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MANUSCRIPT 2013-IJPSS

Find include my response to reviewer in red mark as bellow:

There has been a significant improvement in the editing of the manuscript, making it more comfortably readable. Likewise, the authors have made an appreciated effort to address some of the issues I previously raised.

Thanks

Nevertheless, my disagreement is still with the hypothesis, the assumption the authors have made, using a nitrogen fertilizer rate recommended for lowland rice cultivation in the humid forest zone (80 kgN/ha) to grow rice in the lowland of 2nd order in the Savannah Guinea.

We realize a shortage of information about this matter in the old version of the MS. There is a need to complete it in the revised version (L50-L57): In fact, because of widespread of nitrogen deficiency in soil, this nutrient was extensively studied, and 80 – 90 kgNha-1 were recommended for Lowland rice in West and Central Africa (Guei and Fagade, 2002) meanwile, about 80kgNha-1 was the best rate identified by Becker and Johnson (2001) in both forest and savanna ecologies in Cote d'Ivoire.

Why did the authors have to apply a nitrogen fertilizer recommendation that fits the conditions of the humid forest zone to then draw a conclusion for nitrogen application under lowland of 2nd order conditions in the Guinea Savannah?

It is now explained that 80kgNha-1 is for lowlands in forest and savanna ecologies (L56-L57).

What informed authors' assumption that the rate of 80 kgN/ha recommended elsewhere was fitted to the test site?

Fertilizer recommendation was done for lowland rice in savanna ecology as 60-80 kgNha-1; 30 -60kgPha-1 and 30kgKha-1 (Nwilene et al., 2006) meanwhile, there are three major ecologies of Savanna in Sub-sahara Africa: Guinea savanna, sudan savanna and derived savanna.

Our study concerned the Guinea savanna zone where 80kgNha-1 was identified by Becker and Johnson (2001) but similar data are missing for P and K. This is exposed in the revised version (L50-L57).

A range of 4 to 5 rates, including no- N should have been tested as done with the P and K fertilizers to come up with a valid fertilizer recommendation for the test site.

Yes, this can be suggest for deepening N-fertilizer strategy in further study instead of considering the rate inducing highest yield as observed by Becker and Johnson (2002) regardless to lowland orders (See L309- L312).

What is the test soil potential to supply N?

According to Kjeldahl method the native Soil-N was low (< 1gkg^{-1}), as reported in Table 1.

The purpose of the study was to develop fertilizer recommendations that would be site-specific and even season specific (the experiment was conducted for a single year over three cropping cycles, including the wet and dry seasons.

Yes!

Please be mindful that the processes of nitrogen mineralization and losses through e.g. leaching, denitrification, and volatilization are season-specific and site specific.

This matter is address in M&M (L101) and also in the discussion (L250-L252).

Also, there should be a large array of rates of nitrogen fertilizers to be tested.

In the basis of actual knowledge (Becker et Johnson, 2001; Guei and Fagade, 2002; Nwilene et al., 2006) and national extension agency recommendation to farmers (unpublished), the rate of 80kgNha-1 can be acceptable for assessing rice response to P and K fertilizers.

Nevertheless, in respect to SSNM concept, rice response to N-fertilizer (i.e. 40, 60, 80, 100) should be assessing by future study in different lowland orders (1rst, 2nd, 3rd and plain).

This matter is discussed (L309-L312).

The authors may not just apply a single rate of a nitrogen fertilizer recommended at a site and seasons (humid forest zone) different form the test sites (Guinea savannah) of the study, and make unjustified extrapolations.

Justification is given in the revised version (L56-L57)

Any conclusion from such an extrapolation in recommending the applied rate of N fertilizer to be site-specific might be biased and data there of inaccurate.

The conclusion is revised.

It is recommended to assess N rate (L323) for rice production in the specific agro-ecology (2nd order of lowland in Guinea savanna).

Grain Yield Response to Phosphorus Application

The good response of grain yield to the application of P – up to 45 kgP/ha – did not support the suggestion by the authors that the test soil had ten times higher available P than the critical level.

Yes, we agree with this comment!

Caution should be observed in interpreting the magnitude of P-deficiency in the test soil. Assessment of the P status of the reduced soil by a chemical test conducted on air-dried soil, as measured by the Olsen extraction solution, may not provide a reliable estimate of soil P availability after submergence.

Olsen method was recommended for this purpose by De Datta et al. (1989) during the symposium of “Phosphosphus requirement for sustainable agriculture in Asia and Oceania”.

The good response of rice grain yield to P fertilizer application in the first cycle of its application presumably reflected the magnitude of the test soil P-deficiency, and suggested that available P was not adequate to sustain rice growth up to 45kgP/ha.

Off course, P-deficiency can explain such results. However, referring to the amount of avaible-P before the experiment and the conflicting positions of workers [e.g. Jones et al (1982) vs. Alva et al. (1980)] concerning flooding effect on P availability in lowland, we have recommended more investigation for P-nutrition of rice in submergence condition in the old version of MS. Nevertheless, your comments invite us to give our own position in the revised version of the MS To explain why a response of response was observed regardless to native amount of P in the soil (L272-L276).

The Guinea savannah zone is particularly known for its overall P and N –deficiencies.

Yes, that is so for upland condition. But, it may show difference in lowland, especially in flooded and irrigated conditions depending to parental material. Deficient to moderate soil P contents are common in lowlands of Guinea savanna zone: on acidic rock as in our studied site (granite-gneiss), Windmeijer and Andriesse (1993) recorded P-Bray I of 7.20 ppm in top soil when in Guinea savanna of Cote d'Ivoire P-Olsen was 15 ppm (Hakkeling et al., 1989).

The omission trial conducted by Konan (2013) next to our experiment has identified N and K deficiencies in the studied soil. But this study was also concerning N, K, Ca, Mg and Zn.

An insight into the soil exchange acidity, i.e. the % (Al^{3+} + H^{+}) of CEC exchange, the effective cation exchangeable capacity (CEC) would have provided the reader with a sense of the magnitude of the P-bearing mineral capacity of the soil parent material and subsequently the magnitude of P that might be expected for release upon submergence under lowland conditions.

Unfortunatly, we done have such data!

But, we assume that the granite-gneiss as parental material can supply Ca++ deriving from feldspath mineral weathering, hence immobilizing P (Ca-P) under effect of submersion in concordance with the study done by Abekoe and Tiessen (1998). But this result was observed in the foot slope soil of upland with water logging. Specific lowland study of such process is still missing! (See L274-L275).

Line 211 reads '20kgha^{-1}. Thereafter, an increasing of rice response to P-rates is observed as illustrated'
It should rather reads ' …Thereafter, an increasing of rice response to K-rates is observed as illustrated'

Done

Conclusion

In the present study no attempt was made to determine the appropriate rates of N fertilizers to be applied under the Guinea savannah zone conditions.

Yes.

The 80 kgN/ha applied in the study was extrapolated from previous studies in the humid forest zone.

It is the same for Guinea savanna of Cote d'Ivoire according to the cited literatures.

Therefore, no conclusion as to the recommended fertilizer should include Nitrogen.

Done

In fact, the title of the research paper implies that only P and K were investigated, not nitrogen.

Done

The authors have the option to avoid discussion about and conclusions that imply that N fertilizer was tested and therefore recommended.

N-rate is not recommended

Their conclusions should be based on P and K related data only.

The conclusion is revised.