Sociedad Argentina de Microbiología General

XIX CONGRESO DE LA SOCIEDAD ARGENTINA DE MICROBIOLOGÍA GENERAL

22 al 25 de octubre del 2024
Centro cultural y Pabellón Argentina de la Universidad Nacional de Córdoba, Córdoba, ARGENTINA.

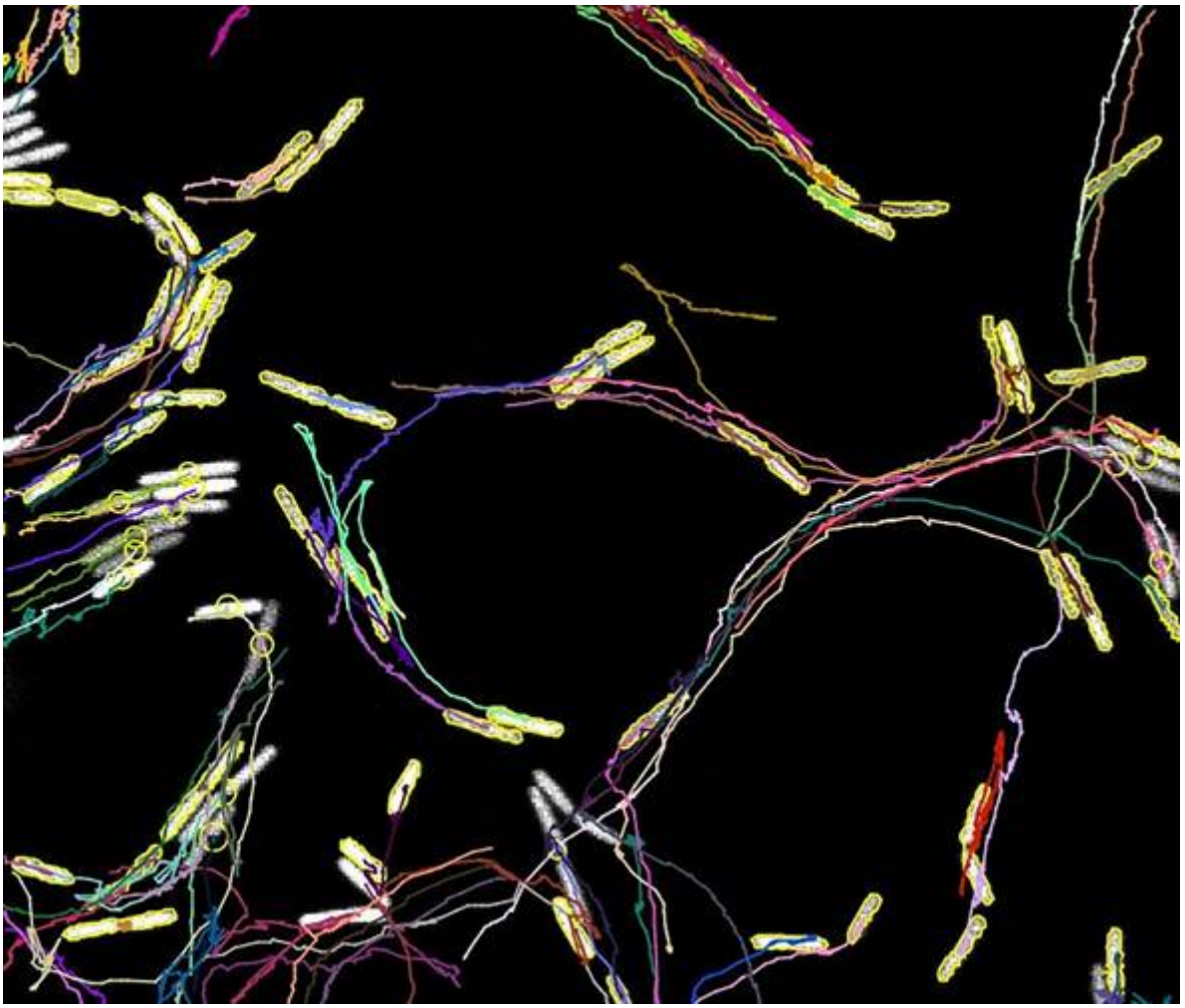

Foto: Se hace camino al andar. Celeste Dea. 1er puesto. Concurso fotográfico SAMIGE 20 años.

BIOLOGICAL CONTROL OF Phytophthora capsici IN PEPPER PLANTS BY THE PGPR Pseudomonas 42P4 NATIVE FROM MENDOZA

Pérez Rodriguez, María Micaela[1] - Barea, Valentina[1] - Lucero, Gabriela Susana [2] - Agaras, Betina[3,4] - Malovini, Emiliano[5] - Ventura, Pablo [5] - Cohen, Ana Carmen[1]

1) Laboratorio de Fisiología Vegetal y Microbiología, Instituto de Biología Agrícola de Mendoza (IBAM-CONICET), Facultad de Ciencias Agrarias, Universidad Nacional de Cuyo - Chacras de Coria - Mendoza - Argentina.
2) Laboratorio de Fitopatología, Instituto de Biología Agrícola de Mendoza (IBAM-CONICET), Facultad de Ciencias Agrarias, Universidad Nacional de Cuyo - Chacras de Coria - Mendoza - Argentina.
3) Laboratorio de Fisiología y Genética de Bacterias Beneficiosas para Plantas, Centro de Bioquímica y Microbiología de Suelos, Universidad Nacional de Quilmes - Bernal - Buenos Aires - Argentina.
4) CONICET - Buenos Aires - Argentina.
5) Tecnosiembra S.A. - Maipú - Mendoza - Argentina.
Contacto: acohen@fca.uncu.edu.ar

Plant pathogens cause the greatest economic losses to farmers. Frequently, there exists an irrational use of pesticides in order to control the plant pathogens, producing adverse effects on the environment and human health. Therefore, society has boosted the use of new technologies to give a solution in a sustainable manner. In this context, the Plant Growth-Promoting Rhizobacteria (PGPR) are a promising alternative considered as bioinputs and used to effectively control plant diseases. PGPR act as biocontrol agents by producing pathogen-antagonistic substances and by inducing systemic resistance in plants. The objective of the study was to evaluate the in vitro antagonistic activity of the native PGPR strain of Mendoza, *Pseudomonas* 42P4, against the pathogenic oomycete Phytophthora capsici; and then, to evaluate the effect of the inoculation of the PGPR on pepper seedlings infected with *P. capsici* under greenhouse conditions. To determine antagonistic activity, a disc of a 5 mm plug containing mycelia of *P. capsici* previously grown in PDA media for 5 days, was placed on the edge of a Petri dish. A strike from an overnight LB culture of *Pseudomonas* 42P4 was done as a line at the opposite edge. The assay was performed by incubating the plates at 28 °C for 7 days. Mycelium growth was determined digitally. A control plate (*P. capsici* alone) was included. The percentage of inhibition was calculated comparing with the control. In the greenhouse assay, the following treatments were applied to pepper seedlings: 1) Control, 2) *Pseudomonas* 42P4, 3) Chemical fungicide, 4) *P. capsici*, 5) *P. capsici* + *Pseudomonas* 42P4, 6) *P. capsici* + Chemical fungicide. *Pseudomonas* 42P4 was applied on the soil surface (20 days after seed sowing), *P. capsici* was applied using colonized millet seeds below the soil surface (30 days after seed

sowing) and fungicide was sprayed (foliar and on the soil, two days after pathogen inoculation). Physiological parameters were evaluated two months after seeds sowing. In the in vitro assay, *Pseudomonas* 42P4 inhibited the mycelial growth of *P. capsici* in the order of 41%. In the greenhouse assay, *P. capsici* reduced Root and Shoot Dry Weight (RDW and SDW), stem diameter, plant height and the maximum efficiency of photosystem II (Fv/Fm) compared to control seedlings. Interestingly, *Pseudomonas* 42P4 inoculation significantly reduced the disease incidence and increased RDW, SDW, stem diameter, plant height and Fv/Fm of infected *P. capsici* seedlings respect to infected *P. capsici* seedlings. Furthermore, *Pseudomonas* 42P4 inoculation significantly increased the growth of uninfected *P. capsici* seedlings. The results suggest that *Pseudomonas* 42P4 mitigates the negative effects of *P. capsici* on pepper seedlings, acting as a biocontrol agent and also as growht promoter. It is a promising candidate for the development of a bioinput to reduce the use of chemical pesticides contributing to the productive processes that promote sustainable development.

Palabras clave: Pseudomonas - Pepper - Phytophthora capsici - Biocontrol - PGPR