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Interactive comment on “Interactions between uptake of amino acids and inorganic nitrogen in wheat plants” by E. Gioseffi et al.

Anonymous Referee #1

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General comments:

This is a well-written paper, and a well-thought out analysis. This article studies the interaction between uptake of two amino acids (glycine and glutamine) and inorganic nitrogen. The main finding is that amino acids can affect nitrate uptake but that nitrate and ammonium do not seem to affect amino acid uptake. Uptake of organic nitrogen is now regarded as an important process for plant growth and little is known concerning interaction between uptake of inorganic and organic N. I feel that the present study represents a good contribution to this topic, and provides new results and ideas within the scope of Biogeosciences. The scientific approach is sound and I agree with the major points discussed, even if the authors should be more careful in the conclusions. The manuscript is a rather short and straight forward and may benefit with the addition

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of some references concerning amino acid uptake by wheat (such as Näshom et al, New phytologist, 2001) or the interaction between organic and inorganic N uptake by other plants (such as Persson and Näsholm, 2002). The iconography is sufficiently clear.

Specific comments:

Abstract Complete and concise. It is mentioned in this section that amino acid uptake and inorganic N uptake were measured with very different techniques (^{15}N ^{13}C labelling for amino acids, rate of removal from the solution for nitrate and ammonium). This is of major importance for interpretation of the data, and I am surprised that this point is very quickly mentioned in the material and method section and discussed nowhere. **Introduction.** This section is concise and clear. The aims and justification of the study are clearly mentioned. **Material and methods and results** These sections are not always clear, and the scientific methods are not always clearly outlined. It would be of interest to explain the specific aim of each experiment. Also I am confused about the incubation time used in each experiment. In experiment I, I do not see where the duration of the labelling experiment is explained. 4 time points are mentioned p 11316 but we do not know which one was used in the figures where no more information is added. In experiment II it is said that gly uptake was measured over 4 days, but a 3-day period is mentioned in figure 4 legend. I presume the authors did use single ^{15}N labelled Gln, but it could be interesting in which position the N was labelled, as Gln can be taken up as glutamate. **Discussion** I agree with the major conclusions here but the authors should be more careful in some places. For example p 11320, the authors cannot write that uptake rates were twice higher for NO_3 and NH_4 compared to amino acids, as NH_4 uptake rates and gly uptake rates shown on figure 2 are not significantly different. Also, it is clearly established that amino acid uptake is concentration dependent, and the comparison between figure 2 and 4 cannot be used to discuss this point as plants were different (not the same age as far as I can see) and no statistics are shown. P 1322 lines 24-28. I do not find this point very convincing or very clear. The low amount of labelled C remained in the solution does not mean that no deamination

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of amino acids occurred before uptake, as it is likely that this C has been respired by microorganism and released in the atmosphere, as suggested by the authors and by numerous studies.

Conclusions Line 5. The conclusion that ammonium causes a down regulation and vice versa is very surprising, as this is shown nowhere convincingly in the paper.

This is a neat paper and I have full confidence the authors can respond constructively to these comments.

Interactive comment on Biogeosciences Discuss., 8, 11311, 2011.

BGD

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