Challenging Crops - Plan To Succeed

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Challenging Crops- Emphasis on Solutions!

Plan to succeed with……

- Petunia
- Gerbera daisy
- Vinca (flowering)
- Pentas
Petunia Root/Stem Rot Issues

You name it, we’ve got it!- *Pythium, Phytophthora, Thielaviopsis, Rhizoctonia*

Preventative fungicide drench program is imperative. Drench at planting and again 4 weeks later.
Read and follow everything on the pesticide labels!!! Caution-Labels change!

Not all mentioned pesticides are labeled in every state.

Products other than those mentioned may be safe and effective.
## Petunia Root/Stem Rot

<table>
<thead>
<tr>
<th>Pythium Phytophthora</th>
<th>MOA</th>
<th>Rates per 100 gals</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segway</td>
<td>21</td>
<td>1.5-3.0 ozs</td>
<td>Lower rate for Pythium</td>
</tr>
<tr>
<td>Terrazole L</td>
<td>14</td>
<td>4.0-6.0 ozs</td>
<td>Truban same active ingredient</td>
</tr>
<tr>
<td>Subdue Maxx</td>
<td>4</td>
<td>1.0 oz</td>
<td>Resistance concerns</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thielaviopsis Rhizoctonia</th>
<th>MOA</th>
<th>Rates per 100 gals</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleary’s 3336</td>
<td>1</td>
<td>8-16 ozs</td>
<td>F or WP- High rate for Thielaviopsis</td>
</tr>
<tr>
<td>Medallion</td>
<td>12</td>
<td>1-2 ozs</td>
<td>High rate for Thielaviopsis</td>
</tr>
<tr>
<td>Affirm</td>
<td>19</td>
<td>8 ozs</td>
<td>Same a.i. as Veranda O</td>
</tr>
</tbody>
</table>

Banrot and Hurricane are combination products.
Petunia Root/Stem Rot

Biofungicide Options:

- Preventative only- Apply after chemical fungicide drench (~1 week)
- Thielaviopsis control?

* Require re-applications at 2-4 week intervals
Aerial Phytophthora
Phytophthora – Landscape Beds

Following info applies to pansy and vinca also:

- Rootshield Plus, Actinovate SP- protection carries over to landscape.

- MOA 33- “Phosphonates”- good preventatives- Aliette, Alude, Agri-Phos, Fosphite, etc.

- MOA 4- Subdue Maxx or Subdue Granular

- MOA 40- Micora, Orvego (+ MOA 45), Stature

- MOA 11- Empress- Too new to evaluate
Powdery Mildew
Powdery Mildew
Petunia- Bloom Safe Botryticides

- MOA 12- Medallion, Palladium (+MOA 9), Mozart TR
- MOA 19 - Affirm, Veranda O
- MOA- 17- Decree (Resistance documented)
- MOA UN- Cease, Actinovate SP

For crops other than petunias add Pageant Intrinsic to bloom safe list.
Iron Deficiency
Iron Deficiency Symptoms

- Interveinal chlorosis that starts in **youngest** growth. Iron is not mobile in plants.

- Veins often remain green while the rest of the leaf turns yellow.

- Examine root health.

- Check soil pH. Confirm symptoms with a soil test.
pH and Iron Deficiency

“Low pH” Crops- Iron becomes more available at lower soil pH.

Not just petunias……

Ideal pH 5.3 to 5.8- Argyranthemum, Bacopa, Calibrachoa, Chrysanthemums, Diascia, Nemesia, Pansies, Petunias, Scaevola, Snapdragons, Verbena, Vinca, and many others
Correcting Iron Deficiency

Adjust soil pH to 5.3 to 5.8 if needed.

- First choice- Sulfuric acid injection. Rate based on alkalinity.

- May be able to use high acid feed such as 21-7-7 or 18-9-18.

- Last resort- drenching with iron sulfate at 1-3 lbs per 100 gallons. Rinse foliage to avoid burning.
Correcting Iron Deficiency

- Soil drench with chelated iron such as Sprint 138 or 330. Drench at 3-5 oz per 100 gallons. Rinse excess off of foliage to avoid pitting and burning.

Boron Deficiency
Boron Deficiency
Boron Deficiency

Causal factors:

- Soil pH- Above 6.0 boron less available. High calcium in soil competes.

- Poor Transpiration= Poor B Uptake.

Remedies- adjust soil pH, improve transpiration/lower humidity. Soil drench of Microbor or Solubor at 0.25 ozs per 100 gals. Need to catch this early to remedy.
Budworms
Budworms- Landscape Curse

Can also attack calibrachoa.

Control options include:

- **MOA 5-** Conserve- contact, good bloom safety
- **MOA 1B-** Acephate, Duraguard- some residual, may burn blooms
- **MOA 3-** Decathlon, Talstar, Tame- contact, good bloom safety
- **MOA 4A-** TriStar- residual control, ovicidal, good bloom safety
Gerbera Daisy, Cartwheel Chardonnay
Powdery Mildew
Bottom Leaf Surface
Gerbera Daisy- Powdery Mildew

- Scout incoming shipments. Can be “dormant” and difficult to detect.
- Preventative program starting soon after planting recommended.
- Excessively high nitrogen levels shown to favor powdery mildew.
Powdery Mildew Options

- MOA 11 - Compass, Disarm O, Heritage, Pageant Intrinsic
- MOA 3 - Eagle, Strike (1 X only)
- MOA M5 - Daconil
- MOA 19 - Affirm, Veranda O
- MOA NC - Milstop/CEase tank mix, Actinovate SP, Regalia PTO
Did you know?
Gerbera Daisy, Downy Mildew
Downy Mildew
Upper Leaf Surface
Gerbera Daisies- Cultural Considerations

- Soil pH- 5.5 to 6.2. EC 1.5-2.25 SME

- Fertilizer- 200ppm constant liquid feed typical. Above average magnesium and iron requirements. (see petunia section for iron chelate instructions.)
Iron and Manganese Toxicity - Soil pH below 5.0
Chelated Iron Not Rinsed Off Foliage
Magnesium Deficiency
Gerbera Daisies- Cultural Considerations

- Night temps- start 65° nights, once established 62-64°.

- Growth regulators to trial if needed- Winter B-Nine @1250 ppm or Bonzi at 10ppm, summer 2500ppm B-Nine or Bonzi at 15ppm. All foliar sprays.
Gerbera Planting Depth

Gerbera need light to reach the crown for flower development.
Effects of Overwatering Gerbera Daisies

Slide Courtesy of Harvey Lang
Aphid Control Options

- MOA 9C - Aria or 9B Endeavor
- MOA 4A - Flagship, Marathon, Safari, TriStar.
- MOA 23 - Kontos
- MOA 7 - Enstar AQ
- UN - NoFly, Met 52 EC, Preferal
GGSPro Bee Safety Codes

- Convey EPA’s bee caution statements
- Help growers select products appropriate to their use
- Provides quick indicator for need to review label
- Emphasize wise and effective use, not exclusion
## Bee Icon Color = Toxicity

<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Red</td>
<td>Highly Toxic EPA describes as highly toxic or very highly toxic to bees</td>
</tr>
<tr>
<td>Orange</td>
<td>Toxic EPA describes as toxic to bees</td>
</tr>
<tr>
<td>Yellow</td>
<td>Low Toxicity EPA describes as having low toxicity to bees</td>
</tr>
<tr>
<td>Blue</td>
<td>Special Case Special use notes per label</td>
</tr>
<tr>
<td>Bee Icon Number</td>
<td>Toxicity risk through direct exposure and residual exposure</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td><strong>Toxicity risk through direct exposure and residual exposure</strong></td>
</tr>
<tr>
<td></td>
<td>- avoid treatment when bees are actively visiting or actively foraging the treatment area</td>
</tr>
</tbody>
</table>
Bee Safety Codes in Action

- **What you see:**
  The red bee means this product is highly toxic to bees while the number 3 means the exposure risk comes from direct spray only.

- **What you do:**
  If planning an outdoor application, review the label. Avoid using this chemical when bees are actively visiting the area. This can be achieved by applying the product in the evening.
Gerbera Daisy-Broad Mite Damage
Broad and Cyclamen Mites

- Broad mites inject toxin, cause stunted and distorted foliage. Growing tips attacked.

- Microscopic size helps them avoid detection. Found in protected places.

- Symptoms can very greatly on different species of plants.
Broad Mite “Short List”

- MOA 6- Avid
- MOA 13- Pylon
- MOA 21- Akari, Sanmite
- MOA 6 and UN- Sirocco
- MOA 23- Kontos drench only

Translaminar systemic products preferred.
Thrips, Out of Control?

Conserve has lost much of it’s effectiveness due to resistance. What’s working?

Start with a quick knockdown product then expand options once the population is under control.
Thrips- Quick Knockdown

- MOA 13- Pylon- 5.2 oz per 100. 2x 7 days apart. No CapSil.

- MOA 6 and UN- Avid/Azatin (or other neem based IGR) tank mix. 2x 7 days apart.

- MOA 1A- Mesurol WP- (RUP)

- MOA 4A- Flagship, TriStar- highest label rate only.
Phytotoxicity From High Rate of Pylon
Azatin Damage On Open Blooms
Vinca Sunstorm, Bright Red
Vinca- Cultural Considerations

Temperature- Source of many vinca woes…..

- Requires soil temp of at least 68° for optimum growth. Ideal 72°.

- Bare Minimums: 68° nights until established, 65° to finish.
Vinca - Root, Stem, Crown Rots

- Root and stem rots common in temperature stressed plants. Drench at planting and again 4 weeks later.

- *Phytophthora* crown rot a problem, especially in the landscape.

- See *Petunia section* for fungicides.
Vinca, *Botrytis* Stem Canker
Vinca- Root, Stem, Crown Rots

- *Rhizoctonia* and *Botrytis* stem canker attack crown area and stems. Fungicides effective against both:

  - MOA 12- Medallion or Palladium (+MOA 9)
  - MOA 19- Affirm, Veranda O
  - MOA 2- Chipco 26019
  - MOA 11 + 7 - Pageant Intrinsic
Vinca- Nutritional Considerations

Soil pH- 5.3 to 5.8 for optimum uptake of iron and suppression of *Thielaviopsis*.

Fertilization- 100ppm CLF

See *Petunia* section for tips on iron deficiency.
High soil pH induced stunting and chlorosis
Fungus Gnat Larvae Damage
Fungus Gnat Larvae Feeding Damage
## Fungus Gnats vs. Shoreflies

<table>
<thead>
<tr>
<th></th>
<th>FG’s</th>
<th>Shore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults do not feed on plants</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Larvae feed on plant tissue</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Larvae spread diseases (<em>Thielaviopsis, Fusarium, Pythium</em>)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Adults spread diseases</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Larvae attracted to potato wedges</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Adults attracted to yellow sticky cards</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Lay eggs in cracks and crevices of soil media</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Lay eggs in semi-aquatic environments</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Larvae controlled by <em>Steinernema feltiae</em></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
Fungus Gnat/Shore Fly- Larvae Control Options

- MOA 4A - Safari
- MOA 7C - Distance
- MOA 17 - Citation, MOA 15 - Adept
- MOA 13 Pylon (FG only- soil surface spray)
- BCA’s- Nematodes, Atheta, H. miles
Sclerotium rolfsii

- Promptly dump affected plants.
- Drench adjacent healthy plants with Medallion.
Spider Mite Damage
Vinca- Height Control

Bedding type vinca- Trial under your conditions before widespread application.

- Bonzi drench 0.25- 0.5ppm
- Topflor foliar sprays. 2.5ppm north, 5ppm south.
- Topflor drenches 1/8 ppm
Vinca, Pacifica Punch

Control  0.5ppm Bonzi  1/8 ppm Topflor  1/4 ppm Topflor

Photo: Joe Moore, Lucas Ghses
Pentas, Starla Mix
Pentas

*Stout in the garden but potential pitfalls early-

- Soil pH important. Ideal 6.5-6.8, take corrective action below 6.3. Drops the pH of the soil over time, monitor regularly.

- High magnesium requirement - watch lower leaves for interveinal chlorosis and cupping.
Pentas- Off to a strong start

- 65° min night temperature, 70° ideal. Bottom heat ideal, (think vinca!).

- Foliage sensitive to cold water. Drip, sub-irrigation or tempered water if possible.

- Don’t over fertilize- 125-150ppm constant feed. Keep pH requirements in mind.
**Pentas- Light is Crucial**

- Facultative long day plants- bloom faster under longer days. 13-14 hour days for fastest bloom.

- High light levels encourage superior branching and more robust flowering.
Pentas Pests

- Foliar diseases - Botrytis (see petunia section), *Cercospora* and powdery mildew, Eagle and strobiluron fungicides control both (Compass, Disarm, Heritage, Pageant)

- Root/Stem Rots - *Pythium* and *Rhizoctonia* - use broad spectrum control strategies in the petunia section.
Pentas Pests

- **Insects and Mites**: Aphids, Spider Mites, Thrips, Whiteflies. (Aphids and Spider Mites- see Gerbera Daisy section.)

- **Spider Mites**: Low humidity and good air movement favor spider mite development. Vent and door openings favorite spots. Scout and place trap crops here.
Spider Mite Control Options

Contact activity:

- MOA UN- Floramite
- MOA 20- Shuttle, MOA 21A-Sanmite, Akari
- UN- Horticultural oils- Ultra-Pure and Suffoil-X.
- BCA’s (persimilis quick knockdown)
Spider Mite Control Options

Translaminar systemics:

- MOA 13- Pylon, Pylon TR
- MOA 23- Judo spray, Kontos drench only
- MOA 10- Tetrasan, Beethoven TR
- MOA 6- Avid
- MOA UN + 6- Sirocco

Refer to technical bulletin from OHP regarding crops with sensitivity to Judo.
Whitefly Control Options

- MOA 4A- Flagship, Safari, TriStar
- MOA 21A- Sanmite
- MOA 7C- Distance (B biotype only)
- MOA 23- Judo or Kontos
- MOA 16- Talus (B biotype only)
Whitefly Control Options

- MOA 18 – Azatin/Molt-X/Azaguard
- UN- Botanigard, Met 52 EC, NoFly, Preferal
- UN- Ultra-Pure oil or Suffoil-X
- BCA’s- A. swirskii (eggs), Encarsia, Eretmocerus