



Subdue[®]

Fungicide

SUBDUE is a systemic fungicide offering control of *Pythium* & *Phytophthora* root rots for:

- Pot plants – flowering
- Pot plants – foliage
- Protected soil grown ornamentals
- Bedding plants in containers
- Hardy nursery stock in containers
- Herbaceous perennials in containers
- Ornamental bulbs



Finally, growers can get the upper hand in high risk disease situations. This unique systemic fungicide product is extremely effective against two major causes of root rot disease affecting the UK outdoor and protected ornamentals industry.

- SUBDUE is a systemic fungicide with both preventative and curative activity offering superior control of *Pythium* and *Phytophthora* spp. root rot diseases.
- SUBDUE provides a versatile control strategy since it can be applied as a pre-planting or a post-planting media treatment.
- SUBDUE is a liquid emulsifiable concentrate containing mefenoxam™ (465.2g/l metalaxyl-M) which disrupts the production of essential fungal cell proteins.
- SUBDUE is approved for use on outdoor and protected ornamental crops and flower bulbs.

SUBDUE: Targets and strategic control

Pythium and *Phytophthora* spp. are major causes of root, stem and crown rot diseases in both glasshouse and outdoor nursery ornamental crops. Infection by these pathogens compromises crop quality and may result in failure or significant economic loss. Classed as Oomycetes they thrive in wet environments so are favoured by frequent overhead irrigation and spread can occur in irrigation water especially if it is recirculated. They are also associated with contamination of operational surfaces such as benches, trolleys and pots. Good nursery hygiene is important but fungicide treatment may be essential to protect vulnerable, high value crops. Use of a protectant fungicide strategy for management of high risk situations is also important.

Pythium can be particularly damaging during propagation and plug plant production (Picture 1).



Picture 1- *Pythium* infection during propagation

Mature rooted plants can also be attacked with the signs of infection often first observed above ground – as chlorosis, stunting or wilting. Plants infected by *Phytophthora* display similar ‘above-ground’ symptoms (Picture 2).



Picture 2: *Phytophthora* infection of Saintpaulia

These symptoms are indicative of root rot often affecting the entire root system. Some hosts exhibit only mild symptoms of root rot and the disease may go unnoticed but harbour infection and spread

disease to other more susceptible hosts. Once plants become infected they serve as a source of inoculum (spores) that can be splashed onto nearby plants or moved in water films through drainage holes in the containers and spread in irrigation systems. The pathogens can also persist as mycelial threads in infected plant tissue or as resting structures, which are dispersed in the media as the infected roots decompose. These structures can survive in a dormant state for long periods until triggered to germinate by root exudates.

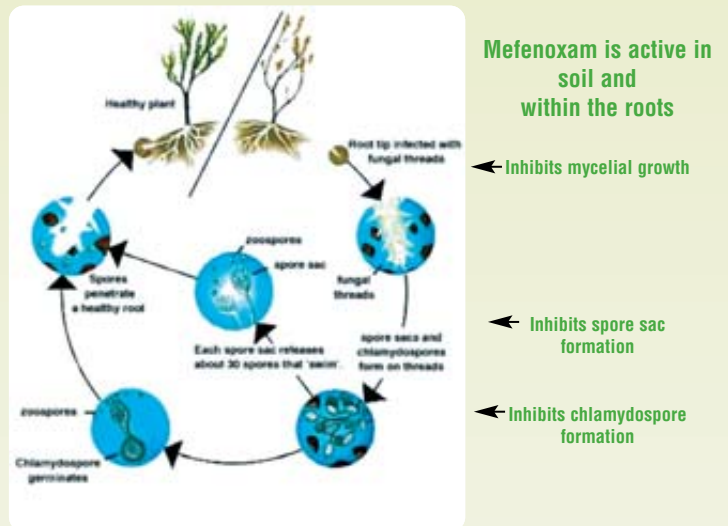
SUBDUE: High level efficacy

SUBDUE is a high performance systemic fungicide. The active substance applied to the growing medium is taken up by the roots, rapidly absorbed and is mainly transported upwards via the sap stream.

SUBDUE prevents the development of *Pythium* and *Phytophthora* spp. by disrupting the production of essential proteins in the cell causing the death of the fungi (Figure 1). The active substance (mefenoxam) in SUBDUE is active in soil and within the roots.

SUBDUE has both preventative and curative activity against *Pythium* and *Phytophthora* root rots.

Figure 1 - Generalised Life Cycle of *Phytophthora cinnamomi*

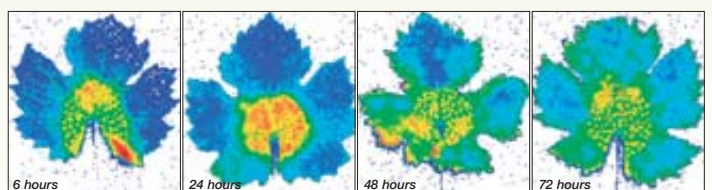


SUBDUE: Systemic activity

SUBDUE is a soluble liquid containing mefenoxam. For optimum effect against *Pythium* and *Phytophthora* spp. the active substance must reach the infection zone. This means that SUBDUE must be applied in such a way that an effective concentration of active substance reaches the roots.

Figure 2 illustrates the distribution of radio-actively labelled mefenoxam in a leaf over a three day period after application to a leaf base. Similar effective distribution occurs when mefenoxam is applied within the root zone.

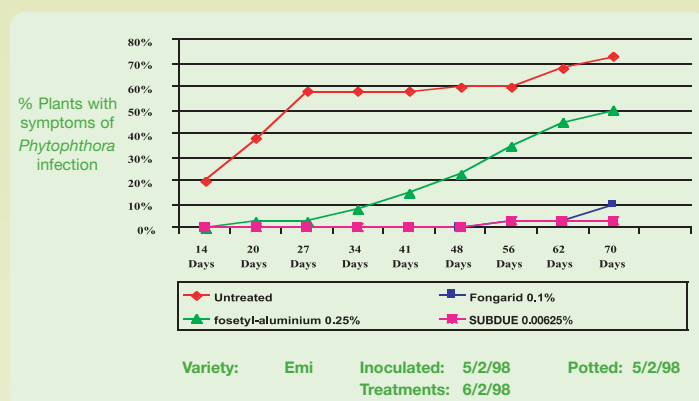
Figure 2. Distribution of radio-labelled mefenoxam 6, 24, 48 and 72 hours after application



Concentration of mefenoxam low high Radio-labelled mefenoxam was applied to the leaf base

Figure 3 demonstrates the relative efficacy of SUBDUE against *Phytophthora* infection of Saintpaulia.

Figure 3. EFFICACY OF SUBDUE against *Phytophthora* infection of Saintpaulia



SUBDUE: Strategic integration

An integrated strategy for control of *Pythium* and *Phytophthora* needs to be based on good nursery hygiene, stock plant management, with optimal irrigation and nutritional management to minimise stress. Insects such as shorefly and sciarids should also be controlled since the adults can ingest and spread fungal resting spores. Ideally SUBDUE should be used preventatively in the early stages of plant production or where there is significant risk of infection.

SUBDUE: Rates of use and application methods

SUBDUE may be incorporated into growing media or applied as a preventative or curative drench (please refer to the product label for specific rates).

SUBDUE can be used on the following crops:

- Protected containerised ornamentals
- Protected soil-grown ornamentals
- Outdoor containerised ornamentals
- Ornamental bulbs

	Pre-potting/ pre-planting media treatment	Drench application
Protected containerised ornamentals	12.5-18.75 ml per m ³ in 5-10 litres water	<i>Preventative</i> 6.25-9.4 ml in 100 litres water ^a <i>Curative</i> 9.4-12.5 ml in 100 litres water ^a
Protected soil-grown ornamentals	18.75 ml per 100m ² in 6-10 litres water incorporated to 10cm depth ^b	<i>Curative</i> 4-6.25 ml per 100m ² irrigated into root zone ^b 18.75 ml per 100m ² in 6-10 litres water irrigated into root zone ^c
Outdoor containerised ornamentals	12.5 ml per m ³ in 5-10 litres water	<i>Preventative</i> 6.25 ml in 100 litres water ^a
Ornamental bulbs	<i>Outdoor:</i> 0.75 litres per hectare ^d or 1.0 litres per hectare ^e in 3000 litres water <i>Indoor^f:</i> 2.5 ml per m ³ in 5-10 litres water	

^a drench volume should correspond to 10% of pot volume

^b chrysanthemum; ^c carnation (treatment can be repeated after 3 weeks at 9.4ml per 100m²)

^d crocus; ^e hyacinth and iris (^d and ^e dose can be increased by 0.25 litres per hectare if heavy infection is expected)

^f tulip, iris and lily

For pre-potting, media treatment of potted plants, spray the required amount of SUBDUE over the media and mix through as evenly as possible. The dose depends on the organic matter content of the potting media. The highest dose should be used for potting media containing more than 10% organic matter.

Alternatively SUBDUE can be applied as a preventative or curative drench after sticking cuttings, planting out or potting. Use the highest dose for disease-sensitive crops or if infection is severe. For best distribution the drench should be applied onto moist media followed by overhead irrigation immediately after application so that the product can penetrate into the rooting zone and any residues of SUBDUE are washed from the leaves.

For glasshouse soil grown crops (chrysanthemums and carnations) SUBDUE can be incorporated pre-planting or drenched as soon as the first symptoms of infection become visible.

On outdoor flower bulb crops of crocus, hyacinth and iris, SUBDUE can be used as a pre-planting preventative furrow treatment. It can also be used as a pre-potting treatment for indoor flower bulb crops of tulip, iris and lily.

SUBDUE: Safety to crops

SUBDUE has been successfully used at the recommended doses on a range of species and cultivars without crop damage. However because of the large number of species and cultivars of ornamentals, the cultivar susceptibility should always be checked by treating a small number of plants in the first instance. Use on *Prunus* and *Viburnum*, is advised against and use on *Hedera* and *Cordyline* is not recommended.

SUBDUE: Resistance management

The active ingredient in SUBDUE belongs to the phenylamide group. Strains of *Pythium* spp and *Phytophthora* spp. may exist which are resistant to phenylamides. SUBDUE should be used in alternation with fungicides from other groups to minimise development of insensitive strains of fungi.

SUBDUE: Environmental considerations

Potting media from treated plants should not be re-used for subsequent crops.

Unnecessary exposure of non-target arthropods should be avoided.

The active ingredient in SUBDUE has a very favourable spectrum of activity with regards to environmental behaviour and IPM.



Use SUBDUE for systemic control of *Pythium* and *Phytophthora* in ornamental crops

SAFETY PRECAUTIONS

Precautions marked * are a legal requirement

(a) Operator protection

- * Engineering control of operator exposure must be used where reasonably practicable in addition to the following personal protective equipment:
- * WEAR SUITABLE PROTECTIVE CLOTHING (COVERALLS), SUITABLE PROTECTIVE GLOVES AND FACE PROTECTION (FACESHIELD) when handling the concentrate.
- * WEAR SUITABLE PROTECTIVE CLOTHING (COVERALLS) AND SUITABLE PROTECTIVE GLOVES when handling contaminated surfaces.
- * WEAR SUITABLE PROTECTIVE CLOTHING (IMPERMEABLE COVERALLS) AND SUITABLE PROTECTIVE GLOVES when applying by hand-held equipment.
- * WEAR SUITABLE PROTECTIVE CLOTHING (COVERALLS) when applying by vehicle-mounted equipment.
- * However engineering controls may replace personal protective equipment if a COSHH assessment shows they provide an equal or higher standard of protection

WASH ALL PROTECTIVE CLOTHING thoroughly after use, especially the inside of gloves.

TAKE OFF IMMEDIATELY all contaminated clothing.

IF YOU FEEL UNWELL, seek medical advice (show label where possible).

AFTER CONTACT WITH SKIN OR EYES, WASH IMMEDIATELY with plenty of water.

WASH HANDS AND EXPOSED SKIN before meals and after work.

(b) Environmental protection

Do not contaminate water with the product or its container. Do not clean application equipment near surface water. Avoid contamination via drains from yards and roads.

(c) Storage and disposal

KEEP IN ORIGINAL CONTAINER, tightly closed, in a safe place.

- * DO NOT RE-USE CONTAINER for any purpose.

RINSE CONTAINER THOROUGHLY by using an integrated pressure rinsing device or manually rinsing three times. Add washings to sprayer at time of filling and dispose of safely.

HARMFUL IF SWALLOWED

IRRITATING TO RESPIRATORY SYSTEM

HARMFUL TO AQUATIC ORGANISMS, MAY CAUSE LONG-TERM ADVERSE EFFECTS IN THE AQUATIC ENVIRONMENT.

Keep out of reach of children

When using do not eat, drink or smoke.

Keep away from food, drink and animal feeding stuffs.

Do not breathe spray

This material and its container must be disposed of in a safe way.

Use appropriate containment to avoid environmental contamination.

To avoid risks to man and the environment, comply with the instructions for use.

Soluble liquid containing
465.2 g/l (44.7% w/w) metalaxyl-M



HARMFUL

The (COSHH) Control of Substances Hazardous to Health Regulations may apply to use of this product at work.

In case of toxic or transport emergency ring (01484) 538444 any time. Material Safety Data Sheet is available from your distributor.

SUBDUE contains 465.2 g/l (44.7% w/w) metalaxyl-M. SUBDUE® and FONGARID® are registered trademarks of a Syngenta Group Company.

™Mefenoxam is the trademark of Syngenta for metalaxyl-M

MAPP 12503

Pack size: 250 ml

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ALWAYS READ THE LABEL. USE PESTICIDES SAFELY.

The text of this brochure is derived from the directions for use. Syngenta guarantee the quality of the product. Because during application factors beyond our control may play a role, we accept no liability for damage directly or indirectly resulting from the use of the product.

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