BC FoodWeb

Peer-reviewed research

Fall Kaolin Sprays for Early-Season Pear Psylla Management

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KEY TAKEAWAYS

Researchers evaluated whether fall applications of kaolin clay (Surround WP) could reduce pear psylla populations and egg-laying the following spring.

- **Spring applications resulted in the lowest numbers** of pear psylla adults and eggs.
- **Fall applications reduced pear psylla populations by nearly 70%** and may offer an alternative if cold, wet conditions or difficult terrain prevent timely spring spraying.
- **Kaolin residue often remained on trees throughout winter**, helping to suppress early-spring populations. Fall applications can provide an added line of defence but should not replace standard spring management.

Production Type
- Pears

Practice Benefit(s)
- Pest Management
- Pear Health and Yield

Research Location
- Washington and Oregon, USA

Key Terms
- *Kaolin clay*: A white mineral powder sprayed on pear trees to form a particle film that discourages pear psylla from settling and laying eggs.
- *Spreader sticker*: A spray additive that helps kaolin clay stick to tree surfaces and remain in place longer.

How can this research be used?

Producers who struggle to access their orchards in early spring may find fall applications useful for managing pear psylla. **This approach is most relevant where wet soils or steep terrain make timely spring sprays difficult.** Instead of missing the spring spray window altogether, a fall application may help reduce early-season pear psylla populations the following spring. When implementing this approach, producers should follow current product labels for application rates, timing, and other use requirements.

Why was this research done?

Pear psylla (Cacopsylla pyricola) is the most damaging insect pest in pear production. If populations are not managed early in the season, they can increase rapidly and reduce tree health, fruit quality, and yield. Preventing population buildup early can help reduce pest pressure later in the season.

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Kaolin clay is commonly applied in early spring to help suppress pear psylla before populations increase. By creating a barrier on tree surfaces, it can reduce pear psylla feeding, movement, and egg-laying. However, some producers cannot make timely spring applications because wet orchard soils or other access challenges prevent spraying equipment from entering the orchard.

To help producers address these challenges, researchers evaluated **whether fall applications could persist through the winter and and remain effective the following spring.** The goal was to determine whether this approach could offer an alternative management option when timely spring applications are not feasible.

Figure 1. Steep, wet and snowy conditions in a commercial orchard. Photo by L. B. Nottingham

What was the outcome?

This study tested kaolin clay using both potted pear trees and commercial pear orchards. The potted-tree experiments provided more controlled conditions to compare how pear psylla responded to different treatments, while the commercial orchard trials tested how the treatments performed under real orchard conditions. Researchers compared untreated trees with a range of application timings, including early fall, late fall, and spring. Additional treatments, such as a spreader-sticker and mineral oil, were included in some experiments.

Reduced number of adult pear psylla

Across the study, kaolin clay reduced adult pear psylla populations compared with untreated trees. Adult numbers declined shortly after fall applications and remained lower the following spring. Spring applications generally provided the greatest reduction, while late-fall applications were more effective than early-fall applications. In experiments where it was tested, **adding a non-ionic spreader-sticker (Nu-Film 17) to fall applications also improved suppression compared with kaolin clay alone.**

The strength of the kaolin clay application varied among orchard locations and years. Reductions in adult pear psylla numbers were more noticeable in orchards with higher pest pressure, while the effects were less apparent where populations were already low. This suggests that the effects of fall applications may be easier to detect in orchards experiencing higher early-season pest pressure.

Figure 2. Spraying kaolin clay in a commercial pear orchard. Photo by L. B. Nottingham

Reduced number of eggs

Kaolin clay also reduced the number of pear psylla eggs across the experiments. Early-fall, late-fall, and spring applications all reduced egg numbers compared with untreated trees, although late-fall and spring applications generally had stronger reductions than early-fall applications.

Figure 3. Pear tree covered with kaolin clay following a fall application. Photo by R. J. Orpet

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The pattern was also observed in the commercial orchard trial, where untreated trees had the highest egg numbers, early-fall application showed intermediate results, and late-fall and spring applications had the lowest egg numbers. This is important because reducing egg numbers early in the season can limit population growth before later generations build up.

Kaolin residue remained through winter

Kaolin clay from fall applications remained on tree branches through much of the winter, although the amount gradually decreased over time. Treated branches were often still visibly whiter than untreated branches in spring, showing that some kaolin clay remained on the trees even after exposure to rain, snow, and other winter conditions.

The amount of kaolin clay left on the branches appeared to affect how well it worked. Trees with more kaolin clay remaining generally had fewer pear psylla, while the effect became weaker as it wore off. This also helps explain why spring applications generally worked better than fall applications, since spring kaolin was newly applied, while fall kaolin had been exposed to winter conditions for several months.

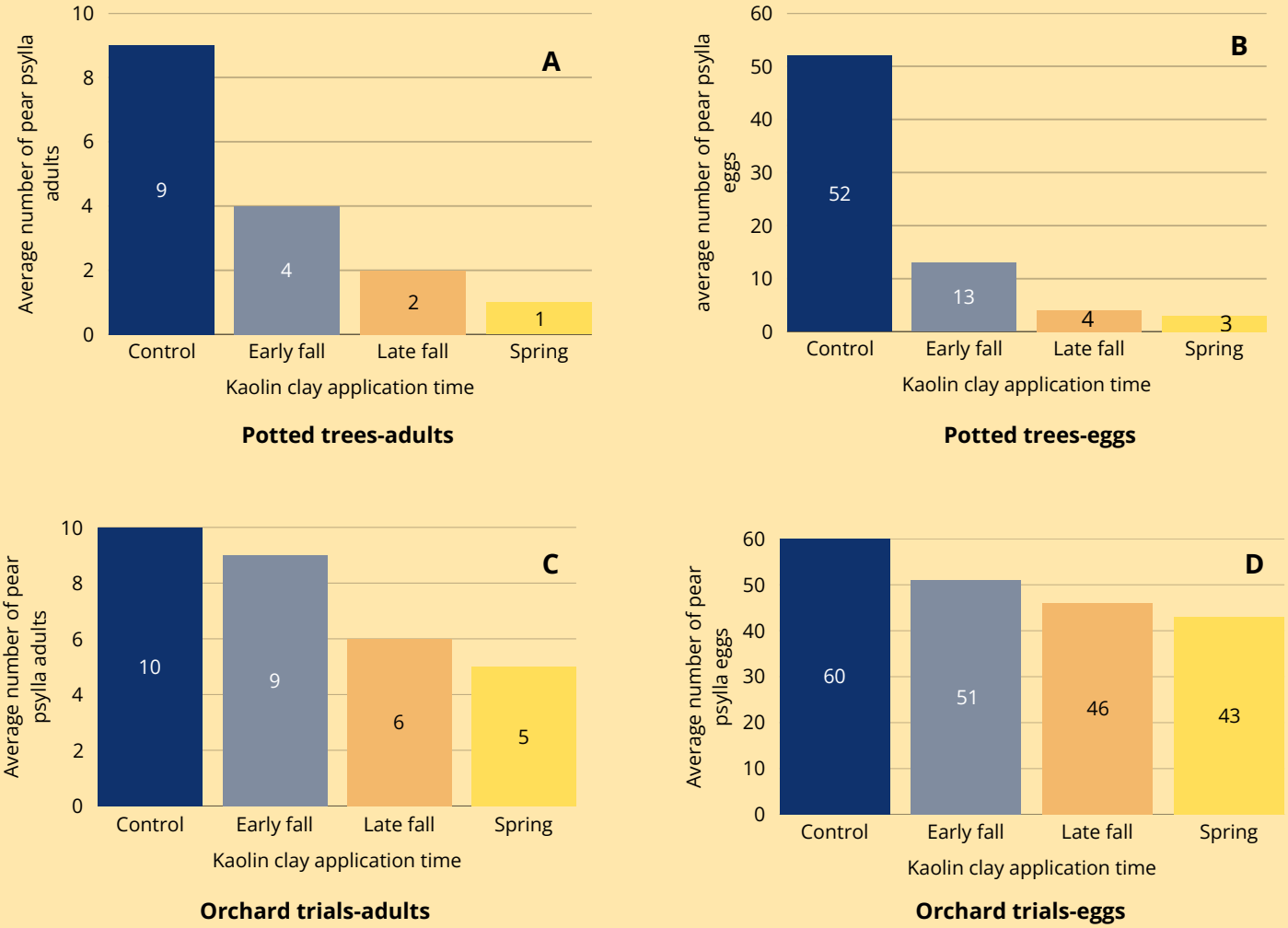

Figure 4. Pear psylla adults and eggs following different kaolin application timings in potted-tree and commercial orchard experiments. Potted-tree values (A, B) are treatment averages measured 72 hours after adults were introduced. Commercial orchard adult values (C) are pooled averages from March and April spring sampling, while egg values (D) are averages from April sampling.

What's next?

Fall applications of a spreader-sticker plus kaolin clay showed potential to improve kaolin clay effectiveness. More testing is needed before these approaches can be broadly recommended. Confirming their performance over multiple years, under different orchard conditions, and evaluating the cost of implementing the practice will be important when helping pear growers decide whether fall-applied kaolin should become part of their pear psylla management program.

How was the research done?

We conducted six experiments between 2017 and 2021 using both controlled studies with potted pear trees and field trials in commercial pear orchards in Wenatchee, Washington, and Hood River and Medford, Oregon. This allowed us to determine whether fall-applied kaolin clay could reduce pear psylla under both controlled and commercial growing conditions.

We compared the effectiveness of kaolin clay in reducing pear psylla eggs and adults when applied at different times. We applied it at three different times:

- **Early fall: September, before leaf drop**
- **Late fall: October to early November, after leaf drop**
- **Spring: March, before pear psylla began recolonising orchards**

Across the experiments, we tested an untreated control, kaolin clay, kaolin combined with the spreader-sticker Nu-Film 17, and mineral oil. Not every treatment was included at every application time. **We applied the highest labelled rate of kaolin in the fall (112 kg/ha) to leave enough kaolin on the branches to withstand winter weather**, and the standard spring rate for spring application (56 kg/ha).

In the controlled studies, trees remained outdoors over the winter to experience natural weather conditions before adult pear psylla were released onto them the following spring. We counted the number of adults that settled on each tree and the number of eggs laid to determine how well each treatment reduced colonisation.

In the commercial orchards, we monitored pear psylla populations before treatment, shortly after the fall applications, and during the early and late spring. We also counted eggs on developing fruit buds and measured how much kaolin clay remained on branches from fall to spring. By comparing treated and untreated orchard plots, we determined whether fall-applied kaolin clay could reduce pear psylla populations under commercial growing conditions.

***Study products and application rates**: This study used the kaolin clay product Surround WP and the non-ionic spreader-sticker Nu-Film 17. Application rates described in this study are specific to the products and conditions evaluated by the researchers. Always follow current product labels and manufacturer directions when selecting and applying pest management products.*

About this brief

This brief was prepared by Yussuf Adedeji from the BC Food Web team, with the help of Robert J. Orpet. The brief is based on the following scientific journal article:

- Louis B. Nottingham, Robert J. Orpet, Christopher G. Adams, Richard Hilton, Elizabeth H. Beers, Suppression of pear psylla, Cacopsylla pyricola (Hemiptera: Psyllidae), with fall applications of kaolin clay. Journal of Economic Entomology, Volume 119, Issue 3, June 2026, Pages 2087–2097. https://doi.org/10.1093/jee/toag053

Want to learn more?
For any questions regarding this research, contact Robert J. Orpet at robert.orpet@oregonstate.edu.

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