Recovery of cover-crop-N in the soil-plant system in the Guinea savannah zone of Ghana

Zeitschrift	Biology and Fertility of Soils
Verlag	Springer Berlin / Heidelberg
ISSN	0178-2762 (Print) 1432-0789 (Online)
Heft	Volume 39, Number 2 / Dezember 2003
Kategorie	Original Paper
DOI	10.1007/s00374-003-0677-3
Seiten	117-122
Subject Collection	Biomedizin & Life Sciences
SpringerLink Date	Donnerstag, 19. Februar 2004

Original Paper

Recovery of cover-crop-N in the soil-plant system in the Guinea savannah zone of Ghana

Mathias Fosu[1]  , Ronald F. Kühne[2] and Paul L. G. Vlek[3]

(1) Savanna Agricultural Research Institute, Council for Scientific and Industrial Research, P.O. Box 52, Tamale, Ghana

(2) Institute of Agronomy and Animal Production in the Tropics and Subtropics, University of Göttingen, Grisebachstrasse 6, 37077 Göttingen, Germany

(3) Centre for Development Research (ZEF), University of Bonn, Walter-Flex-Strasse 3, 53113 Bonn, Germany

Received: 21 March 2003 **Accepted:** 3 September 2003 **Published online:** 5 November 2003

Abstract In order to understand the efficiency of residue-N use and to estimate the minimum input required to obtain a reasonable level of crop response, it is important to quantify the fate of the applied organic-N. The recovery of N from ^{15}N-labelled *Crotalaria juncea* was followed in the soil and the succeeding maize crop. Apparent N recovery (ANR) by maize from unlabelled *Crotalaria juncea, Crotalaria retusa, Calopogonium mucunoides, Mucuna pruriens* and mineral fertilizer at three locations were also evaluated. The maize crop recovered 4.7% and 7.3% of the ^{15}N-labelled *C. juncea*-N at 42 days after sowing (DAS) and at final harvest, respectively. The corresponding ^{15}N recovery from the soil was 92.4% and 58.5%. The highest mean ANR of 57.4% was with mineral fertilizer, whereas the mean ANR of 14.3% from *C. retusa* was the lowest. A large pool substitution and added-N interaction effect was observed when comparing N recovery from the labelled and unlabelled *C. juncea*. The amount of residue-N accounted for by the isotope dilution method at 42 DAS was 97.1% and at final harvest 65.8%. The large residue-N recovery in the soil organic-N pool explains the residual effect usually observed with organic residue application.

Keywords Cover crop - Fallow management - Green manure - Maize yield - Nitrogen

recovery

Mathias Fosu
Email: m_fosu@hotmail.com
Fax: +233-71-23197