

Crop Profile for Impatiens (New Guinea) in Ohio

Prepared November, 2000

General Production Information

- Area of production in Ohio: 406,000 sq. ft - 78% for wholesale market
- Percent of US Acreage/Rank: 9%/2nd
- Number of Growers: 168
- Wholesale Price Per Basket: \$6.51
- Value of Wholesale Production in Ohio: \$2,571,000

Cultural Practices

New Guinea impatiens is propagated by cuttings normally from vegetative stock plants. Cuttings are placed in a well-drained medium with a pH between 6.0-6.5. Three to five cuttings are placed in each hanging basket. As the cuttings set roots, the medium is kept at 20 to 22 degrees C and exposed to short days. Rooting usually takes about 3 weeks during which time the growth medium is kept moist but well drained. After a few weeks of growth, 8-9 weeks before the projected sale, the plants are pinched to 4-5 leaf pairs removing 1-2 cm of stem tissue. Beginning 1-4 weeks after pinching the plants are exposed to long day light hours until the plants begin to flower and are ready to be sold. Growth regulators can be applied at this time to control height. Hanging baskets of fuchsia are marketed when the plant reaches full bloom. As with all ornamental plants, managing pests and diseases is a critical component of New Guinea impatiens production since any damage usually renders a plant unsaleable

Insect Pests

Thrips

Thrips are often the most serious insect pest in greenhouses. They are very difficult to control once a population becomes well established. Thrips feed on leaves and flowers of a wide variety of host plants. The feeding injury can render a plant unmarketable and the act of feeding by a thrips can transmit viruses to a susceptible host plant. The thrips lifecycle begins as an egg is deposited in plant tissue. After the larvae emerge they begin feeding on the plant. Thrips pass through 2 larval and transformation stages before becoming an adult. Feeding injury is done by

the larvae and adults, but only the adults can transmit viruses. The lifecycle of a thrips is temperature dependant with development occurring between 50 – 90 degrees F. The egg to adult cycle lasts between 10-38 days at these temperatures. At temperatures below 50 degrees F thrips can survive but no development occurs.

Fungus Gnats

The fungus gnat is a common pest of greenhouse plants. The adults are tiny, dark, slender, fragile looking flies. They have long antennae and legs and a small head in relation to their bodies. The lifecycle of the fungus gnat is completed in 25-30 days. The adults live about one week and lay up to 200 eggs. The eggs hatch in about 4 days into larvae. The fungus gnat larvae are white and translucent with shiny black heads. The larvae live in the soil for two weeks and feed on the roots of plants. The pupal stage lasts 3-4 days before the adults emerge. Extensive damage can result from larval feeding, resulting in plants that show signs of wilting. The adult fungus gnat is primarily a nuisance pest.

Aphids

There are many species of aphids that can attack greenhouse plants but the two most common species are the green peach aphid (*Myzus persicae*) and the melon/cotton aphid (*Aphis gossypii*). Both of these species are green in color but it can vary from light to dark green for the melon aphid and from light green to nearly pink for the green peach aphid. Aphids have small soft bodies with piercing-sucking mouth parts which they use to insert into the phloem tissue of plants and remove fluid. Aphids cause problems from injury by feeding, the transmission of viruses and by spreading sticky honeydew over the surface of leaves and flowers. In the greenhouse most aphids are female and they produce live young called nymphs. An average female produces between 50 to 200 nymphs during her lifetime. The nymphs, that are all female, begin reproducing in 7-10 days. Adult aphids appear in 2 forms, winged and wingless, depending on population density and /or host plant conditions. Winged aphids are troublesome because they are able to disperse throughout the greenhouse and are also able to fly into the greenhouse from outdoors.

Spider Mites

Spider mites are a persistent pest problem in the greenhouse. Many species of spider mites are found in the greenhouse, but the most common is the two-spotted spider mite (*Tetranychus urticae*). Spider mites are very small arthropods that develop mostly on the undersides of leaves. Their lifecycle lasts between 7-14 days but varies considerably depending on temperature. An adult female spider mite can produce 100-200 eggs in her lifetime. The eggs hatch into tiny larvae in a few days. The larvae pass quickly through several nymph stages before becoming adults. Spider mites cause injury to plants while feeding. Using their piercing-sucking mouth parts, they extract plant fluids. Feeding injury often give the upper leaf surface a characteristic mottled or speckled appearance. Large numbers of spider mites produce a webbing that can completely cover leaves and flowers.

CHEMICAL INSECT CONTROLS (4)

(all chemicals applied at an average rate of 200 gal/A unless otherwise noted)

Abamectin (Avid)

- Percent of total area treated: 86%

- Target pests: Thrips and Aphids

Average rate and frequency of application of most common formulations: (2)

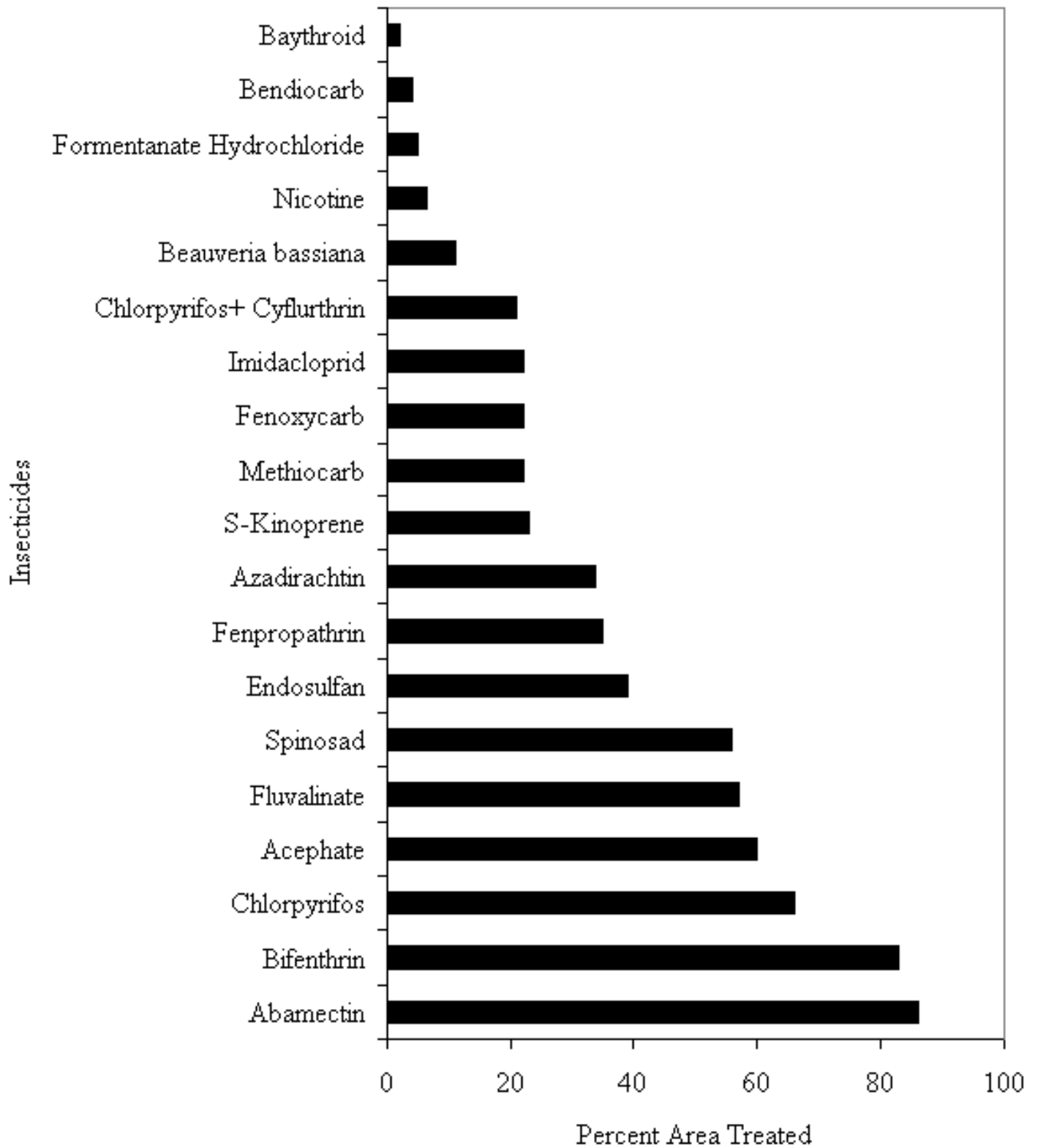
- Avid 0.15 EC – 6.4 oz/100 gal, 2-3 times
- Application method: High Volume Spray
- REI: 12 hours
- Efficacy rating: Good to Very Good

Bifenthrin (Talstar)

- Percent of total area treated: 83%
- Target pests: Thrips, Aphids, Mites and Whiteflies

Average rate and frequency of application of most common formulations: (2)

- Talstar F – 26 oz/100 gal, 1-2 times
- Application method: High Volume Spray
- REI: 12 hours
- Efficacy rating: Good



Chlorpyrifos (DuraGuard)

- Percent of total area treated: 66%
- Target pests: Thrips, Aphids, Whiteflies and Fungus Gnats

Average rate and frequency of application of most common formulations: (2)

- DuraGuard ME – 57 oz/100 gal, twice
- Application method: High Volume Spray
- REI: 12 hours
- Efficacy rating: Good

Acephate (Orthene)

- Percent of total area treated: 60%
- Target pests: Aphids, Thrips, Whiteflies

Average rate and frequency of application of most common formulations: (2)

- Orthene TT&O – 11 oz/100 gal, twice
- Application method: High Volume Spray
- REI: 24 hours
- Efficacy rating: Good

Fluvalinate (Mavrik Aquaflow)

- Percent of total area treated: 57%
- Target pests: Thrips, Whiteflies, Aphids and Mites

Average rate and frequency of application of most common formulations:

- Mavrik Aquaflow – 7 oz/100 gal, 1-2 times
- Application method: High Volume and Low Volume Spray or Fogger
- REI: 12 hours
- Efficacy rating: Good to Very Good

Spinosad (Conserve)

- Percent of total area treated: 56%
- Target pests: Thrips

Average rate and frequency of application of most common formulations: (2)

- Conserve SC – 6 oz/100 gal, twice
- Application method: High Volume Spray
- REI: 4 hours
- Efficacy rating: Very Good

Endosulfan (Thiodan)

- Percent of total area treated: 39%
- Target pests: Thrips, Aphids and Whiteflies

Average rate and frequency of application of most common formulations: (2)

- Thiodan 50 WP – 24 oz/100 gal, twice
- Thiodan 3EC – 48 oz/A, twice
- Fulex Thiodan – 16 oz/100 gal, once
- Application method: High or Low Volume Spray or Fogger
- REI: 24 hours
- Efficacy rating: Good to Very Good

Fenpropathrin (Tame)

- Percent of total area treated: 35%
- Target pests: Thrips and Whiteflies

Average rate and frequency of application of most common formulations: (2)

- Tame 2.4 EC – 10 oz/100 gal, 3 times
- Application method: High Volume Spray
- REI: 24 hrs.
- Efficacy rating: Good
- Used with Orthene TT&O for best results.

Azadirachtin (Azatin)

- Percent of total area treated: 34%
- Target pests: Thrips, Whiteflies and Fungus Gnats

Average rate and frequency of application of most common formulations: (2)

- Azatin XL – 13 oz/100 gal, twice
- Application method: High Volume Spray or Fogger
- REI: 12 hours
- Efficacy rating: Very Good

S-Kinoprene (Enstar)

- Percent of total area treated: 23%
- Target pests: Thrips, Whiteflies, Aphids

Average rate and frequency of application of most common formulations: (2)

- Enstar II – 7 oz/100 gal, twice
- Application method: High Volume spray
- REI: 4 hours

- Efficacy rating: Good to Very Good

Methiocarb (Mesurol)

- Percent of total area treated: 22%
- Target pests: Thrips

Average rate and frequency of application of most common formulations: (2)

- Mesurol 75W – 32 oz/100 gal, twice
- Application method: High Volume Spray
- REI: 24 hours
- Efficacy rating: Very Good

Fenoxycarb (Precision, Preclude)

- Percent of total area treated: 22%
- Target pests: Thrips

Average rate and frequency of application of most common formulations: (2)

- Precision – 4 oz/100 gal, twice
- PT 2100 Preclude -
- Application method: High Volume Spray or Aerosol (Preclude)
- REI: 12 hours
- Efficacy rating: Good to Very Good

Imidacloprid (Marathon)

- Percent of total area treated: 22%
- Target pests: Aphids and White Flies

Average rate and frequency of application of most common formulations: (2)

- Marathon 1% - ½ tsp (2 grams)/10 inch pot, once
- Marathon 60 WSP– 4 (20gram) packets/100 gal (5 oz drench/10 inch pot), once Application method: top dress for 1% and drench for 60 WSP
- REI: 12 hours
- Efficacy rating: Very Good

Chlorpyrifor + Cyfluthrin (Duraplex)

- Percent of total area treated: 21%
- Target pests: Aphids, Thrips and Whiteflies

Average rate and frequency of application of most common formulations: (2)

- Duraplex TR – 1 (6oz) can/9000 sq ft, twice
- Application method:
- REI: 12 hours
- Efficacy rating: Good

Beauveria bassiana (Naturalis-O, BotaniGard)

- Percent of total area treated: 11%
- Target pests: Aphids, Thrips and Whiteflies

Average rate and frequency of application of most common formulations: (2)

- Naturalis-O – 71 oz/100 gal, twice
- BotaniGuard 22WP – 64 oz/100 gal, once
- Application method: High Volume Spray or Fogger
- REI: 4 hours
- Efficacy rating: Good to Very Good

Nicotine (Fulex, Plant Products)

- Percent of total area treated: 6.5%
- Target pests: Aphids, Thrips and Whiteflies

Average rate and frequency of application of most common formulations: (2)

- Plantfume Nicotine – 1 can/20,000 cu. ft, once
- Plant Products Nicotine – 1 can/20,000 cu. ft, 1-2 times
- Application method: Smoke
- REI: 4 hours
- Efficacy rating: Good

Formentanate Hydrochloride (Carzol)

- Percent of total area treated: 5%
- Target pests: Thrips

Average rate and frequency of application of most common formulations: (2)

- Carzol – 16 oz/A, once
- Application method: High Volume Spray or Fogger
- REI:
- Efficacy rating: Good

Bendiocarb(Dycarb)

- Percent of total area treated: 4%
- Target pests: Aphids and Thrips

Average rate and frequency of application of most common formulations: (2)

- Dycarb 76WP – 18 oz/100 gal, 2-3 times
- Application method: High Volume Spray
- REI: 12 hours
- Efficacy rating: Good

Baythroid (Decathalon)

- Percent of total area treated: 2%
- Target pests: Thrips

Average rate and frequency of application of most common formulations: (2)

- Decathalon 20WP – 1.9 oz/100 gal, twice
- Application method: High Volume Spray
- REI: 12 hours
- Efficacy rating: Good

CULTURAL CONTROLS (2,3,5)

Quarantine new plant material for at least one week. Use screens on ventilation system and doors to exclude pests. Practice proper sanitation and weed control in and around the greenhouse. Avoid excessive fertilization since some pests thrive on plant tissue high in nitrogen.

BIOLOGICAL CONTROLS (2,3,5)

Some new and effective biological control products are available for the greenhouse grower. Most growers are taking a cautious approach to these new products and only applying them to small portions of their operations.

Diseases

Botrytis Gray Mold

The most common disease of greenhouse floral crops is gray mold. Gray mold is caused by the fungus *Botrytis cinerea*. It is a common fungus, with a very wide host range and can persist in the greenhouse year-round. The fungus produces a large amount of spores that move throughout the greenhouse via air currents. Under

environmental conditions of relative humidity at or above 85%, little or no air circulation and free water on the leaf surface, the fungal spores land on plant surfaces, germinate and penetrate the host. The symptoms of gray mold vary depending on the host and the environmental conditions associated with the host. In most cases the disease is characterized by the production of leaf spots, flower blight, bud rot, stem canker, stem and crown rot, cutting rot, damping off and in extreme cases, plant death. The fungal growth is characterized by the presence of fluffy gray/brown mycelium that produces a cloud of spores if disturbed. Affected tissue is soft and brown, and sometimes has a water soaked appearance. This disease can be anything from a common nuisance to an economic disaster depending on the host and the conditions under which the crop is grown.

Leaf Spots

A number of leaf diseases that occasionally damage ornamental plants can be caused by fungi or bacteria. Most of these pathogenic organisms require a wet leaf surface for an extended time, usually 24 hours. The wet leaf surface allows the fungal spores to swell, geminate and penetrate the plant and the bacteria to swim to a natural opening in the leaf surface such as a stomate. Bacterial leaf spots are initially light green and look water soaked. Later these leaf spots turn brown or black and may have definite margins. Fungal leaf spots are characterized by brown or black spots randomly scattered across the leaf. The spots may have the appearance of concentric rings. The margins of the spot can be a different color than the center of the spot.

Powdery Mildew

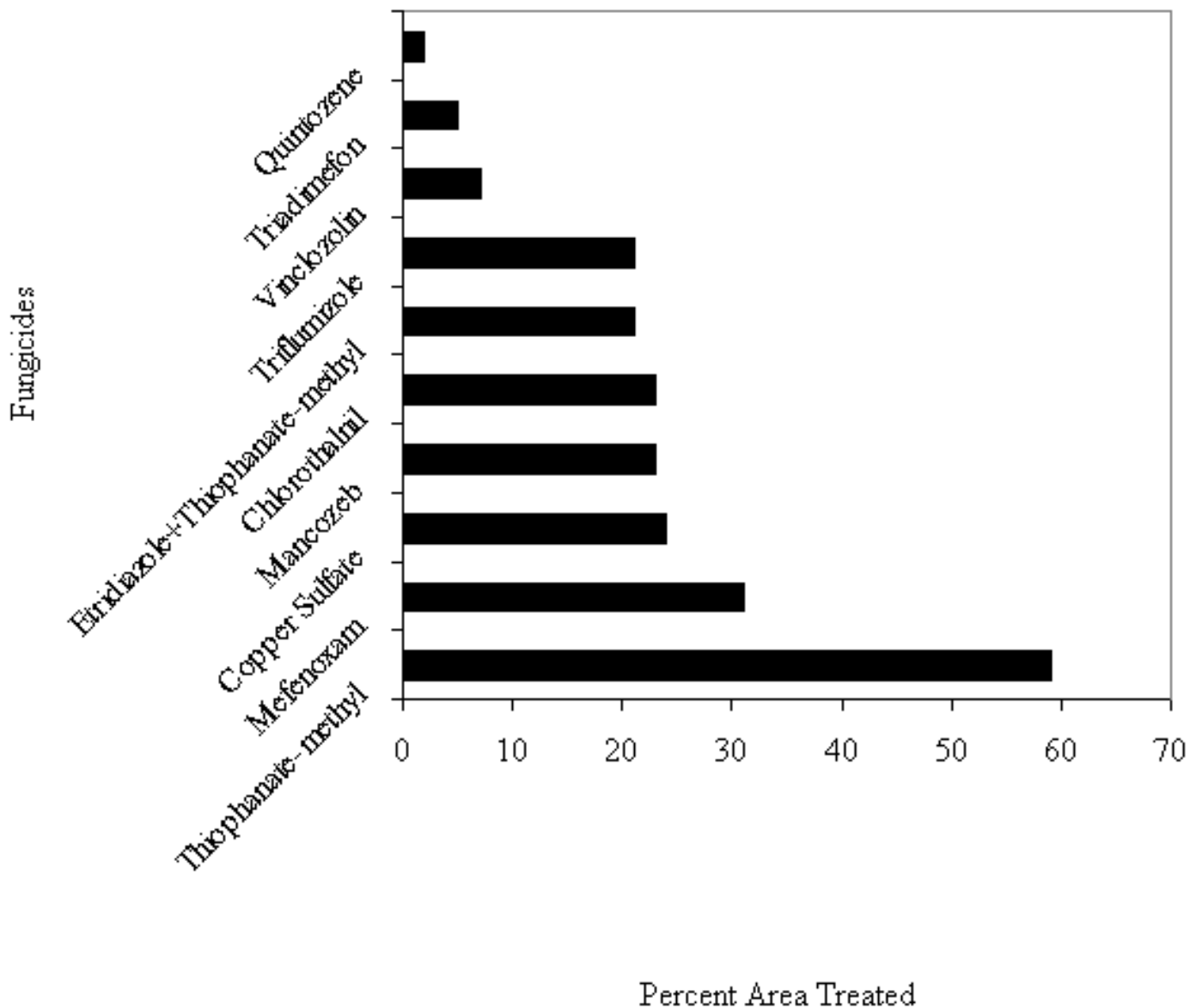
Powdery mildew is one of the most wide spread diseases in the floriculture production industry. It is caused by the fungus *Oidium* spp. whose spores are easily spread by physical movement and air currents. In most cases, symptoms of this disease are relatively easy to identify. The disease is characterized by the fluffy white fungal growth on the leaves, stems, and flowers of infected plants. The disease typically shows up on leaves first and if left unchecked it will spread to the stems and flowers. Tissues infected with powdery mildew can eventually become necrotic. This disease is responsible for significant economic losses in the greenhouse. Powdery mildew tends to be more of a problem later in the growing season when night temperatures get cooler. High humidity is also necessary for development of the fungus. However, it depends on the individual organism as to when and where the disease shows up.

Impatiens Necrotic Spot Virus (INSV)

INSV is becoming one of the more important problems in the floriculture industry. It is transmitted by thrips feeding and through the vegetative propagation of infected plant material. Symptoms on a New Guinea impatiens include stunting, leaf distortion and blackened spots or rings on foliage and stems. The stage of growth of the plant can also influence symptom development. Plants can be infected with the virus and not show symptoms until the plant is under stress, at which time the plant will collapse quickly. The best way to control the disease is to ensure that no plants in the greenhouse are infected with the virus and to exclude thrips.

CHEMICAL DISEASE CONTROLS (4)

(all chemicals applied at an average rate of 200 gal/A unless otherwise noted)



Thiophanate-methyl (Cleary's 3336, Fungo)

- Percent of total area treated: 59%
- Target pests: Botrytis, Rhyzoctonia, Pythium and Stem Rot

Average rate and frequency of application of most common formulations:

- Cleary's 3336 4.5F - 18 oz/100 gal, once
- Fungo Flo 50WP - 20 oz/100 gal, twice
- Application method: High/Low Volume Spray or Drench
- REI: 12 hours
- Efficacy rating: Good to Very Good

Mefenoxam (Subdue MAXX)

- Percent of total area treated: 31%

- Target pests: Root Rots

Average rate and frequency of application of most common formulations:

- Subdue MAXX – ¼ oz/100 gal, once
- Application method: Drench, Overhead Irrigation
- REI: None
- Efficacy rating: Good to Very Good

Copper Sulfate (Phyton-27)

- Percent of total area treated: 24%
- Target pests: Botrytis

Average rate and frequency of application of most common formulations:

- Phyton-27 5.5EC – 16 oz/100 gal, one to two times
- Application method: High Volume Spray
- REI: 12 hours
- Efficacy rating: Good to Very Good

Mancozeb (Protect T/O)

- Percent area treated: 23%
- Target pests: Botrytis and Leaf Spots

Average rate and frequency of application of most common formulations:

- Protect T/O 80 WP – 18 oz/100 gal, twice
- Application method: High Volume Spray
- REI: 24 hours
- Efficacy rating: Very Good

Chlorothalnil (Daconil)

- Percent of total area treated: 23%
- Target pests: Botrytis

Average rate and frequency of application of most common formulations:

- Daconil Ultrex 82.5 WDG – 16 oz/100 gal, twice
- Daconil 2787 Flo 4F – 24 oz/100 gal, once
- Application method: High Volume Spray and fogger
- REI: 12 hours
- Efficacy rating: Good to Very Good

Etridiazole + Thiophanae methyl (Banrot)

- Percent area treated: 21%
- Target pests: Root Rots

Average rate and frequency of application of most common formulations:

- Banrot 40WP– 6 oz/100 gal, once
- Application method: Drench
- REI: 12 hours
- Efficacy rating: Very Good

Triflumizole (Terraguard)

- Percent of total area treated: 21%
- Target pests: RootRots

Average rate and frequency of application of most common formulations:

- Terraguard 50WP – 12 oz/100 gal, once
- Application method: Drench
- REI: 12 hours
- Efficacy rating: Very Good

Vinclozolin (Ornalin)

- Percent of total area treated: 7%
- Target pests: Botrytis

Average rate and frequency of application of most common formulations:

- Ornalin – 18 oz/100 gal, once
- Application method: High Volume Spray
- REI: 12 hours
- Efficacy rating: Very Good

Triadimefon (Bayleton)

- Percent area treated: 5%
- Target pests: Leaf Spots

Average rate and frequency of application of most common formulations:

- Bayleton 50 – 4 oz/100 gal, once
- Application method: High Volume Spray
- REI:
- Efficacy rating: Good

Quintozene (Terraclor)

- Percent of total area treated: 2%
- Target pests: Root Rots

Average rate and frequency of application of most common formulations:

- Terraclor 400 – 11 oz/100 gal, once
- Application method: Drench

- REI: 12 hours
- Efficacy rating: Very Good

CULTURAL CONTROLS (2,3,5)

Buy resistant varieties whenever possible. Quarantine new plant materials for at least a week. Screen the greenhouse doors and vents. Plant disease free cuttings and seeds. Keep growing area clean. Remove all diseased plants as soon as they have been detected. Periodically disinfect the hose end, especially after touching the growing mix or the contaminated water on the floor or benches. Benches should also be disinfected at the end of each crop cycle. Eliminate all weeds and algae. Fertilize plants judiciously. Adjust the pH of the growing medium appropriately. Control relative humidity of the greenhouse, especially during the evening hours. This can require simultaneously ventilating and heating the greenhouse during critical hours. Providing adequate air circulation will also help. The use of well draining growth mediums will help reduce the incidence of root diseases.

Weeds

Weeds are a persistent problem in greenhouse production. Weeds are unsightly and can harbor insect pests and diseases. Therefore, weed management in and around the greenhouse is important to assist with pest and disease control and well as to improve aesthetics.

CHEMICAL CONTROLS (4)

(all chemicals applied at a rate of 200 gal/A unless otherwise noted)

Glyphosate (Roundup)

- Percent of total area treated: 31%, primarily used as a spot spray in work area.
- Target pests: Annual and Perennial Weeds

Average rate and frequency of application of most common formulations:

- Roundup Pro – 1.1 oz/gal, as needed
- Application method: High Volume Spray
- REI: 4 hours
- Efficacy rating: Good to Very Good

Oryzalin (Surflan)

- Percent of total area treated: 1% (used on the exterior of the greenhouse)
- Target pests: Annual Grasses and Broadleaf Weeds

Average rate and frequency of application of most common formulations:

- Finale – 2 oz/gal, once

- Application method: High Volume Spray
- REI: 12 hours
- Efficacy rating: Very Good

CULTURAL CONTROLS (2,3,5)

Use weed block fabric to cover the floor and remove any weeds that grow in along the edges of the fabric. Hand weeding and solarization can also be used to control weeds. Managing weeds outside the greenhouse is important to eliminate the major source of air borne weed seeds and to prevent perennial weeds from growing in under the foundation. Regular mowing can help prevent the most weed seed formation. However, maintaining a weed-free barrier around the greenhouse may be more effective. Adding lime to soil can help too.

Contacts

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