

# Decision support systems to improve direct control methods of codling moth

## Problem

The codling moth *Cydia pomonella* is one of the most important pests in organic fruit growing. Damage is caused by the feeding activity of the larvae. Heavy codling moth infestation can lead to massive yield losses.

## Solution

In addition to pheromone traps (attractant traps) for flight monitoring, various monitoring/population models such as RIMpro and Fruitweb can be consulted, which use various parameters to calculate codling moth hatching and egg laying.

## Benefits

A combined strategy of various direct (granuloviruses; nematodes) and indirect measures (population models, pheromone traps) can lead to a reduction in codling moth populations in the long term.

## Practical recommendation

### Codling moth population model:

- Forecasting models such as the Fruitweb model can be used to predict treatment dates and reduce the need for spray treatments.
- Codling moth forecasting models provide predictions of possible egg-laying and hatching dates and help fruit growers make more accurate codling moth treatment decisions.
- The Fruitweb model shows the current course of a codling moth population (moth flight, egg laying, larval development) in the orchard; codling moth development depends on climate, location/site, temperature and day length.
- The Fruitweb model is based on the codling moth model by Graf, Höhn, Höpli and Kuske (2018).
- For targeted and optimized control, own infestation monitoring (attractant traps) and the recommendations from agricultural advisors should always be used additionally.

### Explanation of the codling moth Fruitweb model (Picture 1)

- The forecast models are calculated with approximate population strengths; the respective local weather conditions are included in the calculation; the calculation is performed retrospectively with the measured weather data and prospectively with the weather forecasts.
- The upper diagram shows the course of the borings (red dotted line), as well as the number of larvae in the respective larval stages (larval stages L1-L5: various shades of orange and yellow, see legend on the bottom).
- The middle diagram shows the daily oviposition, i.e., the number of eggs per day (red line).

## Applicability box

### Theme

Crop production, Horticulture, Temperate fruits

### Keywords

Plant protection, Pest control, Biological pest control

### Context

Central Europe

### Required time

Immediately

### Period of impact

May-August

### Equipment

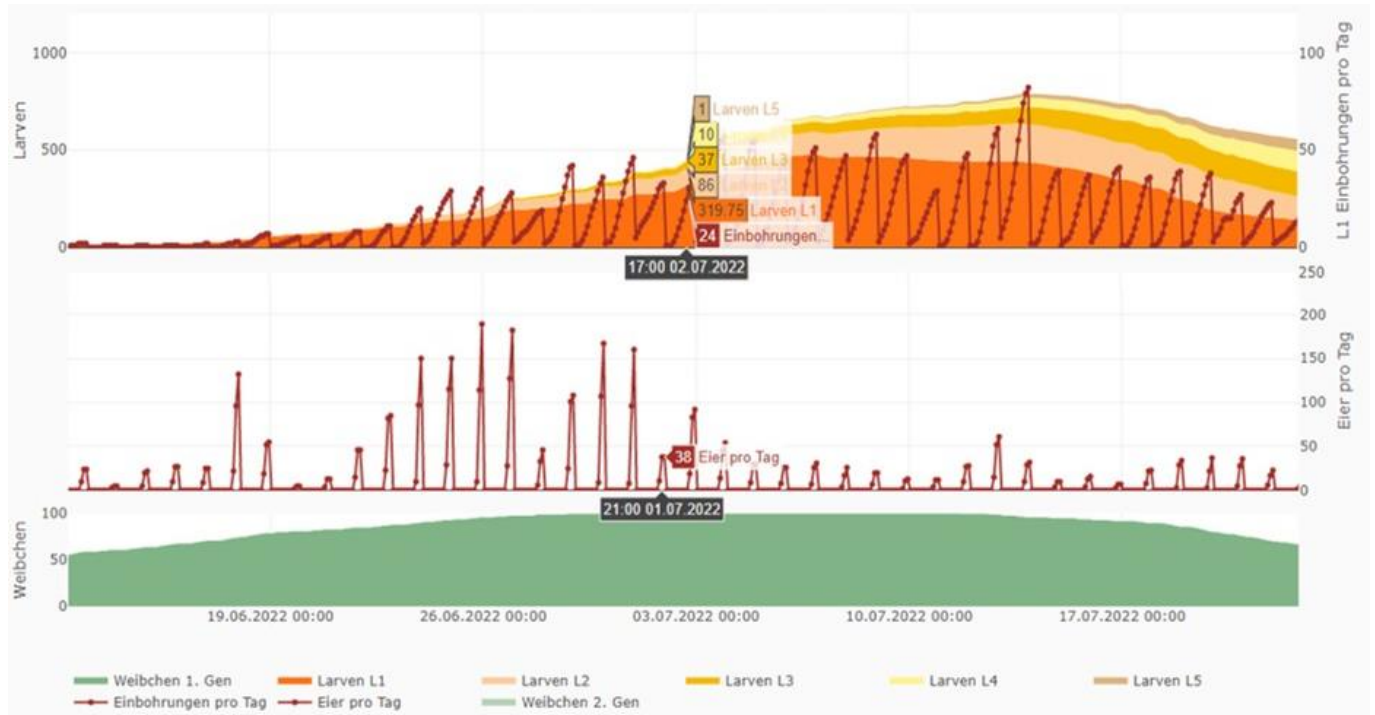
Forecasting models: Fruitweb, RIMpro

### Best in

Organic orchards



- The lower diagram shows (in green) the number of fertile females per day, the flight of the females depends mainly on the weather conditions and the time of day (crepuscular).



Picture 1: Fruitweb forecast model (source: fruitweb.info). X-axis shows the date and time; y1-axis shows in the lower diagram the number of fertile females and in the upper diagram the number of larvae in the respective larval stage L1-L5; y2-axis: shows in the middle diagram the number of eggs per day and in the upper diagram the Larvae holes per day (L1).

## Further information

### Further reading

- Graf, B., Höhn, H., Höpli, H.U., Kuske, S. 2018. Predicting the phenology of codling moth, *Cydia pomonella*, for sustainable pest management in Swiss apple orchards. The Netherlands Entomological Society.
- Graf, B., Höhn, H., Höpli, H.U. 2003. Optimizing insect pest management in apple orchards with SOPRA. Bulletin IOBC/SROP, Vol.26 No.11:43-48.

### Weblinks

- The [Fruitweb model](#)
- The [RIMpro model](#)
- The [Organic Farm Knowledge platform](#) for more practical recommendations

## About this practice abstract

**Publisher:** Fördergemeinschaft Ökologischer Obstbau e.V. (FÖKO)

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**Permalink:** [organic-farmknowledge.org/tool/46019](https://organic-farmknowledge.org/tool/46019)

**Project name:** BIOFRUITNET- Boosting Innovation in ORGANIC FRUIT production through stronger networks

**Project website:** <https://biofruitnet.eu>

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