Fungicide with eradicant and protectant properties for the control of powdery mildews and suppression of Botrytis *on roses and other ornamentals*

Product Use Guide

Introduction

Foliar diseases can reduce both quality and yield. Over the years, growers have had a limited number of fungicides to keep diseases such as powdery mildew, scabs and *Botrytis* in check. In some cases the constant, repeated use of these products has been associated with the development of resistance and loss of effectiveness.

PROCURE brings to growers technically advanced chemistry. It has been proven to be highly effective in controlling powdery mildew and scabs, and in suppressing *Botrytis* diseases. PROCURE is an excellent addition to disease and resistance management strategies.

This Product Use Guide explains how a disease management program using PROCURE will help growers produce the highest quality crops. The following information is for general reference only. Before using PROCURE, or any agricultural chemical, read the product label and follow all recommendations for safe and effective use.

Product Chemistry

PROCURE can be applied through conventional spray equipment. PROCURE contains the active ingredient triflumizole, which is the only imidazole-based fungicide approved in the USA for use on apples, cherries, cucurbits, grapes, pears and strawberries.

The uniqueness of imidazole chemistry makes PROCURE a powerful addition to fungicide resistance management strategies. In addition to being an excellent fungicide, PROCURE has been shown not to cause plant growth regulating (PGR) effects. This allows for PROCURE to be used at any time during crop development – from first signs of new growth, through bloom and throughout production- without concern about size or shape, or possible carry-over effects.

Mode of Action

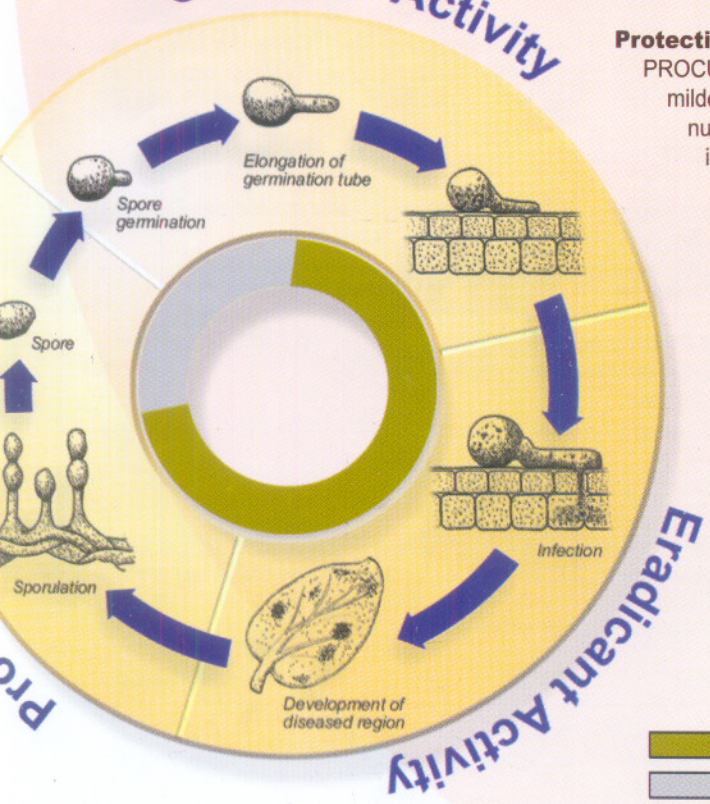
PROCURE is an imidazole fungicide that is effective in inhibiting ergosterol biosynthesis in fungi. Many higher fungi, like the powdery mildews, must synthesize ergosterol, a compound that is thought to function as a stabilizer for membranes that make up their cell walls. Thus if fungi are prevented from forming cell walls, the pathogen collapses and dies. Because ergosterol is a unique component in fungi and this types of chemical has no similar effects in plants or animals, PROCURE is specific in action.

PROCURE inhibits sporulation and spore germination. When applied before infection occurs (as a protectant), PROCURE inhibits elongation and subsequent penetration of the germination tube into the plant tissue.

When applications are made after infection has taken place (as an eradicant), PROCURE inhibits haustoria lobe formation inside the plant tissue, and therefore spore formation.

Protectant Activity

Product Features & Benefits



Protective and Eradicant Properties

PROCURE has both protective and eradicant properties against powdery mildew disease. It inhibits the germination of conidia and deforms nutrient absorbing haustoria of pathogens. Although early treatment is recommended to keep disease symptoms in check, PROCURE can act as an eradicant even after the plant becomes infected. Its anti-sporulant activity reduces spores after lesions become visible.

Translaminar and Vapour Action Activities

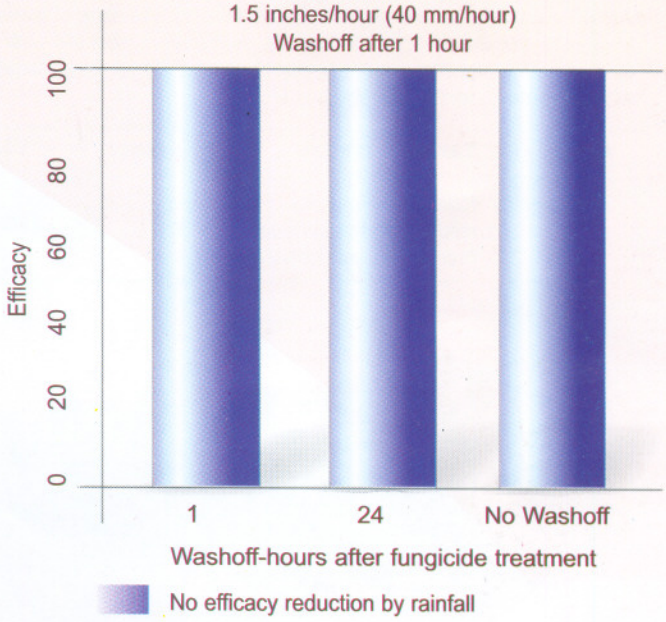
PROCURE has translaminar activity and is locally systemic within the plant. For example, applications made to a lower leaf surface quickly penetrate and translocate through the leaf. Fungal mycelia and haustoria in the lower and upper leaf surfaces are controlled.

Because newly developing tissues are particularly sensitive to infection, it is important to maintain protection with timely applications of PROCURE. Uniform coverage is important to maximize fungicidal effectiveness.

Rainfastness

PROCURE is rapidly absorbed by leaf tissues. Washoff studies have shown that, even when simulated rain follows within one hour after treatment, excellent fungicidal activity remains. In areas where rainfall can seriously affect performance, PROCURE is an especially good choice.

Cucumber Powdery Mildew: Rainfastness test



Utility in Resistance Management

Populations of fungal pathogens are known to develop resistance to fungicide with the same mode of action when used repeatedly. Chemtura encourages responsible resistance management programs to ensure effective long-term control of disease.

Resistance management strategies include alternation and/or tank mixing with other recommended fungicides having different modes of action or limiting the total number of applications per season.

The fungicidal action of PROCURE (triflumizole) is due to the inhibition of ergosterol biosynthesis. Triflumizole is classified as a DMI (dimethylation inhibitor) in sterol biosynthesis (SBI: Class II) and for the purposes of resistance management is grouped together with other Imidazoles, the Pyrimidines and the Triazoles. It is therefore not advisable to alternate PROCURE with products that belong to any of theses group.

Compatibility in an IPM Program

PROCURE is compatible with most other commonly used fungicides including insecticides and foliar nutrients. Because local conditions can modify the compatibility on any tank mixes, it is recommended that small scale mixtures be examined before use on an entire field. When other products are mixed with PROCURE, they should be used only in accordance with their specific label directions.

Crop Safety

PROCURE does not cause crop phytotoxicity or adverse PGR effects when used according to label directions.

Excellent Environmental and Workers' Safety Characteristics

PROCURE offers outstanding environmental and workers' safety features, including:

- 12-hour re-entry interval
- CAUTION signal word
- WHO Class IIIb with an acute oral LD_{50} in rat of greater than 2000 mg/kg b.w
- Minimal personal protective equipment required - Please consult product label for details
- Low application rate per hectare

Use & Rate Recommendations

Roses

Treatment should begin at the first sign of powdery mildew infection. Timing of the initial spray and the rate should take into account past history of the disease in the crop and weather conditions during the early season growth period.

Repeat applications of PROCURE should be continued at 7-10 day intervals.

PROCURE may be used also to suppress *Botrytis*. Therefore, in fields treated with PROCURE the prevalence of *Botrytis* during the main season is significantly reduced.

Crop	Target Disease	Rate
Roses	Control of Powdery mildew (*Sphaerotheca pannosa*) and the suppression of *Botrytis* (*Botrytis cinerea*)	0.7 ml/L or 700 ml/ha

Cucurbits

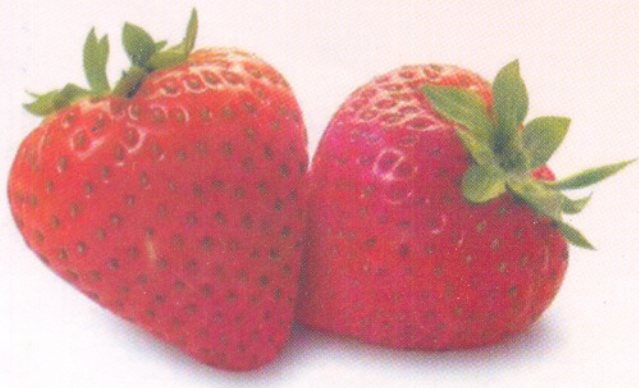
Use 600-700 ml per hectare in 100 litres of water. Applications of PROCURE should begin at the start of vining or at the first indication of disease. Repeated applications should be made at 7-14 day intervals. When conditions are favourable for severe disease pressure and more susceptible varieties are used, use higher rate and shorter spray interval.

Crop	Target Disease	Rate	PHI (Days)	MRL (ppm)
Cucurbits	Control of Powdery mildew (*Podosphaera xanthii* & *Erysiphe cichoracearum*)	0.6-0.7 ml/L or 600-700 ml/ha	1	0.5

Strawberries

Apply PROCURE at the rate of 600-700 ml/ha. Protection of leaves before bloom will reduce in-season disease pressure and results in greater control of flower and fruit infections. Initiate applications at the first sign of powdery mildew. Continue applications at 7-14 days intervals while conditions favour development.

Crop	Target Disease	Rate	PHI (Days)	MRL (ppm)
Strawberries	Control of Powdery mildew (*Sphaerotheca macularis f. sp. fragariae*)	0.6-0.7 ml/L or 600-700 ml/ha	1	2.0



Other Potential Uses for PROCURE

PROCURE has been proven through research to be efficacious in controlling powdery mildew in cabbage (*Erysiphe polygoni*), squash (*Sphaerotheca humuli*), lettuce (*Erysiphe cichoracearum*), and fruit rot in pineapples (*Chalara paradoxa*).

Check with your local Chemtura representative for approved uses of PROCURE in your area.

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