



## ***Interactive comment on “Managing soil nitrate with cover crops and buffer strips in Sicilian vineyards” by A. Novara et al.***

**Anonymous Referee #1**

Received and published: 5 May 2013

### General comments

The paper submitted by Novara et al is focused on the effects of cover crops and the use of buffer strips to reduce nitrate leaching. These measures are quite effective, as shown by previous studies, and their application in vineyards located in slope areas, are of great importance, in order to decrease the nutrient lost and the transport to surface and groundwater bodies. The paper is of interest to our Journal and it is a good contribution to Solid Earth. In addition, this study has a clear practical application. Despite the recognized value of this work, some aspects should be clarified, before final acceptance. For example in the abstract it is needed to show the aim of the study, the most important results, conclusions and implications of the work. The paper states very well the problem, however, the (evident) importance of this study have to be bet-

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ter explained. The statistical analysis need also to be better explained. Throughout the paper, some results are confused and of some statistical analysis are not clearly explained. Some results of the paper could be better discussed as in <sup>15</sup>N tracer in biomass and <sup>15</sup>N tracer in soil. The implications of this study are important and well described, but should not be repeat the previous section (results and discussion). Below I made some minor comments that I hope that contribute to paper quality.

### Minor comments

#### Abstract

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Line 2: Please substitute “inadequate” by “low”. Line 3: Please add also “soil” Line 4: If you use the “nitrates” abbreviation before, please continue throughout the entire abstract. Please do it here and elsewhere. Line 6: Do you mean “management” or “reduction” Line 7-8: Please rewrite this sentence to. “The research was carried out in a vineyard located in Sicilia (Italy). In the study area, it was designed an experimental site with 10m wide and 80m long area at the bottom of a vineyard” Lines 8-13: Please delete it. This information is not essential in the abstract. Please describe the most important results, conclusions and implications of your work.

#### Introduction:

Line 19: Please substitute “are suffering from” by “are being subjected to”. Line 20: Please substitute “This intensification results in herbicides and pesticides abuse” by “This intensification increases the misuse of herbicides and pesticides, leading to soil biological degradation (Garcia Orenes et al., 2009) and soil erosion (Cerdeira et al., 2009a). Line 24: Please describe this environmental problems Line 24-25: Please delete “and soil and water pollution is one of those”. If is possible describe the mention environmental problems and say after it “and soil and water pollution”. Line 25-26: Please delete “due to the intensification of agriculture and the lack of new strategies to

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avoid these problems“. You mentioned before that intensification of agriculture produce environmental problems.

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Introduction: Line 5: Please remove “have” Line 7: Please substitute “In particular, vineyard soils that are conventionally managed and frequently tilled, and thus frequently have bare soil, are prone to a high rate of organic matter mineralization and to nitrate leaching“ by “In particular, vineyard soils are conventionally managed and frequently tilled, which reduces the vegetation cover and increases the proportion of bared soil. This induces a high rate of organic matter mineralization and nitrate leaching” Line 10: Please substitute “suffers” by “are affected by” Line 11: Please remove “;” and ad a “.” after “land”. Line 11-12: Please explain better the findings of Cerda et al. 2009. It is Cerda et al. 2009a or 2009b? Line 12: Please change “in soil erosion“ by “of soil erosion“ Line 12: Please remove “and although“ Line 13: Please change “is being“ by “has been“ Line 19: Can you specify the meaning of “water leaving“? Line 20-22: Please delete “By filtering the runoff water and by taking up nutrients“ Line 25: Please substitute “soil type and slope morphology, and buffer width..“ by “soil type, slope morphology, and buffer width..“ Line 26-28: Do you have any reference that supports this affirmation “Buffer strip efficacy is also affected by the agricultural system (land management and crop) and the management practices used in the buffered area.

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Introduction: Line 1: Substitute “can be also” by “is”. Line 1: Please change “reduces” by “decreases” Line 4: You refer this idea in the line 1, please delete it and continue the idea. Line 6: Please explain why this research field have to be explored.

Materials and Methods

Line 17: Please add the altitude above sea level of the study area. Line 17: Please put “(Fig, 1)” after “(Italy)” Line 21: Please specify the type of soil management. Line 25:

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The data of monthly rainfall and groundwater nitrate concentration it is yours or from other sources? If yes, please specify it. Line 26-27: Please rewrite this sentence and mention also the slope aspect.

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Line 8: Please change “was” for “is” Line 9-10: Please change “and contains 57.1% clay, 34.% silt, and 8.9% sand in the top soil (0–20 cm) based on the pipette method (Day, 1965).“ By “The top soil (0-20 cm) is composed mainly by 57.1% of clay, 34% of silt and 8.9% of sand, measured based on the pipette method (Day, 1965).“ Line 28: “N“means “nitrogen“or “nitrate“. If you use one time nitrogen do not use in other part of the paper N. If you say Nitrogen (N), please use just N in all the paper. It is easier for the reader. Line 28: Please change “were” by “was”

Page 262: Line 7: How many soils samples were collected in each sample period in each treatment and buffer area? Line 13: Have you collected one soil sample in each position slope (upper, middle, and lower)? Line 20: Please change “studying”, by “study”.

Page 263: Line 11: Please explain with better detail the “linear mixed effects model used” Line 11: Please change “. . .and repeated ANOVAs were used to evaluate the fixed effects and temporal effects of soil management..“ by “. . .and repeated ANOVA tests were use to observe the fixed and temporal effects of soil management“ Line 11: Was the data subjected to some previous statistical assessment previous to use ANOVA repeated measures?. ANOVA requires that data follow the normal distribution. Please explain it Line 17-19: Please delete this sentence. Put this information in the beginning of the paragraph, where you describe the ANOVA analysis. Were the significant differences among time and treatments observed at a  $p < 0.05$ ?. If yes, please mention it. What software you have used to make the statistical analysis? Results and discussion:

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Line 21: In the description of the results, please mention only if there was significant differences among treatments and time as you show in the table 1. Were the differences significant at  $p < 0.05$ ?

Line 23-24: Do you have some reference that supports this affirmation?

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Line 3: Please substitute "Our results are in agreement with those of several other studies showing that cover..." by "Our results are in agreement with previous studies, which observed that cover ..."

Line 5: The study did not consider SOM analysis. Please deleted do not discuss what you did not analyzed. Line 6: Where the SOM was studied in this work? If was in previous works, please mentioned it. Was the study carried out by (Barretta and Burke, 2000) carried out in this area?. I think that this reference is wrong. Please change in the references "Barretta" for "Barret". See the correct reference in: <http://www.sciencedirect.com/science/article/pii/S0038071700000894>

Line 14: Please change "mineralization, uptake by vines and uptake by the cover crops" by "mineralization, uptake by vines and cover crops"

Line 19-20: Do this study contributes to the understanding of this complex dynamic. If yes please mention it.

Line 24-25: Please substitute "Soil nitrate values, which were lowest in spring and highest in late summer or autumn (Fig. 3), ranged from 1.45 to 26.56mgL" by "Soil nitrate values were lower in spring and high in late summer or autumn (Fig. 3). The values ranged from 1.45 to 26.56mgL..."

Line 28: Please remove "mainly"

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Line 2: Please substitute "in" by "of" Line 5-6: Do you have some reference that sup-

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ports this idea. Line 7: Please substitute "Seasonal soil nitrate contents were similar..." by "Seasonal soil nitrate concentrations were not significantly different". Is this information shown in the table 1. If yes please mention it?. In the table 1 the differences among time are significant. Where are the results of seasonal comparisons? Which methods you used to do it?. Please refer it. Line 13: With treatments you mean "soil management". Line 15-17: Please substitute "This data demonstrate the leaching of nitrates by the surface wash and subsurface wash, and confirm that the bottom slope buffer strips of the slope can be a good strategy to avoid the pollution with nitrates" by "The results showed that nitrates are leached by surface and subsurface wash. It also confirms that the buffer strips are a good strategy to mitigate nitrate soil pollution"

Soil nitrate in the buffer and nonbuffer strips

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Line 23: Please change "This result" by "This results" Page 266:

Line 5-7: Which statistical analysis. Where they are shown? Are they in the figure 3?

Line 8: Why the authors did not analyzed the non-buffer strips effect, as they made in the other treatments? It is mentioned that "nonbuffer strips was significantly affected by vineyard soil management (treatments V, T, and C)", but where this results are shown?

15N tracer in biomass

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Line 20: Have you done some statistical comparisons to identify differences among distances in each period of study. If yes, please provide the results. If not, please remove "significantly", because induce the reader in error.

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15N tracer in soil

Line 1-2: Please where are shown the statistical tests results that shown the "signifi-

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cant" differences. Line 10: Please show the results of the statistical analysis (Results of ANOVA test, F value).

Implications Line: 18: Please substitute "avoid nitrates pollution" by "reduce nitrates excessive concentration". Line: 23-25: Please do not repeat the results and discussions. Be only focused in the implications of it and if they measures studied in this work are important to reduce the nitrate leaching.

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Line 9: Please remove "although" and "therefore" Line 13: You did not studied the C:N ratio. Please do not mention the implication of it. Please be focused in the outputs of your results.

Table 1. Please explain what you want to mean with altitude. Please explain what differences you are comparing. It is the position in the slope (upper, middle, and lower)?. If yes, please name it with "slope position.

Figure 1: Please use the same font size in both graphs. If possible differentiate it (e.g a and b). The monthly rainfall corresponds to the average?

Figure 3: Please describe the figures with a, b and c in the caption. Do the horizontal black line covered the period where differences are significant, between time and treatments (soil management)?. Do these differences are observed at a  $p < 0.05$ . If yes please mention it in figure caption. Please substitute in the caption "Horizontal lines represent statistical difference according to repeated measure statistical analysis" by "Horizontal lines represent statistical difference according to ANOVA repeated measures statistical analysis test"

Figure 4: Please substitute "histograms" by "bars". Are the hanging bars representing the standard deviation or standard error? How many samples have you measured per distance?

Figure 5: As in the figure 4 please substitute "histograms" by "bars", and please de-

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scribe what represent the hanging bars. Please show also how many samples you analysed per distance.

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Interactive comment on Solid Earth Discuss., 5, 257, 2013.