

# **Abstracts of Technical Papers**

**1995 Annual Meeting**

**Southern Branch  
of  
American Society of Agronomy**

**Number 22**

**New Orleans, Louisiana  
January 30-February 1, 1995**

NICHOLS\*, B. ROGERS, D.C. WOLF, C.M. REYNOLDS, and C.A. BEYROUTY, Univ. of Arkansas and CRREL, Hanover, NH. Rhizosphere microbial populations may increase bioremediation of petroleum contaminated soil. A growth chamber study compared populations in the rhizosphere of contaminated and non-contaminated soil. Alfalfa (*Medicago sativa* L.) and bluegrass (*Poa alpina*) were grown in soil containing 0 and 2000 mg/kg of a petroleum hydrocarbon mixture for 14 weeks. Bacteria and fungi were enumerated by plate count methods and hydrocarbon-degrading microorganisms (HDM) were assessed by a Most-Probable-Number technique. Bacteria and HDM numbers were higher at 9 and 14 weeks in rhizosphere and contaminated soils than bulk and non-contaminated soils, respectively. At 9 weeks, HDM alfalfa rhizosphere levels were  $4 \times 10^7$ /g for contaminated and  $6 \times 10^6$ /g for non-contaminated soils. Bluegrass rhizosphere HDM levels were  $1 \times 10^7$ /g and  $1 \times 10^6$ /g in contaminated and non-contaminated soils, respectively. Higher numbers of HDM in contaminated rhizospheres suggest potential stimulation of bioremediation around plant roots.

T.D. Nichols, (501) 575-5743

Response of Triticale to Tillage on Two Coastal Plains Soils. K.E. Newsom\* and P.L. Mask Auburn University.

This study was conducted to determine the suitability of triticale (*X Triticosecale* Wittmack) for reduced tillage systems. Long-term tillage plots established in 1980 were used for this project. Soil types were a Benndale sandy loam (Typic Paleudults) and a Lucedale fine sandy loam (Rhodic Paleudults). Tillage treatments prior to planting were chisel plow, no-till, disking, subsoiling, subsoiling with starter fertilizer, and turn plowing. In-row subsoiling was done at planting and before the summer crop was planted (soybean [*Glycine max* (L.) Merr.]). On Benndale soil, chisel plow and subsoiling with starter NPK produced the higher yields. On Lucedale soil, subsoiling and subsoiling with with starter NPK gave the higher yields. Benefits of in-row subsoiling were inconclusive.

K.E. Newsom, (205) 844-4100

Pod and Seed Number Development in Autumn-Sown White Lupin. S.L. NOFFSINGER\*, C. HUYGHE and E. VAN SANTEN, Auburn University, Auburn, AL and INRA, Lusignan, France.

Pod and seed number development were examined in determinate, dwarf and indeterminate lines of autumn-sown white lupin (*Lupinus albus* L.) at Lusignan, France and Shorter, Alabama. Seed and pod number stabilized latest at Lusignan in 1994 and earliest at Auburn in 1994 as a result of differences in vegetative development and length of the reproductive period. Seed and pod number stabilized later in the dwarf than in the other genotypes. Final seed and pod number was usually lowest on the mainstem of the dwarf and highest on the mainstem of the determinate lines. Pod and seed development on the secondary inflorescence was limited in Alabama and for the determinate lines. Seeds/pod was more stable on the mainstem inflorescence of the determinate lines than in the indeterminate and dwarf line.

S.L. Noffsinger (205) 844-3988

Quantifying Diffusive Mass Transfer of Non-Reactive Solutes in Undisturbed Soil Columns Using Flow Interruption. O.C. REEDY\*, P.M. JARDINE, and H.M. SELIM. Oak Ridge National Laboratory and Louisiana State University.

Subsurface transport processes of low-level radioactive contaminants are complex due to a vast continuum of pore regions in heterogeneous media. The objective of our study was to quantify the diffusive mass transfer of nonreactive solutes within heterogeneous subsurface media. Large, undisturbed soil columns were acquired from a proposed waste site at the Oak Ridge National Laboratory. The flow interruption technique was used in nonreactive tracer experiments involving the saturated transport of Br to

nonreactive tracer into the heterogeneous media, inhibiting tracer infiltration, and then reinitiating the tracer flow. Experiments considered variations in interrupt period and variations in mean pore water flux. Results indicated that molecular diffusion of solutes was a significant transport process over a large range of experimental fluxes. Numerical simulation of the observed data provided diffusive mass transfer coefficients as a function of mean pore water flux and interrupt duration.

O.C. Reedy, (615) 574-7854

Accumulation of Dry Matter and Nutrients in Three White Lupin Cultivars.

R. L. SCHWAB\*, D. W. REEVES and C. M. PETERSON, Ala. Agric. Exp. Stn., Auburn University and USDA-ARS NSDL.

White lupin (*Lupinus albus* L.) has potential in the Southeast as a winter legume for grain and silage production. However, development of winter-type white lupin in terms of nutrient and dry matter accumulation and partitioning is poorly documented. This ongoing field study is being conducted to determine dry matter accumulation/partitioning and nutrient uptake patterns of three diverse white lupin cultivars in relationship to growth habit. An adapted indeterminate cultivar 'Tifwhite-78', and the French cultivars 'Lunoble' (indeterminate) and 'CH304/73' (determinate) were sowed at 172,000 seed ha<sup>-1</sup> on a Marvyn sandy loam (fine-loamy, siliceous, thermic, Typic Kanhapludult) at Auburn, AL. Plants were sampled throughout the growing season and analyzed for dry matter accumulation/partitioning and nutrient contents. Total dry matter at final harvest averaged 7785 kg ha<sup>-1</sup> for Tifwhite-78, 7752 kg ha<sup>-1</sup> for Lunoble, and 7014 kg ha<sup>-1</sup> for CH304/73. Grain yield averaged 3091 kg ha<sup>-1</sup> for Tifwhite, 2777 kg ha<sup>-1</sup> for Lunoble and 3099 kg ha<sup>-1</sup> for CH304/73. Harvest index was slightly higher in the determinate variety than the two indeterminates. Information from this study is being used to develop a standard description of growth stages for white lupin grown in the Southeast as well as recommendations for fertilization practices of the crop.

R. L. Schwab, (205) 844-3989

**WEDNESDAY, FEBRUARY 1**

Session 7 - Crop Production  
Hyatt Regency Burgundy A

Presiding: Rick Mascagni, Louisiana State University

Effects of Release and Gibgrow on Seedling Emergence of Rice at Various Depths of Planting. W.G. YAN\*, R.H. DILDAY and R.S. HELMS, Univ. of Arkansas, USDA/ARS.

Inadequate stand establishment is a major problem in drill-seeded rice production in the southern U. S. Our objective in this study was to compare two plant growth regulators, Release and Gibgrow, on seedling emergence and stand establishment. In 1992 and 1993 six cultivars were treated with Release and Gibgrow at rates of 0 and 25 PPM. The seeds were planted at depths of 1.9 cm (0.75") and 5.0 cm (2.0") in a randomized complete block design. Both Release and Gibgrow did not increase stand establishment of rice at either depth of planting in either year except Release increased stand establishment at 5.0 cm in 1992. However, both Release and Gibgrow increased emergence speed when compared to the untreated check at both depths of planting in both years. There was no difference between the growth regulators on stand establishment at either depth in either year except Release had a greater number of seedlings when compared to Gibgrow at 5.0 cm depth in 1992. Furthermore, Release increased the speed of seedling emergence more than Gibgrow at both depths in 1992, but not in 1993. Among the cultivars, Katy emerged faster than the other cultivars in 1992, and emerged faster than Bengal, Orion and Lacassine but not Alan and Cyprus in 1993.

W.G. Yan, (501) 673-2661