MINISTERIO
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AGENCIA
ESTATAL DE
INVESTIGACIÓN

CURRICULUM VITAE ABREVIADO (CVA)

IMPORTANT – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.

Part A. PERSONAL INFORMATION

First name	Jose Manuel		
Family name	Palacios Alberti		
Gender (*)	Male	Birth date (dd/mm/yyyy)	
Social Security, Passport, ID number		URL Web	
e-mail			
Open Researcher and Contributor ID (ORCID) (*)	Researcher ID K-1435-2017, ORCID 0000-0002-2541-8812		

(*) Mandatory

A.1. Current position

Position	Full professor			
Initial date	July 2010			
Institution	Universidad Politécnica de Madrid			
Department/Center	Biotechnology-Plant Biology	Center for Plant Biotechnology and Genomics		
Country	Spain		Teleph. number	910670703
Key words	Nitrogen fixation, rhizobium, symbiosis, stress response			

A.2. Previous positions (research activity interuptions, indicate total months)

Period	Position/Institution/Country/Interruption cause
1984-1988	PhD student
1987	Visiting scholar/University California/San Diego/California/USA (3 months)
1989-1990	Associated profesor/UPM/Madrid/Spain
1990-2010	Assistant profesor/UPM/Madrid/Spain
2001	Visiting scientist /University Missouri Columbia/Missouri/USA (1.5 months)
2010-now	Ful lprofessor at UPM/Madrid/Spain

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Ingeniero Agrónomo	Universidad Politécnica de Madrid	1983
Doctor Ingeniero Agrónomo	Universidad Politécnica de Madrid	1988

(Include all the necessary rows)

Part B. CV SUMMARY *(max. 5000 characters, including spaces)*

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), Canada (Dr. P. Constant) and Algeria (F. Boulila), .

Regarding **teaching and management activities**, I have taught the following topics: Microbiology, Agricultural Microbiology, Food Microbiology, Design of New Foods, and Applications of Rhizobacteria. I have been Head of the Biotechnology-Plant Biology Department (2018-2021) and since 2021 I am the Dean of the School for Agriculture, Food and Biosystems Engineering at the Universidad Politécnica de Madrid.

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 Rhizobium-legume symbiosis, a basic tool for a rational and sustainable nitrogen fertilization of crops. 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. Currently, I have been recognized with six 5-year periods of teaching activity and six 6-year terms of research activity, the last one obtained at the end of 2020. I have supervised a total of 10 Doctoral Thesis, 5 of them co-supervised with other members of the lab. All 10 doctors are currently working in fields related to science as university professors (3), research (1), teaching (2), technical managers in the administration (2) or as consultors in the agro- or biotech market (2).
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 participated in basic and applied studies on the role of rhizobial protein secretion systems, (namely T6SS) for the symbiosis, which have allowed to ascertain the relevance of secretion of effectors through this system in several symbioses (Salinero-Lanzarote et al., 2019; de Sousa et al., 2023).

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, and useful for the development of new legume inoculants (Durán et al., 2021; Ballesteros et al., 2023). We are now starting to study the function of a stress proteins on the homeostasis of proteins relevant for symbiotic nitrogen fixation such as nitrogenase (Domingo-Serrano et al., 2024) and a high affinity zinc transport system (Soldek et al., ms in preparation).

Part C. RELEVANT MERITS *(sorted by typology)*

C.1. 10 more relevant publications *(see instructions)*

Domingo-Serrano, L., Sanchis-López, C., Alejandre, C., Soldek, J., Palacios, J. M., & Albareda, M. (2024). A microaerobically induced small heat shock protein contributes to Rhizobium leguminosarum/Pisum sativum symbiosis and interacts with a wide range of bacteroid proteins. *Applied and Environmental Microbiology*, e01385-24.

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

Álvarez-Aragón, R., **Palacios, J.M.**, Ramirez-Parra, E. (2023). Rhizobial symbiosis promotes drought tolerance in Vicia sativa and Pisum sativum. Environmental and Experimental Botany 105268. DOI: 10.1016/j.envexpbot.2023.105268

Durán, D., Albareda, M., García, C., Marina, A.I., Ruiz-Argüeso,T., **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.

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

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, 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. **Congress,** indicating the modality of their participation (invited conference, oral presentation, poster)

Over 120 contributions to national and international congresses

C.3. Research projects, indicating your personal contribution. In the case of young researchers, indicate lines of research for which they have been responsible.

Nuevos mecanismos de adaptación de los rizobios a la simbiosis (RhizoAds) . 01/09/2022 al 31/08/2025. **I.P. Jose M. Palacios Alberti**. Entidad financiadora: AEI, Spain. Total funding: *205.700,00 €*. Ref. PID2021-124344OB-I00

Mecanismos para la adaptación de los rizobios a la simbiosis con plantas leguminosas (RhizoAdapt). Período 2019-2021. **IP: J. M. Palacios Alberti**. 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.4. Contracts, technological or transfer merits, Include patents and other industrial or intellectual property activities (contracts, licenses, agreements, etc.) in which you have collaborated. Indicate: a) the order of signature of authors; b) reference; c) title; d) priority countries; e) date; f) Entity and companies that exploit the patent or similar information, if any.

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