

## CURRICULUM VITAE



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### MOST RELEVANT CONTRIBUTIONS RELATED TO FOREST MYCOLOGY

***Management of the Centre for Forestry Research in Valonsadero belonging to the Regional Government of Castilla y León.***

The Centre for Forestry Research of Valonsadero was an organisational unit dependent on the Directorate-General of the Environment of the Regional Government of Castilla y León and had been running for 25 years before it was closed on 30 June 2012 as a result of the financial crisis. It had been the designated centre for forestry research and experimentation as laid out in the regional forestry management plan.

From May 2007 to June 2011 I divided my time between research and management of the Centre for Forestry Research of Valonsadero. During my role as manager, 1.2 million-euros-worth of competitive research funds from national and European R&D programmes were awarded to Castilla y León, 75% of which were for forest mycology and trufficulture projects. I led and developed the work of twelve people, attracting eleven competitive research projects and writing 14 publications in international science journals, 47 publications in Spanish journals and three books. As a centre, we participated in 18 international conferences and 15 final-year projects, advanced study diplomas and doctoral theses, as well as organising four international science workshops and three Spanish and international working groups. At the same time, I provided many services to the forestry sector, mainly related to forest mycology, genetic improvement of forest species, forest soils and silviculture.

Managing the Centre for Forestry Research of Valonsadero allowed me to consolidate a strong network of contacts belonging to other Spanish and international research groups including CIFOR-INIA (Spain), Forest Sciences Centre of Catalonia (Spain), IRTA-Catalonia (Spain), CSIC (Spain), WSL (Switzerland), University of Murcia (Spain), University of Valladolid (Spain), University of Navarra (Spain), University of Laval (Canada), INRA Bordeaux (France), INRA Nancy (France), CIFA Lourizán (Spain), University of Lleida (Spain), CITA (Spain), Canadian Forest Service (Canada), National Autonomous University of Mexico, Metla (Finland), University of Munich (Germany).

***Management as Scientific Director of the mycological programme in Castilla y León.***

Since 2001 I have been a co-researcher and, as of 2008, the Scientific Director of the Mycology Programme for Castilla y León. This programme, made up of several projects financed by the European Union ([www.myas.info](http://www.myas.info)), the Regional Government of Castilla y León ([www.micodata.es](http://www.micodata.es), [www.myasrc.es](http://www.myasrc.es)) and seven provincial councils of Castilla y León, has an overall budget of 6.5 million euros and has been focusing on four main areas for the past twelve years: 1) research to increase knowledge of mycological resources and their sustainable use; 2) planning and regulation of harvesting and sale of edible wild mushrooms; 3) training and professionalism for those making use of mycological resources; 4) development of mycotourism in rural areas.

The programme currently has more than 320,000 hectares of woodland attached to it, in which mushroom harvesting is regulated and controlled. This has made a significant contribution to the rural areas of Castilla y León, all as a result of research, and has managed to provide a structure to the sector using mycological resources. This region's mycological sector generates a total estimated value of 65 million euros which breaks down into 40% added by mycotourism, 40% by companies selling mushrooms and 20% of direct income generated by buying and selling from harvesters.

<p><b>Coordination of the European network Micosylva for sustainable forest management of mycological resources and their socio-economic value</b></p>	<p>In 2009 I founded the international network which I still coordinate within the European framework Interreg IVB Sudoe SOE1/P2/E069 (<a href="http://www.micosylva.com">www.micosylva.com</a>), a project with an overall budget of 1.8 million euros. This project ran for three years in seven European regions to extend the results from forest mycology and trufficulture research to environmental management. The Micosylva project, created and coordinated by myself, follows two main aims: the integration of myco-silvicultural criteria in forest management and the socio-economic evaluation of mycological use.</p> <p>The Micosylva network is currently made up of scientists and expert technicians from 19 different institutions of the European Union, North America and North Africa. The transferral of these research results and knowledge has been based on establishing 18 experimental demonstration areas in different woodland formations in seven European regions, from the creation of management manuals to the organisation of scientific-technical workshops and work-specific training days.</p> <p>The European Union has renewed its faith in this project by financing a further 1.2 million euros in the new Interreg IVB Sudoe SOE3/P2/E533 Micosylva+ project which will allow us to capitalise on and improve the results from the first Micosylva project from November 2012 until April 2014.</p>
<p><b>Creation, monitoring and scientific exploitation of the network of mycological research plots in the 'Pinar Grande' and 'Pinares Llanos' forests of Soria.</b></p>	<p>In 1994 I started researching at the Centre for Forestry Research of Valonsadero, establishing a network of mycological research plots in the <i>Pinar Grande</i> (Soria) to study the dynamics of production and diversity of mushrooms in the <i>Pinus sylvestris</i> woodland of the Northern Iberian mountain range. For over ten years I carried out weekly sampling of macromycetes on all plots and in 2008 I defended my PhD.</p> <p>In 1997, another network of plots with similar characteristics in <i>Pinus pinaster</i> woodland in Almazán (Soria) was added and both networks were surveyed weekly for 18 and 16 years respectively. The scientific exploitation of this data to date has generated five SCI publications of which I have been the lead researcher.</p> <p>According to the Swiss Federal Institute for Forest, Snow and Landscape Research WSL <a href="http://www.wsl.ch">www.wsl.ch</a>, these plot networks are the second most important in the world to study the effects of climate change and forest treatments on the production and diversity of macromycetes.</p> <p>The AGL2012-40035-C03-02 / FOR project has recently been approved, working in collaboration with the Forest Sciences Centre of Catalonia, the Catalan research institute IRTA, the University of Valladolid and the Swiss Federal Institute for Forest, Snow and Landscape Research WSL, to continue promoting scientific production from the monitoring of these plots.</p>
<p><b>Definition of production models and integration of mycological resources in forestry management</b></p>	<p>Of special relevance is the work carried out in designing edible wild mushroom production models and their integration within forest management. These models have opened up several avenues for research which I have had the opportunity to lead and supervise: a doctoral thesis, five final-year projects for undergraduate and postgraduate forestry engineers and two publications in SCI international journals, four national publications and fifteen conference papers.</p>
<p><b>Study of the economic value generated by mycological resources in forests in Castilla y León and Andalusia.</b></p>	<p>In 2008, I was invited by Dr. Pablo Campos Palacin from the Environmental Economics Group of the Spanish National Research Council to head research into evaluating the public environmental income derived from mushroom harvesting in forests. This research forms part of a larger project designed to estimate commercial and environmental economic values (RECAMAN Project) in order to introduce new evaluation methods into agroforestry accounting systems.</p> <p>Methodologies and inventory protocols were defined over the course of the project and more than 4,000 questionnaires were collated from households in Andalusia, providing the initial estimates of the value of mycological use in the region.</p> <p>At the same time, the first estimates of the economic value generated by mycological resources in Castilla y León were created, ranging from the value of harvested production to the value generated by mycotourism and the sale of mushroom species in the region. This work has been documented in two SCI international publications and three national economics journals.</p>
<p><b>Study of ecology and cultivation possibilities of a unique association between <i>Cistus ladanifer</i> and <i>Boletus edulis</i> (group)</b></p>	<p>Since 2006 I have been the lead researcher in the project INIA RTA2006 -00095-C02-C01 'Arboletus' which studied the ecological peculiarities of the ectomycorrhizal associations between certain shrubs such as <i>Cistus ladanifer</i> and mushroom species held in high gastronomic and commercial regard such as <i>Boletus edulis</i> (group). Several mycorrhizae of this association were described for the first time and published in the Atlas section 'Descriptions of Ectomycorrhizae'. The ecological features of the areas of production for this particular association were also studied, especially those located in extensive areas of the provinces of Zamora, León and Salamanca.</p> <p>Significant steps were taken to successfully cultivate the <i>Boletus edulis</i> (group) associated with these shrubs, with isolates able to synthesise mycorrhizae under controlled laboratory conditions, although this still has not been achieved under nursery conditions.</p> <p>These studies gave rise to four SCI international publications and a prize for the best scientific paper submitted to the I World Conference on Conservation and Sustainable Use of Wild Fungi (World Fungi 07).</p>

<p><b>Establishment of control method for plants inoculated with black truffle (<i>Tuber melanosporum</i>) and analysis of truffle plantations</b></p>	<p>During my time as director of the Centre for Forestry Research of Valonsadero, I coordinated the set-up of a common control method for plants inoculated with <i>Tuber melanosporum</i>. I brought about the signing of an agreement between the Regional Government of Castilla y León and the Forest Sciences Centre of Catalonia for the mutual recognition of the control method, marking the first time that two regional governments have established common criteria on this subject in Spain.</p> <p>I currently participate in the working group created from the National Commission for Improvement and Conservation of Forest Genetic Resources of the Ministry of Agriculture, Food and the Environment to standardise this method in Spain. This control method is in high demand in the trufficulture sector in order to guarantee a certain level of quality in the process of black truffle production.</p>
<p><b>Responsibility for the JCYL-Fungi Data Bank</b></p>	<p>Since 1995 I have assisted as a taxonomist in the installation of the 'mycotheca' data bank located in the Centre for Forestry Research of Valonsadero led by Dr. Marina Fernández Toiran. As a result of this work I have co-authored two books on mycological taxonomy in the province of Soria. Since 2007 I have been in charge of running and maintaining the mycotheca. It currently stores more than 3,190 dried macromycete specimens, mainly from Castilla y León, which have all been digitally catalogued and labelled. In 2008 I joined the mycotheca up to the Association of IberMacaronesian herbaria under the name <i>Micoteca JCYL-Fungi</i> and also to the Global Biodiversity Information Facility in Spain <a href="http://www.gibif.es">www.gibif.es</a>.</p>
<p><b>Coordination of the International Conference on Silvicultural Management of Mycological Resources</b></p>	<p>In 2011 I organized the International Conference <a href="http://www.micosylva.com/pms/node/123">http://www.micosylva.com/pms/node/123</a>, held in Valladolid on 9-11 June 2011. Over 40 experts in forestry mycology from Europe, the USA, Canada and Switzerland took part in the conference, which was also attended by 223 forestry practitioners and managers of mycological resources from ten different countries.</p> <p>As group coordinator since June 2011, I also convened a meeting of the members of the Working Group on Forest Mycology and Trufficulture (Spanish Society of Forest Scientists).</p>
<p><b>MOST RELEVANT SCIENTIFIC PUBLICATIONS</b></p>	
<p>2013</p> <ul style="list-style-type: none"> <li>• De la Varga H, Águeda B, Ágreda T, Martínez-Peña F, Parladé J, Pera J (2013) Seasonal dynamics of <i>Boletus edulis</i> and <i>Lactarius deliciosus</i> extraradical mycelium in pine forests of central Spain. <i>Mycorrhiza</i>. doi: 10.1007/s00572-013-0481-3.</li> </ul> <p>2012</p> <ul style="list-style-type: none"> <li>• Jorge Aldea, Fernando Martínez-Pena 2012. Integration of fungal production in forest management using a multi-criteria method. <i>European Journal of Forest Research</i>. 131, pp. 1991 - 2003.</li> <li>• Martínez-Peña, S.; de-Miguel, T.; Pukkala, J.; Bonet, P.; Ortega-Martínez, J.; Aldea . 2012. Yield models for ectomycorrhizal mushrooms in <i>Pinus sylvestris</i> forests with special focus on <i>Boletus edulis</i> and <i>Lactarius group deliciosus</i>. <i>Forest Ecology and Management</i>. 282, pp. 63 - 69.</li> <li>• Esteban Laleona S ; de Frutos Madrazo P ; Martínez-Peña F . 2012. Propuesta de fiscalización de las rentas procedentes de la primera venta de hongos silvestres comestibles de interés socioeconómico. <i>Revista Gallega de Economía</i>. Frutos Madrazo P ; Martínez-Peña F ; Esteban Laleona S .2012. Edible wild mushroom tourism as a source of income and employment in rural areas. The case of Castilla y León. <i>Forest Systems</i>. 21.</li> </ul> <p>2011</p> <ul style="list-style-type: none"> <li>• Martínez-Peña F; Oria de Rueda JA; Ágreda T .2011. Manual para la gestión del recurso micológico forestal en Castilla y León. Serie Técnica de La Junta de Castilla y León. 447pp.</li> <li>• Martínez-Peña F ; Ágreda T ; Águeda B ; Ortega-Martínez P ; Fernández-Toirán LM .2011. Edible sporocarp production by age class in a Scots pine stand in Northern Spain. <i>Mycorrhiza</i>.</li> <li>• de la Varga H ; Águeda B ; Martínez-Peña F ; Parladé J ; Pera J . 2011. Quantification of extraradical soil mycelium and ectomycorrhizas of <i>Boletus edulis</i> in a Scots pine forest with variable sporocarp productivity. <i>Mycorrhiza</i>.22, pp. 59.</li> <li>• Frutos Madrazo P ; Martínez- Peña F ; Esteban Laleona S .2011. El turismo micológico como fuente de ingresos y empleo en el medio rural. El caso de Castilla y León. <i>Estudios de Economía Aplicada</i>.29, pp. 279 - 308.</li> </ul> <p>2010</p> <ul style="list-style-type: none"> <li>• Alonso Ponce, R. ; Águeda, B. ; Ágreda, T. ; Modrego, M.P. ; Aldea, J. ; Fernández-Toirán, L.; Martínez-Peña, F. 2010. Rockroses and <i>Boletus edulis</i> ectomycorrhizal association: realized niche and climatic suitability in Spain. <i>Fungal Ecology</i>.</li> <li>• Ágreda Cabo, T ; Fernández Toirán LM y Martínez-Peña, F. 2010. Los hongos y el bosque: Principales especies, su ecología y aprovechamiento en Soria. Serie Técnica de la Junta de Castilla y León. pp. 1 - 378. Junta de Castilla y León.</li> <li>• Ortega-Martínez, P. ; Águeda, B. ; Fernández Toirán, LM ; Martínez-Peña, F. 2010. Tree age influences on the development of edible ectomycorrhizal fungi sporocarps in <i>Pinus sylvestris</i> stands. <i>Mycorrhiza</i>.</li> <li>• Alonso Ponce, R. ; Águeda, B. ; Ágreda, T. ; Modrego, M.P. ; Aldea, J. ; Martínez-Peña, F. 2010. Un modelo de potencialidad climática para la trufa negra (<i>Tuber melanosporum</i>) en Teruel (España). <i>Forest Systems</i>.19(2), pp. 208 - 220.</li> <li>• Águeda, B. ; Fernández-Toirán, L.M. ; de Miguel, A.M. ; Martínez-Peña, F. .Ectomycorrhizal status of a mature productive black truffle plantation. <i>Forest Systems</i>.19(1), pp. 89 - 97.</li> </ul> <p>2009</p> <ul style="list-style-type: none"> <li>• De Frutos, P. ; Martínez-Peña, F. ; Ortega-Martínez, P. ; Esteban Laleona, S. 2009. Estimating the social benefits of recreational harvesting of edible wild mushrooms using travel cost methods. <i>Investigación Agraria: Sistemas y Recursos Forestales</i>.18(3), pp. 235 - 246.</li> <li>• Martínez Peña, F. 2009. Producción de carpóforos de macromicetes epigeos en masas ordenadas de <i>Pinus sylvestris</i> L. Tesis Doctoral.1, 291pp.</li> </ul>	

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- Frutos P. de ; Martínez-Peña, F. y Esteban S. .Propuesta de ordenación comercial de los aprovechamientos micológicos a través de lonjas agrarias: análisis económico y financiero para la provincia de Soria. Revista Española de Estudios Agrosociales y Pesqueros.217,pp. 73 – 103.

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- Fernández Toirán, M.; Martínez Peña, F. 1999. Los hongos en los montes de Soria. Junta de Castilla y León, 287pp.
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- Fernández Toirán, M.; Martínez Peña, F.; Castro Cerceda, M. 1998. Fragmenta Chorologica Occidentalia, Fungi, 6348-6380. Anales del Jardín Botánico de Madrid.56 (1),pp. 126 - 127.

### COMPETITIVE R&D PROJECTS WHICH I HAVE COORDINATED

- AGL2012-40035-C03-02 / FOR Integration of mycological production and diversity within forest management and planning in Pinus sylvestris and Pinus pinaster stands in the central north of the peninsular. Ministry of the Economy and Competitiveness 2013-2015. Award (3 beneficiaries): €180,000.
- INTERREG SOE3/P2/E533 MICOSYLVA+: Myco-silviculture and evaluation of edible wild mushrooms as guarantors of forest sustainability and multi-functionality. European Union. 2012-2014. Award (5 beneficiaries): €1,227,175.
- RM 2010-00002-C03. Conservation of Boletus edulis (sensu lato) populations and their diversity in areas of production subjected to mycological use. INIA. 2010-2013. Award (3 beneficiaries) €145,002
- INTERREG SOE1/P2/E069 MICOSYLVA: Silvicultural management of forests which produce edible wild mushrooms of socio-economic interest as a source of rural development. European Union. 2009-2011. Award (8 beneficiaries): €1,838,452.
- PET2007-013-C07. Cataloguing of Truffle Plantations in Teruel. Study of soils and formation of mycorrhizae in relation to truffle production. Designated entity: INIA. 2007-2010. Valonsadero sub-project award: €136,356.
- RTA2006-00095-C02-01 Production of shrubs infected with Boletus edulis group mushrooms. Morphological and molecular features of the mycorrhizal symbiosis and description of the productive habitat. INIA. 2006-2009. Award: €102,628.
- RTA03-046 Study into managing mycological resources in Pinus sylvestris L. stands. INIA. 2003-2005. Award: €72,696.