

Foliar Diseases in Greenhouse Vegetables

Issue 1

March 2007

A new research project examining foliar diseases in greenhouse vegetables commenced in June 2006. The project is funded by the protected cropping industry and the Commonwealth government through Horticulture Australia Limited and runs until May 2009.

Aims of Project

- Determine the main disease problems in greenhouse cucumber, capsicum and eggplant crops
- Identify the current strategies used for disease management
- Examine the environmental conditions most suitable for disease development
- Determine areas in which disease management can be improved
- Evaluate alternative fungicides, environmental controls and resistant varieties
- Develop integrated management programs for foliar diseases

Growers in the Northern Adelaide Plains, Murray Bridge and Sydney Basin were surveyed from July to December 2006 to determine their main foliar disease problems and current management strategies. A total of 78 crops were surveyed comprising cucumbers, capsicums, eggplants and tomatoes. This newsletter outlines the results of the survey and the future work that is planned as part of this research project.

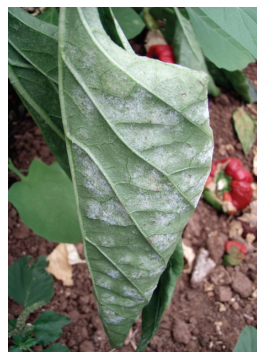
Foliar Diseases

Powdery Mildew

- Most common disease in all crops surveyed
- 100% of cucumber, 85% of capsicum and 87% of tomato crops affected
- Disease most severe in cucumbers



Powdery mildew on cucumber (above) and capsicum (right)



Downy Mildew

- 55% of cucumber crops affected, not as serious as powdery mildew



Downy mildew on cucumber

Grey mould (*Botrytis*)

- 23% of capsicum crops affected, moderate problem
- 36% of tomato and 10% of cucumber crops affected, only slight problem
- Big problem in winter
- 16% of growers do not grow over winter to avoid disease

Bacterial (Black) Spot

- 13% of tomato crops affected, moderate problem
- 8% of capsicum crops affected, only a slight problem

Disease Management

Most growers surveyed use several different methods to manage foliar diseases.

Fungicides

- Main method of management for majority of foliar diseases
- When disease pressure high or conditions are favourable for disease growers may spray every 7-10 days
- Some growers relying on one fungicide only
- Lack of fungicides registered for greenhouse restricts choice
- 20% of growers selecting inappropriate fungicides e.g. Bravo and Ridomil do not work against powdery mildew

Cultural Methods

- Venting greenhouses to reduce humidity
- Pruning lower leaves to increase airflow around plants and remove diseased material
- Disposal of prunings and crop residues
- Growing of disease resistant varieties

Disease Management Getting Harder

Nearly half of the growers surveyed said it was getting harder to manage diseases because of:

- Over-use and mis-use of fungicides
- Increased disease pressure
- Increased production
- Constant workload associated with spraying fungicides.

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Improving Disease Management

Half of all growers surveyed thought they could improve their disease management with:

- Access to a bigger range of fungicides from different groups
- Training in which fungicides to use and spray timing.

Fungicide Resistance

There is an extremely high risk of developing resistance to many of the fungicides currently used in greenhouses because:

- Disease pressure is often high
- Many growers using only one fungicide or fungicides from the same group
- Over-use of fungicides.

Cucurbit (cucumber) powdery mildew readily develops resistance to fungicides from a range of different groups.

- 7% of growers in the survey thought they had experienced fungicide resistance
- Lack of chemicals registered for greenhouses restricts fungicide choice

Managing resistance

Until permits are obtained for alternative fungicides there are several practices commonly used to manage resistance.

- Do not continually spray with the same fungicide
- Rotate fungicides from different groups, not just those with different product names or different active ingredients
- Spray early in disease development

A complete list of fungicide groups and more information on managing fungicide resistance can be found at www.croplifeaustralia.org.au under the Stewardship menu.

- Only 35% of growers surveyed said they consider resistance management when making fungicide choices

Greenhouse Hygiene

Many fungi that cause diseases survive between crops on crop debris and on weeds inside and outside greenhouses. Cleanliness of properties was a major concern for many growers in the survey.

- Old crops left inside houses for prolonged periods
- Crop debris, weeds and rubbish outside houses
- Many growers are not doing as much as they could to keep their properties clean
- Disposal of diseased material and removal of weeds is a critical part of a disease management program



Prunings can harbour disease and re-infect crops



Datalogger in cucumber crop

Environmental monitoring

- Dataloggers recording temperature and relative humidity set-up in 5 commercial greenhouses
- Fortnightly assessments of disease levels

Future Work

Trials for alternative fungicides

- Fungicides from different groups and biological controls will be screened in the research glasshouse
- Products showing promise will be trialed in commercial greenhouses
- Initial trials with powdery mildew in cucumbers and capsicums
- Trials with *Botrytis* and downy mildew when diseases appear later in year

Environmental manipulation

- Determine conditions that are favourable for disease outbreaks
- Help growers make better decisions about venting houses to prevent disease

Disease workshops

Regular workshops on diseases will be run for growers by SARDI and the Virginia Horticulture Centre. The workshops will cover:

- Disease diagnosis
- Spray timing
- Resistance management
- Greenhouse hygiene.

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