

Table S1 - Correlation among measured soil attributes considered for factor analysis in the 0–15 cm depth across all management treatments. Earthworms' total biomass (EW g/m²), abundance (EW i/m²), and average size (EW g/i).

	PR	Water ⁻⁵⁰	P ⁰ _{0.2-0.9µm}	P ⁰ _{>0.9µm}	P ⁰ _{0.2-0.9µm0.2}	WSA	MWD _d	MWD _w	Av P	Total N	EC	pH	Ext Na	Av Zn	Av Cu	Av Ni	Av Cd	Av Pb	SOC	POM-C	EW g/m ²
PR	1																				
Water ⁻⁵⁰	0.345**	1																			
P ⁰ _{0.2-0.9}	0.229	0.764***	1																		
P ⁰ _{>0.9}	-0.229	-0.846***	-0.540**	1																	
P ⁰ _{0.2-0.9µm0.2}	0.253	0.901***	0.795***	-0.933	1																
WSA	0.154	0.395**	0.409**	-0.273	0.356**	1															
MWD _{dry}	-0.190	-0.577**	-0.451**	0.514	-0.561**	-0.312*	1														
MWD _{wet}	0.267	-0.307*	-0.240	0.280	-0.296*	-0.219	0.259	1													
Av P	-0.479**	0.225	0.206	-0.165	0.221	0.108	-0.096	-0.721***	1												
Total N	-0.431**	0.038	0.043	0.001	0.057	0.077	0.144	-0.508**	0.837***	1											
EC	-0.348**	0.292*	0.128	-0.184	0.182	0.148	-0.015	-0.491**	0.8111***	0.663**	1										
pH	0.353**	0.174	0.053	-0.230	0.160	0.103	-0.247	0.432**	-0.633***	-0.620***	-0.445**	1									
Ext Na	-0.218	-0.132	-0.089	-0.048	0.014**	-0.422**	0.305*	-0.180	0.028	0.187	-0.143	-0.119	1								
Av Zn	-0.577**	0.109	0.088	-0.076	0.110	0.023	0.063	-0.664***	0.960***	0.869***	0.792**	-0.695***	0.179	1							
Av Cu	-0.602***	0.053	0.069	-0.015	0.058*	0.018	0.077	-0.669***	0.939***	0.855**	0.709***	-0.679***	0.228	0.986***	1						
Av Ni	-0.529**	0.152	0.102	-0.138	0.163	-0.062	0.039	-0.620***	0.941***	0.805**	0.863**	-0.662**	0.162	0.952***	0.915***	1					
Av Cd	-0.635***	-0.145	0.022	0.199	-0.117	-0.033	0.161	-0.619***	0.770***	0.728***	0.468**	-0.638***	0.322**	0.853***	0.913***	0.745***	1				
Av Pb	-0.605***	-0.065	0.044	0.006	0.040	-0.082	0.089	-0.525**	0.702***	0.635**	0.429**	-0.461**	0.414**	0.763***	0.818***	0.721***	0.808***	1			
SOC	-0.470**	0.032***	-0.067	-0.053	0.040	-0.060	0.024	-0.617	0.892***	0.791	0.801***	-0.693***	0.135	0.917***	0.880***	0.937***	0.738***	0.657**	1		
POM-C	-0.338*	-0.113**	-0.374	-0.003**	-0.124	-0.239	0.015	-0.391	0.472	0.541	0.349**	-0.570**	0.451**	0.566**	0.562**	0.552**	0.511**	0.413**	0.684**	1	
EW g/m ²	0.313*	0.008	-0.004	0.068	-0.069	-0.021	0.103	0.522	-0.404	-0.425**	-0.248	0.238	-0.187	-0.383**	-0.402**	-0.379**	-0.443**	-0.383**	-0.348**	-0.347**	1
EW g/i	0.273*	-0.299*	-0.073	0.350	-0.275*	-0.110	0.130	0.248	-0.316	-0.390**	-0.371**	0.034	-0.081	-0.315**	-0.294*	-0.339*	-0.226	-0.156	-0.268	-0.308**	0.712***

*: Correlation is significant at $p < 0.10$, **: Correlation is significant at $p < 0.05$, ***: Correlation is significant at $p < 0.001$

Table S2 - Correlation among measured soil attributes considered for factor analysis in the 15-30 cm depth across all management treatments.

	P $\bar{O}_{>0.2}$	Av P	EC	pH	Ext K	Ext Na	SOC	POM-C
P $\bar{O}_{>0.2}$	1							
Av P	-0.080	1						
EC	-0.135	0.953***	1					
pH	0.055	-0.877***	-0.878***	1				
Ext K	-0.048	-0.052	-0.080	-0.233	1			
Ext Na	-0.140	0.187	0.146	-0.433**	0.471**	1		
SOC	0.215	0.784***	0.790***	-0.708***	-0.117	0.217	1	
POM-C	0.391	0.534***	0.610***	-0.501**	0.031	0.071	0.635***	1
MBC	0.033**	0.330*	0.351**	-0.413**	0.308*	0.494**	0.246	0.184

*: Correlation is significant at $p < 0.10$, **: Correlation is significant at $p < 0.05$, ***: Correlation is significant at $p < 0.001$