

UNIVERSITY OF HOHENHEIM



Nitrogen dynamics from seasonal and perennial legume residues in Mushinga South-Kivu Eastern, DR Congo

Isaac Balume¹, Sven Marhan², Frank Rasche¹

¹University of Hohenheim, Inst. of Agricultural Sciences in the Tropics (Hans-Ruthenberg-Institute), Stuttgart, Germany ²University of Hohenheim, Inst. of Soil Science and Land Evaluation, Stuttgart, Germany

INTRODUCTION AND OBJECTIVE

A central knowledge gap remains to which extent a change of biochemical quality (e.g. C/N ratio, ([polyphenol+lignin]/N ratio) (PP+L/N) of organic inputs as a result of different legume types shapes nitrogen dynamics in agriculture soils.

www.foodsecurity.de RESULTS AND DISCUSSION



The aim of this study was thus to assess the effect of legume residue type i.e. differences in biochemical quality of organic inputs on soil N dynamics during a defined decomposition period.



MATERIALS AND METHODS

Table 1. Residue type quality characteristics

Treatments	Residue quality		
	C/N ratio	Lignin	PP+L/ N
<i>Calliandra Calothyrusus</i> (C.C)	13.80	14.64	8.00
<i>Leucaena Leucocephala</i> (L.L)	14.96	10.63	6.44
<i>Phasolus Vulgaris</i> (P.V)	11.80	8.88	10.55
Control (CL)	No inputs		

Table 2. Soil physico-chemical properties

 Soil
 Soil

 Soil pH.
 4.79

 TC (%)
 3.80

 TN (%)
 0.35

 Clay (%)
 34

 Sand (%)
 48

 Silt (%)
 18

Fig 1. Nitrogen dynamic in the different residue treatments (A) NH_4^+ , (B) NO_3^- and (C) DOC at different sampling time after field residue application.

- > ANOVA resulted in significant differences for the interaction between residue quality and sampling time for NH_4^+ (*p*<0.05), NO_3^- and DOC (*p*<0.0001).
- High NH₄⁺ was released from P.V and L.L at 15 and 45 days respectively after residue application due to lower lignin content in the litter. NO₃⁻ production was highly boosted under P.V and C.C residue treatments at 165 and 245 days, while DON was only promoted from C.C residue with high proportion lignin after 245 days.

CONCLUSION AND OUTLOOK

Preliminary results indicated that residue inputs increases NH_4^+ nitrogen at earlier stage, while NO_3^- nitrogen of decomposition was boosted at the later stage of the experiment from P.V the seasonal residue type. As well as does DOC in favored by C.C, the most lignified residue type. Hence, designing best-fit organic residue management technologies should recognize residue type.

Soils were mixed with residue type (10 t per ha ⁻¹ dry weight) and incorporated into the soil under field condition.

> After 15, 45, 165, and 245 days of residue application, soil samples were taken for analyses of NH_4^+ , NO_3^- and DON.

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Reference

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Contact: Isaac.balume@uni-hohenheim.de

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