POPULATION DYNAMICS OF WHEAT PESTS IN THE CONTEXT OF CLIMATE CHANGE

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INTRODUCTION

Wheat (*Triticum aestivum* L.) is one of the most widely cultivated crops and serves as a staple food for a large share of the world's population, contributing approximately 20% of the total calories consumed globally (Alomari et al., 2023). Due to its wide cultivation and economic importance, wheat serves as a primary host for numerous insect pest species that can significantly affect crop productivity and quality (Singh and Joshi, 2025). Climate change represents an increasingly serious threat to sustainable wheat production, as rising temperatures influence both plant physiology and the dynamics of pest organisms (Bajwa et al., 2020).

Higher temperatures directly affect the growth and developmental processes of wheat, creating stress conditions that can reduce the plant's ability to tolerate biotic attacks (Asseng et al., 2015). At the same time, the accelerated thermal regime favors the development of insect pests, leading to shorter biological cycles, an increased number of generations per season, and the expansion of their distribution range into new agricultural areas (Skendžić et al. 2021). Thus, rising temperatures not only intensify pest pressure on wheat crops, but also alter the ecological balance among pests, host plants, and natural enemies.

MATERIAL AND METHODS

Considering the importance of pest monitoring in assessing phytosanitary risks and supporting integrated crop protection strategies, a study was conducted at SCDA Turda to monitor insect pests in winter wheat, with the aim of highlighting their population dynamics in the context of climate change. The pest collection activities were carried out within an agroecosystem characterized by protective agroforestry shelterbelts, using an entomological sweep net as the sampling method. The study monitored the evolution of the main wheat pests over two distinct intervals, 2016–2018 and 2022–2024. To accurately reflect the natural population dynamics, the results presented originate from experimental plots where no insecticide treatments were applied.

The collection of useful insects was carried out every ten days using an entomological net through one houndred double sweeps for each sample, starting from the spring months until harvest, depending on climatic conditions.

Figure 1. Experimental field with agroforestry shelterbelts

RESULTS AND DISCUSSION

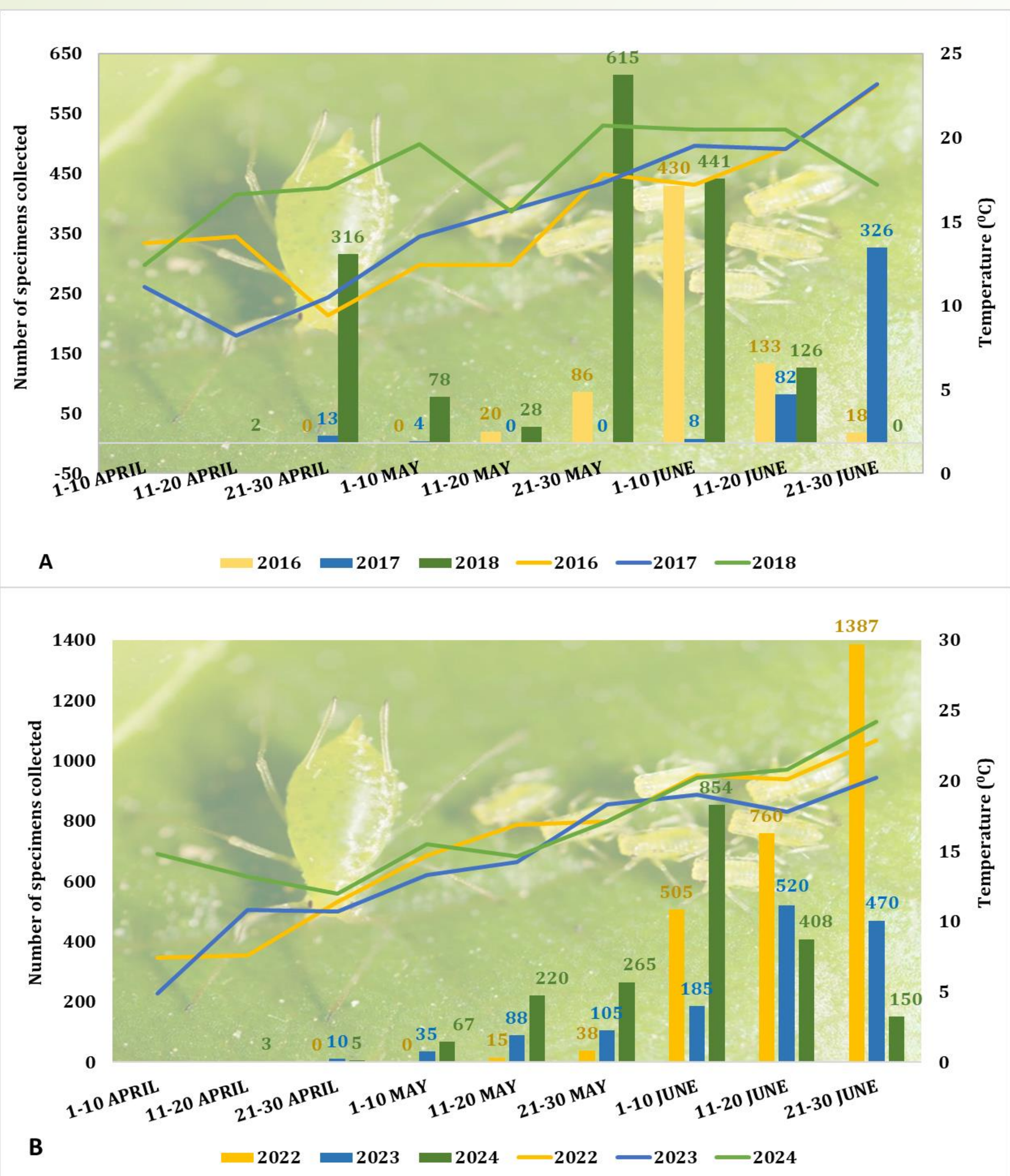

Figure 2. Comparative dynamics of cereal aphid (Aphididae) populations between 2016–2018 (A) and 2022–2024 (B)

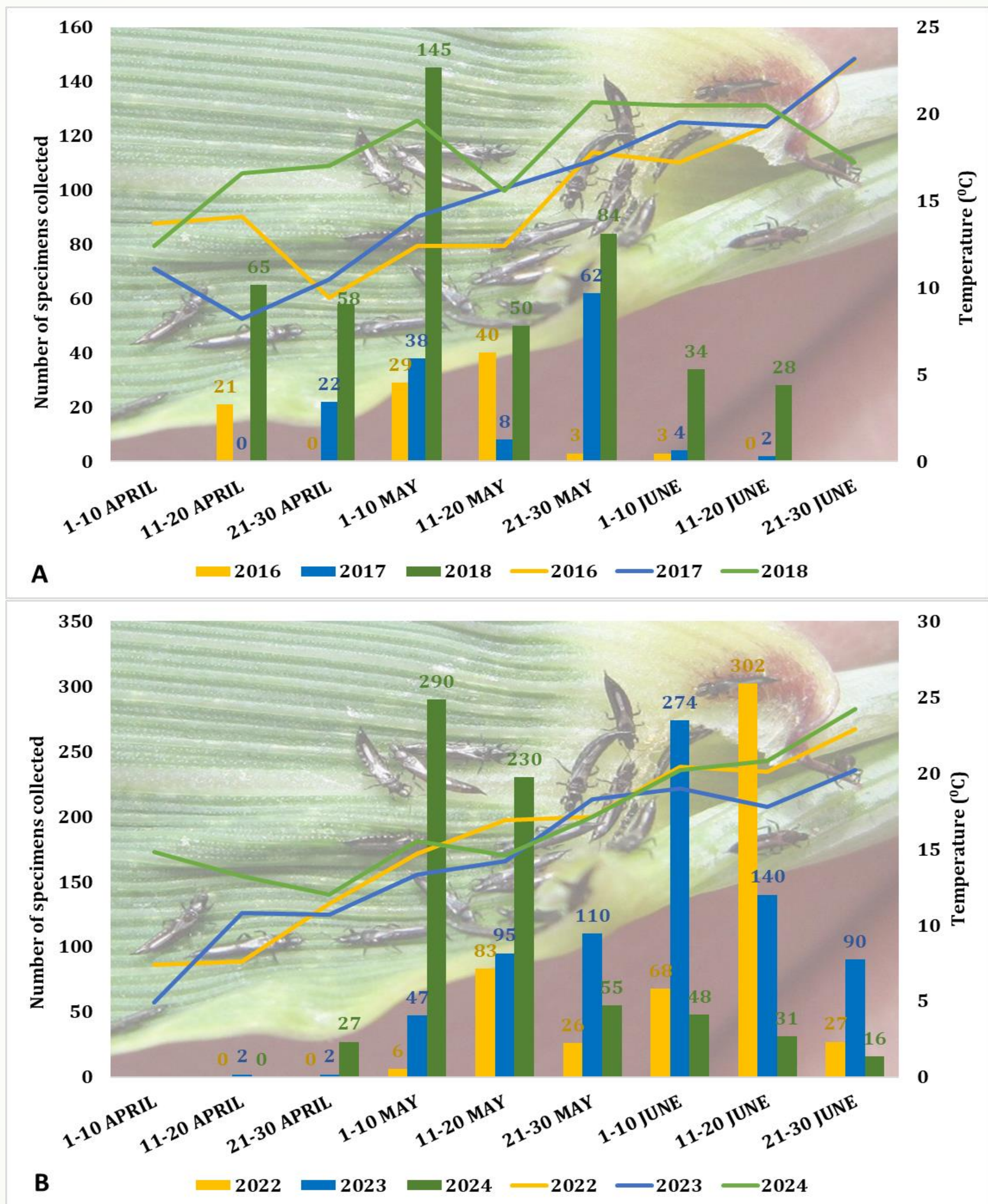

Figure 4. Comparative dynamics of wheat thrips (*Haplothrips tritici*) populations between 2016–2018 (A) and 2022–2024 (B)

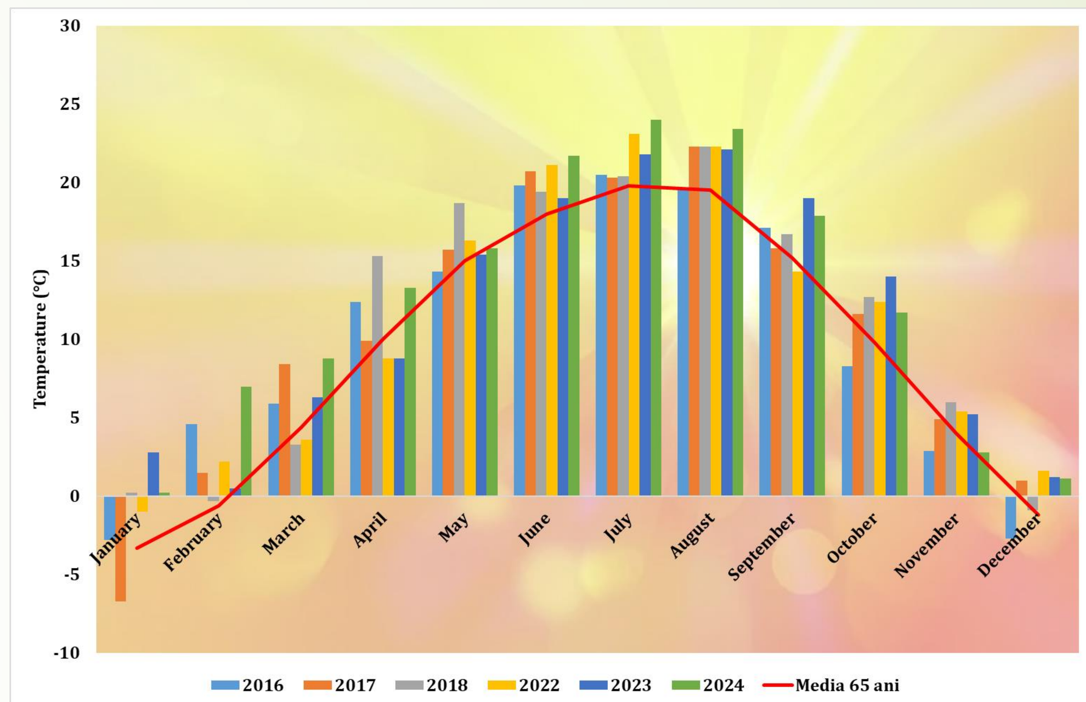

Figure 6. Thermal regime recorded at ARDS Turda in 2016–2018 and 2022–2023

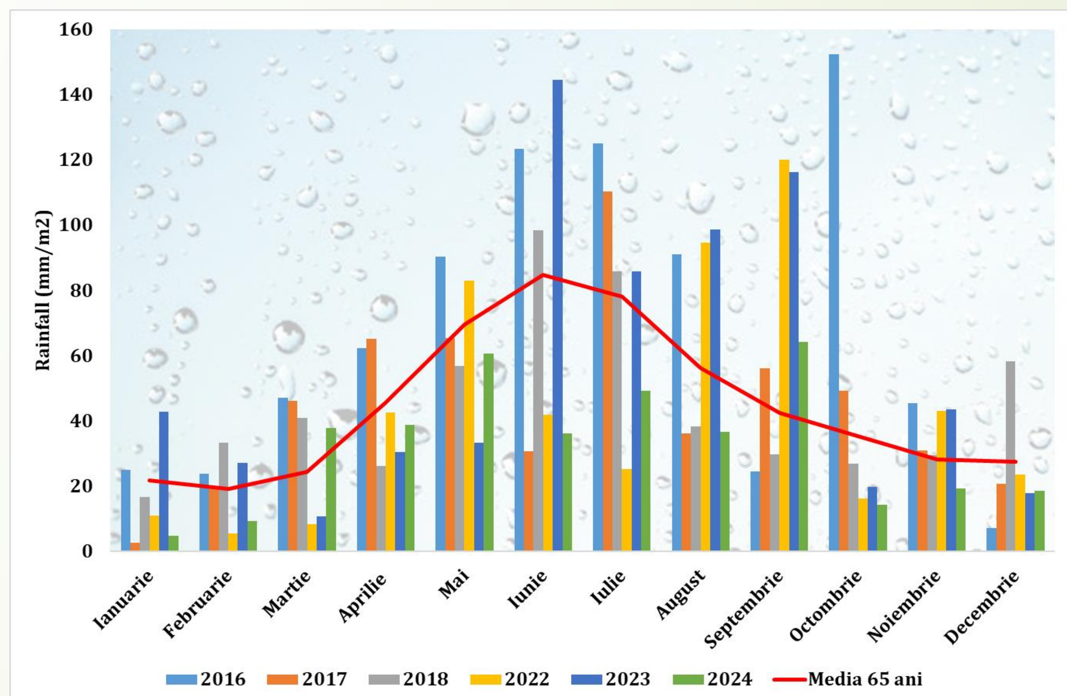

Figure 7. Pluviometric regime recorded at ARDS Turda in 2016-2018 and 2022-2023

Figure 8. Organizing captured insects by species

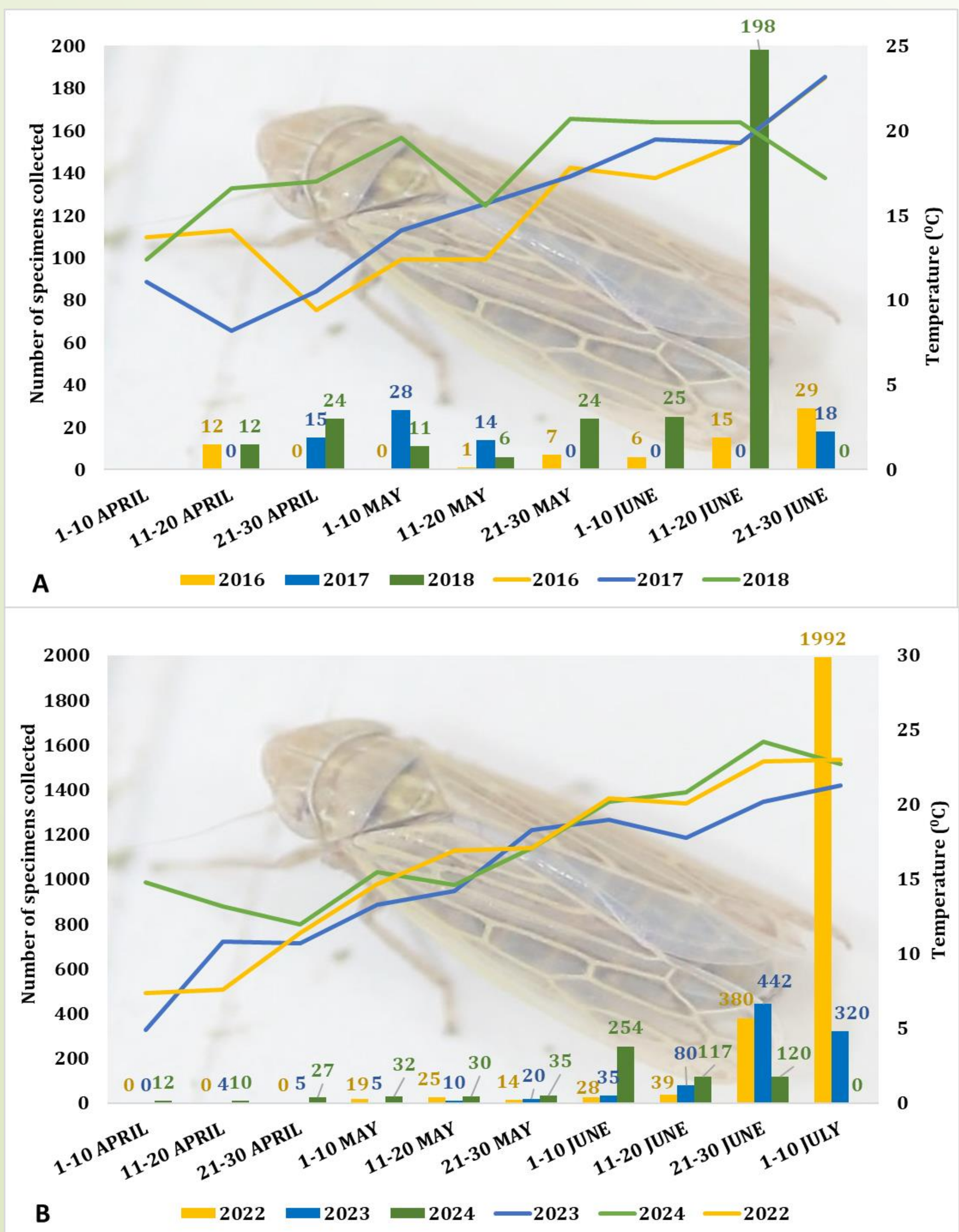

Figure 3. Comparative dynamics of cereal leafhopper (Cicadellidae, Delphacidae) populations between 2016–2018 (A) and 2022–2024 (B)

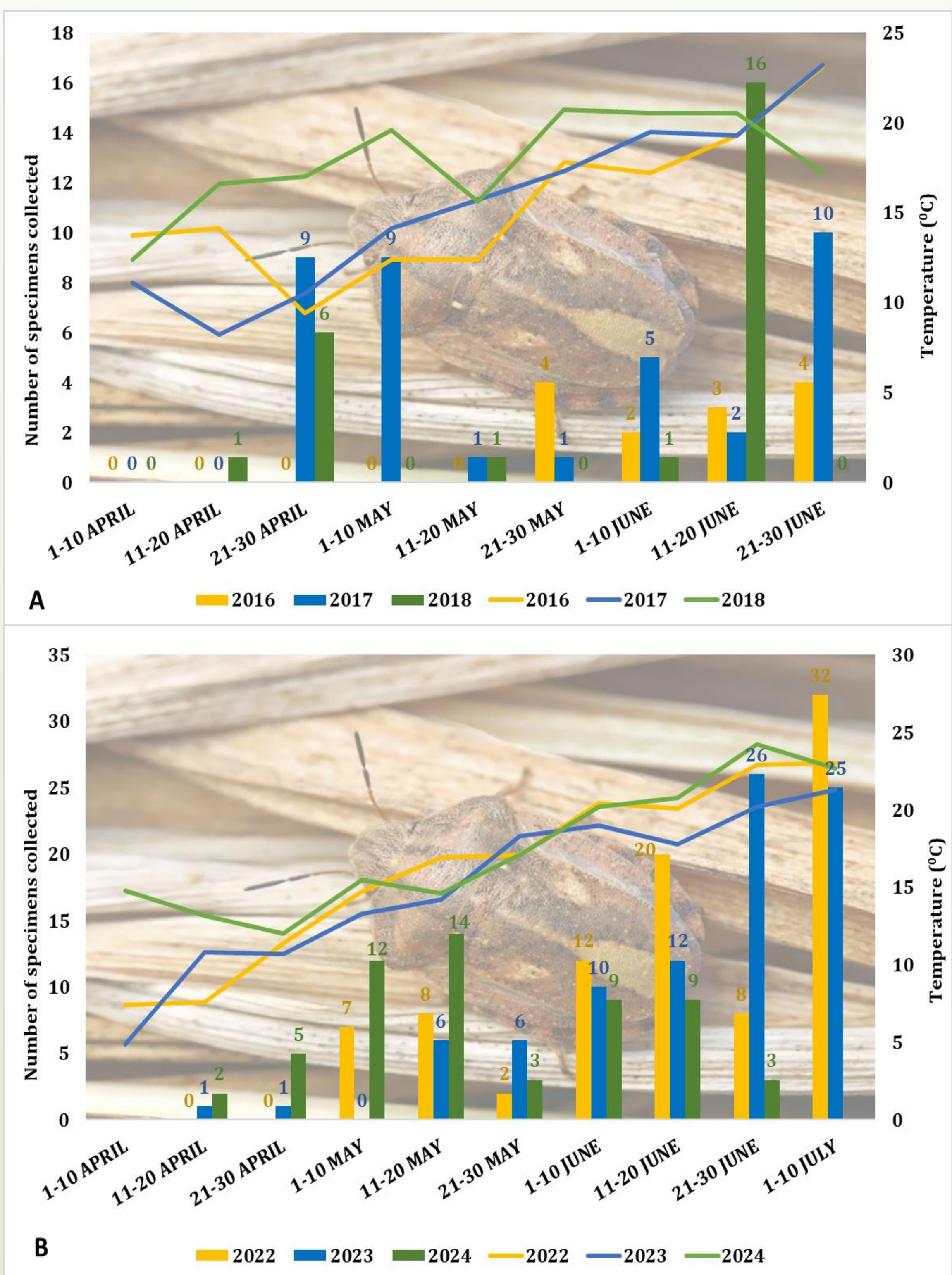

Figure 5. Comparative dynamics of cereal stink bug (Eurygaster spp.) populations between 2016–2018 (A) and 2022–2024 (B)

CONCLUSIONS

- All monitored pest species recorded higher abundances in 2022–2024 than in 2016–2018.
- Increased temperatures likely accelerated pest development and favored population growth.
- Cereal aphids were the most abundant pest species, showing the largest increases in population levels during 2022–2024, indicating a strong sensitivity to rising temperatures.
- Long-term monitoring provides essential information for assessing phytosanitary risks and optimizing pest management strategies in the context of climate warming.

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