

Part A. PERSONAL INFORMATION

CV date

13/09/2023

First and Family name	Joaquín Hortal		
Social Security, Passport, ID number	50729222P	Age	50
Researcher codes	WoS Researcher ID (*)	A-1531-2008	
	SCOPUS Author ID(*)	22937790400	
	Open Researcher and Contributor ID (ORCID) **	0000-0002-8370-8877	

(*) At least one of these is mandatory

(**) Mandatory

A.1. Current position

Name of University/Institution	Museo Nacional de Ciencias Naturales (MNCN) Consejo Superior de Investigaciones Científicas (CSIC)		
Department	Dept. Biogeografía y Cambio Global		
Address and Country	C/José Gutiérrez Abascal 2, 28006 Madrid, Spain		
Phone number	+34915668967	E-mail	jhortal@mncn.csic.es
Current position	<i>Investigador Científico</i> (Scientific Researcher)	From	16/02/2021
Other affiliations	Colaborador externo, Programa de Pós-Graduação em Ecologia e Evolução, Dept. Ecologia, Instituto de Ciências Biológicas, Universidade Federal de Goiás, 74.690-900 Goiânia (GO), Brazil. Associate Researcher, Centre for Ecology, Evolution and Environmental Changes (cE3c), Faculdade de Ciências da Universidade de Lisboa, 1749-016 Lisboa, Portugal.		
Key words	Biogeography, community ecology, biodiversity, ecological theory		

A.2. Education

PhD	University	Year
Evolutionary Biology & Biodiversity	Universidad Autónoma de Madrid	2004

A.3. JCR articles, h Index, thesis supervised...

8172 citations (751 citations/year during 2018–2022); $h = 44$ (according to Scopus)

125 articles in JCR journals, 110 in Q1 journals, 74 of them in top 10% (D1) (*Scimago* categories *Multidisciplinary; Ecology, Evolution, Behavior and Systematics; Environmental Science*). 11 postdocs and 13 PhD Theses supervised (12 in the last 10 years), +5 ongoing PhD students. PI of 13 projects (+1 M€ direct research funds); 1 patent (pending recognition)

More information at <https://jhortal.com/>

Part B. CV SUMMARY (max. 3500 characters, including spaces)

I started my research career in 1997 as a volunteer at the Entomology section of the *Museo Nacional de Ciencias Naturales* (MNCN-CSIC), where I developed my PhD (1999–2004). I trained as entomologist and biogeographer, working on biodiversity estimates, quality of biodiversity data, predictive models and systematic conservation planning.

After my PhD I worked at the *universities of the Azores* (2004–2005) and *Copenhagen* (2006) through a Portuguese FCT postdoc scholarship. My research dealt with topics from island biogeography to global macroecology, also continuing my work on identifying bias in biodiversity data and improving the use of predictive distribution models.

During 2007–2010 I was Research Associate at the *Centre for Population Biology (Imperial College at Silwood Park)*, where I developed a more theoretical approach to biogeography and community ecology, using theoretical models and empirical data to study the environmental, historical, and evolutionary determinants of diversity gradients.

After a short period at MNCN (6-month JAE-Doc grant), I took a Visiting Professorship funded by Brazilian CNPq at the *Universidade Federal de Goiás* (UFG). From 2010 to 2012 I worked on incorporating uncertainty to global change estimates, and continued my work on process-



based theoretical models on the organization and structure of diversity across scales. Part of this time at UFG was shared with my final return to MNCN.

Since 2011 I've been working as PI at MNCN, first as Ramón y Cajal Research Fellow, from 2016 as Tenured Researcher, and in October 2019 I approved the open call for upgrading to Scientific Researcher, which started in February 2021. I'm also scientific collaborator at cE3c (*University of Lisbon*), and External Professor at UFG, where I spend 1-2 months every year thanks to Brazilian and cooperation grants.

I lead a multidisciplinary international lab working on community ecology, functional ecology and biogeography. Currently is composed of 3 postdocs, 4 PhD students, and 1 technician under direct supervision, plus a visiting PhD student; we receive frequent visitors and sabbaticals. Our main research lines include identifying the determinants of community structure and assembly through theoretical models, growth chamber and field experiments with plants and mosses, fieldwork with different groups, and biodiversity big data; establishing the basis of trait-based functional ecology of dung beetles; and describing and mapping the biases and limitations of biodiversity data.

My main achievements so far have been:

- (i) Demonstrating the major importance of limitations and biases in current biodiversity data (e.g. 10 in c.1 below), and providing a framework to incorporate the uncertainty associated to them in ecological and evolutionary research and global change forecasts (1,5,6)
- (ii) Major contributions to the theoretical basis and practical use of species distribution models in biogeography, taking into account the limitations of the data (e.g. 1,3)
- (iii) Providing solid theoretical foundations for the relationship between species richness and habitat diversity (2,7,9)
- (iv) Demonstrating that the determinants of current biodiversity gradients and ecological interactions go beyond climate and evolutionary restrictions, and include biogeographical and historical effects such as dispersal or glaciations (3,4,8)

I have also served extensively as editor and referee of grants and papers. In particular, between 2007 and July 2019 I served as Editor-in-Chief of *Frontiers of Biogeography*, the journal of the International Biogeography Society, transforming an internal bulletin into an open access scientific journal currently indexed at Scopus, and about to enter WoK. Since September 2021 I have been in charge of launching *npj Biodiversity*, a new journal from the *Nature* portfolio, in the quality of Editor-in-Chief.

Part C. RELEVANT MERITS

C.1. Publications (including books)

+200 scientific publications, including 135 papers in journals and books indexed by Scopus, seven book chapters (all international) and 2 edited congress abstract books. 10 most relevant:

1. Tessarolo, G., Ladle, R. J., Lobo, J. M., Rangel, T. F., & **Hortal, J.** (2021) Using maps of biogeographical ignorance to reveal the uncertainty in distributional data hidden in species distribution models. *Ecography*, 44, 1743–1755. doi:10.1111/ecog.05793.
2. **Hortal, J.** & Santos, A.M.C. (2020) Rethinking extinctions that arise from habitat loss. *Nature*, 584, 194-196. doi:10.1038/d41586-020-02210-x
3. Mestre, A., Poulin, R. & **Hortal, J.** (2020) A niche perspective on the range expansion of symbionts. *Biol Rev*, 95, 491-516. doi: 10.1111/brv.12574
4. Calatayud, J., Hórreo, J.L., Madrigal-González, J., Migeon, A., Rodríguez, M.Á., Magalhães, S. & **Hortal, J.** (2016) Geography and major host evolutionary transitions shape the resource use of plant parasites. *Procs Natl Acad Sci USA*, 113, 9840-9845.
5. **Hortal, J.**, de Bello, F., Diniz-Filho, J.A.F., Lewinsohn, T.M., Lobo, J.M. & Ladle, R.J. (2015) Seven shortfalls that beset large-scale knowledge of biodiversity. *Ann Rev Ecol Evol Syst*, 46, 523-549.
6. McInerney, G.J., Chen, M., Freeman, R., Gavaghan, D., Meyer, M., Rowland, F., Spiegelhalter, D.J., Stefaner, M., Tessarolo, G. & **Hortal, J.** (2014) Information visualisation for science and policy: engaging users and avoiding bias. *Trends Ecol Evol* 29, 148-157.



7. **Hortal, J.**, Carrascal, L.M., Triantis, K.A., Thébault, E., Meiri, S. & Sfenthourakis, S. (2013) Species richness can decrease with altitude, but not with habitat diversity. *Procs Natl Acad Sci USA*, 110, E2149–E2150.
8. **Hortal J.**, Diniz-Filho J.A.F., Bini L.M., Rodríguez M.Á., Baselga A., Nogués-Bravo D., Rangel T.F., Hawkins B.A. & Lobo J.M. (2011) Ice age climate, evolutionary constraints and diversity patterns of European dung beetles. *Ecol Lett*, 14, 741–748.
9. **Hortal, J.**, Triantis, K.A., Meiri, S., Thébault, E., & Sfenthourakis, S. (2009) Island species richness increases with habitat diversity. *Am Nat*, 173, E205–E217.
10. **Hortal, J.**, Jiménez-Valverde, A., Gómez, J.F., Lobo, J.M., & Baselga, A. (2008) Historical bias in biodiversity inventories affects the observed realized niche of the species. *Oikos*, 117, 847-858.

C.2. Research projects and grants

I participated in 48 research projects, 14 as PI (+1,400,000€ of direct research funds) incl.:

PID2022-140985NB-C21 NICED - Integrating ecological and biogeographical perspectives on the interplay between niche and coexistence along species distributions (coordinated project) (AEI Knowledge Generation Projects, Spain). MNCN (2023–2026), 188.000 €

PID2019-106840GB-C21 SCENIC - Scaling the effects of niche and interaction dynamics on the ecological and evolutionary outcomes of coexistence (coordinated project) (AEI R+D+i projects, Spain). MNCN (2020–2024), 156.000 €

CGL2016-78070-P UNITED – Unifying niches, interactions and distributions: A common theoretical framework for geographic range dynamics and local coexistence (DGCyT National Plan, Spain). MNCN (2017–2020), 104.000 €

PVE 314523/2014-6 Predicting diversity variations across scales through process-based models linking community ecology and biogeography (CNPq Science Without Borders, Brazil). UFG, co-PI with J.A.F. Diniz-Filho (2015–2017), 460,333 Brazilian R\$

EXPL/BIA-BIC/2311/2013 COMDUNES – Do inland sand dune communities follow strict ecological succession? (FCT Exploratory Projects, Portugal). U. Lisbon (2014–2015), 49.364 €

P2011BR0071 Developing tools to unify range dynamics and community-level processes into a single analytical framework (International Cooperation CSIC, Spain). MNCN & UFG (2013–2015), 45.000 €

CGL2011-29317/BOS SCARPO – Disentangling the geographic and evolutionary determinants of the diversity of Western Palaearctic dung beetles (DGCyT National Plan, Spain). MNCN (2012–2015), 192.390 €

C.3. Patents and other IPR

Pérez García, M.; Miguel Lobo, J.J.; Torregrosa Perera, J.M.; **Hortal Muñoz, J.** – Trampa autónoma para estudio temporal de la actividad de insectos en campo. [Automated trap for field studies on insect phenology] Holding entity: CSIC. Priority country: Spain. Date: In process.

C.4. Participation in meetings, working groups and international consultancy

Advisor in 15 working groups for international institutions and government agencies on research in biodiversity informatics and conservation planning, including:

2012-2013 Brazil-European Union Dialogue on Payment for Ecosystem Services (Ministerio do Meio Ambiente - Brazil, EU DG Environment, Brasilia)

2012 Visualising the future of our planet - Can we do better than heat maps? (Microsoft Research Ltd., Cambridge, UK)

2010 Measuring changes in species' distributions (CEH / Biological Records Centre, UK)

2007 Species vulnerability traits (IUCN, Ascot, UK)

21 lectures by invitation in international conferences, 44 oral communications (35 international), 57 posters (50 international), 28 seminars at academic institutions



C.5 Academic activities

Supervisor/co-supervisor of 9 Postdocs (+2 in progress), 13 PhD (+5 in progress), 3 MSc (+1 in progress) and 1 BSc.

Examiner for 20 PhD and 16 MSc or similar.

Professor/coordinator in 39 postgraduate courses (Spain, Portugal, Brazil, UK, Switzerland and Denmark) (526 hours from 2013)

2012–2020 Academic Commission Official Program "PhD in Ecology Ecosystem Conservation and Restoration."; Univ. Alcalá (coordinator), Univ. Complutense de Madrid, Univ. Politécnica de Madrid and Univ. Rey Juan Carlos.

2010–Present Permanent Professor PostGraduate Program in "Ecologia e Evolução"; UFG

C.6. R+D management

Organizer of one symposium (Sampling and modeling the spatial responses of insects across spatial scales, XXIII International Congress for Entomology. Durban 2008).

Organizer of four working groups: Current and past determinants of Western Palearctic biodiversity (2008-2010) and Developing Putative Networks (2010) at Imperial College, UK; and Mapping Biogeographical Ignorance (2017) and Dung Beetle Functional Ecology (2019) at MNCN.

C.7. Editorial work

I am or have been member of the editorial board of the following journals indexed by Scopus (3 by ISI WoK):

2021–Present Editor-in-chief, *npj Biodiversity* (<https://www.nature.com/npjbiodivers/>). +30 edited articles

2009–Present *Frontiers of Biogeography* (<http://escholarship.org/uc/fb>). +150 edited articles (Editor-in-chief 2009–2019, deputy Editor-in-Chief 2019–2020, associate editor since July 2020)

2014–2021 Editor, *Animal Biodiversity and Conservation* (<http://abc.museucienciasjournals.cat/>). (Q3 scimago journal rank) 12 edited articles

2008–2021 Subject editor, *Ecography* (<http://www.wiley.com/bw/journal.asp?ref=0906-7590>). (D1 scimago journal rank) +100 edited articles

2016–2018, Associate Editor, *BMC Ecology* (<https://bmcecol.biomedcentral.com/>). (Q1 scimago journal rank) 6 edited articles

2007–2009 Editor and Managing Editor, *International Biogeography Society Newsletter* (currently *Frontiers of Biogeography*) (<http://www.biogeography.org/html/newsletter.html>)

Referee for +350 articles and book chapters, including +300 in JCR-indexed journals (incl. *Science*, *Nature*, *PLoS Biol.*, *Ecol. Lett.*, *Procs. Roy. Soc. B.*, *Am. Nat.*, *Mol. Ecol.*, the four major biogeography journals and +50 other journals)

C.8. Referee for grants and academic promotions

Referee for c.80 Research projects (for NSF, NERC, BBSRC, NWO, DFG, FCT, ANEP and 10 other national and international agencies).

Referee of promotions/scholarships for CSIC, ANEP (Spain, incl. Ramón y Cajal Commission), FCT (Portugal, incl. Investigador FCT), University of Pretoria, Czech University of Life Sciences Prague, and several international calls.

C.9 Outreach

Since 2013 – Regular collaborator in *Ciencia Critica* science column at eldiario.es (1st native digital journal in Spanish).

Participant/speaker in 5 forums with the public and/or administration technicians.