



# EVOLUTION

Systemic Disease Protection,  
Year Round.



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# Evolution Fungicide

Evolution is a premium, fungicide mixture containing 120 g/L of the active ingredient Azoxystrobin and 200 g/L Tebuconazole. This unique combination provides powerful systemic control of a broad range of turf diseases including; Dollar Spot, Helminthosporium, Anthracnose, Winter Fusarium, Brown Patch and Fairy Ring.

## Key Features and Benefits of Evolution Fungicide

- Unique combination of active ingredients for the Australian turf market
- Year round usage without the concerns of harsh growth regulation in summer
- Improved systemic activity, providing ease of application and placement over other products within the market
- Excellent residual performance, providing up to 28 days protection
- The only fungicide currently registered in the turf market for Fairy Ring Control
- Broad spectrum disease control, with registration on 6 key turf diseases
- Schedule 5 chemistry, improving ease of handling and use when compared to other fungicides in the market.

## How Evolution Fungicide Works

The combination of two modes of action in Evolution® provides protection against several stages in the life cycle of fungi.

### Strobilurin component:

- Inhibits spore germination and host penetration during the early stages of fungal vegetative growth
- Extended residual activity on spore germination

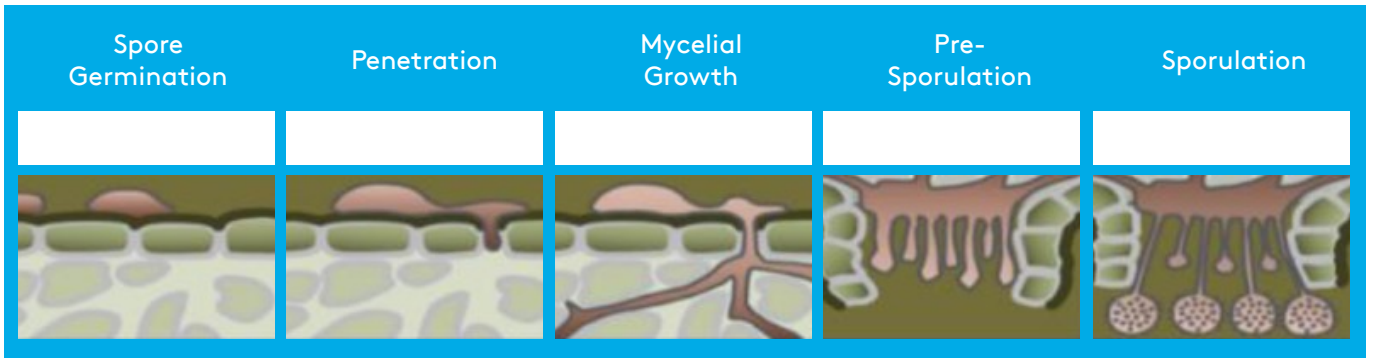
### DMI component:

- Rapidly absorbed into the plant and transported acropetally to provide uniform protection throughout the leaves and roots
- Active on the vegetative mycelia of the fungi with limited direct activity on spores.

The dual combination of a strobilurin + DMI ensures infections are targeted from the time of spore germination on the leaf surface through to mycelial development within leaves. Therefore, applying Evolution® as a preventative treatment prior to spore germination will achieve the maximum benefit from both the strobilurin and DMI components.

Parameter	Azoxystrobin	Tebuconazole
Concentration (g/L)	120	200
FRAC Group	11	3
Group Common Name	Strobilurin	DMI
Mode of Action	Inhibitor of mitochondrial respiration	De-methylation inhibitors, ergosterol biosynthesis inhibitors
Effect on Fungi	Disrupts energy production, particularly in germinating spores	Disrupts cell wall production and mycelial/ hyphal development
Use Pattern	Systemic Protectant	Systemic Protectant
Systemicity	Translaminar, Systemic (Acropetal)	Translaminar, Systemic (Acropetal)
Residual activity	28 days	21 days





Azoxystrobin

### Fungicide Impact on Disease Development



Tebuconazole



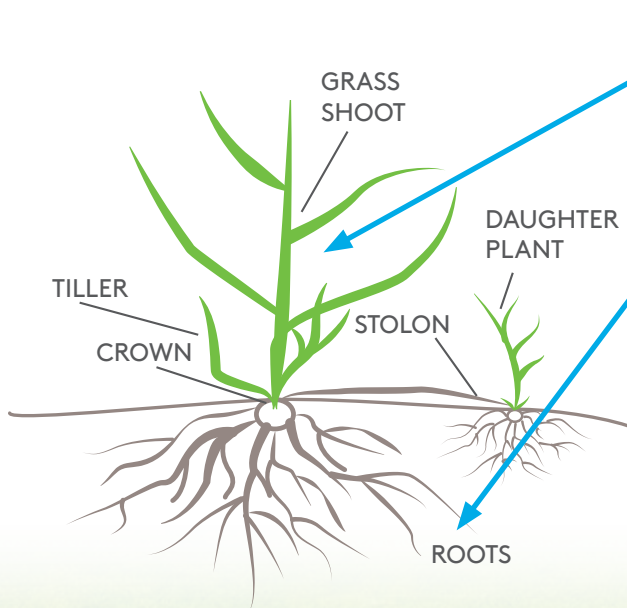
Azoxystrobin + Tebuconazole (Evolution)



■ Highly Effective    ■ Little or no effect

## The Evolution Difference

Evolution – Easier to place due to both actives being upwards systemic within the plant



### Foliar Curative Application:

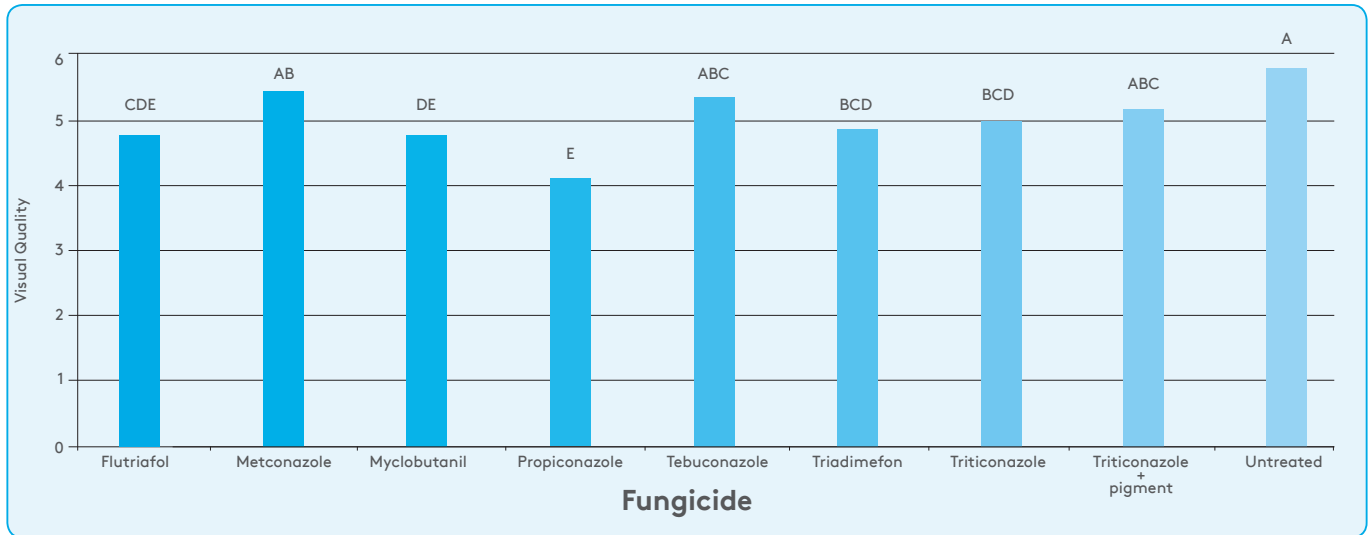
Apply to crown and allow movement towards leaf tips.

### Preventative Application & Root Diseases:

- **Evolution:** Apply to roots and allow movement of both active ingredients upwards optimising protection.
- **Other Products:** Trifloxystrobin is not systemic and is hard to get into rootzone due to strong binding to the leaf.

# Evolution – Delivers Opportunity for Year Round Use

The below trial outlines results of turf quality following differing consecutive applications of DMI or Group 3 fungicides on bentgrass in the summer months. The higher the number, the better the visual quality.



Visual quality values, averaged across all fertility treatments on a 'Penn A-1' creeping bentgrass putting green in 2011. \*Values are the means of four replicates. Values with the same letter above columns are not significantly different accordingly to the Waller-Duncan k-ratio t-test (k=1--). Values were assigned on a 0-9 rating scale with 5 or greater being considered acceptable.

Results indicate that tebuconazole provided statistically better turf quality during the summer period over propiconazole. This result highlights that Evolution can be used as a year round fungicide, without the harsh impact on turf quality that other DMI or Group 3 fungicides can have on the plant.





# Evolution: The 1st Registered Option in Australia for Fairy Ring Control in turf

This unique combination in Evolution provides powerful control of Fairy Ring in turf, as both actives have excellent known activity on many of the causal organisms that produce Fairy Ring symptoms.

Fairy Ring Control Evaluation: NC State University

Active Ingredient	Mode of Action Group	Application Interval (days)	Efficacy Rating – NC State University (Efficacy Rating 1-4 with 4 being best control and 1 providing control with low disease pressure)
Azoxystrobin + Tebuconazole (Evolution)	3/11	28	4
Azoxystrobin	11	28	3
Tebuconazole	3	21-28	4
Flutalonil (Monstar)	7	21-30	3

Ref: NC State University: <http://www.turffiles.ncsu.edu/diseases/fairy-ring>

Preventive fairy ring control can be much more effective and consistent over curative measures. For effective Fairy ring prevention, multiple fungicide applications need to be applied prior to soil temperatures reaching 21°C (uses a 5-day average soil temperature at a 5cm depth) in Spring. Ideal application timing for the initial application is between 15 – 18°C.

Applications of Evolution Fungicide for Curative fairy ring control should be applied soon after symptom development. To achieve effective curative control, apply Evolution at the high rate of 4 L/ha at 30 day intervals. Soil Surfactants should be applied 2 weeks prior to or after the Evolution application to achieve maximum performance. Symptoms take 2-3 weeks to disappear following treatment.

## Evolution – Stronger on the key turf diseases

Turf Disease	University of Kentucky - Rating System for Fungicide Efficacy of DMI Fungicides				Tebuconazole Interval between Applications	Azoxystrobin
	Tebuconazole (Evolution)	Triticonazole	Propiconazole	Myclobutanil		
Anthracnose	3	3	2	2	28	3
Brown Patch	3	2-3	3	2	28	3-4
Dollar Spot	4	3+	4	4	28	-

Rating System for Fungicide Efficacy

4 = consistently good to excellent control. 3 = good to excellent control in most experiments. 2 = Fair to good control in most experiments. 1 = Control is inconsistent between experiments but performs well in some instances. L = Limited Published Data on effectiveness

University research indicates that the Tebuconazole component of Evolution is the most consistent performing and reliable fungicide when compared to other DMI and Group 3 fungicides on 3 of the major bentgrass disease pathogens.

# Evolution – Use Rates and Key Application Information

The rate of Evolution is 2-4 L/ha (20 – 40 mL/100 m<sup>2</sup>).

Application volume for leaf and crown diseases (Anthracnose, Dollar Spot, Helminthosporium diseases, Winter Fusarium and Brown Patch) should be adequate to ensure thorough and even coverage of the turf leaves and penetration to the crowns. Ideal application volume should be 350 to 500 L/ha. For best results use medium [XR Teejet\* (11004 or 10005)] to coarse [Turbo Teejet\* or AIXR Teejet\* (11004 or 11005)] nozzles, at 5 km/h and 3 bar pressure. In higher cut turf ( $\geq 15$  mm) a significant spray shielding effect can occur, impacting negatively on spray penetration and even coverage at low application volumes.

For Fairy Ring application, volumes should be as high as possible (approximately 1000 L/ha) to ensure placement close to the soil surface. When lower application volumes are used, washing in should commence as soon as possible after application. For best results use extremely coarse droplets [Turbo Floodjet\* (TF5) or TurfJet\* (TTJ10)] and total application volume of approximately 1000 L/ha. Preferably spray onto wet or dewy grass. Irrigate with 6 to 10 mm of water commencing within 1 hour of application. To improve Fairy Ring control, use of Evolution in conjunction with a strong soil surfactant program will assist in moving the fungicide more efficiently to the zone of activity.

To maximise preventative control, Evolution is best applied to the rootzone, where it can be absorbed by the root system and then translocated upwards, protecting the whole plant.

## Diseases Controlled by Evolution



*Black Helminthosporium*



*White Helminthosporium*



*Dollar Spot*



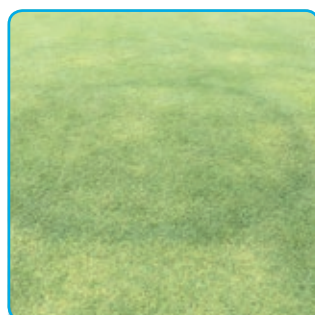
*Brown Patch*



*Winter Fusarium*



*Fairy Ring - Type 1*



*Fairy Ring - Type 2*



*Fairy Ring - Type 3*



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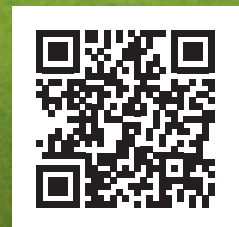
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