



Opties voor beheersing van valse meeldauw in ui zonder synthetische bestrijdingsmiddelen

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Summary

Options for management of downy mildew in onion without synthetic pesticides

Downy mildew in onion, caused by *Peronospora destructor*, is a problem of increasing importance in Dutch agriculture. In conventional cultivation fungicides are available that effectively control downy mildew. However, in organic cultivations there are currently no effective management options available. Consequently, downy mildew in organically grown onions can result in complete crop failure.

The goal of the research was:

- to contribute to the development of novel methods acceptable for organic cultivation to manage downy mildew in onions.
- to contribute to the on-going discussion on methods to manage downy mildew in onion.

The following activities were performed:

- the evaluation of the application of milk whey to control downy mildew in onions.
- analysis of co-existence of conventional and organic onion growers.

The effect of milk whey on incidence of downy mildew in onions was investigated in 4 field experiments (in 2005 and 2006, at Wageningen and at Lelystad). In 2005, the downy mildew epidemic in Wageningen started very late in the growing season and in 2006 in Lelystad no epidemic occurred at all. Contrary to 2005 the downy mildew epidemic in 2006 in Wageningen progressed very fast, and only a single time milk whey could be applied before the crop had to be harvested. In 2005 in Wageningen a significant negative effect of the application of milk whey was observed both of the 1x /week and 2x /week applications. However, in all treatments the disease continued to develop to such an extent, that milk whey is of no interest for practice. In 2005 in Lelystad a clear effect of 2x /week applications of milk whey was observed. On these intensively treated plants (2x /week) a phytotoxic effects of milk whey was observed: they aged faster than the control plants. Application of milk whey had a clear effect on the bacterial populations colonizing the leaves.

A student group investigated the aspects dealing with co-existence of organic and conventional growers. They arrived at the following conclusions: prohibit the cultivation of onions during winter time (since this contributes to the maintenance and development of downy mildew early in the growing season), put under strict surveillance the covering of onion residue heaps with plastic, stimulate the aeration of the crop by planting rows in the direction of dominant wind direction as well as by planting onions in relatively low densities, and finally inform neighbours about the state of affairs relative to downy mildew.

The general conclusions are:

- Milk whey can reduce the infection of downy mildew, but not to an extent that is of importance for farmers.
- Insufficient information is available about some elements of the disease cycle of *Peronospora destructor*, viz. the primary source of infection and the role of oospores. More research on these topics is needed. Also the development of a bioassay for downy mildew in onions is needed.
- The cultivation of onions during winter time and the occurrence of uncovered onion residue heaps probably comprise the greatest risk factors for the onset of an epidemic during spring and summer. If the current rules to keep planting material free of the pathogen (by requiring a warm water treatment for bulbs that originate from infected plants) are insufficient, a national experiment on the effect of concluding the cultivation of onions during winter time for 1 or 2 years is advised.
- If the resistance of the new cultivars against downy mildew that are now appearing on the market appears sustainable, these cultivars will spread quickly worldwide. However, resistance may be broken at some point in time and there further identification of sources of resistance is necessary. The degree of resistance of the new cultivars will define the necessity of additional activities that limit the development of resistant strains of *P. destructor*.