

# Designing the Most Effective Fungicide Rotations

A. R. Chase  
Chase Agricultural  
Consulting, LLC

# Topics covered

**What is your rotation now?**  
**What moa is the new product?**  
**Does it offer something special?**

- ✿ **broader spectrum**
- ✿ **safer to people**
- ✿ **environment or plants**
- ✿ **easier to apply**
- ✿ **less costly**
- ✿ **lower REI**
- ✿ **better control**
- ✿ **resistance management**

## Fine-tuning your choices

- ✿ Level of control desired - do you want to wipe it out or accept loss of quality = loss of crop value
- ✿ Cost of prevention vs. cure - interval and rate and type of product - want to wait for disaster to strike?
- ✿ What does a 14 day interval of lower efficacy product cost for a year vs. an “expensive” product on a 4-10 day interval once disease starts.

# Interval is important

Interval	Advantages	Disadvantages
Short	<ul style="list-style-type: none"><li>✳ More control usually</li><li>✳ Can use lower efficacy product</li></ul>	<ul style="list-style-type: none"><li>✳ More frequent water is more disease</li><li>✳ REI concerns</li><li>✳ More residue</li><li>✳ Higher labor costs</li></ul>
Long	<ul style="list-style-type: none"><li>✳ Less frequent water is more control</li><li>✳ Fewer REI concerns</li><li>✳ Less residue</li><li>✳ Lower labor costs</li></ul>	<ul style="list-style-type: none"><li>✳ Less control usually</li><li>✳ Must use high efficacy product for best effect</li></ul>



# Other Costs of Disease Prevention

- ✿ Heat/vent – energy \$\$ and labor \$
- ✿ Spacing – less product on bench is less \$\$
- ✿ Fans for humidity reduction is equipment \$ (one time expenditure)
- ✿ Time of day for irrigation is management decision – can be the key to downy control
- ✿ Eliminate overhead irrigation – equipment and labor \$\$\$

It is not all  
about  
fungicides!!!

## Other non-targets controlled

- ✿ Limited with Aliette, FenStop, Subdue MAXX and Stature – Phytophthora, downy mildew and Pythium (in some cases)
- ✿ Broad with strobilurins – most foliar diseases.

## Potential for crop damage

- ✿ Low with most products
- ✿ Higher with copper and some DMIs

## Residue

- ✿ Low with many newer products
- ✿ High with mancozeb and chlorothalonil

# Determine the real cost of use per month

COST OF USE PER MONTH

## Step 1. Cost of the product

Camelot 0 \$124/gal (\$1/oz)

Compass 0 \$263/8 oz (\$33/oz)

Daconil Ultrex \$88/6.5 lb (88¢/oz)

Decree \$271/2.5 lb (\$7/oz)

Heritage \$525/16 oz (\$33/oz)

Pageant \$80/16 oz (\$5/oz)

Protect DF \$80/6 lb (83¢/oz)

Spectro 90WDG \$124/5 lb (\$1.55/oz)



## Step 2. Use rate per 100 gal and interval

Camelot 0 48 oz (7 days)  
Compass 0 1-4 oz (7-14 days)  
Daconil Ultrex 1.4 lb (7-14 days)  
Decree 12-24 oz (7-10 days)  
Heritage 1-4 oz (7-14 days)  
Pageant 12-18 oz (7-14 days)  
Protect DF 16-24 oz (7 days)  
Spectro 90WDG 1-2 lbs (7-14 days)

## Step 3. Cost per month

Daconil Ultrex \$57

Protect DF \$53

Spectro 90WDG \$100

Camelot \$192

Compass O \$198

Heritage \$198

Pageant \$240

Decree \$336

Expensive is  
determined by  
the wallet of  
the grower

## Step 4. Cost per month

**Daconil Ultrex \$57 broad-spectrum, moderate to high efficacy**

**Protect DF \$53 broad-spectrum, moderate efficacy**

**Spectro 90WDG \$100 broad-spectrum, moderate efficacy**

**Camelot \$192 very broad-spectrum, moderate efficacy**

**Compass 0 \$198 broad-spectrum, high efficacy**

**Heritage \$198 broad-spectrum, high efficacy**

**Pageant \$240 broad-spectrum, high efficacy**

**Decree \$336 very narrow-spectrum, high efficacy**

# The Best Choices

- **ROTATION** - this means FRAC or MOA group
- Highest efficacy
- Legal use sites
- Prevention vs. eradication
- Cost of use

# Bactericide Rotation

- **Copper** (M1-Camelot O, Kocide and Phyton 27)  
(effective on most bacteria)
- **Cease** (nc-Bacillus subtilis) (best for Pseudomonas and Xanthomonas)
- **Triathlon BA** (Bacillus amyloliquifaciens)  
(effective on most bacteria)
- **Agri-Mycin** (antibiotic-streptomycin sulfate)  
(best for Erwinia)
- **KleenGrow** (nc-quaternary ammonium)  
(effective on most bacteria)



# Bactericide Rotation

- **Erwinia soft rot or fireblight**

- **AgriStrep**

- **KleenGrow**

- **Copper**

- **Xanthomonas leaf spot**

- **KleenGrow**

- **Copper**

- **Triathlon BA**

# Botrytis/Sclerotinia Rotation

- **Decree (1 7-fenhexamid)**
- **Daconil Ultrex (M5-chlorothalonil)**
- **Medallion (1 2-fludioxonil) or Palladium (1 2 and 9-cyprodinil)**
- **Chipco 26019, 26GT (2-iprodione)**
- **Pageant Intrinsic (1 1-strobilurin and 7-pyraclostrobin and boscalid)**

# Botrytis/Sclerotinia Rotation

- **Botrytis Blight**

- **Palladium**

- **Pageant Intrinsic**

- **Decree**

- **Chipco 26019 or GT**

- **Sclerotinia Blight**

- **Pageant Intrinsic**

- **Palladium**

- **Chipco 26109 or GT**

# Alternaria Rotation

- **Daconil Ultrex (M5-chlorothalonil)**
- **Medallion (1 2-fludioxinil) or Palladium (1 2 and 9-cyprodinil)**
- **Compass O, Heritage or Pageant Intrinsic (1 1-strobilurins)**
- **Terraguard, Strike Plus (3-triflumizole)**
- **Chipco 26019 (2-iprodione)**

# Alternaria Rotation - GH vs. Nursery

- **Greenhouse**

- **Pageant Intrinsic**

- **Palladium**

- **Chipco 26109**

- **Nursery**

- **Daconil**

- **Pageant Intrinsic**

- **Sterol inhibitor**

- **mancozeb**



# Cercospora Rotation

- **3336, Fungo, OHP6672 (1-thiophanate methyl)**
- **Medallion (1 2-fludioxonil) or Palladium (1 2 and 9 – fludioxonil and cyprodinil)**
- **Compass O, Heritage or Pageant Intrinsic (1 1-strobilurins)**
- **Daconil Ultrex (M5-chlorothalonil)**

# Colletotrichum Rotation

- **Phyton 27 (M1-copper)**
- **Dithane, Protect, Pentathlon (M3-mancozeb)**
- **Daconil Ultrex and Spectro (M5-chlorothalonil)**
- **Pageant Intrinsic (1 1 and 7- pyraclostrobin and boscalid)**

# Myrothecium Rotation

- **Medallion** (1 2-fludioxonil) or **Palladium** (1 2-fludioxonil and 9-cyprodinil)
- **Compass O, Heritage and Pageant**  
**Intrinsic** (1 1-strobilurins)
- **Daconil Ultrex** (M5-chlorothalonil)

# Powdery Mildew Rotation

- **Compass O, Heritage or Pageant Intrinsic (1 1-strobilurins)**
- **Terraguard, Strike Plus (=Trigo), Banner MAXX, Eagle, Tourney, Trinity, Torque (3-sterol inhibitors)**
- **Camelot O, Kocide, Phyton 27 (M1-copper)**
- **MilStop (nc-K bicarbonate)**
- **Palladium (1 2 and 9)**

# Rust Rotation

- **Banner MAXX, Strike Plus (=Trigo), Trinity, Torque, Tourney, Eagle or Terraguard (3-sterol inhibitor)**
- **Compass O, Heritage or Pageant Intrinsic (1 1- strobilurins)**
- **Camelot O or Phytan 27 (M1-copper)**
- **Dithane, Pentathlon or Protect (M3-mancozeb) (most effective at preventing rust)**



# Downy Mildew Rotation

- **Compass O, Heritage or Pageant Intrinsic** (1 1-strobilurins) OR **FenStop**
- **Subdue MAXX** (4-mefenoxam/tank-mix as directed)
- **Adorn** (43-fluopicolide/tank-mix as directed)
- **Aliette** (33-phosphonate)
- **Segway O** (21-cyazofamid)
- **Micora** (40-mandipropamid), **Stature** or **Orvego** (40-dimethomorph and 45-ametoctradin)

# Phytophthora Rotation

- **Aliette (33-fosetyl aluminum)**
- **Adorn (43-fluopicolide) (tank-mix as directed)**
- **Subdue MAXX (4-mefenoxam)**
- **Micora (40-mandipropamid) or Stature SC (40-dimethomorph)**
- **Terrazole or Truban (14-etridiazole)**
- **FenStop (11-fenamidone)**
- **Segway (21-cyazofamid)**

# Pythium Rotation

- Empress (1 1-pyraclostrobin)
- Subdue MAXX (4-mefenoxam)
- Segway O (21-cyazofamid)
- Terrazole or Truban (1 4-etridiazole)
- RootShield Plus (nc-Trichoderma harzianum T-22 and Trichoderma virens G-41)

# Rhizoctonia Rotation

- **Medallion** (1 2-fludioxinil) or **Palladium** (1 2 and 9-fludioxinil and cyprodinil)
- **Heritage** (1 1-strobilurin) or **Empress** or **Pageant**  
**Intrinsic** (1 1 and 7-pyraclostrobin and boscalid)
- **3336**, **Fungo**, **OHP-6672** (1-tmethyl)
- **RootShield Plus** (nc-Trichoderma harzianum T-22 and T. virens G-41) root rot only
- **Affirm** (1 9 – polyoxin D)
- **Chipco 26GT** (2-iprodione)

# Thielaviopsis Rotation

- **OHP-6672, 3336 (1-thiophanate methyl)**
- **Affirm (1 9-polyoxin D)**  
and to a lesser degree
- **Heritage (1 1- azoxystrobin)**
- **Medallion (1 2-fludioxonil) or Palladium (1 2 and 9 – fludioxonil and cyprodinil)**
- **Terraguard (3-triflumizole)**



# Fusarium Rotation

- **Medallion** (1 2-fludioxonil) or **Palladium** (1 2-fludioxonil and 9-cyprodinil)
- **Heritage** (1 1-azoxystrobin)(use as heavy spray to apply at a high enough rate) or **Empress** (1 1-pyraclostrobin) or **Pageant Intrinsic** (1 1-pyraclostrobin and 7-boscalid)
- **Terraguard** (3-triflumizole)

Chase Agricultural Consulting, LLC  
937 Tierra Verde Circle  
Cottonwood, AZ 86326  
(928)649-0400  
[www.chaseagriculturalconsulting.com](http://www.chaseagriculturalconsulting.com)

