AGRONOMY ABSTRACTS

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A 4 ha portion of a scrub hardwood-rhododendron stand on watershed 19, Coweeta Hydrologic Lab, Franklin, North Carolina, was treated with 50 kg/ha of Tordon 10K, in order to test its effectiveness as a site preparation agent, and to evaluate its effect on forest soil processes. The herbicide was applied in a pelleted form by hand in May, 1978. The application area was instrumented with 24 porous cup lysimeters placed at three different depths. A control area adjacent to the treated area was similarly instrumented with 12 lysimeters. Preliminary impacts on nitrification, soil respiration, decomposition, and movement of the herbicide and nutrients are discussed.


Two experiments were conducted in a greenhouse to support or alloy a concern that biuret in urea fertilizer may reduce growth of Douglas-fir (Pseudotsuga menziesii) or western hemlock (Tsuga heterophylla). Newly germinated seedlings of both species in 2-liter pots were treated with 0, 0.224, 2.24, or 22.4 kg/ha biuret in factorial combinations with 0, 84, or 168 kg/ha N as reagent-grade urea. The biuret was applied as a solution to either the soil or the foliage. Four of the eight replications were harvested after the first growing season; the remaining seedlings were retreated with the original dosages and harvested after the next growing season. In both experiments, seedling dry weight increased linearly with increasing biuret (P < 0.003); averaged over all other factors, weight of seedlings treated with the highest biuret dosage was 14% more than with no biuret. Douglas-fir seedlings were heavier than hemlock, especially at the highest N dosage (P < 0.003). These results indicate that biuret is unlikely to reduce growth of seedlings of either species--and probably of older stands under field conditions--even when heavily contaminated urea is applied at high dosage.

Forest Soil Variability on Northeastern Floodplains. A. V. Molitor*, and A. L. Leaf, State University of New York College of Environmental Science and Forestry, Syracuse.

In a forest type classification study, floodplain areas in eastern New York and western Vermont were sampled for soil properties and tree species composition. On the bases of physiography and species composition, two site types were identified for stratification of data: (1) lateral accretion deposits and (2) vertical accretion deposits. Nested analyses of variance of 13 surface and 13 subsurface soil properties of these alluvial Entisols and Inceptisols shows that, of the variables measured, all with the exception of surface soil variation were significantly less variable within sample plots than among plots and that surface reaction and depth.

Seasonal Patterns of Dry Weight and Nutrient Composition of Fertilized Jack Pine. L.D. Morrow, and V.R. Timmer*, Ontario Ministry of Natural Resources and School of Forestry, Lakehead University, Thunder Bay.

Dry weight, nutrient concentration and nutrient content of current and year-old needles from a 26 year-old jack pine plantation were monitored during the first growing season after fertilization with factorial combination of N, P and K. The seasonal pattern of N concentrations exhibited characteristic dilution of N in the early summer which was coincident with rapid needle elongation. A recovery of N concentration levels was evident later in the season when needle growth stabilized. In contrast, the trend of N content of individual needles shows a more consistent pattern of a sustained increase throughout the season. Current needle growth was significantly increased by N applications, but not with P and K fertilization. N fertilization not only increased the composition of N in the old and new foliage, but also raised the amount of P, K, Ca, and Mg in the new foliage. A preliminary diagnosis of N deficiency was made.

Mycorrhizal Response of Conifer Seedlings to Medium Pretreatment, Fertilizer and Fungal-Inoculation. K. R. Munson*, J. M. Trappe, and B. Zak; Soil Science Department, Oregon State University and USDA Forest Service, Pacific Northwest Forest and Range Experiment Station.

A greenhouse experiment was conducted to determine how mycorrhiza formation of containerized Douglas-fir, ponderosa pine and western hemlock was affected by interaction of medium pretreatment, fertilizer level and species of mycorrhizal fungi. Pretreatments included straining vs. methyl bromide vs. untreated control. Fungal species included Thelephora terrestra vs. Pisolithus tinctorius vs. Hebeloma crustuliniforme vs. Laccaria laccata. Seedlings were grown in Leach cell cultures. Results show that a greater number of ponderosa pine seedlings formed mycorrhiza than did Douglas-fir and western hemlock. Mycorrhiza formation was greater in the steam treatment than in the methyl bromide or control treatments. The low level of fertilization produced a greater percentage of mycorrhizal seedlings than did the high level. A greater percentage of seedlings were mycorrhizal with H. crustuliniforme than with L. laccata, followed by T. terrestra and P. tinctorius. These results suggest that consideration must be given to tree species, fertilizer levels, medium pretreatment methods and fungal species for optimum mycorrhiza formation in container seedling nurseries.


Field experiments have been established at 25 locations throughout California forest lands, covering a range of soils, forest types and tree sizes, to determine growth response to nitrogen fertilization. Treatments consist of full nitrogen fertilization as urea, crossed with brush removal in younger stands or thinning in older. Soil solution was sampled during the wet season at 15, 50, and 100 cm depths and analyzed for NH4+, NO3- and urea. Results suggest that nitrification rates are low in untreated plots, but that rates increase following fertilization in proportion to the amount of urea applied. Removal of competing vegetation, either brush or trees, promoted nitrification and facilitated nitrate movement through the soil profile. Nitrate concentrations decreased with profile depth but increased with time at the 50 and 100 cm depths as nitrate moved from upper horizons with the moisture flux. Ammonium concentrations increased with fertilization rate, but seldom to very high levels - probably because of rapid conversion to nitrate.


Pedon description data were taken from fertilizer test plots on the Willamette National Forest in Western Oregon. Twenty pedon description variables that were thought to have some effect on fertilization response were chosen from a

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