MINISTERIO DE CIENCIA E INNOVACIÓN

Cofinanciado por la Unión Europea

AGENCIA ESTATAL DE INVESTIGACIÓN

CURRICULUM VITAE (CVA)

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

CV date	02/07/2025

Part A. PERSONAL INFORMATION

First name	MARÍA INMACULADA		
Family name	LARENA NISTAL		
Gender (*)	Female	Birth date	04/12/1964
Social Security, Passport, ID number	00813019S		
e-mail	ilarena@inia.csic.es	URL web (https://www.inia.es/investigacion/vegetal/Protecci%C3%B3n%20Vegetal/Hongos%20fitopat%C3%B3genos/Pages/Home.aspx)	
Open Researcher and Contributor ID (ORCID) (*)		0000-0001-8424-8916	

(*) Mandatory

A.1. Current position

Position	Staff Scientist (Personal Investigador Científico OPIS)		
Initial date	01/10/2007		
Institution	CSIC		
Department/Center	Plant Protection	Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA)	
Country	Spain	Teleph. number	+34 913473989
Key words	*Biological control, fungi, Plant Pathology, Integrated Pest Management (IPM), Sustainable agriculture, Crop protection*		

A.2. Previous positions (research activity interruptions, art. 14.2.b)

Period	Position/Institution/Country/Interruption cause
2005-2007	*Ramón y Cajal Researcher/INIA/Spain*
2001-2005	*Senior graduate under recruitment /INIA/Spain*
1994-2001	*Post-Doctoral periods/CIB-IMIDRA-INIA/Spain/Maternity leave (4 months)*
1993	*Pest Control Technical Assistant (5 months)*
1989-1992	*PhD/INIA/Spain (42 months)*

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
First Degree	Complutense of Madrid/Spain	1987
PhD in Plant Pathology	Polytechnic of Madrid (ETSIA)/Spain	1993

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

The PI is working in the research group "Phytopathogenic Fungi" in the Plant Protection Department at INIA-CSIC from 2007 as "Funcionario". Her research career is closely related to Plant Protection, and is fundamentally aimed at developing new tools that improve agricultural quality and productivity and allow the sector to innovate, and solve problems of diseases caused by fungi, according to the concept of Sustainable Agriculture. During her PhD (1989-1993), in Dr. Paloma Melgarejo's pioneering group in biological control, worked in the development of a biocontrol control agent (BCA) (*Penicillium purpurogenum*) against two fungal pathogens: *Fusarium oxysporum* in tomato and *Monilinia* spp in peach (SC89, AGR91-0014-C02, CAM-052/91). Her post-doc stage (1994-1999)

was in the CNB-CSIC (Madrid) where worked for the first time with genomic and genetic tools in fungi to study population genetic diversity. At the INIA-CSIC (1999-current) she´s working on the development of fungi as BCAs, production and formulation (ALI99-00652; AGL2000-00067, AGL2004-02161). As Ramón y Cajal researcher (2005-2007) She developed molecular markers for the traceability of BCAs (*Epicoccum nigrum*, *Penicillium rubens*) in rhizosphere, soil and phyllosphere (RC04-3231). From 2007 I´m working in the commercial development of the BCA *P. rubens* strain 212 (PO212) (RTA2007-00067, RTA2010-00093, RTA2013-00060 as project leader (PL)). We´re studying the plant-PO212-pathogen interaction to determine the genetic, molecular and physiological aspects of the mechanism of resistance induced by PO212 in plants. We´re using omics tools as genomic, proteomic, etc to find the PO212 genes involved in the biocontrol efficacy (RTA2013-00060, RTA2017-00019, PID2021-123594OR as PL). She is also working on improving its action range against other diseases in other hosts to obtain a spectrum of action comparable to that of phytosanitary products. She has participated as a researcher in European projects in the development of BCAs against brown rot (QLK199-01065; BIOCOMES612713). She has developed tools to the molecular detection of strawberry pathogens (TRT2006-00047, 266505 SPAT FP7-ERANET EUPHRESCO II as PL (INIA); E-RTA2013-00063). The results of these investigations are 49 articles in JCR indexed journals (first 34%, last 19% and corresponding 26%, 24 Q1, 15 Q2, 23 OA), 4 articles in non-indexed journals, 27 book chapters, and 103 contributions to national and international conferences. All these results have been possible due to participation in 30 research projects (PL in 8). I´ve 4 six-year CNEAI research periods. She was positively evaluated according to criteria I3 in the evaluation of doctors hired by the Ramón y Cajal program (2008, INIA-CCAA evaluation). Her technical and scientific capacities are within plant pathology: development the biopesticides, molecular detection of fungal pathogens, epidemiology of *Monilinia* spp. in stone fruits. She has collaborated with several international partners such as Prof N. Magan (Cranfield University, UK), Prof. J.R. Montealegre (Santiago de Chile University), Dr E. Loit (Estonian University of Life Sciences) among others. Representative for Spain in the SCAR Collaborative Working Group on "IPM for the reduction of pesticide risks and use" (EU, 2012-2014). Her contribution to society has been mainly through the transference of knowledge, services to productive sector and diffusion. She has participated in 6 contracts or convenies with companies, 10 divulgative publications and in national and international conferences and seminars with the productive sector. This work has contributed to the development of a new IPM in cherry crop in Extremadura and Aragón. We´ve published a field guide “Plagas y enfermedades del cerezo”. I´ve been involved in the development of new alternatives to methyl bromide and new disease resistant strawberry varieties. We have an unlicensed national patent (No. 200100758) "Method for the mass production of filamentous fungal conidia”. She has supervised 2 bachelor´s theses (TFC/TFG), 16 master’s theses and 3 Doctoral Thesis. One of the PhDs is head of the Biology trainee laboratory at a public high school, the second is Technical Director at Certis Belchim España, and the third works as a contractual employee at the INIA on a national plan project. Member of 6 Doctoral Thesis committees and opponent in a Thesis (Esthonian University). Since 2014, She is participating in the master's degree programme in “Applied Plant Biology”. Participation as expert in the commission for the evaluation of research projects in the Knowledge Generation Project 2022 (PID2022) of the CAA/RTA area. She is reviewer of articles in JCR journals, Associated Editor in Spanish Journal of Agricultural Research, and “Guest Associate Editor” of special issues in the Fr Microbiol, J Fungi and Fr Plant Science. Consultant for ANEP (since 2014). Head of Plant Protection Department at INIA-CSIC, 2019-2023. Secretary of the SEF, 2007-2011. Member of the Scientific Committee of XIV (2008) and XVI (2010) Congress of SEF. Member of 5 public opposition committees

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

C.1. Most important publications in books and journals with "peer review" and in conferences

BCA

1. REQUENA E, VELOSO J, ESPESO EA, **LARENA I (2025)** Hybrid assembly of *Penicillium rubens* genomes unveils high conservation of genome structural organisation and the presence of Numts in nuclear DNA. IMA Fungus 16: e145175. https://doi.org/10.3897/imafungus.16.145175
2. **LARENA I,** GUIJARRO B, VILLARINO M , MELGAREJO P, DE CAL A. **(2025)** Functional Diversity of Biocontrol Communities as a Tool to Build Consortia and Improve Their Control Efficacy. Annals of Applied Biology, 187, 79-89 **https://doi.org/10.1111/aab.70004**
3. REQUENA E, ALONSO-GUIRADO L, VELOSO J, VILLARINO M, MELGAREJO P, ESPESO EA, **LARENA I (2023)** *Comparative analysis of Penicillium genomes reveals the absence of a specific genetic basis for biocontrol in Penicillium rubens strain 212. Front Microbiol 13, 1075327.* http://doi.org/10.3389/fmicb.2022.1075327

4. *DE CAL A., GUIJARRO B., **LARENA I.,** MELGAREJO P., **(2020)**. Which Biocontrol Strategies Best Fit with Other IPM System Components? IN: "How Research Can Stimulate the Development of Commercial Biological Control Against Plant Diseases, Progress in Biological Control 21". Chapter 14, Edited by A. De Cal, P. Melgarejo, N. Magan. Springer Nature, Switzerland AG. https://doi.org/10.1007/978-3-030-53238-3_14.*
5. ***LARENA I.,** ESPESO E.A., VILLARINO M., MELGAREJO P., DE CAL A., **(2017)**. Molecular techniques to register and commercialize a Penicillium rubens strain 212 as a biocontrol agent. "New and Future Developments in Microbial Biotechnology and Bioengineering", Chapter 5, Edited by V. Kumar Gupta and S. Rodriguez-Couto. Elsevier B.V., Amsterdam, Neteherlands. pp. 97-114*
6. A. DE CAL, **I. LARENA**, B. GUIJARRO, P. MELGAREJO. **2012.** Use dof biofungicidas for controlling plant diseases to improve food availability. Agriculture 2: 109-124. https://doi.org/10.3390/agriculture2020109 (www.mdpi.com/journal/agriculture)

IPM

7. GONZÁLEZ-NÚÑEZ M., SANDÍN-ESPAÑA P, MATEOS-MIRANDA M, COBOS G, DE CAL A, SÁNCHEZ-RAMOS I, ALONSO-PRADOS JL, **LARENA I (2022)** *Development of a Disease and Pest Management Program to Reduce the Use of Pesticides in Sweet-Cherry Orchards. Agronomy 12, 1986.* https://doi.org/10.3390/agronomy12091986

FUSARIUM: pathogens detection and control

8. VILLARINO M, **LARENA I**, MELGAREJO P, DE CAL A **(2021)** *Effect of chemical alternatives to methyl bromide on soilborne disease incidence and fungal populations in Spanish strawberry nurseries: a long-term study. Pest Manag Sc 77, 766-744.* https://doi.org/10.1002/ps.6077
9. VILLARINO M, DE CAL A, MELGAREJO P, **LARENA I (2021)** Development of a multiplex PCR for the identification of *Fusarium solani* and *F. oxysporum* in a single step. *J Plant Dis Protect 128, 1275–1290*. https://doi.org/10.1007/s41348-021-00475-6
10. VILLARINO M, DE LA LASTRA E, BASALLOTE-UREBA MJ, CAPOTE N, **LARENA I,** MELGAREJO P, DE CAL A **(2019)** *Characterization of Fusarium solani populations associated with spanish strawberry crops. Plant Dis 103, 1974-1982.* https://doi.org/10.1094/PDIS-02-19-0342-RE

C.2. Congress

1. REQUENA E, CARRERAS M, ESPESO EA, **LARENA I. 2024**. Are PO212 endo-xylanases effective elicitors to trigger of plant defence systems in tomato plants? Plant BioProTech & IOBC-IR 2024 conference. June 9-17, Castellon de la Plana. **ORAL**
2. GUIJARRO B, REQUENA E, DE CAL A, VILLARINO M, MELGAREJO P, **LARENA I 2024.** Next generation PO212 microbial fungicide products to trigger induced resistance in temperate horticultural crops against soil-borne pathogens. Plant BioProTech & IOBC-IR 2024 conference. June 9-17, Castellón de la Plana. ORAL
3. GUIJARRO B, VILLARINO M, REQUENA E, **LARENA I,** MELGAREJO P, DE CAL A. **2024.** Improving the biocontrol strategies of three well-defined biocontrol agents, PF909, EN282 and PO212 through consortium formulations. Micrope, July 15-18, Viena, Austria. **ORAL**
4. REQUENA E, ALONSO-GUIRADO L, VELOSO J, VILLARINO M, MELGAREJO P, **LARENA I,** ESPESO EA. **2022.** La genómica comparativa en Penicillium rubens revela la ausencia de base génica en la actividad de biocontrol de P. rubens cepa 212. XX Congreso de la Sociedad Española de Fitopatología. October 24-26, Valencia. **Poster**
5. REQUENA E, CARRERAS M, ESPESO EA, **LARENA I. 2022**. Are PO212 endo-xylanases effective elicitors to trigger of plant defence systems in tomato plants? International Conference of the Scientific Actualitie and Innovations in Horticulture, Vilnius (Lithuania), September 26-28 2022. **Oral**
6. DE CAL A, **LARENA I. 2022.** "Control integrado de las enfermedades del cerezo en España: manejo de resistencias". 3ª Reunión del Grupo Especializado en control químico de enfermedades y desarrollo de resistencias a productos fitosanitarios (FITORES), Oleiros, A Coruña, June 8. **Oral.**
7. GUTIÉRREZ DOCIO A, LAGO C, MARCHENA D, **LARENA I,** LOIS M, NÚÑEZ R, VELOSO J, DÍAZ J, MOLLÁ E, ESTEBAN R, PRODANOV M. **2021.** In vitro and in vivo bioassay-guided fractionation of olive mill wastewaters for effective biocontrol of *Verticillium dahliae* in tomato plants and Phytophthora capsici in pepper plants. XXX International Conference on Polyphenols 13-15 July 2021, Turku, Finland. **Poster**
8. CARRERAS M, CARRILLO-BARRAL N, VILLARINO M, HERRANZ Y, DÍAZ J, ESPESO EA, **LARENA I. 2018.** Estudio de la interacción tritrófica *Penicillium rubens* 212, *Fusarium*

oxysporum f.sp. *lycopersici* y planta de tomate durante el proceso de biocontrol. XIX Congreso de la Sociedad Española de Fitopatología. October 8-10, Toledo. **Oral**

9. **LARENA I. 2018**. PRODUCCIÓN Y FORMULACIÓN DE AGENTES DE BIOCONTROL FÚNGICOS PARA EL MANEJO DE ENFERMEDADES EN PLANTAS. Seminario Internacional "Formulación de agentes de biocontrol de enfermedades en plantas" de la Facultad de Ciencias Agronómicas de la Universidad de Chile, April 13. **Guest speaker**
10. **LARENA I. 2018.** Protección de cultivos agrícolas: control biológico de la marchitez vascular del tomate. III XORNADA DIVULGATIVA SOBRE BIOTECNOLOXÍA VEXETAL E A SÚA APLICACIÓN EN ESTUDIOS DO MEDIO. FACULTAD DE CIENCIAS DE LA UNIVERSIDAD DE LA CORUÑA. September 24. **Guest speaker**

C.3. Projects or research lines in which you have participated

1. ***PID2021-123594OR-C21.*** *Potenciar la resistencia inducida por Penicillium rubens, cepa 212, para su aplicación como agente de control biológico frente a marchiteces vasculares en hortícolas.* Programme of Agrifood Resources and Technologies in coordination with the Autonomous Regions. 2021-2023 **PL: I. Larena**. 205.700€. **Project leader**
2. ***Operating group FITOSCEREZO*** *Availability of phytosanitary products and integrated control strategies in cherry*. 2019-2021. 80% co-financed by the European Agricultural Fund for Rural Development (FEADER) PL (INIA): J. L. Alonso. 452.838,74€. **Researcher**
3. ***RTA2017-00019-C03-01****: Integrated biocontrol strategies alternatives to the application of plant protection products against diseases in horticultural crops"* Programme of Agrifood Resources and Technologies in coordination with the Autonomous Regions. 2017-2021**. PL: I. Larena**. 86,552€
4. ***FONDEF IT16I10006:*** *Desarrollo de una bioformulación con propiedades de efecto elicitor y promotor de crecimiento para el control de Diplodia seriata en vid*". Financed by CONICYT/FONDEF. PL: J.R. Montealegre (Universidad de Chile) 285.573$. 2017-2019.
5. ***RTA2013-00060-C05-01****: Identification of the biocontrol mechanisms of Penicillium oxalicum and its application in the control of horticultural plant diseases.* Agro-food Resources and Technology Programme in coordination with the Autonomous Regions. 2014-2017. **PL: I. Larena**. 141.800€.
6. ***E-RTA2013-00063-C04-01****: Fusarium solani: emerging pathogen in strawberry cultivation in Spain. 2014-2017. INIA. PL:* A. de Cal. 124,608 €. **Researcher**
7. ***BIOCOMES* 612713***: Biological control manufacturers in Europe develop novel biological control products to support the implementation of Integrated Pest Management in agriculture and forestry.* FP7-KBBE-2013.1.2-05 Biological control in agriculture and forestry for effective pest and pathogen control. *2013-2017.* PL: A. de Cal. 217,184€. **Researcher**
8. ***266505 FP7-ERANET EUPHRESCO II****: "European Phytosanitary Research Coordination" SPAT: Strawberry Pathogens Assessment and Testing.* 2013-2015. WP4: Development of common diagnostic methods to quarantine and emerging strawberry pathogens. **PL: I. Larena**. 70,000€.

C.4. Participation in technology/knowledge transfer activities and exploitation of results

1. Evaluación de la resistencia a fungicidas de poblaciones de Monilinia spp en la zona de Cataluña y Aragón. Transferencia de resultados al sector industrial. 2021-2022. Contratante: AEPLA. COORDINADOR: A. De Cal. 6000€. **Researcher**
2. **RE-INIAPTP-2019-01**. Contract number INIAP/EETP/DJ/2019/017. Service of molecular analysis and study of the genetic diversity of microorganisms associated with degressive death in teak according to the INIAP-AECID agreement. Contracting party for the Pichilingue Experimental Station of INIAP. 2019- 2020: 4 months. PL: M. González-Nuñez. INIA, 13,000$. **Researcher**
3. **CC13-0068**. Influence of the physical properties and the microbiota of the soil on the fruiting of the black truffle. INIA-CITA Agreement. 2015-2018. COORDINATOR: Sergio Sánchez Durán (CITA-Aragón). **PL (INIA), I. Larena.** 257,595€. **Project Leader at INIA**
4. **CC13-047**: Agronomic improvements for the sustainable cultivation of cherry trees in the northern area of Cáceres. INIA.25/05/2015-2018. PL: M. González-Núñez. 473,476€. **Researcher.**
5. **TRT2006-00047-CO4:** Characterization of commercial and historical strawberry varieties against the main pathogens. Development of a rapid method for identifying each pathogen. INIA Technology Transfer Programme. 2007-2009. **PL: I. Larena.** 99,750.20€. **Project leader**
6. **Patente Española nº 200100758:** A. DE CAL, **I. LARENA** y P. MELGAREJO. **2001.** Procedimiento para la producción de conidias de hongos filamentosos en fermentación sólida.