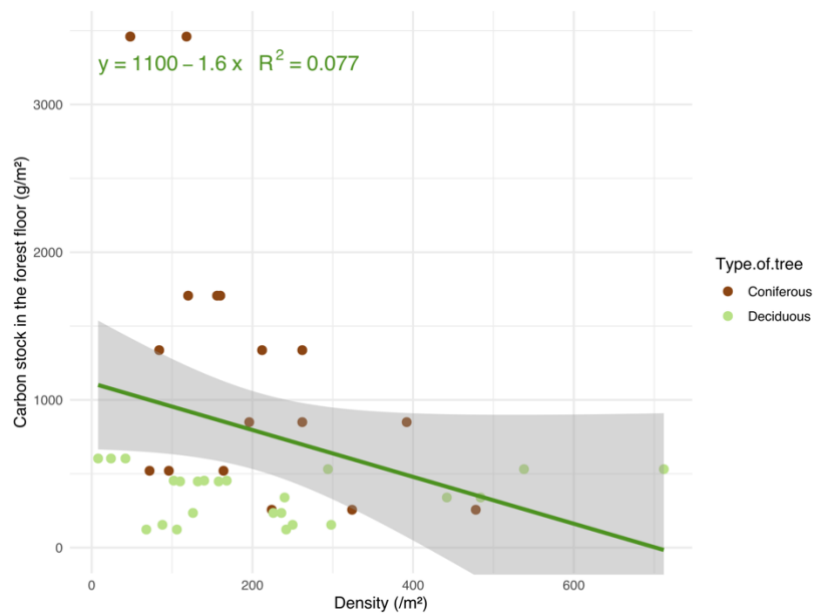


Figure g: Relationship between forest floor carbon stock (g/m^2) and earthworm density ($/m^2$), showing a fitted linear regression (green) and the associated 95% confidence interval (grey area).

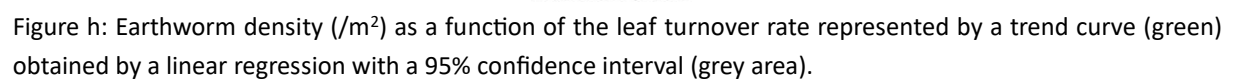
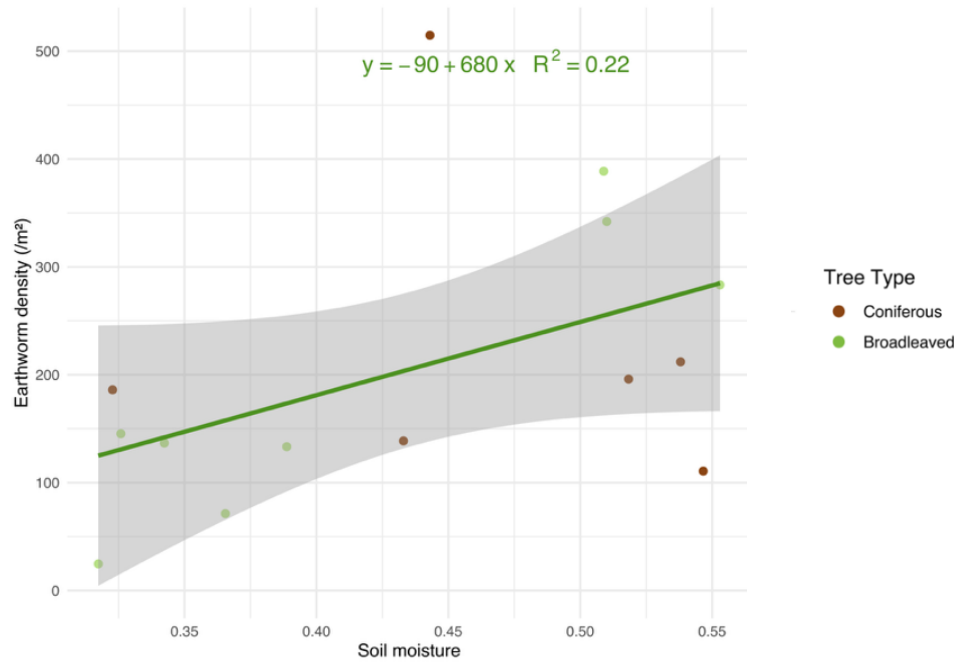


Figure h: Earthworm density ($/m^2$) as a function of the leaf turnover rate represented by a trend curve (green) obtained by a linear regression with a 95% confidence interval (grey area).

A



B

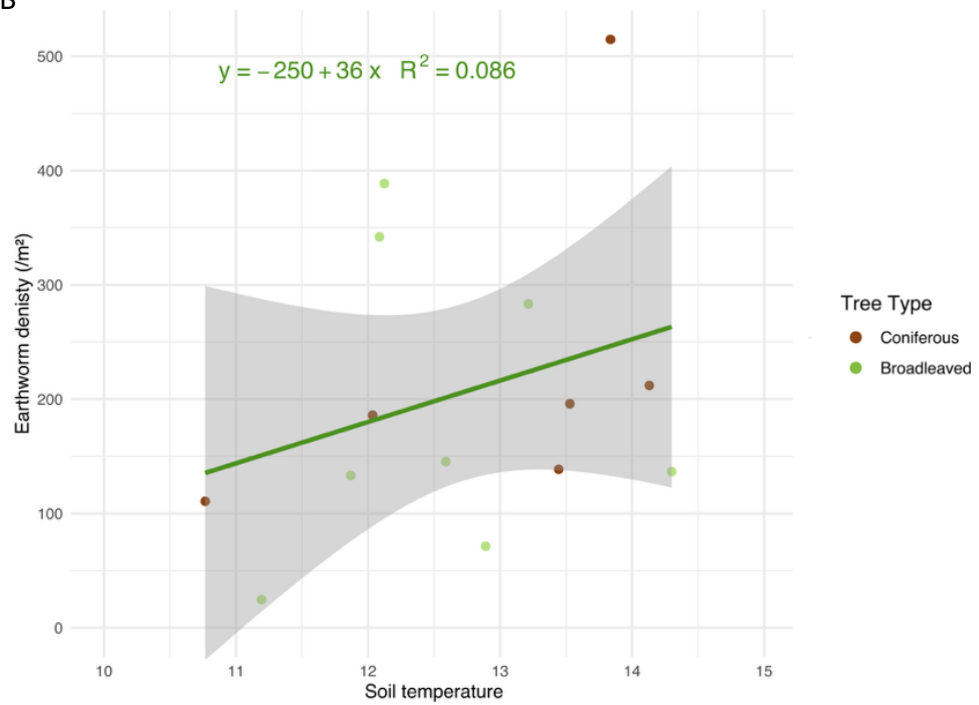


Figure i: Earthworm density as a function of microclimatic values: (A) Soil moisture (m^3/m^3), (B) Soil temperature, represented by a trend curve (green) obtained by a linear regression with a 95% confidence interval (grey area).

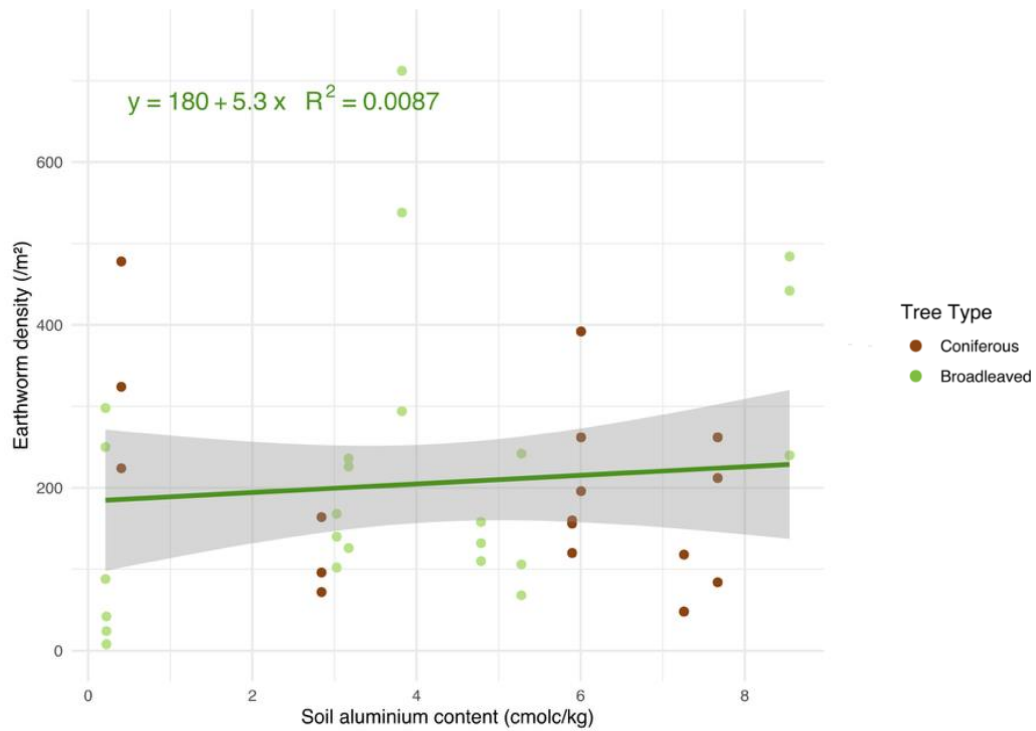


Figure j: Earthworm biomass as a function of exchangeable soil Al content represented by a trend curve (green) obtained by a linear regression with a 95% confidence interval (grey area).

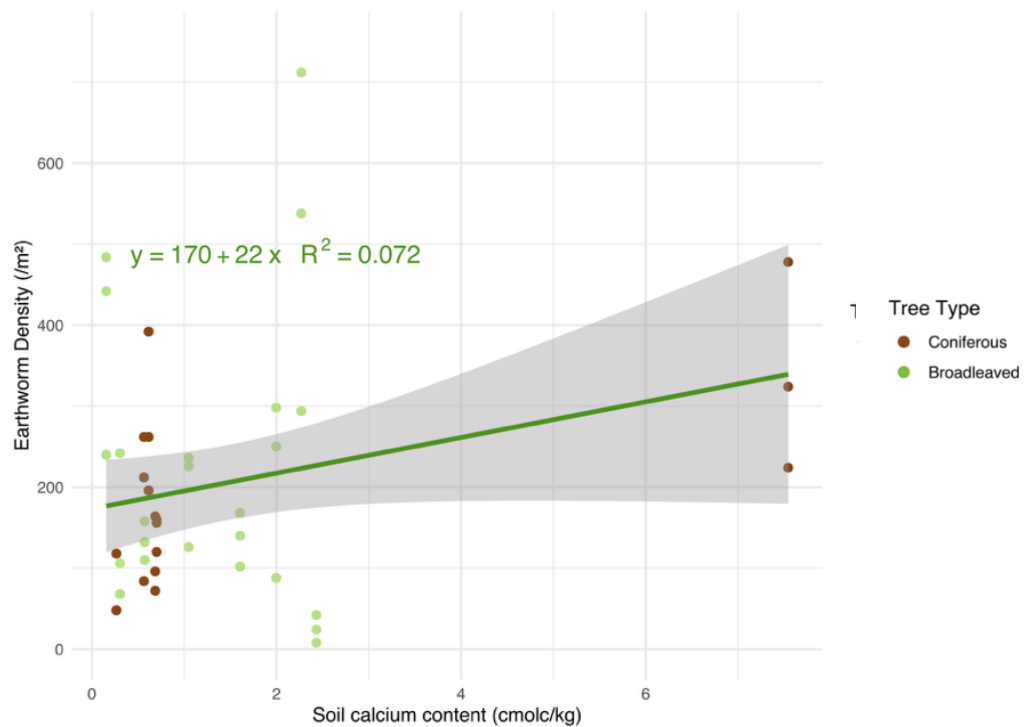


Figure k: Earthworm density as a function of soil Ca content represented by a trend curve (green) obtained by a linear regression with a 95% confidence interval (grey area).

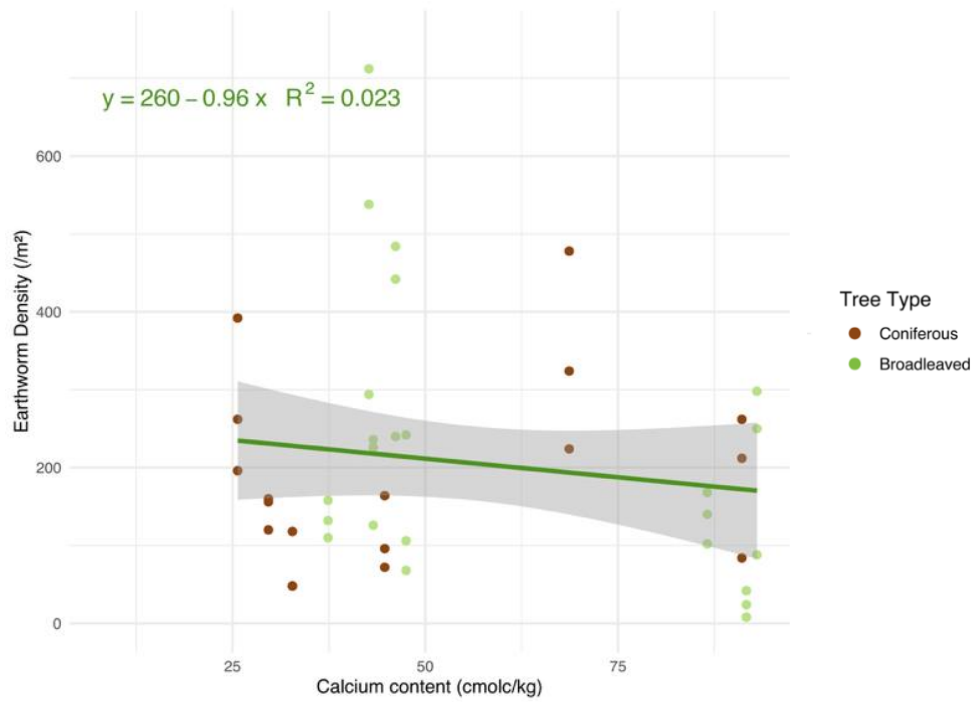


Figure l: Earthworm density as a function of leaf litterfall Ca content represented by a trend curve (green) obtained by a linear regression with a 95% confidence interval (grey area)

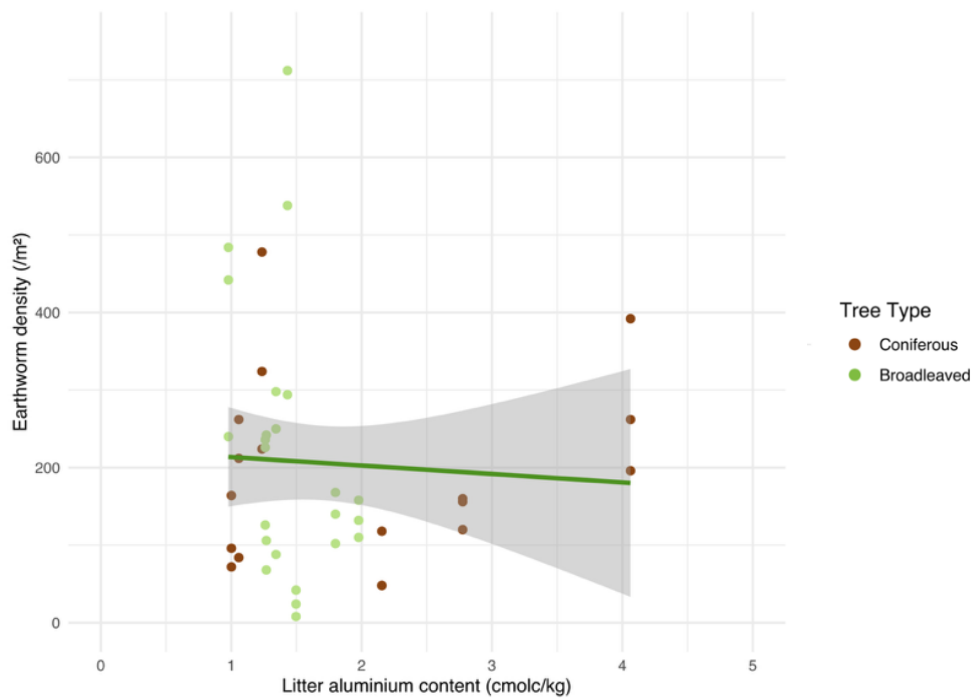


Figure m: Earthworm density as a function of leaf litterfall Al content represented by a trend curve (green) obtained by local smoothing with a 95% confidence interval (grey area).

Appendix 8: PCA analyses

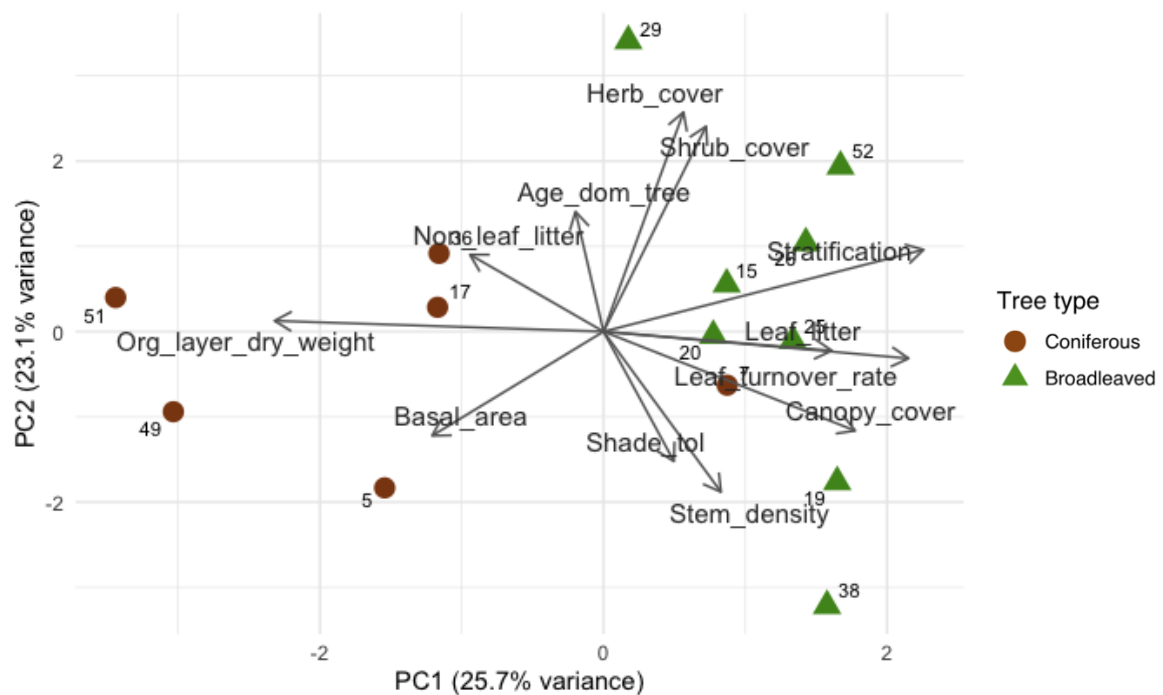


Figure : Results of principal component analysis (PCA) of plot characteristics. The arrows show the contribution of variables to the first two principal dimensions. The direction and length of the arrows indicate the weight and correlation of each variable with the axes. Coniferous species are represented with the brown circles and broadleaved species with green triangles