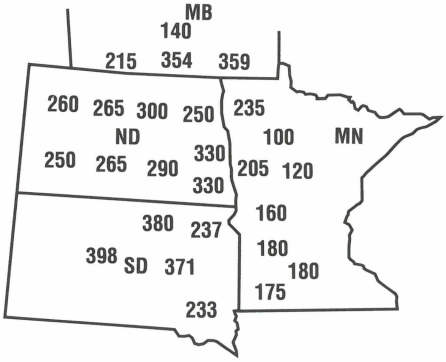


Figure 3. Potassium soil test averages (ppm), 1993. Values are averages of zip code areas only. A current soil test for each field or site should be used to develop specific fertilizer rates.

ences in soil test levels within a state, province or larger region . . . for example, soil parent material, climate, management practices and crop rotations. One weakness of these summaries, however, is that soil test data from one zip code still represent a very large area.

Soil test summaries could be made more specific if the exact location of tested areas were known, but that may never be practical. In areas where best management practices (BMPs) are being introduced, there may be a temptation to use state soil test averages as a benchmark of sorts. **Figures 1, 2 and 3** illustrate the point that there is no way to utilize areas as large as states . . . or even counties . . . as useful tools for managing individual fields.

As scientists, we must communicate with those who develop state, provincial and federal regulations concerning the proper use of soil test summaries . . . informing them that BMPs such as soil testing are best developed on a local basis.

Soil test summaries are another educational tool for stressing the importance of testing each field. Their use in publications and by the media benefits agriculture by helping increase public awareness of the good science and technology used to produce our food and protect the environment. ■

Environotes from TVA

By John E. Culp

A MAJOR NEW DIRECTION for the Tennessee Valley Authority (TVA) Environmental Research Center is conducting studies and developing strategies for watershed protection. One of the key areas of this work involves restoring abused and drastically disturbed lands.

The region has severely eroded and gullied agricultural and forested lands, abandoned mine land, industrial spoil areas, eroded reservoir shorelines, land disturbed by construction activities, and many other disturbed lands. Problems are significant. Soil erosion in the region, for example, averages almost 10 tons/A per year. Some soils are eroding at twice that rate.

TVA scientists at Muscle Shoals are conducting laboratory, greenhouse and field studies on selected environmentally abused or disturbed lands. The purpose is to mitigate nonpoint source pollution and restore the productive capacity of the lands. Some specific objectives include the following.

- Select and screen plants such as legumes, grasses and shrubs, for their use in restoring drastically disturbed lands. Emphasis is on plants that are adapted to acid, nutrient-deficient, and phytotoxic soil conditions.
- Investigate use of land-application of several kinds of inorganic and organic

(continued on next page)

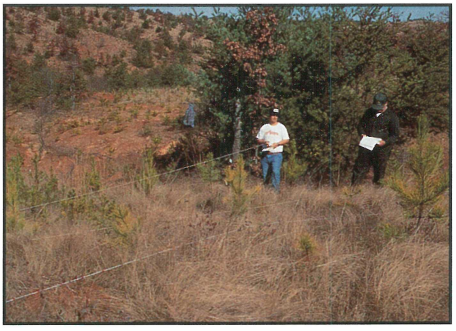
Mr. Culp is with the National Environmental Research Center, Tennessee Valley Authority, Muscle Shoals, AL 35660.

soil amendments–including industrial, municipal, and animal wastes–in restoration of abused or disturbed lands. Scientists will also study implications of this work on water quality.

- Explore the use of microbiological applications for restoration of productivity to drastically disturbed lands. This includes the introduction of nitrogen (N) fixing microbial populations and plants tolerant to acid and harsh conditions of abandoned mine lands.
- Evaluate alternative best management practices (BMPs) and technologies such as hydroseeding for application to revegetation and erosion control on abused or drastically disturbed lands.

Greenhouse Screening Tests/Soil Characterization

Scientists are characterizing representative soils from several mined and disturbed land areas within the Tennessee Valley, including the Copper Basin, brown iron ore, and acid, coal strip-mined land. This information will help develop long-term, cost-effective ways to reclaim and restore these lands.



GROWTH RESPONSE of aerially-seeded grass/legume cover crops and transplanted loblolly pine trees as related to broadcast P fertilization and fertilizer tree tablets is being evaluated in a research study at Copper Basin, TN.

The requirement of maintaining long-term sustainability and increasing soil productivity poses a special need to select the best plants for revegetation of specific problem soils. TVA is conducting a series of greenhouse/growth chamber screening tests to select the optimum legume and grass species for establishment on very acid, harsh soils.

As screening tests are completed, TVA is gearing up to conduct pot studies to evaluate the symbiotic N fixing capacity of select legumes grown on some soils from disturbed land. The quantity of symbiotic N fixed will be determined by ^{15}N isotope dilution method.

Field Research/Demonstrations in Environmentally Sound Land Reclamation

Beginning in 1995, field plot studies will be used to evaluate the effects of grass/legume selections and select BMPs on soil productivity and impacts on water quality. First studies will be in the abandoned brown iron ore mined lands of Franklin County, AL.

Another study will explore the use of a mixture of poultry litter and coal combustion wastes in a land restoration demonstration. This will include the evaluation of hydroseeding techniques in vegetation.

This research, development and demonstration is a part of TVA's Twenty-first Century Agriculture program. Cooperators include the U.S. Environmental Protection Agency, USDA, university researchers, and federal/state land restoration research committees. ■