TECHNICAL
FACT SHEET

Optimising the Use of Fungicides

INTRODUCTION

When using fungicides, Turf Managers sometimes find that the pesticide either does not work or the duration/level of control fails to meet their expectation. Typically *either* the product is blamed *or* resistance suspected. The reality is that these poor results are more likely due to:

- Spraying process.
- Environmental conditions at the time of and following application.
- Management practises.

SPRAY PROCESS

1. Legislation

Although not directly affecting the outcome from spraying, it is essential that legislative requirements are met. The main legislation directly impacting on the application of fungicides is:

- Resource Management Act 1991 – Air plans
- Hazardous Substances and New Organisms Act 1996
- Health and Safety in Employment Act 1992

2. Disease identification

The disease should be accurately identified, in order for the most appropriate fungicide(s) and recovery plan to be used.

Professional diagnosis of a disease problem is available from:

Disease Lab
NZ Sports Turf Institute
163 Old West Road
PALMERSTON NORTH

Pestlab
AgriQuality Ltd
131 Boundary Road
Blockhouse Bay
AUCKLAND

3. Control plan

Once a disease has been confirmed, a comprehensive control plan should be prepared and which would typically include:

- Selecting the most appropriate fungicide and rate of application.
- Assessing whether the disease intensity/environmental conditions are such that follow-up fungicide treatments will be required – *either* to reduce the large spore count present following a serious disease outbreak *or* to protect the unaffected turf until favourable disease conditions desist.
- Developing a management plan that will both encourage recovery of the damaged areas and address those factors such as fertility, moisture etc. that encourage the particular fungus to cause a disease outbreak. Where the conditions favouring the disease are not corrected, reoccurrence/infection will almost certainly occur once the fungicide response runs out.

4 Calibration/application

Boom sprayers should be accurately calibrated and this calibration checked frequently. A correctly calibrated sprayer will ensure that a specific and known volume of water and fungicide is applied uniformly to the area to be treated.

Simply guessing that you have a hectare of greens and basing your spray programme and fungicide rates on this assumption is a recipe for failure.

The procedure for calibration is presented in the NZGCSA Fine Turf Diary *or* the New Zealand Novachem Agrichemical Manual 2008.

Area

Knowledge of the area being sprayed is useful as it allows the correct amount of product and water to be loaded into the spray tank, thereby reducing wastage and issues associated with disposing of the surplus spray mixture.

Other

Research[1] has shown that for foliar applied fungicides, best results are achieved where:

Nozzle type/pressure – flat fan type nozzles and an operating pressure at the nozzle of 30 – 60psi (2 – 4 Bar) are used.

Water rates – Unless otherwise stated on the label, a water rate of 800 – 1000L/ha should be used. The high water rate is required given the huge leaf area and densities associated with turf relative to agricultural/horticultural situations. Where the water rate is too low either the duration and/or level of control can be reduced.

[1] Couch, H.B. (1984). Golf Course Management – Maximising the Use of Fungicides, 52(8):73-80.

Dew – In the absence of any clear research, the goal should be to complete spraying when the surface is dry. The main concern is that where heavy dew is present, there is a risk that the fungicide will run off the plant to the soil surface thereby adversely impacting on the product's performance.

pH of the water – Although rare within New Zealand, if the water used is too alkaline (> pH 9.0) then the effectiveness of some fungicides can be reduced. In this situation, spraying should be carried out immediately following mixing and consideration given to using a buffering product such as Agpro Spray Buffer.

Mixing – As a general comment fungicides should be applied immediately after mixing. Where the fungicide mixture is left to stand for significant periods, there is a likelihood that its effectiveness maybe reduced.

Nitrogen – When using systemic fungicides and for some diseases such as Dollar spot or Anthracnose, the inclusion of some nitrogen (For example: Urea @ 5kg/ha – approx) can improve effectiveness of the fungicide, the level of control achieved and assist with the recovery process.

Follow-up management considerations after the fungicide has been applied – To provide the best opportunity for success the following points are recommended:

- For most systemic fungicides rain/irrigation should not occur for at least 6 hours after application
- For contact fungicides, rain/irrigation should ideally not occur for at least 12 hours after application.
- Mowing should be delayed for at least 12 hours after spraying.

5. Fungicide selection

It is important that the correct fungicide is selected for controlling the disease(s) that are occurring, if a successful outcome is to be achieved.

For example: *Amistar controls a wide range of diseases but is ineffective on and may encourage Dollar spot.*

Or *Mefenoxam/metalaxyl are good on Pythium but ineffective on other diseases such as Brown patch, Melting out etc.*

6. Application rate

Typically the rate found on fungicide labels (NZ and overseas) is expressed as a range;

The lower rate is intended for preventative control or minor disease out breaks; and

The higher rate, for curative control or when environmental conditions are very favourable for disease outbreaks.

When the fungicide rate used is not matched to your particular situation, disappointment is likely with only partial control and/or a reduced duration of control being achieved.

Similarly exceeding label rates is undesirable as it is wasteful, unnecessary and potentially dangerous, increasing both the risk of damage to the turf and/or the development of fungicide resistance.
A second issue is that with many patents now expiring on fungicides, there are now a large range of products on the market. Consequently the amount of active ingredient present in the product needs to be considered and the fungicide application rate adjusted accordingly.

IPRODIONE FORMULATIONS		
Trade names	**Active ingredient (gai/kg or L)**	**Application rates /ha**
Rovral flo	250gai/L	10 – 20L
Rovral WP, Defence 500, Fortify, Ippon 500, Rapid 500	500gai/L	5 – 10L
Rovral Gold	750gai/kg	3.3 – 6.7kg

7. Tank mixing

Generally speaking there is not a problem when mixing fungicides. **However, a trial and product compatibility test is recommended before mixing fungicides.** The main issue is that certain formulations, in particular tank mixing of EC formulations, increases the potential risk of damage occurring to the turf.

Mixing fungicides with other pesticides (insecticides/herbicides) is more risky.

NZ Sports Turf Institute's view is that mixing between pesticide groups is not recommended due to the increased risk of the turf being damaged. If mixing of different pesticides is carried out, the following practises are recommended:

- Complete a compatibility test for the pesticides to be mixed.
- Initially trial the mixture on a small non important turf area.
- Ensure that the "targets" are in fact reached. *For example: High water rates used for fungicides can cause herbicides/pesticides to be washed off the foliage.*