



Agricultural practices and Ecology of soil-borne plant pathogenic microorganisms

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Binary approaches are classically used to control pests when they infect the plant. Pesticides or bio-control agents can indeed provide immediate and hopefully satisfactory results but, the sustainability of these approaches is objectionable because the whole biotic soil compartment is not considered while it may play a major and durable role in limiting the development of primary inoculum during their saprophytic phase. Indeed, the genetic structure and the fitness of the biota are depending on the impact immediate or long term anthropogenic activities may have in agricultural and also in extreme environments. Agricultural practices including preceding crop, monocropping and rotation systems, tree-density and irrigation in olive orchards, conventional or reduced tillage, management of crop residues, nature of organic amendments, solarization and bio-disinfection etc..., alone or in combination, affect in various ways the balance between soil-borne populations what in turn may lead or not to biological control of pathogenic populations. The sustainability of this so called acquired soil suppressiveness needs to be discussed in relation to the strong resilience of the functioning of many soils. The impact these changes might have on the multitrophic interactions should be considered as a stimulating challenge to suggest new alternatives to mitigate these effects and to depict indicators for risk assessments and/or soil health. Statistics including multivariate analyses are now commonly used to exploit the huge amount of data we get in all the domains but the gap still exists between life sciences and mathematical modeling while the two domains are feeding each other respectively. Modeling can help to understand the interactions between the environment (including climate change) and the biota, and also between the components of the biota and to predict the likelihood of success and the risks of failure of biological control, as well as the design of more efficient control strategies. These issues will be addressed even if it is difficult to imagine that this day miracle solutions will be proposed.