# Perspectives for the control of *Plasmopara viticola*

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**Abstract: A model for the controlled management of grapevine downy mildew was developed at the Staatliches Weinbauinstitut, Freiburg [1]. The effective period of fungicides, the duration of protective activity, in this model still remains unsolved. However, field trials showed that this period lasted for more than 21 days on leaves already existing at the time of treatment. Most fungicides showed no effect on leaves grown after fungicide application [2]. To improve the strategy we tried to determine how many leaves are allowed to emerge before the next treatment is necessary. In the year 2000, a field trial showed that 3 to 4 new leaves can develop after an application before the next treatment is necessary. Furthermore, a combination of the biological model of *P. viticola* with empirical models simulating appearance and development of leaves seems to support integrated control of grapevine downy mildew [3].**

**Key words: grapevine, V*itis*, disease control, downy mildew, *Plasmopara viticola*, modeling**

## Introduction

The objective of our field trial in the year 2000 was to quantify the number of leaves that may develop before the next spraying is needed. This information can be used for the application of a growth model to derive the point in time for application.

## Material and methods

The plots were inoculated with a sporangia suspension of *P. viticola*. The first applications were done at the 80% incubation period (Fig. 1). From May 26 until June 14 the plots were irrigated regularly. This method produced a high infection pressure. Before each spraying the last unfolded leaves were marked on eighty shoots per variant. All applications were done with „Metiram“. On June 27 the infestation with *P. viticola* was assessed on every leaf on all marked shoots.

## Results and discussion

In the control, the infestation was high on nearly all leaves; only the youngest showed a decrease in number of oilspots (Fig. 1). The reason could be that the surface of the young leaves had grown in the period of time between the last irrigation (artificial infection) and the assessment. In all treated variants the effect of the fungicide was good on the old leaves (leaf # 1 to 8) in the lower shoot position. Variants 2 and 3 showed a high attack of *P. viticola* on leaves # 9 to 18. In general the infestation was lower with an increasing interval between two applications (Fig. 1). The best result of all was variant 6, where four new leaves were unfolded before the second application was carried out. However, this result does not mean that long spraying intervals are better than short intervals. Since the plots were not sprayed in regular intervals as is usually expected, those variants with the short intervals developed a higher infection rate on the new-grown leaves. Nethertheless, several conclusions are possible:

- Infections can only take place when leaves have grown to a certain leaf size.
- It is possible to extend the interval between two sprayings, without risking more infestation.
- The result indicates that the development of new leaves in addition to the epidemiological situation are an important factor for the determination of spraying intervals.

Further experiments are planned to verify the results. An objective for future studies is the combination of the biological model of *P. viticola* with existing growth models.

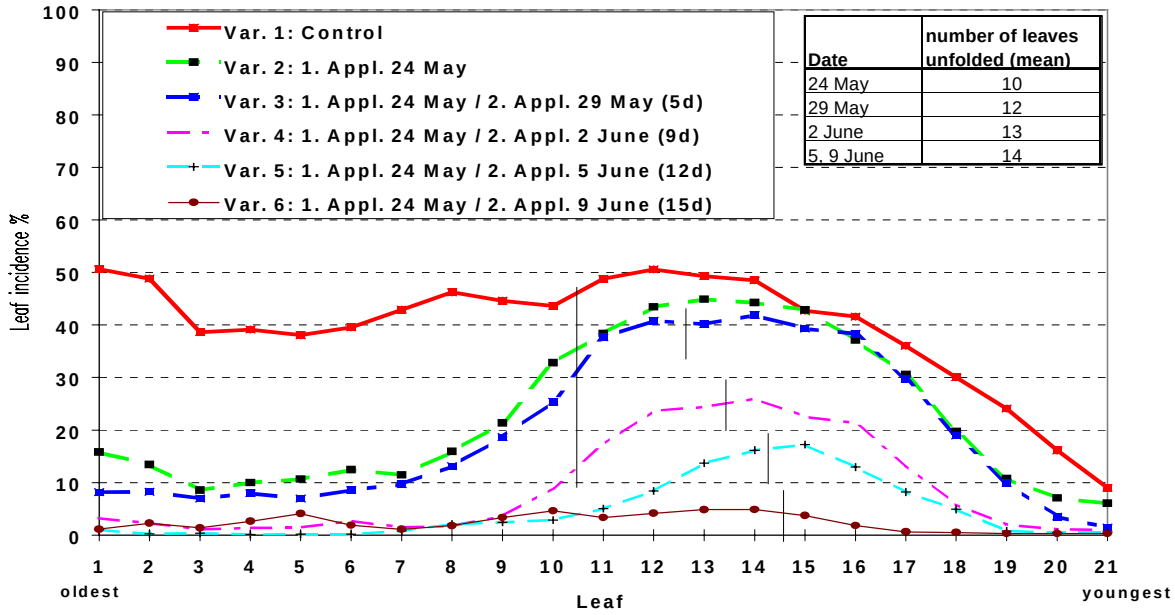


Fig. 1: The trial was designed with six variants and four repetitions. Infestation with *P. viticola* was assessed on June 27. On an average 21 leaves were unfolded at the time of the assessment. Site: Freiburg, Schlierberg, Müller-Thurgau cv.. Abbreviations: Var.: variant, appl.: application

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