

## **Symbiotic Signaling and Nodulation Ability of six *Frankia* Strains Isolated from Nodules of *Casuarinaceae* Trees in Egypt**

Samira Mansour<sup>1</sup>, Aya Ahmed<sup>1</sup>, Jocelyne Bonneau<sup>2</sup>, Daniel Moukouanga<sup>2</sup>,  
Hassen Gherbi<sup>2</sup>, Didier Bogusz<sup>2</sup> and Claudine Franche<sup>2\*</sup>

<sup>1</sup>*Botany Department, Faculty of Science, Suez Canal University, Ismailia, Egypt.*

<sup>2</sup>*Equipe Rhizogènèse, UMR DIADE (IRD, UM2), Institut de Recherche pour le Développement, 911 Avenue Agropolis, BP64501  
34394 Montpellier Cedex 5, France.*

*\*Email: Claudine.franche@ird.fr*

### **Abstract**

The objective of the project that is currently developed between Canal Suez University in Ismailia in Egypt and IRD Montpellier in France, is to study a collection of Egyptian *Frankia* strains for their potential to produce symbiotic factors contributing to an optimal dialogue with the plant root system.

To achieve this goal, transgenic *C. glauca* plants that express the reporter gene  $\beta$ -glucuronidase (*gus*) under the control of the symbiotic promoter *CgCCaMK* (Svistoonoff et al., 2013) have been obtained. *CgCCaMK* encodes a calcium/calmodulin-dependent kinase that is essential for *Frankia* root hair infection and for its intracellular progression through the actinorhizal nodule. In transgenic *C. glauca*, the Pro*CgCCaMK-gus* construct is induced in lateral roots during the perception stage of the reference strain *Frankia* Ccl3, and responds to *Frankia* Ccl3 supernatants containing the still unknown Root Hair Deforming Factor(s) (unpublished data, Rhizogenesis team).

Inoculations of transgenic *gus*-plants were performed with six different *Frankia* strains isolated from actinorhizal nodules in Egypt. A kinetic of nodulation was also established for all strains and the number of nodules were counted two months following *Frankia* inoculation. Two strains, named 15(6) and Manef 4, were found to induce a strong reporter gene activity during the early stages of the symbiotic process. The largest number of nodules (more than 60 nodules per plant) was obtained with the strain 15(6).

From these data, *Frankia* strains that will be the most appropriate for degraded areas in Egypt are expected to be identified.

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