BIOFRUITNET
Boosting Innovation in ORGANIC FRUIT production through stronger networks

FiBL

PRACTICE ABSTRACT

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 meteo data, forecasts and crop info, 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.

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 until the harvest.

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.

Practical recommendation

Apple scab sprayings

Preventive/ stop-treatment	Bud break (BBCH 53 (C)) until balloon stage (BBCH 59 (E2)) 	Balloon stage (BBCH 59 (E2)) until end of flowering (BBCH 69 (H))[1] 	End of flowering (BBCH 69 (H)) until walnut stage/T-stage (BBCH 74) [1] 	Walnut stage/T-stage (BBCH 74) until harvest
preventive treatment	**copper**[1] (300 to 150 g pure copper/ha[2]*) and/or **wettable sulfur**[2] (6-8 kg/ha*)	**wettable sulfur**[2] (6-8 kg/ha*) (+ **acidified clay mineral**[4] (8 kg/ha*)) or **lime sulfur**[3] (10-16 l/ha*)	**wettable sulfur**[2] (2-4 kg/ha*) (+ **acidified clay mineral**[4] (8 kg/ha*)) or **lime sulfur** (8-12 l/ha*)	**wettable sulfur**[2] (2-4 kg/ha*) (+ **acidified clay mineral**[4] (8 kg/ha*)) or **wettable sulfur**[2] (2-4 kg/ha*) + **copper** (100-150 g*)
stop-treatment	**lime sulfur**[3] (10-16 l/ha*) or **potassium bicarbonate** (4-5 kg/ha*) + **wettable sulfur**[2] (6-8 kg/ha*)		**lime sulfur** (8-12 l/ha*) or **potassium bicarbonate** (4-5 kg/ha*) + **wettable sulfur**[2] (2-4 kg/ha*)	

An adhesive and/or wetting agent can be added to improve the efficacy.

[1] **Copper**: Reduce the amount of copper as you get closer to the pre-bloom, and don't use copper from bloom to walnut stage (risk of russeting).

[2] **Sulfur**: Use if T >12 °C (no effect below this temperature as sulfur takes effect when evaporating). The higher the temperature the lower the dosage.

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[3] **Lime sulfur**: Be aware that during the blooming phase, lime sulfur has a thinning effect.
[4] Add **acidified clay mineral** for an additional effect against apple blotch (*Marssonina coronaria*); acidified clay mineral is currently authorized in IT and CH.

*** Dosage for 10,000 m³ tree row volume (TRV) resp. 2 meters canopy height. Check country specifications and authorization.**

- **France: Index of phytosanitary products**
- **Germany, Switzerland, Austria: FiBL input list**
- **Italy: Italian input List**

- **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).
- **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 will kill the spores (Fig. 1, B).

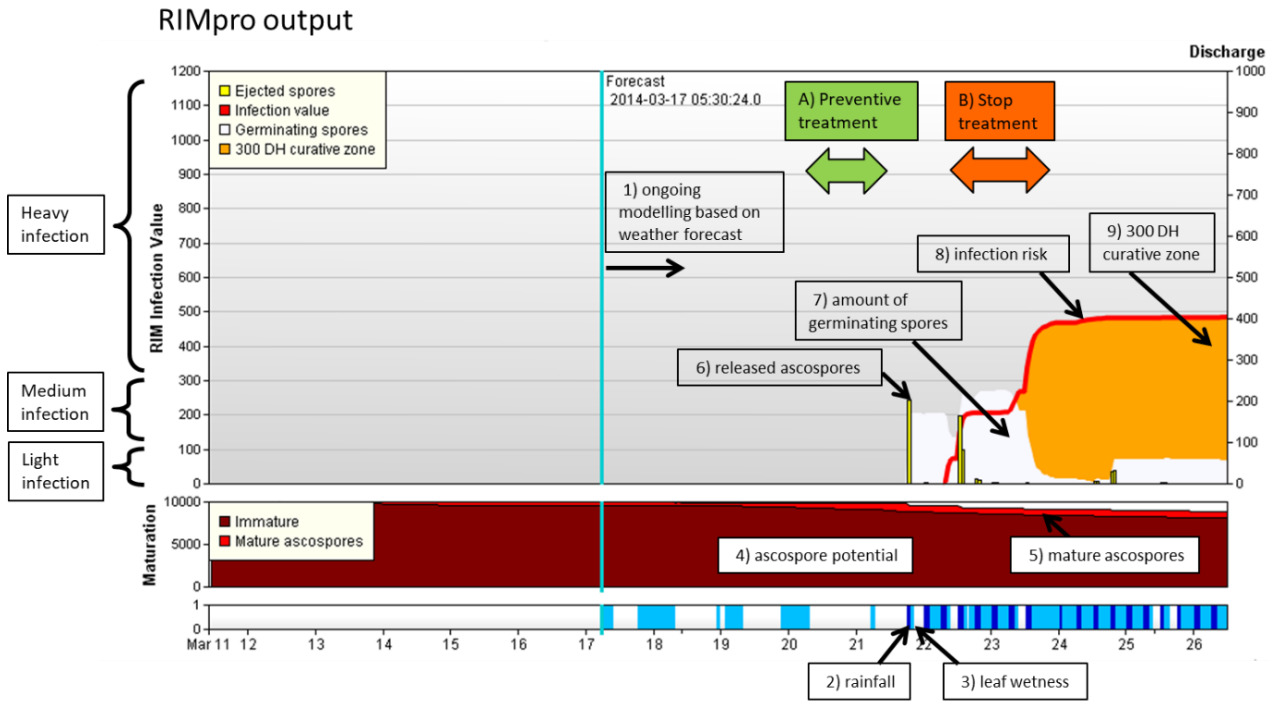

Figure 1. Example of a RIMpro forecast for apple scab. Real-time and site-specific based weather data forecasts (1), estimated infection period (8), measured (left from the blue line) and forecasted (right from the blue line) rainfall (2) and leaf wetness (3). Leaf wetness can occur either after a rainfall 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

- FiBL input list for organic farming
- 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

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- Technical leaflet (in German) on plant protection in organic pome fruit farming in the FiBL shop

About this practice abstract

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