MINISTERIO DE CIENCIA, INNOVACIÓN Y UNIVERSIDADES

CURRICULUM VITAE (maximum 4 pages)

Part A. PERSONAL INFORMATION

CV date	23/01/2023

First and Family name	Jose Manuel Palacios Alberti		
Social Security, Passport, ID number		Age	
Researcher numbers	Researcher ID	K-1435-2017	
	Orcid code	0000-0002-2541-8812	

A.1. Current position

University/Institution	Universidad Politécnica de Madrid		
Department	Centro de Biotecnología y Genómica de Plantas		
Address and Country	Campus de Montegancedo, 28223 Pozuelo de Alarcón		
Phone number	910679184	E-mail	jose.palacios@upm.es
Current position	Full professor	From	July 2010
UNESCO code	2403, 2414, 2415		
Keywords	Nitrogen fixation, rhizobium, symbiosis, stress response		

A.2. Education

Degree/PhD	University	Year
Ingeniero Agrónomo	Universidad Politécnica de Madrid	1983
Doctor Ingeniero Agrónomo	Universidad Politécnica de Madrid	1988

A.3. JCR articles, h Index, thesis supervised…

I have authored over 60 papers in JCR journals, 32 of which are in Q1 in JCR classification. These publications have collected over 1,200 citations, with an average of 40 citations/year in the last 5 years, and a h-index is 20. Currently, I have been recognized six 5-year periods of teaching activity and five 6-year terms of research activity, the last one obtained at the end of 2014. In the last 10 years I have supervised 2 PhD thesis.

Part B. CV SUMMARY *(max. 3500 characters, including spaces)*

Born in Madrid on 20-02-1960, I obtained the degree of Agriculture Engineer in 1983 from the Polytechnic University of Madrid, where I also did the Doctoral Thesis (1988). I was appointed as Assistant Professor in 1989, Associate Professor in 1990, and as a Full Professor at the same University in 2010. I spent time at the Universities of California in San Diego (1987, Dr. D. Helinksy) and at the University of Missouri at Columbia (Dr. Polacco, 2001). I have had and maintain collaborative links with researchers from France (M.A Mandrand-Berthelot, P Mergaert), UK (Dr. P.S. Poole) and Algeria (F. Boulila).

Regarding **teaching activities**, I have taught the following topics: Microbiology, Agricultural Microbiology, Food Microbiology, Design of New Foods, and Applications of Rhizobacteria.

In relation to my **research activity**, I have participated in 26 national and international research projects, being Principal Investigator in 8 of them. My research work has focused on the symbiosis Rhizobium-legume, a basic tool for a rational and sustainable nitrogen fertilization of crops. One of the main focus my work has been the genetic and functional characterization of the hydrogen recycling system constituted by a hydrogenase of endosymbiotic bacteria. This line of research has included basic aspects related to the characterization of proteins involved in the biosynthesis of their metal centers and the regulation of their expression (Palacios et al., 1990; 2005). I have also worked on applied aspects such as the development of a transposon capable of transferring to other bacteria the region of DNA that contains the genes necessary for its synthesis (Bascones et al., 2000). This particular development gave rise to a PCT patent. I studied the protein export system TAT, essential for the export through the membrane of folded enzymes such as hydrogenase and other enzymes of symbiotic interest (Meloni et al., 2003). Other aspects of my work have contributed to the elucidation of metal (nickel) supply systems for the synthesis of hydrogenase and urease, having described the main nickel transport system in *R. leguminosarum* (Brito et al., 2010; Albareda et al., 2015). Following a paper on the physiological bases

of host-effect (Brito et al., 2008) we described the dependency on the host of nickel provision to hydrogenase (Brito et al., 2010; Albareda et al, 2015; Rodrigue et al., 2017), and also the nickel speciation within nodules (Cacho et al., 2010).

I have also studied nickel and cobalt export systems as protective mechanisms in conditions of excess of these metals (Rubio-Sanz et al, 2013; 2018). The work on the hydrogenase provided the first data on the mechanism responsible the host-specific expression of *Rhizobium* proteins (Brito et al., 2008) previously described in our laboratory, and that are somehow continued in this research proposal. More recently, I have participated in the description of new symbiotic systems based on little-studied legumes such as *Lupinus* (Ahnia et al., 2018). These works have been carried out in collaboration with research groups in Algeria and Tunisia.

Currently I am focused on the study of functions of the bacterium and the plant for the adaptation between both symbionts in the nodule, with the ultimate purpose of contributing to the design of symbiotic *Rhizobium*-legume systems more specific and effective, which could be useful for the development of new legume inoculants.

Part C. RELEVANT MERITS

C.1. Relevant Publications (including books) of the last 10 years

De Sousa, BFS, Domingo-Serrano, L., Salinero-Lanzarote, A., , Palacios, J.M. and Rey, L. (2023). The T6SS-dependent effector Re78 of *Rhizobium etli* Mim1 benefits bacterial competition" *Biology* 12, no. 5: 678. doi: 10.3390/biology12050678

Ballesteros-Gutiérrez M, Albareda M, Barbas C, López-Gonzálvez Á, Dunn MF and Palacios JM (2023). A host-specific diaminobutyrate aminotransferase contributes to symbiotic performance, homoserine metabolism, and competitiveness in the *Rhizobium leguminosarum/Pisum sativum* system. *Frontiers in Microbiology* 14:1182563. doi: 10.3389/fmicb.2023.1182563

Durán, D., Albareda, M., García, C., Marina, A.I., Ruiz-Argüeso,T., J.M. Palacios, J.M. (2021) Proteome analysis reveals a significant host-specific response in Rhizobium leguminosarum bv viciae endosymbiotic cells, Molecular & Cellular Proteomics (in press) https://doi.org/10.1074/mcp.RA120.002276.

Jorrín, B., **Palacios, J.,** Peix, A., Imperial, J. (2020) *Rhizobium ruizarguesonis* sp. nov., isolated from nodules of *Pisum sativum* L. Systematic and Applied Microbiology 43:126090. doi: 10.1016/j.syapm.2020.126090

Torres AR, Brito B, Imperial, J, Palacios, JM, Ciampitti, IA, Ruiz-Argüeso, T, Hungria, M (2020) Hydrogen-uptake genes improve symbiotic efficiency in common beans (Phaseolus vulgaris L.). M. Antonie van Leeuwenhoek (in press) **DOI:** 10.1007/s10482-019-01381-6

Albareda, M., Pacios, LF, and **Palacios J.** (2019) Computational analyses, molecular dynamics, and mutagenesis studies of unprocessed form of NiFe hydrogenase reveal the role of disorder for efficient enzyme maturation. BBA-Bioenergetics 1860:325-340. doi: 10.1016/j.bbabio.2019.01.001

Salinero-Lanzarote, A., Alba Pacheco-Moreno, A., Domingo-Serrano, L., Durán, D., Ormeño-Orrillo, E., Martínez-Romero, E., Albareda, M., **Palacios, J**, Rey, L. (2019) The Type VI secretion system of *Rhizobium etli* Mim1 has a positive effect in symbiosis, FEMS Microbiology Ecology 95: fiz054 doi: 10.1093/femsec/fiz054

Rubio-Sanz, L., Brito, B., and **Palacios, J** (2018) Analysis of metal tolerance in *Rhizobium leguminosarum* strains isolated from an ultramafic soil, *FEMS Microbiology Letters*, 365, fny010. doi:10.1093/femsle/fny010

Sánchez-Cañizares, C.; Jorrín, B.; Durán, D.; Nadendla, S.; Albareda, M.; Rubio-Sanz, L.; Lanza, M.; González-Guerrero, M.; Prieto, R.I.; Brito, B.; Giglio, M.G.; Rey, L.; Ruiz-Argüeso, T.; **Palacios, J.M**.; Imperial, J. (2018). Genomic Diversity in the Endosymbiotic Bacterium *Rhizobium leguminosarum*. *Genes 9*, 60. doi: 10.3390/genes9020060

Msaddak A, Duran D, Rejili M, Mars M, Ruiz-Argüeso T, Imperial J, **Palacios** J, Rey L (2017): Diverse Bacteria Affiliated with the Genera Microvirga, Phyllobacterium, and Bradyrhizobium Nodulate Lupinus micranthus Growing in Soils of Northern Tunisia. *Applied and Environmental*

Microbiology , 83:e02820-16. doi: 10.1128/AEM.02820-16

Rodrigue, A., Albareda, M., Mandrand-Berthelot, MA, **Palacios, J**. (2017). Nickel in Microbial Physiology – from Single Proteins to Complex Trafficking Systems: Nickel Import/Export. pp237-258 en The Biological Chemistry of Nickel (Zamble, D., Rowińska-Żyrek, M., and Kozlowski H., eds.) Royal Society of Chemistry, ISBN 978-1-78262-498-1

Albareda, M., Rodrigue, A., Brito, B., Ruiz-Argüeso, T., Imperial, J., Mandrand-Berthelot, M.A., **Palacios**, J.M. (2015) *Rhizobium leguminosarum* HupE is a highly-specific diffusion facilitator for nickel uptake. *Metallomics* 7:691-701. doi: 10.1039/c4mt00298a

Albareda M, Pacios, L.F., Manyani H, Rey, L. Imperial J, Brito B, Ruiz-Argueso T, **Palacios JM.** (2014) Maturation of *Rhizobium leguminosarum* Hydrogenase in the Presence of Oxygen Requires the Interaction of the Chaperone HypC and the Scaffolding Protein HupK. *Journal of Biological Chemistry* 289:21217-21229.

Rubio-Sanz L, Prieto RI, Imperial J, **Palacios JM**, Brito B. (2013). Functional and Expression Analysis of the Metal-Inducible dmeRF System from *Rhizobium leguminosarum* bv. viciae. *Applied and Environmental Microbiology* 79**:**6414-22.

Sanchez-Cañizares C, **Palacios J.** (2013). Construction of a marker system for the evaluation of competitiveness for legume nodulation in *Rhizobium* strains. *Journal of Microbiological Methods* 92:246-249.

Albareda M, Manyani H, Imperial J, Brito B, Ruiz-Argüeso T, Bock A, **Palacios JM.** (2012). Dual role of HupF in the biosynthesis of [NiFe] hydrogenase in *Rhizobium leguminosarum*. *BMC Microbiology* 12**:**256.

C.2. Research projects and grants

Mecanismos para la adaptación de los rizobios a la simbiosis con plantas leguminosas (RhizoAdapt). Período 2019-2021. Entidad financiadora: MCU. Dotación: 125.000 € Referencia RTI2018-094985.

Host- and bacterial factors relevant for the interaction of Rhizobia with eukaryotic hosts. Período: 2019-2021 I.P. Jose M. Palacios Entidad Financiadora Programa Excelencia Severo Ochoa CBGP- MINECO. Dotación: 36000 € Referencia **EoI-TSP3-01-CBGP**

Señalización planta-bacteria en las fases avanzadas de la interacción *Rhizobium*-leguminosa (SYMBIOSIGNAL). Período 2014-2016. I.P. Jose M. Palacios Alberti. Entidad financiadora: MINECO. Dotación: 125.000 € Referencia BIO2013-43040-P.

Metales y metaloenzimas en bacterias endosimbióticas de leguminosas: mecanismos de homeostasis e incorporación de metales (RHIZOMETAL). Período: 2011-2013. I.P. Jose M. Palacios Alberti. Entidad financiadora: MICINN. Dotación: 169.400 € Referencia: BIO2010-15301.

Biotecnología del metabolismo de hidrógeno y oxígeno para la mejora de inoculantes de leguminosas I.P. Jose M. Palacios Alberti Período: 2007-2010 Entidad financiadora: DGI-MEC. Dotación: 327.250 € Referencia: BIO2007-64147

C.3. Contracts

C.4. Patents

Inventors: E. Báscones, J.M. Palacios, T. Ruiz-Argüeso, J. Imperial

Título: Método para la incorporación estable de la capacidad de oxidación de hidrógeno a bacterias Gram negativas
N. de solicitud: P9902819 Country of priority: Spain
Date: 22/12/1999
Organizations: UPM/CSIC

Other merits

- Secretary of the Department of Biotechnology between 2004 and 2007
- Coordinator of the UPM's Degree in Biotechnology at the UPM from 2011 to 2015. Since Head of the Department of Biotechnology-Plant Biology since October 2017.
- Vicepresident of SEM's working Group on Plant Microbiology
- Reviewer of several microbiology journals (Applied and Environmental Microbiology, Molecular Microbiology, FEMS letters).
- Evaluation of research proposals for national and international agencies (ANEP, BBSRC, FONDECYT)
- Organizer of the XI European Nitrogen Fixation Conference (Tenerife, 2014)
- Member of ASM, SEM and SEFIN.

2 thesis supervised in the lasta 10 years (and one in progress on its fourth year)

- **Laura Rubio Sanz** (2014) "Análisis molecular de sistemas génicos implicados en las homeostasis de níquel y eficiencia simbiótica en *Rhizobium leguminosarum*" Supervised by Belen Brito and José M. Palacios. Sobresaliente. Currently she leads a Torres-Quevedo project.

  Publications: Sánchez-Cañizares, C.; Jorrín, B.; Durán, D.; Nadendla, S.; Albareda, M.; **Rubio-Sanz, L.**; Lanza, M.; González-Guerrero, M.; Prieto, R.I.; Brito, B.; Giglio, M.G.; Rey, L.; Ruiz-Argüeso, T.; Palacios, J.M.; Imperial, J. (2018). Genomic diversity in the endosymbiotic bacterium *Rhizobium leguminosarum*. *Genes* **2018**, *9*, 60.

  Rubio-Sanz, L., Brito, B., Palacios, JM (2018) Analysis of metal tolerance in *Rhizobium leguminosarum* strains isolated from an ultramafic soil, *FEMS Microbiology Letters*, 365, fny010.

  Rubio-Sanz L, Prieto RI, Imperial J, Palacios JM, Brito B. (2013). Functional and expression analysis of the metal-inducible *dmeRF* system from *Rhizobium leguminosarum* bv. viciae. Applied and Environmental Microbiology **79:**6414-22.

- **Carmen Sanchez Cañizares** (2013). "Análisis genómico y funcional de los sistemas de quórum sensing en *Rhizobium leguminosarum*" Supervised by Jose M. Palacios, Sobresaliente cum laude, mención internacional. Currently she is post-doctoral and fellow at Queen's College in the University of Oxford.

  Publications: **Sanchez-Cañizares C**, Palacios J. (2013). Construction of a marker system for the evaluation of competitiveness for legume nodulation in rhizobium strains. Journal of Microbiological Methods 92:246-249.

  Sánchez-Cañizares, C.; Jorrín, B.; Durán, D.; Nadendla, S.; Albareda, M.; Rubio-Sanz, L.; Lanza, M.; González-Guerrero, M.; Prieto, R.I.; Brito, B.; Giglio, M.G.; Rey, L.; Ruiz-Argüeso, T.; Palacios, J.M.; Imperial, J. (2018). Genomic Diversity in the Endosymbiotic Bacterium *Rhizobium leguminosarum*. *Genes* **2018**, *9*, 60.

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