
Interactive
Comment

Interactive comment on “Nitrogen, phosphorus, potassium, calcium and magnesium release from two compressed fertilizers: column experiments”

by M. J. Fernández-Sanjurjo et al.

M. J. Fernández-Sanjurjo et al.

avelino.nunez@usc.es

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Nitrogen, phosphorus, potassium, calcium and magnesium release from two compressed fertilizers: column experiments M.J. Fernández-Sanjurjo, E. Alvarez-Rodríguez, A. Núñez-Delgado, M.L. Fernández-Marcos, and A. Romar-Gasalla

Reviewer 1: General comments The manuscript describes an experiment testing the release of elements (N, P, K, Ca and Mg) in soil from controlled-release fertilizer tablets. The experimental design is correct and the research carried out has many implications for agricultural and forest fertilization practices, which is an issue of broad importance. The issue falls within the scope of Solid Earth, in the section of Soil System Science.

C1027

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Discussion Paper



My recommendation is “minor revision”. I have not any objection to results and conclusions. In contrast, I have some concerns in the first sections of the manuscript. The most important are: [1] In the abstract, the authors should start enouncing the objective of your paper. ANSWER: Thank you for your comment. We have done it.

[2] The Introduction section is well written and the state of art is reviewed satisfactorily. But objectives are enounced in a too general way. I suggest highlighting the relevance of objectives in the context of the problem and background. ANSWER: Thank you for your comment. We have followed your indications.

[3] The authors commonly refer to “nutrients”. I think that “elements” or “exchangeable cations” may be much more proper terms. ANSWER: Thank you for your comment. We have changed it.

[4] The methods section needs some minor revision. Some items are obvious, but require some attention. a. The reference list needs to be revised. I have not exhaustively revised it, but some references are not cited in the main text. Some of them are: IUSS-WRB, 2007; Jiménez-Gomez, 1992; Paramasivam and Alva, 1997. b. In other cases, citations are not correct (e.g. “Sato and Morgan, 2008” is cited as “Sato et al., 2008”). ANSWER: Thank you for your comment. We have checked it and we have corrected the mistakes.

[5] Homogeneous criteria are necessary for chemical terms. It is not acceptable to use Phosphorus and P or Calcium and Ca even in the same sentence (see figure legends, for example). ANSWER: Thank you for your comment. We use the whole name only when starting a sentence, as usual in English.

The following are some detailed comments. Detailed comments Page 1556 Line 24 “Slow acting fertilizer” is a correct term. However, I just suggest using “controlled-release fertilizer”, which is more technical and may be also abbreviated as CRF through the text. ANSWER: Thank you for your comment. We have changed it.

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Interactive Discussion

Discussion Paper



Page 1557 Line 5 Re-write: "Most trials...fertilizers have concluded that...". ANSWER: Thank you for your comment. We have changed it.

SED

6, C1027–C1031, 2014

Interactive
Comment

Lines 24-27 These objectives are too general and, only from it, a general relevance for science is not detected. You should re-write your objectives highlighting the used method and the fertilizer qualities. Otherwise, this could be just another poor paper on controlled-released fertilization. What are your strong points? Why designing and testing these fertilizers? What is the background problem? For example, I should change objective (2) in "to understand the dynamics of different nutrients and their impacts on acid forest soils and drainage water". ANSWER: Thank you for your comment. We have changed it in accordance to your indications.

Page 1558 Line 5 It would be helpful if you provide the criteria for collecting the 0-20 layer. Does this correspond to the entire A horizon (umbric or mollic), part of it or part of A and B? ANSWER: Thank you for your comment. As usually done in many soil fertilization studies, we have sampled the arable layer, the most affected by fertilization practices.

Line 8 Are results reliable if sampled soil is 0-20 cm and the column is 50 cm long? ANSWER: Thank you for your comment. The effective soil depth into the column was 20 cm.

Line 10 Explain here briefly why different NPK compositions are used. ANSWER: Thank you for your comment. We have done it.

Line 19 According to data (columns 50 cm long and 7.3 cm in diameter and 900 g soil), I calculate: Volume of the column is $\pi \times (3.65 \text{ cm})^2 \times 50 \text{ cm} = 2092.7 \text{ cm}^3$. Bulk density of soil in the column is $900 \text{ g} / 2092.7 \text{ cm}^3 = 0.43 \text{ g/cm}^3$. This bulk density is too low. To simulate a bulk density similar to that in the original soil, you tapped the soil in the column. 1 g/cm³ is reached if the soil body is tapped until approx. 20 cm length in the column. So, please, can you provide the approximate final length? ANSWER: Thank you for your comment. As indicated above, the effective soil depth

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Interactive Discussion

Discussion Paper



into the column was 20 cm.

Page 1559 Line 3 Continuously or periodically? ANSWER: Thank you for your comment. We have now indicated “each sample” in the manuscript.

Line 23 Substitute “exchange” with “exchangeable”. ANSWER: Thank you for your comment. We have done it.

Page 1560 Lines 1-2 Although obvious, you must explain that normality of data distributions was checked (using Kolmogorov-Smirnov, Shapiro-Wilk or other tests). ANSWER: Thank you for your comment. We have now indicated in the manuscript that we used the Kolmogorov-Smirnov test for normality.

Cite SPSS properly (IBM Corp., 2010): IBM Corp. IBM SPSS Statistics for Windows. Version 19.0. IBM Corp. Armonk, NY. 2010. ANSWER: Thank you for your comment. We have done it.

Table 1 Why “C” in italics? Please, use “organic C”, unless mineral C is included here. ANSWER: Thank you for your comment. It is total C. However, in our case it could be equivalent to organic C due to the absence of carbonates.

Here and through the text, K, Ca, Mg, etc. are elements. The exchangeable forms are K₊, Ca₂₊, Mg₂₊, etc. Strictly, these are the forms that you should use through the text. ANSWER: Thank you for your comment. We have done it.

The last line (percentage of exchangeable Al) is not necessary and should be removed. ANSWER: Thank you for your comment. We have done it.

Figure 1 Re-write: “Acidity (pH) of ...”. ANSWER: Thank you for your comment. We have done it.

What is the objective of the line in control values? It is not a regression, is it? If it is just a line connecting the points, delete it. Figures 2 and 3 See the last comment above. ANSWER: Thank you for your comment. We have removed it.

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Interactive Discussion

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Please also note the supplement to this comment:

<http://www.solid-earth-discuss.net/6/C1027/2014/sed-6-C1027-2014-supplement.pdf>

Interactive comment on Solid Earth Discuss., 6, 1555, 2014.

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