Bulletin of Ecology and Evolutionary Biology Society

January 2026
Issue I

ekoevo

Bulletin of Ecology and Evolutionary Biology Society

Electronic Periodical Publication (**e-Bulletin**)
Language: Turkish and English
Publication Frequency: Annual

Publisher / Owner
Ecology and Evolutionary Biology Society

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Vol 1 · Issue 1 · 30 January 2026

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President's Message:

The Ecology and Evolutionary Biology Society Continues to Grow in Its 11th Year

Over the past decade since our establishment, the Ecology and Evolutionary Biology Society has transformed into a community that brings together scientists from Türkiye and abroad representing diverse universities, areas of expertise, and career stages around a shared purpose. Today, with nearly 400 members, we stand as a strong scientific network. Thanks to the dedicated contributions of our executive and supervisory boards, commissions, working groups, and members, we continue striving to broaden our reach. As we evolve into an increasingly robust academic ecosystem through the symposia we organize, the scientific events we support, and the roles we undertake, we consider encouraging young researchers through awards and supporting their development via various mechanisms to be among our core missions.

From the late Ottoman period into the early Republic, debates surrounding evolutionary theory occupied a central place not only within biology but also within the broader intellectual history and modernization efforts of our country. With an awareness of this historical legacy, our Society aims to strengthen evolutionary biology and ecology as research fields grounded in rigorous scientific evidence, critical thinking, and institutional continuity free from ideological polarization.

In the decade since our founding, the global significance of ecology and evolutionary biology has become more apparent than ever. Habitat loss, climate change, the biodiversity crisis, and rapidly transforming socio-ecological systems have elevated our disciplines from purely academic pursuits to matters of central societal and political relevance. With its exceptional biological and cultural diversity and its complex geological–climatic history, Türkiye stands at the forefront of these developments. In this context, it is of critical importance that our Society expands its capacity to generate, accumulate, and share scientific knowledge through collective wisdom.

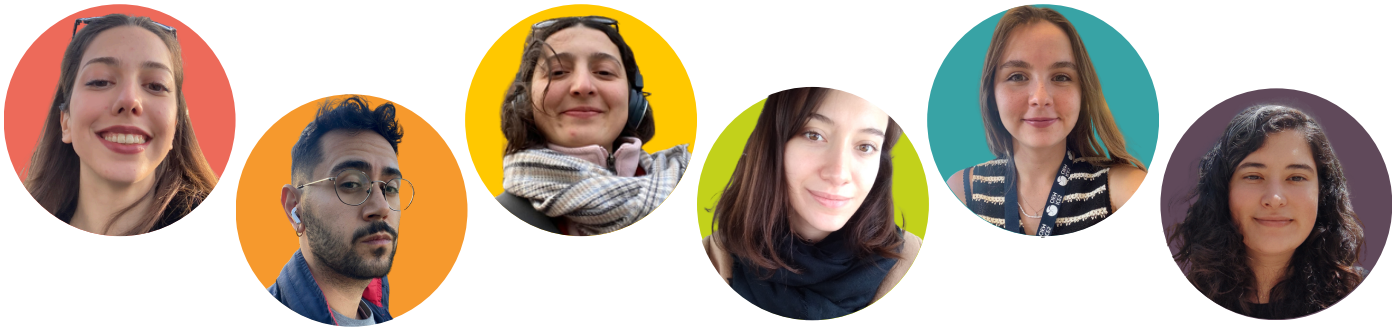
In the coming period, our goal is to build together a society structure that enhances the quality of scientific output, prioritizes the development of young researchers, strengthens national and international collaborations, and enables scientific findings to inform public policy. The bulletin you now read is itself a tangible product of the entirely voluntary efforts of our Bulletin Working Group and all contributing members, reflecting the collective endeavor that defines our Society.

I extend my sincere gratitude to all members who have contributed to the Society thus far, and I am confident that we will continue on our path in the years ahead with the same spirit of solidarity and determination.

Hakan Gür

President of the Ecology and Evolutionary Biology Society

From The Editorial Team



Dear readers,

Nature is a narrative in constant flux, redefining itself through a continuous cycle of becoming and decaying. As both participants and observers of this narrative, we view ecology and evolutionary biology not merely as academic disciplines, but as a profound endeavor to unravel the complexities of life. As the Ecology and Evolutionary Biology Society BulletinTeam, we are delighted to present this new issue of our annual newsletter, a product of our collective labor and our longing for scientific exchange after a long hiatus. While honoring the legacy of past bulletins , we return with a refreshed editorial structure, a modernized visual language, and a publication designed to meet the dynamic needs of our community. Guided by the principle of change—the very essence of science—we have reimagined our newsletter to adapt to this transformation, meet contemporary expectations, and uphold future academic standards.

Our primary objective in this editorial transformation was to evolve the newsletter from a mere announcement channel into a vibrant publishing platform that connects, highlights, and archives every facet of our society's ecosystem. This issue embodies a vision of becoming collective memory, spanning from arduous fieldwork to the depths of laboratories, and from theoretical debates to social outreach. Driven by the conviction that scientific inquiry gains meaning only when shared, we aimed for every page to reflect strong traces of academic solidarity and interdisciplinary interaction. Enhancing the transparency and accessibility of our society's work, alongside that of our stakeholders, remains a cornerstone of this new format.

As you browse through the content, you will find a comprehensive retrospective of EEBST 2025, capturing its highlights & memorable moments, scientific outputs, and participant feedback. This is followed by the latest updates on the highly anticipated preparations for EEBST 2026. In our "Meet the Research Teams" section, you will have the opportunity to visit various working groups and learn more about their projects, while the "Research Highlights" section features recent publications contributed to the literature by our members. In the "Community Members" section, we featured the field and laboratory experiences of post-doctoral researchers within our community. Additionally, the "Perspectives" shares the firsthand experiences of our member researchers, and the

"Regional Reports" documents localized scientific efforts. Finally, in our "Q&A" corner, we get to know different names from our society through brief yet insightful questions.

The true catalyst for this newsletter is the invaluable contribution of EkoEvo members. Every article you share, every research update you send, and every perspective you offer forms the bedrock of this publication's collective endeavor. We envision this platform as a living entity, nourished by your research, field experiences, and academic vision. We believe that by sharing your own work in future issues, you will enhance the scientific depth of our community and strengthen our solidarity. Lastly, we would like to express our sincere gratitude to the authors who devoted their efforts during this intensive preparation process, the teams who shared their research data, and Dilek Koptekin, Tuba Bucak, Duha Alioğlu, and Zeynep Oğuzhan for their contributions to this issue. Scientific production is, by its nature, a collective effort; no research exists independently of the ecosystem in which it flourishes.

We wish you a year guided by the light of science, filled with curiosity and academic solidarity.

Enjoy the read.

Editorial Team

Cansu Baran
Onur Uluar
Nurbahar Usta
Ezgi Küçükel
Tunca Deniz Yazıcı
Fatıma Nur Oğul

Wait! We almost forgot to extend our sincere thanks to our beloved attendees, who were present at every meeting and brightened our gatherings during the preparation of this issue.


Molly


Bonbon


Pera


Mirket


Hiru


Tiffany


Bambi


İzotto

Meet the Board

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EEBST 2025: Meeting Highlights

EEBST 2025 (the 11th Ecology and Evolutionary Biology Symposium) was held at Hacettepe University, Ankara, Türkiye, on 9–11 July 2025. The programme featured ten sessions, including population genetics and ecology; aquatic ecology; ancient DNA and paleobiology; conservation biology and biogeography; microbial ecology and evolution; animal behaviour and wildlife ecology; bioinformatics / phylogenetics / evolutionary genomics; and community and ecosystem ecology. Across these sessions, more than 40 oral presentations and about 70 poster presentations were delivered. Beyond the formal sessions, coffee breaks, poster discussions, and social events created an open forum for new collaborations across subdisciplines.

Plenary lectures included Natália Martínková on genome polarization and hybridization, Jalil Noroozi on plant biodiversity and biogeography of the Irano-Anatolian high mountains, and Paraskevi Karachle on non-indigenous species in the Mediterranean, highlighting the symposium's breadth from evolutionary processes to applied conservation. Two panels, namely, *"Anthropology in Türkiye at Its Centennial: Past, Present, and Future"* and *"Integrating Biodiversity Knowledge into Conservation Practice"*, provided additional space for synthesis and exchange. A Philosophy of Biology mini-symposium on 8 July, including talks by biologists and philosophers, complemented the main meeting with a focused conceptual debate. The symposium celebrated excellence with the Best Oral and Poster Presentation Awards to Nurbahar Usta and Büşra Karataş, respectively. We thank our local support team for their excellent and tireless work, and the participants who make this symposium series a great event for all of us.

Çağatay Tavşanoğlu
On behalf of the Symposium Organizing Committee

2025 EEBST Awards

BEST DOCTORAL THESIS AWARD

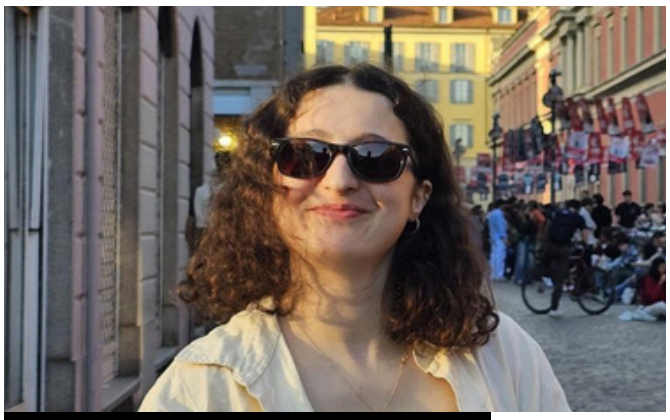
Fatıma Nur Oğul Ünal
Institute of Marine Sciences, Middle East Technical University, Türkiye

Thesis Title: An Integrative Study on *Botryllus humilis* and *Botrylloides niger*: Ecological, Histological, Cellular, and Gene Expression Perspectives

BEST MASTER'S THESIS AWARD

Mehmet Göktuğ Öztürk
Functional Ecology Laboratory, Hacettepe University, Türkiye

Thesis Title: Spatiotemporal patterns of lightning-induced wildfires in Türkiye



BEST ORAL PRESENTATION AWARD

Nurbahar Usta
Functional Ecology Laboratory, Hacettepe University, Türkiye

Presentation Title: Trojan Fir Under Climate Warming: A Faclitor Species Facing Regeneration Limits

BEST POSTER PRESENTATION AWARD

Büşra Karataş
Department of Anthropology, Institute of Social Sciences, Ankara University, Türkiye

Poster Title: Genome Meets Grave: Molecular Identification of Tuberculosis in a Byzantine Burial

EEBST 2026: Announcements & Preparations

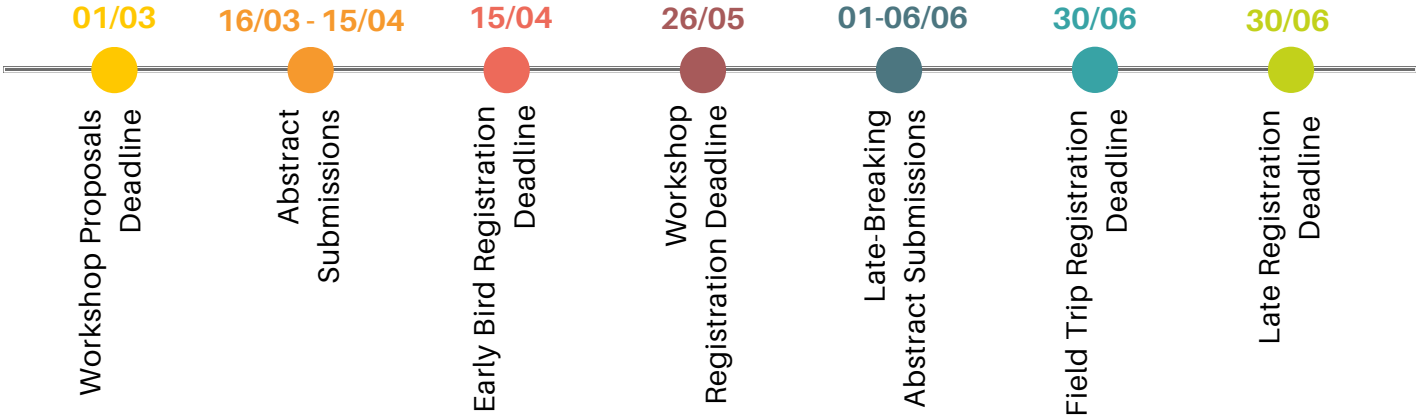
The Ecology and Evolutionary Biology Symposium (EEBST 2026) will be held on 6–10 July 2026, hosted by Mersin University at the Prof. Dr. Uğur Oral Cultural Center, Mersin, Türkiye.

EEBST26 Program at a glance:
July 6: Pre-Symposium Workshops
July 7 – 9: Main Congress Sessions (Keynotes, Talks, and Poster Sessions)
July 10: Post-Congress Field Trip

Our First Keynote Speaker is Officially Confirmed!
We are thrilled to welcome **Lucia Manni** as our first invited speaker. A leading figure in the fields of developmental biology, evolution, and neuroscience—with a focus on ascidians and stem cells.

Workshops and Panels
July 6th We are planning a series of workshops and panels led by leading experts in their fields. The call for proposals for these sessions will open very soon. We kindly invite researchers interested in contributing to stay tuned for our upcoming announcements.

Emrah Kırdök
On behalf of the Symposium Organizing Committee



UPCOMING EVENTS

FEBRUARY — 10-11
Resilient Landscapes & Seas Symposium 2026
Edinburgh, UK

MAY — 4 - 8
Mathematical and Computational Evolutionary Biology 2026
Crete, Greece

MAY — 11-14
Annual Conference of the Canadian Society for Ecology and Evolution 2026
Toronto, Canada

MAY — 12 - 16
ASLO-SIL Joint Meeting 2026
Montreal, Canada

MAY — 13 - 16
12th International Ecology Symposium 2026
Gaziantep, Türkiye

MAY-JUNE — 20-31 1-24
Evolution 2026 (joint meeting of SSE, ASN, SSB)
Cleveland, Ohio, USA

JUNE — 9-12
European Society for Evolutionary Developmental Biology
Glasgow, Scotland

JUNE — 11-12
Molecular Origins of Life Munich Conference 2026
Munich, Germany

JUNE — 22-26
68th Annual Symposium of the International Association for Vegetation Science
Gijon, Spain

28 - 2

JUNE-JULY

Society for Molecular Biology and Evolution Annual Meeting 2026

Copenhagen, Denmark

JUNE-JULY

29 - 3

XIII European Congress of Entomology 2026

Tours, France

6 - 10

JULY

8th European Congress for Conservation Biology

Leiden, the Netherlands

JULY

19 - 23

21st Eurasian Grassland Conference 2026

Sofia, Bulgaria

26 - 31

JULY

Annual Meeting of the Ecological Society of America 2026 (ESA 2026)

Utah, USA

AUGUST

24 - 28

15th European Conference on Ecological Restoration 2026

Brest, France

17-19

SEPTEMBER

European Society for the Study of Human Evolution Conference 2026

Burgos, Spain

OCTOBER-NOVEMBER

31 - 6

10th International Conference on Forest Fire Research (ICFFR 2026)

Coimbra, Portugal

9 - 20

NOVEMBER

2026 UN Climate Change Conference (UNFCCC COP 31)

Antalya, Türkiye

NOVEMBER

17-20

7th World Conference on Marine Biodiversity (WCMB 2026)

Bruges, Belgium

GLOSSAQUA: A global dataset of size spectra across aquatic ecosystems

Summarized by: **Zeynep Ersoy**
Área de Biodiversidad y Conservación & University of Rey Juan Carlos

From microbes to megafauna, body size spans 21 orders of magnitude. In nature, a consistent pattern emerges: small organisms at the base of the food chain (e.g., phytoplankton) outnumber their larger counterparts (e.g., fish). This rule was previously reflected in Charles Elton's upright "pyramid of numbers," proposed in 1927 to represent the relative abundance of organisms at each trophic level. Derived from Elton's pyramid, the concept of the "size spectrum" was first introduced by marine ecologists in 1962 and represents the relationship between abundance or biomass and body size within communities.

Generally, the smaller an organism is, the more abundant it tends to be. Theoretical studies have linked changes in body size and abundance to how energy is transferred from one level of the food web to another. The size spectrum has become a central framework in aquatic ecology. Changes in the size spectrum have been used as key indicators of how biological communities respond to global change drivers, such as overfishing and rising water temperatures. Despite its widespread use, until now, there has been no global database compiling the core variables of size spectra across different aquatic ecosystems and organisms. To fill this gap, we conducted an extensive literature review to compile size spectrum parameters across marine (52%), freshwater (43%), and brackish (5%) communities. The resulting GLOSSAQUA dataset includes information on body-size structure obtained from 135 studies. We also added ecological information such as geographical coordinates of study sites, the presence of pollution or non-native species, and methodological details. Building GLOSSAQUA—our project supported by funding for early-career researchers from the Iberian Society of Ecology (SIBECOL), in which we participated as lead researchers—has been a wonderful experience for us. Our project would not have been successful without the contributions of many field ecologists who generously shared their data. What began as a journey undertaken by three people ultimately became a collaborative effort by more than 40 international co-authors from 12 countries. Looking ahead, we believe our work will open new avenues for investigating how community size structure responds to environmental changes on a global scale.

⁎*This article was first published on the SIBECOL page*

Ersoy, Z., Evangelista, C., Larrañaga, A., Perkins, D. M., Sánchez-Hernández, ... & Arranz, I. (2025). GLOSSAQUA: A global dataset of size spectra across aquatic ecosystems. *Ecology, 106*(3), e70050.

Climate Change and Interspecific Interactions are Reshaping the Distribution of Brown Bears in Europe

Summarized by: **Anıl Soyumert**
Hunting and Wildlife Program, Kastamonu University, Türkiye

This study demonstrates that the continental-scale distribution of the brown bear is shaped largely by its interactions with other species. Results from nearly four years of research indicate that bears preferentially occupy areas where species that form part of their food webs are present. Published in Global Change Biology, the study uses the brown bear as a model to highlight the importance of interspecific interactions in ecosystem conservation.

Understanding how global changes such as climate change or land-use transformations affect species is critical for conserving biological diversity and maintaining ecosystem services, including clean water, soil fertility, and pollination. For example, climate change is causing many species to shift their ranges toward higher elevations or latitudes. The lead author of this comprehensive study, Pablo M. Lucas from the University of Seville, reports that brown bears were found to have an extensive diet comprising 276 different species. In warmer southern European regions such as the Pyrenees, Greece, and Türkiye, brown bears tend to adopt a more plant-based diet, whereas individuals in colder regions like Scandinavia and Finland show more carnivorous tendencies. This indicates that the ecological roles of brown bears can range from herbivore to apex predator, depending on regional conditions.

The study further shows that brown bears are more likely to occur in areas where the energy yield obtained from their dietary species is higher. For instance, in the Pyrenees, the presence of oak and beech trees constitutes a key food resource, increasing the likelihood of bear persistence in this subpopulation. In more carnivorous subpopulations, bear occurrence is more closely associated with the distribution of wild ungulates, such as wild boar or deer.

Through this large-scale international collaboration, researchers accessed more than three million location records from approximately 3,000 individuals across 14 distinct subpopulations living under different environmental conditions. This extensive dataset made it possible to examine how local ecological interactions scale up to shape continental patterns. Such insights are particularly important for predicting where species may persist in the future and which ecological roles they may assume under ongoing climate change and land-use shifts. The findings also reinforce the idea that conserving species necessarily requires conserving the ecosystems on which they depend.

Species that differ from brown bears in key traits such as having narrower diets, limited dispersal ability, or more restrictive environmental requirements may respond very differently to climate change, land-use change, and shifts in ecological interactions. A better understanding of these dynamics is essential for designing more effective strategies to conserve biodiversity and sustain ecosystem services.

This research was coordinated by the University of Seville, Sapienza University of Rome, and the Polish Institute of Nature Conservation, and involved 87 researchers

from 75 institutions across 26 countries, including the Spanish National Museum of Natural Sciences (MNCN-CSIC), Doñana Biological Station (EBD-CSIC), Université Grenoble Alpes, and the French National Centre for Scientific Research (CNRS).

Lucas, P. M., Thuiller, W., Talluto, L., Polaina, E., Albrecht, J., Selva, N., ... & Pollock, L. J. (2025). Trophic interactions are key to understanding the effects of global change on the distribution and functional role of the brown bear. *Global Change Biology*, *31*(6), e70252.

Evolutionary Innovation in the Presence of Endosymbionts

Summarized by: **Zelal Özgür Durmuş**
Graduate School of Science and Engineering, Hacettepe University, Türkiye & Beykoz Institute of Life Sciences and Biotechnology, Bezmialem Vakif University, Türkiye

Positive symbiotic interactions are far more widespread among biological entities than we often assume. The symbiotic relationship between ants (the host) and their intracellular resident bacteria (obligate endosymbionts) represents one of the most striking examples of such interactions.

While molecular interactions among organisms can take many forms, research has predominantly focused on nutrient provisioning or the genomic dependence of bacterial symbionts on their hosts. However, recent studies demonstrate that the multicellular developmental processes of ants are shaped by the contribution of bacterial symbionts to the cellular microenvironment. Ants subjected to antibiotic treatment exhibit disruptions in their developmental processes at both structural and molecular levels. In our recently published article in Evolution and Development, we focus on the development of a second germline lineage that is influenced by the presence of endosymbionts and emerges as a novel cell in a new location. We performed transcriptomic analyses across different tissues and multiple embryonic stages relevant to this question. To monitor the development of this novel multinucleated germline cell, we tracked germline-specific genes (*oskar, Vasa*) using various staining techniques. We also profiled the occurrence of this new cell type across closely related species.

This novel cell represents a unique form that arises through the fusion of cells located at the boundary of bacteriocytes—cells that harbor bacteria in ants and later become part of the gut structure. The characterization of this cell appears to depend on the bacterial microenvironment, which we propose triggers cellular fusion, and on the physical clustering of germline genes (germline granules) at a new location. The presence or absence of bacteria significantly affects both the expression of germline genes and the development of the cellular structure itself. Subsequently, the germline nuclei within this cell migrate toward a putative gonadal disc, while the remaining portion of the cell acquires a new function.

Across different species examined within the Camponotini ant phylogeny, the formation of this secondary germline cell exhibits diverse profiles. In some species, the secondary germline does not form at all, whereas in others a secondary location with the potential to generate a germline cell is observed, yet the cell itself does not develop. Most strikingly, this novel germline cell may have evolved independently multiple times across different lineages. This pattern could

arise solely from genetic variation, but it may also reflect the plasticity of developmental processes shaped by environmental interactions. The involvement of bacterial factors, along with maternal transcripts and proteins in addition to the host genome, lends strong support to the latter explanation. We believe that this study highlights the importance of integrating ecological, developmental, and genetic perspectives to better understand the close coexistence and coevolution of two distinct organisms.

Durmuş, Z.Ö., Milat, N.S., Rajakumar, A,. Rafiqi, A.M. (2025). Endosymbiont Interactions With the Germline Underlie a Case of Evolutionary Novelty in Carpenter Ants. *Evolution & Development*. *27*(4). e70025.

Adaptation to novel climates, sexual selection, and the effects of climate change in the model cricket species *Gryllus bimaculatus*

Yasmin Naz Akyürek
Department of Life Sciences and Systems Biology, University of Turin, Italy

When imagining a summer sunset by the seaside, the familiar "chirping" sound in the background is often produced by the two-spotted field cricket, *Gryllus bimaculatus*. Beyond its recognizable call, this species is widely used as a model organism in studies of sexual selection. Male crickets attract females by producing a calling song; females that find the song attractive approach the male through phonotaxis. Once a female reaches the male, he must perform an energetically costly courtship song. Females can assess male quality based on the calling song, courtship song, and additional behavioral and chemical cues, gaining information about

Figure 1. A mounting pair of crickets.

sperm quality, metabolic rate, age, and even immune function before deciding whether or not to mate.

Mating occurs only when the female climbs onto the male and attaches the spermatophore to her ovipositor; therefore, mating cannot take place without female choice. My doctoral research aims to understand how climate change affects insect mating behavior and to compare these effects between insects adapted to tropical and temperate climates. *Gryllus bimaculatus* is particularly well suited for this research, as it has colonized coastal regions throughout the Mediterranean, Africa, and Asia, as well as tropical islands in the Indian Ocean.

As of December 2025, I am concluding a two-month field study on Réunion Island, a volcanic island where low elevations experience a tropical climate, while higher elevations can even receive snowfall. Remarkably, *G. bimaculatus* has colonized nearly the entire island, up to elevations of 2400 meters. At lower elevations, crickets occur at low densities in sugarcane fields. At higher elevations, as soil becomes scarcer and rocky substrates more abundant, they occupy habitats beneath large rocks and low shrubs. The densest and most abundant populations were observed at approximately 2100 meters above sea level.

Our first research question asks how increasing elevation—and thus increasing thermal extremes—affects singing phenology and mating behavior in G. bimaculatus. At 2100 meters, daytime soil temperatures can reach 34 °C, while nighttime temperatures may drop to as low as 3 °C. Using passive acoustic recorders combined with direct observations, we found that populations up to 1100 meters begin singing at sunset, whereas the population at 2100 meters sings continuously throughout the day and night. One possible explanation is the reduced

Figure 2. A spider preying on a female cricket.

abundance of predators (such as frogs, spiders, and birds) at higher elevations. Nighttime temperatures of 0–5 °C also make nocturnal singing more challenging, as insect metabolism is strongly temperature-dependent and stridulation is an energetically demanding behavior. In temperate climates, *G. bimaculatus* overwinters in the egg stage, and singing or mating below 15 °C is not observed. However, in environments where extreme temperatures occur daily, these insects may possess physiological mechanisms that low them to exploit the residual effects of elevated daytime metabolic rates during the night.

Figure 3. A frame from mating experiments.

Supporting this idea, experiments conducted last year on high-elevation (1000 m) *G. bimaculatus* populations in Madagascar showed that males exposed to a heatwave 24 hours earlier were more successful in singing and mating than males maintained at ambient temperatures. This observation prompts us to reconsider insect thermoregulatory mechanisms, as insects are generally assumed to be directly affected by ambient temperature. However, our findings and this year's observations indicate that insect behavior may not be directly determined by the temperature of their immediate environment.

Our second research question examines how heatwaves affect mating behavior in three populations adapted to different microclimates. According to the climatic variability hypothesis, ectotherms adapted to stable tropical climates are expected to be more vulnerable to climate change. However, future species distribution models often rely primarily on data collected from temperate regions (Bretman et al., 2024), reflecting a strong sampling bias toward the Northern Hemisphere and mid-latitudes (Dougherty et al., 2023).

To address this question, we allowed male–female pairs collected from three different elevations to interact for 30 minutes while recording video and audio. The pairs were then separated and exposed to a four-hour heatwave at 35 °C. After a two-hour recovery period, mating interactions were recorded again using the same protocol. The next step is to analyze the videos to extract mating traits such as mating latency and courtship effort, and to analyze the acoustic recordings to determine whether these traits change following heatwave exposure.

- Bretman, A., Fricke, C., Baur, J., Berger, D., Breedveld, M. C., Dierick, D., ... & Snook, R. R. (2024). Systematic approaches to assessing high-temperature limits to fertility in animals. *Journal of Evolutionary Biology, 37*(4), 471–485.
- Dougherty, L. R., Frost, F., Maenpaa, M. I., Rowe, M., Cole, B. J., Vasudeva, R., ... & Price, T. A. R. (2024). A systematic map of studies testing the relationship between temperature and animal reproduction. *Ecological Solutions and Evidence, 5*(1).
- Janzen, D. H. (1967). Why mountain passes are higher in the tropics. *The American Naturalist,* 101(919), 233-249.

Earliest Modern Human Genomes Sequenced

Summerized by: **Arev Pelin Sümer**
Max Planck Institute for Evolutionary Anthropology, Germany

After modern humans left Africa, they met and mate with Neandertals, resulting in up to ~2% Neandertal DNA maintained in the genomes of all non-Africans today. However, we still know little about when and where this event took place, and the modern human population that participated. A key site is Zlatý kůň in Czechia, where a complete skull from a ~45,000 years old human was discovered and previously genetically analyzed (Prüfer et al., 2021). It was not possible to link this individual to any archaeologically defined group.

Nearby, the Ranis site in Germany is associated with the Lincombian-Ranisian-Jerzmanowician (LRJ)

Figure 1. Illustration of the Zlatý kůň/Ranis group by Tom Björklund.

industry, also dated to ~45,000 years ago. It has long been debated whether the LRJ culture was produced by Neandertals or early modern humans. In our 2024 study (Mylopotamitaki et al., 2024) mitochondrial DNA from 13 Ranis individuals showed they were modern humans, but because mtDNA represents only a tiny part of the genome, their broader relationships to other modern human groups remained unknown.

In our new study, we analyzed the nuclear genomes of 13 Ranis specimens and found they represented at least six individuals, including a mother–daughter pair and other more distant relatives. We also generated a high-quality genome for the Zlatý kůň individual and identified a fifth- or sixth-degree relationship between her and two Ranis individuals. This shows that Zlatý kůň was part of the extended Ranis family and likely also made LRJ-type tools.

Ranis13 and Zlatý kůň genomes represent the oldest high-quality modern human genomes sequenced to date. Genetic variants linked to physical traits indicate that both individuals likely had dark skin, dark hair, and brown eyes, consistent with their recent African origins. We estimated that their population consisted of at most a few hundred individuals and found no evidence that this group contributed to later Europeans or any other world-wide population.

Members of the Zlatý kůň/Ranis population coexisted with Neandertals in Europe, raising the possibility that they had recent Neandertal ancestors. Earlier studies of modern humans older than 40,000 years found evidence for such recent admixture (Hajdinjak et al., 2021). However, we detected no signs of recent Neandertal admixture in the Zlatý kůň/Ranis genomes. The fact that later-arriving modern human groups do show this ancestry, while Ranis and Zlatý kůň do not, suggests that this older lineage may have entered Europe by a different route or had less overlap with Neandertal-inhabited regions. This population represents the earliest known split from the modern humans who left Africa and later spread across Eurasia. Despite this early separation, the Neandertal ancestry in Zlatý kůň and Ranis originated from the same ancient admixture event that can be detected in all people outside Africa today. Analysis of Neandertal DNA segments in the high-coverage Ranis13 genome, combined with radiocarbon dates, places this shared admixture between 45,000 and 49,000 years ago. Since all present-day non-African populations share this Neandertal ancestry with Zlatý kůň and Ranis, this means that around 45,000 to 49,000 years ago, a coherent ancestral non-African population must still have existed. Therefore, any modern human remains older than 50,000 years found outside Africa could not belong to this common non-African group that interbred with Neandertals.

- **Sümer, A. P., Rougier, H., Villalba-Mouco, V., Huang, Y., Iasi, L. N., Essel, E., ... & Krause, J. (2025). Earliest modern human genomes constrain timing of Neanderthal admixture. *Nature, 638*(8051), 711-717.**
- Prüfer, K., Posth, C., Yu, H., Stoessel, A., Spyrou, M. A., Deviese, T., ... Krause, J. (2021). A genome sequence from a modern human skull over 45,000 years old from Zlatý kůň in Czechia. *Nature Ecology & Evolution, 5*(6), 820–825.
- Mylopotamitaki, D., Weiss, M., Fewlass, H., Zavala, E. I., Rougier, H., Sümer, A. P., ... & Hublin, J. J. (2024). Homo sapiens reached the higher latitudes of Europe by 45,000 years ago. *Nature, 626*(7998), 341-346.
- Hajdinjak, M., Mafessoni, F., Skov, L., Vernot, B., Hübner, A., Fu, Q., ... Pääbo, S. (2021). Initial Upper Palaeolithic humans in Europe had recent Neanderthal ancestry. *Nature, 592*(7853), 253–257.

Ancient Environmental Genomics Research in Slovakia

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As the Ancient Environmental Genomics research group, based in Leipzig and Vienna, we aim to generate genetic information about past human communities, fauna, and flora by analysing DNA isolated from sediments collected in various contexts. These contexts may include caves, lakes, or ancient settlement sites. One of our group's main projects focuses on reconstructing the history of communities that lived in a Bronze Age settlement in present-day Slovakia.

Our goal is to collect sediment samples from different domestic and human-associated contexts within the settlement—such as houses, courtyards, and refuse areas—and to

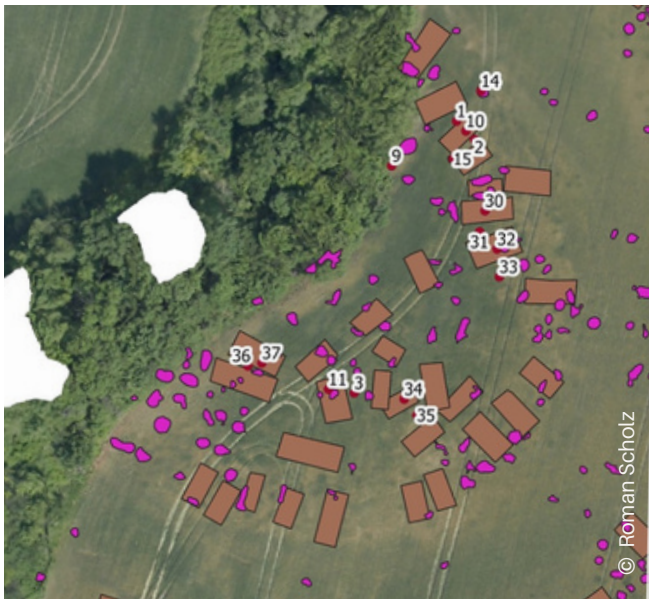

Figure 1. Vrable's settlement plan was mapped using the geomagnetic method. The brown areas indicate houses, while the numbers indicate the points where core samples were taken.

use DNA isolated from these sediments to address questions related to social organization. For example, when considering a single house, did members of the same family occupy that house throughout the entire period of its use, across multiple generations? Or, when examining neighbouring houses, can we detect whether groups of houses were organized according to kinship relationships?
To address these questions, it is first necessary to obtain a detailed spatial understanding of the settlement. Therefore, prior to fieldwork, we examined a geomagnetic survey map of the site that provided a detailed plan of the settlement (Figure 1).

After identifying the houses, courtyards, and other contexts targeted for sampling and recording their coordinates, we conducted sampling during the excavation season in collaboration with archaeologists. We employed two different sampling strategies. First, we extracted sediment cores from predetermined coordinates using a coring device, as shown in Figure 2. These cores were stored and transported to the laboratory, where subsampling will be conducted under controlled conditions (Figure 2).

Figure 2. The machine used for core sampling and the core samples.

Figure 3. A trench running through the centre of houses dates to the Bronze Age.

The second approach involved the in situ collection of individual samples. To minimize disturbance to the site, we reopened an old trench that had originally been excavated during the first investigations at Vráble in the 1960s (Figure 3). One of the key challenges of this work was to coordinate closely with the archaeologists' excavation schedule and workflow in order to collect samples without interfering with their activities.

This trench cut directly through the center of a Bronze Age house, providing a valuable opportunity to sample multiple areas within a single domestic structure. To prevent contamination from modern human DNA, we wore protective equipment such as gloves, masks, and hair covers during sampling. The exposed trench profile contained approximately two meters of superimposed sediment layers extending from the Neolithic period to the present day (Figure 4).

To specifically target Bronze Age layers—and different locations within the house associated with this period—we relied heavily on guidance from the archaeologists. Assuming that DNA would preferentially accumulate on house floors, we focused primarily on sampling floor sediments. In addition, to test how DNA

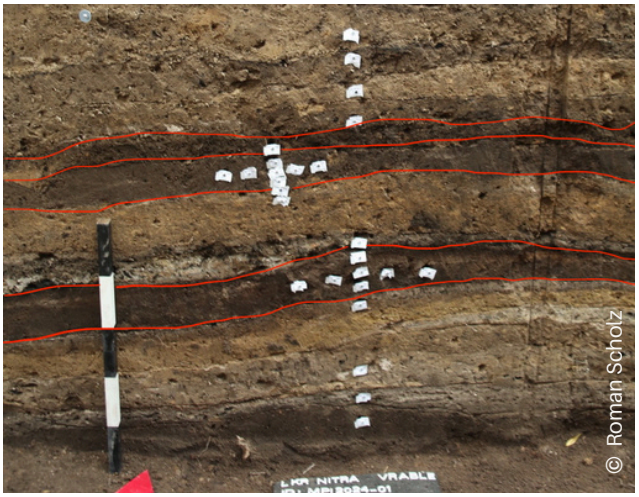

Figure 4. Samples collected from house layers dated to the Bronze Age (shown in red).

was distributed throughout the house stratigraphy, we collected closely spaced vertical and horizontal series of samples (Figure 4). To avoid sediment mixing, sampling proceeded systematically from the bottom layers upward. The stratigraphic layers also contained archaeological materials such as pottery fragments and animal bones, which were collected for radiocarbon dating of the sampled layers. Additional sediment samples were taken for lipid and other chemical analyses. Photographs were taken of each profile, and the precise location of every sample was carefully documented. After returning from the field, archaeologists delineated the boundaries of each stratigraphic layer on the profile photographs. Our georeferenced samples were then plotted onto these images. Based on the spatial distribution of the samples, we recently selected priority samples and submitted them for DNA sequencing. We are now eagerly awaiting the results and hope to gain new insights into the lives of the people who once inhabited these houses.

Multiple ways for enhancing flammability in Mediterranean woody species: a trait-based approach

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Plant flammability in fire-dependent ecosystems is a key ecological trait that directly shapes both fire regimes and the structure of plant communities. In regions such as the Mediterranean Basin, where fire functions as a natural ecological process, the traits that determine species' flammability levels have been molded by natural selection over long time scales and have become a critical component of ecosystem dynamics. This context underscores the necessity of examining flammability-related traits in detail. In this study, the flammability characteristics of 26 woody species occurring in the understory of Turkish red pine forests in Southwestern Anatolia were evaluated using a comprehensive, trait-based approach.

To capture the multidimensional nature of flammability, we measured four leaf traits (dry matter content, moisture content, thickness, and curliness), one branching architecture trait, and three biomass/fuel components (dead-to-live fuel ratio, fine-to-coarse fuel ratio, and the amount of dead fine fuels). Collectively, these metrics provided an integrated assessment of the major structural and functional attributes influencing species-level flammability. The

findings revealed striking heterogeneity among Mediterranean woody species.

Significant interspecific differences were observed across all measured flammability traits, highlighting why flammability is such a complex property at the ecosystem scale. Each trait from leaf morphology to branching structure and fuel composition affected species' flammability potential in different ways, and no species exhibited a single, consistent flammability pattern. Instead, each species possessed a unique combination of flammability-enhancing traits.

This diversity clearly indicates that the structural drivers of flammability vary substantially across species. In some species, leaf functional traits exerted the strongest influence, whereas in others, the accumulation of dead fine fuels or the branching architecture played a more dominant role. These findings emphasize that flammability cannot be evaluated through any single biological component; rather, it constitutes a complex ecological function requiring the integrated assessment of multiple traits.

Another important outcome of the study is that each species combines flammability-related traits in distinctive ways. Leaf morphology, branching density, and the amount of dead fine fuels contributed to flammability at varying magnitudes across species. Using these multidimensional traits, we developed a composite flammability score that enabled holistic comparisons among species. The scoring revealed that Asparagus aphyllus, Astragalus sp., and Genista acanthoclada displayed the highest flammability levels, whereas species such as Spartium junceum and Laurus nobilis exhibited lower flammability.

Taken together, these findings clearly demonstrate that the flammability of Mediterranean woody species cannot be reduced to a single trait and that species possess their own distinct strategies influencing their flammability profiles. These results carry important implications for forest management practices, particularly for applications such as establishing "less flammable green belts." Identifying low-flammability species in Mediterranean ecosystems remains challenging due to the high variability and species-specific nature of flammability traits. Therefore, trait-based, integrative approaches should be adopted when selecting plant species that may contribute to fire-resilient landscape designs.

This study provides a comprehensive framework for understanding why the flammability characteristics of woody plants in the Mediterranean Basin vary so markedly among species and how this variation influences fire dynamics at the ecosystem scale. By integrating multiple plant traits, the approach highlights the multidimensional nature of flammability and underscores the importance of evaluating species through a holistic lens. The trait-based perspective presented here offers a robust reference for both scientific research and applied ecosystem management, particularly for efforts aimed at designing fire-resilient landscapes and improving vegetation planning in fire-prone regions.

Aktepe, N., & Tavsanoglu, Ç. (2025). Multiple ways for enhancing flammability in Mediterranean woody species: a trait-based approach. *iForest, 18*, 301-308.

The Recent Evolutionary History of Blind Mole Rats (Spalacinae)

Summarized by: **Alexey Yanchukov[1], Halil Mert Solak[2] & Ortaç Çetintaş[1]**
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Figure 1. The Middle East blind mole rat (*Nannospalax ehrenbergi*) from the Amanos Mountains.

Blind mole rats (spalacids) are a unique group of rodents adapted to spending their entire lives underground. They are well known in the biomedical literature due to their tolerance to hypoxia and resistance to cancer. In addition, blind mole rats constitute an excellent model for studies of speciation, as they are among the most cytogenetically variable mammals. To date, more than 70 distinct chromosomal forms have been described. These chromosomal forms are parapatric, meaning that each occupies its own geographic area, and they are thought to be reproductively isolated from one another to some extent.

The highest cytogenetic diversity of spalacids is found in Türkiye; however, these animals are distributed across a wide region extending from Eastern Europe southward to Egypt and eastward to the Caucasus Mountains and the steppes of Kazakhstan. Although extensive research has historically focused on documenting cytogenetic and morphological variation, the evolutionary relationships among these forms have long remained unknown.

A research group at Zonguldak Bülent Ecevit University has been one of the most active centers studying blind mole rat biology in Türkiye over the past 15 years. These long-term efforts entered a new phase in 2019 with a TÜBİTAK-funded project. In this project, next-generation sequencing techniques were employed to construct a robust whole-genome phylogeny aimed at resolving the evolutionary relationships of species within the subfamily Spalacinae. The project involved collaboration among three universities in Türkiye and partners from seven countries abroad.

The recent evolutionary history of blind mole rats is particularly striking, as these animals are divided into two main lineages: the large-bodied genus *Spalax* and the small-bodied genus *Nannospalax*. These two groups diverged approximately 3 million years ago. At that time, other spalacid lineages may also

Figure 2. The Cilician blind mole rat (*Nannospalax cilicicus*) from the Taurus mountains.

have existed in environments very different from those of today, but they subsequently went extinct. Currently, high levels of cytogenetic diversity (2n = 36–60) are observed only in *Nannospalax*, whereas such diversity is absent in *Spalax* (2n = 60–62). *Nannospalax* appears to have expanded from southern Anatolia and the northern Levant, and the most basal lineages can still be found in those regions. For more than two million years, the dominant evolutionary pattern in this group has been repeated cycles of population expansion and contraction.

For example, present-day Anatolian populations are divided into two branches. The first branch is much older and is more diverse both genetically and cytogenetically. Members of this group once inhabited all of Anatolia; during the early phases of blind mole rat evolution, one lineage colonized Europe and diversified there. Subsequently, however, the range of this ancient group contracted, leaving many cytogenetically distinct populations isolated in fragmented habitats, primarily in mountainous regions but also in the Aegean part of Anatolia. The reasons underlying this contraction are not yet fully understood.

Interestingly, the second branch, "*cilicicus*," has expanded its range relatively recently (approximately 0.4 million years ago), possibly from a refugial area in either the Taurus or Küre Mountains. Although this group includes numerous individuals distributed across Central Anatolia, it consists of closely related chromosomal forms. The consequences of this recent expansion are clearly visible: "*cilicicus*" has displaced older forms west of the Kızılırmak River but has been unable to cross the river itself, leaving a large, isolated pocket east of the Kızılırmak still occupied by the older population. The biogeographic histories of other populations

In the Levant and Eastern Europe (including large-bodied *Spalax*) show similar patterns. Why do some populations contract while others expand? This is an excellent question for evolutionary biologists to address. At first glance, there appear to be very few differences between animals following these two distinct evolutionary trajectories. Ecological differences are also difficult to discern, as many competing lineages occupy very similar habitats (although they are never sympatric). Our future research will focus on these and other exciting questions by applying deeper genomic and ecological approaches.

For now, what we can say is that these ancient lands have witnessed many striking changes below ground as well as on the surface, reflecting similar transformations in other local species (perhaps including humans). The results of our study were recently published in the Zoological Journal of the Linnean Society.

Yanchukov, A., Çetintas, O., Çolak, F., Nedyalkov, N., Rusin, M., Solak, H.M., ... & Sözen, M. (2026). Genome-wide SNP and mtDNA phylogeny of blind mole rats (Spalacinae, Gray 1821) reflects a complex history of relictualism, expansion, and speciation. *Zoological Journal of the Linnean Society, 206*(1), zlaf186.

Microplastics in Turkish coastal lagoons: Unveiling the hidden threat to wetland ecosystems

Summarized by: **Sedat Gündoğdu**
Faculty of Fisheries, Çukurova University, Türkiye

Plastics are synthetic organic compounds widely used across all aspects of modern life. However, their extensive use has generated major environmental concerns, particularly the accumulation of plastic waste in marine and coastal ecosystems (Stegmann et al., 2022). Since the onset of mass production in the 1950s, global plastic manufacturing has increased exponentially, surpassing 450 million metric tons per year by 2024 (Plastic Europe, 2025). Worldwide, an estimated 19–23 million metric tons of plastic entered aquatic environments in 2016, and projections indicate that this amount may reach 53 million metric tons by 2030 (Borrelle et al., 2020). Ocean currents can drive the accumulation of plastics in certain regions, and the Mediterranean has become one of the most affected areas in this regard (Gedik et al., 2022; Terzi et al., 2024). It is estimated that 5–10% of all global plastic mass accumulates in the Mediterranean Sea (van Sebille et al., 2015).

This study represents the first comprehensive scientific investigation of microplastic (MP) pollution in the Akyatan, Tuzla, Ağyatan, Çamlık, and Yelkoma lagoons located along the northeastern Mediterranean coast of Türkiye. Due to their semi-enclosed nature, limited water exchange, and intense anthropogenic pressures, these lagoons are highly susceptible to MP accumulation and serve as critical habitats for birds, fish, and various aquatic organisms.

The primary objective of the study was to determine the seasonal distribution, morphology, and polymer composition of MPs in surface water and sediments across the five lagoons, identify potential pollution sources,

Figure 1. Plastic debris in a channel connected to the Akyatan and Tuzla lagoons.

and reveal seasonal differences. Samples were collected from 43 stations in November 2021 (autumn–winter) and June 2022 (spring–summer). Surface water samples (5 L) were filtered through 0.45 µm pore-size membranes. Sediments were collected using a grab sampler, and 400 g subsamples were processed through density separation with potassium carbonate followed by organic matter removal using H_2O_2.

Potential MP particles were first examined under a stereomicroscope, and a randomly selected subset was analyzed via µ-Raman spectroscopy for polymer identification. All procedures were performed under stringent contamination-prevention protocols.

A total of 15,526 MP particles were identified. MP concentrations in surface waters were significantly higher in November (47.5±4.02MP/L) compared to June

(17.0±2.57 MP/L). The highest waterborne MP concentration was recorded in Yelkoma (November), whereas sediment MP levels peaked distinctly in Akyatan (85.25 ± 27.96 MP/kg). This pattern suggests prolonged MP retention and deposition in hydrodynamically weak zones of Akyatan.

Fiber-type MPs dominated both water and sediment samples (approximately 75% in water), followed by fragments and, to a lesser extent, films. Polymer analysis revealed polyethylene (PE), polypropylene (PP), and polyester/PET as the most prevalent MP types. This polymer profile strongly indicates agricultural plastic use (greenhouse covers, mulch films, irrigation equipment), fisheries-related inputs, and urban wastewater discharges as key pollution sources.

This research provides the first detailed assessment of MP pollution in the internationally significant lagoons of the Çukurova Delta. Despite their protected status, these ecosystems exhibit notable MP loads, posing potential risks to biodiversity, food webs, and human health. The study highlights the urgent need for long-term monitoring, improved agricultural and urban plastic waste management, enhanced wastewater treatment, and measures to reduce industrial leakages and illegal discharges.

- **Gündoğdu, S., Çevik, C., Terzi, Y., Gedik, K., Büyükdeveci, F., & Öztürk, R. Ç. (2025). Microplastics in Turkish coastal lagoons: Unveiling the hidden threat to wetland ecosystems. *Environmental Pollution*, 126351.**
- Borrelle, S. B., Ringma, J., Law, K. L., Monnahan, C. C., Lebreton, L., McGivern, A., ... & Rochman, C. M. (2020). Predicted growth in plastic waste exceeds efforts to mitigate plastic pollution. *Science*, *369*(6510), 1515-1518.
- Gedik, K., Eryaşar, A. R., Öztürk, R. Ç., Mutlu, E., Karaoğlu, K., Şahin, A., & Özvarol, Y. (2022). The broad-scale microplastic distribution in surface water and sediments along Northeastern Mediterranean shoreline. *Science of the Total Environment*, *843*, 157038.
- Plastic Europe, (2016). Plastics—the facts 2016. An analysis of European plastics production, demand and waste data.
- Stegmann, P., Daioglou, V., Londo, M., van Vuuren, D. P., & Junginger, M. (2022). Plastic futures and their CO2 emissions. *Nature*, *612*(7939), 272-276.
- Terzi, Y., Gündoğdu, S., Tekman, M. B., Gedik, K., Ustaoğlu, D., Ismail, N. P., ... & Aydın, İ. (2024). How much do we know about the microplastic distribution in the Mediterranean Sea: a comprehensive review. *Marine Pollution Bulletin*, *208*, 117049.
- Van Sebille, E., Wilcox, C., Lebreton, L., Maximenko, N., Hardesty, B. D., Van Franeker, J. A., ... & Law, K. L. (2015). A global inventory of small floating plastic debris. *Environmental research letters*, *10*(12), 124006.

Southern Festoon (*Zerynthia polyxena*) butterfly resting on its host plant. (Yenice Village, Çanakkale, Türkiye)

An Ottoman Viper (*Montivipera xanthina*) basking in the sunrise. (Değirmenboğazı Nature Park, Balıkesir, Türkiye)

Plant Biogeography Laboratory

Principal Investigator: **Barış Özüdoğru**
Division of Applied Biology, Department of Biology, Hacettepe University, Türkiye

The Plant Biogeography Laboratory conducts research in plant geography, phylogenomics, and systematics within the Department of Biology at Hacettepe University. Our work primarily focuses on the flora of Anatolia, especially the Brassicaceae (mustard family), whose center of origin lies in this region. Research topics include the discovery of new species, resolving taxonomic problems through genomic and quantitative morphological approaches, evaluating major biogeographic boundaries such as the Anatolian Diagonal through ecological niche modelling, and analysing the environmental determinants of large-scale plant diversity patterns.

Integrative Taxonomy and Biodiversity
Our integrative taxonomy research brings together multiple data layers, genomics (RAD-Seq), quantitative morphology, anatomical variation, and ecological niche divergence to overcome the limitations of traditional, single-dimensional approaches. This framework provides critical insights into taxonomic boundaries and evolutionary processes, especially within the highly diverse and geographically complex landscapes of Anatolia. Current focal systems include the genus *Noccaea*, which comprises recently diversified species complexes, and *Heldreichia bupleurifolia*, an alpine and strongly polymorphic species. The laboratory has also contributed to the description of over ten newly discovered plant species in recent years, including *Hesperis sivasica* and *Erodium hakangurii.*

Our research aims to understand how Anatolia's complex geological history and climatic dynamics have shaped its plant diversity. Within this scope, particularly focusing on high mountain plants, we investigate:

- The responses of Anatolian plants to Pleistocene glacial–interglacial cycles,
- Potential future distribution scenarios from a conservation biology perspective,
- The roles of biogeographic barriers and corridors such as the Anatolian Diagonal

- and the Taurus Way in shaping distribution patterns and evolutionary processes,
- Patterns of species diversity in Anatolia and the environmental variables shaping these patterns.

These studies emphasize the evolutionary and ecological significance of Anatolia's mountain ecosystems and provide scientific foundations for conserving the region's biological diversity.

Genomic Approaches to Phenotypic Divergence and Ecological Adaptation

The laboratory uses *Heldreichia bupleurifolia* as a model system to investigate the genetic basis and environmental drivers of leaf morphology, an adaptive trait whose variation in natural populations remains insufficiently understood. Along an east–west gradient in the Taurus Mountains, populations representing three distinct leaf morphotypes were examined for genome-wide variation; candidate loci and biological pathways associated with differentiation were identified, and relationships with environmental factors were assessed. Findings suggest that leaf morphology may be linked not only to developmental genes but also to ion balance and stress-response

Figure 1. *Heldreichia bupleurifolia*. Alakır Valley, Antalya.

Figure 2. *Ricotia candiriana.* Alakır Valley, Antalya.

pathways that are critical in alpine environments. This work highlights genotype–phenotype–environment interactions and underscores the value of integrating genomic and ecological data for the conservation of high mountain plant species.

Projects Conducted in the Laboratory

The laboratory has completed or is currently conducting multiple projects supported by TÜBİTAK 1001 and 1002 programs as well as the Hacettepe University Scientific Research Coordination Unit. Selected projects include:

- "Molecular Phylogeny and Biogeography of the Genus *Asphodeline* Rchb."
- "Investigating the Responses of Anatolian High Mountain Plants to Quaternary Climatic Changes Using Genomic Methods and Niche Modelling"
- "Bioregions and Geographic Species Richness Patterns for the Brassicaceae Family in Türkiye."

Laboratory researchers are currently involved in three active TÜBİTAK 1001 projects. In addition, the project titled "Plant Diversity and Evolution within the European–Anatolian Biogeographic Interface: The Case

of the Genus *Alyssum* (Brassicaceae) in Türkiye" planned in collaboration with the Slovak Academy of Sciences (SAS), is under evaluation.

Our Team

Ilgın Deniz Can: Completing a PhD focused on resolving infraspecific taxonomic problems in *Heldreichia bupleurifolia* using quantitative morphological and phylogenomic approaches.

İlayda Dumlupınar: Completed her MSc on species richness patterns in the Brassicaceae family—whose center of origin is Anatolia—and is currently in the doctoral coursework phase.

Gizem İşeri: Conducts MSc research on the taxonomic revision of *Campanula* subgenus *Campanula*.

Emrullah Yılmaz (alumnus): Worked on population genomics, phylogenomics, and demographic analyses of the alpine species *Phyllolepidium cyclocarpum.*

Renan Kocayiğit (alumnus): Conducted systematic, phylogenomic, and conservation biology research on *Noccaea rubescens*, an alpine species endemic to the Aladağlar region.

Collaborations

The Plant Biogeography Laboratory maintains extensive international collaborations with researchers from the United States, Germany, Austria, Czechia, the Netherlands, Iran, Russia, and Slovakia. These partnerships encompass projects on the phylogeny and systematics of the Brassicaceae family, chromosomal evolution in particular groups, and biodiversity patterns in Anatolia and its surroundings. Within Türkiye, the laboratory actively collaborates with many researchers—especially from the EkoEvo community—such as Çağatay Tavşanoğlu, Hakan Gür, and İsmail Kudret Sağlam, contributing to interdisciplinary scientific research.

Figure 3. Niğde, Aladağlar**.**

Figure 4. Niğde, Aladağlar**.**

Figure 5. *Noccaea sintenisii*. Bahtlı Mountain, Bayburt.

Fish and Fisheries Researarch Laboratory

Principal Investigator: **Cem Dalyan**
Authors: **Cem Dalyan & Nur Bikem Kesici**
Division of Hydrobiology, Department of Biology, İstanbul University, Türkiye

The Fish and Fisheries Research Laboratory, operating under the Hydrobiology Division of the Department of Biology, Faculty of Science, İstanbul University, is a research unit dedicated to improving our understanding of Türkiye's underwater biodiversity, fisheries resources, and coastal ecosystems.

In our laboratory, we conduct research across a broad spectrum of topics, including fish ecology, fisheries biology, habitat–species relationships, dynamics of invasive species, and the effectiveness of marine protected areas. Our team consists of a dynamic group of master's and doctoral students as well as undergraduate project students, under the academic guidance of Prof. Dr. Lütfiye Eryılmaz and Assoc. Prof. Dr. Cem Dalyan. In our studies extending from the field to the laboratory, we frequently use SCUBA-based underwater visual censuses (UVC) and underwater imaging systems.

For example, in our ecological studies examining the distribution, habitat use, and depth preferences of cryptobenthic fish communities—which represent some of the smallest fish groups in marine ecosystems—we primarily rely on SCUBA diving.

Underwater, we descend to depths allowed by our equipment, collect visual records, and keep detailed field notes; we then evaluate the possible drivers behind these differing ecological preferences. Diving is not only essential for fish studies but also serves as a fundamental method for monitoring coral communities, seagrass meadows, and other coastal habitats. This is because the underwater visual census technique enables direct observation and detailed data collection without disturbing the habitat, making it particularly suitable for work in such sensitive ecosystems.

In addition, the feeding, reproductive, and growth biology of mesopelagic macrofauna and various fish families constitutes an important part of our research. Understanding what species feed on, when they reproduce, and how fast they grow not only reveals food-web dynamics and interspecific relationships, but also provides crucial insights into ecosystem health, shifts in dominant species, and how environmental pressures are reflected in fish communities. These biological data are especially critical for fisheries management, as they indicate which resources economically valuable species depend on and during which periods they are most vulnerable. In this context, regularly conducted trawl surveys along the Turkish coast are among the most important components for determining stock structure and generating data on fisheries biology.

The Northern Aegean Sea is one of the regions where our research is most intensive, hosting projects that span a wide thematic range—from deep-sea megafauna and coralligenous ecosystems to the distribution of gorgonian species and the impacts of trawl fisheries. In recent years, a significant portion of our work around Gökçeada has focused on monitoring top predators, which occupy the highest trophic levels in marine ecosystems and are therefore among the best indicators of ecosystem health and balance.

Figure 1. Trawl fishing in Adana.

Figure 2. A school of damselfish (*Chromis chromis*).

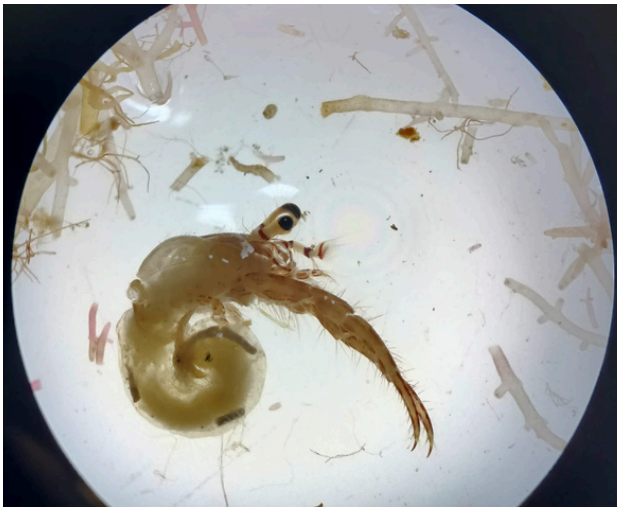


Figure 3. A shrimp found inside a fish's stomach.

Since 2019, through projects supported at regular intervals by Rufford, we have succeeded in establishing a baseline database on marine top predators in the region, including sharks, swordfish, bluefin tuna, various dolphin and whale species, and the Mediterranean monk seal. Alongside observations conducted from boats at sea, by drone from the air, and using binoculars and telescopes from the island's highest vantage points, we have also contributed to strengthening local awareness and fostering a long-term conservation culture through educational activities with children and collaborations with local communities.

Moreover, because the Eastern Mediterranean is one of the fastest-changing marine regions in Türkiye, we regularly monitor species diversity, the introduction of non-native species, and fisheries impacts, and seek to understand the ecological consequences of these changes. Studies conducted in the Sea of Marmara focus more on the ecological integrity of coastal habitats. For instance, projects in the Princes' Islands examining the relationship between *Zostera* seagrass meadows and fish communities, as well as studies aimed at the restoration of yellow sea fan (*Eunicella cavolini*) populations among soft corals, are among the efforts dedicated to conserving the region's sensitive ecosystems.

Figure 4. The invasive seagrass species *Halophila stipulacea*.

Figure 5. Dolphins being monitored with telescopes and binoculars from one of the highest points in Gökçeada.

Figure 6. A souvenir photo taken with the drone we use for aerial observation of large marine megafauna in the field.

In short, all research carried out in our laboratory is shaped by the collective effort of a team that dives together in the field, spends long hours taking measurements on boats, analyzes data in the laboratory, produces maps, and draws on one another's expertise at every stage—ultimately serving a single shared goal: to understand what is happening in our seas. In a period when rising temperatures, invasive species, habitat loss, and fishing pressure are rapidly transforming marine environments, understanding how ecosystems respond to these changes is of great importance. Each successfully completed study helps clarify this bigger picture a little more. In the coming years, we hope to carry this work even further together with new team members who will join us.

STORIES, RESEARCH, AND JOURNEYS FROM OUR MEMBERS

Postdoctoral researcher: **Onur Doğan**
Bilgin Lab., Institute of Environmental Sciences, Boğaziçi University

Hello, I'm Onur Doğan, a marine biologist. Over the past decade, I have conducted research in projects supported by TÜBİTAK and various universities, focusing on DNA-based biodiversity monitoring in aquatic ecosystems, conservation genetics, and urban ecology. My expertise lies in resolving plankton community compositions, ranging from bacteria to algae and animals; extracted from complex matrices such as water columns and even mucilage. For the last year and a half, I have been working as a Postdoctoral Researcher at the Bilgin Lab within the Boğaziçi University Institute of Environmental Sciences. Additionally, I have very recently taken on the role of Principal Investigator for a TÜBİTAK-funded project focused on lagoon ecosystems using environmental DNA (eDNA).

As the first national scale project I am leading as a Principal Investigator following my PhD, this work is a source of both great excitement and strong motivation for me. Hosted by Boğaziçi University and supported by the infrastructure of the Molecular Evolution and DNA Barcoding Laboratory at the Institute of Environmental Sciences, the project is built on a collective foundation that enriches both its methodology and research environment.

Throughout my graduate studies, I participated in seasonal sampling expeditions in the Sea of Marmara and the North Aegean (Figure 1).

Figure 1. In the background, the research vessel Yunus-S; during our 2018 seasonal sampling in the Sea of Marmara, myself and the plankton sampling net.

These recurring field cruises allowed me to appreciate the vital importance of continuous monitoring at specific locations. Maintaining consistency while sampling from various depths, and ensuring metadata remained accurate and organized, proved critical; otherwise, retrospective processing and analysis of raw data became significantly more difficult. During this process, I witnessed the immense value of clear communication and shared responsibility with every member of the team on the research vessel. Learning through trial and error helped me grasp the significance of project planning and hypothesis formulation, ultimately granting me the experience to better assess the requirements and variables needed to rigorously execute a research study.

Furthermore, I have worked in various freshwater systems. I served as a field biologist in the Management Plan projects for the Küçük Menderes and Burdur Basins, conducted by the General Directorate of Water Management under the Republic of Türkiye Ministry of Agriculture and Forestry (Figure 2). This experience led me to realize that basin-scale

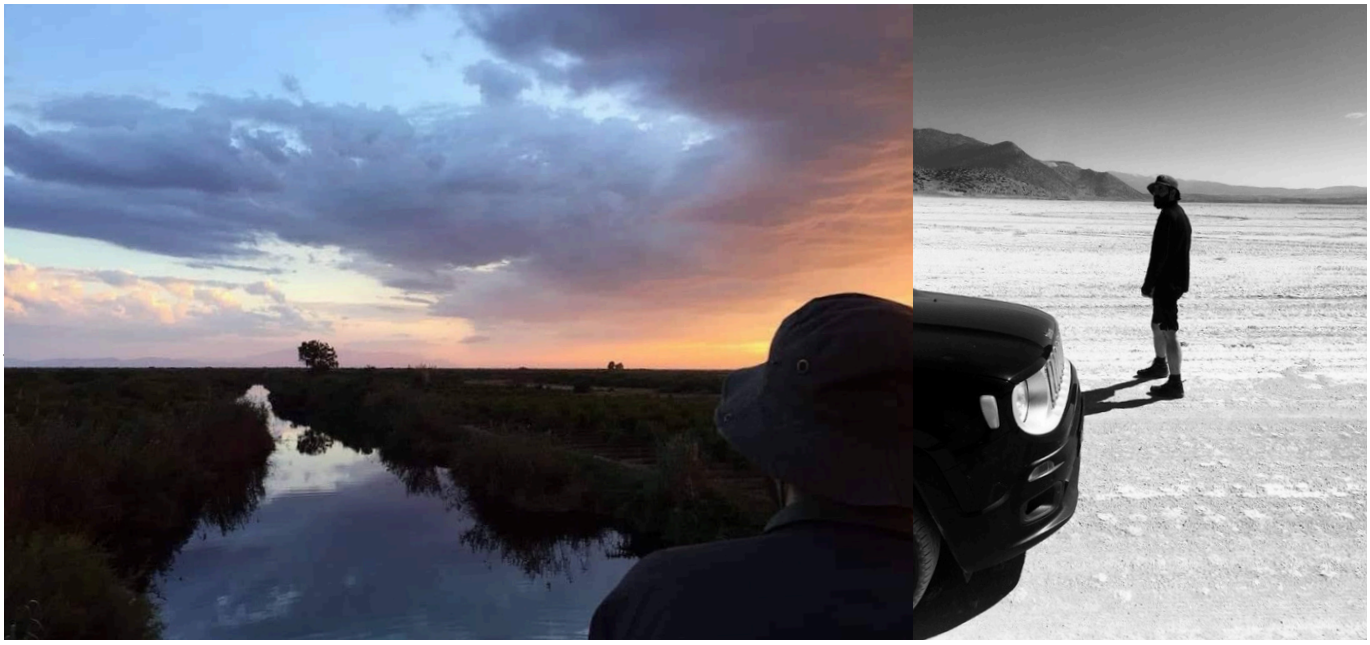


Figure 2. Left; sunset over a river in İzmir, right; a field day at the drying Lake Tuz.

biodiversity and conservation assessments are proactive processes that demand continuous field observation and data collection.

I spent my graduate studies trying to understand the molecular phylogeny of jellyfish species in Türkiye using DNA barcoding. I presented the results of my thesis work as a short talk at the 5th International Jellyfish Blooms Symposium held in Barcelona in 2016 *(Figure 3)*. At that time, this presentation was a very significant step for the development of my academic experience and international communication skills.

During my PhD studies, I was introduced to eDNA metabarcoding. Initially, our goal was to obtain a taxon list from seawater using a single gene (COI). However, with the reoccurrence of the mucilage event, the scope of our work expanded; we were now able to reveal a broad community composition ranging from bacteria to animals from both the water column and mucilage, using multiple gene regions including 16S, 18S, and COI.

A significant portion of this work is included in my PhD thesis and relies on our research article published in *Marine Biodiversity*, of which I am the first author. Here, I would like to touch upon my choice of the word "snapshot" in the article's title. In fact, this usage lies at the very heart of my understanding of eDNA applications: capturing the ephemeral traces of an ecosystem within its own flow.

This approach evokes for me the reflection of the prosaic world that Cervantes adopted in Don Quixote. Much like Cervantes' narrative language, which holds a mirror to the ordinary and disordered world, eDNA data is often as mundane and prosaic as prose itself; it is neither orderly nor polished.

Figure 3. 5th International Jellyfish Blooms Symposium, Barcelona, Spain, 2016. Surprise prizes for anyone who can spot me in the group photo.

Just as Velázquez depicted a snapshot of the mundane in Las Meninas, our data bears the trace of a flawed yet authentic moment. It is precisely this flawed aesthetic—much like the traces of time etched on the faces of Velázquez's dwarfs—that renders each sample unique and distinct. Just as the scars borne by Velázquez's characters constitute an identity, plankton DNA fragments carry the momentary identity of the ecosystem: transient, fragile, accidental.

For every piece of eDNA data is, in essence, a record of a moment. And that moment, however ordinary it may seem, carries a story unique to the ecosystem. Sometimes a trace emerges from fragmented jellyfish tissue, sometimes from a copepod drifting along the bottom, and other times from a mere fragment of DNA suspended in the water column. At times, this trace signifies the presence of a plankton species appearing for only a few days; at others, it is the shadow of a sudden shift occurring throughout the water column; or perhaps, it is a small yet critical sign of an ecological transformation yet to come.

Tracing these ephemeral local signatures is a source of both scientific curiosity and human fulfillment. Much like in Cervantes' prosaic world, the endeavor to understand transient scenes and fragile relationships amidst the ordinary keeps both my curiosity and motivation alive.

In closing, rowing, a sport I have pursued as an amateur in recent years, has allowed me to view science through yet another perspective. Earlier this year, while implementing a "rowing for eDNA" approach during a citizen science initiative in Istanbul's Golden Horn, supported for the second time by the Rufford Foundation, I had the opportunity to observe firsthand how field and laboratory experiences intertwine. The parallel between rowing and research aligns surprisingly well with an analogy drawn by

Figure 4. Artistic visualization of marine taxa detected by eDNA metabarcoding in the Golden Horn (Istanbul, 2025), produced within a Rufford-funded project and incorporating a rowing boat and the Historical Peninsula (illustration by Marina Roa).

Dr. Katalin Karikó, the inventor of mRNA vaccines, in an interview with her daughter, Susan Francia, a two time Olympic gold medalist and five time world champion:

"Rowing in the 8+ is like science... You row backwards and can't see the finish line, but you trust that it's there... pulling as hard as you can and doing whatever it takes to win. And it's never alone, you have the team that helps propel you forward. The team of scientists all working on one common goal."

For further information, please review my research interests and publications. If you are interested in collaborating, establishing scientific partnerships, or discussing potential grant and funding opportunities, please contact me at ***onur.dogan3@bogazici.edu.tr.***

- Doğan, O., Örün, A. D., Bilgin, R., & Isinibilir, M. (2025). Using eDNA metabarcoding to capture a snapshot of plankton community composition in the western Marmara Sea and northeastern Aegean Sea. Marine Biodiversity, 55(4), 60.

- Coxed Eight (8+): A rowing category in which eight rowers compete together with a coxswain in the same boat. (Definition based on the Turkish Rowing Federation: https://www.tkf.gov.tr/tr/federasyon/kurek-sporu

Postdoctoral researcher:
Nikola Petkovic
Research Center of Anatolian Civilizations,
Koç University, Türkiye

My name is Nikola Petkovic, an ecologist by formal education and a graduate from the University of Belgrade (2012). I started my research career during my MSc studies as an environmental microbiologist, and the main objective of my MSc Thesis was to identify if we can fight against an infamous walnut blight disease using an antibiotic produced by a bacterium *Bacillus*. The answer was a clear yes! The walnut blight was very sensitive to the produced antibiotic. I also found that *Bacillus* releases the antibiotic during a cycle which includes two peaks of maximal concentration, which can potentially be utilized in an artificial commercial production and as a biocontrol of the walnut pest.

The experience in using microbes as the model organisms and interest in evolutionary ecology have brought me to the University of Edinburgh, where I have spent 5 years trying to figure out whether sex in unicellular algae (yes, they do it!) can help them survive the lethal concentrations of salt. My major finding was that the type of their sexuality matters! If they were obligate sexual, *Chlamydomonas* populations had a better chance to survive the moderate pace of salt increase. By contrast, if they engaged in sex facultatively, they were able to survive a higher rate of environmental change. The major conclusion of my PhD Thesis was that we have to consider both the rate of environmental change and mode of reproduction of species for the estimate of their vulnerability to global change, as these two factors interact.

After my graduation (2018), I moved to Koç University in Istanbul - now as a postdoc - where I aimed to continue my research about the effects of environmental change on

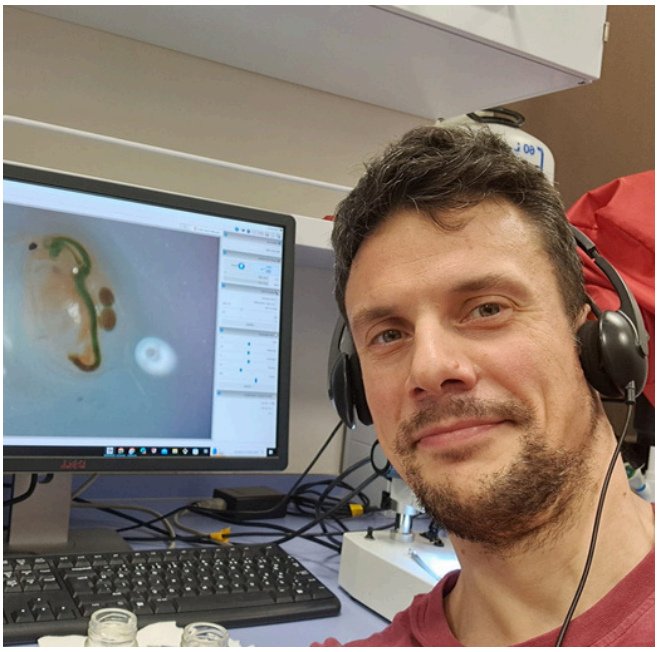


Figure 1. Just another day in the *Daphnia* lab. New babies will arrive soon.

microorganisms. However, life has brought me something bigger, though – a plankton crustacean *Daphnia magna*. This lovely species reproduces almost entirely asexually – all individuals are girls! As global warming is a widely recognized issue which received wide attention from both scientists and non-scientific community, I decided to test how *Daphnia* would respond to it. So I designed the two experiments. For the first experiment, I created many experimental populations and exposed a group of them to gradual warming. The other group was controlled, and maintained at a constant temperature. I monitored how the traits important for their survival and reproduction respond to warming over the course of many generations. I tracked their body size changes, the rate of their growth, fecundity, development time and lifespan - for almost 1.5 years. I found that warming populations tended to produce more babies but lived shorter than control populations. I saw a typical trade-off: *Daphnia* invests more in reproduction than in growth but that comes at the cost of their lifespan. The second experiment was aimed to investigate how traits of *Daphnia* would respond to fluctuating temperatures. This experiment was completed

just a couple of weeks ago, and apart from the fact that *Daphnia* absolutely hates fluctuation of temperature, I am yet to analyse this dataset...but stay tuned for more exciting results!

After completion of my postdoc project, I've made a major shift in my career. As one of my childhood dreams was to be an archaeologist (well, I actually wanted to be Indiana Jones, if I'm completely honest), I decided to make use of my wet-lab experience in DNA extraction in order to obtain ancient DNA from the human samples 6000 – 7000 years old! Those humans have lived in an area which is now Hatay, Türkiye. We still don't know if the local populations have been mixing with the nearby populations from Mesopotamia – and those are very important as they gave rise to some of the World's first civilizations - the Sumerians. So every insight into the migration patterns in these parts could be important. I hope I'll find some missing pieces in this puzzle. Wish me luck!

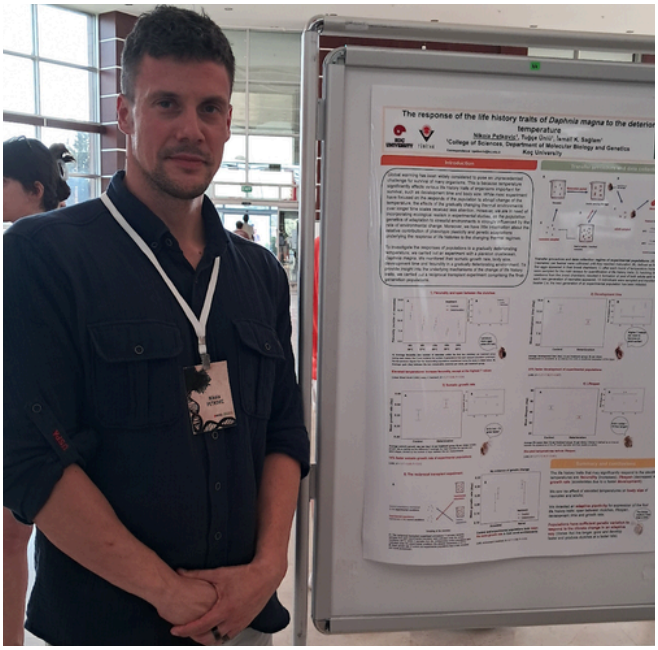
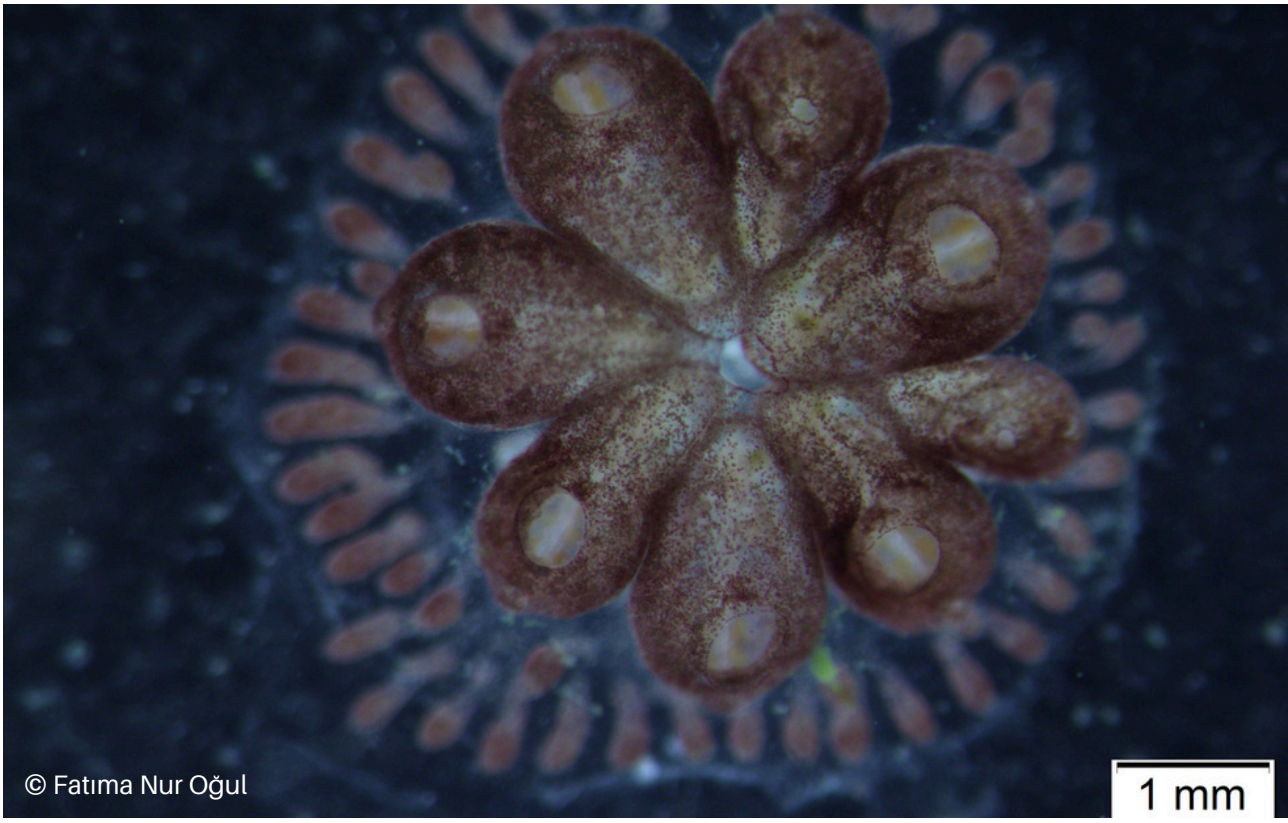


Figure 2. 2025 EEBST, Hacettepe University, Ankara.



Microscopic image of a *Botryllus humilis* (a colonial ascidian) colony consisting of a system of 8 zooids (individuals).

Captured and ringed Eurasian hoopoe (*Upupa epops*) at the Cernek Bird Ringing Station, Samsun, Türkiye.

Another Way Forward: Careers Beyond Academia

When we look at the career trajectories of many researchers currently working in academia, a familiar pattern often emerges: a master's degree pursued immediately after undergraduate studies, followed by a PhD, a postdoctoral position, and eventually a faculty position. This is also the career path envisioned by many graduate students, particularly in the natural sciences who are devoted to science and to research.

However, realizing this ideal usually requires more than participating in high-quality research and producing strong publications. The availability of academic positions in one's field, professional networks, and many other factors can strongly shape the direction of an academic career. When circumstances are unfavorable, or when one begins to feel that academia is no longer the right fit, it is not uncommon to find oneself working in a different sector.

At the same time, there are many career paths outside academia where the knowledge and skills acquired during the research process can be effectively applied. In Türkiye in particular, there are several highly influential non-governmental organizations that work at the interface of scientific methodology and practical implementation in the field of ecology. In this issue of the Bulletin, we directed questions about post-academic NGO careers in Türkiye, Özgül Yahyaoğlu from Yolda Initiative, and to Çisel Kemahlı Aytekin from Nature Conservation Centre both of whom hold PhD degrees in ecology and evolutionary biology, respectively. We believe their responses will provide valuable guidance for graduate students who are considering career paths beyond academia.

Tuba Bucak

The interviews were conducted by Tuba Bucak & Zeynep Oğuzhan.

Özgül Yahyaoğlu
Yolda Initiative
ozgulyahyaoglu@gmail.com

Could you describe your current sector and area of work?

I work as a Nature and Culture Program Specialist at Yolda Initiative. My primary responsibility is coordinating the Saros Gulf Conservation and Restoration Program.

Could you summarize your career path?

After completing my undergraduate major in Biology and a minor in Anthropology at Hacettepe University, I also completed my master's degree in the Department of Biology at the same institution. I received my PhD from Akdeniz University. I began taking an active role in non-governmental research initiatives with the Eastern Mediterranean Research Society, founded in 2016. While pursuing my research career, I was simultaneously involved in NGO work, and after completing my PhD, I decided to make this field the main axis of my professional career.

What were your reasons for not continuing in academia?

I realized that I was more strongly motivated by work that enables knowledge production to be translated more rapidly and directly into practice, policy processes, and decision-making mechanisms.

With this motivation, I turned toward career paths outside academia where I could integrate research with field-based applications.

What technical and social skills are required for your current position?
The scientific working skills and critical thinking abilities gained through a research-oriented career provide technical competencies that are transferable to any career path. In this role, such skills are essential across many tasks, from project design to field data collection. Social skills are equally important, especially in sectors like civil society where multi-stakeholder processes are central. It is necessary to establish, develop, and sustain collaborations with a wide range of national and international actors, including public institutions, NGOs, policymakers, and researchers.

How would you evaluate non-academic job opportunities in our field in Türkiye?
I observe that individuals who are well grounded in scientific research and critical thinking principles have a wide range of opportunities outside academia. Particularly in fields such as ecology and evolutionary biology, which combine theoretical frameworks with fieldwork, young researchers who also develop competencies in computational technologies can access diverse and successful career positions both in Türkiye and internationally. With career planning aligned to their interests, they will be able to recognize how their skills can be transferred and what non-academic opportunities are available.

What are the most fundamental differences between academic and NGO working environments?
NGOs may generate scientific knowledge themselves, and they also work toward solving relevant problems by applying existing knowledge through activities such as advocacy lobbying, and on-the-ground implementation. This process involves close collaboration with all relevant stakeholders. Compared to academia, this results in a more impact-oriented, dynamic, and adaptive working environment.

What advice would you give to early-career researchers who wish to build a future outside academia?
First and foremost, all the skills they acquire and develop in academia will be beneficial regardless of the career path they choose. Once they clarify their areas of interest, they will be able to identify job opportunities that align with their competencies. I would advise them not to limit themselves and not to think of leaving academia as starting everything from scratch. In nearly all institutions and organizations, experience gained in academia is recognized as valid professional experience.

Çisel Kemahlı Aytekin
Nature Conservation Centre
cisel.kemahli@dkm.org.tr

Could you describe your current sector and area of work?
I currently work as the Biodiversity Conservation Program Coordinator at Nature Conservation Centre (DKM). Founded in 2004, DKM is a non-governmental organization that has been active in Türkiye in the fields of nature conservation, biodiversity, and soil and water conservation. Within our organization, we develop and implement national and international projects with the support of, or in collaboration with, FAO, United Nations agencies, public institutions, and the private sector.

Could you summarize your career path?
I completed both my undergraduate and master's degrees in the Department of Biology at Middle East Technical University (METU). From my undergraduate years onward, I oriented myself toward ecology and evolution, taking relevant courses, participating in fieldwork, and playing an active role in the METU BIOGEN Student Society. Many of the activities we carried out there were instrumental in shaping my career trajectory. I then pursued my PhD at Koç University, where I worked in the fields of behavioral and conservation genetics. During this period, I gained extensive experience in fieldwork, laboratory techniques, and bioinformatic analyses. As a postdoctoral researcher, I conducted genetic analyses on wolf–dog hybridization. Throughout my academic career, I participated in meetings and training activities whenever possible and also contributed as a trainer, aiming to continually advance my skills. I am currently continuing my work at DKM. Working in a conservation-focused NGO has been one of the main motivations shaping my career path, as it offers the opportunity to integrate scientific knowledge with real-world needs in the field and to incorporate research directly into applications and planning processes.

What were your reasons for not continuing in academia?
The primary reason was the end of my fellowship period; I experienced challenges that are common in academia both in Türkiye and globally. In a TÜBİTAK-funded project, due to budget constraints, I was only able to work with a fellowship for 15 months within a three-year project and had to leave before the project was completed. This remains a lingering disappointment for me. Around that time, I saw a position announced by DKM, applied, and upon being accepted, moved to Ankara. Had budgetary resources and fellowship opportunities been stronger, I might have continued for a while longer as a postdoctoral researcher. However, working as a TÜBİTAK fellow without a formal position is not sustainable due to insufficient income and challenging living conditions. All of these factors ultimately directed me toward a different path.

What technical and social skills are required for your current position?
DKM has a highly interdisciplinary structure. While biology forms a major component, we work closely with experts from geography, environmental engineering, landscape architecture, urban and regional planning, physics, and agricultural engineering. For this reason, commitment to nature conservation is more important than one's original academic department. In my own work, key technical skills include data analysis, analytical thinking, project management, and Geographic Information Systems. On the social side, because we engage in intensive collaboration with various institutions, strong communication skills, organizational planning, and the ability to

address diverse and broad audiences are critical.

How would you evaluate non-academic job opportunities in our field in Türkiye?
After stepping away from academia, I was able to see this diversity more clearly. NGOs, public institutions (such as the Ministry of Agriculture and Forestry, the Ministry of Environment, Urbanization and Climate Change, and the Ministry of Health), hospitals, international organizations, and the private sector all offer employment opportunities for biologists. Although employment rates may be lower compared to some other professions, I believe the range of options is broader than commonly assumed.

What are the most fundamental differences between academic and NGO working environments?
When you leave academia, there is a risk of being perceived as insufficient in certain settings, regardless of how much expertise you have in your field. One of the greatest strengths of NGOs, on the other hand, is the strong culture of teamwork and the opportunity to gain extensive experience in project management. Even though academic work can involve groups, progress is often largely individual. Because the institution I work for has a very high capacity for project development and implementation, we operate in many ways like a "mini-academy." We actively follow the literature, conduct data analyses, and develop methods and activities with a strong academic dimension. For this reason, I would not say that I have completely moved away from academia.

What advice would you give to young researchers who wish to build a future outside academia?
I would recommend that they continuously develop themselves and, in particular, focus on emerging technical areas such as data analysis, programming, and modeling. Many of us chose biology seeing academia as the natural path, largely because alternative options were not widely discussed. Today, however, the academic system is facing serious challenges both in Türkiye and globally. For this reason, it is important to explore different career options, evaluate new opportunities, and not be afraid to take risks. Building a strong professional network also contributes greatly to career development; connecting with people from different fields often opens new doors. I first experienced working at DKM during an internship, which is why I strongly encourage students at the undergraduate level to gain experience in different settings such as laboratories, NGOs, private companies, and similar organizations.

Exploring Türkiye's Ascidian Biodiversity

Arzu Karahan
Institute of Marine Science, Middle East Technical University, Türkiye

Figure 1. Field trip and sampling sites.

My research focuses on ascidian biodiversity, their life cycles, and genetic, molecular, histological, and cellular characteristics. This interest developed over several years and was shaped by previous work on ascidians in Israel and California. After returning to Türkiye in 2017 and joining the Institute of Marine Sciences at METU, it became apparent that, apart from a limited number of scattered records, ascidians along the Turkish coastline had received little scientific attention.

Given the ecological and biological importance of ascidians, this lack of data was unexpected. Ascidians are key components of benthic communities, functioning as filter feeders capable of accumulating heavy metals. In addition, their exceptional regenerative capacity makes them valuable model organisms for stem cell and regeneration research. Driven by these considerations, my team and I initiated a long-term research effort along Türkiye's coasts, aiming to document ascidian species diversity and to carry out integrated biological studies on these organisms.

In 2023, we carried out a major field expedition aimed at assessing ascidian biodiversity and identifying secondary bioactive metabolites with potential medical and technological applications. Together with two PhD students, Esra Öztürk and Begüm Ece Tohumcu, and a master's student, İrem Bekdemir, we began the journey in August. Our first round of sampling took us across the Black Sea, the Sea of Marmara, the Aegean Sea, and the western Mediterranean coast—a trip completed in about 20 days (Figure 1). We then continued into the eastern

Mediterranean for another month of fieldwork. In total, we sampled more than 20 stations along over 7,000 km of coastline and collected around 1,000 samples. So far, the Mediterranean Sea appears to host the greatest ascidian diversity. During this expedition, we recorded more than 30 ascidian species, and around 20 of them are new species. We also recorded new metabolites that may hold value for pharmacological studies.

Figure 2. We are looking for ascidians on mussel shells at one of the Black Sea stations (Kurucaşile-Bartın).

Each student in our group focuses on a different aspect of ascidian biology. Begüm Ece Tohumcu works on botryllid diversity, population genetics, symbionts, and ecological patterns, while Esra Öztürk studies aging in botryllid ascidians, including transcriptomic analyses and age-related metabolites. İrem Bekdemir focuses on didemnid diversity and taxonomy.
Our 2023 fieldwork was an unforgettable experience for all of us and also marked the most intense driving period of my life. In many parts of the Black Sea and the Sea of Marmara, local people approached us and offered help without us even asking. Since there are no ascidian records for many

offered help without us even asking. Since there are no ascidian records for many
coastal regions in Türkiye, local knowledge was incredibly valuable.

This research was supported by project ADEP-701-2023-11278; however, we had a very limited budget for accommodation and daily expenses, so we had to spend it carefully. We often ate simple meals on the roadside or in the field and organised our days around constant movement—working in the sea, in the car, and in hotels late into the night. Despite the challenges, the excitement of discovering new species and exploring new regions kept us motivated.We are still analyzing the samples collected during this field campaign, and these analyses will continue for some time. But, soon, we will begin sharing our results with the scientific community.

This ongoing work is just one part of our broader effort to fill the knowledge gap on ascidian biodiversity in Türkiye and to highlight their importance in marine ecology, regeneration biology, and biotechnology.
⁎*Ascidians (sea squirts) are marine, filter-feeding, basal chordates that are the closest living relatives of vertebrates.*

Figure 3. We are working in a hotel in the Aegean Sea region.

A Land of Beaches Stretching from Freshwater to Saltwater

Tunca Deniz Yazıcı
Department of Marine Living Resources, Technical University of Denmark, Denmark

Denmark is made up of two main islands, one peninsula, and over a thousand small islands—some of which are uninhabited. It hosts kilometers of sandy beaches stretching between the enclosed waters of the Baltic Sea and the harsh conditions of the North Sea. The Baltic Sea has similar geographic constraints as the Black Sea: limited water exchange with the open ocean and a residence time exceeding 30 years, making it particularly prone to hypoxia. Towards the North Sea, oxygen concentrations increase and salinity rises. Dense, oxygen-rich saline waters from the North Sea flow through the Danish straits into the Baltic Sea (Carstensen & Conley, 2019). In this sense, Denmark is situated within a transition zone shaped by multiple environmental gradients.In my doctoral research, I aim to develop a tool that integrates genetic and ecological methods to support marine spatial planning strategies designed to enhance the resilience of Denmark's marine ecosystems to climate change. As part of this work, I collect samples from coastlines across the entire country in order to represent all habitats within my study area. The indicator I use is sugar kelp (*Saccharina latissima*). This species requires hard substrates for attachment and is typically distributed at depths of up to approximately 30 meters, due to their dependence on oxygen availability, salinity, temperature, and light conditions (Bekkby et al., 2023; Diehl et al., 2024).

The most striking observation during my fieldwork was the near-absence of natural rocky habitats along the Danish coastline. I was able to locate this kelp species almost exclusively on artificial structures, such as harbors. I later learned that until 1999, Denmark extracted rocks from its waters for use in construction—particularly for harbors—a practice known as stone fishing. Based on historical records from 1900 to 1999, approximately 83 million rocks were

removed from the seafloor (Helmig et al., 2020). This led to the exposure of bare seabed, the loss of macroalgal vegetation, and consequently the disappearance of shelter and breeding grounds for many marine organisms. As a result of losing reef structures, the majority of the seafloor has been transformed into extensive expanses of sand and mud.

Rising water temperatures associated with climate change reduce the solubility of oxygen in seawater, while anthropogenic pollution further disrupts ecosystem balance by enhancing the activity of primary producers on the seafloor (Carstensen & Conley, 2019). Denmark is only one of several countries that have contributed to this imbalance through human actions.

Figure 1. Recreational harbor in Kerteminde.

In particular, the transport of agricultural fertilizers into marine ecosystems through various pathways has had significant impacts on oxygen levels and biodiversity. The increasing use of fertilizers since the 1930s, combined with rising water temperatures, has led to excessive nitrogen and phosphorus inputs, accelerating oxygen depletion (Conley et al., 2007). A particularly severe oxygen decline

Figure 2. After successful sampling in Rørvig.

observed in 2002 highlighted the magnitude of this process (Christensen et al., 2004). On a more hopeful note, Denmark has implemented continuous monitoring and observation systems that enable early detection of environmental degradation. Today, extensive efforts are underway to prevent further deterioration. Artificial stone reefs are being established, and strategies aimed at reducing annual and decadal agricultural runoff are being developed. In parallel with these measures, marine organisms—including fish, seagrasses, and macroalgae—are being closely monitored using both genetic and ecological approaches.

- Bekkby, T., Torstensen, R. R. G., Grünfeld, L. A. H., Gundersen, H., Fredriksen, S., Rinde, E., Christie, H., Walday, M., Andersen, G. S., Brkljacic, M. S., Neves, L., & Hancke, K. (2023). Hanging gardens—Comparing fauna communities in kelp farms and wild kelp forests. *Frontiers in Marine Science, 10*, Article 1134567.
- Carstensen, J., & Conley, D. J. (2019). Baltic Sea hypoxia takes many shapes and sizes. *Limnology and Oceanography Bulletin, 28*(4), 125–129.
- Conley, D. J., Carstensen, J., Ærtebjerg, G., Christensen, P. B., Dalsgaard, T., Hansen, J. L. S., & Josefson, A. B. (2007). Long-term changes and impacts of hypoxia in Danish coastal waters. *Ecological Applications, 17*(sp5), S165–S184.
- Diehl, N., Li, H., Scheschonk, L., Burgunter-Delamare, B., Niedzwiedz, S., Forbord, S., Sæther, M., Bischof, K., & Monteiro, C. (2024). The sugar kelp Saccharina latissima I: Recent advances in a changing climate. *Annals of Botany, 133*(1), 183–212.
- Helmig, S. A., Nielsen, M. M., & Petersen, J. K. (2020). Andre presfaktorer end næringsstoffer og klimaforandringer – vurdering af omfanget af stenfiskeri i kystnære marine områder (DTU Aqua-rapport nr. 360-2020). *Institut for Akvatiske Ressourcer, Danmarks Tekniske Universitet.*

The Past, Present, and Future of Ancient DNA Research in Türkiye

Duygu Deniz Kazancı
Compevo Research Group, Middle East Technical University, Türkiye

The geography of Anatolia, due to its location, high biodiversity, rich archaeological heritage, and thousands of years of cultural continuity, offers significant and extensive potential as a study area for ancient DNA (aDNA) research. Rapidly developing over the last fifteen years through national and international collaborations, earlier studies in this field primarily focused on human migrations and the relationship dynamics between different communities, examining the spread of technologies associated with the transition to agriculture and sedentary life. Today, newly developing techniques enable research not only on the human genome but also on plant, animal, and microbial DNA, in addition to sediment ancient DNA (sedaDNA), which allows for tracking long-term changes in biodiversity from the past. These developments have significantly expanded the scope of the analyzable biological archive. New methodological possibilities, accompanied by multidisciplinary approaches, enable research questions regarding the past, present, and indirectly the future to be addressed with greater precision and depth.

Studies conducted in Türkiye in recent years have focused particularly on Anatolia's role in the Neolithization process, its interactions with Near Eastern societies, and demographic transformations over time. aDNA data obtained from key settlements such as Çatalhöyük, Aşıklı Höyük, and Barcın Höyük have made it possible to evaluate the contributions of early farming communities to the spread of the Neolithic package into Europe. Furthermore, numerous published and ongoing studies reveal that Anatolia maintained genetic and socio-cultural interaction networks at various levels with eastern and southeastern communities (Caucasus, Levant, Zagros, etc.) during different periods. These findings demonstrate that Anatolia served as a

crucial bridge during prehistoric processes. Parallel to human mobility, studies on the domestication of species such as horses/donkeys, sheep, and goats, as well as the demographic histories of these processes, are increasingly continuing.

Current research trends have shifted toward analyzing the demographic histories and kinship relations of ancient settlements that bear traces of cultural interaction and transformation during specific periods, as well as tracing the biological reflections of cultural changes. Domestication studies, which were previously limited, have expanded; research has begun on species that no longer exist or are not commonly observed today. The discovery that sediments can be used as a source of genetic data makes it possible to obtain information about ancient flora and fauna, biodiversity, population dynamics, and human settlements without direct biological remains. This approach holds high potential, particularly for regions where archaeological records are limited.

Thanks to collaborations built by local research teams with international laboratories, the aDNA infrastructure in Türkiye is progressively strengthening. The establishment of clean room laboratories, the training of young researchers in methodology and genomic analysis, and the increase in field-laboratory collaborations are significantly boosting interdisciplinary production capacity. The evaluation of genomic data in conjunction with archaeology, anthropology, geoarchaeology, paleoecology, paleopathology, microbiology, linguistics, and historiography allows for the detailed revelation of biological traces regarding both large-scale population dynamics and local micro-historical changes.

Within this framework, ancient DNA studies in Türkiye are currently at a dynamic, growing, and methodologically diversifying stage. However, the future of the field is directly related to the quality of interdisciplinary communication. Ancient DNA research possesses a multidisciplinary structure that requires laboratory-based analyses, ecological and archaeological context knowledge, and genomic interpretation and cultural reading to converge on the same ground. Although the conceptual approaches, terminologies, and priorities of different fields of expertise may diverge from time to time, the sustainable progress of research in Türkiye depends on openly discussing the methodological and epistemological differences between these fields and developing a common scientific language

In the coming years, more genomic studies are expected to shed light on Anatolia's complex history. At the same,it will be essential to simultaneously strengthen collaborative, interdisciplinary research models that allow different fields to complement one another. This transformation will make significant contributions to Türkiye gaining a more holistic and influential position on an international scale in the field of ancient DNA research.

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The moment I realized I wanted to become a scientist was when I noticed that my mind generated endless streams of ecological questions unintentionally.

The hardest professional decision I ever had to make was to stay in science after two years of unemployment following my PhD.

The scientific thrill that keeps me up at night is a wide range of possibilities for a never-ending multivariate analysis. Madness!

A misconception about science or scientists that I wish to correct is that only certain kinds of people become scientists. In reality, anyone can be a scientist—including people who are very good, bad, greedy, cunning, or emotional. Science is no different from any other sector, and sometimes it's even worse because of the huge egos around...

The scientific legacy I hope to leave behind is a new generation of brilliant scientists conducting research on biodiversity in Türkiye and elsewhere.

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The book or article that changed the way I think about science is Augusta, Josef; Burian, Zdeněk (illus.). *Prehistoric Animals*. London: Paul Hamlyn, 1960. 45 pp.;

The field experience that changed how I see nature was taking up the hobby of freediving and spearfishing when I lived next to the Pacific Ocean.

My most memorable academic moment was attending the 70-ies anniversary of Nick Barton just a few month ago.

The most surprising thing I learned from my students is that they couldn't care less about some of the things that appear important to me.

A scientific 'failure' that taught me the most was being overconfident and thinking I can do theoretical biology without a proper knowledge of math

If I weren't an academic, right now I would probably be fighting in the war (I probably wouldn't have much choice, right now)

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The moment I realized I wanted to become a scientist was probably in middle school. It was not a proper "aha" moment, but I remember how much I enjoyed our science classes. They suited with my rational way of thinking at a time when much of the curriculum were imposed. More of a "aha" moment came during high school when I was watching "Gorillas in the mist", a biographical movie about Dian Fossey. I vividly remember thinking "I have to be out there".

The book or article that changed the way I think about science is definitely On the Origin of Species. Evolutionary biologists are constantly exposed to excerpts and quotations, but that is no match to actually reading the book in its entirety. It not only offers a window into the mind of a scientist with extraordinary powers of observation and deduction, but also gives you feeling that you are finally getting to sit down and having a chat with Charles over a cup of coffee (or tea!). Luckily, the book was a required reading during my graduate studies, and later adopted it in my own courses at METU. Students may have found it daunting, I believe they benefited greatly from reading it.

The field experience that changed how I see nature was during my fieldwork in India. The sheer lushness of the landscapes was simply amazing for someone trained in temperate ecosystems. Equally striking was the intellect, curiosity, and genuine joy for nature displayed by my friends and colleagues in India, which continues to impress me.

A misconception about science or scientists that I wish to correct is how science actually works. Scientists are not primarily trying to prove things or declare absolute truths, instead we/they try to refute or falsify null hypotheses, or simply the idea that "there is no effect"... So science is objective, and all scientific hypotheses, or proposals, are falsifiable. At the end, the things we hold dear, are called "theories", which are hypotheses that withstood the rigorous tests countless times, and still haven't been falsified.

What I would like to tell my younger self is that there are many paths from A to B. Not taking a specific route does not mean failure... Just continue being curious!

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My favorite scientific "what if?" question I love thinking about what life would be like if we had tails. Even as I write these lines with both hands on the keyboard, I'm imagining being able to drink my coffee using my tail.

The most surprising thing I've learned from my students I've seen that scientific progress can stem from very different ways of thinking. Excellent results can be achieved through different methods The most humbling part is that some of them are truly smarter than I am.

I would like to tell my younger self listen to your teachers better, be less sarcastic, and channel your energy into positive endeavors.

The scientific "failure" that taught me the most when I realized right in front of everyone, during a major seminar I gave at Harvard, that a genetic marker related to immunity—which I thought was inherited from Neanderthals—actually stemmed from ancient population structure. I was quite embarrassed. This experience taught me both the value of humility and the importance of interpreting ancient signals with great caution.

The biggest challenge facing our discipline today is Society viewing science as a process that just "happens on its own" and overlooking the effort involved. Also, the fact that the vital importance of basic science is not sufficiently understood.

My favorite pastime outside of science Watching my son's soccer games, boxing, and our family trips.

A misconception about science or scientists that I wish to correct is The idea that scientists are antisocial or have no life outside of science. Some of the most social, capable, and fun people I know are from the scientific community.

Recent Achievements of Members

Elif Deniz Ülker has been elected as a Board Member of the International Oak Society (IOS), an international network established in 1992 and dedicated to the research, conservation, and sustainable management of the genus *Quercus* and its ecosystems.

Onur Uluar has been awarded support as a researcher in the project entitled "Global Warming, Locust Pests and *Dericorys albidula*: Genetic Basis for a Newly Swarming Species", funded under the TÜBİTAK–MHESI Uzbekistan 2518 Bilateral Cooperation Program (Principal Investigator: Prof. Dr. Battal Çıplak). In addition, his project "Mitogenome of the genus *Bradyporus* (Orthoptera: Tettigoniidae): Mitogenome characterization, species phylogeny, and phylogeography" has been supported under the TÜBİTAK 1002-A Short term Support Module

Mustafa Yücel, Arzu Karahan and Betül Bitir Soylu participated as researchers in the BRIDGE-BS Project, coordinated by the Institute of Marine Sciences at METU under the EU Horizon 2020 Programme and succesfully completed in November 2025. With 33 partners, the project is among the EU-funded initiatives with the highest number of Turkish partners and achieved a world-leading outcome by developing the first Ocean Digital Twin for the Black Sea.

Zeynep Ersoy has been awarded a five-year project grant under the Talent Attraction program of the Comunidad de Madrid for her project entitled "Unraveling Trophic Interaction Networks: Responses to Anthropogenic and Environmental Change in Lakes (UNRAvEL)".

Nurbahar Usta's project titled "The effect of smoke and heat shock on the germination and early seedling growth of Trojan fir" has been awarded funding under the TÜBİTAK 1002-A Short-Term Support Module.

Sedat Gündoğdu has been selected for the 2025/26 Mercator-IPC Fellowship Program, jointly conducted by Istanbul Policy Center–Sabancı University and the Stiftung Mercator Initiative.

Nefize Ezgi Altınışık has been awarded the 2025 Young Scientist Award (BAGEP) by the Bilim Akademisi.

About Eko-Evo

Our association unites scientists in ecology and evolutionary biology to foster collaboration and advance research standards. We are dedicated to mentoring the next generation of researchers through education and grants, while actively bridging the gap between scientific knowledge and sustainable public policies to benefit society.

How to Become a Member

Membership is open to scientists who conduct or have previously conducted research in evolutionary biology and ecology.

To complete your application, please download the Membership Form from ekoevo.org/uyelik. You are required to submit the completed form and your letter of intent to uye@ekoevo.org. Two Association members or two researchers working in the field must be listed as references on the form.

Annual Fees and Donations

Our society is supported primarily through membership fees and voluntary donations, which ensure the sustainability of our activities and community.

Membership contributions allow us to:

- Support early-career researchers and young scientists,
- Organize symposia, workshops, and scientific events,
- Enable student members to attend events free of charge.

Donations are welcome and contribute directly to sustaining our activities and supporting the next generation of researchers.

Scan here to pay membership fees and make donations via Fonzip.

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