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Karen Lewis is testing a mechanical thinner developed at the University of Bonn, Germany, with the help of intern Dennis Hehnen.

Labor-saving thinner

A mechanical thinning machine can operate in any kind of weather.


By Geraldine Warner



Apple growers see mechanical bloom thinning as a way to reduce labor-intensive hand thinning of fruit. In the Pacific Northwest, hand thinning of apples tends to coincide with a peak demand for labor to harvest cherries.

For the past two years, Karen Lewis, Washington State University Extension educator, has been testing the Darwin prototype 300 mechanical thinning machine from Germany in Washington State orchards. The machine is available commercially, and there are now ten machines in the United States.

In Germany, growers are

 using mechanical thinning as their primary thinning technique. An advantage over chemical thinning is that it can be used in any kind of weather, so growers don't miss the opportunity to thin at the optimum time. "I've used it in snow, gale force wind, and rain, so it's a lot more flexible in that sense," Lewis said.

Most of the trials in Washington have been on peaches, nectarines, and apricots, but Lewis has also tried out the machine on apples, pears, and cherries.

Most growers are looking at mechanical thinning not so much as a labor-saving tool, but a horticultural tool to maximize their returns, she added. On stone fruits, the goal is to reduce the crop load in order to improve fruit size, whereas with pome fruits, the main objective is to ensure return bloom. "The icing on the cake is the reduction in labor for either hand blossom thinning or green fruit thinning," she said.

Funding

The Washington Tree Fruit Research Commission is funding research on mechanical blossom thinning by Dr. Jim Schupp and Dr. Tara Baugher at Pennsylvania State University, as well as by Lewis in Washington. In addition, a \$2 million federal grant for a project called Innovative Technologies for Thinning of Fruit, led by Dr. Paul Heinemann at Penn State, is providing funding for mechanical thinning trials, primarily on stone fruit, in South Carolina, California, Maryland, Pennsylvania, and Washington State.

The Darwin 300 has a ten-foot-tall rotating spindle, with between two and six spines of molded plastic cords running up and down. The 18-inch cords are similar to the cord of a string trimmer. The machine, which costs about \$10,000, is towed by a tractor at between 2.5 and 3.5 miles per hour with the spindle rotating at between 200 and 400 revolutions per minute, depending on the amount of thinning desired. The number of cords can also be adjusted, and the machine can be set up to thin the tops of the trees only.

The researchers hope to determine the ideal stage of bloom for the treatment, which varies by variety. In apples, Lewis has been focusing primarily on Cripps Pink, Gala, and Honeycrisp. If the buds are at tight cluster stage or earlier, the treatment will thin off the clusters. To thin off individual blooms, the treatment should be done between full separation of the flower buds and open king bloom, but not as late as full bloom because of the increasing risk of damaging fruitlets on the tree.

Lewis has been collaborating with Craig Hornblow, a tree fruit consultant with AgFirst in New Zealand, so that they can gather data from two bloom periods each year and speed up the research. Hornblow said it's not uncommon for trees to have some developing fruitlets even during early bloom, but many of the damaged fruitlets drop off during the following few weeks. The physiological shock that the tree goes through as a result of mechanical thinning increases fruit drop and adds to the initial thinning effect.

Washington grower Rick Valicoff expressed his approval after the machine was demonstrated this season in one of his Cripps Pink blocks at Zillah. The machine had already been tested in his soft fruit orchards.



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"I like it," he said. "I think it's got some promise. You can cut a lot of labor costs, no doubt about that. That's what everybody's looking at."

His 11-year-old apple block was trained to an alternate V system. Valicoff noted that if he were to use mechanical thinning on a commercial basis, he'd need to prune the trees with that in mind, making sure that the wood was in the right zone for the machine and not sticking out into the alley or growing into the middle of the V. A hedgerow system would work perfectly, he observed.

Lewis said thinning is most successful on wood that's tied down to a trellis, rather than wood that flaps around. Even more problematic is stiff wood growing into the alley that the machine will scrape and probably strip the bloom off.

Overthinned

Travis Allan of Allan Brothers, Inc., Yakima, said that in tests in two of his company's Gala orchards last year the machine overthinned. He'd like to be able to achieve more predictable results. "It was way overdone," he said. "We were just making stabs in the dark. If we could dial it in and get 50 percent of the job done or 60 percent, then chemical thinning gets easier and green fruit thinning will go way down."

Allan said the machine is fairly affordable and can cover a lot of ground. Besides reducing labor, it avoids exposure of workers to chemicals.

Allan said thinning is part of his company's strategy—along with pruning and selective picking—for eliminating small-sized fruit that generates little profit or even a loss. Their goal is to bring only high-margin fruit into the warehouse. "This will probably result in lower bins per acre, but we're looking for higher returns per acre by doing that," he said.

For organic growers, mechanical thinning could be a "shining star," he thought, whereas for conventional growers it would be another tool, along with chemical and hand thinning. He does not consider any of the thinning tools to be stand-alone practices.

Lewis said she also sees mechanical thinning as just one tool in the toolbox, and a grower might decide to follow up with another bloom thinner or a postbloom thinner, depending on the results.

"I think every situation will require very stringent evaluation, given the tools you have, and the combination is up to the grower," she said. "I do see cases where chemical thinning will be put on top of this."

Lewis is also testing a prototype of a mechanical thinning machine nicknamed the UniBonn. It was developed by Dr. Michael Blanke at the University of Bonn in Germany. The machine has three rollers that move horizontally through the trees at adjustable angles. University of Bonn student Dennis Hehnen, who is working this summer as an intern for the Washington Tree Fruit Research Commission, said the UniBonn is suited to trees with whorls of branches. It is designed to thin more fruit on the inside of the tree, where the lower quality fruit is, than on the outer canopy where the fruit is more exposed to the sun.