

Grower Summary

HNS 173

Epidemiology and prediction of
rose downy mildew

Final 2013

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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.ahdb.org.uk), quoting your HDC number, alternatively contact the HDC at the address below.

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HDC is a division of the Agriculture and Horticulture Development Board.

Project Number: HNS 173

Project Title: Epidemiology and prediction of rose downy mildew

Project Leader: Prof. Xiangming Xu

Contractor: East Malling Research

Industry Representative: Neil Wright, Micropropagation Services (EM) Ltd

Report: Final, 2013

Publication Date: 13 May 2013

Previous report/(s): Annual Report 2011
Annual Report 2010

Start Date: 01 April 2009

End Date: 31 March 2012

Project Cost: £42,184

GROWER SUMMARY

Headline

- The use of the powdery mildew decision support tool may lead to a reduction of on pesticide input costs without comprising disease control
- A rose downy mildew decision support tool is developed and incorporated into the powdery mildew prediction system. However, the model has not been validated with field epidemics yet due to unfavourable weather conditions for downy mildew in 2009-2011.
- The rose disease decision support tool is ready for use by growers, especially the powdery mildew prediction system and a comprehensive user guide is available.

Background and expected deliverables

With HDC funding (HNS 165) we have developed a decision support tool for powdery mildew and implemented the model as a stand-alone computer software package. However, adopting any pest and disease forecasting systems is a gradual process and training given to growers and consultants may encourage the uptake of these systems.

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 also occur. All rose cultivars are considered to be susceptible to this pathogen although they can greatly differ in their sensitivity. Intensive fungicide usage can result in unjustified applications and potential environmental pollution, and does not always control the disease satisfactorily due to poor timing. Severe disease is known to occur under humid conditions but published information has not been adequately synthesised

Expected results of this project include:

- A prediction system. This project will produce a system (computer software) to predict development of rose downy mildew, which will be integrated with the forecasting system for rose powdery mildew.
- Feedback from commercial evaluation of the prediction system. The system will be evaluated in practice by a number of growers with appropriate support from consultants and EMR researchers. This will lead to an improved system for final release and generate confidence on the practical benefit of the system.

Summary of the project and main conclusions

A prediction model has been developed for rose downy mildew and incorporated with the rose powdery mildew (HNS 165) as a stand-alone computer programme. The software can use weather data (text) files of various formats generated by common data loggers.

The powdery mildew model was evaluated in several nurseries in 2010 and 2011. This evaluation led to further improvements to the system and demonstrated that a considerable reduction in fungicide input (> 25%) may be achieved with use of the model predictions which is relevant for the Sustainable Use Directive. Importantly, the tool allows the growers to save spraying time and improve the precision and timing of application. The evaluation also generated several generic issues related to the use of forecasting systems in horticulture, which may be addressed by industry-funded and co-ordinated training activities.

Because of unfavourable weather conditions for downy mildew in 2009-2011, the model has not been validated with field epidemics yet. Hence, further evaluation is necessary, which may be achieved without further funding from HDC if sufficient support from growers is produced.

Financial benefits

Initial use of the powdery mildew system has demonstrated the potential saving in fungicide input (> 25%) without compromising disease control, which is equivalent to a saving of ca. £100 per ha per annum. It is important to note that this also depends on many other factors including variety susceptibility, growing environment, management practices, and products used.

Benefits resulting from using the downy mildew model are more difficult to quantify because of the sporadic nature of this disease, unlike powdery, mildew and further evaluation is necessary.

In addition, the use of these systems demonstrates the responsible use of pesticides which is relevant for the implementation of the Sustainable Use Directive and pesticide reduction programmes.

Action points for growers

- Request a copy of the computer system and the user guide (which contains advice on Installing and running the prediction software) from the HDC.
- Start to use the powdery mildew predictions to assist in the control of powdery mildew (initially on a small scale).
- Once confidence in the model prediction has been gained, gradually make decisions of mildew control based on the model predictions and incorporate this into overall management programmes.
- For downy mildew, weather stations that can record rainfall and surface wetness as well as temperature and humidity are needed.
- Initially, do not time your sprays (at least not on a large scale) according to downy mildew predictions. Monitor downy mildew occurrences (together with weather data), and send these data to Prof Xiangming Xu (Xiangming.xu@emr.ac.uk) to evaluate and improve (if necessary) the model.