O.16 - An agroecological approach to alleviate the impact of nematodes in banana cropping systems

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For many decades, control of plant-parasitic nematodes and in particular of the worldwide species Radopholus similis was mainly based on chemical nematicides not fully safe for the environment and human health. In order to develop more environmentally friendly control strategies, we started to develop in the French West Indies an innovative and modular approach based on integrated crop protection. The two first levels of this approach were conceived to promote prophylaxis in banana agrosystems. They were devoted to soil and plant sanitation. The third and more recent level, which is presented here, also integrates additional prophylatic measures to prevent the spread, in time or space, of parasitic nematodes. It thus includes the assessment of alternative management of nematode-infested crop residues along with use of prophylatic ditches to lessen spatial dissemination of the nematode R. similis. However, this third level of modules is above all built to strengthen our strategy through an ecological intensification of the banana agrosystems. It includes the alleviation of biological soil constraints such as plant-parasitic nematodes by the manipulation of the above-ground diversity (vegetal cover). Our current strategy is to introduce in banana agrosystems nematode-resistant cover plants as associated crops, thus achieving multispecific cropping systems that will be further evaluated to understand whether they become more diversified and less prone to parasitic nematodes. We are now testing the association of bananas with the deep-rooting perennial soybean Neonotonia wightii. This work is complemented by studies assessing the possibility of also having recourse to nemato-toxic plants such as Crotalaria spp. Finally, we assign a module of the third level to the diagnostics of the soil condition, using nematode community structure. This necessary step will help to assess the ecologial impact of (current and upcoming) cropping practices. Results from an ongoing study on the structure of nematode communities in banana agrosystems, varying by their level of anthropisation, are introduced.