

Interactive comment on “Temporal variability in bioassays of ammonia exchange potential in relation to plant and soil nitrogen parameters in intensively managed grassland” by M. Mattsson et al.

M. Mattsson et al.

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We thank reviewer #1 for the evaluation and comments. In consideration of the suggestions given by the reviewer we have made the following changes:

#1 p.2749 Title: We understand the general reservation about the use of the phrase 'emission potential' in the title. The title has accordingly been changed to: 'Temporal variability in bioassays of the stomatal ammonia compensation point in relation to plant and soil nitrogen parameters in intensively managed grassland'.

#2 p.2751-22: Changed to: 'The quantity of ammonia exchanged between crop

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canopies and the atmosphere may vary between seasons, depending on climatic conditions'.

#3 p.2754-4: Why were guttation droplets collected? Response: Guttation droplets were collected in order to include leaf surface wetness parameters in the experiment. This is dealt with in more detail in another paper of the special issue (Burkhardt et al., Biogeosciences Discuss., 5, 2505-2539, 2008).

#4 p 2756-12/13: We agree with the reviewer. The sentence has been changed to: 'Plants on a plot receiving 200 kg N per ha attained a maximum apoplastic ammonium concentration around 800 μM (Fig. 1a)'.

#5, p 2756-18: Reviewer comment: 'Why should gamma (the ratio between apoplastic NH_4^+ and H^+) be temperature independent. It is not necessarily true. The chemical equilibrium is determined by temperature, but the ammonium concentration and pH are also determined by physiological processes, which might be temperature dependent. Therefore, gamma might still include a temperature dependency?'. We agree with the reviewer and have changed the sentence to: 'The ratio between apoplastic NH_4^+ and H^+ concentrations (gamma-apoplast) ranged from 10 to 150 before fertilisation (Fig. 1c)'. Thus, the statement about temperature independence has been deleted. Gamma is anyway a very useful parameter in terms of parameterisation of plant-atmosphere ammonia exchange across plant organs, sites and years.

#5 p 2757-4: define 'FW'. Reply: FW has been replaced by 'fresh weight'.

6 p 2757-20/21. Do they show a similar pattern? Yes.

#7 p 2758-23/25: The explanation of the lower soil concentrations of ammonium and nitrate for the 200 N treatment is not very convincing. Reply: There is no better explanation.

#8 Table 1. During the preparation of the response to reviewers we detected an error in the calculation of gamma-values in Table 1. The values have now been re-calculated

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and the Table revised.

Interactive comment on Biogeosciences Discuss., 5, 2749, 2008.

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