

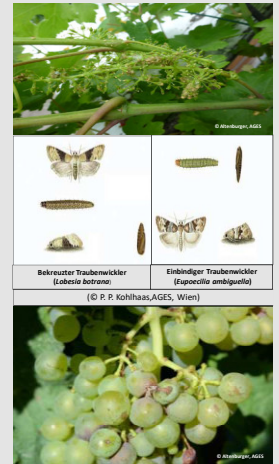
# INFLUENCE OF WEATHER VARIABLES ON THE FIRST SEASONAL OCCURRENCE OF GRAPE BERRY MOTH (*EUPOECILIA AMBIGUELLA*, *LOBESIA BOTRANA*) IN A CASE-STUDY REGION IN AUSTRIA

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<sup>1</sup>: AGES, AT <sup>2</sup>: BOKU-VIENNA, AT

## Introduction

The grape berry/vine moth species *Eupoecilia ambiguella* and *Lobesia botrana* are counted among the key arthropod pests in viticulture and develop in Austria weather dependent 2-3 generations/year. Economic damage is mainly caused by feeding of the 2nd generation instars on the grape berries. Monitoring of the first seasonal occurrence of 1<sup>st</sup> and 2<sup>nd</sup> generation adults, provides important data for related pest forecasting models and optimized scheduling of subsequent plant protection measures. The **present case study analyses the potential influence of four weather related indicators on the first date and duration of adult flight at three selected site clusters in Austria**, based on long term pest monitoring data from operational forecasting services in Austria. **Different forecasting models to predict the first occurrence of the grape berry/vine moth adults were compared for their forecasting performance.**



## Methods

- Calculation temperature sums →  
 $\sum$  daily max. temperature > 0°C until 1st occurrence adults [degree-days]  
 model Freiburg: from 01. Jan (threshold 900 dd);  
 model Neustadt: from 01. März (threshold 620 dd)
- Creation of new multiple linear regression based combination model by using four weather related indicators:
  - 1) mean daily temperature °C: January – May
  - 2) precipitation sum (mm)
  - 3) n days with daily mean temperature < 11°C
  - 4) n days with precipitation
    - # site clusters Krems & Langenlois → calibration sites
    - # site cluster Vienna/Groß-Enzersdorf → validation site

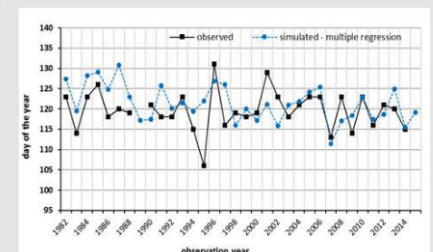
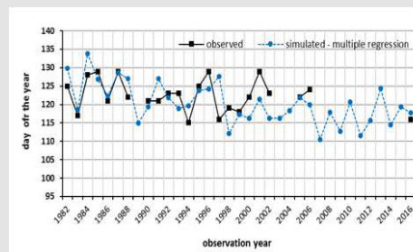
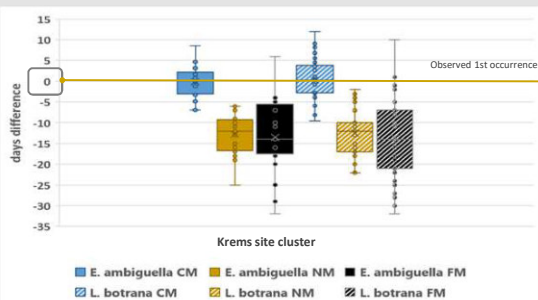
## Materials

- monitoring data: first adult flight at 3 observation site clusters (15 monitoring sites/3 reference weather stations)
- monitoring period: 1982 - 2018
- adult occurrence assessment → pheromone traps; branch cages (every 2-3 days, different operators)
- meteorological data from reference weather stations in Krems, Langenlois and Groß-Enzersdorf (ZAMG)
- daily data of: mean, min., max. air temp. (°C), precipitation (mm)

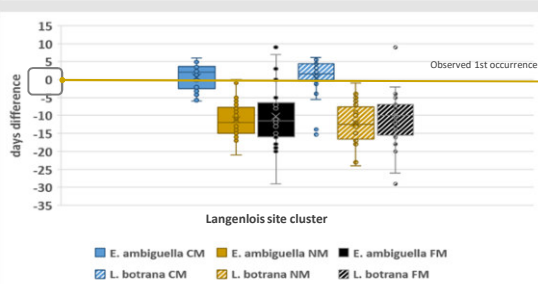
## Results

The first seasonal adult occurrence of both species was observed at the warmest location cluster in Vienna/Groß-Enzersdorf, but fluctuated between observation years and location clusters. The existing degree-day models (Freiburg; Neustadt) for *E. ambiguella* and *L. botrana* predicted the first adult occurrence in most of the observation years on average 5-13 days too early at all site clusters.

The analyses of the influence of single weather parameters on the first appearance of the adults showed that for *E. ambiguella* the number of days with daily mean temp. < 11°C and for *L. botrana* the mean temperature from January-May was crucial at all three location clusters. The accumulated precipitation and the amount of days with precipitation was of little or no importance for the occurrence of both species. The **combined regression based model predicted the first adult appearance date for both species with mean deviations of only 0.2 – 1.3 days**



Validation results for the Combined Model to determine the first occurrence of *E. ambiguella* (left) and *Lobesia botrana* (right) at the Vienna/Groß-Enzersdorf site cluster



## Discussion & Outlook

This first case-study has shown that the **new multiple linear regression based model resulted in an improved forecasting performance** for the first date of seasonal occurrence of adult *E. ambiguella* and *L. botrana* for the tested region in Austria compared to the currently applied two degree-day models.

**With regard to the practicable use of the newly developed forecasting model a further validation and potential improvement with additional data about**

- the first appearance of adults from other locations
- about the first occurrence of the 2<sup>nd</sup> generation adults
- about occurrence and duration of other developmental stages of the two grape berry/vine moth species **is planned.**