



OKLAHOMA PECAN GROWERS ASSOCIATION

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Michael Smith, Editor

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Oklahoma Pecan Growers' Association is published 4 times per year and is a benefit of being an association member. Contact the Oklahoma Pecan Growers' Association c/o Horticulture & Landscape Architecture, Oklahoma State University, 358 Agriculture Hall Stillwater, OK 74078-6027 for further information.

PRESIDENT'S CORNER

Robert Knight

I have had several phone calls concerning the requirements associated with the grazing of cattle in pecan groves. As you may have heard the FDA's Food Safety and Modernization Act is in the process of being finalized. Any regulations associated with it will not have any impact on the current crop, and likely will not be implemented for a couple of years. If you are signing long term cattle and pecan leases, you will need to be aware of what is coming.

If you grow pecans in a grove that has cattle and sell to the commercial shelling trade then for the time being nothing has changed. It may be that this will be the case even after the Food Safety Rules are in place for years to come. Individual buyers and shellers will determine if the pecans you are selling them are clean enough. In the past I know that the shelling trade has complained about cattle manure in harvested native pecans. My guess is that they will probably be even stricter on that in the future. I would expect that in the future loads of pecans may be rejected because of that. If your harvester damages pecans and you are picking in an area that has had cattle in it, this would be of particular concern. Cracked pecans with cow manure on them are bad news.

At the very least the manure should be well dried in the grove before you start harvesting. Also, if pecans are harvested that have a lot of moisture in them, they need to be dried as quickly as possible. Foodborne illnesses love a moist environment. The standards for the sale of native pecans are tightening. In the past the shellers would buy native pecans without counting the nuts per pound. Now that is an issue. Many buyers now regularly check the moisture content. As time moves forward we are going to have to offer the shellers better and better pecans if we expect to be paid adequately for our work. The issue of food safety is a serious one. Each year 5,000 people die in the U.S from

E. coli, salmonella and the like. We need to be careful about our practices.

Various recommendations are out there of 60 or 90 or 120 days to have the cattle out of the grove before the harvest. As the Food Safety and Modernization Act currently stands, this would apply only to those selling directly to the public. These may also be good numbers to have written into grazing or pecan harvesting agreements going forward. These rules have not been finalized and will have no bearing on the current crop. We hope to be able to have better guidelines in the future.

Please be aware that none of this is final. We seem to be okay for this year, but please pay attention in the future. Also, please be aware that although I am President of the Oklahoma Pecan Growers Association, I have no authority whatsoever concerning the Food Safety and Modernization Act. I will attempt to keep you posted on what I know. What I know most of all is that we need to try to make our best effort to sell the best possible pecans.

Our vice president, Mike Spradling, has also brought to my attention the issue of the practice by people releasing hogs for sport hunting. Please contact Blayne Arthur, Oklahoma State Deputy Commissioner of Agriculture. Send her an e-mail at Blayne.arthur@ag.ok.gov in support of legislation that would subject these people to stiff penalties.

Good luck with the harvest. I hope you make a lot of money this year.



HAIL DAMAGE

Becky Carroll

Have you seen this damage occurring in your orchard this year? This was found on Kanza at the Cimarron Valley Research Station at the end of August. Occurring on the top of clusters, these round circular black spots damaged only the shuck indicating it was probably from a hail storm the week before. The damage didn't extend into the shell. This shouldn't be any reason for concern. Stink bug & weevil damage will go through the shuck and into the shell. Weevil damage will often show tracks around the feeding or egg laying site. After shell hardening, hickory shuckworm damage will be confined to the shuck but will not be uniformly shaped in damage area. Shuckworm damages the shuck just under the outside layer.

AMERICAN PECAN BOARD UPDATE

Scott Landgraf

The Federal Marketing Order (FMO) hearings for pecans are complete! Now the fate of the FMO is in the hands of USDA Secretary Vilsack. Assuming that process moves forward, there could be a vote by qualified growers by next spring. With a positive vote for the FMO, the process could be in place for the 2016 pecan crop. The latest version of the FMO can be seen on the American Pecan Board web site.

I would like to thank everyone who gave their testimony at the FMO hearings. Each little piece of information went together to provide a face and personality of the pecan industry. It has been quite an experience to serve on the American Pecan Board. For that experience and your financial support, I sincerely thank you!

The fate of this effort is truly in your hands, as a pecan grower. It is very important to speak favorably of the order in your discussions. Talk with your neighbors building anticipation as to the favorable impact that should come as a result of the installation of the FMO for pecans. I truly feel that this is the only hope for the native pecan market, and possibly the wholesale improved pecan markets, as well.

ALMONDS – A COMPETITOR FOR PECANS

Michael Smith, Department of Horticulture and Landscape Architecture

Below are selected excerpts from a story by Ann-Marie Jeffries published in the American/Western Fruit Grower. In the story Ms. Jeffries quotes Vernon Crowder, Food and Agribusiness Research Advisory Group, senior vice president and senior analyst.

The Almond Board of California is funded by The Almond Marketing Order issued by the U.S. Secretary of Agriculture (<http://www.almonds.com/processors/resources/marketing-order-services>). The Almond Board supports many activities such as conferences, leadership programs, farm advisor internships, Ag in the Classroom, production and food safety research, and food quality and safety symposiums. However, their primary function is expanding almond markets to create demand and thus increase almond value.

Almond production has increased dramatically over several years and new markets have been developed creating demand that has met or exceeded production. As noted below in Crowder's quote, pecans are not the only nut crop that is relying on China's prosperity and other Asia countries to drive market prices.

"I expect on average, prices will be higher the next 10 years than they have been the last 10 years," he says. This is thanks in part, too, to increasing middle-income earners overseas, particularly in Asia. "Not only do they value nuts in general, but especially the almond," Crowder says. "The almond is especially versatile."

Increased profits have driven an expansion in pecan acreage and as noted below are also driving an expansion in almond acreage. The Almond Board has a proven track record and will aggressively pursue new markets and expand existing markets. They have funding through their marketing order to support such activities. For pecans to hold their rightful place among the nut crops, we must actively promote our crop. This is only possible with a consistent funding source. A national marketing order is essential if we expect to reap a profit from growing the crop we love.

"That same profitability is encouraging more planting of almonds, as well," Crowder says. He adds that planting almond orchards is relatively inexpensive from a capital standpoint, because they don't require a lot of wire or trellising. Plus, in the third year after planting, an orchard can already be commercially viable. Because of this, many growers of other crops – and even some livestock producers – are starting to grow almonds.

Regarding recent acreage reports, Crowder says the 30,000 acres that were pulled out may sound like a lot, but it's not that much considering the drought and age of the trees. "Because of the high prices of the almonds, it really pays growers to try to protect those old trees," he says. "They're already in there, so even though they have fewer yields, it's still profitable to keep those older orchards in." He adds that as many as 60,000 or more acres of almonds might have been planted in the last year. "That's consistent with estimates I'm hearing in the industry," he says. "There have been a lot of increased plantings in the last year or two."

A Federal Marketing Order is currently being pursued by the American Pecan Board www.pecanboard.com. For purposes of equal representation on the Board, the U.S. has been divided into three regions, east, central and west with a grower, sheller and grower/sheller representative from each region on the Board. Our representatives are Scott Landgraf, Madill, OK; Mike Adams, Caldwell, TX; and Dan York, Foreman, AR. Help spread the word to all pecan producers that this Market Order is essential for maintaining and expanding pecan markets and to give pecans a strong voice in the political arena.

PLANTING AND EARLY CARE OF PECAN TREES

Michael Smith, Department of Horticulture and Landscape Architecture

1. Planting

- a. Spacing 40 ft x 40 ft managed by tree removal; 35 ft x 35 ft managed by hedging. Both spacing and management methods will eventually require tree removal.
- b. Preferred pattern – offset, see below.

X		X	
	X		X
X		X	
	X		X
X		X	

Mark tree sites and kill vegetation in tree row with glyphosate or glyphosate plus 2,4-D amine (drift may damage non-target crops – follow label) and appropriate surfactant in late September or early October.

- c. If site drainage needs improved this should be done the year before planting. Note that regulations pertaining to declared wetlands may prevent improvements to drainage. Sites with poor surface or internal drainage are not suitable for commercial pecan production. Pecan trees may grow on these sites, but trees typically have low production and are unprofitable.
- d. Planting time
 - i. Bareroot – plant while dormant and before any bud swell in spring.
 - ii. Container – early October best, followed by planting during dormancy.
- e. Tree care before and during planting
 - i. Avoid root drying and root freezing
 1. Pickup directly from nursery
 2. Ensure trees are well packed
 3. If temperatures 28 °F or lower are expected hold in area maintained above freezing or heal into soil. Roots of bareroot trees can be placed in pond if ice is not expected.
 4. Plant as soon as possible. If planting is delayed place roots of bareroot trees in pond until able to plant.
 - ii. Planting
 1. Pre-dig holes using a 6 inch to 8 inch auger. For bareroot trees, dig holes **18 inches deep** by setting the tractor controls or painting a guide on the auger. For container trees, dig holes the same depth as the container.
 2. Bring bareroot trees to field with roots in water.
 - a. Bareroot - Cut root length to about 18 inches and trim lateral roots to comfortably fit hole without bending. Root should set firmly at the hole bottom. Remove $\frac{1}{3}$ to $\frac{1}{2}$ the top at planting time. Note: in spring some trees are alive, but do not begin growth. Cutting 2 to 4 inches more from the tree top frequently causes trees to begin growth.
 - b. Container – Shake most of the media from the root system. Cut the root where it begins to bend at the pot bottom.
 - c. Plant the tree and fill the hole with the same soil that was removed from the hole. Do not use any soil amendments. Water the same day trees are planted. Water after hole is filled to settle the soil.

3. Ensure that the tree is planted at the **same depth** it grew in the field or container. Planting too deep: poor survival, poorly anchored and susceptible to blowing over later, less productive.
 4. Inspect and adjust tree height as needed the next day and re-water.
- iii. Install tree guards – do not use black guards. Some sources are <http://www.tubexusa.com/>, <http://www.growtube.com/>. There are several other brands – search for tree grow tubes or tree guards on the web. Eighteen to 36 inch guards have proven effective to protect trees from glyphosate, many animals and sun scald. Aluminum foil applied to the trunk has also been effective as a tree guard. For larger spade transplanted trees paint trunks white with latex paint rather than using tree guards. Paint may be diluted and applied with hand sprayer (this usually ruins the pump).
 - iv. If possible, apply a wood chip mulch, such as that derived from clearing and chipping right-of-ways or available from some cities. Tulsa offers free wood chips that can be picked up at their mulch site, <https://www.cityoftulsa.org/environmental-programs/mulch-site.aspx>.

During weekends they provide free loading services and during the week they load if time permits. The mulch should be at least a 6 ft square centered on the tree 4 to 6 inches deep.

- v. Install irrigation – most systems in Oklahoma are buried drip or micro-sprinklers. The first 3 or 4 years it is common to use one temporary line down the row with 2 emitters, one on each side of the tree about 3 ft from the trunk. Consult a qualified engineer for proper irrigation design. Several companies supplying irrigation equipment provide free engineering services.
 1. Typically newly planted trees require about 3 to 6 gal/day during peak water use.
 2. Irrigation can be scheduled using the irrigation planner, https://www.mesonet.org/index.php/agriculture/category/horticulture/pecan/irrigation_planner.
 3. Irrigation can be schedule using Watermark Soil Moisture Sensors, <http://www.specmeters.com/weather-monitoring/sensors-and-accessories/sensors/soil-moisture-sensors/watermark-soil-moisture-sensors/>.
 4. Irrigation can be scheduled using your best guess. Peak water use of a mature orchard is 1 to 2 inches/week (about 100 gal/tree/day on trees planted 35 ft x 35 ft when occupying their allotted space).
 5. Discontinue irrigation on non-bearing trees by mid-September and on bearing trees at shuck split or early October.
- vi. Before budbreak apply herbicide with postemergence activity, such as glyphosate tank mixed with a herbicide with preemergence activity with a boom-type sprayer. The vegetation-free area should be at least 4 ft wide on each side of the tree. Below are acceptable preemergence herbicides for newly planted trees. Follow label directions and double check your herbicide sprayer calibration.

Prowl H2O
Prowl 3.3 EC
Surflan

- vii. Fertilize using the following guideline. Use 13-13-13 or similar product. Apply in band on one side of tree 18 to 36 inches from trunk 18 to 48 inches long, adjusting for tree size, i.e. further away from trunk and longer as trees grow. Do not clump fertilizer next to the trunk since damage will occur.

Tree age	2 wks before bud-break	2 wks after bud-break	4 wks after bud-break	6 wks after bud-break
1 st leaf	None	½ lb/tree	¼ lb/tree if trees are growing well	¼ lb/tree if trees are growing well
2 nd leaf	½ lb/tree	½ lb/tree	½ lb/tree	½ lb/tree
3 rd leaf	¾ lb/tree	½ lb/tree	½ lb/tree	½ lb/tree
4 th leaf	1 to 1½ lb/tree	¾ lb/tree	¾ lb/tree	¾ lb/tree

As long as trees are making new growth apply 2 lbs/100 gal ZnSO₄ (36% Zn) plus Lorsban at the label rate to the foliage at 2 week intervals (normally new growth ends about July). If tree borers are problematic apply Lorsban to the trunk using the rate for peach tree borer the first of May, June and July.

1. A fungicide can be tank mixed with the ZnSO₄ and Lorsban solution above if the cultivar is susceptible to scab. Follow the scab model for application times, https://www.mesonet.org/index.php/agriculture/category/horticulture/pecan/pecan_scab_advisor. Alternate at least two classes of fungicides within each season. Chemical classes are denoted by a number on the label, i.e. Abound is "GROUP 11 FUNGICIDE".
 - viii. Maintain vegetation-free in area surrounding tree with glyphosate as needed; normally 3 applications/year (before budbreak, June and early-September). Avoid foliage or trunk contact. Normally, the only still conditions in Oklahoma suitable for herbicide application to small trees are the first 2 or 3 hours after sunrise and the last 2 or 3 hours before dark.
2. Pruning and grafting
- a. Grafted vs seedling followed by grafting in field
 - i. Grafted trees more expensive, but no need to graft and may save 1 to 2 years to production. Prefer trees budded or grafted at least 18 inches above the soil line.
 - ii. Use rootstock adapted for Oklahoma – Giles, Peruche or Apache
 - iii. Essential to choose cultivars adapted for your area. Consult professionals for current recommendations. No cultivar is perfect and none are best for all situations.
 - b. Grafting season for 4-flap and bark graft is May.
 - i. Collect scion wood in December – February. Store in refrigerator in water tight plastic bags. Do not add water or moist paper to the bag. The wood contains sufficient moisture.
 - ii. Keep scion protected from direct sunlight while grafting in the field.
 - iii. Follow standard grafting procedures (see fact sheets <http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-1040/HLA-6204web2011.pdf>, <http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-1034/HLA-6230web2011.pdf> .
 - iv. A stake tied to the rootstock trunk will reduce the amount of grafts damaged by birds and allow the new shoot to be tied loosely to the stake. Tie ribbon works well <http://www.amleo.com/plant-tie-ribbon/p/VP-40XGP/> .
 - v. Maintain the graft as the tallest point on the tree throughout the growing season by shortening or removing limbs extending above the graft.
 - c. Growing season.
 - i. Maintain the graft as the tallest point on the tree. Remove or shorten competing branches.
 - ii. Eliminate
 1. "Crow's feet" (multiple branches from same point at top of graft).

2. Two branches from same node – remove upper branch.
 3. Low branches that could be damaged by herbicide.
 4. Branches in the grow tube.
- iii. Shorten branches taller than the central leader.
 - iv. Note: It is frequently better to shorten branches during the growing season and remove branches during dormancy.
- d. Dormant season
- i. Remove “crow’s feet”.
 - ii. Remove temporary branches (too low, too crowded) when they reach 1+ inch diameter at their base.
 - iii. Remove branches with narrow crotch angles, ideal angle is about 45°. On south side use a wider angle and on the north side a narrower angle. The wind tends to push south branches up and north branches down.
 - iv. Strive to “balance” tree, i.e. equally spaced branches around the tree about 2 feet apart. This is done over several years. Over pruning slows tree growth and causes new branches to be too upright.

MARKETING PECANS IN OKLAHOMA STARTS WITH YOU.

Becky Carroll

With all the excitement surrounding the upcoming Federal Marketing Order, pecan growers shouldn't rely on someone else to promote our wonderful product. Take the time to teach someone about pecans whenever given the opportunity. Most pecan producers I know are quick to share their experiences with others.

It always amazes me when I get a question like “I've had 300 pounds of pecans in my garage since 2010, do you think they will still taste good?” or a nutritionist tries to convince me that pecans are not heart healthy but walnuts and almonds fit the bill. Most people that know me realize that I'm pretty easy going, but when the nutritionist told me the untrue fact about pecans, I got red faced and argued. I don't know if she believed me but I continued to tell her the facts and encouraged her to look it up for herself. Going to big box stores and seeing dark brown pecan kernels being sold is discouraging as well. Consumers who only rely on purchasing pecans at these locations, really don't know what a fresh pecan can taste like when stored properly.

How can you make a difference? Can one person make a change? Philosopher William James said *'Act as if what you do makes a difference. It does'*. Find ways to share your pecan knowledge; visit with a civics group; set up a booth at a county fair or farm show; write an article for your local paper about how to properly store pecans; invite school groups to watch pecan harvest; invite neighbors to join the OPGA.

Kids and pecans are two things I really enjoy! After 10 years of being one of the Perkins 4-H leaders with an average of 120 kids in our club, I missed interacting with the 4-Hers. Over the years, I've had many groups come to the Cimarron Valley Research station to learn and tour the research plots, but one of the most fun times for these tours is during pecan harvest. Seeing the faces of the kids and adults as the trunk shaker does its job and moves the earth beneath them with all the pecans raining to the ground is pretty amazing to see. The kids love to see the harvester in action, blowing out the dirt and leaves and then they are amazed to see the clean ground and the full hopper.

This past year, a new project was added to the Oklahoma Fair Book – a pecan project display. 4-Hers have the opportunity to show what they've learned about pecans and present these display boards at their local county fairs. County first place winners will advance to the state fairs and then the state first place winners will be displayed at the OPGA annual meeting in June. Each of the state fairs at Oklahoma City and Tulsa boast over 1 million attendees. Now I know not all those people will visit the 4-H exhibits, but the opportunity of 2 million people exposed to more pecan promotion

at the fair each year is HUGE! This doesn't include those who view the exhibits at the county fairs. Not only is each child but their parents as well will be learning more about pecan production, storage, nutrition, or history and can teach and expose more people to the benefits of Oklahoma pecans. I'll be sure to update you on the winners from the state fairs in the next newsletter.

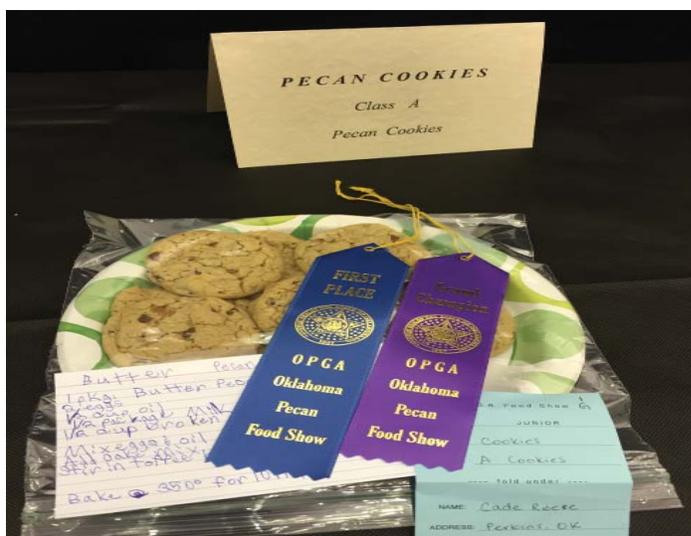
Get people excited about what you love! If you host a group in your orchard or teach a group about pecans, please send me a photo or share your story. I would love to hear how others are sharing their pecan story... becky.carroll@okstate.edu



At this year's 4-H Roundup, I offered a session on pecan grafting. I had 10 kids sign up. The Noble Foundation provided blocks to hold "trees" in place for grafting. The kids loved the lesson and not one cut themselves while using the knives. I was surprised that over half of them shared that their families were part of the pecan industry in some way. Only a couple had tried their hand at grafting though. Getting this next generation interested in pecan production will help provide the support for Oklahoma's pecan industry in the future.



I hosted the Perkins 4-H club at the Cimarron Valley Research station during harvest and then again at grafting time. The kids loved the harvest process and were very excited about learning how to grow trees from seed and how to graft. Many of them are eager to grow their own pecan trees so that they can begin to collect their own pecans.



Several of the Perkins 4-H kids sent pecan baked goods with me to the OPGA Food Show. They also baked pecan items for their county food show that was held in June.

EL NIÑO STILL STRENGTHENING – INCREASED SCAB RISK

Michael Smith, Horticulture and Landscape Architecture

El Niño is strengthening and has an 80% chance of lasting through spring according to the National Oceanic and Atmospheric Administration (NOAA). El Niño is a complex weather pattern resulting from variations in ocean temperature. El Niño typically brings cooler and wetter weather over the southern United States from California to the Carolinas. The greatest impacts are frequently in the fall and winter. This may mean several days when pecan harvest is delayed by wet weather. There may also be more frequent and abundant snow fall this winter.

A welcome change expected with El Niño is copious rainfall in the spring. Oklahoma has suffered through several years of drought, but in 2014 and especially 2015 rainfall was favorable. The August 18, 2015 Oklahoma drought map shows only small areas with abnormally dry to severe drought conditions. This is a welcome change from the massive expanses with extreme to exceptional drought.

A negative aspect of greater rainfall is increased disease pressure. Two diseases can become troublesome – scab and powdery mildew. Pecan scab (*Fig. 1*) requires free moisture to germinate and infect a leaf, stem or shuck. Powdery mildew (*Fig. 2*) does not require free moisture. It becomes problematic when humidity is high. Typically, powdery mildew infections are encountered when southern winds bring moisture laden air, rainfall has been abundant and wind movement within the orchard is constrained. Powdery mildew infections typically occur during the latter part of summer reducing nut size and quality. Fungicides can be selected that control both scab and powdery mildew during likely infection periods.

George Driver and Sharon von Broembsen developed a model to predict scab infection severity that is available on the web http://www.mesonet.org/index.php/agriculture/category/horticulture/pecan/pecan_scab_advisor. It includes an advisory for fungicide application based on cultivar susceptibility and weather conditions. This model should be used as a tool to augment decisions rather than an absolute decision maker. The model uses Mesonet towers to gather weather information for predictions that may not adequately represent conditions at your orchard. In addition, the model only accumulates “scab hours” when the temperature is above 70 °F. At 69, 68, 67, etc. scab infections may occur, just not as rapidly as at warmer temperature. Therefore, a producer should be aware of the model limitations and understand the conditions necessary for infection to take place.

Scab spores require free surface water to germinate and infect tissue. Once an infection has happened a fungicide cannot cure the infection. *Fungicides must be applied before the rainfall event rather than after to be effective.* Normally a drying time of at least 3 hours is needed for the fungicide to be effective and one to three days application before rainfall is preferred. Fungicides are considered effective for 14 days, except under the most severe conditions.

Early season scab infections are the most damaging. These infections have the longest opportunity to grow plus they produce spores for new infections throughout the growing season. Fungicides applied after the infection has happened does not affect its growth rate. Aggressive scab control early is the key to maintaining clean foliage and nuts throughout the growing season.

Young expanding tissue is highly susceptible to scab infections, but mature tissue becomes virtually immune to scab infection. Once leaves are fully expanded new infections are unlikely, unless a new growth flush ensues. Nuts enlarge throughout the growing season until the shells harden. They are highly susceptible to scab infections, especially during rapid sizing in late July through mid- to late-August. At shell hardening new scab infections are not detrimental since there is insufficient developmental time for scab to damage the shuck vascular system. Fungicide application is not recommended after shell hardening.

Managing scab fungicide resistance is essential. Fungicide resistance can develop in a single season. Each fungicide carries a group code. At least two fungicides with different group codes should be used each season. Different group codes should be used the next season for optimal resistance management. Simply using fungicides with different brand names is not sufficient to manage resistance since they may be related chemistries, in the same group with similar modes of action.



Fig. 1. Pecan scab on shucks of 'Pawnee' nuts. Scab decreases nut size and quality, interferes with shuck opening and increases nut drop.



Fig. 2. Powdery mildew on shuck of pecan.

FALL WEBWORM IN PECAN

Jackie Lee, Fruit and Pecan Extension Entomologist

Fall webworm occurs throughout the US and it attacks many types of deciduous hardwood trees and a few evergreen species. In the south, pecan, hickories, and sweetgums are the preferred hosts. The adult moth is a stout bodied white insect with brownish to black spots on the wings (*Fig. 1*). The larvae (caterpillars) have orange heads and tubercles (bumps) where silky white hairs are found, giving the caterpillar a fuzzy appearance (*Fig. 2*). Full grown larvae are around 1 inch long.

Lifecycle

There are three to four generations in Oklahoma each year. The first begins in April and the last in late August, early September. Females lay their eggs on the underside of leaves in masses (*Fig. 3*). Larvae hatch in about a week and feed in groups. As they feed and grow, they construct a large, loose, web which covers the branch and leaves they are feeding on (*Fig. 4*). As the larvae grow so does the web enveloping more leaves for food. The larvae of the earlier generations leave the web and pupate underneath the bark of the trees. The last generation larvae leave the web and drop to the ground to overwinter where they pupate in leaf litter and soil.

Damage

The webs are an eyesore and detract from the aesthetics of an orchard or landscape. Defoliation of the leaves by the webworm can affect the current year's nut quality, and if it is extensive can reduce crop yields the following season. Younger trees are affected more than older trees by this damage. The caterpillars only feed on leaves and do not directly damage the nuts. A few webs will not cause enough defoliation to impact yield or trees. Some years Oklahoma does experience fall webworm in large numbers. The last generation in the fall is generally the only one that causes economic damage.

Control

Webworm is rarely a problem in orchards that manage for other pests. Sprays routinely applied for pecan nut casebearer and hickory shuckworm control the webworm also. In commercial orchards if webs are common and the potential defoliation appears unacceptable, especially if young trees are affected, spray with a product that targets caterpillars.

lar pests: *Bacillus thuringiensis*, methoxyfenozide, chlorpyrifos, or carbaryl. Apply the insecticide as a spot treatment to the web and foliage surrounding the web. The web must be soaked by the insecticide to work. Follow all instructions on insecticide label.

If there are only a few webs present in young trees, these can be pruned out easily. It is much easier to control webworm when the larvae and webs are small; scout orchards and groves regularly. For more information on webworm and other pecan pests go to <http://okpecans.okstate.edu/> or <http://pecan.ipmpipe.org/>.



Fig. 1. Adult fall webworm.
Photo courtesy Gerald J. Lenhard, Louisiana State University, Bugwood.org



Fig. 2. Fall webworm larvae.
Photo courtesy Lacy L. Hyché, Auburn University, Bugwood.org



Fig. 3. Fall webworm egg mass.
Photo courtesy Pennsylvania Department of Conservation and Natural Resources - Forestry Archive, Bugwood.org



Fig. 4. Fall webworm web.
Photo courtesy John A. Weidhass, Virginia Polytechnic Institute and State University, Bugwood.org

NEVER ENDING LEARNING CURVE

Walt Thrun

Excessive rainfall at our location since April will have a profoundly negative affect on this year's production. Rainfall from April through August was 33.35 inches which exceeded the average 31.27 inches total annual rainfall for the past five years. As reported in the previous newsletter, rainfall for May was 13.75 inches.

According to pollination charts, pistil receptivity for 'Maramec' typically occurs during the last week in April and the first week in May; therefore, we optimistically thought pollination was successful. In fact, it appeared that we had a relatively good nut set.

The excessive spring rain resulted in soft ground making it nearly impossible to access the orchard with spraying equipment. Consequently, even though there was significant leaf scab, there was no defoliation and the nutlets appeared to be nearly scab free. However, as a result of the leaf scab, we anticipated that the photosynthetic process would be adversely affected, and so it was.

Then came innumerable new leaf shoots from buds within a fraction of an inch of the nutlets. Now the trees were really stressed and confused. The nutlets for the most part stopped growing and scab expanded on the shucks. It was unstoppable even with an aggressive spray program. It was downhill from there. The combined stress factors caused a very heavy nut drop in the first week of August. The 'Maramec' by far suffered the most loss. 'Pawnee,' 'Mohawk,' and 'Kanza' were minimally affected. We anticipate less than 10% of a 'normal' crop. Now we have to wait and see how much of the limited crop will be stick-tights or wafers. The small crop, however, will be sufficient for the veterans and the second grade of the Christian school to enjoy their annual pecan pick.

So, what did we learn this year and what future actions will we take?

- "Maramec" is labeled as "moderately" susceptible to scab. For our location "Maramec" will be considered to be "extremely" susceptible.
- Fungicide applications will be combined with zinc applications starting at bud break next spring. This tactic will focus on the preventive aspect of scab versus trying to control it after it appears.
- Seeing that much of the scab problem came from the ground up, i.e., dew from grass and legumes, we will be more aware of the need for spring mowing and early establishment of herbicide circles.
- Insure that there are no branches that hang low enough to touch the cab of the tractor.
- Continue to remove overcrowded trees with the goal that no branches of mature trees touch the branches of other trees to allow for optimum spray coverage.
- Seeing that "Pawnee" trees have better branching habits and are more productive than "Maramec" we will be regrafting all young "Maramec" trees with trunk diameter of 3 inches or less with "Pawnee". While "Maramec" is a wonderful nut, they are harder to care for than "Pawnee".
- Be more aware of tractor speed when spraying and be willing to slow down to insure total canopy coverage.
- Unless chemical formulations for new generic fungicides are the same as established products, we'll adhere to Oklahoma Cooperative Extension Service report CR-6209.

Our orchard is relatively small. We have approximately 300 mature (30-35 year old) "Maramec" trees; about 150 younger (5-15 year old) "Maramec" trees; approximately 300 young "Pawnee" trees; and about 50 "Kanza" and/or "Mohawk" pollinators. The orchard is just about the right size for a one-man operation.

This past summer's leaf analysis indicated that all elements are in line so we'll have a good starting point for 2016. The more we learn and experience now, the shorter the learning curve will be for the next generation.

Closing thought: There must be a better way to control weevils than to starve them to death.

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