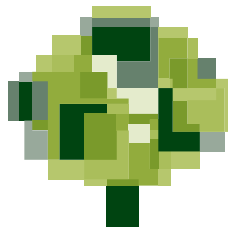


CREAF

Ecology moves us

ANNUAL REPORT 2021



CREAF

Ecology moves us

ANNUAL REPORT 2021

© CREAM 2021







Text and graphics: CREAM

Coordination: Anna Ramon and Adriana Clivillé.

Design and infographics: Lucas Wainer

Cover and Sections photographs © J.Luis Ordóñez

CONTENTS

Who we are	6	
Annual Highlights	16	
International Highlights	19	
Philanthropy & Private Sector Alliances	23	
Gender	28	
Financial Overview	30	
Research Highlights	32	
Scientific Output	59	
Training	88	
Communication And Outreach	92	
Annexes	100	



A scenic view of a mountain valley. In the foreground, there are lush green trees. The middle ground shows a steep, rocky cliff face with distinct horizontal layers of rock. Below the cliff, a dense forest of green trees covers the valley floor. The background shows more distant, hazy mountain ranges under a clear sky.

WHO WE ARE

OUR APPROACH



We are a public research center dedicated to terrestrial ecology, territorial analysis and global change, pursuing excellence in the generation and transfer of knowledge, management tools and methodologies.

We strive to create new knowledge and innovative solutions on terrestrial ecology management and land-atmosphere interaction that helps society to mitigate Global Change effects, creating adaptation plans and boosting the resilience of nature.

“Through excellence in science we aim to be a Mediterranean and world-class research institution that pushes the frontiers of knowledge while addressing some of the biggest and more complex environmental challenges society faces this century.”

Our aims

- Carry out innovative BASIC RESEARCH on ecology
- Promote APPLIED RESEARCH for the sustainable management of ecosystems
- Develop TOOLS to facilitate decision-making and environmental policies
- DISSEMINATE the research in ecology and its impact in society

About us

- Founded in 1987 (Decret 300/1987)
- A leading research center in Mediterranean ecosystems research
- Close to 150 scientists and experts grouped in four research areas: biodiversity, global change, ecology and earth observation.
- CREAM headquarters are located at the campus of the Autonomous University of Barcelona, Spain.
- An independent center for governments, NGOs, scientists, business and local communities to find practical solutions for facing global change in the Mediterranean region
- 70 research projects with field studies and activities around the planet.
- Funded by governments, international and national research programs, private companies and foundations.
- Governed by a board of trustees formed by different public entities (administrations, universities, and research centers and institutes).

Governing organizations

CREAF is a public research center which exists as a consortium between different public entities (administrations, universities, and research centers and institutes).

BOARD OF TRUSTEES



DISTINCTIONS



MEMBERS OF



WITH SUPPORT FROM



THE GOVERNING COUNCIL OF CREAM



PRESIDENT OF THE GOVERNING COUNCIL

Ms. Teresa Jordà i Roure, Consellera d'Acció Climàtica, Alimentació i Agenda Rural, Delegate in Ms. Anna Barnadas, Secretària d'Acció Climàtica.

SECRETARY OF THE GOVERNING COUNCIL

Mr. Joan Pino, Director of CREAM.

CREAM MEMBERS OF THE GOVERNING COUNCIL

Mr. Javier Lafuente Sancho, Rector de la UAB. Delegate in Ms. Rosa Maria Sebastián Vicerectora d'Innovació i Projectes Estratègics.

Mr. Joan Guàrdia Olmos, Rector de la UB. Delegate in Mr. Jordi García Fernández, Vicerector de Recerca.

Ms. Maria Teresa Cabré, Presidenta de l'IEC. Delegate in Mr. Joandomènec Ros Aragonès.

Mr. Rosa María Menéndez López, Presidenta del CSIC. Delegate in Mr. Lluís Calvo Calvo de la Delegació del CSIC a Catalunya.

Ms. Anna Sanitjas, Directora General d'Ecosistemes Forestals (DACA).

Mr. Pere Sala Martí, Director de l'Observatori del Paisatge Departament de la Vicepresidència i de Polítiques Digitals i Territori.

Mr. Marc Vilahur Chiaraviglio, Director General de Polítiques Ambientals i Medi Natural (DACA).

Mr. Francesc Xavier Grau Vidal, Secretari d'Universitats i Recerca (DRU). Delegate in Mr. Joan Gómez Pallarès, Director General de Recerca. (DGR).

Mr. Joan Delort Menal, Director General de Prevenció, Extinció d'Incendis i Salvaments (DI).

Mr. Lluís Rovira, Director de la Fundació I-CERCA.

EXECUTIVE COMMISSION OF CREAF

The Executive commission is named by the Governing Council and handles day-to-day issues of the Center. It is presided by the Director of CREAF.

PRESIDENT OF THE EXECUTIVE COMMISSION

Mr. Joan Pino, Director of CREAF.

MEMBERS OF THE EXECUTIVE COMMISSION

Ms. Teresa Jordà i Roure, Consellera d'Acció Climàtica, Alimentació i Agenda Rural, Delegate in Ms. Anna Barnadas, Secretària d'Acció Climàtica.

Mr. Francesc Xavier Grau Vidal, Secretari d'Universitats i Recerca (DRU). Delegate in Mr. Joan Gómez Pallarès, Director General de Recerca. (DGR).

Ms. Anna Sanitjas, Direcció General de d'Ecosistemes Forestals (DACA).

Mr. Javier Lafuente Sancho, Rector de la UAB. Delegate in Ms. Rosa Maria Sebastián Vicerectora d'Innovació i Projectes Estratègics.

Mr. Joan Guàrdia Olmos, Rector de la UB. Delegate in Mr. Jordi García Fernández, Vicerector de Recerca.

Ms. Rosa María Menéndez López, Presidenta del CSIC. Delegate in Mr. Lluís Calvo Calvo de la Delegació del CSIC a Catalunya.

Scientific Committee



Pep Canadell
CSIRO, Australia

John Grace
Edinburg
University, UK



Rob Jackson
Duke's Center of
Global Change, EUA

Ivan Janssens
Antwerpen
University, Belgium



Ophélie Ronce
Institut des Sciences de l'Evo-
lution de Montpellier, France

Bridget Emmett
Centre for Ecology and
Hydrology,
United Kingdom



Staff

SCIENTIFIC DIRECTOR

Pino Vilalta, Joan

SCIENTIFIC COORDINATOR

Pérez-Porro Rodríguez, Alicia

MANAGER

Escobar Prats, Joaquim

RESEARCHERS

CREAF Researchers

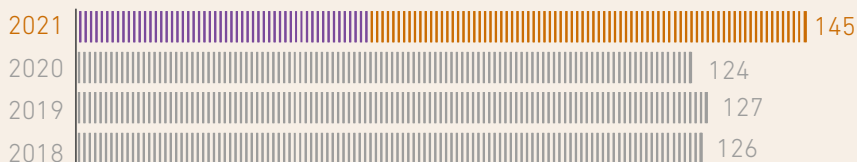
1. Andres Pastor, Pilar
2. Avila Castells, Anna
3. Basnou, Corina
4. Bosch Gras, Jordi
5. Broekman, Anne E.E.
6. De Cáceres Ainsa, Miquel
7. Doblas Miranda, Enrique
8. Domingo Marimon, Cristina
9. Eritja Mathieu, Roger
10. Espelta Morral, Jose Maria
11. Gracia Moya, Marc
12. Herrando Vila, Sergio
13. Lapedra González, Oriol
14. Llusia Benet, Joan
15. Marcer Batlle, Arnald
16. Masó Pau, Joan
17. Mayol Martinez, Maria
18. Morán Ordóñez, Alejandra
19. Nogué Bosch, Sandra
20. Pérez-Porro Rodriguez, Alicia Irene
21. Pesquer Mayos, Lluís
22. Pla Rabés, Sergi
23. Samsó Campa, Roger
24. Sardans Galobart, Jordi
25. Vayreda Duran, Jordi

UAB Researchers

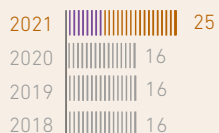
1. Alcañiz Baldellou, Josep M.
2. Claramunt López, Bernat
3. Cristobal Roselló, Jordi

STAFF

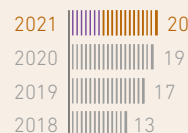
Researchers



CREAF researchers



UAB researchers



UB researchers



CSIC researchers



Associate researchers



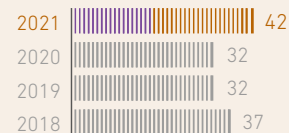
ICREA researchers



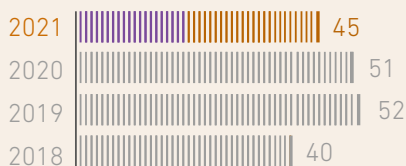
Post-Doctoral



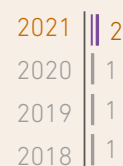
Doctoral Candidates



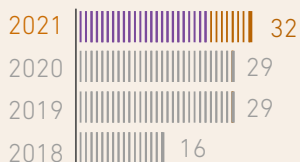
Technicians



UAB Staff



Management



Total	Total	Total
2018 205	2019 217	2020 212



Total
2021 224

4. Bateman Neubert, Alessandra
5. Ferrandíz Rovira, Mariona
6. Garcia Callejas, David
7. Hernández Castellano, Carlos
8. Lloret Maya, Francisco
9. Marañón Jiménez, Sara
10. Martínez Vilalta, Jordi
11. Pino Vilalta, Joan
12. Piñol Pascual, Josep
13. Quevedo Dalmau, Lidia
14. Retana Alumbroeros, Javier
15. Riba Rovira, Miquel
16. Ribas Artola, Angela
17. Rodrigo Domínguez, Anselm
18. Saura Mas, Sandra
19. Terradas Serra, Jaume
20. Urbina, Ifigenia

UB Researchers:

1. Carnicer Cols, Jofre
2. Felip Benach, Marisol
3. Sabaté Jorba, Santiago
4. Sabater, Francesc

CSIC Researchers:

1. Brotons Alabau, Lluís
2. Catalan Aguilà, Jordi
3. Estiarte Garrofé, Marc
4. Filella Cubells, Iolanda
5. Peñuelas Reixach, Josep
6. Sol Rueda, Daniel

Catalonian Institute For Research And Advanced Studies (Icrea) Researchers

1. Mencuccini, Maurizio
2. Andreu Hayles, Laia

Associated Researchers

1. Arnan Viadiu, Xavier
2. Bonal Andrés, Raül
3. Calleja Alarcón, Juan Antonio
4. Castells, Eva
5. Coll Mir, Lluís

6. García Valdés, Raül
7. González Martínez, Santiago C
8. Grau Fernandez, Oriol
9. Guerrieri, Rossella
10. Jump, Alistar
11. Lefebvre, Louis
12. Montoya, José M
13. Muñoz, Alberto
14. Ojeda Castro, Gerardo
15. Piera Fernández, Jaume
16. Roman Cuesta, Rosa M.
17. Solé Ollé, Jordi
18. Stefanescu, Constantí
19. Verger Ten, Aleixandre
20. Yañez Serrano, Ana Maria

Post-Doctoral Researchers

1. Anadon Rosell, Alba
2. Azpiazu Segovia, Celeste
3. Barba Ferrer, Josep
4. Batllori Presas, Enric
5. Cardador Bergua, Laura
6. Fernandez De Uña, Laura
7. Fernandez Martinez, Marcos
8. Fuzessy Franco, Lisieux
9. Gómez Gener, Lluís
10. Hurtado Aragüés, Pilar
11. Jiménez Liébanas, Laura
12. Jolles, Jolle Wolters
13. Margalef Marrase, Olga
14. Mattana, Stefania
15. Melero Caverro, Yolanda
16. Ogaya Inurrigarro, Romà
17. Otsu, Kaori
18. Peguero Gutiérrez, Guillermo
19. Poyatos Lopez, Rafael
20. Preece, Catherine
21. Ramírez Valiente, José Alberto
22. Rocés Díaz, José Valentin
23. Romero Sotoca, Estela
24. Rotchés Ribalta, Roser
25. Samsó Campa, Roger
26. Vilà Cabrera, Albert

Doctoral Candidates

1. Albacete Gonzalez, Sergio
2. Boet Escarceller, Olga
3. Bookwalter, Jamie
4. Coello Sanz, Fernando
5. Da Sois, Luca
6. Daiyoub, Angham
7. De La Casa Sánchez, Javier
8. Descals Ferrando, Adrià
9. Díaz Borrego, Raquel
10. Fagin Garcia, Elena
11. Fang, Jianbo
12. Fatecha, Brenda Veronica
13. Ferrin Guardiola, Miquel
14. Garcia Raventós, Aina
15. Jaime González, Luciana Andrea
16. Jimenez Elvira, Nuria
17. Llovet Martín, Alba
18. Martín Lorenzo, Daniel
19. Martínez Artero, Jordi
20. Móstiga Rodríguez, Maricel
21. Olmo Gilabert, Rubén
22. Pei, Jiuying
23. Pesqueda, Argus
24. Pou Rosell, Marçal
25. Riera Domínguez, Marc
26. Rodríguez Miret, Xènia
27. Sanchez Martinez, Pablo
28. Sancho Blanco, Gonzalo
29. Sandoya, Verónica
30. Selwyn Álvarez, Miriam Andrea
31. Serrano Serrano, Tomàs
32. Solà Vila, Oriol
33. Tan, Yu
34. Tie, Liheua
35. Torres, Karen
36. Vallicrosa Pou, Helena
37. Vives Ingla, Maria
38. Wannng, Qin
39. Yang, Fang
40. Yang, Kaijung
41. Zango Palau, Anna
42. Zhu, Jianxing

TECHNICIANS**CREAF Staff**

1. Aguilera López, Javier
2. Alcover Comas, Joan Enric
3. Ayala Roque, Marta
4. Ballesteros Olivet, Xavier
5. Banque Casanovas, Mireia
6. Batalla Mercade, Meritxell
7. Batlles Climent, Carles
8. Blanco Rodriguez, Miguel Angel
9. Brobia Ansoleaga, Alba
10. Broncano Atencia, Maria Jose
11. Calaf Ramirez, Xavier
12. Calduch Fernandez, Sandra
13. Cano Gesé, Sergi
14. Carabassa Closa, Vicenç
15. Casanovas Berenguer, Rosa
16. Casbas Pinto, Guillem
17. Cobo Ollero, Sandra
18. Comas Boronat, Lluís
19. Escobar Rubies, Agustin
20. Español Escoda, Marc
21. Fuentes López, Laura
22. Giralt Garcia, Berta
23. Gordillo Cerrada, Javier
24. Granda García, Víctor
25. Hernández Serrano, Ana
26. Jaime González, Luciana Andrea
27. Julià Selvas, Núria
28. Márquez Balecillos, Guadalupe Del Valle
29. Márquez Tur, Laura
30. Martí Pino, David
31. Martin Martinez, Eneko
32. Maspons Ventura, Joan
33. Montero Estaña, Pau
34. Pascual Sanchez, Diana
35. Pau Garcia, Abel
36. Pla Ferrer, Eduard
37. Pons Andreu, Matias
38. Prat Carrio, Ester
39. Prunera Olive, Joan
40. Sala Garcia, Javier
41. Sanchez Plaza, Ana Isabel

42. Serra Recasens, Immaculada
43. Serral Montoro, Ivette
44. Verkaik Witteveen, Iraima
45. Zuccarini, Paolo

UAB Staff

1. Pacios, Carme
2. Ferrer, Meritxell

MANAGEMENT

1. Barcelo Perez, Marta
2. Blanco Cabrera, Raúl
3. Cardona Barreña, Alicia
4. Carreño Leal, Carlos
5. Cliville Morato, Adriana
6. Couto Antelo, Verónica
7. Del Hoyo Vinuesa, M Rosario
8. Florido, Florencia Paula
9. Galiano Pérez, Lucía
10. Gamez Jimenez, Paola
11. Garcia Lopez, Cristina
12. Gaya Gas, Gerard
13. Gimenez Cuadrado, Ainoa
14. Guzmán Martín, Pau
15. Justamante Rodríguez, Ángela
16. León Gil, Yolanda
17. Martín Fernández, M^a Elena
18. Martinez Bayarri, Judith
19. Martínez Gómez, Daniel
20. Massó Caeiro, Laura
21. Mayor Eixarch, Gerard
22. Molowny Horas, Roberto
23. Morales Duran, David
24. Nadal Borrás, Nuria
25. Ordoñez Garcia, Jose Luis
26. Pizarroso Velasco, Maite
27. Pujol Mardones, Magdalena
28. Ramon Revilla, Anna
29. Roig Herrera, Olga
30. Rosas Torrent, M Teresa
31. Soler Pastor, Nora
32. Vilar Navarro, Vanessa

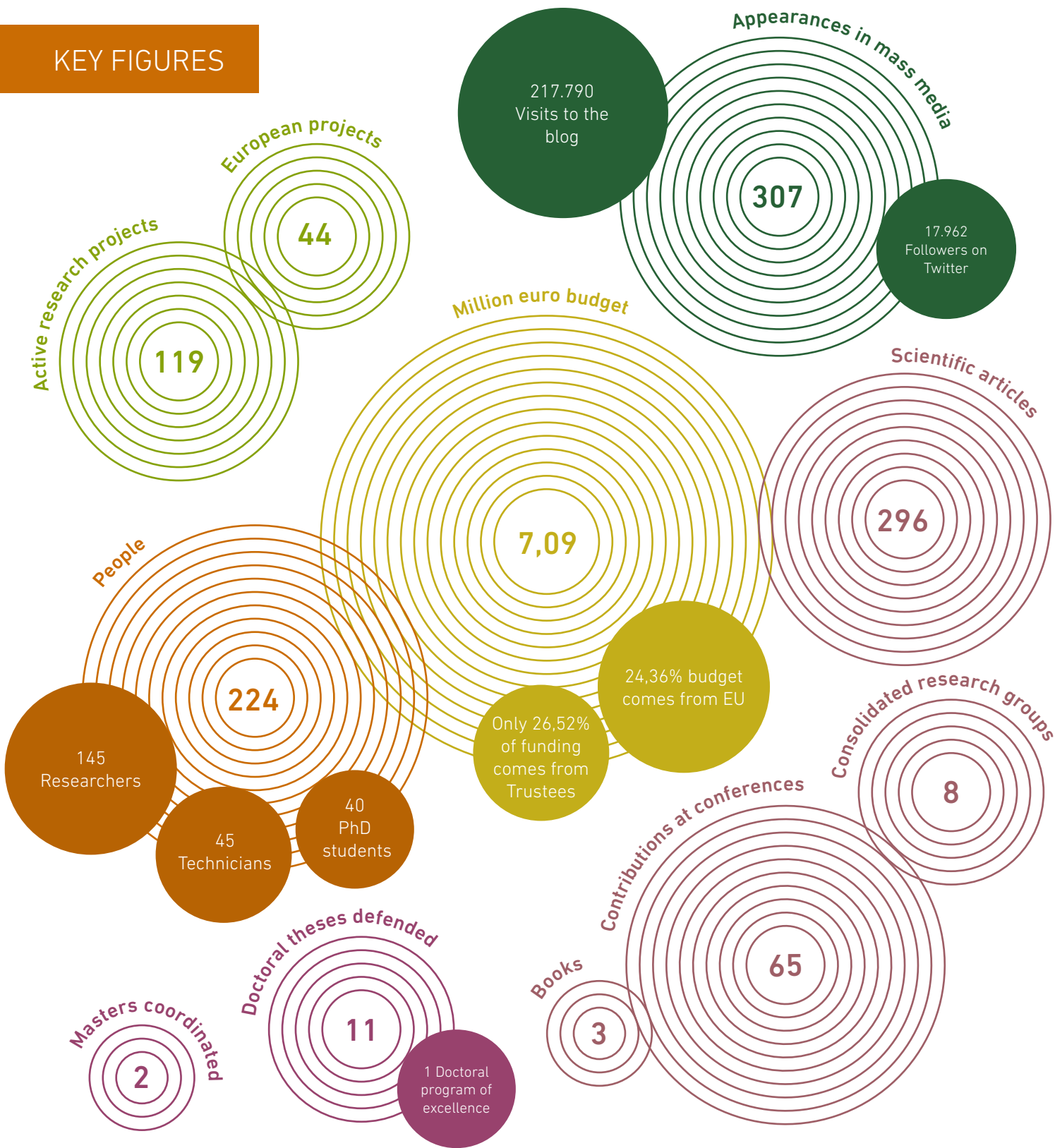
VISITING RESEARCHERS FROM NATIONAL AND INTERNATIONAL INSTITUTIONS

1. Chirimi Toumi Laboratoire Des Sciences De L'environnement Marin (Lemar)
2. Cecilia Estravis Universidad De Buenos Aires
3. Dolors Armenteras Universidad De Colombia

WITH FINALIZATION OF RELATION WITH CREAM DURING 2021

Bacardit Peñarroya, Montserrat, Barnadas Serinanell, Marta, Blanco Rodriguez, Miguel Angel, Blanquer Valderas, Laura, Bórnez Mejías, Kevin, Closa Santos, Guillem, Duan, Beixing, Estop Andrés, Diana, Fernandez Garberi, Pere Roc, Flo Sierra, Victor, Fraile Torroella, Irene, Garcia Gonzalez, Christian, Heleine, Laura, Home Mas, Orellys, Jaumejoan Gil, Xènia, Ladrón De Gueva Sáez De Eguilaz, Mónica, Llovet Martín, Alba, Moreno Fernandez, Sandra Estela, Mu, Zhaobin, Oliveras Casas, Pol, Palmero Iniesta, Marina, Pérez Cazorla, Beatriz, Pérez Navarro, M^a Ángeles, Pladevall Vilavendrell, Marc, Rionegro Perez, Raquel, Toro Alvarez, Francisca Andrea, Valls Sánchez, Aleix, Vidal Durà, Andrea, Yin, Gaofei, Zabala Torres, Alaitz,

KEY FIGURES





ANNUAL HIGHLIGHTS

CREAF IS A PARTNER AND PROMOTER OF THE EURECAT CLIMATE RESILIENCE CENTRE

The brand new Eurecat Climate Resilience Centre has the firm commitment to fight the climate emergency based on research, technology and innovation, as well as the ecological transition in Catalonia, Spain and the Mediterranean basin.



The activities and investments in laboratories for the Centre will involve investments of more than 12 million euros during 4 years.

SEVERAL CREAM RESEARCHERS CONTRIBUTE TO THE CATALAN ROADMAP TO REDUCE THE IMPACT OF CLIMATE CHANGE IN CATALONIA

The 2021-2030 Climate Change Adaptation Strategy developed by the Catalan Office for Climate Change has had the participation of several CREAM researchers, who have contributed scientific knowledge to the documentation phase. This document is the roadmap to reduce the impact of climate change in Catalonia.



CREAF has been involved from the outset, contributing scientific knowledge in the documentation stage.



Reducing emissions by 2030 and climate neutrality by 2050 are the horizons with which the AMB is working.

JOAN PINO AND JOFRE CARNICER, MEMBERS OF THE ECOLOGY ADVISORY COUNCIL OF THE BARCELONA METROPOLITAN AREA

Following the approval of its Declaration of Climate Emergency, the Barcelona Metropolitan Council approved that CREAM's director, Joan Pino, and CREAM researcher Jofre Carnicer join the Ecology Advisory Council of the Metropolitan Area of Barcelona. The Declaration consists of 5 major challenges that inspire actions to be undertaken.

FOUR CREAM RESEARCHERS, AMONG THE HIGHLY CITED SCIENTIFICS IN THEIR AREA WORLDWIDE

Jordi Martínez-Vilalta, Maurizio Mencuccini, Josep Peñuelas and Jordi Sardans are on the list of the most influential scientists in the world published by Clarivate Analytics -a leading company in the innovation sector- that identifies the experts who lead the works with the greatest impact international scientist in various areas of study.



The ranking is built up by Clarivate Analytics, a leading company in the innovation sector.



THE LIST
The Reuters Hot List

CREAF and CSIC researcher Josep Peñuelas tops the list of Spanish representatives in the ranking, which also includes CREAM and CSIC researcher Marc Estiarte.

CREAF, IN THE LIST OF THE 1,000 MOST INFLUENTIAL SCIENTISTS WORLDWIDE IN THE CLIMATE FIELD

Reuters' list of climate scientists identifies the world's 1,000 most influential specialists by the number of articles they have published on climate change, the number of citations in similar fields of study, and the frequency with which they are referenced in other channels such as the media, non-specialist press and political documents.

INTERNATIONAL HIGHLIGHTS

#TeamJunckerEU

Europese
Commissie

Commission
européenne

European
Commission



Incorporating nature into our thinking on climate action is essential: all countries should include nature-based solutions in their national contributions.

ESSENTIAL OUTCOMES FOR COP26

CREAF and CSIC researcher Josep Peñuelas signs an editorial in *Global Change Biology* together with a high-impact international team, about COP26 and the expected results by science. One of the main conclusions is that developed countries must have the financial support to ensure that natural climate solutions are protected, restored and improved in a fair and equitable manner.

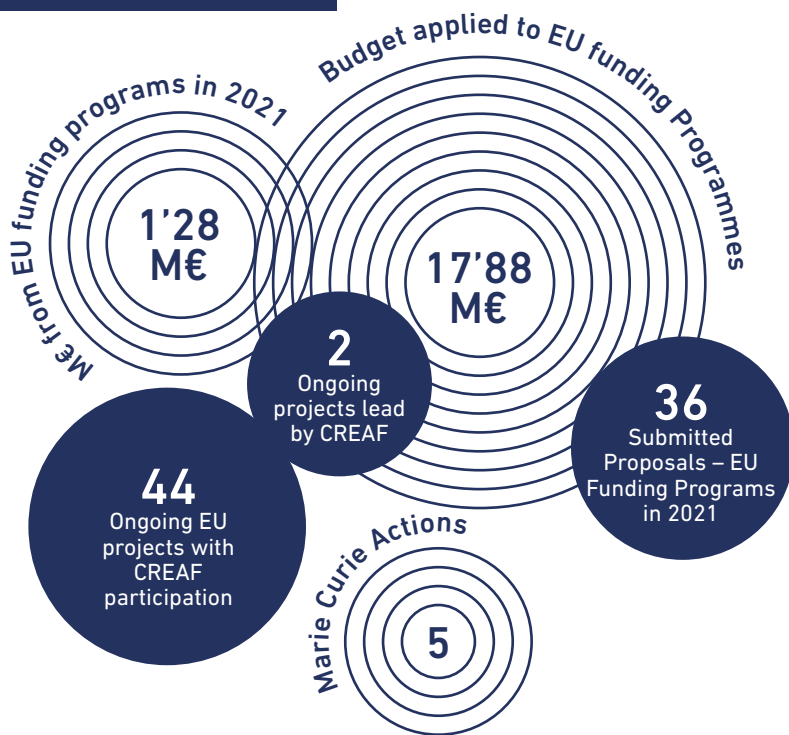
CREAF SUPPORTS THE DECLARATION SCIENTISTS IN SUPPORT FOR AN AMBITIOUS EU NATURE RESTORATION LAW

CREAF is one of the 33 European expert networks and associations and 1400 scientists to demand ambition in the EU Nature Restoration Law. We have signed the Declaration 'Scientists in Support of an Ambitious European Union Nature Restoration Law' proposed by the Society for Ecological Restoration Europe.

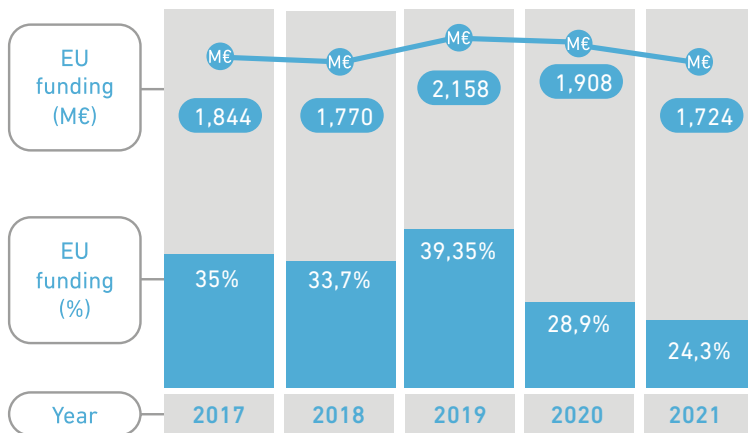


The Society for Ecological Restoration is one of the most prestigious international forums on ecological restoration and, in particular, soil recovery.

KEY FIGURES



Total EU funding and % of EU funding related to the total incomes per year



Submitted proposals

22 she/her

89 he/him

36 Submitted proposal (12 coordinated by CREAM)	8			28
	2			10
34 HORIZON EUROPE	7			27
15 H2020 - Excellent science	3			12
3 ERCs	1			2
1 ERC CoG	1			
1 ERC StG				1
1 ERC SyC				1
11 MSCA	2			9
1 MSCA Cofund	1			
10 MSCA IF-PF	1			9
1 INFRASTRUCTURES				1
19 H2020 - Societal challenges (Collaborative projects)	4			15
1 CLUSTER 3				1
8 CLUSTER 6	1			7
10 GREEN DEAL	3			7
1 LIFE +				1
1 LIFE+ Nature				1
1 Other external fuds	1			
1 Tenders with EU public institutions	1			
20 Collaboratives projects funding scheme	2			18
2 Coordination & supporting Actions				2
8 Research & Innovation Actions	1			7
10 Innovation Actions	1			9

PHILANTHROPY & PRIVATE SECTOR ALLIANCES

SCIENTIFIC PHILANTHROPY

CREAF offers new opportunities for collaboration with the private sector:



CONSOLIDATION OF OUR 'PHILANTHROPY & STRATEGIC ALLIANCES OFFICE'

Generate synergies between the public and private sectors

- Analysis of **key societal challenges and needs**
- Creation of **high impact value propositions** for the private sector
- **Renewed Partnership Agreement CREAM-Fundació Terra** (our core partner foundation)
- Meetings with foundations and companies to promote new opportunities for **quadruple helix collaborations**
- Development of **new opportunities for people** to join and support our high quality science

Creating a Philanthropic Culture at CREAM

- Reference base documentation: **first 'Private Sector Ethics and Code of Conduct Code'**
- Second **annual Internal Session 'Fundraising Moves Us'**
- Acquisition and training of CREAM's **first CRM tool** (efficient, centralised, secure and automated management to improve our relations with people and entities).

HIGHLIGHTS

CREAF CONSOLIDATES ITS FIRST CORPORATIVE COLLABORATIONS PROGRAM

Initiated in 2020, we now consolidate our first institutional fundraising program with first collaborative agreements, strategic transfer contracts and donations. The Program focuses on Corporative Partnerships & mid and major Donors, based on the identification of entities whose values and core activity align with CREAM's mission and vision. We aim to improve, strengthen and develop collaborative private sector relations to boost intersectorial win-win collaborations.



ALICIA CARDONA RECEIVES THE POSTGRADUATE CERTIFICATE IN FUNDRAISING FROM UNIVERSITY OF BARCELONA-IL3

As a student from the 2020-21 cohort, Alicia Cardona -our Philanthropy & Strategic Alliances Officer- was awarded her completion certificate. The degree is designed to professionalize fundraisers, improving their ability to support excellence across their institution's life-cycle, developing different stakeholders' strategic collaboration opportunities while solving multiple challenges along the way. This was part of her Professional Training at CREAM.

CREAF PARTICIPATES IN REGIONAL PHILANTHROPIC PROFESSIONAL NETWORK

Alicia Cardona, our Philanthropy & Strategic Alliances Officer, continues to actively participate in 'Fundraising.cat' where she participates in general meetings and networking events and engages in the 'Research Sector' Working Group to boost intersectorial collaborations.



CREATING CONNECTIONS

We were gladly joined by some of our Strategic Collaborators who participated in the following CREAM's events:

DKV Seguros (Marta Pahissa, Head of Environmental Transformation)- XVIII Annual CREAM-SCB-ICHN From Ecosystem health to Global Health



Familia Torres (Miquel Torres, Director)- Polyfarming project's final conference 'Regenerative Agriculture: Sowing the Future'

We attended and participated in multiple events, including:

Women in Data Science -WiDS- Conference '21

Participation: Equal Opportunities and Genre perspective round table & Networking

Location: Barcelona

Attendees: over 100 (+700 online live stream)

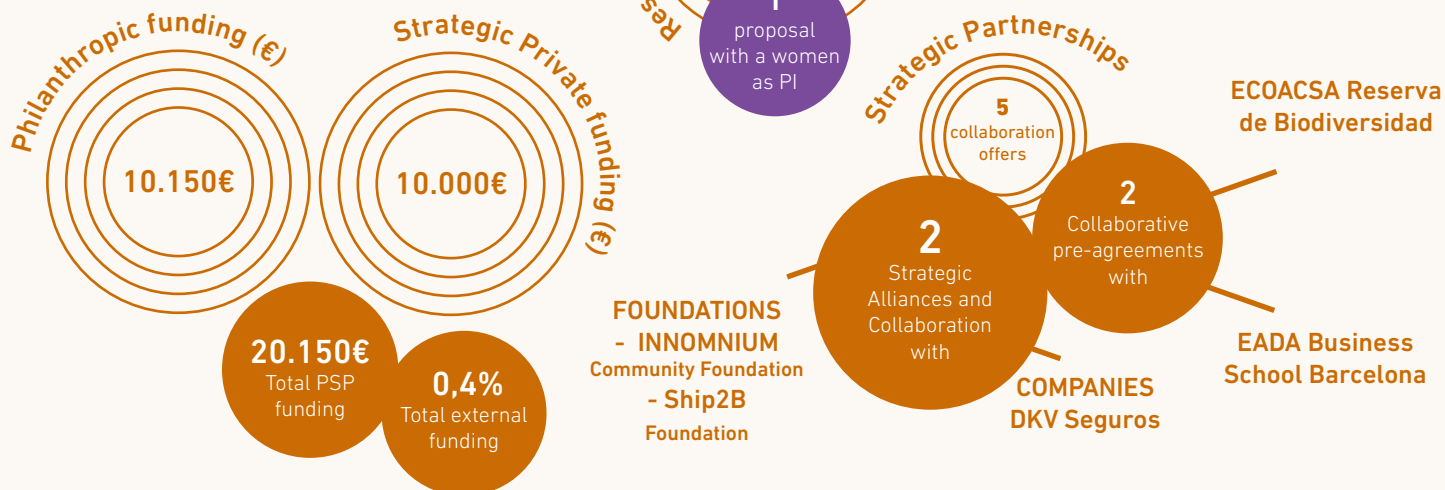
National Host: Clara Lapiedra (Aula Magna Business School)

Organizer: Stanford University (global international initiative)



Total Philanthropic and Strategic Private (PSP) non-competitive funding

Overall PSP funding and overall % related to the centre's total external income in 2021 per year





STRATEGIC PARTNERSHIPS FOR THE GOALS

New strategic connections with the private sector: Fundació PIMEC, CECOT, and Aula Magna Business School AMBS -Clara Lapiedra (one of our first institutional Ambassadors).

CREAF joins forces with INNOMNIUM Community Foundation to promote research and innovation in sustainable land management

Framework Strategic Partnership Agreement to enhance sustainable development and knowledge transfer in rural areas, specifically with projects rooted in the territory.



CREAF becomes Ship2B Foundation's Knowledge Partner in the Tech4Climate Lab Program

CREAF joins one more year Tech4Climate's Experts Committee as a Scientific Knowledge Partner, as part of our recently consolidated framework Strategic Partnership Agreement. The overall objective: to boost and enhance the transfer of scientific knowledge and technology to promote innovation and the development of a new green impact economy based on science of excellence.



CREAF collaborates with DKV Seguros as Scientific Knowledge Partner to promote Science-based forestry restoration

CREAF and DKV join forces in order to protect and restore forests.



Fundació Caixa d'Enginyers supports CREAM's citizen science

Corporative Collaboration Agreement, through CREAM's core partner foundation Fundació Terra, to enhance the transfer of CREAM's scientific knowledge directly to citizens, by boosting society's environmental engagement and involvement in science through cooperation -citizen science-. Philanthropic economic support: 10.000,00€



OUR COMMUNITY DONORS



COLLABORATORS



STRATEGIC ALLIANCES



AMBASSADORS AND OTHER COLLABORATORS



We would like to extend a special thank-you to our Community of Donors, Collaborators and other Strategic Allies, and a very special thank-you to our first individual Donor too!

THANK YOU FOR HELPING US MOVE ECOLOGY AND PROTECT OUR FUTURE!

A final thank you to all our past and current private sector collaborators.

Important notice: the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has meant that 2020-21 were years of adaptation for CREAM and its private sector collaborators. Despite this, we have managed to progress on many fronts, thanks to the flexibility and adaptability of CREAM staff and private partners, and for that we extend a special thank-you to all of you.

Check **Annexes** -pag. 123- to see private sector collaborators or contact Alicia Cardona, Philanthropy & Strategic Alliances Office a.cardona@creaf.uab.cat for more information.

GENDER



RENEWED JEDI COMMITTEE

On 8th November and after an open call for applications, the CIOG (Gender Equality Committee) was renewed with representatives of all CREAM's professional groups (research staff, technical staff, and administration and services staff). To include other diversities beyond gender, it was agreed to change its name to the JEDI (Justice, Equity, Diversity and Inclusion) committee. The members of the new committee are Annelies Broekman and Luca Da Sois (research staff), Eduard Pla and Mireia Banqué (technical staff), administration and services staff (Anabel Sánchez), Romà Ogaya (appointed provisionally by CIC, until its renovation) and Teresa Rosas (appointed by Management Team). The new team will be crucial in the design and monitoring of the new JEDI Plan 2022-2026.

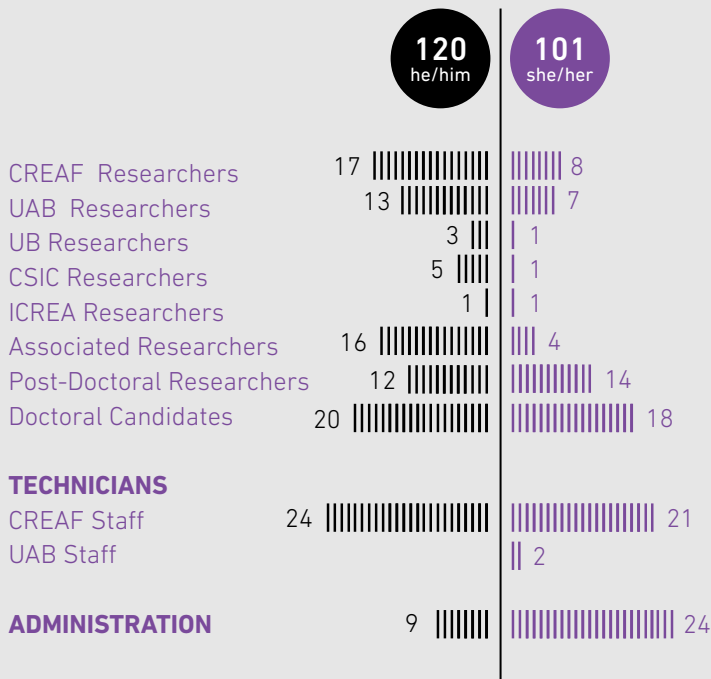
TWO TRAINING COURSES TO RAISE AWARENESS OF GENDER (IN-) EQUALITIES IN THE ACADEMIA AND RESEARCH

Two training courses have been organized in 2021 to stimulate sensitivity and strengthen people's knowledge and skills to engage with gender equality issues. Specifically, the topics covered have been: (1) how to include the gender perspective in a research project and (2) concepts and practical tools for preventing and addressing sexual and gender-based harassment. The courses were followed by 42 participants (60% women and 40% men). The administration staff was the group with the highest participation in the courses. It is worth noting that the participation of senior research staff has increased significantly (from 3 people in 2020 to 9 people in 2021) as well as of the Management Team.



THE DIRECTOR OF THE CREAM, ANNOUNCES THAT HE WILL NOT BE PART OF MALE-ONLY EXPERT PANELS

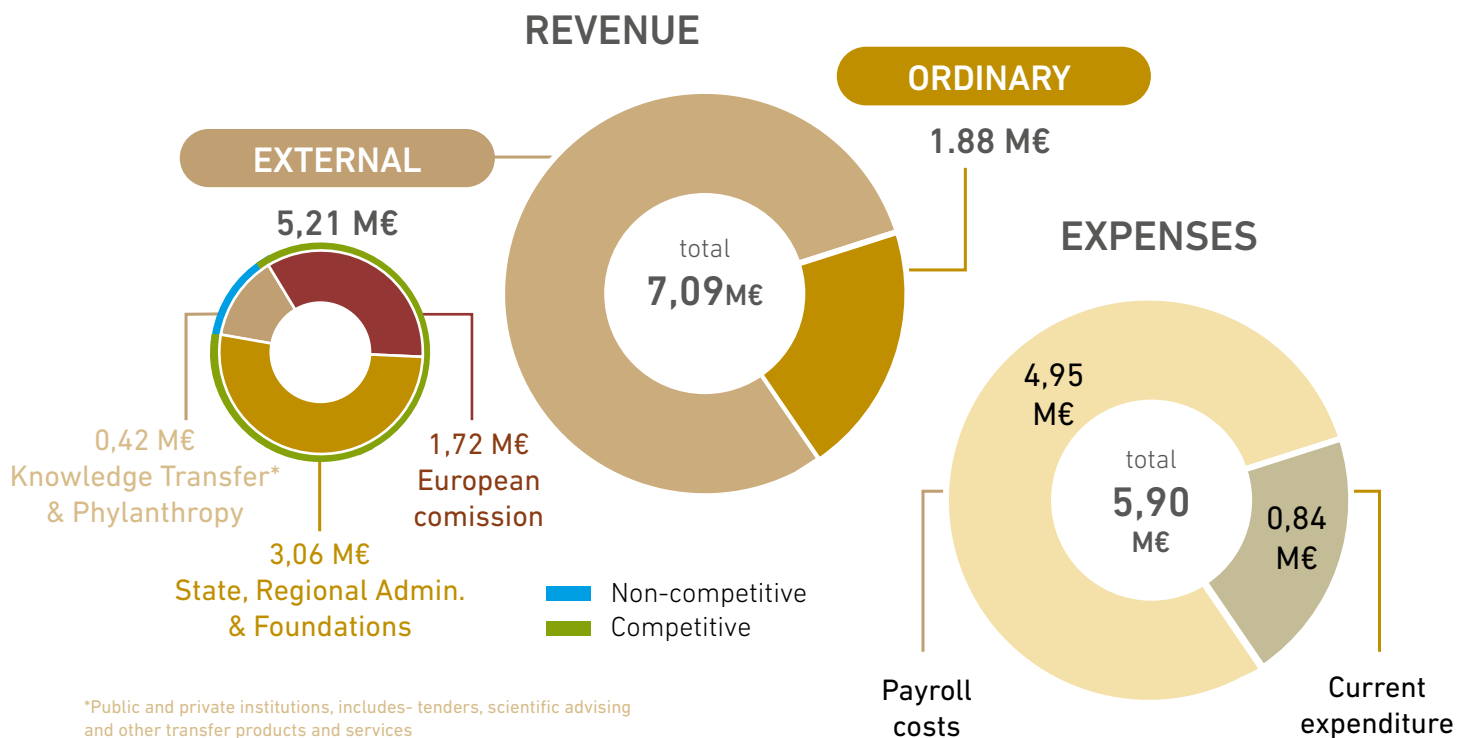
To commemorate International Woman’s Day CREAM promoted the campaign #EMCOMPROMETO (I commit myself in Catalan), an initiative that made public through social networks the 38 staff personal commitments (60% made by women and 40% made by men) in favour of an inclusive science. The director of CREAM also joined the institutional campaign making public his commitment raising the voice against the so-called manel or all-man panels.



OTHER HIGHLIGHTS

- Review of the gender perspective in 11 projects (1 European, 7 MSCA; 3 MINECO).
- A new CREAM’s OTM-R (Open, Transparent and Merit-based Recruitment) policy with a gender perspective is available on CREAM’s website.
- Positive recruitment policy in Severo Ochoa senior positions and gender-balanced selection commissions.

FINANCIAL OVERVIEW



Contributions from the Board of Trustees

UAB
Universitat Autònoma de Barcelona

Researchers and facilities
560000*+150000

*703.802,16 researchers cost for 2021

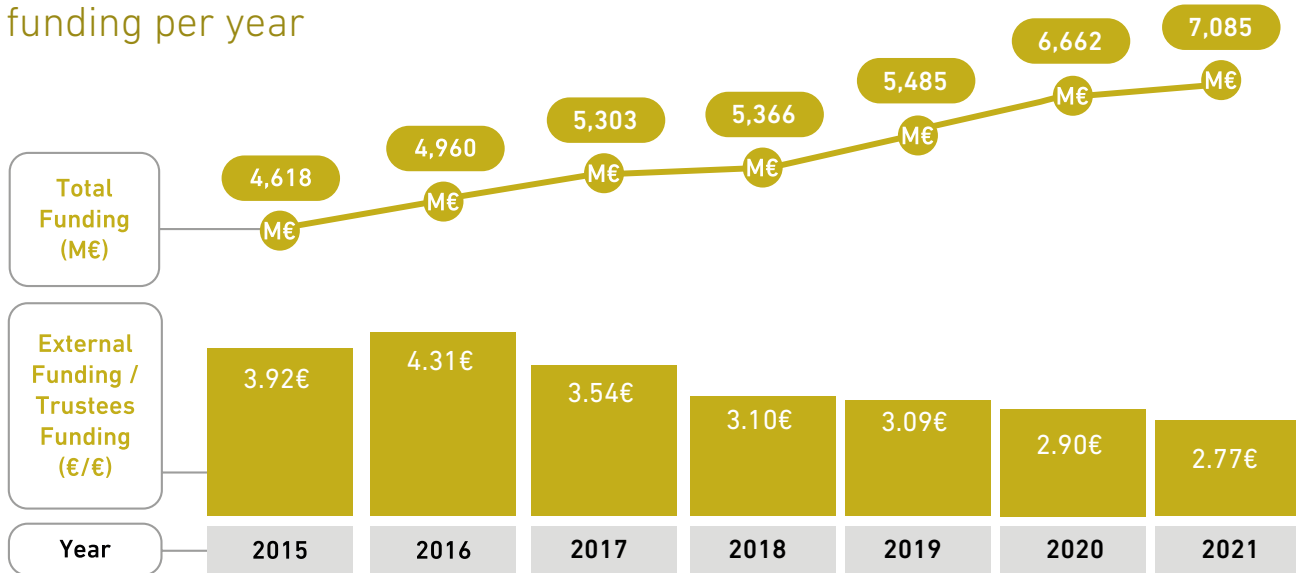
CSIC
CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

Researchers
420.000

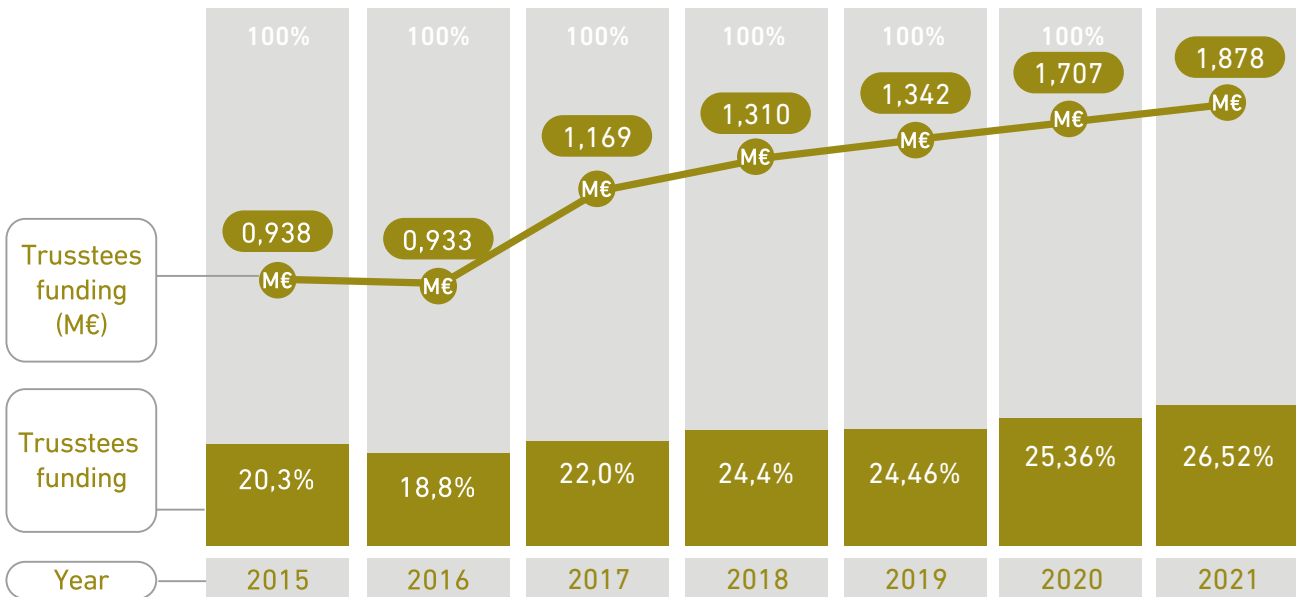
UNIVERSITAT DE BARCELONA

Researchers
140.000

Total CREAM's funding and relationship between external funding and Trustees funding per year



Total contribution of Trustees to CREAM's budget and % of Trustees funding related to the total incomes per year

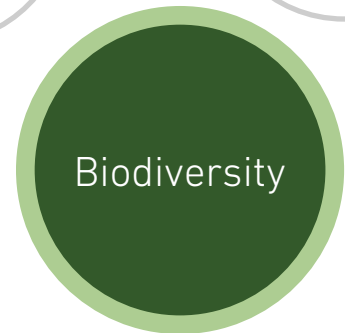
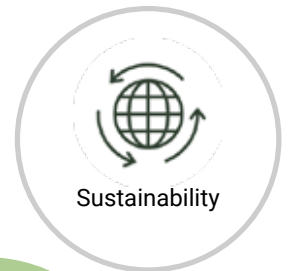
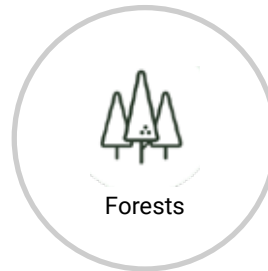


A vibrant red mushroom with white spots on a forest floor. The mushroom has a bright red cap with numerous small, white, star-shaped spots. It has a thick, white stem. The background is a forest floor covered in dry leaves, twigs, and pine needles. A green rectangular overlay is in the top right corner, containing the text "RESEARCH HIGHLIGHTS".

RESEARCH
HIGHLIGHTS

Our research has a global impact.

We have a broad and multidisciplinary research portfolio, integrating fundamental research advances with important contributions in environmental issues of great socioeconomic impact. Our research focuses on four big areas and six cross-cutting topics.





Biodiversity

The Mediterranean Basin is one of the principal points of biodiversity concentration on the planet. The loss of this biodiversity is one of the greatest environmental challenges which we have been obliged to face in the past few decades. Without biodiversity, it would be impossible to obtain the multitude of ecological goods and services which we need to live.

At CREAM we study the mechanisms which generate and maintain biodiversity in terrestrial ecosystems. We analyze territorial patterns of biodiversity and the factors which threaten it. We work with species and communities of plants and animals, with studies carried out from the molecular to ecosystem scale.

Research lines

- Behavior, ecology and evolution
- Population and community dynamics
- Evolutionary ecology
- Species distribution and phenology
- Ecological networks and species interactions

SCIENTIFIC ADVANCES

August 16, 2021

Bee species with larger brains learn better

Having a larger brain has a direct impact on bee learning, a theory already demonstrated in birds and primates, which is highlighted in a study published in the **Royal Society Open Science**, led by a scientific team from CREAM and the Doñana Biological Station (CSIC). Investing in brain tissue is costly, so it only makes sense when there is a benefit. Previous studies have already confirmed that species with higher cognitive demands – for example, specialised bees that need to locate particular floral resources – have evolved to acquire larger brains. “Much remains to be understood, we are only beginning to understand



Species of bees with larger brains, both in absolute terms and relative to body size, have a greater capacity for learning. Image: *Bombus terrestris*, source Wikipedia.

the enormous capacity of small bee brains,” concludes Daniel Sol from CREAM.

November 2, 2021

The soundscape created by birds is becoming quieter and less varied, with potential effects on people’s health

The favourable properties of natural soundscapes are changing, due to declining bird populations and their new geographic distribution. As a consequence, the trill of birds is changing and birdsongs at dawn are becoming quieter and less varied. Lluís Brotons, CSIC researcher at CREAM, has been involved in the study and attributes the **generalized decrease in the biodiversity and sound intensity of birds** in particular to changes in the composition of their communities.



Losing a species like the Willow warbler (*Phylloscopus trochilus*), with a rich and intricate song, has more impact on the complexity of the soundscape than that of a species with a more shrill tweet. Image: Xavier Riera.

July 23, 2021

Fishing can alter the shoaling behaviour of fish, with ecological and socio-economic consequences

Fishing activity may decrease the shoaling behaviour of commercially and recreationally valuable fish, a strategy they use to minimise the risk of predation, acquire resources more easily and transmit information efficiently to each other. In addition, this new behaviour may have a major impact on the dynamics of fish stocks and thus on fishing activity. **“Altering the composition of fish shoals, as happens with fishing, can have major repercussions on social cohesion, coordination and the learning benefits of these animal species against predators”**, says CREAM researcher **Jolle Jolles**, co-first author of the study.



Leaves in an urban environment. ClipArt CC BY.

SCIENCE FOR ENVIRONMENTAL MANAGEMENT

September 20, 2021

La Ricarda, the last piece of the Llobregat delta?

If the Llobregat delta were a plane, the protected area of la Ricarda would be a very important part (who knows if the last one) that supports the complex operation of the delta. An impossible space to remove without shaking the rest of the ecosystem and the environmental services it provides to the entire population. Want to know why? “Ecosystems are like a plane and our alteration of them is taking the screws out of that plane. It could be that la Ricarda was one of the last snails in the delta”, Joan Pino.



Joan Pino explaining the environmental value of la Ricarda. Image: Ara newspaper.

HIGHLIGHTED BIODIVERSITY RESEARCH PROJECTS

EUROPABON

Europa Biodiversity Observation Network: integrating data streams to support policy



Principal investigator:

Lluís Brotons

Budget: 2994318,75 €

Entity: EU

Period: 2020-2023

UBMS

uBMS proposes to create Citizen Observatory of Urban Butterflies with volunteers who prospect butterflies in big cities



Principal investigator:

Yolanda Melero

Budget: 15.000 €

Entity: Fundación Biodiversidad

Period: 2018-2021

EXOCAT

Monitoring program of exotic species in Catalonia



Principal investigator: Joan Pino

Budget: 40.000 €

Entity: Generalitat de Catalunya

Period: 2010-2023

BIORGEST LIFE

Innovative Forest Management Strategies to Enhance Biodiversity in Mediterranean Forests



Principal investigator:

Jordi Vayreda

Budget: 1.576.374 €

Entity: Life Program

Period: 2018-2023

WILDLIFE IN THE ANDORRAN PYRENEES

Long term survey of high elevation organisms and some of their interactions, to determine whether climate change and/or human pressure will lead to new communities



Principal investigator:

Bernat Claramunt

Budget: 314.246 €

Entity: EarthWatch Institute

Period: 2018-2021

SISEBIO

Catalonian program for comprehensive biodiversity monitoring



Principal investigator: Javier Retana

Budget: 90.000 €

Entity: Generalitat de Catalunya

Period: 2016-2023

PODARCIS

Unraveling biological invasions: cosequences of a rapidly spreading snake invasion for a Mediterranean endemic lizard



Principal investigator:

Oriol Lapiedra

Budget: 24.800 €

Entity: La Caixa Foundation

Period: 2020-2021

Check **Annexes** to see other research projects in Biodiversity Area

Global Change

Each organism, every community, and every ecosystem plays an important role in the regulation of cycles of energy and nutrients which keep the planet alive. Some of these roles have been modified due to atmospheric changes, climate change, increases in disturbances and changes in land use.

At CREAM we study the effects of **global change** (which includes all of the aforementioned changes) with an international and multidisciplinary focus. The methods of study require working at **diverse scales** (from the organism to the ecosystem), combining experimentation with modeling, and conducting **long-term** monitoring of different ecosystems.

Research lines:

- Biological invasions
- Land use change and landscape dynamics
- Climate change
- Fires
- Integrative and adaptive management of water and the territory
- Urbanization and biodiversity

SCIENTIFIC ADVANCES

December 15, 2021

The 12 consequences of global change in the mountains

The intense human presence, the rise in thermometers on the summits and the reduced availability of water are accelerating a **new circumstance in mountain areas**. The balance between enjoying nature and damaging it with our presence is a difficult reality, especially when it is frequent and without clear regulation. "Mutual understanding on how to address the current and future challenges of global change in mountain areas should be one of the priorities in Europe". Bernat Claramunt, CREAM researcher, UAB professor and coordinator of the European network NEMOR.



Europe has yet to develop a common research agenda and policy strategy on mountain regions. Image: Frederic Planas.

January 27, 2021

Fog can give a second chance to desertified land

Capturing tiny droplets of water from fog and using them to restore areas affected by extreme drought and desertification is the aim of the **European LIFE Nieblas project**. "We restore habitats of community interest that are home to plant and animal species unique in the world and that have a direct impact on the people who live on the island. We also propose innovative reforestation methods, raise awareness of the importance of forest cover and water resources, and promote knowledge transfer between universities and companies", in the words of CREAM researcher **Vicenç Carabassa**.



LIFE Nieblas collects tiny drops of water suspended in the fog and dew, to recover the forests and aquifers of two areas of the island of Gran Canaria. Image: La Provincia.

April 29, 2021

Human settlement causes changes in the plant biodiversity of islands around the world 11 times more intense than the climate

The article '**The human dimension of biodiversity changes on islands**' published at the end of April 2021 in the journal **Science** indicates that changes in the plant life of an island ecosystem caused by human colonisation are **11 times greater** than those due to climate or effects such as predicted volcanic eruptions. The research has been carried out on **27 islands around the world**. This modification caused by human action is irreversible and is constantly reproducing itself, centuries after colonisation by humans. **The first author of the article is the researcher Sandra Nogué**, from the Southampton University (United Kingdom),



In Iceland from the year 920 the activity of the first settlers accelerated changes in vegetation, intensified erosion and destroyed forests in favor of pastures. Image: Pùblic domain.

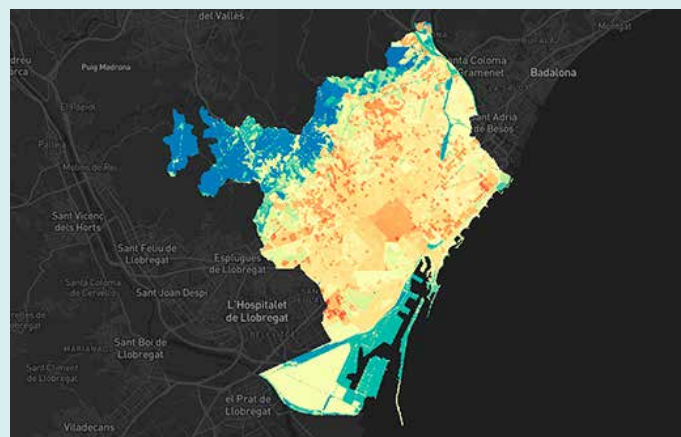
who analysed the data and shaped the work while she was a visiting researcher at CREA, when she collaborated with researcher **Josep Peñuelas**.

SCIENCE FOR ENVIRONMENTAL MANAGEMENT

September 30, 2021

Barcelona has the world's first tiger mosquito prediction map

The #MosquitoAlertBCN project team has developed the **first daily map** that predicts the risk of finding a tiger mosquito in Barcelona. It is a digital map, unique in the world, that reports in real time and on a 20-meter scale about the likelihood of a mosquito and a person meeting or interacting that day. New technologies and citizen participation have made it possible to develop this system for real-time prediction of the risk of the world's only tiger mosquito. This makes it a practical tool to anticipate and act much more dynamically and effectively in hot spots of mosquito activity. **FREDERIC BARTUMEUS**, ICREA researcher at CEAB-CSIC and CREA and co-director of Mosquito Alert.



Risk map by neighborhoods in the city of Barcelona

HIGHLIGHTED GLOBAL CHANGE RESEARCH PROJECTS

LIFE MIDMACC

Mid-mountain adaptation to climate change



Principal investigator:
Javier Retana
Budget: 2.595.725 €
Entity: Life EU
Period: 2019-2024

CONEXUS

CO-producing NBS and restored Ecosystems - transdisciplinary neXus for Urban Sustainability



Principal investigator:
Corina Basnou
Budget: 4.999.940 €
Entity: EU
Period: 2020-2023

PHUSICOS

The project aims to test natural-based solutions to counteract the increasing risk of hydrogeological disasters in the EU mountain regions



Principal investigator:
Pilar Andrés
Budget: 158.121,60 €
Entity: EU
Period: 2018-2022

CLEARING HOUSE

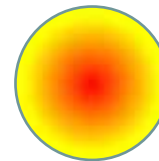
Collaborative Learning in Research, Information-sharing and Governance on How Urban forest-based solutions support Sino-European urban futures



Principal investigator:
Joan Pino and Corina Basnou
Budget: 4.986.463 €
Entity: EU
Period: 2019-2023

OCS

Citizen Observatory of Drought



Principal investigator:
Anabel Sánchez, Annelies Broekman, Javier Retana
Entity: FECYT
Period: 2020-2021

UFOREST

European Alliance on Interdisciplinary Learning and Business Innovation for Urban Forests



Principal investigator:
Pilar Andrés
Entity: EU
Period: 2021-2023

Check **Annexes** to see other research projects in Global Change Area

Ecosystem functioning

Each organism, every community, and every ecosystem plays an important role in the regulation of cycles of energy and nutrients which keep the planet alive. Some of these roles have been modified due to atmospheric changes, climate change, increases in disturbances and changes in land use.

At CREAM we study the effects of global change (which includes all of the aforementioned changes) with an international and multidisciplinary focus. The methods of study require working at diverse scales (from the organism to the ecosystem), combining experimentation with modeling, and conducting long-term monitoring of different ecosystems.

Research lines:

- Functional biogeography
- Chemical ecology, ecotoxicology, metagenomics, and metabolomics
- Soil function and restoration
- Atmosphere-biosphere interactions
- Stores and flows of water, carbon, and nutrients

SCIENTIFIC ADVANCES

September, 29th 2020

Let's talk about risks: if your forest were a country, which one would it be?

The authors of the study had identified a set of key elements for **determining a country's vulnerability** to a natural disaster, including its population's literacy rate, its medical services, access to clean water and the availability of food. They had divided the factors in question into three groups corresponding to a population's **susceptibility** to a disaster, its **ability to cope with the consequences** of the disaster, and its **ability to adapt** to the disaster through social changes. Each group also included a set of key variables for calculating the risk of being affected by a disaster. That prompted the team to look for equivalents in



Drought-affected stone pine groves in Maresme. Photo: J.Luis Ordóñez.

the forestry sphere. After a great deal of thought, Judit, Jordi Martínez-Vilalta, Mireia Banqué, Albert Alvarez, Jordi Vayreda and Javier Retana defined the characteristics that influence forests' vulnerability to the disturbances that can affect them.

May 11, 2021

Drought is already one of the 4 most critical natural hazards in Southwest Europe

Drought and its consequences is one of the 4 most critical natural hazards in the mountain areas of Southwest Europe, together with **floods, fires** and **soil degradation**. This is one of the starting points of the third transnational seminar on strategies for the management and prevention of drought impacts on mountain forests in Southwest Europe, integrated in the SUDOE. Cases of forest **decline due to drought are on the increase worldwide, especially in mountain areas**. According to **Jordi Martínez-Vilalta**, researcher at CREAM and professor at UAB, this phenomenon has



As a recurrent and extreme phenomenon, droughts are difficult to predict, with high spatial and temporal variability. Image: CREAM.

affected 3.3% of Catalan forests between 2012 and 2020. MONTCLIMA project.

February 12, 2021

Contribution of life in soil remains largely underestimated, according to United Nations

FAO launched its first ever report on “The State of Knowledge of Soil Biodiversity”. The report, with the participation of **Pilar Andrés** as an expert, examines the potential of soil organisms in ensuring sustainable agri-food systems and mitigating climate change. Pilar Andrés, CREAM researcher, has contributed with her expertise in **ecology, soil biodiversity and ecosystem restoration** in chapters 5, on threats to biodiversity and soil functions, and 8, on challenges and opportunities. She worked on both chapters



The report, State of knowledge of soil biodiversity – Status, challenges and potentialities

under the coordination of Georges G. Brown (EMBRAPA, Brasil) and Wim van der Putten (Netherlands Institute of Ecology), respectively.

SCIENCE FOR ENVIRONMENTAL MANAGEMENT

April 28, 2021

Planting 3,000 million trees in Europe could increase the risk of forest fires

A research group made up of researchers from CREAM, CTFC, InBIO/CIBIO, University of Santiago de Compostela and CSIC warns that the massive reforestation proposed by the Green Deal could increase the risk of fire if it isn't carried out according to good planning and scientific criteria. Forests are **large reservoirs of carbon and contribute greatly to offsetting the increase in carbon dioxide in the atmosphere.** For this reason, policies to conserve and restore them are widely supported as an effective way of combating climate change. The European Union, following the Green Deal roadmap towards a decarbonised economy, has committed itself to restoring the habitats with the greatest potential to capture and store carbon. Among other things, has



Forest fire. Image: Unsplash

committed to forest restoration through various initiatives, one of which is to plant 3,000 million trees by 2030.

HIGHLIGHTED ECOSYSTEM FUNCTIONING RESEARCH PROJECTS

NEWFORLAND

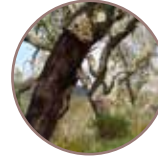
New Iberian Forests: ecological role and potential vulnerability under climate change



Principal investigator:
Josep Maria Espelta, Joan Pino
Budget: 160.930 €
Entity: Ministerio Ciencia
Innovación y Universidades
Period: 2019-2021

CONECTFOR

Caracterización y conservación de espacios forestales de alto valor ecológico y de su conectividad ecológica



Principal investigators:
Jordi Vayreda
Budget: 878.273,76 €
Entity: EU
Period: 2019-2022

ELEMENTALSHIFT

Impacts of anthropogenic global changes in bioelemental stocks and flows on nature and humans



Principal investigator:
Josep Peñuelas
Budget: 332.750,00 €
Entity: Ministerio de Ciencia,
Innovación y Universidades
Period: 2020-2022

DATAFORUSE

Una evaluación basada en datos de las respuestas a la sequía de los árboles y del uso del agua de los bosques a nivel global



Principal investigators:
Rafael Poyatos
Budget: 142.780,00 €
Entity: Ministerio de Ciencia e
Innovación
Period: 2019-2022

DISTRESS

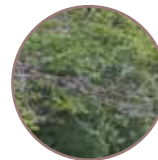
Understanding the mechanisms behind tree responses to drought-induced stress with increasing tree size



Principal investigator:
Laura Fernández de Uña
Entity: MSCA - EU
Period: 2019-2022

SUSFORAGE

Sown forage mixtures for sustainable agroecosystems in the Mediterranean area



Principal investigator:
Angela Ribas
Budget: 88.910,00 €
Entity: Ministerio de Ciencia e
Innovación
Period: 2021-2024

Check **Annexes** to see other research projects in Ecosystem functioning Area



Earth Observation

Remote sensing and geographic information systems have permitted analysis of the territory at large scales, and which are at the same time increasingly detailed. These analyses become fundamental for making decisions about the sustainable management of natural resources, designing networks of protected areas, and facing the threats of global change.

Thanks to research carried out by CREAM in this area, we have been able to provide to the public a collection of digital maps of land use of various periods of time, design new formats for storing and distributing thematic cartography, and develop computing tools such as the MiraMon GIS, all of which permit the consultation and analysis of a large quantity of information about our natural heritage.

Research lines:

- Geospatial products and international standards
- Long term ecosystem monitoring
- GIS and remote sensing methodologies and applications
- Regional and global environmental information services

SCIENTIFIC ADVANCES

March 19, 2021

How to improve the EU's drinking water supply by monitoring lakes

Monitoring the extent of lake effluents provides valuable information on the **risk of pollution** and **contributes to improving drinking water production and preserving environmental sustainability**. This is the aim of the European **WQeMS** project, which seeks to improve the supply of drinking water to all member states of the EU by monitoring the quality of lake water, through Earth observation tools. CREAM researchers **Joan Masó** and **Ivette Serral**, members of the **Grumets research group**, are taking an active part in documenting the quality and uncertainty of the data and in integrating the geospatial response of users.



Monitoring the reach of lake tributaries provides valuable information on the risk of pollution, improves drinking water production and preserves environmental sustainability. Lake Pien-Saimaa, in southern Finland. Image: Sentinel 2 satellite, in real color, from Copernicus.

February 9, 2021

Water-ForCE, a roadmap on future Copernicus water-related services and missions

A group of specialists in remote sensing applications in the water sector and in the fields of research, engineering and political decision making define the necessary services and future missions related to water of **Copernicus**, the observation program of the land of the European Union and the European Space Agency. This is the main axis of the European **Water-ForCE** research project. At CREAM, the main researcher involved is **Lluís Pesquer**, as well as the researchers **Ester Prat**, **Cristina Domingo** and **Joan Masó**, all of them also members of the GRUMETS research group.



From CREAM we take part in the definition of the necessary services and future missions related to Copernicus water. Image: Public domain.

February 16, 2021

Measuring the biodiversity of European agriculture, FRAMEwork's project objective

Agriculture's commitment to biodiversity is the guiding thread of FRAMEwork, an H2020 scientific research project in which CREAM provides specialization in citizen science and data standardization. The aim of the proposal is to innovate in the agricultural sector in Europe. "From CREAM we guarantee that the information generated responds to a transparent format, is well documented, accessible, is interoperable and easy to use and can be reused", explains researcher Joan Masó, who is involved in the initiative together with researchers Cristina Domingo and Alaitz Zabala.



From CREAM we provide specialization in citizen science and data standardization to FRAMEwork, an investigation about the commitment that agriculture has with biodiversity. Image: Public domain.

SCIENCE FOR ENVIRONMENTAL MANAGEMENT

February 19, 2021

Nature-based solutions and remote sensing to recover degraded land with NewLife4Drylands

The European **NewLife4Drylands** project aims to apply nature-based solutions (NBS) to restore degraded and desertified lands, using remote sensing data and models. From CREAM we contribute with the experience of two research teams: the **Protecsòls group**, for the restoration of degraded landscapes, and the **Grumets group**, for environmental remote sensing.

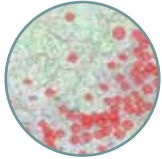


The main objective of this initiative, which will last 2 and a half years, is to define a protocol for identifying, intervening and monitoring degraded land. Image: iStock/Rifrazione.

HIGHLIGHTED EARTH OBSERVATION RESEARCH PROJECTS

EOTiST

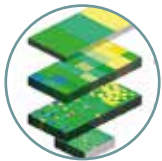
Earth Observation Training in Science and Technology at the Space Research Centre of the Polish Academy of Sciences



Principal investigator: Lluís Pesquer
Budget: 896.875,00 €
Entity: European Commission
Period: 2020-2023

ESACCI

ESA project that aims to study and investigate the role of the spatial resolution of Land Cover and its changes in supporting climate modelling research at regional scale



Principal investigator: Lluís Pesquer
Entity: European Commission
Period: 2018-2021

FRAMEWORK

Farmer clusters for Realising Agrobiodiversity Management across Ecosystems



Principal investigator: Joan Masó
Budget: 7.997.600,76 €
Entity: EU
Period: 2020-2025

MIRAMON

The geographic information system and remote sensing software MiraMon



Principal investigator: Xavier Pons, UAB
Budget: 63.000,00 €
Entity: Generalitat de Catalunya
Period: 2021

E-SHAPE

EuroGEOSS SHowcases: Applications Powered by Europe



Principal investigator: Joan Masó Pau
Budget: 15.876.336,75 €
Entity: European Commission
Period: 2018-2021

I-CISK

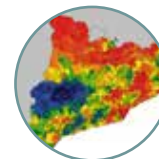
Innovating Climate Services through integrating scientific and local knowledge



Principal investigator: Lluís Pesquer
Budget: 4.998.806,88 €
Entity: EU
Period: 2021-2025

BESTMAP

Behavioural, Ecological and Socio-economic Tools for Modelling Agricultural Policy



Principal investigator: Joan Masó
Budget: 3.995.811,25 €
Entity: EU
Period: 2019-2023

Check **Annexes** to see other research projects in Earth Observation Area

CROSS-CUTTING TOPICS



Forests



Citizen science



Sustainability



Big Data and
data quality



Ecosystem
services



Mediterranean
Basin



In this area, CREAM focuses its research on the structure, dynamics and functioning of forests. In particular, we study the decline, regeneration and global functioning of forests by studying nutrient and water cycles and uses. In addition, we develop mathematical models, carry out forest inventories, and create databases.

Featured news

March, 20th 2020

Passive restoration as a potential management alternative

Researcher **Josep M Espelta** is a co-editor of a special issue published in the **Journal of Applied Ecology** on Managing Forest Regeneration and Expansion at a Time of Unprecedented Global Change. The special edition includes a series of articles on how seriously forests are currently being challenged by local human pressure and global climate change. However, it reveals an overwhelming consensus that forests offer fundamental ecosystem services to support biodiversity conservation and mitigate climate change.



There's an overwhelming consensus that forests offer fundamental ecosystem services to support biodiversity conservation and mitigate climate change. Image: Josep Maria Espelta.

Highlighted project

MODOSIN

Monitoring and modelling integrated into a warning system of mountain forests' vulnerability

Principal investigator: Enric Batllori

Budget: 48.773,80 €

Entity: Ministerio de Economía y Competitividad

Period: 2020-2022





Despite the youth of this program at CREAM, we have already shown that citizen science can be used to set up early warning systems, environmental management systems, or even the collaborative drafting of climate change adaptation strategies.



The new RitmeNatura FenoCentre seal will distinguish the schools and institutes that collaborate continuously in this citizen science project. Credit: Pau Guzmán

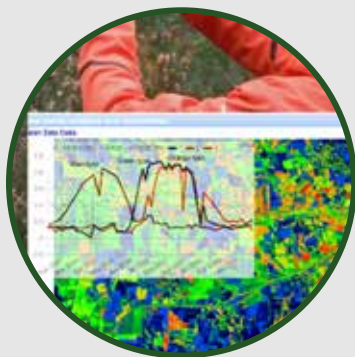
Featured news

November, 17th 2021

RitmeNatura phenology observatory launches a new campaign FenoTwin

RitmeNatura's new FenoCentre seal will distinguish schools and institutes that collaborate continuously in this citizen science project. The RitmeNatura phenology observatory, formed by CREAM and Meteocat, is launching a new campaign of face-to-face workshops for secondary schools in the province of Barcelona with an innovative distinction for those schools that collaborate continuously over the course of the year: the FenoCentre seal.

Highlighted project



FenoTwin

The Digital Twin of phenology

Principal investigator: Joan Masó Pau

Budget: 30.000,00 €

Entity: FECYT

Period: 2021- 2022



Given the contemporary challenges of global change, a transition towards a sustainable economic system is more imperative than ever. The production of sufficient primary products must be assured with minimal environmental or social impacts and without altering ecosystem services. In this context, sustainable management of resources such as forests and water is key.

Featured news

June 16, 2021

“Participating in ESCACC30 is a humbling experience: the research perspective combines with all the others to pave the way for something strategic”

CREAF’s ideas about Catalonia’s adaptation to climate change have reached ESCACC30, the territory’s Strategy for Adaptation to Climate Change 2021-2030, which the Catalan Office for Climate Change has been developing for some months now. As is reflected here, CREAF has been highly active in the corresponding participatory process.

ESCACC
Adaptació 2021-2030

Highlighted project

Mid-mountain adaptation to climate change

The main objective is to promote adaptation through the implementation and testing of different landscape management measures to meet climate change related challenges in marginal mid-mountain areas of Spain, while improving their socioeconomic development.

Principal investigator: Javier Retana

Budget: 2.595.725,00 €

Entity: Life Program

Period: 2019-2024





Big data offers great opportunities for research but also requires new approaches for managing it efficiently, rigorously and accurately, all depending on the particularities of associated thematic information. On the other hand, the quality of the alphanumeric and spatial information of the available data must be analyzed. It is necessary to verify that access, maintenance and propagation of metadata is adequate and consistent.



Jolle Jolles Raspberry Pi

Featured news

Single-board computers like the Raspberry Pi are helping revolutionize biological research and democratize science

Single-board computers like the Raspberry Pi have taken the world by storm and are being used by scientists and hobbyists in any situation imaginable. The new review study 'Broad-scale Applications of the Raspberry Pi: A Review and Guide for Biologists' published in the journal **Methods in Ecology and Evolution** by CREAM researcher Jolle Jolles shows that these low-cost open-source electronics are also increasingly being used in science and are a key technological advancement that will help further revolutionize biological research.

Highlighted project

EuroGEOSS SHowcases: Applications Powered by Europe

The E-Shape project is driven by the need to develop operational Earth Observation EO services with and for the users and to create a conducive environment whereby the strengths of Europe are exploited towards addressing societal challenges, fostering entrepreneurship and supporting sustainable development.

Principal investigator: Joan Masó

Budget: 15.876.336,75 €

Entity: EU

Period: 2019-2023





Ecosystem services are being moved to the center of national and European policies, and used as indicators of the quality of society's interaction with the environment. The next step is to place ecosystem services in the centre of decision-making and environmental policies. Once this is done we will have the tools to identify what management options can help mitigate the effects of global change, optimize the benefits, and avoid costs and potential risks to ecosystems and societies.



Santi Sabater, CREAM researcher. Photo: Juanjo Guillén, EFE.

Featured news

May 27, 2021

Life Terra: apply the scientific criteria to plant a tree for every inhabitant of Europe until 2025

Planting 500 million trees in Europe by 2025 using scientific criteria and **promoting environmental education among citizens** is the main objective of Life Terra, an international project in which CREAM participates with a team of researchers from the University of Barcelona. The aim of this initiative is to mitigate the effects of climate change with the participation of the whole of society.

Highlighted project



EUROPABON

Europa Biodiversity Observation Network: integrating data streams to support policy

Principal investigator: Lluís Brotons

Budget: 2.994.318,75 €

Entity: EU

Period: 2020-2023



CREAF has studied these ecosystems due to their ecological value as well as physical proximity to the center. It is for these reasons that many of CREAM's research lines center on this geographic area. The main objectives of this research are to measure the impact of global change on Mediterranean ecosystems by assessing the multiple interactions that occur between climate, living beings, fires, and human activity, also taking into account the region's evolutionary history.



If warming in the Mediterranean basin rises above 2°C, the numerous indicators on fire and climate risks increase by an average of 64%. Image: Public domain

Featured news

February, 21th 2020

The ecosystem services of Mediterranean forests are at risk if global temperatures rise more than 2°C

For the first time, the scientific evidence on how fire risk and ecosystem services in Mediterranean forests are affected by a global temperature increase or decrease above 2°C is reviewed. A study led by **Alejandra Morán-Ordóñez**, CREAM researcher.

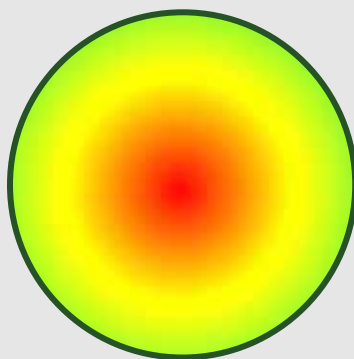
Highlighted project

CITIZEN OBSERVATORY OF DROUGHT

Principal investigator: Annelies Broekman and Anabel Sánchez

Entity: Ministerio de Economía y Competitividad

Period: 2020-2021



CONSOLIDATED RESEARCH GROUPS

“CREAF coordinates seven Consolidated Research Groups recognized by the Government of Catalonia. This recognition is intended to support the research groups that work in the different scientific areas, in order to recognize and promote high-quality research, the transfer of knowledge and the internationalization of its scientific activities.”

BEEMed Biodiversity and evolution of mediterranean ecosystems

Research Group focused on the study of the processes generating and maintaining biodiversity in the Mediterranean region at different spatial and temporal scales, while analyzing the effects of global change on biodiversity. Studies include all levels of variation, from genes to organisms, landscapes and communities.



Forest dynamics and wildfires

Research Group focused on the study of the structure and functioning of forest ecosystems (forests, scrublands and natural grasslands) and the changes in forest ecosystems by different impacts of global change: fires, deforestation and climate change.



GECA Environmental Change Ecology Group

Research Group that studies of the interdependence between the biogeodynamics of the biogeosphere (transport, storage and reactivity of materials and energy related to organisms) and the different ways that biodiversity manifests and distributes (genes, biological type, species, communities, biomes).





Global Ecology Unit

Research Group that studies the global, climatic and anthropogenic local change effects on terrestrial ecosystems.



Grumets

The aim of the Methods and Applications in Remote Sensing and Geographic Information Systems Research Group, GRUMETS, is the development of new algorithms, theory and methodologies in these fields as well as the integration of the fields of geographic information science, geoservices and interoperability, standardization, metadata, applied work and software development.



PROTECSOLS Consolidated Research Group on Soil Protection

Research Group focused on the study of soil degradation associated with pollution, mining activities, infrastructures and wildfires.



Response of terrestrial ecosystems to changing environmental gradients

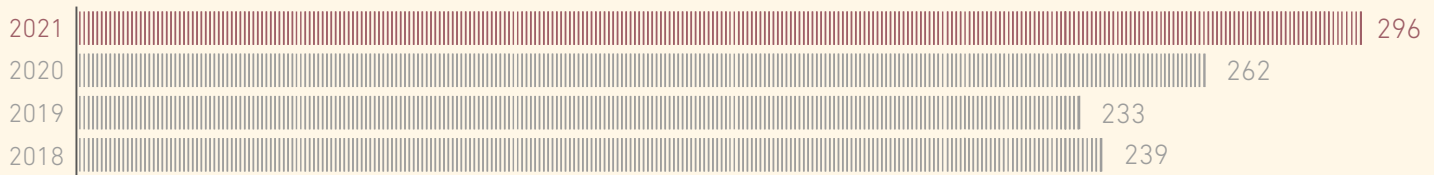
Research Group that includes researches devoted to study terrestrial ecosystems functioning. The group focuses on ecosystem responses to environmental changes that at large extent are determined by human activity and are often related to global change. These studies correspond to several topics and methodological approaches.



SCIENTIFIC OUTPUT

KEY NUMBERS

SCI publications



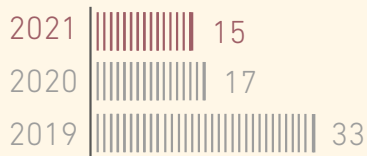
Contribution in national and international scientific conferences



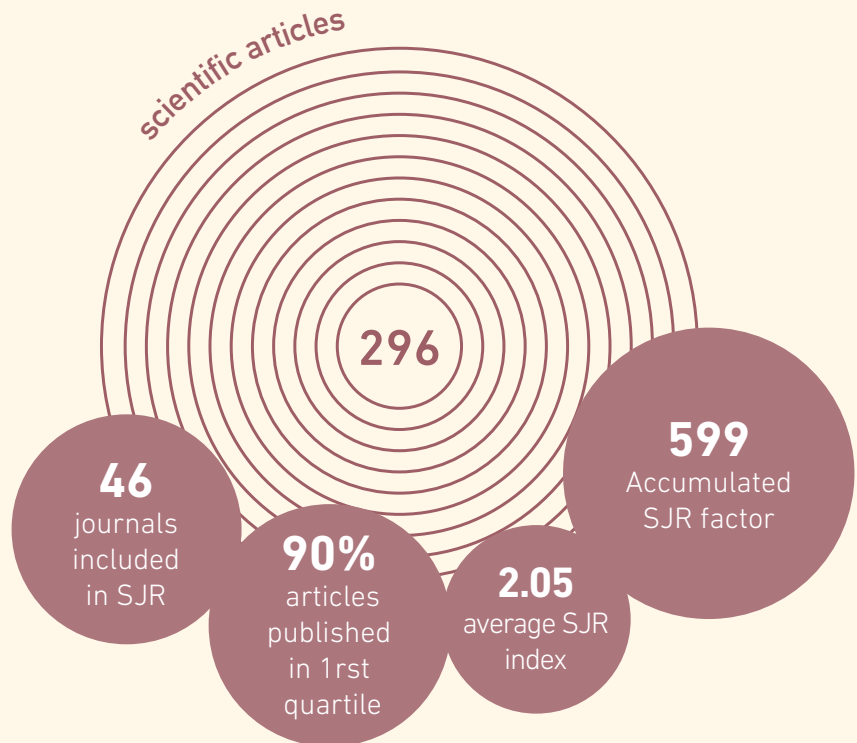
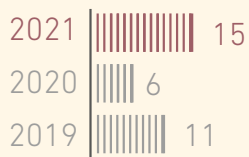
Books



Non SCI publications



Book chapters



Journals

JOURNAL	Article	Quartile	SJR index
Advances in Climate Change Research	1	1	1,054
Agricultural and Forest Meteorology	3	1	1,719
Agricultural Water Management	1	1	1,491
Agriculture, Ecosystems and Environment	1	1	1,664
Agronomy	1	1	0,654
Ambio	1	1	1,661
Animal Behaviour	1	1	1,068
Animal Cognition	1	1	0,865
Animals	1	1	0,61
Annals of Botany	1	1	1,271
Annals of Forest Science	1	1	0,802
Applied Soil Ecology	4	1	1,107
Atmospheric Environment	3	1	1,383
Behavioral Ecology	1	1	1,08
Biodiversity and Conservation	1	1	0,974
Biological Conservation	1	1	2,14
Biological Reviews	1	1	4,357
Biology and Fertility of Soils	1	1	1,863
Catena	4	1	1,391
Cells	1	1	1,452
Climate Dynamics	1	1	1,769
Climatic Change	1	1	1,357
Current Forestry Reports	1	1	1,684
Diversity and Distributions	3	1	1,688
Earth Surface Processes and Landforms	1	1	1,193
Earth System Science Data	3	1	3,657
Ecography	3	1	2,523

JOURNAL	Article	Quartile	SJR index
Ecological Applications	2	1	1,591
Ecological Economics	1	1	1,778
Ecological Entomology	1	1	0,726
Ecological Indicators	3	1	1,284
Ecological Monographs	1	1	3,58
Ecology	2	1	2,021
Ecology and Evolution	6	1	0,98
Ecology Letters	2	1	5,673
Ecosphere	5	1	1,151
Ecosystem Services	2	1	1,749
Ecosystems	2	1	1,371
Ecotoxicology and Environmental Safety	1	1	1,239
Environmental Archaeology	1	1	0,809
Environmental Microbiology	1	1	1,445
Environmental Pollution	1	1	1,954
Environmental Research Letters	1	1	2,111
Environmental Science and Technology	2	1	2,635
European Journal of Forest Research	1	1	0,703
European Journal of Soil Biology	3	1	0,796
European Journal of Soil Science	2	1	1,4
Field Crops Research	1	1	1,571
Forest Ecology and Management	10	1	1,107
Forest Ecosystems	1	1	1,027
Forests	5	1	0,623
Freshwater Biology	1	1	1,199
Frontiers in Ecology and the Environment	1	1	3,185
Frontiers in Forests and Global Change	1	1	1,041

JOURNAL	Article	Quartile	SJR index
Frontiers in Physiology	1	1	1,126
Frontiers in Plant Science	4	1	1,359
Functional Ecology	3	1	2,03
Geoderma	2	1	1,875
Geophysical Research Letters	2	1	1,857
Global Biogeochemical Cycles	1	1	2,194
Global Change Biology	18	1	3,685
Global Ecology and Biogeography	4	1	2,716
Global Environmental Change	1	1	3,154
Holocene	1	1	1,037
IEEE Geoscience and Remote Sensing Letters	1	1	1,403
Insect Science	1	1	0,857
Insects	1	1	0,707
ISPRS Int. J. Geo-Inf	2	1	0,721
Journal of Animal Ecology	2	1	1,969
Journal of Applied Ecology	1	1	2,08
Journal of Archaeological Science	1	1	1,438
Journal of Chemical Ecology	1	1	0,747
Journal of Ecology	10	1	2,193
Journal of Experimental Biology	1	1	1,159
Journal of Geophysical Research: Biogeosciences	2	1	1,335
Journal of Vegetation Science	2	1	0,945
Landscape Ecology	1	1	1,166
Landscape and Urban Planning	1	1	1,908
Landscape Ecology	3	1	1,166
Mammal Review	1	1	1,438

JOURNAL	Article	Quartile	SJR index
Methods in Ecology and Evolution	1	1	2,992
Microbiome	1	1	4,394
Molecular Ecology	1	1	2,496
Molecular Ecology Resources	1	1	2,496
Molecular Phylogenetics and Evolution	1	1	1,533
Movement Ecology	2	1	1,564
Myrmecological News	1	1	1,016
National Science Review	1	1	2,842
Nature	1	1	17,897
Nature Climate Change	1	1	6,134
Nature Communications	4	1	4,843
Nature Ecology and Evolution	5	1	5,533
Nature Geoscience	1	1	5,364
NeoBiota	2	1	1,004
New Phytologist	12	1	3,009
Oikos	1	1	1,446
Parasites and Vectors	1	1	1,089
Perspectives in Ecology and Conservation	1	1	1,539
Perspectives in Plant Ecology, Evolution and Systematics	1	1	1,185
Physical Review E	1	1	0,847
Physical Review Letters	1	1	3,246
Plant and Soil	2	1	1,123
Plant Cell and Environment	1	1	2,026
Plants	2	1	0,765
PLoS ONE	3	1	0,852
Proceedings of the National Academy of Sciences of the United States of America	5	1	4,184

JOURNAL	Article	Quartile	SJR index
Proceedings of the Royal Society B: Biological Sciences	2	1	1,927
Remote Sensing	2	1	1,283
Remote Sensing of Environment	2	1	3,862
Resources, Conservation and Recycling	1	1	2,589
Restoration Ecology	1	1	1,099
Royal Society Open Science	1	1	0,758
Science	2	1	14,589
Science Advances	1	1	4,586
Science Bulletin	2	1	2,503
Science of the Total Environment	10	1	1,806
Scientific Reports	5	1	1,005
Soil Biology and Biochemistry	2	1	2,656
Tree Physiology	3	1	1,179
Trees - Structure and Function	1	1	0,658
Trends in Ecology and Evolution	1	1	5,42
Water	1	1	0,716
Applied Geochemistry	1	2	0,829
Applied Sciences	1	2	0,507
Aquaculture Research	1	2	0,54
Ardeola	1	2	0,516
Biomass Conversion and Biorefinery	1	2	0,552
Diseases of Aquatic Organisms	1	2	0,46
Environmental Processes	1	2	0,574
Environments MDPI	1	2	0,654
Experimental Agriculture	1	2	0,498
Frontiers in Physics	1	2	0,669

JOURNAL	Article	Quartile	SJR index
International Journal of Environmental Research and Public Health	1	2	0,814
Journal of Hymenoptera Research	1	2	0,45
Journal of Insect Conservation	1	2	0,711
Journal of Pharmaceutical and Biomedical Analysis	1	2	0,657
Journal of Plant Ecology	1	2	0,584
Journal of Plant Research	2	2	0,598
Metabolites	1	2	0,956
Minerals	1	2	0,522
New Medit	2	2	0,293
Pedobiologia	1	2	0,611
Soil Ecology Letters	2	2	0,714
Soil Research	1	2	0,586
Sustainability	3	2	0,664
Sociobiology	1	3	0,379

Scientific articles

ABOURASHED, A., DOORNEKAMP, L., ESCARTIN, S., KOENRAADT, C. J., SCHRAMA, M., WAGENER, M., BARTUMEUS, F. & VAN GORP, E. (2021). The potential role of school citizen science programs in infectious disease surveillance: a critical review. *International Journal of Environmental Research and Public Health*, 18(13), 7019.

ALBA-PATINO, D., CARABASSA, V., CASTRO, H., GUTIÉRREZ-BRICEÑO, I., GARCÍA-LLORENTE, M., GIAGNOCAVO, C., ... & CASTRO, A. J. (2021). Social indicators of ecosystem restoration for enhancing human wellbeing. *Resources, Conservation and Recycling*, 174, 105782.

ALFARO-SÁNCHEZ, R., ESPELTA, J. M., VALLADARES, F., ACUÑA-MÍGUEZ, B., & MARTÍN-FORÉS, I. (2021). Disentangling the role of sex dimorphism and forest structure as drivers of growth and wood density in expanding juniperus thurifera L. woodlands. *Annals of Forest Science*, 78(4) doi:10.1007/s13595-021-01097-6

ALONSO-FORN, D., PEGUERO-PINA, J. J., FERRIO, J. P., MENCUCINI, M., MENDOZA-HERRER, Ó., SANCHO-KNAPIK, D., & GIL-PELEGRÍN, E. (2021). Contrasting functional strategies following severe drought in two mediterranean oaks with different leaf habit: *Quercus faginea* and *quercus ilex* subsp. *rotundifolia*. *Tree Physiology*, 41(3), 371-387. doi:10.1093/treephys/tpaa135

AMÉZTEGUI GONZÁLEZ, A., MORÁN ORDÓÑEZ, A., MÁRQUEZ, A., BLÁZQUEZ CASADO, Á., PLA, M., VILLERO, D., ... & COLL, L. (2021). Forest expansion in mountain protected areas: trends and consequences for the landscape. *Landscape and Urban Planning*, 2021, vol. 2016, núm, 104240, p. 1-10.

ANDRÉS, P.; DOBLAS-MIRANDA, E.; MATTANA, S.; MOLOWNY-HORAS, R.; VAYREDA, J.; GUARDIOLA, M.; PINO, J.; GORDILLO, J. A Battery of Soil and Plant Indicators of NBS Environmental Performance in the Context of Global Change. *Sustainability* 2021, 13, 1913. <https://doi.org/10.3390/su13041913>

AQUILUÉ, N., MESSIER, C., MARTINS, K. T., DUMAIS-LALONDE, V., & MINA, M. (2021). A simple-to-use management approach to boost adaptive capacity of forests to global uncertainty. *Forest Ecology and Management*, 481 doi:10.1016/j.foreco.2020.118692

ARIZA-LÓPEZ, F.J.; RODRÍGUEZ-PASCUAL, A.; LOPEZ-PELLICER, F.J.; VILCHES-BLÁZQUEZ, L.M.; VILLAR-IGLESIAS, A.; MASÓ, J.; DÍAZ-DÍAZ, E.; UREÑA-CÁMARA, M.A.; GONZÁLEZ-YANES, A. An Analysis of Existing Production Frameworks for Statistical and Geographic Information: Synergies, Gaps and Integration. *ISPRS Int. J. Geo-Inf.* 2021, 10, 374. <https://doi.org/10.3390/ijgi10060374>

ARMENTERAS, D., DÁVALOS, L. M., BARRETO, J. S., MIRANDA, A., HERNÁNDEZ-MORENO, A., ZAMORANO-ELGUETA, C., . . . RETANA, J. (2021). Fire-induced loss of the world's most biodiverse forests in latin america. *Science Advances*, 7(33) doi:10.1126/sciadv.abd3357

ARMENTERAS, D., MEZA, M. C., GONZÁLEZ, T. M., OLIVERAS, I., BALCH, J. K., & RETANA, J. (2021). Fire threatens the diversity and structure of tropical gallery forests. *Ecosphere*, 12(1) doi:10.1002/ecs2.3347

ARNAN, X., ANGULO, E., BOULAY, R., MOLOWNY-HORAS, R., CERDÁ, X., & RETANA, J. (2021). Introduced ant species occupy empty climatic niches in europe. *Scientific Reports*, 11(1) doi:10.1038/s41598-021-82982-y

ASCENSÁO, F., D'AMICO, M., MARTINS, R. C., REBELO, R., BARBOSA, A. M., BENCATEL, J., CARDADOR, L . . CAPINHA, C. (2021). Distribution of alien tetrapods in the iberian

peninsula. *NeoBiota*, 64, 1-21. doi:10.3897/NEOBIOTA.64.55597

ASENSIO, D., ZUCCARINI, P., OGAYA, R., MARAÑÓN-JIMÉNEZ, S., SARDANS, J., & PEÑUELAS, J. (2021). Simulated climate change and seasonal drought increase carbon and phosphorus demand in mediterranean forest soils. *Soil Biology and Biochemistry*, 163 doi:10.1016/j.soilbio.2021.108424

AZPIAZU, C., BOSCH, J., BORTOLOTTI, L., MEDRZYCKI, P., TEPER, D., MOLOWNY-HORAS, R., & SGOLAstra, F. (2021). Toxicity of the insecticide sulfoxaflozole alone and in combination with the fungicide fluxapyroxad in three bee species. *Scientific Reports*, 11(1) doi:10.1038/s41598-021-86036-1

AZPIAZU, C., BOSCH, J., VIÑUELA, E., MEDRZYCKI, P., TEPER, D., & SGOLAstra, F. (2021). Author correction: Chronic oral exposure to field-realistic pesticide combinations via pollen and nectar: Effects on feeding and thermal performance in a solitary bee (scientific reports,(2019),9,1,(13770),10.1038/s41598-019-50255-4). *Scientific Reports*, 11(1) doi:10.1038/s41598-021-95575-6

BACH, A., CERON, J. J., MANEJA, R., LLUSIÀ, J., PEÑUELAS, J., & ESCRIBANO, D. (2021). Evolution of human salivary stress markers during an eight-hour exposure to a mediterranean holm oak forest. A pilot study. *Forests*, 12(11) doi:10.3390/F12111600

BACH, A., MANEJA, R., ZALDO-AUBANELL, Q., ROMANILLOS, T., LLUSIÀ, J., EUSTAQUIO, A., . . . PEÑUELAS, J. (2021). Human absorption of monoterpenes after a 2-h forest exposure: A

field experiment in a mediterranean holm oak forest. *Journal of Pharmaceutical and Biomedical Analysis*, 200 doi:10.1016/j.jpba.2021.114080

BARBA, J., POYATOS, R., CAPOCCI, M., & VARGAS, R. (2021). Spatiotemporal variability and origin of CO₂ and CH₄ tree stem fluxes in an upland forest. *Global Change Biology*, 27(19), 4879-4893. doi:10.1111/gcb.15783

BASTAZINI, V. A. G., GALIANA, N., HILLEBRAND, H., ESTIARTE, M., OGAYA, R., PEÑUELAS, J., . . . MONTOYA, J. M. (2021). The impact of climate warming on species diversity across scales: Lessons from experimental meta-ecosystems. *Global Ecology and Biogeography*, 30(7), 1545-1554. doi:10.1111/geb.13308

BATUECAS, I., ALOMAR, O., CASTAÑE, C., PIÑOL, J., BOYER, S., GALLARDO-MONTOYA, L., & AGUSTÍ, N. (2021). Development of a multiprimer metabarcoding approach to understanding trophic interactions in agroecosystems. *Insect Science*, doi:10.1111/1744-7917.12992

BAUDROT, V., WALKER, E., LANG, A., STEFANESCU, C., REY, J. -., SOUBEYRAND, S., & MESSÉAN, A. (2021). When the average hides the risk of bt-corn pollen on non-target lepidoptera: Application to aglais io in catalonia. *Ecotoxicology and Environmental Safety*, 207 doi:10.1016/j.ecoenv.2020.111215

BERRANG-FORD, L., SIDERS, A. R., LESNIKOWSKI, A., FISCHER, A. P., CALLAGHAN, M. W., HADDAWAY, N. R., SARDANS, J., PEÑUELAS, J. . . . ABU, T. Z. (2021). A systematic global stocktake of evidence on human adaptation to climate change. *Nature Climate Change*, 11(11), 989-1000. doi:10.1038/s41558-021-01170-y

BINKS, O., FINNIGAN, J., COUGHLIN, I., DISNEY, M., CALDERS, K., BURT, A., MENCUCINI, M. . . MEIR, P. (2021). Canopy wetness in the eastern amazon. *Agricultural and Forest Meteorology*, 297 doi:10.1016/j.agrformet.2020.108250

BLANCO-SACRISTÁN, J., PANIGADA, C., GENTILI, R., TAGLIABUE, G., GARZONIO, R., MARTÍN, M. P., DE GUEVARA, M. . . ROSSINI, M.

(2021). UAV RGB, thermal infrared and multispectral imagery used to investigate the control of terrain on the spatial distribution of dryland biocrust. *Earth Surface Processes and Landforms*, 46(12), 2466-2484. doi:10.1002/esp.5189

BOCK, D. G., BAECKENS, S., PITA-AQUINO, J. N., CHEJANOVSKI, Z. A., MICHAELIDES, S. N., MURALIDHAR, P., . . . KOLBE, J. J. (2021). Changes in selection pressure can facilitate hybridization during biological invasion in a cuban lizard. *Proceedings of the National Academy of Sciences of the United States of America*, 118(42) doi:10.1073/pnas.2108638118

BOGDZIEWICZ, M., SZYMKOWIAK, J., CALAMA, R., CRONE, E. E., ESPELTA, J. M., LESICA, P., . . . KELLY, D. (2021). Does masting scale with plant size? high reproductive variability and low synchrony in small and unproductive individuals. *Annals of Botany*, 126(5), 971-979. doi:10.1093/AOB/MCAA118

BÓRNEZ, K., VERGER, A., DESCALS, A., & PEÑUELAS, J. (2021). Monitoring the responses of deciduous forest phenology to 2000–2018 climatic anomalies in the northern hemisphere. *Remote Sensing*, 13(14) doi:10.3390/rs13142806

BOSCH, J., OSORIO-CANADAS, S., SGOLAstra, F., VICENS, N. (2021). Use of a managed solitary bee to pollinate almonds: population sustainability and increased fruit set. *Insects*, 12, 56. doi.org/10.3390/insects12010056

BULDYREV, S. V., RAPOSO, E. P., BARTUMEUS, F., HAVLIN, S., RUSCH, F. R., DA LUZ, M. G. E., & VISWANATHAN, G. M. (2021). Comment on "inverse square lévy walks are not optimal search strategies for $d \geq 2$ ". *Physical Review Letters*, 126(4) doi:10.1103/PhysRevLett.126.048901

CALLAGHAN, C. T., SAYOL, F., BENEDETTI, Y., MORELLI, F., & SOL, D. (2021). Validation of a globally-applicable method to measure urban tolerance of birds using citizen science data. *Ecological Indicators*, 120 doi:10.1016/j.ecolind.2020.106905

CAMARERO, J. J., GAZOL, A., SÁNCHEZ-SALGUERO, R., FAJARDO, A., McINTIRE, E. J. B., GUTIÉRREZ, E., . . . WILMKING, M. (2021). Global fading of the temperature–growth coupling at alpine and

polar treelines. *Global Change Biology*, 27(9), 1879-1889. doi:10.1111/gcb.15530

CAMPOS, J. C., BERNHARDT, J., AQUILUÉ, N., BROTONS, L., DOMÍNGUEZ, J., LOMBA, A., . . . REGOS, A. (2021). Using fire to enhance rewilding when agricultural policies fail. *Science of the Total Environment*, 755 doi:10.1016/j.scitotenv.2020.142897

CANELLES, Q., AQUILUÉ, N., JAMES, P. M. A., LAWLER, J., & BROTONS, L. (2021). Global review on interactions between insect pests and other forest disturbances. *Landscape Ecology*, 36(4), 945-972. doi:10.1007/s10980-021-01209-7

CANELLES, Q., BASSOLS, E., VAYREDA, J., & BROTONS, L. (2021). Predicting the potential distribution and forest impact of the invasive species *Cydalima perspectalis* in europe. *Ecology and Evolution*, 11(10), 5713-5727. doi:10.1002/ece3.7476

CAPÓ, M., ENGELBRECHT, C., CARDONA, C., CASTELLS, E., BARTOLOMÉ, J., RAMONEDA, M., & BARAZA, E. (2021). Mildly toxic shrubs as indicators of goats herbivory give information for the management of natural landscapes on mediterranean islands. *Science of the Total Environment*, 786 doi:10.1016/j.scitotenv.2021.147391

CARABASSA, V., MONTERO, P., ALCAÑIZ, J. M., & PADRÓ, J. -. (2021). Soil erosion monitoring in quarry restoration using drones. *Minerals*, 11(9) doi:10.3390/min11090949

CARNICER, J., VIVES-INGLA, M., BLANQUER, L., MÉNDEZ-CAMPS, X., ROSELL, C., SABATÉ, S., . . . BARBETA, A. (2021). Forest resilience to

global warming is strongly modulated by local-scale topographic, microclimatic and biotic conditions. *Journal of Ecology*, 109(9), 3322-3339. doi:10.1111/1365-2745.13752

CASTRO-COBO, S., BLIGHT, O., ESPADALER, X., & ANGULO, E. (2021). Long-term spread of argentine ant (hymenoptera: Formicidae) european supercolonies on three mediterranean islands. *Myrmecological News*, 31, 185-200. doi:10.25849/myrmecol.news_031:185

CEAUȘU, S., APAZA-QUEVEDO, A., SCHMID, M., MARTÍN-LÓPEZ, B., CORTÉS-AVIZANDA, A., MAES, J., ... PEREIRA, H. M. (2021). Ecosystem service mapping needs to capture more effectively the biodiversity important for service supply. *Ecosystem Services*, 48 doi:10.1016/j.ecoser.2021.101259

CHEN, X., WIESMEIER, M., SARDANS, J., VAN ZWIETEN, L., FANG, Y., GARGALLO-GARRIGA, A., ... WANG, W. (2021). Effects of crabs on greenhouse gas emissions, soil nutrients, and stoichiometry in a subtropical estuarine wetland. *Biology and Fertility of Soils*, 57(1), 131-144. doi:10.1007/s00374-020-01512-6

CHIN-PAMPILLO, J. S., ALFARO-VARGAS, A., ROJAS, R., GIACOMELLI, C. E., PEREZ-VILLANUEVA, M., CHINCHILLA-SOTO, C., ... DOMENE, X. (2021). Widespread tropical agrowastes as novel feedstocks for biochar production: Characterization and priority environmental uses. *Biomass Conversion and Biorefinery*, 11(5), 1775-1785. doi:10.1007/s13399-020-00714-0

CHIN-PAMPILLO, J. S., PEREZ-VILLANUEVA, M., MASIS-MORA, M., MORA-DITTEL, T., CARAZO-ROJAS, E., ALCAÑIZ, J. M., ... DOMENE, X.

(2021). Amendments with pyrolyzed agrowastes change bromacil and diuron's sorption and persistence in a tropical soil without modifying their environmental risk. *Science of the Total Environment*, 772 doi:10.1016/j.scitotenv.2021.145515

CLARKE, N., KIÆR, L. P., JANNE KJØNAAS, O., BÁRCENA, T. G., VESTERDAL, L., STUPAK, I., ... SIGURDSSON, B. D. (2021). Effects of intensive biomass harvesting on forest soils in the nordic countries and the UK: A meta-analysis. *Forest Ecology and Management*, 482 doi:10.1016/j.foreco.2020.118877

CLOSA, G., MASÓ, J., JULIÀ, N., & PONS, X. (2021). Geospatial queries on data collection using a common provenance model. *ISPRS International Journal of Geo-Information*, 10(3) doi:10.3390/ijgi10030139

COLLADO, M. A., MENZEL, R., SOL, D., & BARTOMEUS, I. (2021). Innovation in solitary bees is driven by exploration, shyness and activity levels. *Journal of Experimental Biology*, 224(3) doi:10.1242/jeb.232058

COLLADO, M. Á., MONTANER, C. M., MOLINA, F. P., SOL, D., & BARTOMEUS, I. (2021). Brain size predicts learning abilities in bees. *Royal Society Open Science*, 8(5) doi:10.1098/rsos.201940

COLOM, P., TRAVESET, A., & STEFANESCU, C. (2021). Long-term effects of abandonment and restoration of mediterranean meadows on butterfly-plant interactions. *Journal of Insect Conservation*, 25(3), 383-393. doi:10.1007/s10841-021-00307-w

COLOM, P., TRAVESET, A., CARRERAS, D., & STEFANESCU, C. (2021). Spatio-temporal responses of butterflies to global warming on a mediterranean island over two decades. *Ecological Entomology*, 46(2), 262-272. doi:10.1111/een.12958

COOPMAN, R. E., NGUYEN, H. T., MENCUCCINI, M., OLIVEIRA, R. S., SACK, L., LOVELOCK, C. E., & BALL, M. C. (2021). Harvesting water from unsaturated atmospheres: Deliquescence of salt secreted onto leaf surfaces drives reverse sap flow in a dominant arid climate mangrove, *avicennia marina*. *New Phytologist*, 231(4), 1401-1414. doi:10.1111/nph.17461

- CORREIA, M., ESPELTA, J. M., MORILLO, J. A., PINO, J., & RODRÍGUEZ-ECHEVERRÍA, S.** (2021). Land-use history alters the diversity, community composition and interaction networks of ectomycorrhizal fungi in beech forests. *Journal of Ecology*, 109(8), 2856-2870. doi:10.1111/1365-2745.13674
- CORTINA-SEGARRA, J., GARCÍA-SÁNCHEZ, I., GRACE, M., ANDRÉS, P., BAKER, S., BULLOCK, C., . . . VENTOCILLA, J. L.** (2021). Barriers to ecological restoration in europe: Expert perspectives. *Restoration Ecology*, 29(4) doi:10.1111/rec.13346
- CREMADES, R., SANCHEZ-PLAZA, A., HEWITT, R. J., MITTER, H., BAGGIO, J. A., OLAZABAL, M., . . . TUDOSE, N. C.** (2021). Guiding cities under increased droughts: The limits to sustainable urban futures. *Ecological Economics*, 189 doi:10.1016/j.ecolecon.2021.107140
- CRUZ-ALONSO, V., ESPELTA, J. M., & PINO, J.** (2021). Woody species richness and turnover in expanding mediterranean forests: A story of landscape legacies influenced by climatic aridity. *Landscape Ecology*, 36(6), 1787-1800. doi:10.1007/s10980-021-01249-z
- DAVI, N. K., RAO, M. P., WILSON, R., ANDREU-HAYLES, L., OELKERS, R., D'ARRIGO, R., . . . SURAN, B.** (2021). Accelerated recent warming and temperature variability over the past eight centuries in the central asian altai from blue intensity in tree rings. *Geophysical Research Letters*, 48(16) doi:10.1029/2021GL092933
- DAWSON, S. K., CARMONA, C. P., GONZÁLEZ-SUÁREZ, M., JÖNSSON, M., CHICHORRO, F., MALLEN-COOPER, M., . . . DUTHIE, A. B.** (2021). The traits of "trait ecologists": An analysis of the use of trait and functional trait terminology. *Ecology and Evolution*, 11(23), 16434-16445. doi:10.1002/ece3.8321
- DE CÁCERES, M., MENCUCCINI, M., MARTIN-STPAUL, N., LIMOUSIN, J. -, COLL, L., POYATOS, R., . . . MARTÍNEZ-VILALTA, J.** (2021). Unravelling the effect of species mixing on water use and drought stress in mediterranean forests: A modelling approach. *Agricultural and Forest Meteorology*, 296 doi:10.1016/j.agrformet.2020.108233
- DE PEDRO, M., RIBA, M., GONZÁLEZ-MARTÍNEZ, S. C., SEOANE, P., BAUTISTA, R., CLAROS, M. G., & MAYOL, M.** (2021). Demography, genetic diversity and expansion load in the colonizing species *leontodon longirostris* (asteraceae) throughout its native range. *Molecular Ecology*, 30(5), 1190-1205. doi:10.1111/mec.15802
- DEGUELDRE, F., MARDULYN, P., KUHN, A., PINEL, A., KARAMAN, C., LEBAS, C., . . . ARON, S.** (2021). Evolutionary history of inquiline social parasitism in *plagiolepis* ants. *Molecular Phylogenetics and Evolution*, 155 doi:10.1016/j.ympev.2020.107016
- DESCALS, A., WICH, S., MEIJAARD, E., GAVEAU, D. L. A., PEEDELL, S., & SZANTOI, Z.** (2021). High-resolution global map of smallholder and industrial closed-canopy oil palm plantations. *Earth System Science Data*, 13(3), 1211-1231. doi:10.5194/essd-13-1211-2021
- DÍAZ, M., CONCEPCIÓN, E. D., MORALES, M. B., ALONSO, J. C., AZCÁRATE, F. M., BARTOMEUS, I., . . . VELADO-ALONSO, E.** (2021). Environmental objectives of spanish agriculture: Scientific guidelines for their effective implementation under the common agricultural policy 2023-2030. [Objetivos ambientales de la agricultura española: recomendaciones científicas para su implementación efectiva según la nueva política agraria común 2023-2030] *Ardeola*, 68(2), 445-460. doi:10.13157/arla.68.2.2021.fo1
- DOBLAS-MIRANDA E, ESPELTA JM, PINO J.** (2021). Connectivity affects species turnover in soil microarthropod communities during Mediterranean forest establishment. *Ecosphere* 12(12): e03865. DOI: 10.1002/ecs2.3865

- DOMENE, X., MATTANA, S., & SÁNCHEZ-MORENO, S.** (2021). Biochar addition rate determines contrasting shifts in soil nematode trophic groups in outdoor mesocosms: An appraisal of underlying mechanisms. *Applied Soil Ecology*, 158 doi:10.1016/j.apsoil.2020.103788
- DOX, I., GRIČAR, J., MARCHAND, L. J., LEYS, S., ZUCCARINI, P., GERON, C., . . . CAMPIOLI, M.** (2021). Timeline of autumn phenology in temperate deciduous trees. *Tree Physiology*, 40(8), 1001-1013. doi:10.1093/TREEPHYS/TPAA058
- DRISCOLL, D. A., ARMENTERAS, D., BENNETT, A. F., BROTONS, L., CLARKE, M. F., DOHERTY, T. S., . . . WEVILL, T.** (2021). How fire interacts with habitat loss and fragmentation. *Biological Reviews*, 96(3), 976-998. doi:10.1111/brv.12687
- DUANE, A., CASTELLNOU, M., & BROTONS, L.** (2021). Towards a comprehensive look at global drivers of novel extreme wildfire events. *Climatic Change*, 165(3-4) doi:10.1007/s10584-021-03066-4
- DUANE, A., MIRANDA, M. D., & BROTONS, L.** (2021). Forest connectivity percolation thresholds for fire spread under different weather conditions. *Forest Ecology and Management*, 498 doi:10.1016/j.foreco.2021.119558
- EL-MADANY, T. S., REICHSTEIN, M., CARRARA, A., MARTÍN, M. P., MORENO, G., GONZALEZ-CASCON, R., . . . MIGLIAVACCA, M.** (2021). How nitrogen and phosphorus availability change water use efficiency in a mediterranean savanna ecosystem. *Journal of Geophysical Research: Biogeosciences*, 126(5) doi:10.1029/2020JG006005
- ELVIRA, N. J., LLORET, F., JAIME, L., MARGALEF-MARRASE, J., PÉREZ NAVARRO, M. Á., & BATLLORI, E.** (2021). Species climatic niche explains post-fire regeneration of aleppo pine (*pinus halepensis* mill.) under compounded effects of fire and drought in east spain. *Science of the Total Environment*, 798 doi:10.1016/j.scitotenv.2021.149308
- ERITJA, R., DELACOUR-ESTRELLA, S., RUIZ-ARRONDO, I., GONZÁLEZ, M. A., BARCELÓ, C., GARCÍA-PÉREZ, A. L., . . . BARTUMEUS, F.** (2021). At the tip of an iceberg: Citizen science and active surveillance collaborating to broaden the known distribution of *aedes japonicus* in spain. *Parasites and Vectors*, 14(1) doi:10.1186/s13071-021-04874-4
- FENG, X., FU, B., ZHANG, Y., PAN, N., ZENG, Z., TIAN, H., . . . PEÑUELAS, J.** (2021). Recent leveling off of vegetation greenness and primary production reveals the increasing soil water limitations on the greening earth. *Science Bulletin*, 66(14), 1462-1471. doi:10.1016/j.scib.2021.02.023
- FERNÁNDEZ-MARTÍNEZ, M., & PEÑUELAS, J.** (2021). Measuring temporal patterns in ecology: The case of mast seeding. *Ecology and Evolution*, 11(7), 2990-2996. doi:10.1002/ece3.7291
- FERNÁNDEZ-MARTÍNEZ, M., PREECE, C., CORBERA, J., CANO, O., GARCIA-PORTA, J., BOGDZIEWICZ, M., . . . PEÑUELAS, J.** (2021). Nutrients control reproductive traits of hygrophytic bryophytes. *Freshwater Biology*, 66(7), 1436-1446. doi:10.1111/fwb.13729
- FERNÁNDEZ-MARTÍNEZ, M., PREECE, C., CORBERA, J., CANO, O., GARCIA-PORTA, J., SARDANS, J., . . . PEÑUELAS, J.** (2021). Bryophyte C:N:P stoichiometry, biogeochemical niches and elementome plasticity driven by environment and coexistence. *Ecology Letters*, 24(7), 1375-1386. doi:10.1111/ele.13752
- FERREIRA, J., RAPOSO, E. P., ARAÚJO, H. A., DA LUZ, M. G. E., VISWANATHAN, G. M., BARTUMEUS, F., & CAMPOS, D.** (2021). Landscape-scaled strategies can outperform lévy random searches. *Physical Review E*, 103(2) doi:10.1103/PhysRevE.103.022105

- FIELD, R. D., ANDREU-HAYLES, L., D'ARRIGO, R. D., OELKERS, R., LUCKMAN, B. H., MORIMOTO, D., ... LEVESQUE, M.** (2021). Correction to: Tree-ring cellulose $\delta^{18}\text{O}$ records similar large-scale climate influences as precipitation $\delta^{18}\text{O}$ in the northwest territories of Canada (climate dynamics, (2021), 10.1007/s00382-021-05932-4). *Climate Dynamics*, doi:10.1007/s00382-021-06080-5
- FLO, V., MARTÍNEZ-VILALTA, J., MENCUCCINI, M., GRANDA, V., ANDEREGG, W. R. L., & POYATOS, R.** (2021). Climate and functional traits jointly mediate tree water-use strategies. *New Phytologist*, 231(2), 617-630. doi:10.1111/nph.17404
- FUNES, I., SAVÉ, R., DE HERRALDE, F., BIEL, C., PLA, E., PASCUAL, D., . . . ARANDA, X.** (2021). Modeling impacts of climate change on the water needs and growing cycle of crops in three mediterranean basins. *Agricultural Water Management*, 249 doi:10.1016/j.agwat.2021.106797
- GACIA, E., SOTO, D. X., ROIG, R., & CATALAN, J.** (2021). Phragmites australis as a dual indicator (air and sediment) of trace metal pollution in wetlands – the key case of Flix reservoir (Ebro river). *Science of the Total Environment*, 765 doi:10.1016/j.scitotenv.2020.142789
- GARCÍA-VALDÉS, R., VAYREDA, J., RETANA, J., & MARTÍNEZ-VILALTA, J.** (2021). Low forest productivity associated with increasing drought-tolerant species is compensated by an increase in drought-tolerance richness. *Global Change Biology*, 27(10), 2113-2127. doi:10.1111/gcb.15529
- GARGALLO-GARRIGA, A., SARDANS, J., ALREFAEI, A. F., KLEM, K., FUCHSLUEGER, L., RAMÍREZ-ROJAS, I., ... PEÑUELAS, J.** (2021). Tree species and epiphyte taxa determine the “metabolomic niche” of canopy suspended soils in a species-rich lowland tropical rainforest. *Metabolites*, 11(11) doi:10.3390/metabo11110718
- GARGALLO-GARRIGA, A., SARDANS, J., AYALA-ROQUE, M., SIGURDSSON, B. D., LEBLANS, N. I. W., ORAVEC, M., . . . PEÑUELAS, J.** (2021). Warming affects soil metabolome: The case study of Icelandic grasslands. *European Journal of Soil Biology*, 105 doi:10.1016/j.ejsobi.2021.103317
- GARRATT, M. P. D., DE GROOT, G. A., ALBRECHT, M., BOSCH, J., BREEZE, T. D., FOUNTAIN, M. T., . . . ZHUSUPBAEVA, A.** (2021). Opportunities to reduce pollination deficits and address production shortfalls in an important insect-pollinated crop. *Ecological Applications*, 31(8) doi:10.1002/eap.2445
- GAVEAU, D. L. A., DESCALS, A., SALIM, M. A., SHEIL, D., & SLOAN, S.** (2021). Refined burned-area mapping protocol using Sentinel-2 data increases estimate of 2019 Indonesian burning. *Earth System Science Data*, 13(11), 5353-5368. doi:10.5194/essd-13-5353-2021
- GOLL, D. S., CIAIS, P., AMANN, T., BUERMANN, W., CHANG, J., EKER, S., . . . VICCA, S.** (2021). Potential CO₂ removal from enhanced weathering by ecosystem responses to powdered rock. *Nature Geoscience*, 14(8), 545-549. doi:10.1038/s41561-021-00798-x
- GONZÁLEZ DE ANDRÉS, E., ROSAS, T., CAMARERO, J. J., & MARTÍNEZ-VILALTA, J.** (2021). The intraspecific variation of functional traits modulates drought resilience of European beech and pubescent oak. *Journal of Ecology*, 109(10), 3652-3669. doi:10.1111/1365-2745.13743
- GONZÁLEZ, T. M., GONZÁLEZ-TRUJILLO, J. D., MUÑOZ, A., & ARMENTERAS, D.** (2021). Differential effects of fire on the occupancy of small mammals in neotropical savanna-gallery forests. *Perspectives in Ecology and Conservation*, 19(2), 179-188. doi:10.1016/j.pecon.2021.03.005
- GONZÁLEZ-LAGOS, C., CARDADOR, L., & SOL, D.** (2021). Invasion success and tolerance to urbanization in birds. *Ecography*, 44(11), 1642-1652. doi:10.1111/ecog.05826

- GORDO, O., BROTONS, L., HERRANDO, S., & GARGALLO, G.** (2021). Rapid behavioural response of urban birds to COVID-19 lockdown. *Proceedings of the Royal Society B: Biological Sciences*, 288(1946) doi:10.1098/rspb.2020.2513
- GUERRERO-RAMÍREZ, N. R., MOMMER, L., FRESCHET, G. T., IVERSEN, C. M., McCORMACK, M. L., KATTGE, J., . . . WEIGELT, A.** (2021). Global root traits (GRooT) database. *Global Ecology and Biogeography*, 30(1), 25-37. doi:10.1111/geb.13179
- GUERRIERI, R., CORREIA, M., MARTÍN-FORÉS, I., ALFARO-SÁNCHEZ, R., PINO, J., HAMPE, A., . . . ESPELTA, J. M.** (2021). Land-use legacies influence tree water-use efficiency and nitrogen availability in recently established european forests. *Functional Ecology*, 35(6), 1325-1340. doi:10.1111/1365-2435.13787
- HAESEN, S., LEMBRECHTS, J. J., DE FRENNE, P., LENOIR, J., AALTO, J., ASHCROFT, M. B., . . . VAN MEERBEEK, K.** (2021). ForestTemp—sub-canopy microclimate temperatures of european forests. *Global Change Biology*, 27(23), 6307-6319. doi:10.1111/gcb.15892
- HARATI, S., PEREZ, L., & MOLOWNY-HORAS, R.** (2021). Promoting the emergence of behavior norms in a principal–agent problem—an agent-based modeling approach using reinforcement learning. *Applied Sciences (Switzerland)*, 11(18) doi:10.3390/app11188368
- HARATI, S., PEREZ, L., MOLOWNY-HORAS, R., & PONTIUS, R. G.** (2021). Validating models of one-way land change: An example case of forest insect disturbance. *Landscape Ecology*, 36(10), 2919-2935. doi:10.1007/s10980-021-01272-0
- HARRISON, S. P., CRAMER, W., FRANKLIN, O., PRENTICE, I. C., WANG, H., BRÄNNSTRÖM, Å., . . . WRIGHT, I. J.** (2021). Eco-evolutionary optimality as a means to improve vegetation and land-surface models. *New Phytologist*, 231(6), 2125-2141. doi:10.1111/nph.17558
- HE, Y., WANG, X., WANG, K., TANG, S., XU, H., CHEN, A., . . . PIAO, S.** (2021). Data-driven estimates of global litter production imply slower vegetation carbon turnover. *Global Change Biology*, 27(8), 1678-1688. doi:10.1111/gcb.15515
- HERMOSO, V., REGOS, A., MORÁN-ORDÓÑEZ, A., DUANE, A., & BROTONS, L.** (2021). Tree planting: A double-edged sword to fight climate change in an era of megafires. *Global Change Biology*, 27(13), 3001-3003. doi:10.1111/gcb.15625
- HERNÁNDEZ-CASTELLANO, C., PIÑOL, J., & ESPADALER, X.** (2021). Distinct macroinvertebrate soil food webs at one-meter scale in a mediterranean agroecosystem. *Pedobiologia*, 87-88 doi:10.1016/j.pedobi.2021.150751
- HOSTINSKÁ, L., KUNEŠ, P., HADRAVA, J., BOSCH, J., SCARAMOZZINO, P. L., & BOGUSCH, P.** (2021). Comparative biology of four rhodanthidium species (hymenoptera, megachilidae) that nest in snail shells. *Journal of Hymenoptera Research*, 85, 11-28. doi:10.3897/JHR.85.64925
- HU, M., LE, Y., SARDANS, J., & PEÑUELAS, J.** (2021). Low-level saltwater intrusion alters soil diazotrophic community structure in a subtropical estuarine wetland. *Applied Soil Ecology*, 164 doi:10.1016/j.apsoil.2021.103959
- HU, M., PEÑUELAS, J., SARDANS, J., HUANG, J., XU, K., & TONG, C.** (2021). Denitrification rates in tidal marsh soils: The roles of soil texture, salinity and nitrogen enrichment. *European Journal of Soil Science*, 72(1), 474-479. doi:10.1111/ejss.12956
- HU, M., SARDANS, J., LE, Y., WANG, Y., PEÑUELAS, J., & TONG, C.** (2021). Phosphorus mobilization and availability across the freshwater to oligohaline water transition in subtropical estuarine marshes. *Catena*, 201 doi:10.1016/j.catena.2021.105195

- IBAÑEZ, M., ALTIMIR, N., RIBAS, À., EUGSTER, W., & SEBASTIÀ, M. -.** (2021). Cereal-legume mixtures increase net CO₂ uptake in a forage crop system in the eastern pyrenees. *Field Crops Research*, 272 doi:10.1016/j.fcr.2021.108262
- IBAÑEZ, M., LEIVA, M. J., CHOCARRO, C., ALJAZAIRI, S., RIBAS, À., & SEBASTIÀ, M. -.** (2021). Tree—open grassland structure and composition drive greenhouse gas exchange in holm oak meadows of the iberian peninsula. *Agronomy*, 11(1) doi:10.3390/agronomy11010050
- JARQUE-BASCUÑANA, L., BARTOLOMÉ, J., SERRANO, E., ESPUNYES, J., GAREL, M., ALARCÓN, J. A. C., . . . ALBANELL, E.** (2021). Near infrared reflectance spectroscopy analysis to predict diet composition of a mountain ungulate species. *Animals*, 11(5) doi:10.3390/ani11051449
- JIN, Q., PEÑUELAS, J., SARDANS, J., ROMERO, E., CHEN, S., LIU, X., . . . WANG, W.** (2021). Changes in soil carbon, nitrogen, and phosphorus contents, storages, and stoichiometry during land degradation in jasmine croplands in subtropical china. *Experimental Agriculture*, 57(2), 113-125. doi:10.1017/S0014479721000089
- JOLLES, J. W.** (2021). Broad-scale applications of the raspberry pi: A review and guide for biologists. *Methods in Ecology and Evolution*, 12(9), 1562-1579. doi:10.1111/2041-210X.13652
- JONES, G., KLUYVER, T., PREECE, C., SWARBRICK, J., FORSTER, E., WALLACE, M., . . . OSBORNE, C. P.** (2021). The origins of agriculture: Intentions and consequences. *Journal of Archaeological Science*, 125 doi:10.1016/j.jas.2020.105290
- KELLY, R., HEALY, K., ANAND, M., BAUDRAZ, M. E. A., BAHN, M., CERABOLINI, B. E. L., . . . BUCKLEY, Y. M.** (2021). Climatic and evolutionary contexts are required to infer plant life history strategies from functional traits at a global scale. *Ecology Letters*, 24(5), 970-983. doi:10.1111/ele.13704
- KILLEN, S. S., CORTESE, D., COTGROVE, L., JOLLES, J. W., MUNSON, A., & IOANNOU, C. C.** (2021). The potential for physiological performance curves to shape environmental effects on social behavior. *Frontiers in Physiology*, 12 doi:10.3389/fphys.2021.754719
- KLAMSER, P. P., GÓMEZ-NAVA, L., LANDGRAF, T., JOLLES, J. W., BIERBACH, D., & ROMANCZUK, P.** (2021). Impact of variable speed on collective movement of animal groups. *Frontiers in Physics*, 9 doi:10.3389/fphy.2021.715996
- KNEESHAW, D. D., STURTEVANT, B. R., DEGRANDPÉ, L., DOBLAS-MIRANDA, E., JAMES, P. M. A., TARDIF, D., & BURTON, P. J.** (2021). The vision of managing for pest-resistant landscapes: Realistic or utopic? *Current Forestry Reports*, 7(2), 97-113. doi:10.1007/s40725-021-00140-z
- KONINGS, A. G., SAATCHI, S. S., FRANKENBERG, C., KELLER, M., LESHYK, V., ANDEREGG, W. R. L., . . . ZUIDEMA, P. A.** (2021). Detecting forest response to droughts with global observations of vegetation water content. *Global Change Biology*, 27(23), 6005-6024. doi:10.1111/gcb.15872
- KREUZWIESER, J., MEISCHNER, M., GRÜN, M., YÁÑEZ-SERRANO, A. M., FASBENDER, L., & WERNER, C.** (2021). Drought affects carbon partitioning into volatile organic compound biosynthesis in scots pine needles. *New Phytologist*, 232(5), 1930-1943. doi:10.1111/nph.17736
- KRISHNA, M., WINTERNITZ, J., GARKOTI, S. C., & PENUELAS, J.** (2021). Correction to: Functional leaf traits indicate phylogenetic signals in forests across an elevational gradient in the central himalaya (journal of plant research, (2021), 134, 4, (753-764), 10.1007/s10265-021-01289-1). *Journal of Plant Research*, 134(4), 887. doi:10.1007/s10265-021-01306-3

- KRISHNA, M., WINTERNITZ, J., GARKOTI, S. C., & PENUELAS, J.** (2021). Functional leaf traits indicate phylogenetic signals in forests across an elevational gradient in the central himalaya. *Journal of Plant Research*, 134(4), 753-764. doi:10.1007/s10265-021-01289-1
- LANZAS, M., HERMOSO, V., MORÁN-ORDOÑEZ, A., REGOS, A., BOTA, G., & BROTONS, L.** (2021). The value of unprotected land for future conservation efforts under dynamic conditions. *Biological Conservation*, 261 doi:10.1016/j.biocon.2021.109232
- LAPIEDRA, O., SAYOL, F., GARCIA-PORTA, J., & SOL, D.** (2021). Niche shifts after island colonization spurred adaptive diversification and speciation in a cosmopolitan bird clade. *Proceedings of the Royal Society B: Biological Sciences*, 288(1958) doi:10.1098/rspb.2021.1022
- LASSALETTA, L., SANZ-COBENA, A., AGUILERA, E., QUEMADA, M., BILLEN, G., BONDEAU, A., . . . GIMENO, B. S.** (2021). Nitrogen dynamics in cropping systems under mediterranean climate: A systemic analysis. *Environmental Research Letters*, 16(7) doi:10.1088/1748-9326/ac002c
- LAUGHLIN, D. C., MOMMER, L., SABATINI, F. M., BRUELHEIDE, H., KUYPER, T. W., MCCORMACK, M. L., . . . WEIGELT, A.** (2021). Root traits explain plant species distributions along climatic gradients yet challenge the nature of ecological trade-offs. *Nature Ecology and Evolution*, 5(8), 1123-1134. doi:10.1038/s41559-021-01471-7
- LÁZARO-GONZÁLEZ, A., GARGALLO-GARRIGA, A., HÓDAR, J. A., SARDANS, J., ORAVEC, M., URBAN, O., . . . ZAMORA, R.** (2021). Implications of mistletoe parasitism for the host metabolome: A new plant identity in the forest canopy. *Plant Cell and Environment*, 44(11), 3655-3666. doi:10.1111/pce.14179
- LECINA-DIAZ, J., MARTÍNEZ-VILALTA, J., ALVAREZ, A., BANQUÉ, M., BIRKMANN, J., FELDMEYER, D., . . . RETANA, J.** (2021). Characterizing forest vulnerability and risk to climate-change hazards. *Frontiers in Ecology and the Environment*, 19(2), 126-133. doi:10.1002/fee.2278
- LECINA-DIAZ, J., MARTÍNEZ-VILALTA, J., ALVAREZ, A., VAYREDA, J., & RETANA, J.** (2021). Assessing the risk of losing forest ecosystem services due to wildfires. *Ecosystems*, 24(7), 1687-1701. doi:10.1007/s10021-021-00611-1
- LEHIKONEN, A., LINDSTRÖM, Å., SANTANGELI, A., SIRKIÄ, P. M., BROTONS, L., DEVICTOR, V., . . . VAN TURNHOUT, C.** (2021). Wintering bird communities are tracking climate change faster than breeding communities. *Journal of Animal Ecology*, 90(5), 1085-1095. doi:10.1111/1365-2656.13433
- LI, X., PIAO, S., WANG, K., WANG, X., WANG, T., CIAIS, P., . . . PEÑUELAS, J.** (2021). Reply to: Disentangling biology from mathematical necessity in twentieth-century gymnosperm resilience trends. *Nature Ecology and Evolution*, 5(6), 736-737. doi:10.1038/s41559-021-01412-4
- LI, Z., REICHEL, R., LI, Z., YANG, K., ZHANG, L., TAN, B., . . . XU, Z.** (2021). Effects of snow absence on available N pools and enzyme activities within soil aggregates in a spruce forest on the eastern tibetan plateau. *Soil Ecology Letters*, doi:10.1007/s42832-021-0117-z
- LIAN, X., PIAO, S., CHEN, A., WANG, K., LI, X., BUERMANN, W., . . . MYNENI, R. B.** (2021). Seasonal biological carryover dominates northern vegetation growth. *Nature Communications*, 12(1) doi:10.1038/s41467-021-21223-2
- LIN, Y., KUANG, L., TANG, S., MOU, Z., PHILLIPS, O. L., LAMBERS, H., . . . KUANG, Y.** (2021). Leaf traits from stomata to morphology

are associated with climatic and edaphic variables for dominant tropical forest evergreen oaks. *Journal of Plant Ecology*, 14(6), 1115-1127. doi:10.1093/jpe/rtab060

LIU, D., CHANG, P. - S., POWER, S. A., BELL, J. N. B., & MANNING, P. (2021). Changes in plant species abundance alter the multifunctionality and functional space of heathland ecosystems. *New Phytologist*, 232(3), 1238-1249. doi:10.1111/nph.17667

LIU, D., ZHANG, C., OGAYA, R., FERNÁNDEZ-MARTÍNEZ, M., PUGH, T. A. M., & PEÑUELAS, J. (2021). Increasing climatic sensitivity of global grassland vegetation biomass and species diversity correlates with water availability. *New Phytologist*, 230(5), 1761-1771. doi:10.1111/nph.17269

LIU, P., LV, W., SUN, J., LUO, C., ZHANG, Z., ZHU, X., . . . WANG, S. (2021). Ambient climate determines the directional trend of community stability under warming and grazing. *Global Change Biology*, 27(20), 5198-5210. doi:10.1111/gcb.15786

LIU, X., PEÑUELAS, J., SARDANS, J., FANG, Y., WIESMEIER, M., WU, L., . . . WANG, W. (2021). Response of soil nutrient concentrations and stoichiometry, and greenhouse gas carbon emissions linked to change in land-use of paddy fields in china. *Catena*, 203 doi:10.1016/j.catena.2021.105326

LIU, Y., GE, T., JAN VAN GROENIGEN, K., YANG, Y., WANG, P., CHENG, K., ZHU, Z., WANG, J., LI, Y., GUGGENBERGER, G., SARDANS, J., PENUELAS, J., WU, J., KUZYAKOV, Y. (2021). Rice paddy soils are a quantitatively important carbon store according to a global synthesis. *Communications Earth & Environment* (2021)2:154, doi: 10.1038/s43247-021-00229-0.

LLOVET, A., MATTANA, S., CHIN-PAMPILLO, J., GASCÓ, G., SÁNCHEZ, S., MONDINI, C., . . . DOMENE, X. (2021). Long-term effects of gasification biochar application on soil functions in a mediterranean agroecosystem: Higher addition rates sequester more carbon but pose a risk to soil faunal communities. *Science of the Total Environment*, 801 doi:10.1016/j.scitotenv.2021.149580

LLOVET, A., MATTANA, S., CHIN-PAMPILLO, J., OTERO, N., CARREY, R., MONDINI, C., . . . RIBAS, A. (2021). Fresh biochar application provokes a reduction of nitrate which is unexplained by conventional mechanisms. *Science of the Total Environment*, 755 doi:10.1016/j.scitotenv.2020.142430

LOSAPIO, G., NORTON HASDAY, E., ESPADALER, X., GERMANN, C., ORTIZ-SÁNCHEZ, F. J., PONT, A., . . . SCHÖB, C. (2021). Facilitation and biodiversity jointly drive mutualistic networks. *Journal of Ecology*, 109(5), 2029-2037. doi:10.1111/1365-2745.13593

LU, T., ZHANG, Z., LI, Y., ZHANG, Q., CUI, H., SUN, L., . . . QIAN, H. (2021). Does biological rhythm transmit from plants to rhizosphere microbes? *Environmental Microbiology*, 23(11), 6895-6906. doi:10.1111/1462-2920.15820

LUN, F., SARDANS, J., SUN, D., XIAO, X., LIU, M., LI, Z., . . . PEÑUELAS, J. (2021). Influences of international agricultural trade on the global phosphorus cycle and its associated issues. *Global Environmental Change*, 69 doi:10.1016/j.gloenvcha.2021.102282

LUPON, A., RODRÍGUEZ-LOZANO, P., BARTRONS, M., ANADON-ROSELL, A., BATALLA, M., BERNAL, S., . . . PASTOR, A. (2021). Towards women-inclusive ecology: Representation, behavior, and perception of women at an international conference. *PLoS ONE*, 16(12 December) doi:10.1371/journal.pone.0260163

LYU, M., SUN, M., PEÑUELAS, J., SARDANS, J., SUN, J., CHEN, X., . . . CHENG, D. (2021). Temperature controls growth of *pinus taiwanensis* along an elevational

gradient. *Trees - Structure and Function*, 35(2), 433-440. doi:10.1007/s00468-020-02045-z

MACEDA-VEIGA, A., ALBACETE, S., CARLES-TOLRÁ, M., PUJADE-VILLAR, J., MÁCA, J., & MAC NALLY, R. (2021). Streams and rural abandonment are related to the summer activity of the invasive pest *Drosophila suzukii* in protected European forests. *Forest Ecology and Management*, 485 doi:10.1016/j.foreco.2021.118942

MACEDA-VEIGA, A., ALBACETE, S., FLOR-ARNAU, N., VIEIRA, C., BROS, V., DOMÈNECH, M., . . . MAC NALLY, R. (2021). Local and downstream cumulative effects of traditional meadow management on stream-water quality and multiple riparian taxa. *Science of the Total Environment*, 794 doi:10.1016/j.scitotenv.2021.148601

MAHDHI, N., DHEHIBI, B., BROKMAN, A., & CHOUIKHI, F. (2021). Water users associations and irrigation water use efficiency in coastal oases areas in Gabès, southeastern Tunisia. *New Medit*, 20(1), 19-37. doi:10.30682/NM2101B

MAHDHI, N., DHEHIBI, B., BROKMAN, A., & CHOUIKHI, F. (2021). Water users associations and irrigation water use efficiency in coastal oases areas of Gabes, South-eastern Tunisia. *New Medit*, 20(1), 19. <https://doi.org/10.30682/nm2101b>

MARAÑÓN-JIMÉNEZ, S., RADUJKOVIĆ, D., VERBRUGGEN, E., GRAU, O., CUNTZ, M., PEÑUELAS, J., . . . REBMANN, C. (2021). Shifts in the abundances of saprotrophic and ectomycorrhizal fungi with altered leaf litter inputs. *Frontiers in Plant Science*, 12 doi:10.3389/fpls.2021.682142

MARCEY, A., HASTON, E., GROOM, Q., ARIÑO, A. H., CHAPMAN, A. D., BAKKEN, T., . . . WIECZOREK, J. R. (2021). Quality issues in georeferencing: From physical collections to digital data repositories for ecological research. *Diversity and Distributions*, 27(3), 564-567. doi:10.1111/ddi.13208

MARGALEF, O., SARDANS, J., MASPONS, J., MOLOWNY-HORAS, R., FERNÁNDEZ-MARTÍNEZ, M., JANSSENS, I. A., . . . PEÑUELAS, J. (2021). The effect of global change on soil phosphatase activity. *Global Change Biology*, 27(22), 5989-6003. doi:10.1111/gcb.15832

MARGALEF-MARTI, R., LLOVET, A., CARREY, R., RIBAS, A., DOMENE, X., MATTANA, S., . . . OTERO, N. (2021). Impact of fertilization with pig slurry on the isotopic composition of nitrate retained in soil and leached to groundwater in agricultural areas. *Applied Geochemistry*, 125 doi:10.1016/j.apgeochem.2020.104832

MAROSO, F., VERA, M., FERREIRO, J., MAYOL, M., RIBA, M., RAMIL-REGO, P., . . . BOUZA, C. (2021). Genetic diversity and structure of *Taxus baccata* from the Cantabrian-Atlantic area in northern Spain: A guide for conservation and management actions. *Forest Ecology and Management*, 482 doi:10.1016/j.foreco.2020.118844

MARTÍ, E., SIERRA, J., DOMENE, X., MUMBRÚ, M., CRUAÑAS, R., & GARAU, M. A. (2021). One-year monitoring of nitrogen forms after the application of various types of biochar on different soils. *Geoderma*, 402 doi:10.1016/j.geoderma.2021.115178

MARTÍNEZ-VILALTA, J., SANTIAGO, L. S., POYATOS, R., BADIELLA, L., DE CÁCERES, M., ARANDA, I., . . . MENCUCCINI, M. (2021). Towards a statistically robust determination of minimum water potential and hydraulic risk in plants. *New Phytologist*, 232(1), 404-417. doi:10.1111/nph.17571

MAS, M., FLAQUER, C., REBELO, H., & LÓPEZ-BAUCELLS, A. (2021). Bats and wetlands: Synthesising gaps in current knowledge and future opportunities for conservation. *Mammal Review*, 51(3), 369-384. doi:10.1111/mam.12243

- MAS-PONCE, A., MOLOWNY-HORAS, R., PLA, E., & SÀNCHEZ-MATEO, S.** (2021). Assessing the effects of wastewater treatment plant effluents on the ecological quality status in a mediterranean river basin. *Environmental Processes*, 8(2), 533-551. doi:10.1007/s40710-021-00498-z
- MATA, L., ANDERSEN, A. N., MORÁN-ORDÓÑEZ, A., HAHS, A. K., BACKSTROM, A., IVES, C. D., ... LYNCH, Y.** (2021). Indigenous plants promote insect biodiversity in urban greenspaces. *Ecological Applications*, 31(4) doi:10.1002/eap.2309
- MATAS, A., MAC NALLY, R., ALBACETE, S., CARLES-TOLRÁ, M., DOMÈNECH, M., VIVES, E., . . . MACEDA-VEIGA, A.** (2021). Wild boar rooting and rural abandonment may alter food-chain length in arthropod assemblages in a european forest region. *Forest Ecology and Management*, 479 doi:10.1016/j.foreco.2020.118583
- MENG, L., ZHOU, Y., GU, L., RICHARDSON, A. D., PEÑUELAS, J., FU, Y., . . . WANG, Z.** (2021). Photoperiod decelerates the advance of spring phenology of six deciduous tree species under climate warming. *Global Change Biology*, 27(12), 2914-2927. doi:10.1111/gcb.15575
- MIGLIAVACCA, M., MUSAVI, T., MAHECHA, M. D., NELSON, J. A., KNAUER, J., BALDOCCHI, D. D., PEÑUELAS, J. REICHSTEIN, M.** (2021). The three major axes of terrestrial ecosystem function. *Nature*, 598(7881), 468-472. doi:10.1038/s41586-021-03939-9
- MORÁN-ORDÓÑEZ, A., RAMSAUER, J., COLL, L., BROTONS, L., & AMEZTEGUI, A.** (2021). Ecosystem services provision by mediterranean forests will be compromised above 2°C warming. *Global Change Biology*, 27(18), 4210-4222. doi:10.1111/gcb.15745
- MORRISON, C. A., AUNIŇŠ, A., BENKÓ, Z., BROTONS, L., CHODKIEWICZ, T., CHYLARECKI, P., HERRANDO, S. . BUTLER, S. J.** (2021). Bird population declines and species turnover are changing the acoustic properties of spring soundscapes. *Nature Communications*, 12(1) doi:10.1038/s41467-021-26488-1
- MOU, Z., KUANG, L., HE, L., ZHANG, J., ZHANG, X., HUI, D., PEÑUELAS, J. , SARDANS, J. . . LIU, Z.** (2021). Climatic and edaphic controls over the elevational pattern of microbial necromass in subtropical forests. *Catena*, 207 doi:10.1016/j.catena.2021.105707
- MUFFLER, L., SCHMEDDES, J., WEIGEL, R., BARBETA, A., BEIL, I., BOLTE, A., . . . KREYLING, J.** (2021). High plasticity in germination and establishment success in the dominant forest tree fagus sylvatica across europe. *Global Ecology and Biogeography*, 30(8), 1583-1596. doi:10.1111/geb.13320
- MUÑOZ-MAS, R., CARRETE, M., CASTRO-DÍEZ, P., DELIBES-MATEOS, M., JAQUES, J. A., LÓPEZ-DARIAS, M., . . . GARCÍA-BERTHOU, E.** (2021). Management of invasive alien species in spain: A bibliometric review. *NeoBiota*, 70, 123-150. doi:10.3897/NEOBIOTA.70.68202
- NADAL-SALA, D., MEDLYN, B. E., RUEHR, N. K., BARTON, C. V. M., ELLSWORTH, D. S., GRACIA, C., . . . SABATÉ, S.** (2021). Increasing aridity will not offset CO2 fertilization in fast-growing eucalypts with access to deep soil water. *Global Change Biology*, 27(12), 2970-2990. doi:10.1111/gcb.15590
- NING, Q., HÄTTENSCHWILER, S., XIAOTAO, L., KARDOL, P., ZHANG, Y., WEI, C., . . . HAN, X.** (2021). Carbon limitation overrides acidification in mediating soil microbial activity to nitrogen enrichment in a temperate grassland. *Global Change Biology*, 27(22), 5976-5988. doi:10.1111/gcb.15819
- NOGUÉ, S., SANTOS, A. M. C., JOHN B. BIRKS, H., BJÖRCK, S., CASTILLA-BELTRÁN, A., CONNOR,**

- S., PEÑUELAS, J. . . STEINBAUER, M. J.** (2021). The human dimension of biodiversity changes on islands. *Science*, 372(6541), 488-491. doi:10.1126/science.abd6706
- OGAYA, R., & PEÑUELAS, J.** (2021). Climate change effects in a mediterranean forest following 21 consecutive years of experimental drought. *Forests*, 12(3) doi:10.3390/f12030306
- OJEDA, F., CARRERA, C., PANIW, M., GARCÍA-MORENO, L., BARBERO, G. F., & PALMA, M.** (2021). Volatile and semi-volatile organic compounds may help reduce pollinator-prey overlap in the carnivorous plant *Drosera rotundifolia* (droseraceae). *Journal of Chemical Ecology*, 47(1), 73-86. doi:10.1007/s10886-020-01235-w
- OLIVEIRA, F. M. P., CÂMARA, T., DURVAL, J. I. F., OLIVEIRA, C. L. S., ARNAN, X., ANDERSEN, A. N., . . . LEAL, I. R.** (2021). Plant protection services mediated by extrafloral nectaries decline with aridity but are not influenced by chronic anthropogenic disturbance in brazilian caatinga. *Journal of Ecology*, 109(1), 260-272. doi:10.1111/1365-2745.13469
- OSTERMAN, J., AIZEN, M. A., BIESMEIJER, J. C., BOSCH, J., HOWLETT, B. G., INOUE, D. W., . . . PAXTON, R. J.** (2021). Global trends in the number and diversity of managed pollinator species. *Agriculture, Ecosystems and Environment*, 322 doi:10.1016/j.agee.2021.107653
- OUT, W. A., MIETH, A., PLA-RABÉS, S., MADELLA, M., KHAMNUEVA-WENDT, S., LANGAN, C., . . . BORK, H. -.** (2021). Prehistoric pigment production on Rapa Nui (Easter Island), c. AD 1200–1650: New insights from vaipú and poike based on phytoliths, diatoms and ¹⁴C dating. *Holocene*, 31(4), 592-606. doi:10.1177/0959683620981671
- OVENDEN, T. S., PERKS, M. P., CLARKE, T. -, MENCUCCINI, M., & JUMP, A. S.** (2021). Life after recovery: Increased resolution of forest resilience assessment sheds new light on post-drought compensatory growth and recovery dynamics. *Journal of Ecology*, 109(9), 3157-3170. doi:10.1111/1365-2745.13576
- OVENDEN, T. S., PERKS, M. P., CLARKE, T. -, MENCUCCINI, M., & JUMP, A. S.** (2021). Threshold response to extreme drought shifts inter-tree growth dominance in *Pinus sylvestris*. *Frontiers in Forests and Global Change*, 4 doi:10.3389/ffgc.2021.737342
- PADULLÉS CUBINO, J., BOROWY, D., KNAPP, S., LOSOSOVÁ, Z., RICOTTA, C., SIEBERT, S., . . . SWAN, C.** (2021). Contrasting impacts of cultivated exotics on the functional diversity of domestic gardens in three regions with different aridity. *Ecosystems*, 24(4), 875-890. doi:10.1007/s10021-020-00556-x
- PAGÈS, J. F., BARTUMEUS, F., ROMERO, J., & ALCOVERRO, T.** (2021). The scent of fear makes sea urchins go ballistic. *Movement Ecology*, 9(1) doi:10.1186/s40462-021-00287-1
- PALMERO-INIESTA, M., ESPELTA, J. M., PADIAL-IGLESIAS, M., GONZÁLEZ-GUERRERO, Ò., PESQUER, L., DOMINGO-MARIMON, C., . . . PINO, J.** (2021). The role of recent (1985–2014) patterns of land abandonment and environmental factors in the establishment and growth of secondary forests in the Iberian Peninsula. *Land*, 10(8) doi:10.3390/land10080817
- PALMERO-INIESTA, M., PINO, J., PESQUER, L., & ESPELTA, J. M.** (2021). Recent forest area increase in Europe: Expanding and regenerating forests differ in their regional patterns, drivers and productivity trends. *European Journal of Forest Research*, 140(4), 793-805. doi:10.1007/s10342-021-01366-z
- PALOMAR, G., JAKÓBIK, J., BOSCH, J., KOLENDA, K., KACZMARSKI, M., JOSKO, P., . . . PABIJAN, M.** (2021). Emerging infectious diseases of amphibians in Poland: Distribution and environmental drivers. *Diseases of Aquatic Organisms*, 147, 1-12. doi:10.3354/dao03631

- PAMPUCH, T., ANADON-ROSELL, A., TROUILLIER, M., LANGE, J., & WILMKING, M.** (2021). Direct and indirect effects of environmental limitations on white spruce xylem anatomy at treeline. *Frontiers in Plant Science*, 12 doi:10.3389/fpls.2021.748055
- PANIW, M., DE LA RIVA, E. G., & LLORET, F.** (2021). Demographic traits improve predictions of spatiotemporal changes in community resilience to drought. *Journal of Ecology*, 109(9), 3233-3245. doi:10.1111/1365-2745.13597
- PANIW, M., JAMES, T. D., RUTH ARCHER, C., RÖMER, G., LEVIN, S., COMPAGNONI, A., . . . SALGUERO-GÓMEZ, R.** (2021). The myriad of complex demographic responses of terrestrial mammals to climate change and gaps of knowledge: A global analysis. *Journal of Animal Ecology*, 90(6), 1398-1407. doi:10.1111/1365-2656.13467
- PATAKI, B. A., GARRIGA, J., ERITJA, R., PALMER, J. R. B., BARTUMEUS, F., & CSABAI, I.** (2021). Deep learning identification for citizen science surveillance of tiger mosquitoes. *Scientific Reports*, 11(1) doi:10.1038/s41598-021-83657-4
- PEGUERO, G., FOLCH, E., LIU, L., OGAYA, R., & PEÑUELAS, J.** (2021). Divergent effects of drought and nitrogen deposition on microbial and arthropod soil communities in a mediterranean forest. *European Journal of Soil Biology*, 103 doi:10.1016/j.ejsobi.2020.103275
- PEGUERO, G., GARGALLO-GARRIGA, A., MASPONS, J., KLEM, K., URBAN, O., SARDANS, J., & PEÑUELAS, J.** (2021). Metabolome-wide, phylogenetically controlled comparison indicates higher phenolic diversity in tropical tree species. *Plants*, 10(3), 1-9. doi:10.3390/plants10030554
- PENUELAS, J., & SARDANS, J.** (2021). Developing holistic models of the structure and function of the soil/plant/atmosphere continuum. *Plant and Soil*, 461(1-2), 29-42. doi:10.1007/s11104-020-04641-x
- PEÑUELAS, J., & SARDANS, J.** (2021). Global change and forest disturbances in the mediterranean basin: Breakthroughs, knowledge gaps, and recommendations. *Forests*, 12(5) doi:10.3390/f12050603
- PEÑUELAS, J., GERMAIN, J., ÁLVAREZ, E., APARICIO, E., ARÚS, P., BASNOU, C., . . . VINYOLES, D.** (2021). Impacts of use and abuse of nature in catalonia with proposals for sustainable management. *Land*, 10(2), 1-53. doi:10.3390/land10020144
- PÉREZ-GRANADOS, C., CALLEJA, J. A., SEOANE, J., FERNÁNDEZ-TIZÓN, M., VIGALONDO, B., MELÉNDEZ, L., & KIAT, Y.** (2021). Time available for moulting shapes inter- and intra-specific variability in post-juvenile moult extent in wheatears (genus oenanthe). *Journal of Ornithology*, 162(1), 255-264. doi:10.1007/s10336-020-01826-0
- PEREZ-NAVARRO, M. A., BROENNIMANN, O., ESTEVE, M. A., MOYA-PEREZ, J. M., CARREÑO, M. F., GUISAN, A., & LLORET, F.** (2021). Temporal variability is key to modelling the climatic niche. *Diversity and Distributions*, 27(3), 473-484. doi:10.1111/ddi.13207
- PÉREZ-NAVARRO, M. Á., SERRA-DIAZ, J. M., SVENNING, J. -, ESTEVE-SELMA, M. Á., HERNÁNDEZ-BASTIDA, J., & LLORET, F.** (2021). Extreme drought reduces climatic disequilibrium in dryland plant communities. *Oikos*, 130(5), 680-690. doi:10.1111/oik.07882
- PERISSI, I., MARTELLONI, G., BARDI, U., NATALINI, D., JONES, A., NIKOLAEV, A., . . . SOLÉ, J.** (2021). Cross-validation of the MEDEAS energy-economy- environment model with the integrated MARKAL-EFOM system (TIMES) and the long-range energy alternatives planning system (LEAP). *Sustainability*

(Switzerland), 13(4), 1-27. doi:10.3390/su13041967

PETERS, R. L., PAPPAS, C., HURLEY, A. G., POYATOS, R., FLO, V., ZWEIFEL, R., . . . STEPPE, K. (2021). Assimilate, process and analyse thermal dissipation sap flow data using the TREX r package. *Methods in Ecology and Evolution*, 12(2), 342-350. doi:10.1111/2041-210X.13524

PETERS, R. L., STEPPE, K., CUNY, H. E., DE PAUW, D. J. W., FRANK, D. C., SCHAUB, M., . . . FONTI, P. (2021). Turgor – a limiting factor for radial growth in mature conifers along an elevational gradient. *New Phytologist*, 229(1), 213-229. doi:10.1111/nph.16872

PIÑOL, J. (2021). Genotype by sequencing: An alternative new method to amplicon metabarcoding and shotgun metagenomics for the assessment of eukaryote biodiversity. *Molecular Ecology Resources*, 21(4), 1001-1004. doi:10.1111/1755-0998.13320

PIQUÉ, R., MORERA, N., REVELLES, J., CASTELLS, E., LÓPEZ-BULTÓ, O., FRANCH, A., & BURJACHS, F. (2021). The distribution and use of box (*Buxus sempervirens* L.) in the northeastern iberian peninsula during the holocene. *Environmental Archaeology*, 26(2), 179-191. doi:10.1080/14614103.2018.1515054

POYATOS, R., GRANDA, V., FLO, V., ADAMS, M. A., ADORJÁN, B., AGUADÉ, D., . . . MARTÍNEZ-VILALTA, J. (2021). Global transpiration data from sap flow measurements: The SAPFLUXNET database. *Earth System Science Data*, 13(6), 2607-2649. doi:10.5194/essd-13-2607-2021

PREECE, C., FARRÉ-ARMENGOL, G., VERBRUGGEN, E., & PEÑUELAS, J. (2021). Interactive effects of soil water content and nutrients on root exudation in two mediterranean tree species. *Soil Biology and Biochemistry*, 163 doi:10.1016/j.soilbio.2021.108453

QIAN, H., ZHANG, Q., LU, T., PEIJNENBURG, W. J. G. M., PENUELAS, J., & ZHU, Y. (2021). Lessons learned from COVID-19 on potentially pathogenic soil microorganisms. *Soil Ecology Letters*, 3(1) doi:10.1007/s42832-020-0068-9

QUINTELA, M., RICHTER-BOIX, À., BEKKEVOLD, D., KVAMME, C., BERG, F., JANSSON, E., . . . GLOVER, K. A. (2021). Genetic response to human-induced habitat changes in the marine environment: A century of evolution of european sprat in landvikvannet, norway. *Ecology and Evolution*, 11(4), 1691-1718. doi:10.1002/ece3.7160

RAMIREZ, J. A., VITALI, V., MARTÍNEZ-VILALTA, J., HANDA, I. T., & MESSIER, C. (2021). Reserve accumulation is prioritized over growth following single or combined injuries in three common north american urban tree species. *Frontiers in Plant Science*, 12 doi:10.3389/fpls.2021.715399

RAMÍREZ-VALIENTE, J. A., SANTOS DEL BLANCO, L., ALÍA, R., ROBLEDO-ARNUNCIO, J. J., & CLIMENT, J. (2021). Adaptation of mediterranean forest species to climate: Lessons from common garden experiments. *Journal of Ecology*, doi:10.1111/1365-2745.13730

RAMÍREZ-VALIENTE, J. A., SOLÉ-MEDINA, A., PYHÄJÄRVI, T., SAVOLAINEN, O., HEER, K., OPGENOORTH, L., . . . ROBLEDO-ARNUNCIO, J. J. (2021). Adaptive responses to temperature and precipitation variation at the early-life stages of *Pinus sylvestris*. *New Phytologist*, 232(4), 1632-1647. doi:10.1111/nph.17678

RAMSAUER, J., BROTONS, L., HERRANDO, S. & MORÁN-ORDOÑEZ, A. (2021). A multi-scale landscape approach to understand dispersal of the mistletoe by birds in Mediterranean pine forests. *Landscape Ecology* 37:511-528. doi.org/10.1007/s10980-021-01369-6

RAPOSEIRO, P. M., HERNÁNDEZ, A., PLA-RABES, S., GONÇALVES, V., BAO, R., SÁEZ, A., . . . GIRALT, S. (2021). Climate change facilitated the early colonization of the azores archipelago during medieval times. *Proceedings of the National Academy of Sciences of the United States of America*, 118(41) doi:10.1073/pnas.2108236118

RESENTE, G., GILLERT, A., TROUILLIER, M., ANADON-ROSELL, A., PETERS, R. L., VON ARX, G., . . . WILMKING, M. (2021). Mask, train, repeat! artificial intelligence for quantitative wood anatomy. *Frontiers in Plant Science*, 12 doi:10.3389/fpls.2021.767400

RIERA, M., PINO, J., & MELERO, Y. (2021). Impact of introduction pathways on the spread and geographical distribution of alien species: Implications for preventive management in mediterranean ecosystems. *Diversity and Distributions*, 27(6), 1019-1034. doi:10.1111/ddi.13251

ROCES-DÍAZ, J. V., VAYREDA, J., DE CÁCERES, M., GARCÍA-VALDÉS, R., BANQUÉ-CASANOVAS, M., MORÁN-ORDÓÑEZ, A., . . . MARTÍNEZ-VILALTA, J. (2021). Temporal changes in mediterranean forest ecosystem services are driven by stand development, rather than by climate-related disturbances. *Forest Ecology and Management*, 480 doi:10.1016/j.foreco.2020.118623

RODRIGUEZ-CATON, M., ANDREU-HAYLES, L., MORALES, M. S., DAUX, V., CHRISTIE, D. A., COOPMAN, R. E., . . . VILLALBA, R. (2021). Different climate sensitivity for radial growth, but uniform for tree-ring stable isotopes along an aridity gradient in *Populus euphratica*, the world's highest elevation tree species. *Tree Physiology*, 41(8), 1353-1371. doi:10.1093/treephys/tpab021

ROLO, V., ROCES-DIAZ, J. V., TORRALBA, M., KAY, S., FAGERHOLM, N., AVIRON, S., . . . MORENO, G. (2021). Mixtures of forest and agroforestry alleviate trade-offs between ecosystem services in european rural landscapes. *Ecosystem Services*, 50 doi:10.1016/j.ecoser.2021.101318

ROMERO, E., LUDWIG, W., SADAQUI, M., LASSALETTA, L., BOUWMAN, A. F., BEUSEN, A. H. W., . . . PEÑUELAS, J. (2021).

The mediterranean region as a paradigm of the global decoupling of N and P between soils and freshwaters. *Global Biogeochemical Cycles*, 35(3) doi:10.1029/2020GB006874

ROQUER-BENI, L., ALINS, G., ARNAN, X., BOREUX, V., GARCÍA, D., HAMBÄCK, P. A., . . . BOSCH, J. (2021). Management-dependent effects of pollinator functional diversity on apple pollination services: A response-effect trait approach. *Journal of Applied Ecology*, 58(12), 2843-2853. doi:10.1111/1365-2664.14022

ROSAS, T., MENCUCINI, M., BATLLES, C., REGALADO, Í., SAURA-MAS, S., STERCK, F., & MARTÍNEZ-VILALTA, J. (2021). Are leaf, stem and hydraulic traits good predictors of individual tree growth? *Functional Ecology*, 35(11), 2435-2447. doi:10.1111/1365-2435.13906

ROTCHÉS-RIBALTA, R., RUAS, S., AHMED, K. D., GORMALLY, M., MORAN, J., STOUT, J., . . . Ó HUALLACHÁIN, D. (2021). Assessment of semi-natural habitats and landscape features on irish farmland: New insights to inform EU common agricultural policy implementation. *Ambio*, 50(2), 346-359. doi:10.1007/s13280-020-01344-6

ROWLAND, L., DA COSTA, A. C. L., OLIVEIRA, R. S., BITTENCOURT, P. R. L., GILES, A. L., COUGHLIN, I., . . . MEIR, P. (2021). The response of carbon assimilation and storage to long-term drought in tropical trees is dependent on light availability. *Functional Ecology*, 35(1), 43-53. doi:10.1111/1365-2435.13689

ROWLAND, L., MARTÍNEZ-VILALTA, J., & MENCUCINI, M. (2021). Hard times for high expectations from hydraulics: Predicting drought-induced forest mortality at

landscape scales remains a challenge. *New Phytologist*, 230(5), 1685-1687. doi:10.1111/nph.17317

ROWLAND, L., OLIVEIRA, R. S., BITTENCOURT, P. R. L., GILES, A. L., COUGHLIN, I., COSTA, P. D. B., . . . MENCUCCINI, M. (2021). Plant traits controlling growth change in response to a drier climate. *New Phytologist*, 229(3), 1363-1374. doi:10.1111/nph.16972

RUAS, S., ROTCHÉS-RIBALTA, R., HUALLACHÁIN, D. Ó., AHMED, K. D., GORMALLY, M., STOUT, J. C., . . . MORAN, J. (2021). Selecting appropriate plant indicator species for result-based agri-environment payments schemes. *Ecological Indicators*, 126 doi:10.1016/j.ecolind.2021.107679

SABÁS, I., MIRÓ, A., PIERA, J., CATALAN, J., CAMARERO, L., BUCHACA, T., & VENTURA, M. (2021). Factors of surface thermal variation in high-mountain lakes of the pyrenees. *PLoS ONE*, 16(8 August) doi:10.1371/journal.pone.0254702

SABATINI, F. M., LENOIR, J., HATTAB, T., ARNST, E. A., CHYTRÝ, M., DENGLER, J., . . . BRUELHEIDE, H. (2021). sPlotOpen – an environmentally balanced, open-access, global dataset of vegetation plots. *Global Ecology and Biogeography*, 30(9), 1740-1764. doi:10.1111/geb.13346

SALDAÑA-LÓPEZ, A., VILÀ, M., LLORET, F., MANUEL HERRERA, J., & GONZÁLEZ-MORENO, P. (2021). Assembly of species' climatic niches of coastal communities does not shift after invasion. *Journal of Vegetation Science*, 32(2) doi:10.1111/jvs.12989

SANCHEZ-MARTINEZ, P., MARCER, A., MAYOL, M., & RIBA, M. (2021). Shaping

the niche of *taxus baccata*, a modelling exercise using biologically meaningful information. *Forest Ecology and Management*, 501 doi:10.1016/j.foreco.2021.119688

SÁNCHEZ-PINILLOS, M., DE CÁCERES, M., CASALS, P., ALVAREZ, A., BELTRÁN, M., PAUSAS, J. G., . . . COLL, L. (2021). Spatial and temporal variations of overstorey and understorey fuels in mediterranean landscapes. *Forest Ecology and Management*, 490 doi:10.1016/j.foreco.2021.119094

SANCHEZ-PLAZA, A., BROEKMAN, A., RETANA, J., BRUGGEMAN, A., GIANNAKIS, E., JEBARI, S., . . . & VERKERK, P. J. (2021). Participatory Evaluation of Water Management Options for Climate Change Adaptation in River Basins. *Environments*, 8(9), 93.

SANDOYA, V., SAURA-MAS, S., GRANZOW-DE LA CERDA, I., ARELLANO, G., MACÍA, M. J., TELLO, J. S., & LLORET, F. (2021). Contribution of species abundance and frequency to aboveground forest biomass along an andean elevation gradient. *Forest Ecology and Management*, 479 doi:10.1016/j.foreco.2020.118549

SARDANS, J., & PEÑUELAS, J. (2021). Potassium control of plant functions: Ecological and agricultural implications. *Plants*, 10(2), 1-31. doi:10.3390/plants10020419

SARDANS, J., GARGALLO-GARRIGA, A., URBAN, O., KLEM, K., HOLUB, P., JANSSENS, I. A., . . . PEÑUELAS, J. (2021). Ecometabolomics of plant-herbivore and plant-fungi interactions: A synthesis study. *Ecosphere*, 12(9) doi:10.1002/ecs2.3736

SARDANS, J., JANSSENS, I. A., CIAIS, P., OBERSTEINER, M., & PEÑUELAS, J. (2021). Recent advances and future research in ecological stoichiometry. *Perspectives in Plant Ecology, Evolution and Systematics*, 50 doi:10.1016/j.ppees.2021.125611

SARDANS, J., VALLICROSA, H., ZUCCARINI, P., FARRÉ-ARMENGOL, G., FERNÁNDEZ-MARTÍNEZ, M., PEGUERO, G., . . . PEÑUELAS, J. (2021). Empirical support for the biogeochemical niche hypothesis in forest trees. *Nature Ecology and Evolution*, 5(2), 184-194. doi:10.1038/s41559-020-01348-1

- SBRAGAGLIA, V., JOLLES, J. W., COLL, M., & ARLINGHAUS, R.** (2021). Fisheries-induced changes of shoaling behaviour: Mechanisms and potential consequences. *Trends in Ecology and Evolution*, 36(10), 885-888. doi:10.1016/j.tree.2021.06.015
- SCHIFANI, E., SCUPOLA, A., MENCHETTI, M., BAZZATO, E., & ESPADALER, X.** (2021). Morphology and phenology of sexuals and new distribution data on the blind mediterranean ant *hypoconera abeillei* (hymenoptera, formicidae). *Sociobiology*, 68(4) doi:10.13102/SOCIOBIOLOGY.V68I4.7261
- SCHWEIGER, R., CASTELLS, E., DA SOIS, L., MARTÍNEZ-VILALTA, J., & MÜLLER, C.** (2021). Highly species-specific foliar metabolomes of diverse woody species and relationships with the leaf economics spectrum. *Cells*, 10(3), 1-19. doi:10.3390/cells10030644
- SEBASTIANA, M., GARGALLO-GARRIGA, A., SARDANS, J., PÉREZ-TRUJILLO, M., MONTEIRO, F., FIGUEIREDO, A., . . . PEÑUELAS, J.** (2021). Metabolomics and transcriptomics to decipher molecular mechanisms underlying ectomycorrhizal root colonization of an oak tree. *Scientific Reports*, 11(1) doi:10.1038/s41598-021-87886-5
- SERRA-MALUQUER, X., GRANDA, E., CAMARERO, J. J., VILÀ-CABRERA, A., JUMP, A. S., SÁNCHEZ-SALGUERO, R., VILÀ, A. . . GAZOL, A.** (2021). Impacts of recurrent dry and wet years alter long-term tree growth trajectories. *Journal of Ecology*, 109(3), 1561-1574. doi:10.1111/1365-2745.13579
- SHAN, N., ZHANG, Y., CHEN, J. M., JU, W., MIGLIAVACCA, M., PEÑUELAS, J., . . . GOULAS, Y.** (2021). A model for estimating transpiration from remotely sensed solar-induced chlorophyll fluorescence. *Remote Sensing of Environment*, 252 doi:10.1016/j.rse.2020.112134
- SHEN, Z., ZHANG, Q., PIAO, S., PEÑUELAS, J., STENSETH, N. C., CHEN, D., . . . LIU, T.** (2021). Mining can exacerbate global degradation of dryland. *Geophysical Research Letters*, 48(21) doi:10.1029/2021GL094490
- SHIK, J. Z., KOOIJ, P. W., DONOSO, D. A., SANTOS, J. C., GOMEZ, E. B., FRANCO, M., . . . BOOMSMA, J. J.** (2021). Nutritional niches reveal fundamental domestication trade-offs in fungus-farming ants. *Nature Ecology and Evolution*, 5(1), 122-134. doi:10.1038/s41559-020-01314-x
- SIGDEL, S. R., PANDEY, J., LIANG, E., MUHAMMAD, S., BABST, F., LEAVITT, S. W., . . . PEÑUELAS, J.** (2021). No benefits from warming even for subnival vegetation in the central himalayas. *Science Bulletin*, 66(18), 1825-1829. doi:10.1016/j.scib.2021.06.005
- SIGNORI-MÜLLER, C., OLIVEIRA, R. S., BARROS, F. V., TAVARES, J. V., GILPIN, M., DINIZ, F. C., MENCUCINI, M. . . GALBRAITH, D.** (2021). Non-structural carbohydrates mediate seasonal water stress across amazon forests. *Nature Communications*, 12(1) doi:10.1038/s41467-021-22378-8
- SOL, D., LAPIEDRA, O., GONZÁLEZ-LAGOS, C., & DE CÁCERES, M.** (2021). Resource preferences and the emergence of individual niche specialization within populations. *Behavioral Ecology*, 32(6), 1202-1211. doi:10.1093/beheco/arab086
- SOROLLA, A., PIERA, E., MOTA-FREIXAS, B., SALVANS, G. S., RUEDA, I., PRATS, A. L., & UNZETA, C.** (2021). Improvement of the plantation success in a crib wall in a mediterranean hydro-meteorological risks scenario—practical results. *Sustainability (Switzerland)*, 13(21) doi:10.3390/su132111785
- SPORBERT, M., WELK, E., SEIDLER, G., JANDT, U., AĆÍĆ, S., BIURRUN, I., . . . BRUELHEIDE, H.** (2021).

Different sets of traits explain abundance and distribution patterns of European plants at different spatial scales. *Journal of Vegetation Science*, 32(2) doi:10.1111/jvs.13016

STEFANESCU, C., UBACH, A., & WIKLUND, C. (2021). Timing of mating, reproductive status and resource availability in relation to migration in the painted lady butterfly. *Animal Behaviour*, 172, 145-153. doi:10.1016/j.anbehav.2020.12.013

STURBOIS, A., CUCHEROUSSET, J., DE CÁCERES, M., DESROY, N., RIERA, P., CARPENTIER, A., . . . SCHAAL, G. (2021). Stable isotope trajectory analysis (SITA): A new approach to quantify and visualize dynamics in stable isotope studies. *Ecological Monographs*, doi:10.1002/ecm.1501

SWAN, C. M., BROWN, B., BOROWY, D., CAVENDER-BARES, J., JELIAZKOV, A., KNAPP, S., . . . SOL, D. (2021). A framework for understanding how biodiversity patterns unfold across multiple spatial scales in urban ecosystems. *Ecosphere*, 12(7) doi:10.1002/ecs2.3650

SZCZERBA, A., PLA-RABES, S., ŻARCZYŃSKI, M., & TYLMANN, W. (2021). The relationship between chrysophyte cyst assemblages and meteorological conditions: Evidence from a sediment-trap study in northeast Poland. *Ecological Indicators*, 133 doi:10.1016/j.ecolind.2021.108395

TELLO-GARCÍA, E., GAMBOA-BADILLA, N., ÁLVAREZ, E., FUENTES, L., BASNOU, C., ESPELTA, J. M., & PINO, J. (2021). Plant species surplus in recent peri-urban forests: The

role of forest connectivity, species' habitat requirements and dispersal types. *Biodiversity and Conservation*, 30(2), 365-384. doi:10.1007/s10531-020-02094-3

TIE, L., FENG, M., HUANG, C., PEÑUELAS, J., SARDANS, J., BAI, W., . . . LI, W. (2021). Soil cover improves soil quality in a young walnut forest in the Sichuan basin, China. *Forests*, 12(2), 1-13. doi:10.3390/f12020236

TIE, L., WEI, S., PEÑUELAS, J., SARDANS, J., PEGUERO, G., ZHOU, S., . . . HUANG, C. (2021). Phosphorus addition reverses the negative effect of nitrogen addition on soil arthropods during litter decomposition in a subtropical forest. *Science of the Total Environment*, 781 doi:10.1016/j.scitotenv.2021.146786

TREMP, J., DE JAGER, M., BARTUMEUS, F., & SOONS, M. B. (2021). Seed dispersal as a search strategy: Dynamic and fragmented landscapes select for multi-scale movement strategies in plants. *Movement Ecology*, 9(1) doi:10.1186/s40462-020-00239-1

TUDOSE, N. C., CREMADES, R., BROEKMAN, A., SANCHEZ-PLAZA, A., MITTER, H., & MARIN, M. (2021). Mainstreaming the nexus approach in climate services will enable coherent local and regional climate policies. *Advances in Climate Change Research*, 12(5), 752-755. doi:10.1016/j.accre.2021.08.005

URBINA, I., GRAU, O., SARDANS, J., MARGALEF, O., PEGUERO, G., ASENSIO, D., . . . PEÑUELAS, J. (2021). High foliar K and P resorption efficiencies in old-growth tropical forests growing on nutrient-poor soils. *Ecology and Evolution*, 11(13), 8969-8982. doi:10.1002/ece3.7734

VALLICROSA, H., SARDANS, J., OGAYA, R., FERNÁNDEZ, P. R., & PEÑUELAS, J. (2021). Short-term N-fertilization differently affects the leaf and leaf litter chemistry of the dominant species in a Mediterranean forest under drought conditions. *Forests*, 12(5) doi:10.3390/f12050605

VAN LANGENHOVE, L., DEPAEPE, T., VERRYCKT, L. T., FUCHSLUEGER, L., DONALD, J., LEROY, C., . . . JANSSENS, I. A.

(2021). Comparable canopy and soil free-living nitrogen fixation rates in a lowland tropical forest. *Science of the Total Environment*, 754 doi:10.1016/j.scitotenv.2020.142202

VAN LANGENHOVE, L., DEPAEPE, T., VERRYCKT, L. T., VALLICROSA, H., FUCHSLUEGER, L., LUGLI, L. F., LLUCIÀ, J, PEÑUELAS, J. . . JANSSENS, I. A. (2021). Impact of nutrient additions on free-living nitrogen fixation in litter and soil of two french-guianese lowland tropical forests. *Journal of Geophysical Research: Biogeosciences*, 126(7) doi:10.1029/2020JG006023

VAN LANGENHOVE, L., VERRYCKT, L. T., STAHL, C., COURTOIS, E. A., URBINA, I., GRAU, O., . . . JANSSENS, I. A. (2021). Soil nutrient variation along a shallow catena in paracou, french guiana. *Soil Research*, 59(2), 130-145. doi:10.1071/SR20023

VAN OVERVELD, T., SOL, D., BLANCO, G., MARGALIDA, A., DE LA RIVA, M., & DONÁZAR, J. A. (2021). Vultures as an overlooked model in cognitive ecology. *Animal Cognition*, doi:10.1007/s10071-021-01585-2

VIRKKALA, A. -, AALTO, J., ROGERS, B. M., TAGESSON, T., TREAT, C. C., NATALI, S. M., POYATOS, R. . . LUOTO, M. (2021). Statistical upscaling of ecosystem CO₂ fluxes across the terrestrial tundra and boreal domain: Regional patterns and uncertainties. *Global Change Biology*, 27(17), 4040-4059. doi:10.1111/gcb.15659

WALKER, A. P., DE KAUWE, M. G., BASTOS, A., BELMECHERI, S., GEORGIU, K., KEELING, R. F., PEÑUELAS, J. . . ZUIDEMA, P. A. (2021). Integrating the evidence for a terrestrial carbon sink caused by increasing atmospheric CO₂. *New Phytologist*, 229(5), 2413-2445. doi:10.1111/nph.16866

WANG, C., SARDANS, J., TONG, C., PEÑUELAS, J., & WANG, W. (2021). Typhoon-induced increases in porewater nutrient concentrations and CO₂ and CH₄ emissions associated with salinity and carbon intrusion in a subtropical tidal wetland in china: A mesocosm study. *Geoderma*, 384 doi:10.1016/j.geoderma.2020.114800

WANG, R., & PEÑUELAS, J. (2021). Monitoring compliance in

pandemic management with air pollution data: A lesson from COVID-19. *Environmental Science and Technology*, 55(20), 13571-13574. doi:10.1021/acs.est.1c03818

WANG, R., LIU, H., SARDANS, J., FENG, X., XU, Z., & PEÑUELAS, J. (2021). Interacting effects of urea and water addition on soil mineral-bound phosphorus dynamics in semi-arid grasslands with different land-use history. *European Journal of Soil Science*, 72(2), 946-962. doi:10.1111/ejss.13046

WANG, R., LÜ, L., CAO, Y., SARDANS, J., LIU, H., LI, B., . . . JIANG, Y. (2021). Stability of elemental content correlates with plant resistance to soil impoverishment. *Plant and Soil*, 467(1-2), 213-226. doi:10.1007/s11104-021-05079-5

WANG, R., PENUELAS, J., LI, T., LIU, H., WU, H., ZHANG, Y., SARDANS, J., JIANG, Y. (2021). Natural abundance of ¹³C and ¹⁵N provides evidence for plant-soil carbon and nitrogen dynamics in a N-fertilized meadow. *Ecology* e03348. doi: 10.1002/ecy.3348.

WANG, R., PEÑUELAS, J., LI, T., LIU, H., WU, H., ZHANG, Y., . . . JIANG, Y. (2021). Natural abundance of ¹³C and ¹⁵N provides evidence for plant-soil carbon and nitrogen dynamics in a N-fertilized meadow. *Ecology*, 102(6) doi:10.1002/ecy.3348

WANG, S., ZHANG, Y., JU, W., CHEN, J. M., CESCATTI, A., SARDANS, J., . . . PEÑUELAS, J. (2021). Response to comments on "Recent global decline of CO₂ fertilization effects on vegetation photosynthesis". *Science*, 373(6562) doi:10.1126/science.abg7484

- WANG, Y., LIANG, E., LU, X., CAMARERO, J. J., BABST, F., SHEN, M., & PEÑUELAS, J.** (2021). Warming-induced shrubline advance stalled by moisture limitation on the tibetan plateau. *Ecography*, 44(11), 1631-1641. doi:10.1111/ecog.05845
- WANG, Y., LIANG, E., LU, X., CAMARERO, J.J., BABST, F., SHEN, M., PEÑUELAS, J.** (2021). Warming-induced shrubline advance stalled by moisture limitation on the Tibetan Plateau. *Ecography* 44: 1–11, 2021. doi: 10.1111/ecog.05845.
- WILFAHRT, P. A., SCHWEIGER, A. H., ABRANTES, N., ARFIN-KHAN, M. A. S., BAHN, M., BERAUER, B. J., ESTIARTE, M., PEÑUELAS, J. . . JENTSCH, A.** (2021). Disentangling climate from soil nutrient effects on plant biomass production using a multispecies phytometer. *Ecosphere*, 12(8) doi:10.1002/ecs2.3719
- WU, C., WANG, J., CIAIS, P., PEÑUELAS, J., ZHANG, X., SONNENTAG, O., . . . GE, Q.** (2021). Widespread decline in winds delayed autumn foliar senescence over high latitudes. *Proceedings of the National Academy of Sciences of the United States of America*, 118(16) doi:10.1073/pnas.2015821118
- WU, W., KUANG, L., LI, Y., HE, L., MOU, Z., WANG, F., PEÑUELAS, J., SARDANS, J. . LIU, Z.** (2021). Faster recovery of soil biodiversity in native species mixture than in eucalyptus monoculture after 60 years afforestation in tropical degraded coastal terraces. *Global Change Biology*, 27(20), 5329-5340. doi:10.1111/gcb.15774
- XIAO, Y., ZHAO, F., PEÑUELAS, J., HUANG, Q., & ZHU, Y. -.** (2021). Super pathogens from environmental biotechnologies threaten global health. *National Science Review*, 8(9) doi:10.1093/nsr/nwab110
- XING, X., WANG, R., BAUER, N., CIAIS, P., CAO, J., CHEN, J., PEÑUELAS, J. . . XU, S.** (2021). Spatially explicit analysis identifies significant potential for bioenergy with carbon capture and storage in china. *Nature Communications*, 12(1) doi:10.1038/s41467-021-23282-x
- XING, X., XIONG, Y., YANG, R., WANG, R., WANG, W., KAN, H., PEÑUELAS, J. . . ZHANG, R.** (2021). Predicting the effect of confinement on the COVID-19 spread using machine learning enriched with satellite air pollution observations. *Proceedings of the National Academy of Sciences of the United States of America*, 118(33) doi:10.1073/pnas.2109098118
- YAN, T., FU, Y., CAMPIOLI, M., PEÑUELAS, J., & WANG, X.** (2021). Divergent responses of phenology and growth to summer and autumnal warming. *Global Change Biology*, 27(12), 2905-2913. doi:10.1111/gcb.15586
- YANG, K., YIN, R., PEÑUELAS, J., LI, Z., TAN, B., YOU, C., . . . XU, Z.** (2021). Divergent effects of snow exclusion on microbial variables across aggregate size classes. *Catena*, 206 doi:10.1016/j.catena.2021.105481
- YANG, P., HUANG, J., YANG, H., PEÑUELAS, J., TANG, K. W., LAI, D. Y. F., . . . TONG, C.** (2021). Diffusive CH₄ fluxes from aquaculture ponds using floating chambers and thin boundary layer equations. *Atmospheric Environment*, 253 doi:10.1016/j.atmosenv.2021.118384
- YÁÑEZ-SERRANO, A. M., BACH, A., BARTOLOMÉ-CATALÀ, D., MATTHAIOS, V., SECO, R., LLUSIÀ, J., . . . PEÑUELAS, J.** (2021). Dynamics of volatile organic compounds in a western mediterranean oak forest. *Atmospheric Environment*, 257 doi:10.1016/j.atmosenv.2021.118447
- YÁÑEZ-SERRANO, A. M., FILELLA, I., LLUSIÀ, J., GARGALLO-GARRIGA, A., GRANDA, V., BOURTSOUKIDIS, E., . . . PEÑUELAS, J.** (2021). GLOVOCS - master compound assignment

guide for proton transfer reaction mass spectrometry users. *Atmospheric Environment*, 244 doi:10.1016/j.atmosenv.2020.117929

YIN, G., LI, J., XU, B., ZENG, Y., WU, S., YAN, K., . . . LIU, G. (2021). PLC-C: An integrated method for sentinel-2 topographic and angular normalization. *IEEE Geoscience and Remote Sensing Letters*, 18(8), 1446-1450. doi:10.1109/LGRS.2020.3001905

YIN, X., PEÑUELAS, J., SARDANS, J., XU, X., CHEN, Y., FANG, Y., . . . WANG, W. (2021). Effects of nitrogen-enriched biochar on rice growth and yield, iron dynamics, and soil carbon storage and emissions: A tool to improve sustainable rice cultivation. *Environmental Pollution*, 287 doi:10.1016/j.envpol.2021.117565

YIN, X., PEÑUELAS, J., XU, X., SARDANS, J., FANG, Y., WIESMEIER, M., . . . WANG, W. (2021). Effects of addition of nitrogen-enriched biochar on bacteria and fungi community structure and C, N, P, and Fe stoichiometry in subtropical paddy soils. *European Journal of Soil Biology*, 106 doi:10.1016/j.ejsobi.2021.103351

YU, H., YIN, G., LIU, G., YE, Y., QU, Y., XU, B., & VERGER, A. (2021). Validation of sentinel-2, MODIS, CGLS, SAF, GLASS and C3S leaf area index products in maize crops. *Remote Sensing*, 13(22) doi:10.3390/rs13224529

YUAN, Y., LI, Y., MOU, Z., KUANG, L., WU, W., ZHANG, J., PEÑUELAS, J., SARDANS, J., . . . LIU, Z. (2021). Phosphorus addition decreases microbial residual contribution to soil organic carbon pool in a tropical coastal forest. *Global Change Biology*, 27(2), 454-466. doi:10.1111/gcb.15407

YUE, K., DE FRENNE, P., FORNARA, D. A., VAN MEERBEEK, K., LI, W., PENG, X., . . . PEÑUELAS, J. (2021). Global patterns and drivers of rainfall partitioning by trees and shrubs. *Global Change Biology*, 27(14), 3350-3357. doi:10.1111/gcb.15644

ZABALA, A., MASÓ, J., BASTIN, L., GIULIANI, G., & PONS, X. (2021). Geospatial user feedback: How to raise users' voices and collectively build knowledge at the same time. *ISPRS International Journal of Geo-Information*, 10(3) doi:10.3390/ijgi10030141

ZANGIABADI, S., ZAREMAIVAN, H., BROTONS, L., MOSTAFAVI, H., & RANJBAR, H. (2021). Using climatic variables alone overestimate climate change impacts on predicting distribution of an endemic species. *PLoS ONE*, 16(9 September) doi:10.1371/journal.pone.0256918

ZAPATA, A., RIVERA-RONDÓN, C. A., VALOYES, D., MUÑOZ-LÓPEZ, C. L., MEJÍA-ROCHA, M., & CATALAN, J. (2021). Páramo lakes of Colombia: An overview of their geographical distribution and physicochemical characteristics. *Water (Switzerland)*, 13(16) doi:10.3390/w13162175

ZENG, Z., WU, W., GE, Q., LI, Z., WANG, X., ZHOU, Y., . . . PEÑUELAS, J. (2021). Legacy effects of spring phenology on vegetation growth under pre-season meteorological drought in the northern hemisphere. *Agricultural and Forest Meteorology*, 310 doi:10.1016/j.agrformet.2021.108630

ZHAN, P., LI, L., TANG, C., YANG, P., HU, H., PEÑUELAS, J., & TONG, C. (2021). Successional patterns of bacterial communities and their functions in shrimp aquaculture pond water across farming phases. *Aquaculture Research*, 52(12), 6322-6337. doi:10.1111/are.15496

ZHANG, J., ZHENG, M., ZHANG, Y., WANG, J., SHEN, H., LIN, Y., PEÑUELAS, J., SARDANS, J., . . . LIU, Z. (2021). Soil phosphorus availability affects diazotroph communities during vegetation succession in lowland subtropical forests. *Applied Soil Ecology*, 166 doi:10.1016/j.apsoil.2021.104009

ZHANG, L., REN, Y., YANG, K., LI, Z., TAN, B., LIU, Y., . . . XU, Z. (2021). Immediate and legacy effects of snow exclusion on soil fungal

diversity and community composition. *Forest Ecosystems*, 8(1) doi:10.1186/s40663-021-00299-8

ZHANG, Q., ZHANG, Z., LU, T., YU, Y., PENUELAS, J., ZHU, Y. -, & QIAN, H. (2021). Gammaproteobacteria, a core taxon in the guts of soil fauna, are potential responders to environmental concentrations of soil pollutants. *Microbiome*, 9(1) doi:10.1186/s40168-021-01150-6

ZHANG, Y., MIGLIAVACCA, M., PENUELAS, J., & JU, W. (2021). Advances in hyperspectral remote sensing of vegetation traits and functions. *Remote Sensing of Environment*, 252 doi:10.1016/j.rse.2020.112121

ZHENG, T., MARTÍNEZ-VILALTA, J., GARCÍA-VALDÉS, R., GAZOL, A., CAMARERO, J. J., & MENCUCINI, M. (2021). Disentangling biology from mathematical necessity in twentieth-century gymnosperm resilience trends. *Nature Ecology and Evolution*, 5(6), 733-735. doi:10.1038/s41559-021-01436-w

ZHU, D., DELGADO-BAQUERIZO, M., SU, J. -, DING, J., LI, H., GILLINGS, M. R., . . . ZHU, Y. -. (2021). Deciphering potential roles of earthworms in mitigation of antibiotic resistance in the soils from diverse ecosystems. *Environmental Science and Technology*, 55(11), 7445-7455. doi:10.1021/acs.est.1c00811

ZUCCARINI, P., ASENSIO, D., SARDANS, J., OGAYA, R., & PEÑUELAS, J. (2021). Changes in soil enzymatic activity in a P-limited mediterranean shrubland subject to experimental nitrogen deposition. *Applied Soil Ecology*, 168 doi:10.1016/j.apsoil.2021.104159

ZUFIAURRE, A., FELIP, M., GIMÉNEZ-GRAU, P., PLA-RABÈS, S., CAMARERO, L., & CATALAN, J. (2021). Episodic nutrient enrichments stabilise protist coexistence in planktonic oligotrophic conditions. *Journal of Ecology*, 109(4), 1717-1729. doi:10.1111/1365-2745.13591

Books

GRACIA M., BRONCANO M. J., RETANA, J. (2021). Manual for the design and implementation of a regenerative agri-food model: the Polyfarming system. CREA. Barcelona. Creative Commons Attribution 4.0 (CC BY 4.0).

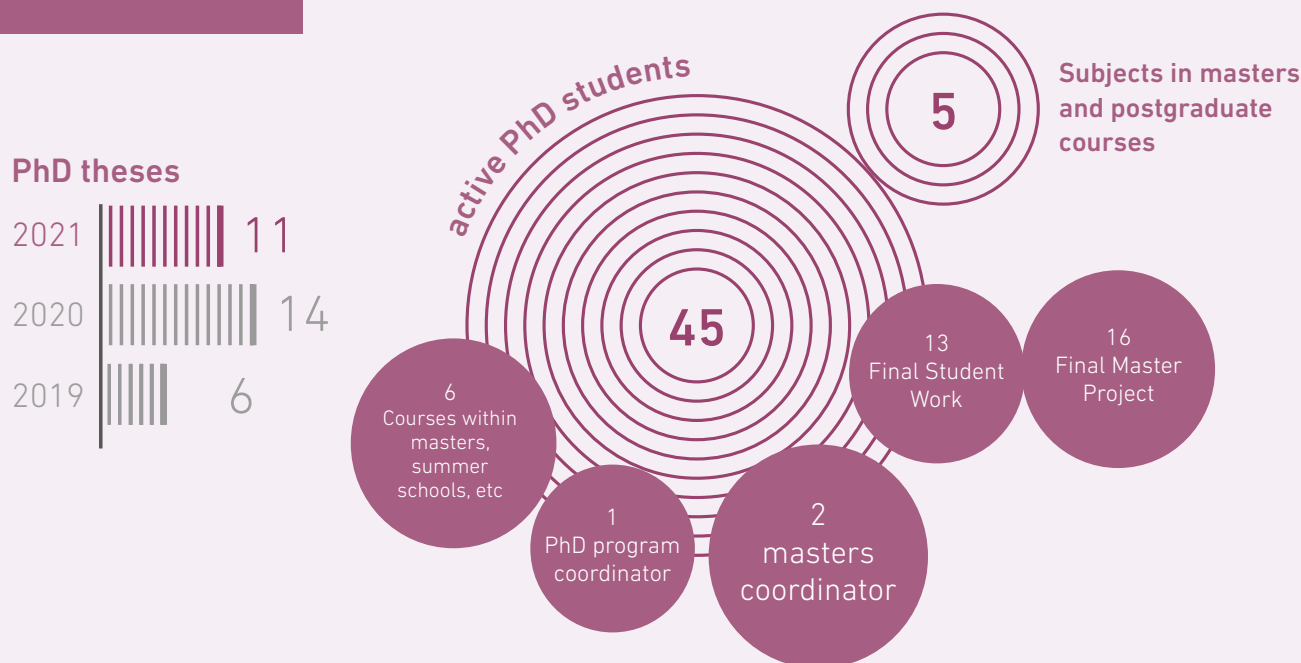
FRANCH M., HERRANDO S., ANTON M., VILLERO D., BROTONS, L. (2021). Atles dels ocells nidificants de Catalunya: Distribució i abundància 2015–2018 i canvi des de 1980. Institut Català d'Ornitologia / Cossetània Edicions. Barcelona. ISBN 978-84-1356-093-9

PIHL E., ALFREDSSON E., BENGTTSSON M., BOWEN K.J., CASTAN BROTO V., TIEN CHOU K., CLEUGH H., EBI K., EDWARDS C.M., FISHER E., FRIEDLINGSTEIN P., GODOY-FAÚNDEZ A., GUPTA M., HARRINGTON A.R., HAYES K., HAYWARD B.M., HEBDEN S.R., HICKMANN T., HUGELIUS G., ILYINA T., JACKS R.B., KEENAN T.F., LAMBINO R.A., LEUZINGER S., MALMAEUS M., McDONALD R.I., McMICHAEL C., MILLER C.A., MURATORI M., NAGABHATLA N., NAGENDRA H., PASSARELLO, C., PENUELAS J., PONGRATZ J., ROCKSTRÖM J., ROMERO-LANKAO P.M. ROY, J., SCAIFE A.A., SCHLOSSER P., SCHUUR E., SCOBIE M., SHERWOOD S.C., SIOEN G.B., SKOVGAARD J., SOBENES OBREGON E.A., SONNTAG S., SPANGENBERG J.H., SPIJKERS O., SRIVASTAVA L., STAMMER D.B., TORRES P.H.C., TURETSKY M.R., UKKOLA A.M., VAN VUUREN D.P., VOIGT C., WANNOUS C., ZELINKA M.D. (FUTURE EARTH, THE EARTH LEAGUE, WCRP) (2021). 10 New Insights in Climate Science 2020. Stockholm. <https://futureearth.org/10-insights-2020>

A group of approximately 15-20 people are gathered outdoors in a natural setting, likely a forest or park. They are arranged in a loose circle, engaged in conversation. In the center, a man with grey hair and glasses, wearing a blue shirt and a red vest, is speaking to the group. He is holding a glass. To his right, a woman with dark hair is smiling. In the foreground, several people are seen from the back, wearing light-colored t-shirts. The background is a lush, green forested hillside under a clear sky. A purple rectangular overlay is positioned in the upper right corner of the image, containing the word "TRAINING" in white, uppercase letters.

TRAINING

KEY NUMBERS



PHD IN TERRESTRIAL ECOLOGY

CREAF coordinates the PhD in Terrestrial Ecology which consists in writing, presenting and defending an original piece of research which, in this case, is framed within the ambit of the terrestrial ecology.

This PhD programme is aimed at students interested in understanding the processes involved in global environmental change and the loss of biodiversity, as well as possible actions to mitigate the damaging effects of environmental changes and the conservation of natural resources.

The PhD programme consists of 35 lecturers and associated researchers working on the following lines of research: Biodiversity, Functional ecology and global change; Forest ecology and fires; Soil protection and conservation; Remote sensing and GIS.

Coordinator: Anna Àvila

Lecturers: Josep Maria Alcañiz Balldellou, Pilar Andrés Pastor, Xavier Arnan, Anna Àvila Castells, Jordi Bosch Gras, Jofre Carnicer Cols, Jordi Catalan Aguilà, Bernat Claramunt López, Enriquer Doblas Miranda, Xavier Domene Casadesús, Xavier Espadaler Gelabert, Josep Maria Espelta Morral, Iolanda Filella Cubells, Marc Estiarte Garrofé, Marc Gràcia Moya, Francisco Lloret Maya, Joan Llusà Benet, Arnald Marcer Batlle, Jordi Marínez Vilalta, Maria Mayol Martínez, Maurizio Mencuccini, Romà Ogaya Inurrigarro, Oriol Ortiz Perpinyà, Josep Peñuelas Reixach, Joan Pino Vilalta, Josep Piñol Pascual, Eduard Pla Ferrer, Rafael Poyatos López, Javier Retana Alumbros, Miquel Riba Rovira, Angela Ribas Artola, Ferran Rodà de Llanza, Anselm Rodrigo Domínguez, Jordi Sardans Galobart, Sandra Saura Mas, Robert Savé Montserrat, Daniel Sol Rueda, David Tarrasón.

PHD THESES

BÓRNEZ MEJÍAS, K. (2021). *Study of vegetation dynamics from satellite: phenological responses to climate change*. Universitat Autònoma de Barcelona. Directors: Josep Peñuelas and Aleixandre Verger.

BRUNA P. (2021) *Arte y ecología política. Un viaje desde el modelo antropocéntrico a las realidades de los no humanos*. Barcelona Univeristy. Directors: Jordi Morell and Jordi Martínez-Vilalta.

CANELLES Q. (2021) *Incorporating insect pest outbreaks to landscape modelling: the case of *Cydalima perspectalis* invasion in Europe*. Universitat Autònoma de Barcelona. Director: Lluís Brotons.

CLOSA G. (2021) *Aportacions en el camp del llinatge geospacial en entorns distribuïts: de la captura a l'explotació*. Universitat Autònoma de Barcelona. Director: Joan Masó.

DE PEDRO M. (2021) *Evolutionary ecology of range expansion in the colonizing plant *Leontodon longirostris* (Asteraceae)*. Autonomous University of Barcelona. Directors: Maria Mayol and Miquel Riba.

FLO, V. (2022). *Global ecological drivers of transpiration regulation in trees*. Autonomous University of Barcelona. Supervisors: Rafael Poyatos and Jordi Martínez-Vilalta.

JAIME GONZALEZ, L. (2021) *Role of the species climatic niche on the insect-host system under drought episodes*. Universitat Autònoma de Barcelona. Directors: Francisco Lloret and Enric Batllori.

LLOVET MARTÍN, A. (2021) *Role of biochar in nitrogen cycling in a Mediterranean agroecosystem: potential benefits and trade-offs*. Directors: Xavier Domene and Angela Ribas

MU, Z. (2021). *Ecology of VOCs emissions by plants under global environmental changes*. Universitat Autònoma de Barcelona. Directors: Josep Peñuelas and Joan Llusà.

PALMERO-INIESTA M (2021) *Recent Forest Expansion in Europe (1985-2015). Patterns, Drivers, and Implications on Forest Growth*. Autonomous University of Barcelona. Directors: Josep Maria Espelta and Joan Pino.

VALLICROSA, H. (2021). *Global change and forest nutrient stoichiometry. The foliar elemental composition of woody plants and its drivers*. Universitat Autònoma de Barcelona. Directors: Josep Peñuelas and Jordi Sardans.

OFFICIAL MASTER IN TERRESTRIAL ECOLOGY AND BIODIVERSITY MANAGEMENT

This master's degree in Terrestrial Ecology and Biodiversity Management is addressed to students interested in the processes involved in the functioning of terrestrial ecosystems and the options for mitigating their future deterioration in a context of global environmental change, and also to students interested in the management and conservation of biological natural resources (flora and fauna). The master's degree takes up one academic year and is divided into 2 specialisations: Terrestrial Ecology and Management and Diversity of Fauna and Flora (marine and terrestrial). Master in Terrestrial Ecology and Biodiversity.

Coordinator: Francisco Lloret.

Directors: Francisco Lloret, Anna Morton.

Lecturers: Josep Maria Alcañiz, Pilar Andrés, Anna Àvila, Carme Biel, Jordi Bosch, Lluís Brotons, Juan Antonio Calleja, Eva Castells, Maite Carrasón, Jordi Catalan, Bernat Claramunt, Lluís Coll, Maria Constenla, Xavier Domene, Josep Maria Espelta, Marc Estiarte, Iolanda Filella, Mercè Galvany, Fernando García, Carles Gracia, Marc Gràcia, Iñigo Granzow, Laia Guàrdia, Santiago Lavin, Concepción de Linares, Francisco Lloret, Joan Llusà, Manel López Bejar, Javier López, Jordi López Olvera, Ignasi Marco, Jordi Martínez-Vilalta, Joan Masó, Maria Mayol, Maurizio Mencuccini, Ana Morton, Francesc Muñoz, Miquel Ninyerola, Romà Ogaya, Josep Peñuelas, Ramon Pérez, Joan Pino, Josep Piñol, Eduard Pla, Rafael Poyatos, Javier Retana, Miquel Riba, Àngela Ribas, Anselm Rodrigo, Santiago Sabaté, Llorenç Sáez, Sergi Santamaria, Jordi Sardans, Sandra Saura, Robert Savé, Emmanuel Serrano, Daniel Sol, Anna Soler, Constantí Stefanescu, Jaume Terradas, Emilio Valbuena, Jordi Vayreda.

OFFICIAL MASTER IN REMOTE SENSING AND GIS

The aim of this Master is to provide sound scientific training in techniques for observing the Earth and for generating and analyzing information in order to be able to study a given territory and manage its resources using GIS. The program is divided into 7 modules: 4 modules of mandatory subjects and 2 modules of elective advanced subjects. In addition, the Master course is complemented by practical sessions with a tutor and a Final Project as the last mandatory module of the program.

Coordinator: Xavier Pons.

Coordinator assistant: Cristina Cea

Lecturers: Joan Bech, Antoni Broquetas, José Ángel Burriel, Jaume Calvet, Adriano Camps, Cristina Cea, Bernat Codina, Ricardo Díaz-Delgado, Josep A. Gili, Sergi Gumà, Jordi Isern, Agustín Lobo, Arnald Marcer, Joan Masó, Eduardo de Miguel, Maria Mira, Òscar Mora, Javier Muñoz, Miquel Ninyerola, Fernando Pérez, Lluís Pesquer, Joan Pino, Xavier Pons, Càrol Puig, Pere Serra, Jordi Vayreda, Alaitz Zabala.

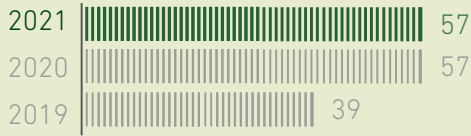
Check Annexes to see all Training activity of CREAM

COMMUNICATION AND OUTREACH



KEY NUMBERS

Press releases



Press releases

57

Impacts in mass media

307

5400
subscribers
to our monthly
newsletter

5.158 followers in LinkedIn

5.750 Instagram

Blog sessions 217.790



+ 199.407
unic visitors
of our blog
in 2020

Blog sessions



followers on Twitter

Total

2021 | 17.962 followers

Total

2020 | 15.022 followers

Total

2019 | 11.000 followers



KEY NUMBERS



Participation as organizer in other outreach conferences



OUTREACH CONFERENCES OR TECHNICAL SEMINARS

Organized by CREAM

FASTER Summer School, training week.

Online - May 2021 - CREAM members involved in organising: Sánchez A., Broekman A., E. Doblás-Miranda.

Increasing Awareness of Science Diplomacy in the Mediterranean. Challenges and opportunities for science diplomacy in the Mediterranean.

Co-organized by CREAM and Union for the Mediterranean (UfM). Online - October 2021. CREAM member involved as co-organizer: Pérez-Porro A.

Increasing Awareness of Science Diplomacy in the Mediterranean. Challenges and opportunities for science diplomacy in the Mediterranean.

Co-organized by CREAM and Union for the Mediterranean (UfM). Online - October 2021. CREAM members involved: Broekman A., Doblás-Miranda E.

Integrating ecosystem concerns into policy & decision making, training. PROGRESS International Training Workshop 2.

Online - January 2021 CREAM member involved as co-organizer: Doblás-Miranda E.

MONTCLIMA project Seminar: Strategies for managing and preventing drought impacts in forests in the SUDOE mountains.

Barcelona and online - September 2021 - Numbers of attendees: 125 attendees, 40 presential and 85 online CREAM members involved as co-organizers: Pascual D., Pla E., Broekman A.

Restauració de sòls amb esmenes orgàniques. Departament de Territori i Sostenibilitat-ARC-CREAM.

Online - May 2021 - Numbers of attendees: 125
CREAM members involved as co-organizer: Carabassa V., Alcañiz J. M.

Volem junts? Segueix en directe el llançament del satèl·lit Landsat-9

Online - September 2021 - Numbers of attendees: 50 - 100
CREAM members involved: Masó J., Serral I., Serra I., Prat E.

XVIII Jornada anual CREAM-SCB-ICHN De la salut dels ecosistemes a la salut global

Barcelona - November 2021- Numbers of attendees: 150
CREAM members involved in organising: Ramon A., Pino J., Espelta J. M.

OUTREACH NEWS

ECOLOGY MOVES US AND SO DOES EDUCATION!



Every day at CREAM we learn something more about the nature that surrounds us and we try to ensure that this knowledge, full of values, reaches society. Several people and initiatives have brought us this far and have allowed us to offer 'green' learning to the people around us and, in particular, to schools and future generations.

CREAF CONNECTS CHILDREN WITH URBAN NATURE



On 18 November, more than 70 people attended the online presentation of the Green4Children, Transformem els patis and La ciutat dels arbres initiatives, led by CREAM, Barcelona City Council and BOS+, respectively. The webinar "Naturalitzem la infància des de l'escola" discover new ways to connect children with the nature of the cities. The central themes of this event: what is the role of nature in urban environments? What impact does it have on children? What can schools do to take part in the environmental and social transformation of cities?

TURN YOUR SCHOOL INTO A FENOCENTRE!



The RitmeNatura phenology observatory, formed by CREAM and Meteocat, is launching a new campaign of face-to-face activities for secondary schools in the province of Barcelona with an innovative distinction for those schools that collaborate continuously throughout the academic year: the FenoCentro seal.

WHY NOT HOLD MORE CLASSES OUTDOORS?

The European project Clearing House has today launched a survey of primary and secondary school teachers throughout Catalonia to discover whether or not they hold classes outdoors, what they feel the drawbacks or obstacles to doing so are, and in what subject areas they bring up urban green spaces



NEXT STOP ECOLOGY, NEWS CREAM SECTIONS IN CREAM BLOG FROM SANDRA SAURA!

What will we find in the new section "Next stop: ecology"? When you get on the ecology train, you never know where it will take you. The final destination is ecology, transdisciplinary by definition, and therefore full of discoveries of new worlds and territories across different disciplines. The ecology train stops at remote stations and also at points of intersection of tracks full of connections to many other trains and destinations. During the journey I present to you transdisciplinary, gender and environmental justice will be our faithful travelling companions. In addition, at each stop we will find recommendations for audiovisual resources or readings for those who want to delve deeper into the landscape.



MARIONA FERRANDIZ WINS THE BARCELONA CITY COUNCIL SCIENTIFIC RESEARCH AWARD

Ferrandiz received the award for her project "Let's rethink school environments", which is based on the school and its environment as a fundamental point on which to focus efforts to rethink the city. "Let's rethink is an initiative that gained momentum since the pandemic and as a result of my working conditions changing. Since last summer we have been training in entrepreneurship and looking to work not only in administrations and schools as we have done so far, but also to promote changes in companies and homes. Moving towards sustainable cities where people and biodiversity are taken care of is the key to our future and, therefore, we have a lot of work to do since we are rethinking our approach!



Check Annexes to see more CREAM outreach activity



ECOTONS – ART & ECOLOGICAL SCIENCE

CREAF has an Arts & Ecological Science residency driven internally by a group of science lovers who firmly believe in the benefits of its intersection with art.

This group of people create “Ecotons Art & Ecological Science residency” as an internal initiative working on different proposals and ideas around art and science. Ecotons are transition zones between different ecological communities, somewhat marginal places where different realities come into contact with each other, where tensions arise but also unexpected fertility.

CREAF and the creative factory La ESCOCESA have begun a stable collaboration through an agreement signed by both institutions. In this case, the collaboration is within the framework of the call for research and artistic experimentation projects where CREAM offers a specific module that has been named Ecotons.

FUTURE FOREST DIORAMA 2021 ART & ECOLOGICAL SCIENCE RESIDENCY 2021- 2022

The two resident artists in the framework of the collaboration with La Escocesa were:

Carola Moujan and **Agustín Ortiz** Herrera's artistic research at CREAM has focused on their shared interest in plant communities and the possibility of speculating on possible transpositions of the sophisticated principles of communication, cooperation and interaction with the environment that plants develop in other areas.

Both artists have sought to understand how these cooperative networks are organised, what parameters are involved in their constitution, development and evolution.

They have taken as the basis of their study the forest ecosystem and, in particular, the forest of the Collserola Natural Park in Barcelona.

This work has been a preamble and a basis for the development of Future Forest Diorama, a project to install a network of terrariums built inside discarded objects. Inside each terrarium, a homeostatic system regulates living conditions such as humidity, temperature and air quality. Like botanical communities, the terrariums are connected to each other and control the surrounding activity through simple machine-to-machine networks, interacting with participants through sounds, air movements and light modulations.



Agustín Ortiz Herrera



Carola Moujan

A close-up photograph of a mossy rock. The moss is a vibrant green color and is growing in a dense, tufted pattern. The rock is a light brown or tan color and has a rough, textured surface. The background is blurred, showing more of the rock and some greenery. The overall scene is a natural, outdoor setting.

ANNEXES

PUBLICATIONS

No SCI publications

AVILA A., MOLOWNY-HORAS R., BARRERA-ESCODA A., ALTAVA V. (2021), El canvi climàtic a La Cerdanya. Querol Revista Cultural de La Cerdanya; num. 20. March 2021.

BUCHKOWSKI R., SARDANS J., PEÑUELAS J. (2021), Evolution's got a hold on stoichiometry. *Ratios Matter* 5(2).
Domene X., Mattana S., Sánchez-Moreno S. (2021), Biochar addition rate determines contrasting shifts in soil nematode trophic groups in outdoor mesocosms: an appraisal of underlying mechanisms. *Applied Soil Ecology*. 158: 103788

GERMAIN J., PENUELAS J., FOLCH R., SERRAT, D. (2021), Reptes socials i econòmics de la gestió de la natura a Catalunya. 5 cèntims.cat.

HAGER G., GOLD M., WEHN U., AJATES R., SEE L., WOODS M., TSIAKOS V., MASÓ J., FRAISL D., MOORTHY I., DOMIAN D., FRITZ S. (2021) Onto new horizons: insights from the WeObserve project to strengthen the awareness, acceptability and sustainability of Citizen Observatories in Europe. *Journal of Science Communication* 20 (6): 1-31. DOI: 10.22323/2.20060201. https://jcom.sissa.it/archive/20/06/JCOM_2006_2021_A01

KELLER, V., BAUER, H. G., HERRANDO, S., VOŘÍŠEK P. (2021), Vogelneozoen – eine europäische Übersicht. *Der Falke Journal für Vogelbeobachter* 67: 8-12. Jahrgang, Sonderheft 2020. ISSN 0323-357X4

KLAMSER P. P., GÓMEZ-NAVA L., LANDGRAF, T., JOLLES J. W., BIERBACH D., ROMANCZUK P. (2021), Impact of Variable Speed on Collective Movement of Animal Groups. *Frontiers in Physics* 9: 1-11.

MARCEA A., GROOM Q., HASTON E., URIBE F. (2021), Natural History Collections Georeferencing Survey Report. Current georeferencing practices across institutions worldwide.

MOBILISE EU Cost Action CA17106 Report. <https://doi.org/10.5281/zenodo.4644529>

PEÑUELAS J., GERMAIN J., TERRADAS J., ET AL. (2021), Impacts of Use and Abuse of Nature in Catalonia with Proposals for Sustainable Management. *Land* 2021, 10(2), 144; <https://doi.org/10.3390/land10020144>. February 2021.

PEÑUELAS J., GERMAIN J., TERRADAS J., et al. Natura, ús o abús? (2018-2019), Ús i abús de la natura, impactes i propostes de gestió. El cas de Catalunya com a paradigma. Institut d'Estudis Catalans. ISBN: 978-84-9965-457-7 DOI: 10.2436/15.0110.22.17. Arxius de les seccions de Ciències, CXLVIII, Institut d'Estudis Catalans. Pp. 49-126. Barcelona.

SBRAGAGLIA V.*, JOLLES J. W.*, COLL M., ARLINGHAUS R. (2021), Fisheries-induced changes of shoaling behaviour: Mechanisms and consequences. *Trends in Ecology and Evolution* 36(10): 885-888. *co-first authorship.

SOL, D. (2021), Ingenio y creatividad de los animales en un planeta cambiante. *Etología*. 27, pp. 9 - 26.

TERRADAS J. (2021), La pandèmia en l'entorn ecològic actual. A Allò que hem après de la COVID-19. *Debat COVID-19*. Institut d'Estudis Catalans. Pp. 8-10. Barcelona.

TERRADAS J. (2021), Pandèmia i ecologia. Vidre i mirall: Jornades de debat covid—19 a l'Institut d'Estudis Catalans. *Annals de Medicina*. Vol- 104. Pp. 153-154. Barcelona.

TERRADAS J. 2021. Bases ecològiques per a la gestió de la natura. A natura, ús o abús

(2018-2019), Ús i abús de la natura, impactes i propostes de gestió. El cas de Catalunya com a paradigma. Arxius de les seccions de Ciències, CXLVIII. Institut d'Estudis Catalans. Pp- 15-24. Barcelona.

Book chapters

ARROYO B., BARTOMEUS I., BROTONS L., CEBRIAN E., DELIBES-MATEOS M., GALLARDO B., HORTAL, J. LAHOZ-MONFORT J., LEONARD J.A., LÓPEZ-BAO J., CASAMAYOR E., TOMÀS F. (2021), Challenge 3: Preserving biodiversity and its functions under global change. In *Libros Blancos. Desafíos Científicos 2030 del CSIC*, vol. 7; coordinated by Jesús Marco de Lucas and M. Victoria Moreno-Arribas; 174 p. ISBN: 978-84-00-10750-5

CARABASSA V., ALCAÑIZ J.M., DOMENEX. (2021), Organic amendments for soils rehabilitation of open-pit mines in Spain. Cap 24, p 257-266. In: *FAO and ITPS. 2021. Recarbonizing global soils, A technical manual of recommended management practices: Volume 6 FORESTRY, WETLANDS, URBAN SOILS - Case studies.* Food and Agriculture Organization of the United Nations, Rome, 202. ISBN 978-92-5-134899-4. <https://doi.org/10.4060/cb6605en>

CARDADOR L., ABELLÁN P., ANADÓN J. D., CARRETE M., TELLA J. L. (2021), The World Parrot Trade. In: (Pruett-Jones S. Ed). *Naturalized Parrots of the World: Distribution, Ecology, and Impacts of the World's Most Colorful Colonizers.* Princeton University Press. ISBN 9780691204413

CARDADOR L., VAREA A., BONFIL J. (2021) L'arpella vulgar (*Circus aeruginosus*). In: *Atlas*

dels ocells nidificants de Catalunya. Distribució i abundància 2015-2018 i canvi des de 1980. Institut Català d'Ornitologia i Cossetània Edicions. ISBN 9788413560939

CARRETE M., ABELLÁN P., CARDADOR L., ANADÓN J.D., TELLA J.L. (2021), The Fate of Multistage Parrot Invasions in Spain and Portugal. In: (Pruett-Jones S. Ed). *Naturalized Parrots of the World: Distribution, Ecology, and Impacts of the World's Most Colorful Colonizers.* Princeton University Press. ISBN 9780691204413

CASAMAYOR E.O., VALLADARES F., AUSÍN T., BARTUMEUS F., BERNAL S., CAMARERO L., BECERRO M., CEBRIAN E., CATALAN J., FERRER-CARBONELL A., GARRABOU J., GUASCH H., NOGALES A., PALMER J.R., SOROLLA A. AND TERRADOS J. (2021), Healthy planet: hazards, risk management, and solutions-oriented research. In: M. B. García and P. Jordano (eds.), *Global change impacts.* CSIC, Madrid, pp. 153-172.

CHERIF S., DOBLAS-MIRANDA E., LIONELLO P. (COORDINATORS), BORREGO C., GIORGI F., IGLESIAS A., JEBARI S., MAHMOUDI E., MORIONDO M., PRINGAULT O., RILOV G., SOMOT S., TSIKLIRAS A., VILA M., ZITTIS G. (2021), chapter 2. Drivers of change. In: *Climate and Environmental Change in the Mediterranean Basin – Current Situation and Risks for the Future. First Mediterranean Assessment Report, MAR1* (Eds: Cramer W., Guiot J., Marini K. et al.). MedECC, Marseille. ISBN 978-2-9577416-0-1

CRAMER W., GUIOT J., MARINI K., AZZOPARDI B., BALZAN MV., CHERIF S., DOBLAS-MIRANDA E., DOS SANTOS M., DROBINSKI P., FADER M., HASSOUN A., GIUPPONI C., KOUBI V., LANGE M., LIONELLO P., LLASAT MC., MONCADA S., MRABET R., PAZ S., SAVÉ R., SNOUSSI M., TORETI A., VAFEIDIS AT., XOPLAKI E. (2021), MedECC 2020 Summary for Policymakers. In: *Climate and Environmental Change in the Mediterranean Basin – Current Situation and Risks for the Future. First Mediterranean Assessment Report, MAR1* (Eds: Cramer W, Guiot J, Marini K et al.). MedECC, Marseille. ISBN 978-2-9577416-0-1

DUCATEZ S.; SAYOL F.; SOL D. (2021), Technical Intelligence Hypothesis. In: *The Encyclopedia of Evolutionary Psychological*

Science, Springer International Publishing. 978-3-319-19651-0

FARRÉ-ARMENGOL G., FERNANDEZ-MARTINEZ M., FILELLA I., JUNKER R.R., PEÑUELAS J. (2021), Deciphering the Biotic and Climatic Factors That Influence Floral Scents: A Systematic Review of Floral Volatile Emissions. In: Borghi M., Junker R. R., Lucas-Barbosa D., Zych M., eds. (2021). *Flower Metabolism And Pollinators*. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-88971-758-3. Pp 24-38

HERRANDO, S., BROTONS, L., FRANCH, M., VILLERO, D., ANTON, D., LEHIKONEN, A. (2021), General patterns of distribution, abundance and change (2021). In Franch, M. et al. *Atles dels ocells nidificants de Catalunya: distribució i abundància 2015–2018 i canvi des de 1980*. Institut Català d'Ornitologia / Cossetània Edicions. Barcelona. ISBN 978-84-1356-093-9

HERRANDO S., BROTONS L., FRANCH M., VILLERO D., ANTON D., GARCIA D., PLA, M. (2021), Methodology. In Franch, M. et al. *Atles dels ocells nidificants de Catalunya: Distribució i abundància 2015–2018 i canvi des de 1980*. Institut Català d'Ornitologia / Cossetània Edicions. Barcelona. ISBN 978-84-1356-093-9

LLORET F., BATLLORI E. (2021), Climate-induced global forest shifts due to heatwave-drought. In: JG Canadell and RB Jackson (eds). *Ecosystem Collapse and Climate Change, Ecological Studies 241*, Springer-Verlag, pp. 155-186. https://doi.org/10.1007/978-3-030-71330-0_7 ISBN-10 3030713296

MAZZETTI, P., CARABASSA V., ADAMO M. P., BLONDA, P., PETRACCHINI F., SANTORO M., TARANTINO CR., TOMASSETTI L., MANAKOS I., CALZOLARI C., UGOLINI F., UNGARO F., DOMINGO C., MASÓ J., MONTERO P., GEORGIADIS C., PETROU N., ASSENNATO F., DANTONA M., DI LEGINIO M., LUISE A., MARINOSCI I., MUNAFÒ M., SMIRAGLIA D., CAMBRIA V. E., VITALE M., BAXEVANI P., DAMIANAKIS K., PROBONAS M. (2021), *NewLife4Drylands: remote sensing - oriented nature-based solutions towards a new life for drylands*, EGU General Assembly 2021. Online. April 2021. EGU21-10928. <https://doi.org/10.5194/egusphere-egu21-10928>, 2021.

SOL D., SAYOL F., DUCATEZ S. (2021), Intelligence Versus Natural Selection. In: *Encyclopedia of Evolutionary Psychological Science*, Springer International Publishing. 978-3-319-19651-0

Conferences

Member of the scientific committee of national and international conferences

Biodiversitat metropolitana: biodiversitat funcional?

Online - 9 February 2021

CREAF members in the scientific committee: J. Pino, P. Guzmán.

1st Iberian Congress in Soil and Sustainable Development: Challenges and Solutions / Congreso Ibérico "Suelo y desarrollo sostenible: desafíos y soluciones".

Online - 17 and 18 June 2021

CREAF members in the scientific committee: X. Domene.

The Future Arctic For Hot Workshop "Joint Ecosystem Assessment on the Effects of Natural Soil Warming and N-input Manipulation on Subarctic Grasslands and Forests".

Online - 1-3 March 2021

CREAF members in the scientific committee: J., Penuelas.

XV Congreso AEET.

Plasencia (Spain)

18-22 October 2021

CREAF members in the scientific committee: F. Lloret.

XVIII Jornada Anual CREAM-SCB-ICHN De la salut dels ecosistemes a la salut global.

Barcelona - 25 November 2021

CREAF members in the scientific committee:
A. Ramon, J. Pino, J. M. Espelta.

Poster contribution in national and international conferences.

CARABASSA V., OLIVA S., DOMENE X., BRANDON R., GONZÁLEZ F., REGALADO C., RITTER A., ARENCIBIA M.T., MARTEL G., MOTA A., VIERA G. (2021), Trees from the fog: restoring degraded landscapes using fog capture ecotechnologies. 12th European Conference on Ecological Restoration-SER Europe. Online. September 2021.

CARABASSA, V.; MAZZETTI P., ADAMO M. P., BLONDA P., PETRACCHINI F., SANTORO M., TARANTINO C., TOMASSETTI L., MANAKOS I., CALZOLARI CO, UGOLINI F., UNGARO F.; DOMINGO C., MASÓ J., MONTERO P., GEORGIADIS C., PETROU N., ASSENNATO F., DANTONA M., DI LEGINIO M., LUISE A., MARINOSCI I., MUNAFÒ M., SMIRAGLIA D., CAMBRIA V. E., VITALE M., BAXEVANI P., DAMIANAKIS K., PROBONAS M. (2021), Monitoring land degradation processes and restoration actions through remote sensing tools: the NewLife4Drylands Project. 9th World Conference on Ecological Restoration. Online. June 2021.

CARABASSA, V.; OLIVA S., DOMENE X., BRANDON R., GONZÁLEZ F., REGALADO C., ARENCIBIA M. T., MARTEL G., MOTA A., VIERA G. (2021), LIFE Nieblas - Reforestation & Climate Change Mitigation: tests, evaluation and transfer of innovative methods based on fog collection. 9th World Conference on Ecological Restoration. Online. June 2021.

CARBAJO S., SOLINA J., ESTOPÀ I., SOROLLA A., RODRIGO A., BOSCH J. (2021), Ten measures to favour pollinators in environmental restoration. IENE 2020 International Conference, LIFE Linear Infrastructure Networks with Ecological Solutions. Évora, Portugal. January 2021.

HERRANDO S., VORISEK P., KELLER V. (2021), EBBA2 – das neue Referenzwerk zu Verbreitung, Häufigkeit und Verbreitungsänderungen von Brutvögeln in Europa. Schweizerische Vogelwarte, Switzerland. Online conference. February 2021. (Invited speaker).

RUIZ-CHECA, R., PÉREZ-JORDÁN, H., ELUSTONDO, D., ÀVILA, A., GARCÍA-GÓMEZ, H., ALONSO, R. (2021). Atmospheric nitrogen deposition in Holm oak forests. FORMON - Forest Monitoring to assess Forest Functioning under Air Pollution and Climate Change. ICP Forests / SwissForestLab / NFZ.forestnet Summer School. Davos (Switzerland). August 2021.

TOLEDO, B., MARCER, A., PICÓ, X. (2021) Disentangling the current distribution of the annual plant *Arabidopsis thaliana* in its native range. II Simposio anual de botánica española: Hibridación natural y aloploidia. Importancia en biodiversidad y evolución de plantas. Sociedad Botánica Española. Facultad de Ciencias, Universidad Autónoma de Madrid. November 2021.

YÁÑEZ-SERRANO A.M., BACH A., BARTOLOMÉ-CATALÀ D., MATTHAIOS V., SECO R., LLUSIA J., FILELLA, I., PENUELAS J. (2021). Dynamics of volatile organic compounds in a western Mediterranean oak forest. Land-Atmosphere Interactions Workshop. Online. June 2021.

Oral contribution in national and international conferences

CARABASSA V., MONTERO P., PADRÓ, J.C., ALCAÑIZ, J.M. (2021) Monitoring opencast mine restoration using drones (oral presentation). The 12th European Conference on Ecological Restoration, held online on September 7-10, 2021. Society for Ecological Restoration-Europe.

ALBA-PATIÑO D., CARABASSA V., EXPÓSITO-GRANADOS M., GUTIÉRREZ-BRINCENO I., GARCÍA-LLORENTE M., CASTRO A.J. (2021), Assessing impacts of ecological restoration on ecosystem services and human well-being across Mediterranean cultural landscapes, XV Congreso Nacional de la AEET. Plasencia (Spain). October 2021.

ALONSO C., BARAZA E., BROLLY M., BURNSIDE N., CALLEJA J.A., CANDEL M., CARDELLS J., CARVALHO J., CLAUSS M., CUENCA R., FERNÁNDEZ-LLARIO P., FILELLA I., FONSECA C., GAMBRA D., HERNÁNDEZ C., IBAÑEZ-ALVAREZ M., JOLLES A., KRUMINS J., LAVÍN S., LIZANA, V., MARTÍNEZ-JAUREGUI M., MENTABERRE G., PELÁEZ M., PEÑUELAS J., RAMANZIN M., RISCO D., SAN MIGUEL A., TINOCO R., VILLAFUERTE-JORDÁN R. (2021). The INCREMENTO Consortium. A 12ª edição da RUSI (Reunião sobre Ungulados Silvestres Ibéricos). Campus Universitário da UTAD - Universidade de Trás-os-Montes e Alto Douro, Vila Real (Portugal). October 2021.

ANADON-ROSELL A., CASANOVAS A., NINOT J.M., ILLA E., PÉREZ-HAASE A., KREYLING J., MARTÍNEZ-VILALTA J., WILMKING M. (2021), Disentangling the sources of trait variability in clonal shrubs along elevational and latitudinal gradients. AEET Conference. Plasencia. October 2021.

ANADON-ROSELL A., CASANOVAS A., NINOT J.M., ILLA E., PÉREZ-HAASE A., KREYLING J., MARTÍNEZ-VILALTA J., WILMKING M. (2021), Disentangling the sources of trait variability in clonal shrubs of cold ecosystems along elevational and latitudinal gradients. CLONE 2021. Online. September 2021.

AVILA, A. (2021). De com la pluja reflecteix la qualitat de l'aire. 2n Congrés de l'Aire. Sabadell (Barcelona). October 2021.

AZPIAZU C., BOSCH J., ALBACETE S., SANCHO G., MALAGNINI V., ZANOTELLI L., GROSSAR D., JEKER L., STRAUB L., STROBL V., TOSI S., GIFFARD H., BANNIER F., BRANDT A., MARTINS C., MEDRZYCKI P., SGOLA STRA F. (2021), Ring test for the assessment of chronic toxicity in solitary bees: comparison of different experimental cages. Workshop APITOX, 17th COLOSS Conference. Online.

BATLLORI E., PÉREZ-NAVARRO M.A., LLORET F. (2021), Where drought-induced mortality occurs? XV Congreso AEET. Plasencia, Spain. October 2021.

CARABASSA V., CAMPO J., CASTRO A., PATIÑO D., KALLEN S., ANDREU V., GONZÁLEZ F., VIERA G., PIAZZA E., KORUKOUMPAS D., ZIOGA A., VAN LEIJEN G., LOVENSTEIN H., ALCAÑIZ J. M. (2021), Restoring degraded areas with the Cocoon ecotechnology. 9th World Conference on Ecological Restoration. Online. June 2021.

CASTELLS E., SCHWEIGER R., DA SOIS L., MARTÍNEZ-VILALTA J., MÜLLER C. (2021), High species-specific metabolic diversity in 20 woody species and its relationship with the leaf economics spectrum. AEET Conference. Plasencia. October 2021.

CATALAN, J. El lago, como ecosistema no empieza en la cuenca: importancia de la influencia atmosférica en las cargas externas e internas. Jornada IAHR-Spain Water. Los lagos: centinelas y sensores de cambio globales. Prioridades en la investigación y gestión. Online. October 2021. (Invited speaker).

DA SOIS L., MENCUCINI M., CASTELLS E., MARTÍNEZ-VILALTA J. (2021), Disentangling trait coordination in plant responses to drought. AEET Conference. Plasencia. October 2021.

DECHANT B., PAVLICK R., KATTGE J., SCHNEIDER F., BUTLER E., MORENO A., VAN BODEGOM P., VALLICROSA H., KATTENBORN T., BOONMAN C., ZAEHLE S., MADANI N., PRENTICE C., WRIGHT I., CAVENDER-BARRES J., DIAZ S., MYERS-SMITH I., REBEL K., DONG N., DURAN, S.,

CROFT H., SIMOVA I., FEILHAUER H., SABBATINI F., BRUELHEIDE H., PENUELAS J., AGUIRRE-GUTIERREZ, J., REICH P., MAHECHA M., WIRTH C., REICHSTEIN M., MALHI Y., TOWNSEND, P.A. (2021). Intercomparing Global Foliar Trait and Canopy Height Maps: Upscaling Approaches and Spatial Patterns. Session: B082: vegetation canopies: physiology, structure, function (Trevor Keenan). AGU Fall meeting, New Orleans and Online Everywhere. 13 - 17 December 2021.

ELVIRA N.J., LLORET F., JAIME L., MARGALEF-MARRASSÉ J., PÉREZ-NAVARRO M.A., BATLLORI E. (2021), Species climatic niche explains post-fire regeneration of Aleppo pine (*Pinus halepensis* Mill.) under compounded effects of fire and drought in eastern Spain. XV Congreso AEET. Plasencia, Spain. October 2021.

FERRIN M., PEGUERO G., PENUELAS J. (2021). Soil Fauna eDNA. ForHot Seasonal Meeting. Online. May 2021.

GARCÍA-GÓMEZ, H., ELUSTONDO D., ALONSO R., ÁVILA A., GONZÁLEZ-FERNÁNDEZ I., PÉREZ-JORDÁN I., RÁBAGO I., RUIZ-CHECA R. (2021), Dry deposition Working Group-Kick-off meeting. 19th Meeting of the Expert Panel on Deposition del International Cooperative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests). Online. (Ávila A., invited speaker).

GARCÍA-VALDÉS R., VAYREDA J., RETANA J., MARTÍNEZ-VILALTA, J. (2021), Low forest productivity associated with increasing drought-tolerant species is compensated by an increase in drought-tolerance richness. AEET Conference. Plasencia. October 2021.

GUERRIERI R., BARCELÓ A., MATTANA S., CALÍZ J., CASAMAYOR E., ELUSTONDO D., HELLSTEN S., MATTEUCCI G., MERILÄ P., MICHALSKI G., NICOLAS M., THIMONIER A., VANGUELOVA E., VERSTRAETEN A., WALDNER P., WATANABE M., PENUELAS J., MENCUCINI M. (2021). Nitrification in tree canopies of European forests: evidence from oxygen isotopes in nitrate and microbial analyses in rainfall and throughfall water. EGU meeting 2021, session HS10.6 – Stable isotopes to study water and nutrient dynamics in the soil-plant-atmosphere continuum. Gather Online. April 2021.

GÜNDLER P., CANARINIA., MARAÑÓN JIMÉNEZ S., GUNNARSDÓTTIR G., SIGURÐSSON P., PEÑUELAS J., JANSSENS I. A., SIGURÐSSON B. D., RICHTER A. (2021), Warming affects seasonal dynamics of microorganisms and reduces the N storage capacity of soil microbes in winter, EGU General Assembly 2021. Online. April 2021, EGU21-13232, <https://doi.org/10.5194/egusphere-egu21-13232>, 2021.

HAMMOND W.M. ET AL. (INCL. MARTÍNEZ-VILALTA J., MENCUCINI M., POYATOS R.) (2021), The global vulnerability of plant xylem. AGU Fall Meeting 2021. New Orleans, USA. December 2021.

JAIME L., BATLLORI E., FERRETI M., LLORET F. (2021), Climatic and stand drivers of forest persistence to recent bark beetle disturbance in European conifers forests. XV Congreso AEET. Plasencia. October 2021.

JOLLES J. W. Experimental insights into the personality and collective behaviour of sticklebacks social and eco-evolutionary consequences. Annual stickleback white sea workshop, St Petersburg, Russia. Online. February 2021.

JOLLES J. W. The benefits of Open Electronics for researchers. Society for Experimental Biology Conference. Antwerp, Belgium. Online. July 2021.

JOLLES J. W. The Raspberry Pi: a versatile tool for biologists. Society for Experimental Biology Conference. Antwerp, Belgium. Online. July 2021. (Invited speaker).

LADRÓN DE GUEVARA M., PENUELAS J. (2021). Respuestas fenotípicas y memoria ecológica de la especie graminoide *Bouteloua eriopoda* a los rangos de precipitación extremos. [ST.10-O-17]. XV Congreso Nacional de la AEET, El valor de la Naturaleza para una Sociedad Global. October 2021. Palacio de Congresos de Plasencia, Cáceres, Spain.

LEHMANN A., MASÓ P., SERRAL I. (2021) Lessons learned from GEOEssential. GEOVirtual Symposium 2021. Online. June 2021.

LIU D., ZHANG C., PUGH T., PENUELAS J. (2021). Delayed and altered post-fire recovery pathways of Mediterranean shrubland under 20-year drought manipulation. EGU meeting 2021, session BG3.22 – Vegetation function responses to global change: across observations, experiments, and models. Gather Online. April 2021.

LLORET, F. (2021), A guide to resilience measures in Ecology. XV Congreso AEET. Plasencia, Spain. October 2021. (Invited speaker).

MARAÑÓN JIMÉNEZ S., FUCHSLUEGUER L., GÜNDLER P., RICHTER A., SIGURDSSON J., PEÑUELAS J. (2021), Nitrogen transformation rates in response to warming. Seasonal ForHot Meeting. Online. May 2021. (Invited speaker)

MARAÑÓN S., PENUELAS J., ET AL. (2021). Results from the seasonal 15N labeling experiment. Emerging ideas for the soil N losses. ForHot Seasonal Meeting. Online. May 2021.

MARTÍNEZ-VILALTA J., SANTIAGO L.S., POYATOS R., BADIELLA L., DE CÁCERES M., ARANDA I., DELZON S., VILAGROSA A., MENCUCCINI M. (2021), Improving the estimation of minimum leaf water potential and hydraulic risk in plants. AEET Conference. Plasencia. October 2021.

MAZZETTI P., DOMINGO MARIMON C., MASÓ J., ET AL. (2021), NewLife4Drylands: remote sensing - oriented nature-based solutions towards a new life for drylands. EGU General Assembly Conference Abstracts: 10928. DOI: 10.5194/egusphere-egu21-10928. <https://doi.org/10.5194/egusphere-egu21-10928>. EGU General Assembly, April 2021, Online.

MAZZETTI P., CARABASSA V., ADAMO M. P., BLONDA P., PETRACCHINI F., SANTORO M., TARANTINO C., TOMASSETTI L., MANAKOS I., CALZOLARI C., UGOLINI F., UNGARO F., DOMINGO C., MASÓ J., MONTERO P., GEORGIADIS C., PETROU N., ASSENNATO F., DANTONA M., DI LEGINIO M., LUISE A., MARINOSCI I., MUNAFÒ M., SMIRAGLIA D., CAMBRIA V. E., VITALE M., BAXEVANI P., DAMIANAKIS K., PROBONAS M. (2021) NewLife4Drylands: remote sensing - oriented nature-based solutions towards a new life for drylands, EGU General Assembly 2021. Online. April 2021. EGU21-10928.

PASCUAL D. (2021), Adaptive forest management in a Holm oak forest in Montnegre-Corredor massif (Barcelona). Strategies for managing and preventing drought impacts in forests in the SUDOE mountains, online Seminar of MONTCLIMA project. Barcelona. September 2021. (Invited speaker).

PASCUAL D. (2021), Adaptive management practices in Mediterranean forests. 29th European Biomass Conference and Exhibition (EUBCE), Speakers' corner. On-line presentation. April 2021. (Invited speaker).

PASCUAL D. (2021), How to manage forest to reduce fire risk at a local scale. Strategies for managing and preventing forest fires in the SUDOE space, online Seminar of MONTCLIMA project. On-line presentation. April 2021. (Invited speaker).

PASCUAL D. (2021), Implementation of adaptation measures to reduce forest vulnerability to climate change. 4th World Symposium on CC Adaptation. Online parallel to COP26 in Glasgow, Scotland. November 2021.

PASCUAL D., PLA E. (2021), Alternatives for climate change adaptation and socio-economic recovery in mid-mountain areas (La Rioja, Aragon, Catalonia). SERE 2021 - 12th European Conference on Ecological Restoration. Online presentation. September 2021.

PEAUCELLE M., PENUELAS J., VERBEECK, H. (2021). Phenology studies need to account for tissue temperature, not air. EGU meeting 2021, session CL2.8 Phenology and seasonality in climate change. Gather Online. April 2021

PENUELAS J. (2021). Ecometabolomics. Synthesising plant Metabolomics into biodiversity, Life history & Ecology sMiLE working group meeting. Leipzig, Germany. October 2021. (Invited speaker).

PENUELAS J. (2021). IMBALANCE-P on-line Workshop "Joint Ecosystem Assessment on the Effects of N-input Manipulation on Guiana tropical Forests". June 2021. (Invited speaker).

PENUELAS J. (2021). Impactes del canvi global en la salut de les persones. XVIII Jornada anual CREAM-SCB-ICHN de la salut dels ecosistemes a la salut global. XVIII Jornada del Centre de Recerca Ecològica i Aplicacions Forestals (CREAF), la Societat Catalana de Biologia (SCB) i la Institució Catalana d'Història Natural (ICHN). November 2022. Institut d'Estudis Catalans, Barcelona. (Peñuelas J., invited speaker).

PENUELAS J. (2021). Organizer and chairman of the ERC Synergy IMBALANCE-P meeting on Guiana forest fertilization. Online. June 2021. (Invited speaker).

PENUELAS J. (2021). Remotely Sensing foliar traits. Integrating in-situ, upscaled and air- and spaceborne observations of plant traits. sTRAITS working group meeting. Leipzig, Germany. October 2021. (Invited speaker).

PENUELAS J., JANSSENS I., OBERSTEINER M., CIAIS P., SARDANS J. (2021). GC52B-01: Increasing Biospheric Imbalances Between Nitrogen and Phosphorus. A New Driver of Global Change with Multiple Consequences for the Environment, Food Security and Human Health. AGU Fall meeting, New Orleans and Online Everywhere. December 2021. (Peñuelas J., and Sardans J., invited speakers).

PÉREZ-NAVARRO M.A., ESTEVE-SELMA MA., LLORET F. (2021), Canopy-recruit interactions and climatic debt in plant communities XV Congreso AEET. Plasencia, Spain. October 2021.

PESQUEDA A., GARGALLO, SARDANS J., PENUELAS J., (2021). Seasonal changes in the soil metabolome in response to warming and N fertilization. ForHot Seasonal Meeting 28 May 2021, on line (oral).

PLA E. (2021), Presentation of LIFE MIDMACC project: experimental experiences. Simposio Euromediterráneo Gestión adaptativa para la protección de los servicios ecosistémicos en espacios naturales (LIFE ADAPTAMED LIFE14 CCA/ES/000612). Málaga. November 2021. (Invited speaker).

POYATOS R., GRANDA V., FLO V., MENCUCINI M., MARTÍNEZ-VILALTA J. (2021), Towards a consistent quantification of ecosystem transpiration from the SAPFLUXNET database. EGU Annual Meeting 2021. April 2021.

RANITS C., FUCHSLUEGER L., VAN LANGENHOVE L., VERRYCKT L.T., VERLINDEN M., VALLICROSA H., OGAYA, R., LLUSIÀ J., GRA, O., FIGUEIREDO LUGLI, L., JANSSENS, I.A., PENUELAS, J., RICHTER A. (2021). What controls microbial growth in tropical soils? The role of carbon and phosphorus. EGU meeting 2021, session SSS5.5 – Linking Carbon, Nitrogen and Phosphorus cycles - from soil microbial stoichiometry to ecosystem functioning. Gather Online. April 2021.

SELWYN M., ESPELTA J.M., PINO J. (2021), Towards a better understanding of seed dispersal restoration in the functioning of new forests: a global review. XV Congreso Nacional de la AEET, Plasencia, Cáceres, Spain. 18-21 October 2021.

SGOLA STRA F., AZPIAZU C., BOSCH J. (2021), Synergistic effects of insecticide-fungicide combinations on bees: a comparative approach. XXVI Italian National Congress of Entomology. Torino, Italy. June 2021.

SOL D. (2021), Behaviour, life history and persistence in novel environments. University of Texas at Arlington Seminar series, Online. March 2021. (Invited speaker).

SOL D. (2021), Urbanització i pèrdua de diversitat funcional, Jornada en línia del LET "Biodiversitat metropolitana: biodiversitat funcional?". Online. February 2021. (Invited speaker).

SOL D. (2021), Urbanization and the loss of functional diversity. University of Texas at Austin Seminar series, Online. January 2021. (Invited speaker).

SÖLLINGER A., BORG DAH M., SÉNECA J., PROMMER J., VERBRUGGEN E., SIGURDSSON B.D., JANSSENS, I., PENUELAS J., URICH T., RICHTER A., TVEIT A.T. (2021). Central Metabolic Responses of Microorganisms to Years and Decades of Soil Warming. World Microbe Forum. Online. June 2021.

TORHAN S., GRADY C., AJIBADE I., GALAPPATHTHI E., HERNANDEZ R.R, MUSAH-SURUGU J., NUNBOGU A., SEGNON A., SHANG Y., ULIBARRI N., CAMPBELL D., JOE E., PEÑUELAS J., SARDANS J., SHAH M.A.R. AND THE GLOBAL ADAPTATION MAPPING TEAM. (2021). A Global Characterization of Adaptations Addressing Vulnerabilities Across the Food-Energy-Water Nexus. AGU Fall meeting, New Orleans and Online Everywhere. 13 - 17 December 2021.

Datasets and software

DATASETS

MARTÍ, D. 2021. European networks of biodiversity monitoring schemes. EUROPABON WorkPackage 3.1. <https://monitoring.europabon.org/monitoring/>

OUTREACH PUBLICATIONS

BATLLORI E., LLORET F. (2021), Poden sobreviure els boscos al canvi climàtic? UABdivulga <https://www.uab.cat/web/detall-de-noticia/poden-sobreviure-els-boscos-al-canvi-climatic-1345469002000.html?noticiaid=1345838114742>

BROEKMAN A., JEBARI S., BERNDTSSON R., SOUISSI T., BOUSLAHI, Z. (2021). Atlas for adaptation to climatechange in Tunisian Agriculture. Publication from the FASTER H2020-EU.4.b. ID_810812 project, "Farmers' Adaptation and Sustainability in Tunisia through Excellence in Research" , European Commission, 159 pp ISBN 978-9973-0994-2-6 URL https://faster-h2020.eu/wp-content/uploads/2022/04/FASTER_Atlas-English_Online-Version-13.04.pdf

BROEKMAN A., JEBARI S., BERNDTSSON R., SOUISSI T., BOUSLAHI Z. (2021). Enhancing the potential of FASTER's Capacity Building Initiatives: lessons learnt and future prospects https://faster-h2020.eu/wp-content/uploads/2021/12/FASTER_WP3-Enhancing-the-potential-of-FASTERs-Capacity-Building-Initiatives-V5.pdf

BROEKMAN A., JEBARI S., BERNDTSSON R., SOUISSI T., BOUSLAHI Z. (2021). FASTER "Guidelines on Future Research" https://faster-h2020.eu/wp-content/uploads/2021/11/FASTER_WP5-Guidelines-V4.pdf

BROTONS L., CASTELL C., PÉREZ-PORRO A., PINO J. (2021), Biodiversity: time for action?. IDEES num. 49. 2021 <https://revistaidees.cat/en/biodiversity-time-for-action/>

GIMÉNEZ-GRAU P., FELIP M., ZUFIAURRE A., PLA-RABÈS S., CAMARERO L. AND CATALAN J. 2021. Deployment of ENEX Enclosures in High-Mountain Lake Redon (Spain). The Bulletin of the Ecological Society of America 102: e01799.

PEÑUELAS J. Newsletter Institut d'Estudis Catalans. "El creixement de la vegetació a la Terra està disminuint i això tindrà conseqüències en el clima". January 2021.

PEÑUELAS J. Newsletter Institut d'Estudis Catalans. Què passa quan el gel de l'Àrtic es fon a causa de l'escalfament de la Terra?. February 2021.

PEÑUELAS J. Fundació Catalana per a la Recerca i la Innovació. Interview.

ROS J., TERRADAS, J. 2021. El medi ambient a Catalunya. A J. Ros, Cal que siguem masovers del món. Ed. Empúries. pp. 51-64.

Outreach conferences or seminars of knowledge transfer**Participation in other outreach conferences or seminars of knowledge transfer****A GEO community Green Paper: Faster uptake of Earth observation**

Online – GEO Virtual Symposium 2021

June 2021- CREAM members involved: Masó J., Serral I.

An example of multi-source surveillance strategy for invasive mosquitoes in Spain XIX Congreso Ibérico de Entomología. Sociedad Española de Entomología.

Coimbra, Portugal - September 2021

CREAM members involved: Eritja R., Delacour-Estrella S., Ruiz-Arrondo I., González M. A., Barceló C., García-Pérez A. L., Lucientes J., Miranda M. A., Bartumeus F.

Best practices in agro-silvo-pastoralism: examples from LIFE MIDMACC and LIFE POLYFARMING projects. Summer School for Farmer advisory Services Agents of Change. On-line presentation.

May 2021- CREAM members involved: Pascual D., Pla E.

Bienal ciutat i ciència. Vespres de recerca - Emergència climàtica i models productius.

RePLANTegem entorns escolars

June 2021 - CREAM member involved as co-organizer: Ferrandiz-Rovira M.

Bridging the Green and Digital Agendas in Cities to Drive more Ambitious and Inclusive Transitions. In preparation for COP26.

CIDOB, Barcelona: in-person and online workshop.

October 2021- CREAM member involved: Pérez-Porro A.

Citizen science across Europe: going global while keeping local

3rd AIM-COST annual conference. AIM COST.

Istanbul, Turkey

September 2021- CREAM members involved: Eritja R., Richter-Boix A., Bartumeus F.

Citizen science on invasive mosquitoes

10th International EMCA conference. European Mosquito Control Association.

Wien, Austria

October 2021- CREAM members involved: Eritja R., Palmer JRB., Bartumeus F.

Divergent resource-use strategies along climatic gradients in populations of a Mediterranean forest species.

XV Congreso Nacional de la AEET. Plasencia (Spain).

October 2021 - CREAM members involved: Solé-Medina A., Ramírez-Valiente J. A.

El declivi dels pol·litzadors i com aturar-lo

Recerques per aprendre. Institut Ciències de l'Educació de la UAB. Online.

19 May 2021 - CREAM members involved: Rodrigo A.

Elucidating the role of temperature and precipitation regimes in the macro- and micro-evolutionary processes of two Iberian oak species.

XV Congreso Nacional de la AEET. Plasencia (Spain).

October 2021. CREAM members involved: Ramírez Valiente J.A., Solé-Medina A.

FASTER H2020 project Summer school

Adaptation measures: basic definitions and concepts.

May 2021 - CREAM members involved: Broekman A., Sánchez A.

Harnessing the power of citizen science and the inherent diversity that it offers

Online – GEO Virtual Symposium 2021

June 2021- CREAM members involved: Masó J.

Impacts of climate change on forests in the Mediterranean. Summer School for Farmer advisory Services Agents of Change. On-line presentation.

May 2021- CREAM members involved: Pascual D., Pla E.

Innovation in governance for adaptation Summer school in FASTER H2020 project

May 2021- CREAM members involved: Broekman A., Sánchez A.

Interop Community of Practice - interoperability and standards for citizen observatories. OGC Citizen Science Interoperability Experiment (CitSciE)

Online - October and December 2021

Numbers of attendees: 10

CREAM members involved in organising: Masó J., Otsu K.

Lessons learned from adaptive forest management: cases and examples. Summer School for Farmer advisory Services Agents of Change. Online presentation.

May 2021 - CREAM members involved: Pascual D., Pla E.

MONTCLIMA project Seminar: Strategies for managing and preventing forest fires in the SUDOE space.

Online - April 2021

CREAM members involved as co-organizers: Pascual D., Pla E.

OGC Citizen Science Domain Working Group - standardization issues

Singapore Geospatial Festival 2021

Online - September 2021

Numbers of attendees: 30

CREAM members involved in organising: Masó J., Otsu K.

On the use of remote sensing for monitoring and modelling the water cycle

Online - WaterForCE workshop

March 2021- CREAM member involved: Pesquer L.

Pol·linitzadors en perill... ens hi va la vida!

Cicle de tertúlies: el Club dels llunàtic i llunàtiques. Museu de les ciències naturals de Barcelona

18 Februry 2021 - CREAM member involved: Rodrigo A.

Presentació del LET, un nou laboratori de la xarxa dels UAB Open Labs

Online - June 2021

CREAM members involved as co-organizer: Pino J., Guzmán P.

Projectar la metròpoli diversa. N'hi ha prou amb la marca Barcelona?

CCCB and CIDOB. Barcelona.

November 2021- CREAM member involved: Pérez-Porro A.

Prosperitat sense natura?

Online - June 2021

CREAM members involved as co-organizer: Pino J., Guzmán P.

Participation as speaker in outreach conferences or knowledge transfer seminars

BOSCH J. Impact of agrochemical cocktails on pollinators. Online Workshop on extensive winter crops. Recomex. eConference. September 2021.

BROEKMAN A., SÁNCHEZ A. FASTER H2020 project Summer school. Adaptation measures: basic definitions and concepts. May 2021.

BROEKMAN A., SÁNCHEZ A. FASTER H2020 project Summer school. Innovation in governance for adaptation. Innovation in governance for adaptation. May 2021.

DOBLAS-MIRANDA E. Challenges and opportunities for science diplomacy in the Mediterranean panel of the event Increasing

Awareness of Science Diplomacy in the Mediterranean, organized by UfM. Online. October 2021.

DOBLAS-MIRANDA E. R&D-Industry Collaborations to Support Innovation scientific session of the forum Green and Digital Transition in the Euro-Mediterranean: Youth Connecting the Dots Across Economic Development, Migration and Security, IV Euromed Young Researchers Forum, AECID & IEMed, Barcelona. October 2021.

DOBLAS-MIRANDA E. La diagnosi (del cel a la terra), panel of the forum Atmosterra 2001, Unió de Pagesos, Barcelona. October 2021.

DOBLAS-MIRANDA E. Empowering wellbeing and health through nature: inspiring good practices and initiatives across Europe panel of the 19th European Week of Regions and Cities, EC. Online. October 2021.

DOMINGO C. Success stories in Research, Innovation and Development projects by CREAM: generating impact. EOTIST 1st Exploratory visit. Online. November 2021.

JULIÀ N. Creación y gestión de metadatos geográficos. Actividades previas XIX Congreso de Tecnologías de la Información Geográfica. Universidad de Zaragoza y Asociación Española de Geografía. Online. October 2021.

MAYOL M. Demography, genetic diversity and adaptation in *Taxus baccata* L. Genetic diversity and conservation of English yew (*Taxus baccata*) in the Iberian Peninsula. Online technical seminar. May 2021.

MARTÍNEZ-VILALTA J. How drought impacts on forests in the Sudoe space. Montclima climate and natural risks in mountain areas. Strategie for managing and preventing drought impacts in forests in the Sudoe mountains. Institut d'Estudis Catalans. Barcelona. September 2021.

PASCUAL D., Pla E. Best practices in agro-silvo-pastoralism: examples from LIFE MIDMACC and LIFE POLYFARMING projects. Summer School for Farmer advisory Services Agents of Change. Online. May 2021.

PASCUAL D., Pla E. Impacts of climate change on forests in the Mediterranean. Summer School for Farmer advisory Services Agents of Change. Online. May 2021.

PASCUAL D., Pla E. Lessons learned from adaptive forest management: cases and examples. Summer School for Farmer advisory Services Agents of Change. Online. May 2021.

PEÑUELAS J. Canvis ambientals i climàtics als Ports i arreu. Conferència inaugural jornada medi ambient i clima dels Ports, Forcall. August 2021.

PEÑUELAS J. Els canvis global, natura i humans. Fundació Bosch i Cardellach de Sabadell, la Secció de Ciència i Tecnologia. October 2021.

PEÑUELAS J. Els canvis globals, naturals i humans, Fundació Bosch i Cardellach, Cicle de conferències "L'ecologia i l'urbanisme". October 2021.

PEÑUELAS J. Aportació de l'IEC a una avaluació de l'emergència ambiental i possibles accions per revertir-la. Institut d'Estudis Catalans (Barcelona). November 2021.

PEÑUELAS J. Xerrada Canvi global i salut humana. XVIII Jornada anual CREAM-SCB-ICHN de la salut dels ecosistemes a la salut global. November 2021.

PRAT E. Harmonizing Remote Sensing and Citizen Science Vegetation Phenology Observations. EOTIST Workshop III: Ecological predictors of change. Online. December 2021.

PRAT E. Presentació RitmeNatura. Jornada Ciència Ciutadana UAB. June 2021.

SERRAL I. How to create ISO 19139 metadata documents. WQeMS Workshop. Online. March 2021.

TERRADAS J. Covid session. Ecologia i salut. Institut d'Estudis Catalans. May 2021.

TERRADAS J. Ecologia, territori, urbanisme. Cicle sobre Ecologia i urbanisme. Fundació Bosch i Cardellach. Sabadell (Barcelona). October 2021

MAKING AND IMPACT THROUGH:

Participation in meetings or activities organised by administrations, the private sector or other social agents to advice or provide guidance based on the results of your research/scientific experience

Annual Meeting of the Consell Assessor dels Àrids de Catalunya.

Online - May 2021
Carabassa V., Alcañiz J. M.

Científiks. V Scholar quiz of videogames design (<https://cientificsenjoc.cat/>)

Department of Research and Universities of the Generalitat de Catalunya and Eduxarxa.
Online - 2021- Marañón-Jiménez S.

Consell assessor científic de l'Ajuntament de Barcelona.

Barcelona - 2021 - Peñuelas J.

Formulation of protocols for standardised assessment of the threats and pressures of habitat types of community interest. Workshop in Series Natura 2000 Biogeographic process for the Mediterranean region.

Tragsatec, Ministerio para la Transición Ecológica y el Reto Demográfico, European Commission.

Online - March 2021 - Lloret F.

Jornada de debat sobre el model de Barcelona com a Ciutat de Ciència

Online - April 2021 - Pino J.

Taula de Coordinació de Collserola

Online - April 2021 - Pino J.

Presentació del Pla Natura Barcelona

Ajuntament de Barcelona - June 2021 - Pino J.

Participation in the elaboration of Strategic Plans of the Generalitat of Catalonia. Global Change Adaptation

Strategy (ESCACC30). - March 2021.

Broncano M. J., Pascual D., Pla E., Retana J.

Catalan Rural Agenda. ARC-Waste Catalan Agency, Generalitat of Catalonia.

March 2021 - Broncano M. J., Pascual D., Pla E., Retana J.

Strategic Plan of Agro-Food Research, Innovation and Transfer of Catalonia 2021-2030 (PRITAC 2030).

September 2021 - M. J. Broncano, Retana J.

PROGRESS local stakeholders meeting on landscape governance

Online - September 2021 - Numbers of attendees: 8

CREAF members involved in organising: Doblas-Miranda E.

Meeting or activity title: FASTER international stakeholders meeting on Adaptation to climate change in land & water management in the Mediterranean

Online - Date: April and June 2021

Doblas-Miranda E., Sánchez A., Broekman A.

RecerKids, recerca científica per a escoles inquietes. General Directorate of Research of the Generalitat de Catalunya and Eduxarxa.

Online - May 2021 - Marañón-Jiménez S.

Production of reports, guides, handbooks, other transfer materials, or policy briefs

HERRANDO S. Analysis of data from the European breeding bird atlases 1 and 2. Changes in farmland birds over 30 years of changes in farmlands. Report for The Joint Research Centre of the European Commission. 2021.

HERRANDO S., MARTÍ D., SOLER N. Technical Committee of the Catalan Association of Aggregate Producers. Development of the European Breeding Bird Atlas 2 website. <https://www.ebba2.info>. 2021.

DOBLAS-MIRANDA E. Guidelines on future research. FASTER, H2020 project no. 810812 - WIDESPREAD-05-2017-Twinning, European Commission. 2021.

GRACIA M., RETANA J., BRONCANO M.J., JUSTAMANTE A. The regenerative agri-food model: the Polyfarming system. Layman's report. Life Polyfarming. 2021.

PÉREZ-PORRO A. Take away ideas report. Science and innovation diplomacy in the Mediterranean. CREAM and Union for the Mediterranean (UfM). 2021.

Participation in projects involving co-creation of knowledge together with diverse stakeholders including administrations, private entities etc.

1st Participatory Workshops of the Catalan Climate Change Adaptation Strategy (ESCACC30). Water, forests and food.
Online - January and March 2021
CREAF members involved: D. Pascual.

2nd Participatory Workshops of the Catalan Climate Change Adaptation Strategy (ESCACC30). Urban and rural agenda.
Online - January and March 2021
CREAF members involved: D. Pascual.

2nd meeting of the stakeholders Supra-Regional Working Group of LIFE MIDMACC project.

Stakeholder's participants: 10 stakeholders from 9 institutions, 6 stakeholders from the administration.

Online - February 2021

CREAF members involved: D. Pascual, E. Pla.

2nd Participatory Workshop of the Climate Change Pyrenean Strategy (EPiCC). System 2, Natural and resilient ecosystems.

Online - June 2021

CREAF members involved: D. Pascual.

3rd Participatory Workshop of the Catalan Rural Agenda (ARC). Resilient and adapted mountains.

Online - July 2021

CREAF members involved: D. Pascual.

5th Participatory Workshop of the Catalan Rural Agenda (ARC). Forest System.

Online - July 2021

CREAF members involved: D. Pascual.

Creating a Knowledge Exchange Space for data management and documentation. OntoCommons (Ontology-driven data documentation for Industry Commons).

Online - October and November 2021

CREAF members involved: K. Otsu.

FASTER: Farmers' Adaptation Sustainability in Tunisia through Excellence in Research Farm Advisory Service 3rd Living Lab Workshop.

Tabarka (Tunisia) and online - March 2021

CREAF members involved: A. Broekman, A. Sánchez.

FASTER: Farmers' Adaptation Sustainability in Tunisia through Excellence in Research Farm Advisory Service 4th Living Lab Workshop.

Tabarka (Tunisia) and online - April 2021
CREAF members involved: A. Broekman, A. Sánchez.

Flower mixtures for roadside restoration programs. Cooperative agreement with the Department of Territory and Environment of the Catalan Government.

2021 - CREAM members involved: A. Rodrigo, J. Bosch.

H2020 BESTMAP Co-design at EU level.

CREAF members involved: J. Masó, C. Domingo.

I-CISK project

CREAF members involved: L. Pesquer, E. Prat.

Improving soil carbon, nitrogen and microbial diversity in Catalan vineyards.

Catalonia - 2020-2022 - CREAM members involved: J. Sardans, J. Peñuelas.

Meeting of the Comitè Científic de l'Atlas de mamífers de Catalunya

Barcelona - November 2021 - CREAM members involved: S. Herrando.

Meeting of the Grup Motor de l'Atlas de mamífers de Catalunya

Online - December 2021

CREAF members involved: S. Herrando, L. Brotons.

Metropolitan butterfly monitoring scheme (mBMS) <https://mbms.creaf.cat/>

CREAF members involved: P. Guzmán, J. Pino.

Participatory Workshops of the Catalan Rural Agenda (ARC). People, welfare and demographic challenge. Ecological transition, climate change and biodiversity.

Online - June 2021 - CREAM members involved: D. Pascual, E. Pla.

Participatory Workshop of the Climate Change Pyrenean Strategy (EPiCC).

Catalonia. Online - July 2021 - CREAM members involved: D. Pascual.

Participatory Workshop of the Climate Change Pyrenean Strategy (EPiCC).

Operative Plan to develop EPiCC.

Online - November 2021 - CREAM members involved: D. Pascual.

Urban butterfly monitoring scheme (uBMS) <https://ubms.creaf.cat/>

CREAF members involved: P. Guzmán, Y. Melero, J. Pino.

Research related information/knowledge that has been incorporated within plan, strategies or management activities of diverse administrations or policy actors. Specify how.

Bird Forest Indicator 2020. Provided to Observatori Forestal Català. <https://www.observatoriforestal.cat/indicador-docells-forestals/https://www.idescat.cat/indicadors/?id=ods&n=13546>

CREAF members involved: S. Herrando, L. Brotons.

Farmland Bird Indicator 2020. Provided to IDESCAT <https://www.idescat.cat/indicadors/?id=ods&n=13546>

CREAF members involved: S. Herrando, L. Brotons.

Fitxes tècniques per utilitzar esmenes orgàniques en restauració de sòls. Agència de Residus de Catalunya - CREAM. https://residus.gencat.cat/ca/ambits_dactuacio/tipus_de_residu/residus_organics/restauracio_sols/fitxes_tecniques/.

CREAF members involved: J. M. Alcañiz, V. Carabassa.

MiraMon's tool for storing geospatial resources in the cloud, NiMMbus, developed by Grumets within the framework of the NextGEOSS project, has been included in

the European Open Science Cloud (EOSC) portal. Grumets research group.

Results of the metropolitan butterfly monitoring scheme (mBMS). <https://mbms.creaf.cat/>) have been incorporated into the management of grassland areas in metropolitan Parks to improve biodiversity. J. Pino.

Results of EXOCAT (<http://exocat.creaf.cat/>) have been incorporated into the early warning and management strategies on IAS in Catalonia. (https://mediambient.gencat.cat/ca/05_ambits_dactuacio/patrimoni_natural/especies_exotiques_invasores/xarxa-dalerta/). J. Pino.

Standards to certificate mediterranean forest restoration projects. WWF-SER-Universitat d'Alacant-VAERSA-CREAF. CREAM member involved: V. Carabassa.

The project WaterInnEU, coordinated by Grumets and financed by the European Commission in the Horizon 2020 program during the years 2015-2017, was cited in the European Catalogue of Information and Communication Technologies Water Standards and Specifications. Grumets research group.

Participation in multilateral platforms (e.g. IPBES, IPCC, etc).

C. AZPIAZU, J. BOSCH, S. ALBACETE, G. SANCHO. Participation in the APITOX ring test for the development of pesticide chronic exposure protocols for solitary bees.

E. DOBLAS-MIRANDA. Member of MedECC, Mediterranean Experts on environmental and Climate Change.

F. LLORET. Member of the Consell de Protecció de la Natura, Generalitat de Catalunya.

F. LLORET. Member of the Patronat del Parc Natural de l'Alt Pirineu.

F. LLORET. President of the Scientific Committee of Parc Natural de l'Alt Pirineu.

J. PENUÉLAS. Member of the stakeholder committee. MetClimVOC. Metrology for climate relevant volatile organic compounds. Project Number: 19ENV06. Advisory board. EURAMET.

J. PINO, A. CLIVILLÉ. Members of the Alternet Management board.

L. BROTONS. Observer Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).

L. BROTONS. Expert Mediterranean Experts on Climate and environmental Change (MEDECC).

L. BROTONS. Steering committee European Breeding Bird Atlas 2 (EBBA2) member.

S. MARAÑÓN-JIMÉNEZ, J. M. ALCAÑIZ, X. DOMENE, V. CARABASSA, A. VIDAL. Participation in the public consultation of the new EU soil strategy.

Participation in other intersectorial (public-private) events/platforms/initiatives (i.e. round tables, debates, symposiums, workshops, interviews, committees etc.):

Adaptive management practices in Mediterranean forests. 29th European Biomass Conference and Exhibition (EUBCE), Speakers' corner. Online presentation. April 2021. CREAM members involved: D. Pascual.

CosmoAcción - Jornada Dialoga Otoño 2021. CosmoCaixa. October 2021. CREAM members involved: E. Prat.

Estratègia catalana d'adaptació al canvi climàtic: Eix 3. Agenda urbana. Agenda rural, Catalan Government. Online. March 2021. CREAM member involved: E. Doblas-Miranda.

EUROPABON project meetings. Regular participation online 5 times in 2021. CREAM members involved: CREAM member involved: S. Herrando.

European Bird Census Council Board meetings. Regular participation online 4 times in 2021. CREAM members involved: Herrando S., as observer of the European Breeding Bird Atlas 2.

Healthy soils for Europe, EIP-AGRI seminar. Online. April 2021. CREAM member involved: E. Doblas-Miranda.

International Ramon Margalef Award Governing Board. CREAM member involved: J. Terradas.

Jornades sobre la COVID. Institut d'Estudis Catalans, May 2021. CREAM member involved: J. Terradas.

Lectures on Ecologia i urbanisme, Fundació Bosch i Cardellach, Sabadell, October 2021. CREAM member involved: J. Terradas.

Participation in the video series Ampliar l'aeroport? Institut d'Estudis Catalans, <https://www.youtube.com/>

[watch?v=a7ZpDmvh1Wg](#) CREAM members involved: J. Terradas.

Presentation of the book Geografia particular by Josep Vigo. Llibreria Tòmiris, Barcelona, October 2021. CREAM members involved: J. Terradas.

Scientific advisor of the Max Plank Institute. 2020-2022. CREAM members involved: J. Peñuelas.

Spanish Forest Technological Platform, General assembly and Executive board. 2021. CREAM members involved: J. M. Espelta.

TRAINING ANNEXES

Subjects in masters and postgraduate courses (only subjects in others masters outside CREAM sphere)

Evaluation of coal mines restoration works. Geological risks and environmental rehabilitation. Master of Soil and Water Management. Universitat Autònoma de Barcelona. Josep Maria Alcañiz.

Disturbance regimes and forest management in protected natural areas. Ecosystem Management. Master in protected natural areas. UAH-Fundación González Bernáldez. Universidad Autónoma de Madrid. Josep Maria Espelta.

Landscape ecology and plant communities. Master in Ecology, Environmental Management and Restoration. University of Barcelona. Joan Pino.

Soil Ecology. University of Lleida, University of Barcelona, Universitat Autònoma de Barcelona and University of Navarra. Xavier Domene.

Urbanization and the loss of functional diversity. Master de Biodiversitat. Universitat de Barcelona. Daniel Sol.

Courses or workshops or seminars within masters, summer schools, meetings, etc.

A cross-system view of the biological C cycle in the Anthropocene. Ramon Margalef virtual Colloquium 2021. ICM, SIBECOL, CREAM. Barcelona (online). 5-8 October 2021. Jordi Martínez-Vilalta, member of the Scientific Committee organizing the colloquium.

Best practices in agro-silvo-pastoralism: examples from LIFE MIDMACC and LIFE POLYFARMING projects. Summer School for Farmer advisory Services Agents of Change (FASTER project). Lund University. Online presentation. May 27th 2021. Diana Pascual and Eduard Pla.

Creación y gestión de metadatos geográficos. Actividades previas XIX Congreso de Tecnologías de la Información Geográfica. Universidad de Zaragoza y Asociación Española de Geografía. Online. 19th October. Núria Julià.

Impacts of climate change on forests in the Mediterranean. Summer School for Farmer advisory Services Agents of Change (FASTER project). Lund University. Online presentation. May 26th 2021. Diana Pascual and Eduard Pla.

Inaugural conference New Forests: threats and opportunities of passive forest expansion across Europe. Master in Ecosystem Restoration. Universidad de Alcalá. Universidad Politécnica de Madrid. Josep Maria Espelta.

Lessons learned from adaptive forest management: cases and examples. Summer School for Farmer advisory Services Agents of Change (FASTER project). Lund University. Online presentation. May 26th 2021. Diana Pascual and Eduard Pla.

Doctoral theses

BÓRNEZ MEJÍAS, K. (2021). Study of vegetation dynamics from satellite: phenological responses to climate change. Universitat Autònoma de Barcelona. Directors:

Josep Peñuelas and Aleixandre Verger.

BRUNA P. (2021) Arte y ecología política. Un viaje desde el modelo antropocéntrico a las realidades de los no humanos. Barcelona Univeristy. Directors: Jordi Morell and Jordi Martínez-Vilalta.

CANELLES Q. (2021) Incorporating insect pest outbreaks to landscape modelling: the case of *Cydalima perspectalis* invasion in Europe. Universitat Autònoma de Barcelona. Director: Lluís Brotons.

CLOSA G. (2021) Aportacions en el camp del llinatge geospacial en entorns distribuïts: de la captura a l'explotació. Universitat Autònoma de Barcelona. Director: Joan Masó.

DE PEDRO M. (2021) Evolutionary ecology of range expansion in the colonizing plant *Leontodon longirostris* (Asteraceae). Autonomous University of Barcelona. Directors: Maria Mayol and Miquel Riba.

FLO, V. 2022. Global ecological drivers of transpiration regulation in trees. Autonomous University of Barcelona. Supervisors: Rafael Poyatos and Jordi Martínez-Vilalta.

JAIME GONZALEZ, L. (2021) Role of the species climatic niche on the insect-host system under drought episodes. Universitat Autònoma de Barcelona. Directors: Francisco Lloret and Enric Batllori.

MU, Z. (2021). Ecology of VOCs emissions by plants under global environmental changes. Universitat Autònoma de Barcelona. Directors: Josep Peñuelas and Joan Llusà.

PALMERO-INIESTA M (2021) Recent Forest Expansion in Europe (1985-2015). Patterns, Drivers, and Implications on Forest Growth. Autonomous University of Barcelona. Directors: Josep Maria Espelta and Joan Pino.

VALLICROSA, H. (2020). Global change and forest nutrient stoichiometry. The foliar elemental composition of woody plants and its drivers. Universitat Autònoma de Barcelona. Directors: Josep Peñuelas and Jordi Sardans.

Final Master Project (Diploma d'Estudis Avançats)

AUCEJO M. (2021). Climate niche conservatism and its potential for adaptation to global change in birds. Universitat de Barcelona. Directors: Laura Cardador, Daniel Sol.

BUSCÀ RIU S. (2021). Forest adaptation strategies to climate change: An experiment to promote different species in mixed scots pine forests. Masters in Ecology, Environmental Management and Restoration, University of Barcelona. Director: Eduard Pla Ferrer.

CARDOZO, J. (2021). Seguimiento a los trabajos de explotación minera en la cantera La Constancia, Catalunya, mediante teledetección con drones. 2021. Màster en SIG i Teledetecció.

DÍAZ BORREGO, R. (2021). The climatic disequilibrium of recruit communities across a drought-induced defoliation gradient in Mediterranean shrubland. Máster en Ecología Terrestre i Gestió de la Biodiversitat,

Universitat Autònoma Barcelona. Directors: Francisco Lloret, María Angeles Pérez Navarro.

LOPEZ R. (2021). Remote sensing vegetation indices to model insect migration. Master en Teledetecció i Sistemes d'Informació Geogràfica. Universitat Autònoma de Barcelona. Director: Cristina Domingo.

MORA C. (2021.) Niche shifts from terrestrial to arboreal feeding behaviours on islands favours an increase in relative brain size in a cosmopolitan bird clade. Universitat de Barcelona. Directors: Daniel Sol, Ferran Sayol.

MORELL J. (2021). Disentangling the role of land-use history and protection status on the taxonomic and functional diversity of Iberian Forests. Master's Degree in Terrestrial Ecology and Biodiversity Management (Terrestrial Ecology specialization). Directors: Josep Maria Espelta, Núria Aquilué.

PEREZ L. (2021). Social information in nest-site choice of a colonial passerine. Universitat Autònoma de Barcelona. Director: Daniel Sol.

PREGO, A. (2021). Evolución de estrategias vitales en aves marinas. Universitat de Barcelona. Directors: Daniel Sol, Antonio Hernandez, Jacob González-Solis.

SABATÉ GIL, C. (2021). Disentangling the effect of Temperature, Photoperiod and light intensity on leaf unfolding of deciduous species. Directors: Josep Peñuelas, Marc Peaucelle.

SOLER RUIZ P. (2021). Modelled hydraulic traits fail to predict regional scale tree mortality. Master en Ecologia Terrestre i gestió de la Biodiversitat. Universitat Autònoma de Barcelona. Directors: Jordi Martínez-Vilalta, Miquel de Cáceres, Raúl García-Valdés.

VIDAL A. (2021). Proximate factors explaining the stable isotopic values and trophic position of the blue shark (*Prionace glauca*). Master in Oceanography and management of the marine environment. Universitat de Barcelona. Directors: Laura Cardador J. Navarro.

Final Student Work (projecte final de carrera)

ANDREU, M (2021). La sostenibilitat no té edat! Disseny d'un Programa de sortides i tallers per gent gran. Environmental Biology Degree, UAB. Director: Anselm Rodrigo.

BARBERO A. (2021). Grans incendis forestals. Estudi de la proliferació dels GIF als diferents biomes del planeta. Autonomous University of Barcelona. Director: Joan Pino.

BHOWMIK S. (2021). Estudi de les interaccions entre licènids (Lepidoptera:Lycaenidae) i formigues (Hymenoptera:Formicidae) a Catalunya Environmental Biology Degree, UAB. Director: Anselm Rodrigo.

HIDALGO C. (2021). Distribució o origen dels materials loèssics a Catalunya com a material parental de sòls. Universitat Autònoma de Barcelona (Geology Degree). Director: Xavier Domene.

LENGUAS P. (2021). Descripción de la diversidad de suelos en la zona de Sant Martí de Llémena. Universitat Autònoma de Barcelona (Geology Degree). Director: Xavier Domene.

MAIRAL N. (2021). Com afecta el canvi climàtic a les dones? Universitat Autònoma de Barcelona. Director: Mariona Ferrandiz.

MOSSOLL G. (2021). Afectació de l'eruga del boix (*Cydalima perspectalis*) a la Garrotxa : importància de l'altitud i la cobertura arbòria. Autonomous University of Barcelona. Director: Joan Pino.

OLIVER Q. (2021). Indicadors estructurals per a l'avaluació de boscos madurs mediterranis. Universitat Autònoma de Barcelona. Director: Francisco Lloret.

ORTIZ C. (2021). Disseny d'una activitat de lleure per promoure l'interès per l'etnobotànica i la vegetació silvestre local. Universitat Autònoma de Barcelona. Director: Mariona Ferrandiz.

PONS M. (2021). Dinàmica del fòsfor en sòls tropicals en una toposeqüència: efecte de la mineralogia, la microestructura edàfica i l'activitat biològica (Amazònia, Guaiana Francesa). Universitat Autònoma de Barcelona (Geology Degree). Director: Xavier Domene.

TRESSERRAS-PUJADAS J. (2021). El Jardí Botànic de Flora Autòctona del Parc Nou. Environmental Biology Degree, UAB. Director: Anselm Rodrigo.

VICENTE M. A. (2021.) Influència de la topografia en el cycle del fòsfor en sòls tropicals de la Guaiana Francesa. Universitat Autònoma de Barcelona (Geology Degree). Director: Xavier Domene.

ZUMEL A. (2021). Fauna i flora del riu d'Agost i la Malesa. Universitat Autònoma de Barcelona. Director: Mariona Ferrandiz.

AWARDS

Awards and distinctions received by members of CREAM

Biodiversa Prize of Excellence & Impact 2021 to the Sponforest project. CREAM IP, Espelta J. M.

Dia del Biòleg 2021 Award. Col·legi Oficial de Biòlegs de Catalunya. Category Recerca i investigació to Pino J.

Highly Cited Researcher 2021 (Clarivate analytics) to Martínez-Vilalta J., Peñuelas J., Mencuccini M., Sardans J.

Imbalance-P project elected between the highlighted 15 examples of how ERC researchers have truly transformed science (among 10,000 ERC grantees) to Peñuelas, J.

Lector by the Serra Hunter Programme to Marañón-Jiménez S. Generalitat de Catalunya. 5 years, starting in March 2021.

Most productive ecologist of the world (GlobalauthorID 2021 ranking) to Peñuelas, J.

Premi Crítica Serra d'Or de Recerca en l'apartat de Ciències 2021 per l'obra Llibre blanc de la gestió de la natura als Països Catalans to Peñuelas, J.

Premi Crítica Serra d'Or 2021 to the collective

work Natura, ús o abús 3^a ed. Contribution: the first chapter on Ecological basis of nature management to Terradas, J.

Premi de Recerca científica Fons COVID de l'Ajuntament de Barcelona. Replantejament entorns escolars to Mariona Ferrandiz-Rovira.

Ranked one of the ten most influential researchers in Spain by the Influx platform in the Environment and Ecology category to Peñuelas J. and Brotons L.

Ranked one of the sixty most influential researchers in Spain and Spaniards abroad based on the newest Webometrics Ranking to Peñuelas, J.

Recognized as an Expertscape World Expert in Climatic Processes to Peñuelas, J. <https://expertscape.com/ex/climatic+processes>

WE WOULD LIKE TO THANK ALL OF OUR PAST AND CURRENT PRIVATE SECTOR COLLABORATORS, INCLUDING

Foundations/Associations

- FUNDACIÓ BANCARIA "LA CAIXA"
- BBVA FOUNDATION
- FUNDESPLAI (FUNDACIÓ CATALANA DE L'ESPLAI)
- FUNDACIÓ UNIVERSITÀRIA BALMES (UNIVERSITAT DE VIC)
- ASSOCIACIÓ SÈLVANS
- La Paniquella Associació Naturalista
- Associació Leader Illa de Menorca
- ASS. INST.CATALÀ D'ORNITOLOGIA - Museu Ciències Naturals BCN
- AIDIMME - INSTITUTO TECNOLÓGICO
- INNOMNIUM Community Foundation
- FUNDACIÓ UNIVERSITAT AUTÒNOMA DE BARCELONA (EUTDH)
- Fundació PIMEC
- Fundación Ramón Areces

Other

- CREAM's alumni
- NATIONAL GEOGRAPHIC SOCIETY
- EARTHWATCH INSTITUTE, INC
- OPEN GEOSPATIAL CONSORTIUM, INC - Open Geospatial Consortium (Europe) Ltd.
- CECOT
- PONTIFICIA UNIVERSIDAD JAVERIANA
- Patronat de la Muntanya de Montserrat
- Stichting IHE Delft Institute for Water Education
- German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig - Christian Wirth
- Union for the Mediterranean
- EADA Business School Barcelona

Business

- LOKIMIKA SA
- FAMILIA TORRES (Miquel Torres SA)
- PROMSA (PROMOTORA MEDITERRANEA-2, S.A.)
- ECOACSA Reserva de Biodiversidad
- GIRBAU CONSULTING
- ECOSTUDI SIMA
- APATURA IRIS S.L.
- Aprèn, Serveis Ambientals, SL
- RICOH ESPAÑA, S.L.U.
- WILDBIENE + PARTNER AG
- Evenflow EU
- Aula Magna Business School AMBS
- DKV Seguros

ACTIVE PROJECTS IN 2021

PROJECT NAME	ACRONYM	PRINCIPAL INVESTIGATOR	BUDGET	ENTITY	PERIOD
Biogeografia funcional: resposta dels ecosistemes terrestres als canvis i gradients ambientals	2017-2019 SGR/1001 LLORET	Francisco Lloret	37.367,00 €	AGAUR	2017-2021
Unitat d'Ecologia Global - grup de recerca consolidat	2017-2019 SGR/1005 PEÑUELAS	Josep Peñuelas	60.216,00 €	AGAUR	2017-2021
Biodiversitat i evolució en ecosistemes mediterranis	2017-2019 SGR/1006 MAYOL	Maria Mayol	20.000,00 €	AGAUR	2017-2021
Protecció de sòls	2017-2019 SGR/761 ALCANIZ	Josep Maria Alcañiz	0,00 €	AGAUR	2017-2021
Dinàmica forestal i incendis	2017-2019 SGR/857 RETANA	Javier Retana	59.463,30 €	AGAUR	2017-2021
GECA Grup d'Ecologia dels Canvis Ambientals	2017-2019 SGR/910 CATALAN	Jordi Catalán	60.216,00 €	AGAUR	2017-2021
Architecture implementation pilot phase 4 (AIP-4) WCS and WFS tutorials	AIP-4-TUTORIALS	Joan Masó	11.072,48 €	OPEN GEOSPATIAL CONSORTIUM	2021
Valorisation of the bovine and silvopastoral resources of the transboundary Pyrenees-Mediterranean massif	ALBERAPASTUR	Marc Gràcia	1.376.386,00 €	EU	2018-2021
El gradient pH-alcalinitat en l'espai i el temps, un marc ecològic per a la biodiversitat de les aigües continentals.	ALKALDIA	Jordi Catalán	202.070,00 €	Ministerio de Ciencia e Innovación	2020-2023
Base de dades de modelització	BBDD modelització	Jordi Vayreda	30.000,00 €	Generalitat de Catalunya	2021
Assessing the role of land use legacies and management in forest resilience to climate change disturbances	Beca Inphinit Faqrul Islam Chowdhury	Faqrul Islam Chowdhury	115.092,00 €	Fundació Bancària La Caixa	2022-2025
The role of behavior in evolution: an empirical study in the context of rapid environmental change	Beca Postdoctorado Junior Leader FBLC "la Caixa" 2020 - Oriol Lapiedra	Oriol Lapiedra	303.900,00 €	Fundació Bancària La Caixa	2020-2023
Elemental stoichiometry to understand biodiversity-ecosystem functioning relationships: ES-BEF	Beca Postdoctorado Junior Leader FBLC "la Caixa" 2021 - Marcos Fernández	Marcos Fernández	303.900,00 €	Fundació Bancària La Caixa	2021-2024
Impact of climate-enhanced hydrological intermittency on the carbon cycle of high-mountain watersheds	Beca Postdoctorado Junior Leader FBLC "la Caixa" 2021 Lluís Gómez	Lluís Gómez	297.900,00 €	Fundació Bancària La Caixa	2021-2024
Comportamiento animal: un modelador de las dinámicas eco-evolutivas en un planeta cambiante?	BEECOEVO	Oriol Lapiedra	100.000,00 €	Ministerio de Ciencia e Innovación	2021-2023
Evolutionary behavioural ecology	BEHAVIOUR	Oriol Lapiedra	7.000,00 €	National Science Foundation	2020-2021

PROJECT NAME	ACRONYM	PRINCIPAL INVESTIGATOR	BUDGET	ENTITY	PERIOD
Behavioural, ecological and socio-economic tools for modelling agricultural policy	BESTMAP	Joan Masó	3.995.811,25 €	EU	2019-2023
Bateries biodegradables i compostables per agricultura de precisió i sistemes d'energia descentralitzats	BIDEKO	Xavier Domene / Vicenç Carabassa / Sara Marañón	125.816,00 €	Ministerio de Ciencia e Innovación	2021-2024
Inteligència de dades de ciència ciutadana i massives per lluitar contra les malalties trameses per mosquits	BIG MOSQUITO BYTES	Frederic Bartumeus	135.080,00 €	Fundació Bancària La Caixa	2019-2022
Canvis en els estocs, fluxes i la estequiometria de bioelements (N:P:K) en el sistema planta-sòl associats a l'increment de l'aridesa (BIO-ARID)	BIO-ARID	Jordi Sardans	114.950,00 €	Ministerio de Ciencia e Innovación	2021-2024
La aceleración de los ciclos biogeoquímicos en la alta montaña durante el Antropoceno.	BIOGEOMONT	Jordi Catalán	60.753,35 €	Organismo Autónomo de Parques Nacionales	2020-2023
Gestió i avaluació de la composició química i l'acidesa de la precipitació de Catalunya	"CARACTERITZACIÓ PLUGES"	Anna Àvila	30.000,00 €	Generalitat de Catalunya	2021
Agricultural potential in carbon sequestration, humus content of land used for agriculture and CO2 storage (EU-27)	CARBOFOOD	Pilar Andrés	18.000,00 €	European Parliament	2021
Actuacions en infraestructures científico-tecnològiques del sistema CERCA i pel desenvolupament d'una plataforma d'accés a les mateixes.	CERCA-GINYS	Lucía Galiano	23.000,00 €	CERCA	2021-2023
Connectivity of forest and riparian ecosystems of the SUDOE space	CERES	Jordi Vayreda	1.272.214,00 €	EU	2018-2021
Copernicus Global Land Service – Framework contract for the operation, evaluation and evolution of the global land component of the Copernicus land service.	C-GLOPS1	Aleixandre Verger	307.635,24 €	EU	2015-2021
Ciència ciutadana	CIENCIA CIUTADANA	Anna Ramon	10.000,00 €	Generalitat de Catalunya	2021
Collaborative learning in research, information-sharing and governance on how urban tree-based solutions support Sino-European urban futures'	CLEARING HOUSE	Corina Basnou	4.986.463,75 €	EU	2019-2023
Comportament i persistència de la població sota canvis ambientals	COG-BUFFER	Daniel Sol	194.810,00 €	Ministerio de Ciencia e Innovación	2021-2024

PROJECT NAME	ACRONYM	PRINCIPAL INVESTIGATOR	BUDGET	ENTITY	PERIOD
Characterisation and conservation of forest areas of high ecological value and their ecological connectivity	CONNECTFOR	Jordi Vayreda	878.273,76 €	EU	2019-2022
CO-producing Nature-Based Solutions and restored ecosystems: transdisciplinary nexus for urban sustainability	CONEXUS	Corina Basnou	4.999.940,00 €	EU	2020-2024
Mapes connectivitat Delta	CONNECTIVITAT DELTA	Joan Pino	10.000,00 €	Generalitat de Catalunya	2021
Connectivitat ecològica	CONNECTIVITAT ECOLOGICA	Xavier Pons	10.000,00 €	Generalitat de Catalunya	2021
Co-designed citizen observatories services for the EOS-Cloud	COS4CLOUD	Joan Masó / Anna Ramon	5.999.055,75 €	EU	
Global decoupling of Covid-19 infection and activities from lockdown to post-lockdown period using observations from the space	COVID NOX	Josep Peñuelas	198.000,00 €	AGAUR	2021-2022
La protecció del patrimoni en zones de conflicte a través d'eines digitals: el paper de la societat civil	CULTURAPP	Bernat Claramunt	9.500,00 €	CSIC	2019-2021
Una evaluación basada en datos de las respuestas a la sequía de los árboles y del uso del agua de los bosques a nivel global	DATAFORUSE	Rafael Poyatos	142.780,00 €	Ministerio de Ciencia e Innovación	2019-2022
Monitoring network for observing the status of the forests of Catalonia	DEBOSCAT	Jordi Vayreda / Jordi Martínez Vilalta	35.000,00 €	Generalitat de Catalunya	2020
Differential adaptation capacity of dryland grasses to directional changes in water availability	DIAGRASS	Josep Peñuelas (Marie Curie Fellowship granted to Mónica Ladrón de Guevara)	239.191,20 €	EU	2018-2021
Estudi, anàlisi i divulgació de resultats de treballs silvícoles i de la dinàmica forestal resultants dels programes de prevenció d'incendis, restauració i millora forestal de la Diputació de Barcelona	DINFORREST	Josep Maria Espelta	97.550,00 €	Oficina Tècnica de Prevenció Municipal d'Incendis Forestals - DIBA)	2018-2021
Understanding the mechanisms underlying tree responses to drought stress based on tree size	DISTRESS	Jordi Martínez Vilalta (Marie Curie Fellowship granted to Laura Fernández de Uña)	245.732,16 €	EU	2019-2022
Assessorament científic-tècnic per al projecte "un millón de árboles" de DKV	DKV_arbres_2021	Centre	10.000,00 €	DKV Seguros y Reaseguros	2021
Uso del agua y estrategias de resistencia a la sequía a distintas escalas: desde los mecanismos homeostáticos a la dinámica regional de la vegetación	DRESS	Jordi Martínez Vilalta	193.600,00 €	Ministerio de Ciencia e Innovación	2018-2021

PROJECT NAME	ACRONYM	PRINCIPAL INVESTIGATOR	BUDGET	ENTITY	PERIOD
Wildlife in the Andorran Pyrenees (II)	EARTHWATCH PIRINEU (II)	Bernat Claramunt	314.246,28 €	EarthWatch Institute	2016-2021
Fomento de la adaptación al cambio global en sistemas agrícolas y forestales a largo plazo: multifuncionalidad como criterio	ECOFARMERS	Xavier Domene	194.810,00 €	Ministerio de Ciencia e Innovación	2021-2024
Impactes del canvi climàtic sobre les reserves i els fluxos de nutrients i efectes retroactius sobre els ecosistemes i cultius	ELEMENTAL CLIMATE	Josep Peñuelas	112.000,00 €	Fundación Ramón Areces	2021-2023
Impactes dels canvis globals antropogènics a les reserves i fluxes de bioelements sobre els ecosistemes i els humans - ElementalShift	ELEMENTAL-SHIFT	Josep Peñuelas	332.750,00 €	Ministerio de Ciencia e Innovación	2020-2022
Document marc per un programa de seguiment dels Espais Naturals Protegits	ENP's	Lluís Brotons / Anna Ramon	30.000,00 €	Generalitat de Catalunya	2021
Long-term consequences of environmental changes on biodiversity: incorporation of life history traits and temporal dimension when assessing and predicting the loss of functional and phylogenetic complexity	ENVIRON-CHANGE	Daniel Sol (Marie Skłodowska-Curie Individual Fellowships granted to Lisieux Fuzessy)	160.932,48 €	EU	2021-2023
Training in Earth observation science and technology at the Space Research Center of the Polish Academy of Science	EOTIST	Lluís Pesquer	896.875,00 €	EU	2020-2023
The European network for observing our changing planet	ERA-PLANET	Joan Masó	50.730.791,00 €	EU	2016-2021
European Alliance on interdisciplinary learning and business innovation for urban forests	ERASMUS UFOREST	Corina Basnou	969.314,00 €	EU	2021-2023
EuroGEOSS showcases: applications powered by Europe	E-SHAPE	Joan Masó	15.876.336,75 €	EU	2019-2023
"Europa Biodiversity Observation Network: integrating data streams to support policy"	EUROPABON	Lluís Brotons	2.994.318,75 €	EU	2020-2023
Spread to natural environment of the most planted alien plants in the green areas in Barcelona	EXO BCN 2	Joan Pino	103.683,69 €	Ajuntament de Barcelona	2017-2021
EXOCAT	EXOCAT	Joan Pino	50.000,00 €	Generalitat de Catalunya	2021
Anàlisi de canvis de cobertes del sòl	FACTORS DE CANVI	Xavier Pons	50.000,00 €	Generalitat de Catalunya	2021

PROJECT NAME	ACRONYM	PRINCIPAL INVESTIGATOR	BUDGET	ENTITY	PERIOD
Farmers' adaptation and Sustainability in Tunisia through excellence in research	FASTER	Javier Retana	998.250,00 €	EU	2018-2021
FenoTwin - El gemelo digital de fenología	FENOTWIN	Joan Masó	30.000,00 €	Fundación Española para la Ciencia y la Tecnología (FECYT)	2021-2022
Improving access to forest genetic resources Information and services for end-users	FORGENIUS	Maurizio Mencuccini	7.000.000,00 €	EU	2021-2025
"Farmer clusters for realising agrobiodiversity Management across Ecosystems"	FRAMEWORK	Joan Masó	7.997.600,76 €	EU	2020-2025
Efectes comportamentals i poblacionals d'aplicacions autoritzades de fungicides sobre pol·linitzadors de fruiters: estudis de laboratori, semi-camp i camp	FUNKY	Jordi Bosch/ Anselm Rodrigo	199.650,00 €	Ministerio de Ciencia e Innovación	2019-2021
A look at the Arctic future: equipping a unique natural experiment for next-generation ecosystem research	FUTURE ARTIC	Josep Peñuelas	3.965.109,84 €	EU	2019-2023
Aprendiendo del pasado para dar las respuestas de gestión al cambio global: tendencias recientes observadas y evaluación del riesgo de perder SE y biodiversidad forestales	GREEN-RISK	Javier Retana	112.409,00 €	Ministerio de Ciencia e Innovación	2021-2024
Avaluació de la contaminació als horts urbans de Barcelona	HORTS4U	Corina Basnou	14.533,00 €	Barcelona Regional	2019-2021
ESA Climate Change Initiative. Essential Climate Variables: Land cover with high spatial resolution	HRLandCoverCCI	Lluís Pesquer	199.953,00 €	University of Trento	2018-2021
Innovating climate services through integrating scientific and local knowledge	I-CISK	Lluís Pesquer	4.998.806,88 €	EU	2021-2025
Integrated digital framework for comprehensive maritime data and Information services	ILIAD	Joan Masó	48.250,00 €	EU	2022-2025
Incorporation of GEOSS data management and sharing principles in support of the European environment	InSituGEO	Joan Masó	45.220,00 €	EU	2021
Promoting the governance of regional ecosystem services	INTERREG PROGRESS	Enrique Doblás	1.640.000,00 €	EU	2019-2023
Agricultural potential in carbon sequestration, humus content of land used for agriculture and CO ² storage	IP/B/AGRI/IC/2021-052	Pilar Andrés	71.877,00 €	EU	2021-2022
Creació i desplegament del Laboratori Metropolità d'Ecologia i Territori de Barcelona (LET-BCN)	LET-BCN	Joan Pino	72.000,00 €	IERMB	2018-2021

PROJECT NAME	ACRONYM	PRINCIPAL INVESTIGATOR	BUDGET	ENTITY	PERIOD
Implementation of a Mediterranean biorefinery to promote forest management through the generation of value-added products	LIFE BIOREFORMED	Jordi Vayreda	53.853,00 €	EU	2020-2024
Innovative forest management strategies to improve the biodiversity of Mediterranean forests. Incentives and management tools	LIFE BIORGEST	Jordi Vayreda	1.576.374,00 €	EU	2018-2023
Mid-mountain adaptation to climate change	LIFE MIDMACC	Javier Retana	2.595.725,00 €	EU	2019-2024
Reforestation & climate change mitigation: tests, evaluation and transfer of innovative methods based on fog collection	LIFE NIEBLAS	Vicenç Carabassa	127.610,00 €	EU	2020-2024
Demonstration of a new agro-silvo-pastoral land use to improve farm profitability in mountain areas	LIFE POLYFARMING	Marc Gràcia	1.135.787,00 €	EU	2016-2021
Nature-based solutions to improve forest adaptation to climate change	LIFE REDBOSQUES_CLIMA	Jordi Vayreda	1.569.661,00 €	EU	2021-2025
Low-carbon society: an enhanced modelling tool for the transition to sustainability	LOCOMOTION	Santi Sabaté / Jordi Solé	6.315.865,00 €	EU	2019-2023
De islas a trampas: dinámicas metapoblacionales en la ciudad y su mediación a través de los atributos de las especies y de las condiciones del ambiente	MEDYCI	Yolanda Melero	106.480,00 €	Ministerio de Ciencia e Innovación	2021-2024
Variación microclimática y resiliencia de los sumideros de carbono forestales al calentamiento global.	MICROCLIM	Jofre Carnicer	95.832,00 €	Ministerio de Ciencia e Innovación	2021-2024
Mira-mon	MIRAMON	Xavier Pons	50.000,00 €	Generalitat de Catalunya	2021
Monitoratge i modelització integrats en un sistema d'alerta de la vulnerabilitat climàtica en boscos de muntanya	MODOSIN	Entic Batllori	48.773,80 €	Ministerio para la transición ecológica (Organismo Autónomo Parques Nacionales)	2019-2022
Model sistematitzat d'anàlisi i gestió d'ús públic. Gestió de la sobre-freqüentació en espais de bany de conques internes de les Comarques Gironines	ModSAGUP	Lluís Pesquer	2.696,36 €	Diputació de Girona - Fundació Privada Emys	2021-2022
"Montclima: climate and natural hazards in the SUDOE mountains"	MONTCLIMA	Javier Retana	1.051.358,47 €	EU	2019-2021
Strengthening Barcelona's defenses against disease-vector mosquitoes	MOSQUITO ALERT BCN	Frederic Bartumeus	149.978,00 €	Institut de Cultura de Barcelona	2019-2021

PROJECT NAME	ACRONYM	PRINCIPAL INVESTIGATOR	BUDGET	ENTITY	PERIOD
Monitoring vegetation status and functioning at high spatio-temporal resolution from Sentinel-2	MOVES	Aleixandre Verger (Marie Curie Fellowship granted to Gaofei Yin)	172.932,48 €	EU	2019-2021
Estat de naturalització i estratègia per la biodiversitat del municipi de Viladecans	NAT_VILADECANS	Joan Pino	34.630,60 €	Ajuntament de Viladecans	2021-2022
Els nous boscos ibèrics: paper ecològic i vulnerabilitat potencial al canvi climàtic	NEWFORLAND	Joan Pino / Josep M.Espelta	160.930,00 €	Ministerio de Ciencia e Innovación	2019-2022
Remote sensing oriented nature based solutions towards a New Life for drylands	NEWLIFE4DRYLANDS	Joan Masó / Vicenç Carabassa	490.073,00 €	EU	2021-2023
Observatori de la natura	OBSERVATORI	Lluís Brotons / Anna Ramon	50.000,00 €	Generalitat de Catalunya	2021
Canvi global i boscos - OCCC (Projecte Forestfuture)	OCCC	Jordi Vayreda	80.000,00 €	Generalitat de Catalunya	2021
Paleolimnologia: tècniques i aplicacions	PALEO	Jordi Catalán	79.467,50 €	CEDEX / Instituto Pirenaico de Ecología / Diversos	2017-2021
Estudi de prospecció de com afecta la pastura intensiva de la ramaderia bovina a la qualitat del sòl en relació a la silvopastura i al nivell de carboni a l'illa de Menorca".	PASTOSOIL	Pilar Andrés	14.820,00 €	Associació Leader Illa de Menorca	2021
Research and innovation in the control and restoration process of mining activities	PEDRERES	Josep Maria Alcañiz	40.000,00 €	Generalitat de Catalunya	2021
CSEOL Citizen Science Earth Observation Lab	PHENOTANDEM	Joan Masó	68.100,00 €	STICHTING IHE DELFT (UNESCO-IHE)	2019-2021
According to nature - solutions to reduce risk in mountain landscapes	PHUSICOS	Pilar Andrés	9.472.200,00 €	EU	2018-2022
Unmasking biological invasions: consequences of the proliferation of invasive snakes by an endemic lizard in the Mediterranean	PODARCIS	Oriol Lapiedra	24.800,00 €	National Geographic Foundation	2020-2021
Pol·linització	POL.LINITZACIÓ	Jordi Bosch/ Anselm Rodrigo	15.000,00 €	Generalitat de Catalunya	2021
Primary. Vulneracions de drets i desforestació del bosc tropical primari (Catalunya)	PRIMARY	Anna Ramon	20.000,00 €	Ajuntament de Barcelona i Agència Catalana de Cooperació al Desenvolupament	2020-2021
Prismàtic, plataforma de coneixement per la gestió del patrimoni natural i de la biodiversitat	PRISMÀTIC	Anna Ramon	30.000,00 €	Generalitat de Catalunya	2021

PROJECT NAME	ACRONYM	PRINCIPAL INVESTIGATOR	BUDGET	ENTITY	PERIOD
Green infrastructure mapping support system for Dún Laoghaire Rathdown County (Ireland) based on SITxell	PROGRESS-EIRE	Joan Pino	15.800,00 €	Eastern & Midland Regional Assembly (Ireland)	2021-2022
PYMEDEAS (base de dades modelització)	PYMEDEAS	Jordi Solé	50.000,00 €	Generalitat de Catalunya	2021
Patrons regionals de variabilitat genotípica i fenotípica associats a l'adaptació a <i>Taxus baccata</i> L	READAPT	Maria Mayol	137.940,00 €	Ministerio de Ciencia e Innovación	2021-2024
Resiliència de comunitats llenyoses enfront de perturbacions associades al canvi climàtic i nínxol climàtic de les espècies	RESIBIO	Francisco Lloret	116.523,00 €	Ministerio de Ciencia e Innovación	2021-2024
Improving the resilience of forests and the forest value chain through ecological and socio-economic proposals	RESONATE	Josep Maria Espelta	4.994.062,50 €	EU	2021-2025
Investigació, innovació i promoció de l'ús d'esmenes i residus orgànics en la restauració de sòls	RESTARTC	Vicenç Carabassa	25.000,00 €	Generalitat de Catalunya	2021
Awareness raising on scientific diplomacy in the Mediterranean - Tender - contracting authority: Union for the Mediterranean	SCDIPMED	Alicia Pérez Porro	18.000,00 €	Union for the Mediterranean	2021
Protocol de modificació de segues	SEGUES	Anselm Rodrigo / Jordi Bosch	20.000,00 €	Generalitat de Catalunya	2021
Serveis ecosistèmics	SERVEIS ECOSISTÈMICS	Joan Pino	75.000,00 €	Generalitat de Catalunya	2021
Acreditación Severo Ochoa	SEVERO OCHOA	Javier Retana	4.000.000,00 €	Ministerio de Ciencia e Innovación	2019-2023
SISEBIO	SISEBIO	Javier Retana	110.000,00 €	Generalitat de Catalunya	2021
Monitoring program for pollinator recovery	SPRING	Jordi Bosch	405.000,00 €	Helmholtz (Comissió Europea)	2021-2023
Sown forage mixtures for sustainable agroecosystems in the Mediterranean area	SUSFORAGE	Angela Ribas	88.910,00 €	Ministerio de Ciencia e Innovación	2021-2024
The fate of terrestrial forest carbon from photosynthesis to structural biomass under climate change	TERRACARB	Josep Peñuelas (Marie Curie Fellowship granted to Mukund Palat Rao)	172.932,48 €	EU	2022-2024
Water scenarios for Copernicus exploitation	WATERFORCE	Lluís Pesquer	2.999.575,00 €	EU	2021-2023
Management of <i>Osmia cornuta</i> populations for fruit tree pollination	WILD	Jordi Bosch	223.510,15 €	WILDBIENE	2017-2021
Copernicus assisted lake water quality emergency monitoring service	WQEMS	Joan Masó	1.499.506,25 €	EU	2021-2023
Xarxa boscos dinàmica natural	XARXA BOSCOS	Jordi Vayreda	35.000,00 €	Generalitat de Catalunya	2021



Campus UAB. Edifici C
 08193 Bellaterra
 (Barcelona)
 Tel. + 34 93 581 13 12
 Fax + 34 93 581 41 51
www.cream.cat

BOARD OF TRUSTEES



DISTINCTIONS



WE ARE



MEMBERS OF



WITH SUPPORT FROM

