Grower summary

HNS 173

Epidemiology and prediction of rose downy mildew

Final Report 2010

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The results and conclusions in this report may be based on an investigation conducted over one year. Therefore, care must be taken with the interpretation of the results.

Use of pesticides

Only officially approved pesticides may be used in the UK. Approvals are normally granted only in relation to individual products and for specified uses. It is an offence to use non-approved products or to use approved products in a manner that does not comply with the statutory conditions of use, except where the crop or situation is the subject of an off-label extension of use.

Before using all pesticides check the approval status and conditions of use.

Read the label before use: use pesticides safely.

Further information

If you would like a copy of the full report, please email the HDC office (hdc@hdc.org.uk), quoting your HDC number, alternatively contact the HDC at the address below.

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Headline

A prototype computer model to assist with the integrated control of rose downy mildew is currently being developed.

Background and expected deliverables

Downy mildew (*Peronospora sparsa*) is a highly destructive disease on roses, causing severe and rapid defoliation. Infection is generally restricted to young plant growth. Severe leaf abscission may occur. Intensive fungicide usage, which can result in unjustified applications and environmental pollution, does not always control the disease satisfactorily due to poor timing or choice of fungicides, and may accelerate the selection of fungal strains that are resistant to fungicides.

Infected plants, particularly those with severe leaf abscission, are usually discarded because of possible infection of stems and hence the risk of diseased growth the following year. This not only results in production losses but also leads to additional waste. Severe disease is known to occur under humid conditions but published information has not been adequately synthesised. All rose cultivars are considered to be susceptible to this pathogen although they can greatly differ in their sensitivity.

Research has demonstrated a disease control approach utilising computer models to be successful on several crops, although operating such a system may place some extra demand on producers. EMR has already obtained some quantitative data on rose downy mildew development from an un-replicated experiment; another similar set of data were recently obtained in California. In a preliminary study at EMR, conidia were shown to have a very high potency for infecting leaflets: only 25-40 conidia per leaflet resulted in the near maximum incidence of disease. EMR has also developed and validated a prediction model for rose powdery mildew with HDC funding (HNS 165). In this work, we shall combine the prediction models for powdery and downy mildews on rose.

Expected deliverables and benefits

- This project will produce a system (computer software) to predict development of rose downy mildew that will improve disease control efficacy, which will be integrated with the forecasting system for rose powdery mildew that has recently been developed at EMR with HDC funding (HNS165)
- The system can be used by growers to develop cultural methods that avoid creating favourable microclimate conditions for downy mildews, to time fungicide applications, and to select appropriate fungicides and dose
- How to use the model predictions for practical disease management may depend on individual circumstances. It may include:

  - programming irrigation schemes to reduce the risk of disease development, particularly in the glasshouse, based on the joint effects of temperature and duration of wetness on disease development
  - using protectant products in the initial epidemic phase (i.e. early season) with the timing of application determined by model predictions as well as weather forecasts
  - using products that have high efficacy as an anti-sporulant when disease has already established in the crop, with the timing of application determined by model predictions as well as current disease level and weather forecasts

Summary of the project and main conclusions

- This is the first year of a three-year project, focusing on developing experimental protocols and developing a prototype forecasting model
- We have developed an initial prototype forecasting model and incorporated this model with the powdery mildew model as a computer software package. We will now collect more experimental data to improve and validate this model
- We failed to obtain viable downy mildew isolates from many samples sent to us last year. However, we have arranged for two downy mildew isolates to be sent to us from a German research institute in March 2010 for experimentation this year

Financial benefits

It is too early to claim any financial benefits of this project to growers

Action points for growers

- As the success of this project relies on information on current rose production systems, please take time to get involved in the work when the opportunities arise.