



European Society of Arachnology Early Career Newsletter February 2026, No. 5

*Secretariat of the European Society of Arachnology
Department of Molecular Biology and Genetics, Democritus University of Thrace
Dimitras 19, 68100 Alexandroupolis, Greece
E-mail: maria.chatzaki@gmail.com*

Editor: Elena Piano, E-mail: elena.piano@unito.it
Co-editor: Marco Isaia, E-mail: marco.isaia@unito.it

Dear fellow arachnologists,

Here comes the next edition of the Early Career Newsletter (EarlCNews) from the European Arachnological Society.

Background for this special newsletter: The EarlCNews has served as a dedicated platform since 2022 for the society's younger members, including Bachelor's, Master's, and PhD students, providing them with a unique opportunity to showcase their ongoing projects and recent research findings. This special issue compiles summaries of theses completed within the past year across various academic levels, offering a comprehensive overview of the latest contributions to arachnological research by early-career scientists. The abstracts featured in this edition are organized into three distinct scientific areas. Such categorization allows readers to easily navigate through the diverse range of research topics and find studies aligned with their specific interests. To foster collaboration and knowledge exchange within the arachnological community, each abstract is accompanied by the corresponding young researcher's email address. This enables direct communication between members, facilitating discussions, potential collaborations, and the exchange of ideas. Such networking opportunities are invaluable for early-career researchers, as they can lead to mentorship relationships, research partnerships, and a broader understanding of the field's current trends and challenges. Thanks go to Elena Piano for compiling this special edition.

A message to early career scientists: Thank you for submitting your abstracts! By showcasing your work, the newsletter helps increase your visibility in the scientific community even before your work is formally published. This exposure can foster new connections between research groups and support early career scientists in establishing their presence within the community. We especially encourage you to reach out to senior researchers proactively. Mentorship plays a crucial role in career development for guidance, advice, and collaboration opportunities. So please do not hesitate to reach out to senior colleagues via E-mail and ask for mentorship.

Please also note the dates for the next ESA congress. It will be held from August 30th to September 3rd 2027 in the wonderful city of Wrocław, Poland, hosted by Izabela Jędrzejowska and her team. As always, this event promises to be an excellent opportunity for knowledge exchange, networking, and professional growth across all career stages.

With my very best wishes

*Gabriele Uhl
President of the European Arachnological Society*



#EVOLUTIONARY, BEHAVIOURAL AND FUNCTIONAL BIOLOGY

Narmin I. BEYDIZADA | PhD thesis

The role of personality in solitary spiders in different contexts

The growing recognition that animals across taxa show consistent individual differences in behavior, often referred to as “animal personalities”, has led the fields of behavioral and evolutionary ecology to focus on understanding the evolutionary implications of individual differences in behavioral expression. Recognizing animal personalities helps us to predict how individuals may respond to various stimuli, stressors, or environmental changes. This predictive ability is crucial for understanding population dynamics, interspecific competition, and predator-prey interactions affecting the overall maintenance of biodiversity (conservation efforts), extinction risks, and animal welfare (animals in captivity). Yet, studies have explored to a lesser degree the role that behavioral types (personality) play in different aspects of animal life, specifically invertebrate behavior due to the difficulties in methodology or experimental designs/protocols as well as conceptual interpretations (theoretical difficulties) that researchers often face. This Ph.D. thesis encompasses four published scientific papers and two submitted ones (one of the submitted papers is under major revision). This thesis aims to investigate the behavioral and ecological consequences of individual differences in spider models to answer fundamental questions about the nature of personality and its reflective effect on selected behavioral patterns/aspects. The thesis contains several methodological measures of personality as well as various behavioral experimental or hypothetical approaches and techniques some of which have been tested/reported for the first time in a spider model. This research was conducted on several spider species coming from different families. The first two manuscripts are focused on foraging behaviour using two representatives of ground spiders. Either the plasticity of attack strategy on prey (in the first study) or the link between personality axes of spider predator and its attack strategy choice concerning prey type was studied by performing a set of manipulative experimental assays. The third manuscript

focuses on endosymbiont manipulation of personality in an important biocontrol agent. The fourth manuscript describes the study of visual discrimination/stimuli response and links it to the personality axes in a jumping spider by performing a specifically designed cognitive experiment, and boldness score test. The last two submitted manuscripts illustrate the studies on the sphere of (inter) sexual conflict/selection by aiming to improve our understanding of how individual variation affects mating strategies and reproductive success in two species of spiders. The findings highlight the fundamental extension of the behavioral and ecological importance and nature of animal personality as a factor impacting many behavioral traits in the solitary spider models. This research not only provides further steps of theoretical and practical testing of personality but also opens avenues for further investigations in the field of animal personality. Furthermore, it encourages the integration of diverse behavioral experiments and provides potential implementations in other invertebrate animal system.

Contact: narminbeydiyeva03@gmail.com

Supervisor: Stanislav PEKÁR (Masaryk University, Brno, Czechia)

Matyáš HIRMAN | PhD thesis

Evolutionary Dynamics of Karyotypes Differentiation in Harvestmen (Arachnida: Opiliones)

The order of harvestmen (Opiliones) represents one of the oldest lineages of arachnids, with occurrences documented as far back as the Devonian period. Despite their long evolutionary history and the colonization of a wide range of terrestrial habitats, harvestmen have maintained relatively conservative morphology. However, this morphological uniformity may conceal high hidden species diversity that cannot be reliably detected based solely on external features. Cytogenetic analysis, especially when combined with morphological and molecular phylogenetic results, thus becomes a potential tool for uncovering hidden differences between individual lineages. The presented thesis focuses on a detailed study of the karyotypes of selected representatives of harvestmen, aiming to explore their internal genetic diversity and the evolutionary dynamics of selected chromosomal structures. The



research is based on a combination of classical cytogenetic methods, used to describe the number and morphology of chromosomes, and advanced molecular cytogenetic techniques, particularly fluorescence in situ hybridization (FISH), through which the localization and variability of 18S rDNA clusters and selected microsatellites were mapped. Special attention was paid to the estimation of possible chromosomal rearrangements that may have occurred during karyotypic differentiation and play a significant role in the emergence of evolutionary novelties within individual lineages. The research also included a comparison of newly obtained cytogenetic data with previously published morphological and molecular phylogenetic analyses, which made it possible to better understand the rate and nature of changes at the karyotypic level. This approach not only reveals hidden diversity but also helps to better understand the evolutionary processes that have shaped the current species diversity of harvestmen. The results show that the dynamics of karyotypic differentiation in harvestmen are conditioned by a complex combination of changes in diploid numbers, structural rearrangements of chromosomes, and secondary modifications of the number of NORs, suggesting a significant role of chromosomal reorganizations in the evolution of hidden diversity within this group.

Contact: m.hirman5@gmail.com

Supervisor: František ŠTÁHLAVSKÝ (Charles University, Prague, Czechia)

Kuang-Ping YU | PhD thesis

Biogeography of the Globally Distributed Raft Spiders (Pisauridae: *Dolomedes*)

The fishing spiders, genus *Dolomedes*, are globally distributed freshwater-associated invertebrates. Although several *Dolomedes* species are popular model organisms in many study fields, their biogeographic history remains largely unknown. Therefore, my dissertation aims to detect and bridge the knowledge gaps that hamper such studies and reconstruct the global biogeographic history of *Dolomedes*. By reviewing the vast literature, these knowledge gaps are ambiguous species boundaries, the conflicting familial affiliation, and the unknown species-level phylogeny. My dissertation

develops an integrative taxonomic model to test the species boundaries among closely related *Dolomedes* from Madagascar and La Réunion. The model suggests that valid species with robust boundaries should be morphologically, phylogenetically, and ecologically diagnosable. Through the proposed species boundaries, my dissertation gathers and delimits an extensive taxon set of 53 out of the total 105 *Dolomedes* species, spanning the genus range, with relevant outgroups to reconstruct a species-level UCE phylogeny. The results necessitate removal of *Dolomedes* and its Oceanian relatives from Pisauridae and erecting a separate family, Dolomedidae. The divergence time estimations reconstruct a late Miocene origin of *Dolomedes*, between 9 and 16 Ma. By integrating all the above results, my dissertation reconstructs the ancestral area of *Dolomedes* in the Australasian + Oriental realm. My original BioGeoBEARS pipeline, correcting physical distances among realms by historic climate data, suggests that the late Cenozoic plate tectonics and climate oscillations combined shaped the *Dolomedes* diversity pattern. However, the analyses detect no significant influence of morphological, behavioural, and ecological traits on the biogeographic history of *Dolomedes*. My dissertation largely closes the knowledge gaps in *Dolomedes* research. It provides new pipelines for testing species boundaries and for statistically testing the effects of climate change in historical biogeographic studies. The fact that *Dolomedes* is sensitive to historical climate oscillation also sheds light on understanding how global changes will impact freshwater-associated invertebrates and their habitats in the future.

Contact: kuang-ping.yu@nib.si

Supervisor: Matjaž KUNTNER (University of Ljubljana, Slovenia)

Mattia BOLOGNESI | Master thesis

Effects of heatwaves of *Pisaura mirabilis*'s (Araneae) reproduction

Climate warming is influencing species' distributions and abundances, posing a threat to biodiversity. The frequency and intensity of extreme climatic events, such as heatwaves, characterised by temperatures exceeding local averages by 5 °C for at least five days, are becoming more frequent and intense. These



posing serious risks to health, society, and the environment. Yet, their effects on population persistence are poorly understood. Heatwaves can affect species beyond survival, because even if temperatures are sublethal, they can impact reproduction and various biological functions. Individuals, for example, may become sterile at temperatures below their lethal limits. Ectothermic organisms are particularly vulnerable to temperature fluctuations due to their reliance on ambient temperature for body regulation. Understanding the impacts of heat stress on ectotherms is essential for assessing the ecological consequences of climate change and understand potential mechanisms that are driving the massive decline in arthropod numbers. The nursery web spider, *Pisaura mirabilis*, is ideal for studying the effects of heatwaves on reproduction and survival due to its wide distribution, ease of recognition and collection, and well-documented mating behaviours. In addition, the effect of heatwaves on spider reproductive behaviour remains largely unknown. The study aims to investigate the effects of heatwaves on the mating behaviour and fitness of male *Pisaura mirabilis*. Juvenile spiders were collected and raised to adulthood in a lab setting. Adult males were then assigned to either a control group at room temperature or heatwave treatment group exposed to a 5-day simulated heatwaves of 36 °C. Male Behaviours such as exploration, aggression, and behaviours expressed during mating trials with control females, such as courtship and mating were recorded and analyzed. Females' reproductive success was monitored by assessing brood size and eggs count. Our main findings show that heatwaves affect certain male individual behaviours and partially fitness, but we haven't found effects on mating behaviours. We found significant effects concerning the body mass of the subjects, with an important role of female weight in both mating (duration and rate) and fitness results.

Contact: mattia.bolognesi@gmail.com

Supervisor: Cristina TUNI (University of Torino, Turin, Italy)

Anita CURTI | Master thesis

Consequences of heatwaves on female mating behavior and silk-bond signaling of the spider *Pisaura mirabilis*

The frequency of extreme heat events is increasing, with important consequences for animal behaviour. Heatwaves - periods of five consecutive days with temperatures exceeding seasonal averages by 5 °C - can strongly affect reproductive behaviour of ectotherms, which have limited thermoregulatory capacity. While the behavioural effects of heatwaves on insects are increasingly studied, spiders remain largely overlooked. The nursery web spider *Pisaura mirabilis* is a classic model in behavioural ecology, particularly in the study of sexual selection and mating communication. Yet, little is known about how temperature extremes influence its reproductive behaviour. Here, we tested how simulated heatwaves affect female behaviour, including silk-bond signaling, mating interactions and fitness, by exposing females to a 5-day heatwave treatment at 36 °C or at control temperature (20 °C), and subsequently pairing them with untreated males. We quantified female attractiveness through male courtship performance, copulation dynamics, and reproductive output. We found lack of differences in male courtship, whereas heat-treated females experienced prolonged copulations compared to controls. Strikingly, no heat-treated female produced viable offspring. Our results indicate that thermal stress can disrupt female physiology and mating processes in spiders, with potential consequences for sexual selection and population persistence under ongoing climate change.

Contact: anita.curti@unito.it

Supervisor: Cristina TUNI (University of Torino, Turin, Italy)

Juraj DORIČKA | Bachelor thesis

Predatory behaviour of spiders of the genus *Ero* (Mimetidae)

In the theoretical part of this bachelor's thesis, the biology of representatives of the family Mimetidae is described. Araneophagy, thus the specialization in hunting spiders, is the focus of the first part, as representatives of this family are often cited as an example of this feeding specialization. This is followed by an overview of the individual genera of the family, a description of their distribution and reproduction. I pay particular attention to the prey of Mimetidae and their predatory behavior with an emphasis on



aggressive mimicry. The practical part consisted of observations of the predatory behavior of spiders of the genus *Ero* under laboratory conditions. Spiders of the families Theridiidae, Dytinidae, Linyphiidae, Araneidae, and Agelenidae were used as prey. These families were selected as representatives of the diversity of web types of our spiders. The only family that *Ero* did not prey on was the family Dytinidae. The highest hunting success rate was recorded for the family Theridiidae. Ethograms of predatory behavior were created for the families Theridiidae and Linyphiidae. The question of the use of aggressive mimicry in hunting remains open.

Contact: pekar@sci.muni.cz

Supervisor: Stanislav PEKÁŘ (Masaryk University, Brno, Czechia)

Jori Oskari HEYKES | Bachelor thesis

Phenological and functional aspects of female genital damage in the orb-weaving spider *Larinioides cornutus* (Clerck, 1757)

Sexual selection and conflict shape the evolution of mating strategies and genital morphology in many species. In polygamous species, adaptations have evolved to mitigate sperm competition, affecting both behaviour and functional morphology of the males, including interactions with the female reproductive anatomy. In the orb-weaving spider *Larinioides cornutus*, females in the wild were observed with and without damage to their external genitalia (epigyne), which suggests that males may remove the female coupling structure (scapus) during mating, which would impede subsequent males from connecting with the female epigyne. I investigated the causes, mechanisms, and consequences of female genital damage in *L. cornutus* using field surveys, staged mating experiments, and high-resolution imaging (SEM and μ CT). Field observations conducted over a period of one year revealed that most females encountered lacked a scapus. Controlled mating observations demonstrated that males were responsible for damaging the female epigyne. Mating trials could not directly show reduced functioning of the female genitalia. However, the receptivity of mated females was reduced, regardless of whether they had lost their scapus or not. Using SEM imaging, I compared the intact epigyne of

virgin females with those of mated females showing various degrees of scapus damage. The results revealed that, during mating, not only is the scapus lost, but also half of the collar-shaped structure (scapus base) from which the scapus emerges. Through μ CT reconstruction of pairs fixed in copula, I elucidated the mechanical complexity of genital interlocking and the structural basis for male-induced damage to female genital structures. Males use a specialised apophysis to pierce the collar-shaped structure, tearing the scapus halfway. This study contributes to the understanding of harmful mating in arthropods, highlighting the frequent occurrence and independent evolution of male strategies that mitigate the effects of sperm competition.

Contact: jori.heykes@stud.uni-greifswald.de

Supervisor: Gabriele UHL (Zoological Institute and Museum, General and Systematic Zoology, University of Greifswald, Germany)

Štěpán JERÁBEK | Bachelor thesis

Mechanism of sperm transfer in spiders (Araneae)

Spiders possess a unique kind of reproduction involving the transfer of sperm via a secondary copulatory organ (the bulb), which evolved through the modification of the male pedipalp. This bachelor's thesis focuses on sperm transfer in spiders from both a morphological and behavioral perspective. The introductory section summarizes the fundamental reproductive mechanisms of spiders, particularly the indirect transfer of sperm using male pedipalps and the storage of sperm within the female's body. The thesis analyzes the diversity of copulatory behavior across major spider groups.

It aims to summarize current knowledge regarding firstly the transfer of sperm into the bulb itself (sperm induction), and secondly the transfer of sperm from the bulb into the female's body, along with the associated course of copulation.

Another aspect of the thesis is the evaluation of correlations between bulb volume, the number of sperm inductions into the bulb, and the timing of these inductions. Processes associated with sperm transfer during copulation may also be influenced by various abiotic and biotic factors, whose effects are assessed in this work. The thesis further includes a comparison of mating



approaches between polygamous and monogamous spider species.

Finally, this study critically evaluates the current state of research, identifying both well-studied areas (such as the morphology of reproductive organs and some aspects of spider sexual behavior) and gaps in knowledge (such as the mechanism of sperm activation). The conclusion summarizes the key findings and proposes directions for future research.

Contact: jerabekste@natur.cuni.cz

Supervisor: Petr DOLEJŠ (Charles University, Prague, Czechia)

Kristýna KALAMENOVÁ | Bachelor thesis

Use of olfaction during feeding behaviour of spiders

Plants are capable of secreting specific volatile substances after damage by herbivore insect, thus attracting natural predators of these herbivores. This thesis focuses on the perception of volatile substances by spiders with different feeding strategies and the differences in the responses of actively hunting spiders (*Philodromus sp.*) and web spiders (*Araniella cucurbitina*).

Contact: tvardk00@prf.jcu.cz

Supervisors: Kateřina SAM (University of South Bohemia in České Budějovice, Czechia)

Isabela Tamaru NAKAMURA | Bachelor thesis

Unveiling expression patterns of orphan genes in *Parasteatoda tepidariorum*

Understanding the molecular mechanisms underlying phenotypic adaptation and diversity is not only central to evolutionary developmental biology, but also essential for predicting species' responses to environmental change. Spiders are a very species rich and phenotypically diverse animal group and thus valuable models to investigate the evolution of novelty and adaptation. In addition, spiders experienced an ancestral whole-genome duplication offering the ability to get insights into the evolutionary impact of gene duplications on biodiversification. While the impact of duplications for phenotypic innovations is extensively studied, the impact of

other genetic mechanisms remains underexplored, especially the impact of orphan genes—lineage-specific genes often linked to ecological adaptation through morphological innovations and immune specializations in other taxa. In chelicerates, this gap exists mainly due to the long scarce availability of high-quality genomes. The recent increase in high quality spider genome assemblies has made studies on identification and the impact of spider orphan genes feasible. To assess whether orphan genes contribute to adaptation in spiders, we combined bioinformatic analyses (RNA Sequencing, Isoform Sequencing, and Single-cell RNA Sequencing) with temporal and spatial expression assays during embryogenesis to investigate the expression patterns and potential functions of *Parasteatoda*-specific genes in the spider model species *Parasteatoda tepidariorum*. We found that most orphan genes were not expressed during embryogenesis, suggesting they are unlikely to contribute to morphological novelties, but leaving open the possibility that they influence adaptation through processes such as metabolic regulation in juvenile or adult spiders. The genes that were expressed during embryogenesis mostly had low ubiquitous expression, consistent with findings of low average expression for newly evolved genes in other taxa. Five genes exhibited distinct spatial expressions, mostly in the extra-embryonic region, but also in legs and chelicerae. Bioinformatic data supports the role of orphan genes expressed in the extra-embryonic region particularly during midgut development and/or immune system processes. This suggests most orphan genes may be involved in adaptations of the midgut and the immune system to the prey they consume and pathogens, respectively. Spatial expression of the remaining genes suggest involvement with leg neuroblast formation, yolk mass separation and cuticle specialization. The cuticle composition of fangs and claws may also be an adaptation to prey and habitat, respectively, suggesting that the orphan gene could contribute to adaptation via these traits. Overall, although the functions of most orphan genes remain unknown, these findings suggest that *Parasteatoda*-specific genes may contribute to adaptation primarily through immune system and metabolic regulation in adults and juveniles, rather than through morphological innovations.

Contact: isabelatnakamura@gmail.com

Supervisor: Natascha TURETZKE (Ludwig Maximilian University of Munich, Germany)



Jindřiška ŠTRYPLOVÁ | Bachelor thesis

Predatory methods of selected members of synanthropic spider species in North Bohemia

This bachelor thesis focuses on a review study of spider predation strategies and the influence of the environment on their occurrence and behavior. The theoretical part summarizes current knowledge about foraging methods and morphological adaptations of spiders, and the ecology of synanthropic species. The practical part is based on field research conducted in three localities in northern Bohemia (Liberec, Bulovka, Krásná Lípa), where species composition and relative abundance of spiders were observed. The results are then compared with literature data and discussed in terms of species interactions and adaptations to human-influenced environments. The thesis provides an overview of current findings on synanthropic spiders in both urban and rural environments and contributes to understanding the factors that influence their distribution.

Contact: martin.pudil@tul.cz

Supervisor: Martin PUDIL (Technical University of Liberec, Czechia)

#ECOLOGY AND ENVIRONMENTAL CHANGE

Nathan VIEL | PhD thesis

Ecology of a Range Expanding Spider

Species are adapted to specific ranges of environmental conditions. This is theorized by the concept of ecological niche, which distinguishes between (i) the fundamental niche, i.e. the set of abiotic conditions and resources necessary for the persistence of species in environments, and (ii) the realized niche, i.e. a subset of the fundamental niche that further account for biotic interactions (e.g. natural enemies and mutualists). The realized niche of species appears to be reflected in their spatial distribution, this is the niche-biotope duality, but only partially depending on their dispersal abilities and on the geographical barriers across landscapes. While species geographic ranges are dynamic on a regional scale, they remain

relatively stable on a broad scale and in the short to medium term. Yet, dramatic range changes, such as range expansions, are sometimes observed to occur. These phenomena represent great opportunities to understand how niches are dynamic over space and time, e.g. fundamental versus realized niche changes, and how species range limits are shaped reciprocally. As predators with great ecological diversity and a strong potential for adapting to new environments, spiders represent relevant models for studying these phenomena. The present thesis aimed to investigate the unexplored case of the geographic range expansion of the ant-eating spider *Zodarion rubidum* Simon, 1914 across Europe.

The thesis includes four studies. The first one investigates the range expansion history of *Z. rubidum*, describing its appearance across the study area and trying to infer its expansion pathways. It further estimates the original and current potential suitable range of the species. The second study investigates the diet of *Z. rubidum*, testing the hypothesis of a diet shifting or broadening over space. The third and fourth studies assess different eco-evolutionary processes to understand how *Z. rubidum* rapidly dispersed across Europe, and how it was able to establish viable populations in new areas on such a broad scale. Specifically, the potential role of endosymbionts as vectors of expansion is being explored, and the emergence of highly dispersive phenotypes at the species northern range limit, through spatial sorting, is being tested. Finally, phenotypic differences in thermal and diet niche related-traits were investigated between geographically distinct populations to detect potential changes in the species fundamental niche.

The results of these studies show that *Z. rubidum* started to expand its geographic range in the 1970's in central Europe. The dispersion of the species across Europe does not seem to be related to the prevalence of endosymbionts or to the effects of spatial sorting, but might have been induced by human activities, e.g. active transportation through railroads and roads. Moreover, the range expansion of *Z. rubidum* does not clearly coincide with a diet shifting or broadening, or with changes in its fundamental thermal or diet niche. Rather, *Z. rubidum* seems to originally have a large potential suitable geographic range, including broad areas in western and northeastern Europe which it colonized within few decades. Our findings suggest that the geographic range expansion of



Z. rubidum represents an example of niche filling, where the species colonized suitable but heretofore unreachable areas.

Contact: pekar@sci.muni.cz

Supervisor: Stanislav PEKÁR & Julien PÉTILLON
(Masaryk University, Brno, Czechia)

Kateřina ČERNÁNSKÁ | Master thesis

Attractiveness of true bugs used in biological plant protection as prey of spiders

This master thesis focuses on interactions between spiders (Araneae) and selected species of predatory true bugs (Heteroptera) some of which are commonly used in biological pest control. The aim of the study was to experimentally assess whether and to what extent the bugs *Orius laevigatus*, *Macrolophus pygmaeus*, and *Deraeocoris* sp. are attractive as prey to spiders, and whether intraguild predation (IGP) may occur. This type of interaction, in which predators sharing the same prey also prey upon each other, can have significant implications for the effectiveness of biological pest control. IGP is currently considered one of the key factors that may weaken the stability of food webs and disrupt ecological balance in agroecosystems. Three species of cursorial spiders with different hunting strategies (*Evarcha arcuata*, *Pardosa* sp., and *Philodromus* sp.) were tested in laboratory experiments. For each spider-prey combination, both the occurrence of an attack and subsequent prey consumption were recorded. Each spider was tested four times with each bug species and once with a control prey, which in this case was *Drosophila melanogaster*. The results showed that spiders more frequently attacked smaller bug species. The most frequently consumed bug was *Orius laevigatus* and almost as often *Macrolophus pygmaeus*, while *Deraeocoris* sp. was not consumed at all, as no successful attacks were recorded. This outcome may be related to the relatively larger size of *Deraeocoris* sp. compared to the spiders. The results also showed that spiders of the genus *Evarcha* were the most aggressive, attacking more frequently than other tested species. In fact, they were the only ones that attempted to attack *Deraeocoris* sp., although none of these attempts were successful. The observed differences in predation suggest that morphological and behavioral traits of prey, such as size, species, body shape, and activity

level, may significantly influence their vulnerability to predators. From an ecological perspective, spiders may pose a potential risk to certain species of beneficial bugs—particularly smaller and more active ones—thereby reducing the effectiveness of biological control. The findings of this study underscore the importance of a detailed understanding of interactions between natural enemies in agricultural ecosystems and highlight the need to consider intraguild predation when designing and implementing integrated pest management programs. These insights can contribute to more effective use of natural enemies and help minimize unintended ecological consequences.

Contact: janrsk@gmail.com

Supervisor: Jan RAŠKA (Czech University of Life Science, Prague, Czechia)

Veronika GRYGAROVÁ | Master thesis

Impact of a forest fire in Bohemian Switzerland National Park on ground-dwelling predators

This thesis investigates the impact of a large-scale forest fire in the Bohemian and Saxon Switzerland National Parks in 2022 on ground-dwelling predators (spiders and ground beetles) during the first season after the fire. Data were collected using pitfall traps across two forest types (beech and pine), at two spatial scales (micro- and macroscale), and along a gradient of burn severity. The study highlights the importance of post-fire spatial heterogeneity in shaping arthropod communities. Detailed results are presented in the form of a manuscript.

Contact: veronikagrygarova@seznam.cz

Supervisors: Alena SUCHÁČKOVÁ (University of South Bohemia, České Budějovice, Czechia)

Vít KAČMAŘÍK | Master thesis

The impact of ash dieback in forest ecosystems of the Poodří region on the diversity of spiders (Araneae) and ground beetles (Carabidae)

This thesis examines the impact of an ash decline and dieback on the diversity of two groups of epigeic predators in floodplain forests in the Poodří region. These two taxa were



sampled using pitfall traps during the 2025 vegetation period at four sites differing in the degree of infestation and management regime. A total of 1,932 ground beetle (Carabidae) individuals belonging to 50 species were recorded, while 7225 spider individuals from 106 species were captured. Hierarchical cluster analysis revealed that ground beetle communities in non-infested stands were statistically significantly different from those in highly infested after dieback, primarily due to differences in species composition. However, the total number of individuals and species did not differ significantly across sites. Similarly, the management regime was not found to be a determining factor in shaping community structure. In the case of spiders, hierarchical cluster analysis showed significant differences between wilting stands and management regimes which may point towards the importance old-growth elements in forest management like dead wood, microhabitat heterogeneity and more stable microclimate.

To mitigate the effect of ash decline and dieback on the studied communities, several management practises were proposed. These measures primarily aim to preserve stand microclimate and canopy cover. This can be achieved through small-scale regeneration elements and the support of natural regeneration, which helps to create structurally rich a differentiated stands. Vertical structure allows that keeping a relatively stable conditions in case of disturbance, while a diverse horizontal structure offers a range of habitats that can serve as refuges. For regenerating heavily affected stands, it is recommended to combine natural and artificial regeneration, utilize the potential of pioneer tree species, and retain deadwood on site. This approach at least partially mitigates the abrupt microclimatic changes that are often followed with changes in community composition.

Contact: ondra.kosulic@seznam.cz

Supervisor: Ondřej KOŠULIČ (Mendel University, Brno, Czechia)

Zdeněk VACEK | Master thesis

Ecology of yellow sac spider *Cheiracanthium punctorium* (Villers, 1789) and its interactions with associated organisms on an elevation gradient



The subject of this diploma thesis is the analysis of differences in the distribution, ecology, and behavioral aspects of *Cheiracanthium punctorium* in the study area of the Ore mountains and the Ore mountains foreland. The study also aims to obtain information on the ecology of organisms that, during their life cycle, exhibit an association with the cocoon of the focal spider specie. Following initial field surveys, site monitoring was conducted during the summer months of 2021 to 2023, recording the number of *Cheiracanthium punctorium* individuals along with environmental variables directly influencing the population viability of the spider across different elevational gradients between the mountains and the foothills. To better understand ecological interactions, microhabitat preferences were also monitored at various altitudes. Based on findings derived from interannual research, further analyses conducted in 2023 and 2024 focused on investigating potential relationships between changing population parameters of yellow sac spider and the possible presence or absence of potential predators, parasitoids, and other organisms associated with the spider cocoon. In addition to field monitoring, cocoons were collected from sites at different elevations for subsequent analysis of associated organisms under laboratory conditions. The results of the study revealed new insights into the distribution of the thermophilic spider *Cheiracanthium punctorium* along an altitudinal gradient. Furthermore, the spider's ability to adapt to cooler environments was confirmed through the selection of more suitable microhabitats, enabling its spread into higher elevations. The presence of true predators and an unidentified parasitoid specie was also recorded in the spider's nests, thereby confirming the hypothesis.

Contact: korenko.stanislav@gmail.com

Supervisor: Stanislav KORENKO (Czech University of Life Science, Prague, Czechia)

Yuval ZALTZ | Master thesis

Factors determining cave spider trophic interactions and competition

Cave ecosystems are shaped by unique environmental constraints, influencing species distributions and trophic interactions. My study

explores the dietary composition of cave-dwelling spiders in the Levant using molecular gut content analysis. Through the integration of network analysis and multivariate ordinations (NMDS, CCA), I assessed spider's trophic interactions, competition and spatial dynamics. My results reveal that spider diets do not simply reflect prey availability in each cave. Instead, I observed a mismatch; prey taxa that were abundant in caves, were often not detected in the spider's guts, while prey taxa that were rare in caves were detected in many spider's guts. Furthermore, I found that the presence of bat colonies in the caves acts as a primary ecological driver, creating distinct prey assemblages compared to caves without bats. In essence, spider diet composition was significantly affected by the cave characteristics (zone and bat colony presence), and the spider characteristics (spider family and predation guild, and spider sex and age). Using network analysis and the visualization of food webs, I found complex intraguild interactions in caves, with a notable reduction in potential competition at cave dark zones, suggesting that niche partitioning facilitates coexistence of spiders in these energy-limited underground environments. My study shows that, as key predators in subterranean habitats, spiders provide an important ecological perspective on the unique structure of cave food webs.

Contact: yuval.zaltz@mail.huji.ac.il

Supervisor: Efrat Gavish REGEV (The Hebrew University of Jerusalem, Israel)

Nunzio AGOSTINACCHIO | Bachelor thesis

Spiders in urban environments: faunistic insights into the species occurring in the city of Turin

Spiders play a fundamental ecological role in terrestrial ecosystems, contributing to the natural control of insect populations and acting as sensitive indicators of environmental change, including transformations associated with urbanization. Nevertheless, knowledge of their distribution in Italian urban areas remains fragmentary. The aim of this study was to update and expand current knowledge of the spider fauna of the Municipality of Turin by integrating bibliographic data with original results obtained from sampling campaigns carried out in 2023

and 2024. Overall, 171 species belonging to 31 families were recorded, 30 of which are reported for the first time from the Turin area. The results reveal a complex faunal composition, characterized by the coexistence of synanthropic and generalist species alongside taxa typical of natural or semi-natural habitats. This pattern challenges the idea that urban communities are dominated exclusively by ubiquitous species tolerant of disturbance. The presence of alien species of exotic origin was also detected, confirming the vulnerability of urban environments to the introduction of non-native taxa. These data highlight the potential value of urban environments, such as the city of Turin, for the conservation of regional biodiversity. They also emphasize the importance of promoting systematic monitoring of urban fauna, particularly in relation to the increasing spread of exotic species and the development of sustainable urban green-space management policies.

Contact: nunzio.agostinacchio@edu.unito.it

Supervisor: Marco ISAIA (University of Torino, Turin, Italy)

David Anthony BONAVIDA | Bachelor thesis

Non-native spider species in Italy: origin, spread and habitats

Approximately 1,700 spider species occur in Italy, 22 of which are non-native. In the absence of specific studies on the impact of alien spider species in Italy, and with the aim of facilitating future targeted research, this thesis developed a checklist of the 22 established non-native spider species currently occurring in the Italian territory, according to the website Araneae.it v. 2.0. Morphological and ecological information was collected to provide a general overview of each species. Specifically, the pathways of introduction were analysed, together with the georeferencing of records retrieved from the literature. These data were used to determine the rarity index in Italy and to produce diagrams of regional taxonomic richness. The study shows that most species originate from the Nearctic region and that they reached Italy mainly through trade, plant imports and accidental introduction. The dispersal potential of each species was also considered, with particular attention to colonization ability through



ballooning. Urban environments and greenhouses were the habitats with the highest number of records, although many species were found exclusively in natural environments.

Contact: david.bonavita@edu.unito.it

Supervisor: Marco ISAIA (University of Torino, Turin, Italy)

David MOKRYŠ | Bachelor thesis

Prey of Scorpiones, Opiliones, Pseudoscorpiones and Ricinulei

This bachelor's thesis summarizes information about the prey of four arachnid orders: scorpions, harvestmen, pseudoscorpions, and ricinulei. A review of published data and photographs revealed that all primarily hunt invertebrates. Harvestmen prey mostly on flies, scorpions on orthopterans, pseudoscorpions on ants, and ricinulei on dipterans and termites. Scorpions, pseudoscorpions, and ricinulei are active predators, while harvestmen are omnivorous and often passive. These orders are generalists, not specialized on any specific prey and possessing broad trophic niches.

Contact: pekar@sci.muni.cz

Supervisor: Stanislav PEKÁR (Masaryk University, Brno, Czechia)

Francesca ROMAGNOLLI | Bachelor thesis

Analysis of reproductive parameters in the monitoring of *Vesubia jugorum* (Simon, 1881) (Arachnida: Araneae), an IUCN Red List species

Vesubia jugorum (Simon, 1881) (Araneae: Lycosidae) is a spider endemic to the Maritime Alps between Italy and France, restricted to rocky habitats above 2,000 m a.s.l. Based on the projected future reduction of its bioclimatic range in relation to global warming, the species has been included in the Red List of the International Union for Conservation of Nature (IUCN), and a long-term monitoring programme has been planned to assess its status by monitoring functional traits, namely femur length and egg sac size, in relation to bioclimatic suitability. The aim of this thesis was to test whether egg sac diameter is a good indicator of

reproductive success and whether it can be used as a useful parameter for the long-term monitoring of the species. Data collected through field sampling and laboratory measurements were compared using correlation analyses. The results showed that egg sac diameter, being positively correlated with the number of eggs, represents a good proxy for reproductive success. However, egg sac diameter also appears to be related to phenology and developmental stage, which may make it difficult to compare this trait over the long term, as it can vary seasonally. By contrast, no correlation was found between egg sac diameter and femur length. Femur length is therefore considered the most suitable trait for assessing the condition of the species in a monitoring perspective. In view of the continuation of the monitoring programme, reproductive parameters may be useful for seasonal analyses of the different conditions characterizing the sampling sites, for instance in relation to the quantity and quality of available resources.

Contact: francesca.romagnolli@edu.unito.it

Supervisor: Marco ISAIA (University of Torino, Turin, Italy)

Viktor STŘEŠTÍK | Bachelor thesis

The impact of controlled biomass burning on selected groups of invertebrates in European non-forest ecosystems

This work summarizes how communities of selected invertebrate groups (Araneae, Coleoptera, Orthoptera, Lepidoptera) respond to controlled biomass burning in European non-forested areas. The paper reviews the current state of knowledge of the characteristics and history of fire disturbance, as well as its significance for these ecosystems. The effects of fire on invertebrate communities are presented not only at a theoretical level, but also through a synthesis of methodologies and results from numerous studies conducted across European ecosystems. Based on this review, existing knowledge gaps are identified. Prescribed burning promotes rare heliophilous and xerophilous species of spiders and butterflies with *Hipparchia fagi* being the only exception. In contrast, the response of beetle and orthopteran communities shows variability. Compared to



other management strategies, prescribed fire is an underutilized and represents a valuable tool not only for the conservation of rare species but also for the effective management of threatened habitats.

Contact: strestik.viktor@gmail.com

Supervisor: Petr ŠÍPEK & Tomáš HAMŘÍK
(Charles University, Prague, Czechia)



#FAUNISTICS, BIODIVERSITY AND CONSERVATION

Bleritina ISLAMI | Master thesis

Faunistic characteristics of some groups of arachnids (Arachnida: Opiliones, Araneae) in Kosovo

Arthropods represent the most diverse group of invertebrates and are essential for ecosystem functioning. However, arachnid fauna in Kosovo remains incompletely documented. In this study we provide records of spiders (Araneae) and harvestmen (Opiliones) from ten localities in Kosovo, collected using multiple sampling techniques. A total of 101 individuals were collected, including 71 harvestmen and 30 spiders. Thirteen harvestman species are newly recorded for Kosovo, in addition to further records of *Opilio ruzickai* Šilhavý, 1938. Among spiders, two species are confirmed as new national records. These findings provide valuable faunistic data and strengthen the knowledge of Kosovo's arachnid diversity.

Contact: islamibleritina@gmail.com

Supervisor: Halil IBRAHIMI (University of Prishtina, Kosovo)

Simona ŠOURKOVÁ | Master thesis

Spider fauna of wetland near village Stvolný

This thesis focuses on the species diversity of spiders (Araneae) in two ecologically different wetland sites in the vicinity of Stvolný. Field research was conducted from April 2024 to October 2025 using four collection methods: pitfall traps, sweep netting, sieving, and beating. A total of 64 spider species belonging to 14 families were recorded. The results show differences in species composition between the two sites, with one of the sites recording the presence of the endangered species *Myrmarachne formicaria*. The study contributes to the understanding of the arachnofauna of wetland habitats and highlights their importance for biodiversity conservation.

Contact: ihradska@zcm.cz

Supervisor: Ivana HRADSKÁ (University of West Bohemia, Plzeň, Czechia)

Supervisor: Marco ISAIA (University of Torino, Italy)



Giulia ANGELICA | Bachelor thesis

Faunistic remarks on Italian endemic jumping spiders and crab spiders (Araneae: Salticidae, Thomisidae)

This study analyses the geographic distribution of Italian endemic species belonging to the families Salticidae and Thomisidae, with the aim of providing an updated overview of their occurrence across the national territory and highlighting the main biogeographic and ecological patterns. The study was based on the collection of bibliographic data available from the online catalogue of Italian spiders, Araneae.it, and from the relevant scientific literature. Individual records were then georeferenced and organized into a structured database. For each species, distribution ranges were reconstructed, and the Area of Occupancy (AOO) and Extent of Occurrence (EOO) were calculated using the GeoCAT software. In addition, the provincial rarity index provided by Araneae.it was considered. The analysis revealed the presence of 12 species, six salticids and six thomisids, unevenly distributed across Italy. The results show marked variability in both range size and the level of knowledge available for individual species. Some species, such as *Attulus longipes*, have a relatively wide and well-documented distribution along the Alpine arc, whereas others, such as *Leptorchestes elisae* and *Pellenes lagrecai*, are known from a single record only, indicating that current knowledge remains fragmentary. Two main areas of concentration emerge: the Alpine region and the southern-insular sector, both characterized by environmental conditions favourable to ecological specialization and geographic isolation. In several cases, species co-occurrence appears compatible with partial ecological differentiation, linked to predatory strategies and microhabitat use. Overall, the results underline that the currently available distributional data represent a useful, yet still incomplete, basis for biogeographic interpretation and future conservation assessments. The study therefore highlights the need for further sampling campaigns and targeted ecological investigations, which are essential to define more accurately the actual distribution of the species considered and their potential vulnerability status.

Contact: giulia.angelica@edu.unito.it



Supervisor: Marco ISAIA (University of Torino, Turin, Italy)

Alessandra Luisa CHIAUDANO | Bachelor thesis

Ecology and distribution of Italian endemic zodariid spiders (Araneae, Zodariidae)

This thesis aims to georeference the available Italian records of twelve endemic species belonging to the family Zodariidae (Araneae), with the goal of improving biogeographic and ecological knowledge of the group. The main objective is to provide a solid data basis for future detailed analyses, useful for assessing conservation status and subsequently defining protection strategies. The georeferencing work was carried out through the consultation of scientific literature and the use of dedicated software for mapping occurrence data. Subsequently, a biogeographic analysis was performed for each species by calculating distribution parameters, namely Area of Occupancy (AOO) and Extent of Occurrence (EOO). Where available, ecological and morphological information was also integrated. The results confirmed the presence of twelve species, all belonging to the genus *Zodariion*. These species are distributed across fourteen Italian regions, with a clear concentration of records in Sardinia and in northeastern Italy. This made it possible to accurately outline the distribution ranges of the species and to indicate the ecological preferences of the genus, confirming that many species are closely associated with specific microhabitats. Furthermore, the partial overlap of distribution ranges highlighted possible niche segregation phenomena and selective resource use by coexisting species. The georeferencing of occurrence data allowed the current distribution of Italian endemic zodariids to be defined more accurately. This information is essential not only for validating distributional and ecological hypotheses, but also as a key methodological prerequisite for risk assessment according to IUCN categories and for the planning of future conservation and management strategies.

Contact: alessandra.chiaudano@edu.unito.it

Supervisor: Marco ISAIA (University of Torino, Turin, Italy)

Lorenzo GAMBA | Bachelor thesis

Ecology and distribution of Italian leptonetid spiders (Arachnida: Araneae, Leptonetidae)

In Italy, the distributional knowledge of many spider taxa remains incomplete. This thesis provides an updated overview of the distribution of Leptonetidae in Italy by integrating and georeferencing all available bibliographic records and describing species ranges through the parameters Extent of Occurrence (E00) and Area of Occupancy (A00). The species reported in Araneae.it (Isaia et al., 2025) were considered, comprising 3 genera and 8 species. Information obtained from the literature was organized into a database and georeferenced in WGS84 coordinates, with associated precision classes. Distribution maps and E00/A00 calculations were produced using GeoCAT. The results reveal marked heterogeneity among species: some, such as *Leptoneta crypticola franciscoloi* and *Paraleptoneta spinimana*, are supported by numerous records, whereas many others are known from only a few occurrence points, often restricted to single localities. Most species show extremely narrow and fragmented ranges, with a concentration of endemism in Sardinia and strong localizations also in northwestern Italy, particularly in Piedmont and Liguria. The interpretation of species ranges also suggests possible sampling gaps, especially for hypogean species. The complete georeferencing of occurrence records provides a solid basis for future assessments according to IUCN criteria and represents an essential starting point for further research and conservation of spider biodiversity in Italy.

Contact: lorenzo.gamba@edu.unito.it

Supervisor: Marco ISAIA (University of Torino, Turin, Italy)

Martina MARCHIO | Bachelor thesis

Knowledge of the genus *Eresus* (Araneae, Eresidae) in Italy and the potential contribution of citizen science

The genus *Eresus* Walckenaer, 1805 includes a group of velvet spiders that are easily recognizable because of the bright red and black colour pattern of adult males, but whose

taxonomy, distribution and conservation status remain poorly understood. This thesis aims to improve current knowledge on the distribution of *Eresus* species in Italy and to assess the potential contribution of citizen science to the study of this taxonomically complex and elusive genus. Bibliographic records available from the Italian spider database Araneae.it were reviewed and georeferenced in order to map the known occurrence of *Eresus* species reported from Italy. The species considered from the literature were *E. albopictus*, *E. kollari*, *E. ruficapillus*, *E. sandaliatus* and *E. walckenaeri*. In addition, photographic records from iNaturalist were analysed to evaluate their reliability and usefulness for distributional and phenological studies. A total of 388 observations of *Eresus* from Italy were examined on the basis of visible morphological characters, including the colour of the prosoma, opisthosoma and legs, the number of abdominal spots and the presence of white hairs. Because species-level identification based only on photographs is often uncertain, observations were assigned to five morphospecies corresponding to *E. cf. albopictus*, *E. cf. kollari*, *E. cf. moravicus*, *E. cf. sandaliatus* and *E. cf. walckenaeri*. The results show that published records of *Eresus* in Italy are limited and geographically incomplete, whereas citizen-science observations provide a much broader and more recent dataset. Although photographic records require expert validation, they offer valuable information on the distribution and phenology of these spiders and may reveal the presence of populations in areas not previously documented in the scientific literature. Overall, this study highlights the importance of georeferenced occurrence data for assessing the vulnerability of *Eresus* species and underlines the potential role of citizen science as a complementary tool for biodiversity research and conservation planning.

Contact: martina.marchio@edu.unito.it

Supervisor: Marco ISAIA (University of Torino, Turin, Italy)

Micol MERLO | Bachelor thesis

Ecology and distribution of Italian mygalomorph spiders

Mygalomorphs are an infraorder of spiders distributed across temperate and tropical



regions worldwide. They are difficult to observe because of their peculiar lifestyle: thanks to specific morphological adaptations, they live in burrows excavated in the ground, which they close at the surface with a silk trapdoor. This behaviour, which has led them to be commonly known as trapdoor spiders, allows them to colonize a wide range of habitats and to survive for long periods, even during unfavourable seasons. Like spiders in general, mygalomorphs receive little attention from a conservation perspective. In Europe, only 4 out of 146 species are currently protected. This thesis focused on the 32 species of Italian mygalomorphs, with particular attention to the georeferencing of their occurrence points, based on direct observations and records retrieved from the scientific literature, the estimation of their distribution ranges in Italy, expressed as Area of Occupancy (AOO) and Extent of Occurrence (EOO), and the assessment of the current level of knowledge for each species. AOO and EOO values made it possible to assign threat categories to each species, providing a clearer picture of their extinction risk. The search for information also allowed the current state of taxonomic knowledge to be outlined, highlighting that, for half of the Italian species, sufficient data are available to confirm their presence in Italy, whereas for the remaining half knowledge is fragmentary and, in several cases, taxonomic validity is uncertain. These latter species lack complete descriptions, are not known from both sexes, have been recorded in Italy only a few times and/or in the distant past, are known only from the type locality, or have been subject to misidentifications. For the 16 species whose presence is confirmed, it was instead possible to provide broader considerations on their global and regional distribution in Italy, preferred habitats, taxonomic diversity, range size, and potential extinction risk. In particular, the results highlight that the most widely distributed species in the country are the only ones protected by legislation, whereas species with smaller ranges and therefore higher-risk IUCN categories are not currently protected.

Contact: micol.merlo@edu.unito.it

Supervisor: Marco ISAIA (University of Torino, Turin, Italy)

Endangered invertebrate species in the National Park Podyjí

The bachelor's thesis focuses on endangered invertebrate species in the Podyjí National Park, with a particular emphasis on their classification based on the level of threat. The primary objective is to conduct a comprehensive review of scientific literature and compile a list of these species. The thesis draws on available scientific sources and faunistic surveys from the Podyjí National Park area. Individual species are categorized into relevant threat categories based on applicable legislation and Red Lists. The thesis contributes to a deeper understanding of the biodiversity of Podyjí National Park, highlighting its unique significance as a refuge for many endangered species.

Contact: katerina.sklenarova@upol.cz

Supervisor: Kateřina SKLENÁŘOVÁ (Palacký University, Olomouc, Czechia)

Adéla STERNWALDOVÁ | Bachelor thesis

