

Grower Summary

HNS 173

Epidemiology and prediction of
rose downy mildew

Annual 2011

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Use of pesticides

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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.

Headline

- A decision support tool for use in the management of rose downy mildew and powdery mildew has been further refined.
- Commercial evaluation at one rose site in 2010 suggested that the tool could considerably reduce fungicide input while maintaining good control of powdery mildew.

Background and expected deliverables

Downy mildew (*Peronospora sparsa*) is a highly destructive disease on roses, causing severe and rapid defoliation. Severe disease outbreaks are known to occur under humid conditions. All rose cultivars are considered to be susceptible to downy mildew although they can greatly differ in their sensitivity. Infection is generally restricted to young plant growth. 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 produces additional waste.

Intensive fungicide usage can result in unjustified applications and potential environmental pollution, and 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.

Recent research on several crops has demonstrated that more careful targeting of fungicides can reduce overall fungicide use and provide successful control, although operating such an approach may place extra demand on producers. East Malling Research (EMR) developed a prototype powdery mildew forecasting model (under HNS 165) which can be used to assist with the better targeting of fungicides. This current project will develop a forecasting model for downy mildew and combine the two models within a single decision support tool (computer software) that could lead to improvements in the management of both diseases.

The decision support tool will be able to be used by growers to develop cultural methods that avoid creating favourable microclimate conditions for mildews, to time fungicide applications, and to select appropriate fungicides and dose.

Examples of management changes informed through the use of the decision support tool 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 leaf wetness on disease development.
- using protectant crop protection products in the initial epidemic phase (i.e. early season) with the timing of application determined by disease forecasts as well as weather forecasts.
- using crop protection products that have high efficacy as an anti-sporulant when disease has already established in the crop, with the timing of application determined by disease forecasts as well as current disease level and weather forecasts.

Summary of the project and main conclusions

- The models use weather data (e.g. rainfall, temperature, relative humidity) and information on crop protection products (i.e. fungicides) applied to the crop and combines these data to forecasts infection risk from powdery and downy mildew.
- Understanding the level of infection risk can assist with the management of diseases (e.g. via product choice and through adjustment of application frequency or volume).
- Compared to the conventional crop protection management programme at Whartons Nurseries, Norfolk, a model-informed management strategy resulted in a 25% reduction in fungicide input whilst maintaining satisfactory control of powdery mildew.
- The rose downy mildew model was further revised to reflect environmental conditions that significantly influence infection. This includes the length of surface leaf wetness required at a given temperature for infection to occur and the influence of dry periods on the viability of downy mildew spores.
- Weather conditions in 2010 were not conducive for rose downy mildew development, and this affected the evaluation of the downy mildew model. Experiments will be repeated in 2011.
- The decision support tool (which incorporates both the powdery mildew and downy mildew models) was modified in response to feedback received from Whartons Nurseries and will be further evaluated at several commercial sites in 2011.
- A workshop to train growers in the practical use of decision support tools for the management of diseases is planned in conjunction with a British Rose Group event.

- A comprehensive Users' Guide, which contains simple but thorough guidelines on how to use the decision support tool to assist with practical disease management, has been refined.
- The Users' Guide will be submitted along with the Final Report for this project and distributed to rose growers along with the decision support tool.

Financial benefits

The initial evaluation suggested that the number of fungicide applications could be reduced (by around 25%) without jeopardising powdery mildew control on roses. Although the direct savings in actual fungicide product will be relatively small, because fungicides tend to be applied regularly from bud break onwards in a typical rose production programme a greater financial saving will be made in the labour costs associated with product application.

Action points for growers

- Attend the planned British Rose Group workshop on the use of decision support tools for the management of rose diseases during 2011.
- Contact Xiangming Xu at East Malling Research to find out how to get involved in trialling the draft version of the decision support tool.