Seeking sites to slip sludge

COLLEGE PARK, Md.—The state of Maryland produces about eight to nine thousand tons of wet sludge—every day.

About one-quarter of the sludge is used as farmland fertilizer.

But as farmland in the state disappears, new sites are being considered as sludge fills. Forest land is one alternative under consideration.

"A prime concern with sludge application to forest land," says Marla McIntosh, from the University of Maryland, College Park, "is the fate of nutrients in the sludge, especially nitrogen."

As part of a continuous regional project—suppported in part by the Maryland Agricultural Experiment Station—McIntosh is examining how sludge can be scattered in forests without harming the surroundings.

> The advantages: sludge can be applied to forests year-round; forests are more accessible than farmlands, and are not near public food supplies.

Nitrate levels a clue. After applying sludge to forest land, McIntosh measures the nitrate levels in the soil water, which is the water contained in the soil above the ground water level. The soil may be different from that used as farmland, says McIntosh, as the rich organic material in the layer of leaf litter may immobilize sludge-borne nitrogen, and decreasing the amount of nitrogen that can leach into the ground water.

Other advantages. According to Dr. McIntosh, sludge can be applied to forests year-round. Forest lands are more accessible than farmland and are not associated with public food supplies, McIntosh says.

The experiment station reports good results with sludge application in some West Coast forests. The nutrients have helped the timber industry by improving tree growth.

Dr. Marla McIntosh, center, Dr. Robert Hill, left, and Dr. Scott Angle hope to put sludge to work in forests.

However, results in one part of the country may not apply to another.

"You cannot generalize to other areas," says McIntosh, who reports no improved growth from her study. Researchers in Pennsylvania and New Hampshire, also participating in the regional project, found different results.

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Raising nitrogen levels. Three different sludge concentrations—low, medium and high—were applied to a plot of trees at the Central Maryland Research and Educational Center in Clarksville.

Nitrogen increased slightly in the soil water containing low sludge concentrations and returned to normal after a short time.

The medium and high concentrations resulted in soil water with nitrogen levels well above acceptable levels. The nitrogen levels remained above normal after two years.

To be considered useful, research has to be able to predict nitrogen leakage under worst-case conditions.

These include instances where nitrogen is not being cycled into the ecosystem, leaving more to leach into the groundwater.

Maryland experienced this worst-case scenario with its two-year drought in 1986 and 1987, where rainfall was half that of normal, says McIntosh, which may have caused the lack of growth as well as the varied results in nitrogen leaching. When water is scarce—as in a drought—two things can happen: plants do not take up as much nitrogen and denitrification—the process by which nitrogen is released into the atmosphere as nitrogen gas, and occurs only under waterlogged conditions—does not occur.

> Nitrate leaching into groundwater is the limiting factor for applying sludge to forest lands.

The sludge was applied at a rate of 714 lbs./acre, twice the medium of 357 lbs. Leaching levels, however, were about the same for both rates.

McIntosh suggests that under more rainy conditions, leaching might not occur or might not be as high.

Nitrate leaching into the ground water is the limiting factor for applying sludge to forest land.

McIntosh says nitrogen levels must be watched closely, and be allowed to return to baseline levels before re-applying.

Sludge application on farmland is highly regulated, but no regulations exist for forest lands, according to McIntosh, who hopes her research findings will help establish such guidelines.

AgriDyne seeks foreign markets for neem

SALT LAKE CITY—AgriDyne Technologies, Inc. announced recently that it had filed foreign registration applications for its neem-based bioinsecticides.

The applications were filed in Italy, France, Spain and the Netherlands, as well as 14 Latin American countries, including Mexico.

AgriDyne has requested marketing clearance for three bioinsecticides:

- Azatin, for non-food crop application in the nursery and ornametnal markets,;
- Turplex, for lawn and turf application;
- Align, for food crop application.

The active ingredient for each bioinsecticide is azadirachtin, a natural insect growth regulator extracted from the seed of neem trees. Found in more than 50 countries worldwide, the tropical neem tree has long been recognized for its natural insecticidal properties.

AgriDyne received marketing clearance from the U.S. Environmental Protection Agency (EPA) for Azatin and Turplex in January 1992, and anticipates EPA registration for Align in 1993.

"The four European countries represent a significant portion of the European market for insecticides," says Eric B. Hale, AgriDyne president and chief executive officer.

"Additionally, they are some of the more environmentally progressive nations in Europe.

"These foreign registration filings are part of our on-going strategy to broaden the market and grow our revenue stream, for our familiy of bioinsecticides."

AgriDyne had previously received marketing clearance for its neem-based bioinsecticides from the Dominican Republic.

Biosys buys AgriSense

PALO ALTO, Calif.—Biosys announced recently it had acquired AgriSense, a Delaware general partnership.

The acquisition includes the wholly-owned AgriSense European subsidiary, Bilogical Contyrol Systems and the U.S. operations headquartered in Freseno, Calif.

Both divisions of AgriSense develop and market pheromone-based products for detetion and monitoring of cockroaches and insect pests in high value crops and stored products. Other product and technologies include thaose that disrupt the mating of insect pests which attack rice and cotton crops.

AgriSense was sold for $3.5 million in cash and 400,000 shares of biosys common stock. Additional shares may be issued under "certain circumstances."

AgriSense is commercializing products based on Phillips Petroleum's pheromone synthesis technology and Dow Corning's micro-encapsulation/slow release technology developed for pheromone traps and lure applications.

The product range provides for non-toxic, environmentally compatible detection, monitoring and control of insects in agricultural fields and orchards as well as in residential and industrial sites. Integrated pest management regimes which minimize the use of chemical pesticides are made more effective through the use of such monitoring techniques which assist in timing and in minimizing the application of pesticides.