Tropentag, September 17-19, 2018, Ghent

"Global food security and food safety:
The role of universities"

Effect of Soil Management on Mite and Springtail Populations in Agroecosystems from Santa Clara, Cuba

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Abstract

For assessing the effect of soil management on mites and springtails were selected twelve farms located on brown calcareous soil in Santa Clara, Cuba. Farms were grouped according to their soil practices and landownership, resulting in three groups: State farms run under conventional agriculture, private farms managed conventionally, and private farms organically managed. Besides, there were chosen three reference patterns (Pasture, Marabou and Natural), all under homogeneity edaphic and climatic. Two or three fields of each farm were selected for the study. Four composite soil samples per field were taken to 20 cm of depth. Sampling was done twice: November, 2015 and June, 2017 in order to study the dry and the rainy season. The analyses of mites and springtails were done by the Bayer's methodology (2006). For the extraction of the mesofauna components, 300 g of soil were placed in modified Berlese funnels, which separated the organisms from the soil by entrapping them in alcohol. Generally, mites and springtail populations are lower in soils under agriculture. In both seasons, the higher number of mites and springtails were found in the marabou and in the natural forest, without difference with the pasture area. The farms under organic management showed populations lower than these references areas, but higher and significantly different from those farms under conventional agriculture. No significant differences were found between the fields under conventional farming, either from the private or state sectors. It can be assumed that the organic management diminished the negative effect of agriculture on soil mesofauna. The structure of the mites' community showed that Oribatid was the most abundant order and never was below 60 %, followed by Mesostigmata and Gasamids. The Prostigmatide was the order with low populations. In the springtails' group, the family Isotomidae presented the highest number of individuals and the lower was found in the family Entomobrydae. These results suggest that the effect of soil management in agricultural systems showed influence on soil mesofauna component used as indicators for determine soil health.

Keywords: Farming systems, mesofauna, mites, soil management, springtails

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