



Libro de resúmenes



XIX Congreso Nacional y XVI Iberoamericano
de Etología y Ecología Evolutiva

Sevilla, 2-5 de Septiembre de 2025



Foto portada: Luis Rodríguez Rodríguez, Antas (Almería)
Autillo (*Otus scops*) con escolopendra (*Scolopendra cinculata*)

XIX Congreso Nacional y XVI Iberoamericano de Etología y Ecología Evolutiva

Sevilla 2-5 de septiembre de 2025

Organiza:



Patrocinadores



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Bienvenida

¡Bienvenidos de nuevo!

Después del último y exitoso congreso celebrado en Badajoz, con estas líneas tenemos el placer de invitaros al XIX Congreso Nacional y XVI Iberoamericano de Etología y Ecología, organizado por la Estación Biológica de Doñana (CSIC), la Universidad de Sevilla y la Sociedad Española de Etología y Ecología Evolutiva (<http://www.etoecoevo.org/>).

Desde el 2 hasta el 5 de septiembre de 2025, personal científico nacional e internacional se reunirán en Sevilla para presentar los resultados más novedosos de sus investigaciones en el campo del Comportamiento Animal y la Ecología Evolutiva. La sede del congreso es el Aula Magna del Edificio Rojo de la Facultad de Biología de Sevilla situada en el Campus de Reina Mercedes.

Sevilla, situada en el corazón de Andalucía, es una ciudad vibrante que combina un rico patrimonio histórico con una impresionante belleza natural. Con su emblemática catedral, el majestuoso Alcázar y el encantador barrio de Santa Cruz, Sevilla es un verdadero tesoro cultural. Además, su entorno natural, que incluye el Parque Natural de Doñana y las marismas del Guadalquivir, ofrece un hábitat diverso y fascinante para el estudio del comportamiento animal. Este congreso no solo será una oportunidad para compartir nuestros conocimientos, sino también para disfrutar de la singularidad de una ciudad que celebra la historia y la naturaleza en perfecta armonía.

El programa del congreso incluye conferencias plenarias de nueve prestigiosos ponentes de primer nivel internacional, un total de 67 comunicaciones orales y la exhibición de más de 90 pósteres científicos, incluyendo una sesión de póster pitch. Se desarrollarán actividades para generar la mayor interacción entre los asistentes, generando además un espacio para la interacción entre la ciencia y la sociedad.

La cuota de inscripción del congreso cubrirá todas las actividades del congreso, incluyendo la asistencia al congreso, administración e información relevante. Además, con el fin de facilitar la interacción y comodidad de los asistentes, la cuota de inscripción incluirá las comidas, pausas con café y una cena social de gala.

¡Esperemos que disfrutéis de todas las actividades del congreso y tengáis una feliz estancia en Sevilla!

Josué Martínez de la Puente y Juan Francisco Beltrán

Presidentes del Comité Organizador y Científico del XIX Congreso Nacional y XVI Iberoamericano de Etología y Ecología Evolutiva

Información adicional

Sede del congreso. Campus de Reina Mercedes: Edificio Rojo de la Facultad de Biología de la Universidad de Sevilla, Avda. de la Reina Mercedes, 6, 41012 - Sevilla.

Comidas y cafés. Cafetería Comedor de la Escuela de Idiomas (Campus Reina Mercedes, Edificio Celestino Mutis, a menos de 100 m de la sede del congreso).

Cena de gala. Restaurante Muelle 21 (Avda. Santiago Montoto, s/n. 41012 Sevilla).

Conciliación familiar. Se dispone de un servicio de campamentos urbanos durante el Congreso. Los asistentes al congreso podrán beneficiarse de los servicios de campamentos urbanos organizados por la Universidad durante la semana del 2 al 5 de septiembre, en el campus de Reina Mercedes, muy cerca del lugar de celebración del congreso.

Información adicional:

En la web del congreso: <https://xixcongresoetoecoevo.wordpress.com/>

En los carteles durante la celebración del congreso.

Comité organizador del congreso

Juan Fco. Beltrán (Universidad de Sevilla)
Josué Martínez de la Puente (Estación Biológica de Doñana)
Javier Balbontín (Universidad de Sevilla)
Sonia Cebrián-Camisón (Estación Biológica de Doñana)
Xim Cerdá (Estación Biológica de Doñana)
Martina Ferraguti (Estación Biológica de Doñana)
Jordi Figuerola (Estación Biológica de Doñana)
Marta Garrigós (Estación Biológica de Doñana)
Sergio Magallanes (Estación Biológica de Doñana)
Ana Irina Martín López (Estación Biológica de Doñana)
María América Davis López de Carrizosa (Universidad de Sevilla)
Francisco Oficialdegui (Estación Biológica de Doñana)
Juan Manuel Peralta Sánchez (Universidad de Sevilla)
Carlos Rouco (Universidad de Sevilla)
María José Ruiz López (Estación Biológica de Doñana)
Joan Carles Senar (Museo de Ciencias Naturales de Barcelona)
Jesús Veiga (Estación Biológica de Doñana)

Comité científico del congreso

Josué Martínez de la Puente (Estación Biológica de Doñana)

Juan F. Beltrán (Universidad de Sevilla)

Elena Angulo (Estación Biológica de Doñana)

Elena Arriero (Universidad de Complutense de Madrid)

Javier Cuervo (Museo Nacional de Ciencias Naturales)

Martina Ferraguti (Estación Biológica de Doñana)

Jordi Figuerola (Estación Biológica de Doñana)

Laura Gangoso (Estación Biológica de Doñana)

Mario Garrido (Universidad Rey Juan Carlos)

Pilar López (Museo Nacional de Ciencias Naturales)

David Martín Gálvez (Universidad de Málaga)

Rafael Márquez (Museo Nacional de Ciencias Naturales)

Santiago Merino (Museo Nacional de Ciencias Naturales)

Judith Morales (Museo Nacional de Ciencias Naturales)

José Carlos Noguera (Universidad de Vigo)

Deseada Parejo (Estación Experimental de Zonas Áridas)

Lorenzo Pérez (Instituto de Investigación en Recursos Cinegéticos)

Héctor Fabio Rivera-Gutiérrez (Universidad de Antioquia)

Gustavo Tomás (Estación Experimental de Zonas Áridas)

Roxana Torres (Universidad Nacional Autónoma de México)

Alumnos colaboradores de la Universidad de Sevilla y de la Universidad Pablo de Olavide

Mario Galileo Antón Enríquez

Jesús Manuel Aragón Rey

Paula Aranda Pérez

Abel Espina Rosado

Ana Fernández Rodríguez

Marta García Morcelo

Inés Guerrero Cordon

Andrea López Maldonado

Sergio Martín Peña

Alba Mata González

Alejandro Molinero Osorno

Pablo Moro Gutierrez

Iván Mota Flores

José Antonio Navarro Moreno

Adam Ali Rahali

Mar Redón López

Ana Rodríguez Brualla

Juan Sanz Isorna

Programa

MARTES 2 de septiembre

8:30-10:30 Recibimiento y recogida de acreditaciones (Hall del Edificio Rojo, Facultad de Biología).

9:30-10:30 Inauguración (Aula Magna del Edificio Rojo, Facultad de Biología).

10:30-11:30 Conferencia Plenaria: *Cooperative breeding in meerkats and other mammals* (Tim Clutton-Brock). Presenta: Juan Francisco Beltrán.

11:30-11:45 Pausa.

11:45-14:00 Sesión 1 - Conferencias orales. Modera: Jesús Veiga.

- 11:45-12:00 ¿Manipula *Plasmodium* a su mosquito huésped? La transcriptómica es clave (Luz García-Longoria).
- 12:00-12:15 Parasitism determines seasonal migration strategies in a partially migratory seabird: An experimental study (Francisco Ruiz-Raya).
- 12:15-12:30 Avian malaria infection and cloacal microbiota composition varies in wild House Sparrows from habitats with different urbanization levels (Jéssica Jiménez Peñuela).
- 12:30-12:45 Do parasites select for a reduced brood size? (Jorge Garrido Bautista).
- 12:45-13:00 Parasitismo temprano y su huella fisiológica: Un enfoque experimental considerando las relaciones genéticas (Antonio José García Núñez).
- 13:00-13:15 Agroindustry shapes avian blood parasite communities on São Tomé Island (Rafael Gutiérrez López).
- 13:15-13:30 Efecto de la malaria aviar sobre la microbiota del plumaje en el Gorrión Común (*Passer domesticus*) (Irene Hernández Caballero).
- 13:30-13:45 Disentangling infection dynamics: The combined role of host traits and host-parasite specificity (Mario Garrido).
- 13:45-14:00 Linking migration, parasitism, and immunity: Insights from Iberian populations of Eurasian Hoopoes (*Upupa epops*) (Elena Arriero).

14:00-15:45 Comida

15:45-16:45 Conferencia Invitada: *Las tradiciones arquitectónicas de gorriones tejedores que cooperan al construir* (María C. Tello Ramos). Presenta: Martina Ferraguti.

16:45-17:45 Sesión 2 - Conferencias orales. Modera: José J. Cuervo.

- 16:45-17:00 Testing the phenological thermal tracking hypothesis across space and species (David López Idiaquez).
- 17:00-17:15 Escaping the oven: behavioural strategies of heat avoidance and exploration in birds (Stefania D'arpa).
- 17:15-17:30 Rolling under pressure: Life-history adaptations of dung beetles to temperature extremes and land use (Sonja Huber).
- 17:30-17:45 Does temperature affect reproductive strategies and parental effects in three-spined sticklebacks? (Wendy Fernández Pujó).

17:45-18:30 Pausa Café.

18:30-20:15 Sesión 3 - Conferencias orales. Modera: Judith Morales.

- 18:30-18:45 A polymorphic raptor reproducing against all odds: phenotypic, sex and environmental effects on senescence (Elisa Pérez Badás).
- 18:45-19:00 Feather volatile compounds as sexual signal and health proxy in Scarlet Macaws (Elisa Espartosa García).
- 19:00-19:15 El valor de ingerir arañas: un estudio de cruce de polladas en carboneros mediterráneos (Javier Quesada).
- 19:15-19:30 Changes in incubation patterns of the Pied Flycatcher in response to an experimental immune activation (Isabel Barreda Muñoz).
- 19:30-19:45 Characteristics of host neighbourhoods affect parasitism decisions by Common Cuckoos (Teresa Abaurrea).
- 19:45-20:00 Reproductive consequences of mate retention and divorce in short-lived migratory passerine (Daniel Ramírez Rodríguez Solís).
- 20:00-20:15 Relación entre la actividad reproductiva del Cuco Común (*Cuculus canorus*) y la fenología de puesta de sus potenciales especies hospedadoras en Sierra Nevada (Mari Carmen López Luengo).

MIÉRCOLES 3 de septiembre

8:45-9:45 Conferencia Invitada: Short and long-term consequences of the early developmental period (Raquel Monclús). Presenta: Carlos Rouco.

9:45-11:00 Sesión 4 - Conferencias orales. Modera: Deseada Parejo.

- 9:45-10:00 Kinship and social structure in the Iberian Magpie (*Cyanopica cooki*): 25 years of social network analysis in a cooperatively breeding species (Deseada Parejo).
- 10:00-10:15 Phenological plasticity and reproductive responses under changing climate: A long-term study in Pied Flycatchers (Enrique González Bernardo).
- 10:15-10:30 Invisible neighbours: Differences between perceived and actual social density on maternal investment decisions (Alejandro García Antón).
- 10:30-10:45 Factores que determinan la latencia de la respuesta del hospedador frente a los huevos parasitarios: un enfoque metaanalítico (José Ignacio Huertas Gómez).
- 10:45-11:00 Sociabilidad y personalidad en el Pingüino Barbijo (Gabriel López-Poveda).

11:00-11:45 Pausa Café.

11:45-13:15 Sesión 5 - Conferencias orales. Modera: Sergio Magallanes.

- 11:45-12:00 Entre especies y estrategias: el papel del polimorfismo en la evolución del aislamiento reproductivo en Caballitos del Diablo (Rosa Sánchez Guillen).
- 12:00-12:15 Coexistence and divergence of chromosomal lineages in Common Quails (Celia Vinagre).
- 12:15-12:30 Social organisation and the evolution of dental dimorphism in Papionines (José Miguel Martínez Gázquez).
- 12:30-12:45 Evolución contemporánea de la Cotorra Argentina: la selección natural impulsa cambios morfológicos en las zonas invadidas (Juan Carlos Senar).
- 12:45-13:00 Entendiendo la evolución de las características acústicas del canto en aves (Héctor Fabio Rivera Gutiérrez).
- 13:00-13:15 Factores ecológicos asociados al tamaño corporal y al dimorfismo sexual en tamaño en la lagartija colirroja (José Javier Cuervo).

13:15-14:00 Homenaje al Prof. Dr. Luis Arias De Reyna.

14:00-15:45 Comida.

**15:45-16:45 Conferencia Invitada. *From behavioral ecology to immunoecology: exploring the effects of mild infections and immune responses* (Dennis Hasselquist).
Presenta: Juan M. Peralta.**

16:45-18:30 Sesión 6 - Conferencias orales. Modera: Santiago Merino.

- 16:45-17:00 Beyond the breeding season: Winter associations shape pair bonds in a gregarious passerine (Roger Fusté I Mach).
- 17:00-17:15 Reintroduction provides insight into multimodal mimicry evolution in an ant social parasite (Daniel Sánchez García).
- 17:15-17:30 Does offspring behavior shape optimal litter size in large mammals? Insights from brownbears (Lara Naves).
- 17:30-17:45 Habitat selection in Blue Tits: The role of stress phenotype and social density (Pablo Melero Romero).
- 17:45-18:00 Dynamic begging displays as partly informative signals of nestling hunger (Daniel Parejo).
- 18:00-18:15 Morfología y jerarquía: explorando la dominancia social en una especie de roedor silvestre (Laura Ribagorda García).
- 18:15-18:30 Los mirlos usan el olfato para encontrar su alimento (Luisa Amo).

18:30-20:00 Sesión de pósters con aperitivo (Hall del Edificio Rojo, Facultad de Biología)

JUEVES 4 de septiembre

8:45-9:45 **Conferencia Invitada: *Personality-dependent selection in exploited fish populations* (Josep Alós). Presenta: Francisco J. Oficialdegui.**

9:45-11:15 **Sesión 7 - Conferencias orales. Modera: Jordi Figuerola.**

- 9:45-10:00 Modulation of sex traits in response to social environment (Juan Carranza).
- 10:00-10:15 Carotenoid-based ornament expression level positively correlates with survival in male but not female birds: A phylogenetic meta-analysis (Carlos Alonso-Álvarez).
- 10:15-10:30 Los volátiles del barro como pistas olfativas para la selección del material usado en la construcción de nidos en la Golondrina Común (Andrea De Wind Borrego).
- 10:30-10:45 Individual variation in the plumage structure of the Great Tit (*Parus major*): heritability and environmental effects (Irene Hernández Téllez).
- 10:45-11:00 Universal rule constraints vocal signals in vertebrates and indicates fitness in a songbird (Javier Sierro Martínez).
- 11:00-11:15 Desentrañando la fiabilidad del color del pico como señal sexual en el Diamante Mandarin (Alejandro Cantarero).

11:15-12:00 Pausa Café.

12:00-14:00 **Sesión 8 - Conferencias orales. Modera: Maya América Davis López.**

- 12:00-12:15 Invisibles pero vulnerables: efectos subletales de la contaminación del sustrato por herbicidas a base de glifosato sobre la fisiología y el comportamiento de un reptil de vida subterránea (Leonardo Crocenzi).
- 12:15-12:30 Long-term impact of direct developmental noise exposure on spatial learning in the Zebra Finch (Mylene M Mariette).
- 12:30-12:45 Extreme environments modulate life-history trade-offs: reversal of the longevity–reproduction relationship in beetles exposed to ionizing radiation (Pablo Burraco).
- 12:45-13:00 Still begging for answers: Nestling signals revisited (Tomás Redondo).
- 13:00-13:15 Use of water points and drinking behaviour of individual wild birds: wintering Ring Ouzels in an arid ecosystem of the Canary Islands (Tamara Burgos).

- 13:15-13:30 Cuando el calor silencia: efectos del estrés térmico sobre la fisiología y la comunicación química de un reptil subterráneo (María del Pilar López).
- 13:30-13:45 Feathers under pressure: linking contour feather structure and land use intensification in Dippers (Gema Porras Claudios).
- 13:45-14:00 Plastic biovectoring by gulls: Linking movement data with plastic loads (Manuel Serrano Jiménez).

14:00-15:45 Comida.

15:45-16:45 **Conferencia Invitada. *Comportamiento en ranas venenosas* (Bibiana Rojas). Presenta: Josué Martínez de la Puente.**

16:45-18:00 Homenaje a socios.

18:00-18:15 Pausa.

18:15-20:00 Asamblea de la Sociedad /Taller de construcción de cajas nido.

Alternativamente a la asamblea de la Sociedad, se desarrollará un **Taller de construcción e instalación de cajas nido** a cargo del Grupo de cajas nido de Sevilla, Torreblanca Natura. Incluye todas las herramientas, el material de montaje (tablas cortadas y perforadas, gancho y tornillería), así como el quemado y barnizado con aceite y la colocación de las cajas.

21:15 Cena de Gala.

VIERNES 5 de septiembre

8:45-9:45 Conferencia Invitada. Relatos de la selva de asfalto: *Construyendo modelos de integridad ecosistémica urbana* (Ian MacGregor-Fors) Presenta: Jéssica Jimenez-Peñuela.

9:45-11:15 Sesión 9 - Conferencias orales. Modera: Laura Gangoso.

- 9:45-10:00 An experimental study of the role of yolk vitamin E in early-life growth, physiology and telomere dynamics of a wild passerine (Silvia Casquero Sánchez).
- 10:00-10:15 Energy, genomic stability and migration: Mitochondrial copy number and telomere length in the Eurasian blackcap (Pablo Salmón Saro).
- 10:15-10:30 Trade-off between immune response and tissue regeneration (Mar Comas).
- 10:30-10:45 Ejaculate-mediated trade-off between offspring quality and quantity: Enhanced fertilization success comes at the cost of aged offspring (Ana Ángela Romero Haro).
- 10:45-11:00 Prenatal androgen exposure shapes malaria susceptibility, aging, and survival in a wild passerine (Jaime Muriel).
- 11:00-11:15 Sex reversal in the wild: Population-specific differences in a viviparous reptile (Carles Ferre Ortega).

11:15-12:00 Pausa Café.

12:00-13:00 Sesión Póster Pitch (presentaciones de 2-3 minutos). Modera: Marta Garrigós.

- Sex-specific ageing trajectories of reproductive traits in the Pied Flycatcher (*Ficedula hypoleuca*) (Julene Gómez Vicioso).
- Epigenetic potential, dispersal propensity and fitness in Pied Flycatchers (Blanca Jimeno).
- Diversidad y prevalencia de haemosporidios aviares en el suroeste ibérico: el papel diferencial de aves nativas, migratorias y exóticas (Carlos Mora Rubio).
- Global mosquito blood-feeding patterns: Implications of phylogeny (Paula Parra Jiménez).
- Manual lateralization in primates: Evolutionary patterns across taxonomic and ecological diversity in 40 species (Miquel Llorente Espino).
- Estudio de redes sociales en Monos Araña de Geoffroy (*Ateles geoffroyi*) reintroducidos en Guanacaste, Costa Rica (Patricia Hernández García).

- Event cameras, a novel tool for studying behaviour. Pilot study monitoring Ecstatic Display on wild penguins (Ignacio Juarez Martínez).
- Daily activity levels and activity patterns of mammals in Venezuelan Llanos (Illad Gabriel Vivas López).
- Estudio del comportamiento social y uso del espacio en un roedor cíclico (Eva TrapoteVillalaín).
- Efecto de la contaminación por metales pesados en las características microbiológicas de los nidos construidos con barro (Celia González Muñoz).
- Factores ecológicos y evolutivos que determinan los patrones de infección en aves endémicas de Suramérica (Juliana Tamayo Quintero).
- Efectos de la migración en la diversificación del Orden Accipitriformes: La fuerza evolutiva de los viajes con retorno (Amparo M. Rodríguez Riz).
- Las señales químicas sexuales permiten a las hembras de un reptil fosorial evitar sitios marcados por machos expuestos a metales pesados (Alejandro de la Concha Maroto).

13:00-14:00 Conferencia Invitada. *Interindividual differences in cognitive skills of wild Eurasian magpies: behavioral, neural, and evolutionary perspectives* (Mercedes Molina-Morales). Presenta: Mario Garrido.

14:00-15:45 Comida.

15:45-18:00 Sesión 10 - Conferencias orales. Modera: Javier Balbontín.

- 15:45-16:00 Life-history traits predict West Nile virus antibodies in wild birds (Ana Irina Martín López).
- 16:00-16:15 Birds, ants, and cavities: Unraveling the patterns of coexistence across altitude and habitat transformation (Ángela Salido Delgado).
- 16:15-16:30 The uropygial gland of the European Hoopoe as a symbiotic organ (Manuel Martín-Vivaldi Martínez).
- 16:30-16:45 Surviving the unpredictable: how a new trophic strategy boosts reproductive success under resource scarcity (Laura Gangoso De La Colina).
- 16:45-17:00 Assessment of predation risk through conspecific cues by anuran larvae (Nuria Polo Cavia).
- 17:00-17:15 Refining the ecological role of Neotropical frugivorous primates along the mutualism-antagonism continuum (Iván Ortiz Solano).
- 17:15-17:30 Impact of nest microclimate alterations on the nest microbiome and its interactions with parasites and bird condition (Marina García Del Río).

- 17:30-17:45 Microorganismos transmitidos por el alimento: relación entre la comunidad bacteriana del Cernícalo Vulgar y dos de sus especies presa (Juan Antonio Fargallo Vallejo).
- 17:45-18:00 Exploring patterns of phyllosymbiosis in Upupiformes and Bucerotiformes (María Dolores Barón Rodríguez).

18:00-18:15 Pausa.

18:15-19:15 Conferencia Plenaria: *The badgers of Wytham Woods: Two paradoxes, a state-shift, and a perplexing puzzle* (David W. Macdonald). Presenta: Juan Francisco Beltrán.

19:15-20:00 Clausura del congreso y entrega de premios.

Comunicaciones invitadas

Cooperative breeding in meerkats and other mammals

Tim Clutton-Brock

University of Cambridge, UK

As Charles Darwin recognised, societies where most individuals spend much of their lives helping others to breed rather than breeding themselves pose an important challenge to the theory of natural selection. Though breeding systems of this kind are most common in insects, they also occur in some birds and mammals, raising important questions about why most females fail to breed, about the costs and benefits of helping and the extent to which they affect the behaviour of different individuals. This talk summarises results of our attempts to answer these questions in Kalahari meerkats, one of the most specialised cooperative breeders among mammals, and ends by asking whether research on meerkats and other specialised cooperative breeders provides any insights into the evolution of alloparental care in mammals.

Las tradiciones arquitectónicas de gorriones tejedores que cooperan al construir

María C. Tello Ramos

University of Hull, UK

Diferentes culturas humanas tienen estilos arquitectónicos distintos. Sin embargo, los humanos no somos los únicos en mezclar la construcción con la cultura. Al medir cientos de estructuras in situ, (nidos para la reproducción y múltiples refugios individuales para dormir), demostramos que grupos de gorriones tejedores de ceja blanca (*Plocepasser mahali*) construyen estructuras que difieren arquitectónicamente de las estructuras construidas por grupos vecinos. Las diferencias morfológicas entre grupos son constantes a lo largo de los años y son evidentes incluso entre grupos con territorios separados por tan sólo unos cuantos metros. Estas diferencias no se explican por la variación en las condiciones climáticas locales, el tamaño de las aves, la altura de los árboles, ni los patrones de parentesco genético. Los estilos arquitectónicos también son robustos a la inmigración de aves de otros grupos. Al excluir todos estos factores, proponemos que la cultura, a través del aprendizaje social, son responsables de los diferentes estilos arquitectónicos de los gorriones tejedores.

Interindividual differences in cognitive skills of wild Eurasian magpies: behavioral, neural, and evolutionary perspectives

Mercedes Molina-Morales

Universidad de Granada, España

Cognition encompasses the mechanisms by which animals acquire, process, store, and act on environmental information. These mechanisms enable animals to adjust their behavior to ecological and social contexts, remember resource locations, and associate environmental cues with food, mates, or predators. Avian species vary in their reliance on cognition for solving ecological challenges, and cognitive performance can differ significantly among individuals within a species. Recent neurobiological studies have identified brain regions involved in specific cognitive skills, revealing intraspecific differences in brain volume. However, few studies have examined cognition in wild populations, particularly its relationship with reproductive success. Corvids rank among the most cognitively advanced birds. The Eurasian magpie (*Pica pica*), for example, exhibits complex behaviors such as discrimination and rejection of parasitic eggs, a defensive strategy against brood parasitism. As a scatter-hoarder, it stores and retrieves food, making it an ideal model for studying memory and problem-solving in functional behaviors. In this talk, I will present results from our project conducting problem-solving experiments in the wild using marked individuals with known age, sex, and reproductive success. We quantify their egg rejection ability, cognitive task performance, and brain morphology—assessing overall and regional brain volume via *in vivo* MRI. Additionally, we investigate age-related changes in cognitive performance, as observed in egg rejection behavior, and evaluate the fitness consequences of cognitive variation.

Personality-dependent selection in exploited fish populations

Josep Alós

IMEDEA-CSIC, España

Fish must move to find food, reproduce, and avoid predators in dynamic environments. Advances in tracking technologies have revealed significant individual variation in movement patterns and strategies within species, driven by personality traits that influence ecological and evolutionary processes. Understanding how fish movement affects fisheries sustainability has gained interest, as fishing, like hunting, can induce a «timidity syndrome» in exploited populations. In this presentation, we examine the fitness consequences of individual movement heterogeneity by testing whether fishing selects for specific, repeatable behavioural traits in exploited environments. Using AI-based underwater video analysis, we documented exceptionally high exploitation rates in marine fish—among the highest recorded in any animal system. High-resolution tracking technologies allowed us to monitor the movements of hundreds of free-living fish, revealing how ecological context shapes behavioural variation. Our findings show that fish exhibit repeatable movement behaviours and that harvesting exerts strong negative selection gradients, favouring timid individuals. This fisheries-induced behavioural shift may lead to a «timidity syndrome,» with complex ecological and economic implications. Finally, we emphasize movement variation as a critical yet often overlooked component of biodiversity, highlighting its importance for sustainable management and conservation.

From behavioral ecology to immunoecology: exploring the effects of mild infections and immune responses

Dennis Hasselquist

Lund University, Sweden

Costs of severe diseases are often easily observable and have devastating effects such as increased mortality risk. However, whether there are any negative effects associated with mild infections has been debated for decades. If there are such costs, how significant are they for fitness and survival? How are they manifested, what are the reasons behind them and which key mechanisms can be involved? In my talk, I will show that the costs of mild infections are not negligible, especially in the long term. I will present results from studies of direct (energetic) and delayed (hidden') costs of immune responses and mild infections, and how such costs may impact survival and reproductive success. I will also talk about how these results have inspired the 'accumulating cost hypothesis' and how mild infections can be associated with telomere dynamics and ageing processes. My talk will also be a chronicle over my own scientific journey into these topics from the perspective of a researcher that started as a behavioural ecologist and then ended up doing a lot of research in immunoecology.

Relatos de la selva de asfalto: Construyendo modelos de integridad ecosistémica urbana

Ian MacGregor-Fors

University of Helsinki, Finland

El proceso de urbanización genera alta heterogeneidad ambiental, no solo en el uso de suelo, sino también en el grado de urbanización. Aunque las ciudades albergan solo una fracción de la biodiversidad regional debido al filtrado ecológico, muchas especies visitan, habitan e incluso prosperan en entornos urbanos. Con el creciente reconocimiento de la importancia de la biodiversidad urbana y en el contexto de la crisis global de biodiversidad, numerosos gobiernos han puesto el foco en la vida silvestre en las ciudades. Como resultado, se busca medir la biodiversidad urbana de manera económica y estandarizada o, idealmente, mediante índices más complejos que faciliten el monitoreo y la toma de decisiones. Para abordar este desafío, en mi grupo de investigación hemos desarrollado un índice basado en el concepto de integridad ecosistémica aplicado a entornos urbanos: el Índice de Integridad del Ecosistema Urbano. Este índice contrasta variables físicas y biológicas de la ciudad con ecosistemas de referencia, generando una evaluación espacialmente explícita, económica, replicable y comparable. Su implementación permite comprender mejor el estado ecológico de las ciudades en su totalidad, facilitando la toma de decisiones basadas en evidencia y promoviendo estrategias urbanas más ecológicamente amigables y habitables.

Short and long-term consequences of the early developmental period

Raquel Monclús

Univerisity Sorbonne Paris Nord, France

The early developmental period – the period that goes from conception until the animal reaches sexual maturity – is crucial to understanding the adult phenotype. Disturbances during this phase of development have long-lasting consequences on the fitness of any individual. Such disturbances can be triggered not only by abiotic factors but also by the social environment where an individual develops. Parents and siblings are the main modifiers during the early stages of life. Indeed, parental effects – the non-genetic effects of the parents' phenotype on the offspring's phenotype – are strong modulators of early life conditions. I will present some of my work on the life-history consequences of the prenatal and postnatal social environment in three study systems: the European rabbit, the yellow-bellied marmot, and the spotless starling. Long-term studies with individually marked animals are essential to explore these questions. The results show that early life events affect morphology, physiology, and life-history traits and that the effects are long-lasting. Whether individuals can compensate for their early environment deserves further work.

Comportamiento en ranas venenosas

Bibiana Rojas

Konrad Lorenz Institute of Ethology, Austria

Las larvas de anuros habitan, por lo general, en cuerpos de agua dulce con una gran variedad de tamaños y características abióticas (pH, salinidad, oxígeno disuelto, etc.). Dependiendo del cuerpo de agua en que se desarrollan, los renacuajos pueden tener diferentes características morfológicas, fisiológicas, comportamentales y de historia de vida. Uno de los casos más interesantes es el de aquellos renacuajos que completan su desarrollo en cuerpos de agua efímeros que se forman en estructuras vegetales (i.e., fitotelmas). A diferencia de cuerpos de agua permanentes y de gran tamaño, donde abundan los depredadores, las fitotelmas son ambientes con pocos recursos alimenticios y un gran riesgo de desecación, donde puede haber altos niveles de competencia intra-e interespecífica. Esta competencia también puede tomar forma de depredación, e incluso canibalismo, dependiendo de el orden de llegada de los diferentes habitantes. Como si eso fuera poco, las fitotelmas pueden acumular contaminantes de los cuales los renacuajos no pueden escapar, y cuyos efectos pueden incluso reflejarse en los estadios terrestres después de la metamorfosis. Por estas razones, estos pequeños cuerpos de agua esparcidos en el bosque representan microcosmos naturales, ideales para investigar interacciones entre depredadores y presas, los factores que determinan la sobrevivencia de las larvas, el papel del parentesco (o ausencia de éste) en el resultado de encuentros agresivos entre conespecíficos, e incluso el impacto de actividades antropogénicas. Durante esta charla abordaré estos y otros aspectos de la vida larval de un habitante de fitotelmas en el escudo guyanés: la rana venenosa *Dendrobates tinctorius*.

The badgers of Wytham Woods: Two paradoxes, a state-shift, and a perplexing puzzle

David W. Macdonald

University of Oxford, UK

A study of the European badgers, *Meles meles*, of Wytham Woods has involved documenting the life histories of 1823 individuals, based on 14,000 capture records, 1,350 DNA fingerprints and thousands of hours of infra-red video observation. Over this time, much has changed, illustrating the importance of long-term studies. Two paradoxes emerge. The first concerns why the badgers live in social groups, and the nature of cooperation amongst them. The second concerns territoriality, its function and permeability. More than 35 years of demographic and life history data reveals a remarkable state-change in the population's socio-spatial organisation; explanations for this can be found in changes in land-use and, most especially, the weather. This reveals individual differences in pace of life, and highlights a perplexing puzzle in the shifting proportion, although always a minority, of females that produce cubs. Clues to the answer, with epigenetic consequences, come from infectious disease.

Comunicaciones orales

Sesión 1. Martes 2 de septiembre, 11:45-14:00

O1. ¿Manipula *Plasmodium* a su mosquito huésped? La transcriptómica es la clave

Luz García-Longoria Batanete¹, Arnaud Berthomieu³, Olof Hellgren², Ana Rivero³

1) Universidad de Extremadura 2) Lund University 3) Univ Montpellier, CNRS

El estudio de las interacciones mosquito-*Plasmodium* se ha centrado principalmente en la inmunidad del mosquito, revelando los mecanismos clave por los que los mosquitos intentan combatir la infección por *Plasmodium*. Sin embargo, pruebas recientes sugieren que, más allá de la inmunidad, una multitud de vías fisiológicas y metabólicas del mosquito desempeñan papeles cruciales a la hora de determinar si el parásito completa su desarrollo dentro del mosquito. En este estudio primero (i) revisamos cuáles de estas vías metabólicas están potencialmente moduladas por *Plasmodium*, revelando un estado de conocimiento fragmentado y en ocasiones contradictorio. A continuación, (ii) presentamos un análisis transcriptómico exhaustivo de mosquitos infectados y no infectados por *Plasmodium*, en el que se examina la expresión génica de genes cruciales en diferentes etapas del desarrollo del parásito. Estos genes abarcan desde enzimas y proteínas clave implicadas en la estructura y función intestinal, hasta genes implicados en la producción y reabsorción de huevos, la invasión de glándulas salivales y el comportamiento del mosquito. Para ello, trabajamos en la interacción entre el parásito de la malaria aviar *Plasmodium relictum*, un parásito invasor que amenaza la biodiversidad de las aves en todo el mundo, y su vector natural, el mosquito *Culex pipiens*. Nuestros resultados revelan cómo en cada etapa de su desarrollo dentro del mosquito, *Plasmodium* modula una miríada de vías metabólicas del mosquito, de manera que potencialmente favorece su supervivencia y la finalización de su ciclo vital. Nuestros hallazgos ponen de relieve la complejidad de las interacciones mosquito-*Plasmodium* y subrayan la necesidad de un enfoque más amplio e integrador para comprender mejor las presiones selectivas ejercidas por los parásitos de la malaria sobre sus vectores, con implicaciones tanto para el control de la enfermedad como para la conservación de la biodiversidad.

O2. Parasitism determines seasonal migration strategies in a partially migratory seabird: an experimental study

Francisco Ruiz-Raya^{1,2}, Fiona Greco¹, Sarah Burthe³, Jane Reid^{4,5}, Suzanne Bonamour⁴, Rita Fortuna⁴, Cassandra Ugland⁴, Thomas R. Haaland⁴, Timothy Morley⁵, Chiara D'Avino¹, Mark Newell³, Josie Hewitt³, Francis Daunt³, Hannah Ravenswater¹, Emma Cunningham¹

1) Institute of Ecology and Evolution, School of Biological Sciences, University of Edinburgh 2) School of Biodiversity, One Health and Veterinary Medicine, Graham Kerr Building, University of Glasgow 3) Centre for Ecology & Hydrology, Bush Estate 4) Centre for Biodiversity Dynamics, NTNU 5) School of Biological Sciences, University of Aberdeen

Understanding how infections shape animal movement is critical for predicting evolutionary processes and wildlife disease dynamics in animal populations. Recent theoretical work suggests that parasitism may drive variation in seasonal migratory behaviour, as migration could allow individuals to escape parasite-rich environments or recover from infection. However, experimental evidence for the effects of parasitism on seasonal migration remains scarce. Here, we present an experimental test of whether early-life nematode parasitism influences the early expression of migratory vs. resident strategies in a partially migratory population of European shags (*Gulosus aristotelis*) on the Isle of May, Scotland. In 2022 and 2023, we experimentally reduced nematode burden in shag chicks to test whether lowering infection levels reduces the likelihood of migrating after fledgling. Chicks within the same brood were randomly assigned either an anti-helminthic treatment, calibrated to prevent parasite establishment, or a matched saline control. Chicks from non-manipulated clutches were used as an additional control group. All birds were uniquely colour-ringed at fledging. During 2022-2024, we collected comprehensive data on annual survival and winter locations of juvenile and adult shags breeding on the Isle of May. We then used a multi-state mark-recapture framework to model the effect of reduced parasitism on the early-life expression of migratory vs. resident strategies. Our findings indicate that early-life infection plays a direct role in shaping migratory decisions and timing in juvenile shags. Specifically, individuals with experimentally reduced parasite burden delayed their departure from the breeding colony during their first migratory season. By combining experimental manipulation, large-scale individual tracking, and demographic modelling, our study provides novel causal evidence linking parasitic infection to seasonal migration tactics in a natural population, providing key insights into the ecological and evolutionary consequences of host–parasite interactions.

O3. Avian malaria infection and cloacal microbiota composition varies in wild house sparrows from habitats with different urbanization levels

Marta Garrigós¹, Jéssica Jiménez-Peñuela², Irene Saavedra¹, Jesús Veiga¹, Mercedes Molina-Morales², María José García-López⁵, María José Ruíz-López^{1,4}, Mario Garrido³, Isabel Moreno-Indias^{5,6}, Jordi Figuerola^{1,4}, Josué Martínez-De La Puente^{1,4}

1) Estación Biológica de Doñana (EBD-CSIC) 2) Universidad de Granada (UGR) 3) Universidad Rey Juan Carlos 4) CIBER de Epidemiología y Salud Pública (CIBERESP) 5) Department of Endocrinology and Nutrition, Instituto de Investigación Biomédica de Málaga (IBIMA) and Hospital Universitario Virgen de la Victoria 6) CIBER de Fisiopatología de la Obesidad y Nutrición (CIBEROBN)

Urbanization has been linked to biodiversity loss and changes in community composition, altering the interactions between organisms, including parasites and other microorganisms. Pollutants and low-quality food resources, among other urban stressors, can alter the physiology of wild organisms and compromise the immune system of animals living in cities, finally affecting their susceptibility to certain pathogens. The house sparrow (*Passer domesticus*) is considered one of the most urban-dwelling passerines due to its close association with human environments, and it relies on anthropogenic resources in both rural and urban areas. In this study, we identify the impact of habitat anthropization on blood parasite infection and cloacal bacterial composition of house sparrows from urban, rural and natural habitats in southern Spain. We molecularly identified the infection status by avian malaria parasites of the genera *Plasmodium* and *Haemoproteus* and the cloacal microbiota composition using a metabarcoding approach. We found that the habitat type, significantly affected avian malaria prevalence and the association between infection with bacterial richness and bacterial relative abundance. Specifically, birds from natural habitats had a higher parasite prevalence than those from urban areas. In addition, in the case of birds from natural habitats, infected individuals had lower bacterial richness than uninfected birds, while no differences were found in birds from rural and urban areas. Moreover, infected and uninfected birds showed different relative bacteria abundance in natural habitats in comparison with urban birds while no difference was recorded in birds from rural habitats. In conclusion, parasite prevalence and cloacal bacteria differs between habitats, with uninfected birds from natural habitats showing a different microbiota than infected birds from the same habitat and individuals from urban and rural areas.

O4. Do parasites select for a reduced brood size?

Jorge Garrido-Bautista^{1,2}, Gregorio Moreno-Rueda¹

1) Department of Zoology, Faculty of Sciences, University of Granada (UGR) 2) Instituto de Investigación en Recursos Cinegéticos (IREC, CSIC-UCLM-JCCM)

The evolution of clutch size has attracted considerable theoretical and empirical interest since clutch size varies significantly both between and within species. Ectoparasites are potential selective pressures acting on clutch size in altricial birds since they typically have detrimental effects on nestling health, and usually, the larger the brood size, the more ectoparasites in a nest. Then, if the density of ectoparasites (number of parasites per nestling) increases with brood size, one could expect selection for reduced brood size. By contrast, similar or decreasing ectoparasite densities with brood sizes would not select for reduced brood size. We tested this idea in a population of blue tits (*Cyanistes caeruleus*) whose nests are infested with blowflies (*Protocalliphora azurea*), using correlative and experimental data. In non-manipulated nests, we found a positive correlation between the number of blowflies and brood size, with a rate of increase of 2.4 blowflies per additional nestling. Similarly, the number of blowflies was higher in experimentally enlarged broods than in control and experimentally reduced broods. In non-manipulated nests, the density of blowflies (number of ectoparasites per nestling) remained constant along the brood size, with a mean of 2.4 blowflies per nestling irrespective of brood size. Likewise, the experimentally enlarged broods showed a blowfly density similar to that of the control and experimentally reduced broods. Our results show that blowfly pressure (parasites per host) remains constant through the range of brood size variation, and thus blowflies do not select for reduced brood size. It is worth highlighting that blowflies are long-cycled ectoparasites since its life-cycle length is similar to the length of nestling phase, but they show the predicted pattern for short-cycled ectoparasites according to theoretical models. We propose a new variable to consider in models for parasite-mediated evolution of brood size: the timing of infestation. Blowfly females, unlike other common ectoparasites (mites, fleas or lice), lay their eggs in bird nests only (but not before) when eggs hatch since larvae are obligate hematophagous. This would suggest that blowflies can adjust their population size to the clutch size of the host.

O5. Parasitismo temprano y su huella fisiológica: un enfoque experimental considerando las relaciones genéticas

Antonio José García Núñez¹, Gustavo Tomás Gutiérrez¹, Juan José Soler Cruz¹, Cristina Ruiz Castellanos¹, Jordi Figuerola²

1) Estación Experimental de Zonas Áridas (EEZA-CSIC) 2) Estación Biológica de Doñana (EBD-CSIC)

Los parásitos desempeñan un papel clave en muchos procesos ecológicos y evolutivos debido a los costes que imponen a sus hospedadores, y que afectarían a su desarrollo, supervivencia y eficacia biológica. Sin embargo, el impacto de los parásitos sobre el fenotipo de los hospedadores es muy variable y esta variación puede tener una base genética. En este trabajo, investigamos experimentalmente el impacto del parasitismo sobre el desarrollo de pollos de estornino negro (*Sturnus unicolor*) de diferente ascendencia genética (i.e., diferentes progenitores) criados en el mismo nido, y evaluamos los componentes genético y ambiental de distintos caracteres. Dos días después de la eclosión incrementamos la abundancia de moscas ectoparásitas (*Carnus hemapterus*) en la mitad de los nidos e intercambiamos dos pollos entre nidos controles y experimentales. Medimos el peso de los pollos a los 8 y 14 días de edad. Además, en esta última visita medimos la longitud del ala y del tarso y extrajimos una muestra de sangre para analizar indicadores del estado fisiológico de los pollos (concentración de carotenos, longitud relativa y dinámica de telómeros e intensidad de antagonismo). Nuestros resultados revelan que el aumento experimental de la carga parasitaria durante el desarrollo temprano tuvo un efecto negativo en el peso de los pollos a día 8, mientras que a día 14 estos pollos experimentaron tasas de acortamiento de telómeros más bajas que los pollos criados en nidos controles, lo que podría indicar respuestas compensatorias o estrategias alternativas de inversión fisiológica. Los efectos del parasitismo experimental no dependieron significativamente de la ascendencia de los pollos (i.e., nido de origen) para el peso a día 8 y variables relacionadas con telómeros, aunque sí lo hicieron para el resto de variables. Estos hallazgos resaltan la compleja influencia del parasitismo en el desarrollo temprano y sugieren que, aunque los efectos observados a corto plazo podrían tener implicaciones importantes sobre la eficacia biológica y la supervivencia a largo plazo de los individuos, esos efectos dependen tanto de características heredadas de los padres y como del ambiente.

O6. Agroindustry shapes avian blood parasite communities on São Tomé Island

Rafael Gutiérrez Lopez^{1,2,3}, María José Ruiz López^{4,5}, Vincent Bourret^{1,6}, Martim Melo^{1,7,8}, Claire Loiseau^{1,6}

1) CIBIO-InBIO - Research Center in Biodiversity and Genetic Resources, InBIO Associate Laboratory 2) National Center of Microbiology, Health Institute Carlos III 3) CIBER de Enfermedades Infecciosas (CIBERINFEC) 4) Departamento de Biología de la Conservación y Cambio Global, Estación Biológica de Doñana (EBD-CSIC) 5) CIBER de Epidemiología y Salud Pública (CIBERESP) 6) CEFS, INRAE 7) MHNC-UP, Natural History and Science Museum of the University of Porto 8) Fitz Patrick Institute of African Ornithology, Department of Biological Sciences, University of Cape Town 9) MIVEGEC, Montpellier University, IRD, CNRS,

Agroindustry is a major driver of deforestation in tropical regions. Monoculture practices indirectly affect pathogens transmission by altering hosts and vectors populations. Understanding how habitat disturbance influences host–parasite interactions is therefore key to predict disease transmission dynamics in wildlife. We investigated bird–parasite interactions along an anthropogenic disturbance gradient on São Tomé Island, ranging from native forest to oil palm plantations. We assessed the prevalence, richness (alpha diversity), and community composition (beta diversity) of blood parasites in the four most common bird species (*Anabathmis newtonii*, *Ploceus sanctithomae*, *Terpsiphone trochalybeia* and *Turdus olivaceofuscus*). A total of 317 blood samples were analyzed using eukaryotic 28S rRNA metabarcoding to detect a broad range of parasites. We employed generalized linear models (GLMs) to identify the best predictors of parasite presence, richness and community composition, testing host species, season, year and anthropization score. The most prevalent parasite families were Plasmodiidae (25%), Eimeriidae (24%), and Filariidae (20%). Plasmodiidae presence increased significantly with anthropization, suggesting higher transmission in oil palm plantations. In contrast, Eimeriidae were more common in forested areas, especially in *P. sanctithomae*, while Filariidae were most frequent in *T. olivaceofuscus*. Parasite richness varied by host species, habitat, and season, with higher richness in forest and plantation compared to edge habitats. Richness decreased during the rainy season. Community composition also differed significantly by host species and along the anthropization gradient. Birds in less disturbed areas hosted significantly more Eimeriidae parasites. In summary, our results show that deforestation affected parasite families differently, with Plasmodiidae increasing in disturbed habitats, while Eimeriidae were common in forest. These contrasting patterns likely reflect differences in transmission dynamics. Plasmodiidae are vector-borne and their increase in oil palm plantations is likely due to mosquito proliferation in disturbed habitats. In contrast, Eimeriidae are transmitted by contact and feces and their increase in forest areas may be due to reduced habitat size and increased host aggregation in remnant forest patches which can facilitate direct transmission. Our results highlight that even moderate anthropogenic habitat changes can alter the structure and composition of blood parasite communities in tropical birds.

O7. Efecto de la malaria aviar sobre la microbiota del plumaje en el gorrión común (*Passer domesticus*)

Alazne Díez-Fernández¹, Irene Hernandez-Caballero¹, Luz García-Longoria¹, Carlos Mora-Rubio¹, Alfonso Marzal^{1,2}

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Históricamente, las aves han constituido un modelo clave para el estudio de enfermedades infecciosas emergentes, como la malaria aviar. El impacto de esta enfermedad podría ir más allá de lo previamente documentado, incluyendo no solo la disminución de la condición corporal y la eficacia biológica, sino también efectos más sutiles en la salud del hospedador, como alteraciones en la microbiota. Sin embargo, los estudios que examinan el impacto de los hemosporidios en las comunidades microbianas de las aves siguen siendo escasos. Este estudio evaluó el efecto de la infección por malaria en la microbiota del plumaje del gorrión común (*Passer domesticus*). Se recolectaron muestras con hisopo en el cuello y las axilas, así como muestras de sangre. La infección se detectó mediante PCR anidada del gen del citocromo b de hemosporidios, y las comunidades microbianas se caracterizaron mediante secuenciación de nueva generación (NGS) del gen 16S rRNA. Se analizó la diversidad alfa para medir la variabilidad de los taxones dentro de las muestras y la diversidad beta para comparar la composición microbiana entre los grupos. Además, se utilizó la dispersión beta para evaluar la heterogeneidad dentro de cada grupo. Nuestros resultados indican que la diversidad alfa no presenta diferencias significativas según la zona corporal, el estado de infección ni su interacción. En cambio, el análisis PERMANOVA mostró diferencias significativas en la composición microbiana entre zonas del cuerpo y en su interacción con el estado de infección. La dispersión beta reveló alta variabilidad individual entre muestras. Estos hallazgos resaltan la complejidad de la microbiota del plumaje en el gorrión común, influenciada por factores como la zona corporal y la infección por malaria, y enfatizan la importancia de identificar las fuentes de variación individual observada en este estudio.

O8. Disentangling infection dynamics: The combined role of host traits and host–parasite specificity

Ruth Rodríguez-Pastor^{1,2}, Mario Garrido^{1,3}, Nadav Knossow¹, Naama Shahr¹, Ron Flatau^{1,4}, Hadas Hawlena¹

1) Mitrani Department of Desert Ecology, Swiss Institute for Dryland Environmental and Energy Research, The Jacob Blaustein Institutes for Desert Research, Ben-Gurion University of the Negev 2) Agri-Food Institute of Aragon (IA2) - University of Zaragoza-CITA 3) Department of Biology and Geology, Physics and Inorganic Chemistry, Zoology Area, Rey Juan Carlos University 4) Ocean Genome Legacy Center, Northeastern University

Variation in how infections progress within different host species can shape parasite ecology, evolution, and epidemiology. However, the underlying causes of this variation remain poorly understood, largely due to the lack of experimental studies involving multiple hosts and pathogens, while also tracking detailed within-host dynamics. In this study, we used an experimental rodent–bacteria model system from Israel’s northwestern Negev Desert to test two competing hypotheses explaining host-driven variability in infection dynamics. The "host trait variation" hypothesis posits that differences among host species affect all pathogens similarly, while the "specific host–parasite interaction" hypothesis suggests that outcomes depend on unique combinations of host and parasite traits. We experimentally inoculated individuals from three wild gerbil species (*Gerbillus andersoni*, *G. pyramidum*, and *G. gerbillus*) with one of two prevalent bacterial pathogens: *Bartonella krasnovii* A2 or a *Mycoplasma haemomuris*-like bacterium. We monitored infection dynamics during both primary infection and reinfection phases. Our results partially support both hypotheses. For instance, both pathogens exhibited consistently lower performance in *G. gerbillus*, supporting a general host trait effect. However, most infection parameters—such as infection intensity, persistence, and response to reinfection—varied across host–parasite combinations, suggesting strong specificity in host–parasite interactions. These findings highlight that variability in infection dynamics cannot be fully explained by general host traits alone. Instead, it emerges from the specific interplay between host and parasite characteristics. We emphasize the need for future research to explore these interactions more deeply, particularly in natural, multispecies systems. Until broader empirical data are available, caution is warranted when extrapolating from one host–parasite pair to community-level patterns.

O9. Linking migration, parasitism, and immunity: Insights from Iberian populations of Eurasian Hoopoes (*Upupa epops*)

Elena Arriero¹, Mercè Palacios¹, Francisco Pulido¹, David Martín-Gálvez²

1) Universidad Complutense de Madrid (UCM) 2) Universidad de Málaga (UMA)

Understanding how migratory behaviour influences host–parasite dynamics is a central question in evolutionary ecology, with important implications for conservation biology and disease management. Partially migratory bird populations provide an excellent opportunity to study this link, as they include both resident and migratory individuals that coexist in the same area for part of the year but may experience different ecological and physiological conditions throughout their life cycles. These differences can shape exposure to pathogens, immune investment, and infection risk, and the mechanisms underlying such variation remain as key topics in the discipline. This study focuses on two Iberian populations of Eurasian hoopoes (*Upupa epops*), a trans-Saharan long-distance migrant with resident individuals, to explore the interplay between migratory strategy, parasitism and host immune function. We determined the migratory status using stable isotope analysis of deuterium (²H) in feathers and assessed infection status through visual and molecular detection of blood parasites from the genus *Leucocytozoon*. Additionally, we measured several immune parameters, including estimates of innate and adaptive immunity. Our results show an overall prevalence of *Leucocytozoon* sp. infection of 36% among hoopoes in the studied populations, with notably high prevalence of infection in individuals wintering locally (57%). Interestingly, resident birds exhibited higher levels of immunoglobulin Y (IgY) antibodies than migrants, and we also explored the associations between antibody levels and infection intensity throughout the year. These findings highlight the complex interactions between parasitic infections, immune investment, and migratory behaviour. By integrating parasitological, immunological and isotopic data, our study helps clarifying how health status relates to migration and the potential mechanisms underlying the coexistence of different migratory strategies within populations.

Sesión 2. Martes 2 de septiembre, 16:45-17:45

O10. Testing the phenological thermal tracking hypothesis across space and species

David López-Idiáquez¹, Ben C. Sheldon¹

1) Edward Grey Institute, Department of Biology, University of Oxford

Shifts in the timing of seasonal events are widely documented biological responses to climate change, but measuring these shifts using human calendars reveals little about the underlying biological causes of such changes. Here, we use six decades of individual-based data from the great tit *Parus major* population in Wytham Woods (UK) to show that plasticity in reproductive phenology has enabled stable long-term thermal homeostasis at different stages of reproduction (i.e. the phenological thermal tracking hypothesis), despite marked local warming. We show, further, that reproductive success is maximised at approximately the temperatures being tracked, likely because this temperature tracking ensured optimal timing with respect to a key food source, the winter moth *Operophtera brumata*. Finally, we expand these analyses to 41 European populations and three bird species to assess the generality of the pattern observed in Wytham Woods' great tits across space and species. We use more than 135,000 breeding observations to analyse how well-known drivers of climate change responses (e.g. latitude and woodland type) influence the populations' ability to track optimal climatic conditions during breeding. Overall, our results suggest that shifting our perspective to analyse the timing of life-history events relative to relevant environmental gradients can shed new light on the mechanisms and consequences of population responses to climate change.

O11. Escaping the oven: behavioural strategies of heat avoidance and exploration in birds

Stefania D'arpa¹, Alexandre Maccarone-Sauret², Mylene Mariette¹

1) Estación Biológica de Doñana (EBD-CSIC) 2) EPHE - PSL (France)

Understanding behavioural responses to temperature is crucial to predicting the impact of rising global temperature on populations, as behavioural decisions may buffer exposure to thermal extremes. While behavioural thermoregulation is well-studied in ectotherms, it has received little attention in endotherms, including birds. Here, we present a novel experimental approach in birds to measure heat avoidance or “*Voluntary Thermal Maximum* (VTmax)” – the highest environmental temperature an individual will tolerate before actively seeking thermal refuge. We tested individual behavioural variation in domestic zebra finches (*Taeniopygia guttata*), a desert-adapted species. Individuals were exposed to a progressively increasing temperature in a thermal chamber with a small exit to a cooler area. The individual’s behaviour and body temperature were continuously monitored. We show that VTmax, as the maximum chamber temperature reached before exiting, is a consistent and moderately repeatable trait amongst individuals (n = 94 trials), suggesting individual behavioural strategies in heat avoidance. VTmax was also sensitive to weather variations, revealing behavioural plasticity in response to short-term thermal experience. To further investigate the basis of individual variation in heat avoidance we observed, we subjected the same individuals to an activity and exploration experiment. Individuals were observed while released in a cage with partitions, passages and lures to invite them to move between compartments. Preliminary analyses from this test further link the heat avoidance behaviour to traits such as exploration tendency, indicating that behavioural thermoregulation may covary with other axes of behavioural variation. Overall, our findings highlight the critical role of individual behavioural strategies in mitigating heat stress. This research offers a valuable tool for incorporating thermoregulation into behavioural ecology models, particularly in the context of climate change.

O12. Rolling under pressure: Life-history adaptations of dung beetles to temperature extremes and land use

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Dung beetles are key ecosystem engineers in semi-arid environments like the Kalahari Desert (South Africa), where they act as soil-conditioning agents promoting nutrient cycling, soil aeration, and seed dispersal. Despite their ecological significance, the responses of dung beetle populations to climate variability across landscapes remain poorly understood. Such responses are generally shaped by multiple feedbacks involving individual traits, life-history processes (such as survival, reproduction and development) and species interactions. However, the limited availability of quantitative data on insect life-history components hinders our understanding of key mechanisms that may buffer or amplify environmental effects. This study aims to assess and model the population dynamics of dung beetles under the combined effect of climate change and land-use practices by inferring vital rates from observed abundances. Abundance data for the most frequent large roller species, *Escarabaeus satyrus* and *Scarabaeus proboscideus*, was collected through monthly sampling across 8 sites, using dung-baited pitfall traps placed on two different days as part of an ongoing monitoring program planned over three years. We built dynamic N-mixture models, a type of Bayesian hierarchical models, which enable the inference of stage-specific apparent survival (including emigration) and the influx of new individuals (due to reproduction or immigration) based on abundance estimates derived from repeated counts of unmarked individuals. N-mixture models are a promising approach to integrate data and infer unobserved states but are underused in invertebrate studies. We successfully inferred vital rates from abundances for both study species. Our findings suggest that dung beetle population dynamics are highly seasonal, and driven by precipitation but less so by temperature extremes. Population dynamics are also strongly influenced by the effects of grazing pressure on recruitment/ immigration – with those processes being highest under intermediate grazing pressure. This study highlights that, while some dung beetle species are resilient to increases in temperature extremes, they are highly sensitive to human-driven perturbations in the environment. This calls for more studies on how land management can ensure the continued functionality of dung beetles in semi-arid ecosystems, and their potential adaptation or failure to adapt to changing environments.

O13. Does temperature affect reproductive strategies and parental effects in three-spined sticklebacks?

Wendy Fernández Pujó¹, Sin-Yeon Kim¹, Alberto Velando Rodríguez¹

1) Universidad de Vigo

There is growing evidence that temperature during growth and reproduction can strongly impact the physiology and life history of ectotherms. However, it is less well known whether animals can adaptively adjust their reproductive behaviors and parental effects in response to increasing temperatures to enhance offspring survival. We studied the impact of long-term exposure to increased temperatures on courtship and nest-building behaviours in male three-spined sticklebacks (*Gasterosteus aculeatus*) and on spawning strategies in females. We established two experimental groups. The control fish were exposed to normal temperatures of their natural habitat, and the experimental fish were exposed to warmer temperatures (2°C higher). During the breeding season, we assessed nest size and structure, nuptial coloration and courtship behaviours in males. Our results indicate that the experimental males constructed less compact nests than did the control males. This loose nest structure may facilitate oxygen flow. The courtship behaviour of the experimental males involved increased fan displays, simulating stronger parental ability for egg ventilation. Seasonal spawning strategies differed between the experimental and control females. The experimental females spawned less frequently than the controls throughout the season. They also tended to produce increasingly larger clutches but smaller eggs as the season progressed. Our experimental study suggests that sticklebacks change their behaviours and parental strategies in response to environmental temperature.

Sesión 3. Martes 2 de septiembre, 18:30-20:15

O14. A polymorphic raptor reproducing against all odds: phenotypic, sex and environmental effects on senescence

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The decline in reproductive performance with age (reproductive senescence) is a well-known process in evolutionary biology. Both the phenotype and the early-life environment profoundly impact senescence, but the strength and interactive nature of such effects results in puzzling within-species variation in senescence patterns. Longitudinal studies on species that show genetically determined colour polymorphism could help unravel such puzzles, partly because melanin synthesis interacts with other molecular and physiological pathways. Here, we used complete life histories gathered over 13 years to evaluate, for the first time, age, environmental and phenotypic effects on annual offspring number and lifetime reproductive success in the Eleonora's falcon (*Falco eleonora*), a colour polymorphic raptor. We found evidence of within-individual reproductive senescence, but only in dark morph females. Independent of sex and colour morph, longer-lived falcons born in benign environments had higher annual and lifetime reproductive success. In shorter-lived individuals, however, the negative effects of harsh early-life conditions on reproductive performance were less evident. Our findings suggest a 'silver-spoon' effect of benign early-life conditions on reproductive success via selective disappearance of poor reproducers. For individuals born in unfavourable early-life conditions, we propose that a breeding strategy maximising reproductive effort early in adulthood may be beneficial, but costly to maintain. Our study also highlights the need to explore the sex-specific effects of synthesising melanin on physiological senescence.

O15. Feather volatile compounds as sexual signal and health proxy in scarlet macaws

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Parrots, especially macaws, have long been thought to have a limited sense of smell, but recent studies have shown that parrots possess a functional olfactory system. For example, scarlet macaws produce a distinct sweet odor, suggesting the presence of volatile compounds in their feathers. These compounds may provide important cues about the birds' reproductive status, identity, and mate quality. Understanding the role of these odors is also crucial for improving captive bird welfare and enhancing conservation efforts, including breeding and reintroduction programs. In this research, we investigate the diversity of volatile compounds present in the feathers of male and female scarlet macaws (*Ara macao*) and examine their relationship with the quality of their immune system. Feather samples were collected from a captive breeding population at Loro Parque (Tenerife), consisting of 18 individuals. Five feathers were collected from each individual by trimming them from the dorsal region of the nape and placing them in sealed glass vials. Volatile compound analysis was conducted using solid phase micro extraction (SPME) followed by gas chromatography-mass spectrometry (GC-MS). Additionally, a small blood sample was collected to assess bactericidal activity in serum samples by flow cytometry. The results showed that the relative proportion of alkanes varied between sexes being higher in females than in males. This finding suggests that plumage odor may be linked to reproductive traits and that alkanes, potentially metabolized from diet-derived compounds, may serve a short-term sex recognition signaling function. We also found that individuals with a stronger immune response (i.e. a greater bactericidal plasma activity) had a higher diversity of volatile compounds, suggesting that volatile chemical constituents of plumage odor may signal enhanced competitive ability and better health conditions. This supports the hypothesis that chemical communication may be an important mechanism for the intraspecific communication and mate choice in this species. Overall, these results will contribute to improving our limited understanding of this species and also help to determine the impact of the olfactory environment on macaw well-being.

O16. El valor de ingerir arañas: un estudio de cruce de polladas en carboneros mediterráneos

Javier Quesada¹, Àlex Benítez-Martínez², Helena Navalpotro³, José G. Carrillo-Ortiz¹, Francesc Uribe¹, Juan Carlos Senar¹

1) Museu de Ciències Naturals de Barcelona 2) Universitat de Barcelona 3) Centre de Ciència i Tecnologia Forestal de Catalunya (CTFC)

La dieta proporcionada por los padres durante el desarrollo temprano influye en su desarrollo general, condición corporal, supervivencia y capacidad cognitiva. En ambientes mediterráneos, estudios previos han demostrado que los padres de Carbonero común (*Parus major*) que incrementan el porcentaje de arañas en la dieta de sus crías producen individuos de mejor condición física. Sin embargo, no está claro si este efecto se debe a las propiedades nutricionales de las arañas o a que los padres que proveen más arañas poseen una mayor calidad genética. Para distinguir entre estos dos factores, se implementó un diseño experimental de cruce de polladas que permitió separar los efectos genéticos parentales de los nutricionales. Así, se predice que si las arañas son un recurso de alta calidad *per se*, los pollos criados por padres adoptivos que les proporcionaran mayor porcentaje de arañas mostrarían mejor condición corporal, independientemente de su herencia genética. Durante la reproducción de 2015 y 2017, se intercambiaron 47 nidadas completas entre parejas reproductoras en el Parc Natural de Collserola (Barcelona). Cuando los polluelos tenían 10-13 días de edad (etapa de máximo aprovisionamiento), se registró la dieta mediante grabaciones, clasificando las presas en tres categorías: orugas, arañas y otros artrópodos. La condición corporal de los polluelos se cuantificó mediante un índice estandarizado que relacionaba masa corporal y longitud del tarso. Los datos se analizaron mediante modelos lineales generalizados que controlaban variables ambientales como estructura del hábitat y fecha de muestreo. Se encontró una correlación positiva entre el porcentaje de arañas en la dieta proporcionada por los padres adoptivos y la condición corporal de los polluelos. El estudio demuestra que la mejora en la condición corporal asociada al consumo de arañas se debe principalmente a su valor nutricional intrínseco, y no a la calidad genética de los padres. Estos resultados permiten desentrañar los mecanismos involucrados en el efecto de los nutrientes proporcionados por las arañas en el desarrollo de los polluelos y permiten comprender mejor los mecanismos involucrados en el desarrollo temprano de las aves.

O17. Changes in incubation patterns of the Pied Flycatcher in response to an experimental immune activation

Isabel Barreda Muñoz^{1,2}, Marina García-del-Río¹, Santiago Merino Rodríguez¹, Alejandro Cantarero²

1) Museo Nacional de Ciencias Naturales (MNCN-CSIC) 2) Departamento de Fisiología, Facultad de Veterinaria, Universidad Complutense de Madrid (UCM)

Incubation is vital for avian embryo development but demands significant parental investment, potentially at the cost of self-maintenance and immune function. For example, the acute phase response (APR), a systemic reaction against inflammation, infection, or tissue injury, can trigger sickness behaviours like reduced activity and foraging. In this study, we experimentally exposed wild Pied Flycatcher (*Ficedula hypoleuca*) females to an immune challenge through lipopolysaccharide (LPS) injection to test the effects of the immune activation on female incubation behaviour and their reproductive consequences. We found a clear reduction in the average duration of incubation sessions in those birds administered with LPS, as well as an increase in the number of incubation sessions, while other behaviours remained unaffected. These changes had no apparent effects on fitness-related traits of females, but they were related to fledging success, which turned out to be higher in the nestlings of females administered with LPS. These findings suggest that females are capable of maintaining proper incubation conditions while simultaneously sustaining their own fitness during immune activation, as well a compensation for potential future reproductive failures by the prioritization of immediate reproduction.

O18. Characteristics of host neighbourhoods affect parasitism decisions by Common cuckoos

Teresa Abaurrea^{1,2,5}, Robert L. Thomson^{3,4}, Rose Thorogood^{1,2}, Michael J. O'Brien⁵

1) Helsinki Institute of Life Sciences, University of Helsinki 2) Research Programme in Organismal and Evolutionary Biology, Faculty of Biological and Environmental Sciences, University of Helsinki 3) Fitzpatrick Institute of African Ornithology, University of Cape Town 4) Section of Ecology, Department of Biology, University of Turku 5) Estación Experimental de Zonas Áridas (EEZA-CSIC)

The behaviour of other individuals can provide a rich source of social information about the local environment. There is a growing body of work showing that social information can influence acquisition and use of resources as well as breeding decisions, and has potential to influence how selection operates within and between species. However, the availability and utility of social information is highly determined by the distance in time, space, and ecology between the source of information and user. Despite extensive research accounting for neighbour proximity and interactions in other fields of ecology (e.g. plant ecology), this approach is yet to be adopted in studies of behaviour. Here I will present how we can use neighbourhood models with maximum likelihood approach to explore how the laying decisions of brood-parasitic Common cuckoos (*Cuculus canorus*) are influenced by information of foster parent quality acquired from local host neighbourhoods. We used a georeferenced 9-year long monitoring dataset to model cuckoo parasitism probability depending on a host (focal) phenotype, while incorporating characteristics (number, phenotype, and distance) of surrounding host neighbours. We found that focal nests were less likely to be parasitised if they were closer to neighbours or if neighbours were higher quality. Our results therefore suggest that the neighbourhood is more important for determining parasitism risk than the phenotype of the host nest that cuckoos choose, and highlight the potential for neighbourhood models to improve understanding of systems where risk or decision-making depends on who else is around.

O19. Reproductive consequences of mate retention and divorce in a short-lived migratory passerine

Daniel Ramírez Rodríguez-Solís¹, Iraidia Redondo¹, Jesús Martínez-Padilla², Carlos Camacho³, Jaime Potti³, David Canal¹

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In socially monogamous birds, pair bond duration varies widely across species, from single-breeding associations to long-lasting, multi-year bonds. Studies on mate retention and divorce have predominantly focused on long-lived species, while research in short-lived and migratory species is limited. Consequently, the fitness consequences of divorce or remating in these species remain unclear. Here, we used a long term (1987–2023) and individual-based dataset to investigate the reproductive consequences of mate retention and divorce in pied flycatchers (*Ficedula hypoleuca*), a short-lived, long-distance migratory passerine. First, we described the overall patterns of divorce and remating within the population. Then, we analyzed whether reproductive parameters (laying date, clutch size and number of fledglings) differed between individuals that remate and those that divorce, while controlling for confounding factors, such as age and breeding dispersal. Specifically, we compared the reproductive consequences in the season before remating or divorce (year t) and the subsequent season (year $t+1$). We found that remating rates were low (3.52%) compared to divorces (26.8%), and both remained stable over the study period. Regarding reproductive performance, pair bond duration (remating vs. divorce) did not explain variation in laying date or clutch size. However, divorce was associated with an increase in the number of fledglings in the year following separation for both males and females, while remated individuals did not show improved reproductive success. The reproductive consequences of divorce/remating persisted after accounting for confounding factors, suggesting that divorcing as mating strategy might persist in our population because enhance fitness benefits compared to remating. These findings highlight the complex dynamics of mate relationships in short-lived migratory birds and emphasize the need for further research into the adaptive potential of pair-bond stability.

O20. Relación entre la actividad reproductiva del cuco común (*Cuculus canorus*) y la fenología de puesta de sus potenciales especies hospedadoras en Sierra Nevada

M^a Carmen López Luengo¹, Francisco Ruíz Raya², Jose Ignacio Huertas Gómez¹, Tereza Hladká³, José Fernández Miranda¹, Libya González Dávalos¹, Manuel Soler^{1,4}

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Las aves parásitas de cría, como el cuco común (*Cuculus canorus*), ponen sus huevos en los nidos de otras especies (hospedadoras), lo que obliga a éstas a invertir recursos en la cría de polluelos que no son los propios. Este tipo de parasitismo es altamente costoso para los hospedadores, que han desarrollado defensas a lo largo del ciclo reproductor para evitar el parasitismo. Entre ellas, las denominadas defensas "de primera línea" (aquellas que impiden directamente que el nido sea parasitado) resultan especialmente eficaces. Aunque algunas de estas defensas han sido bien estudiadas, otras han recibido menos atención y siguen siendo poco conocidas en muchos sistemas parásito de cría–hospedador. Este es el caso de los cambios en la fenología reproductiva por parte de las especies hospedadoras, que podrían adelantar o retrasar la puesta de huevos para desincronizarla de la actividad reproductiva del parásito. En este estudio, llevamos a cabo censos durante toda la época reproductiva para analizar la fenología de puesta de 11 especies potencialmente hospedadoras del cuco común en Sierra Nevada, con el objetivo de compararla con la del parásito. Nuestros resultados muestran que aproximadamente la mitad de las especies estudiadas no presentan solapamiento temporal con los picos de actividad reproductiva del cuco. En conjunto, nuestros resultados apoyan la hipótesis de que algunos potenciales hospedadores del cuco podrían ajustar su fenología reproductiva como una estrategia para disminuir la posibilidad de ser parasitados. No obstante, se requieren estudios experimentales que permitan confirmar esta asociación y profundizar en los mecanismos coevolutivos implicados.

Sesión 4. Miércoles 2 de septiembre, 9:45-11:00

O21. Kinship and social structure in the Iberian Magpie (*Cyanopica cooki*): 25 years of social network analysis in a cooperatively breeding species

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1) Estación Experimental de Zonas Áridas (EEZA-CSIC) 2) Universidad de Extremadura (UEX)

Social structure can promote cooperation beyond the immediate family by fostering social stability and increasing tolerance among individuals. However, in cooperatively breeding species, distinguishing between cooperation mechanisms driven by social structure and those based on kinship is challenging, especially when spatiotemporal stability leads to a strong correlation between geographic proximity and relatedness. In this study, we examined the social organization and the role of kinship in the Iberian magpie (*Cyanopica cooki*), a cooperatively breeding bird species, using 25 years monitoring data from a population. We analyzed the stability of social relationships from winter to the breeding season, as well as across consecutive seasons, by comparing social networks constructed from a five-year subsample. The results indicate that associations between individuals show some seasonal continuity, but also undergo changes, revealing a flexible social structure. We further assessed the persistence of associations by comparing network metrics across periods, but found no consistent patterns. Accordingly, the winter association index between pairs of individuals ($n = 2,667$ days) was generally low, and only 1% of the pairs were associated in more than half of the observations (i.e., with a value greater than 0.5). We also explored whether the winter association index related to nest proximity and shared membership in cooperative groups in spring. We found that individuals more strongly connected in winter tended to nest closer together and to belong to the same breeding group in spring. To assess the influence of kinship, we analyzed the correlation between matrices of pairwise associations and kinship matrices derived from pedigree data over the years. Additionally, we evaluated whether the likelihood of recruited offspring associating with relatives in spring depended on their social status. Overall, the data suggest that cooperative breeding in the Iberian magpie is strongly influenced by kinship, which may be a key factor shaping its social structure.

O22. Phenological plasticity and reproductive responses under changing climate: A long-term study in Pied Flycatchers

Enrique González-Bernardo², Jesús Martínez-Padilla³, Carlos Camacho⁴, Jaime Potti⁴, David Canal¹

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Temperate-zone breeders must synchronize reproduction with optimal environmental conditions to maximize fitness, as phenological mismatches can reduce reproductive success. Phenological plasticity—in both timing and investment—is therefore crucial for coping with rapid climate change with minimal fitness consequences. We predicted that pied flycatchers track specific pre-laying environmental conditions, and that plastic adjustments in laying date and clutch size buffer fitness costs under shifting climate. To test this, we (i) quantified long-term trends in spring temperature and precipitation; (ii) evaluated whether pre-laying conditions at individual level have remained similar over the study period—implying active timing of laying to specific (optimal) conditions; (iii) assessed advances in laying dates over time and with warming; (iv) quantified clutch size plasticity as a function of laying date, laying synchrony and pre-laying climatic conditions and (v) examined consequences of variation in pre-laying climatic conditions for fledging success. Using mixed models on 3,207 events (34 years), we model: (i) spring mean temperature and cumulative rainfall trends against year; (ii) pre-laying temperature and rainfall against year to test whether pre-laying conditions have remained similar over the study period; (iii) laying date in relation to year, temperature and precipitation; (iv) clutch size against synchrony and the interactive effects between laying date and pre-laying temperature and rainfall (15-day window, after comparing multiple window lengths), controlling for variation with female age; (v) fledging success with the same predictors as in the previous step. Spring mean temperatures increased and rainfall declined over time, and laying dates advanced both annually and with warmer springs. Pre-laying climatic conditions remained consistent over the years, supporting active adjustment of laying onset to match specific (optimal) pre-laying conditions. Clutch size showed plasticity, declining more steeply with delayed laying dates when pre-laying temperatures were higher, with no effect of rainfall. Fledging success increased with earlier layings regardless of pre-laying environmental conditions indicating that phenological and clutch size adjustments allowed to maintain reproductive output. Pied flycatchers maintain reproductive performance under changing spring conditions by advancing laying dates and plastically adjusting clutch size to prevailing conditions, together buffering fitness in a rapidly changing environment.

O23. Invisible neighbours: Differences between perceived and actual social density on maternal investment decisions

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Mothers may use environmental cues to predict the conditions that their offspring will experience after birth and adapt their development to better thrive under those conditions. In oviparous species, one key mechanism behind this process is the allocation of maternal hormones to the eggs. For example, previous studies in birds suggest that females respond to social density (i.e., the number of conspecifics) by altering the transfer of testosterone to the eggs. Nonetheless, whether such a maternal effect translates into differences in the behavioural (social) phenotype of the offspring remains unclear. In two separate experiments performed in two different years, we explored whether wild blue tit (*Cyanistes caeruleus*) females adjust the allocation of maternal testosterone in response to social density, and whether this shapes the development of social traits in offspring. In the first experiment, we used conspecific vocal playbacks before egg laying to simulate high social density, while in the second experiment, we directly manipulated the number of nest-boxes to create high and low density plots. We found that mothers subjected to social cues from conspecifics allocated less testosterone to eggs, which was associated with higher sociability in nestlings. Conversely, females breeding in high-density plots transferred more testosterone to eggs than those in low-density ones, and higher social densities had a sex-specific effect on their offspring's social preferences. Male offspring showed a stronger social preference than female offspring when raised in low-density plots. Overall, these results suggest that maternal allocation of testosterone to eggs is associated with direct social (and possibly competitive) interactions. The next step is to determine whether the observed changes in the social phenotype of the offspring are adaptive.

O24. Factores que determinan la latencia de la respuesta del hospedador frente a los huevos parasitarios: un enfoque metaanalítico

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El rechazo de huevos es la estrategia de defensa más utilizada por los hospedadores de parásitos de cría de las aves para mitigar los costes que impone el parasitismo. El intervalo de tiempo entre el evento parasitario y el rechazo del huevo es un aspecto crucial de las defensas antiparasitarias del hospedador, pero los principales factores que determinan la latencia del rechazo en diferentes contextos y sistemas parásito-hospedador siguen siendo inciertos. Mediante un metaanálisis de experimentos de rechazo de huevos en diversos sistemas parásito-hospedador identificamos los factores clave que influyen en la latencia del rechazo. Se observó que los hospedadores de poblaciones simpátricas con parásitos rechazaban los huevos más rápidamente que los de poblaciones alopátricas. Las características de los huevos afectaron significativamente al tiempo de rechazo: los huevos más miméticos fueron rechazados más tarde; los huevos de tamaño similar fueron los que más tardaron en ser rechazados, mientras que los huevos más pequeños fueron los más rápidos. Además, las tasas de rechazo más elevadas se asociaron a un rechazo más rápido. En particular, la duración del periodo de seguimiento del nido por los investigadores fue un factor que influyó significativamente en los resultados, lo que subraya la importancia de consideraciones metodológicas. Nuestros hallazgos confirman que las características que se sabe que desencadenan el rechazo de huevos a menudo también influyen en la latencia del rechazo. Este estudio avanza en nuestra comprensión de las características clave que subyacen a las defensas del hospedador, al tiempo que subraya la importancia de las metodologías estandarizadas, en particular en la duración del seguimiento de los nidos, para garantizar una evaluación precisa de la latencia del rechazo de los huevos.

O25. Sociabilidad y personalidad en el pingüino barbijo

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1) Universidad de Alcalá (UAH) 2) Museo Nacional de Ciencias Naturales (MNCN-CSIC)

Los estudios sobre sociabilidad en el mundo animal indican que existe variabilidad entre los individuos, y los individuos más sociales se relacionan más con otros individuos. Por otro lado, los estudios sobre personalidad animal describen ejes de variación entre los individuos en relación con la agresividad, la exploración o la audacia. Sin embargo, la relación entre sociabilidad y personalidad está menos explorada, si bien una pudiera tener implicaciones importantes sobre la otra. El objetivo de este trabajo ha sido indagar sobre estos aspectos en el pingüino barbijo (*Pygoscelis antarcticus*) durante la época reproductora. Para ello se han analizado 1) fotografías realizadas por fototrampeo de individuos en nido para detectar interacciones con otros individuos de la colonia como medida de sociabilidad, y 2) vídeos de los mismos individuos interactuando con un objeto novedoso como medida de la personalidad. Este estudio explora la intersección entre personalidad animal y sociabilidad en un ave colonial, y discute sus posibles implicaciones ecológicas y evolutivas.

O26. Entre especies y estrategias: el papel del polimorfismo en la evolución del aislamiento reproductivo en caballitos del diablo

Rosa Ana Sánchez Guillén¹

1) Instituto de Ecología (INECOL) A.C.

La hibridación entre especies cercanas proporciona un escenario ideal para estudiar las interacciones entre fuerzas intra- e interespecíficas en la evolución del aislamiento reproductivo. En este contexto, investigamos el papel del polimorfismo femenino en la dinámica de reforzamiento y desplazamiento de caracteres reproductivos (DCR) en dos especies de libélulas, *Ischnura elegans* e *Ischnura graellsii*, las cuales presentan morfos femeninos con estrategias reproductivas alternativas y han formado al menos dos zonas híbridas independientes en España. Para ello evaluamos: 1) la frecuencia de los morfos femeninos y su tasa de apareamiento en las zonas híbridas en comparación con la zona de alopatría. 2) el reforzamiento y el DCR en los morfos de color (androcromo y ginocromos). Evaluamos la intensidad de cinco barreras reproductivas precigóticas en cruces coespecíficos y heterospecíficos, tanto en poblaciones simpátricas como alopátricas. Además, mediante morfometría geométrica, evaluamos DCR en estructuras clave para el apareamiento, como el protórax en hembras y machos, y los apéndices caudales en machos, tanto en las zonas híbridas como en alopatría. Detectamos un aumento en la frecuencia de hembras androcromas en ambas especies al ingresar en las zonas híbridas, especialmente en *I. elegans*. Este incremento podría explicarse porque estas hembras están aisladas reproductivamente de forma innata de los machos de *I. graellsii*, posiblemente como consecuencia de sus diferentes estrategias reproductivas, lo que les confiere una ventaja en las zonas híbridas. Sin embargo, el reforzamiento y el DCR asimétrico —presente solo en las hembras ginocromas— reducen esta ventaja en las zonas híbridas. La frecuencia de apareamiento de los morfos femeninos de ambas especies se vio influenciada tanto por las proporciones locales de machos coespecíficos y heterospecíficos, como por la frecuencia local de morfos femeninos de color. En resumen, nuestro estudio muestra cómo el polimorfismo femenino interactúa con la hibridación para moldear barreras reproductivas, morfología de los caracteres reproductivos y frecuencias fenotípicas, contribuyendo así a procesos de especiación incipiente en estos odonatos.

O27. Coexistence and divergence of chromosomal lineages in common quails

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A large chromosomal inversion was previously identified in common quails (*Coturnix coturnix*) associated with differences in body size, migratory behavior and pigmentation among karyotypes. Such inversion could result in reduced survival of individuals carrying the two chromosomal types and could promote selective forces to keep them apart. This study explores the phenology and coexistence of three karyotypes—homozygotes for the standard chromosome (AA), heterozygotes (AB), and homozygotes for the inversion (BB)—around Doñana National Park (Spain). Through year-round sampling, we investigated (a) the frequency and seasonal patterns of karyotypes in wild quail populations, (b) the relationship between the inversion and phenotypic diversity in morphology, migratory behavior, and pigmentation, and (c) the mechanisms supporting genotype coexistence, such as temporal segregation in breeding time. We integrated genomic data from Genotyping-by-Sequencing (GBS), stable isotope data ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$, and $\delta^2\text{H}$), and morphological measurements. Consistent with previous research, we found that the inversion was significantly associated with phenotypic traits like body mass, wing shape, and coloration. Stable isotope data ($\delta^2\text{H}$ and $\delta^{13}\text{C}$) showed that AA individuals had wider migratory movements than BB and AB quails and also indicated potentially different diets of AA quails staying in Doñana during winter. The results also showed that all three karyotypes were present across seasons, with adult heterokaryotypes (AB) being predominant among breeders, while yearlings of this karyotype were underrepresented compared to expectations which could support the presence of selective forces reducing their fitness. These results hint at an emerging separation between two chromosomal lineages. These findings highlight the importance of chromosomal inversions in sustaining genetic diversity and supporting adaptive strategies, even amid ongoing gene flow and environmental pressures.

O28. Social organization and the evolution of dental dimorphism in papionines

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Sexual dimorphism—the degree of morphological, behavioural and chromatic difference between males and females—varies widely among primates and is thought to be shaped by different factors. The Anatomical Hypothesis of Sexual Dimorphism predicts greater canine and bodysize dimorphism in species organised into harem/one-male units (OMUs) than in those inhabiting multimale multifemale (MMM) societies in primates as a phenomenon of sexual selection. Here, we test this hypothesis in 24 highly dimorphic papionine monkey species of the clades *Papio*, *Theropithecus* and *Mandrillus* (9 extant, 15 extinct) by analysing canine crown height (UCH) and buccolingual width of upper molars (LM1–LM3) in 847 individuals (3915 dental measurements), and relating them to their social structures. We calculate coefficients of variation (CV) to quantify dental dimorphism, apply ANOVA ($P < 0.05$) to assess sex differences, and use linear models to explore relationships among tooth size, dimorphism, geological time (million years ago, Mya) and sociality. All extant papionines exhibit pronounced UCH dimorphism ($CV \approx 30\text{--}40\%$), with MMM species generally showing higher values than OMU species—except in *Mandrillus*—thus contradicting the Anatomical Hypothesis. Regression of absolute tooth size on time reveals modest but significant increases in UCH ($\Delta \approx 1.6\text{ mm}$) and molar width (LM1–LM3) over the past c. 4 Mya, with regression lines crossing between 0.8 and 1.7 Mya. Moderate positive correlations between UCH and molar dimorphism ($R^2 \approx 0.27\text{--}0.29$, $P < 0.05$) indicate that canine and molar dimorphism evolve in concert. Crucially, multivariate models incorporating time and sociality explain up to 83.1 % of the variance in UCHCV ($R^2 = 0.831$, $P < 0.05$), with MMM species exhibiting, on average, 21.7 units higher UCHCV per million years than OMU species. These findings demonstrate a general evolutionary trend toward reduced canine and molar dimorphism since > 4 Mya—except in *Papio*—and highlight the overriding influence of social organisation over clade affiliation in shaping dental sexual dimorphism. Our results refute the Anatomical Hypothesis in papionines and underscore the need to consider socioecological context when interpreting patterns of dimorphism in fossil and extant primate lineages.

O29. Evolución contemporánea de la cotorra argentina: la selección natural impulsa cambios morfológicos en las zonas invadidas

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Las especies invasoras no nativas ofrecen un marco de gran interés para estudiar la evolución contemporánea, al proporcionar información sobre cómo estas especies se ajustan a nuevos entornos. En contextos urbanos, la selección natural puede desempeñar un papel aún más importante, facilitando los procesos de adaptación local. En este estudio, examinamos si la morfología de la cotorra argentina (*Myiopsitta monachus*) ha experimentado cambios evolutivos en respuesta a variaciones que ha experimentado la especie en su dieta y comportamiento de forrajeo en la ciudad de Barcelona en los últimos 30 años. Utilizando datos de captura-recaptura ($N = 1.182$) recogidos entre 2009 y 2023, aplicamos modelos de supervivencia en MARK y RMark para evaluar la relación entre rasgos morfológicos y supervivencia. Nos centramos en el peso corporal, la longitud del ala y de la cola, medidas del pico y tamaño del cráneo. Nuestro análisis reveló selección direccional relacionada con una mayor supervivencia a favor de una mayor longitud de alas y colas, así como un mayor tamaño del cráneo. Los análisis también muestran aumentos en estos parámetros biométricos que van del 0,01 al 0,32% de incremento anual. Alas y colas más largas podrían mejorar el rendimiento en vuelo, incluyendo la velocidad de despegue y la capacidad de dispersión, mientras que cráneos más grandes podrían estar relacionados con un aumento general del tamaño o incluso con un mayor tamaño cerebral, facilitando la explotación de recursos urbanos. Estos resultados sugieren que la selección natural podría estar moldeando los rasgos morfológicos de las cotorras argentinas en su proceso de adaptación al entorno urbano.

O30. Entendiendo la evolución de las características acústicas del canto en aves

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El canto de las aves es una señal acústica bien conocida que juega un papel fundamental en la comunicación de las especies. Aunque se cree que la selección sexual es el principal impulsor de la evolución del canto de las aves, existen múltiples presiones de selección que actúan simultáneamente para lograr una mejor transmisión y/o honestidad de las señales. Aquí presentamos un análisis comparativo de ecuaciones estructuradas corregido filogenéticamente (PPA) para explorar la relación evolutiva causa-efecto entre la selección sexual, el tamaño corporal y el ambiente sobre las características del canto en aves. El PPA estima los efectos directos, indirectos y la importancia relativa de los modelos causales. Por lo tanto, el PPA permite entender las posibles relaciones causa-efecto entre los factores que probablemente afectan la evolución de la frecuencia del canto en aves. Pusimos a prueba la hipótesis morfológica (efecto del tamaño corporal), de adaptación acústica (efecto del ambiente) y de selección sexual. Obtuvimos las características de frecuencia (máxima, mínima, pico, ancho de banda) para 472 especies de aves neotropicales. Calculamos el porcentaje promedio de cobertura boscosa en el rango de distribución de cada especie y recopilamos un conjunto de rasgos morfológicos que fueron reducidos mediante un análisis de componentes principales. Finalmente, recolectamos datos de dimorfismo sexual, como un indicador de selección sexual. Con el paquete phylopath en R se implementaron diferentes modelos de ecuaciones estructuradas para cada una de las variables respuesta. Estos modelos incluyeron 100 árboles filogenéticos para tener un marco filogenético confiable. Encontramos que las características de frecuencia son explicadas simultáneamente por el ambiente, la morfología y el dimorfismo. Además, el ambiente y el dimorfismo afectan la morfología, configurándose un efecto indirecto sobre la frecuencia. Mostramos evidencia de que todos los factores (ambiente, selección sexual, morfología) interactúan de manera intrincada impulsando la evolución del canto de las aves, lo que respalda todas las hipótesis. Concluimos que la evolución actúa de una manera compleja y sugerimos que el uso de métodos como los PPA pueden ser más adecuados para evaluar las interacciones involucradas en la evolución de los rasgos acústicos.

O31. Factores ecológicos asociados al tamaño corporal y al dimorfismo sexual en tamaño en la lagartija colirroja

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El tamaño corporal y el dimorfismo sexual en tamaño son rasgos de historia de vida fundamentales que varían ampliamente entre poblaciones, influidos por factores ambientales y por la selección sexual. En este estudio analizamos cómo el clima, la productividad primaria y la intensidad de la selección sexual se relacionan con el tamaño corporal y el dimorfismo sexual en tamaño en 19 poblaciones de lagartija colirroja (*Acanthodactylus erythrurus*) distribuidas a lo largo de gran parte del territorio peninsular español. Durante la primavera y principios del verano de 2010, 2011 y 2013 se capturaron 358 adultos (194 machos y 164 hembras). Para cada individuo se tomaron medidas morfológicas y se caracterizó el microhábitat, y para cada población se obtuvieron variables climáticas y de productividad mediante sistemas de información geográfica. Se utilizaron modelos filogenéticos de mínimos cuadrados generalizados (PGLS) para examinar la influencia de estas variables, incorporando la estructura filogenética entre poblaciones. Los resultados mostraron que el tamaño corporal de los machos fue mayor en poblaciones con mayor estacionalidad (mayores rangos de temperatura y precipitación), menor precipitación en primavera-verano y temperaturas máximas más elevadas. En contraste, el tamaño de las hembras se asoció positivamente con el índice de vegetación EVI, indicador de productividad primaria. Esto sugiere que los tamaños corporales de machos y hembras responden a presiones selectivas distintas, ambientales en ambos casos, pero posiblemente relacionadas con diferentes aspectos del ciclo vital. Los machos fueron significativamente más grandes que las hembras, y el dimorfismo sexual en tamaño fue mayor en poblaciones con temperaturas medias más altas, vegetación más alta en el microhábitat, y machos con cabezas proporcionalmente más grandes, rasgo vinculado a la competencia intrasexual. Estos resultados apoyan un papel conjunto de la selección sexual y de los factores ambientales en la evolución del dimorfismo sexual en tamaño en esta especie.

O32. Beyond the breeding season: Winter associations shape pair bonds in a gregarious passerine

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In social animals, maintaining strong bonds with conspecifics is crucial for both reproduction and survival. A primary type of social relationship is that formed among reproductive partners during the breeding season. In birds, pair bonds have been extensively — and almost exclusively — studied within the reproductive context, largely due to the difficulties associated with collecting data during the winter months. As a result, there remains limited information on whether pair bonds extend beyond reproduction. In fact, it is commonly assumed that pair bonds are established at the onset of the breeding season. Using winter social interaction data from an RFID-tagged spotless starling (*Sturnus unicolor*) population at feeders, we studied whether stable pairs that bred in consecutive seasons, maintained their pair bond across the non-breeding season. Additionally, we examined if social interactions during the preceding winter are indicative of the mate choice of newly formed pairs. Our results showed that in the majority of the stable pairs, male and female partners were respectively each other's strongest social associate during the non-breeding season. This pattern was also observed in over half of the newly formed pairs. Furthermore, the difference in association strength between the top-associated partner and the second strongest associate was similar in both new and stable pairs, suggesting that the expression of pair bonding in new pairs was already similar to those expressed by stable pairs during winter and before the breeding season. These findings challenge the common belief that pair formation in this species takes place in spring and highlight the potential for non-breeding social associations to drive patterns of sexual selection. Our results emphasize the need to understand which traits individuals assess when choosing a mate, since sexual ornamentation or displays are typically produced around the breeding season.

O33. Reintroduction provides insight into multimodal mimicry evolution in an ant social parasite

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Understanding the evolutionary dynamics between parasites and their hosts is crucial for comprehending species adaptation and ecosystem resilience. We studied the evolutionary responsiveness of the socially parasitic butterfly *Phengaris teleius* to its host ant *Myrmica scabrinodis* after a reintroduction event. The reintroduction of *P. teleius* to the Netherlands three decades ago provided a unique opportunity to examine the host-parasite coevolutionary processes. We compared chemical and acoustic signals of caterpillars from the reintroduced Dutch population and the source Polish population, focusing on adaptations to the local *M. scabrinodis* ants. Employing cuticular hydrocarbon (CHCs) analyses, vibroacoustic signal comparisons, playback experiments, and behavioral assays, we assessed changes in the caterpillar communication strategies. Our results reveal that the reintroduced caterpillars exhibit distinct chemical and vibroacoustic profiles compared to the source population after approximately 30 generations. In the pre-adoption phase, chemical similarity in the reintroduced population remains limited, but comparable to that observed in the source system. However, post-adoption chemical development appears less pronounced than in the source population. Nevertheless, the achieved similarity seems sufficient to ensure host acceptance and survival during adoption. Notably, the acoustic signals of the reintroduced caterpillars showed greater similarity to their sympatric host ants, suggesting an efficient local adaptation. Our findings demonstrate that *P. teleius*, a generalist within the *Phengaris* genus, can rapidly respond to new ecological contexts by modifying its chemical and vibroacoustic signals to potentially adapt to a novel host population, highlighting the adaptability of this social parasite.

O34. Does offspring behavior shape optimal litter size in large mammals? Insights from Brown bears

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Understanding the determinants of optimal litter size is a key question in life-history theory. While ecological constraints and maternal investment have been extensively studied, the role of offspring behavioral development remains underexplored. Here, we examined whether litter size influences early behavioral development in brown bear (*Ursus arctos*) cubs. We analyzed 5,968 behavioral observations collected from video recordings of 61 free-ranging bear family groups in the Cantabrian Mountains (Spain) between 2009 and 2019, up to 17 months of cub age, when family breakup typically occurs. Our analyses focused on how litter size, cub age, and maternal behavior influenced cub behavioral development, specifically in the domains of foraging (exploration and food searching), rest, and social behavior (play and affiliative interactions). We found that cubs from two-cub litters exhibited distinct behavioral profiles compared to those from litters of one or three. Specifically, dyads showed reduced individual foraging and exploratory behaviors, and increased social interactions. These patterns suggest improved social learning opportunities. Cubs in litters of three displayed intermediate patterns, often resembling singletons. Importantly, maternal behavior remained consistent across litter sizes, indicating that observed differences in cub behavior were primarily shaped by sibling dynamics. Across more than 40 brown bear populations, the average litter size is two, consistent with our results suggesting that two-cub litters offer an optimal balance of social and developmental benefits. Similar patterns have been observed in small mammal species under laboratory conditions, where intermediate litter sizes are associated with more favorable neurobehavioral outcomes. Our results support the “common optimal litter size” model, which proposes that litter size can be evolutionarily optimized to support both maternal efficiency and offspring development, while also highlighting offspring behavior as a relevant factor in this dynamic. Altogether, our study provides novel empirical evidence that behavioral development, not just energetic trade-offs, can shape optimal litter size in free-ranging large mammals. These findings offer new perspectives on the evolution of reproductive strategies in long-lived mammals with extended maternal care.

O35. Habitat selection in Blue tits: The role of stress phenotype and social density

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Breeding site selection can be influenced by social information, as individuals may base their habitat preference on conspecific densities. While it can be assumed that individuals make well-informed decisions, we know very little about how their choices are shaped by an individual's predisposition, such as long-term stress and body condition. Moreover, once settled, individuals may in turn modify their behaviour and stress response to adapt to a certain social density (adaptive plasticity). This study, therefore, investigates the causes and consequences of breeding site selection in blue tit females (*Cyanistes caeruleus*) in a nest-box breeding population, where we experimentally manipulated the social density (i.e. the number of nest-boxes). We found that the female's phenotype did not predict breeding site selection, since neither female body condition nor corticosterone concentration in feathers (a proxy for long-term stress) influenced their preference for high or low breeding densities. However, after settlement, females breeding in low-density areas showed higher breathing rates, suggesting that social density in turn influenced their stress response in the short term. In addition, corticosterone concentrations in feathers were positively correlated with breathing rates, indicating consistency in the stress phenotype. Thus, feather corticosterone may provide insight into how females respond to stress, regardless of their breeding location. These findings highlight the complex interplay between stress sensitivity and social density, paving the way for future research into female's behaviour and habitat selection.

O36. Dynamic begging displays as partly informative signals of nestling hunger

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Costly signalling models of nestling begging regard it as an information-rich signal that allows parents to obtain accurate information about their offspring's level of need or hunger. These models typically focus on a single type of honest signalling equilibrium—the separating equilibrium—in which each condition state produces a unique, distinct signal intensity in a gradual manner. However, communication between relatives could evolve into alternative equilibria, such as pooling equilibria—where there is some overlap in hunger states across different begging intensities—or mixed equilibria—where certain random, but directional, variability exists in how begging intensities vary with hunger and in how parents respond. In this study, we combined observations of spotless starling nestling begging and parental feeding in natural broods with a laboratory deprivation experiment to revisit the concept of begging honesty, exploring theoretical alternatives to separating equilibria models. First, we assessed whether postural begging displays function as graded signals by analysing their fine temporal structure. We then tested whether such variation predicted intermediate levels of food deprivation. Second, we measured the efficacy and consistency of postural and vocal begging as indicators of hunger using both traditional correlational methods with random regression, along with novel information-theory measures. Our results suggest that postural begging does not function as a graded, information-rich signal as predicted by separating equilibria models. Postural displays were highly efficient coding about extreme, but not intermediate hunger levels, showing a bimodal pattern. The most informative component of the postural display was the duration at maximum intensity, while other postural or acoustic variables conveyed little or no information. We also found substantial random variation in the relationship between food deprivation and signal intensity, as well as in parental responses to these signals. This random variation departed from pure noise in ways predicted by mixed equilibria models. These findings suggest that begging may align more closely with the predictions of partly-informative pooling and mixed equilibria models. This study highlights the need to reconsider the strict reliance on separating equilibria in models of parent-offspring communication, suggesting that alternative equilibria may offer a more accurate framework for explaining natural observations.

O37. Morfología y jerarquía: explorando la dominancia social en una especie de roedor silvestre

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Las jerarquías de dominancia social influyen profundamente en la estructura y dinámica de las poblaciones animales, al modular el acceso diferencial a recursos clave como el alimento, el refugio, la reproducción y la supervivencia. El ratón de campo (*Apodemus sylvaticus*) es una de las especies más abundante y ampliamente distribuida en Europa, sin embargo, la información sobre el comportamiento social de la especie es muy escasa. Con el objetivo de identificar qué factores determinan la dominancia en esta especie, analizamos la relación entre variables morfométricas y el estatus social de los individuos, mediante el denominado “test del tubo” y el análisis comportamental de los enfrentamientos entre pares. Las variables morfométricas analizadas fueron el peso corporal, la distancia anogenital (DAG), el tamaño corporal (CC) y el índice de condición corporal (ICC). De manera general, los ratones mostraron cambios en el rango social cuando se enfrentaban a un animal con un peso diferente (mayor o menor) que el suyo. De modo que los ratones con mayor peso, DAG, CC e ICC tendían a comportarse de forma más dominante, mientras que los de peso similar o inferior mostraban más frecuentemente conductas subordinadas. Además, aquellos con mayores valores morfométricos tendieron a mantener o adquirir dominancia, mientras que la pérdida del estatus dominante fue menos común entre ellos. Estos resultados sugieren una relación potencial entre ciertas características físicas y el estatus social, lo que apunta a un papel modulador de la morfología en la estructura jerárquica de esta especie. Sin embargo, son necesarios estudios adicionales para comprender los determinantes ecológicos y evolutivos de la dominancia social en pequeños roedores.

O38. Los mirlos usan el olfato para encontrar su alimento

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La dieta ha jugado un papel importante en la evolución de las capacidades olfativas de las aves. Los Procellariiformes y Sphenisciformes pueden detectar el dimetilsulfuro, un compuesto que señala áreas de gran productividad en los océanos donde estas aves marinas pueden encontrar su alimento. El olfato de las aves también juega un papel importante en las interacciones entre plantas, herbívoros artrópodos y sus depredadores, ya que las aves insectívoras pueden detectar los volátiles de las plantas inducidos por la herbivoría. Otros grupos en los que se ha demostrado el uso del olfato para encontrar el alimento son los buitres de América, las rapaces como los cernícalos vulgares y algunas especies de Psitaciformes. Sin embargo, siguen faltando evidencias en otros grupos de aves, como las aves insectívoras que se alimentan en el sustrato. Realizamos un estudio experimental en cautividad para estudiar si los volantes de mirlo común, *Turdus merula*, pueden detectar las señales químicas de una de sus presas, la lombriz de tierra *Eisenia andrei*. Los volantes fueron liberados en un terrario con dos recipientes que contenían tierra. Uno de los recipientes contenía tierra que había tenido lombrices hasta el momento del experimento, cuando fueron retiradas, y el otro recipiente contenía tierra de composición similar pero que no había tenido lombrices. Se anotó el número de visitas y el tiempo cerca al recipiente con olor de lombriz para determinar si el olfato juega un papel importante en la búsqueda del alimento en esta especie de ave insectívora. Los resultados se discuten desde un punto de vista ecológico evolutivo.

O39. Modulation of sex traits in response to social environment

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Sexual traits, either weapons or ornaments, are generally costly to produce. The production cost depends on the condition of the individual, making optimal development condition-dependent, which in turn affects their reliability in the case of signaling. There is a broad theoretical basis and empirical evidence supporting this condition dependence, linked to the costs associated with the development of sexual traits. However, the benefits that a sexual trait provides to an individual are not solely determined by the degree of development of that trait. Since such benefits arise from sexual competition, the social environment plays a crucial role in the realization of potential benefits. Optimization theory of investment in sexual traits must therefore account for this modulation, which depends not only on costs but also on expected payoffs. In recent years, we have studied this modulation in male red deer traits, specifically antlers and the black ventral patch. To do so, we collected data from two types of populations (open and fenced), which strongly differ in sex ratio and male-age population structure, and hence in the intensity of male–male competition for mating. In addition to field data, we conducted experiments under captive conditions simulating two contrasting social environments: one with high and one with low presence of male competitors relative to females. The results showed reduced development of sexual traits when the level of competition was low, indicating plastic modulation in response to the social environment. Transcriptomic analysis revealed that this modulation is underpinned by differences in the expression of genes related to sexual traits. Such findings are rare in the literature on sexual traits. We discuss how theoretical models of plasticity in the development of sexual traits should incorporate modulation dependent on the expected benefits determined by the social environment.

O40. Carotenoid-based ornament expression level positively correlates with survival in male but not female birds: a phylogenetic meta-analysis

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Carotenoid-based ornaments in vertebrates have been the focus of intense research for decades. They are considered signals informing about the quality of the bearer in social or sexual selection contexts. They should, theoretically, transmit reliable information that benefits both the signaler and the receiver to evolve as signals. Recent meta-analyses have demonstrated that carotenoid-based ornament expression is correlated to physiological markers of condition and reproductive capacity, at least in birds, i.e., the most studied taxon in this framework. Thus, these traits reveal the owner's individual quality in terms of fitness potential, deduced from fecundity and survival estimates. The latter (survival) is inferred from studies correlating carotenoid-based ornament expression levels with parameters such as immune competence, oxidative stress, parasite resistance, etc. Here, we performed a phylogenetic meta-regression to directly address that question on survival rates or longevity estimates from available literature in birds, which included 29 studies on 20 avian species. We detected a significant positive correlation between the expression level of carotenoid-based colorations and survival. The effect, however, was found in males but not females. We argue sex-related differences in longevity, oxidative status and life history to explain this difference. Additionally, we hypothesized that red carotenoid-based ornaments should better predict longevity than those colored by yellow carotenoids. The first group of colorations is often attained by synthesizing red keto-carotenoids from dietary yellow carotenoids. Oxidative enzymes make this transformation probably related to mitochondrial metabolism, whose malfunction is, in turn, linked to aging and reduced longevity. We did not detect significant differences in the capacity to reveal survival probabilities between red and yellow (or transformed vs dietary) carotenoid-based ornaments. It is probably too early to extract definitive conclusions about this hypothesis due to the scarcity of studies.

O41. Los volátiles del barro como pistas olfativas para la selección del material usado en la construcción de nidos en la golondrina común

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El material seleccionado por las aves para construir sus nidos desempeña un papel clave en su éxito reproductivo por diversos factores, entre ellos por su capacidad de inhibir el crecimiento bacteriano y por tanto evitar la infección de huevos y pollos. Sin embargo, los mecanismos por los que las aves seleccionan el material más beneficioso son todavía desconocidos. Debido a la gran sensibilidad y capacidad de discriminación demostrada en aves en el reconocimiento de diversos compuestos químicos mediante el olfato, planteamos la hipótesis de que los volátiles presentes en el barro puedan constituir señales olfativas que las aves usen para seleccionarlo o evitarlo. Para explorar esto, mediante cromatografía de gases, comparamos los perfiles químicos del barro del suelo de zonas donde las golondrinas (*Hirundo rustica*) lo cogen, diferenciando dentro de estas zonas entre puntos de barro recolectado y no recolectado. Además, estudiamos dichos perfiles en el barro de nidos cercanos a los puntos de recolección. Evaluamos la riqueza química de compuestos volátiles, composición global y frecuencia de aparición de compuestos. Observamos diferencias en los perfiles de volátiles entre el barro seleccionado y no seleccionado, principalmente en la abundancia de diversos tipos de alcoholes como *hexanol* y *2-etilhexanol*, siendo mayor en el barro usado para construir los nidos. Además, esta mayor cantidad de alcoholes se corresponde con la que hay en los nidos. En cambio, el barro no seleccionado presenta una mayor abundancia de compuestos de otra naturaleza, destacando entre ellos *β -cyclocitral*, *ionona* e *indol*, compuestos no presentes en el barro no seleccionado ni en los nidos. Estas diferencias indican un posible reconocimiento de ciertos compuestos del barro por las aves, que podrían ser seleccionados o bien evitados para construir sus nidos. La relación de estos compuestos con determinadas propiedades del barro que puedan influir en el éxito reproductor, nos indicará la información que dichos compuestos aportan.

O42. Individual variation in the plumage structure of the great tit (*Parus major*): heritability and environmental effects

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Bird feathers play a key role in essential functions such as thermoregulation, signaling and flight. Despite their functional importance, little is known about the consistency of plumage structure across an individual life span, and the factors that determine variation in this trait. The aim of this study is to assess how feather structure varies with age within the same individuals, from nestling to adulthood, and to estimate both its heritability and the influence of environmental factors. To this end, chest feathers were collected from 28 Great Tits (*Parus major*) sampled at least twice in their lifetime (nestling plumage and winter or spring plumage) during a longitudinal study conducted between 2016 and 2019 at Vomb Fure (Lund, Sweden). We also have feathers from 14 families (14 mothers and 14 offspring with adult plumage). Feather structure was analyzed using standardized microscopy, and morphometric techniques. In addition, a proportion of the population was exposed to a food supplementation experiment during winter. This design allows us to estimate the individual repeatability and heritability of the trait, as well as to assess the influence of environmental factors such as food availability on the consistency of feather structure. It is then hypothesized that feather structure is a trait that is consistent within individuals over time, with a heritable basis and whose expression depends on the physiological condition of the bird. Individuals that were exposed to food supplementation during the winter will predictably show a greater repeatability in their feather structure compared to those in the control group, which would indicate greater stability of the trait under favourable environmental conditions. This study will contribute to the understanding of the evolutionary and developmental dynamics of feather structure in birds.

O43. Universal rule constraints vocal signals in vertebrates and indicates fitness in a songbird

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The production of acoustic signals to modulate animal interactions is common in most groups. Terrestrial vertebrates can use voice to produce sound and these vocalizations are essential to the advertisement displays of many species. Some features, such as sound frequency, are well known to be restricted by the physical attributes of the sound generating organs and thus, carry information of the anatomy and condition of the signaler. On the other hand, constraints that affect the duration of vocal displays have been less studied, although these features are often chosen as candidates to signal quality. Here, we studied the advertisement calls of 2,448 species of terrestrial vertebrates, including birds, frogs, geckos and mammals. The analysis of 26,658 vocal sequences, more than half a million sound elements, showed that the maximum length of a vocal sequence is inversely correlated with the duration of individual elements. This pattern indicates there is a trade-off between element and sequence length, although such constraint disappears as the inter-element gaps increase. Namely, for very low-density sequences with long gaps, the duration of the whole sequence is not constrained. The observed trade-off is modulated by body size, and larger animals produce longer sequences for the same density. The universality of the pattern and the body size association points to a fundamental cause: air storage capacity. An integrated analysis of song duration, note duration or gap duration in a songbird species explained variation in fitness in our study population. Our evidence, together with a diverse array of physiological adaptation found across taxa, suggest that maximizing density and duration of vocal sequences is universally adaptive. Revisiting the work after integrating this newly found limitations in vocal production could clarify the results and bring new light to the study of acoustic communication in animals.

O44. Desentrañando la fiabilidad del color del pico como señal sexual en el diamante mandarín

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La teoría predice que los rasgos que evolucionan como señales animales deben transmitir información fiable sobre la calidad del individuo portador. Usualmente se proponen dos hipótesis para explicar cómo las coloraciones basadas en carotenoides funcionan como señales fiables de calidad individual. La primera hipótesis sugiere el compromiso en la asignación de carotenoides entre la señalización y las funciones relacionadas con la supervivencia mantienen la fiabilidad de la señal. Solo los individuos de alta calidad podrían resolver este compromiso sin incurrir en una pérdida de aptitud física. Dichas señales son plásticas, y el emisor puede gestionar estratégicamente su nivel de expresión para aumentar los retornos en éxito reproductivo. La segunda hipótesis postula que ciertas señales basadas en carotenoides están fuertemente restringidas en su expresión, lo que impide la manipulación estratégica o el engaño. En este trabajo provocamos infecciones simuladas en diamante mandarín (*Taeniopygia guttata*) mediante la inyección de lipopolisacáridos (LPS) derivados de *Escherichia coli*. En comparación con los controles, las aves tratadas con LPS redujeron el enrojecimiento del pico, una señal sexual. Sin embargo, esta reducción se explicó en gran medida por la menor ingesta de alimento causada por LPS. En general, nuestros hallazgos sugieren que la coloración del pico basada en carotenoides refleja predominantemente la condición fisiológica reciente de los individuos y los compromisos en la asignación de recursos en lugar de indicar directamente la calidad individual.

O45. Invisibles pero vulnerables: efectos subletales de la contaminación del sustrato por herbicidas a base de glifosato sobre la fisiología y el comportamiento de un reptil de vida subterránea

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Los ecosistemas de todo el mundo están cada vez más expuestos a gran diversidad de contaminantes ambientales. Entre estos, los agroquímicos representan las sustancias más comúnmente utilizadas en las prácticas agrícolas. En particular, los herbicidas a base de glifosato han sido los más comercializados y aplicados legalmente en agricultura en las últimas décadas. Numerosos estudios han reportado efectos adversos en varias especies animales, pero su impacto en vertebrados de vida subterránea sigue siendo desconocido. En este estudio, evaluamos las respuestas fisiológicas y comportamentales de un reptil fosorial, la culebrilla ciega (*Blanus cinereus*), tras la exposición experimental a sustratos tratados con un herbicida comercial a base de glifosato. Los individuos se mantuvieron durante 21 días en terrarios con sustratos limpios o contaminados (7,2 mg/L de glifosato, la dosis de uso recomendada en agricultura) para evaluar los efectos sobre su salud general (condición corporal, respuesta inmune y niveles de glucocorticoides), así como las alteraciones en su comportamiento antidepredador. Tras los 21 días de exposición al glifosato, no se observaron cambios significativos en la condición corporal, pero los individuos expuestos mostraron una respuesta inmune reducida, lo que podría indicar inmunosupresión. Además, incrementaron la intensidad de sus comportamientos antidepredadores (enroscarse y sacudirse) y huían enterrándose más rápido que los individuos control, lo que sugiere una alteración comportamental, posiblemente asociada a un aumento en la respuesta de estrés fisiológico. Se realizaron también dos experimentos complementarios para evaluar la capacidad de *B. cinereus* para detectar y evitar sustratos contaminados con glifosato. En primer lugar, se utilizaron terrarios con sustratos limpios o contaminados con baja (3,6 mg/L) o alta concentración (7,2 mg/L) de glifosato. En segundo lugar, se realizaron pruebas de detección quimiosensorial utilizando estímulos olorosos con los mismos tratamientos, en un laberinto en T que simulaba un sistema de galerías subterráneas. Curiosamente, los individuos no evitaban, sino que mostraban atracción por sustratos contaminados con bajas concentraciones de glifosato, lo que sugiere una "trampa ecológica" con posibles consecuencias negativas para su estado de salud general. Estos resultados resaltan la importancia de utilizar indicadores comportamentales, en adición a los fisiológicos, para evaluar los efectos de la contaminación ambiental.

O46. Long-term impact of direct developmental noise exposure on spatial learning in the zebra finch

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Anthropogenic noise is a rapidly growing threat for biodiversity, affecting fitness in many ways. In particular, noise has been shown to affect acoustic communication across taxa, as well as more recently other behaviours, including learning and parental care, as well as stress physiology. However, most studies focus on the immediate impact of noise, and much less is known about the long-lasting effects of early-life noise exposure. Yet, stress experienced during development is known to strongly impact individual phenotype and fitness. Therefore, here, we tested the impact of early-life noise exposure on cognition at adulthood, in the Australian zebra finch. We experimentally exposed individuals to either traffic noise or conspecific song during the prenatal and postnatal periods, using a 2x2 factorial design, where only offspring, but not parents, were exposed. At adulthood, we tested individual spatial learning ability, based on performance in a foraging task. We found that pre and post-natal noise exposure had cumulative negative impact on growth and physiology. In addition, at adulthood, prenatal noise exposure, but not postnatal noise, led to reduced spatial learning abilities in females. Namely, females exposed to prenatal noise required more trials to learn the task and were less likely to learn, than those exposed to song prenatally. By contrast, males showed no effect of early-life noise exposure on learning abilities, but postnatal noise exposure led to increased exploratory behaviour in a novel environment. This study provides the first evidence that prenatal noise exposure can affect spatial learning at adulthood. It raises important questions on the direct impact of anthropogenic noise on development and its long-term consequences.

O47. Extreme environments modulate life-history trade-offs: reversing the longevity–reproduction relationship in beetles exposed to ionizing radiation

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Human activities are rapidly altering environmental conditions across ecosystems worldwide. In some cases, these changes result in elevated levels of contaminants that compromise an organism's health, ultimately reducing fitness and threatening the viability of populations. In this context, ionizing radiation stands out as a significant potential risk to wildlife. Elevated radiation levels can occur following nuclear accidents or the use of nuclear weapons. Ionizing radiation can affect organisms both directly by damaging DNA, and indirectly, through the generation of free radicals that interact with biomolecules. Despite the potential risk of ionizing radiation, its putative intra- and transgenerational effects remain poorly understood, with current evidence often limited to cross-sectional field-based studies. To address this gap, we conducted a long-term laboratory experiment to assess the consequences of a single exposure to a gradient of ionizing radiation on individual lifespan and lifetime reproductive success. We used the seed beetle *Callosobruchus maculatus*, a species in which reproduction is typically highly costly for females, and much less for males. Interestingly, we found that females exposed to high levels of radiation had longer lifespans, but this came at the cost of a substantial reduction in their lifetime reproductive success. In contrast, males exposed to high radiation levels exhibited declines in both lifespan and reproductive success. Notably, some of these effects persisted into the next generations. To our knowledge, this is the first report of a reversal in the trade-off between lifespan and reproduction, as a result of an environmental shift. These findings highlight the complex and sometimes counterintuitive effects that contaminants such as ionizing radiation can have on animal health and fitness. Understanding these effects is critical for predicting eco-evolutionary dynamics in the face of ongoing global change.

O48. Still begging for answers: Nestling signals revisited

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Nestling begging has become a model for understanding animal communication. Elaborate and seemingly costly behaviours such as calling, posturing, and gape colouration have traditionally been explained through signalling theory, particularly Godfray's (1991) model, which treats begging as an honest and costly signal of cryptic need. While widely adopted, this framework is now being challenged both theoretically and empirically. Begging may convey information—but what kind? While it is well established that begging reflects nestling hunger, this is not exactly what theory predicts. Whether begging also informs parents about long-term condition, beyond short-term hunger, remains unresolved—and difficult to test. Moreover, begging varies with many other factors, including sex, temperature, size, social environment, and experience. Is this complex blend of traits the message of interest to parents? How should we understand such high plasticity? In most studies, this variation is dismissed as noise, yet it aligns with recent models predicting low-cost, partly informative signals. Although there is broad consensus that begging is highly informative (and therefore must be costly), this assumption remains untested. On the receiver side, parents do respond to begging—but often inconsistently. Their decisions are influenced by non-begging traits and frequently show substantial intra- and inter-individual variation that classical begging theory overlooks. However, this variation is crucial to alternative explanations of begging as a cheaper, less informative signal. Also, after almost half a century of research, we still lack consensus on how parents decide which chick to feed—and this seemingly minor detail has major theoretical consequences. Begging is widely assumed to be costly, yet evidence for the direct costs proposed by traditional costly models—such as increased predation risk or physiological stress—remains elusive. Some possibilities, however (such as differential or out-of-equilibrium costs), remain unexplored. The field now needs models that allow for receiver inattention, integrate variation in both hunger and long-term reproductive value, and incorporate learning and plasticity. Crucially, traditional models treat begging as a purely competitive trait, overlooking cooperative behaviour among siblings driven by both indirect and direct shared benefits. Despite decades of work, nestling begging remains a rich field with many unanswered questions and exciting research opportunities.

O49. Use of water points and drinking behaviour of individual wild birds: wintering ring ouzels in an arid ecosystem of the Canary Islands

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Water is an essential resource particularly limited in arid environments, where it is scarce and unpredictable. For birds, water is necessary not only for hydration but also for thermoregulation through drinking and bathing. While most studies on avian water use have focused on species-level patterns, individual-level data remain scarce. The Ring Ouzel (*Turdus torquatus*), a key wintering seed disperser in El Teide National Park (high mountains of Tenerife, Canary Islands), offers an ideal model to investigate intra-specific water dependence in a harsh environment, especially due to its low numbers and the simplicity of the system. Using camera traps, we assessed the water use patterns and drinking behaviour of this population at three water points during one winter. We recorded bird visits, water-drinking frequency, bathing behaviour, and time spent per visit at water points. Individual visits were identified by recognizing previously ringed individuals ($n = 9$). A total of 2546 independent visits were recorded, with an overall water-drinking probability of 70%. Additionally, we classified the behaviour exhibited by individual birds when interacting with conspecifics as dominant, indifferent or subordinate to calculate a dominance index for each bird. We found significant differences among individuals for all types of behaviours. In addition, we identified dominance hierarchies, with some birds defending access to water. The dominance index was positively correlated with the number of sips per day and the drinking probability during the visit but negatively with the number of visits per day. Subordinate birds drank significantly less water per visit when interacting with dominant conspecifics. Other variables such as temperature or number of birds present at the water point also influenced water use. This study emphasizes the importance of considering individual-level behaviour and social dynamics when evaluating species' responses to resource scarcity in harsh ecosystems. Dominance hierarchies played a key role in shaping access to water, with dominant individuals exhibiting more efficient water use. Such behavioural asymmetries suggest that intra-specific social structure can modulate the physiological resilience of individuals in arid environments. This is particularly relevant in the current climate change scenario, where water availability is expected to become even more limiting.

O50. Cuando el calor silencia: efectos del estrés térmico sobre la fisiología y la comunicación química de un reptil subterráneo

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En el escenario actual de cambio global, es importante conocer los efectos de las variaciones ambientales rápidas esperadas que pueden comprometer la salud y supervivencia de los animales. Este impacto podría ser especialmente severo en animales fosoriales, que tienen una movilidad reducida y escasa capacidad para dispersarse hacia hábitats más favorables. En este estudio evaluamos los efectos del previsible aumento de temperaturas en una especie de reptil estrictamente subterránea, la culebrilla ciega (*Blanuscinereus*). Para simular una ola de calor moderada de corta duración, se sometió a individuos experimentales a un aumento realista de la temperatura ambiental en las horas centrales del día, durante diez días, mientras que un grupo control se mantuvo bajo condiciones térmicas normales. Previamente, se manipuló el estado fisiológico inicial de algunos individuos dentro de cada grupo mediante la aplicación no invasiva de corticosterona para simular un aumento del estrés debido a condiciones adversas previas, y examinar si estos individuos compensan peor los aumentos de temperatura. Se evaluaron los efectos conjuntos de ambos tratamientos sobre indicadores del estado de salud como la condición corporal, la respuesta inmune y los niveles de metabolitos de glucocorticoides fecales. Además, se examinaron los efectos sobre la producción de compuestos lipofílicos volátiles en las secreciones de las glándulas precloacales utilizadas para la comunicación intraespecífica. Los resultados muestran que el aumento de temperatura repentino y el nivel de la respuesta de estrés inicial solo produjeron efectos moderados no significativos sobre los indicadores de salud evaluados. Sin embargo, sí que se detectaron cambios marcados en las secreciones. En el tratamiento de temperatura elevada, se produjo una disminución de la abundancia de compuestos en las secreciones, en contraste a un aumento del número de compuestos en los individuos suplementados con corticosterona. Estos resultados sugieren que un aumento de las temperaturas derivado del cambio climático podría producir un deterioro en la capacidad de comunicación química de esta especie, lo que podría comprometer su ecología social y reproductiva, afectando negativamente a la conservación de sus poblaciones.

O51. Feathers under pressure: linking contour feather structure and land use intensification in dippers

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Land use change driven by human activities is widely recognized as one of the main threats to biodiversity, and numerous studies show how anthropogenic stressors affect physiological, morphological and behavioural traits. Nevertheless, in birds, the effects of human activities on contour feather structure remain poorly understood. Contour feathers play a major role in thermoregulation, waterproofing and aerodynamic efficiency, and their structure can be sensitive to several environmental variables such as pollution, habitat quality and food availability. Thus, analysing the association between contour feather structure and human pressure is important to better understand the mechanisms through which anthropogenic disturbance may compromise avian fitness and survival. Here, we tackled this issue by focusing on white-throated dippers (*Cinclus cinclus*). As apex predators and bioindicators of riparian ecosystems, dippers are sensitive to the variation in the quality of the rivers they dwell on, making them a very suitable species for our study. Using 153 observations collected along four years in five river basins in Biscay (northern Spain) we analysed how three metrics of feather structure (feather length and barbe and barbule density) are associated with body condition and land use intensification at different spatial scales. Overall, our findings suggest that contour feather structure is a condition dependent trait, and thus that it can respond to the variation in the environmental conditions. Land use intensification has contrasting effects on the three studied metrics of feather structure. The negative association with feather length suggests that inhabiting more anthropized environments can constrain feather growth. The positive association with barbe and barbule density suggest that dippers can develop more dense feathers in more anthropized environments. We speculate that these associations may result from the predominance of agricultural areas in our study region, in which the use of fertilizers can increase nutrient loads in the environment, leading to higher macroinvertebrate densities; and therefore, may enhance food availability for dippers, potentially allowing them to compensate for other environmental stressors. Our study highlights the value of trait-based approaches for monitoring ecological health and underscores the sensitivity of riparian birds to human-driven habitat transformation.

O52. Plastic biovectoring by gulls: linking movement data with plastic loads

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The accumulation of plastics is a global issue that affects multiple components of organisms and ecosystems. To date, marine ecosystems are the most studied in terms of plastic accumulation and its consequences, in contrast to wetlands and saltpans, which are also highly exposed to plastic and associated toxic compounds. In this study, we evaluate the role of the yellow-legged gull (*Larus michahellis*) and the lesser black-backed gull (*Larus fuscus*), as vectors for the mobilization and dispersal of plastics from anthropogenic areas to the estuary of the Odiel and Tinto rivers (SW Spain). In this study, we analyzed the movement ecology of the two gull species to evaluate their role in plastic transport to protected wetland areas. Using high-resolution GPS tracking and population estimates derived from monthly counts, we modeled species-specific plastic deposition across the Odiel and Tinto marshes. We also identified the specific zones within the marshes where both species are depositing the majority of plastics, utilizing heat maps generated for each species. Our findings indicate that plastic deposition is not random but spatially structured, with distinct areas exhibiting higher concentrations and accumulation rates. Our findings reveal marked interspecific differences in foraging patterns and habitat use: *Larus fuscus* predominantly foraged at inland landfills and was responsible for the majority of plastic input to the marshes, reflecting both its foraging strategy and its high wintering abundance. In contrast, *Larus michahellis* exhibited a more coastal and urban foraging profile, with plastic delivery concentrated in the Odiel estuary. FTIR analysis of pellets revealed that more than 250 kg of plastic—mostly microplastics of varying morphotypes—are introduced into these sensitive ecosystems each winter, these results highlight the importance of considering multiple species as biovectors, as their differential habitat use, foraging strategies, and movement patterns can lead to distinct spatial and quantitative impacts on plastic transport into sensitive ecosystem.

O53. An experimental study of the role of yolk vitamin E in early-life growth, physiology and telomere dynamics of a wild passerine

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Early development is a critical stage, shaping the life history of individuals. In oviparous species, maternally antioxidants allocated to egg yolk may strongly influence offspring early development. Empirical evidence has demonstrated that vitamin E plays a crucial role in this period, with augmentation boosting growth and yielding protection against oxidative stress. This is relevant since oxidative stress (the imbalance between pro-oxidants and antioxidants) may impair vital physiological functions, such as immune response and telomere maintenance. Telomeres are repetitive non-coding DNA sequences at the end of chromosomes that safeguard the genetic material, with their length and dynamic acting as biomarkers of ageing. However, *in vivo* experimental studies testing the connections among oxidative stress, immune response and telomeres are scarce, particularly during early development in wild vertebrates. In this study, we increased the levels of yolk vitamin E in eggs of wild spotless starlings (*Sturnus unicolor*) via *in ovo* injections, and studied its effects on nestling growth, oxidative status, immune response and telomere dynamics. While the experimental increase of yolk vitamin E did not affect nestlings' growth or oxidative status biomarkers, T-cell-mediated immune response of vitamin E-supplemented females -but not males- was enhanced. Also, unexpectedly, vitamin E-supplemented chicks had shorter telomeres in comparison with controls. Despite the lack of a clear positive impact of increased vitamin E levels, these findings suggest that a trade-off between immune response and telomere protection exists regarding antioxidants' allocation, at least in female nestlings. In any case, this highlights the significant physiological role of maternally allocated yolk antioxidants. Finally, independently of the experimental treatment, nestling telomeres lengthened from hatching to 14 days of age. Since we quantified telomere length using a gold-standard method (i.e., Terminal Restriction Fragment; TRF), this finding provides valuable support (not biased by methodology) for the growing body of evidence stating that telomeres may lengthen under certain circumstances. Overall, our results underscore the need for a better understanding of maternal effects and telomere dynamics in early-life development and its consequences.

O54. Energy, genomic stability and migration: Mitochondrial copy number and telomere length in the Eurasian blackcap

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The proximate mechanisms underlying migratory performance remain poorly understood. Migratory birds face extreme physiological demands, yet the roles of mitochondrial function and genomic stability in this context are still underexplored. Mitochondria not only fuel long-distance journeys but also influence oxidative stress and cellular maintenance, directly impacting telomere dynamics, a key marker of somatic integrity and ageing. Despite their mechanistic interconnection, few studies have jointly examined mitochondrial and telomeric traits in the context of migration. Here, we investigate both the seasonal plasticity and population-level variation of mitochondrial DNA copy number and telomere length in the Eurasian blackcap (*Sylvia atricapilla*), a species with diverse migratory strategies. To explore the interplay between these two traits in relation to migration, we conducted two approaches. First, using a common garden experiment, we assessed the plasticity of mitochondrial copy number and telomere length across three tissues (blood, heart, and muscle) in wild-caught juvenile males kept in captivity over nine months, spanning their first Spring migration. Migratory restlessness (*Zugunruhe*) was also measured as a proxy for migratory intensity. Second, to identify population-specific differences, we used whole-genome sequencing (WGS) to compare these traits among individuals from populations with distinct migratory behaviours. By integrating molecular, physiological, and behavioural data across both individual and population scales, this study aims to shed light on the interconnection between energy metabolism and genomic maintenance in migratory birds.

O55. Trade-off between immune response and tissue regeneration

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There is enormous diversity in the capacity of vertebrates to regenerate damaged tissues. While urodeles easily regenerate damaged tissues and even entire organs, this capacity is very limited in mammals. Here, we hypothesize that tissue regeneration may be traded off with the ability to mount an immune response since (1) both processes use similar resources (energy, amino acids...), (2) both processes generate free radicals and, whether working simultaneously, may jeopardize the oxidative status of the organism, and (3) the immune system could cause autoimmune damage to the new tissue in regeneration. To test this hypothesis, we carried out an experiment with Iberian ribbed newts (*Pleurodeles waltl*). Part of the tail was amputated in 50 newts, another 50 newts acting as controls. In each group, half of the newts were inoculated with an antigen (lipopolysaccharide from the wall of *E. coli*, LPS), the other half being inoculated with phosphate buffer (PBS). As expected, the rate of tail regeneration was slower in the LPS-inoculated newts, which were forced to mount an immune response, than in the PBS-inoculated newts. Likewise, the immune response was greater in the control newts than in those that were regenerating their tails. Our results, therefore, indicate the existence of a trade-off between tissue regeneration and immune response. The ultimate causes of this trade-off remain unknown. Still, this trade-off might be behind the variation in regeneration capacity in vertebrates.

O56. Ejaculate-mediated trade-off between offspring quality and quantity: Enhanced fertilization success comes at the cost of aged offspring

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Besides DNA, fathers can transfer non-genetic factors during copulation, which can affect offspring phenotype (i.e., *ejaculate-mediated paternal effects*; EMPEs). Today it remains unclear if EMPEs are adaptive, a selectively neutral side effect of copulatory interactions, or even detrimental for the offspring. The latter scenario could arise if ejaculate components that increase male fitness, for example through increased fertilisation success, have detrimental effects on individual offspring quality (quality – quantity trade-off), resulting in parent-offspring conflict. EMPEs have been studied mostly in invertebrate species, and their generalisation—or even their presence—in other taxa is poorly known. Male quail of the genus *Coturnix* are unique among birds in that they produce a white foam, secreted by the proctodeal (or cloacal) gland independently of sperm and seminal fluid, which is transferred during copulation. This foam consists of viscous, aerated glycomucoproteins, which boosts fertilisation success and may influence sperm competition outcomes. Certain foam components have been shown to fuel sperm, enhancing its motility, velocity and longevity, with glucose and lactate identified as main energy suppliers. However, the factors that shape heterogeneity in foam composition among males and the consequences of foam transfer for the offspring remain unknown. Here we tested whether foam components that improve male fertilisation success influence offspring quality at birth in Japanese quail (*Coturnix japonica*). To this end, we took repeated foam samples from males to quantify foam mass and concentrations of foam lactate and glucose and to assess trait repeatability. Then, males were mated with a randomly allocated female, and we quantified offspring body mass and blood telomere length (by TRF), a biomarker of physiological damage and ageing. We found a high repeatability of all foam traits. While no association between foam components and offspring body mass was found, foam glucose concentrations were negatively associated with offspring telomere length at birth ($r = 0.58$). These findings highlight that non-genetic foam components transmitted during copulation affect offspring phenotype and that fathers and offspring are in conflict over copulatory foam composition in this precocial bird.

O57. Prenatal androgen exposure shapes malaria susceptibility, aging, and survival in a wild passerine

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In the context of global change, emerging infectious diseases are becoming increasingly difficult to prevent or control. Among birds, malaria parasites are a major cause of population declines worldwide. Despite similar exposure risk, individuals vary markedly in their susceptibility to infection. Since hormone-mediated maternal effects can act as mechanisms of phenotypic plasticity, facilitating offspring adaptation to changing environments, we experimentally explored the dose-dependent effects of maternal yolk testosterone (T) by injecting two different doses into the egg yolks of wild great tits (*Parus major*). High prenatal T levels may offer short-term benefits but also impose long-term costs, such as accelerated telomere shortening and immunosuppression, potentially increasing vulnerability to infections. Our preliminary results indicate that high prenatal T concentrations increased malaria susceptibility in male juveniles but not in females, suggesting a sex- and dose-dependent modulation of immunity. We found no significant effects of T treatment on body size or condition, but nestlings exposed to higher T doses showed increased breathing rates, possibly reflecting heightened metabolic demands. Interestingly, survival to fledging was positively associated with prenatal T, while hatching success and post-fledging survival were unaffected. Regarding medium- to long-term costs, we found that prenatal T unexpectedly increased telomere length early in life without altering postnatal telomere dynamics. Overall, our study suggests that the balance between costs and benefits of maternal hormone allocation is highly dose-dependent and sex-specific. Future research should carefully consider a range of androgen concentrations to better understand the evolutionary and ecological consequences of maternal effects on offspring fitness.

O58. Sex reversal in the wild: Population-specific differences in a viviparous reptile

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Climate change poses a risk of altering sex ratios in species whose sex is influenced by temperature, potentially hindering population growth. Until recently, species with sex chromosomes were thought immune to such climate-induced sex ratio fluctuations. However, emerging evidence suggests otherwise, with the Tasmanian spotted snow skink (*Carinacincus ocellatus*), a viviparous reptile with both sex chromosomes (XX/XY) and climate-induced sex ratio alterations, serving as a compelling case study. Previous laboratory research demonstrates that temperature changes during gestation can induce sex reversal in this species, but only in one direction (male offspring with XX chromosomes). This study extends these findings by examining whether similar sex reversal occurs in the wild in response to temperature fluctuations. Over nine years, we analyzed the genetic and phenotypic sexes of offspring, identifying instances of sex reversal in at least one year. Notably, this phenomenon appears localized to the warmer regions of the wild *C. ocellatus* distribution. This marks the first observation of sex reversal in wild viviparous reptiles, paving the way for exploration into the evolutionary implications and underlying mechanisms of this phenomenon.

O59. Life-history traits predict West Nile virus antibodies in wild birds

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West Nile virus (WNV) is a vector-borne pathogen naturally circulating between birds and mosquitoes, occasionally affecting humans and horses. This virus is considered a re-emerging zoonotic pathogen with a rising incidence in Europe, having caused outbreaks in Spain during the last years. However, the ecological mechanisms driving the observed fluctuations in WNV incidence remain poorly understood. Gaining insight into the eco-epidemiology of WNV in wildlife and the potential for human transmission requires longitudinal surveillance of the virus in wildlife populations. Here, we analysed the life-history traits associated to the presence of WNV antibodies in 19,105 samples from 50 bird species collected between 2003 and 2024 in south Spain. Bird phylogeny, age, locality and year explained a large amount of variance in WNV antibody status. The prevalence of WNV antibodies was higher in bird species using human modified habitats in years with positive human cases, but no differences were found in bird species using other habitats. Moreover, the WNV prevalence in adult birds was positively correlated with body mass and migratory behaviour. In juveniles, antibody prevalence was related to primarily lifestyle, being higher in species with a terrestrial and generalist lifestyle compared to aerial or aquatic species. These findings highlight the complex interactions between bird species, their phylogenetic relationships, and their life-history traits which may determine, among other factors, their exposure to mosquito vectors. Elucidating these dynamics will facilitate the design and implementation of evidence-based disease control strategies.

O60. Birds, ants, and cavities: Unraveling the patterns of coexistence across altitude and habitat transformation

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Recent studies have suggested that tree cavities offer a favorable environment for interactions between birds and ants, as ants may exploit resources generated by bird reproduction or benefit from the nest microclimate for their larval development. However, quantitative evidence for this phenomenon remains scarce, and the factors driving its variation are largely unknown. In this study, we investigated cavity-nesting bird communities and the presence of ants in their nests across two breeding seasons, using systematic sampling in five localities. We measured the co-occurrence of either any ant species, or specifically *Crematogaster scutellaris* and *Tapinoma ibericum* —the two most prevalent ant species— with birds during the breeding season. Generalized linear models were used to assess the influence of environmental factors (altitude and habitat transformation) and their interaction on the three independent estimates of co-occurrence. Additionally, we applied bipartite network analyses to generate metrics from bird-ant co-occurrence matrices, in which interaction strength was defined by the number of times each bird-ant pair was found sharing a nest during the reproductive period, at each locality. We then examined how network metrics varied across years, altitude, and habitat transformation. We recorded seven cavity-nesting bird species and 14 ant species. Co-occurrence between birds and any ant species was more likely in transformed habitats, but unrelated to altitude. Similarly, co-occurrence between birds and *Crematogaster* was more frequent in highly transformed areas and lower elevations. Some network metrics, such as complementary specialization and weighted nestedness, varied across the five study sites but remained consistent between years. No covariation was observed between network metrics and either altitude or the extent of original (non-transformed) vegetation. However, a taxonomic metric—redundancy (the tendency of an ant species to co-occur with one or more bird species)—was lower at higher-elevation sites. Our findings suggest that habitat transformation facilitates bird–ant co-occurrence in cavity nests and that altitude modulates associations specifically involving *Crematogaster*. Bird–ant co-occurrence patterns vary geographically but remain stable between years, highlighting the potential role of microhabitat conditions in shaping these interactions. Altitudinal differences may influence the diversity of bird species that can co-occur with ants, particularly in high-elevation areas.

O61. The uropygial gland of the European hoopoe as a symbiotic organ

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Animals rely on symbiotic bacteria living within/on their tissues for multiple functions, while simultaneously needing to protect themselves from potentially pathogenic microorganisms that could invade those tissues. As a result, interactions with complex arrays of bacteria of different potential effects have driven the evolution of host strategies to control established symbioses. One such strategies involves development of organs specialized in maintaining associations with beneficial members of the microbial community—so-called *symbiotic organs*. These organs compartmentalize spaces where favorable conditions for the beneficial bacteria are promoted, while preventing invasion of other tissues by these and other bacteria, thanks to the barriers of the organ. These organs also favor recruiting (either through vertical or horizontal transmission) and selective filtering of the most beneficial symbionts, allowing *partner choice* by hosts. Although several model-systems of symbiotic organs have been proposed in animals, none has been recognized in non-aquatic vertebrates except for the intestinal crypts of mammals. Here, we hypothesize that holocrine glands of non-aquatic vertebrates may be specialized symbiotic organs. We tested this hypothesis using the uropygial gland of the hoopoe (*Upupa epops*), which hosts a complex bacterial community that includes antimicrobial-producing symbionts. First, using high-throughput sequencing data from two different European populations, we examined whether the uropygial gland supports a specific symbiotic community, by comparing the microbiome composition of the uropygial secretions and eggshell surfaces between the two populations. Additionally, using histological staining and fluorescence in situ hybridization, we investigated structural specializations for compartmentalization and bacterial targeting in the glands of breeding hoopoes in comparison with non-breeding ones (the latter lacking symbiosis) and other bird species. We found that Swiss and Spanish hoopoes shared a common core of bacterial strains in the gland microbiome, which was less diverse than that of eggshells. Furthermore, breeding hoopoes exhibited a distinctive organization of the epithelium lining gland's papilla—where secretion accumulates—, compartmentalizing the space available for bacteria but also the distribution of bacterial types within the gland. Altogether, our results support the specialization of the hoopoe uropygial gland as a symbiotic organ.

O62. Surviving the unpredictable: how a new trophic strategy boosts reproductive success under resource scarcity

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Generalist and specialist strategies often coexist, but their relative success depends on environmental conditions and their stability. Specialists are expected to be more vulnerable to environmental change unless plasticity allows them to buffer resource fluctuations. In this study, we document the emergence of a novel foraging strategy in a color-polymorphic, specialist predator—the Eleonora’s falcon (*Falco eleonora*)—which typically relies on migratory songbirds as prey during the breeding season. Using 16 years of monitoring data from a breeding population in the Canary Islands, we show that some individuals, particularly dark-morph males, have increasingly exploited local seabirds (petrels), which were previously anecdotal in the diet. This trophic shift is associated with colony location and morph-dependent behavior, as dark males nesting in peripheral or low-density areas captured significantly more petrels than pale ones. We found that consuming petrels advanced egg-laying dates, likely because seabirds are available earlier than migratory birds. Importantly, productivity increased with the number of petrels consumed, particularly under poor migratory bird availability, suggesting that this alternative resource buffers against food scarcity and stabilizes reproductive output. Furthermore, colonies with higher petrel consumption showed increased breeding pair numbers over time, implying a potential demographic effect of this emergent strategy. Our findings highlight how intraspecific dietary diversification, shaped by spatial, morphological, and ecological factors, can mitigate the reproductive costs of environmental unpredictability. This case exemplifies how phenotypic variation and behavioral flexibility within a specialist species can enhance resilience to fluctuating resources.

O63. Assessment of predation risk through conspecific cues by anuran larvae

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Accurate assessment of predation risk is critical for prey survival during predator–prey interactions. Prey can assess predation risk by the presence of cues dropped by predators themselves, but they can also gather information about risk level through cues released by other prey, avoiding the hazard of being in close proximity to predators. In this study, we examine the ability of anuran larvae (*Pelobates cultripes*) to detect predation risk indirectly when they are in contact with conspecifics that have been recently exposed to chemical stimuli from natural predators (larvae of aquatic beetles). In a first experiment, we confirmed that larvae exposed to predator cues exhibited innate defensive behavior, indicating that they perceived the risk of predation and, thus, could potentially act as risk indicators for naïve conspecifics. In a second experiment, we observed that unexposed larvae paired with a startled conspecific adjusted their antipredator behavior, presumably by mirroring conspecifics' behavior and/or using chemical cues from their partners as a risk information source. This cognitive ability of tadpoles to assess predation risk through conspecific cues might play an important role in their interaction with predators, facilitating the early detection of potential threats to elicit appropriate antipredator responses and increase the chances of survival.

O64. Refining the ecological role of Neotropical frugivorous primates along the mutualism-antagonism continuum

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Neotropical frugivorous primates play a crucial role in forest regeneration, acting either as mutualists (seed dispersers) or antagonists (seed predators). However, their ecological role may vary across plant genera, translating the mutualism-antagonism dichotomy to a continuum. Traditionally, their classification has been based on the dissemination stage of the seed dispersal process. However, this approach may overlook antagonistic interactions occurring during foraging stages, when primates may discard or predate seeds. Here, we quantify the variation of the ecological role of Neotropical frugivorous primates at different stages of the seed dispersal process along a mutualism-antagonism continuum. To assess the ecological roles at the dissemination stage we conducted a literature review of 137 studies on six primate genera (*Alouatta* spp., *Ateles* spp., *Cebus* spp., *Pithecia* spp., *Saimiri* spp., and *Sapajus* spp.). To assess variations at the foraging stage, we set up >270 arboreal camera traps during ~35000 camera-trap days in six *terrafirme* forests in Western Brazilian Amazon. Cameras were set up in 157 individuals of five genera of fleshy-fruited woody plants differing in fruit and seed size (*Euterpe* sp., *Pourouma* spp., *Virola* spp., *Iryanthera* spp., and *Pouteria* spp.). For both stages, we estimated the proportion of mutualistic interactions and the position of each primate genus along the continuum. Likewise, we estimated their effectiveness as seed dispersers in the foraging stage to explore variations among the five plant genera. *Ateles* and *Pithecia* maintained their roles as mutualist and antagonist, respectively, across both stages and none had variations between plant genera. The other primates shifted toward more antagonistic positions when incorporating foraging observations. *Saimiri* and *Sapajus* were antagonists for *Virola* and *Iryanthera* while *Alouatta* was an antagonist for *Euterpe* and *Cebus* for *Pouteria*. Hence, antagonistic interactions are more prone to occur during earlier stages of the seed dispersal process, and together with the different handling of the plant species explain the shifts in the role of the primates. Our results emphasize the importance of considering behaviours at the foraging stage and their variation among plant species for accurately characterizing the ecological roles of frugivorous primates and its implications for natural tropical forest regeneration.

O65. Impact of nest microclimate alterations on the nest microbiome and its interactions with parasites and bird condition

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Microclimate inside avian nesting cavities provides suitable growth conditions for microbial communities and ectoparasites, which in turn may play a crucial role in influencing the well-being of the host. In this study, we investigated the microbiome of Blue Tit (*Cyanistes caeruleus*) nests subjected to experimental manipulations of temperature and humidity, aiming to evaluate the impact of these factors on fungal and bacterial communities and on the associations between these microbial communities, parasitism, and nesting birds' condition. Our results indicated that while bacterial alpha diversity remained unaffected by the experimental manipulation, beta diversity differed significantly, particularly between nests with increased humidity and control nests. Similarly, elevated temperature and humidity increased fungal alpha diversity and altered fungal beta diversity. In addition, pathogenic fungi, including dermatophytes, proliferated in humidity nests, potentially contributing to poorer nestling body condition compared to other nest treatment groups. Furthermore, alterations in the microclimate influenced the interactions between microbes, ectoparasites and nestling body condition. We found positive relationships between microbes and parasites in the nests, where they were more abundant or were not negatively affected by changes in the microclimate. This suggests that there were the necessary conditions to promote the development of those microbes that coexist with parasites. On the other hand, we identified strong associations between certain bacteria and fungi and ectoparasites such as fleas, mites and blood-sucking dipterans, which, due to the effects of their parasitism, can facilitate microbial growth. Overall, this study represents the first comprehensive analysis of the microclimate effects on the nest microbiome. These findings highlight the complex interactions between nest microclimate, microbial diversity, ectoparasites, and nestling development, offering new insights into the ecological effects of microclimatic conditions in avian nesting environments.

O66. Microorganismos transmitidos por el alimento: relación entre la comunidad bacteriana del cernícalo vulgar y dos de sus especies presa

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La Teoría del Forrajeo Óptimo predice que el comportamiento de forrajeo está mediado por el balance energético, esto es, la obtención de un alimento que aporte la mayor cantidad de energía y nutrientes necesarios con el menor gasto energético posible. Sin embargo, las presas no sólo pueden aportar energía y nutrientes a los depredadores, sino que también pueden ser una fuente de enfermedades para éstos, por ejemplo, pueden transmitir microorganismos que pasan del animal consumido al animal consumidor. Por ello, en la elección de las presas por parte de los depredadores deben jugar un papel importante los mecanismos necesarios para evitar infecciones. Al mismo tiempo, la distribución de microorganismos en las especies animales debería estar mediada por las relaciones depredador-presa a escala local, donde el depredador y especies presa comparten el mismo ambiente. Si existen mecanismos de prevención de la transmisión de microorganismos, la distribución de los grupos de bacterias en los depredadores debería ser una respuesta a la comunidad de bacterias presente en las especies más consumidas. Utilizando métodos genéticos para analizar los grupos bacterianos presentes en la flora intestinal de cernícalos vulgares *Falco tinnunculus* y dos de sus especies presa. En el presente estudio se explora la relación de la comunidad bacteriana del cernícalo vulgar *Falco tinnunculus* con sus dos especies presa, topillos campesinos *Microtus arvalis* y lagartos ocelados *Timon lepidus* gracias al empleo de metabarcoding para analizar el microbioma de la flora intestinal de este sistema depredador-presas. Se espera que la comunidad bacteriana de cernícalos sea más dependiente de la especie presa más consumida y con la que comparte una historia evolutiva más larga (topillo) que con otra especie menos consumida y con la que comparte una historia evolutiva más corta (lagarto). Al mismo tiempo se espera una mayor asociación en el perfil bacteriano entre depredador y presa que entre especies presa.

O67. Exploring patterns of phyllosymbiosis in Upupiformes and Bucerotiformes

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Bacterial symbionts provide multiple benefits to their hosts, including pathogen defence, immune modulation, and nutrient acquisition, which suggests that they have played a key role in animal evolution. Since different hosts might differ in the strength and type of selection pressures that promote animal evolution and which particular beneficial bacteria could help to counteract them, host evolution is likely to parallel changes in the composition of symbiotic communities. As closely related host species experience similar selective pressures, their symbiotic communities should also exhibit greater similarity, a pattern known as phyllosymbiosis, which has rarely been detected in birds. However, different species also vary in environmental conditions (e.g., habitat characteristics, geographic distribution, etc.) that would influence their bacterial communities. Therefore, phyllosymbiosis patterns do not necessarily have to be a consequence of natural selection. Then, to demonstrate functional (i.e., adaptive) phyllosymbiosis, interspecific differences in benefits promoted by the bacterial symbionts should be associated with those reflecting both phylogenetic distances and/or diversity and composition of the symbiotic bacterial communities. Here, we explore such patterns in Upupiformes, which harbours complex bacterial communities in their uropygium, including antibiotic-producing symbionts. We sampled the uropygial secretion of hoopoes and woodhoopoes, and their sister clade, Bucerotiformes (hornbills), from Spain, Switzerland, China, Namibia, and South Africa. For each individual, we (i) assessed the antimicrobial activity of bacterial isolates against three selected pathogens and (ii) characterized the uropygial secretion bacterial communities using high-throughput 16S rRNA gene amplicon sequencing. We found (1) a strong positive correlation between host phylogenetic distance (built from 100 trees downloaded from birdtree.org) and bacterial community dissimilarity, supporting a clear pattern of phyllosymbiosis. Moreover, although (2) antimicrobial profiles did not associate with host phylogeny, (3) microbial beta diversity predicted antimicrobial activity estimated for each individual. That third association only occurs for Upupiformes, which suggests that natural selection could be responsible for the detected pattern of phyllosymbiosis in this group. These findings not only provide the first evidence for strong phyllosymbiosis in birds but also suggest functional selection of bacteria in the uropygial gland across Upupiformes.

Comunicaciones en panel

Modalidad
Poster Pitch

P1. Epigenetic potential, dispersal propensity and fitness in pied flycatchers

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Understanding the mechanisms driving organismal responses to environmental change and the evolutionary relevance of phenotypic plasticity becomes fundamental in predicting the biological impact of ongoing climate and land-use changes. Phenotypic plasticity may be achieved via epigenetic processes, which enable rapid and adaptive responses and occur in specific genomic regions (e.g. DNA methylation on CpG sites). Thus, genomes differ in their capacity to be modified epigenetically, and this “Epigenetic Potential” may represent the range of phenotypic plasticity attainable by individuals, and a key mechanism mediating environmental coping and life-history variation. We tested the association between epigenetic potential (quantified as the number of CpG sites throughout the genome), dispersal propensity (hypothesized to require greater coping abilities) and fitness (lifespan and reproductive success) in a long-term study population of Pied flycatchers (*Ficedula hypoleuca*). We found a significant, positive association between epigenetic potential and dispersal propensity using both spatial (between-patch vs. within-patch dispersal) and temporal (early vs. later generations) comparisons, pointing at epigenetic potential playing a role in dispersal propensity and successful settlement. Furthermore, preliminary results also suggest associations between CpG site abundance and some of the fitness estimates considered. These findings reinforce the hypothesis that epigenetic potential underlies phenotypic plasticity, a link that may reflect the trade-off between reproduction and self-maintenance.

P2. Sex-specific ageing trajectories of reproductive traits in the pied flycatcher (*Ficedula hypoleuca*)

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Reproductive ageing has been extensively studied both among and within species, yet sex-dependent variation remains poorly understood, particularly in socially monogamous birds. Here, we investigated sex-specific ageing trajectories in three key reproductive traits -laying date, clutch size and number of fledglings- using 40 years of longitudinal data from 3162 breeding attempts in a central Iberian population of pied flycatchers (*Ficedula hypoleuca*). We used generalised linear mixed models incorporating within- and between-individual effects, allowing us to identify trait- and sex-specific patterns of ageing and senescence. Both sexes showed age-related variation in reproductive traits, though with marked differences in the timing and rate of senescence. Females showed a delayed onset but a steeper decline in performance across the three traits, whereas males showed earlier but subtler changes. These differences likely reflect sex-specific trade-offs between reproductive effort and somatic maintenance, arising from underlying physiological and behavioural asymmetries. In pied flycatchers, females not only undertake incubation but also often invest more heavily in parental care and have an inherently more demanding reproductive physiology than males. This elevated reproductive effort might constrain their investment in somatic maintenance, thereby accelerating physiological deterioration and ultimately leading to senescence. These results call for further investigation into how sex-specific reproductive strategies shape ageing, with important implications for understanding life-history evolution in wild populations.

P3. Diversidad y prevalencia de haemosporidios aviares en el suroeste ibérico: el papel diferencial de aves nativas, migratorias y exóticas

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La malaria aviar y los parásitos haemosporidios asociados (géneros *Plasmodium*, *Haemoproteus* y *Leucocytozoon*) constituyen un grupo diverso de protozoos que infectan a aves pertenecientes a múltiples órdenes taxonómicos. En este estudio se evaluaron la diversidad y prevalencia de haemosporidios en aves silvestres de la provincia de Badajoz (Extremadura, suroeste de España), una región que alberga 69 Zonas de Especial Protección para las Aves (ZEPA), clave en la ruta migratoria del Atlántico oriental y la reproducción e invernada de numerosas especies. Entre mayo y diciembre de 2020 se capturaron un total de 1.157 aves pertenecientes a 38 especies, clasificadas en tres categorías: exóticas (3 especies), migratorias (3 especies) y nativas (32 especies). La prevalencia global de infección fue del 24,63%, con tasas específicas del 8,82% para *Haemoproteus*, 8,38% para *Plasmodium* y 7,43% para *Leucocytozoon*. Asimismo, el 2,7% de los individuos presentaron infecciones mixtas por *Leucocytozoon* y *Plasmodium* o *Haemoproteus*. La prevalencia de infección difirió significativamente entre los grupos de aves ($\chi^2 = 141,92$, $p < 0,001$), siendo mayor en especies nativas (41,1%) que en exóticas (15,8%) y migratorias (8,2%). En total, se identificaron 47 linajes distintos de haemosporidios: 16 de *Haemoproteus* (cinco de ellos descritos por primera vez), 14 de *Plasmodium* (incluidos dos nuevos) y 17 de *Leucocytozoon* (dos también novedosos). En las aves nativas se detectaron 14 linajes de *Haemoproteus* y 7 de *Plasmodium*; en exóticas, un total de 10 linajes (7 correspondientes a *Plasmodium* y 3 a *Haemoproteus*); y en migratorias, únicamente tres linajes de *Plasmodium*, todos ellos exclusivos de este grupo (*Plasmodium ashfordi* GRW02, *Plasmodium* sp. DELURB5 y *Plasmodium* sp. GRW09). Por el contrario, los linajes *Plasmodium relictum* SGS1, *Plasmodium* sp. PADOM01 y *Plasmodium* sp. SYAT24 fueron detectados tanto en aves exóticas como nativas. El linaje RECOB3 de *Leucocytozoon* fue el único compartido entre los tres grupos. Estos resultados evidencian una elevada diversidad genética de haemosporidios en las aves silvestres de Extremadura, subrayando su importancia ecológica y epidemiológica. El estudio proporciona una base sólida para futuras investigaciones orientadas a comprender la ecología de la infección y el riesgo de transmisión entre aves de distintos grupos en esta región.

P4. Global mosquito blood-feeding patterns: implications of phylogeny

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Vector-borne diseases (VBDs) represent a significant global concern for public health and economic development, playing mosquitoes a crucial role as vectors of pathogens responsible for severe diseases in humans, livestock, and wildlife. Mosquitoes exhibit relevant interspecific differences in their blood-feeding patterns, leading to important implications for the transmission and epidemiology of vector-borne parasites. A systematic literature review was conducted to compile information on the blood-feeding patterns of mosquito species worldwide covering the main vector genera. Generalized Least Squares models were used to test the phylogenetic inertia of blood-feeding patterns of mosquitoes and a Generalized Linear Mixed Model (GLMM) was conducted to assess the fixed effects of mosquito tribe and the random effects of country and species, using the proportion of blood meals from each vertebrate group as the response variable. To examine the significance of the mosquito tribe variable, we performed an ANOVA followed by post-hoc pairwise comparisons to explore differences between tribes in their feeding patterns. The results show that phylogenetically related species of mosquitoes tend to feed on similar groups of vertebrates. The proportion of amphibians ($\lambda = 0.954$) on mosquito bloodmeals had a high phylogenetic inertia, while moderate λ values were found for the case of reptiles ($\lambda = 0.617$), total mammals ($\lambda = 0.652$), non-human mammals ($\lambda = 0.565$) and birds ($\lambda = 0.475$). Humans ($\lambda = 0.223$) showed the lowest λ value, indicating a weak phylogenetic signal. In addition, our results show that geographic and species-related factors significantly contribute to variations in mosquito blood-feeding preferences. Tribe-level effects alone explain only a small proportion of the variation, indicating that other factors may also play important roles in shaping feeding patterns. Our findings enhance our understanding of the evolution of feeding patterns of mosquito species, and identifies species with a high likelihood of acting as bridge vectors for zoonotic pathogens. This framework aids in identifying species linked to vector-borne disease transmission to humans, enhancing targeted surveillance and control efforts.

P5. Manual lateralization in primates: evolutionary patterns across taxonomic and ecological diversity in 40 species

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Brain lateralization is a key feature in the evolution of motor and cognitive specialization. While manual preferences have been widely studied in humans, its evolutionary origins and variability across nonhuman primates (NHPs) remain underexplored. In this study, we investigated bimanual hand preferences in 272 individuals from 40 NHP species, including 34 species never previously tested in bimanual coordination tasks. Using the tube task, we aimed to identify evolutionary patterns of manual lateralization across taxonomic and ecological dimensions. A total of 82% of subjects engaged with the task, though only 53% yielded sufficient data for analysis. Among those, 82% displayed individual-level lateralization (51% right-handed, 49% left-handed). No significant group-level biases or interspecies differences were detected in the direction of hand preference, except *Cercopithecus ascanius* and *Chlorocebus cynosuros*. Additionally, no sex differences were observed in either the direction or the strength of manual lateralization. We did not find differences in lateralization strength between right- and left-handed individuals. However, both right- and left-handed individuals showed stronger lateralization than ambipreferent subjects. At a broader level, significant differences in lateralization strength (but not direction) were found across taxonomic families and dietary categories. In particular, Cebidae and Cercopithecidae showed higher levels of lateralization strength compared to Atelidae and Callitrichidae. Similarly, frugivorous species were more strongly lateralized than folivores, and especially gummivores, who showed the weakest lateralization. These findings suggest that manual lateralization is a widespread individual trait in NHPs, but its population-level expression is rare and likely shaped by ecological and evolutionary factors. Variation in lateralization strength across families and diets may reflect adaptive responses to ecological pressures such as foraging complexity or fine motor demands. Our results underscore the importance of integrating taxonomic, ecological, and behavioural variables when exploring the evolution of brain asymmetries in primates.

P6. Estudio de Redes Sociales en monos araña de Geoffroy (*Ateles geoffroyi*) reintroducidos en Guanacaste, Costa Rica

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En el siguiente estudio de redes sociales, se ha evaluado la estructura de un grupo de 15 individuos de monos araña de Geoffroy (*Ateles geoffroyi*) reintroducidos en un bosque tropical seco en Guanacaste, Costa Rica. Los objetivos principales fueron caracterizar su red social, identificar individuos clave y comparar sus dinámicas con las de poblaciones silvestres. Durante 8 semanas se registraron los comportamientos de proximidad, contacto y allogrooming a través de scans de 1h con intervalos de 3 minutos, así como algunas conductas breves (embrace, interacción sexual, amenaza, agresión, actitud defensiva y “otros”), mediante registro de all-occurrences. Se analizaron las medidas de centralidad de grado, fuerza y betweenness, para la caracterización de la red social, el Hierarchical Clustering para identificar posibles subgrupos y tests QAP para evaluar las correlaciones entre las matrices. Los resultados muestran que la proximidad favorece el contacto físico ($R = 0,522$; $p < 0,001$) y, aunque el grooming se relaciona con ambos, parece estar condicionado por otros factores contextuales ($R \approx 0,19$; $p < 0,05$). Tres individuos, dos hembras adultas (Sara y Fancy) y un macho adulto (Grin), emergen como nodos centrales en la cohesión grupal, indicando su relevancia dentro de ella. Aunque las hembras muestran alta proximidad, los machos también son centrales en contacto físico, lo que sugiere que ambos sexos contribuyen significativamente a la cohesión grupal. Se identificaron 6 posibles subgrupos, entre los que destacan el constituido por 5 hembras adultas, y el constituido tanto por hembras (2) como machos adultos (3) y un macho subadulto. Finalmente, se concluye que la estructura social del grupo reintroducido es similar a la de poblaciones silvestres, sugiriendo un proceso de integración exitoso tras la reintroducción. Sin embargo, un estudio longitudinal que evalúe la estabilidad de la red a lo largo del tiempo podría aportar más información sobre este grupo de monos araña reintroducidos.

P7. Event cameras, a novel tool for studying behaviour. Pilot study monitoring ecstatic display on wild penguins

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The ecstatic display (ED) is a common behaviour in various penguin species, and has been known for long, but its function and quantitative details in Chinstrap penguins (*Pygoscelis antarcticus*) remains unknown. During ED, the penguin points its head up and emits a loud call while beating its wings, often starting a display outburst among nearby individuals. Because this behaviour influences -and is influenced by- surrounding animals it requires study in the time dimension as well. In this chapter I pilot the use of a novel technology: event (or neuromorphic) cameras to characterise and quantify ED during two weeks within the chick-guard period at Deception Island, Antarctica. Event camera sensors are completely different from frame-based devices as they record changes in light intensity pixel by pixel whenever they occur (emulating retinal receptors). This change-based recording system plus their inherent microsecond time resolution and extensive dynamic range make these devices ideal for capturing movement. Detected events (per-pixel changes in light intensity) produced by a specific behaviour can be easily stacked up to show the shape of each behaviour. These shapes can be used to train a machine-learning algorithm. I use this approach to produce a complete ethogram for 16 nests spanning 93 hours. Ground-truthing the technique against a human analyst shows an estimated 95% accuracy. I use this dataset to characterise Ecstatic Display for the first time in Chinstrap Penguins, study its occurrence, its contagiousness and differences between individuals. Ecstatic Display is performed by every individual in the study regardless of date, sex, time of day or day within the observation period. This behaviour is greatly influenced by weather, neighbouring nests performing ED and by the amount of hours an individual has been in the nest after a changeover. I hypothesise that this behaviour could have a dynamic territorial function, possibly to avoid neighbours stealing nesting material. This may explain its patterns of occurrence and transmissibility around the colony. This pilot study proves that event cameras can produce a precise quantitative description of behaviour in a relatively efficient, automated and non-invasive way.

P8. Daily activity levels and activity patterns of mammals in Venezuelan Llanos

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All animals, whether faunivorous or herbivorous, adjust their daily activity level and pattern to meet physiological needs, like feeding, mating, or survival. However, for predator species, prey availability and behavior can influence their own activity, leading to a complex ecological dynamic. Thus, we estimated daily activity levels and daily activity patterns in a community of sympatric mammals to test whether or not the activity of mammals responds to their guilds. On this basis, we conducted a camera trapping assessment at Hato Piñero, in the Western Llanos of Venezuela, to collect activity records of mammals. We gathered 13,831 records, over a two-year period. Then, we used the kernel density estimators to evaluate the daily activity levels, daily activity patterns, and overlapping coefficient of 12 mammal species. Faunivorous species, such as jaguar, puma, ocelot, crab-eating fox and giant anteater, exhibited a higher activity level than herbivorous species. These activities ranged from 9.4 h/day (ocelot) to 11.4 h/day (giant anteater), passing through 10 h/day (puma), 10.8 h/day (crab-eating fox), and 11.2 h/day (jaguar). In contrast, herbivorous species spent less time active than faunivorous species. These activities ranged from 3.3 h/day (white-lipped peccary), to 8.6 h/day (white-tailed deer), passing through 4.5 h/day (red-rumped agouti), 5.3 h/day (eastern cottontail rabbit), 5.6 h/day (capybara), 6.1 h/day (wedge-capped capuchin), and 7.6 h/day (South American tapir). Furthermore, activity patterns varied among species, reaching their activity peaks at different times after sunset and before sunrise. Faunivorous species were more active during twilight and nighttime, while herbivorous species were more active during daytime. It is likely that predators use nighttime to improve hunting efficiency, while reducing survival risks. In contrast, the activity of preys was more diverse and may depend on a tradeoff between foraging and predation avoidance strategy for each species. Because during daytime it may be easier to selectively feed on best vegetation spots and at the same time it is easier to detect predators. Our analysis showed that activity overlapping between predator and prey were not complete, but still substantial, around 50%, suggesting that faunivorous species may hunt for both active or inactive prey.

P9. Estudio del comportamiento social y uso del espacio en un roedor cíclico

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Comprender los mecanismos que generan los ciclos poblacionales en algunos roedores silvestres es un tema central en Ecología, especialmente si llevan asociados impactos socioeconómicos y sanitarios. Aunque se han estudiado ampliamente como los factores extrínsecos (alimento, climatología, depredadores y parásitos/patógenos) regulan estas poblaciones, los factores intrínsecos (organización social, patrones reproductivos y uso del espacio) han sido menos estudiados. Aquí abordamos esta cuestión en el topillo campesino, *Microtus arvalis*, durante un ciclo poblacional completo. Predecimos que el reclutamiento temprano y rápido durante la fase de crecimiento está relacionado con una alta proporción de hembras reproductoras formando agrupaciones dentro de las colonias, las cuales intensifican la competencia por la fertilización entre los machos. Además, ambos sexos alcanzarán los mayores tamaños corporales, relacionados con una mayor productividad. La fase de crecimiento consistirá en grupos sociales altamente estables con altas tasas de reclutamiento y reproducción, mientras que la fase de pico se caracterizará por una disrupción del sistema social y menor reclutamiento y supervivencia. Entre 2023 y 2024 llevamos a cabo un estudio de Captura-Marcaje-Recaptura, identificando y midiendo 480 individuos. Analizamos los datos mediante modelos SECR e inferencia bayesiana. Nuestros resultados confirman en gran medida las predicciones. Encontramos que durante la fase inicial de crecimiento se establecen agrupaciones espaciales bien definidas en ambos sexos, se produce la mayor tasa de reproducción de las hembras, y aparecen las hembras y los machos más grandes, haciéndose el dimorfismo sexual más evidente. También, encontramos un mayor porcentaje de recapturas que de nuevas capturas en comparación con el resto de los meses, siendo significativamente mayor en hembras que en machos, lo que sugiere un comportamiento más residente en hembras y más dispersivo en machos. Durante los últimos meses de crecimiento y durante el pico poblacional, el patrón espacial fue difuso y las nuevas capturas superaron a las recapturas, indicando un posible aumento de la dispersión y mortalidad. Aunque son muchos los factores que influyen en la dinámica poblacional del topillo, nuestros resultados subrayan la importancia de los factores intrínsecos en la mejora del entendimiento de las fases de crecimiento y pico poblacional en este grupo de roedores.

P10. Efecto de la contaminación por metales pesados en las características microbiológicas de los nidos contruidos con barro

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Las aves han desarrollado mecanismos de defensa frente a patógenos en sus nidos mediante la selección de materiales con propiedades antimicrobianas. Entre ellos, el barro puede albergar bacterias capaces de producir compuestos antibióticos. Sin embargo, la contaminación ambiental, en particular por metales pesados, puede alterar la microbiota de los nidos y comprometer su función protectora. Este estudio tiene como objetivo analizar el efecto de la contaminación por metales pesados en la abundancia de bacterias y la capacidad antimicrobiana del barro utilizado por distintas especies de aves para construir sus nidos, centrándose en áreas afectadas por el desastre minero de Aznalcóllar en 1998. Para ello, se recolectaron muestras de barro de nidos y suelo de alrededor de las colonias de tres especies de aves (*Cecropis daurica*, *Hirundo rustica*, *Delichon urbicum*) distribuidos en varias provincias del sur de España, incluyendo zonas con distintos grados de exposición a la contaminación. El análisis de metales se realizó mediante espectrometría de fluorescencia de rayos X, la estimación de bacterias fue mediante siembras, y la capacidad antibiótica de las muestras fue evaluada a través de ensayos de antagonismo con cepas indicadoras. Los resultados indican que la presencia de ciertos metales pesados, especialmente aquellos asociados a contaminación, tiende a correlacionarse con una reducción de la carga bacteriana, mostrando un efecto bactericida. Algunos de ellos también parecen modular la capacidad de inhibición antibiótica, en algunos casos potenciándola. Además, ciertos metales no contaminantes también mostraron asociaciones con una mayor actividad antibiótica, lo que sugiere un papel complejo de los componentes minerales del barro en la dinámica microbiana de los nidos. Estos hallazgos preliminares sugieren que la composición del barro, influida por la contaminación ambiental, puede alterar significativamente la microbiota de los nidos y su capacidad antibiótica. Esto podría tener consecuencias ecológicas importantes, afectando a la protección frente a patógenos y, en última instancia, el éxito reproductivo de las aves que nidifican en zonas contaminadas.

P12. Factores ecológicos y evolutivos que determinan los patrones de infección en aves endémicas de Suramérica

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Las aves endémicas son especies restringidas geográficamente a una región específica, lo cual las hace potencialmente vulnerables a declives poblacionales por cambios antrópicos y naturales. Entre estos últimos, los parásitos pueden generar un impacto significativo en ellas, incluyendo extinciones a largo plazo por cambios en las dinámicas ecológicas de estas interacciones. Sin embargo, hasta el momento se conocen pocos estudios sobre los predictores de haemosporidiosis aviares en este grupo de hospederos, y ninguno a escala geográfica amplia. Nuestro objetivo fue evaluar el papel del tamaño de la distribución y algunos predictores ecológicos y evolutivos de las especies hospedadoras que pudieran influir en su probabilidad de infección por haemosporidiosis en aves endémicas de Suramérica. Para esto, se tomaron los datos ecológicos de especies endémicas y no endémicas del listado del Comité de clasificación de Suramérica, y se compilaron datos de MalAvi y de tres universidades colombianas para establecer la presencia o no de haemosporidiosis aviares en cada una de las especies. De 577 especies de aves endémicas, solo 70 presentaron infección para haemosporidiosis aviares. El análisis de modelos lineales generalizados mixtos (GLMMs), reveló una relación significativa y positiva entre el tamaño del área de distribución del hospedero y la probabilidad de infección, es decir, especies con mayor área de distribución presentaron mayor probabilidad de estar infectadas. Además, el análisis sugiere una variación entre grupos filogenéticos en la susceptibilidad a la infección. Estos resultados destacan la relevancia de los atributos ecológicos y de distribución en la dinámica de infección de haemosporidiosis aviares. Evaluar, por lo tanto, predictores ecológicos y evolutivos permitirá entender la ecología de enfermedades en regiones megadiversas como Suramérica y contribuir a estrategias de conservación enfocadas en estas especies de interés.

P13. Efectos de la migración en la diversificación del orden Accipitriformes: La fuerza evolutiva de los viajes con retorno

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La dispersión (movimiento unidireccional de propagación), es uno de los tópicos más interesantes a estudiar en ornitología, dado afecta diversos procesos evolutivos y ecológicos, incluyendo la diversificación del linaje al definir cómo se distribuyen en áreas geográficas con diferentes presiones selectivas, pero consecuencias evolutivas de la migración, como rasgo evidente donde la dispersión es parte del proceso, han sido menos estudiadas. La migración, comportamiento de ida y vuelta entre áreas separadas, puede afectar los procesos de diversificación directamente. Por un lado, especies migratorias, al desplazarse siguiendo su nicho, evadirían extinciones, manteniendo clados antiguos poco diversos. A su vez, especies sedentarias están sometidas a variaciones locales, dependiendo la diversificación de la capacidad de dispersión al colonizar áreas y/o salvar barreras. En las especies con migración parcial, donde parte de la especie permanece sedentaria, la diversificación aumentaría por la reproducción de subconjuntos aislados, sometidos a diferentes presiones locales, generando clados distintos. Accipitriformes presenta las tres categorías migratorias, y, al ser cosmopolita y variado en características, es un excelente modelo para entender el efecto de la migración en la diversificación. El objetivo de este estudio fue evaluar la influencia de la conducta migratoria, junto a otras variables (dispersión, rango de distribución) sobre las tasas de diversificación de Accipitriformes mediante métodos filogenéticos. Se reconstruyó el árbol filogenético y una base de datos con información relevante para la diversificación: masa, dispersión potencial (Hand-WingIndex), migratoriedad, y área y latitud de la distribución. Se estimaron tasas de diversificación (DR) y aplicaron análisis PGLS (Regresión Filogenética de Mínimos Cuadrados Generalizados) y de señal filogenética, seleccionándose los mejores modelos para su análisis de diversificación dependientes del estado MuSSE (Multistate-Speciated Speciation and Extinction), QuaSSE (Quantitative-SSE) y HiSSE (Hidden-SSE). La categoría migratoria mostró una alta señal filogenética y un fuerte ajuste como predictor de las tasas de diversificación. En contraste, la masa corporal mostró un efecto moderado, pero con menor consistencia entre réplicas filogenéticas y la potencial dispersión no mostró poder predictivo ni ajuste en ningún modelo. La migración emerge como un factor clave asociado a patrones de diversificación en Accipitriformes, mostrando una clara estructura filogenética y un efecto significativo en modelos filogenéticos.

P23. Las señales químicas sexuales permiten a las hembras de un reptil fosorial evitar sitios marcados por machos expuestos a metales pesados

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La ecología de los animales de vida fosorial está condicionada por las características del medio subterráneo, donde, por ejemplo, las señales visuales son difíciles de detectar. Sin embargo, algunos reptiles fosoriales, como los anfisbenios, poseen un sistema quimiosensorial altamente desarrollado que les permite detectar presas y depredadores, y que además desempeña un papel clave en la comunicación intraespecífica y la selección sexual. Asimismo, en animales fosoriales con territorios pequeños y una capacidad de dispersión limitada, las alteraciones locales del suelo pueden tener un impacto significativo en su estado de salud. En las Islas Chafarinas, donde los excrementos de una colonia gaviotas nidificantes actúan como vectores que transfieren metales pesados al suelo, se ha observado una correlación entre la contaminación del suelo y un aumento de la respuesta fisiológica de estrés en la culebrilla mora (*Trogonophis wiegmanni*). Esta contaminación también podría afectar a las señales químicas sexuales implicadas en la selección de pareja. Dado que estos reptiles son capaces de detectar rasgos individuales mediante sus capacidades quimiosensoriales, también podrían percibir alteraciones en el olor de sus conespecíficos derivadas de la contaminación del suelo y usar esta información para seleccionar parejas o evaluar la calidad del hábitat. En este estudio, recolectamos muestras de olor (secreciones cloacales) de machos de culebrilla mora que habitaban suelos “contaminados” o suelos “no contaminados”. Para evaluar la preferencia de las hembras (provenientes de ambos tipos de suelo) por estas señales químicas, diseñamos un experimento de laboratorio en el que estas podían elegir entre sustratos no contaminados pero manipulados con marcas de olor de machos procedentes de ambos tipos de suelo. Encontramos que las hembras, independientemente de su procedencia, evitaban los sustratos marcados por machos “contaminados” y preferían los de machos “no contaminados”. Estas preferencias podrían explicarse por diferencias en los perfiles químicos de los machos, posiblemente causadas por diferencias en su estado de salud provocadas por los metales pesados. Nuestros resultados sugieren que las señales químicas de los conespecíficos podrían permitir a estos anfisbenios seleccionar hábitats de mayor calidad y parejas potencialmente más sanas, ayudándoles a compensar las limitaciones de la vida fosorial.

Comunicaciones en panel

P14. Does malaria infection increase the risk of predation-related mortality during bird migration?

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The migratory culling hypothesis posits that infected individuals are less likely to survive long-distance migration due to physiological and behavioral effects, but this lacks empirical evidence. Here, we tested this hypothesis by sampling 357 passerines from 11 species during their autumn migration to wintering grounds in two different areas, i) at a stopover in southern Spain, and ii) in the Canary Islands, where they were drifted and preyed upon by Eleonora's falcons while en route to the southern Sahara. Molecular detection of infections by *Plasmodium*, *Haemoproteus*, and *Leucocytozoon* was conducted on bird samples. A higher prevalence of both *Plasmodium* and *Haemoproteus* was observed in birds preyed upon by falcons. While a complete understanding of the mechanistic effects of haemosporidian infections on migration performance needs experimental validation, our approach suggests that infection reduces migration success by increasing mortality due to route deviations and/or predation.

P16. Avances recientes en la identificación de genes de resistencia a insecticidas en mosquitos

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Los mosquitos son vectores clave en la transmisión de enfermedades como la malaria, y su creciente resistencia a insecticidas sintéticos representa un desafío urgente para la salud pública. Esta resistencia, especialmente preocupante frente a los piretroides, compromete las estrategias de control actuales y varía según la región, con especial incidencia en África subsahariana y datos emergentes en Asia, América y Europa. Pese a su relevancia, hasta ahora no existía una revisión actualizada que reuniera los últimos hallazgos sobre los genes implicados en este fenómeno ni que ofreciera una visión clara de sus mecanismos subyacentes. Este estudio aborda esa necesidad, analizando los principales genes asociados a la resistencia en los géneros de mayor impacto epidemiológico (*Anopheles*, *Culex* y *Aedes*), a partir de una revisión sistemática de literatura científica publicada entre julio de 2023 y enero de 2025. Los resultados destacan dos mecanismos principales: la desintoxicación metabólica y las alteraciones en los sitios diana de los insecticidas. Aunque el enfoque genético se ha centrado mayoritariamente en *Anopheles*, también se han identificado patrones comunes en otros géneros. En conjunto, los datos confirman que la resistencia a insecticidas es un fenómeno complejo, en constante evolución y condicionado por múltiples factores genéticos y ambientales. Comprender su base molecular es clave para anticiparse a su propagación y diseñar estrategias más sostenibles. Así, el estudio no solo aporta una síntesis necesaria del conocimiento disponible, sino que también subraya la urgencia de alinear la ciencia con las realidades locales y considerar alternativas innovadoras como los biopesticidas, agentes microbianos o pinturas insecticidas. Solo mediante un enfoque integrado será posible frenar la expansión de mosquitos resistentes y proteger la salud pública frente a enfermedades transmitidas por vectores.

P17. Feeding behaviour and ecology of mosquitoes in winter in a West Nile virus-endemic area

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The feeding and overwintering behaviour of insect vectors play a crucial role in shaping the ecology and evolution of the pathogens they transmit. In this study, we analysed the winter activity of mosquitoes in southwestern Spain, specifically in a region with endemic circulation of West Nile virus (WNV). Between the winters of 2021 and 2024, a total of 642 female mosquitoes were collected using aspirators at urban scuppers, horse stables, and drainage pipes. The most abundant species were *Culex pipiens*, *Cx. theileri*, and *Cx. perexiguus*. We found blood-fed females throughout the study period. Overall, 20.46% of the collected individuals had recently fed, with *Cx. pipiens* showing a preference for birds, and *Cx. theileri* for mammals. Mosquito abundance showed a positive response to temperature and a negative response to accumulated precipitation over the previous 15 days, indicating divergence from the typical patterns observed during high activity months (from spring to autumn). The availability of sheltering habitats such as animal stables or scuppers, combined with mild winter temperatures, may reduce the need for a complete diapause state and allow mosquito activity to persist year-round. Although WNV was not detected, the low prevalence of infected mosquitoes even during WNV outbreaks make necessary the analyses of a much higher number of females, between 3.000 and 15.000 to ensure detection of the virus with a 95% probability. Our findings demonstrate that key WNV vectors remain active and continue feeding during the winter under mild climatic conditions, which has important implications for the persistence of the WNV transmission cycle in these regions. This study highlights the importance of considering winter mosquito behaviour in population dynamics and their ecological role as vectors throughout the year.

P18. Determinants of the degree of exposure of a cavity nesting bird to biting midges (*Culicoides*) in a semi-arid environment

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Nest-site selection has major consequences for avian performance, impacting survival, reproductive success, or fitness due to biotic (e.g., predation pressure) and abiotic (e.g. exposure to environmental factors) aspects associated with the various nest sites. Parasites also impose a strong influence on nest site-selection and breeding performance. Parasitism increases nest abandonment and nest site avoidance, and influences breeding behaviour (e.g., incorporation of herbs with insecticidal properties) and the rate of food provisioning to nestlings. Furthermore, some ectoparasites can also transmit pathogens to birds. In this study we investigate the community of biting midges (Genus *Culicoides*), potential vectors of avian malaria-like parasites of the *Haemoproteus* genus, around the nests of European rollers (*Coracias garrulus*) in a dense population in the semi-arid southeast of the Iberian Peninsula. The *Culicoides* community was analysed at species level for three consecutive years (2016 to 2018), and potential abiotic factors, i.e., breeding phenology and nest-site habitat type (trees, cliffs and bridges), influencing community assembly and composition were also explored. The most abundant and prevalent species during the three years were the allocthonous species *Culicoides paolae* (56,6% of the captures; n=3251; prevalence=0,90), *C. circumscriptus* (25,5%; n=1464; prevalence=0,93), and a group including *C. catanei* and *C. gejjelensis* (10,3%; n=592; prevalence=0,64). Community structure was not affected by sampling year but phenology had a significant effect in the analysed years. In particular, the abundance of *C. circumscriptus* decreased throughout the breeding season, while the abundance of *C. paolae* increased. Habitat type surrounding roller nests also had a significant effect, but only during 2017, when nest located in bridges had higher abundances of *C. pulicaris*, while nests on trees and cliffs had higher abundances of *C. circumscriptus* and *C. catanei/gejjelensis*, respectively. In conclusion, the European Roller has a high exposure to ornithophilous *Culicoides* species during the breeding period, mostly to two species. This study finds a consistent effect of phenology on the abundance of some *Culicoides* but no consistent effect of habitat type during the analysed years.

P19. What factors affect the road crossing speed in an amphibian? Analysis for two common species

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Amphibians are the most threatened vertebrate group globally, with road mortality posing a significant risk to their populations. Road-crossing speed, a key factor in determining an individual's probability of being killed by a vehicle, is influenced by both biological and environmental variables. This study analyzes, for the first time under natural conditions, the determinants of road-crossing speed in two common Iberian amphibians: the natterjack toad (*Epidalea calamita*) and the western spadefoot toad (*Pelobates cultripes*). Fieldwork was conducted on secondary roads in Salamanca (NW Spain), recording road-crossing speeds, mobility, environmental parameters, and individual traits. *E. calamita* was found to be nearly three times faster than *P. cultripes*, with sex and age being key explanatory variables, whereas rainfall significantly affected the crossing speed of *P. cultripes*. Using empirical data, individual roadkill probability curves were generated as a function of traffic intensity, and risk maps were developed for the province. Our results highlight that road-crossing speed—and thus roadkill risk—varies both between and within species due to anatomy, behavior, and environmental responsiveness. These findings are critical for improving amphibian conservation strategies, including the design of mitigation measures such as temporary road closures. This pioneering approach offers a methodological and conceptual basis for future research and for the planning of more effective wildlife-road conflict mitigation tools.

P20. Una nueva interacción parásito hospedador: Infestación por chinche de la cama (*Cimex lectularius* L.) en nidos de herrerillo común (*Cyanistes caeruleus* L.)

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En la naturaleza las aves silvestres son hospedadores de multitud de parásitos. En el caso de las aves que crían en cavidades muchos de ellos se desarrollan en los nidos donde encuentran condiciones adecuadas para su desarrollo. En lo que respecta al herrerillo común (*Cyanistes caeruleus* (Linnaeus, 1758)) es frecuente encontrar en sus nidos larvas de mosca azul *Protocalliphora azurea* (Fallén, 1817), pulgas *Ceratophyllus gallinae* (Schrunk, 1803) y ácaros del género *Dermanyssus* Dugès, 1834. Sin embargo, recientemente hemos detectado un número considerable de chinches hematófagas de la familia Cimicidae infestando los nidos de herrerillo. En este estudio analizamos los ejemplares de chinches encontrados en cuatro nidos diferentes a lo largo de tres años en un robledal ubicado en los Montes de Valsaín, Segovia, España. Se tomaron medidas morfológicas de 15 machos, 19 hembras y 45 ninfas, y los resultados mostraron una gran similitud con las características de la especie *Cimex lectularius* (Linnaeus, 1758). Sin embargo, encontramos una ligera diferencia en el ratio anchura de la cabeza / tercer segmento antenal (1.51, SD 0.121) respecto al valor reportado por la literatura para *C. lectularius* (1.45, SD 0.096). Asimismo, se obtuvieron las secuencias de la subunidad I de la citocromo oxidasa (COI) y del 16S rRNA (16S) de 12 ejemplares (4 machos, 4 hembras y 4 ninfas). Los análisis de estas secuencias mostraron un 100% de similitud en BLAST con secuencias de *C. lectularius* de USA, China y República Checa. Los hallazgos de este estudio ponen de manifiesto el carácter cosmopolita de *C. lectularius* demostrando así que es un parásito capaz de adaptarse a múltiples hospedadores además de a los seres humanos.

P21. El Etograma del Perro (Parte II): Propuesta de un nuevo etograma

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Un etograma es una recopilación meticulosa de comportamientos específicos de una especie, definidos de manera rigurosa. Es el primer paso en el estudio etológico, ayudando a estandarizar y simplificar la investigación. La falta de un etograma exhaustivo y generalmente aceptado del perro (*Canis familiaris*) ha obstaculizado la investigación en esta especie. Considerando el enorme impacto del perro en la vida humana y su estrecha convivencia con nosotros, resulta fundamental comprender su comportamiento para mejorar su bienestar y el de las personas que los rodean. Este estudio busca crear un etograma completo del perro que pueda ser aceptado por la comunidad científica, estableciendo un lenguaje unificado para la nomenclatura en futuros estudios del comportamiento canino. Se observaron 12 perros Beagle de la Facultad de Veterinaria de la Universidad Autónoma de Barcelona y 39 perros ferales de Gambia, durante un total de 120 horas. Las observaciones se realizaron de forma directa y mediante grabaciones de vídeo, utilizando un sistema de observación de escaneo y de secuencia. Inicialmente se elaboró un listado de conductas basado en etogramas parciales preexistentes. Durante la observación, se señalaban las conductas presentes y se añadían aquellas no contempladas inicialmente. Posteriormente, todas las conductas fueron descritas de forma precisa y detallada. En nuestro etograma se describen 151 conductas. Las conductas se clasifican en específicas (involucran solo una parte del cuerpo) y generales (involucran todo el cuerpo y son incompatibles entre sí). Las específicas se ordenan según la parte corporal involucrada, y las generales según su necesidad o no de interacción con otro individuo. Nuestro etograma se caracteriza por el elevado número de conductas descritas, su claridad, la evitación de definiciones funcionales, una categorización morfológica rigurosa y la inclusión de ilustraciones para facilitar la interpretación. Elaborar un etograma estandarizado es esencial para unificar criterios, usar una terminología consistente y reducir la subjetividad. Este estudio presenta un etograma detallado del perro e invita a futuros investigadores a enriquecerlo, trabajando colectivamente para mejorar el entendimiento de esta especie.

P22. Behavioural responses of captive primates to visitors: The influence of personality and environmental conditions

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Zoos play a crucial role in wildlife conservation, education and research, and ensuring the welfare of the animals they house is a fundamental responsibility. Behavioural monitoring is a key tool in applied ethology to assess and promote animal welfare in these captive environments. One factor that may affect welfare is the so-called “visitor effect”, which refers to the influence of human presence on animal behaviour. However, results across studies remain inconsistent, indicating that no universal pattern applies across species or individuals. In this study, we evaluated the impact of the visitor effect on the behaviour and spatial use of various primate species, while also considering individual personality, social responsiveness, and environmental factors (noise level, weather, temperature). We observed 24 individuals from nine species of nonhuman primates housed at Centro de Conservación de la Biodiversidad Zoobotánico de Jerez (Spain) for a total of 100 hours (12.5h per species). We recorded behavioural time budgets and generated heatmaps to analyse spatial use. As visitor numbers and ambient noise increased, the primates displayed more undesirable behaviours and fewer desirable ones, suggesting a negative influence from human presence. We also found significant correlations between weather, temperature, personality traits and social responsiveness with behavioural patterns and space use. These results highlight that individual and environmental variables shape primate responses and limit the ability to generalise across species. Our Generalised Linear Mixed Model (GLMM) analysis identified the visitor effect as the strongest predictor for most behavioural variables, even when other factors showed significant influences. We conclude that while personality and environmental context modulate behaviour, visitor presence remains the primary factor affecting the welfare and behavioural expression of zoo-housed primates.

P24. Environmental factors and avian *Plasmodium* infection shape the microbiota of *Culex pipiens* mosquitoes in southern Spain

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The mosquito bacterial microbiota (hereafter, mosquito microbiota) affects different physiological traits of mosquitoes, such as their survival rate or nutrition, but also parasite development, affecting its vectorial capacity. The composition of mosquito microbiota depends on both biotic and abiotic factors, including environmental conditions and intrinsic factors related to the characteristics of mosquito individuals. *Culex pipiens* is a widely distributed mosquito species that play a key role in the transmission of avian malaria parasites of the genus *Plasmodium*. Thus, understanding those factors shaping mosquito microbiota composition in wild populations is crucial to better understand the transmission dynamics of these mosquito-borne parasites. Here, we sampled mosquitoes from May to November 2022 in five localities across Granada and Malaga. Using a 16S rRNA metabarcoding approach, we analyzed the microbiota of 196 pools of 4 female mosquitoes from three species: the native species *Culex pipiens* and *Culiseta longiareolata*, and the invasive *Aedes albopictus*. We also assessed the relationships between *Cx. pipiens* microbiota and avian *Plasmodium* infection status, sampling session, and locality. Mosquito microbiota alpha diversity (richness and Shannon index), beta diversity, and profile (defined as the relative abundance of different taxa) differed among mosquito species. Notably, *Wolbachia* dominated the microbiota of *Cx. pipiens* and *Ae. albopictus*, but were virtually absent in *Cs. longiareolata*. In *Cx. pipiens*, the most extensively sampled species, infection by avian *Plasmodium* was significantly associated with bacterial profile, beta- and alpha-diversity, with infected pools showing a lower bacterial richness. Additionally, beta diversity and microbiota profile varied along the season and among localities. These findings suggest that the microbiota of wild mosquitoes is shaped by mosquito species, season, and geographic location, and it is associated with avian *Plasmodium* infection status, highlighting the importance of mosquito microbiota on the epidemiology of this wildlife parasite.

P25. The effects of early-life environmental conditions on late-life performance in a cooperatively breeding bird

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Environmental conditions experienced during early life are widely recognized as key factors shaping individual development, survival, and reproductive success. As such, the social environment experienced at birth and throughout life can impact life-history decisions. For example, providing help during reproduction to dominant breeders (a strategy known as cooperative breeding) increases reproductive success. Such early-life influences can have persistent effects across lifespan, but these often vary across sexes. An array of studies has explored the beneficial effects of benign environmental conditions during early life on adult fitness, a phenomenon referred to as the "silver spoon" effect. While this pattern has been well documented in short-lived species, its relevance in long-lived species remains less clear, as adult environmental factors may also play a significant role in determining fitness outcomes over time. In the field of evolutionary ecology, alternative frameworks such as the Predictive Adaptive Response (PAR) hypothesis propose that individuals use early-life environmental cues to adjust their development adaptively to anticipate future conditions. According to this, fitness is maximized not by early-life advantages per se, but by the match between early and later-life environments. However, whether the social environment (i.e., the number of helpers) alleviates early-life environmental effects is still unknown. This study investigates both the silver spoon and PAR hypotheses in a wild, long-lived, cooperatively breeding species, the acorn woodpecker (*Melanerpes formicivorus*). We used life-history data over 20 years from a population breeding at the Hastings Natural History Reservation in California, USA. Specifically, we examine the effects of territory quality and social environment, both at birth and during adulthood, on lifetime reproductive success. Preliminary results indicate that female's lifetime reproductive success is negatively affected by the number of dominant males in the group in the early-life environment. Our approach allows us to test for the interaction between early-life and adult environmental conditions. We will discuss our preliminary results in the context of life-history decisions, intra-species competition and reproductive ageing.

P26. A proposal on how to study the environmental causes of natural selection

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By decomposing fitness variation into contributions by various phenotypic traits, the classic multiple regression approach of Lande & Arnold allows us to better understand natural selection. However, this approach only informs us on the organismal causes of fitness variation – it tells us nothing about the environmental causes of fitness variation. We suggest that environmental causes of natural selection can be estimated by also including environmental variables into the multiple regression. For example, bill size in a population of Darwin's finches might be found to be statistically related to reproductive success. But why? If we suspect that seed size has anything to do with it, we can include individual measures of available seed size (which may vary in space or in time) in our statistical model. Even more, selection on bill size might be hypothesised to depend on seed size. This can be tested by including the interaction term bill size * seed size into the model. Or perhaps it is hypothesised that larger bills prevent overheating of the finches. In that case we could include the interaction between individual bill size and the maximum temperature an individual is exposed to in the model, and see how much variance in reproductive success it explains. By including different environmental variables in the statistical model, we can estimate their apparent relative contributions to fitness. This seems relevant, because natural environments are typically multidimensional, which means that selection on phenotypic traits would be expected to be multifarious too. However, the multidimensional nature of the environmental causes of selection is seldom acknowledged, let alone quantified. Using this novel application of a classical approach can increase our understanding of how the environment drives phenotypic selection in natural populations, and allows us to quantify the relative importance of different selective agents.

P27. Rutas tróficas invisibles: el análisis no invasivo de isótopos estables revela influencias ambientales en la ecología trófica de un reptil subterráneo

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El análisis de isótopos estables es una herramienta fundamental para reconstruir las dietas y comprender mejor las interacciones tróficas de la fauna silvestre. Así, el objetivo de este estudio fue investigar la ecología trófica de una especie de reptil subterráneo, la culebrilla mora (*Trogonophis wiegmanni*), en las Islas Chafarinas. Para ello utilizamos análisis no invasivos de isótopos estables ($\delta^{13}\text{C}$ y $\delta^{15}\text{N}$) en heces de 150 ejemplares, examinando posibles variaciones entre islas y/o debidas a características individuales (sexo, edad y variables morfométricas). Los valores isotópicos medios ($\delta^{13}\text{C} = -22,18\text{‰}$, rango: $-15,40 - -26,72$; $\delta^{15}\text{N} = 15,20\text{‰}$, rango: $7,61 - 21,16$) no variaron en función del sexo o la edad, pero sí hubo diferencias significativas entre islas. En la Isla Isabel, encontramos mayores valores de $\delta^{13}\text{C}$ y menores de $\delta^{15}\text{N}$ que en el resto de islas, lo que sugiere diferencias en la dieta de las culebrillas. Además, el patrón en los valores isotópicos entre islas fue similar en los invertebrados presa, aunque únicamente fue significativo para el $\delta^{15}\text{N}$. Sin embargo, en estudios previos no encontramos diferencias entre islas en los tipos de presas incluidos en la dieta. Estas diferencias isotópicas podrían deberse a la menor presencia en esta isla, con respecto a las otras, de colonias nidificantes de gaviotas, cuyos excrementos parecen actuar como fuente de entrada de compuestos nitrogenados al suelo y de ahí a toda la cadena trófica. Además, aunque no se encontraron correlaciones significativas entre las medidas corporales y los isótopos estables, los individuos de la Isla Isabel mostraron menor peso, longitud y condición corporal, lo que refuerza la hipótesis de un menor aporte de nitrógeno a la cadena trófica en esta isla. Aunque es necesario seguir investigando, estos resultados proporcionan, por primera vez, datos de referencia para interpretar los patrones isotópicos en esta especie. Además, destacan el potencial del análisis isotópico en heces como herramienta no invasiva para detectar efectos ambientales sobre las variaciones poblacionales de la ecología trófica en ecosistemas subterráneos.

P28. Análisis comparado de las respuestas inducidas por depredador en renacuajos y su regulación por corticosterona

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Los organismos suelen estar expuestos a una gran heterogeneidad ambiental espacial y temporal, por lo que la mayoría han desarrollado la capacidad de percibir esas fluctuaciones y ajustar su fenotipo en consecuencia. Las respuestas fenotípicas a los cambios ambientales pueden ser bastante complejas y requerir ajustes en su fisiología, comportamiento, morfología e incluso en sus historias de vida. Estos cambios fenotípicos suelen estar impulsados por cambios hormonales que resultan en una expresión génica diferencial en los tejidos. Las larvas de anfibios son capaces de percibir a los depredadores, ya sea química o visualmente, y a menudo pueden alterar su comportamiento y morfología de tal manera que reducen su riesgo de depredación. Se cree que las defensas inducibles en las larvas de anfibios están reguladas por el eje hipotálamo-hipofisario-interrenal (HPI), sin embargo, se han reportado resultados contradictorios con respecto al papel de los glucocorticoides (corticosterona, CORT) en la regulación de estas respuestas en larvas de anfibios. Aquí usamos una aproximación experimental comparada en doce especies de anuros para estudiar el papel de la corticosterona en las respuestas antidepredadoras de los renacuajos. Al exponer experimentalmente larvas de cada especie a la presencia / ausencia de señales de depredador, o a diferentes niveles de corticosterona exógena, evaluamos el efecto de estos dos fuertes inductores en la tasa de actividad, la morfología y sus historias de vida. Además, medimos la concentración endógena de corticosterona y el nivel de estrés oxidativo de los renacuajos. Observamos una amplia variación interespecífica en su grado de plasticidad y la capacidad de respuesta de la expresión de CORT. Las respuestas morfológicas y conductuales al riesgo de depredación generalmente aparecieron disociadas entre sí en las distintas especies. También fueron diferentes en sus respuestas al aumento de corticosterona. A pesar del número limitado de especies comparadas en este estudio, presentamos evidencia sólida que sugiere que las defensas de los renacuajos contra los depredadores pueden controlarse mediante un mecanismo fisiológico distinto de CORT, y que aspectos adicionales del desarrollo de los anfibios, como la tasa de desarrollo, pueden ser relevantes para comprender la variación en las respuestas inducidas por los depredadores.

P29. Rasgos del hospedador y parásitos de la malaria aviar: Comprendiendo las conexiones intrínsecas

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El parasitismo puede imponer presiones evolutivas sobre las aves y desempeñar un papel clave en la adaptabilidad de las especies a los cambios ambientales. Los Hemosporidios son hemoparásitos que comúnmente parasita aves y comprender cómo influyen los rasgos intrínsecos de las especies de aves en su probabilidad de infección por hemosporidios es fundamental para entender la dinámica hospedero-parásito, especialmente en regiones tropicales biodiversas. Aquí presentamos un análisis comparativo mediante modelos lineales generalizados filogenéticos (phylo-GLMs) para explorar la relación evolutiva entre diversas características ecológicas, morfológicas y de coloración con la prevalencia y la presencia de la infección por Hemosporidios. Este análisis nos permitió determinar los rasgos del hospedero que están relacionados con la probabilidad de infección por Hemosporidios en 115 especies de aves en un país tropical. Recopilamos diagnósticos publicados de Hemosporidios en aves de Colombia y datos sobre rasgos ecológicos, morfológicos, de coloración e indicadores de selección sexual (dimorfismo y dicromatismo) para cada especie. También calculamos un índice de especialización de hábitat. Con el paquete *PhyloLM* de R realizamos la búsqueda de los modelos que mejor se ajustaran a las variables respuesta. Nuestro análisis reveló que las especies migratorias, las aves de mayor tamaño corporal y las de plumaje más colorido tienen una mayor probabilidad de infección. Por el contrario, la especialización en el hábitat se asoció negativamente con el riesgo de infección. Nuestros resultados se explican en el marco de una mayor exposición a vectores de Hemosporidios. Sin embargo, se necesitan más estudios para comprender mejor la relación entre los rasgos relacionados con la selección sexual y la infección. Estos resultados aportan valiosos conocimientos sobre la dinámica hospedero-parásito en las comunidades de aves tropicales y ayudan a comprender los factores de susceptibilidad, teniendo en cuenta las posibles consecuencias negativas para las comunidades de aves.

P30. Serological and demographic divergence between *Oryctolagus cuniculus algirus* and *O. c. cuniculus* in the Iberian Peninsula: Further evidence for species-level separation?

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The Iberian Peninsula is the only region in the world where the two currently recognised subspecies of the European rabbit—*Oryctolagus cuniculus algirus* and *O. c. cuniculus*—coexist in sympatry. In recent years, there has been growing debate over whether these subspecies should be elevated to distinct species, as accumulating evidence highlights more differences than similarities across behavioural, reproductive, and morphological traits. In this study, we provide further support for this hypothesis by demonstrating clear epidemiological divergence in response to the two most impactful viral diseases affecting wild rabbit populations: myxomatosis and rabbit haemorrhagic disease (RHD). Between 2019 and 2022, we surveyed 2300 wild rabbits from 118 populations across the Iberian Peninsula, testing for antibody prevalence to both myxoma virus (MYXV) and RHD virus (RHDV). In parallel, we examined long-term population trends using hunting data from 2009 to 2020, categorising populations by subspecies distribution. Populations located in the contact area between the two subspecies, were excluded from the analyses. Our results show that mean antibody prevalence was significantly higher in *O. c. cuniculus* populations compared to *O. c. algirus* populations: 80% vs 54% for MYXV ($P < 0.0001$), and 74% vs 47% for RHDV ($P < 0.0001$). Moreover, hunting records indicated stable population trends in *O. c. cuniculus* areas (a slight increase of 0.17%), whereas *O. c. algirus* populations experienced a sharp decline of nearly 60% ($R^2 = 0.88$, $P < 0.0001$). These findings underscore marked differences in both immune response and demographic trajectories between the two subspecies. Such divergence adds to the growing body of evidence suggesting that *O. c. algirus* and *O. c. cuniculus* may warrant consideration as distinct species. Beyond taxonomic implications, this distinction may be crucial for effective conservation strategies, particularly for the declining *O. c. algirus*, whose unique genetic and ecological identity could be better protected under species-level management.

P31. Los humanos y el tráfico afectan al comportamiento de los gatos monteses en paisajes ganaderos

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Las actividades e infraestructuras humanas causan molestias sobre la fauna alterando su comportamiento y activando respuestas antidepredatorias tales como alteraciones en el tiempo que los individuos dedican a diferentes comportamientos. Por ejemplo, el tráfico puede causar variaciones significativas en el tiempo de vigilancia, que puede servir como una medida sensible de los efectos de las molestias humanas sobre los animales. Dichos cambios pueden derivar en costes fisiológicos y ecológicos para las especies. En el presente trabajo, utilizamos la oportunidad de observar directamente y en el medio silvestre el comportamiento de los gatos monteses (*Felis silvestris*) en la Cordillera Cantábrica (noroeste de España) para investigar como diferentes fuentes de molestias antrópicas afectan al tiempo que los gatos monteses dedican a ciertos comportamientos. También analizamos como el tráfico influye sobre el tiempo que los gatos dedican a comportamientos de caza y vigilancia, así como su efecto sobre el éxito en la caza de roedores. Nuestros resultados muestran que los gatos monteses dedicaron más tiempo a comportamientos de alerta y menos tiempo a cazar, alimentarse y moverse, en presencia de humanos que en escenarios sin molestias. Los gatos monteses también pasaron más tiempo cazando cuando los niveles de tráfico fueron altos, cerca de carreteras y lejos de poblados. Además, los gatos pasaron más tiempo vigilando mientras se alimentaban en presencia de vehículos. Por último, el descenso en el éxito en la caza en presencia de vehículos fue más notable en el caso de las hembras que en el de los machos, aunque los efectos no fueron significativos. En conclusión, los humanos y el tráfico afectan al comportamiento de los gatos monteses que habitan paisajes ganaderos, aunque es difícil determinar en qué grado esto se traduce en consecuencias demográficas.

P32. “Keep an eye on the danger”: Wildebeest change their reactive behaviour when encountering lions in windy conditions

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Reactive anti-predation behaviours include all behaviours that prey display during or after the perception of predator cues. A variety of reactive strategies have been studied, but in general, prey must decide whether to flee from the location where they encounter a predator or remain in the vicinity. The decision to flee is known to depend on various factors (e.g., species ecology, habitat characteristics, hunting mode). Although wind conditions largely reduce the perception of sensory cues, no study has investigated their influence on reactive responses to predators. Here, we used simultaneous GPS data from 18 wildebeest (*Connochaetes taurinus*) and 11 lions (*Panthera leo*), collared in Hluhluwe iMfolozi (South Africa) to identify 219 encounter events and examine the influence of wind on (1) the probability of fleeing an encounter with a lion and (2) movement patterns after fleeing. Although we found that wildebeest appear to leave the encounter area regardless of wind speed, we show that the movement patterns of wildebeest after they decide to flee depend on wind conditions. We found that wildebeest tend to stay at a relatively smaller distance from the predator (1 km) in windy conditions than in calm conditions and that they continue to move, but in a relatively non-linear fashion. Since wind limits perception and can be considered “risky”, we suggest that such a behavioural strategy could be performed to “keep an eye” on the danger and ensure that it is kept at a certain distance. In windy conditions, an optimal trajectory after an encounter would be a compromise between reaching the maximum distance to the predator, while keeping it within the field of sensory view.

P33. Effect of avian malaria infection on body condition *Manacus manacus* (Passeriformes: Pipridae)

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Avian malaria, caused by protozoa of the genus *Plasmodium* and related haemosporidians, is transmitted by dipteran vectors and may induce significant physiological stress. In birds, such infections have been associated with reduced body condition, potentially compromising reproductive success. Parasite–host interactions in wild birds are critical for understanding ecological dynamics and assessing the physiological and reproductive impacts of parasitic infections. In Colombia, *Manacus manacus*, a passerine inhabiting humid lowland tropical forests, exhibits pronounced sexual dimorphism and complex lekking behaviors. These traits make it a suitable model for studying how parasites influence sexually selected characteristics such as body condition. To evaluate the effect of infection on body condition in *M. manacus*, 131 blood samples were collected between 2016 and 2019 across four reservoirs in the department of Antioquia, Colombia. Parasite detection was conducted using PCR, and body condition was estimated from the ratio of body weight (g) to tarsus length (mm). Data were analyzed using mean comparisons and generalized linear mixed models (GLMMs). The overall prevalence of infection was 12.21% (16/131). Of the infected individuals, 81.26% (13/16) were males, compared to 50.4% in the uninfected group. Although infected individuals showed higher average body condition values (mean infected: 0.18673; mean uninfected: -0.0259), the difference was not statistically significant ($t = -0.76$, $df = 21.26$, $p = 0.45$). However, GLMM results indicated that sex was a significant predictor of body condition ($t = 4.016$, $p < 0.001$), with infected males exhibiting slightly lower values than uninfected males (mean infected males: -0.0137; mean uninfected males: 0.0031; $p = 0.94$). This pattern may be due to the high proportion of infected males, who generally display better body condition than females, and the likelihood that most infections were chronic, with reduced parasitemia and minimal physiological cost. Our findings suggest that avian malaria does not significantly impair body condition in *M. manacus*. Future studies should explore other sexually selected traits, such as plumage coloration, which may reflect individual health and offer further insight into the effects of parasitic infections on sexual selection.

P34. Southern European common kestrels (*Falco tinnunculus*) can also migrate: Results from the first GPS-tracked trans-Saharan migration of this species

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Recent advances in animal tracking systems and the increase of the number of species and populations tracked are revealing a variety of dispersal and migratory behaviours in populations previously considered as sedentary. The common kestrel (*Falco tinnunculus*) is a small falcon that shows different migratory and dispersal behaviours across its breeding range. These range from populations completely comprised by migratory individuals to entirely sedentary populations, whereas others are partially migratory. In southern Iberia, populations have traditionally been considered as sedentary, although some postbreeding dispersive migration events have been described recently. Although some long range transaharan displacements have been recorded in this species, thanks to ringing recoveries in Subsaharan Africa of birds from Central Europe, and despite its ubiquity in the Western Palearctic, little is known about the long-range migrations this species is able to undertake. Here we present what is, to our knowledge, the first GPS-tracked trans-Saharan migration of a common kestrel. This is a female tagged as a breeder in the Doñana area, which spent the following winter in southern Mauritania and returned to the same breeding area the following season. Using high-resolution GPS and accelerometer data, we describe the migration phenology, daily activity pattern, stopover use and migratory route of this birds' prebreeding and postbreeding migration. Also, we describe its home range and movement pattern during the wintering period. Finally, we compare it with that of a closely related species (*Falco naumanni*), which typically perform transaharan migrations that have been more extensively studied.

P35. ¿Cómo perciben el miedo los bosques? Efectos de la territorialidad del azor (*Accipiter gentilis*) en el comportamiento dispersor del arrendajo euroasiático (*Garrulus glandarius*)

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Azores y arrendajos coexisten en buena parte de los bosques europeos, se trata de 2 especies estrictamente forestales abundantes e íntimamente relacionadas a través de su ecología trófica. El arrendajo es una de las principales presas del azor, además del dispersor de bellotas más efectivo en ambientes boscosos, esto constituye una cascada trófica depredador apical-dispersor-productor que puede tener efectos en la configuración de los paisajes forestales. El objetivo del estudio es evaluar cómo cambian los patrones de dispersión del arrendajo en función de la distancia a territorios de cría del azor, para ello, se emplearon datos de nidificación en 21 territorios estables durante el periodo de 2004 a 2017. Para cada territorio se calculó un centroide de actividad reproductora a partir de los nidos utilizados, y desde ese punto se instalaron 10 parcelas de muestreo a 5 distancias crecientes (0 a 700 m) para cuantificar el regenerado sexual de *Quercus robur*. Se consideró tanto la influencia de la oferta de bellotas mediante la selección de árboles productores bien caracterizados, como la abundancia de arrendajos y otros posibles árboles productores en las inmediaciones de las parcelas. Los resultados principales fueron un efecto positivo en el reclutamiento que aumenta junto con la distancia a los nidos de azor, además de otra correlación positiva entre reclutado y oferta de bellotas. Estos resultados parecen indicar un claro efecto en los patrones de regenerado a causa del arrendajo, que necesariamente debe producirse por el efecto del paisaje del miedo que produce el azor en las inmediaciones a su territorio de cría, donde cazan y pasan la mayor parte del tiempo. Las conclusiones que se extraen del estudio son: 1) Comprender cómo se ensamblan las comunidades es fundamental para gestionar los ecosistemas; 2) La territorialidad reproductora de las rapaces apicales influye en la regulación top-down de la naturaleza; 3) La abundancia de bellotas es fundamental para su dispersión y 4) El arrendajo es capaz de modificar por sí solo la estructura del bosque.

P36. Evaluación de personalidad y gestión de bienestar animal en núcleos zoológicos aplicado a osos marinos (*Arctocephalus pusillus*)

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La evaluación de la personalidad en animales no humanos es una herramienta valiosa para mejorar la gestión en cautividad, el bienestar y las estrategias de conservación. Sin embargo, la investigación sobre la sociobiología de los osos marinos (*Arctocephalus pusillus*) sigue siendo limitada. Este estudio tuvo como objetivo identificar y describir los rasgos de personalidad en un grupo de osos marinos criados en cautividad utilizando dos enfoques complementarios: la evaluación mediante cuestionarios completados por entrenadores y la codificación sistemática de la conducta. Un análisis de componentes principales (PCA) sobre los datos de los cuestionarios reveló dos dimensiones principales de personalidad: Neuroticismo/Excitabilidad, caracterizado por impulsividad, alta actividad, imprevisibilidad y baja sociabilidad con personas; y Confianza/Extraversión, asociado con audacia, alta sociabilidad con personas y un temperamento estable. Los análisis de correlación indicaron que los individuos con puntuaciones altas en Neuroticismo/Excitabilidad mostraron un mayor nivel de vigilancia y conductas dirigidas hacia sí mismos, mientras que aquellos con puntuaciones altas en Confianza/Extraversión presentaron mayores niveles de juego e interacciones sociales. No obstante, las correlaciones obtenidas no fueron estadísticamente significativas debido al tamaño reducido de la muestra. Estos hallazgos se alinean con modelos de personalidad ya establecidos en otras especies de pinnípedos. Desde una perspectiva de manejo, los individuos más excitables pueden potenciar la participación del público, pero podrían no ser adecuados para actividades de contacto cercano, mientras que los animales más confiados podrían ser más apropiados para intervenciones asistidas con humanos. A pesar de las limitaciones de tamaño muestral ($n = 7$), este estudio ofrece una base para futuras investigaciones sobre la personalidad de los osos marinos y destaca la importancia de una atención individualizada para optimizar el bienestar y el enriquecimiento conductual en cautividad.

P37. Aplicación de un protocolo de bienestar animal y de enriquecimiento ambiental en un Centro de Recuperación de Fauna Silvestre en Chile (UFAS, UNAB) para aumentar la liberación de animales a su hábitat

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El objetivo principal de los Centros de Recuperación de Fauna Silvestre es el cuidado, recuperación y finalmente liberación, de individuos de fauna silvestre autóctona que por su condición (heridos, electrocutados, envenenados...) no podrían sobrevivir en la naturaleza. Tras un período de rehabilitación, deben someterse a una evaluación médica y etológica que muestre si son aptos para sobrevivir por ellos mismos y entonces son liberados. Para ello, durante su estancia en un centro de recuperación, los animales deben presentar buenas condiciones de bienestar, es decir, deben tener cubiertas la dimensión física, la dimensión mental y la dimensión conductual. Con ese objetivo y en base a estas tres dimensiones se diseñó en 2020 un protocolo de bienestar animal aplicado a los animales que están siendo tratados como pacientes en la Unidad de Rehabilitación de Fauna Silvestre (UFAS, de la Universidad Andrés Bello, Chile), adaptado a cada taxón, para mejorar sus condiciones durante su estancia y así incrementar las posibilidades de reincorporación a su hábitat. Por otro lado, se diseñó un protocolo de enriquecimiento ambiental que sirve como herramienta de evaluación etológica para saber si el animal está en adecuadas condiciones de ser liberado, y que se aplica en la fase de pre-liberación. Estos protocolos se han aplicado a 1.874 animales que ingresaron desde 2020 hasta la fecha, de los cuales 600 han sido liberados. La inclusión de estos protocolos sirve como herramientas prácticas para mejorar el manejo y las condiciones de bienestar durante su estancia, además de evaluar si los animales están aptos para ser liberados y poder continuar con su trayectoria vital.

P38. Evaluando la respuesta vocal de pardelas y murciélagos a la contaminación lumínica

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La contaminación lumínica altera los ciclos naturales de luz y oscuridad, interfiriendo con los ritmos biológicos de múltiples especies. Nuestro estudio se centra en dos taxones especialmente sensibles a este tipo de contaminación (pardelas y murciélagos) e hipotetizamos que la actividad vocal es alterada por la exposición experimental a luz artificial. Las pardelas únicamente visitan las colonias de reproducción durante la noche, produciendo vocalizaciones muy notables. Aunque no se comprende del todo su función, las pardelas vocalizan con menor frecuencia en noches con alta iluminación lunar. Así, esperamos que reduzcan las vocalizaciones ante condiciones de iluminación artificial. Los murciélagos muestran respuestas variadas a la luz artificial: algunas especies evitan zonas iluminadas debido al riesgo de depredación, mientras que otras más oportunistas aprovechan la concentración de insectos atraídos por la iluminación artificial, lo que influye directamente en sus patrones de forrajeo y actividad. Con este fin, diseñamos un experimento de campo en el barranco del Infierno (Tenerife) con iluminación LED de color naranja y blanca a dos intensidades distintas durante agosto de 2023 y 2024. Se colocaron grabadoras acústicas para registrar la actividad vocal durante los tratamientos experimentales (control, naranja a baja intensidad, naranja a alta intensidad, blanco a baja intensidad y blanco a alta intensidad). Contrario a nuestra hipótesis, la luz no ejerce un efecto significativo en cuanto a la variable estudiada (tasa de vocalización) en estos dos grupos. Esto podría deberse a dos razones no excluyentes: 1) las intensidades utilizadas en los tratamientos no son lo suficientemente potentes como para desencadenar una respuesta; 2) los individuos podrían estar habituados a paisajes contaminados lumínicamente y no responder a iluminación artificial adicional. Esto no implica que la contaminación lumínica no tenga efectos perniciosos sobre estos grupos taxonómicos en particular (los cuales han sido ampliamente descritos), sino que nosotros no logramos detectar un efecto sobre la tasa de vocalización con el diseño experimental realizado.

P39. Phenology modulates the top-down control of *Crematogaster scutellaris* on house sparrow mites: From mutualism to antagonism

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Bird–ant interactions are diverse but remain poorly integrated into ecological theory, largely due to the lack of experimental studies capable of identifying the true nature of these interactions across ecological contexts. One underexplored aspect is the potential role of ants in regulating ectoparasite loads within bird nests—a concept known as the parasite control hypothesis. To investigate these interactions under natural conditions, we focused on a specific system involving the house sparrow (*Passer domesticus*), the arboreal ant *Crematogaster scutellaris*, and the blood-feeding mite *Pellonyssus reedi*, a specialized ectoparasite known to impair nestling development. Using an experimental field design, we assessed whether the exclusion of *C. scutellaris* from sparrow nests altered ectoparasite abundance and nestling growth, while also considering reproductive phenology as a key contingency factor. Our results show that the role of ants shifted from beneficial to detrimental as the season progressed: ant presence significantly reduced mite abundance and enhanced chick growth early in the season, but had neutral or negative effects later on. These findings reveal that the benefits of ant presence are highly context-dependent, shifting from mutualism to antagonism over time, and underscore the temporal complexity of species interactions in natural ecosystems.

P40. Scratching as behavioural contagion in wild Ecuadorian capuchin monkeys (*Cebus aequatorialis*)

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Behavioural contagion is widespread across animal species and is thought to promote social cohesion and group synchrony. While contagious yawning has been extensively studied, contagious scratching remains comparatively understudied. In this study, we explored yawning and scratching contagion in a wild group of Ecuadorian white-fronted capuchin monkeys (*Cebus aequatorialis*, N=16) at La Hesperia Cloud Forest Reserve, Ecuador. We assessed whether scratching or yawning were more likely after observing, rather than not observing, another individual (i.e., model) scratching or yawning (i.e., triggering event) by recording all occurrences of these behaviours in each focal sample. Additionally, we assessed whether social factors—such as the model's social integration or the relationship quality between the model and observer—modulated the probability of contagion. Relationship quality was estimated through grooming, co-feeding, social proximity, and interaction duration. Our results revealed that individuals who observed scratching were more likely to scratch themselves shortly after, compared to those who did not observe a triggering event. However, neither the model's social integration nor the dyadic relationship quality significantly influences this effect. These findings suggest that while scratching is indeed contagious in this species, its modulation by social factors may be limited or context dependent. The absence of modulatory effects may also be related to the limited observation time or other ecological variables. No yawning events were recorded during the study. We hypothesize that this may be due to environmental conditions specific to the observation period, and that future research conducted during the dry season may yield different results. Our findings contribute to a growing body of research on behavioural contagion in non-human primates and support the idea that such phenomena occur in the wild beyond controlled environments. We recommend further investigation into the situational context and potential emotional functions of scratching contagion, as these may provide insights into its role in social communication and group coordination.

P41. Thermal stability of pigment- and structurally based body coloration in a polymorphic lizard

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Animal coloration plays a fundamental role in communication, camouflage, mimicry, thermoregulation and protection from the environment, and has strong implications for adaptation and diversification. Phenotypic plasticity of color traits can thus affect social, reproductive, antipredator, or thermoregulatory behavior and determining the causes and consequences of color change helps us understand evolution. In contrast to seasonal or ontogenetic color changes, physiological color change in response to fine-scale changes in environmental conditions has received less attention. Temperature-driven, rapid changes in coloration can have profound implications for ecophysiology, particularly in ectotherms. Here, using a widespread color polymorphic lacertid, *Podarcis muralis*, we study the impact of temperature on the conspicuousness of pigment- and structurally based body coloration. We subjected male and female adult lizards of pure orange, yellow and white ventral coloration to two different temperature regimes: cold (25°C) and hot (>34°C) temperature, and quantified body color change in the ultraviolet (UV)-visible range using a spectrophotometer. We then applied visual modeling to assess color variation from the perspective of a conspecific or a visual predator observer. We show that despite minor differences in spectral reflectance metrics, temperature had no significant effect on how color patches from the dorsum, belly, throat and UV-blue ventrolateral patches are perceived by receivers. Moreover, temperature did not affect existing sex and morph differences in color properties, suggesting that the minor changes we observed have little or no functional/adaptive consequences. Contrary to results reported in other lizard taxa (iguanians and geckos), our findings suggest that rapid color change is unlikely in this lacertid species.

P42. Comportamiento de forrajeo y condición nutricional de pingüinos barbijo en Isla Decepción, Antártica

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La capacidad de adquirir energía determina los recursos que un individuo puede asignar a la reproducción y al mantenimiento, por ello, el comportamiento de forrajeo es un rasgo clave para comprender mejor los mecanismos subyacentes a estas diferencias. Analizamos los movimientos de forrajeo de pingüinos de barbijo de la colonia de pingüinos Vapour Col en la Isla Decepción, Shetlands del Sur (63° 00'S 60° 40'O) durante el verano austral de 22/23 y 23/24 de adultos reproductores con dos pollos que fueron capturados en nidos equipados con GPS-TDR durante cinco días. Estudios previos mostraron cómo el estado de nutrición y el sexo de los individuos puede explicar respuestas conductuales individuales, como el comportamiento de forrajeo. Con el fin de incluir el papel de la condición nutricional, utilizamos análisis de bioquímica sanguínea para cuantificar el estado nutricional (medido como concentraciones de urea, ácido úrico y beta-hidroxibutirato en sangre) y examinar la relación entre comportamiento de forrajeo, el sexo, la posición de la colonia, y estado nutricional de los pollos de pingüinos barbijo reproductores.

P43. Dispersión invernada de pingüinos barbijo de Isla Decepción, Antártida

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El pingüino barbijo (*Pygoscelis antarctica*) se alimenta principalmente de kril (*Euphausia superba*) y ha sido designado como especie clave para monitoreo en el marco de la Convención para la Conservación de los Recursos Vivos Marinos Antárticos (CCRVMA). Tras la reproducción, esta especie abandona las colonias reproductivas y pasa hasta ocho meses invernando en el mar. A pesar de la evidente importancia de la temporada no reproductiva para su supervivencia, se desconocen en su mayoría las distribuciones y comportamientos invernados de los pingüinos de barbijo en la Península Antártica. Diversos estudios han demostrado en diferentes organismos cómo sus movimientos pueden ajustarse a diferentes patrones para optimizar la búsqueda de alimento. A partir de localizaciones GPS, analizamos la adecuación de los patrones de movimiento a las funciones de las estrategias de Lévy y Browniana. Este análisis de los patrones de búsqueda de alimento puede utilizarse como indicador indirecto para rastrear los cambios en la disponibilidad de alimento en una amplia gama de condiciones ambientales. Utilizamos telemetría satelital para rastrear los movimientos de adultos que mudaron en la colonia de pingüinos Vapour Col, en la Isla Decepción, Shetlands del Sur (63° 00'S 60° 40'O). El análisis de la ubicación satelital nos permite obtener información precisa sobre los patrones de movimiento, las regiones geográficas específicas que utilizan los pingüinos durante los meses no reproductivos y la superposición espacial entre las principales zonas de pesca y alimentación, lo que podría ayudar a dilucidar los factores que influyen en su supervivencia. El análisis de los movimientos invernados de los pingüinos barbijo es importante en el contexto actual de cambio global, que se prevé que afecte a las especies migratorias.

P44. Every stage matter: exploring the impact of early life stress on development and performance in amphibians

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Global environmental change poses significant challenges to wildlife, particularly for ectotherms with complex life cycles, where the most vulnerable life stage determines population sensitivity and persistence. Amphibians exemplify this challenge, undergoing one of the most dramatic metamorphic transitions in the animal kingdom—marked by profound morphological, physiological, and ecological shifts as they transition from aquatic larvae to terrestrial adults. Their dependence on both environments makes them especially susceptible to climate-induced stressors. Moreover, as the most threatened vertebrate taxon, with over 41% of species at risk of extinction, understanding how environmental stressors shape amphibian development and survival is critical for predicting their persistence in a changing world. I will present experimental and meta-analytical results on both the “cold side of climate change,” focusing on increasing winter variability, and the “warm side of climate change,” examining elevated developmental temperatures. Additionally, I will highlight how early-life stress carries over to later stages, shaping important performance traits such as thermal tolerance, responsiveness to acute stressors, and growth. Lastly, I will discuss methodological challenges in studying early-life stress in amphibians. Overall, our findings demonstrate that early-life conditions can shape both individual performance and population resilience in response to environmental change. Recognizing these effects is essential for predicting amphibian vulnerability and informing conservation strategies in a rapidly changing world.

P45. Uso de Social Network Analysis (SNA) para la descripción de la red de un grupo de osos marinos (*Arctocephalus pusillus*)

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En este estudio se presenta el análisis de la red social de un grupo de siete osos marinos (*Arctocephalus pusillus*) de las instalaciones de Faunia, Madrid. Seis de ellos eran hembras y uno de ellos macho, todos adultos. Se observó al grupo en dos periodos. El I del 23 de noviembre de 2023 al 29 de diciembre de 2023 y el II del 1 de febrero de 2024 al 1 de marzo de 2024. Una observadora, mediante focales registró la conducta afiliativa de cada individuo 65 minutos en el periodo I y 70 en el periodo II. Se analizaron las tres conductas que con más frecuencia se daban en el grupo: cruce sincronizado, frotamiento y nado sincronizado. Se usó la metodología *Social Network Analysis (SNA)*. Para extraer diferentes parámetros de la red social. Se hizo un análisis QAP para observar si había estabilidad en la red entre ambos momentos. Además, se calculó la densidad para las tres conductas tanto en el periodo I como en el periodo II. Se calcularon también los estadísticos *Eigenvector* para las tres conductas analizadas en ambos momentos. Como se observó estabilidad en la red, se trazaron los sociogramas de todos los datos conjuntos usando *In Eigenvector*. Se observó estabilidad en la red. Además, en la densidad, en todas las conductas se vio un alto grado de interconexión en el grupo si bien nado sincronizado en ambos momentos era el valor más bajo (no inferior a 0,5). Los individuos más populares eran el único macho y dos de las hembras de mayor edad, una de ellas madre del macho y de otra hembra del grupo. Las más aisladas eran la hembra más pequeña y nueva en el grupo, y otra hembra de las de mayor edad madre de otra hembra del grupo. A la hora de ver las relaciones, se veía que varias coincidían con semejanzas de edad o relaciones de parentesco entre los individuos. Este estudio, tiene valor a la hora de pensar en el manejo de este grupo de animales dentro del núcleo zoológico y su la medida de su bienestar.

P46. Implicaciones de la acumulación de piedras en nidos de pardela cenicienta

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Las pardelas cenicientas (*Calonectris borealis*) son aves marinas longevas, monógamas y filopátricas, que regresan cada año al mismo nido para encontrarse con su misma pareja y poner un único huevo por temporada. Esta especie acumula piedras en la entrada de sus cavidades nido (58.8% de presencia). La función de tal comportamiento se desconoce, aunque existe una relación positiva entre la presencia de piedras y el éxito reproductor. Se desconoce también si se acumulan en un único intento de cría y quién las acarrea. Diversas hipótesis podrían explicar esta conducta: 1) Protección del nido hacia depredadores. Los acúmulos de piedras reducen el tamaño de la entrada de los nidos, haciéndolos menos accesibles a los depredadores. Así, se ha observado que el tamaño de la entrada del nido se correlaciona positivamente con el éxito reproductor. 2) Mejora del aislamiento. La reducción de la entrada por las piedras favorecería un ambiente de nidificación más estable, contribuyendo al aislamiento frente a las condiciones climáticas. 3) Selección sexual a través de fenotipo extendido. La cantidad y características de las piedras podría servir como señal del estado fisiológico y predisposición reproductiva de la pareja. En otras aves, como la collalba negra (*Oenanthe leucura*), las hembras evalúan la masa de piedras depositadas por los machos, encontrando además una asociación entre el número de piedras y el éxito reproductivo. Sin embargo, la fidelidad de las pardelas al nido y la pareja no parecen apoyar esta hipótesis. Como estudio preliminar, manipulamos experimentalmente seis nidos (tres con piedras y tres sin). En los nidos con piedras, se midieron y pesaron >1500 piedras (longitud media: 39mm; peso medio: 22g). En los nidos sin piedras, se colocaron piedras similares (longitud media: 43mm; peso medio: 34g). Las piedras se dispusieron en dos montones, uno de piedras grandes y otro de pequeñas, en la entrada de los nidos. Además, instalamos cámaras-trampa, para evaluar la tasa de acumulación (en una o varias reproducciones), la preferencia de tamaño de las piedras y la contribución de cada sexo. Así, se espera esclarecer el papel que juegan las piedras en el comportamiento reproductivo de la especie.

P47. Shifts in mammal community structure following *Retama monosperma* encroachment in Doñana National Park

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Retama monosperma, a native shrub of the southwestern Iberian coastal dunes, has exhibited rapid expansion since the 1990s, particularly within the open juniper woodlands of the Pinar del Faro area in southern Doñana National Park. This structural transformation of the habitat may be altering the behavioral ecology of key terrestrial mammals, particularly in terms of habitat use and spatial distribution. In Doñana, the European rabbit (*Oryctolagus cuniculus*) and the Iberian hare (*Lepus granatensis*) are ecologically significant herbivores that favor heterogeneous landscapes combining open grasslands and low shrub cover. Despite this preference, both species have suffered severe long-term population declines, possibly linked to both disease and habitat changes. To investigate how *Retama monosperma* encroachment may be influencing mammalian behavior and habitat selection, we conducted systematic faecal pellet counts of lagomorphs and ungulates across four 7-hectare plots characterized by varying densities of retama and Mediterranean shrubland. Camera traps were also deployed to document species presence and behavioral activity patterns. Preliminary data indicate that lagomorphs are largely absent from areas with extreme shrub densities—either very low (< 1%) or very high (>100%)—and are only active in plots with moderate shrub cover (9–37%). In contrast, ungulates (e.g., red deer and wild boar) showed increased activity and spatial use in denser retama-dominated plots, with up to 80% of detections occurring in the plot with the densest cover (180%). These patterns suggest a shift in habitat use behaviors among mammalian species in response to vegetation structure. Specifically, *Retama monosperma* encroachment may be facilitating ungulate foraging and shelter behaviors, while simultaneously constraining the movement and foraging strategies of lagomorphs. Such behavioral insights are critical for informing management practices aimed at balancing shrub expansion with the conservation needs of vulnerable mammal species in Mediterranean dune ecosystems.

P48. Spatiotemporal behavioural plasticity in a mesocarnivore guild as a response to anthropogenic pressure in an agro-pastoral system

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Animals' spatial and temporal behaviour is highly modulated by the environment they live in. Increased human pressure in the form of livestock and agriculture might change the spatial and activity patterns of mesocarnivores. We aimed to determine how differential land use (agricultural vs livestock) affected spatial and temporal behaviour in a mesocarnivore community. We deployed 20 camera traps (11 in agricultural areas vs 9 in livestock areas) from November (2024) until January (2025) in the communal agricultural and livestock pastureland of Oliva de la Frontera (Extremadura, Spain). During the resulting 1129 total sampling days, 13 mammal species were recorded, of which the common genet (*Genetta genetta*), Egyptian mongoose (*Herpestes ichneumon*), Eurasian otter (*Lutra lutra*), stone marten (*Martes foina*), European badger (*Meles meles*) and the red fox (*Vulpes vulpes*) belonged to the mesocarnivore guild. Due to the Eurasian otter detections being limited to riverbanks and the Egyptian mongoose having very few detections, these were discarded for further analysis. Relative Abundance Indexes (RAI) and activity patterns were obtained for each target species, domestic dogs (*Canis lupus familiaris*) and livestock and compared between different habitats. Also, single-species occupancy models were built to see if RAI-s from domestic animals' influenced the occupancy estimates of target mesocarnivores. Mean RAI values for mesocarnivores were higher in the agricultural area (with fewer dogs and no livestock) than in the livestock area for common genet, stone marten and European badger while the contrary was true for the red fox. Along these lines, models showed reduced presence of genet and badgers in stations with higher dog and livestock RAI values, whilst showing no correlation between these covariates and fox and marten occupancy. Nevertheless, activity patterns differed significantly between habitats for the red fox. Foxes from the agricultural areas showed a more diurnal activity pattern than those in the livestock area which were restricted to a more crepuscular-nocturnal time of the day. These results exhibit the high degree of plasticity these species possess to avoid human pressure, especially the red fox which instead of altering their space use, made use of the same areas but changed their timing.

P49. Modelo competitivo para expresión de percepciones y conducta en neuroetología

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Una posibilidad alternativa en neurociencias y neuroetología a los estudios cerebrales invasivos consiste en registrar los comportamientos externos y realizar modelos de representación interna, que sean explicativos de la conducta observada, y que idealmente pudieran ser predictivos. El presente modelo competitivo, intenta demostrar la validez de un modelo competitivo (modelo-C) entre las redes neuronales participantes en las distintas conductas. Para modelar las distribuciones temporales de las conductas el modelo plantea dos períodos: (i) Un período refractario para nuevas conductas, modelado mediante una ecuación sigmoidea (parámetro A), y que permitiría un tiempo suficiente para realizar la función comportamental seleccionada en un determinado momento. (ii) Una fase competitiva entre las distintas redes neuronales, modulada por un parámetro ps, dentro de una función de densidad de probabilidad geométrica, que estaría relacionado con la competencia continua entre las distintas redes neuronales aspirando a producir conducta observable. El modelo ha sido ajustado a diversas condiciones experimentales de percepción y acción, en humanos y animales, en situaciones relativamente espontáneas: (i) Conducta de presión de palanca en ratas, en cajas de Skinner, en un paradigma de reforzamiento por intervalo variable. Variables operacionalizada (VO), el tiempo entre dos presiones de palancas. (ii) La percepción de figuras ambiguas, como el cubo de Necker, y la rivalidad ocular. VO: Duración de los perceptos alternativos. (iii) Durante escaneo de imágenes visuales. VO: Los tiempos de las fijaciones oculares durante el escaneo. (iv) Conducta de desplazamiento en *Drosophila melanogaster*. VO: Los tiempos de desplazamiento y de paradas en una situación relativamente libre. El modelo sugiere que la competencia entre redes neuronales sería una propiedad organizativa del cerebro para facilitar el proceso de toma de decisiones tanto en la acción como en la percepción, sugiere alternativas para la comprensión de procesos internos a través de la observación y registro conductual. El modelo tendría validez en diferentes conductas y organismos.

P50. Efectos de la temperatura y la humedad relativa sobre la concentración de CO₂ y CH₄ y la abundancia de ectoparásitos en nidos de herrerillo común (*Cyanistes caeruleus*)

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La presencia de polluelos influye en el microclima de las cavidades donde anidan las aves. En este estudio, exploramos los efectos de la temperatura, la humedad relativa, el dióxido de carbono (CO₂) y el metano (CH₄) sobre la abundancia de ectoparásitos en nidos de herrerillo común durante el periodo de crecimiento de sus polluelos. Se compararon dos años con diferentes condiciones climáticas externas (2016 y 2017), y el segundo año, manipulamos la temperatura y la humedad relativa en el interior de las cajas-nido. La temperatura media en las cajas-nido fue menor durante 2016 que en 2017, y en este último año se alcanzaron condiciones aún más cálidas, debido a la manipulación experimental de la temperatura. La concentración de CO₂ en el aire del bosque fue ligeramente menor en 2016 que en 2017. En ambos años la concentración de CO₂ en el interior de las cajas-nido fue mayor que el aire del bosque, y en 2017 se observó una mayor diferencia. Sin embargo, la concentración de CO₂ en las cajas-nido fue mayor durante el año más cálido, lo que implica que a temperaturas más altas, la descomposición de la materia orgánica probablemente se acelera, liberando más CO₂ a la atmósfera. Contrariamente, la concentración de CH₄ en el interior de las cajas-nido, que fue similar en ambos años, fue menor que la del aire del bosque, particularmente en el año más húmedo y frío. Se encontró una relación positiva y significativa entre la abundancia de larvas de pulgas y la temperatura en el día 8 de edad de los polluelos, pero negativa para los ácaros en las mismas condiciones microclimáticas. Además, se observó una relación negativa y significativa entre la abundancia de ácaros, jejenes y moscas negras y la concentración de CH₄ a diferentes edades de los polluelos. Estos resultados sugieren que los cambios en las condiciones climáticas también pueden afectar las concentraciones de CH₄ y CO₂ dentro y fuera de las cajas-nido, lo que a su vez afecta de manera diferencial la abundancia de ectoparásitos.

P51. Modeling the role of mosquito species in shaping West Nile virus outbreak risk in Mediterranean ecosystems

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Mosquito species composition plays a pivotal role in the dynamics of vector-borne diseases such as West Nile virus (WNV). This emerging zoonotic arbovirus circulates primarily between mosquitoes (vectors) and birds (the main amplifying hosts), and has shown a global increase in both incidence and geographic spread. Although humans can become infected, they do not contribute to further transmission, acting as dead-end hosts. Among the most important vectors in Europe and the U.S. are *Culex pipiens* and *Culex perexiguus*, yet their distinct ecological traits and transmission roles remain not fully understood. To explore how vector composition and host preferences influence WNV spread, we constructed SEIR-based mathematical models incorporating two mosquito species (*Cx. pipiens* and *Cx. perexiguus*) and two host categories (birds and humans). These models also integrated climatic data that influence mosquito population dynamics and key epidemiological parameters. We used the predicted number of infected mosquitoes as a proxy for human infection risk. The simulations revealed that *Cx. pipiens* alone could not sustain WNV transmission. However, the inclusion of *Cx. perexiguus* enabled outbreak conditions, especially when both mosquito species showed a strong feeding preference for avian hosts. Notably, the basic reproduction number (R_0) remained below 1 under all conditions, unless feeding preferences shifted to favor bird hosts more strongly. These results highlight the critical importance of mosquito community structure and host selection behavior in shaping WNV transmission dynamics. Targeted surveillance and vector management strategies should account for species-specific behaviors to improve outbreak prevention. The modeling approach presented here offers a flexible tool for testing field-derived hypotheses and can be adapted for other mosquito-borne diseases.

P52. Abundancia, composición y factores ecológicos asociados a las comunidades de garrapatas en el suroeste de España.

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En las últimas décadas, brotes de enfermedades infecciosas emergentes han surgido en todo el mundo, amenazando la salud pública y la biodiversidad, especialmente en zonas consideradas puntos calientes, como el sudoeste peninsular. Las garrapatas son vectores clave en la transmisión de numerosos patógenos, muchos de ellos zoonóticos, lo que las convierte en un componente fundamental en el estudio de enfermedades infecciosas emergentes. Esta relevancia se acentúa en regiones como el suroeste español, considerado un punto caliente de biodiversidad y transmisión de enfermedades. En este trabajo analizamos la abundancia, composición y distribución de las comunidades de garrapatas en distintos hábitats rurales y naturales del suroeste peninsular, evaluando cómo factores ambientales, estacionales y de tipo de hábitat influyen en su dinámica. Nuestros resultados evidencian patrones espacio-temporales diferenciados entre especies, permitiendo identificar periodos críticos de actividad y áreas de mayor riesgo potencial para la transmisión de patógenos. Este conocimiento es clave para el desarrollo de estrategias de vigilancia y control de enfermedades transmitidas por garrapatas en un contexto de cambio global.

P53. Small-scale habitat determines gut microbiota of a migratory passerine on its breeding ground

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The gut microbiome is an important mediator of life-history traits in animals and performs essential functions that may allow hosts to exploit novel niches. However, sources of variation in microbiome abundance and composition within vertebrate species are poorly understood, particularly in wild birds. Here, we used 16S rRNA gene sequencing to describe the faecal microbiome of a trans-Saharan migratory passerine species breeding in Central Spain, the pied flycatcher (*Ficedula hypoleuca*), focusing on small-scale differences in bacterial composition and relative abundance between the natural habitat of the species (oakwood) and a newly created habitat (pinewood) located 1 km apart. We detected a difference in the composition of the microbiomes of birds between the habitats, with birds from the oakwood showing a higher abundance of several bacterial taxa, such as *Actinobacteriota* and *Proteobacteria*. We observed no microbiome differences according to individual characteristics such as sex or age, although nestlings and females showed a higher abundance of certain bacteria, especially those in the oakwood habitat. We investigated metabolic pathways associated with the microbiome and detected a higher abundance of bacteria with fatty acid biosynthesis and degradation pathways and metabolite precursor and energy generation pathways in oakwood birds compared to pinewood birds. In the pinewood birds, we found a significant increase in bacteria with the L-alanine biosynthesis and pentose phosphate pathways. Our study improves our understanding of the gut microbiome composition of insectivore passerines and shows that local-scale environmental factors, such as habitat, are among the most important modulators of avian gut microbiome composition.

P54. Unveiling the diversity and ecology of understudied black gnats of the genus *Leptoconops* in southwestern Spain: New species, habitat preferences, and distribution

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The genus *Leptoconops* (Diptera: Ceratopogonidae), also known as black gnats, is known for delivering painful bites that often provoke considerable irritation and allergic reactions in both humans and animals. In terms of their direct nuisance to humans, *Leptoconops* species are regarded as equally problematic as other ceratopogonid midges, such as those belonging to the genus *Culicoides*. Despite this, situation this genus has been understudied in Europe particularly in Spain where its distribution, habitat, and phenology are largely unknown. Our study aimed to clarify the taxonomy status, species composition, and ecological factors influencing habitat preferences of *Leptoconops* in southwestern Spain. A comprehensive sampling effort across a wide study area covering sampling points in three provinces – Huelva, Cadiz and Sevilla – yielded eight species, including four new species, as well as the first records of *Leptoconops irritans* and *Leptoconops bidentatus* on the Iberian Peninsula. Ecologically, *Leptoconops* species showed habitat preferences to zones associated with irrigated agricultural areas, non-irrigated and near water bodies, which serve as primary biotopes. Moreover, we conducted a morphological analysis and molecular sequencing of cytochrome c oxidase I (COI) gene to confirm the identities of these species and to construct a phylogenetic tree to understand phylogenetic relationships of the genus. This study highlights the critical role of environmental variables in shaping *Leptoconops* community structure and provides essential taxonomic approach for further research, including potential implications for controlling vector-borne diseases.

P55. Behavioural responses of mosquito larvae to a novel predation threat

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Predator-prey interactions are critical selective forces shaping the evolution of behavioural traits in aquatic organisms and influencing population dynamics. The introduction of non-native species creates novel ecological interactions, including unique predator-prey relationships with largely unpredictable consequences. Mosquito larvae display vertical distribution patterns that reflect their need to access both food and atmospheric oxygen, potentially affecting their vulnerability to benthic predators such as crayfish. In this study, we examined whether naïve *Culex pipiens* larvae alter their vertical behaviour in response to the presence of a non-native benthic predator, the marbled crayfish (*Procambarus virginalis*). We hypothesised that due to the lack of co-evolutionary history, mosquito larvae would not initially recognise the predator, exhibiting limited anti-predator responses. To test this, we conducted controlled aquarium experiments in which mosquito larval activity was recorded for the first 5 minutes using digital video cameras, in the presence or absence of the predator. The vertical space within the aquaria was partitioned into fifteen 1-cm zones to capture fine-scale behavioural variation. For each zone, we quantified the cumulative time spent (s), number of visits between zones, swimming velocity ($\text{cm} \cdot \text{s}^{-1}$), and percentage of time larvae were actively moving. Contrarily to our hypothesis, our results showed that the presence of the marbled crayfish significantly altered larval behaviour. Larvae spent more time in the upper zones and avoided deeper regions near the predator, with behavioural changes detectable within the first five minutes. Additionally, larvae exhibited reduced velocity at the water surface when the predator was present. These findings suggest that even in the absence of prior exposure, mosquito larvae respond to novel predation threats, potentially through generalised risk chemical cues. The shift away from benthic zones may reduce larval access to food resources located at the bottom, thereby affecting individual fitness and altering trophic dynamics. We discuss the potential implications of these behavioural shifts for mosquito ecology and the transmission dynamics of mosquito-borne diseases.

P56. Reaprendizaje natural de vocalizaciones en loros choroy (*Enicognathus leptorhynchus*) antes de su liberación

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El principal objetivo de un Centro de Recuperación de Fauna Silvestre es tratar y rehabilitar médica y etológicamente a los individuos para que puedan ser liberados a su hábitat. Los animales que no tienen un comportamiento natural de su especie no pueden ser liberados. Las aves sociales son muy complejas, porque muestran constantemente interacciones entre individuos, mediante el tacto, expresiones y/o vocalizaciones. Los animales que han sido mantenidos ilegalmente como mascotas suelen mostrar vocalizaciones “antinaturales”, que no forman parte del repertorio habitual de la especie en condiciones silvestres. El objetivo de nuestro estudio fue analizar la comunicación vocal entre 14 individuos de loros choroy (*Enicognathus leptorhynchus*), una especie endémica de Chile, mediante grabaciones audiovisuales simultáneas realizadas sin la presencia de observadores entre octubre de 2018 y abril de 2019 en la Unidad de Rehabilitación de Fauna Silvestre (UFAS, de la Universidad Andrés Bello) en Chile. Todos los loros fueron previamente marcados para poder ser identificados individualmente. Los resultados mostraron que, aunque los loros habían sido mantenidos como mascotas y presentaban vocalizaciones poco naturales durante sus exámenes médicos y los primeros días en UFAS, no emitían estas vocalizaciones cuando interactuaban con los individuos del grupo, incluso aquellos que fueron mascota durante varios años. Asimismo, los individuos expresan más vocalizaciones cuando están comiendo e incluso bajo perturbaciones no usan esas vocalizaciones no naturales. Con estos resultados, se concluye que los loros choroy recuperan su vocalización natural cuando se unen a otros individuos en un grupo de pre-liberación, lo cual es requisito indispensable para la formación de un grupo estable que va a ser liberado en su hábitat natural.

P57. Family context & begging signals: Brood size, provisioning rate and diet composition drive nestling begging behaviour

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Understanding the dynamics of parent-offspring communication is essential to comprehend how resources are allocated and how family interactions are shaped. In altricial birds, begging behaviour is a crucial mechanism through which nestlings signal their needs to parents, thus influencing food provisioning and overall parental investment. However, nestling begging and parental responsiveness can vary depending on factors such as brood size and the frequency and quality of food provided to nestlings. Still, the combined role of these factors in regulating begging signals remains largely misunderstood. This study aims to explore the role of brood size in shaping nestling begging time, parental feeding rate, and diet composition in a population of blue tits (*Cyanistes caeruleus*). To this end, we manipulated the brood size, producing reduced, control, and enlarged broods, and used micro-cameras to record begging behaviour and parental responses (per brood and per nestling feeding rate and nestling diet composition). Our results showed that nestlings in reduced broods begged for significantly less time than in control and enlarged broods, which showed similar begging time. Despite this, the begging time for the whole brood was increased in enlarged broods and decreased in reduced broods, regarding controls, supporting the hypothesis that brood size affects begging dynamics. A key finding was the combined effect of feeding rate and diet composition, since nestlings in broods with higher feeding rates and lower proportions of spiders relative to caterpillars begged more time, whereas nestlings in broods with lower feeding rates displayed reduced begging, which was less dependent on diet composition. These findings suggest that nestling food demand may be addressed toward specific types of food and conditioned by nutritional needs, highlighting the complexity of parent-offspring communication. This study contributes to a broader understanding of signalling theories, showing that begging behaviour is influenced by both environmental conditions and family context

P58. Mosquitoes and the city: effects of urbanization on mosquito captures and *Dirofilaria* DNA screening in Granada

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Urbanized areas provide suitable environments for mosquito establishment and proliferation. Among urban species, the Asian Tiger mosquito, *Aedes albopictus*, listed among the world's 100 worst invasive species, has expanded from its native range in Asia to numerous countries worldwide, including Spain. This species plays a key role in the local transmission of arboviruses such as dengue, chikungunya, and Zika, and parasites such as filarial nematodes. In this study, we investigated the influence of habitat type on the abundance of two common mosquito species in urban areas, namely *Ae. albopictus* and the common house mosquito *Culex pipiens* in southern Spain, and screened both species for *Dirofilaria* DNA. Mosquitoes were sampled across three urban and three peri-urban sites in Granada over two consecutive years (2023–2024), yielding a total of 651 *Ae. albopictus* (450 females and 201 males) and 707 *Cx. pipiens* (641 females and 66 males). Statistical and molecular analyses were restricted to mosquito females, given their higher abundances and greater epidemiological relevance. Our results revealed that *Ae. albopictus* abundance varied seasonally, following a unimodal pattern and peaking between late July and late August. Seasonal patterns differed marginally between urban and peri-urban areas. In contrast, *Cx. pipiens* exhibited moderate seasonal variation, with higher captures in peri-urban than in urban areas and a general decline towards the end of the sampling period. Despite the known vector competence of these two mosquito species for *Dirofilaria*, no evidence of infection was detected in the sampled mosquitoes. These findings emphasize the influence of habitat type on mosquito populations, with apparent contrasting effects depending on the mosquito species considered. Our results underscore the need for targeted vector control and surveillance efforts in urban environments recently colonized by the invasive *Ae. albopictus*.

P59. Respuestas comportamentales de una lagartija a llamadas de una rapaz mesodepredadora: implicaciones para la detección indirecta del riesgo de depredación

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La depredación constituye una fuerza selectiva que moldea los rasgos de historia de vida de las especies presa e influye en la estructura de las comunidades animales. En respuesta a los depredadores, muchos animales emiten llamadas de alarma, reconocidas por su alto valor informativo. En sistemas tróficos complejos, la comunicación acústica puede mediar interacciones más allá de la relación directa depredador-presa. En particular, los mesodepredadores, al enfrentarse a depredadores superiores, pueden emitir señales de alarma para sus conespecíficos pero que podrían ser también detectadas por sus presas basales, brindándoles información indirecta para estimar el riesgo de depredación. Para evaluar esta hipótesis, realizamos un experimento de mesocosmos en el que simulamos la emisión de llamadas de alarma y vocalizaciones neutras de cernícalo vulgar (*Falco tinnunculus*), actuando como mesodepredador, y de pinzón vulgar (*Fringilla coelebs*), utilizado como control por su dieta granívora. Analizamos el efecto de estos sonidos sobre el comportamiento de lagartijas colilargas (*Psammodromus algirus*), que son presas basales de los cernícalos. Nuestros resultados revelan una alta variabilidad en el comportamiento de las lagartijas, tanto en la distancia al refugio como en el tiempo dedicado a la actividad locomotora a lo largo del experimento. Se observó que, en todos los tratamientos, los machos de lagartija permanecieron a mayor distancia del refugio que las hembras, lo que podría interpretarse como una manifestación de un comportamiento más arriesgado. Sin embargo, tanto machos como hembras redujeron la distancia al refugio en presencia de llamadas de cernícalo en mayor medida que ante el canto del pinzón, aunque esta diferencia se diluyó con el tiempo, lo que sugiere habituación al estímulo acústico. Paralelamente, tanto la frecuencia como el tiempo total en movimiento fueron mayores durante la exposición a llamadas de cernícalo en comparación con las del pinzón. En conjunto, estos resultados sugieren que esta especie de lagartija es capaz de discriminar señales acústicas asociadas a un depredador potencial y que responde incrementando su actividad locomotora, posiblemente como una estrategia de evasión ante una amenaza percibida. Esto puede tener consecuencias relevantes en la dinámica de las interacciones tróficas y en la evolución de comportamientos antidepredatorios.

P60. Individual activity patterns in Iberian lynx (*Lynx pardinus*)

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Until recently, the role of intraspecific individual variation in behavioral ecology had received little attention. Despite technical advances facilitated monitoring animal movements in their natural environment are providing large amounts of data, most of studies at population level only account for mean sources of variation at age, gender, and season/year. The study of diel activity patterns is singularly affected, and movement ecologists often have seen unexplained variation around the mean as “noise”. From 1983 to 1985, we completed 117 24-h radio-tracking sessions of 12 individual Iberian lynxes (*Lynx pardinus*), inhabiting Doñana National Park (southwestern Spain). We examined circadian activity pattern, assessing variation in percent of activity, movement rates, and activity rhythms among individuals, seasons, age-classes and gender. The most important sources of variation were individual (up to 38% for nocturnal movement rates), and season (up to 21% for daytime movement rates). Individual, seasonal and age variation explained 36-41% of variation in diurnal movement rates and distance traveled per 24-h. Synchrony among individual activity patterns was highest during summer, lowest during winter. Within a season, variation among individual activity patterns was affected by age-class (higher among adults) habitat (individuals occupying same area tend to have similar activity patterns), dispersal, and reproductive status. We argue that behavioral and ecological plasticity in individual diel activity patterns may help to reduce intraspecific competition, providing a better exploitation of resources, and a potential ability to adapt to habitat changes, with may have implications for species survival, thus supporting the adaptive value of intraspecific individual variation in mammals.

P61. Individual differences in the welfare effects of cognitive research in captive macaques

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Cognitive research with captive animals is increasingly recognised not only as a valuable scientific method but also as a potential tool for enhancing animal welfare. However, inter-individual differences may significantly affect their willingness to participate, cognitive performance, motivation, and ultimately, welfare outcomes. In this study, we investigated the welfare impacts of engaging in cognitive tasks in a group of seven captive macaques (*Macaca spp.*) housed at the National Zoo of Cuba, with specific focus on inter-individual variation. To assess personality, we applied a modified version of Eysenck's PEN model. Behavioural indicators of welfare—including self-directed behaviours (e.g., scratching, self-grooming) and abnormal behaviours (e.g., stereotypies)—were systematically recorded across three phases: pre-experimental, experimental (during cognitive tasks), and post-experimental. Our results revealed a significant reduction in the probability of performing abnormal behaviours during the experimental phase, suggesting that participation in cognitive tasks may act as an effective form of environmental enrichment. In contrast, self-directed behaviours, often interpreted as indicators of mild stress, did not vary significantly across all phases, indicating that engagement in the cognitive tasks did not cause noticeable distress. Contrary to our predictions, personality traits and rearing experiences did not significantly influence behavioural responses or welfare outcomes, which may be partly due to the limited sample size. These findings suggest that while cognitive enrichment can have generally positive welfare effects, the role of individual personality traits remains complex and warrants further study. This research contributes to the growing body of evidence supporting the use of cognitive challenges to improve the welfare of captive non-human primates. It also highlights the importance of considering individual variability when designing enrichment and research protocols to ensure the well-being of all animals involved.

P62. Ecología de nidificación de la avispa papelera (*Polistes gallicus*) en el suroeste ibérico: un enfoque con teledetección y variables meteorológicas

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Polistes gallicus es una avispa social común en el área mediterránea, donde nidifica sobre plantas herbáceas en hábitats naturales y seminaturales. Además de su interés ecológico, desempeña un papel destacado como agente de control biológico de insectos fitófagos. La selección del lugar de nidificación influye directamente en el éxito de las colonias y está determinada por múltiples factores ambientales. Este estudio analizó la ecología de nidificación de *P. gallicus* mediante el seguimiento intensivo de 31 colonias en una zona rural del suroeste de Extremadura entre febrero y junio de 2019. Cada tres días se registraron el número de celdas por nido, el estado de ocupación, el número de individuos, el tipo de sustrato y, cuando fue posible, la causa de desaparición de la colonia. Paralelamente, se recopilaron datos meteorológicos (AEMET Open Data) y de teledetección (índices NDVI, NDWI y NDMI del programa Sentinel-2) para evaluar su relación con la abundancia estacional de nidos. El 83,9 % de los nidos se ubicaron sobre plantas, principalmente *Scirpus holoschoenus* y especies de *Opuntia*, aunque también se documentaron ocho nidos anclados a postes de hormigón, reflejando una notable plasticidad en la elección del sustrato. La duración media de las colonias fue de 51,1 días ($\pm 23,4$), pero solo una sobrevivió hasta junio. Las principales causas de desaparición fueron episodios tormentosos, depredación y abandono. Solo el 19,4 % de las colonias logró producir obreras, lo que revela una elevada mortalidad durante las primeras fases del ciclo colonial. Por otro lado, los análisis revelaron una relación significativa entre la abundancia de avisperos y las variables espectrales NDVI ($p < 0.001$), NDWI ($p < 0.001$) y NDMI ($p = 0.003$), mientras que no se detectaron asociaciones con las variables meteorológicas. Esto sugiere que la estructura y el verdor de la vegetación explican mejor la distribución de nidos que las condiciones climáticas. Comprender estos patrones resulta clave para conservar poblaciones naturales de avispas sociales y su papel funcional en agroecosistemas mediterráneos.

P63. Cambios en la riqueza y abundancia de aves en Parques Nacionales de montaña en los últimos 40 años

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Las áreas de montaña son especialmente vulnerables, ya que pequeñas perturbaciones pueden alterar la estructura e interacción de los elementos de estos ecosistemas. Los cambios recientes en el clima y en los usos del suelo de las últimas décadas podrían haber afectado los frágiles equilibrios ecológicos de estas áreas. En este estudio, combinamos modelos biogeográficos con censos de aves para analizar cómo las condiciones ambientales influyen en la riqueza y abundancia de aves en parques nacionales de montaña en España: Ordesa y Monte Perdido (PNOMP), Picos de Europa (PPEE), Sierra Nevada (SN) y Guadarrama (PNSG), durante los últimos 40 años. Para la riqueza, se han usado 176 estimas de hace 40 años y 163 de la actualidad. En total, se han detectado 2666 contactos con 90 especies diferentes, en rangos altitudinales desde 600 a 2950 msnm. Para la abundancia, contamos con 178 estimas para 39 especies. Para las especies detectadas generamos modelos biogeográficos usando la función de favorabilidad para determinar la importancia relativa de los cambios climáticos y de usos del suelo en la riqueza y abundancia de especies de aves. Nuestros resultados muestran que la riqueza de especies ha aumentado con el tiempo en los parques de alta montaña (PNOMP, PPEE, SN), aunque no la abundancia. Tampoco se detectaron cambios significativos en la favorabilidad ambiental total, climática o de usos del suelo en estos parques. Sin embargo, la relación entre la favorabilidad ambiental y la riqueza de especies alpinas ha cambiado: de negativa hace 40 años a positiva en la actualidad, únicamente en parques de alta montaña. Este cambio podría explicarse por una mayor especialización de las especies alpinas en el pasado y una reciente introgresión de especies más generalistas. Además, encontramos una relación positiva entre la favorabilidad ambiental y la abundancia relativa de las especies en ambos periodos temporales. En conjunto, nuestros hallazgos sugieren que los cambios ambientales combinados —climáticos y de usos del suelo— están modificando las comunidades de aves alpinas en los parques nacionales de alta montaña.

P64. Maternal Legacy: Influence of mother and litter on the European mink personality

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Animal personality, understood as consistent behavioral differences between individuals, is an expanding field with key applications in conservation. However, further knowledge is still needed about its plasticity and the factors that modulate it. The European mink (*Mustela lutreola*) Ex situ breeding program provides a great opportunity to examine the influence of early factors on the personality of this endangered species. Our study evaluated the influence of maternal factors (mother and litter) on personality traits of 44 European minks (22 males/22 females) at a breeding center in Spain. Personality was measured using a context test (observation of behavior in response to four novel objects of different shapes, sizes, weights, and colors) and questionnaires in which eight caregivers rated nine traits on a Likert scale. The questionnaire's internal consistency was assessed using intraclass correlation coefficients (2,k) and validated using a Spearman correlation between caregiver scores and behavioral variables recorded in the context tests. Correlated traits were grouped into four personality components. Generalized Linear Mixed Models (GLMMs) were fitted, with sex and age as fixed effects, and mother or litter as random effects. In addition, the Wilcoxon-Mann-Whitney test was applied to detect differences between the mothers' offspring and the other minks in the population sample. GLMMs showed that including the mother or the litter significantly improved the statistical fit for the traits of intelligence, fearfulness, aggression, and activity, according to the AIC and BIC criteria. Thus, the results revealed differences between offspring from different mothers and suggest the influence of maternal and/or early shared environment in personality, as described with other mammals. These effects could have genetic, epigenetic, or environmental origins. However, the fact that most mothers had only one litter prevented a complete separation of these two effects. In conclusion, maternal factors appear to play a relevant role in the personality of European minks, even under controlled ex situ breeding conditions. These results underscore the importance of considering familiar and early environmental influences on the expression of behavioral traits. Including this variability in conservation programs can contribute to preserving behavioral diversity, a key factor for adaptation to changing environments.

P65. Prenatal maternal effects and social traits in birds: a comparative analysis across species

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Juvenile birds are born into an environment where communication is key, not only within their families, but also in broader social contexts later in life. It has therefore been proposed that mothers might “prepare” their offspring for the postnatal social environment through maternal effects (e.g., by transferring hormones to the eggs). As a result, offspring would express social signals early in life (e.g., in the family context) and develop social behaviours to communicate. There is variation in sociability across species, for instance, some are colonial and others solitary during the breeding season, and may be gregarious or not outside of it. Thus, it would be interesting to examine whether this maternal input varies interspecifically according to sociability. We therefore carried out a comparative study in avian species, focusing on maternal hormones in the yolk and social traits. First, we searched Web of Science for articles reporting yolk concentrations of testosterone (146 species), androstenedione (122 species), oestradiol (28 species) and corticosterone (23 species). Then, we gathered information from the literature on the social characteristics of each species (e.g., winter gregariousness and coloniality during breeding) and life history traits (e.g., clutch size and brood size). Since we also wanted to analyse the role of juvenile colouration as a signal, we recorded the presence or absence of white plumage in different parts of their body. We then performed phylogenetically controlled mixed models (MCMCglmm) to explore whether sociability traits are related to prenatal maternal effects. We present preliminary results on this relationship.

P66. Primer registro de parásitos de malaria aviar en *Leptoconops* (Diptera: Ceratopogonidae): un posible nuevo vector en ecosistemas mediterráneos

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Los parásitos causantes de la malaria aviar —géneros *Plasmodium*, *Haemoproteus* y *Leucocytozoon*— ejercen un impacto negativo sobre las poblaciones de aves silvestres. Estos protozoos se transmiten a través de insectos hematófagos: *Plasmodium* mediante mosquitos de la familia Culicidae; *Haemoproteus* a través de *Culicoides* (Ceratopogonidae) e insectos de la familia Hippoboscidae; y *Leucocytozoon* por medio de moscas negras (Simuliidae). Sin embargo, en la península ibérica existen otros grupos de dípteros hematófagos, como el género *Leptoconops*, perteneciente a Ceratopogonidae, cuya posible participación en la transmisión de hemoparásitos aviares no ha sido previamente evaluada. En este estudio se examina, por primera vez, la posible implicación de *Leptoconops* en la transmisión de *Plasmodium*, *Haemoproteus* y *Leucocytozoon* en Andalucía occidental. Mediante técnicas moleculares se procesaron hembras no alimentadas de *Leptoconops* (N = 1012), agrupadas en 41 pools según especie, fecha y localización de captura. Los resultados preliminares muestran una prevalencia global de infección del 0,42% (I.C. 95%: 0,13–0,96), con un 0,2% de muestras positivas para *Plasmodium*/*Haemoproteus* y otro 0,2% para *Leucocytozoon*. Esta detección inicial de parásitos aviares en *Leptoconops* sugiere su posible implicación en los ciclos ecológicos de estos protozoos. Aunque estos hallazgos amplían el conocimiento sobre la diversidad de potenciales vectores en ecosistemas mediterráneos, la confirmación de su papel vectorial requiere estudios experimentales adicionales, así como la identificación de linajes parasitarios para inferir los hospedadores implicados, considerando el alto grado de especificidad de estos parásitos hacia determinados grupos aviares.

P67. Epigenetic potential and migration propensity in Eurasian *Passer* sparrows

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Epigenetic potential is defined as the susceptibility of a genome to undergo epigenetic modifications that mediate phenotypic variation through changes in gene function. Among epigenetic mechanisms, DNA methylation – primarily occurring in CpG sites in vertebrates – is one of the most studied. The number of CpG sites appearing in the genome show variation among individuals and species. Therefore, this number may be considered a form of epigenetic potential, under the prediction that a greater number could allow for a wider achievable variation in DNA methylation/demethylation, leading to higher phenotypic plasticity. In birds, a high epigenetic potential has been suggested to mediate adaptive responses to novel environments, and eventually individual and population differences in environmental coping. *Passer* sparrows present a wide range of migratory behaviour patterns which could point to a high degree of phenotypic plasticity at both intra- and interpopulation levels, making it a good novel target of study for epigenetic potential through whole genome comparisons. This group includes the house sparrow (*Passer domesticus*), one of the most populous and widespread introduced birds on earth which has undergone several major range expansions in the last two centuries. Using whole genome sequencing data from 5 *Passer* ecotypes, including the house sparrow, I will present within- and among- species differences in CpG abundance, and make hypotheses on whether they may be playing a role in the wide ecological differences characterizing these species, also during repeated introductions.

P68. Effect of intrabrood competition on a carotenoid-based begging signal in a songbird

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Carotenoid-based colouration in vertebrates is considered a condition-dependent signal reflecting individual quality, as carotenoids are often limited dietary resources used in several physiological processes. In nestlings of many altricial birds, carotenoid-based mouth flange colouration acts as a begging signal. There is ample evidence that carotenoid-based traits mirror carotenoid levels in the organism, being therefore positively related to overall individual condition. However, there is also some evidence that individuals can strategically adjust the allocation of available carotenoids to signal expression depending on the social or competitive scenario. Both hypotheses -carotenoid-based colouration mirroring condition, and increased allocation of carotenoids to signal expression- are plausible and to some extent compatible, but they have rarely been tested simultaneously, and never in a context of sibling competition. In this study, we tested these ideas in a wild blue tit (*Cyanistes caeruleus*) population by conducting a brood size manipulation experiment (creating reduced, control, and enlarged broods, aiming at resulting in scenarios of low, average and intense sibling competition, respectively). We considered the within-brood size rank, parental feeding rate, and nestling diet as potential extra modulators of nestling flange colouration. Our results show that nestlings under low intrabrood competition conditions (reduced broods) exhibit less saturated flange colouration than nestlings reared in control and enlarged broods. Moreover, the influence of experimental treatments on flange colouration depended both on parental feeding rate and diet composition: in reduced broods, higher per-nestling feeding rates were associated with less saturated flanges, but in enlarged broods, a higher proportion of caterpillars in the diet was associated with an increased investment in colouration. In addition, the smallest nestling within a brood showed lower flange colouration than the largest nestlings. Our findings support the hypothesis that carotenoid-based traits act as honest signals shaped by both environmental and social conditions. Nestling mouth flange colouration results from a trade-off between metabolic limitation and plastic pigment allocation, allowing adaptive signalling of condition and competitive need.

P69. Mosquitos en Doñana: ¿qué especies hay y qué transmiten a la fauna silvestre?

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Los mosquitos son importantes vectores de patógenos que afectan a la fauna silvestre. A pesar de ello, su interacción con patógenos en la naturaleza ha sido poco estudiada en comparación con los estudios desarrollados en vertebrados. Con el objetivo de conocer los patógenos circulantes entre la fauna silvestre a través de mosquitos en el área del Parque Natural y Nacional de Doñana se realizó un muestreo en 9 localizaciones durante 2023 desde abril a septiembre, cubriendo el periodo de máxima actividad de los mosquitos. Se capturaron 12,652 hembras de mosquitos de 14 especies pertenecientes a los géneros *Aedes*, *Anopheles*, *Culex*, y *Culiseta*. Este muestreo permitió identificar, por primera vez en este espacio protegido, la especie invasora *Aedes albopictus*, conocida comúnmente como mosquito tigre. Por otro lado, se analizaron molecularmente mosquitos de cuatro especies del género *Culex* para la determinar la prevalencia de virus West Nile (WNV), protozoos de la malaria aviar (*Plasmodium* spp.) y nemátodos del género *Dirofilaria*. En conjunto, se analizaron 95 pooles de mosquitos conteniendo 1376 hembras, identificándose la presencia de WNV en 5 pooles (n = 40 analizados) de *Cx. perexiguus*, así como parásitos de la malaria aviar en 17 pooles (n = 42) de *Cx. perexiguus* y 11 de *Cx. pipiens* (n= 40). Ninguno de los pooles fue positivo para *Dirofilaria*. No se identificaron pooles positivos para ningún patógeno en las especies *Cx. modestus* y *Cx. laticintus*. Este estudio evidencia la diversa comunidad de mosquitos presente en este entorno natural protegido, donde juegan un papel importante como vectores de patógenos que afectan a la fauna silvestre, incluyendo virus zoonóticos como el WNV y parásitos de la malaria aviar.

P70. Patrones de alimentación de mosquitos vectores en el suroeste ibérico: implicaciones para la transmisión de arbovirus

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Las enfermedades zoonóticas representan un importante problema tanto para la ecología como para la salud pública. Entre ellas, destacan por su impacto aquellas transmitidas por artrópodos como los mosquitos (Culicidae). En España, destacan dos virus transmitidos por mosquitos que encuentran en las aves silvestres su reservorio principal: el virus del Nilo Occidental (WNV, por sus siglas en inglés), responsable de brotes recurrentes en humanos y équidos en Andalucía, y el virus Usutu (USUV), en fase de expansión en diversas regiones del país, aunque hasta la fecha solo detectado en aves. Para entender el papel vectorial de las diferentes especies de mosquitos en la transmisión de estos virus, es fundamental conocer los patrones de alimentación y los factores que condicionan el contacto entre hospedadores y vectores. En este estudio, se capturaron 1.228 hembras de mosquito alimentadas en 17 localidades de las provincias de Sevilla y Huelva. Se identificó la fuente de alimentación en 1.063 individuos, pertenecientes a 11 especies de los géneros *Aedes*, *Anopheles*, *Culex* y *Culiseta*. Las especies más abundantes fueron *Culex perexiguus* (N=371), *Cx. pipiens* (N=207) y *Cx. theileri* (N=297), siendo las dos primeras reconocidas como vectores principales de WNV y USUV. Mediante análisis moleculares, se identificaron 65 especies de vertebrados como fuente de sangre: 2 especies de reptiles, 49 especies de aves y 14 de mamíferos. En *Cx. perexiguus*, las presas más frecuentes fueron la vaca (*Bos taurus*, N=111, 29,9%), el conejo (*Oryctolagus cuniculus*, N=66, 17,8%,) y el mirlo común (*Turdus merula*, N=26, 7%). En *Cx. pipiens*, destacaron el gorrión común (*Passer domesticus*, N=59, 28,5%), y nuevamente el mirlo (N=46, 22,2%). La monitorización de los patrones de alimentación de los vectores resulta clave para comprender la dinámica de transmisión de arbovirus como WNV y USUV. La elevada proporción de aves paseriformes en *Cx. perexiguus* y *Cx. pipiens* sugiere una posible implicación de estos vectores en la amplificación y transmisión de estos virus. Por el contrario, la alta frecuencia de mamíferos en *Cx. perexiguus* podría tener un efecto dilución, al reducir la interacción entre hospedadores amplificadores y vectores y, en consecuencia, la probabilidad de transmisión zoonótica.

P71. ¿Cómo volver a llenar las aulas en las clases presenciales de educación universitaria de grado?

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Tras la pandemia, el nivel de absentismo de los alumnos en las clases presenciales es muy superior a los niveles de los cursos previos a la llegada del COVID-19. A factores como la crisis económica, que ya contribuían a la deserción del estudiantado en enseñanzas superiores, debemos ahora añadir otros, como la aparición de plataformas de intercambio de apuntes, o la inmersión de la juventud en una era digital en la que la información, por concisa que sea, está disponible con un solo clic del ratón. Sin embargo, no todas las consecuencias de la pandemia han sido negativas. La necesidad de adaptarnos al confinamiento domiciliario ha promovido una rápida inmersión de profesores y alumnos en el uso de nuevas tecnologías y herramientas digitales aplicadas a la educación. Dado que un número creciente de estudios, así como nuestra propia experiencia, demuestran que la asistencia a clase permite una mejor y más profunda comprensión de los conceptos, y esto, a su vez, influye en una mejoría de los resultados académicos del alumno, en este proyecto, se planteó el uso continuado de la herramienta colaborativa Wooclap, como mecanismo para evaluar y fomentar la asistencia del alumnado a clase. Este trabajo evalúa el uso de esta tecnología en la asignatura optativa de Etología del Grado en Biología por la Universidad de Sevilla desde el curso 2022/23 hasta la actualidad. Se estudió si existe relación directa entre los datos de asistencia y de calificación final del alumno y si, motivar la asistencia, contribuye a la mejoría de los resultados académicos respecto de cursos anteriores. Finalmente, se analizó la opinión del alumnado sobre el uso de Wooclap gracias a las encuestas realizadas al final de cada curso.

P72. Keratinolytic bacterial communities associated to house sparrows' feathers change under different humidity conditions

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Climatic conditions have direct effects on interactions between hosts and parasites by affecting, for example, the abundance and virulence of parasites in wild populations. Feathers are constituted mostly by keratin, which confers high mechanical stability and resistance because the molecules are tightly packed and cross-linked by cysteine bridges. Among potential agents that can damage bird feathers are certain microorganisms which secrete enzymes (keratinases) that digest the keratin. We hypothesize that birds moulting under different humidity conditions, will differ in their bacterial loads, but also, that keratinolytic activity of bacteria will differ in different environments. We tested this hypothesis with house sparrows (*Passer domesticus*) that were captured six months before their moult and kept in controlled captivity conditions under two different humidity treatments, dry and wet (45% and 70% respectively). Through microbiological cultures, we quantified feather's bacterial load and isolated some strains, and then, the isolates keratinolytic activity was estimated by performing keratin degradation experiments. Feathers were sampled both during the individuals capturing (i.e., before the treatment), and after the moult's period in newly developed feathers. Lastly, we randomly selected isolated strains with and without keratinolytic activity and sequenced the 16S RNAr to identify the species. Our results showed a decrease of bacterial loads on bird's feathers exposed to the dry environment comparing to wet and before treatment collected feathers. On the other hand, there was a significant less keratin degradation in isolated strains from feathers sampled in dry conditions, while bacteria with keratinolytic activity were less abundant than in wet conditions. Finally, we identified around 25 genera and 41 different bacterial species whose distribution varied among different environments, being half of the genera exclusive of dry or wet treatments. Our results suggest that birds exposed to a lower humidity environment may host lower bacterial loads on their feathers and strains with less feather degradation capacity. Consequently, environmental humidity changes will alter the probability of birds suffering from bacterial damage in their plumage.

P73. Reconocimiento individual de la voz humana generada por inteligencia artificial en gallinas

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La señal del habla no solo contiene información lingüística, también aporta información sobre el hablante, lo que en humanos permite el reconocimiento individual. Incluso en el útero, los bebés responden de manera diferente a la voz de su madre en comparación con la de un extraño (Kisilevsky et al., 2003). Pero, ¿son capaces los animales de distinguir a un humano en concreto por las características de su voz? Algunos estudios previos han obtenido resultados que apuntan en ese sentido, pero se han hecho en base a palabras que estos animales ya conocían como por ejemplo sus nombres (Kriengwatana et al., 2015) y queda por tanto la duda de que lo que reconozcan sean sonidos concretos y no las características individuales de la voz de una persona. El objetivo de este trabajo es ver si los animales, en concreto aves como las gallinas, son capaces de reconocer individualmente a una persona por las características de su voz. Para llevar a cabo este estudio hemos usado cuatro tipos de gallinas; *Numidia meleagris* (gallina de Guinea) y tres variedades de *Gallus-gallus domesticus*, Un cuidador se encargó del mantenimiento de estos animales hablando cada día en presencia de las gallinas al menos durante 10 minutos. A los tres meses se realizaron test con voces generadas por Inteligencia Artificial, una de ellas la del propio cuidador y otras elegidas al azar. Se reprodujo el mismo texto en tres diferentes idiomas, español, inglés y chino. No se encontraron diferencias en las gallinas domésticas, pero sí en las gallinas de guinea que se mostraron más alerta cuando oían una voz extraña. Aunque hay un acostumbamiento, vemos que estas aves son capaces de reconocer individualmente las características de la voz humana. Este estudio, hasta donde sabemos, es el primero que utiliza la inteligencia artificial para estudiar el reconocimiento individual de la voz humana en animales, lo que ha permitido aislar las características de la voz de las palabras concretas u otras propiedades que el emisor puede dejar en una grabación de su propia voz.

P74. La relación entre el estrés y los componentes de variación del comportamiento individual de la lagartija carpetana

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Los cambios y perturbaciones ambientales, tanto bióticos como abióticos, a menudo inducen un incremento del estrés que obliga a los organismos a ir más allá de sus preferencias ecológicas o límites fisiológicos de tolerancia. Un factor crucial para hacer frente a estos desafíos es la flexibilidad y plasticidad del comportamiento, lo que sugiere que el estrés podría desempeñar un papel clave en el desarrollo de diferencias comportamentales individuales consistentes, conocidas como “personalidad animal”. La relación entre estrés y comportamiento depende en gran medida de la intensidad del factor estresante. En situaciones de estrés extremo (por ejemplo, inanición severa o deshidratación), se espera que todos los individuos adopten una estrategia de comportamiento similar (escenario de canalización). En cambio, cuando el estrés es leve y no representa una amenaza inmediata para la supervivencia (como el hambre moderado o la competencia social), podrían emerger respuestas comportamentales más diversas entre los individuos (escenario de diversificación). En el presente estudio, investigamos el efecto de la escasez temporal de alimento sobre el comportamiento de asunción de riesgo en machos de lagartija carpetana (*Iberolacerta cyreni*). Durante los tres primeros días del experimento, los animales tuvieron acceso *ad libitum* al alimento bajo condiciones de temperatura óptimas. Posteriormente, el alimento fue retirado durante otros tres días, y este ciclo se repitió a lo largo de 24 días. El comportamiento de asunción de riesgos fue evaluado diariamente. Según nuestra hipótesis la privación de alimento, al no representar una amenaza directa para la supervivencia, daría lugar a respuestas comportamentales más diversas, en función del estado fisiológico y del perfil individual de cada lagartija. Los resultados muestran que la escasez de alimento tuvo un efecto leve sobre el tipo de comportamiento y no afectó a la presencia, ausencia o intensidad de la personalidad animal. Aunque no pudimos respaldar nuestra hipótesis de que las condiciones adversas generan diferencias de personalidad, una tendencia no significativa sugiere que la personalidad fue más marcada en el tratamiento con privación de alimento.

P75. Estudio del comportamiento afiliativo en una especie de ave de cría cooperativa

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Los comportamientos afiliativos entre distintos miembros de un grupo social, tales como el acicalamiento mutuo, pueden favorecer la formación de vínculos estrechos, lo que a su vez puede generar beneficios en la salud y éxito reproductor. Sin embargo, el acicalamiento también puede suponer costes para quien lo realiza, como la pérdida de oportunidades en alimentación o vigilancia. Por ello, la teoría sugiere que la reciprocidad podría ser un mecanismo necesario para que este tipo de comportamiento se produzca. Además, se ha observado que, en algunas especies sociales, el acicalamiento puede representar la “moneda de cambio” en los denominados “mercados biológicos” permitiendo a los individuos obtener otro tipo de favores a cambio de este “servicio”, por ejemplo, en forma de alimentos o de alianza ante conflictos. En este estudio, se explora el papel que juega el acicalamiento en la cría cooperativa de la corneja negra, *Corvus corone*, en 74 grupos sociales. Este comportamiento aumentó en grupos grandes, donde la división de tareas o “aligeramiento de la carga” es posible, así como en polladas más pequeñas y a edades tempranas del desarrollo de la descendencia donde la demanda energética de las crías es menor. Bajo este contexto, los adultos podrían dedicar menos tiempo al cuidado parental y más al fortalecimiento de vínculos entre ellos, especialmente de la pareja reproductora. De hecho, encontramos que es la hembra reproductora quien mayoritariamente realiza este comportamiento y el macho reproductor quien lo recibe, en comparación con las demás categorías sociales. Además, nuestros resultados sugieren un cierto grado de reciprocidad en forma de “moneda de cambio”, particularmente entre los miembros de la pareja reproductora, como indica la relación significativa entre la tasa de cebas tanto al nido como a la hembra proporcionadas por el macho y la cantidad de acicalamiento que ésta le devuelve. Finalmente, no se encontraron diferencias significativas con relación al éxito reproductor, pero detectamos una tendencia positiva entre el acicalamiento y el mantenimiento estable en el tiempo del vínculo de la pareja reproductiva.

P76. Efectos fisiológicos en la variación individual de la estructura de las plumas

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Las plumas son un carácter diagnóstico en aves, que juegan un papel esencial en el vuelo, el aislamiento del ambiente y la comunicación visual. El rol de las plumas en la termorregulación aviar se considera esencial en su éxito irrefutable, dado que son los vertebrados más diversos y ampliamente distribuidos del planeta. Sin embargo, la variación estructural de las plumas, tanto individual como entre individuos y poblaciones, y su relevancia en la termorregulación siguen por determinar. La muda aviar puede ser costosa tanto energéticamente como en forma de nutrientes, y el modo en que los individuos gestionan estos recursos puede tener consecuencias en la capacidad termorreguladora del plumaje y en la condición fisiológica del individuo. Manipulamos experimentalmente la composición de Metionina, un nutriente esencial para la producción de las plumas, en la dieta de individuos salvajes de Carbonero común (*Parus major*) capturados antes de mudar, y mantenidos en cautividad por un periodo de 12 semanas hasta su desarrollo completo del plumaje y de su fenotipo invernal. Posteriormente estudiamos la estructura de las plumas y de diversos parámetros fisiológicos incluyendo el metabolismo (BMR and Max MR), diversos parámetros sanguíneos y el potencial aislante del plumaje (termografía e implantes térmicos subcutáneos). Los individuos presentaron cambios en el gasto energético y su fisiología según su dieta. Las aves podrían priorizar la estructura del plumaje frente a los diversos parámetros fisiológicos estudiados en relación al gasto energético y el estado nutricional y balance oxidativo en sangre, que a su vez puede repercutir en sus estrategias comportamentales y de estrategia vital.

P77. Music at home: do starlings sing inside nest cavities to broadcast nest quality?

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Many avian species use natural cavities to build their nests and raise their young. The chosen cavity must fit all fledglings and protect against weather conditions and predators. Competition over nesting opportunities can be high leading to intra- and inter-specific interactions. Moreover, in colonial species where pairs nest in close proximity, singing inside the nest may be adaptive to signal ownership while minimize aggression from neighbors. Finally, the quality of the nest may be a key to find the best mate, as nest quality can determine fitness. Here, we describe a poorly known behavior of nest singing displays in a songbird, the spotless starling (*Sturnus unicolor*). We carried out a comprehensive analysis of novel sound elements that appear when singing inside the nest, unheard in outdoor singing. In parallel, we present a detailed study of artificial nest boxes as acoustic resonators and established their parallels with natural nesting cavities. From deep subharmonics that reflect nest size to acoustic filters which depend on the aperture of the cavity, nest song displays seem an ideal candidate to understand key decisions during reproduction, including mate choice.

P78. Growing up alone: Lifelong costs of early social isolation in field crickets

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For animals living in complex social groups and family units, social isolation - defined as the lack of social interactions - often negatively affects physiology and behaviour. However, many species are not genuinely social as adults, with social interactions occurring primarily during their juvenile stages. While previous evidence suggests that early-life social experiences can significantly influence adult behaviour across various taxa, including insects, the short- and long-term impacts of early-life social isolation on behaviour, survival, and ageing trajectories, and the mechanisms underlying these effects, remain poorly understood. Using the Mediterranean field cricket *Gryllus bimaculatus*, we show that early-life social isolation has immediate and lasting consequences. In the short term, socially isolated juvenile crickets grew more slowly, had lower activity levels, exhibited a shyer personality, reached smaller adult sizes, and experienced higher mortality compared to non-isolated individuals. Notably, early-life social isolation also resulted in long-term effects in adulthood: both males and females who had been isolated as juveniles displayed increased sexual behaviours in adulthood and an increased accumulation of cellular damage (e.g., oxidative damage). Overall, our findings highlight the pervasive and mostly detrimental effects that early social deprivation can exert throughout life.

P79. Hormonal influence of parental care behaviour in a social lizard

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Parental care is crucial for offspring survival, affecting population fitness, life-history strategies, and social dynamics. To understand how parental care evolves across the animal kingdom, it is essential to explore the physiological processes underpinning this behaviour. Most research on parental care in this context has focused on systems with a long evolutionary history of care, such as mammals and birds. In contrast, squamate reptiles (snakes and lizards) have been relatively understudied, and recent research has suggested they display a range of post-natal parental behaviours, including tolerance or protection of offspring after hatching or birth. Thus, my research investigates how hormonal mechanisms interact to shape parental care in *Liopholis whitii* (also known as White's skinks), a socially complex lizard native to Australia. White's skinks live in family groups, sometimes comprising individuals from multiple generations. Parental care in this species involves parents cohabiting with offspring within their burrow system. The facultative nature of this species' family structure provides an excellent model for examining family interactions, thus allowing us to understand the evolution and plasticity of parental care in an ectothermic context. A wide range of hormones play a role in regulating physiological processes associated with parental care. When offspring are present, elevated levels of hormones such as oxytocin and prolactin in mothers, or reduced testosterone in fathers, enhance caregiving behaviours. To test how the presence of offspring influences maternal hormone profiles in parental care in White's skinks, we brought wild-caught pregnant females to outdoor enclosures at the University of Tasmania. Once offspring were born, we established two groups of females: one group was kept with their offspring while the other was separated. During a six-week period, we sampled blood to identify hormonal changes and correlate them with the presence or absence of offspring. Concurrently, behaviours of the females alone, as well as interactions between the females and offspring, were observed and noted. Both the hormonal and behavioural data collected from this experiment will form a chapter of my PhD and are currently in the analysis process.

P80. Efecto del estrés de captura sobre los recuentos leucocitarios en aves

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En el campo de la ecología del comportamiento, ciertas variables fisiológicas - conocidas como biomarcadores- pueden resultar de gran utilidad para estimar de manera rápida y sencilla aspectos concretos del estado físico, la condición u otras características clave de los individuos de estudio. Este es el caso de los recuentos leucocitarios, que pueden aportar información muy valiosa tanto sobre el estado inmune de un organismo como sobre sus niveles de estrés. Sin embargo, diversos factores externos, como los relacionados con el proceso de extracción de la muestra sanguínea, pueden introducir sesgos que afecten a los resultados y comprometan nuestras conclusiones. Una de las principales fuentes de sesgo puede ser el estrés causado por la propia captura y manejo de los animales, lo que puede alterar los niveles del biomarcador. El objetivo de este estudio es identificar el efecto de este estrés sobre los recuentos leucocitarios en aves. Para ello, trabajamos con dos modelos de estudio: ejemplares adultos silvestres de estornino negro (*Sturnus unicolor*) y machos adultos de perdiz roja (*Alectoris rufa*) de una población en cautividad. En ambos casos las aves fueron sometidas a un protocolo estándar de captura y manejo, y se les extrajo una muestra de sangre en diferentes tiempos tras la captura. Estas muestras se utilizaron para hacer frotis sanguíneos en los que se realizaron recuentos leucocitarios totales y diferenciales. Nuestros resultados muestran que, cuanto mayor es el tiempo transcurrido desde la captura hasta la toma de la muestra de sangre menor es el número de leucocitos totales en sangre y mayor la proporción heterófilos/linfocitos, dos parámetros estrechamente relacionados con la respuesta de estrés agudo. Por tanto, minimizar el tiempo de manipulación y de extracción de la muestra sanguínea es esencial para evitar alteraciones en las medidas fisiológicas y asegurar datos fiables y comparables. En conclusión, evaluar y controlar el impacto potencial del propio protocolo de muestreo debería ser una práctica habitual en todos los estudios que involucren biomarcadores clave.

P81. Long-term consistency and flexibility in the use of road microsites in a nocturnal insectivorous bird

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Site fidelity is a key aspect of space use in animals that can influence survival and reproductive success. For habitat specialists, understanding the environmental and intrinsic factors that determine site fidelity is crucial for effective conservation, but the combined influence of these factors on long-term site fidelity remains poorly understood, particularly among nocturnal birds. This study examined the role of age, sex, and body size in modulating interannual fidelity to foraging and resting sites of red-necked nightjars (*Caprimulgus ruficollis*) using roads and trails crossing a traffic-restricted area before and after its inclusion in Doñana National Park (SW Spain). Over a 15-year period (2009–2023), we collected and analyzed data from 789 captures of 237 individuals marked as juveniles and monitored for between 1 and 7 years across 316 car–transect days. The results revealed that age positively influenced the degree of nightjars' fidelity to road microsites across years, presumably because older, more experienced individuals are better able than juveniles to access and defend spatial resources. This association emerged during the second part of the study, after a reduction in roadside vegetation (a critical resource for foraging-and-resting nightjars) due to clearings conducted as part of the protection and management actions carried out in the study area during 2016–2017. Contrary to predictions, neither sex nor body size (keel size) influenced site fidelity, suggesting equal benefits from site fidelity for males and females, regardless of body size. The findings of this study underscore the importance of the joint influence of age, experience, and landscape elements in modulating site fidelity in red-necked nightjars. This information may serve as a foundation for guiding management efforts to preserve key sites for species conservation, although the ecological factors influencing the complex space-use patterns of nightjars still require further study.

P82. Enriquecimiento ambiental con osos pardos cantábricos en cautividad

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Los entornos cautivos tienen características negativas por las cuales muchos animales desarrollan estereotipias, que son consideradas como uno de los indicadores de bienestar reducido. Para abordarlas, el método más común es el enriquecimiento ambiental, el cual busca brindar a las especies oportunidades para mejorar los comportamientos específicos propios. Los osos pardos son muy susceptibles a desarrollar problemas de comportamiento debido a diferentes factores, siendo el ritmo la estereotipia más común. Este estudio busca comprender las posibles causas de las estereotipias de dos osas cautivas y disminuirlas, promoviendo comportamientos específicos de la especie a través de técnicas de enriquecimiento ambiental. El proyecto se ha desarrollado en los cercados de la Fundación Oso de Asturias a lo largo del verano y otoño del 2021 y los sujetos de estudio han sido *Paca* y *Molina*, los dos únicos ejemplares de oso pardo cantábrico que se encuentran en cautividad debido a la imposibilidad de reintroducirlas en su medio natural por diversas causas. Ambas presentan ritmos locomotores (ambas lineales y *Molina* circulares) y como técnicas de enriquecimiento ambiental, se han usado diferentes objetos, alimentos y técnicas de manejo. Se han tomado datos de diferentes variables que podrían estar influyendo en sus comportamientos y se han realizado grabaciones seriadas, que han permitido el posterior procesamiento de dichos comportamientos. Los comportamientos específicos (manipulación, locomoción y exploración) de ambas parecen estar motivados por el enriquecimiento ambiental. Respecto a las estereotipias, el ritmo lineal de ambas osas aumenta durante las horas previas a la alimentación, la presencia del cuidador y en lugares desde donde ven al cuidador. En el caso de *Molina*, disminuye cuando hay enriquecimiento, pero este no tiene efectos sobre *Paca*. *Paca*, además, también lo realiza en lugares donde solía recibir comida y el público parece aumentar su realización. Respecto al ritmo circular de *Molina*, aumenta en aquellos lugares donde recibía comida y ni el cuidador ni el enriquecimiento parecen influirle. El público parece ser irrelevante en que *Molina* presente más o menos estereotipias. Añadir que, actualmente, *Paca* no se encuentra en las instalaciones debido a su fallecimiento el presente año.

P83. Transcriptomic signatures of migration - First insights from partially migratory European hoopoes (*Upupa epops*)

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The genomics of migration is an important field of study within evolutionary ecology. It has contributed to unravel how genetic mechanisms control behavioural adaptations, with direct implications for understanding biodiversity patterns, species resilience, and conservation strategies in a changing world. As a constantly developing area of research, advances in genomics and transcriptomics are starting to reveal which genes are involved in migration, and how genetic variation in these genes, together with their regulation and expression, underlies the control and evolution of avian migration. Here, we present the first results of an analysis of gene expression in European hoopoes (*Upupa epops*), a non-passerine bird with partially migratory populations in southern Spain. We generated complete transcriptomes (RNAseq) of individuals with a) different migratory behaviours (residents and migrants, previously determined by stable isotope analysis of feathers), b) across different moments of the annual cycle (breeding, premigration and winter), and c) from two different tissues (blood and breast muscle). We quantified gene expression and compared it among migratory behaviours, sampling periods, and tissue types. Additionally, we conducted enrichment analyses to identify biological processes and molecular functions related to migration. We also assessed how these functional patterns varied according to intrinsic individual factors such as sex and age. We discuss the strengths and limitations of our approach, as well as the potential of our results, that are very encouraging. In a follow-up study (incorporating sequences of more individuals), we expect to improve the functional interpretation of gene expression patterns associated with migratory strategies and ultimately continue to shed light on the molecular basis of animal behaviour.

P84. Could the inverted sequence derive from ancient introgression from one of these extinct island endemics?

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Chromosomal inversions play a critical role in gene linkage and can contribute to speciation and adaptation by forming supergenes that evolve independently across lineages. Our group previously identified a large chromosomal inversion in *Coturnix coturnix* (common quails) that affects approximately 12% of its genome, found only in the southern Iberian Peninsula, Morocco, and the Macaronesian archipelagos. This inversion is associated with phenotypic traits and reduced migratory behavior. Here, we explore the hypothesis that the inversion could derive from introgression from a now extinct species. Several flightless or near-flightless species of *Coturnix* quails have been identified in the fossil record of the Macaronesian archipelagos, including *C. lignorum* and *C. alabrevis* on Madeira, *C. centensis* on Cape Verde, and *C. gomeræ* in the Canary Islands. These species exhibited anatomical features linked to flightlessness and terrestrial lifestyles, and all of these lineages went extinct following human arrival. The presence of so many species in such small areas contrasts with the vast distribution of the highly mobile *C. coturnix*, which migrates across large geographical ranges. Could common quail with the chromosomal inversion derive from a lineage of these extinct island-endemic species? To test this hypothesis, we analyzed ancient DNA from bone samples of *C. lignorum*, *C. alabrevis*, and *C. centensis*. Complete mitochondrial genomes were generated for each taxon and compared with modern *C. coturnix* and other modern *Coturnix* species available in GenBank. The phylogenetic analysis revealed two separate, monophyletic clades for ancient and modern quails, and mitochondrial data showed no significant differentiation among the extinct species. Given the time of divergence between modern common quails and ancient quails, it seems possible that the inversion could derive from ancient introgression. Ongoing analyses of nuclear data could help test this hypothesis.

P85. Revisión sistemática de la personalidad animal en depredadores marinos dependientes del medio terrestre

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El estudio de la personalidad animal ha permitido ampliar el campo de la ecología del comportamiento, al revelar las consecuencias ecológicas y evolutivas de las diferencias individuales en comportamiento consistentes a lo largo del tiempo y en diferentes contextos. Sin embargo, en la literatura actual encontramos pocos estudios realizados en determinados grupos taxonómicos y bajo condiciones naturales. En esta revisión nos centramos en estudios sobre aves marinas y pinnípedos, dos grupos que ocupan el mismo hábitat y nicho como depredadores marinos dependientes del medio terrestre para la reproducción. Mediante una revisión sistemática (método PRISMA-EcoEvo) identificamos un total de 52 artículos que abordan el concepto de personalidad en estas especies. Analizamos los aspectos más importantes de dichos estudios, como los taxones y los rasgos de personalidad de interés, el contexto ecológico en el que se han realizado y la metodología que han seguido. Como casos modelo, comentamos los estudios realizados en dos de las especies más estudiadas: el pingüino africano y el albatros errante. Finalmente, discutimos las implicaciones ecológicas y evolutivas de la personalidad en aspectos clave como el éxito reproductivo, el comportamiento de forrajeo, las migraciones y las adaptaciones al cambio climático. Este último aspecto es especialmente relevante, dado que varios estudios exploran el potencial adaptativo de distintas personalidades – en particular a lo largo del eje reactivo-proactivo – frente a las consecuencias del cambio climático, así como sus posibles aplicaciones en biología de la conservación. En conclusión, la investigación sobre personalidad en aves marinas y pinnípedos es un campo poco explorado cuyo desarrollo contribuiría a una mejor comprensión de las bases fisiológicas de la personalidad, y sobre sus efectos a nivel poblacional y evolutivo.

P86. Apparent absence of avian malaria parasites in the highly endangered Bermuda Petrel (*Pterodroma cahow*) and the White-tailed Tropicbird (*Phaethon lepturus*)

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Avian malaria parasites of the genus *Plasmodium* and the related *Haemoproteus* and *Leucocytozoon* represent a highly diverse group of parasites infecting wild birds worldwide. Avian malaria parasites are considered pathogenic for their vertebrate hosts, producing deleterious effects in terms of survival and reproductive success. This is especially relevant for the case of endangered species, which could suffer the impact of parasites affecting their populations. In spite of that, previous studies evidence the lack of information about parasite infections in endangered species and, particularly, in the case of seabirds which have been traditionally neglected. Here, we screened for blood parasite infections in 23 individuals of the critically endangered Bermuda Petrel, *Pterodroma cahow*, during the 2022 breeding season. We combine molecular approaches and smear screening to detect avian malaria parasites. Furthermore, nine individuals of White-tailed Tropicbird *Phaethon lepturus* breeding sympatrically in the same islands, were also analysed. Our results reveal the total absence of avian malaria parasites, namely *Plasmodium*, *Haemoproteus* and *Leucocytozoon* in these two species. Our results support current knowledge of generally low parasite infections in seabirds, especially in the case of birds of the families Procellariidae and Phaethontidae. The pelagic lifestyle of both species, their breeding on remote island, and the underground nesting behaviour of *P. cahow* likely reduce the exposition of birds to the attack of insect vectors. However, in the current context of global change, where changes in vector distribution may alter epidemiological scenarios, continuous surveillance of vector-borne pathogens is essential, particularly for endangered species such as the Bermuda Petrel.

P87. Determinants of the variability in eggshell thickness and pigmentation in the red-legged partridge

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The egg serves as the primary vehicle for channeling the female prenatal reproductive investment in oviparous species. Eggshell provides not only mechanical and microbiological protection for the developing embryo but also a crucial source of calcium, especially in birds, where the shell is a hard, calcium carbonate-rich structure. Given that egg laying demands a large calcium input over a short period, a female's ability to produce eggs with thicker shells may depend on both intrinsic and extrinsic factors. Additionally, eggshells of many bird species often exhibit variable external pigmentation, typically in ochre tones due to protoporphyrin accumulation. While this pigmentation may primarily perform camouflage functions, it has also been hypothesized to enhance eggshell strength or act as an intraspecific signal that reflects the female's physiological condition at laying. In this study, we analyzed a broad range of factors that may influence eggshell thickness and pigmentation in the red-legged partridge (*Alectoris rufa*), a wild species known for producing some of the largest clutches among birds. To this end, we measured eggshell thickness and pigmentation of several eggs throughout the laying sequence from the same captive females over two consecutive years. In addition, we quantified these same traits in eggs laid by females whose condition was experimentally boosted (by vitamin supplementation) or challenged (by the activation of an immune response), both before and after the treatments. We found that, while the experimental manipulations did not affect eggshell traits, thickness and pigmentation showed very high individual consistency both within and across years. Our findings suggest that these eggshell traits are under a strong genetic control in this species, with limited amount of variance explained by other factors. We discuss the implications of these results in light of the different hypotheses proposed to explain the variability in these key egg characteristics.

P88. Is haemoglobin a reliable index for assessing body condition in birds?

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Haemoglobin concentration has been proposed as a valid proxy for a variety of fitness measures, and has been used as a physiological index to estimate bird individual quality. The availability of cheap and fast point-of-care haemoglobin measuring systems has prompted researchers to collect these data in the field. However, while several studies have reported positive correlations between haemoglobin levels and condition indices, supporting its use as a robust proxy for individual quality, others have found no such relationship. These inconsistencies in the relationship of haemoglobin with other condition indices highlight the importance of further validation, as the reliability of these markers may vary with ecological context, life-history stage, and physiological constraints. In this study, we assessed the reliability and relevance of haemoglobin as an indicator of individual condition in a large sample of free-ranging population of spotless starlings (*Sturnus unicolor*). Data were collected by using a commercial point-of-care portable apparatus (Hemocue) over two consecutive breeding seasons, just before the nestling period. Since haemoglobin concentration is strongly affected by haematocrit (the percentage of erythrocytes in blood), we also measured haematocrit in the same samples to correct haemoglobin values. Thus, we examined three physiological parameters: haematocrit-corrected haemoglobin, haematocrit, and raw haemoglobin in relation to body condition. Our results revealed that, as expected, haemoglobin concentrations were strongly and positively affected by haematocrit, this relationship being steeper for females than for males. Unexpectedly, haematocrit-corrected haemoglobin was negatively related to body condition in females, but not in males. Also unexpectedly, haematocrit showed a negative correlation with body condition in males, but not in females. Uncorrected haemoglobin estimates showed no trend in relation to body condition. These findings challenge the assumption that high haemoglobin or haematocrit levels necessarily indicate better condition, and are consistent with previous reports of weak or absent relationships in certain species. Further studies are needed to clarify the mechanisms linking blood parameters to individual condition and fitness.

P89. Seasonal shifts in mitochondrial plasticity in the three-spined stickleback

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Understanding how organisms adjust to environmental change is a central question in evolutionary biology. As key metabolic and signalling hubs, mitochondria play a crucial role in mediating whole-organism responses to environmental fluctuations. In ectothermic vertebrates, mitochondria can modify their function to buffer the impacts of thermal variability, a capacity known as mitochondrial plasticity. This supports cellular homeostasis and physiological performance. Changes in mitochondrial functionality occur during the life course which could affect mitochondrial plasticity. In annual populations of semelparous species, adults often undergo marked physiological changes over the course of their single breeding season, including changes in reproductive effort and in somatic condition. Whether these changes are linked to altered metabolic capacity and its flexibility in response to thermal changes remains largely unexplored. In this study, we investigated whether mitochondrial plasticity changes over the course of the breeding season in the three-spined stickleback (*Gasterosteus aculeatus*). At the beginning and after the end of the breeding season fish were acclimated to one of three thermal regimes: constant cold (12°C), constant warm (21°C), or daily fluctuating temperatures (12–21°C). Mitochondrial respiration was then measured in isolated muscle mitochondria at a common assay temperature (21°C), assessing ATP production capacity (OXPHOS), LEAK respiration (unconnected to ATP production) and mitochondrial efficiency (net phosphorylation efficiency). We found that early in the breeding season fish showed a high level of plasticity in OXPHOS and LEAK respiration in response to changing temperatures. In contrast, fish tested after the end of the breeding season showed little OXPHOS or LEAK response to temperature changes, suggesting reduced mitochondrial flexibility. Net phosphorylation efficiency did not differ significantly among treatments, indicating that seasonal changes primarily affected respiratory capacity rather than efficiency. These results reveal a seasonal decline in mitochondrial plasticity, possibly reflecting a physiological shift from somatic maintenance to terminal reproductive investment. This seasonal change in mitochondrial function may influence thermal resilience and energy allocation strategies in ectothermic species facing environmental changes.

P90. Ant Hunters: A citizen science initiative for ant biodiversity research

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Ant Hunters is a citizen science initiative led by the Ant Ecology Group at the Doñana Biological Station (EBD - CSIC) that invites both general citizens and school teachers to contribute to the study of ant biodiversity in their local surroundings across several participating countries. The sampling method is straightforward and accessible; participants receive an AntHunters sampling kit containing everything necessary to place sugar water baits, attract, observe, and collect local ant species, and a pre-paid envelope for sample return. There are two participation pathways: general citizens sample both an urban and a natural area, while teachers can use the activity as a hands-on learning experience for their students by sampling near the school. Data and samples collected through Ant Hunters will enable several main research areas, including: 1) the study of ant community ecology, analyzing species coexistence and interactions; 2) the generation of COI barcodes for molecular species identification and phylogeographic analysis; 3) the investigation of the ant microbiome; and 4) the early detection of invasive alien species, which is crucial for local biodiversity conservation.

P91. Food intake of nightjars peaks on moonlit nights

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Nocturnal predators often track the lunar cycle, increasing their activity during full-moon periods. Nightjars (Caprimulgidae) are efficient crepuscular-nocturnal predators of aerial insects that rely on semi-darkness for visual prey detection. Most tracking studies of caprimulgids report an increase in the duration of daily activity on bright moonlit nights compared to moonless nights. This increased activity is interpreted as a response to increased foraging opportunities. However, a similar pattern could result from nightjars increasing their foraging effort to compensate for reduced prey accessibility during full-moon periods. Therefore, to confirm that increased nightjar activity under moonlight translates into increased foraging success, food intake must be considered. To assess the foraging success of nightjars in relation to moon phase, we examined nighttime trends in the degree of fullness of the muscular stomach (gizzard) of adult red-necked nightjars (*Caprimulgus ruficollis*) captured as part of a long-term study conducted in Doñana, southern Spain. Caprimulgids can store large amounts of digesta in the gizzard, making it possible to obtain accurate estimates of foraging success in the field through non-invasive external palpation and assessment of gizzard fullness. We used an ordinal scale of 0–4 (empty, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, or full) to score the degree of gizzard fullness. We then used a portable ultrasonographer to scan the gizzards of free-ranging nightjars and validate our field scores. Field scores of gizzard fullness for 40 nightjars captured in 2024 reliably predicted actual gizzard size (maximum gizzard diameter). Based on field gizzard scores obtained from 2,848 captures of 1,459 individuals (843 females, 616 males) in 2011–2024, we showed that, on dark nights, the degree of gizzard fullness gradually declined over time, suggesting that feeding stopped shortly after dusk. However, on moonlit nights, nightjar gizzards remained approximately half-full throughout the night, indicating that the birds continued to feed at a relatively constant rate after sunset. This suggests that increased nightjar activity on moonlit nights does not reflect a reduction in prey accessibility, but an actual increase in total foraging time, enabling nightjars to maximise food intake on full-moon nights.

P92. Enhancing field-based biological training through a student-led internship group at the University of Seville

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Modern universities are increasingly engaged in activities beyond formal teaching, positioning themselves as hubs for scientific outreach, academic exchange, and public engagement. Within this framework, undergraduate students often face challenges in finding academic, scientific, and career guidance tailored to their interests—especially those interested in practical field biology. To address this, we established a student-led internship group within the Biology Degree program at the University of Seville, integrating traditional fieldwork ("boot biology") with digital tools and new technologies. A recruitment campaign on Instagram for 6 official internship positions attracted 22 applicants. As word spread via social media, the group expanded to 35 Biology students and later welcomed 3 more students from other degree programs. Over the academic year, we organized 30 diverse activities involving 21 active participants. These included bird banding sessions, nest box building workshops, installation and monitoring of nest boxes, bird censuses in urban parks across Seville, the development of a visual bird guide for the Reina Mercedes campus, or stable isotope analysis of feathers. The initiative has proven highly motivating for students with a strong interest in fieldwork, offering hands-on experiences not typically available in formal coursework. In addition to skills development, it has fostered a sense of community and active participation among students. However, we also identified areas for improvement, particularly in the dissemination of our activities. Enhancing our communication strategies through Instagram Reels and Telegram broadcast channels could increase visibility, attract more participants, and better connect students with field biology opportunities offered by other institutions and potential employers. We conclude that such extracurricular, student-driven programs can serve as powerful tools for bridging the gap between academic learning and professional development in field-based biology.

P93. Born to aggressive mothers – are certain chicks more susceptible to early life exposure to aggression

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Early development in vertebrates is a period of heightened neural plasticity, making it particularly sensitive to environmental influences. Adverse experiences, such as poor nutrition, disease, or social adversity, can therefore have lasting effects on behavioural and cognitive development. However, how these effects may be shaped by both genetic predisposition and the early life environment, as well as the interplay between genetic and environmental components remain poorly understood. We investigated these mechanisms in domestic canaries (*Serinus canaria*), a species in which mothers may exhibit maternal aggression (MA) towards their nestlings. We hypothesised that early MA exposure would increase impulsivity, reduce neophobia, and enhance aggression, potentially leading to higher dominance ranks. We expected that these effects would become more pronounced in socially challenging conditions, such as high group densities, and should be amplified in individuals genetically predisposed to aggression. To test these hypotheses, full clutches were cross-fostered within and between MA and no-MA mothers, creating four experimental groups to disentangle genetic and environmental influences. Once independent, juveniles underwent a series of standardised behavioural tests. Our results showed that the relative influence of genes and environment varied across traits: aggression-related behaviours and response inhibition reflected primarily genetic/prenatal influences, whereas the rearing environment mainly affected food motivation. In contrast, neophobia was best explained by a gene–environment interaction, possibly because both response inhibition (genetic) and food motivation (environmental) contributed to a more risk-prone phenotype. These findings support the idea that MA may itself be a heritable trait (the “cycle of violence” hypothesis), perhaps mediated by shared predispositions for impulsivity or poor behavioural regulation. Our results further suggest that environmental effects on food motivation may reflect nutritional stress or maternal neglect, but are unlikely to fully account for the expression of maternal aggression itself.



Foto contraportada: Miguel A. Sánchez Romero,
P.N. Sierra de Hornachuelos (Córdoba)
Autillo europeo (*Otus scops*)

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