

Feeding activity of soil invertebrates in a Crop-Livestock-Forest System in Cerrado region measured with bait lamina method

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Introduction The establishment of sustainability indicators in integrated production systems is important for the valuation of ecosystem services. The bait lamina method has been used in soil ecology research to study the effect of anthropogenic activities on soil functions as an indicator of habitat function or, indirectly, of nutrient cycling in the soil (Römbke, 2014). This method consists of plastic sticks with holes filled with bait material, which are inserted in the soil. The amount of opened holes is taken as a measurement of the feeding activity after a period of time, indicating the activity of soil fauna and, consequently, the soil quality. Despite the simplicity of the method, it is still scarcely used in the tropics. In crop-livestock-forest systems (CLFS), a common question has been how to carry out the soil sampling in an integrated system with forest and pasture components, where there are differences within the system such as the shading of the trees. Therefore, our objectives were to evaluate the potential of bait-lamina method in a crop-livestock-forest system in Cerrado biome and to evaluate whether the feeding activity of soil invertebrates differ within the microhabitats in that system. The data presented here are still preliminary.

Material and Methods

The study was carried out at Embrapa Cerrados Research Center, Planaltina, DF, Brazil, in a plot of CLFS of 1,34 ha composed of *Eucalyptus urograndis* with *Brachiaria brizantha* cv. Piatã between alleys (silvopastoral system with plant trees spacing of 2 x 2 m and spacing between alleys of 22 m). Bait lamina purchased from terra protecta GmbH Germany (Kratz, 1998), were placed at 9 points, three of them at the middlemost alley distant 10 meters from each other (Tree), and the other 6 points were 5m (Inter) and 10m (Brac) downwards, in parallel to the tree alleys. A set of 14 bait laminas was placed at each point up to a depth of 8 cm in the soil and removed 12 days later. Laminas placed at a monoculture of *Eucalyptus* clones were used as a reference. The opened holes (eaten bait) were counted and the feeding activity estimated for each treatment up to 8 cm in depth at every 2 cm.

Results and Conclusions

The percentages of opened holes, i.e. eaten baits obtained in each treatment were 77,8 (Tree), 82,3 (Inter), 76,4 (Brac) and 60,4 (Euca). The biggest difference of eaten baits was observed between Inter and Euca, however the feeding activity was not different statistically among the treatments (ANOVA, $p > 0,05$). The feeding activity at the different depths did not show significant differences either, although the lower percentage of opened holes in the depth of 6-8 cm in Euca suggests a reduction in the activity. The experiment should be repeated exposing the bait lamina for a shorter period, in order to obtain about 50% of bait consumption and, consequently, a better contrast between the treatments. A higher number of laminas would also improve the data in order to confirm the present results. Overall, the method has shown a good potential as a quick and simple tool for soil quality evaluation.

References cited

Kratz et al. (1998) Environ. Sci. & Pollut. Res. 5 (2): 94-96.
Römbke (2014) Plant Soil 383: 43-46.

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