

## CONTROL OF GREENHOUSE ENEMIES

*Recommendations by  
Cornell University Floriculture Faculty*

Sanitation is an important element in any insect control program. Weeds growing within or adjacent to the greenhouse may serve as reservoirs for insect pests, providing a constant source for reinfestation. Discarded plants, plant parts or organic growing media may also attract or harbor destructive pests, and should be removed from the growing area. Other effective procedures especially for preventing or managing whitefly infestations are suggested as follows.

1. Prevent whiteflies from being introduced into the greenhouse. Examine cuttings of new stock for the presence of whiteflies before adding to the existent crop.
2. Learn to recognize the first signs of whitefly infestation. Inspect the undersurface of the young foliage from time to time.
3. Treat when the *first* signs are noticed, not delaying until clouds of adults can be flushed out of the plants.

Generally, the greenhouse whitefly is the most prevalent and serious pest. Mealybugs, spider mites and fungus gnats may also be troublesome on occasion. Brief descriptions of these insects and their damage follow.

**Whiteflies (WF).** The whitefly life cycle is complex, consisting of a number of different stages, some of which are highly tolerant to insectical treatment. (Fig. 1.) The duration of the cycle is from 30-45 days, since each female is capable of depositing about 400 eggs in her lifetime, infestations may build rapidly and overlapping of stages is common. The leaf undersurface is the preferred feeding site. The plants become chlorotic and may drop their leaves prematurely. In addition, "honeydew" excretions serve as a substrate for the growth of a sooty fungus which gives the plant a blackened, unattractive appearance. The fungal growth also interferes with photosynthetic activity. Given the fact that insecticide-tolerant stages become increasingly prevalent as an infestation develops, frequent and regular treatment is necessary until all immature stages have developed to maturity and none of the tolerant stages remain.

**Spider Mites (SM)**—These minute, insect-life relatives also congregate on the undersurface of the leaves. They are able to complete a generation in as few as five days during hot, dry periods. As in the case of the whitefly, the two spotted spider mite also passes through distinct stages, some of which are tolerant to insecticides. Since development during favorable growing conditions is rapid, it may be necessary to make multiple applications at closely timed intervals (4-5 days). Feeding damage is evident as chlorotic specking and yellowing or bronzing of the foliage. Heavy feeding may result in the death of the plant. During the initial stages of an infestation, mites may be detected by shaking the plant or sharply rapping the leaves over a sheet of white paper. The mites will be evident as minute, moving specks. Silken webbing scattered through the foliage signals the presence of a sizeable population.

**Mealybugs (MB)**—The presence of fluffy white, waxy secretions is a sure sign of a mealybug infestation. Generally, during early attack, these cottony puffs are confined to the leaf axils and other sites on the plant where they are less apt to be noticed. The eggs of the species most common to this growing region are protected within

a mass of irregular cottony secretions. Upon hatching, the young crawlers (nymphs) disperse throughout the plant, and may occasionally be found feeding on the roots. The crawler stage is most vulnerable to insecticidal treatment. Damage results from the injection of toxic saliva into the plant tissue as the insect extracts the fluid contents from the cells by means of its sucking mouthparts. As with the whitefly, there is considerable "honeydew" produced upon which the sooty fungus grows. Leaf drop and distorted growth is not unusual when populations are high.

**Fungus Gnats (FG)**—The adult is a slender, delicate fly which may be observed flitting among the plants or running rapidly over the surface of the growing medium in the pots. Large adult populations may be a nuisance to greenhouse workers. The immature stage (larva) is white and legless, with a conspicuous black head. Adults are attracted to moist organic matter such as the potting mixes used in plant production. The females lay their eggs in clusters of 20 or more on the surface or in crevices of the potting medium or in any other organic matter which may be present in the greenhouse environment.


The larvae feed on rootlets and roots and may burrow into the lower stem promoting decay and collapse of the tissue. Wilting will be evident as the injury progresses. A period of approximately 4 weeks is required for completion of the life cycle from egg to adult. Applications of insecticidal granules, or drenches, may be needed to protect against larval feeding. Foliar sprays, aerosols or smokes will control the adults.

### Control

The insecticides which are listed will provide control if applications are well timed and sufficient in number. Initiate the program early and maintain plants free of infestation during early plant development because after bracts show color they are very sensitive to pesticides and the choice of safe, effective insecticides is limited. If treatment is necessary after bract coloration, it should be restricted to the use of aerosols of resmethrin, dichlorvos, dithio or acephate. Label directions must be adhered to closely, or plant damage may occur. In the following list, insecticides preceded by the notation (R) are restricted-use chemicals whose use requires the supervision of a certified pesticide application.

### Acephate

(Orthene 75% SP)—2 tsp/gal. (PT 1300 3% aerosol)  
—Use as directed on label. Use 2-3 times at 7-10 day intervals. Controls whitefly, mealbug, spider mites.



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\*R **Aldicarb** (Temik) 10% gran. Apply to the soil after the plants are well rooted. Do not mix with potting soil. Spread evenly over soil surface and gently water surface so as not to wash granules out of the pot. Repeat treatment if needed but in no case, within 4 weeks of marketing. Do not let the plants dry out or injury may occur.

Use any of the following treatments: For whitefly: 18-28 oz/1000 sq ft of closely packed pots. For mealybug and spider mites: 28-37 oz/1000 sq ft or for individual pots:

Pot size	Tsp.
4-6"	$\frac{1}{16}$
8-10"	$\frac{1}{8}$
12"	$\frac{1}{4}$

\*Special note: Aldicarb (Temik) is not cleared for use in Suffolk County.

**Cyhexatin** (Plictran 50WP):  $\frac{3}{4}$  tsp/gal for spider mites.

(R) **Dichlorvos**

(DDVP, Vapona 10% aerosol)—1 oz/3000 cu ft.

(4EC): vaporize 1 oz/10,000 cu ft on pipes or in pan.

Make multiple applications at 4 day intervals; foliage dry, vents closed 2 hours or overnight. Controls whitefly, mealbug, spider mites, fungus gnat adults.

**Hexakis** (Vendex 4L)—1 tsp/gal for spider mites.

(R) **Oxamyl** 10% gran: in soil mix—3 oz/cu yd, add while tumbling. As post planting pot treatment, water in.

Pot size	Tsp.
4-6"	$\frac{1}{16}$
8-10"	$\frac{1}{8}$

Controls whitefly, mealybug, fungus gnat larvae.

**Pentac**

(50WP)—1 tsp. gal. (4 flow)— $\frac{2}{3}$  tsp/gal. Treat every 7 days until spider mite controlled.

**Resmethrin**

(SBP-1382, 2 EC)—1 tsp/gal weekly for 4-6 weeks.

(PT 1200, 1% aerosol)—use labeled rates, good for late season control. Controls whitefly, fungus gnat adults.

(R) **Sulfotepp**

(Dithio 5% aerosol)—1 lb bomb/50,000 cu. ft. (15% smoke)—use labeled rates. Treat at 7 day intervals. Foliage dry. Vents closed for 2 hours or overnight. Controls whitefly, mealybug, spider mites, fungus gnat adults.

**Sumithrin**

(1% aerosol)—follow label directions. (2EC)—1 tsp/gal for whitefly; 2 tsp/gal for mealybug, spider mite. Apply weekly.

Additional control suggestions may be found in *Cornell Recommendations for Commercial Floriculture Crops Part II: Pest Control—Diseases, Insects and Weeds*. Follow label directions closely.

Bracts of poinsettia increase in sensitivity to pesticides as color formation progresses. **If applications become necessary after the onset of bract coloration, only dichlorvos, dithio or acephate aerosols should be used, follow label directions closely.**

### Non-Pest Problems

**Branch break.** Some of the newer cultivars are more subject to branch break than older cultivars previously grown. Part of this susceptibility is due to the genetic character of the plants and the acute angle of branch attachment. Little can be done about this condition. Failure of branches is also due to improper cultural conditions such as overcrowding plants, underfeeding them to keep them short, improper nutrient balance, such as leaving out the trace elements and improper watering. Growing them too warm to try to accelerate bloom may also be a contributing factor to branch break.

**CRUD.** Referred to by the name "crud" is an exudation of latex from the leaves and stems. Unsightly, if excessive, crud has not been found to be harmful. It has been thought to be related to environmental conditions but no real cause has been found.

**Herbicide damage.** Bedding plant growers who finish out the year by forcing poinsettias for Christmas should be advised not to use weed killers in the greenhouse following the bedding plant crop. Several cases of plant injury have occurred where weed killers such as Treflan have been applied to greenhouse soils during summer months. The materials have not been watered in well following application. When the houses were covered in the fall and the poinsettia crop started, there was sufficient herbicide to volatilize and cause the plant damage.

**Wood preservatives.** Another source of plant damage occurs when the wrong type of wood preservative is used in the greenhouse on benches, flats, supporting members or any place where wood is treated. Copper naphthanate is the only safe product to use. **DO NOT USE PENTACHLOROPHENOL OR CREOSOTE** products as severe plant damage can occur from the fumes of these materials.

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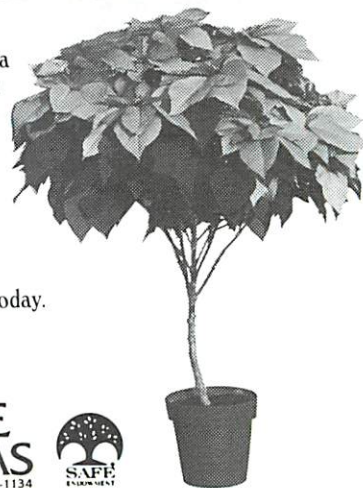
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