

*Curriculum vitae*  
**PEDRO VILLAR-SALVADOR**

**WORK ADDRESS**

Forest Ecology and Restoration Group  
Department of Life Sciences  
Universidad de Alcalá  
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**EDUCATION**

- BSc in Biology, 1990. University of Valencia (Spain).
- PhD in Biology, 2000. Title of the thesis: Ecological and functional strategies of xylem in Mediterranean woody species. University of Valencia (Spain).

**PRESENT POSITION**

Associate professor in Ecology at the University of Alcalá since 2005

**APPOINTMENTS**

Position	Institution	
Biologist (contracted)	C.S.I.C., Instituto Pirenaico de Ecología (Zaragoza, Spain)	1993
Researcher (contracted)	Empresa de Transformaciones Agrarias (TRAGSA) (Guadalajara, Spain)	1995-1996
Researcher (as a freelance)	National Centre of Forest Improvement "El Serranillo", Spanish Ministry of Environment (Guadalajara, Spain)	1997-2005
Assistant professor in Ecology	University de Alcalá (Madrid, Spain)	2000-2004

**MAIN RESEARCH TOPICS**

Ecophysiology and functional ecology of plants, nursery plant cultivation and afforestation, woodland restoration and regeneration, plant colonization and seed dispersal.

**RESEARCH PROJECTS AND CONTRACTS (2015-2021)**

Project title: **Assessing avian functions and ecosystem services in agroforestry systems (EVALUAVE) PID2019-106806GB-I00.**

Financing entity: Spanish Ministry of Science and Innovation. 163.350 €. Duration: 2020-2023. PI: Salvador Rebollo and José M<sup>a</sup> Rey Benayas. Number of involved researchers: 6 of the University of Alcalá and the University of Granada.

**Project title: Pan-European Network for Climate Adaptive Forest Restoration and Reforestation (CA19128, PEN-CAFoRR)**

Financing entity: COST Program, UE. 23 countries from Europe + Canada and USA. 550000 €

**Project title: Program for contracting research assistants and technicians**

Financing entity: Community of Madrid and European Union. 45.000 €. Duration: 2021-2023. PI: Pedro Villar-Salvador. University of Alcalá.

**Project title: Scientific knowledge for achieving the Sustainable Development objectives: a translational ecology is needed (S2013/MAE-2719)**

Financing entity: Programa de actividades de I+D de la Comunidad de Madrid. PI: Adrián Escudero (all coordinated project) PI at the UAH: José M. Rey Benayas. Funding: 850000€ of which 71300 € are for UAH. Number of involved research centers: 7 Researchers of the University of Alcalá: 10. 01/01/2019-31/12/2022.

**Contract title: Design and performance of ecosystem restoration projects**

Financing entity: Contract with the International foundation for Ecosystem Restoration (FIRE). 15.000 €. Duration: 2017-2019. PI: Pedro Villar-Salvador. University of Alcalá. Number of involved researchers: 8 of the University of Alcalá.

**Project title: Program for contracting research assistants and technicians**

Financing entity: Community of Madrid and European Union. 45.000 €. Duration: 2017-2019. PI: Pedro Villar-Salvador. University of Alcalá.

**Project title: Ecosystem services provided by birds (high mobile link species) in farmland and forest mosaics: forest regeneration and plague regulation (CGL2014-53308-P).**

Financing entity: Spanish Ministry of Economy. 180.000 €. Duration: 2015-2019. PI: Salvador Rebollo and José M<sup>a</sup> Rey Benayas. Number of involved researchers: 5 of the University of Alcalá and the University of Granada.

**Contract title: Strategies and techniques for Agroecosystems restoration**

Financing entity: FIRE (International Foundation for Ecological Restoration). 12.000 €  
Duration: Nov. 2016- Nov. 2017. PI: Pedro Villar-Salvador. Number of involved researchers: 6

**Contract title: Strategies and techniques for Agroecosystems restoration**

Financing entity: FIRE (International Foundation for Ecological Restoration). 12.000 €  
Duration: Nov. 2015- Nov. 2016. PI: Pedro Villar-Salvador. Number of involved researchers: 6

**Project title: Ecosystem services provided by birds (high mobile link species) in farmland: seed dispersal and pests regulation CG2014/BIO-004.**

Financing entity: University of Alcalá. 9000 €. Duration: 2015. PI: Salvador Rebollo. Number of involved researchers: 6.

**Project title: Research + Development activities of the Community of Madrid on the restoration of natural environment. REMEDINAL 3 (S2013/MAE-2719).**

Financing entity: Government of the Community of Madrid (300.000 €, of which 45.000 € are for the University of Alcalá). Duration: 2014-2017. PI: Adrián Escudero, Number of involved research centers: 7 Researchers of the University of Alcalá: 10.

**PEER-REVIEWED PAPERS (2015-2021) \* main conceptual author**

- M. Molina-Morales, Leverkus A.B., Albaladejo-Robles G., Martínez-Baroja L., Pérez-Camacho L., **Villar-Salvador P.**, Rebollo S., Rey Benayas J.M., Castro J. 2022. Linking animal behaviour and tree recruitment: caching decisions by a scatter hoarder corvid determine seed fate in a Mediterranean agroforestry system. *Journal of Ecology* (in press).
- L. Martínez-Baroja, Rey-Benayas J.M., Pérez Camacho L., **Villar-Salvador P.**, 2021 Drivers of oak establishment from 25 year-old woodland islets planted to assist natural regeneration in Mediterranean old fields. *European Journal of Forest Research* 141:17-30.
- J.L. García, Oliet, J.A., **Villar-Salvador P.**, Guzmán, J.E. 2021. Root growth dynamics and structure in seedlings of four shade tolerant Mediterranean species grown under moderate and low light. *Forests* 12, 1540
- A.B. Leverkus, L. Levy , E. Andivia , P. Annighöfer , B De Cuyper , V. Ivetic , D. Lazdina, M. Löff , P. Madsen, **P. Villar-Salvador** 2021 Restoring vegetation through direct seeding or planting: Protocol for a continental-scale experiment" provides a clear and detailed methodology to test how seeds and seedlings interact with a range of environmental conditions across Eurasia. *Plos One* 16(11): e0259552.
- Luo, **Villar-Salvador P.**, Li G., Wang J. 2021. The dark side of nursery photoperiod reduction for summer plantation in a temperate-climate conifer: high winter mortality mediated by reduced seedling carbohydrate and nitrogen storage *Forest Ecology and Management* 491: 119171
- E. Andivia\*, **Villar-Salvador P\***, Oliet, J., Puértolas J., Dumroese R.K, Ivetic V. Molina-Venegas R., Arellano E., Li G., Ovalle J. 2021 Climate and species stress resistance modulate the higher survival of large seedlings in forest restoration worldwide. *Ecological Applications* e2394.
- L. Martínez-Baroja, Pérez-Camacho L.,**Villar-Salvador P.**, Rebollo S., Leverkus A.B, Pesendorfer M., Molina-Morales M., Castro J., Rey-Benayas J.M. 2020. Caching territoriality and site preferences by a scatter-hoarder drive the spatial pattern of seed dispersal and affect seedling emergence. *Journal of Ecology* 109: 2342–2353.
- A.O. Toca, **Villar-Salvador P\***, Oliet J., Jacobs D.F. 2020 Normalization criteria determine the interpretation of nitrogen effects on the root hydraulics of pine seedlings. *Tree Physiology* 40: 1381-1391.
- V. Cruz, **Villar-Salvador P\***, Ruiz-Benito P., Ibáñez I., Rey-Benayas J.M. 2020. Long-term dynamics of shrub facilitation shape the mixing of evergreen and deciduous oaks in Mediterranean abandoned fields. *Journal of Ecology* 108: 1125-1137.
- L. Martínez-Baroja, Pérez Camacho L., **Villar-Salvador P.**, Rebollo S, Quiles P., Gómez-Sánchez D., Molina-Morales M, Leverkus A, Castro J, Rey-Benayas JM. 2019. Massive and effective acorn dispersal into open agroforestry systems by an overlooked vector, the Eurasian magpie (*Pica pica*). *Ecosphere* 10 (12): e02989.
- A.O. Toca, Oliet J., **Villar-Salvador P.**, Martínez R., Jacobs D.F. 2019 Ecologically distinct pine species show differential root development after outplanting in response to nursery nutrient cultivation. *Forest Ecology and Management* 451: 117562
- P. Ruiz-Benito, **Villar-Salvador P.**, Pardos M., Herrero H., Cruz-Alonso V. Andivia E. 2019. Bases ecológicas para la gestión adaptativa de sistemas forestales”, IV reunión del Grupo de Trabajo de Ecología, Ecofisiología y Suelos Forestales de la Sociedad Española de Ciencias Forestales. *Ecosistemas* 28:120-121

- S. Rebollo, Rey-Benayas J.M., **Villar-Salvador P.**, Pérez-Camacho L., Castro J., Molina-Morales M., Leverkus A.B., Baz A., Martínez-Baroja L., Quiles P., Gómez-Sánchez D., Fernández-Pereira J.M., Meltzer J., Monteagudo N., Ballesteros L., Cayuela L., de las Heras, D., García-Salgado G., Martínez-Hestekamp S. 2019. Servicios de la avifauna (high mobile link species) en mosaicos agroforestales: regeneración forestal y regulación de plagas. *Ecosistemas* 28: 32-41.
- L. Fernández-Pérez, Zavala M.A., **Villar-Salvador P.**, Madrigal-González J. 2019. Divergent last century tree growth along an altitudinal gradient in a *Pinus sylvestris* dry-edge population. *Forests* 10: 532 [10.3390/f10070532](https://doi.org/10.3390/f10070532)
- W. Shi, **Villar-Salvador P.**, Li G., Jiang, X. 2019 Acorn size is more important than nursery fertilization for field performance of planted *Quercus variabilis* seedlings *Annals of Forest Science* 72 (1), pp.22.
- V. Cruz-Alonso, Ruiz-Benito P., **Villar-Salvador P.**, Rey-Benayas, J. M. 2019. Long-term recovery of Mediterranean forests depends on restoration strategy and forest type. *Journal of Applied Ecology* 56: 745-757.
- J. Wang, **Villar-Salvador P.**, Liu Y., Li G. 2019. Water stress does not inhibit nitrogen remobilization allowing high growth in high nitrogen content *Quercus variabilis* seedlings under drought conditions *Tree Physiology* 39: 650–660.
- E. Andivia, Zuccarini P., Grau B, De Herralde F., **Villar-Salvador P.**, Savé R. 2019. Rooting big and deep rapidly: the ecological roots of pine species distribution in southern Europe. *Structure and Function* 33: 293–303.
- E. Andivia, **Villar-Salvador P.**, Oliet J., Puértolas J., Dumroese K. 2019. How can my paper be useful for future meta-analysis on forest restoration plantations? *New Forests* 50: 255–266.
- E. Andivia, Madrigal-González J., **Villar-Salvador P.**, Zavala, M.A. 2018. Does facilitation from adult conspecifics increase sapling resilience to repeated droughts in water-limited pine forest? *Ecosphere* 9(6): article e02282.
- D. Salazar-Tortosa, Castro J., **Villar-Salvador P\***, Viñegla B., Matías L., Michelsen A., Rubio de Casas R., Querejeta, I. 2018. The “isohydric trap”: a proposed feedback between water shortage, stomatal regulation and nutrient acquisition drives differential growth and survival of European pines under climatic dryness. *Global Change Biology* 24: 4069-4083
- D. Salazar-Tortosa, Castro J., De Casas R.R., Viñegla-Pérez B., Sánchez-Cañete E.P., **Villar-Salvador P\***. 2018. Gas exchange at whole plant level shows that a less conservative water use is linked to a higher performance in three ecologically distinct pine species. *Environmental Research Letters* 13: 045004.
- L. Fernández-Pérez, **Villar-Salvador P\***, Martínez-Vilalta J., Toca A.O., Zavala M.A 2018 Distribution of pines in Iberia Peninsula agrees with seedling differences in foliage frost tolerance, not with xylem embolism vulnerability. *Tree Physiology* 38:507-516.
- W. Shi, **Villar-Salvador P.**, Jacobs D.F., Li G., Jang X. 2018. Simulated predation of *Quercus variabilis* acorns impairs nutrient remobilization and seedling performance irrespective of soil fertility. *Plant and Soil* 423:295–306
- A.O. Toca, Oliet J.A., **Villar-Salvador P.**, Maroto J., Jacobs, D.F. 2018. Species ecology determines the role of nitrogen nutrition on the frost tolerance of pine seedlings. *Tree Physiology* 38: 96-108.
- J. Castro, Molina-Morales M., Leverkus A.B., Martínez L., Pérez-Camacho L., **Villar-Salvador P.**, Rebollo S, Rey-Benayas J.M. 2017. Effective nut dispersal by magpies (*Pica pica* L.) in a Mediterranean agroecosystem. *Oecologia* 184: 183-192.

- E. Andivia, **Villar-Salvador P\***, Tovar L., Rabasa S., Rey-Benayas J.M. 2017. Multiscale assessment of woody species recruitment in Mediterranean shrublands: facilitation and beyond. *Journal of Vegetation Science* 28: 639-648.
- M. Uscola, **Villar-Salvador P\***, Oliet J., Warren Ch. 2017 Root uptake of inorganic and organic N chemical forms in two coexisting Mediterranean forest trees. *Plant and Soil* 415:387-392
- L. Matías, Castro J., **Villar-Salvador P.**, Quero J.L., Jump A.S. 2016. Differential impact of hotter drought on seedling performance of five ecologically distinct pine species. *Plant Ecology* 218:201-212.
- **P. Villar-Salvador 2016.** Restoration of Spanish pine plantations: A main challenge for the 21st century. *Reforesta* 1:53-66.
- M. Uscola, **Villar-Salvador P\***, Maillard, P. y Gross, P. 2015. Fast growth involves high dependence on stored resources in seedlings of Mediterranean evergreen trees. *Annals of Botany* 115: 1001-1013
- **P. Villar-Salvador\***, Uscola, M. Jacobs, D.F. 2015 The role of stored carbohydrates and nitrogen in the growth and stress tolerance of planted forest trees. *New Forests* 46: 813-839.

### PEER REVIEWED BOOK CHAPTERS (2015-2022)

- A. Herrero, Ruiz-Benito P., Andivia E., Madrigal-González J., **Villar-Salvador P.**, Ratcliffe S., Zavala M.A. 2021. Assessing drivers of current and future distribution of Mediterranean pine forests. In: N. Gidi and O. Yagil (eds.). *Pines and their mixed forest ecosystems in the Mediterranean Basin*. Chapter 17. pp 251-277. Springer, Cham, ISBN: 978-3-030-63624-1.
- J.M. Rey Benayas, Martínez de Baroja L., García de León, D., Crespo Cepas G., Pajares Guerra M., Pérez Camacho L., **Villar Salvador P.** 2021. Forest islands and hedgerows plantations as green infrastructure to assist natural regeneration in Mediterranean agricultural landscapes. In: J. Pemán, R.M. Navarro, R. Serrada (eds). *Ecological and Technical Basis for the forestation*. pp: 523-532. Ministerio para la Transición Ecológica y el Reto Demográfico. Madrid (Spain). ISBN: 9788418508561 (in Spanish)
- **P. Villar Salvador**, Oliet J.A. 2021. Factors and processes determining seedling establishment in forest plantations. In: J. Pemán, R.M. Navarro, R. Serrada (eds). *Ecological and Technical Basis for the forestation*. pp: 89-127. Ministerio para la Transición Ecológica y el Reto Demográfico. Madrid (Spain). ISBN: 9788418508561 (in Spanish).
- **P. Villar Salvador \***, Nicolás Peragón J.L., Peñuelas Rubira J.L. 2021. The quality of forest reproduction material. In: J. Pemán, R.M. Navarro, R. Serrada (eds). *Ecological and Technical Basis for the forestation*. pp: 781-822. Ministerio para la Transición Ecológica y el Reto Demográfico. Madrid (Spain). ISBN: 9788418508561 (in Spanish).
- J. Pemán; E. Chirino; D.F. Jacobs; J.M. Espelta; P. Martín-Gómez; R. Navarro-Cerrillo; J. Oliet; A. Vilagrosa; **P. Villar-Salvador**; E. Gil-Pelegrín. 2017. Physiological keys for natural and artificial regeneration of oaks. *Oaks Physiological Ecology. Exploring the Functional Diversity of Genus Quercus L.* 7, pp. 453 - 511. Springer, Germany. ISBN 978-3-319-69098-8

### PUBLICATION QUALITY INDEXES

Published paper in journals indexed the SCI: 64, 42 are in Q1

Published papers in journals not included in the SCI (mostly in Spanish): 46

Book chapters: 19, three in English and the rest in Spanish

h-index=35; i10-index=61; Total citations of my published work = 5416 (according to Google Scholar)

h-index (according to Web of Science) = 27

## **SYNERGISTIC ACTIVITIES AND CONFERENCES**

- Associate Editor of *New Forests* (2010 to 2021)
- Associate Editor of *Canadian Journal of Forest Research* (2019 to 2021)
- Secretary of the Department of Ecology at the University of Alcalá (2009-to 2013).
- Coordinator of the Master on Ecosystem Restoration at the University of Alcalá (2013 to 2021).
- Coordinator of the PhD programme Ecology, Biodiversity and Global Change. University of Alcalá (2020-to present)
- Chair in the scientific committee of the symposium on Restoring Forests
- Chair in the scientific committee of the III y V Spanish Forestry Congress, held in Granada 2001 and Ávila 2009, respectively.
- Organization of the congress: 1<sup>st</sup> Co-meeting of the working group of forestation of the Spanish Society of Forest Science (SECF) and the group on Ecological Restoration of the Spanish Society of Terrestrial Ecology. November 2007.
- Organization of the congress: IV Meeting of the Working group on Ecology, Ecophysiology and Forest soils of the Spanish Society of Forest Science (SECF). May 2019.
- Keynote speaker in the 1<sup>st</sup> Congress on Reforestation challenges. IUFRO-University of Belgrade, Belgrade (Serbia), June 2015. Title of conference: Restoration of the Spanish Mediterranean forests: challenges for the XXI century and lesson on plant quality and nursery cultivation.
- Keynote speaker in the 2<sup>nd</sup> Restoring Forests. IUFRO-Purdue University. Lafayette, Indiana, USA. Title of conference: Importance of stored nitrogen and carbohydrates on seedling outplanting performance.
- Keynote speaker in the Congress on Nutrient Dynamics of Planted Forests, November 2012, Vancouver, Washington USA. Title of the conference: Nursery fertilization of oaks: consequences for plant quality and out-planting”

## **SHORT STAYS AT RESEARCH INSTITUTIONS**

- INRA, Unité Mixte de Recherche, Ecologie et Ecophysologie Forestières. Nancy (France). February-May 2004
- Macaulay Institute, Aberdeen, (UK). June 2008
- INRA, Unité Mixte de Recherche, Ecologie et Ecophysologie Forestières. Nancy (France). October 2010.
- Forestry and Natural Resources Department, Purdue University. West Lafayette (Indiana, USA). July 2011
- Biological and Environmental Sciences, School of Natural Sciences, University of Stirling, UK. October 2013.
- Forestry and Natural Resources Department, Purdue University. West Lafayette (Indiana, USA). August 2014
- Key Laboratory for Silviculture and Conservation, Beijing Forestry University, Beijing, China. July 2017
- Key Laboratory for Silviculture and Conservation, Beijing Forestry University, Beijing, China. May-July 2019

## SCIENTIFIC SUPERVISOR:

- Supervised PhD thesis:
  - 1) Bárbara Cuesta. February 2010. Revegetation of abandoned croplands in Mediterranean continental environments. From the ecophysiology of individuals to ecosystem properties. Universidad de Alcalá (Spain).
  - 2) Mercedes Uscola July 2013. Ecophysiology of nitrogen in Mediterranean plants: strategies of nitrogen forms absorption, functional responses, and use of reserves for growth. Universidad de Alcalá (Spain).
  - 3) Laura Fernández Pérez. May 2018. Functional responses of conifers to cold and drought: a multiscale approach. Universidad de Alcalá (Spain).
  - 4) Wenhui Shi. June 2018. Effects of acorn nutrient and soil fertility on *Quercus variabilis* seedling quality and outplanting performance. Beijing Forestry University (China).
  - 5) Jiayi Wang. June 2019. Effect of nitrogen loading on seasonal nitrogen internal cycling and seedling quality of *Quercus variabilis*". Beijing Forestry University
  - 6) Andrei Toca 2019. The role of nitrogen on the frost tolerance, root growth dynamics and hydraulic conductance of ecologically distinct *Pinus* spp. species. Universidad de Alcalá (Spain).
  - 7) Verónica Cruz 2019. Long-term dynamics of forest recovery in Mediterranean abandoned fields: Outcomes, processes and drivers of contrasting restoration strategies. Universidad de Alcalá (Spain).
  - 8) Loreto Martínez Baroja 2021. Drivers of the recruitment of holm oaks (*Quercus ilex*) in agroforestry mosaics. Acorn dispersal by magpies (*Pica pica*) and seedling establishment. Universidad de Alcalá (Spain).
  - 9) José Luis García 2022. Spatial patterns and processes determining the diversification of Mediterranean pine plantations. Ecological and silviculture factors. Polytechnic University of Madrid (Spain)
- Master and Undergraduate thesis: Supervisor of more than 42 students.

## REFEREE IN INTERNATIONAL SCIENTIFIC JOURNALS

Acta Botanica Croata, Acta Oecologica, American Journal of Botany, Annals of Forest Science, Bosques, Canadian Journal of Forest Research, Ecological Engineering, Ecosphere, Environmental and Experimental Botany, Forest Pathology, Forest Systems, Frontiers in Forests and Global Change, Functional Plant Biology, Journal of Applied Ecology, Journal of Arid Environments, Journal of Forest Research, Journal of Vegetation Science, New Forests, New Phytologist, Oecologia, Planta, Plant Cell and Environment, Plant Ecology, Plant Ecology and Diversity, Plant and Soil, PlosOne, Restoration Ecology, Scientific Reports, Tree and Forestry Science and Biotechnology, Tree Physiology, Web Ecology.