A Few Christmas Tree Diseases in PA April 23, 2013

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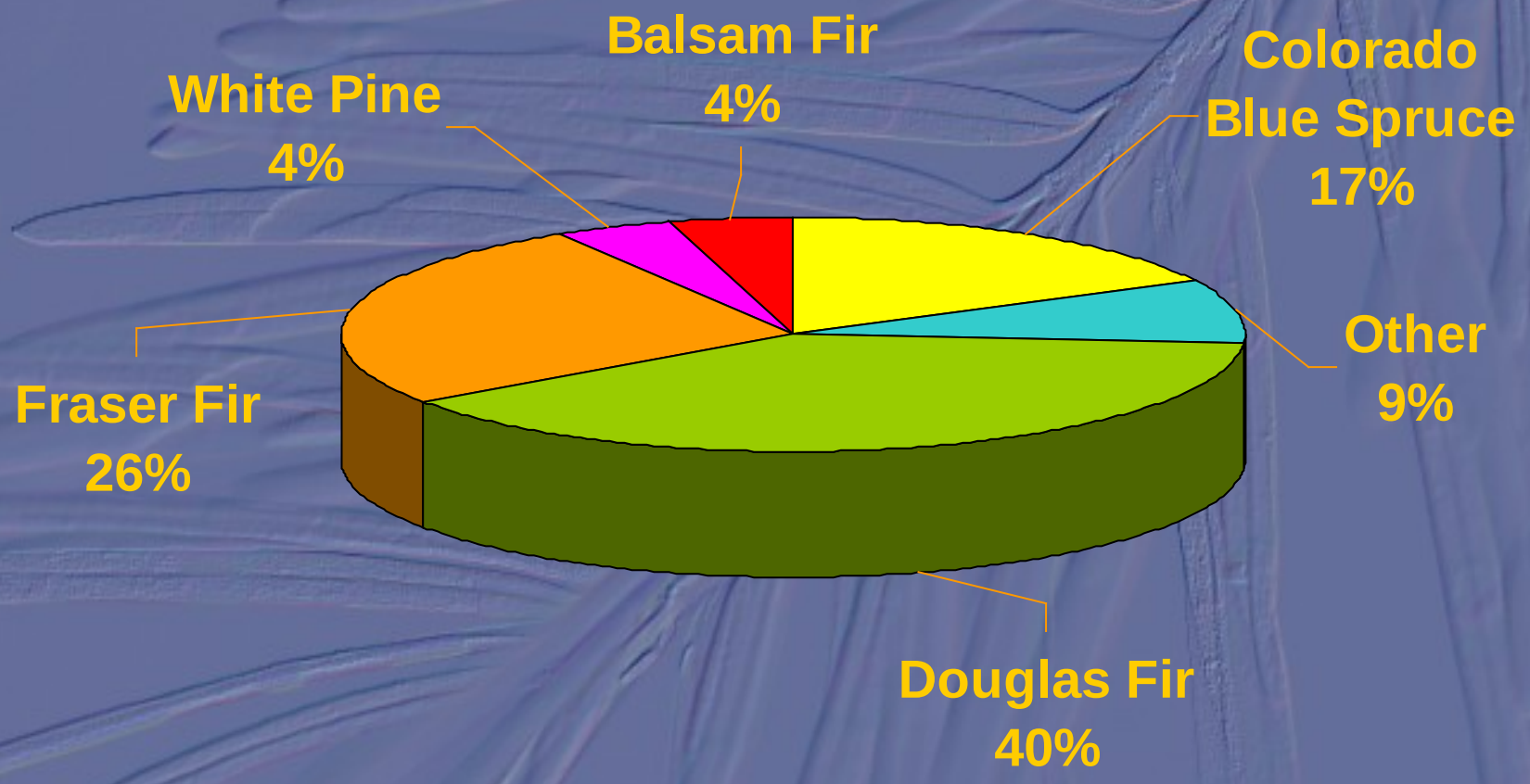
PA Cut Christmas Tree Acreage, 2009

Production by Species

from Farms with $10,000+ Sales



2009 Census of Horticulture

National Ag Statistics Service-PA, USDA

Diseases to be covered

1. **Swiss Needle Cast** (*Phaeocryptopus gaumannii*)
2. **Phytophthora Root Rot** (*Phytophthora spp.)*
3. **Rhizosphaera/Stigmina Needle Blight of Spruce** (*Rhizosphaera kalkhoffii* and *Stigmina lautii)*
4. **Rosellinia Needle Blight** (*Rosellinia herpotrichoides)*

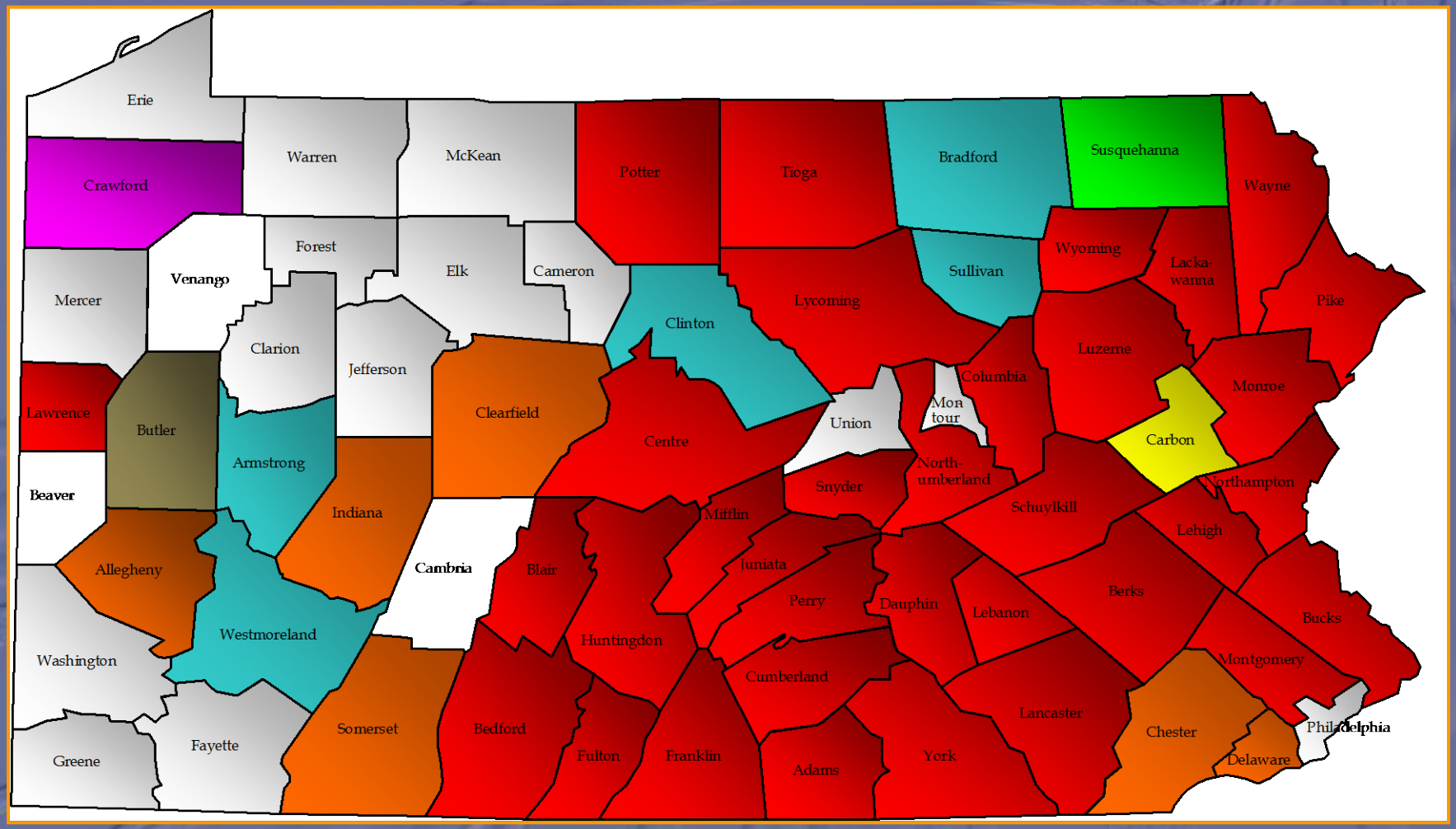
Swiss Needle Cast

(Phaeocryptopus gaumannii)

- Extremely damaging disease.
- Only occurs on Douglas-fir.
- Intermountain provenances most susceptible.
- Distribution:
  - Australia
  - Europe
  - North America
    - endemic in natural range (PNW).
    - introduced to other areas.
    - PA-1973 in Susq. Co.

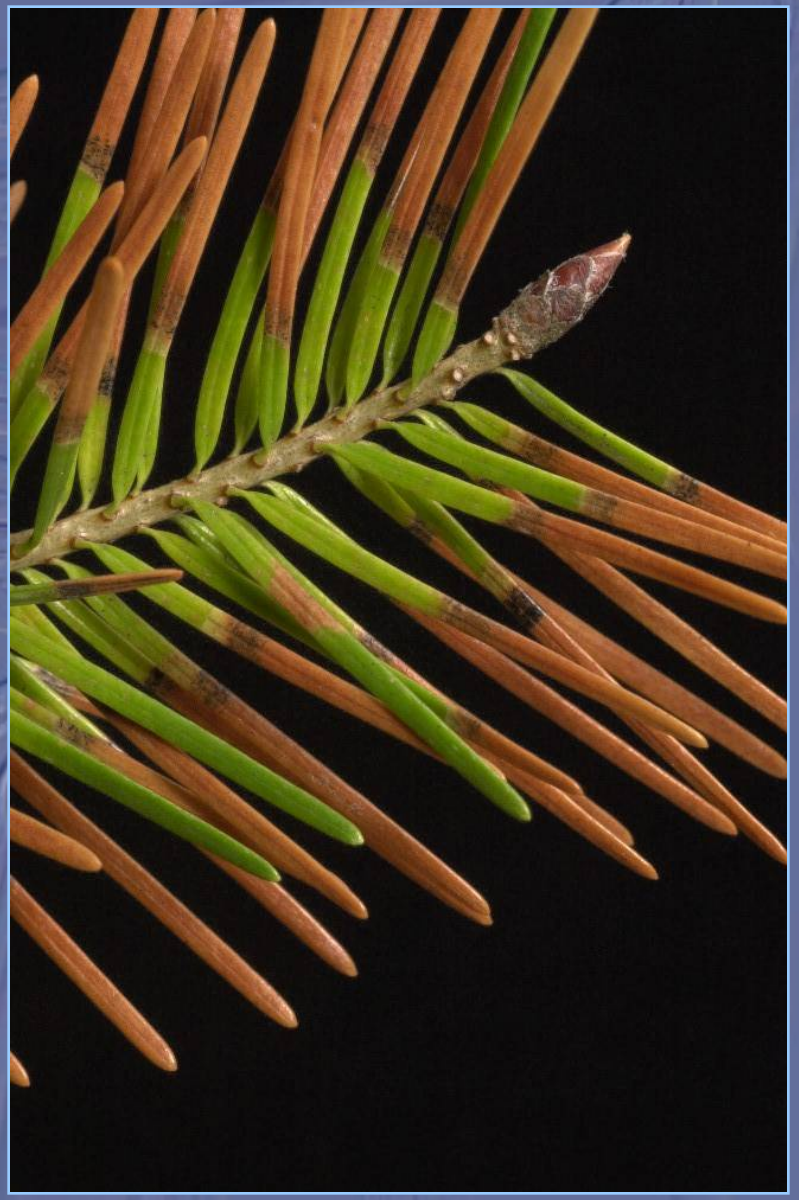
Occurrence of Swiss Needle Cast in PA, 1973-2010

(Based on samples submitted to PA-PDDL)
Green=original detections 1973, red=1987-2007, pink=2008, yellow=2009, aqua=2010, orange=2011



Swiss Needle Cast Symptoms

- Needle tips of current and/or previous years needles yellow and gradually brown during late winter.
- Needles eventually defoliate and leave interior of tree bare.
- Looks like drought stress.
- Some growers report almost complete needle loss to young trees.



- Diagnostic fruiting bodies (pseudothecia) develop through stomata on underside of needles.
- Fruiting bodies may be detected anytime on:
  - any age needle.
  - discolored needle
  - green needles, even before symptoms develop!
- Infected needle may not defoliate for several years.
- As long as needle remains attached, it will sporulate in subsequent years.
- Fungicides are protectant, not curative.

Latent vs. Severe

- Latent
  - Current year needles appear healthy.
  - Fruiting bodies abundant on older needles.
- Severe
  - Current year needles exhibit dieback.
  - Fruiting bodies develop on current year needles.

- Fruiting bodies mature and begin to release spores during bud break.
- Spores can infect only newly expanding needles.
- Needles need to be wet for infection to occur.
- Difficult to determine end of sporulation period.
- Formation of fruiting bodies obstruct stomata and interfere with CO2 uptake and transpiration – results in drought stress symptoms and retarded growth.

Swiss Needle Cast

Needle tip dieback on upper sides of needles.

Fruiting bodies on undersides of needles give “Dirty” appearance.

Severe symptoms

Latent symptoms

Rhabdocline vs. Swiss Needle Cast

Swiss and Rhabdocline on same needles

Chemical Control of Rhabdocline/Swiss Needle Cast

- All fungicides are protectants.
- Timing of first application is critical. Carefully scout symptomatic trees in spring for budbreak and fungus sporulation.
- Four fungicide applications *
  - #1 - when 1st 10% of the trees in plantation break bud.
  - #2 - one week after first application.
  - #3 - two weeks after second application.
  - #4 - three weeks after the third application.

* 4th application necessary if spring is prolonged by cool, wet whether, or Swiss is present.

Symptoms of a Root Problem

- Chlorosis
- Wilting
- Stunting
- Branch Cankers
- Basal Bleeding
- Root/Crown Discoloration
- Death

What Can Cause a Whole Tree to Die?

- **Damage to Crown or Roots:**
- Abiotic Causes
  - *J-rooted/compaction
  - Fertilizer burn
  - Heat damage
  - Moisture extremes
    - Too wet
    - Too dry
  - Mechanical damage

What Can Cause a Whole Tree to Die?

- Insects
  - Pine root collar weevil
  - Allegheny mound ants
  - Bark beetles
  - Grubs
- Disease
  - Fungi –

    most not visible

Fungi that Cause Root/Crown Rot in PA

	Seedlings	Transplants	Mature
Discosia sp.	✓		
Brown Felt Fungi (*Herpotrichia juniperi*)	✓		
Fusarium spp.	✓		
Pythium spp.	✓		
Rhizoctonia solani	✓	✓	
Cylindrocladium scoparium	✓	✓	
***Phytophthora* spp.**	✓	✓	✓
Armillaria sp.		✓	✓
Procera		✓	✓

Phytophthora Root Rot

Disease Cycle

Sporangia produce swimming **zoospores** which infects hosts

Sources of Phytophthora

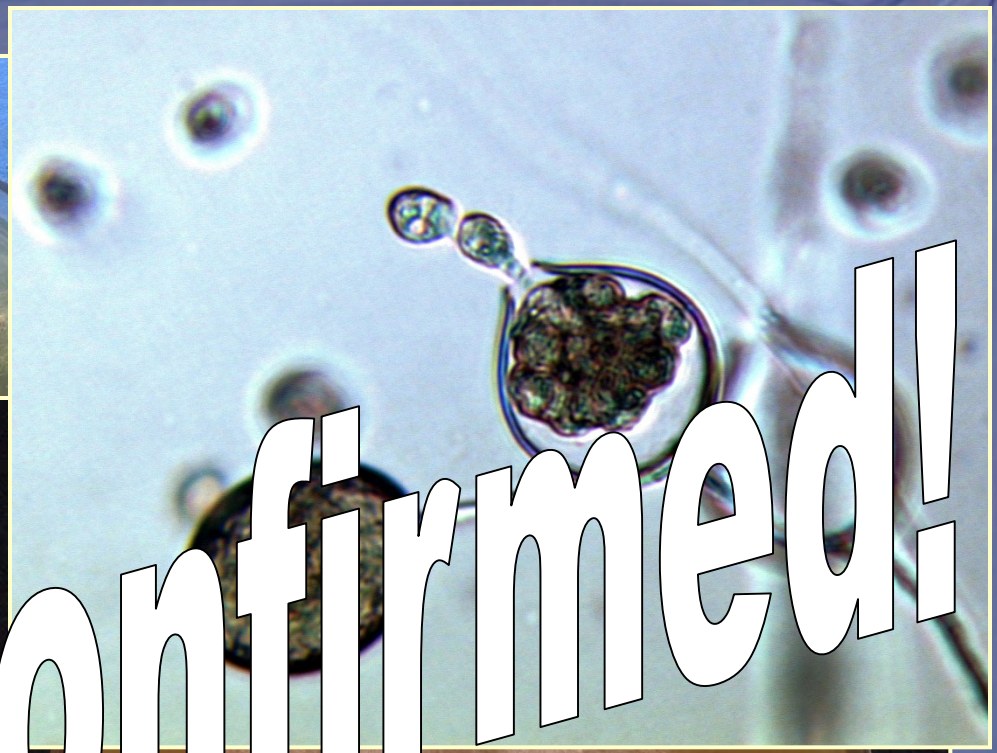
1. Arriving on infected seedlings/transplants.
2. Contaminated soil.
    a) From previous crops.
    b) Spread on machinery/equipment/shoes/etc.
3. Contaminated irrigation water.

Disease usually starts in lower lying areas where water collects.

Plants under stress tend to succumb more quickly.

Symptoms of Phytophthora Root Rot





Get it confirmed!

Fraser Fir Root Rot in NC

Caused by *Phytophthora cinnamomi*

Research at NCSU and Others

- Fungicides
- Grafting
- Resistance screening
  - *Abies fraseri*
  - *Abies* spp.

Controlling Phytophthora in Seedling/Transplant Beds/Nurseries

Start clean – Keep it out:

1. Start in “Phytophthora-free” soil.
2. Start with “Phytophthora-free” plants.
3. Good site selection
   a) Beds should be raised with good draining soil type and no compaction.
   b) Avoid areas where water may puddle.
   c) No nursery crops nearby.
4. Good cultural practices (planting, pesticides, fertilizers, etc)
5. Irrigate with “Phytophthora-free” water.

Controlling Phytophthora in Seedling/Transplant Beds/Nurseries

If it does develop

- Quarantine the diseased area.
  - Water flowing from this area is assumed to be contaminated.
  - Soil transported from this area is assumed to be contaminated.
- Do not dig trees from this area.
- Do not replant susceptible trees in this area.
- The use of Subdue will get you 1 more season – maybe.

Managing Phytophthora in *Cut Christmas Tree Plantations*

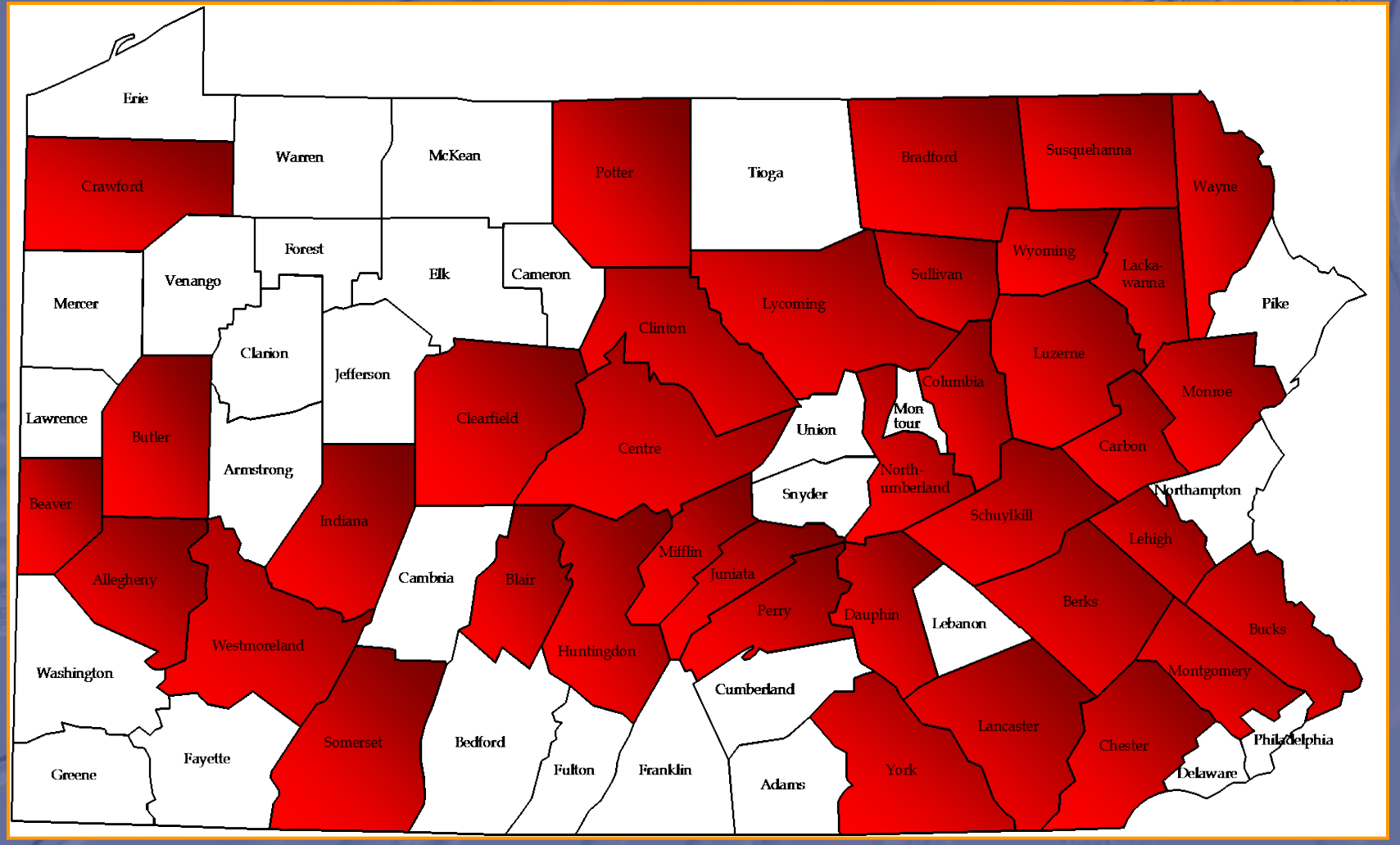
- Do not replant susceptible trees in this area.
- If you must:
  - Consider
    - Mounding
    - Drainage tile
    - Pre-planting root treatment
    - Grade changes to eliminate chance of standing water*
    - Grafted plants
  - Care in planting
  - The use of Subdue will get you 1 more season – maybe.

Rhizosphaera Needlecast

Previous years infected needles cast during summer

Distribution of Rhizosphaera Needle Blight in PA 1991-2010

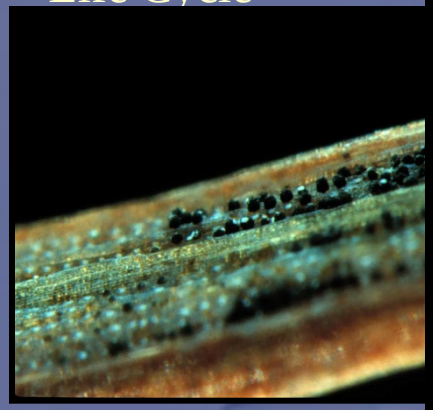
(Based on samples submitted to PA-PDDL)

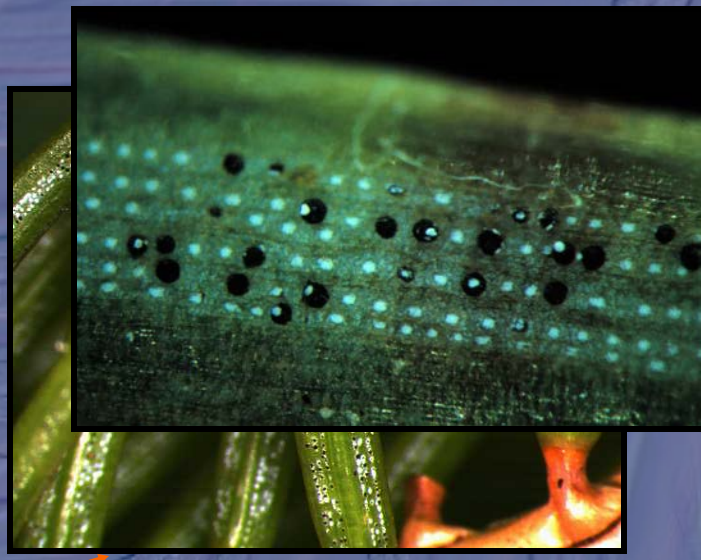


Rhizosphaera Needlecast

Spores can infect newly emerging needles,
or they can infect older needles that are stressed or senescent.

Rhizosphaera Life Cycle





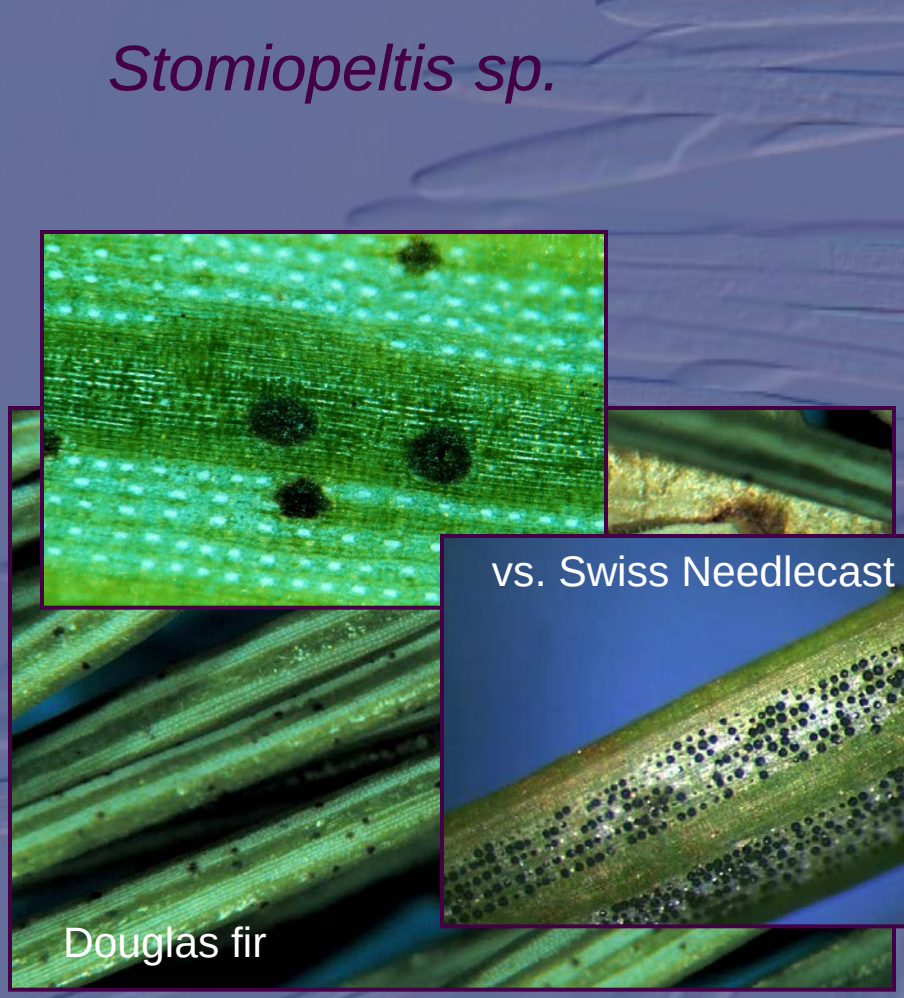
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar

Rhizosphaera

Stigmina

Flyspeck (may be confused as a needle cast)

Stomiopeltis sp.



Rosellinia Blight on Blue Spruce





Diplodia (Sphaeropsis) Tip Blight

- Severe damage potential to Austrian and Scotch pines.
- Sporulation starts in spring and lasts through summer.

Diplodia Blight on Dougas Fir

PA Christmas Tree Scouting Report: Contact Sarah Pickel c-sapickel@pa.gov

Also available on web: http://ento.psu.edu/extension/christmas-trees

PENNSYLVANIA'S CHRISTMAS TREE SCOUTING REPORT

APRIL 18, 2013

Weekly newsletter compiled by Sarah Pickel, PA Department of Agriculture.

This week's scouting data contributors: Jim Fogarty (Halabura Tree Farm), Karen Najda (PDA), Susan Newhart (Acadia Tree Farm), Sarah Pickel, Brian Schildt (PDA), and Cathy Thomas (PDA).

GROWING DEGREE DAY TOTALS, 4/17/13:

LOCATION	GDD TOTAL
Conoy Twp, Elizabethtown (SW), Lancaster Co.	177
Mount Joy Twp, Elizabethtown (NE), Lancaster Co.	107
Hallstead, Susquehanna Co.	30
Indiana, Indiana Co.	130.5
New Cumberland, York Co.	103
New Ringgold, Schuylkill Co.	93.5

BALSAM TWIG APHID

This week in Lancaster and York Counties, stem mothers (or 1st generation nymphs) of Balsam twig aphids were found hatched on the needles of true firs (the only host genus of this pest). When scouting for this pest, hold a dark flat surface under a branch and tap the upper surface of the branch. The light-green aphids will fall to the dark surface and be clearly visible. This soft-bodied pest hatches from a silvery overwintering egg and begins to feed on the underside of last season's needles. As bud break approaches, the stem mothers will move to the buds and prepare to give birth to live young which will enter and feed inside the newly breaking buds. The key to avoiding the typical symptom of the twisted new growth is to control the stem mothers after the eggs have hatched, but before bud break occurs. In northern York County, no eggs were found, so the hatch was close to 100%. For more information on Balsam twig aphid, visit: http://extension.psu.edu/ipm/program/christmas-tree/pest-fact-sheets/needle-discoloration-and-injury/balsam-twig-aphid.pdf/view.

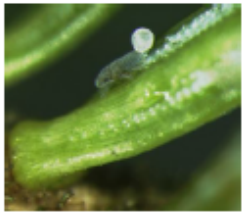


Figure 1: Balsam twig aphid stem mother [PDA]

SPIDER MITES

Spruce spider mites have hatched this week in central York County on Fraser fir. No eggs were found on these sprigs, so in that region, hatch is close to 100%. Spider Mites were also hatched on Arborvitae in Schuylkill County. In this location, eggs were still found, and the hatch level was estimated at about 50%. Egg hatch has not yet been reported from scouts in Lancaster and Susquehanna Counties. Growers can monitor for hatch by holding a light flat surface (ex. Paper plate) under a branch and tapping the upper side of the branch to dislodge any mites onto the surface. After a few seconds, the rusty-brown mites will begin to move across the surface and be clearly visible. When hatch approaches 100%, growers should consider making a control application if 10 or more mites are found per sprig. Growers should scout the treated blocks about a week after the first application to determine if a second application would be necessary. For more information on Spruce spider mites, visit: http://extension.psu.edu/ipm/program/christmas-tree/pest-fact-sheets/needle-discoloration-and-injury/spruce-spider-mite.pdf/view.

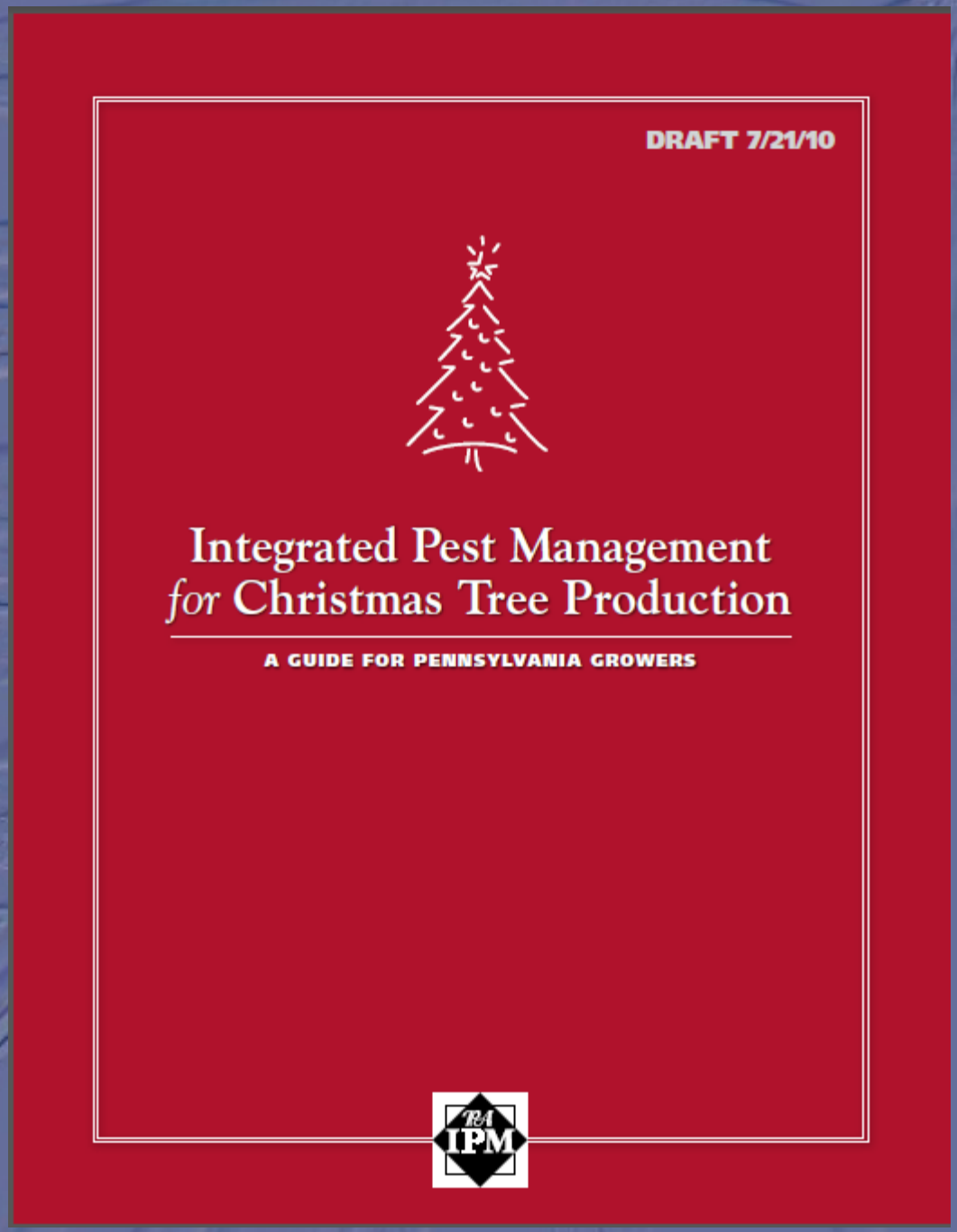
Figure 2: Spruce spider mite nymphs and adults [PDA]

WEEVIL TRAPPING

Weevils continued to be active in traps in Schuylkill and York Counties this week. After a

Google to find the downloadable:

Pennsylvania Christmas Tree IPM manual



http:ento.psu.edu/extension/christmas-trees

Or Google: “psu christmas trees”