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Long-Term Plant Persistence and Restoration of Acidic Dredge Soils with Sewage Sludge and Lime

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Abstract: A field study was conducted to determine whether sewage sludge and lime could be useful as soil amendments on acidic (pH 2.4) and infertile dredged spoils and to evaluate grasses that may be suitable for restoring acidic dredged spoils. Applications of dolomitic limestone in combination with sewage sludge or commercial fertilizer and topsoil improved soil fertility and produced a better overall growth environment at the site. Metal concentrations resulting from sludge applications increased but not to excessive levels. Movement of metals below the 20-cm depth was noted for the extractable forms of zinc, copper and nickel. A total of 29 grass treatments, containing grasses seeded alone or in combinations and receiving the sludge/lime treatment, were evaluated over a seven-year period, and selected grasses were analyzed for mineral composition. All grass species showed good establishment on the amended, acidic spoil. Most treatments in this study had good soil cover after 82 months. As the study progressed, other species were able to dominate sites where less persistent species were sown. There were no continuing differences between varieties within species. The only difference in the chemical composition of selected plants sampled 50 months after seeding was the high concentrations of zinc in Pennlawn red fescue and phosphorus in K-31 tall fescue. After this time the red fescues received lower visual ratings, indicating a partial metal toxicity.

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