IECE 2025 Conference

The 2nd International Electronic Conference on Entomology

19–21 May 2025

Potential Invasion and Distribution of *Lymantria mathura* in Ukraine: Risk Assessment and Management Strategies

Yurii KLECHKOVSKIY[1], Liudmyla TITOVA[1], Lesia BONDAREVA[2*], Maryna KALIUZHNA[3]

[1]Quarantine station of grape and fruit cultures of plant protection institute NAAS of Ukraine, Odesa, 65049, Fontanska road str., 49, Ukraine, e-mail: oskvpk@te.net, titova.l.g.48@gmail.com

[2]Department of Entomology, Integrated Protection and Plant Quarantine, Faculty of Plant Protection, Biotechnology and Ecology, National University of Life and Environmental Sciences, 03041, Kyiv, Heroiv Oborony str., 13, Ukraine, e-mail: lnubip69@gmail.com

[3]Department of Taxonomy of Entomophagous Insects and Ecological Principles of Biocontrol, I.I. Schmalhausen Institute of Zoology of National Academy of Sciences of Ukraine, 01054, B. Khmelnytskogo str., 15, Kyiv, Ukraine, e-mail: kaliuzhna.maryna@gmail.com

*Corresponding author

Introduction

Lymantria mathura (Moore, 1865), the rosy gypsy moth, is a polyphagous defoliator from the family Erebidae, which inhabits deciduous forests mainly in South and Southeast Asia (fig. 1). The broad trophic spectrum of this species makes it an important pest that threatens forests, urban greenery, ornamental plants, and fruit trees. Due to climate change, this species could become a threat beyond its natural range and the aim of our research was to assess the risk of invasion and establishment of *L. mathura* in Ukraine and to model the potential distribution of natural enemies of this moth.

Material and Methods

GIS modeling in MapInfo Pro 15.0 (ESTIMap) and IDRISI Selva (Clark Labs) was used to model the potential distribution of *L. mathura*, and MaxEnt was used to model the potential distribution of entomophagous insects known to be effective in *L. mathura* biocontrol.

Keywords: *Lymantria mathura*; bioclimatic factors; potential range; plant resources; risk management; entomophagous; Ukraine

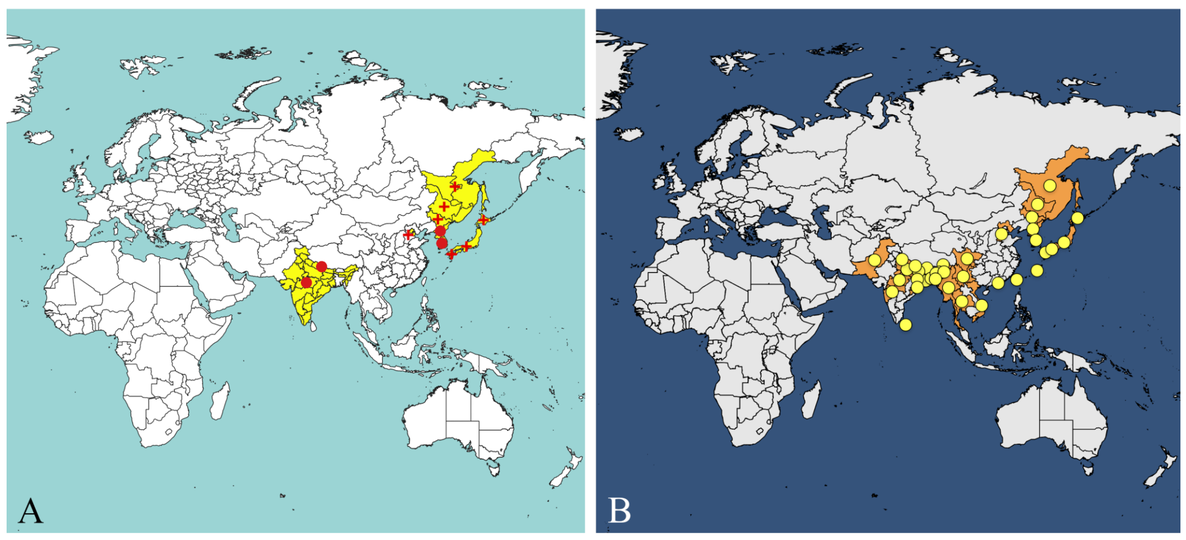

Fig. 1 Distribution of *Lymantria mathura* in 2005 (A) and 2023 (B)
https://gd.eppo.int/taxon/LYMAMA/distribution

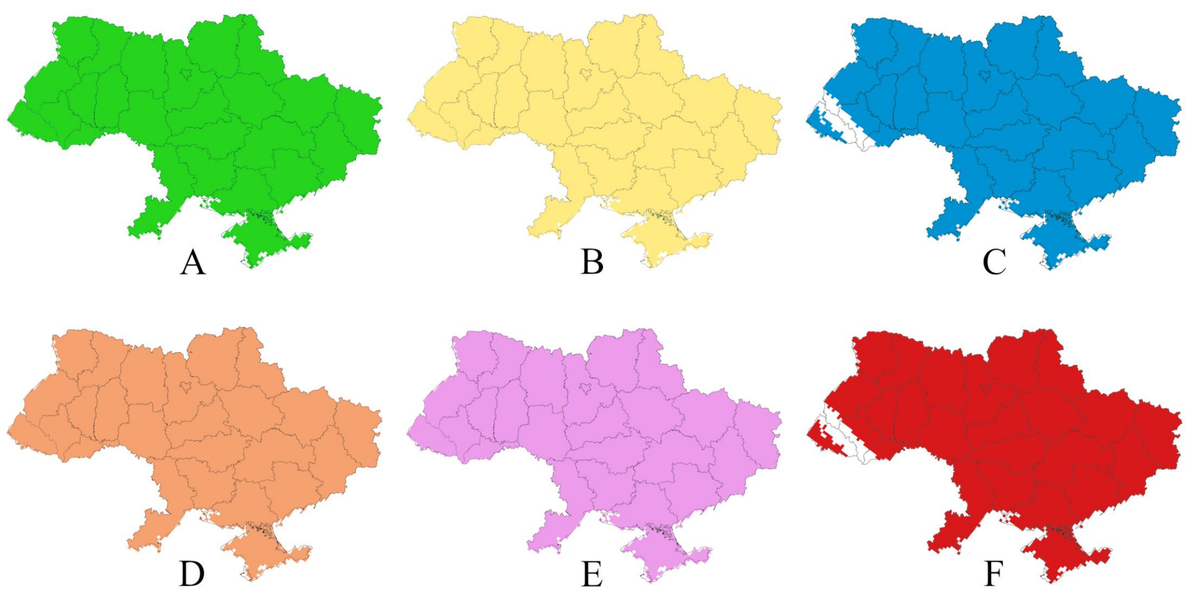

Fig. 2. Territories of Ukraine that meet the climatic preferences of *L. mathura* by indicators (colored – suitable territory; white – unsuitable territory): **A** – mean annual temperature, T℃; **B** – temperature of the warmest month, T℃; **C** – mean temperature of the coldest month, T℃; **D** – the sum of active temperatures above 10 ℃, T℃; **E** – hydrothermal coefficient (HTC); **F** – potential range of *L. mathura*.

Results and Discussion

We found that the potential range of *L. mathura* covers almost all of Ukraine, except for the Carpathian highlands (fig. 2). The most important bioclimatic factors influencing its establishment are the mean annual temperature, the temperature of the warmest month, and the sum of active temperatures above 10 ℃, while the limiting factor is the mean temperature of the coldest month. Modeling suggests that natural enemies such as *Cotesia melanoscela* (Hymenoptera: Braconidae), *Compsilura concinnata*, and *Carcelia gnava* (Diptera: Tachinidae) could play a crucial role in biological control if *L. mathura* invades Ukraine (fig. 3-5).

Conclusion

Due to its high risk of introduction, broad climatic tolerance, excellent flight ability, and numerous suitable host plants, *L. mathura* poses a serious threat to Ukraine's plant resources. A key risk management strategy could be its inclusion in List A1 (absent) of the Ukrainian Regulated Pests List.

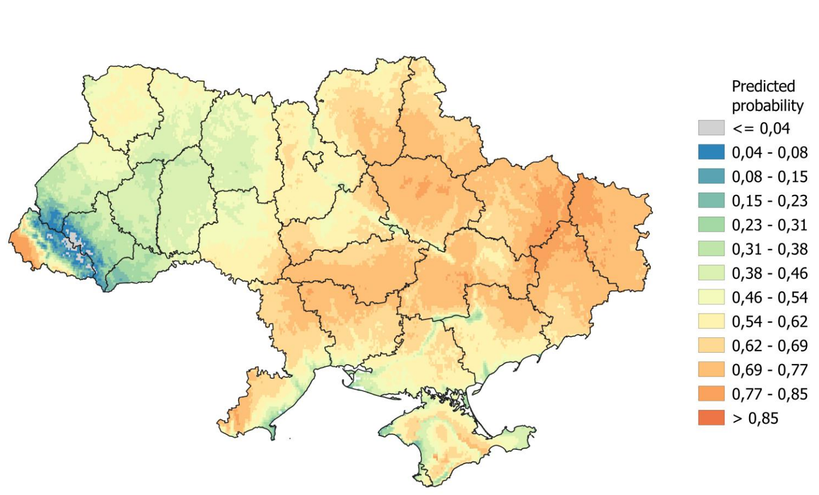

Fig. 3. Potential distribution of *Cotesia melanoscela* in Ukraine

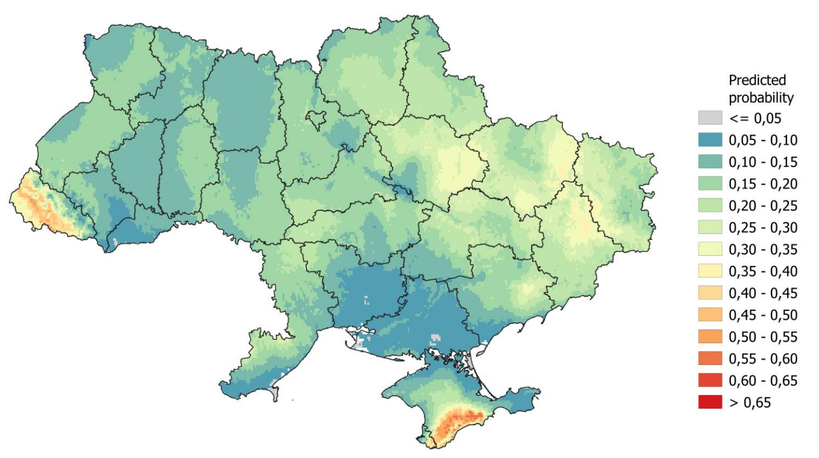

Fig. 4. Potential distribution of *Compsilura concinnata* in Ukraine

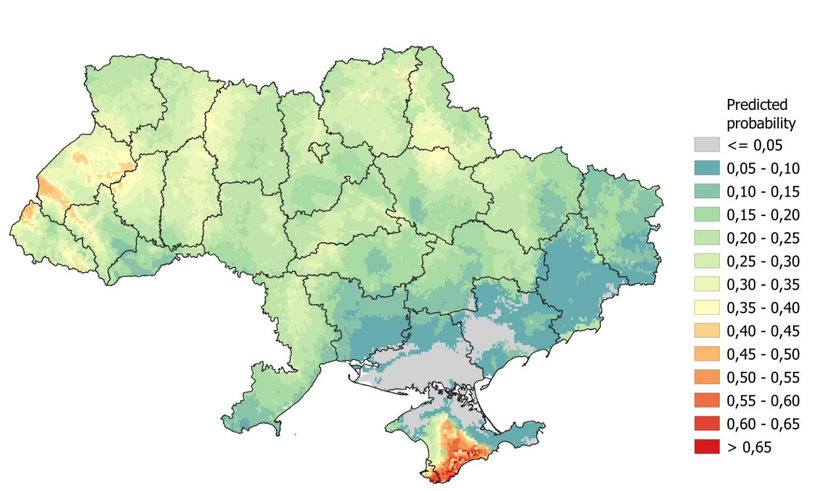

Fig. 5. Potential distribution of *Carcelia gnava* in Ukraine

Yu. E. Klechkovskiy (https://orcid.org/0000-0003-4404-5553)

L. G. Titova (https://orcid.org/0000-0003-4168-7753)

L. M. Bondareva (https://orcid.org/0000-0002-8171-2338)

M.O. Kaliuzhna (https://orcid.org/0000-0002-9265-0195)