

Exploring Polyphosphates in Soil: Presence, Extractability, and Contribution to Microbial Biomass Phosphorus

Supplementary Information

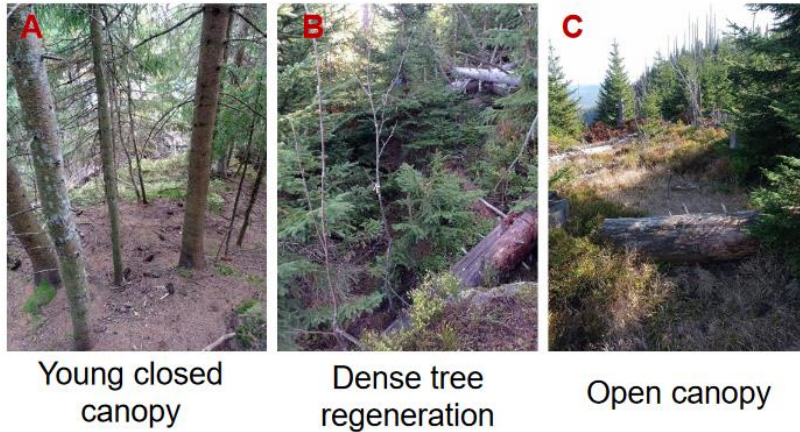
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Table S1: Dry weight (DW) and microbial biomass carbon (MBC) estimated in litter and organic topsoil horizons from six different localities (under different vegetation cover) within Plešné and Čertovo catchments. The reported values were used to calculate weight of soil, which contains 70 μmol of MBC. This amount of soil was used as a soil inoculum in growth experiment described in section 2.2. “Presence of polyphosphates in biomass of soil microorganisms” in main text. The center-aligned values are means of three replicates and right-aligned values in italics are standard deviations of the mean.

Catchment	Vegetation cover	Horizon	DW	MBC $\mu\text{mol g}^{-1}$	Weight of soil inoculum g
Plešné	Young closed canopy	Litter Layer	0.37	477 26.31	0.4
		Organic Horizon	0.34	313 13.76	0.7
	Dense tree regeneration	Litter Layer	0.20	261 21.23	1.3
		Organic Horizon	0.24	140 8.21	2.1
	Open canopy	Litter Layer	0.18	435 22.53	0.9
		Organic Horizon	0.31	176 7.49	1.3
Čertovo	After tree dieback	Litter Layer	0.22	378 5.88	0.8
		Organic Horizon	0.23	260 13.17	1.2
	Mature closed canopy	Litter Layer	0.22	492 27.91	0.6
		Organic Horizon	0.25	211 13.83	1.3
	Dense tree regeneration	Litter Layer	0.28	337 20.99	0.7
		Organic Horizon	0.38	175 4.72	1.1

A) – C) Plešné catchment



D) – F) Čertovo catchment

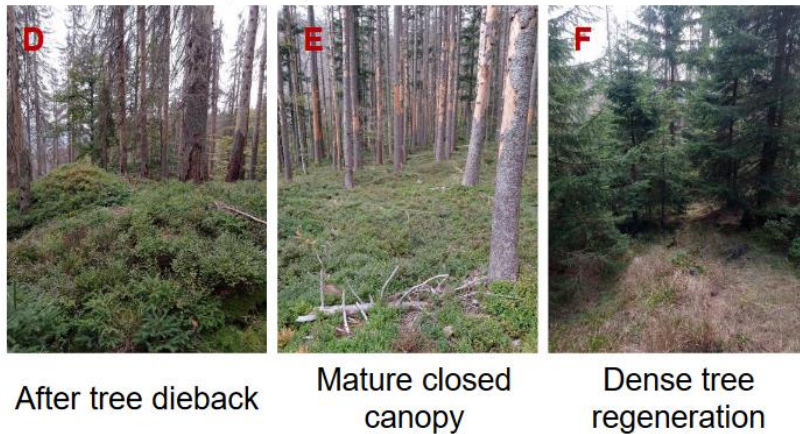


Figure S1: Sampling localities within the Plešné (A – C) and Čertovo (D – F) catchments. Localities encompass the gradient of the variability in vegetation cover (of original spruce forest ecosystem) recently affected by bark beetle outbreak. Samples of diagnostic soil horizons Ol + Of (i.e., top ~ 5 cm containing fragmented but visible plant litter remnants) and H (i.e., between ~ 5 and 15 cm depth containing amorphous organic material) were collected from three different soil pits excavated randomly at each locality. Three field replicates were mixed together to create one composite sample, which is representative to a specific locality within catchment.

Bacterial community NMDS ordination

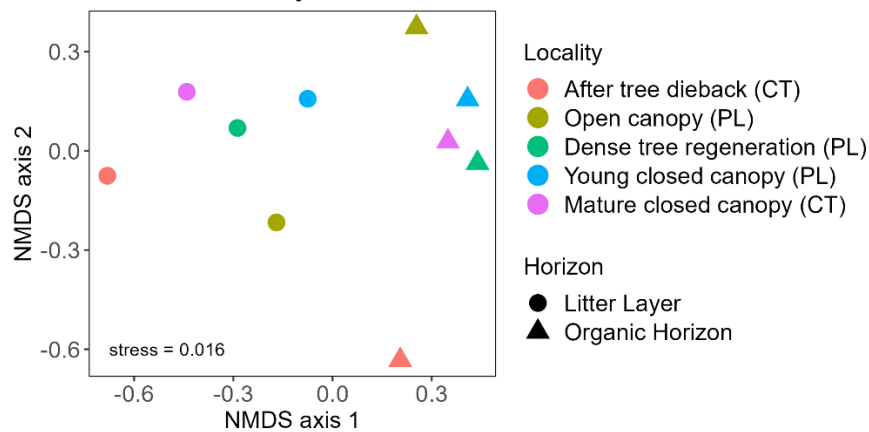


Figure S2: Bacterial community composition: ordination diagram of non-metric multidimensional scaling (NMDS) based on Bray-Curtis dissimilarities between samples based on amplicon sequencing (bacterial V4 region) profiles. Based on data from Choma et al. in prep.

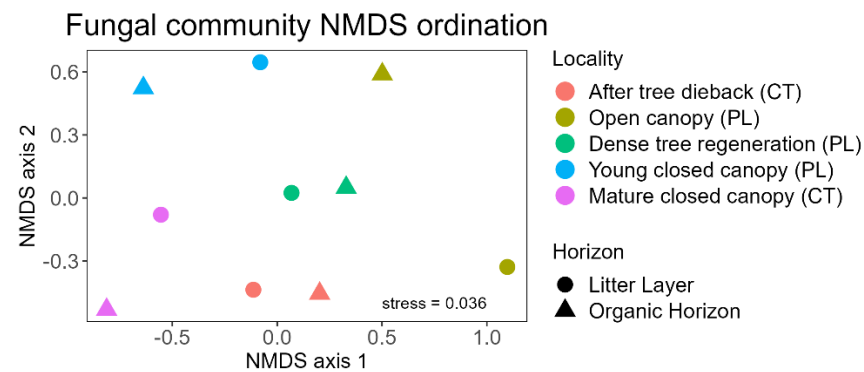


Figure S3: Fungal community composition: ordination diagram of non-metric multidimensional scaling (NMDS) based on Bray-Curtis dissimilarities between samples based on amplicon sequencing (fungal ITS region) profiles. Based on data from Choma et al. in prep.

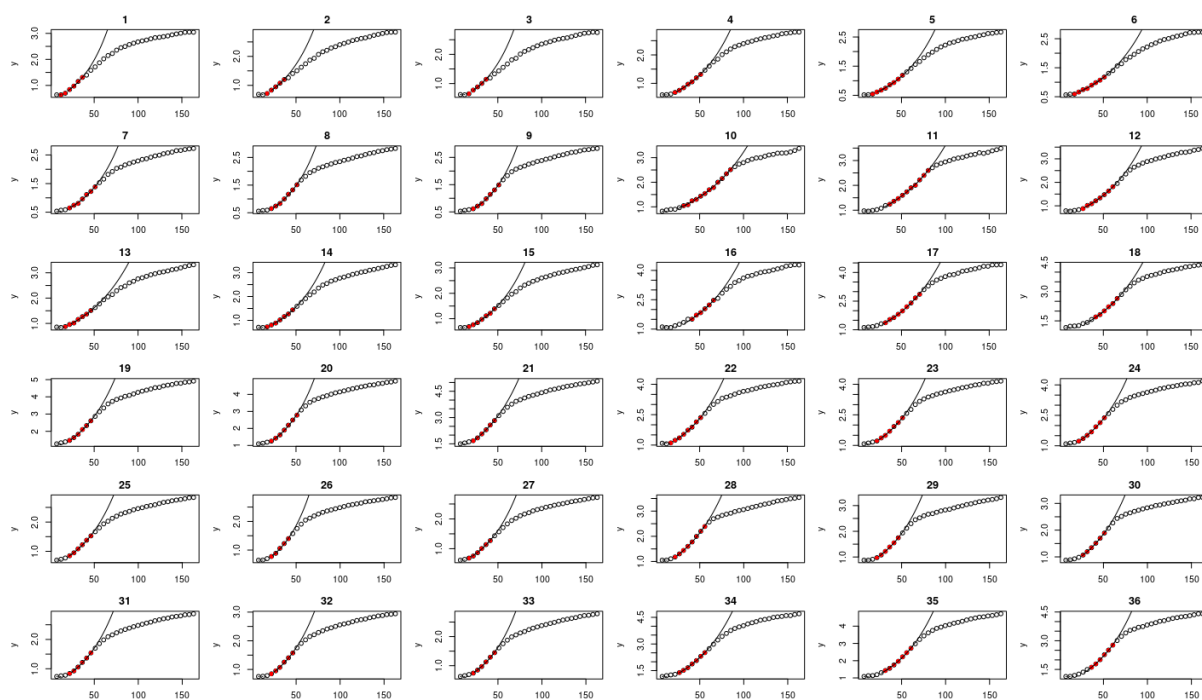


Figure S4: Progress curves of oxygen consumption over time for all 36 six samples used in this study (2 catchments $\times$ 3 locations $\times$ 2 horizons $\times$ 3 laboratory replicates). The oxygen consumption (y-axis) is expressed in mmoles of O_2 per mole of initial MBC and time (x-axis) in hours. Circles represent measured oxygen consumption and the red solid line the maximum slope of O_2 consumption increase over time as estimated using R package *growthrates* (version 0.8.4)(Petzoldt, 2022). The slope of increase is related to growth rate of microbial community added to an experimental system as soil inoculum.

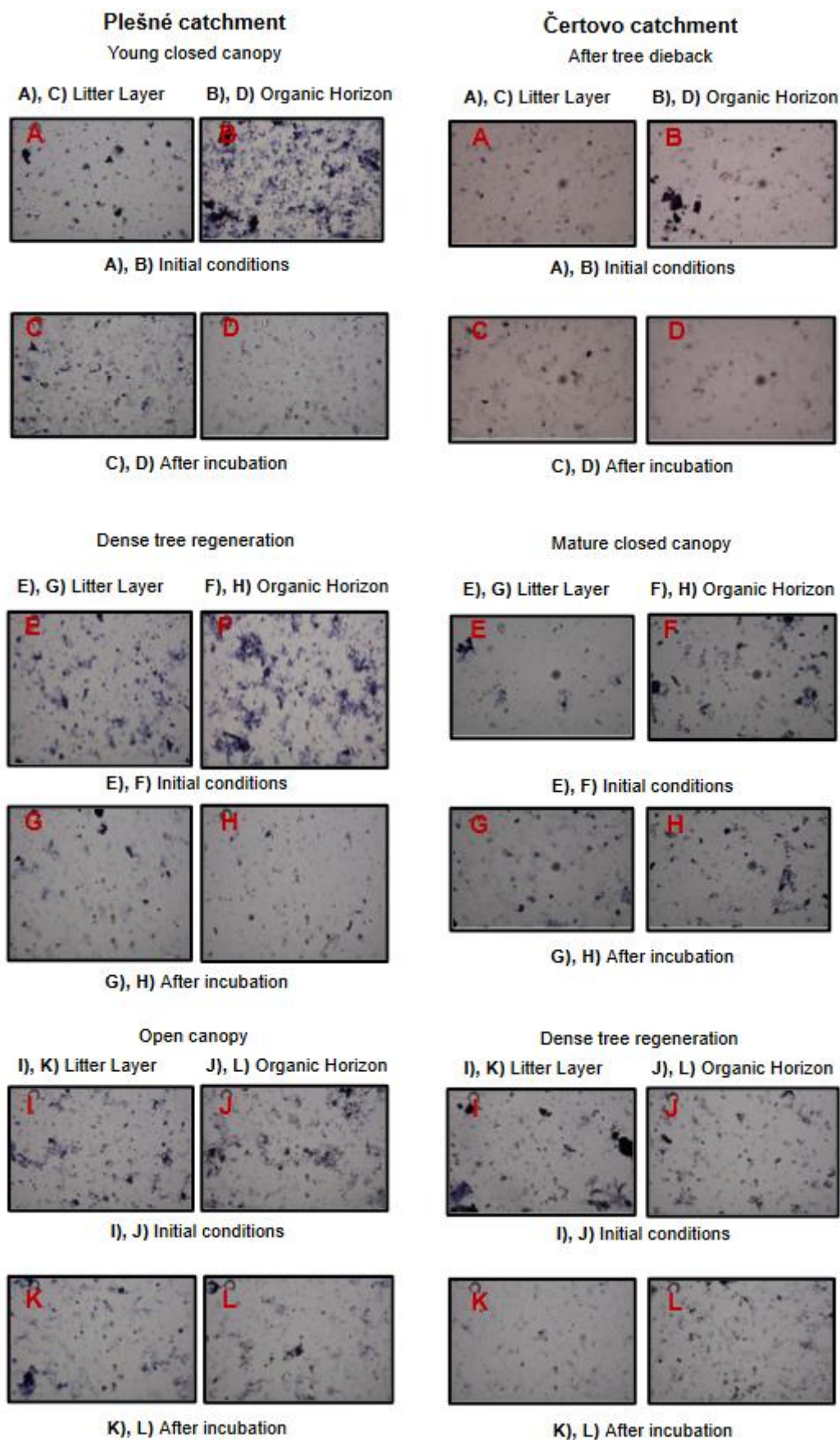


Figure S5: Slurries stained by Neisser method. Samples of litter layers and organic horizons from three different localities within Plešné and Čertovo catchments. Pictures of slurries of soil inoculum

before the incubation on media without P and after one week of incubation on media without P are shown. See “Material and methods” section in the main text for details.

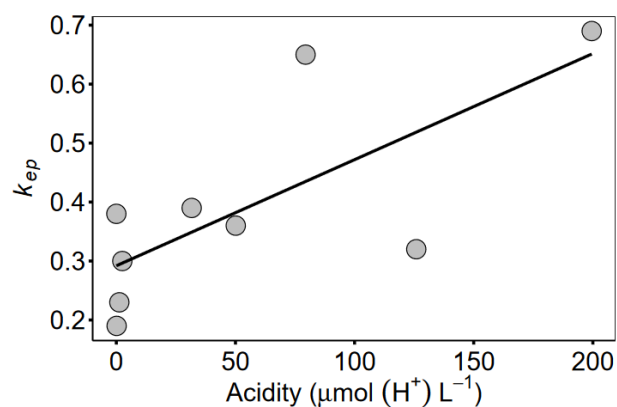


Figure S6: Relationship between soil acidity and conversion factor (k_{ep}) between CHCl_3 -labile soil phosphorus and microbial biomass phosphorus. Data were taken from study of Bilyera et al. (2018).