European Journal of Ecology, 2024, 1-4

PROGRESS IN SHRIKE RESEARCH: GLOBAL TRENDS, CHALLENGES, AND NEW DIRECTIONS

Reuven Yosef[1] and Piotr Tryjanowski[2]

[1]*Ben Gurion University of the Negev, Eilat Campus, P. O. Box 272, Eilat 8810201, Israel (ryosef60@gmail.com)*
[2]*Department of Zoology, Poznań University of Life Sciences, Wojska Polskiego 71C, 60-625 Poznań, Poland*

Abstract.

Over the past 30 years, research on shrikes has made significant strides, driven by technological advancements, long-term ecological studies, and an increasing focus on conservation. Shrikes (Laniidae), a fascinating group of passerines with predatory behaviors, are studied globally; however, research remains heavily concentrated on a limited number of species in Europe, North America, and Asia. Despite growing interest, critical gaps persist in understanding the ecology and behavior of lesser-known species, particularly in Africa and Asia. This symposium brings together global experts to share insights from long-term monitoring, examine the impact of climate change, and showcase cutting-edge methodologies such as geolocation and genomics. By addressing both emerging trends and challenges in shrike conservation, this symposium paves the way for new directions in avian research, offering a comprehensive vision for the future of shrike studies.

Key words: *avian conservation; behavioral adaptations; climate change impact; long-term monitoring*

The intriguing Shrikes

Shrikes (Laniidae) are a fascinating group of passerine birds, exhibiting behaviors reminiscent of birds of prey. They have captivated researchers for decades, leading to the establishment of the International Shrike Working Group (ISWG) to enhance collaboration among those studying this unique group. This initiative formalized efforts to connect researchers, share literature, and organize symposia. The first symposium was held in Florida in 1993, followed by meetings in Israel (1996), Gdańsk (1999), and Chemnitz (2003). After a prolonged gap, partly due to the COVID-19 pandemic, the 5th International Shrike Symposium was finally held in Porto, Portugal, in July 2023, marking the 30th anniversary of the ISWG's founding.

The 2023 symposium was more than a research-sharing event; it was a testament to the resilience of the shrike research community. Despite the loss of valued colleagues, including influential figures like Tom Cade, Viking Olsson, Hans Esselink, Tony Harris, and most recently Eugeny Panov (Panov, 2011), the field continues to attract new generations of researchers. These younger scientists bring fresh methodologies and advanced technologies, breathing new life into shrike research. This continuous influx of talent ensures that the field remains dynamic and innovative.

Significant progress in shrike research has been made in recent years, including the publication of two seminal books now considered cornerstones in the field: Panov's *The True Shrikes of the World* (2011) and the second edition of Lefranc's *Shrikes of the World* (2022). Additionally, species accounts initially compiled by ISWG members and featured in the Handbook of the Birds of the World are now accessible on a digital platform hosted by the Cornell Lab of Ornithology (*Birds of the World*, 2022). This shift highlights the evolving nature of scientific research, where digital accessibility plays an increasingly important role in data sharing and collaboration. Furthermore, the international shrike library, once a key resource in Israel, has been relocated to the World Center for Birds of Prey in Boise, Idaho. Although this move aimed to preserve important hard copies, the increasing reliance on digital re-

Fig. 1. The conference logo artwork was created by renowned French graphic artist and watercolorist Alexis Nouailhat. Sadly, Alexis passed away in January 2022 at the age of 55, just before the symposium took place. A collection of his watercolors, illustrations, and postcards can be viewed at: http://alexis-nouailhat.com/.

sources has made the library less utilized than anticipated.

Long-term, integrative data was a recurring theme at the symposium. Many researchers, including those from Belgium, the Netherlands, and Austria, presented long-term studies—some spanning over 30 years—emphasizing the importance of continuous monitoring to understand the impacts of climate change, habitat alteration, and other anthropogenic factors on shrike populations. However, these studies are often limited to the edges of species' ranges, leaving large gaps in our understanding of global population trends, particularly in under-studied areas like Asia and Africa.

Migration studies also took center stage. New data on migration routes and wintering grounds, obtained through advanced tracking technologies such as geolocators, have offered fresh insights into the movements of several shrike species. This includes recently discovered migration patterns of the Lesser Grey Shrike (*Lanius minor*), whose population has been rapidly declining in Central Europe, as discussed by Anton Krištín and others (see below). Conservation remains a top priority, with numerous presentations addressing habitat restoration and public engagement efforts. In Italy, researchers used camera traps to gather detailed information on habitat use and feeding behavior. Meanwhile, in northern Italy and Spain, researchers are examining how plastic pollution affects nesting success, underscoring broader environmental challenges facing shrikes and many other species.

The symposium also touched on the cultural significance of shrikes. These birds have long been celebrated in art, from ancient Egyptian tomb paintings to modern postage stamps. Their symbolic value and ecological importance make them ideal for public engagement initiatives aimed at raising conservation awareness. In conclusion, the 5th International Shrike Symposium not only reflected on the rich history of shrike research but also highlighted the exciting directions the field is taking. With ongoing technological advances and an ever-growing community of dedicated researchers, the future of shrike studies is bright. As we look ahead, the challenge remains to expand research to include under-studied species and regions, integrating global perspectives to better understand and conserve these remarkable birds. The next symposium, anticipated to be held in Africa, will continue to foster collaboration and innovation in shrike research.

Standing on the Shoulders of Giants

Modern shrike research is deeply rooted in the foundational work of pioneers whose dedication and creativity have shaped the field. The advancements in our understanding of these remarkable birds owe much to the legacy of these giants, whose innovative approaches continue to inspire new generations of scientists and artists. This issue of the *European Journal of Ecology* pays tribute to two such individuals—Evgeniy Panov and Alexis Nouailhat—whose contributions have profoundly influenced the study and appreciation of shrikes. In recent years, the shrike research community has faced the profound loss of these two pivotal figures. Evgeniy Panov, a brilliant scientist and a pioneer in the behavioral ecology of shrikes, dedicated his career to unraveling the intricacies of their lives. His groundbreaking research and publications set a benchmark in ornithology, providing invaluable insights into the complex interactions and adaptations of these birds. Alexis Nouailhat, in contrast, brought shrikes to life through his artistry, capturing their beauty and essence in a way that science alone could not convey. His unique perspective illuminated the emotional and aesthetic dimensions of nature, inspiring a broader audience to appreciate and protect these birds. Nouailhat's work fostered a deeper emotional connection to conservation, blending art with advocacy in a way that resonates profoundly in a time of increasing environmental challenges. Together, Panov and Nouailhat exemplify the powerful synergy of science and art. Their legacies are a testament to the diverse ways in which human creativity and intellect can enhance our understanding of the natural world. As shrike research continues to evolve, their vision and contributions form the bedrock upon which future discoveries will be made. This harmonious integration of meticulous scientific study and evocative artistic expression reminds us that today's progress is built on the efforts of those who came before. Panov and Nouailhat's enduring influence serves not only as an inspiration but also as a call to continue bridging the gap between disciplines, enriching our collective understanding of nature and deepening our commitment to its preservation.

Ongoing Progress

At one point, it seemed research on shrikes might have reached a peak, with the group's challenging field study conditions limiting new insights. However, recent studies—many of which were presented at the symposium—show that this is far from the case. New research continues to push the boundaries of what we know about shrikes, underscoring the dynamic and evolving nature of this field.

Since the symposium, several notable studies have been published. One groundbreaking study by Adamík et al. (2024) examined the migration patterns of the Lesser Grey Shrike, providing valuable data on non-breeding sites and annual migration cycles. Utilizing advanced tracking technology, this research offered unprecedented insights into migration routes and stopover sites. Another study by Tryjanowski et al. (2024) explored interactions between the red-backed shrike (*L. collurio*) and the common cuckoo (*Cuculus canorus*), examining how brood parasitism influences shrike settlement patterns. Their findings point to the complexity of host-parasite interactions and suggest that human presence and nest predation may also influence territory selection. Meanwhile, Kwieciński et al. (2024)

focused on the impact of plastic pollution on shrike nesting behavior, revealing startling levels of contamination in farmland environments. This research emphasizes the importance of understanding the broader ecological context in which shrikes operate, particularly as human-induced environmental changes reshape natural habitats.

In addition to these studies, other recent research has further enriched our understanding of shrike biology. For example, a study by Peña-Peniche et al. (2023) documented the Loggerhead Shrike (*L. ludovicianus*) hunting scaled quails—prey significantly larger than itself. This documentation of "big game hunting" underscores the shrike's dietary versatility and highlights the need to understand predator-prey interactions across different environmental contexts. Hill et al. (2023) also made a compelling contribution with their research on adoption behavior in Loggerhead Shrikes. Their findings suggest that unpaired males may adopt unrelated young as a reproductive strategy in populations with a skewed sex ratio, presenting a fascinating evolutionary explanation for this costly behavior.

In the realm of biomechanics, Sustaita and Laurin (2024) investigated the functional anatomy of Loggerhead Shrikes' jaw-closing mechanics, highlighting how these birds manage diverse prey. Their findings reveal a balance between force and speed in the shrike's bite, illustrating the importance of biomechanics in understanding predatory efficiency.

Genetic studies have also yielded new insights. McCullough et al. (2023) examined ultra conserved elements in shrikes and their relatives, proposing the new avian family Eurocephalidae for the white-crowned shrikes (Eurocephalus). This genetic re-evaluation redefines our taxonomic understanding and underscores the need for continued molecular research (see Fuchs et al., 2019). Meanwhile, Muhammad et al. (2024) used mitochondrial DNA analysis to assess genetic variation and population differentiation among four shrike species in Pakistan, providing critical data for conservation efforts aimed at preserving genetic diversity.

On the topic of species interactions, Mizumura et al. (2024) studied hybridization between the endangered brown shrike (*L. cristatus*) and the common bull-headed shrike (*L. bucephalus*) in Japan, discovering that hybrid individuals are fertile. This finding raises concerns about gene flow and the conservation implications for the brown shrike's genetic integrity.

Jarrett et al. (2024) used DNA analyses and metabarcoding to reveal the dietary habits of migratory shrikes by analyzing their fecal samples. The researchers successfully showed how Woodchat Shrikes (*L. senator*) stopping over in Morocco in spring, while returning north from their wintering grounds in Africa, consumed blood-swollen camel-ticks (*Hyalomma dromedarii*). This study raises interesting questions about how shrikes access protein-rich prey while on migration and how many other such strategies have yet to be discovered with the help of ever-improving modern technology. Cortés-Fossati and Rojo (2023) also provided valuable insights with their study on shrike predation of toxic blister beetles, showing selective feeding strategies that enable shrikes to avoid the more toxic parts. This research contributes to our understanding of shrikes' complex foraging strategies and their role in controlling pest species.

Collectively, these studies highlight the ongoing vibrancy of shrike research, spanning behavioral ecology, biomechanics, genetics, and conservation. The field is thriving, and the integration of novel technologies and cross-disciplinary collaborations continues to drive new discoveries.

Acknowledgments

Our deepest gratitude to Professors Luis Reino and Joanna Santana, whose efforts made the 5th International Shrike Symposium in Portugal an enriching and successful event; supported by the BIOPOLIS-CIBIO - University of Porto at Vairão, Vila do Conde, Portugal, they navigated logistical challenges to create a hybrid format, allowing remote participation for international researchers. The Scientific Committee, comprising Dries van Nieuwenhuyse (Belgium), Prof. Piotr Tryjanowski (Poland), Dr. Boris Nikolov (Bulgaria), Norbert Lefranc (France), Amy Chabot (Canada), and Prof. Reuven Yosef (Israel), played a crucial role in shaping the program.

We also extend heartfelt thanks to those involved in producing these proceedings, especially Professor Jakub Z. Kosicki, who accepted the proceedings as a special issue of the European Journal of Ecology. Special thanks go to the reviewers, including Norbert Lefranc, Dries van Nieuwenhuyse, Boris Nikolov, Susan Craig, Piotr Tryjanowski, Luis Reino, and Ursula Bryson, whose expertise was invaluable in ensuring the quality and success of the symposium and its publications.

References

Adamík, P., Wong, J. B., Hahn, S., & Krištín, A. (2024). Non-breeding sites, loop migration and flight activity patterns over the annual cycle in the Lesser Grey Shrike *Lanius minor* from a north-western edge of its range. *Journal of Ornithology*, *165*(1), 247-256.

Cortés-Fossati, F., & Rojo, M. (2023). When Toxicity is Not Enough: Review and New Data on Blister Beetle (Coleoptera, Meloidae) Predation by Shrikes. *Acta Ornithologica*, *57*(2), 197-202.

Fuchs, J., Alström, P., Yosef, R., & Olsson, U. (2019). Miocene diversification of an open-habitat predatorial passerine radiation, the shrikes (Aves: Passeriformes: Laniidae). *Zoologica Scripta*, *48*(5), 571-588.

Golawski, A. (2024). Red-Backed Shrikes "Help" in Studies of the Expansion of the European mantis. *Entomological News*, *131*(1). 131(1) : 53-55

Hill, C. E., Miles, K. R., Maddox, K. A., & Tegeler, A. (2023). Are adoptions in a predatory songbird a strategy to aid mate acquisition?. *Journal of Field Ornithology*, *94*(2).

Jarrett, C., Illa, M., Burri, M., Marcacci, G., Mata, V.A., Boglino, M.L., Himmi, O., Maggini, I. and Helm, B., (2024). 'Vampire birds': diet metabarcoding reveals that migrating Woodchat Shrikes *Lanius senator* consume engorged camel ticks in a desert stopover site. *Ostrich*, 1-5. https://doi.org/10.2989/00306525.2024.2386454

Kwieciński, Z., Gajzmer, M., Beszterda, M., Szala, K., Golawski, A., & Zduniak, P. (2024). Assessing plastic pollution in farmland: Impact of agricultural practices on bird nesting materials. *Ecotoxicology and Environmental Safety*, *285*, 117077.

Lefranc N. 2022. Shrikes of the World. Helm. London.

McCullough, J. M., Hruska, J. P., Oliveros, C. H., Moyle, R. G., & Andersen, M. J. (2023). Ultraconserved elements support the elevation of a new avian family, Eurocephalidae, the white-crowned shrikes. *Ornithology*, *140*(3), ukad025.

Mizumura, H., Kubota, K., Nishiumi, I., Imanishi, S., Mochizuki, M., & Higuchi, H. (2024). Hybridization and backcrossing between the endangered brown shrike (*Lanius cristatus superciliosus*) and the common bull-headed shrike (*L. bucephalus bucephalus*). *Biological Journal of the Linnean Society*, *142*(1), 81-90.

Muhammad, S., Imtiaz, A., Ruby, T., & Khan, A. A. (2024). Genetic variations and population differentiation in four species of shrikes based on mitochondrial (Mt) DNA cytochrome oxidase B gene. *Ciência Rural*, *54*(7), e20220553.

Panov, E. N. 2011. The True Shrikes (Laniidae) of the world – Ecology, Behavior and Evolution. Pensoft Publishers, Sofia. 910 pp.

Peña-Peniche, A., Canizales-Bañuelos, J. Á., & Ruvalcaba-Ortega, I. (2023). The Loggerhead Shrike (*Lanius ludovicianus*) goes big game hunting. *The Wilson Journal of Ornithology*, *135*(4), 589-593.

Sustaita, D., & Laurin, M. A. (2024). Biomechanics of biting in loggerhead shrikes: jaw-closing force, velocity and an argument for power. *Journal of Experimental Biology*, *227*(9), jeb246555.

Tryjanowski, P., Golawski, A., Jankowiak, Ł., Osiejuk, T. S., Kwieciński, Z., Møller, A. P., Grzywaczewski, G., & Jerzak, L. (2024). Do cuckoo calls affect red-backed shrike settlement pattern? An experimental approach. *The European Zoological Journal*, *91*(1), 550-558.