

Efficacy testing of novel organic fungicides and elicitors: from the lab to the field

Ten out of 39 novel organic fungicides and elicitors tested under controlled conditions were further examined under field conditions. All of the new products tested under field conditions showed at least partial efficacy. However, the efficacy was not good enough to protect grapevine plants sufficiently from downy mildew. For a complete replacement of copper in plant protection against downy mildew on grapevine in organic agriculture, additional new products are needed.

Introduction

Plant protection against downy mildew in organic viticulture depends strongly on the use of copper. Due to the foreseeable ban of copper in plant protection in the EU, novel plant protection products against downy mildew in organic viticulture are urgently needed.

To evaluate the efficacy of potential products (e.g. plant extracts, bio control agents), indoor screening and field screening was used.

Materials and Methods

Efficacy testing for fungicidal and elicitor activity was performed on grapevine seedlings (cv. Chasselas). The test substances were applied in an automated spray cabinet. Subsequent to application, plants were either incubated for 5 days before challenge inoculation (elicitor screening) or inoculated 1 day after treatment (fungicide screening) (Fig. 1).

The field experiments were carried out in a screening vineyard in a randomized block design (Fig. 2). The test products and reference treatments were deployed weekly. The plants were treated with an air assisted knapsack sprayer until near run-off. During the growing season, visual disease scoring was carried out several times by recording disease incidence and disease severity. The experiments were carried out following the relevant EPPO guidelines.



Figure 1. Incubation of grapevine seedlings for efficacy testing of novel plant protection products (indoor screening).



Figure 2. Overview of the screening vineyard on 19th August 2005.

Results and Conclusions

In general, infection levels of control treatments were stable and reproducibility of results was satisfactory.

However, results of elicitor screening tend to vary considerably between experimental sets. Based on the results of the indoor screening trials 10 out of 39 test substances were recommended to be tested under field conditions.

Of the new products that have shown promising results indoors, none has shown high efficacy against the disease under field conditions (Fig. 3). As copper free variants, acidified clay mineral products showed good protection against *P. viticola*. Under Swiss conditions a replacement of copper seems to be possible with clay-mineral products.

Testing products in the lab and in the field is an efficient method for identification of novel candidate products. Within the framework of the EU-funded project "REPCO" a new series of promising products will be tested under controlled conditions and in the field in the 2006/7 season.

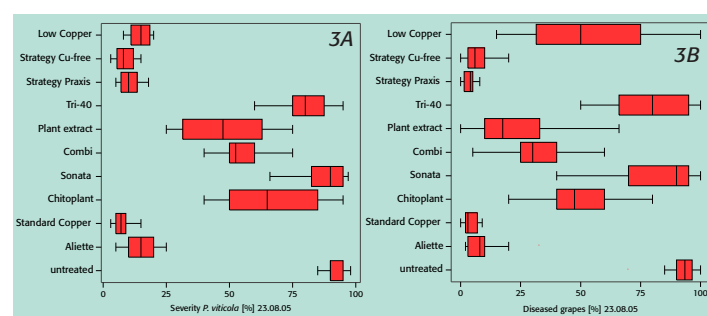


Figure 3. Effect of plant protection products and strategies against *Plasmopara viticola* on grapevine plants cv 'Müller-Thurgau' under field conditions. Disease severity on leaves (Figure 3A) and grapes (Figure 3B) recorded visually on 23 August 2005. Each data box represents the values of four replicates of six plants each.