

Apple scab (*Venturia inaequalis*): Direct control using decision support systems

Problem

Field hygiene measures and resistant varieties against apple scab exist but if resistance is overcome, direct control with plant protection products is still the most efficient measure in organic production.

Solution

Based on the pathogen biology, local meteorological data, forecasts and crop information, decision support systems, e.g. RIMpro or Simscab, enable farmers to assess the infection risk for apple scab and allow optimal timing of direct crop protection measures.

Benefits

Support systems such as RIMpro provide forecasts of infection events and assist farmers in the decision-making for higher efficacy of the treatments and better scab control.

Practical recommendation

Apple scab sprayings

- Preventive treatment prior to infection period: The freshly germinating ascospores are very susceptible to contact fungicide, so a preventive treatment can be implemented prior to spore ejection (Fig. 1, A).
 - Until balloon stage (BBCH 59): **copper** (150-300 g pure copper/ha*) or **copper + wettable sulfur** (exchange sulphur with a wetting agent when the temperature is low²); reduce the amount of copper as you get closer to the pre-bloom (risk of russetting).
 - From balloon stage (BBCH 59) to walnut stage (BBCH 74)¹: **acidified clay mineral** (8 kg/ha*) + **wettable sulfur** (8-12 kg/ha prior to full bloom BBCH 65, 3-8 kg/ha after full bloom, choose lower dosage if high temperatures*), or **only wettable sulfur** if acidified clay mineral is not allowed in your country*.
 - From walnut stage on (BBCH 74): continue with **acidified clay mineral + wettable sulfur***, or switch to **copper (+ sulfur)***.
- Stop-treatment onto wet foliage: The amount of germinating ascospores over time is indicated by the white area behind the yellow bar (Fig. 1, 7). Within this time, a stop treatment can be used to kill the spores (Fig. 1, B).
 - **lime sulfur** (25.6 l/ha prior to full Bloom, 19.2 l/ha after full bloom*) or
 - **potassium bicarbonate** (4.8 kg/ha*) + **wettable sulfur** (8-12 kg/ha prior to full bloom BBCH 65, 3-8 kg/ha after full bloom, choose lower dosage if high temperatures²*)

¹No copper during this period (risk of russetting). This can also be used as a copper-free strategy during the whole season.

²Sulfur takes effect when evaporating.

*Check country specifications and authorization. Acidified clay mineral is currently authorized in Italy and Switzerland.

Applicability box

Theme

Crop production, Horticulture

Keywords

Temperate fruits, plant disease control, plant protection, apples, apple scab

Context

Temperate regions. Can be applied wherever apple scab is a problem and where the RIMpro forecast model is supported.

Application time

March/April to June/July.

Required time

Time to regularly check the RIMpro forecast model when rainfall events are forecasted.

Equipment

Smartphone or computer with internet access.
Weather station nearby the orchard and user access to the RIMpro platform.

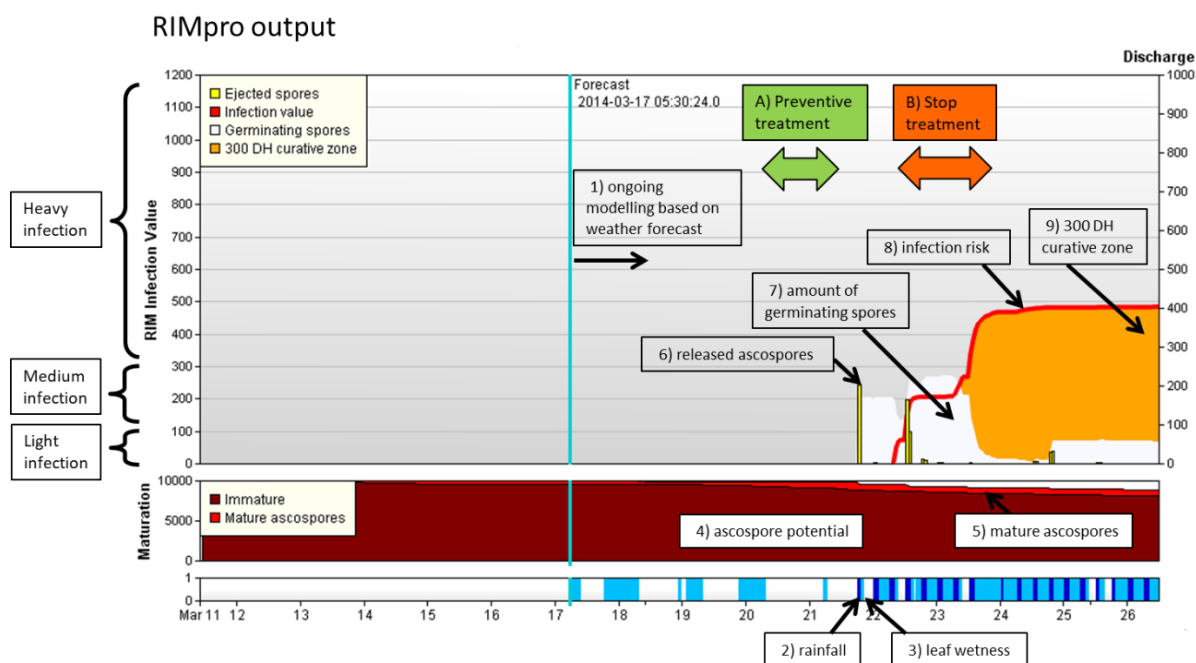


Figure 1. Example of a RIMpro forecast for apple scab. Real-time and site-specific based weather data forecasts (1), estimated infection period (8), measured (left from the blue line) and forecasted (right from the blue line) rainfall (2) and leaf wetness (3). Leaf wetness can occur either after a rainfall event or due to dew or high relative humidity. The proportion of immature spores (equalling to the ascospore potential, 4) and proportion of mature ascospores (5) from the total stock for the season. Mature ascospores are released after a rainfall event (yellow bar, 6) and can then germinate when landing on a leaf (7). The red line (8) indicates the number of germinated spores about to penetrate the leaf (=infection). These spores are not susceptible anymore to contact fungicides. The orange area (9) shows the period of 300-degree hours (DH) from the calculated time point of infection. During this time, it is possible to kill germinated spores with curative plant protection products, which are, however, not available in organic farming. The infection risk is given by the height of the red line: RIM < 100 = light infection, RIM 100 - 300 = medium infection, RIM >300 = heavy infection. Photo: adapted from rimpro.eu.

Further information

Weblinks

- Check the [Organic Farm Knowledge](#) platform for more practical recommendations.
- [RIMpro apple scab](#) forecast model
- [Article in the Bioaktuell magazine](#) about the RIMpro apple scab forecast model (in German)
- [Other apple scab forecast models](#): Fruitweb, Farm Software, Simscab, Metos
- Technical leaflet (in German) on [plant protection in organic pome fruit farming](#) in the FiBL shop

About this practice abstract

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