

Late Blight Control Strategies in the United States

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Important Production Areas of the US



Late Blight

Foliage Loss

Reduced Yields

Storage Losses



Leaf Infection



Terminal Death

Tuber Decay



Environmental Factors

Cool temperatures

Frequent rainfall

Frequent wetting of foliage

Dew, Rain, Irrigation

Shifts in Pathogen Genotype in Wisconsin

- Prior to 1993
 - All isolates - US#1 genotype - A1 mating type
- During 1993
 - Mixture of isolates
 - US#1 - A1 mating type; metalaxyl sensitive
 - US#7 - A2 mating type; metalaxyl insensitive
 - US#8 - A2 mating type; metalaxyl insensitive

Shifts in Pathogen Genotype in Wisconsin

■ During 1994

- Mixture of isolates
 - US#1 - A1 mating type; metalaxyl sensitive
 - US#8 - A2 mating type; metalaxyl insensitive

■ After 1994

- Shift to 100% US#8
- US#1 not seen after 1995 growing season

Frequency of *Phytophthora infestans* mating types

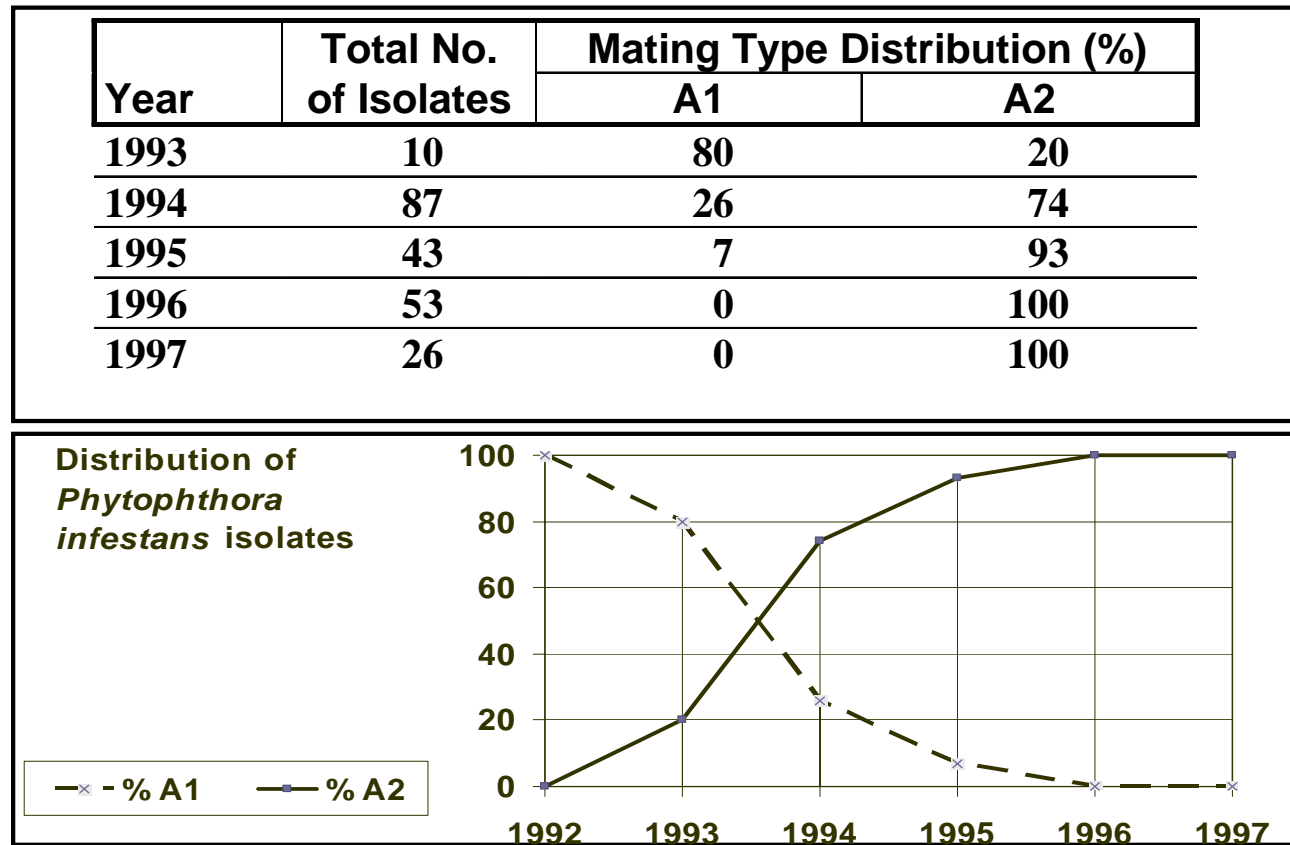


Figure 1. Changing frequency of *Phytophthora infestans* mating types over time in Wisconsin potato production fields.

The Tragedy of Late Blight

- Loss of valuable chemistry - metalaxyl & mefenoxam due to resistant pathogen genotypes
- Some growers continued to use ineffective metalaxyl sprays - suffered heavy loss of yield and tuber quality
- Multimillion \$\$ loss attributed to late blight when trusted chemicals were ineffective
- Sudden increase in control costs
 - \$50/A control bills ballooned to >\$300/A
 - Market did not compensate for higher control costs

The Tragedy of Late Blight

- Each year that late blight is active in Wisconsin (~30,000 ha), disease control costs and crop losses increase by \$12 million.
- A few long established growers quit the potato business when production expenses exceeded returns.
- Late blight also represents increased risk to environment, drift and overspray of fungicides, increased exposure of applicators to pesticides.

Late Blight - Current Status

- Some production areas such as WI -
 - No late blight observed since 2002
- Other production areas
 - Confront late blight each year
- Across North America - Late blight periodic problem, but losses small compared with 1990's. Still see control costs.
- Many great fungicides available that target late blight

Multi Site Fungicides Historically Used For Late Blight Control

- chlorothalonil (Bravo, Echo, Equus)
- copper hydroxide (Kocide, Champion) (Option for Organic Growers)
- mancozeb, maneb, metiram (Dithane, Manzate, Penncozeb, Polyram)
- triphenyltin hydroxide (Super-Tin)

Fungicides - Early and Late Blight Control

- azoxystrobin (Quadris, Amistar)
- boscalid (Endura) (early blight only)
- chlorothalonil (Bravo, Echo, Equus)
- copper hydroxide (Kocide, Champion)
- fenamidone (Reason)
- fluoxastrobin (Evito)
- mancozeb, maneb, metiram (Dithane, Manzate, Penncozeb, Polyram)
- mandipropamid + difenoconazole (Revus Top) (2008?)
- pyraclostrobin (Headline)
- pyrimethanil (Scala) (early blight only)
- trifloxystrobin (Gem)
- triphenyltin hydroxide (Super-Tin)

Fungicides Specifically For Late Blight

- cymoxanil (Curzate)
- famoxadone (Tanos includes cymoxanil)
- dimethomorph (Forum)
- propamocarb hydrochloride (Previcur Flex)
- zoxamide (Gavel includes mancozeb)
- fluazinam (Omega)
- cyazofamid (Ranman)
- mandipropamid (Revus Top includes difenoconoazole) - 2008?

Late Blight - Education is Key

- **Key Components for Control**
 - Plant late blight-free seed
 - Control volunteer potatoes
 - Eliminate cull piles before planting
 - Follow late blight predictions-18 Sev Values
 - Treat with effective fungicides
 - Calibrate the sprayer, count the rows!
 - Thoroughly scout fields weekly
 - Talk with your neighbors

Fungicide Resistance Management

- Lesson of metalaxyl must not be forgotten!
- Avoid curative applications
- Never apply back-to-back treatments with site-specific fungicides or fungicides with a medium to high risk of resistance
- Rotate fungicide applications between different mode of action groups

Fungicide Resistance Management

- Use formulated or tank mixtures of effective fungicides having different modes of action
- Use effective multi-site fungicides that are less prone to fungicide resistance as mixing partners especially in later parts of the growing season when disease pressure is often greatest

How Can Growers Reduce The Risk Of Pathogen Resistance To Fungicides?

- Be alert for control failures and report the location of control difficulties so that the possibility of resistance can be monitored and evaluated.
- Local and regional cooperation in resistance management is essential since many disease problems soon become community problems.
- Use of resistance management program can be an economic benefit to the industry
- In the long term
 - Protect newer chemistries
 - Reduce pressure on older chemistries
 - Increase yields through better disease control
 - Resistance Management Doesn't Cost, It Pays!

Discussion

