

Amount and position of post-fire coarse wood influences litter decomposition and microarthropods

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Spatial variation in vegetation and coarse wood is a major source of heterogeneity within forests, yet little is known about how ecosystem processes vary with this heterogeneity. We studied decomposition in 15-yr post-fire *Pinus contorta* stands in Yellowstone National Park to address two questions: (1) Within stands, how does the structural heterogeneity created by coarse wood and pine saplings influence fine-litter decomposition rates? (2) Among stands, does coarse wood abundance influence fine-litter decomposition rates? Mesh litterbags were deployed for two years to estimate decomposition within stands ($n = 720$ bags in three 0.25-ha stands) and among stands ($n = 880$ bags in 17 burned stands and 3 unburned stands with varying coarse wood densities). Within stands, mass loss of needle (NL) and herbaceous litter (HL) was slower under logs elevated (≤ 10 cm) above the ground (NL 11%, HL 34%) than under logs contacting the ground (NL 17%, HL 44%), under *P. contorta* saplings (NL 20%, HL 49%), below highly decayed wood (NL 27%, HL 44%), above highly decayed wood (NL 25%, HL 55%) or on exposed soil (NL 20%, HL 46%). Soil moisture (recorded hourly for one year) was lowest under elevated logs and highest beneath contact and highly decayed logs; soil moisture was positively correlated with density (adj. $R^2 = 0.48$) and diversity (adj. $R^2 = 0.40$) of microarthropods that colonized the litterbags. Among stands, mass loss of NL and HL did not vary with coarse wood abundance, but mass loss of fine woody litter (WL) was less (15%) in stands with high densities of elevated logs than in stands with low densities of elevated logs (23%). Mass loss rates of WL were slower (10%) in unburned stands but similar to stands with abundant coarse wood. The influence of elevated logs both within and among suggests that coarse wood accumulation patterns in young post-fire *Pinus contorta* stands influence soil processes at multiple scales.

1951 characters (with spaces).