SPEARS, JULIE* and KATE LAJTHA. Oregon State University. **Coarse woody debris may influence soil chemistry and direct pedogenesis towards podzolization in the Oregon Cascades.**

Coarse woody debris (CWD) may affect pedogenesis through the release of dissolved organic matter (DOM) rich in acidic substances. Acidic DOM has been implicated in many soil processes such as podzolization, the displacement of anions from the soil matrix, the release of P from iron and aluminum hydroxides and the dissolution of soil minerals. We investigated the potential contribution of CWD to podzolization and the influence of CWD on soil nutrients in the Oregon Cascades. We measured soil solution from lysimeters at different depths under coarse woody debris for total DOC, organic acids, and polyphenols. DOC was further separated by chemical fractionation. We also sampled soil for total C, N and P, water soluble organic C, pH, exchangeable acidity and cations, exchangeable Al and Fe in $BaCl_2$, aluminum and iron bound PI and Po, and sodium pyrophosphate, ammonium oxalate, and citrate-dithionate extractable Al and Fe. We found lower pH ($p=0.004$), higher exchangeable acidity ($p=0.008$) and more exchangeable aluminum ($p=0.04$) and iron ($p=0.06$) 0-5 cm under CWD than in adjacent soils. At 30-60 cm there were fewer differences between control soils and soils with CWD. These results suggest that CWD acidifies the surface soil as it decomposes by decreasing exchangeable bases and increasing exchangeable acidity and aluminum. CWD may have a long-term influence on soil pedogenesis and thus, removal may alter ecosystem processes such as nutrient cycling, pedogenesis and C storage.

SPETICH, MARTIN A.,[1,*] STEPHEN R. SHIFLEY[2] and GEORGE R. PARKER.[3] [1] USDA Forest Service, Southern Research Station; [2] USDA Forest Service, North Central Research Station; [3] Purdue University. **Tree cavities of Midwestern old-growth forests.**

Cavities in trees serve a wide range of wildlife species in Midwestern old-growth forests. However these cavities have not been quantified on a regional basis. We present the results of a study that examines tree cavities across a four state region. Thirty 0.1 ha permanent plots/site were established at 11 sites. For trees $\geq$ 2 cm in diameter the number and size of cavities were recorded. The mean number of cavities among sites was 38/ha, 24/ha and 11/ha for cavities 2 to 5 cm, 5 to 10 cm and >10 cm respectively. The mean number of cavities per square m of basal area was 17 cavities/square m for cavities $>$ 2 and $<$ 10 cm and 5 cavities/square m for cavities $\geq$ 10 cm. The largest number of cavities existed in small diameter trees with 15 cavities/ha for 10 to 20 cm diameter trees, decreasing to $<$ 1/ha in the largest diameters. However, the percent of trees with cavities showed just the opposite trend with only 10 percent of trees in the 10 to 20 cm diameter class, increasing to 100 percent of the trees in the largest diameters. These findings should be useful as baseline data for comparison to earlier stages of succession and in understanding the role and dynamics of Midwestern old-growth forests.

SPRINGER, JUDITH D.,* PETER Z. FULE, MARGARET M. MOORE and W. WALLACE COVINGTON. Northern Arizona University. **Effects of ecological restoration treatments on legumes, shrubs and C_4 grasses.**

Recovery of understory plant communities is essential following ecological restoration treatments in southwestern ponderosa pine forests. Historical evidence suggests that a century of active fire suppression, along with heavy domestic and wild ungulate grazing and browsing has led to canopy closure and declines in abundance of shrubs, legumes, and C_4 grasses, and increases in non-native species. Restoration of these ecosystems involves thinning small diameter trees and reintroducing low intensity fire. We hypothesize that frequencies of these functional groups should increase following thinning and prescribed burning treatments. To test these hypotheses, post-treatment surveys were conducted for 2 or 4 years at two sites in northern Arizona where cattle were excluded. Populations of C_4 grasses had not recovered to pre-treatment levels by post-treatment year 2 or 4, and one site had no naturally regenerating populations of C_4 grasses. However, prescribed fire substantially enhanced legume abundance (500% or more in some cases) one year after burning, but species richness remained low, ranging from 0 to 4 species per plot post-treatment. Shrub abundance also increased following restoration treatments. This study demonstrates the need for long-term monitoring in these forests, and suggests that areas undergoing restoration are highly variable between and within landscapes. Decisions to seed or conduct repeated burnings should be dependent on pre-treatment conditions (such as the abundance of species in the soil seed bank) and should be evaluated on a case-by-case basis.

SRIVASTAVA, DIANE S.[1,*] and JENNIFER L. RUESINK.[2] [1] University of British Columbia; [2] University of Washington. **Mechanisms maintaining ecosystem function after species loss: Numerical and per capita compensation by stream insects.**

The effects of species loss on ecosystem function will depend on the response of the remaining species. In principle, ecosystem function could be maintained after species loss in two ways: the remaining species could increase their processing rates (per capita compensation) or they could increase in abundance (numerical compensation). We were able to distinguish between these two types of compensation by manipulating stream insect communities in flow-through enclosures and measuring the effects on an ecosystem function, processing of leaf litter. We also compared the effects of removing each of two dominant species separately, the stonefly *Pteronarcys californica* and the caddisfly *Lepidostoma unicolor*. To test for per capita compensation, we compared leaf processing rates in full-diversity communities with those in similar communities missing one dominant species, i.e. reduced in both species number and abundance. Per capita compensation occurred after *Pteronarcys* loss but not *Lepidostoma* loss. To test the effectiveness of numerical compensation, we experimentally increased abundances in these depleted-diversity communities so that the expected metabolic capacity of the assemblage returned to original levels. These increases in abundance were always effective in maintaining rates of leaf breakdown after *Pteronarcys* loss, but not always after *Lepidostoma* loss. In the latter case, it mattered which of the remaining species increased in abundance. In summary, the effect of species loss in our study depended on which species was lost, which species responded to this loss, and how they responded. These results indicate that a variety of different mechanisms may underlie patterns between biodiversity loss and ecosystem function.

STAMP, NANCY E. and ANGELA M. PAGANO.* BINGHAMTON UNIVERSITY. **Workshops in university science education.**

In general, university faculty and graduate students receive little instruction about teaching, especially relative to their subdiscipline. We conducted a series of 2-hour workshops to provide science faculty and graduate students a means for familiarizing themselves with current pedagogical issues. For this, we developed a generic workshop procedure. In addition, we developed three surveys for quantitative assessment of attitude about various teaching approaches and of effectiveness of the workshops. The survey regarding attitude indicated that both faculty and graduate students were most comfortable with more traditional classroom techniques (e.g., lecture and discussion) and were unsure of the effectiveness of less traditional teaching methods such as using case studies, portfolios, and the web. Feedback surveys from workshops on case studies, learning styles, and the 5E method of instruction showed an increase in both comfort level and perception of the effectiveness of the approach. Surveys also indicated an increase in planned use of the approaches or methods covered in the workshops. Our results suggest that short, well-planned workshops can provide an effective means for exposing graduate students and faculty to alternative teaching approaches and that this exposure may increase comfort with and planned use of these techniques in the future.

STANLEY, AMANDA G.* University of Washington, Zoology. **Weeds, bugs, and mice: why two biocontrol insects failed.**

Biological control has the potential to be a cost-effective alternative to pesticides. However, the current success rate for weed biocontrol is very low. Improving the efficacy of biological control requires an understanding of what causes success or failure. Many biocontrol agents successfully establish and spread, but fail to suppress the target weed. I consider two non-exclusive hypotheses: first, the control attacks a robust life stage of the target, such that the damage produces little population-level effect. Alternatively, interactions with other native species suppress the biocontrol populations (e.g. predation, competition). To address these hypotheses,

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