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# Residual Effect of Mungbean (*Vigna radiata*) in a Cropping System

Juan Barroso, Lisa Pataczek, Thomas Hilger, Georg Cadisch

*University of Hohenheim, Inst. of Agric. Sci. in the Tropics (Hans-Ruthenberg-Institute), Germany*

**Abstract**

It is well documented that including legumes in a cropping system has the potential to improve soil fertility and increase yields of succeeding crops. However, in the case of grain legumes, much of the fixed nitrogen is removed at harvest in grain/pods, and in the case of mungbean (*Vigna radiata*), also stems and leaves are most often removed from the field, so it is questionable if mungbean could have a significant residual contribution to any cropping system.

In several farming systems, legumes have showed evidence of positive net balance returns of fixed nitrogen, positive contributions to the soil organic matter, enhanced nitrogen mineralisation and increased soil mineral nitrogen. However, the succeeding cereal yield responses are not always correlated with the nitrogen fixation supply, so there are also non-N factors that contribute to several improvements in crop productivity. Therefore, it is suggested that legumes might enhance soil phosphorus solubilisation, improve soil structure, increase soil organic matter and promote soil biological activity.

This research work aims to identify the main residual effects of mungbean, as well as the nitrogen contribution to succeeding crops. To reach this objective it was performed a systematic review on grain legumes, including mungbean, with 2 research lines. The first line, collected data related with residual nitrogen, nitrogen balance and nitrogen input in a cropping system. The data was sorted by tropical or temperate origin and cropping system to perform a Meta-Analysis. 140 studies were selected, of which only 24 include mungbean. The second line, collected data related with soil organic matter, nutrient solubilisation and soil biology. A review analysis was used to correlate the residual effects from other grain legumes to mungbean. Increment of soil organic carbon, phosphorus solubilisation by organic acids and enhancement of microbial activity by hydrogenase enzyme were the most common effects.

**Keywords:** Meta-analysis, nitrogen fixation, residual nitrogen, soil fertility, *Vigna radiata*

**Contact Address:** Juan Barroso, University of Hohenheim, Inst. of Agric. Sci. in the Tropics (Hans-Ruthenberg-Institute), Garbenstrasse 13, 70599 Stuttgart, Germany, e-mail: juan.barroso@uni-hohenheim.de