



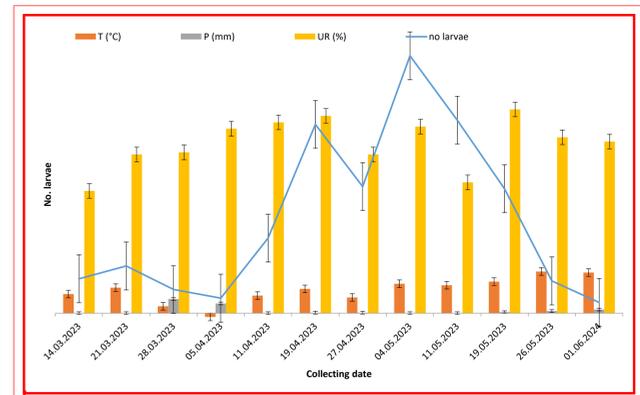
# WINTER MOTH, *OPEROPHTERA BRUMATA* (LEPIDOPTERA: GEOMETRIDAE) - A PEST PROBLEM FOR BLUEBERRY ORCHARDS IN WESTERN ROMANIA

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*Operophtera brumata*, due to its extreme polyphagy, is a potential pest of major importance for many fruit-growing areas in Europe and in Romania. In the western part of Romania, this species of geometrids is more abundant than any other defoliator, and its larvae are extremely harmful, significant damage being produced in the orchards of fruit trees and shrubs.



## Introduction

The most recent infestation with larvae of this pest was reported in 2022, on the southern side of a private blueberry orchard in the Bocşa area, where the blueberry bushes were defoliated only in limited areas. In the autumn of the same year, the adults were also collected with the help of pheromone traps.

The following year, 2023, the infestation was more widespread, 10% of the orchard area was infested and chemical treatments had to be applied. The paper aim was to analyse the structure and dynamics of the pest population in order to understand the regularity of its reappearance

## Material and method

In the spring of 2023, from the first decade of March, surveys are carried out in the blueberry plantation to identify larval infestation, and from the second decade of March, harvesting of biological material - larvae - begins. Monitoring of blueberry larvae begins on 14 March, when the leaf and flower buds begin to open, and continues until 1 July, when the larvae withdraw to pupate.

For a period of 12 weeks, samples were taken weekly. In our experiment, samples were taken from 30 blueberry bushes, each time different ones, to cover a larger area studied. The number of samples to be taken from a bush is 4, with 2 randomly selected branches being monitored. A sample consists of 2 terminal branch pieces of 10 cm length each.



*Operophtera brumata*

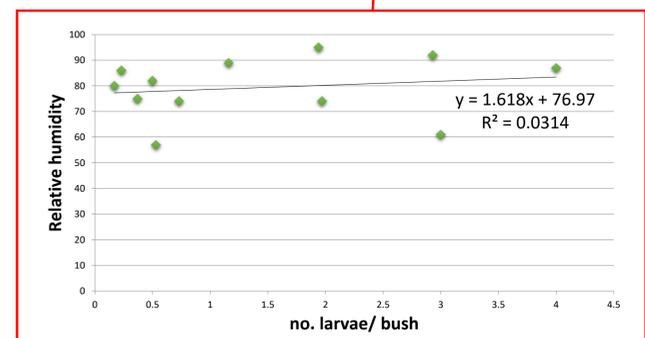
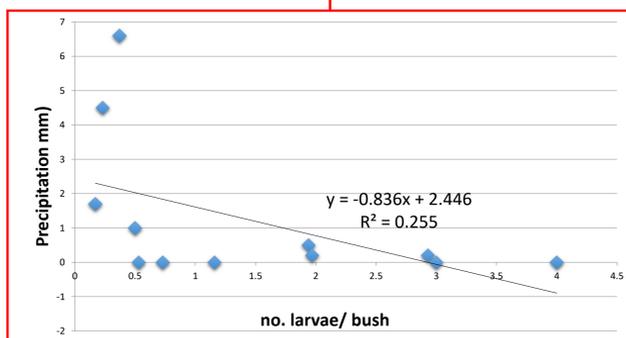
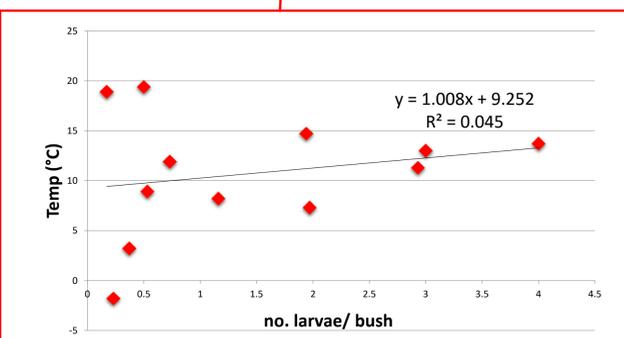
## Results and discussions

During the 79 days in which the larval stage was observed, oscillating values were recorded, with an average catch of 17.53 larvae per bush and the highest number of larvae recorded on 4 May 2023 (n = 120). The high abundance of larvae can be explained by the presence of its abundant primary and secondary host plants: oak (*Quercus* spp.), maple (*Acer* spp.), birch (*Betula* spp.), which are abundant around the plantation as it is located in the high hills and surrounded by deciduous forest. For the larvae samples collected in 2023, significant differences were found between the number of larvae and the abundance of larvae (p<0.5).

The populations of larvae show insignificant variations in numbers at the beginning of the observation period, which continue over a period of 3 weeks, followed by a sharp decrease on the 5th of April, mainly due to the drop in temperature below freezing point. After this date, there is a steady and sustained increase over 4 weeks, reaching the maximum threshold (n = 120) in terms of the number of larvae present in the blueberry orchard on 4 May. Towards the end of the collection period, a continuous decrease in the number of larvae was observed.

By correlating population evolution with atmospheric temperature and humidity, we can observe their influence on larval population evolution.

Correlation analyses using a simple linear regression model showed non-significant positive correlations between climatic factors and the average number of adults, r = 0.045 for temperature, r = 0.031 for relative humidity, and a moderate positive correlation with precipitation = 0.255..



## Conclusions:

The study highlights the importance of climatic conditions, especially temperature and precipitation, and food availability/preference in limiting/expanding *Operophtera brumata* outbreaks in western Romania.