

ANALYSIS OF PHYTOSANITARY RISKS IN FIELD-GROWN TOMATOES UNDER NATURAL CYCLES OF MOISTURE DEFICIT AND EXCESS

IOSOB Gabriel-Alin*, <https://orcid.org/0000-0002-8204-9814>

ANTAL Andreea, <https://orcid.org/0000-0001-9906-1003>

CRISTEA Tina Oana, <https://orcid.org/0000-0002-2511-8887>

AMBĂRUȘ Silvia, <https://orcid.org/0000-0002-9623-6602>

BREZEANU Marian, <https://orcid.org/0000-0002-1480-3360>

BREZEANU Creola, <https://orcid.org/0000-0002-3352-3081>

BĂLĂIȚĂ Claudia, <https://orcid.org/0009-0001-4730-1682>

BENCHEA Carmina, <https://orcid.org/0009-0002-5100-4127>

CALARA Mariana, <https://orcid.org/0000-0002-0989-5846>

AVASILOAIEI Dan Ioan, <https://orcid.org/0000-0003-3316-168X>

Vegetable Research and Development Station Bacau, Bacău, Romania

**Corresponding e-mail: iosob.gabriel@gmail.com*

Current climate change, characterized by extreme and unpredictable weather phenomena, calls for a reassessment of plant protection strategies. This paper analyzes the dynamics of key pathogens affecting tomato crops (*Solanum lycopersicum*), namely *Phytophthora infestans* (late blight) and *Xanthomonas campestris* pv. *vesicatoria* (bacterial spot), under the influence of severe climatic fluctuations recorded in the Moldova region (VRDS Bacău) during the years 2024 and 2025.

Pathogen monitoring was conducted through periodic field observations at 10-day intervals, under conditions of natural infestation, and the degree of infestation (GA%) was calculated. Meteorological data (temperature, relative humidity, precipitation) were recorded using the iMmetos 3.3 weather station. The efficacy of certain biological products based on plant extracts (Mimoten, Funres) and copper compounds (Cuprick-L Green) was also evaluated in organic farming systems.

The results highlight a close correlation between rainfall patterns and the severity of the infestation. In 2024, a severe drought in August (0.3 mm of precipitation) followed by extreme rainfall in September (170.4 mm) created major water stress, subsequently favoring an outbreak of *Phytophthora infestans*, which peaked at 28.1% amid day/night temperature fluctuations and condensation. In 2025, rainy periods in July (up to 53 mm/decade) combined with 100% atmospheric humidity

led to an outbreak of late blight, with the incidence rate (GA%) reaching the critical threshold of 30%. *Xanthomonas campestris* pv. *vesicatoria* showed a maximum incidence of 15–18%, strictly dependent on warm (23–30°C) and humid periods. In terms of control, the Cuprick-L Green product (copper-based) demonstrated the highest efficacy (85–92%) in limiting both pathogens.

The study confirms that the alternation between atmospheric drought and episodes of heavy rainfall poses the greatest phytosanitary risk to field-grown tomato crops. It is recommended to adjust control strategies by applying copper-based treatments preventively immediately after heavy rains to prevent bacterial infections and to strictly monitor nighttime dew for the control of late blight.

Keywords: *Phytophthora infestans*, *Xanthomonas campestris* pv. *vesicatoria*, climatic stress, relative humidity, organic farming.

Acknowledgments. This work was supported by a grant from the Romanian Ministry of Agriculture and Rural Development, ADER 6.3.18./2023-2026 and Building the Research Center Leg(O)Nest - cofounded by the European Union, Romanian Government, Regio Nord Est Programm 2021-2027, ADR NORD EST, call PR/NE/2024/P1/RSO1.1/1/2 - Infrastructuri CDI, contract nr. 651/26.03.2025 Smis code, 335392.