

SOIL Discuss., referee comment RC1  
<https://doi.org/10.5194/soil-2021-113-RC1>, 2021  
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## **Comment on soil-2021-113**

Anonymous Referee #1

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Referee comment on "Transition to conservation agriculture: how tillage intensity and covering affect soil physical parameters" by Felice Sartori et al., SOIL Discuss., <https://doi.org/10.5194/soil-2021-113-RC1>, 2021

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In this study the short-term effects of conservation agriculture practices evaluated for their effect in three soil physical properties. Different soil cultivation and soil cover treatments evaluated for their effects on bulk density, penetration resistance and hydraulic conductivity + sorptivity. The authors used mixed effects models to analyse the effects and interactions. The outcome of the research is highly relevant to improve the existing knowledge on CA and promote proper adoption of CA practices in the region of the study site.

The authors have used a proper experimental design and experimental procedures combined with state of the art and advanced statistical analysis. The manuscript though, needs language refinement and additions especially in the introduction section and results presentation to achieve an excellent overall quality.

### **Specifically:**

In the introduction, in the first paragraph the benefits and drawbacks of CA should be added, coupled with results from existing literature. In the third paragraph where the situation in Italy is described the half paragraph is about general drawbacks and benefits of CA and is more suitable to be moved in the first one. The fourth paragraph describes the suitable species and situation for Italy and should be merged with the third one. Also, the tillage systems used in Italy should be mentioned.

In the 5<sup>th</sup> paragraph you mention that these measurements cover different spatial resolutions, but these measurements quantify different soil physical properties. It is not a matter of scale but a matter of different properties, and this should be clarified and corrected in the text. I think you should reconsider your scientific question.

In the methods section clarify the experimental design. In L 88 I suppose you mean in strips not in plots Be careful with the terms. In a split plot the whole plot is split into subplots (or strips) and the first factor is allocated there- I suppose is tillage for you- and then the second factor is randomly allocated within these in the experimental units. So, I think you have 18 experimental units. Please use the proper terminology throughout the manuscript. It would be nice to include the experimental design layout as a figure.

For the surveys you should add months also in Figure 1 to give a perspective of time within the year. And also specify the replicates per experimental unit (within the plot replicates) for all the measurements. Eg how many BD undisturbed samples you collected from each experimental unit.

Finally indicate the p value in the method.

In the results you refer to texture measurements, effects and correlation without presenting the variation of texture within the plots.

### **Detailed comments**

L6: CA relies in three main piles add also crop rotation

L7 and other places in the text: Correct soil physics to soil physical benefits or soil physical properties. Soil physics is the science and it include a wide range of properties and concepts

L7: is reduced soil strength a benefit?

L10: Define BD, PR in parenthesis and other abbreviations the first time appear in both in abstract and introduction before you use the short versions

L:10 and other places in the text: Change measures to measurements. Be careful when used measurements: the quantification of attributes of an object or event e.g. measurements of BD, weight etc

Measures: actions taken to achieve a particular purpose e.g. no tillage cover crops etc

L10: Define what soil hydraulic measures

L10: To evaluate the soil quality not the results

L13: use more or other word instead of better

L13: define or the percentage change in parenthesis or write from how much reduced to the second value

L15: see comment for line L7

L15-16 "as evidenced by root growth-limiting threshold declines (-11% in BD values >1.55 g cm<sup>-3</sup> and -7% in PR values >2.5 MPa)." Rephrase

L16: define what measure not only soil hydraulic measurements

L20: specify how the strategy enhances soil physical properties

L21: change to "This study demonstrates that to quantify CA effects requires monitoring several soil physical parameters." or similar

L25-28: references needed

L28: specify what type of contrasting results have been reported

L30: reference is needed

L39-40: What situations? specify

L66- L 95: the BD and PR have already been used before. Specify only the first time mentioned in the text.

L81 and other places in the text: Change rainfalls to rainfall.

L107: specify the volume and height of the core and give details for the sampling depths (0-20, 20-40 etc). and how many cores per depth and per experimental plot.

L110: Do you mean experimental units?

L111: change to measurements

L112-114: I believe this belong to the results

L116: threshold which is considered

L119: You measure infiltration rates and from that you calculated the  $K_s$  and  $S$  with the Philips equation please change.

L121: Indicate the number of within the experimental plot replicates of the measurement

L126: the plot effect – remove inside each treatment.

L130:do you mean within the whole profile?

L136: The DB range may not be significant statistically but is important physically. You should elaborate on the impacts of these values.

Table 1 change the captions/ It is not easy for the user to figure out the sampling when half of these are seasons and the other half years. Use uniform format. E.g. spring 2018

and also specify in the text why you had no applicable # (e.g. measurements only on the topsoil) Also in the first column use same format for the words. Some are only capital letters other start with capital etc. Specify what is GWC

139 and many other places in the text: Some times you use Figure in the main text to refer to the figure and some other Fig. Please use the same format.

L 189 and other places in the text remove the word combination next to treatment as by default the treatments is a combination of factors. So, either use for example the MT-TR treatments or the MT-TR combination

L189: resulted in

L199 you use respectively but you do not refer to which treatments

L 219 change the word lost with a more suitable

L222 above which of the two thresholds? Or you mean these instead of this?

L223 which range you mean please specify

L226 what do you mean by closed or open indicators? I think you mean solid and symbols

L: 229 Which results specifically and effects on what?

L231: effects on soil physical properties or soil physical condition

L243 wrong syntax

L251-252 and many places in the discussion specify what these authors found instead of only mention the names. Eg The results agree with XX who found .... and disagree with xx who found ....

L300 as mentioned before these measurements are used to evaluate different soil properties. You should not compare their scale. In order to reduce the effect of soil heterogeneity you replicate the same measurement within each experimental plot more times. You cannot say that by using the infiltrometer which measure infiltration capacity can overcome the variability problems you face when measure BD just because it covers a bigger area. These are two different unique measurements. I think you should reconsider/remove that part