ALTERNATIVE SYSTEM TO SLASH-AND-BURN FOR AGRICULTURE IN THE EASTERN AMAZON REGION: IMPACTS ON ANT SPECIES RICHNESS

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INTRODUCTION

Slash-and-burn is the most widespread approach to preparing land for agriculture and livestock in Brazil's Amazon region. Leaf-litter biomass may be totally burned in affected areas, destroying a vital habitat for thousands of invertebrate, such as ant communities. An alternative to slash-and-burn has been developed, using tractor-driven equipment to mulch vegetation, leaving organic material on the soil surface. This study focuses on evaluating ant species richness in plantations of cassava under slash-and-burn and mulch systems.
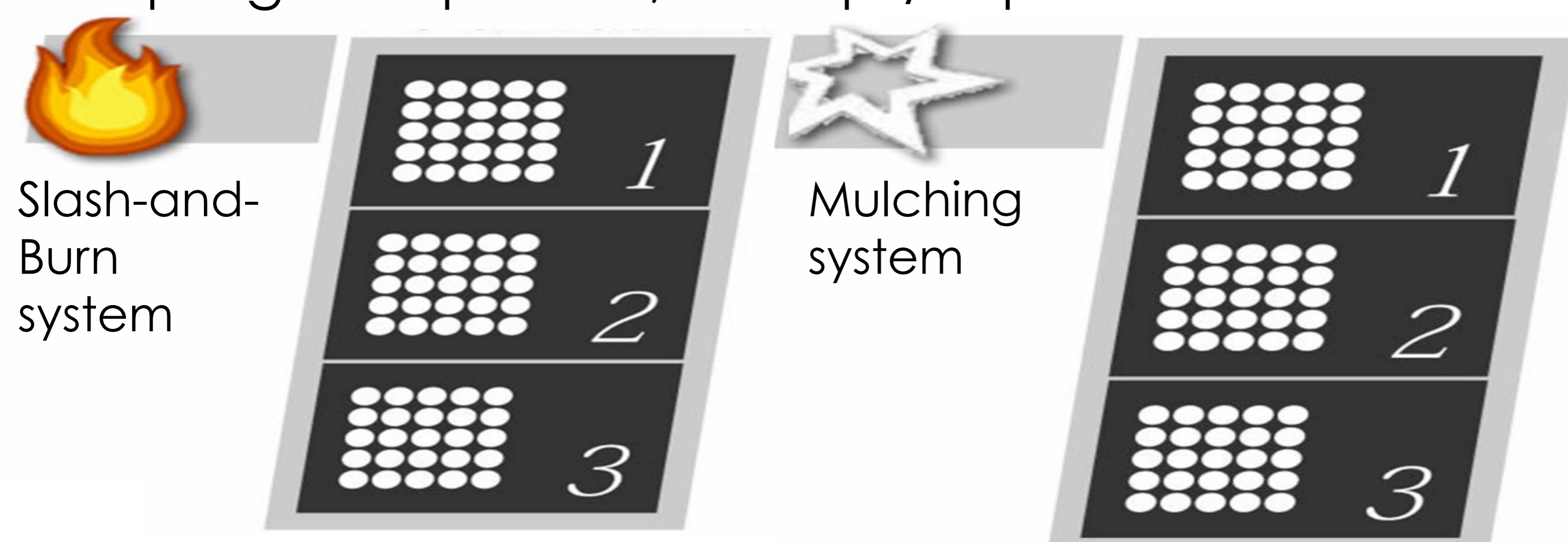
MATERIALS AND METHODS

Locality: Northeastern of Pará State , Brazil
Sampling period: 01 – 04/2008
Agricutural Sistem: Plantations of Cassava
Sampling: 3 Repetions, 20 traps/ rep.

Slash-and-Burn system

Mulching system

Statistical Analysis: Multiple regressions with quase-Poisson error distribution, in statistical program R.

Figure 1: Capoeira (vegetation)

Figure 2: Cassava (*Manihot esculenta*)

RESULTS

We found greater ant species diversity in mulching as compared to slash-and-burn systems ($p<0.005$). Higher magnitudes in the variables plant height ($p<0.005$), leaf litter biomass ($p=0.016$) and litter phosphorus content ($p=0.020$) were significantly related to increased ant species richness in both systems. Higher litter nitrogen content was significantly related to increased ant species richness in mulching systems ($p=0.030$). In a model analyzing slash-and-burn sites, soil hardness ($p<0.005$), phosphorous ($p<0.0005$) and aluminum content ($p=0.015$) were found to be significantly related to increased ant species richness. In a model analyzing mulch systems, leaf litter biomass ($p<0.0005$) and distance from the nearest forest fragment ($p=0.012$) were the environmental variables correlating to greater richness

CONCLUSION

Our results showed that land-use systems using different crop preparation approaches have different impacts on biodiversity, specifically that systems using fire reduced ant species richness as compared to the fire-free mulch systems. The fire-free systems appeared to maintain the environmental variables within the agricultural matrix that are vital for resource and habitat conditions for ant species.

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Photos: www.google.com