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Evaluation of biological nitrogen fixation contribution in soybean and cowpea cultivated under integrated crop/livestock systems in Roraima state.

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Introduction The warm conditions of the tropics leads to a rapid degradation of soil organic matter (SOM). To reduce this depletion a positive nitrogen balance in agricultural systems is necessary. The area under integrated crop/livestock systems in Roraima state is increasing. In this context, especially in the transition from pasture to crop, it is important to measure the N derived from biological nitrogen fixation in grain legumes for evaluation its nitrogen nutrition status. The objective of this study was to assess biological nitrogen fixation contribution in soybean and cowpea cultivated in two pasture areas recently converted to cropping of these legumes in Roraima.

Material and Methods

The experiments sites were located near the Embrapa Roraima. Both areas were recently change from pasture to crop under Argissol soil. The sites were located in São Paulo experimental field of Embrapa Roraima and Serra da Prata private farm and the crops were sampled in 2012. To determine the BNF contribution to the crops, three blocks were established at sowing of soybean and cowpea crops. The soybean cultivars were BRS Tracajá and the cowpea cultivars was BRS Guariba. Recommended bacteria strains were used for inoculation of both crops. The contribution of N derived from BNF was determined using the isotopic ^{15}N natural abundance technique.

Results and Conclusions

The results in Table 1 showed that contribution of N in soybean derived from BNF was 65% independently of the sampled area.

Table 1. Proportion of N derived from biological nitrogen fixation (N-BNF%) in soybean and cowpea, estimated through the ^{15}N natural abundance technique.

Site	Soybean N-BNF (%)	Cowpea N-BNF (%)
São Paulo Farm	65	47
Serra da Prata Farm	64.5	66.5
Average	**65**	**56.8**

It was observed that N derived from BNF in cowpea was 47% in São Paulo Farm and 66.5% in Serra da Prata Farm. It is concluded that under recently converted areas from pasture to crop, a considerable proportion of legume N plant can be derived from soil organic matter. However, soil N content can decrease after two or three years. For this reason, more research to improve the efficiency of the *Bradyrhizobium* strains in legume crops is important to maintain satisfactory inputs of N derived from BNF.

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