

## UMR LSTM

**Laboratory of tropical and Mediterranean symbioses** (Laboratoire des symbioses tropicales et méditerranéennes)

**Director**  
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### Research area

The **JRU Laboratory of tropical and Mediterranean symbioses (LSTM)** is centred on the characterisation and analysis of the biodiversity of symbiotic microorganisms and on gaining understanding of the molecular mechanisms involved in plant/bacterium interactions. The main lines addressed are the characterisation of the biodiversity of symbioses in Mediterranean and tropical ecosystems and understanding the structure and evolution of the genetic diversity of symbiotic bacterial populations, the development of a genomic technique for photosynthetic *Bradyrhizobium*, characterisation of a new symbiotic pathway and the decoding of plant signalling pathways in response to bacteria.

Website: <http://www.mpl.ird.fr/lstm/>

### Research highlights

The scientific targets of the LSTM include undertaking fundamental and applied research on the biology, ecology and use of plant-microorganism symbioses in tropical and Mediterranean areas. During the last years, the LSTM major results have contributed to the international repute of the unit, such as the discovery of symbiotic beta-proteobacteria, the description of the phytochrome and photosystem synthesis in an anoxygenic bacteria, discovery of new recognition mechanisms between plant and bacteria, and more generally several studies including bacterial diversity and relationships among plant, bacteria and fungi in various ecological frame.

### Staff profile

	Total permanent staff	Total Scientists*	Scientists with "HDR" <sup>1</sup>	Post-doc fellows	PhD students
Staff	<b>36</b>	<b>26</b>	<b>13</b>	<b>1</b>	<b>7</b>

\*Scientists per member institution: 5 CIRAD, 2 INRA, 1 Montpellier SupAgro, 13 IRD, 4 UM II, 1 Univ. Antilles-Guyane

### Research teams

- Ecology and molecular physiology of photosynthetic Bradyrhizobia
- Biodiversity and symbiosis evolution
- Plant response to microorganisms
- Plant and microorganism adaptation to nickel
- Functioning of ecosystems

### Most important international partnerships

Microbiology Laboratory, University Cheikh Anta Diop, Dakar, Senegal  
National Center for Soybean Biotechnology, Department of Molecular Microbiology and Immunology, University of Missouri, USA.  
Rhizobiology Laboratory, University of Oran Es-Senia, Algeria  
Symbiosis and Environment Unit, University Caddi Ayyad, Marrakech, Morocco.

### Facts and figures

#### Publications in international ranking journals

- ❖ 2007 : 32
- ❖ 2006 : 32
- ❖ 2005 : 40

<sup>1</sup> French university degree for confirmed thesis supervisor

## Representative publications

Giraud E., Moulin L., D. Vallenet, V. Barbe, E. Cytryn, J-C. Avarre, M. Jaubert, D. Simon, F. Cartieaux, Y. Prin, G. Bena, L. Hannibal, J. Fardoux, M. Kojadinovic, L. Vuillet, A. Lajus, S. Cruveiller, Z. Rouy, S. Mangenot, B. Segurens, C. Dossat, W. L. Franck, W-S. Chang, E. Saunders, D. Bruce, P. Richardson, P. Normand, B. Dreyfus, D. Pignol, G. Stacey, D. Emerich, A. Vermeglio, C. Medigue, And M. Sadowsky. (2007). Legumes Symbioses: Absence of *Nod* Genes in Photosynthetic Bradyrhizobia. *Science* 316: 1307-1312

Bailly X, I Olivieri, B Brunel, J-C Cleyet-Marel, and G Béna. (2007). Horizontal gene transfer and homologous recombination drive the evolution of the nitrogen-fixing symbionts of *Medicago* species. *J. Bacteriol* 189: 5223-5236.

Duponnois, R., Plenchette, C., Prin, Y., Ducouso, M., Kisa, M., Bâ, A.M. & Galiana, A. (2006). Use of mycorrhizal inoculation to improve reforestation process with Australian *Acacia* in Sahelian ecozones. *Ecological engineering*. 29: 105-112.

Rasolomampianina, R., Bailly, X., Fetiaron, R., Rabevohitra, R. Bena, G., Ramarason, L., Raherimandimby, M. Moulin, L., De Lajudie, P., Dreyfus, B., Avarre, J.C. (2005). Nitrogen fixing nodules from rose wood legume trees (*Dalbergia* spp.) endemic to Madagascar host seven different genera belonging to  $\alpha$  and  $\beta$ -proteobacteria. *Molecular Ecology*. 14: 4135-4146.

Mantelin, S., Desbrosses, G., Larcher, M., Tranbarger, T., Cleyet-Marel, J.C., Touraine, B. (2006). Nitrate Dependent control of root architecture and N nutrition are altered by a plant growth-promoting *Phyllobacterium* sp. *Planta*. 223: 591-603.

## Total annual budget

	<b>2006</b>	<b>2007</b>
Total annual budget (k€- <u>excluding</u> salaries)	238 045	227 359
External contracts (k€):		
ANR	40 598	138 425
EU	16 401	
Private sector		
Others	49 643	60 790