

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

Part A. PERSONAL INFORMATION

CV date	25/01/2023
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First name	Raquel		
Family name	Campos Herrera		
Gender (*)	Female	Birth date (dd/mm/yyyy)	04/12/1978
Social Security, Passport, ID number	53015842Z		
e-mail	raquel.campos@icvv.es	URL Web: https://www.icvv.es/invid	
Open Researcher and Contributor ID (ORCID) (*)	0000-0003-0852-5269		

(*) *Mandatory*

A.1. Current position

Position	Tenured Scientist (Científico Titular)		
Initial date	01/12/2021		
Institution	CSIC		
Department/Center	Viticulture	Instituto de las Ciencias de la Vid y del Vino	
Country	Spain	Teleph. number	+34 941 894980
Key words	Entomopathogenic nematodes, biological control, crop protection, soil food webs, molecular ecology		

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

Period	Position/Institution/Country/Interruption cause
01/07/2018-30/11/2021	Ramón y Cajal contract/CSIC/Spain
23/02/2018-22/06/2018	Maternity (1 daughter born on 23/02/2018 in Faro, Portugal)
01/11/2015-30/06/2018	FCT Investigator Starting Grant/Universidade do Algarve/Portugal
01/10/2013-31/10/2015	Postdoctoral SNSF-NRP68/University of Neuchatel/ Switzerland
01/10/2010-30/09/2013	Marie Curie IOF fellow/CSIC/Spain (in USA 2 years)
01/10/2008-30/09/2010	Ramón Areces Postdoctoral fellow/University of Florida/USA
07/05/2007-30/06/2007	Graduate Assistant/IMIDRA/Spain
01/01/2005-31/12/2005	I3P Postgraduated CSIC/ CSIC/ Spain
01/01/2002-31/12/2005	FPU/CSIC/Spain
01/10/2001-31/12/2001	Prodoctoral fellowship grant / CSIC/ Spain

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD	Universidad Complutense de Madrid (UCM), Spain	2006
Licensed (<i>Licenciado</i>)	Universidad de León (ULE), Spain	2001

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

I have devoted my career to the study of entomopathogenic nematodes (EPNs) as a model in the area of biocontrol and soil agroecology. **During my thesis (2002-2006, CCMA-CSIC, Spain, Ph.D. Extraordinary Award)**, I studied both EPNs and their symbiotic bacteria, showing, for example, the negative impact of agrochemical residues on the distribution of native EPNs in agroecosystems. **In my first postdoctoral experience (CREC-UF, USA, 2008-2012)**, I developed a pioneer molecular system to evaluate EPN soil food webs that showed, for example, that a new citrus management system altered the soil food web and the severity of a pest–disease complex. **In Switzerland (UniNe, 2013-2015)**, we explored the combined use of beneficial soil organisms (BSO) to enhance crop health and production, demonstrating, for example, that EPN can be combined with other BSO to achieve a positive impact. **As a group leader in Portugal (UALg, 2015-2018)**, we investigated belowground multitrophic interactions related to pest control, including entomopathogens (fungi, nematodes) and antagonists (free-living nematodes). **Since July 1, 2018, I lead the group “Agroecological Innovation of the Vineyard” (IN-Vid, <http://www.icvv.es/invid>, CSIC group code: 886222)**. Our long-term challenge is to reduce the dependency on traditional agrochemicals in pest control, with an emphasis on the vineyard. Overall, I



have published 74 peer-review articles (45 as first/senior-last author, 68% Q1, H = 27, total cites = 2111), 1 book (Editor, Springer), 6 book chapters (4 as the first author), and 10 trade publications. I have 114 communications in congress, including 4 as keynote speakers and 18 invited speakers for symposia. I gained two awards (Young Emergent Researcher 2019, University of La Rioja, and Syngenta Crop Protection Award 2017, Society of Nematologist of America) and I have 2 “Sexenios” approved by ANECA (2004-2011, 2012-2017). **Leadership has been a key feature during my career.** Besides self-funding my whole career (see Table A.2), I have acquired >425.000 euros as Principal Investigator (PI) in national and international competitive grants (e.g PID2019-104112RB-I00 and TED2021-129169B-I00), and 7 Technological Support Grant with enterprises (Koppert B.S., Jungbunzlauer Ladenburg GmbH, and ARTAL Smart Agriculture, > 130.000 €). I have supervised 7 Doctoral Thesis (5 defended – 2016, 2017, 2022 (2), 2023 -, ongoing 2), 2 Master Thesis (2010, 2022), and 5 undergraduate theses (TFG). I supported various student grants: Ph.D. = FPI-CAR (2), FPI-UR (1), FPI-FCT (1), ADER (1), JAE-Intro CSIC (1), and mobilities: Erasmus Mundus (1), MareNostrum (1), Postdoct-internship MarieCurie 2 months (1). I team-taught formal courses at UCM, UJI, UR (Spain), UniNe (Switzerland), and UF (USA), and participated in other short courses. As outreach, I developed activities for High School students (e.g. Week of Science) and promoted activities for transferring knowledge to the public/farmers. **My international expertise is also widely recognized.** I serve as an international expert for project evaluation panels (e.g. US–Egypt, USA; NWO Open program, The Netherlands; ANECA, Spain). Also, I am a Board Member of the European Society of Nematologists, and I have been chair of the Nematode Division at the Society of Invertebrate Pathology (2018-2021) and Society of Nematologists (2012-2014). I am Associate Editor of *J. Nematol.* (2016-present), *J. Invertebrate Pathology* (2021-present), and *Biol. Control* (2023-present).

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

C.1. Publications (Selected 10 relevant publications for SOIL-PRO-VINE) *corresponding author

- [1] Jaffuel, G., Krishnamani, S., Machado, R.A.R., **Campos-Herrera, R.**, Turlings, T.C.J. 2022. Potent ant deterrents emitted from nematode-infected insect cadavers. *J. Chem. Ecol.*, 48, 71-78. (Ecology, 90/173) <https://doi.org/10.1007/s10886-021-01320-8>. Citations = 2 (0.7/year)
- [2] Vicente-Díez, I., Blanco-Pérez, R., Chelha M., Puelles, M., Pou, A., ***Campos-Herrera, R.** 2021. Exploring the use of entomopathogenic nematodes and the natural products derived from their symbiotic bacteria to control the grapevine moth, *Lobesia botrana* (Lepidoptera: Tortricidae). *Insects* 12, 1033. (Entomology, 17/100). <https://doi.org/10.3390/insects12111033>. Citations = 4 (1.3/year)
- [3] Vicente-Díez, I., Blanco-Pérez, R., González-Trujillo, M.M., Pou, A., ***Campos-Herrera, R.** 2021. Insecticidal effect of entomopathogenic nematodes and the cell-free supernatant from their symbiotic bacteria against *Philaenus spumarius* (Hemiptera: Aphrophoridae) nymphs. *Insects*, 12, 448. (Entomology, 17/100). <https://doi.org/10.3390/insects12050448J>. Citations = 5 (1.7/year)
- [4] Bueno-Pallero, F.A., Blanco-Pérez, R., Dionisio, L., ***Campos-Herrera, R.** 2018. Simultaneous exposure of nematophagous fungi, entomopathogenic nematodes and entomopathogenic fungi can modulate belowground insect pest control. *J. Invertebr. Pathol.*, 154, 85-94. (Zoology, 18/166), doi: 10.1016/j.jip.2018.04.004. Citations = 16 (2.7/year).
- [5] Imperiali, N., Chiriboga M., X., Schlaeppli, K., Fesselet, M., Villacrés, D., Jaffuel, G., Bender, S.F., Dennert, F., Blanco-Pérez, R., van der Heijden, M.G.A., Maurhofer, M., Mascher, F., Turlings, T.C.J., Keel, C., ***Campos-Herrera, R.** 2017. Combined field inoculations of Pseudomonas bacteria, arbuscular mycorrhizal fungi and entomopathogenic nematodes and their effects on wheat performance. *Front. Plant Sci.*, 8, 1809. (Plant Sciences, 24/222) Doi: 10.3389/fpls.2017.01809. Citations = 28 (4/year).
- [6] Jaffuel, G., Mäder, P., Blanco-Perez, R., Chiriboga, X., Fliessbach, A., Turlings, T.C.J., ***Campos-Herrera, R.** 2016. Prevalence and activity of entomopathogenic nematodes and their antagonists in soils that are subject to different agricultural practices. *Agric. Ecosyst. Environ.*, 230, 329-340. (Agriculture Multidisciplinar, 1/53), doi : 10.1016/j.agee.2016.06.009. Citations = 26 (3.3/year).
- [7] ***Campos-Herrera, R.**, Půža, V., Jaffuel, G., Blanco-Pérez, R., Čepulytė Rakauskienė, R., Turlings, T.C.J. 2015. Unraveling the intraguild competition between *Oscheius* spp. nematodes and entomopathogenic nematodes: implications for their natural distribution in Swiss agricultural soils. *J. Invertebr. Pathol.*, 132, 216-227. (Zoology, 19/161). Doi: 10.1016/j.jip.2015.10.007. Citations = 43 (4.8/year).



- [8] *Campos-Herrera, R., El-Borai, F.E., Duncan, L.W. 2012. Real-time PCR as an effective technique to assess the impact of phoresy by *Paenibacillus* sp. bacteria on *Steinernema diaprepesi* nematodes in nature. *Mol. Ecol. Res.* 12, 885–893. (Ecology, 7/136). Doi: 10.1111/j.1755-0998.2012.03159.x. Citations = 9 (0.8/year).
- [9] *Campos-Herrera, R., Tailliez, P., Pagès, S., Ginibre, N., Gutiérrez, C., Boemare, N.E. 2009. Characterization of *Xenorhabdus* isolates from La Rioja (Northern Spain) and virulence with and without their symbiotic entomopathogenic nematodes (Nematoda: Steinernematidae). *J. Invertebr. Pathol.*, 102, 173–181. (Zoology, 25/128), doi:10.1016/j.jip.2009.08.007. Citations = 16 (1.1/year).
- [10] Campos-Herrera, R., Gutiérrez, C. 2009. Screening for Spanish isolates of steinernematid nematodes as biological control agents through laboratory and greenhouse microcosm study. *J. Invertebr. Pathol.*, 100, 100–105. (Zoology, 25/128), doi:10.1016/j.jip.2008.11.009. Citations = 34 (2.3/year).

C.2. Congress

Presentation as plenary session and key-note speaker

- Campos-Herrera, R. 2018.** Towards the next generation agriculture: implementing the Ecological Intensification of Agriculture concepts for enhancing biological control of insect pests. Advances in Nematology, Annals of Applied Biology, Linnaean Society of London, Piccadilly (UK), December 11, 2018. **Plenary session.**
- Campos-Herrera, R. 2018.** Nematodos entomopatógenos, interacciones multitróficas y su impacto en la mejora de la protección y producción de cultivos. XIX Congreso de la Sociedad Española de Fitopatología, Toledo (Spain), october 8-10, 2018. **Key-note speaker**
- Campos-Herrera, R. 2017.** Soil agroecology: understanding multi-trophic interactions in the soil to enhance the biocontrol of insects. 21ST Nematological Society of Southern Africa Symposium, Fairmont, Zimbali Ballito KwaZulu Natal (SouthAfrica), May 7-11, 2017. **Plenary session.**
- Campos-Herrera, R., El-Borai, F.E., Pathak, E., Stuart, R.J., Gutiérrez, C., Duncan, L.W. 2012.** Linking ecology and agriculture: studying soil food web to conserve entomopathogenic nematodes. XXX Congresso Brasileiro de Nematologia, organized by the Sociedade da nematologia Brasileira, Ubêrlandia, Mina Gerais (Brazil), June 24-28, 2012. **Plenary session.**

Invited speaker

- Vicente-Díez, I., Carpennero, E., Pou, A., **Campos-Herrera, R., 2022.** Avances en el empleo de nematodos entomopatógenos y derivados de sus bacterias para el manejo de plagas de la vid. 5º Simposio Chileno De Control Biológico, INIA, Chile (virtual), August 30-September 1 2022.
- Campos-Herrera, R., 2022.** Conservation Biocontrol with EPN: biotic and abiotic factors driving its potential. Symposium “EPN commercialization and application”, organized by R.-U. Ehlers y M.G. Rodríguez. 7th International Conference of Nematology, organized by the International Federation of Nematologists, Antibes Juan-les-Pines (France), May 1-6 2022.
- Vicente-Díez, I., Pou, A., **Campos-Herrera, R. 2021.** Desarrollo de herramientas directas e indirectas de control de plagas y enfermedades asociadas con el viñedo basadas en nematodos entomopatógenos y sus derivados. VIII Foro de Producción Animal & IV Foro de Agricultura Tropical de la Universidad Papaloapan (Mexico), December 3 2021(virtual).

C.3. Research projects as Principal Investigator

- 2022-2024.** Evaluation of functional soil biodiversity as an ecological indicator of sustainable management in vineyards on Northern Spain (SosVidSoil) (TED2021-129169B-I00). Ministerio de Ciencia e Innovación, Proyectos de Transición Ecológica y Transición Digital, 2021, Instituto de Ciencias de la Vid y del Vino (CSIC)(Logroño, La Rioja). Term: 2 años: Financiación: 144’900.00€
- 2020-2023** – Novel strategies for persistent and emergent arthropod pest management on vine and their impact on the grape quality (SOS-VINE) (PID2019-104112RB-I00). Proyectos de I + D + i, Retos Investigación 2019, Instituto de Ciencias de la Vid y del Vino (CSIC) (Logroño, La Rioja, España). Term: 3 years. Financed: **100.430,00 €**
- 2020-2021** – Evaluación del impacto de la presencia de lombrices en la comunidad de bacterias del suelo y la actividad de los nematodos entomopatógenos como agentes de biocontrol (IER Government of La Rioja, ref. Resolución 1/12/2020), Instituto de Ciencias de la Vid y del Vino (CSIC) (Logroño, La Rioja, España). Term: 1 year. **Financed: 1.837,90 €**

- 2019-2021** – Biological interactions between earthworms and rhizosphere components: characterizing multi-trophic interactions to improve biocontrol of insect pests. Programme I-COOP+ 2018 (CSIC)(COOPA20231), Instituto de Ciencias de la Vid y del Vino (CSIC) (Logroño, La Rioja, España). Term: 1 year and 8 months. **Financed: 29.000,00 €**
- 2019-2020** – Implementación de técnicas de secuenciación masiva de nueva generación para evaluar la salud del suelo en las viñas riojanas mediante el estudio de las comunidades edáficas de nematodos (IER Government of La Rioja, ref. Resolución 17/2019), Instituto de Ciencias de la Vid y del Vino (CSIC) (Logroño, La Rioja, España). Term: 1 year. **Financed: 2.430,19 €**
- 2018-2023** – Soil Agroecology: characterizing multi-trophic interactions to improve biocontrol of insect pests. Associated financial support (RYC-2016-19939), Instituto de Ciencias de la Vid y del Vino (CSIC) (Logroño, La Rioja, España). Term: 5 years. **Financed: 40.000,00 €**
- 2015-2018** – Mediterranean ecosystem as a model in the development of molecular and ecological approaches for the study of multitrophic interactions in the soil: ecosystem services and biocontrol enhancement (IF/00552/2014/CP1234/CT0007, FCT Portugal). Research location: Centro para os Recursos Biológicos e Alimentos Mediterrânicos (MeditBio), University of Algarve (Faro, Portugal), term: 3 years. **Financed: 50.000,00 €**

C.4. Contracts, technological or transfer merits

Patent

Vicente-Díez, I., Campos-Herrera, R., Vilanova, M. 2023. Volatile organic compounds obtained from *Photorhabdus laumondii* subsp. *laumondii* and uses thereof. **CSIC internal reference EP1641.1761.** (only pending CECT registration number for the bacteria).

Technological grants

- 2022-2023.** Evaluation of the viability, infectivity and adherence of entomopathogenic nematodes combined with potencial novel adjuvants: searching for new compounds, including Xanthan gum and citrate esters, for succesful aerial application. Jungbunzlauer Ladenburg GmbH. PI: Dr. R. Campos-Herrera; research location: ICVV-CSIC (Logroño, Spain); Term: 6 months. October 2022-April 2023. **Financed: 4.606,55 €**
- 2022-2023.** Evaluation of the potential of new isolates of entomopathogenic nematodes against Coleopteran pests of interest in annual and perennial crops for a commercial perspective Koppert Biological System. PI: Dr. R. Campos-Herrera; research location: ICVV-CSIC (Logroño, Spain); term: 10 months. September 2022-June 2023. **Financed: 28.846,40 €**
- 2021-2022** – Avances en el desarrollo de nuevas bio-herramientas para el manejo de nematodos fitoparásitos basados en los metabolitos secundarios de las bacterias *Xenorhabdus*, simbioses de nematodos entomopatógenos: estudio en sistemas naturalizados suelo-planta. Artal Smart Agriculture. PI: Dr. R. Campos-Herrera; research location: ICVV-CSIC (Logroño, Spain); term: 1 year and 2 months. November 2021-December 2022. **Financed: 46.324,85 €**
- 2020-2021** – Avances en el estudio comparativo de la virulencia de poblaciones comerciales y autóctonas de tres especies de nematodos entomopatógenos *Frankliniella occidentalis* (Thysanoptera: Thripidae) y *Tuta absoluta* (Lepidoptera: Gelechiidae). Koppert. PI: Dr. R. Campos-Herrera; research location: ICVV-CSIC (Logroño, Spain); term: 8 months. September 2020-April 2021. **Financed: 7.469,14 €**
- 2020-2021** – Desarrollo de nuevas bio-herramientas para el manejo de nematodos fitoparásitos basadas en los metabolitos secundarios de las bacterias *Xenorhabdus*, simbioses de nematodos entomopatógenos: estudio inicial de selección de actividades. Artal Smart Agriculture. PI: Dr. R. Campos-Herrera; research location: ICVV-CSIC (Logroño, Spain); term: 1 year and 3 months. March 2020-December 2021. **Financed: 39.988,89 €**
- 2020** – Evaluación de la virulencia de poblaciones autóctonas y comerciales de nematodos entomopatógenos frente a dos plagas aéreas de cultivos de importancias en invernaderos: *Frankliniella occidentalis* (Thysanoptera: Thripidae) y *Tuta absoluta* (Lepidoptera: Gelechiidae). Koppert. PI: Dr. R. Campos-Herrera; research location: ICVV-CSIC (Logroño, Spain); term: 3 months. January 2020-March 2020. **Financed: 3.630,00 €**
- 2019-2020** – Evaluación de la virulencia de poblaciones autóctonas y comerciales de nematodos entomopatógenos frente a *Frankliniella occidentalis* (Thysanoptera: Thripidae) y *Tuta absoluta* (Lepidoptera: Gelechiidae): estudio preliminar. KOPPERT Biological Systems CIF B30557284. research location: ICVV-CSIC (Logroño, Spain); term: 3 months. **Financed: 3.000,00 €**