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2020-12-15

Statement of evaluation – dissertation Hem Raj Bhattarai

The contribution of abiotic and biotic drivers of soil nitrous acid (HONO) emissions is not well explored. The work of Hem Raj Bhattarai adds to the understanding of which edaphic factors that are most influential and which pathways that dominate in boreal agricultural soil. An important finding was that HONO emissions are driven by microbial activity and to a lesser extent by abiotic processes. The work on dissecting the pathways further allowed for mechanistic understanding and is an important contribution to the research field.

The work is mainly of an exploratory nature, partly due the limited existing knowledge of the field when the thesis work was initiated. A mix of approaches was used to address the importance of edaphic factors, vegetation (i.e. germination) and the major HONO production pathways in soil. The thesis show progress from correlation-based approaches using data from field experiments to lab-scale experimental providing causal relationships. All approaches have their advantages and limitations and this aspect could have been better acknowledged both in the thesis and during the oral defense. A limited number of soils and conditions were used throughout the thesis, hampering generic conclusions about soil factors and pathways, as these may over time and under different conditions and soil types.

An impressive range of methods were used across the three studies showing that Bhattarai can conduct different techniques and can select and apply appropriate methods to answer the research questions.

The thesis is efficiently organized with an introduction that places the three main chapters in a broader context. The discussion captures the findings, but does not go beyond the individual chapters. The thesis is well written with and the language is good. It was a joy to read. Two studies are already published demonstrating that Bhattarai is well-acquainted with scientific publishing.

I approve the thesis and its defense and propose the grade **Approved**.

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'Sara Hallin', is written over a horizontal line.

Sara Hallin
Professor