

IOBC Meeting 2013

IOBC-WPRS Meeting of the Working Group
on "Integrated Protection and Production in Viticulture"
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Presentation of the VitiMeteo forecasting system

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Overview

- Introduction
- VitiMeteo - Current state
- VitiMeteo - Outlook

What is „VitiMeteo“?

- Cooperation project since 2002
- Platform for forecasting models and weather data for viticulture

Changins

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GEOsens
■ Ingenieurpartnerschaft
■ Messsystem- und
■ Softwareentwicklung

Objectives

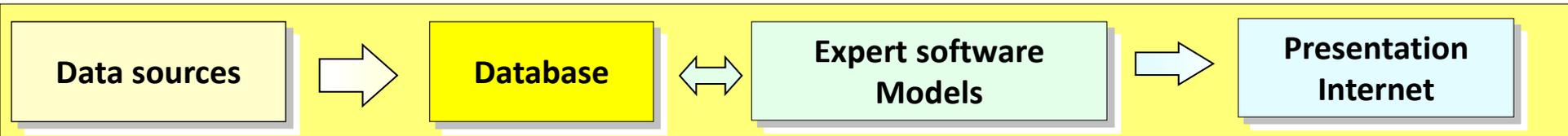
- **VitiMeteo – modern and flexible tools**
 - Tools for research
 - Further development of models
 - Use in practical plant protection
 - **Advisory service**
 - Winegrowers
 - Others



Overview

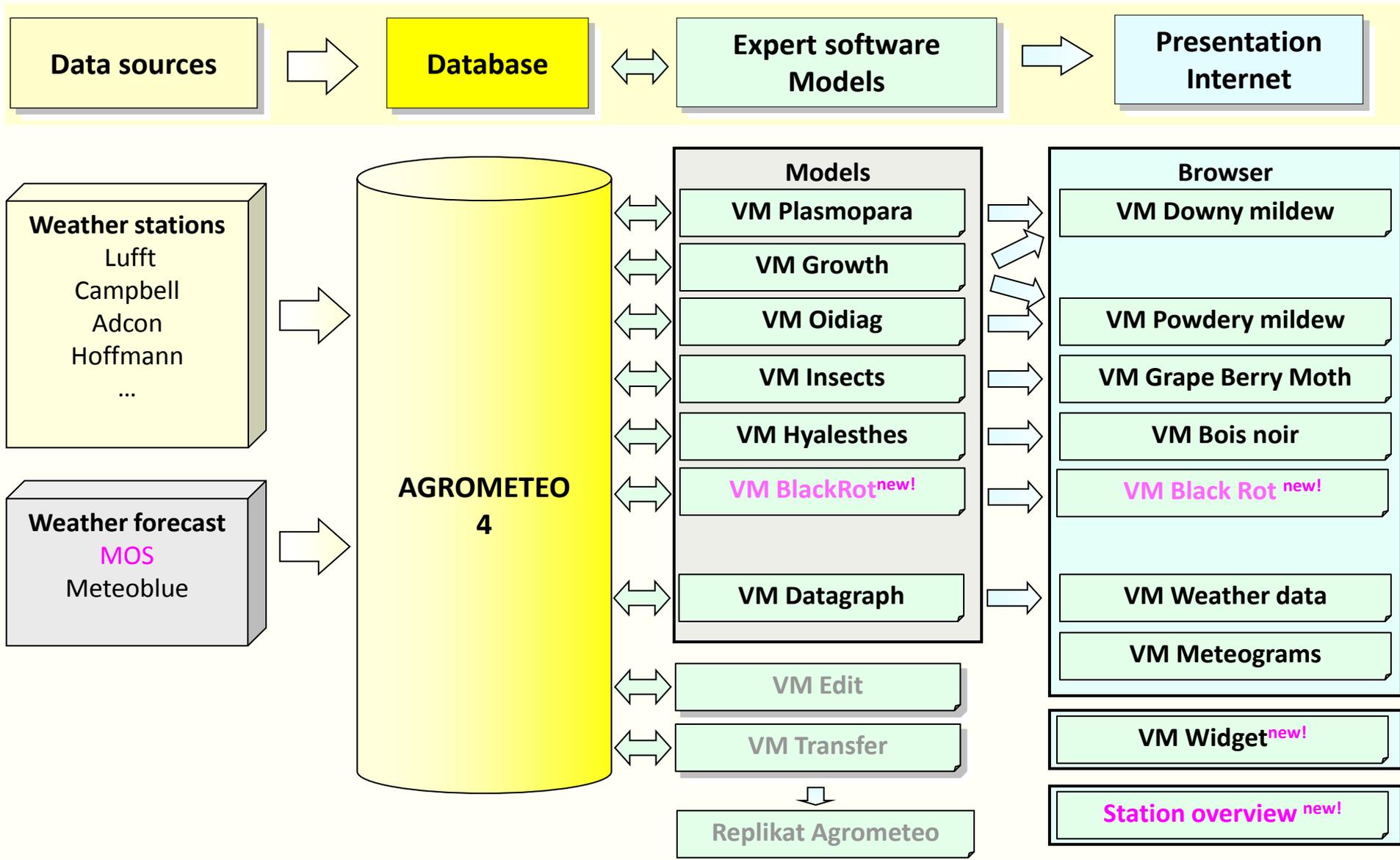
- Introduction
- **VitiMeteo - Current state**
- VitiMeteo - outlook

Forecasting system "VitiMeteo" 2013

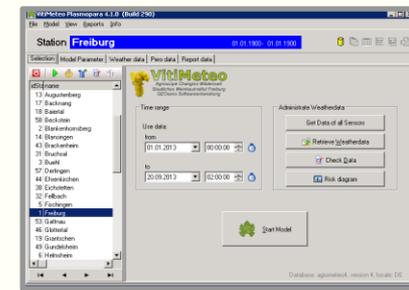


Forecasting system "VitiMeteo" 2013

VM = VitiMeteo



“VM Plasmopara”

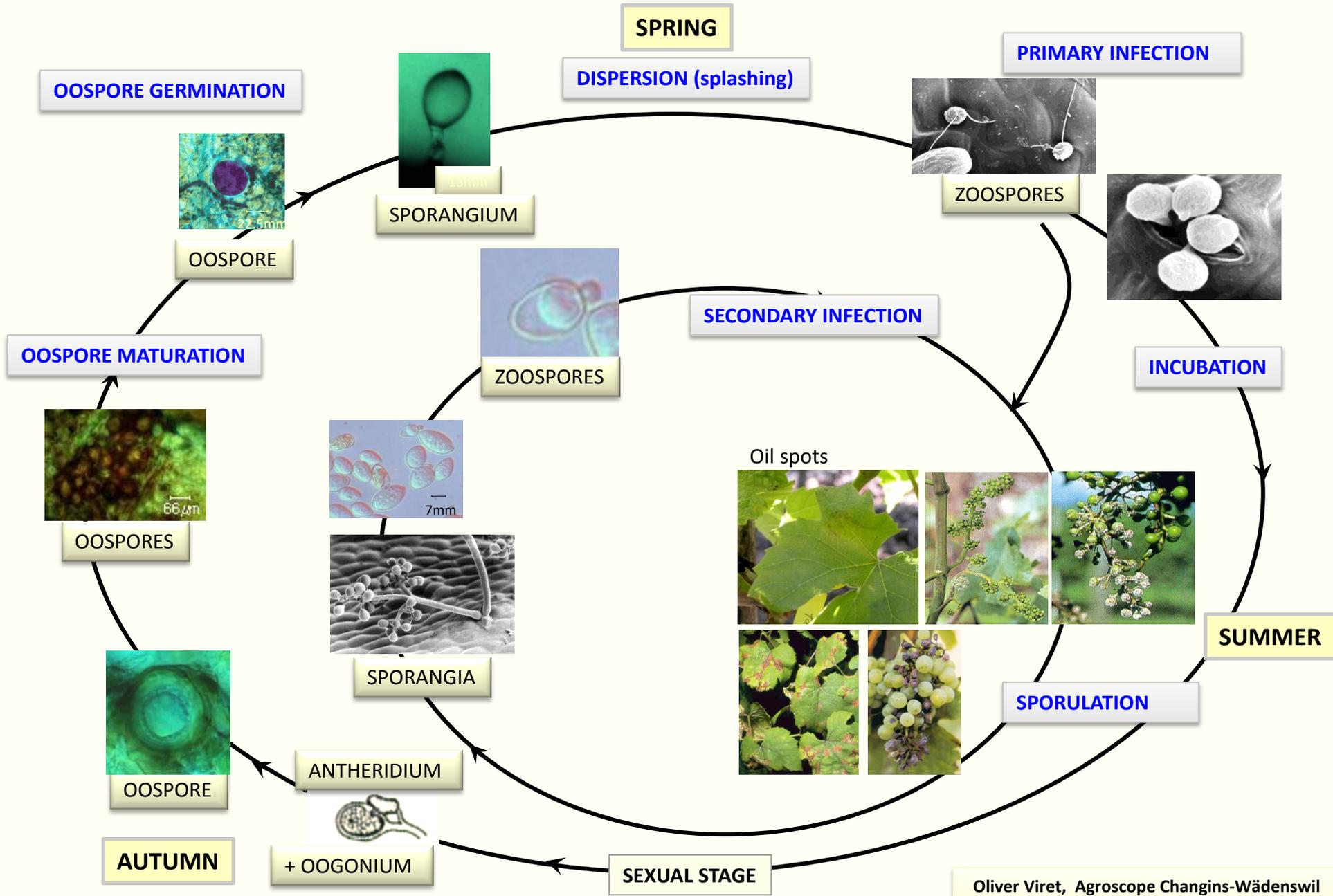


Type of model: Numeric simulation of biological processes

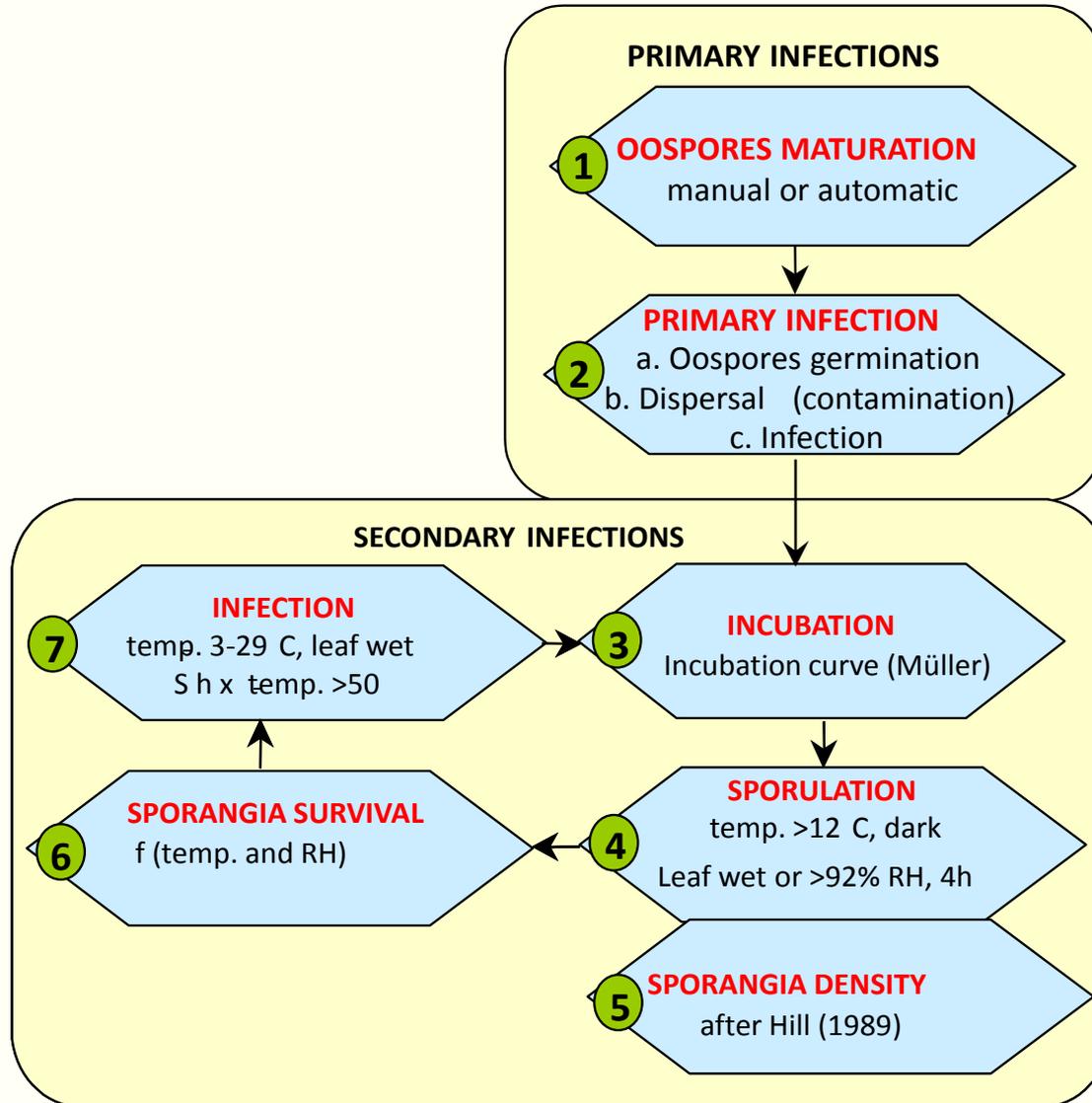
Literature, basis of the model

- Müller, K. und Sleumer, H. 1934: Biologische Untersuchungen über die Rebenperonospora in den südwestdeutschen Weinbaubezirken. Z. Pfl. Krankh. Pfl.schutz 57, 635-683
- Blaeser, M., 1978: Untersuchungen zur Epidemiologie des Falschen Mehltaus an Weinreben, *Plasmopara viticola* (BERK et CURT ex DE BARY) BERL. et DE TONI. Diss. Univ. Bonn
- Hill G.K., 1989: Effect of temperature on sporulation efficiency of oilspots caused by *Plasmopara viticola*, Berk. & Curt. ex de Bary, Berl. & de Toni in vineyards, Wein-Wissenschaft, (44) 86-90
- Schultz, H.R., 1992: An empirical model for the simulation of leaf appearance and leaf development of primary shoots of several grapevine (*Vitis vinifera* L.) canopy-systems. Scienta Hortic.; 52: 179-200
- Bleyer G. und Huber B., 1996: Bekämpfung der Peronospora nach dem Freiburger Prognosemodell, Deutsches Weinbau-Jahrbuch (47) 101-112
- Kast W. K., 1999: Stark-Urnau, Survival of sporangia from **Plasmopara viticola**, the downy mildew of grapevine, *Vitis*, 38 (4) 185-186
- Hill, G. K., 1997: Peronospora: Dem Rätsel der Primärfektion auf der Spur, Deutsches Weinbau- Jahrbuch (48), 123-131
- Gessler C., Rumbou A., Jermini M. and Gobbin D., 2002: Oosporic infections versus asexual reproduction in *Plasmopara viticola* epidemics: practical consequences Proceedings of the 4th International Workshop on Powdery and Downy Mildew in Grapevine, Napa, California, 16
- Loskill B.J., Hoppmann, D, Berkelmann-Löhnertz B., 2002: Epidemiological studies on soilborne infections of downy mildew. Proceedings of the 4th International Workshop on Powdery and Downy Mildew in Grapevine, Napa, California, 9
- Viret O. and Bloesch B., 2002: Observation on germination of oospores and primary infection of *Plasmopara viticola* (Berk & Curt.) Berl. & De Toni under field conditions in Switzerland. Proceedings of the 4th International Workshop on Powdery and Downy Mildew in Grapevine, Napa, California, 10
- Huber, B. et al. 2002: Studies on the effective period of protective fungicides against downy mildew (*P. viticola*); Proceedings of the 4th International Workshop on Powdery and Downy Mildew in Grapevine, Napa, California, 29-30
- Schultz, H.R., 2003: Wachstumsmodell der Rebe: Jetzt wächst die Rebe am Bildschirm. Das Deutsche Weinmagazin 10, 28-31
- Bleyer G., Huber B., Steinmetz V. and Kassemeyer H.-H., 2003: Growth-models, a tool to define spray intervals against downy mildew (*Plasmopara viticola*); IOBC/wprs Bulletin Vol. 26 (8), 7-12

Lifecycle *Plasmopara viticola*



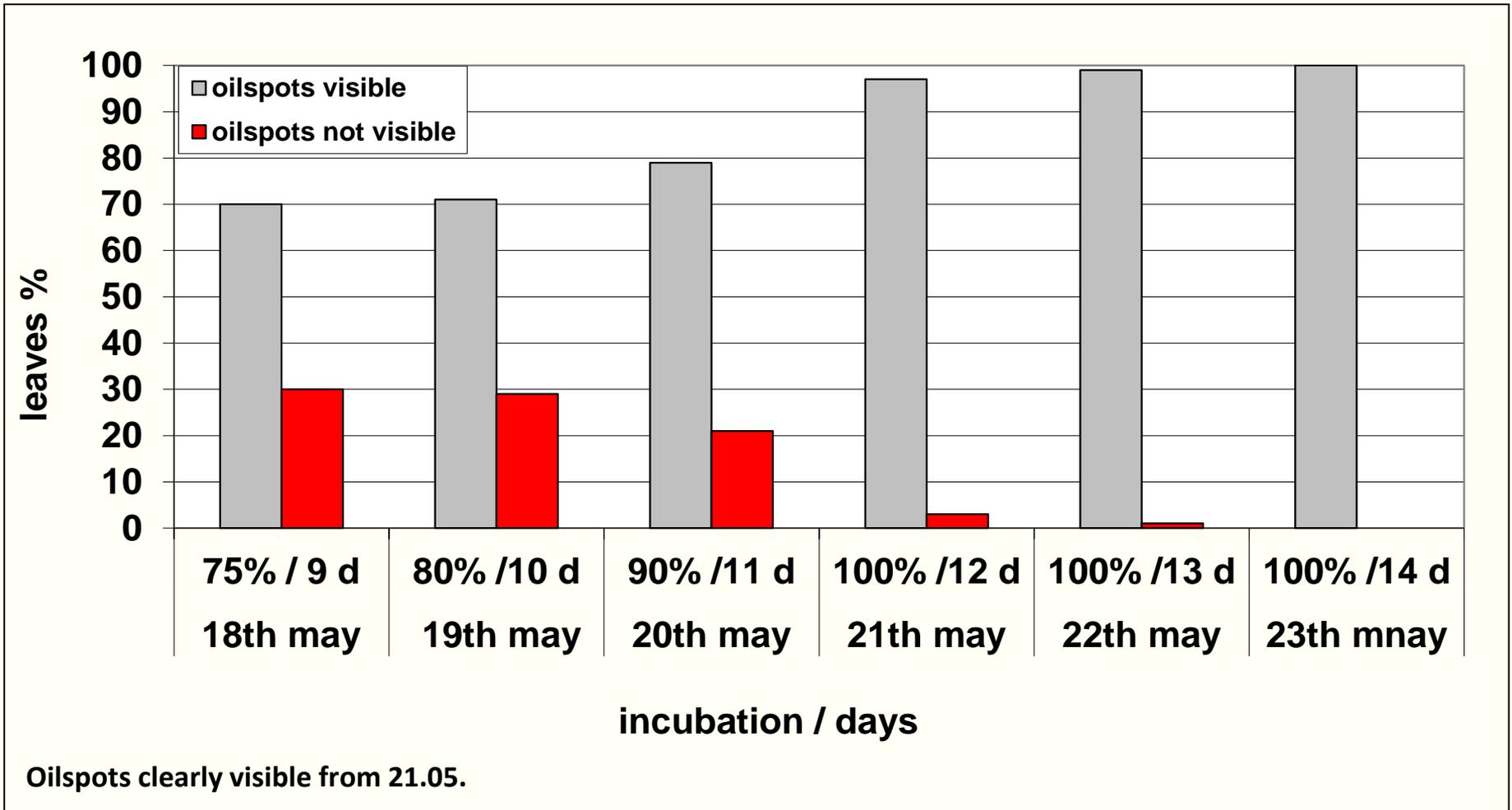
Algorithms contain all steps of the development of *Plasmopara viticola*



Validation of incubation period with "VM Plasmopara"

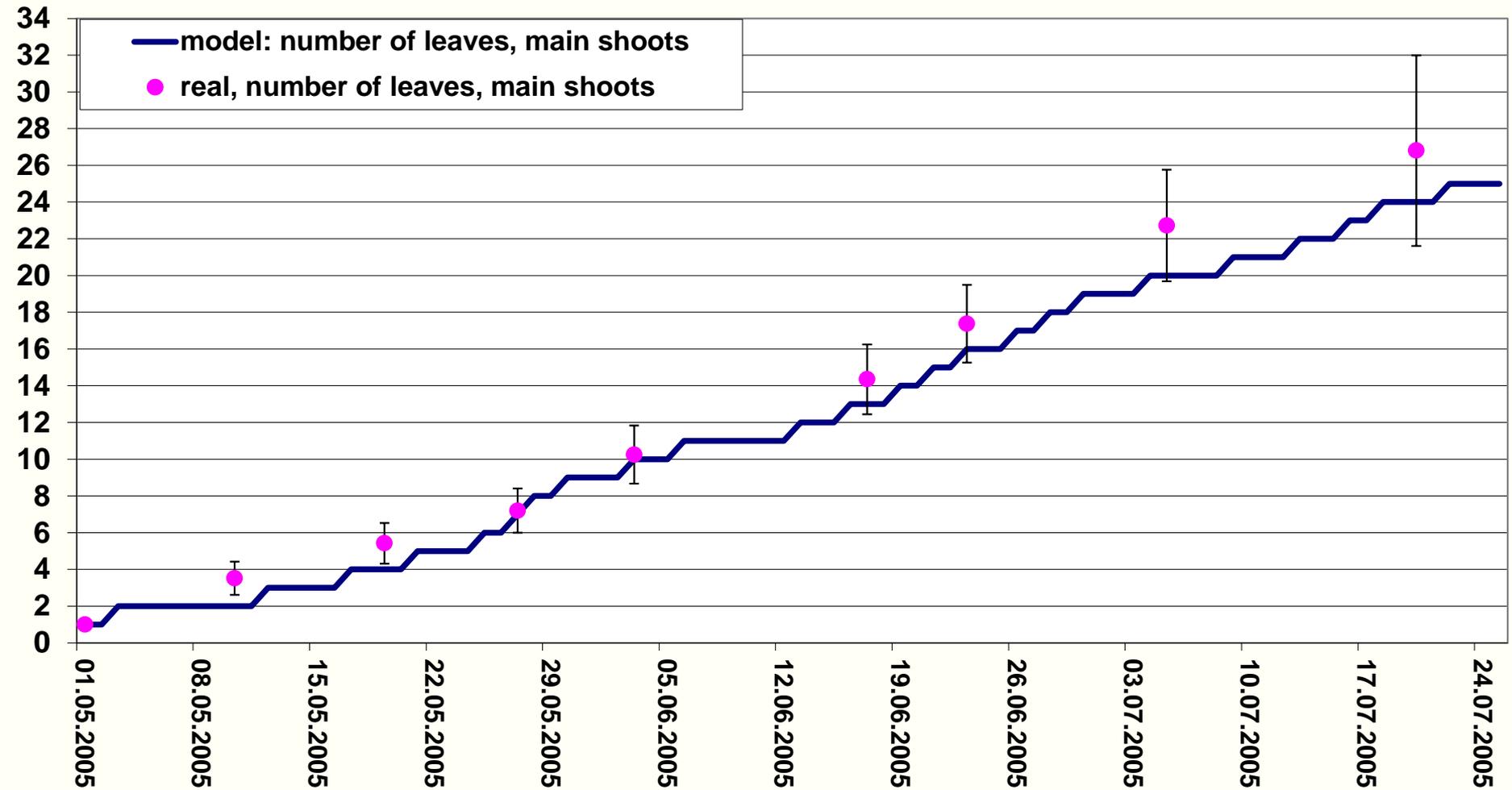
Plasmopara viticola: incubation period and symptoms (oilspots), n = 100;

Freiburg, Schlierberg, Pinot Noir cv., artificial infection on 9th May 2005



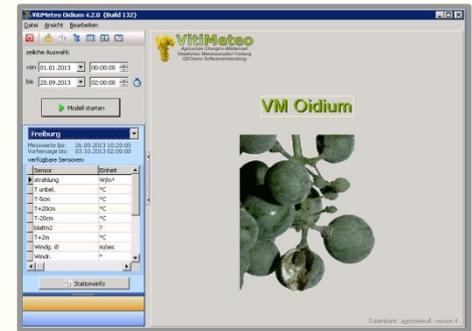
Lit.: Bleyer, G.; Kassemeyer, H. H.; Krause, R.; Viret, O.; Siegfried, W. : "VitiMeteo Plasmopara"-Prognosemodell zur Bekämpfung von „*Plasmopara viticola*“ (Rebenperonospora) im Weinbau. Gesunde Pflanzen, Germany. 60 (3) 91-100 Jahr: 2008

Validation of the growth model, simulation results, Freiburg, Müller-Thurgau cv. 2005



Lit.: Bleyer, G.; Kassemeyer, H. H.; Krause, R.; Viret, O.; Siegfried, W. : "VitiMeteo Plasmopara"-Prognosemodell zur Bekämpfung von „*Plasmopara viticola*“ (Rebenperonospora) im Weinbau. Gesunde Pflanzen, Germany. 60 (3) 91-100 Jahr: 2008

“VM Powdery mildew”

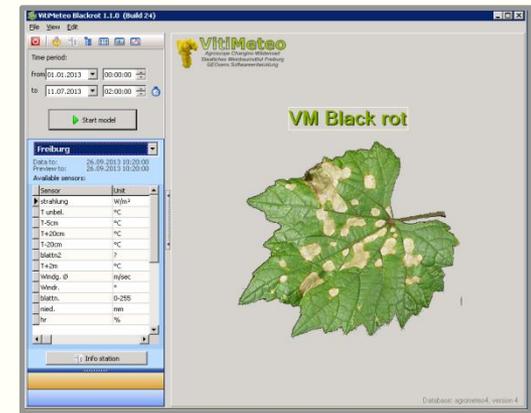


Type of model: Risk model, mixture of biological and statistical correlations

Literature, basis of the model

- Stark-Urnau, M.; Kast, W. K.: Development of ontogenic resistance of powdery mildew in fruit of differently susceptible grapevines (cvs Trollinger and Lemberger), Mitteilungen Klosterneuburg, Rebe und Wein, Obstbau und Fruchteverwertung. 49 (5) 186-189, 1999
- Kast, W. K.; Bleyer, K.: The expert system OiDiag-2.2. - a useful tool for the precise scheduling of sprays against powdery mildew of vine (*Erysiphe necator* Schwein.), IOBC/WPRD IOBC/WPRS Working group “Integrated Protection and Production in Viticulture , Staufen, 2009
- Kast, W. K.; Bleyer, K.: The expert system OiDiag-2.2.-a useful tool for the precise scheduling of sprays against powdery mildew of vine (*Erysiphe necator**) Schwein. Proceedings of the 6th International Workshop on Grapevine Downy and Powdery Mildew. 151-154, 2010
- Kast, W. K.; Bleyer, K.: EFFICACY OF SPRAYS DURING THE “OPEN WINDOW PERIOD” AGAINST POWDERY MILDEW (*ERYSIPHE NECATOR*) INFECTIONS OF CLUSTERS OF GRAPEVINES (*VITIS VINIFERA*). Journal of Plant Pathology. 93, S1.29-S1.32, 2011

“VM Blackrot”



Type of model: Numeric simulation of biological processes

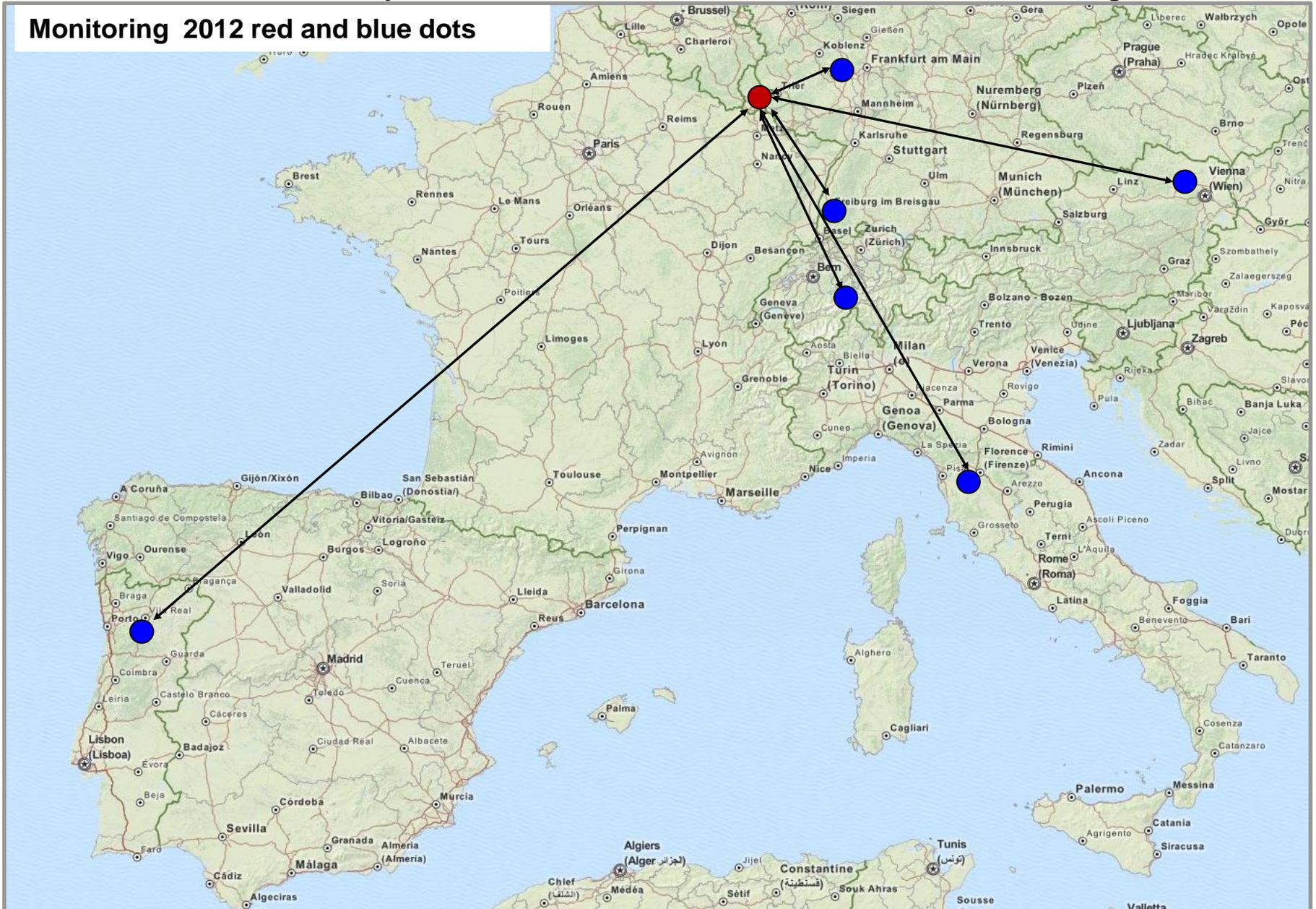
Literature, basis of the model

- Molitor D. (2009): Untersuchungen zur Biologie und Bekämpfung der Schwarzfäule (*Guignardia bidwellii*) an Weinreben. Dissertation, Justus-Liebig-Universität Gießen
- Etc.

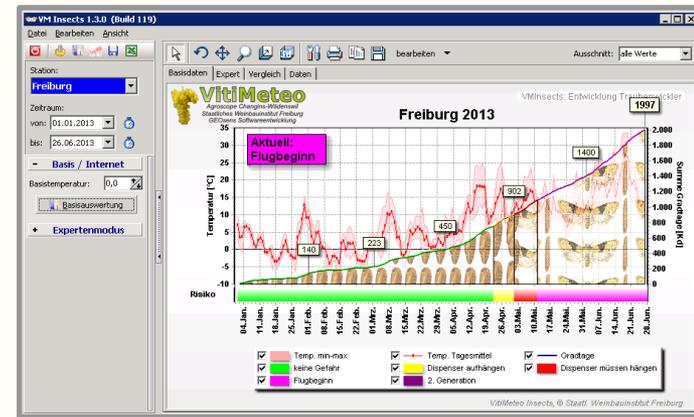
VitiMeteo – Blackrot Validation since 2012

coordination by Daniel Molitor, Centre de Recherche Public, Luxembourg

Monitoring 2012 red and blue dots



“VM Insects”



Type of model: Statistical correlations of weather data and abundance of pests

Literature

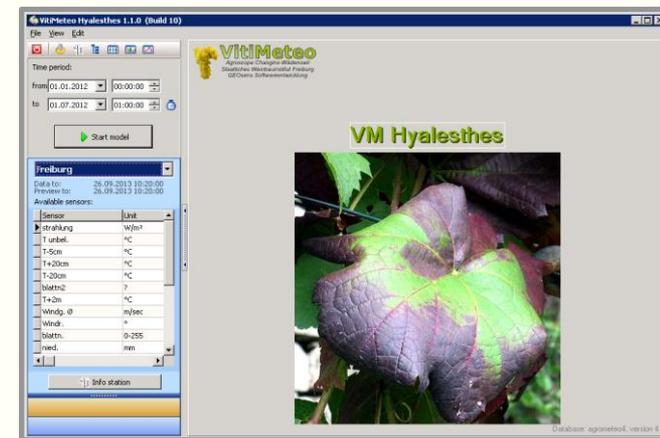
- Vogt, E., Schruff G. 2000: „Weinbau“- Eugen Ulmer, p. 322-328.
- Etc.

Validation since 2007, Germany (Baden-Württemberg)

- **Good correlation between observed and predicated flight**

Lit. : Bleyer, G.; Breuer, M.; Kassemeyer, H. H.; Viret, O.; Dubuis, P. H.; Naef, A.; Hubert, M.; Krause, R.; Mattedi, L.; Varner, M.: Das Prognosesystem "VitiMeteo", Deutsches Weinbau-Jahrbuch, 63 146-158, 2012

“VM Hyalesthes”



Type of model : Statistical correlations of weather data and abundance of pests

Literature

- M. Maixner and M. Langer: Prediction of the flight of *Hyalesthes obsoletus*, vector of stolbur phytoplasma, using temperature sums, Integrated Protection in Viticulture, **IOBC/wprs Bulletin** Vol. 29(11), 2006 pp 191-16

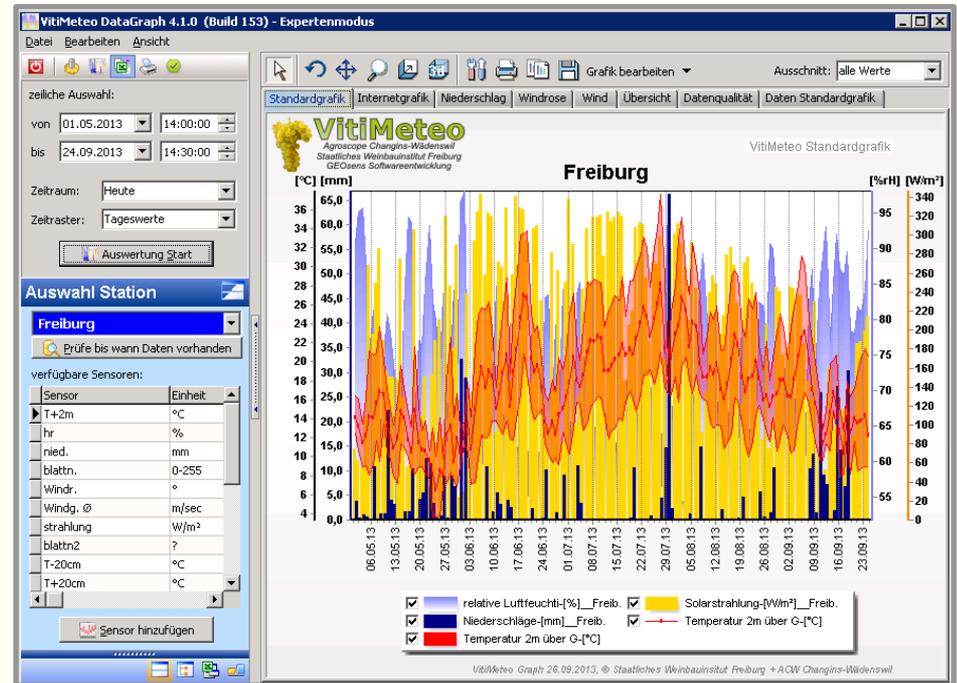
Validation since 2008, Germany (Baden-Württemberg)

- **Good correlation between observed and predicated flight**
 - Lit. : Bleyer, G.; Breuer, M.; Kassemeyer, H. H.; Viret, O.; Dubuis, P. H.; Naef, A.; Hubert, M.; Krause, R.; Mattedi, L.; Varner, M.: Das Prognosesystem "VitiMeteo", *Deutsches Weinbau-Jahrbuch*, 63 146-158, 2012
 - Etc.

“VitiMeteo Data Graph”

Extensive software for

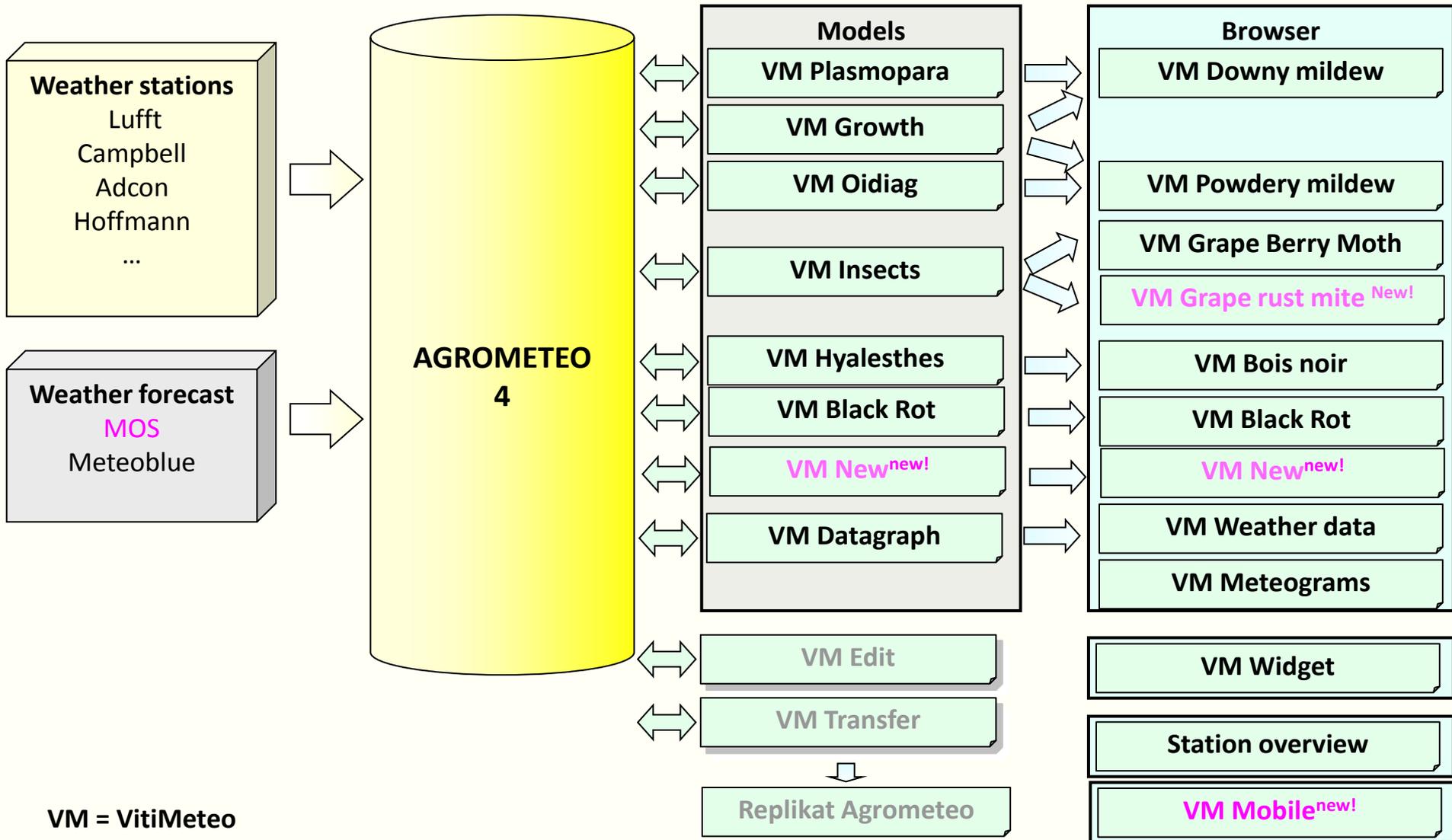
- Presenting
- Administrating
- Controlling
- Weather data



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- **VitiMeteo - outlook**

Outlook - Forecasting system "VitiMeteo" 2014...



Conclusions - VitiMeteo, 2002 –2013

- **Growing platform for forecasting models and weather data for viticulture**
- **Timely implementation of current research into practical use**
- **Variable, interactive system for scientists, advisors and winegrowers**
- **Fruitful and effective participation of many research institutions and partners at home and abroad**



picture: E. Kühner

Thank you for the very good cooperation



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Thank you for your attention

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