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Effect of Mulch Physical properties on soil invertebrate communities

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Mulching is a practice providing numerous agroecological benefits such as weed control, improvement of soil organic matter, and the creation of favorable habitat for soil invertebrates. Although the effect of mulch on weed control has already been studied, very little is known about how the mulch affects soil fauna and the underlying mechanisms. The chemical composition of mulch or litter is often studied as the main factor affecting soil fauna community but recent works also highlight the role of habitat physical structure on invertebrate communities. In the present work, we investigated the role of mulch physical properties on invertebrate community composition through a field experiment testing the effect of seven kind of mulch having contrasted physical structures. The experiment was carried out during two month in a tropical agroecosystem (Martinique, Lesser Antilles). Weeds were monitored and soil invertebrates were sampled in each kind of mulch as well as in the bare-soil control treatments. Mulch physical properties has been characterized through trait measurements such as 3D index, solid volume fraction and mulch area index (MAI) which is the equivalent of leaf area index (LAI) for mulch. These variables were measured in order to be linked with data on soil fauna communities. Furthermore, according to the grain size hypothesis, it is predicted that organisms having long leg relative to their body size tend to live in a more complex (rugose) habitat. Trait measurements on soil invertebrate (body size and leg size) were also realized in order to test such hypothesis.

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