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XIX CONGRESO DE LA SOCIEDAD ARGENTINA DE MICROBIOLOGÍA GENERAL

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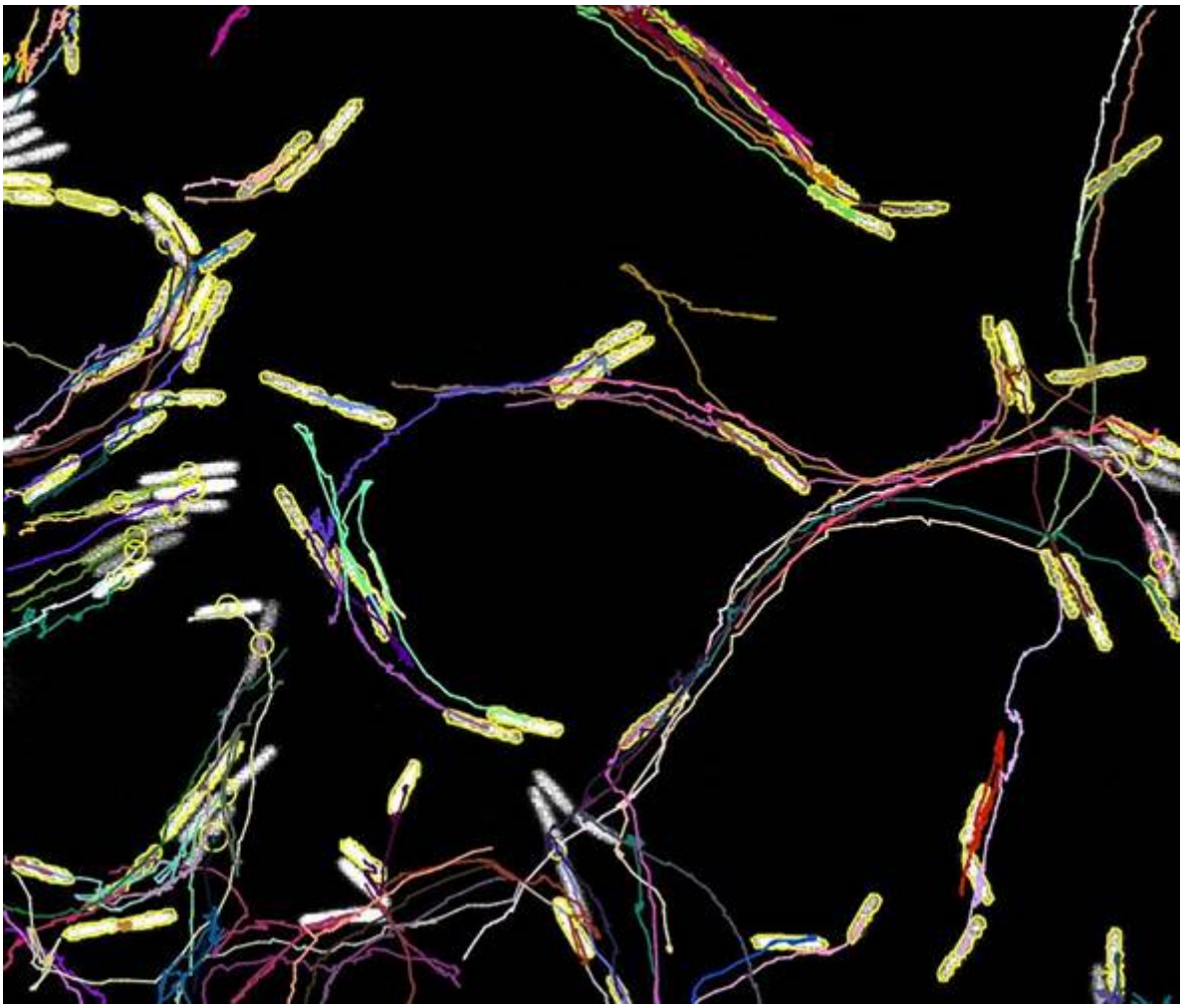

Foto: Se hace camino al andar. Celeste Dea. 1er puesto. Concurso fotográfico SAMIGE 20 años.

2 - Microbiología Molecular y Fisiología

RELATIVE EXPRESSION OF BIOFILM AND MOTILITY GENES IN TWO BIOCONTROL AGENTS ISOLATED FROM THE MAIZE PHYLLOSPHERE: Bacillus subtilis STRAIN EM-A7 AND Bacillus velezensis STRAIN EM-A8

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Maize (*Zea mays L*.), one of the main crops cultivated in Argentina, had an average annual yield of 47.5 million tons in 2023–2024. Exserohilum turcicum (Pass.) Leonard and Suggs (*Syn. Helminthosporium turcicum Pass.*), an important pathogen found on maize leaves, is the causal agent of the endemic disease known as Northern Corn Leaf Blight (NCLB), which produces significant leaf lesions and can decrease yield. According to studies in our laboratory, *Bacillus subtilis* strain EM-A7 and Bacillus velezensis strain EM-A8 were chosen for their effectiveness in reducing the severity of NCLB. We previously determined the effect of light quality on physiological parameter, and observed in vitro that biofilm formation and motility were modified in EM-A7 and EM-A8 by changing conditions of temperature, water potential, growth medium, time, and different light qualities. Some studies have reported that even non-phototrophic microorganisms can respond phenotypically to differences in light quality. We aimed to evaluate the relative expression (R) of the tasA, srfA, spoA, epsA, hag, and blsA genes, under different light qualities. Gene selection was performed according to their role in biofilm formation and motility. Light intensity was maintained at 460 ?mol $m^{?1}$ $s^{?2}$. Total RNA extraction was performed with Trizol under different experimental conditions: EM-A7 or EM-A8 were not exposed to any light sources, as a control, and strains were exposed to red or white light during 8 h in a liquid culture. Genomic DNA was removed from RNA samples using the DNase I, RNase-free. The High-Capacity cDNA Reverse Transcription Kit was used to obtain cDNA, and qPCR was using iTaq Universal SRYB Green 2x SuperMix kit in triplicate in two independent experiments. To determine the R of the genes for each strain under different light qualities, the CT value was used by the PfaffI method, and differences in the expression levels of the genes were analyzed with respect to the control by unpaired t-test. As a result, we observed that the R changed depending on the LED light to which strains were exposed. In EM-A7 the red light up-regulated the R of srfA, spoA, epsA, and hag genes, while the white LED up-regulated srfA and hag genes. These results suggest a positive effect of red light, which favors the R associated with biofilm formation or motility. These results were not observed in the EM-A8 strain, where exposure to red or white light downregulated the R of most of the genes evaluated. The expression of tasA and eps increased significantly compared to the control group

after exposure to both LED lights, which suggests that exposure to red or white light increases the R associated with biofilm formation in this strain. This study deepens knowledge about the effect of different light qualities on biofilm formation in phyllosphere isolates, where light could be a significant element to consider in the design of biocontrol strategies. Itmay enhance their chances of success in the field.

Palabras clave: Bacillus - expression relative – biofilm - light LED - biocontrol