Context

Worldwide, pest attacks decrease crop productivity, causing major economic loss. The SOPRA model was developed in Switzerland by Agroscope to optimize monitoring, management and measurements of fruit orchards pests. Its predictions are based on meteorological stations deployed throughout the country.

Objective

Demonstrate that local measurement leads to better predictions on pest development using SOPRA model.

Case Study

- Location: Sion (CH)
- Pest: Codling Moth

Methodology

Data Collection

- 2 local weather stations
- 1 meteoswiss station
- 4 pheromone traps

Data treatment

- SOPRA

Remote monitoring

Analysis & Interpretation

Analogy

Difference in prediction of the Codling Moth’s first flight.

- Meteoswiss: 97 days
- Local weather station: 113 days (Bad weather)
- Ground truth: 125 days

Results

Discussion

- Data from stations in apple orchard lead to a better prediction of the time of first flight for the codling moth than meteoswiss data.
- The station closest to the pest’s habitat leads to better prediction than the one in the field.
- Delay between the prediction and the ground truth is still important.
- Delay could be explained by bad climate conditions that prevented the adults moth to fly.

Summary

- Number of days to first flight:
  - Meteoswiss: 97 days
  - Local weather station: 113 days (Bad weather)
  - Ground truth: 125 days

- Population stages:
  - Pupa, female
  - Pupa, male
  - Adult, female
  - Adult, male
  - Egg

- First flight from station 5:
  - 22nd of April
  - 13th of April

- First flight ground truth:
  - 5th of May

Conclusion

- Local measurement leads to better pest development prediction using SOPRA model
- The closest the sensor is to the pest’s habitat, the better is the accuracy
- Furthermore: SOPRA model’s predictions could be improved by a threshold accounting on climate conditions