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.

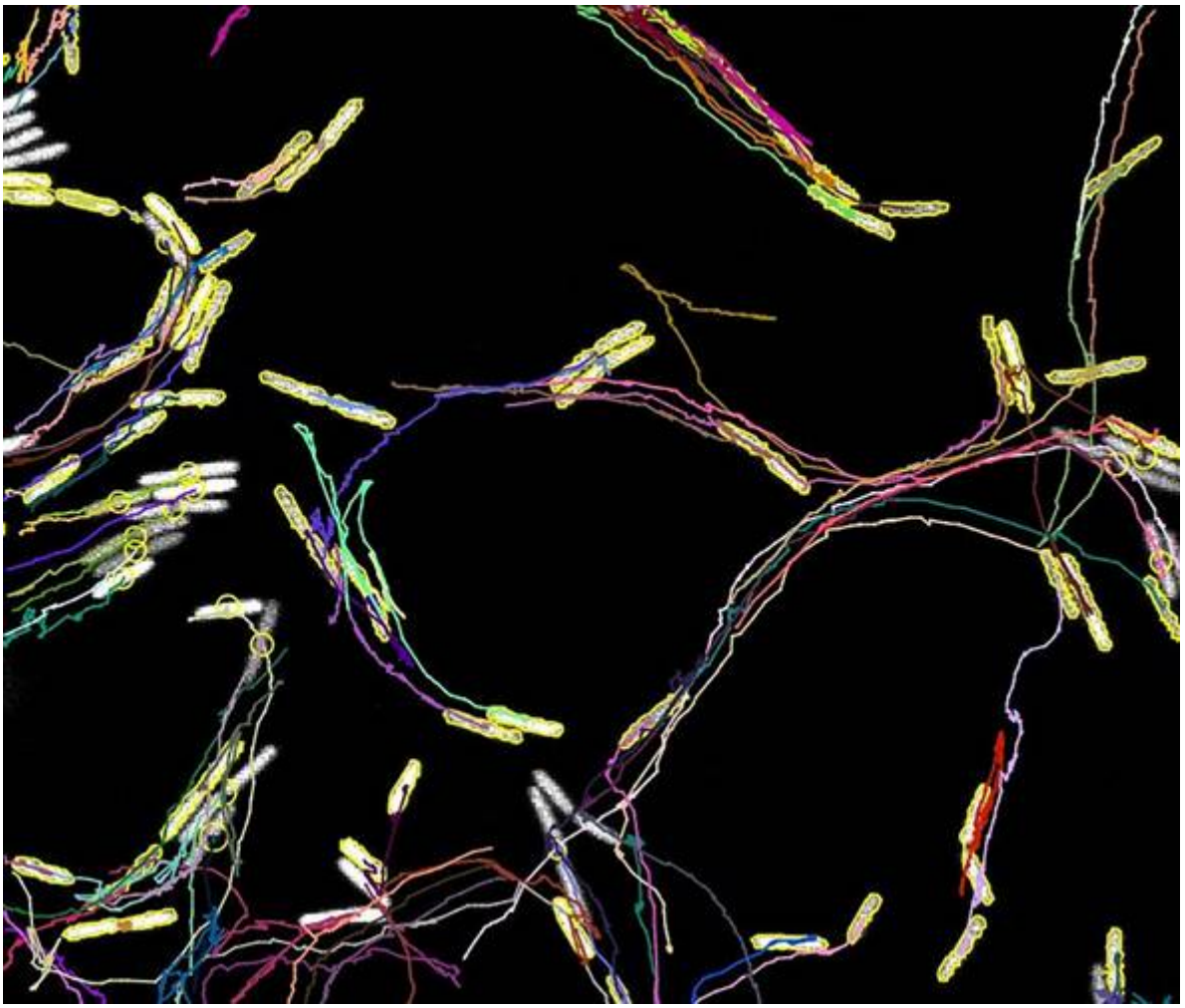

Foto: Se hace camino al andar. Celeste Dea. 1er puesto. Concurso fotográfico SAMIGE 20 años.

EVALUATION OF ZN SOLUBILIZING BACTERIA UNDER ABIOTIC STRESSES AND THEIR INTERACTION WITH RICE

Salazar, Andy[1] - Rodríguez A., Andrés[1] - Wyzz, Beatriz[1] - Duránd, Mariano[3] - Romero, Fernando Matías[2] - Maiale, Santiago[1]

1) Instituto Tecnológico de Chascomús, Laboratorio de Fisiología y Asistencia al Mejoramiento Vegetal-Ciudad de Chascomús-Buenos Aires-Argentina
2) Instituto Tecnológico de Chascomús, Laboratorio de Estrés Abiótico y Biótico en Plantas-Ciudad de Chascomús-Buenos Aires-Argentina
3) Estación Experimental Agropecuaria, INTA Concepción del Uruguay-Concepción del Uruguay-Entre Ríos-Argentina
Contacto: asalazartamayo@intech.gov.ar

Rice in Argentina is mainly produced in Entre Ríos, here crop has limitations due to several stresses, among them stands out the Zn deficit, low temperatures and salinity. We proposed the study of zinc solubilizing bacteria as an alternative to increase the rice productivity and to reduce chemical fertilization. Previously we have reported the isolation and characterization of Zn-solubilizing bacteria from rice rhizosphere and the selection of six isolates with high degree of Zn solubilization. Our goal in this work was to select among these isolates, the best in terms of tolerance to cold and salinity and to evaluate the interactions of these isolates with rice plants. Low temperature (16°C) and salinity (0.6 M NaCl) tolerance was evaluated by monitoring bacterial growth in vitro both alone and in combination. To evaluate the interactions with plants, rice seeds were disinfected and inoculated with a bacterial suspension for one hour. Then, seeds were grown in vitro until seedling stage. Bacterial colonization was evaluated on roots and leaves both as epiphytes and endophytes. Finally, we evaluate the interaction on growth chamber and determined plant growth and photosynthetic parameters. Our results showed that all six isolates were able to cope with low temperatures and salinity at different degrees. However, three out of six (50, 61 and 64) showed the highest tolerance in terms of colony size under cold and/or salinity. Colony size of these tolerant isolates was 22.1% higher than more sensible ones under cold. Under salinity, they were 24.6% higher for tolerant isolates. Finally, on combined stress conditions these isolates showed an increase in colony size in 50% compared to sensible ones. Moreover, when these isolates kept Zn solubilization ability even under stress conditions. To evaluate plant colonization capability of selected isolates, we took samples of roots and leaves from rice seedlings, so, we observed that both isolates analyzed were reisolated from roots surfaces, but not from leaves samples. Then, an endophytic lifestyle was evaluated by superficial disinfection of tissues and sample homogenization. Thus, we determined again that both isolates were able to grow endophytically on rice roots. Also, we determined interaction of these isolates with rice plants to determine their effect on plant performance. In

this way, we observed that plant inoculation didn´t affect neither biomass nor photosynthetic parameters. In conclusion we were able to identify isolates tolerant to cold and salinity, which is highly relevant if we keep in mind rice production system where these stresses are present at different stages. Moreover, our isolates maintain Zn-solubilizing ability under these stressful conditions. Also, selected isolates were able to colonize rice roots both as epiphytes and endophytes without showing detrimental effects on plants. These results indicates that these isolates are promising candidates for rice bioformulations.

Palabras clave: Low temperature – salinity - tolerant bacteria - bacterial growth - rice endophyte