

THE EXPERTS ON YOUNG PLANTS



HOW TO CARE FOR NEW PLANTS

When Plugs Arrive: Scouting Advice from BASF

Open boxes and bags in an area away from production and shake URCs or plugs over white and black backgrounds (big paper or cardboard works best) to look for thrips and mites.



Look for fungus gnats hanging around on the inside of bags

- The best environment for rooting cuttings is also favorable for Botrytis and fungus gnats – be sure to scout and prepare to be proactive against attacks



Use a hand lens to examine areas where pests congregate (bud ends and nodes)

- Remember to scout for mites and thrips larvae/pupae with hand lens, as sticky cards only catch flying pests (and mostly only in adult stage)

Please always read the labels before applying any chemicals and start by trialing in small batches. The labels provide guidelines on choosing application rates.



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When Plugs Arrive: Scouting Advice – based on advice from Raymond Cloyd

Put together a “Scouting Kit”

- Potato wedges and/or sticks
- Indicator plant (sweet potato vine is a good choice for aphids)
- 10x hand lens
- Clipboard with white paper
- Flags
- Data sheets & Maps of each greenhouse – great if it’s on Excel so you can update your database on the computer
 - Colored sticky cards (blue and yellow)
 - BioWorks Blue & Yellow Cards, 100/pack
 - Blue is top choice for thrips
 - Yellow works well for most other insects
- Bioline’s Trapline T+
 - Specific color, unique patterning, adhesive and attraction pheromone to increase control of Western Flower Thrips
 - 10 pack of cards
 - Roller Trap Plus 6in x 328ft

Passive Scouting – good for throughout lifecycle

- Set up system when plants first come in
- Use devices (cards, potato wedges/sticks)
- Main goal is to trap or lure insects so you can scout what is present
- Position sticky traps above the crop canopy in a way you can adjust as plants grow
 - Also place them near openings (doorways, vents, sidewalls, etc)
 - Place sticky cards under the table to scout for thrips, fungus gnats, and shore fly pupae

Active Scouting – good for when they first arrive

- Good way to scout for plants when they first come in
- Visually inspect insects and mites underneath leaves or entire plants
- Randomly select about 20 plants per greenhouse section
 - Flag these plants to indicate which ones you’re counting
- Active scouting works best for immature thrips, whitefly nymphs, young and wingless aphids, mealybugs, and spider mites
 - To look for insects on young plants, place a sheet of white paper under foliage and gently strike to see if any mites or thrips can be seen



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When Plugs Arrive: Isolation Advice from Michigan State University

Try to buy only from high quality certified pest-free stock

- Consider visiting suppliers to inspect their sanitation practices
 - Costly to do, but yields best results when you start clean, you can stay clean easier

Inspect new plant material thoroughly right away.

- Know how to identify diseases and insects—either reject the shipment or place in a quarantined area of the greenhouse
 - Best to keep plants from different suppliers in separate areas of the greenhouse
 - Once you are sure the new plants are clean, the plants can be put together
 - Note if your supplier uses BCA's so you don't reject a shipment with the "good bugs" because you think they're bad
- Look for injury symptoms on arriving plants—more susceptible to diseases
- Suspicious plants that are not rejected or discarded should be tested for diseases immediately either with in-house testing or sent to professional labs like Michigan State University Diagnostic Services



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GENERAL ADVICE FOR PESTICIDES ON YOUNG PLANTS

General Tips

Use systemic insecticides preventively, as soon as possible, but experts recommend spraying insecticides right away and waiting to drench 2-3 weeks after planting unrooted cuttings, until roots are reaching the edges of the container.

- If you get rooted liners in, you can drench if the roots are to the end of the container
- If you are rooting your own cuttings, best to wait 2-3 weeks until their roots are more developed before drenching insecticides
- **In the meantime, if there is a problem it is best to spray**

Rycar

- **MOA Group:** 9B
- Extremely safe on beneficials & excellent crop safety
- **REI:** 12 hr
- Translaminar
- **Targets:** Aphids, Whitefly (both B and Q type), Mealybugs
- **Foliar Spray Application Rates:**
 - 1.6 oz per 100 gal
 - 6.4 oz per 100 gal

Safari

- **MOA Group:** 4A
 - Excellent Crop Safety
- **REI:** 12 hr
- **Targets:** Aphids, Japanese Beetles, Leafminers, Mealybugs, Scales, Thrips, and Whiteflies (Both B and Q Biotypes)
- Translaminar & Systemic
- **Foliar Spray Application Rate:** 4 to 8 oz per 100 gal



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Drenches

Drenches offer long-term control and are cheaper to apply when plants are young, which helps bring the cost of the non-neonic alternative choices down. Many great insecticide drenches are neonicotinoids: Marathon, Flagship, Safari-but there are alternatives (below).

Insecticide Drenching Recommendations (Non-Neonic)

Altus

- MOA Group: 4D
- Labeled for: Whitefly, Mealybugs, Aphids, Suppresses Thrips
- Rate for Drench Applications: 3.7 fl oz per 100 gallons

Mainspring

- MOA Group: 28
- Labeled for: Broad-spectrum including Aphids, Whitefly, Thrips, Soft scale, Leafminers, Caterpillars
- Rate for Drench Applications: 8-12 fl oz per 100 gallons

Kontos

- MOA Group: 23
- Labeled for: Aphids, Whitefly, Thrips, Mites, Mealybugs
- Rate for Drench Applications: 3.4 fl oz per 100 gallons
- Caution: Do not apply Kontos to geraniums, Orchids, Hoya, Dracena, Cordyline, Schefflera, Neanthebella Palm and Ferns

Miticide Recommendations (all Foliar Spray, no drench)

Akari

- MOA Group: 21A
- REI: 12 hours
- Labeled for: All mites, all life stages
- Foliar Spray Application: Rate: 16-32 fl. oz. per 100 gallons

Sultan

- MOA: 25
- REI: 12 hours
- Labeled for: Two-Spotted Spider mite, all life stages, contact only. Soft on beneficials
- Foliar Spray Application: Rate: 13.7 fl oz/100 gal

Pylon

- MOA Group: 13
- REI: 12 hours
- Labeled for: Spider mites and broad mites (also thrips and fungus gnats)
- Foliar Spray Application Rate: 5.2-10 fl oz/100 gal
- Other info: Translaminar, do not use Ultra Low Volume applications on young plants, no more than 3 applications per crop



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3- Way Biological Dip to protect against insects and disease – suggested by BioWorks:

Dips for unrooted cuttings and liners are increasingly more popular, as there is nothing to ensure as much coverage as dipping the entire plant in a mix of fungicides/insecticides.

There are biological-friendly ways to dip young plants, and most are also OMRI listed as well.

Rates for dipping plug trays/liners, unrooted cuttings, and bare root:

- BotaniGard 22WP 1.5oz/5gal
- NemaShield 19million/5gal
- Rootshield Plus WP 1.5oz/5gal

Fungicide Drench Treating Advice

General Tips

- Prevent fungal diseases with a drench, but if the roots are slimy then you need to drench with a curative fungicide
- Drench new plugs when you get them instead of after you transplant them into pots to save money by using less fungicide
- Some fungal diseases have extremely rapid inoculum buildup: Botrytis blight, Powdery mildew, Rusts, and Downy mildew
- Use higher recommended rate on label instead of lower rate

BASF Recommends to Start with Pageant

- Pageant is a group 7 + 11 broad-spectrum fungicide with awesome plant health benefits when used as the first and last fungicide in the rotation
- **Plant Health Benefits:**
 - Aids in quicker & more uniform rooting on unrooted cuttings
 - Drought stress recovery
 - Increased efficiency of plant processes
- **Rate for Drench Applications:**
 - 12 oz per 100 gallons (controls all foliar and some others like crown)
 - **Application Interval:** 7-14 days

General recommendation for drenches from John Erwin, University of Maryland:

- ½ fl oz/100 gal of Subdue Maxx in a tank with 8 fl oz/100 gal of 3336 to control most diseases
 - **Exception:** Crowns of any perennial which are susceptible to Fusarium
 - **Recommendation:** ½ fl oz/100 gal of Subdue Maxx in a tank with 1-4 oz/100gal of Medallion

Root Pathogen & Botrytis suggestions from BioSafe:

- **Prior to Sticking Cuttings/Planting/Seeding:**
 - Dipping cuttings once in 1:250 ZeroTol 2.0 for 2 minutes prior to sticking
 - Drenching growing media/soil once with 1:500 ZeroTol 2.0 (4 hrs) prior to sticking
- **After Rooting:**
 - OxiPhos as a soil/media drench @ 1:500 once every 3 weeks with first application starting immediately after initial rooting
 - PVent as a soil/media drench @ 13.2 oz per 100 Gallons once every 2 weeks
 - Make first application of OxiPhos @ initial rooting followed by PVent drench 4 hrs after. Then follow 3 week regime for OxiPhos and 2 week regime for PVent
- **After Plant Establishment:**
 - PVent as a foliar spray @ 6.6 oz per 100 Gallons of water only if Botrytis is an issue once every 2 weeks as a tank mix with once a week sprays of BioCeres WP @ 3.0 Lbs/100 Gallons of Water + AzaGuard @ 12 fl.oz per 100 Gallons of water-Spray to run off

Additional Fungicides for Drenches

3336 F Fungicide

- **MOA Group:** 1
- **REI:** 12 hr
- **Use Sites:** GH/N
- **Application rate:** 8-16 fl oz/100 gal (drench)
- **Other info:** A t-methyl fungicide that offers powerful control in a flowable form! Easy to use, full chemigation label, broad-spectrum disease control. Tank-mix compatible with most commonly used pesticides

Actinovate SP Biological Fungicide – OMRI Listed

- **MOA Group:** NC (Resistance risk: low to medium)
- **REI:** 1 hour
- **Use Sites:** GH/N
- **Application rate:** 4-12 oz/100 gal
- **Other info:** Biofungicide that protects against many common foliar and soil-borne diseases found in greenhouses, nurseries, and turf. Based on the Beneficial bacteria, *Streptomyces lydicus* WYEC 108. This formulation is water soluble, good for drenches, in irrigation, or as a spray. Primarily for root diseases. OMRI Listed

After Plant Establishment:

- PVent as a foliar spray @ 6.6 oz per 100 Gallons of water only if Botrytis is an issue once every 2 weeks as a tank mix with once a week sprays of BioCeres WP @ 3.0 Lbs/100 Gallons of Water + AzaGuard @ 12 fl.oz per 100 Gallons of water-Spray to run off

Aliette WDG Systemic Fungicide

- **MOA Group:** 33 (Resistance risk: low to medium)
- **REI:** 12 hours
- **Use Sites:** GH/N
- **Application rate:** 2.5 to 5 lbs/100 gal
- **Other info:** Good on a wide range of ornamental flowering and foliage plants as a foliar spray, drench, or as a dip for control of diseases caused by Pythium, Phytophthora, and Downy mildew

Banrot 40WP

- **MOA Group:** 1 + 14
- **Best Use:** For curative control of common root and stem rot diseases such as Pythium, Phytophthora, Rhizoctonia, Fusarium, Thielaviopsis, and Damping-off
- **Rate for Drench Applications:** For bedding plants use 4-8 oz per 100 gallons, re-treat at 4-8 week intervals as needed

Heritage WDG Fungicide

- **MOA Group:** 11 (Resistance risk: medium to high)
- **REI:** 4 hours
- **Use Sites:** GH/N
- **Application rate:** 2-4 oz/100 gal
- **Other info:** Long-lasting, broad spectrum preventative fungicide. Up to 28 days of foliar disease protection. The only systemic strobilurin that provides disease control against all four major classes of fungi

Medallion WDG Fungicide

- **MOA Group:** 12 (Resistance risk: high)
- **REI:** 12 hours
- **Use Sites:** GH/N
- **Application rate:** 1-4 oz/100 gal
- **Other info:** User-friendly way to control major Foliar, Root, and Stem diseases. Fludioxonil is extremely effective at low rates and begins working immediately to protect plants. Delivers 21-28 day residual control as a drench, 7-14 day residual control as a foliar spray

Mural Fungicide

- **MOA Group:** 7 & 11 (Resistance risk: medium to high)
- **REI:** 12 hours
- **Use Sites:** GH/N
- **Rate for Drench Applications:** 2-3oz/100 gal
- **Rate for Spray Applications:** 4-7oz/100 gal
- **Other info:** For Botrytis, Powdery & Downy Mildew, Leaf spots, Rhizoctonia, and Rusts. With both Systemic and Translaminar activity, Mural is great for fungicide rotations. Up to 28 days of control can be expected.

Segway O

- **MOA Group:** 21 (Resistance risk: low to medium)
- **REI:** 12 hours
- **Use Sites:** GH/N
- **Application rate:** 2.1-6 fl oz/100 gal
- **Other info:** For Pythium, Phytophthora, and Downy mildew. Great for fungicide rotations, and will play a key role in resistance management. Up to 28 days of control can be expected

Subdue MAXX Fungicide

- **MOA Group:** 4 (Resistance risk: medium)
- **REI:** 0-48 hours
- **Use Sites:** GH/N
- **Application rate:** 0.5-1 fl oz/100 gal
- **Other info:** High efficiency, economical control of root and stem diseases in ornamentals that can readily be tank-mixed with other fungicides (like Medallion WDG or Heritage fungicide) for complete control of all major forms of soil-borne pathogens. Fast absorption, even systemic movement. Low odor and non-staining formulation

RootShield Plus WP Biological Fungicide – OMRI Listed

- **MOA Group:** NC (Resistance risk: low to medium)
- **REI:** 4 hours
- **Use Sites:** GH/N
- **Application rate:** 3-8 oz/100 gal
- **Other info:** Grows on roots “shielding” them against root damaging fungi. Contains two active ingredients, preventative control of major root diseases including soil borne Phytophthora and Controls diseases caused by Rhizoctonia, Pythium, Fusarium, Thielaviopsis, and Cylindrocladium. Improved suppression of the aggressive hot-season Pythium. One application provides up to 12 weeks of protection

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