

Summary CV Maria Zunzunegui González,

Full Professor, University of Seville, since December 2, 2020

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General Indexes of Research Quality Activity

I have been acknowledged with 5 six-year research periods (Sexenios from the Spanish Government), 6 five-year teaching periods (Quinquenios from Universidad de Sevilla) and 5 regional working periods (Regional Government).

Total number of publications: 78

Publications in JCR (ISI journals): 59

Publications indexed in Latindex journals: 6

Chapters in books with ISBN: 6

Publication articles in divulgation journals: 3; and videos: 4

Following Scopus, I have an H index of 27 and have been cited 2075 times.

Congress: 56

PhD Theses directed: 6 and 1 Master Thesis.

Project participated: 20, (7 international), being the principal investigator in 5

Contracts with companies participated: 8.

Since 1990, I have taught at the Faculty of Biology, participating in theoretical and practical classes of 12 different subjects. From the 2014/2015 academic year, I have been teaching in the Master of Advanced Biology at the Faculty of Biology.

In the last 10 years

I have been involved in 9 national and 4 international R&D projects, serving as the principal investigator in two national projects. In this period, I have published 27 papers in JCR-indexed journals (20 Q1) and a book chapter.

Summary:

I graduated in Biology in 1989 and earned a PhD in Biology in 1997. For over 30 years, I have been working in plant ecology, focusing on gas exchange, chlorophyll fluorescence, water relations and stable isotopes to study dynamic processes. My research integrates biochemical and physiological analyses to understand plant responses to biotic and environmental factors. I have conducted studies on Mediterranean scrub in coastal areas in Portugal and Spain, as well as research projects in Morocco, Argentina and Mexico.

My main research line is an ecophysiological approach to Mediterranean scrub ecosystems, focusing on key indicators such as leaf water potential, photochemical efficiency of photosystem II, gas exchange, leaf pigment content, leaf-free proline content, and stable isotopes of C, N and O. These studies primarily address plant responses to stress in Mediterranean ecosystems. I have explored phenotypic plasticity and functional plant traits in Mediterranean scrub species, examining traits such as specific leaf area, leaf dry matter content, and resource allocation patterns. These analyses have identified key traits linked to drought tolerance, competitive ability, and resilience, providing insights into plant strategies for coping with resource-limited conditions and environmental changes.

A significant part of my research has focused on invasive species, or natives with invasive behaviour, and their impact on native vegetation, including endemic and vulnerable species such as *Corema album* and *Thymus mastichina* in Iberian coastal ecosystems. I am currently working with *Retama monosperma* in the SW of Spain, identifying the main factors that contributing to the invasive success of this native species with invasive behaviour in coastal dunes. My work also

includes studying dioecy and reproductive costs in *Corema album* (Iberian Peninsula) and *Empetrum rubrum* (Argentina); as well as the physiological mechanisms of water exchange in the hemiparasite species *Osyris lanceolata*. Currently, I am working on a project to establish protocols for the propagation and organic cultivation of *Corema album* to endorse efficient use of natural resources, promoting the protection of biodiversity and sustainable cultivation in agroecological systems.

Regarding stable isotopes, I have supervised two PhD theses. The first defended in 2009 analysed water sources and water-use efficiency in *Argania spinosa*. The second, defended in 2013, investigated facilitation and competition dynamics between native and invasive species using stable isotopes to explain the interactions between species. Beyond these theses, my research has focused on applying stable isotopes as a powerful tool to understand plant-water relations, resource-use strategies, and plant interactions in Mediterranean ecosystems. For example, I have studied isotopic discrimination in C, N, and O to analyze water-use efficiency and drought resilience in species of Mediterranean scrub and coastal dunes. My work has also explored carbon allocation patterns in response to environmental stressors and competitive dynamics in coastal ecosystems.

Overall, my research has significantly advanced the understanding of plant responses to stress, the ecological dynamics of Mediterranean ecosystems, and the interactions between invasive and native species. These findings have been published in high-impact journals, contributing to the knowledge of plant physiological responses to resource limitations and their implications for ecosystem management and conservation.

The most important publications of the last 10 years

1. Esquivias MP, Zunzunegui M, Díaz Barradas MC, Álvarez-Cansino L. 2015. Competitive effect of a native-invasive species on a threatened shrub in a Mediterranean dune system. *Oecologia* 177:133–146
2. Díaz-Barradas MC, Zunzunegui M, Álvarez-Cansino L, Esquivias MP, Collantes MB, Cipriotti PA. 2015. Species-specific effects of the invasive *Hieracium pilosella* in Magellanic steppe grasslands are driven by nitrogen cycle changes. *Plant and Soil* 397: 175-187.
3. Ain-Lhout F, Boutaleb S, Díaz-Barradas MC, Jáuregui J, Zunzunegui M. 2016. Monitoring the evolution of soil moisture in root zone system of *Argania spinosa* using Electrical resistivity imaging. *Agricultural Water Management*: 164: 158-166.
4. Zunzunegui M., Díaz-Barradas MC, Jáuregui J, Rodríguez Martínez H., Álvarez-Cansino L. 2016. Season-dependent and independent responses of Mediterranean scrub to light conditions. *Plant Physiology and Biochemistry* 102: 80-91.
5. Zunzunegui M, Esquivias MP, Fernández González P, Valera Burgos J, Díaz Barradas MC Gallego Fernández JB. 2017. Morpho-physiological response of *Retama monosperma* to extreme salinity levels. *Ecohydrology*. 10.1002/eco.1871.
6. Díaz-Barradas MC, Zunzunegui M, Alvarez-Cansino L, Esquivias MP, Valera J, Rodríguez H 2018. How do Mediterranean shrub species cope with shade? Ecophysiological response to different light intensities. *Plant Biology* 20: 296-306.
7. Zunzunegui M, Boutaleb S, Díaz Barradas MC, Esquivias MP, Valera J, Jáuregui J, Tagma T, Ain-Lhout F. 2018. Reliance on deep soil water in the tree species *Argania spinosa* *Tree Physiology* 38: 678-689.
8. Antunes C, Díaz-Barradas MC, Zunzunegui, M, Vieira S, Pereira Â. Anjos A, Correia Otilia, Pereira MJ, Máguas C. 2018. Contrasting plant water-use responses to groundwater depth in coastal dune ecosystems. *Functional Ecology*. 32: 1931-1943.

9. Antunes C, Díaz-Barradas MC, Zunzunegui M, Vieira S, Máguas C. 2018. Water source partitioning among plant functional types in a semi-arid dune ecosystem. *Journal of Vegetation Science* 29: 671-683.
10. Antunes C, Chozas S, West J, Zunzunegui M, Díaz-Barradas MC, Vieira S, Máguas C. 2018. Groundwater drawdown drives ecophysiological adjustments of woody vegetation in a semi-arid coastal ecosystem. *Global Change Biology* 24: 4894-4908
11. Díaz-Barradas MC, Zunzunegui M, Correia O, Ain-Lhout F, Esquivias MP, Álvarez-Cansino L. 2018. Gender dimorphism in *Corema album* across its biogeographical area and implications under a scenario of extreme drought events. *Environmental and Experimental Botany* 155: 609-618.
12. Zunzunegui M, Ruiz-Valdepeñas E, Sert MA, Díaz-Barradas MC, Gallego-Fernández JB. 2020. Field comparison of ecophysiological traits between an invader and a native species in a Mediterranean coastal dune. *Plant Physiology and Biochemistry* 146: 278-286.
13. Díaz-Barradas MC, Gallego-Fernández JB, Zunzunegui M. 2020. Plant response to water stress of native and non-native *Oenothera drummondii* populations. *Plant Physiology and Biochemistry* 154: 219-228.
14. Gallego-Fernández JB., Morales-Sánchez JA, Martínez ML, García-Franco JG, Zunzunegui M. 2020. Recovery of beach-foredune vegetation after disturbance by storms. *J Journal of Coastal Research* 95:34-38.
15. Gallego-Fernández JB. Martínez ML, García-Franco JG., Zunzunegui M 2021. Multiple seed dispersal modes of an invasive plant species on coastal dunes. *Biological Invasions*.
16. Zunzunegui M, Morales Sánchez JA, Díaz Barradas MC, Gallego-Fernández JB. 2021. Different tolerance to salinity of two populations of *Oenothera drummondii* with contrasted biogeographical origin. *Plant Physiology and Biochemistry* 162: 336–348.
17. Zunzunegui M, Esquivias MP, Gallego-Fernández JB. 2022. Spatial and temporal patterns of water use by Mediterranean coastal dune vegetation. *Plant and soil* 477: 807–828.
18. de la Fuente JL, Zunzunegui M, Díaz Barradas MC. 2023. Physiological responses to water stress and stress memory in *Argania spinosa*. *Plant Stress* 7: 100133.
19. Díaz-Barradas MC, Valera J, Esquivias MP, Zunzunegui M. 2023. The hemiparasitic shrub *Osyris lanceolata* (Santalaceae) does not disturb the ecophysiology of its hosts. *Flora* 303: 152277
20. García López JV, Redondo Gómez S, Flores Duarte NJ, Zunzunegui González M, Rodríguez Llorente ID, Pajuelo Domínguez E, Mateos Naranjo E. (2023). Exploring through the use of physiological and isotopic techniques the potential of a PGPR-based biofertilizer to improve nitrogen fertilizer practices efficiency in strawberry cultivation. *Frontiers in Plant Science* 14: 1243509.
21. Zunzunegui M, Esquivias MP, Álvarez-Cansino L, Gallego-Fernández JB. 2024. Seawater spray as a significant nitrogen source across coastal dune vegetation gradients, *Estuarine, Coastal and Shelf Science* 309.
22. Valle-Romero P, Martín-Peláez MR, Flores-Duarte NJ, Redondo-Gómez S, Puglielli G, Zunzunegui M, Álvarez-Cansino L, Rodríguez-Llorente ID, Pajuelo E, Mateos-Naranjo E. Conditions for vegetative propagation of three key halophytes from habitats of EU community interest: substrate nature, salinity and PGP-bacterial interactions and cost evaluation. *Estuarine, Coastal and Shelf Science*.
23. Fernández-Martínez M; Jiménez-Carrasco C; Díaz Barradas MC; Gallego-Fernández JB; Zunzunegui M. 2025. Ecophysiological keys to the success of a native-expansive Mediterranean species in threatened coastal dune habitats. *Plants* 14, 2342.
24. Zunzunegui; M Esquivias MP, Díaz Barradas MC; Gallego-Fernández JB.; Álvarez-Cansino L.2025. Interspecific competition and intraspecific facilitation shape coastal dune shrub responses to experimental drought. *Plants* 14, 2663.