PennState Extension

Eriophyid Rust and Sheath Mites

All species of rust mites overwinter as eggs on the needles of host trees. Egg hatch occurs in very early spring, as early as mid-March. Damage includes needle discoloration and injury.

ARTICLES | **UPDATED: NOVEMBER 21, 2017**

Lower branch showing rusty feeding damage of the spruce rust mite. Courtesy of Sandy Gardosik, PDA

***Nalepella* and *Setoptus* spp.**

These are "cool-season" mites, like the spruce spider mite, but are active several weeks before spider mite eggs hatch.

Hosts

- Spruce
- Fir
- Eastern white pine
- Scotch pine
- Hemlock

Damage Potential

- Moderate

Symptoms and Signs

Rust Mites (Nalepella spp.)

- Chlorotic or rusty-brown-appearing needles
- Silvered, dusty, or bleached-out appearance on Colorado blue spruce

- Premature needle drop may occur

Sheath Mites (*Setoptus* spp.)

- Stunted/chlorotic needles; premature needle drop
- Silvering or graying of needles, particularly on south side of tree

Causes of Similar Symptoms

- Spruce spider mite
- Environmental stress
- Nutrient imbalances

Identification

Eriophyid mites are distinctly different from the typical spider mite. They are extremely small and only have two pairs of legs in all active stages. The body is wedge or carrot shaped and light tan or pinkish (Figures 1–3).

Figure 1. Spruce rust mites in new growth. Courtesy of Sandy Gardosik, PDA

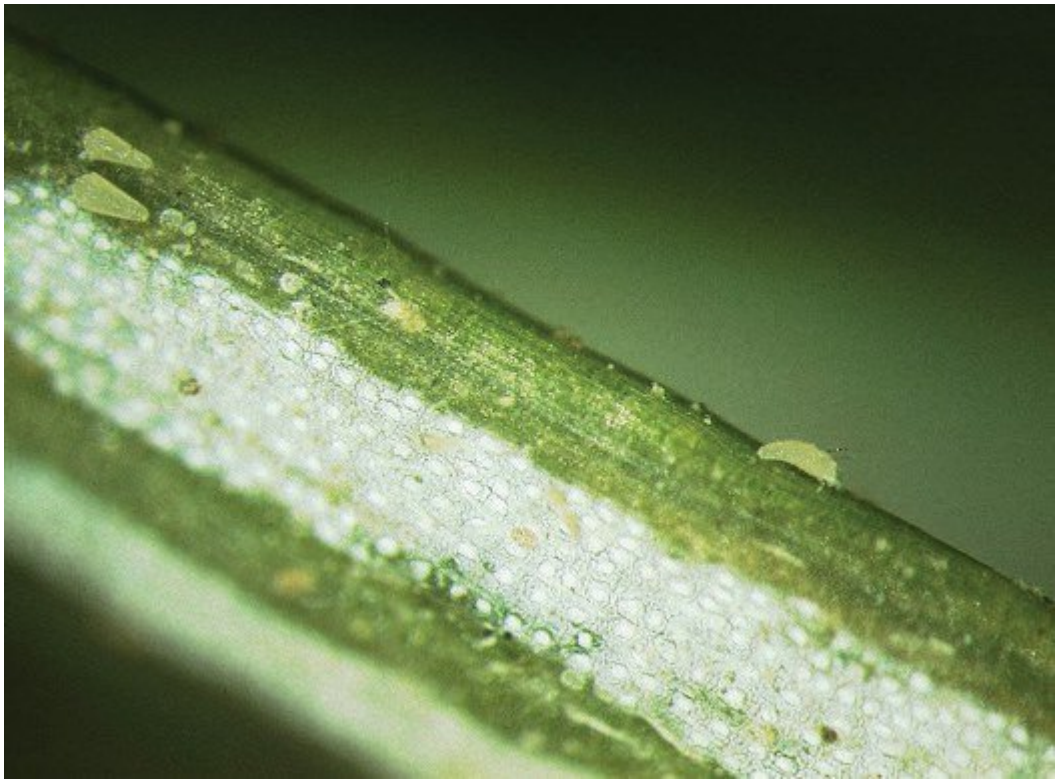


Figure 2. Hemlock rust mites moving along the needle. Courtesy of Sandy Gardosik, PDA

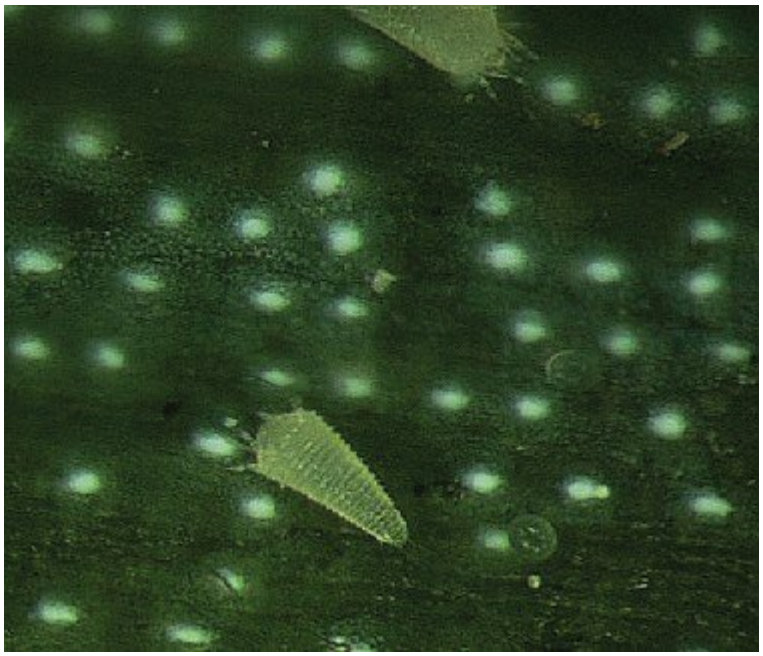


Figure 3. Wedge-shaped eriophyid mites (note four legs). Courtesy of Sandy Gardosik, PDA

Three species of rust mites in the genus *Nalepella* are found on Christmas trees in Pennsylvania. Hemlock rust mite, *Nalepella tsugifolia* Keifer, is the predominant species on fir and hemlock. Another species, *Nalepella octonema* Keifer, is found occasionally on fir. The third species, dubbed the spruce rust mite (*Nalepella*

halourga Keifer), is restricted to spruce. Identification of species requires examination under a very high-powered microscope. However, because the biology, life history, and damage of the three species are the same, confirmation of a rust mite infestation is all that is needed. Two species of pine sheath mites in the genus *Setoptus* are found in Pennsylvania. White pine sheath mite, *Setoptus strobacus* Keifer, can be found in the needle sheath and on the needles of eastern white pine. Scotch pine sheath mite, *Setoptus jonesi* Keifer, has the same habits but on Scotch pine.

To scout for eriophyid mites, use a 15–20X hand lens. Select a lateral branch 4–5 feet (1.23–1.52 m) from the ground on the southern-facing side of the tree. For rust mites, turn the branch over to see the underside of the needles and look for mites and eggs or cast skins. To locate sheath mites, look inside the needle sheath at the base of the needles. The mites are slow moving, and the anterior end is the widest portion of the body. You may see two pairs of short legs.

Eggs are round and about the size of the needle stomata. During the growing season, eggs are generally found in the same location as the adults and are off-white or tan. Overwintering eggs will be found on the lower third of the needle (closer to the needle base on fir) and, like the adults, on the underside of the needle (Figure 4). These eggs range in color from clear to salmon to tan and can be deposited in clusters of 20 or more (Figure 5). To see these eggs, pull needles one by one and examine the base. Overwintering sheath mite eggs are located on the exposed base of needle bundles. During the growing season, these eggs will be found in the needle sheath and can be located by gently pulling needle bundles from the sheath.

Figure 4. Overwintering rust mite eggs laid near the base of the needle. Courtesy of Sandy Gardosik, PDA

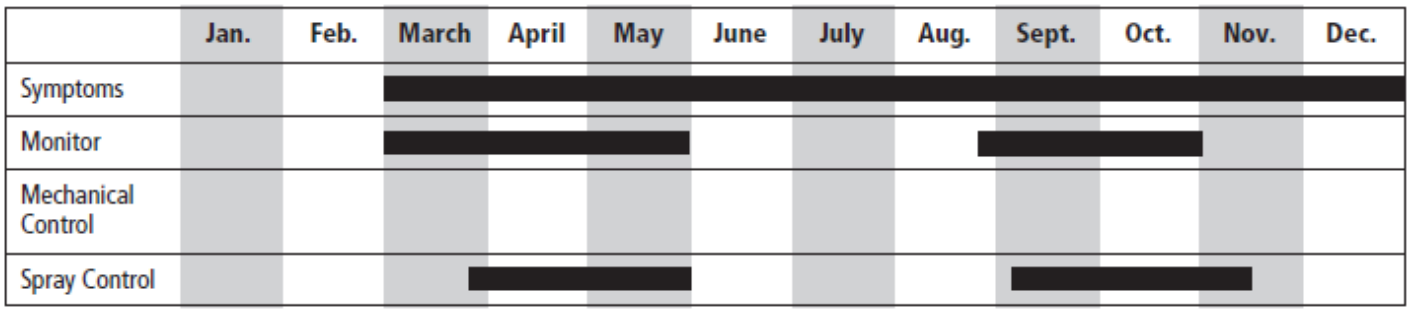
Figure 5. Overwintering rust mite eggs laid in clusters of 20 or more. Courtesy of Rayanne D. Lehman, PDA

Another method of detecting eriophyid mites is to look for cast skins on the needles. These appear as minute, white strands and offer better contrast to the needles than the adults. A hand lens is needed to look for cast skins (Figures 6 and 7). If this method is employed, an attempt to find adults or eggs should follow to confirm the infestation is active.

Figure 6. Threadlike cast skins of eriophyid mites. Courtesy of Rayanne D. Lehman, PDA

Figure 7. Cast skins giving the needles a fuzzy appearance. Courtesy of Sandy Gardosik, PDA

Calendar of Activity



Biology and Life Cycle

All species of rust mites overwinter as eggs on the needles of host trees. Egg hatch occurs in very early spring, as early as mid- March. These are “cool-season" mites, like the spruce spider mite, but are active several weeks before spider mite eggs hatch. By the time spider mite overwintering eggs hatch, rust mites have completed several generations and rusty or bleached damage may be apparent (Figure 8).

Figure 8. Mite feeding damage giving foliage a rusted or bleached look. Courtesy of Tracey Olson, PDA

During late spring and summer, rust mite populations are very low. However, in late summer when temperatures begin to moderate, populations build again. Overwintering eggs are deposited in fall, but rust mites may be active into December.

White pine sheath mite biology may involve two distinctly different phases of activity. When candles are elongating, mites inhabit the needle sheath and feed on the elongating needles (Figure 9). This causes needles to be stunted. The mites feed openly on mature needles, causing them to turn silver or brown.

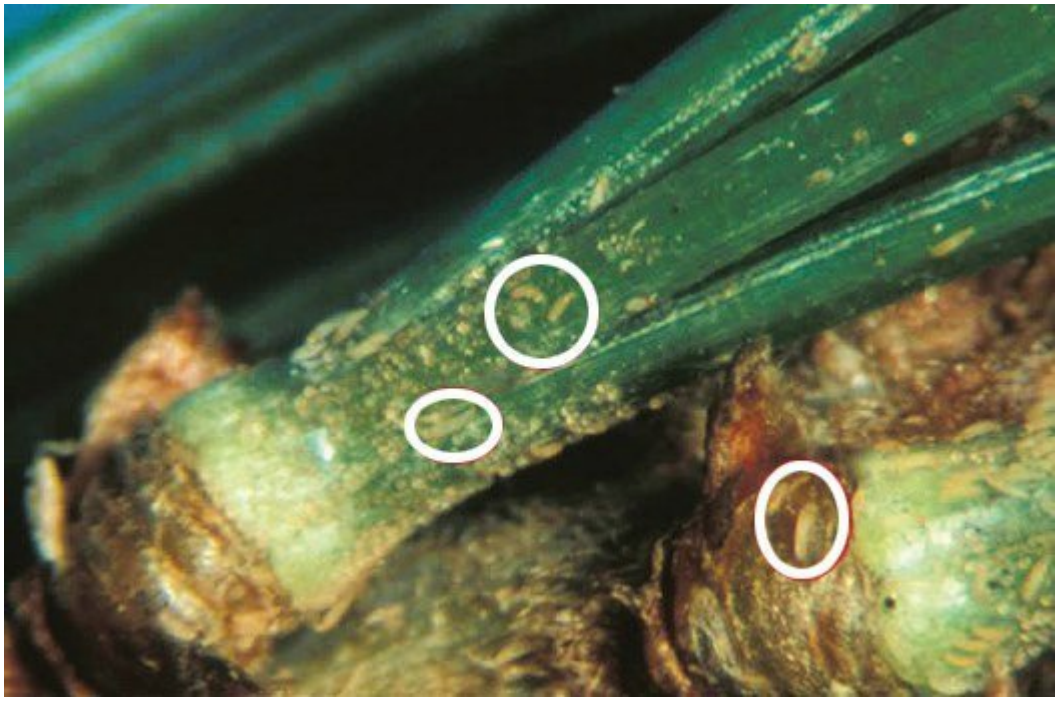


Figure 9. White pine sheath mites (circled). Courtesy of Rayanne D. Lehman, PDA

Monitoring and Management Strategies

Plantation Establishment

- No recommendations are available at this time.

Preseason

- Begin scouting in early March by examining 10–20 trees per acre. Choose trees with previous damage or, if no previous damage has occurred, trees at random.
  — On spruce, look for clusters of red eggs on underside of needle.
  — On fir, look for amber-colored eggs along the base of the needle where it lies flat against the stem.
  — On pine, look at the exposed needle base of last year's growth.
- Scouting on overcast days will help symptoms stand out.
- Look for predatory mites that may be feeding on overwintering eggs or immature mites following egg hatch. Predatory mites may keep this pest in check.

Growing Season

- Growing degree days: Overwintering eggs hatch at 0–15 GDDs.

- Threshold level (both criteria for rust mite on hemlock must be met):

— At least 80 percent of sampled shoots have mites on them.

— At least eight mites are present on one single needle in the plantation (examine all sides of the needle).

- Continue scouting in spring until temperatures rise. Look for pine sheath mites by gently pulling elongating needles from the sheath and examining the needle bases.
- Resume scouting in fall for population resurgence.
- At the end of the season, evaluate results and update records.

Control Options

Biological

- Encourage predatory mites.

Mechanical

- No recommendations are available at this time.

Biorational

- Apply dormant oil in early spring before bud break. Eggs may have already hatched, but oil will control active mites if coverage is thorough. Oil will remove the blue color on some spruce.

Chemical

- Apply a miticide specifically labeled for rust or eriophyid mites in mid-April–mid-May. General miticides may not control eriophyid mites. Make a second application if warranted 1–2 weeks later.
- Scout to determine if a fall application is necessary.

Next Crop/Prevention

- Purchase and plant pest-free nursery stock from a reputable company.