Opinion

The importance of compatibility among manures and microbiota in agricultural soils

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Monocultures are widely practiced in the modern commercial and industrial agriculture for animal feed, oil, commercial food products, agro-fuels.[1] Cultivated crops with genetic similarity, same growth patterns and resistant to certain common disease are perfect in the largest commercial agriculture and in terms of reduced costs in the production process.[2] However, it is well known that increased chemical inputs and deleterious effects on the soil ecosystem are not well understood. Toxic chemicals and different plant physiological disorders of modern monoculture destroy the wild ecosystem.[3] Fortunately, different types of manures, wastes, residues, compost and biochar are being tested worldwide (Table 1); however, there is few researches focusing on the compatibility among biofertilizers and soil conditioners together. In spite of the slow adoption of natural soil conditioners by commercial agriculture, organic agriculture, which is increasingly growing, is more interested on the addition of natural residues on horticultural plants and crops. Most crops associate with microorganisms in a mutually beneficial way (simbiosis). Legumes, such as soybean, associate with rhizobial bacteria. Legumes and non-legumes associate with other soil microorganisms, especially with fungi, such as arbuscular mycorrhizas (Glomeromycota), known as natural biofertilizers which establish the mycorrhizosphere.[4] To support sustainable agricultural systems and to deal with the effects of global change, the associated plant-soil microbial communities have been more investigated.

Table 1 Journal articles dealing with symbiotic soil microorganisms and soil conditioners in some important agro-ecosystems

Key words	Number of journal articles
Legume crops+manure	947
Legumes+AMF	184
Grapevine+manure	29
Grapevine+AMF	22
Olive+manure	176
Olive+AMF	25
Maize+manure	2,227
Maize+AMF	233
Soybean+manure	911
Soybean+AMF	69

Database survey conducted on July 2016 (SCOPUS); AMF, arbuscular mycorrhizal fungi.

The mycorrhizal symbiosis in maize was more studied in several countries worldwide[5] and several research groups devoted to appreciate that symbiosis.[6] Application of compost[7] efficient phosphate solubilizer microorganisms,[5,8,9] microbial inoculants[10] and biochar[11] as well as other soil conditioners[12] for crops is increasingly investigated. Agroecosystems of high economic interest such as coffee[13] and olive[14] are in the focus of new technologies for their cultivation including their associated microbiota. To compile and organize results is important to understand the effects of different soil conditioners on crops, and their agricultural implications. Further studies are required to understand the microbiome in crops as well as the effects on agronomical successions and organic matter decomposition.

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Conflict of interest

The author declares no conflict of interest.

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