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.

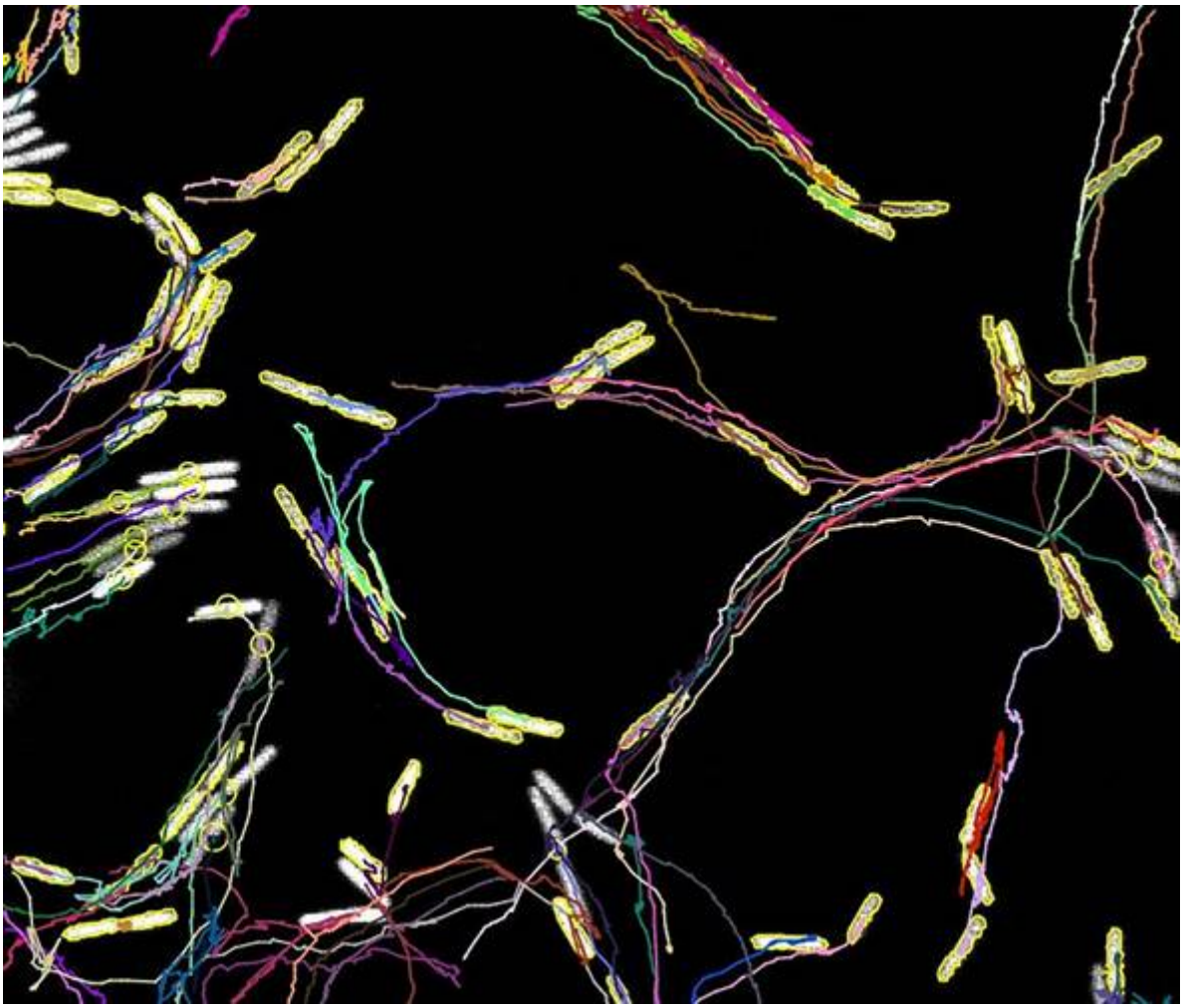

Foto: Se hace camino al andar. Celeste Dea. 1er puesto. Concurso fotográfico SAMIGE 20 años.

# EFFECT OF TYPE III SECRETION SYSTEM (T3SS) AND TYPE III EFFECTORS (T3Es) IN NODULATION OF CULTIVATED PEANUT AND WILD ARACHIS SPECIES

Silvestrin, Selena[1] - Angelini, Jorge[1] - Tonelli, María Laura[1] - Gully, Djamel[2] - Svistoonoff, Sergio[2] - Ibañez, Fernando[1]

1) Instituto de Investigaciones Agrobiotecnológicas, INIAB (UNRC-CONICET), Río Cuarto, Córdoba, Argentina.
2) Institut de Recherche pour le Développement (IRD), UMR PHIM IRD/INRAE/CIRAD/U.Montpellier/Institut Agro, Montpellier, Francia.
*Contacto: fibanez@exa.unrc.edu.ar*

The symbiotic relationship between bradyrhizobia and peanut represents a fascinating and complex model with significant agronomic and ecological importance. This relationship is highly specific and depends on perception of rhizobial Nod factors (NFs) and effectors secreted through a Type III Secretion System (T3SS). This T3SS functions as a nanosyringe structure that injects Type III Effectors (T3Es) into eukaryotic cells during interaction with the host, playing a crucial role during symbiosis and significantly influencing the outcome of the interaction. T3Es identified in rhizobia can act as double-edged swords, depending on the host legume species or even cultivar. They can promote symbiosis by suppressing the plant immune system or, if they are recognized by plant resistance proteins, they can trigger an immune response known as effector-triggered immunity (ETI), which can block rhizobial infection. This dual functionality highlights the complex interaction between rhizobia and their host plants, whereby the same effector proteins can facilitate or hinder symbiosis depending on the plant's immune recognition mechanisms. In this work, we used the genomic sequences of two native bradyrhizobial isolates (*Bradyrhizobium* sp. LH237 and *Bradyrhizobium* sp. CH81) to detect the presence of genes coding for T3SS structural components and T3Es. Results obtained showed that all the genes coding for the structural components required for T3SS apparatus assembly are conserved in the isolates. These genes are located in a common region in the chromosome of *B.* sp. LH237 and in a megaplasmid present in *B.* sp. CH81. A phylogenetic analysis of the marker gene *rhcN* confirmed the importance of horizontal gene transfer in modeling the symbiotic genome in bradyrhizobia. In addition, detection of T3Es through homology search and presence of a tts box indicated that both isolates display a similar array of effectors. Interestingly, the array of T3Es found in native isolates differs from the present in other peanut-nodulating non-native reference strains. Nodulation analysis revealed that both native isolates can efficiently nodulate cultivated peanut (*Arachis hypogaea* L.) and other wild species of the genus *Arachis* (*A. monticola*, *A. duranensis*, *A. ipaensis* and *A. stenosperma*). Taken together, the presence and conservation of T3SS in the genomes indicates the importance of

the secretion system in native isolates. Analysis of the arrays of T3Es in the different isolates suggests specific effectors that could be essential for efficient peanut nodulation or determinants of the host range. Further inoculation assays and determination of the nodulation ability of reference strains in wild species of the genus *Arachis* will help to elucidate the evolution and significance of T3SS and the role of specific T3Es in the symbiotic peanut-bradyrhizobia interaction. Supported by UNRC, ANPCyT, CONICET.

Palabras clave: Arachis - Bradyrhizobium - Symbiosis - Type III Secretion System (T3SS)- Effectors