

Research area of interest

Systems: Agricultural soil, Forest soil, Peat soil, Arctic tundra, Wetlands, Marine Sediments, Water treatment systems

Processes: N-cycling (Denitrification, Nitrification, N₂O reduction, N₂ fixation)

Organisms: Bacteria and Archaea



Members of research group

Sara Hallin (professor)
Maria Hellman (technician)
Christopher Jones (researcher)
Jaanis Juhanson (postdoc)
Maren Emmerich (postdoc)
Germán Bonilla Rosso (postdoc)
Daniel Graf (PhD student)
Lea Wittorf (PhD student)
Laurent Philippot (guest researcher)

Searching for new PhD student!!!

Application June 1, 2013 (www.slu.se)

Methods

qPCR:

(*nirS*, *nirK*, *nosZ*, *amoA*, *nifH*, *hzo*, 16S rRNA)

454 pyrosequencing of amplicons:

(functional genes and 16S rRNA)

T-RFLP:

(functional genes and 16S rRNA)

DNA and mRNA extraction

Activity assays:

(nitrification, denitrification, respiration)

Bioinformatics (phylogeny, diversity metrics, genomics)

Multivariate statistics

Resources

Field sites:

- Ultuna long-term soil organic matter experiment
- Logården experimental farm
- SLU:s long-term field trials (fertilization, tillage etc)



UPPMAX Computational Center
qPCR machines
Gas chromatography (N₂O, CH₄),
Respirometer

Five recent key publications

Jones, C.M., Graf, D., Bru, D., Philippot, L. and Hallin, S. 2013. The unaccounted yet abundant nitrous oxide reducing microbial community - a potential nitrous oxide sink. *The ISME Journal*, 7:417-426.

Philippot, L., Andert, J., Jones, C.M. and Hallin, S. 2011. Importance of denitrifiers lacking the genes encoding the nitrous oxide reductase for N₂O emissions from soil. *Global Change Biology*, 17: 1497-1504.

Wessén, E., Söderström, M., Stenberg, M., Bru, D., Hellman, M., Welsh, A., Thomson, F., Klemetsson, L., Philippot, L. and Hallin, S. 2011. Spatial distribution of ammonia oxidizing bacteria and archaea across a 44-hectare farm related to ecosystem functioning. *The ISME Journal*, 5:1213-1225.

Philippot, L., Andersson, S.G.E., Battin, T.J., Prosser, J.I., Schimel, J.P., Whitman, W.B. and Hallin, S. 2010. The ecological coherence of higher bacterial taxonomic ranks. *Nature Reviews Microbiology* 8:523-529.

Hallin S., Jones, C.M., Schloter, M. and Philippot, L. 2009. Relationship between N-cycling communities and ecosystem functioning in a 50-year-old fertilization experiment. *The ISME Journal*, 3: 597-605.