

ABSTRACT

Denitrification potentials of some soils in the humid tropics were studied in field, greenhouse and laboratory experiments.

150 lb. nitrogen per acre were applied in different chemical forms to grass and bare soil in a field experiment. When ammonium-N was applied nitrate-N accumulated in bare soil but not under grass; in bare soil a nitrifying inhibitor delayed nitrate-N accumulation. In no treatment was nitrite-N resulting from denitrification found. Leaching was greater in bare soil, with nitrate-ion leaching more than ammonium-ion. A positive correlation was found between evapotranspiration and ammonia volatilisation.

Ammonium-N was applied at 3 concentrations to soil under pangola grass in a greenhouse experiment. Nitrate-N accumulated after 4 weeks when the concentration of ammonium-N was 200 ppm or above. Unaccounted for nitrogen increased as more ammonium-N was applied.

In the laboratory, the denitrifying potentials of 6 contrasting soils were studied by measuring total-N loss, when soils were incubated with added nitrate-N and glucose under waterlogged conditions. Total-N equivalent to 22-95 per cent of added nitrate-N was lost after 10 days. In all soils except an acid clay applied nitrate-N disappeared after 7 days. Nitrite-N, ammonium-N and total mineral-N increased during the first 7 to 10 days and then decreased. Denitrification was less in fine textured soils and in acid soils within a textural group. An optimum induced C/N ratio for these studies was found to be 1.

The effect of nitrate-N concentration, soil moisture content and an energy source on denitrification was investigated using a sandy loam soil. Loss of nitrogen increased as soil moisture content increased from 40-120% W.H.C. and when an energy source was added at 120% W.H.C.