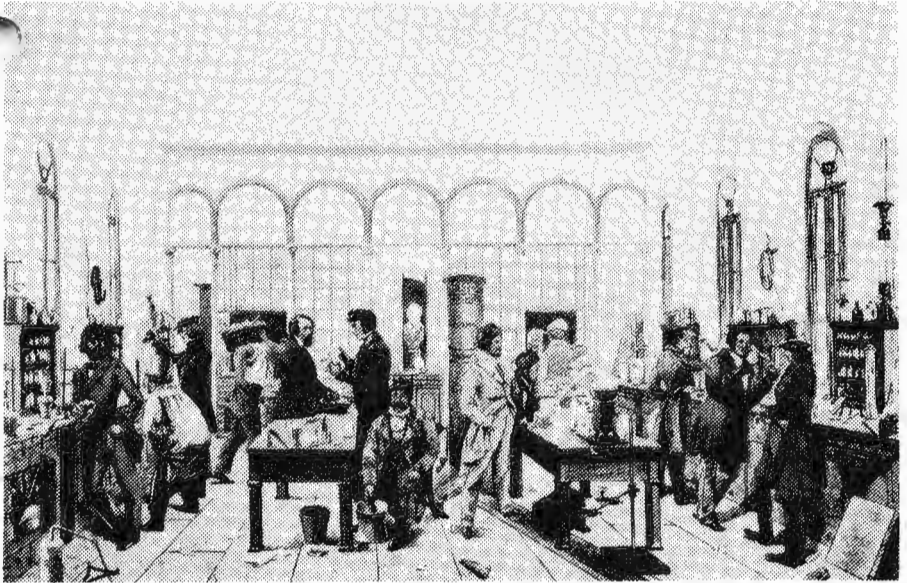


Technical Program

International Workshop on Denitrification in Soil, Rhizosphere and Aquifer



Liebig's analytical laboratory (1840) in Giessen

Giessen, FRG

March 17-19, 1989

Program

International Workshop on Denitrification in Soil, Rhizosphere and Aquifer

Giessen, FRG, March 17 - 19, 1989

President J.C.G. Ottow

Organizing committee

G. Benckiser, Giessen, FRG
N.N. Goswami, New Delhi, India
R.K. Thauer, Marburg, FRG
G. Trolldenier, Hannover, FRG

Patronage

International Society of Soil Science (ISSS)
Commissions for
Soil Biology (III) and Soil Fertility and Plant Nutrition (VI)

German Society for Soil Science (DGB)
Commission for Soil Biology (III)

German Society for General and Applied Microbiology (VAAM))

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General Information

- Location:** Philosophikum I, Building A, 10, Otto-Behaghel-Strasse, 6300 Giessen (registration, lectures, posters). A large parking lot is close to the building.
- Speaking time:** key notes = 25 min + 5 min (discussion)
voluntary contributions = 15 min + 5 min
- Transport:** Most participants from abroad and from the FRG are accomodated in
- | | |
|--|----------------|
| Hotel am Ludwigsplatz, Ludwigsplatz 8 | Tel. 3 3038/83 |
| Hotel Kübel, Bahnhofstr. 47 | 7 70 70 |
| Hotel Köhler, Westanlage 35 | 7 60 86 |
| Parkhotel Sletz, Wolfstr. 26 | 4 20 96 |
| Hotel Dornberger, Kreuzplatz 2 | 3 10 84/85 |
| Hotel-Pension Burkart, Georg-Schlosser-Str. 13 | 3 45 91 |
- Walking time from these hotels to the Philosophikum I will be 20-35 min. Those colleagues arriving by car are kindly requested to offer transportation to non-mobile participants. You may also
- take Bus line 8 or 9 (from Berliner Platz)
 - call Taxi and Minicar Service, Tel. 3301 (inexpensive group service)
- Lunch:** On Friday, March 17, and Saturday, March 18, you may have your lunch at the student's mensa (about 100 m from the Philosophikum). On Sunday, March 19, a snack will be arranged at the Cafeteria in the hall of the Philosophikum I
- Weather:** March in Germany may be cold (with temperatures at night around 0-5⁰ C and at noon between 4 and 14⁰ C) with frequent rain showers.
- Equipment:** A slide and overhead projector will be available. Speakers are kindly requested to deliver their slides to the projectionist at least 40 minutes before presentation.
- Information desk:** An information desk will be located in the hall of the Philosophikum I. Messages for participants may be delivered through this desk.
- Address:** Registration and Information Office
- Tel. 0641/ 702 8332**
Otto-Behaghel-Str. 10
- Philosophikum -
D- 6300 Giessen

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14.00 - 17.40 h 10

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Scientific program

Friday, March 17, 1989

- 8.00 h Registration (Philosophikum I)
- 8.45 h Opening
Prof.Dr. J.C.G. Ottow, President ISSS-
Commission for Soil Biology
Adresses
M. Mutz, Mayor, City of Giessen
Prof.Dr. H. Bauer, President Justus-Liebig
University of Giessen
Prof.Dr.Dr. h.c. F. Kuhlmann, Vice Dean,
Division of Agricultural Sciences
Prof.Dr.Dr. h.c. Y. Takai, Vice President,
International Society of Soil Science
Prof.Dr. H. Kuntze, President German
Society of Soil Science
- 9.45-10.00 **Coffee / tea break**

Methods to quantify denitrification losses in-situ
Chairmen: K. Vlassak and J.R. Freney
- 10.00 **Mosier, A.R., O. Heinemeyer & K. Haider** (Fort Collins, USA;
Braunschweig, FRG)
Field measurement of denitrification
- 10.30 **Klemedtsson, L.** (Uppsala, Sweden)
Methods to separate N₂O produced from denitrification
and nitrification
- 11.00 **Höper, H. & K.W. Becker** (Göttingen, FRG)
Denitrification losses under field conditions as
indicated by the acetylene inhibition method: A critical review
- 11.20 **Becker, K.W.** (Göttingen, FRG)
Rates of denitrification in the field as measured by
the ¹⁵N-labeled soil nitrogen balance experiments in
Germany: A critical review
- 11.40 **Tarek, M., Ulrike Schneider & K. Haider** (Faisalabad,
Pakistan; Braunschweig, FRG)
Preliminary results by comparing gaseous denitrifi-
cation losses with ¹⁵N-balance in a wheat cropped field
- 12.00 **Brumme, R., F. Beese & N. Lötffeld** (Göttingen and
München, FRG)
N₂O and CO₂ of an acid soil after liming and fertilization
- 12.20 **Butler, A.R. & W.A. Adams** (Aberystwyth, UK)
Denitrification characteristics of a compacted pasture soil
- 12.40-14.00 **Lunch**

Sink and source mechanisms of denitrification products
Chairmen: O. van Cleemput and Y. Avnimelech

- 14.00 **Chalamet, A.** (Lyon, France)
Sink and source mechanisms in soils related to denitrification measurements
- 14.30 **Stegemann, D. & H.K. Cammenga** (Braunschweig, FRG)
Adsorption and diffusion of nitrous oxide in soil matrices
- 14.50 **Baumgärtner, M & R. Conrad** (Konstanz, FRG)
Release and uptake of nitric oxide by soils under anoxic conditions
- 15.10 **Beauchamp, E.G. & A.G. Seech** (Guelph, Canada)
Denitrification affected by different size aggregates
- 15.30-16.00 **Coffee/tea break**
- Ecophysiology and kinetics of denitrification*
Chairmen: J.C. Germon and W.G. Zumft
- 16.00 **Lloyd, D., K. J. Davis & L. Boddy** (Cardiff, UK)
Aerobic denitrification in Paracoccus denitrificans, Pseudomonas aeruginosa and in an estuarine sediment studied by membrane inlet
- 16.30 **Duxbury, J. M.** (Ithaca, USA)
Ecophysiology and kinetics of the denitrification process
- 17.00 **Robertson, Lesley A. & E.J.G. Kuenen** (Delft, Netherlands)
Simultaneous aerobic denitrification and heterotrophic nitrification: Coincidence or related phenomena?
- 17.20 **Cox, R.P., T. Geest & J. K. Thomsen** (Odense, Denmark)
Kinetics of denitrification in Paracoccus denitrificans: Measurements using a mass spectrometer with a permeable membrane inlet
- 17.40 **Lescure, Chantal, P. Gamard & R. Lensi** (Lyon, France)
Influence of pre-existing oxygen conditions on denitrifying enzyme activity in soil
- 18.00 **Mehana, T., M. Ragab & R. Aldag** (Bayreuth, FRG)
Effect of the initial oxygen level on the denitrification process, nitrogen and carbon balance in a water-sediment system of Ismailia region (Egypt)
- 18.20 **Danneberg, G., W. Zimmer & H. Bothe** (Köln, FRG)
Energy yields in denitrification by Azospirillum spp.
- 18.40 **Casella, S.** (Pisa, Italy)
Relationships between denitrification and nitrogen fixation

Saturday, March 18, 1989

Ecological effects on regulation and on products of denitrification
Chairmen: E. G. Beauchamp and H. Bothe

- 8.30 **Zumft, W. G.** (Karlsruhe, FRG)
Products and regulation of denitrification in pseudomonads
- 9.00 **Munch, J. C.** (Stuttgart-Hohenheim, FRG)
Composition of denitrification products as affected by ecological conditions and type of denitrifying microorganisms
- 9.30 **André, J. P.** (Antibes, France)
Direct and permanent measurement of dissolved nitric oxide during microbiological processes of denitrification
- 9.50 **Ottow, J.C.G. & M.N.I. Abou Seada** (Giessen, FRG)
Effect of soil on the quantity and quality of denitrification by physiologically different bacteria
- 10.10 **Remde, A. & R. Conrad** (Konstanz, FRG)
Role of nitrification versus denitrification for production and uptake of nitric oxide in soils
- 10.30-10.45 **Coffee/tea break**
- 10.45-12.30 **General poster session**

All posters are displayed in the hall of the Philosophikum I opposite to the lecture hall
- 12.30-14.00 **Lunch**

Effect of manuring and fertilization on denitrification losses
Chairmen: N.N. Goswami and D. Sauerbeck
- 14.00 **Smith, K.A.** (Edinburgh, UK)
The influence of manuring and fertilization on denitrification losses from soils
- 14.30 **Buresh, R.J. & S.K. De Datta** (Muscle Shoals, USA; Los Baños, Philippines)
Denitrification losses from puddled rice soil in the tropics

- 15.00 **Uppal, K. S., N. K. Banerjee, N.N. Goswami & A. R. Mosier**
(New Delhi, India; Fort Collins, USA)
Use of encapsulated calcium carbide to reduce denitrification losses in flooded rice from urea fertilizer as studied by direct ^{15}N measurement technique
- 15.20 **Van Cleemput, O., R. M. Malkanti, Y. d'Ydewalle & L. Baert**
(Gent, Belgium)
Denitrification influenced by incorporated harvest residues
- 15.40-16.00 **Coffee/tea break**
- 16.00 **Corré, W. J.** (Utrecht, The Netherlands)
Denitrification in the top soil of production grassland
- 16.20 **Richter, G. M., B. Schéffer & H. Kuntze** (Bremen, FRG)
Seasonal variation of nitrate and nitrous oxide reductase activity on an eutric histosol under grassland
- 16.40 **Benckiser, G., G. Gaus, K. M. Syring, K. Haider & D. Sauerbeck** (Giessen and Braunschweig, FRG)
Relation between field measured N_2O soil air concentration and carbon turn-over, nitrate concentration, water tension and temperature
- 17.00 **Avnimelech, Y.** (Haifa, Israel)
Minimizing nitrate accumulation in organic soils of the Hula valley (Israel) by control of denitrification
- 17.20 **Fabig, W.** (Schmallenberg, FRG)
Distribution and efficiency of nitrifying and denitrifying microorganisms in forest soils as affected by various techniques of liming
- 19.30 Departure of busses from Ostanlage (close to Congresshalle) for Schloss Rauischholzhausen (social evening; free banquet)
- The castle of Rauischholzhausen is located about 35 km outside of the city of Giessen and is part of the experimental Station for Crop Selection and Production (Prof. Dr. M. Zoschke). It is surrounded by a public garden and used for conferences and festivities.
- 23.00 Return of first bus to Giessen.

Sunday, March 19, 1989

Conditions and mechanisms of denitrification in subsoil and aquifer
Chairmen: T. S. Kovács and C. J. Soeder

- 8.30 **Kölle, W.** (Hannover, FRG)
Prerequisites and mechanisms of denitrification in aquifers
- 9.00 **Obermann, P.** (Bochum, FRG)
Significance of anoxic reaction zones in an aquifer in the lower Rhine region
- 10.00 **Van den Berg, R. & L.J.M. Boumans** (Bilthoven, The Netherlands)
Denitrification in Dutch aquifers
- 10.20 **Böttcher, J., O. Strebel & W.H.M. Duynisfeld** (Hannover, FRG)
Microbial denitrification in the groundwater of a sandy aquifer: Kinetics and stream-tube-model
- 10.40-11.00 **Coffee/tea break**
- 11.00 **Isermann, K. & G. Henjes** (Limburgerhof, FRG)
Potential for biological denitrification in the (un)saturated zone with different soil managements
- 11.20 **Sørensen, J., L. Thorling, Birgit T. Jensen** (Aarhus, Denmark)
Surface catalysis by ferric oxyhydroxides during chemodenitrification
- 11.40 **M. Luther, A. Lange, N. Saihani & C. J. Soeder** (Jülich, FRG)
Temperature dependance of the denitrifying bacteria in the Rotated-Drum-Bioreactor
- Direct and indirect effects of plants on denitrification*
Chairmen: H. G. van Faassen and G. Trolldenier
- 12.00 **Christensen, S.** (Copenhagen, Denmark)
Conditions for denitrification in the rhizosphere of plants
- 13.00-14.00 **Lunch** (snack will be served in the hall)

- 14.00 **Freney, J. R., A. R. Mosier & S. L. Chapman** (Canberra, Australia; Fort Collins, USA)
Determination of dinitrogen emission and retention in floodwater and porewater of a low-land rice field fertilized with ^{15}N -urea
- 14.20 **Mosier, A. R.** (Fort Collins, USA)
Influence of rice plants on the evolution of N_2 and N_2O from the soil to the atmosphere
Chairman: R. Aldag
- 14.40 **Prade, K. & G. Trolldenier** (Hannover, FRG)
Denitrification in the rhizosphere of rice and wheat seedlings as influenced by the K status of the plants
- 15.00 **Von Rheinbaben, W.** (Hannover, FRG)
Influence of plants on denitrification in pot experiments with soils
- 15.20 **Weier, K. L. & I. C. MacRae** (Brisbane, Australia)
Seasonal variation in denitrification in a clay soil under a cultivated crop and permanent pasture
- 15.40-16.00 **Coffee/tea break**
Modeling of denitrification
Chairmen: K. A. Smith and J. M. Duxbury
- 16.00 **Rolston, D. E.** (Davis, USA)
Modeling of denitrification: Approaches, successes and problems
- 16.30 **Syring, K. M. & G. Benckiser** (Braunschweig and Giessen, FRG)
Modeling of denitrification
- 17.00 **Schäfer, W., W. Kinzelbach & M. Finkel** (Kassel, FRG)
Modeling of an in-situ remediation using denitrifying bacteria
- 17.20 **Arah, J. R. M.** (Edinburgh, UK)
Steady-state denitrification: A reasonable approximation?
- 17.40 *Panel discussion: Identification of future research needs on denitrification*

Discussion leader: S. K. De Datta
Rapporteur: A. R. Mosier
Members: S. Christensen, K. Isermann, D. LLOYD, B. Meyer, D. E. Rolston and O. Strebel

POSTER SESSION

Posters are displayed throughout the Workshop in the hall of the Philosophikum I, Otto-Behaghel-Strasse 10, 6300 Giessen. You are kindly requested to attach your poster (size limits 170 x 160 cm) as soon as possible after registration (or during first break after the opening and addresses). The official poster session will be on Saturday, March 18, from 10.45 to 12.30 h. However, those presenting a poster should be prepared to join their work during the breaks to offer ample opportunity for discussion.

Your poster number is given by the list number below.

1. **Jacques, D. & J. C. Germon** (Dijon, France)
Denitrifying activity measurement by soil-core-method: Effect of depth and characterization of N_2O/N_2 ratio in different soils
2. **Janssen, E., K. W. Becker & B. Meyer** (Göttingen, FRG)
The ^{15}N -balance method for calculation denitrification in arable fields and its verification by direct measurement of gaseous ^{15}N -losses
3. **Voerkelius, Susanne & H. L. Schmidt** (Freising-Weihenstephan, FRG)
Natural oxygen- and nitrogen isotope abundances as indicators for denitrification
4. **Schultz-Hock, R. & M. R. Hajirezaei** (Jülich, FRG)
Spatial distribution of denitrification in an artificial wetland
5. **Hütsch, Birgit, S. Heilenz, H. Schmeer & K. Mengel** (Giessen, FRG)
A new technique for measuring denitrification potentials in soils
7. **Walenzik, Gabriele & Ö. Heinemeyer** (Braunschweig, FRG)
Time course of gaseous N-losses from compacted soil cores
8. **Maag, M.** (Lyngby, Denmark)
Denitrification rate constants in soil amended with organic manure
- 9: **Freney, J. R., S. K. De Datta, A. C. F. Trevitt, W. N. Obcemea & J. G. Real** (Canberra, Australia; Los Baños, Philippines)
The relative importance of denitrification and ammonia volatilization as loss processes in flooded rice soils of the Philippines

10. **Van den Abbeel, Rita, D. Paulus, C. De Ruyscher & K. Vlassak** (Leuven, Belgium)
Measuring denitrification following application of pig slurry on a loamy soil
11. **Von Bischopinck, K.U., J.C. Munch, J. Y. Chapot & O. Heinemeyer** (Stuttgart-Hohenheim, FRG; Colmar, France; Braunschweig, FRG)
Differentiation of nitrogen losses from a soil amended with ¹⁵N-labelled green manure
12. **Kovács, T. S.** (Budapest, Hungary)
Potential denitrification of samples originated from irrigated plots
13. **Avnimelech, Y. & M. Kochva** (Haifa, Israel)
Interrelationship of manganese and nitrate reduction
14. **Nieder, R. & G. Schollmayer** (Krefeld, FRG)
Denitrification in agricultural soils of temperate and subtropical climate
15. **Lehn-Reiser, M., J. C. Munch, J. Y. Chapot & J. C. G. Ottow** (Stuttgart-Hohenheim, FRG; Colmar, France; Giessen, FRG)
Field measured denitrification losses from a calcareous Inceptisol after green manuring
16. **Gamard, P., Chantal Lescure & R. Lensi** (Lyon, France)
Denitrification and anaerobic nitrate and nitrite-dependant growth in Azospirillum spp.
17. **Kumar, V., S. K. Sharma & M. Singh** (Hisar, India)
Effect of exchangeable sodium percentages (ESP), water content, and nitrogen rates on gaseous losses of nitrogen under laboratory conditions
18. **Rehr, B. & J. H. Klemme** (Bonn, FRG)
Competition for nitrate between denitrifying bacteria and nitrate ammonifying Citrobacter freundii
19. **Schultz-Hock, R. & M. R. Hajireszaei** (Jülich, FRG)
Straw polysaccharides as substrates for mixed populations of denitrifying microorganisms
20. **Weissenhorn, Ingrid, J. C. Munch & W. R. Fischer** (Stuttgart-Hohenheim, FRG)
Characterization of denitrifying bacterial populations with distinct trophic need from different cropped soil

21. **Schmider, F. & J. C. G. Ottow** (Limburgerhof & Giessen, FRG)
The denitrifying microflora in sewage plants: Characterization of new denitrifying organisms belonging to the genus "Empedobacter" spp.
22. **Bertelsen, F.** (Roskilde, Denmark)
Reduction of nitrate to nitrous oxide or dinitrogen gas by Rhizobium leguminosarum
23. **Biehler, M.J.** (Stuttgart-Hohenheim, FRG)
A new isolation procedure for denitrifying bacteria and the characterization of denitrification with poly- β -hydroxy-butyric acid (PHB) as carbon source
24. **Bothe, H. & W. Zimmer** (Köln, FRG)
Nitrate respiration by Azospirillum brasilense and an alternative explanation for plant growth promotion by bacteria of the genus Azospirillum
25. **Knauber, W. R., Sabine Schmid, J. Schwarz, M. Kapp, G. Benckiser, P. Daniel, W. Opitz von Boberfeld & J. C. G. Ottow** (Giessen, FRG)
Estimation of denitrification losses by the acetylene inhibition method from a ryegrass field (Lolium perenne) as effected by mineral fertilization or animal slurry
26. **Vinther, F. P.** (Lyngby, Denmark)
Effect of temperature and water content on the N_2O and N_2 -production during the denitrification process
27. **Van Faassen, H. G., C. Kroeze & P. C. de Ruiter** (Haren, The Netherlands)
Potential denitrification rates of acid soils under forest
28. **Beese, F., R. Brumme, H. Mosheninia & Anke Wille** (Neuherberg and Göttingen, FRG)
Factors influencing denitrification in acid forest soils
29. **Montuelle, B.** (Lyon, France)
Gas chromatographic studies on denitrification in activated sludge: Kinetic data of N_2O -production (disappearance) during batch incubation
30. **Malik, R. S., C. Mishra & B. K. Pattnaik** (Hisar, India)
Effect of solution flow rate on reduction of nitrate moving through soil columns
31. **Esnault, G.** (Abidjan, Ivory Coast)
Denitrification kinetics of different strains isolated from the anoxic hypolimnion of the Biétray bay (Ebrie lagoon, Ivory Coast)