

Stemphylium forecast with TomCast – an online tool for fungicide timing in asparagus

Actual situation

- **Stemphylium botryosum** is the most important asparagus disease in the region. Disease progress is neither easily recognizable nor continuous.
- Fungicide application is often not possible during or after heavy rainfall.
- The IPM concept - timing after disease progress thresholds - is not practicable.

Possible solution

A forecast model, which makes an realistic approach to disease progress, may deliver a solution, so that:

- in accordance to the disease progress and
- existing or lack of fungicide protection, a dynamic fungicide strategy is possible.

Model from the USA

TomCast model

- originating from the USA (Madden et.al., 1978) for *Alternaria* at tomatoes (TOMato foreCAST);
- small weather stations with sensors for leaf wetness and temperature are placed in resp. beneath the crop;
- disease severity values (DSV) are shown direct on the logger of the weather station or weather data are transferred to a PC/laptop, where the forecast is running;
- the model is used worldwide in tomatoes (USA, Canada, Brasil, etc.), but also in other crops as asparagus, carrots, celery, etc.;
- the model can be purchased as an additional tool for weather stations (Spectrum, Adcon, Metos, etc.);

Consequences:

- Rhineland-Palatinate has more than 100 agrometeorological weather stations from another supplier; so own programming was necessary and was done by ZEPP.

Leaf wetness (dew) modul DSV_S

leaf wetness hours	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
13 - 17°C	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	3
18 - 20°C	0	0	0	0	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3	4	4
21 - 25°C	0	0	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	4	4	4	4
26 - 29°C	0	0	0	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3	4	4

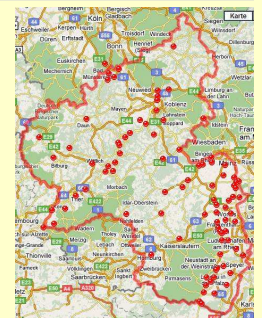
Disease Severity Values (0 to 4) are derived for every day (11 to 11 a.m.) from the mean temperature during the leaf wetness periods.



Metos weather sensors in the canopy

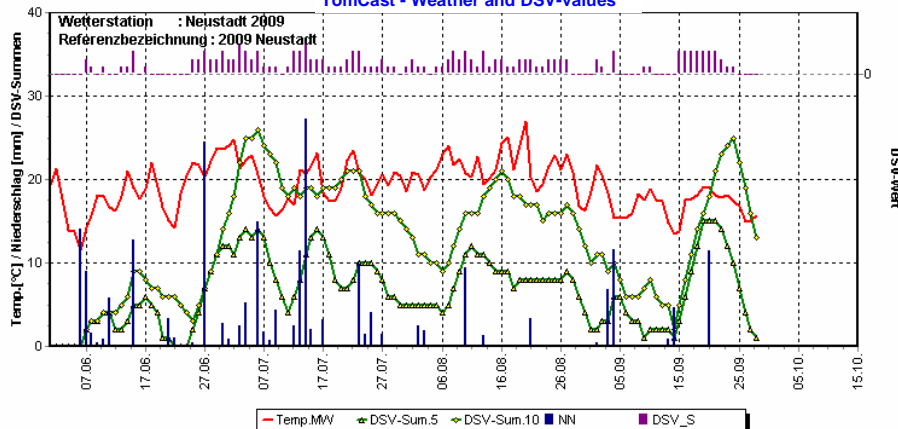
Activities

- Modelling of TomCast under PASO-surface by ZEPP.
- Several trials for the validation of the model from 2007 to 2009 in cooperation with other state institutes and chemical companies.
- Online publishing of the daily TomCast forecast for 6 relevant weather stations in the asparagus growing area on www.dlr-rheinpfalz.rlp.de.
- Additional advice for the use of the model with respect to history of the plantation, previous selected fungicides and weather forecast or intended irrigation respectively.



Network with 100 weather stations

TomCast - Weather and DSV-values



Actual online tools

- Daily DSV_S (0 to 4)
- Cumulated DSV for the last 5 days
- Cumulated DSV for the last 10 days
- Mean temperature (° C)
- Daily rain (mm)
- Temperature (° C; MIN and MAX) in a extra graph
- Csv file with all model outputs

Actual strategy for fungicide timing with TomCast

- DSV-threshold for the first fungicide application is 35, or first application primary oriented against *Botrytis cinerea*.
- Approximately DSV-threshold for the following applications is 20.
- In accordance to the assumed existing or not existing fungicide protection, weather forecast and intended irrigation the fungicide strategy is adopted for the use of protective and/or curative fungicides.