DEEP FERTILIZER AND LIME PLACEMENT WITH DIFFERENT TILLAGE SYSTEMS IN ULTISOLS. J. H. Edwards*[1], D. L. Karlen[2], D. W. Reeves[1], and W. J. Busscher[3], [1]USDA-ARS, National Soil Dynamics Lab, Auburn, Alabama, [2]USDA-ARS, National Soil Tilth Lab, Ames, Iowa, and [3]USDA-ARS, Coastal Plains Soil and Water Conservation Research Center, Florence, South Carolina, USA.

Deep tillage is required in coarse-textured sandy soils of the Southeast because dense, root-restrictive soil layers are present. Slit-tillage modifies these layers by leaving narrow vertical slits that permit root penetration and proliferation into subsoil horizons. Slit-tillage also provides a means of placing nutrients into the subsoil zones where roots are concentrated. Greenhouse and field studies were conducted on a Norfolk loamy sand (Typic Paleudult), a Marvyn loamy sand (Typic Hapludult), and a Hartsells fine sandy loam (Typic Hapludult) to determine the effects of placement of fertilizers and lime on growth and yield of grain sorghum [*Sorghum bicolor* (L.) Moench]. Fertilizer amendments used in greenhouse experiments were calcium nitrate, calcium phosphate, ammonium phosphate, ammonium nitrate, and dolomitic limestone in similar concentrations to the starter fertilizer used in the field experiments. Treatments included in field studies at three locations were a no-amendment control, N-P starter, lime slurry, and N-P + lime slurry. These materials were applied at planting in an in-row subsoil channel, in a slit (16 x 0.4 cm) below the subsoil channel, or in a band located 7 cm below and 7 cm to one side in the no-tillage treatment. Starter fertilizer + lime significantly increased grain yields at one location when applied in conjunction with some form of deep tillage. The three-year average grain sorghum yield was 3.3 Mg kg^{-1} for no-tillage. Soil chemical properties were altered significantly by placement of chemical amendments in the slit of a simulated hardpan in the greenhouse. There appeared to be an added benefit of slit-tillage with time due to the semi-permanent nature of slits in the compacted zone.

RESPONSE OF UPLAND RICE AND COMMON BEAN TO LIMING ON A BRAZILIAN OXISOL. N. K. Fageria*[1], R. J. Wright[2], V. C. Baligar[2], and J. R. P. Carvalho[1], [1]EMBRAPA/CNPAF, Goiania, Goias, Brazil, and [2]USDA-ARS, Beckley, West Virginia, USA.

Liming is an important cultural practice to improve crop productivity on acid soils. The objectives of this study were to evaluate response of upland rice (*Oryza sativa* L.) and common bean (*Phaseolus vulgaris* L.) to liming on an Oxisol (Typic Haplustox) and to monitor chemical property changes in the soil profile. Dolomitic lime was applied at rates of 0, 3, 6, 9, and 12 metric tons ha^{-1}. Upland rice was less responsive than common bean to lime addition. Upland rice dry matter and grain yields increased up to 32 and 19%, respectively, with lime addition. Liming increased common bean dry matter production up to 40% and grain yield up to 45%. Plow-layer addition of dolomitic limestone resulted in significant downward movement of Ca and Mg into the subsoil and improvement of subsoil acidity conditions. These results confirm that surface application of dolomitic lime can partially ameliorate subsoil acidity in Brazilian Oxisols.

PROGRAM AND ABSTRACTS

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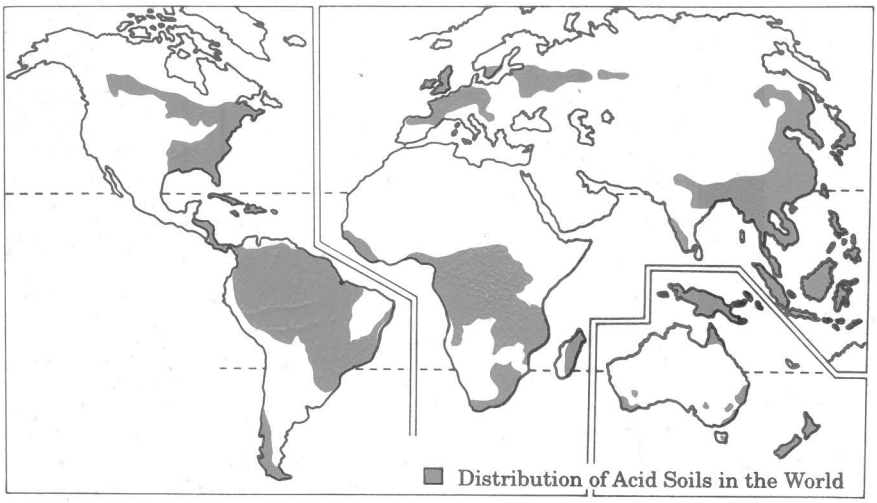

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