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Symptomatic and Biological Observations of *Colomerus vitis* under Changing Climatic Conditions

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INTRODUCTION & AIM

The eriophyid mite *Colomerus vitis* (Pagenstecher) is one of the primary biotic agents responsible for inducing galls and morphological deformities on the foliage and young shoots of *Vitis vinifera* cultivars. In the current context of global climate change, characterized by increasingly mild winters and extended vegetative periods, the population dynamics of this pest have undergone significant shifts. This study aims to document the fundamental biological traits of the species and analyze symptomatic manifestations in correlation with environmental factors. The research emphasizes the importance of understanding complex arthropod–host plant interactions to anticipate the ecological expansion of the mite within vineyards in eastern Romania.

METHOD

Investigations were conducted during the active growth period of the grapevines, monitoring a diverse range of cultivars across various phenological stages. The methodology integrated systematic visual field inspections with high-resolution macrophotography for the in situ documentation of symptomatology. Laboratory analysis involved detailed microscopic examinations of affected tissues, facilitating the morphological identification of individuals and the assessment of population density within erineum structures. The spatial distribution of the mites was correlated with plant age and the genetic characteristics of the hosts, providing a quantitative perspective on the colonization process and the development of *C. vitis* populations.

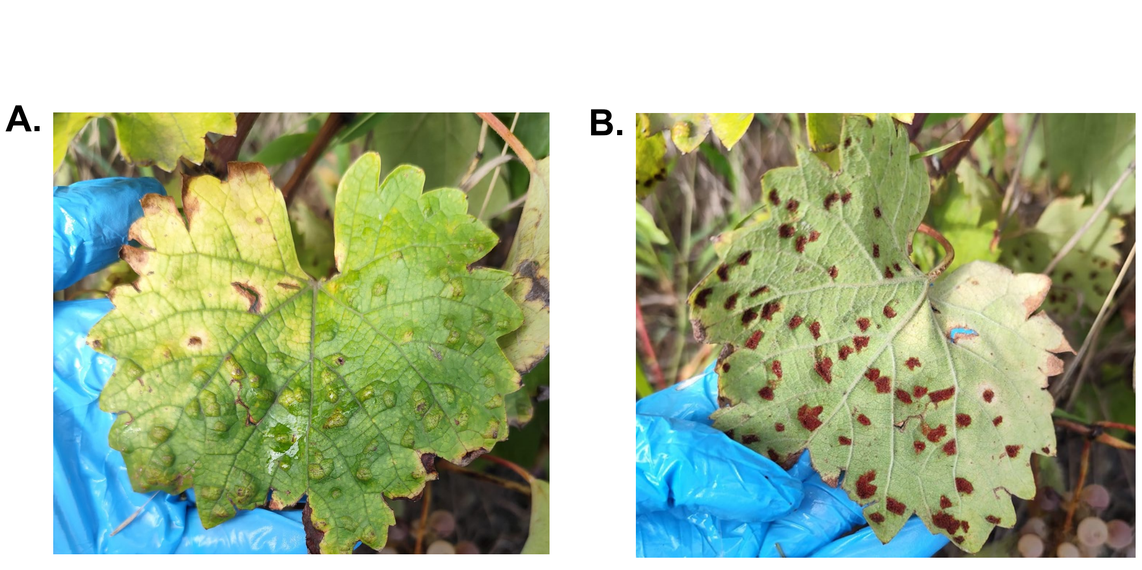

Figure 1. Symptoms of *Colomerus vitis* on grapevine leaves: A. upper surface showing blister-like galls; B. lower surface showing corresponding depressions and hypertrophied tissues.

RESULTS & DISCUSSION

The integrated microscopic and macroscopic analysis revealed a complex array of morphogenetic plant responses elicited by *Colomerus vitis* feeding activities. The most prevalent symptomatic expressions identified were prominent leaf galls, characterized by abnormal trichome proliferation (erineum), alongside pronounced leaf blade curling and severe distortions of young vegetative shoots. These structural alterations represent a specialized host-parasite interaction where the mite manipulates plant ontogeny to create a protective microenvironment. Quantitative data collected across various study sites demonstrate a significant variability in susceptibility among Vitis vinifera cultivars, indicating that the host's genetic architecture and physiological state are primary determinants of infestation severity and damage extent. From an ecological perspective, the escalating prevalence of *C. vitis* directly correlated with the recent trend of milder winters in eastern Romania threatens to disrupt established vineyard ecosystem dynamics. Beyond the immediate reduction in photosynthetic efficiency and plant vigor, the proliferation of this eriophyid mite facilitates its potential role as a biological vector for emerging viral pathogens. Of particular concern is the transmission of Grapevine Pinot gris virus (GPGV), as the increased density and mobility of mite populations under warmer climatic conditions may accelerate the epidemiological spread of the virus within and between vineyards. Consequently, these findings necessitate a fundamental re-evaluation of current economic damage thresholds and the implementation of biodiversity-oriented integrated monitoring strategies to ensure viticultural resilience in a changing climate.

CONCLUSION

The study confirms that *Colomerus vitis* exhibits enhanced adaptability to the emerging climatic conditions in the Moldavia region, showing an aggressive colonization capacity in the investigated vineyards. The systematic documentation of the interaction between biotic and abiotic factors provides essential information for developing sustainable management strategies focused on biodiversity conservation and increasing the resilience of viticultural ecosystems. These results establish a foundation for future research regarding the selection of resistant cultivars and the optimization of biological control methods in the context of agriculture adapted to climate change.

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