suSCon Green
Sustained Control of Soil Insects for Potted Ornamental Plants

suSCon Green is a controlled release granular insecticide for the control of the larvae of a range of soil insect pests, including black vine weevil and sciarid fly in potting media for container grown plants.

The Product
suSCon Green contains 100g/kg of the insecticide chlorpyrifos, which is contained within 1mm diameter dark green spherical granules based on a polymer matrix.

Chlorpyrifos belongs to the organophosphate group of insecticides and is widely used throughout the world as a soil insecticide.

The product has a bulk density of 0.65 g/cc with the granules having an intrinsic specific gravity of 1.1 (ie will not float in water). There are approximately 1500 granules/gram of product.

suSCon Green is packed in a 10kg plastic pail which is easy to carry and store.

Mode of Action
The suSCon technology utilises polymers (plastics) as carriers to extend the period of effectiveness of inherently non-persistent insecticides. For example chlorpyrifos, the active ingredient of suSCon Green, has an effective life of 1 to 3 months in the soil, depending on the soil type and soil conditions. By incorporating chlorpyrifos into a polymer matrix, suSCon Green takes the effective control period for soil insects in potting media out to "up to 2 years control".

Release of the chlorpyrifos from the granule involves a balance of a number of mechanisms. The key ones being:

- Dissolution of the soluble components in(489,390),(994,806) the formulation which dissolve leaving a micro porous structure within the granule through which chlorpyrifos leaches from the granules.
- Diffusion of chlorpyrifos through the polymer matrix to the outside of the granule. The choice of polymer influences the solubility and diffusion characteristics of chlorpyrifos from the granule and thus the release rate “R”.
- The granule sets up an equilibrium with the chlorpyrifos in the potting media zone surrounding the granule. The rate of degradation “D” of the chlorpyrifos (by chemical, biological and physical processes) from this layer influences the rate of release from the granule. (see Figure 1)

When the rate of degradation in the potting media increases the release rate from the granule increases.

![Figure 1. Equilibrium in Potting Media](image)

The active ingredient in suSCon Green, chlorpyrifos is both a contact and stomach insecticide. Once chlorpyrifos is released from granules into the potting media it is very immobile and is not readily leached out of pots.

Chlorpyrifos has very low water solubility (0.4 ppm) and is strongly absorbed to clay and organic particles in the potting media. These factors combined mean that the chlorpyrifos released from the granules moves only a small distance from the granules in the potting media.
Control of soil insects therefore relies on the larvae coming into contact of the “active zone” around the susCon Green granules in the potting media. Even mixing of susCon Green at the correct rate is therefore essential if the larvae of insect pests are to be controlled before they damage roots of potted plants. susCon Green targets larvae at their most susceptible stage when they have just emerged from the egg (neonate larvae) or at the first instar stage. Although eggs are laid over a period of several months and in some cases year round, susCon Green controlled release activity will continue to provide control of emerging larvae.

The Pests
A range of soil insects have been identified as injurious to container grown ornamental plants in Australia. They include black vine weevil (Otiorhynchus sulcatus), garden weevil (Phylctinus callosus), Fuller’s rose weevil (Asynonychus cervinus), a range of scarab larvae (white grubs) and sciarids (fungus gnats). Larvae of the weevil species and most of the scarabs have a one year life cycle and most damage is caused by later instars of the larvae feeding on roots and underground stems of hardy ornamental plants. However some species have 2 year life cycles. Damage ranges from minor reduction in vigour to death of plants depending on the species of insect, the level of infestation and the plant species involved.

The importance of species varies within and between geographical areas. In the Melbourne metropolitan area the larvae of weevil species accounts for over 90% of species found and black vine weevil is the most severe pest. In the Sydney area the larvae of the scarab species (Cyclocephala signaticollis and Sericesthis geminata) are the most common problem. Sciarid flies (Lycoriella spp and Bradysia spp.) are common in more protected propagation environments in all areas. susCon Green will control the larvae of a broad range of soil insect pests in potting media for container grown plants, including the following species on which the product is registered in Australia.

- Black vine weevil (Otiorhynchus sulcatus)
- Pruinose scarab (Sericesthis geminata)
- Argentine scarab (Cyclocephala signaticollis)
- Fiddler beetle (Eupoecila australasiae)
- Opaline cockchafer (Anaplognathus porosus)
- Sciarid fly (Bradysia spp.)
- Shore fly (Scatella stagnalis)

Trial Results
A large number of trials have been conducted with susCon Green in Europe and Australia to examine the control of the larvae of soil pests of hardy ornamental nursery stock and annual nursery plants. The results of some of these trials are shown on page 3.

Crop Safety
A wide range of species have been tested and safely treated. A list of all the species that have been tested is available from your supplier of susCon Green. Some species and cultivars have been shown to be sensitive. DO NOT use susCon Green on Elaegnus ebbengi, Phlox subulata, Majoris cvs, and Helichrysum spp. Growers should satisfy themselves as to the safety of susCon Green to any particular variety or species, particularly those that have not been tested, before undertaking any wide scale treatment. This is particularly important with native species since susCon Green has not been used widely on native Australian plants.

Only vigorously growing plants should be potted into susCon Green treated media, and those pots should be kept in good condition.

It is also important when using susCon Green that:
- recommended rates are used and not exceeded
- mixing into potting media is thorough
- plants are kept in good condition, avoiding especially water logging of the pots and subsequent anaerobic conditions.

To avoid any possible contamination of ponds and waterways, susCon Green should NOT be used in potting media for aquatic and semi-aquatic species.
Key Benefits of suSCon Green

- Sustained control of insect pests for up to 2 years without multiple applications.
- Improved plant vigour and reduced plant losses from soil insects.
- Safe on a wide range of ornamental nursery stock.
- Reduced potential for dermal toxicity to end users because of the nature of polymer matrix “containing” active ingredient.
- Minimal impact on non target organisms and therefore useful in IPM systems.

Graph 1. suSCon Green - Black Weevil Control
Western Red Cedar (Thuja plicata) Peat/Bark/Grit Compost Larvae/Pot

Graph 2. suSCon Green - Scarab* Larvae Control
Callistemon (Callistemon pruinifolius) ANL No 2 Potting Mix Percent of pots infested 10 months after establishment

Graph 3. suSCon Green - Opaline Cockchafer Control
Cyprus Pine (Cupressus torulosa) Pine Bark/Sand/Peat Compost Larvae/Pot

Graph 4. suSCon Green - Plant Height & Mortality*
Cyprus Pine (Cupressus torulosa) Pine Bark/Sand/Peat Compost

*Scarabs were a mixture of Argentine scarab, pruniose scarab, African black beetle and fiddler beetle.

Plant mortality was caused by root feeding of cockchafer larvae.
Application and Use Recommendations

Complete control of insect larvae over a 2 year potting/growth cycle will only be achieved if the potting media is treated at all potting stages. Potting untreated liners into untreated media, or vice versa, can lead to infestation through eggs being laid and larvae growing in the untreated portion. Although larvae may subsequently disperse into the treated portion of media, by this stage they might be too big to control.

Thus even mixing of suSCon Green granules in the potting media is essential either by the potting media manufacturer (to be supplied to the nursery) or by the nurseryman prior to use. Thorough mixing is particularly important where media contains material such as perlite or rockwool.

Directions for use:

<table>
<thead>
<tr>
<th>CROP</th>
<th>PEST</th>
<th>STATE</th>
<th>RATES</th>
<th>CRITICAL COMMENTS</th>
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<tbody>
<tr>
<td>Hardy ornamental nursery stock (Do not use on Elaeagnus ebbingei, Phlox subulata, Majoris cv’s, White Delight and Scarlet Flame, Helichrysum Golden Baby.)</td>
<td>Prunose scarab (Sericesthis geminata)</td>
<td>All States</td>
<td>per cubic metre of potting media</td>
<td>Application Rate Use the lower rate in most soil-less and soil-based media. Use the higher rate in media containing 20% or more of tree bark.</td>
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<tr>
<td></td>
<td>Argentine scarab (Cyclocephala signaticollis), Fiddler beetle (Eupeocilla australiasiae), Opaline cockchafer (Anaplognathus porosus), Black vine weevil (Otiorhynchus sulcatus)</td>
<td></td>
<td>750g or 1kg</td>
<td>Application Method and Timing Apply by thorough incorporation in the potting medium just before young bare root plants are first potted from the rooted cutting or seedling stage. Where young plants growing in treated media are potted into larger containers for successive seasons, potting media freshly treated with suSCon Green must be used for repotting. Once suSCon Green is incorporated into potting media it should be used within 30 days to avoid a reduction in the period insect control provided in the potted plants.</td>
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<tr>
<td>Ornamental nursery plants (Rooted cuttings or seedlings or direct seed or unstruck cuttings)</td>
<td>Sciarid fly (Bradysia spp) Shore fly (Scatella stagnalis)</td>
<td>All States</td>
<td>500g in peat based media only</td>
<td>Application Method and Timing Apply by thorough incorporation in the media just before young bare root plants or seedlings or cuttings are planted or sown or struck in the treated media. Where young plants growing in treated media are potted into larger containers, potting media freshly treated with suSCon Green must be used for repotting. Once suSCon Green is incorporated into potting media it should be used within 30 days to avoid a reduction in the period of insect control provided in the potted plants.</td>
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Rate of Use

suSCon Green is recommended for use at the following rates on hardy ornamental nursery stock:
- 750 g/m³ of potting media in soil-less or peat based media
- 1 kg/m³ of potting media in media containing 20% or more tree bark

suSCon Green is recommended for control of sciarid fly and shore fly larvae on ornamental nursery stock:
- 500 g/m³ of peat based potting media only

suSCon Green treated potting media should be used within 30 days of mixing to maximise the period of control.

NOT TO BE USED FOR ANY PURPOSE, OR IN ANY MANNER, CONTRARY TO THIS LABEL UNLESS AUTHORISED UNDER APPROPRIATE LEGISLATION.

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