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UA Scientist Is Building a Better Pecan Pie

With a group of fertilizers known as chelates, zinc levels can be managed in pecan trees — and that's good news for Arizona growers.



Sunlight cuts through the rows of trees that make up the pecan groves just south of Tucson. It's not yet Thanksgiving, but harvesting has already begun. Thanks to El Niño, farmers are expecting early and substantial rains — conditions ill-suited for gathering nuts once they have been shaken from the trees.

Native to the Mississippi River Valley, pecan trees enjoy that area's acidic soil, but they also are vulnerable to fungal diseases given the locale's relatively high humidity. In Arizona, pecans thrive as long as they get the right amount of water and the proper diet, one that includes zinc. Arizona is the fourth-largest producer of pecans in the United States.

"They really love sunlight," says **James Walworth**, professor of soil science at the University of Arizona. "The more sunlight the better. They perform beautifully in the desert if they're given the right amount of water and if they're fertilized properly, particularly with zinc. And if you do all that, the yields will typically be about twice as high as they are in more humid areas."

Walworth has been studying zinc's effect on pecans for about a decade, so he knows firsthand how important the mineral is to the tree.

There are two ways to manage zinc levels in pecan trees, he says.

The first is amending Arizona's soil to increase its acidity. "Low-acid soils tend to have plenty of zinc, but nonadapted plants don't know how to get it out of the soil," Walworth says. However, amending the soil is costly.

The second involves fertilization through the surrounding soil or through the leaves, the latter known as foliar fertilization, where growers spray zinc directly on the leaves. Though effective, foliar fertilization can be spotty or uneven. What's more, when new foliage appears, it has not yet

been fertilized, so **spraying must be repeated often.**

"In pecan orchards, they'll spray anywhere from four to 13 times per season to get zinc onto the new foliage," Walworth says. "It's expensive. There's equipment, labor, materials and soil compaction from driving through the orchard, and that's been the standard method for the last 60 or 70 years."

So Walworth began looking for a better way to fertilize the trees through soil applications and has since focused on a group of fertilizers known as chelates, organic molecules that grab hold of a metal and allow the plant to take it up more easily.

Now growers can use their pressurized irrigation systems to fertilize, or **fertigate**, their pecan groves with zinc chelates.

"The systems are set up to inject other nutrients as well, so it's very simple to do this with zinc, too," Walworth says. "We've been really successful injecting zinc chelate into the microsprinkler systems. Now all of the orchards with pressurized irrigation systems are injecting zinc chelate with the exception of the organic producers."

Walworth is looking into the optimal amount of zinc that pecan trees need to thrive here.

"Growers ask me how much they should or can put on, and I don't really have an answer for that yet," Walworth says. "We know it works, we know it's effective, growers are doing it, but there's still a bit of guesswork left."

Sahuarita Pecan Festival



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