Multi-dimensional approach against Marssonina coronaria in apple

Introduction
The apple pathogen Marssonina coronaria (teleomorph: Diplodia mali) has recently become a significant problem in Central European organic apple production, causing dark spots on both the leaves and fruit (Fig. 1), and early leaf fall (Fig. 2).

The pathogen most probably originates from Asia, where it accounts for crop losses of up to 28%. First symptoms can be observed in June after a humid period, leaf drop may start two to three weeks later. Severely infected trees can be completely defoliated already in August.

In Europe it was first detected in Italy in 2001 and is spreading since then in Switzerland and southern Germany (first reports in 2010), mainly in organic apple orchards and in orchards for cider production with a reduced fungicide regime.

Approach and first results
In a multi-dimensional approach, the FiBL and KOB Interreg project aims at gaining more knowledge on the biology of the fungus and on control methods in organic farming.

For example has the teleomorph Diplodia mali not yet been detected in Europe and also the form of overwintering is still unknown. Related to this, the genetic structure of the European population of M. isolates seems to be relatively uniform and completely different from populations in Asia (publication in prep.).

Identification of resistant or less susceptible apple cultivars, to be directly used in apple production or as sources of resistance in apple breeding, is another important pillar in Marssonina control (Fig. 3).

Direct disease control with products compatible with organic farming practices is of utmost importance. Lab-studies and field testing of products against Marssonina leaf drop have shown that products based on clay-minerals (e.g. Myco-Sin®), (lime) sulphur or copper have high efficacy against the disease (Fig. 4).

Finally, timing of the applications based on an infection forecast model will further help to optimally use this limited set of efficient products.

Conclusions and Outlook
Marssonina disease is a new threat to European apple production. To prevent from and to counter this pathogen, a multi-dimensional approach, based on detailed knowledge of the biology of the pathogen, resistance breeding in the apple host and targeted use of direct plant protection is necessary and under development.

References

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