Quantifying Denitrification in the Subsoil Using 15N Natural Abundance and Potential Denitrification. (S03-vangroenigen081408-Oral)

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Abstract:

Direct measurements of denitrification throughout a soil profile, either through 15N isotope dilution or through acetylene inhibition, are relatively expensive. Moreover, denitrification rates may vary considerably over short periods of time. For purposes of quantifying N losses from an agroecosystem over larger periods of time, it is therefore necessary to develop integrative measurements of the denitrification potential of a soil profile. The potential denitrification (PD) in the subsoil is of special interest since relatively few denitrification measurements from those depths are reported in the literature. We measured the PD, defined as the rate of denitrification after addition of excess nitrate under optimal moisture and temperature conditions, at 5 farms in the Netherlands. Except for one profile with a peat subsoil, all significant PD was confined to the upper 60 cm, with a maximum PD of 8.81 mg N kg-1 soil-1 day-1. The peat soil still had a PD of 1.63 mg N kg-1 soil-1 day-1 at 190 cm depth. In order to relate the data to actual denitrification in the field, PD rates were plotted against 15N natural abundance enrichment through the profiles, both for mineral N and total N in the soil.

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