

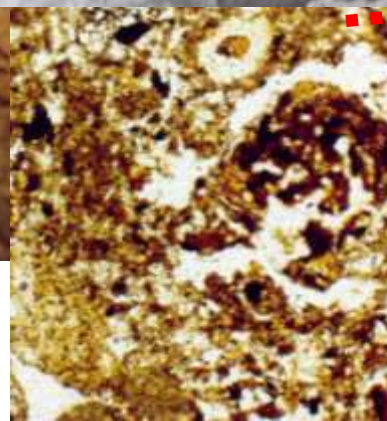
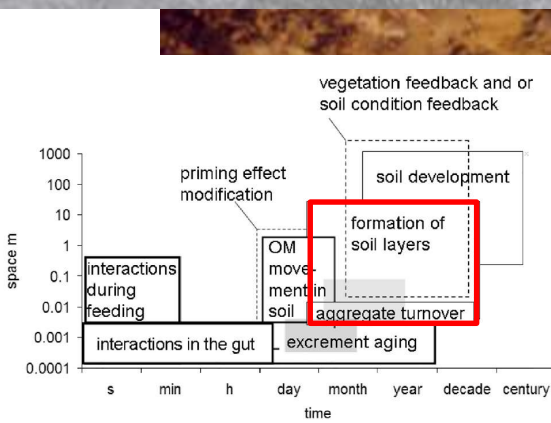
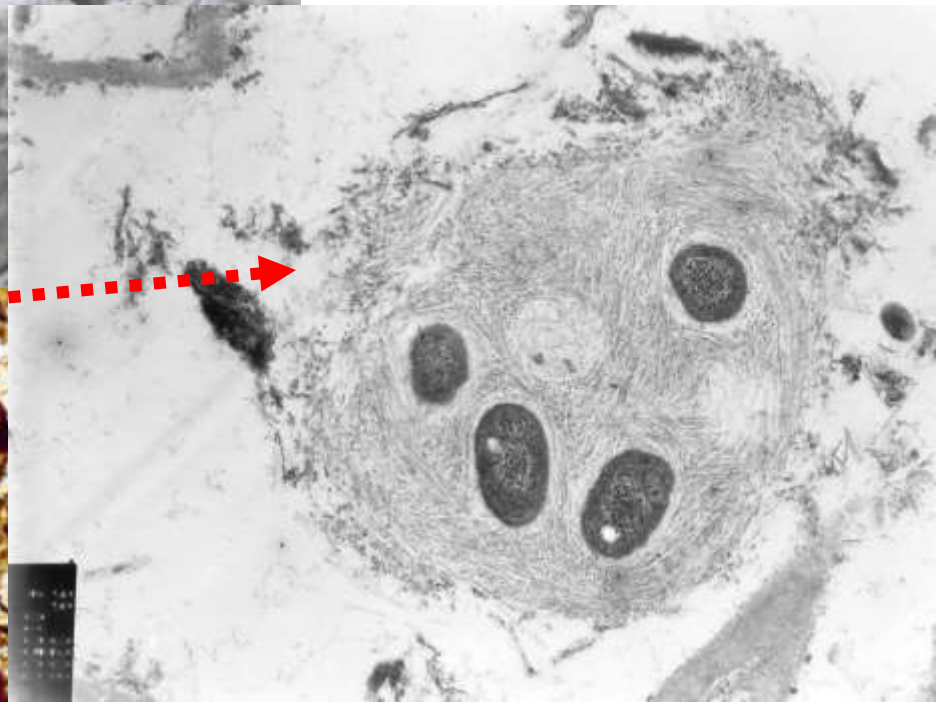
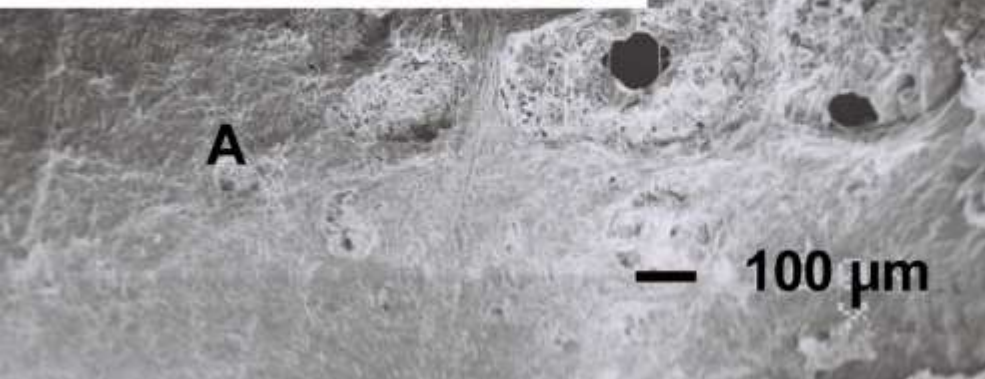
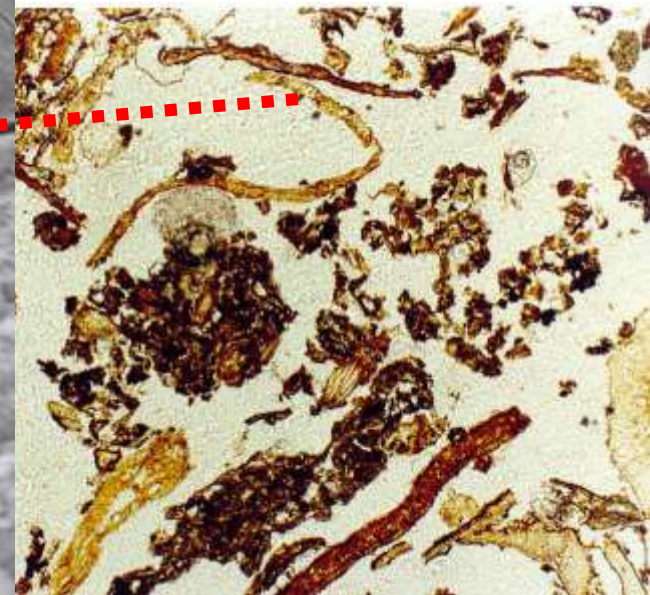
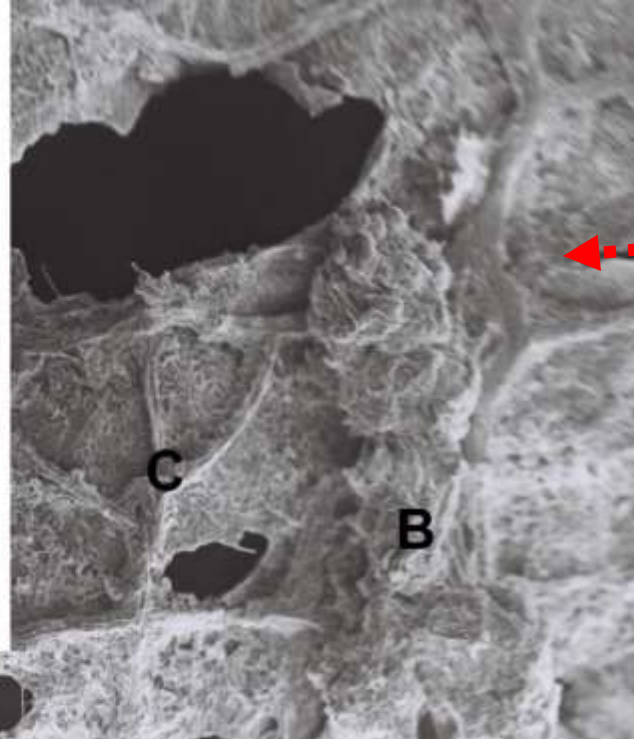
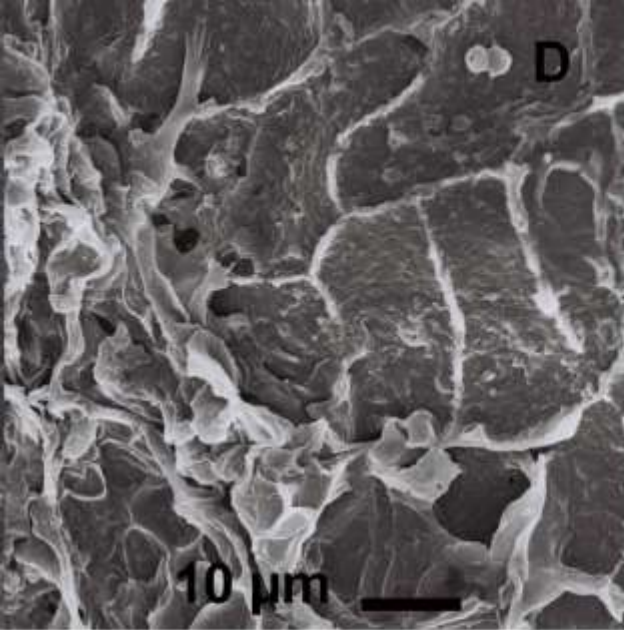
Půda a život

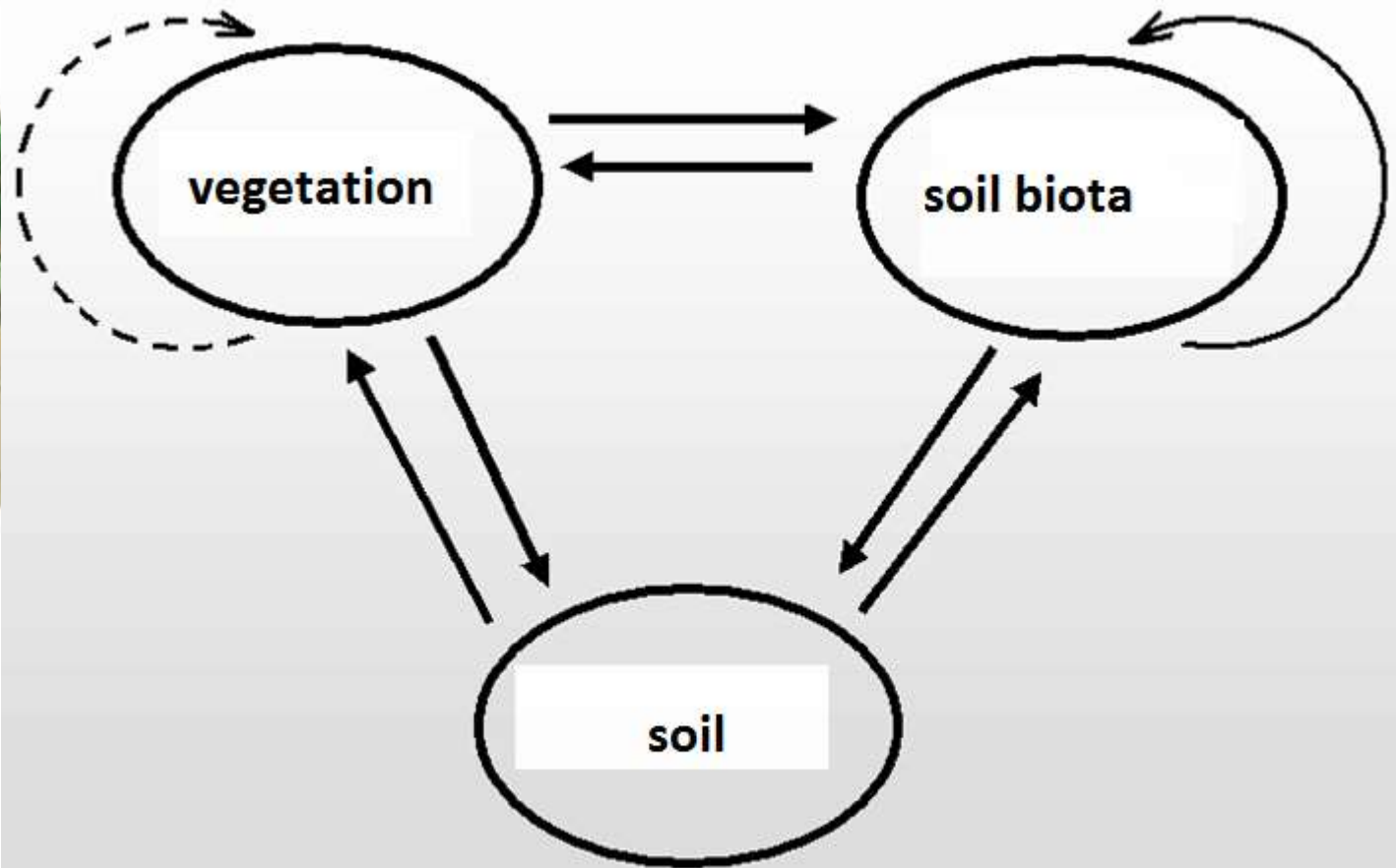
Jan Frouz

***Charles University Prague, Biology Centre AS CR České Budejovice
Czech Republic***



**BIOLOGICKÉ
CENTRUM
AV ČR, v. v. i.**



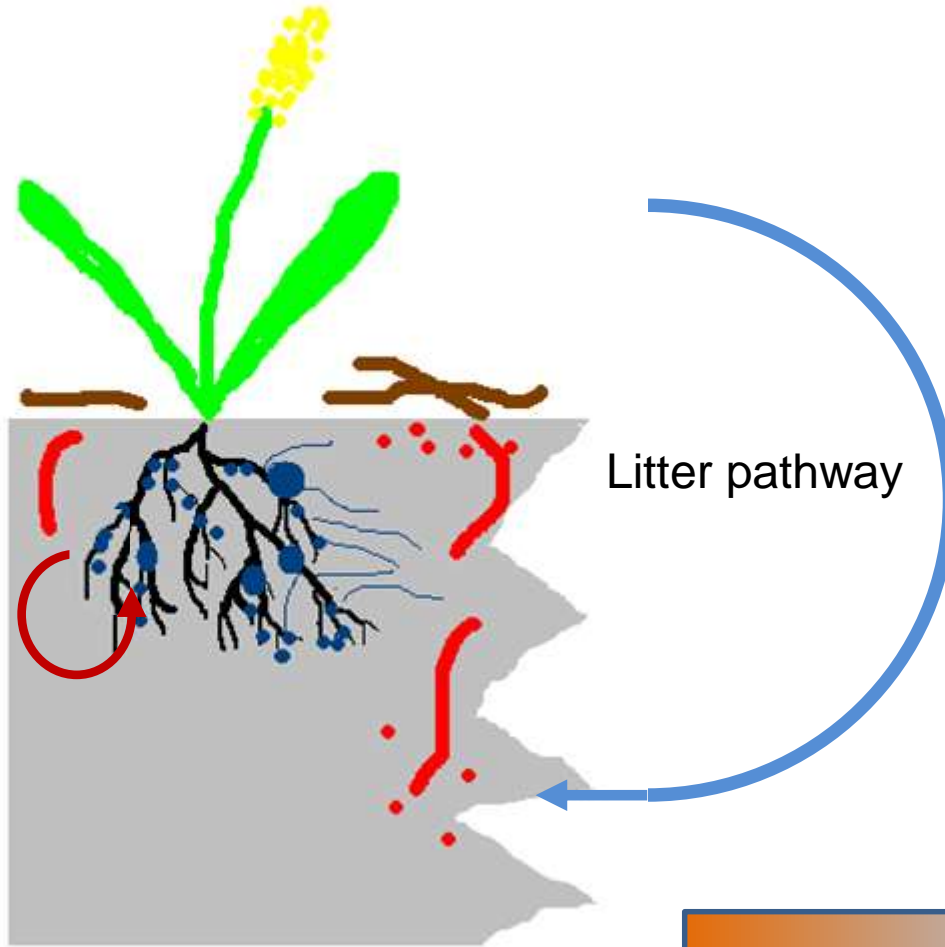


Root pathway

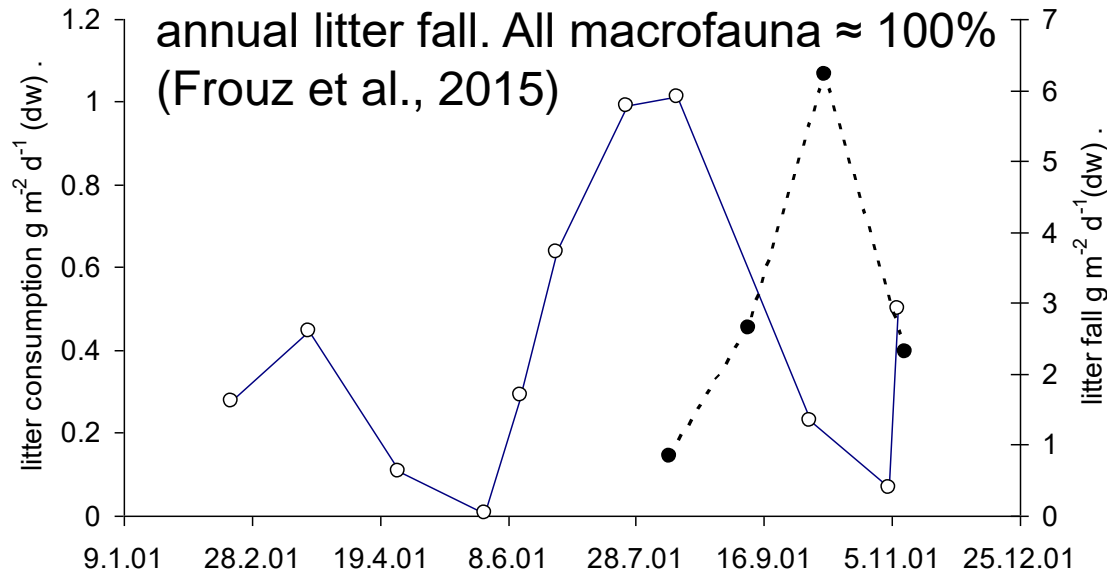
Litter pathway

Legacy

Immediate effect

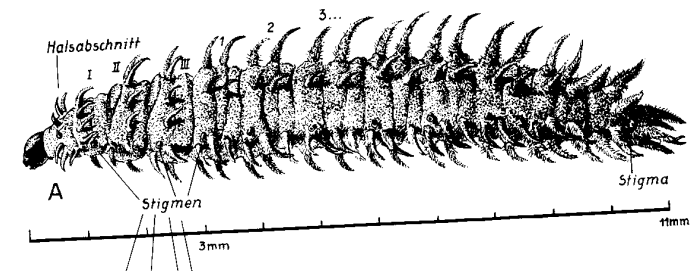
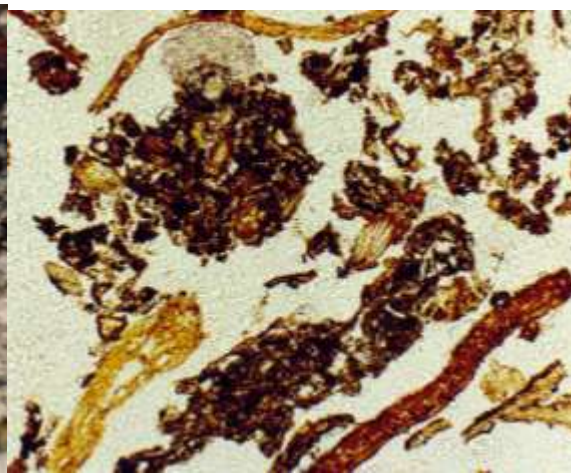
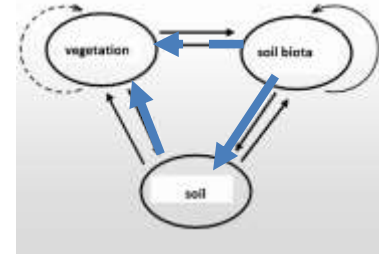


Larvae *P. holosericea* consume 40% annual litter fall. All macrofauna \approx 100% (Frouz et al., 2015)



Makrofauna consume 20-100% annual litter fall

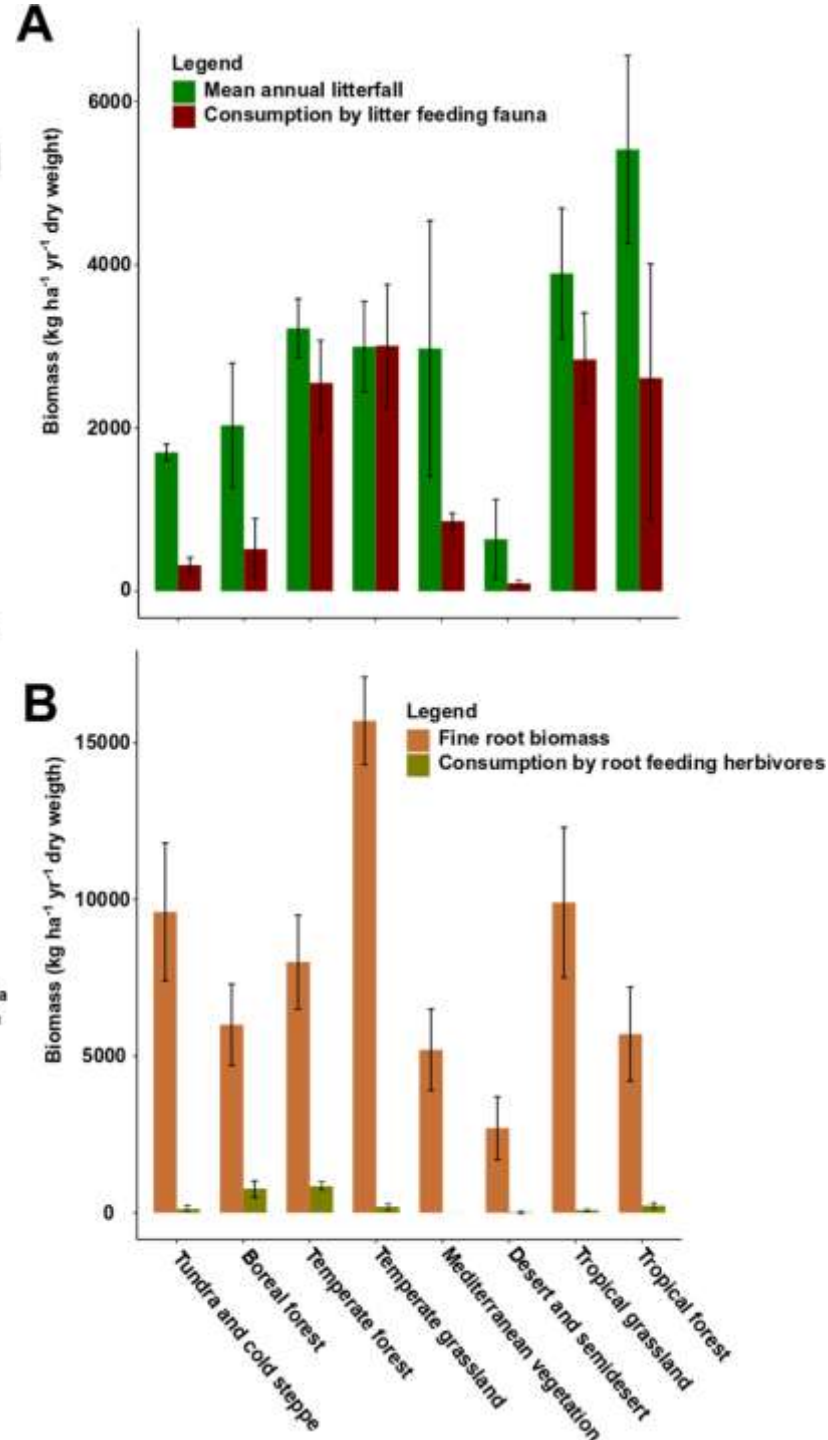
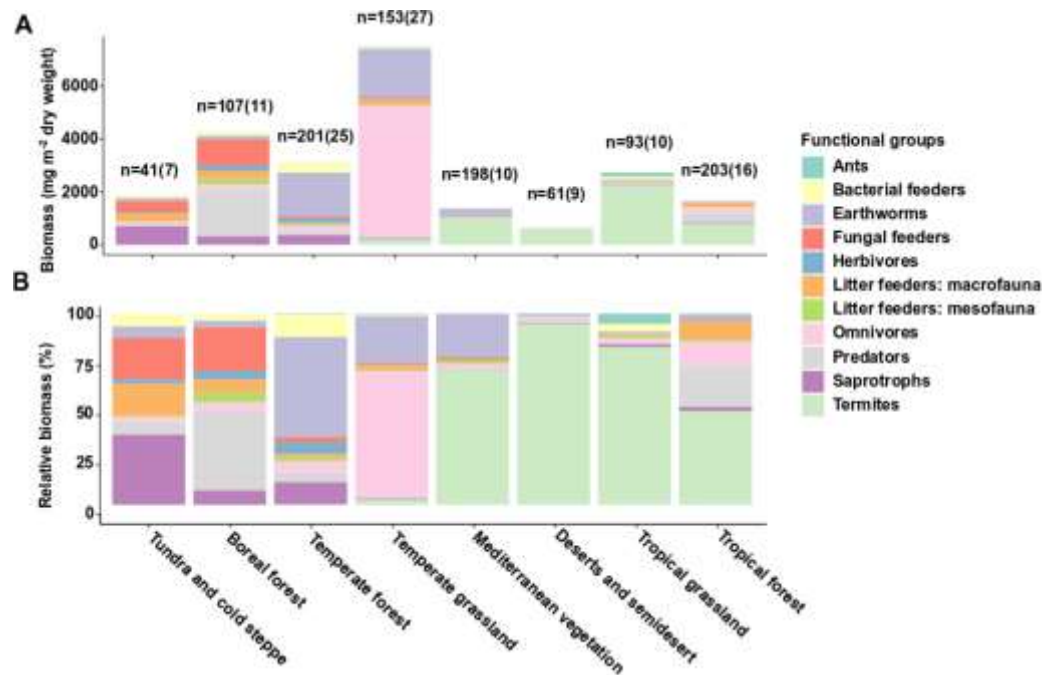
(Schaeffer 1900, Tajovský 1992, García-Palacios, 2013)

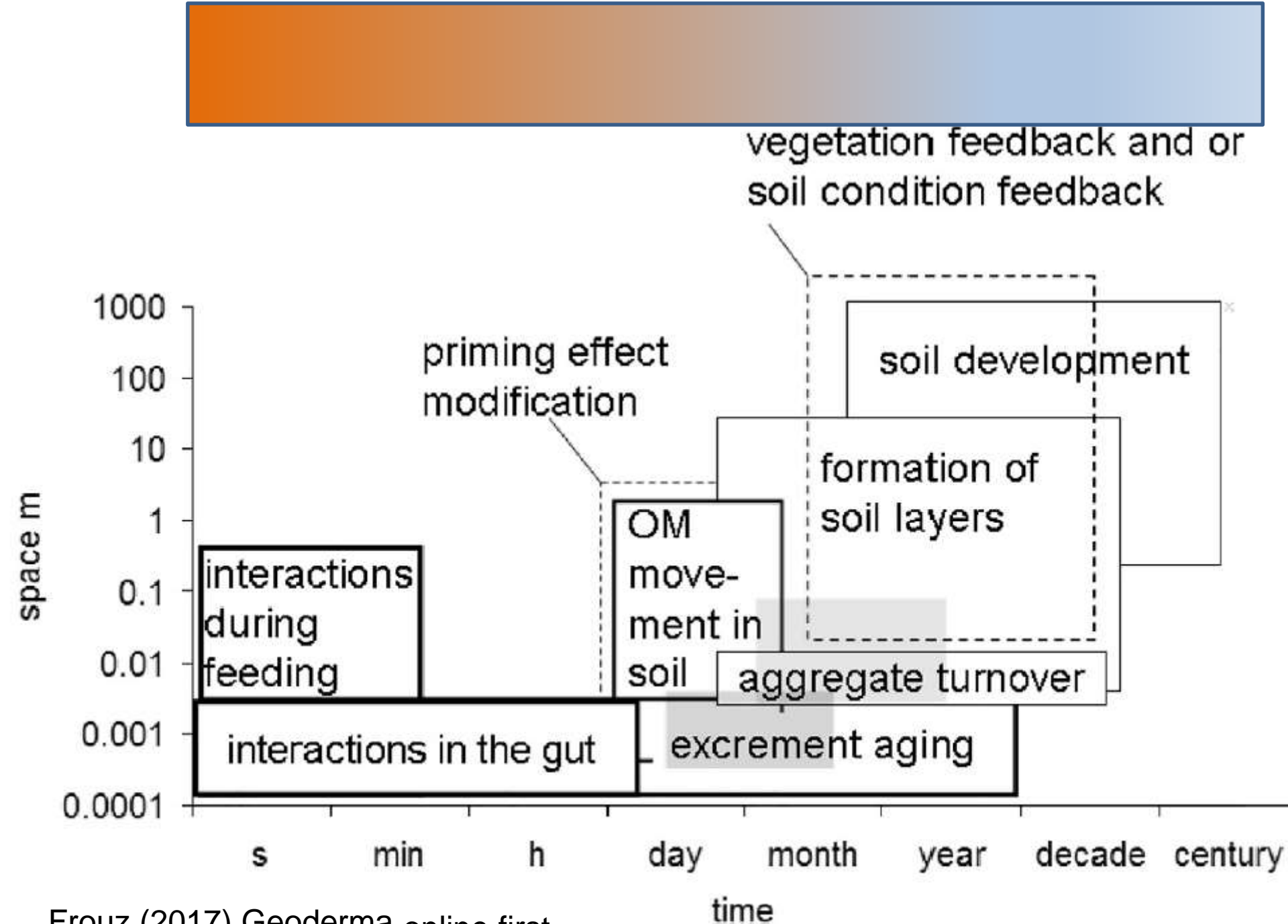


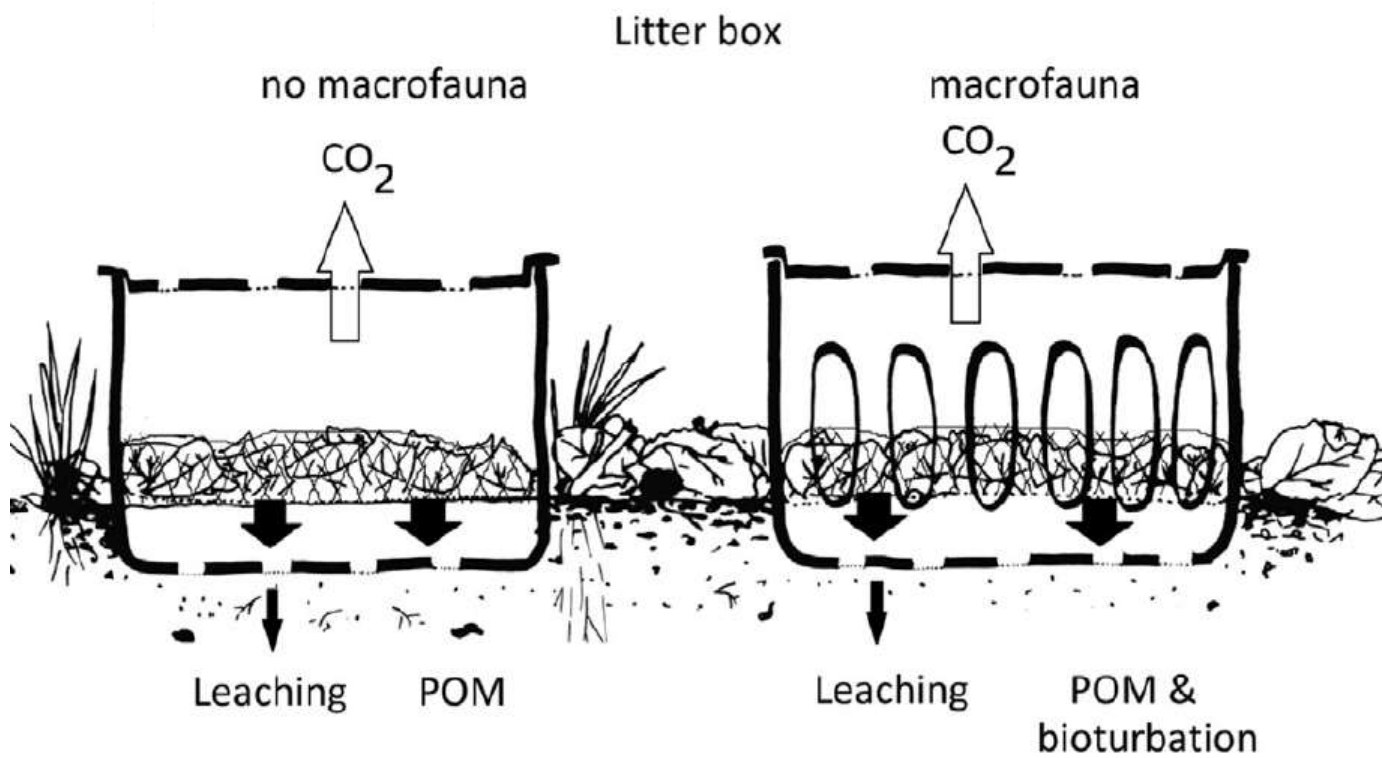
OPEN Global distribution of soil fauna functional groups and their estimated litter consumption across biomes

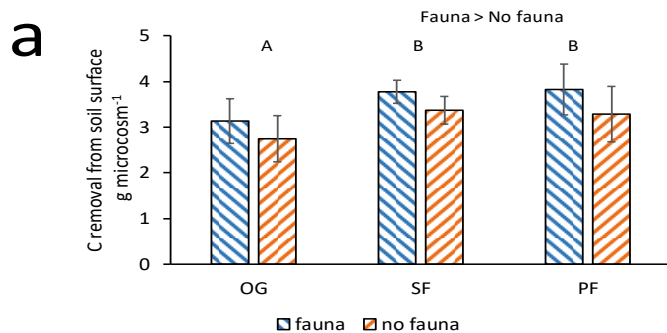
Petr Heděný^{1,2}, Juan Jose Jiménez³, Jabbar Moradi^{1,10}, Xavier Domene⁴, Davorka Hackenberger⁵, Sébastien Barot⁶, Aline Frossard⁷, Lidia Oktaba⁸, Juliane Filser⁹, Pavel Kindlmann¹⁰ & Jan Frouz^{1,10,11}

Soil invertebrates (i.e., soil fauna) are important drivers of many key processes in soils including soil aggregate formation, water retention, and soil organic matter transformation. Many soil fauna groups directly or indirectly participate in litter consumption. However, the quantity of litter consumed by major faunal groups across biomes remains unknown. To estimate this quantity, we reviewed > 1000 observations from 70 studies that determined the biomass of soil fauna across various biomes and 200 observations from 44 studies on litter consumption by soil fauna. To compare litter

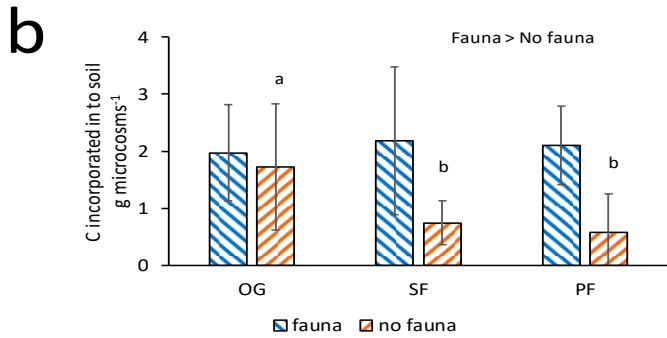




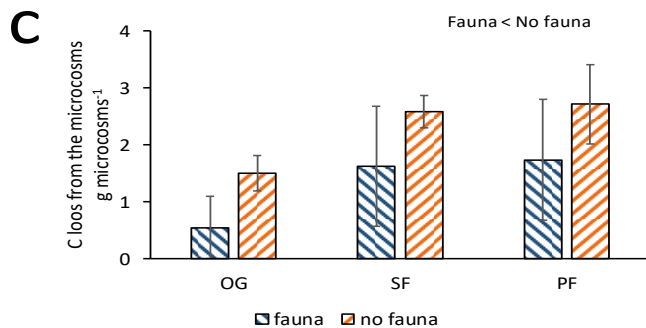




Fauna increased C removal from soil surface

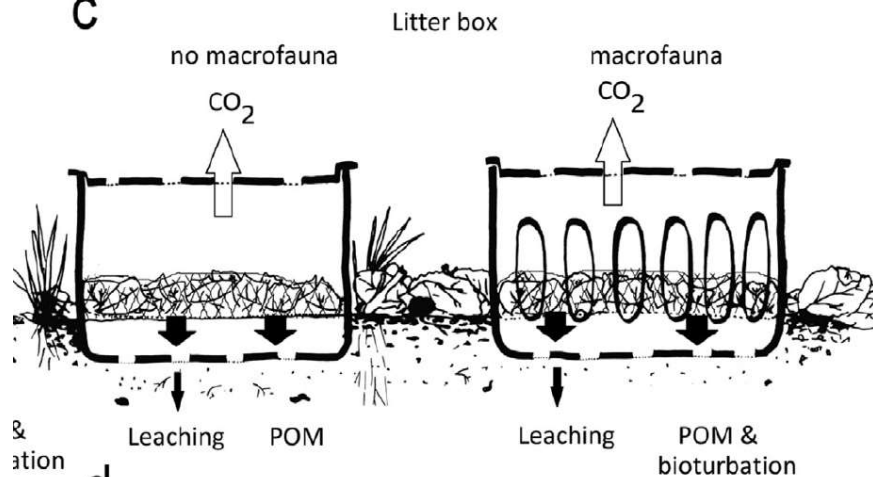


Fauna also increased C incorporation in mineral soil, namely in intermediate and late succession

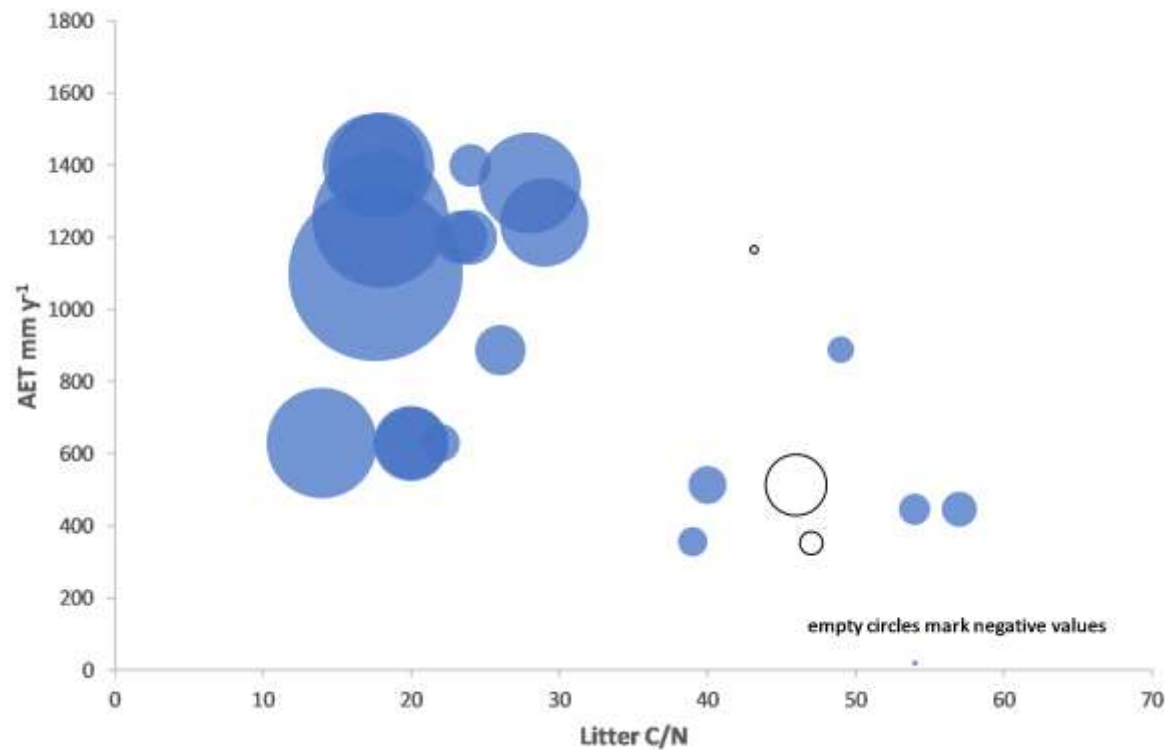


Fauna reduce overall loss of C from the system – promote accumulation of C in soil

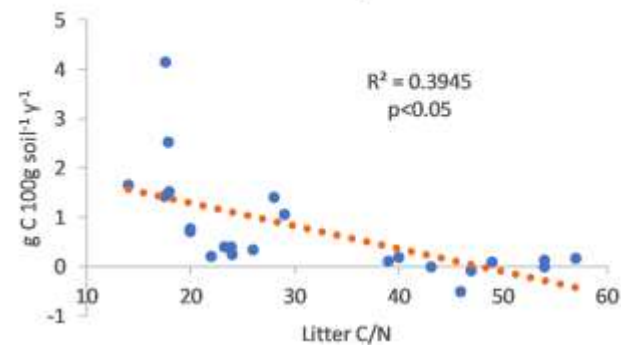
C



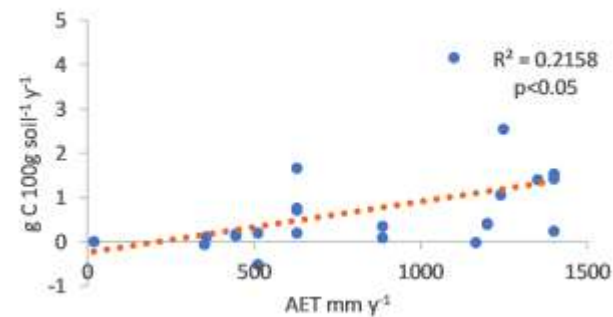
Fauna mediated C incorporation in top 1 cm of mineral soil $\text{g C } 100\text{g}^{-1} \text{y}^{-1}$



Effect of litter C/N ratio

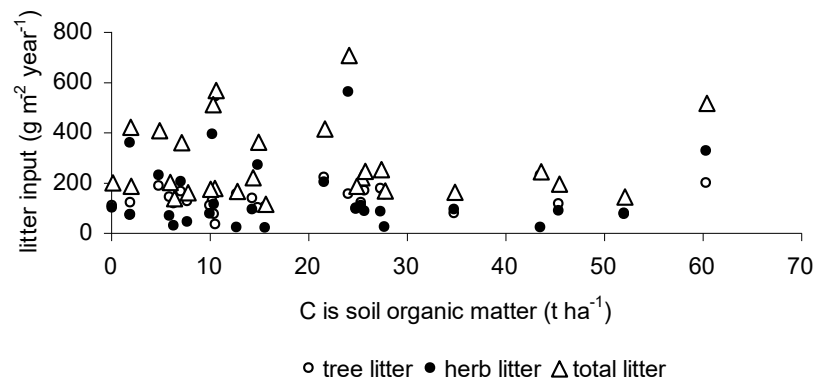
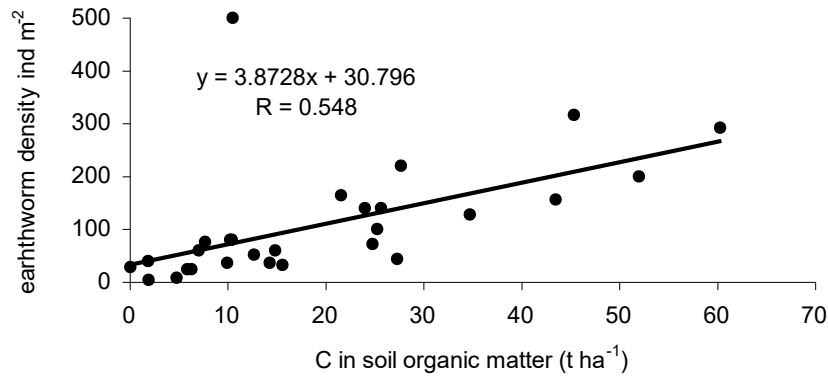
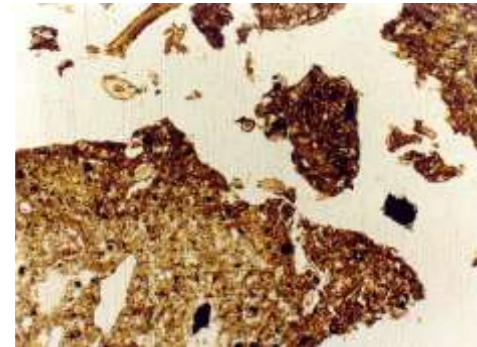
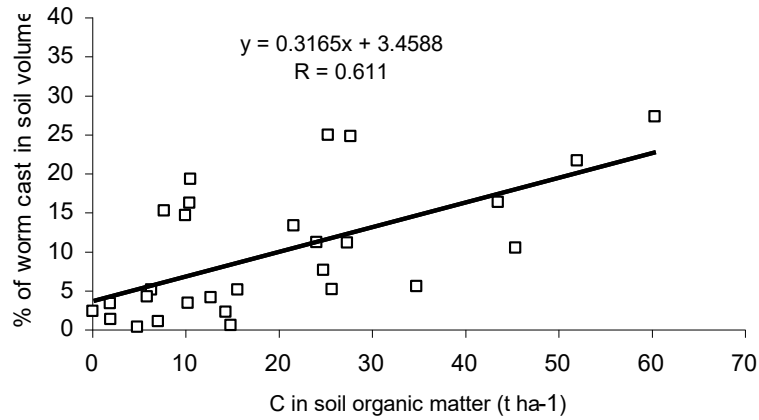


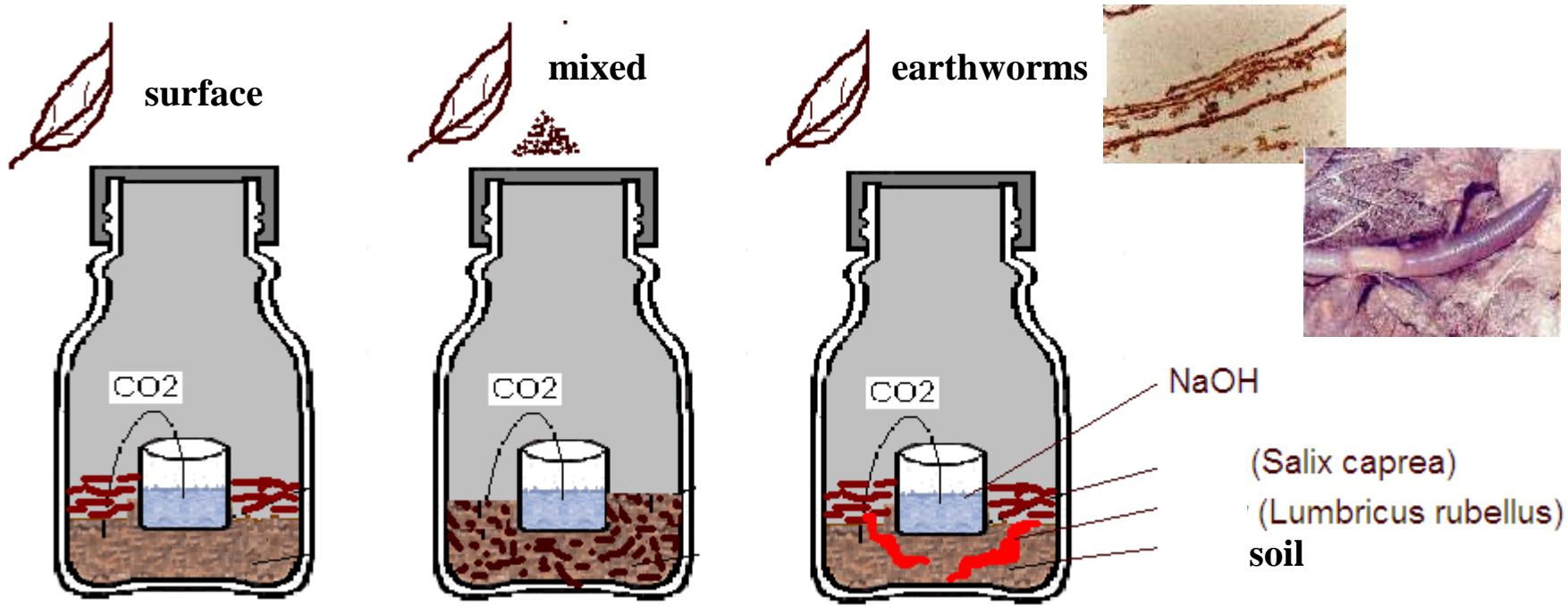
Effect of Actual EvapoTranspiration (AET)



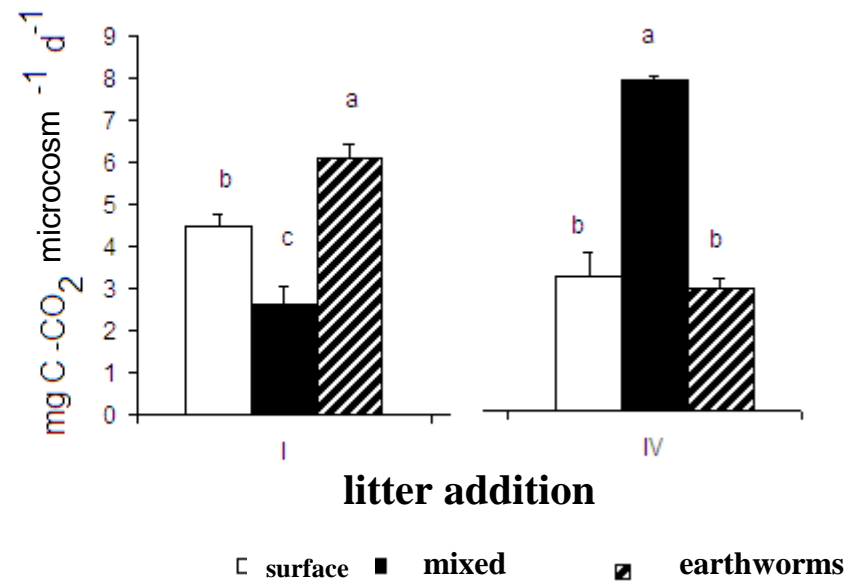
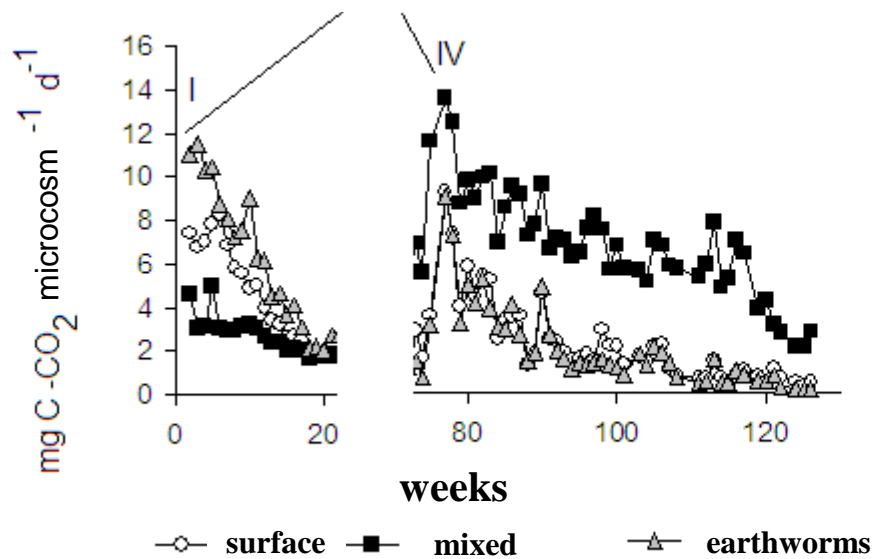
Comparison of soil development under various plantations.

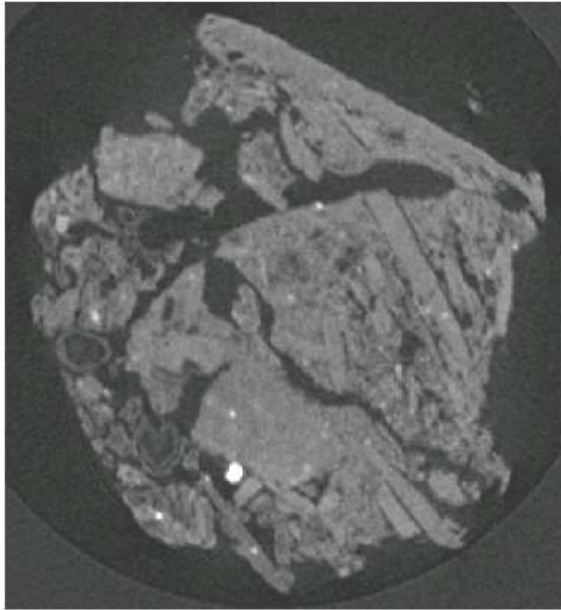




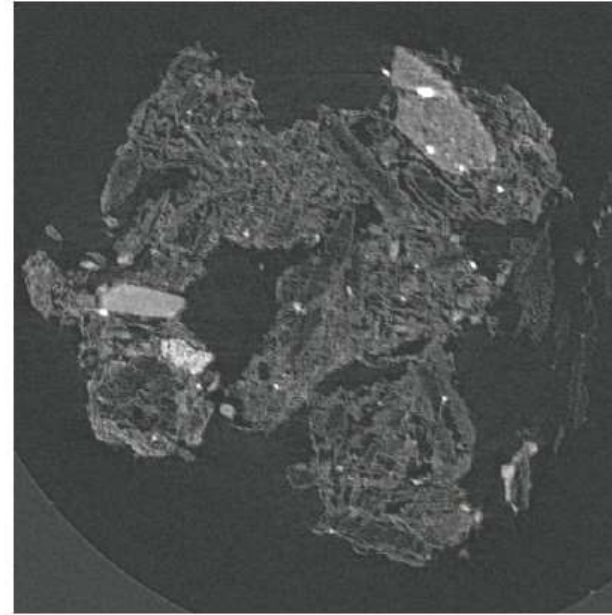


litter addition





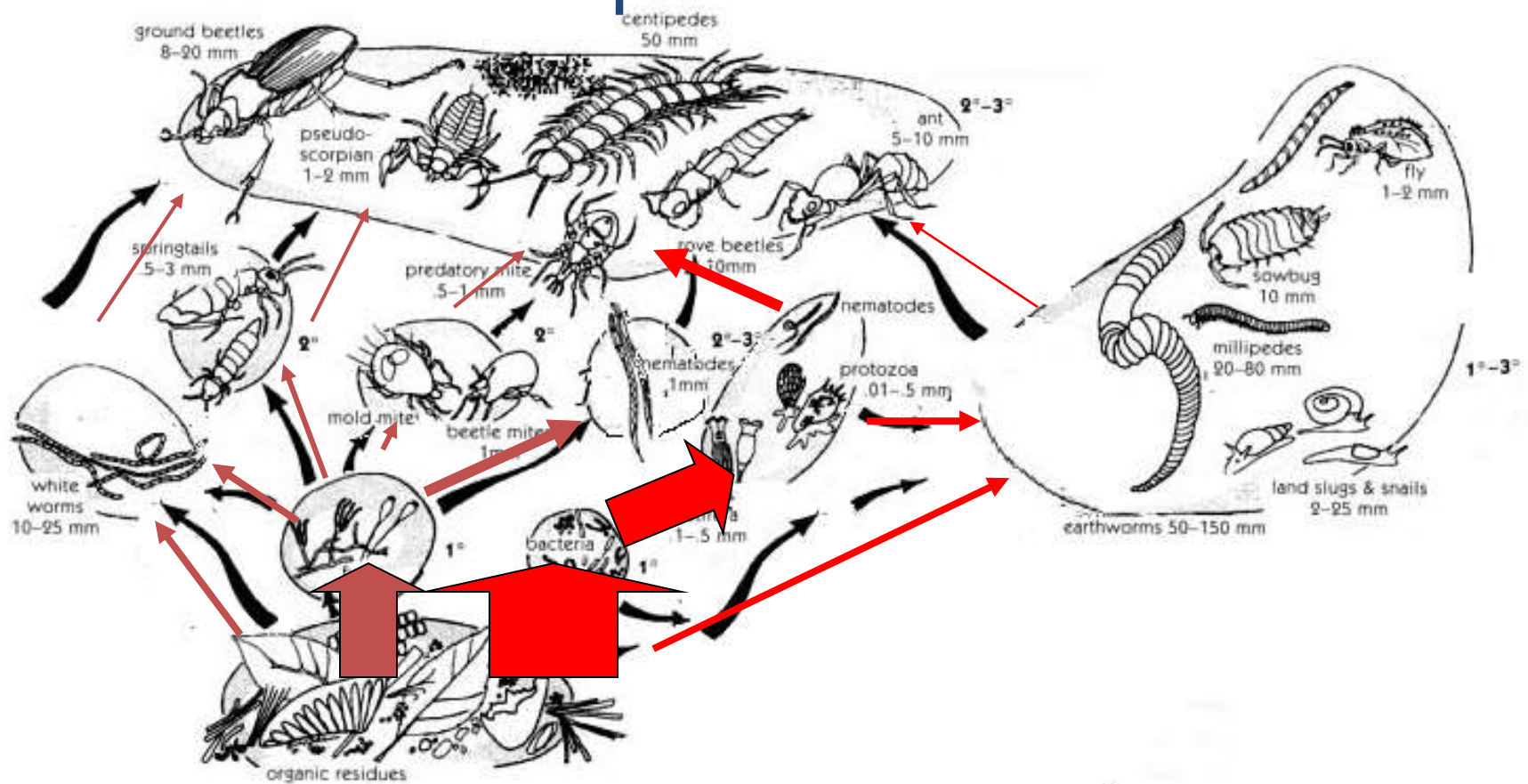
Other aggregates



Earthworm casts

	Other aggregates	Earthworm casts
Light POM	0.34 ± 0.21	0.84 ± 0.55
Bounded light POM	$0.18 \pm 0.12^*$	$1.34 \pm 0.43^*$

Decomposer food web

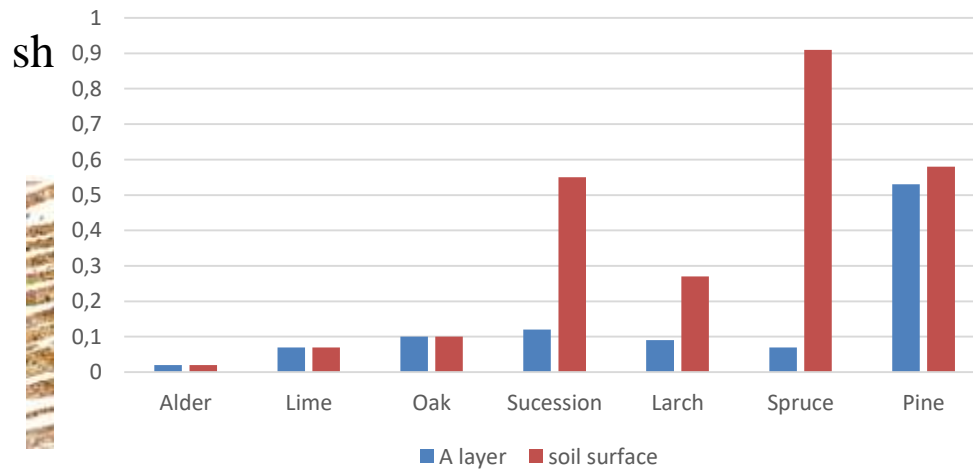
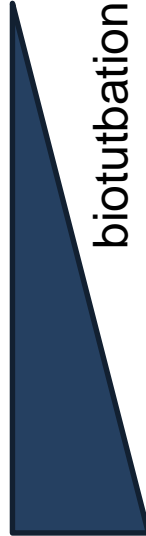
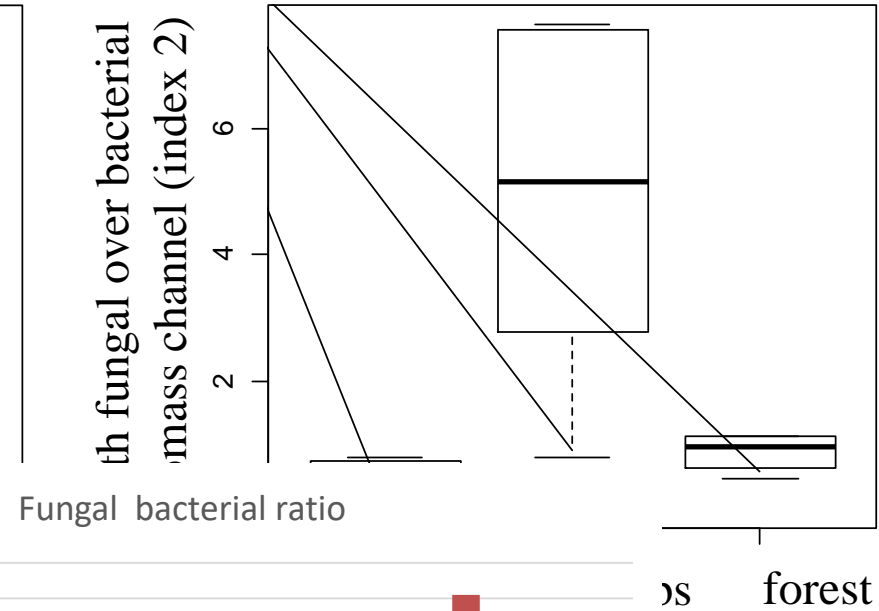
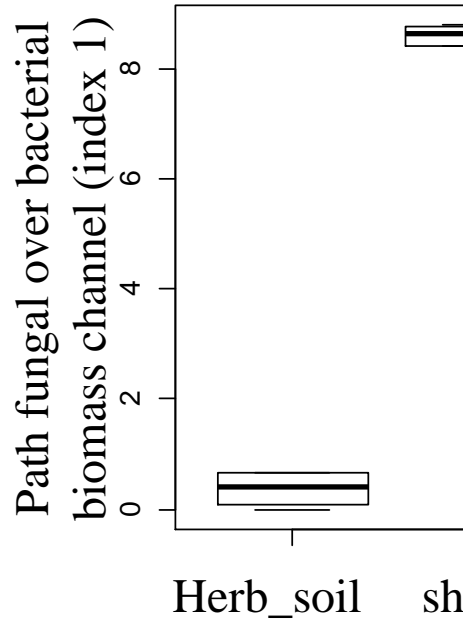


Fungal channel

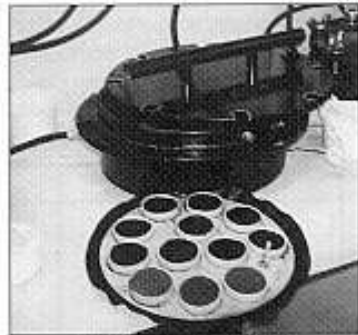
- high C/N
- pH acid
- litter on soil surface

Bacterial channel

- low C/N
- pH neutral
- litter mixed in soil



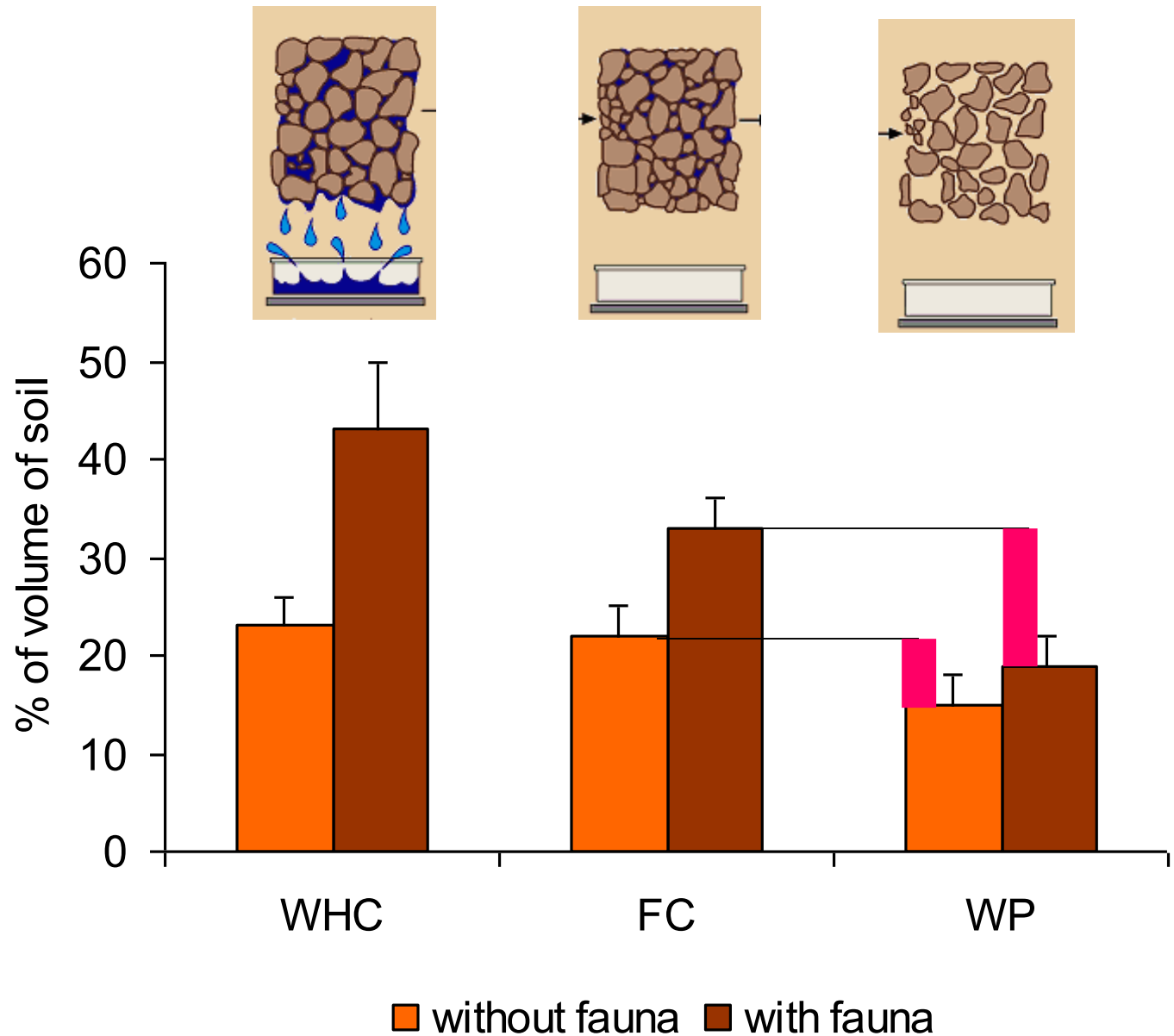
Effect of SOM accumulation on soil water budget



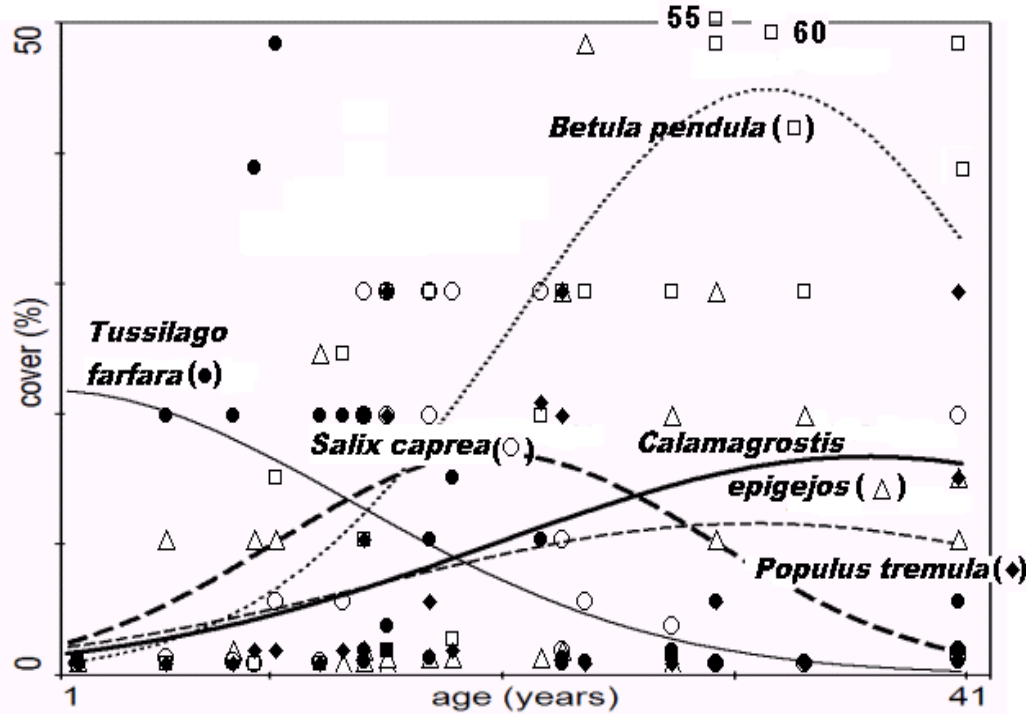
15 Bar laboratory apparatus



1/3 (333) Bar laboratory apparatus



Plant community changes



presence humus layer
s strongest predictor of
these groups
(discriminant analysis,
backward selection)

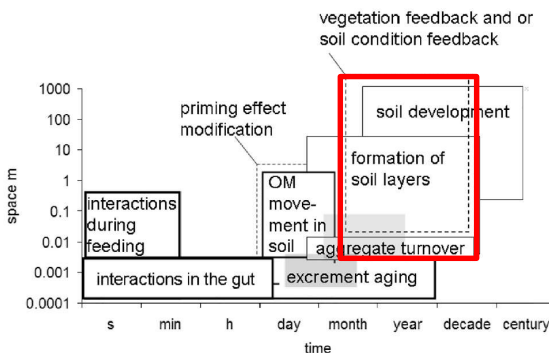
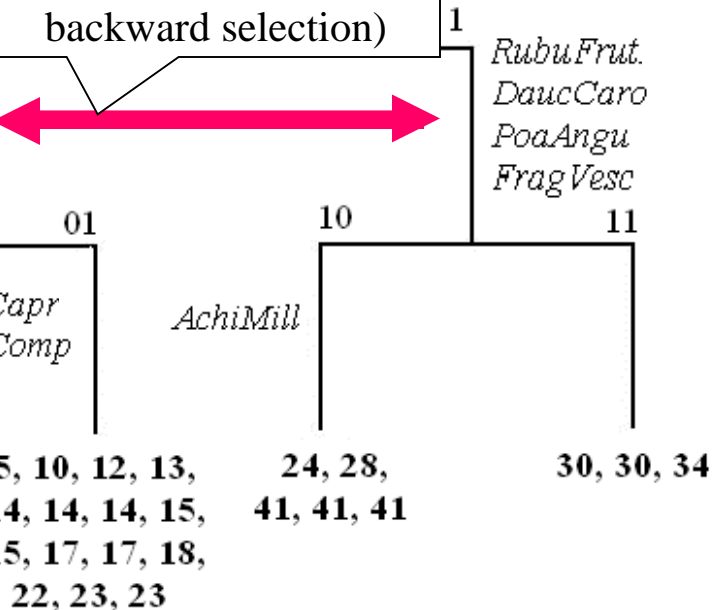




Fig. 1 Schematic diagram of sampling design. Samples were collected in *Salix caprea* monocenosis (SalM), *Calamagrostis epigejos* monocenosis (CalM) and in the contact zone of the two species (Mix).

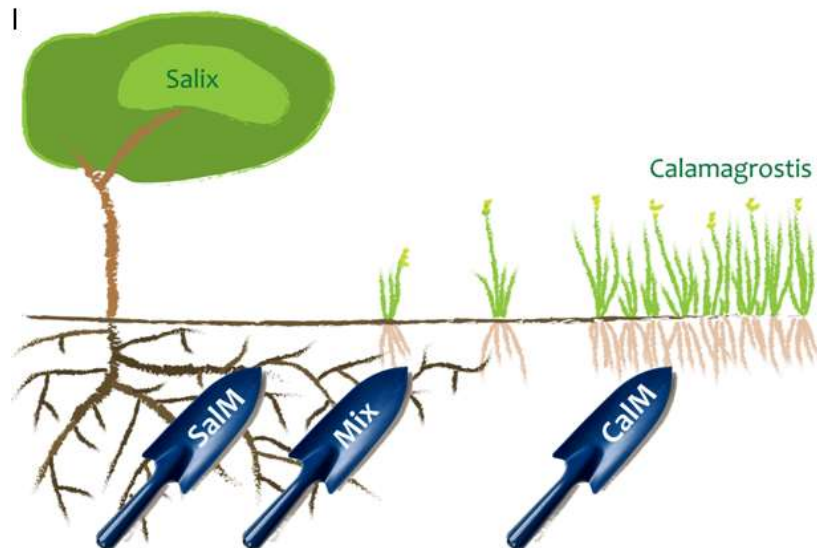
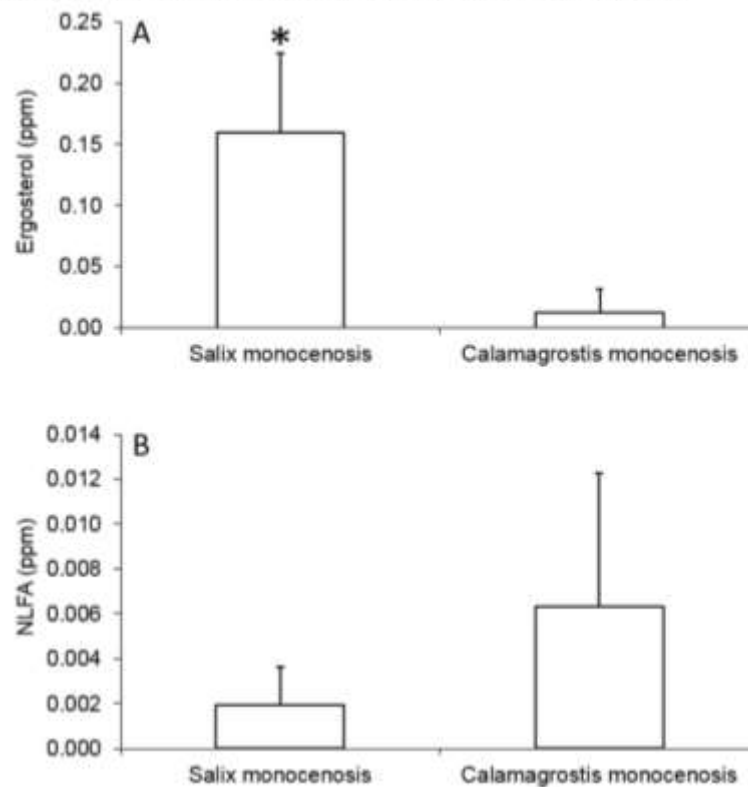
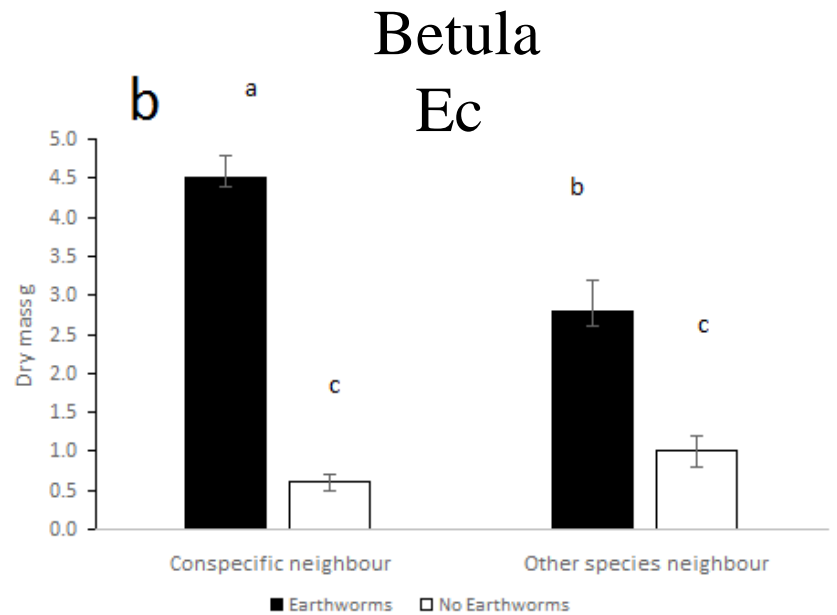
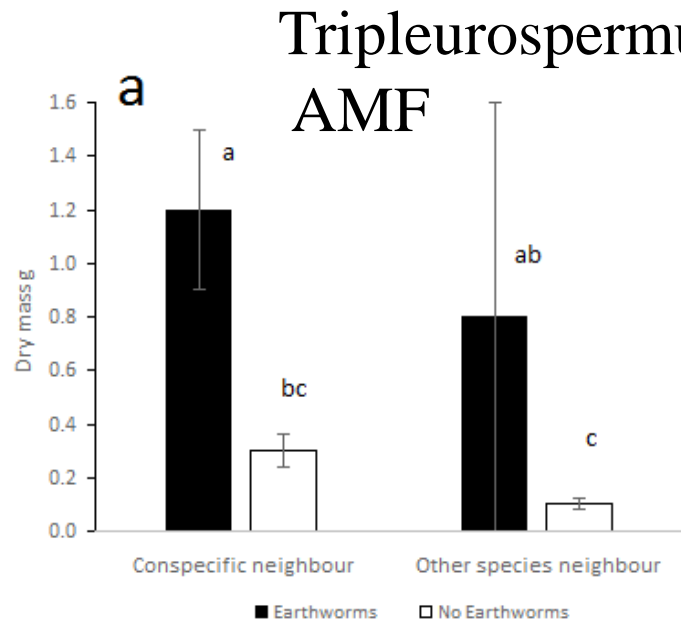
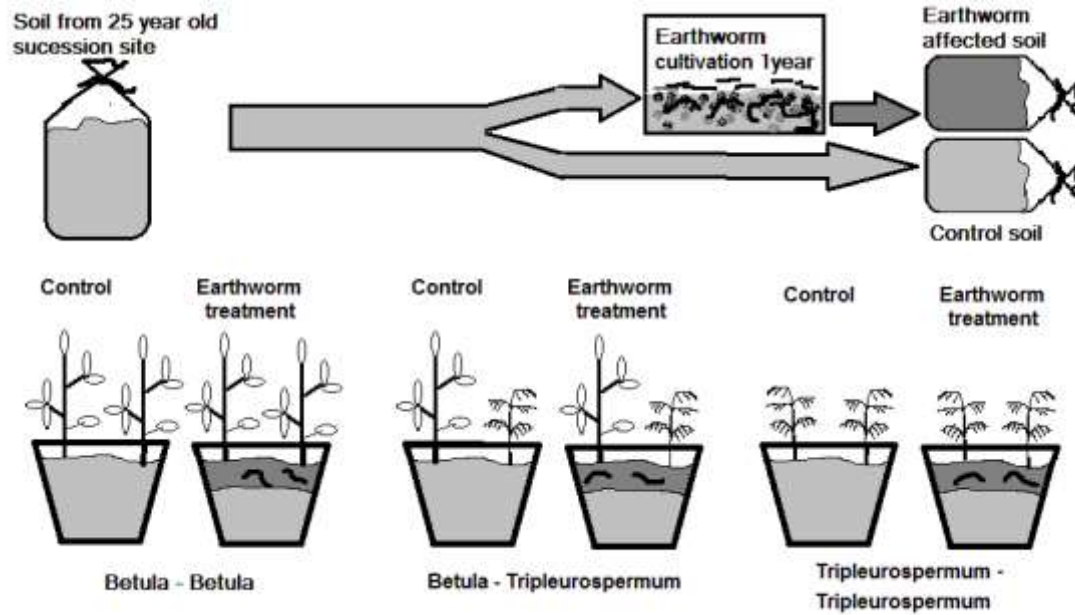
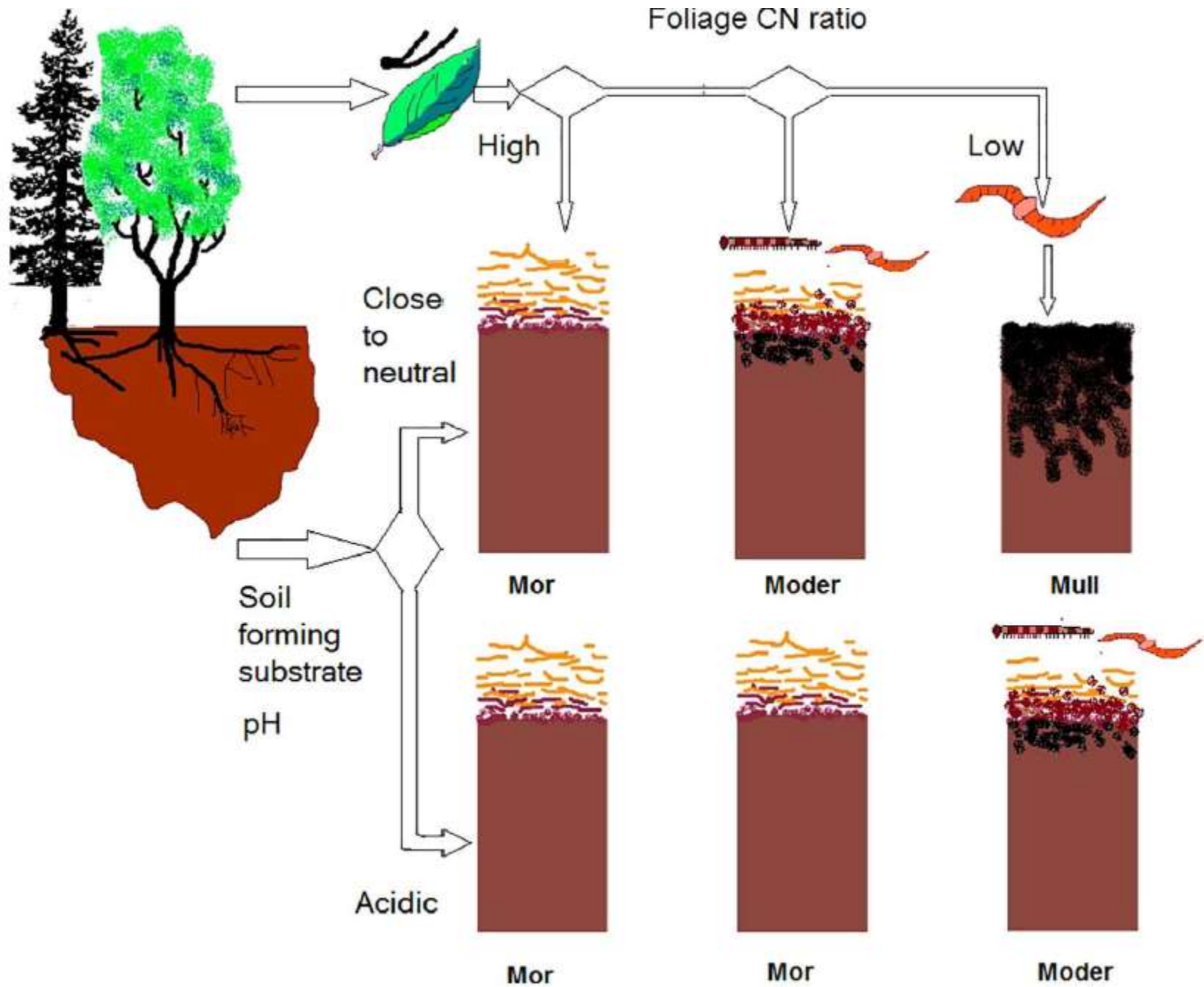
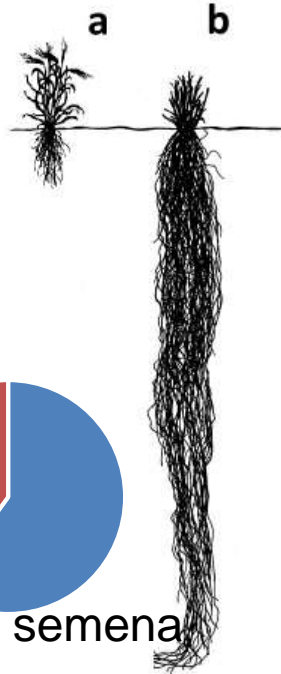


Fig. 2 Concentration of ergosterol (A) in sand bags was significantly higher in *S. caprea* monocenosis than in *C. epigejos* monocenosis ($p < 0.0001$). We observed a trend in concentration of NLFA (B) of slightly higher values in *C. epigejos* monocenosis than in *S. caprea* monocenosis ($p = 0.0746$).





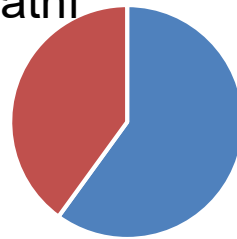




Jednoleté rostliny investují většinu asimilátů do produkce semen, ta se rozšíří v krajině a dají na vhodných stanovištích vnik další generaci.

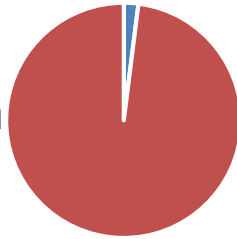
Rostlina využívá vhodných stanovišť, zpravidla vzniklých disturbancí, pěstovat ji znamená vytvářet pro ni vhodné stanoviště

ostatní



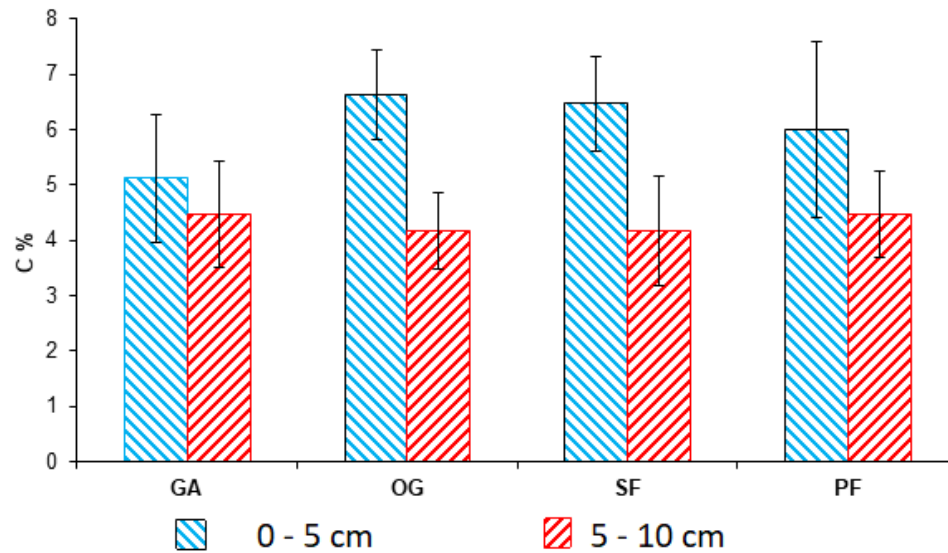
semena

Víceleté rostliny investují jen málo do produkce semen většina asimilátů jde na jiné věci, růst do výšky usnadňující konkurenci o světlo, růst kořenů umožňujících získávat vodu a živiny, obrana proti patogenům a škůdcům, podpora symbiontů a mutualistů, rezervy. Díky tomu si víceleté rostliny vytváří pro sebe vhodné prostředí



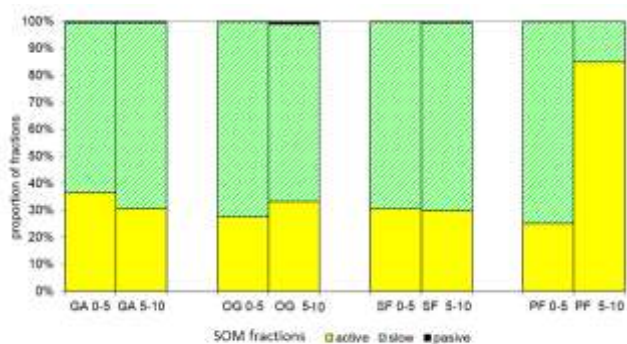


- A) Active garden
typically at the end of
first year of gardening
- B) Old garden 5-10
years after gardening
stop
- C) Secondary forest
about 20 year after
gardening
- D) Primary forest
undisturbed in recent
history

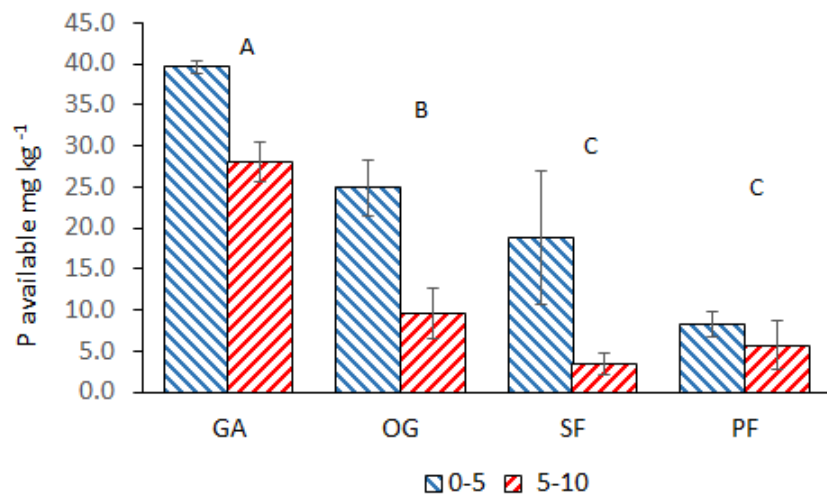


No significant difference in total C, N P

No significant difference in SOM fraction



	Active garden		Old garden		Secondary forest		Primary forest	
pH 0-5 cm	7.22	±0.36	7.27	±0.46	6.90	±0.60	7.31	±0.55
pH 5-10 cm	6.91	±0.47	7.70	±0.74	7.56	±0.42	7.80	±0.80
conductivity 0-5 cm [$\mu\text{S cm}^{-1}$]	0.101	±0.020	0.087	±0.022	0.115	±0.022	0.074	±0.015
conductivity 5-10 cm [$\mu\text{S cm}^{-1}$]	0.088	±0.016	0.078	±0.021	0.080	±0.015	0.105	±0.029
N 0-5 cm [%]	0.424	±0.074	0.510	±0.036	0.528	±0.073	0.480	±0.109
N 5-10 cm [%]	0.389	±0.063	0.393	±0.058	0.403	0.102	0.396	±0.044
C:N 0-5 cm	12.1	±1.3	13.0	±1.0	12.4	±1.3	12.3	±0.9
C:N 5-10 cm	11.5	±1.2	10.7	±0.7	11.2	±0.8	10.5	±0.7
P 0-5 cm [mg kg^{-1}]	772.9	±93.9	838.7	±158.0	946.9	±230.0	649.9	±173.4
P 5-10 cm [mg kg^{-1}]	836.1	±214.0	879.5	±189.3	849.5	±316.7	608.6	±122.8



	Active garden		Old garden		Secondary forest		Primary forest	
Ca 0-5 cm [mg kg ⁻¹]	7637.1	±51.7	7979.1	±503.2	7181.2	±858.3	5690.9	±911.5
Ca 5-10 cm [mg kg ⁻¹]	7447.1	±62.0	7109.4	±696.0	5357.4	±388.5	5184.3	±1221.9
	A		A		B		B	
Mg 0-5 cm [mg kg ⁻¹]	1223.7	±18.3	988.4	±137.7	972.4	±58.6	752.5	±153.5
Mg 5-10 cm [mg kg ⁻¹]	1531.9	±191.8	951.0	±137.8	1024.0	±73.7	643.3	±153.2
	A		B		B		C	
K 0-5 cm [mg kg ⁻¹]	511.1	±5.7	442.2	±40.4	337.1	±0.8	302.5	±22.8
K 5-10 cm [mg kg ⁻¹]	478.5	±1.6	386.9	±7.5	236.3	±19.9	235.3	±69.8
	A		B		C		C	
NO ₃ ⁻ 0-5 cm [mg kg ⁻¹]	50.4	±2.1	36.9	±8.9	64.3	±5.1	37.0	±3.4
NO ₃ ⁻ 5-10 cm [mg kg ⁻¹]	42.7	±3.4	24.8	±5.5	35.3	±6.4	36.4	±11.6
	A		B		A		B	

Significant differences in available P, Ca, Mg, K, and NO₃

Naproti tomu mechanické odlesnění dlouhodobější kultivace (5let a více) tropických půd vede ke ztrátě organické hmoty erozi ztrátě živin a úrodnosti

Thank you for your attention

