Sociedad Argentina de Microbiología General

XIX CONGRESO DE LA SOCIEDAD ARGENTINA DE MICROBIOLOGÍA GENERAL

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Centro cultural y Pabellón Argentina de la Universidad Nacional de Córdoba, Córdoba, ARGENTINA.

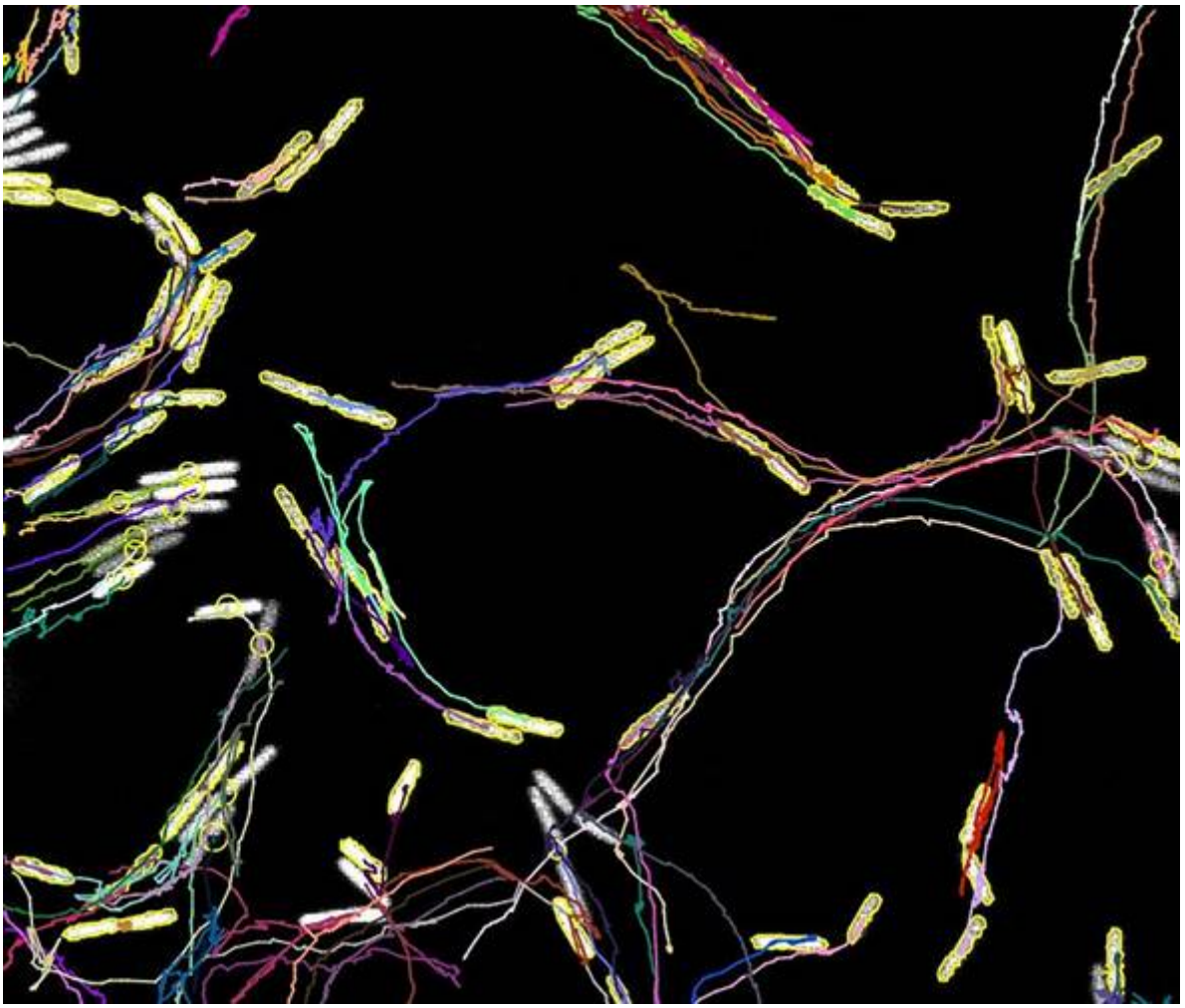

Foto: Se hace camino al andar. Celeste Dea. 1er puesto. Concurso fotográfico SAMIGE 20 años.

35 - Microbiología Ambiental, Agrícola y del Suelo

IMPACT OF NOVEL BIOINOCULANTS FOR AGRICULTURE ON THE MICROBIOTA WITHIN NITROGEN-FIXING NODULES OF SOYBEAN PLANTS.

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The intensive use of agrochemicals can significantly alter soil biodiversity, leading to a decline in beneficial microorganisms, reduced soil quality and fertility, and adverse effects on human health. Bioinoculants represent a viable alternative to mitigate soil stress, enhance crop yields, preserve native microorganisms, and reduce reliance on agrochemicals. Bioinoculants, in particular, can improve soil fertility by promoting Biological Nitrogen Fixation (BNF) in legume nodules. This study aimed to evaluate the effects of three novel bioinoculants on soybean nodulation and the microbiota within the nodules. Soybean seeds were inoculated with a commercial strain of Bradyrhizobium japonicum alongside one of the bioinoculants—Bio.R, Bio.C, or Bio.RC. For assessment, plants were sampled at different phenological stages (V3/V4, R1, and R6). Root size and nodule count were measured across 10 plants per treatment. For bacterial isolation, 10 nodules per treatment and phenological stage were selected. Phenotypic characterization was performed to evaluate the isolates' plant growth-promoting (PGP) traits. Additionally, in vitro biocompatibility was assessed between isolates exhibiting at least two PGP traits and the commercial *Bradyrhizobium* used in soybean cultivation. Significant differences in nodule count were observed between control plants and those treated with the bioinoculants, with these differences varying by phenological stage. A total of 132 isolates were obtained from nodules of both control and treated plants (Bio.R, Bio.C, and Bio.RC) at the V3/V4, R1 and R6 stages. Regarding PGP traits, 10% of the isolates produced the phytohormone indole acetic acid (IAA), 13% could solubilize phosphate, 25% produced siderophores, 55% fixed atmospheric nitrogen, and less than 21% exhibited pectinase, protease, and lipase activities. Most isolates demonstrated in vitro compatibility with the commercial *Bradyrhizobium*. Based on these findings, we conclude that both the bioinoculant used and the plant's phenological stage influence the dynamics of nodule microbiota, highlighting the importance of studying microbial interactions in these environments and their potential agricultural benefits.

Palabras clave: bioinoculants - biocompatibility - nitrogen fixation - microbiota - nodulation