Sociedad Argentina de Microbiología General

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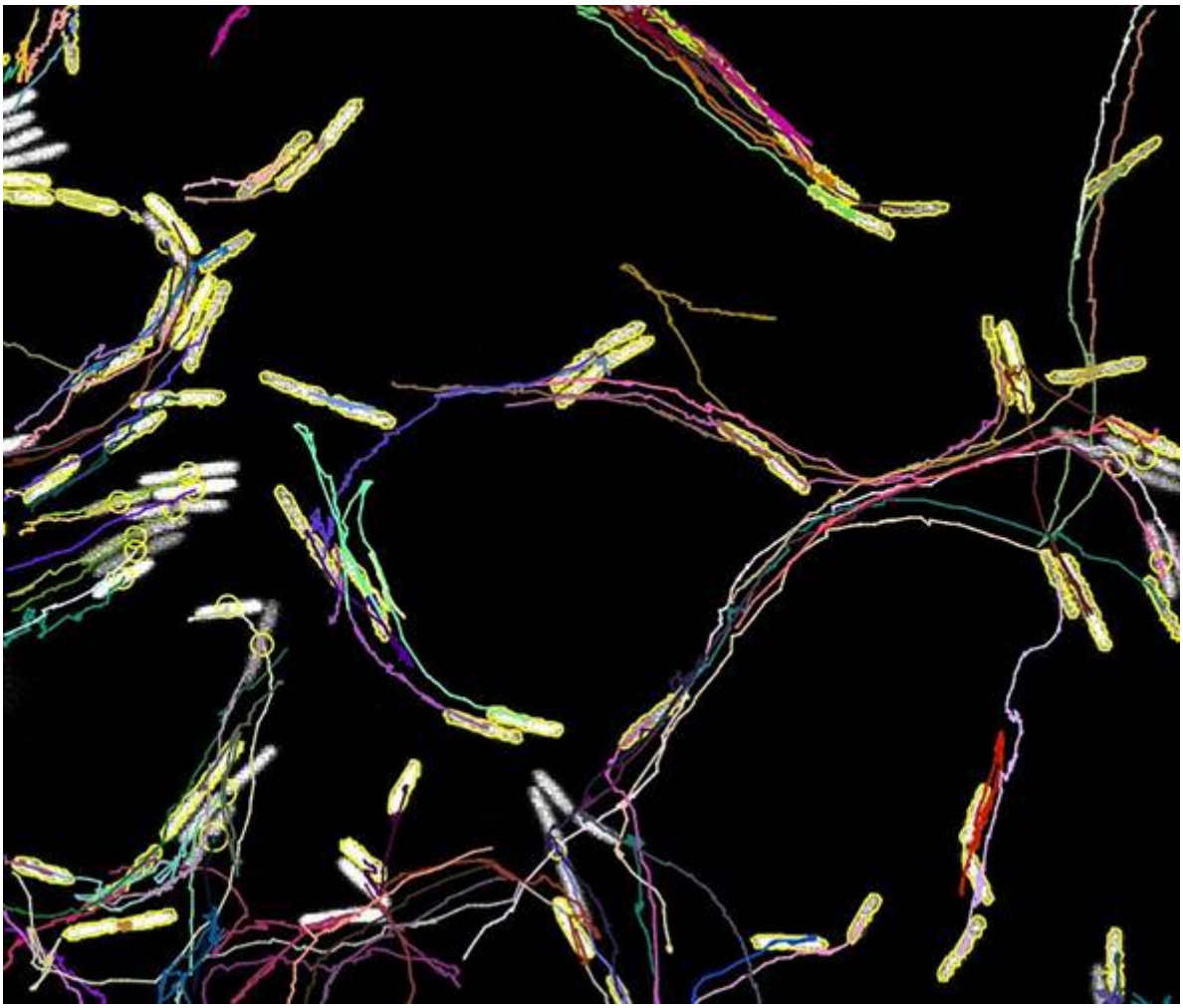

Foto: Se hace camino al andar. Celeste Dea. 1er puesto. Concurso fotográfico SAMIGE 20 años.

IMPACT OF AGROCHEMICAL AND PGPB APPLICATION ON THE COMMUNITY OF ARBUSCULAR MYCORRHICAL FUNGI AFTER A 4-YEAR CROP ROTATION SCHEME IN AN AGRICULTURAL ESTABLISHMENT IN SOUTHERN CORDOBA, ARGENTINA

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The use of agrochemicals has a significant impact on the activity and composition of soil microbiota such arbuscular mycorrhizal fungi (AMF). On the other hand, the use of plant growth promoting bacteria (PGPB) positively influences soil microorganisms, promoting both plant and AMF health. The aim of this work was to analyze the impact of the application of agrochemicals commonly used on agricultural soils of southern Cordoba and PGPBs inoculation on the spore diversity of native AMF and the prevalence of these fungi in a 4-year soybean-wheat-corn rotation. For this purpose, four treatments were used: (1) non agrochemical and nor bacterial application (control treatment), (2) PGPB inoculation (commercial biological fertilizers), (3) application of agrochemicals, (4) mixed application of PGPB and agrochemicals. The rotation scheme started in December 2019 and finished in May 2024 and was: soybean-wheat-maize-wheat-maize-wheat-soybean. The AMF community was analyzed on rhizosphere soil samples and on plant roots obtained at the time of harvest of the first and last crop used in the rotation scheme (soybean). AMF spores and inoculum availability were determined on the samples. Spores were extracted by wet sieving and centrifugation in sucrose and taxonomically identified by analyzing morphological characteristics. The availability of inoculum was evaluated by the Most Probable Number (MPN) method. At the beginning of the trial, the estimated available infective inoculum was 48 units in 100 grams of soil. After the crop rotation cycle had elapsed, the highest infective inoculum observed was in treatment 2 with 420 infective units while both treatments with agrochemical application (3 and 4) presented lower inoculum values than the control, with 84 and 130 infectious units in 100 g of soil, respectively. From the samples corresponding to the soybean harvest of the first campaign, 169 spores belonging to 4 families and 7 species of AMF were extracted. Except for Acaulospora tuberculata, all species presented generalist behavior, being present in all treatments and in similar abundances. At the end of the 4-year crop rotation cycle, 1251 spores belonging to 7 families and 26 species of AMF were isolated and identified. The dominance of families, based on the number of species per family, indicated that *Glomeraceae* was the dominant family followed by Gigasporaceae and Acaulosporaceae. Six species of AMF were identified that increased their abundance in the presence of agrochemicals and 7 species

showed sensitivity to them. It is possible to conclude that agrochemical application decreases the infective inoculum of AMF and modifies the community structure of these microorganisms, negatively impacting some AMF species and increasing the abundance of others. Crop rotation and PGPB inoculation produce beneficial effect on the AMF spore community and on the infective inoculum available in agricultural soils.

Palabras clave: arbuscular mycorrhizal fungi - plant growth promoting bacteria – agrochemicals - crop rotation