



Current Report

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Commercial Pecan Insect and Disease Control – 2013

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Pecans are native to Oklahoma. Records reveal that Native Americans were the first to know of pecan trees and respect the value of this nut crop.

Today, more and more pecan growers are realizing that a full management cultural program must be employed if consistent, high quality, profitable pecan crops are to be expected. In the modern pecan tree management program, attention is given to (1) annual fertilization, (2) reduction of weed and grass competition plus irrigation where practical, (3) relieving over-crowding of trees, and (4) controlling insects and diseases.

The influx of insects and incidences of diseases in recent years has made the application of sprays to control these pests a very important factor in pecan production. In many seasons, insect and disease control will be the difference between a good pecan crop and no crop.

Even with the best chemicals and the most modern equipment, insect and disease control is not an easy job. Approximately seven months are required for growth and development of a pecan crop. At some time during this period, weather conditions are likely to be favorable for numerous pests.

To apply an effective pesticide spray to pecan trees, follow these rules:

- Use an effective chemical(s)
- At the proper rate (concentration)
- Apply thoroughly
- At the proper time.

When one or more of these four rules is not carried out properly, the spray effectiveness is reduced or could totally fail.

The amount of spray applied to an individual tree or acre of trees may vary greatly depending on the type of equipment used and the manner in which it is operated. Most pecan growers in Oklahoma use ground machines calibrated to deliver 100 gallons of spray per acre. Each year, sprayer output should be calibrated and recorded with notes on pressure settings, tractor speed, and rpm's.

Regardless of the gallonage of spray applied, the amount of chemical (pesticide) applied to an acre should remain the same.

Suggested chemical rates in this publication are given as rate/acre.

Variable tree size and spacing complicate estimates of quantity of spray solution needed. These decisions must be made on an individual basis. An acre equivalent of pecan trees is approximately 30 square feet of cross sectional trunk area. This figure is derived by measuring tree trunks at 4.5 feet above ground, calculating and totaling the area. When this total reaches 30 the number of trees is one acre equivalent.

Number of trees per acre equivalent can be estimated from the following table:

<i>Tree diameter</i>	<i>Trees per acre equivalent</i>
13"	30
19"	15
23"	10

For additional information on calculating cross sectional trunk area consult OSU Fact Sheet EPP-6208.

If the label requires 1 pound of chemical per acre and if the average tree size is 23 inches in diameter then 10 trees should receive 1 pound of chemical. The chemical should be dissolved in adequate water to wet the entire tree canopy. The amount of water required can vary depending on the amount of tree canopy and other conditions. Native trees that have been crowded for example, may not have canopy normally associated with the trunk size. In those cases grower judgment must be utilized to determine if the volume of water utilized is adequate to cover the leaves. It is better to apply too much water than an inadequate amount.

Adequate spray solution must be applied to insure coverage of the entire tree canopy. Larger trees require more solution. Manufacturers' recommendations for gallons vary from 100 to 600 gallons per acre. Refer to the chemical label for any manufacturers' recommendations on gallons per acre to apply. This table is a guideline and not a legal document. Changes in registration status may occur. Consult the pesticide label before application. The label is the law.

Pest/time To Spray

Insecticide

<i>Pest/time To Spray</i>	<i>Insecticide (MOA Group)** and Formulation¹</i>	<i>Amount of Material Needed² Per Acre</i>	<i>Comments</i>
DORMANT SEASON SCALE INSECTS(Obscure scale, San Jose Scale, etc) and MITE CONTROL	Dormant oils Dormant oil 435 Superior Spray oil N.W Purespray green	4-10 gals (3 gal/100 gal water) 3-3.5 gals/100 gal of water 2-3 gals/100 gal of water	All dormant oils should be applied in February or March, well before budbreak. Do not apply late, as injury will occur. Use paraffinic oils with unsulfurated residues (UR) greater than 92%. Thorough coverage is essential since these materials act to entrap or suffocate pests. During and after application, temperatures should be between 50-70° F.
PHYLLOXERA (GALLS) Apply from bud break to when new shoot growth is 2 inches long. Controls are not effective when typical symptoms appear (July).	Asana XL ^r (3) Centric 40 WG (4A) Cobalt Advanced ^r (1B+3) Lorsban 4E ^r (1B) Malathion 57 EC (1B) Movento (23) Pasada 1.6F (4A) Provado 1.6F (4A) Sevin80S(1A) Sevin XLR+ (1A) Silencer ^r (3) Warrior (3)	4.8-14.5 oz 2-2.5 oz 22-57 oz 2.0-4.0 pts 1.2 pts 6-9 fl oz 3.5-7.0 oz 3.5-7.0 oz 2.5-6.25 lb 2-5 qts 2.56-5.12 oz 2.56 – 5.12 oz	Make one or two applications. For best results with Lorsban, apply 1pt/100 gal at budbreak and the same 7-10 days later. When applying all sprays, thoroughly wet the foliage. Do not apply more than 28 oz of Pasada or Provado per acre per year. Do not apply more than 0.96 pints per acre per year post bloom (Proaxis or Warrior).
PECAN NUT CASEBEARER ³ First Generation May 20 to June 10 when eggs appear (when tips of nuts turn brown). Second Generation July 15-25.	Altacor (28) Ammo 2.5 EC ^r (3) Asana XL ^r (3) Battalion 0.2 EC ^r (3) BaythroidXL ^r (3) Cobalt Advanced ^r (1B+3) Heror (3) Javelin WG (11B2) Malathion 57 EC (1B) Confirm 2F (18) Imidan 70WSB ⁴ (1B) Proaxis ^r (3) Spintor 2 SC (5) Lorsban 4E ^r (1B) Sevin XLR+ (1A) Silencer ^r (3) Intrepid 2F (18) Dipel ES (11B2) Mustang-MAX ^r (3) Warrior (3) Warrior II ^r (3)	2-4.5 oz 3-5 oz 4.8-14.5 oz 12.8 – 21.1 oz 2.0-2.4 oz 16-57 oz 10.3 oz .25-4.0 lb 1.2 pts 8.0-16.0 oz 2.0-3.125 lbs 2.56-5.12 oz 4-10 oz 1.5-4 pts 2-5 qts 2.56-5.12 oz 4-8 oz 1-4 pts 3.2-4.0 oz 2.56-5.12 oz 1.28-2.56 oz	1 or 2 applications. If second application is needed, apply 7 to 10 days after the first. With adequate monitoring for casebearer eggs, one application of the biological control agent, <i>Bacillus thuringiensis</i> (found in Javelin and Dipel) or the insect growth regulator, (found in Confirm or Intrepid) can provide safe effective control while preserving beneficial organisms. Under high insect pressure use 2.0-2.5 pts per 100-300 GPA (Lorsban)
HICKORY SHUCKWORM July 1 - July 7 A repeat application two weeks later may be needed.	Altacor (28) Ammo 2.5 EC ^r (3) Asana XL ^r (3) Battalion 0.2 EC ^r (3) BaythroidXL ^r (3) Cobalt Advanced ^r (1B+3) Confirm 2F (18) Heror (3) Mustang-MAX ^r (3) Sevin 80S (1A) Sevin XLR+ (1A) Silencer ^r (3) Intrepid 2F (18) Lorsban 4E ^r (1B) Spintor 2SC (5) Warrior (3) Warrior II ^r (3) Imidan 70WSB ⁴ (1B) Proaxis ^r (3)	2-4.5 oz 3-5 oz 4.8-14.5 oz 12.8 – 21.1 oz 2.4-2.8 oz 22-57 oz 8.0-16.0 oz 10.3 oz 3.2-4.0 oz 2.5-6.25 lbs 2-5 qts 2.56-5.12 oz 4-8 oz 2-4 pts 4-10 oz 2.56-5.12 oz 1.28-2.56 oz 2.0-3.125 lbs 2.56-5.12 oz	Shuckworm can continue to be a problem through shell hardening and may not peak until half-shell hardening (about the time of weevil emergence).

<i>Pest/time To Spray</i>	<i>Insecticide (MOA Group)** and Formulation¹</i>	<i>Amount of Material Needed² Per Acre</i>	<i>Comments</i>
PECAN WEEVIL ⁵ Late July, early August or when weevils appear, but before shuck split.	Ammo 2.5 EC ^r (3) BaythroidXL ^r (3) Battalion 0.2 EC ^r (3) Hero ^r (3) Imidan 70WSB4 (1B) Sevin 80S (1A) Sevin XLR+ (1A) Silencer ^r (3) Mustang-MAX ^r (3) Asana XL ^r (3) Warrior (3) Warrior II ^r (3) Proaxis ^r (3)	3-5 oz 2.0-2.4 oz 12.8 – 21.1 oz 10.3 oz 2.0-3.125 lbs 2.5-6.25 lbs 2-5 qts 2.56-5.12 oz 3.2-4.0 oz 4.8-14.5 oz 2.56-5.12 oz 1.28-2.56 oz 2.56-5.12 oz	The majority of weevils emerge immediately after a rain (1"-2") and populations can continue late July to mid-Oct. depending on rainfall and/ emerging from or soil type. Control with Imidan may not be adequate when heavy populations are present. Pecans are most susceptible to injury from weevils. During the dough stage till shuck split.
APHIDS When they appear	Admire PRO (4A) Ammo 2.5 EC ^r (3) Asana XL ^r (3) Battalion 0.2 EC ^r (3) Centric 40 WG (4A) Closer SC (4B) Cobalt Advanced ^r (1B+3) Dimethoate 4E (1B) Heror (3) Mustang-MAX ^r (3) Provado 1.6F (4A) Proaxisr (3) Pasada 1.6F (4A) Provado 1.6F (4A) Lorsban 4E ⁶ (1B) Malathion 57EC (1B) Warrior II ^r (3) Silencer ^r (3)	7.0-14.0 oz 3-5 oz 4.8-14.5 oz 12.8 – 21.1 oz 2-2.5 oz 1.5-2.75 oz 22-57 oz 0.66 pt 10.3 oz 3.2-4.0 oz 3.5-8.0 oz 2.56-5.12 oz 3.5-8.0 oz 8 oz 1-4 pts 1-2 pts 1.28-2.5 oz 2.56-5.12 oz	Chemigation into root zone or subsurface side-dress shanked into root zone near emitter line. (Admire only) Higher rate for Black Pecan Aphid (Centric & Closer) Do not use less than 22 oz of Cobalt Advanced for black aphid. For yellow aphids. Do not make a foliar application of Provado after a soil application of Admire in the same year. Highest rate (8 oz) for black aphids only. Highest rate (8 oz) for black aphids only. For black aphids. Avoid controlling sub-economic infestations of aphids early in the season. This destroys beneficials.
WEBWORM OR WALNUT DATANA When caterpillars appear feeding on leaves (June to late August)	Cobalt Advanced r(1B+3) Bacillus thuringiensis products: Dipel ES (11B2) Javelin WG (11B2) Lorsban 4Er6 (1B) Spintor 2 SC (5) Confirm 2F (18) Intrepid 2F (18) Sevin 80S (1A) Sevin XLR+ (1A)	16-57 oz 1.0-4.0pts 0.25-4.0oz 1.5-4oz 4-10 oz 8.0-16.0 oz 4-8 oz 2.5-6.25 lbs 2-5 qts	1 or 2 applications. 1 or 2 applications. Follow label directions.
TWIG GIRDLER When damage first occurs -late August or early Sept.	Sevin 80S (1A) Sevin XLR+ (1A)	2.5-6.25 lbs 2-5 qts	Dedicated sanitation of orchard floor (sticks) can dramatically reduce twig girdler and pruner populations.

<i>Pest/time To Spray</i>	<i>Insecticide (MOA Group)** and Formulation¹</i>	<i>Amount of Material Needed² Per Acre</i>	<i>Comments</i>
STINK BUGS and LEAF-FOOTED BUG (True Bugs)	Battalion 0.2 EC ^r (3) BaythroidXL ^r (3) Cobalt Advanced ^r (1B+3) Imidan 70WSB4 (1B) Mustang-MAX ^r (3) Proaxisr (3) Silencer ^r (3) Warrior 1EC ^r (3) Warrior II ^r (3)	12.8 – 21.1 oz 2.0-2.4 oz 22-57 oz 2.0-3.125 lb 3.2-4.0 oz 2.56-5.12 oz 2.56-5.12 oz 2.56-5.12 oz 1.28-2.56 oz	In areas where legume crops are grown near pecan, true bug management can involve use of trap crops to draw these insects into small plantings of row crops (e.g. pearl millet) where control can be implemented on a much smaller scale. Stink bug only.
MITES During hot, dry periods—late in season.	Acramite 4SC (25) Dimethoate 4E (1B) Onager 1EC (10A) Malathion 57EC (1B) Vendex 4L Vendex 50WP	12-24 oz 0.66 pts 12-24 oz 1-2pts 1-2.5 pts 1-2.5 lb	1 application per year. 1 application per year. Vendex is very effective against mites. Use higher rates on larger trees.

SPRAY SCHEDULE FOR VARIETIES SUSCEPTIBLE TO SCAB

<i>APPLICATION AND TIMING *</i>	<i>COMMON NAME (Fungicide MOA Group**)</i>	<i>FORMULATION: RATE/ACRE</i>	<i>PRE-HARVEST INTERVAL</i>	<i>COMMENTS</i>
PRE-POLLINATION	Azoxystrobin (11)	Abound: 6.2 – 12.3 oz	45 days	Do not apply more than two (2) consecutive applications of QoI (strobilurin) fungicides without alternating to a non-QoI labeled fungicide. Do not make more than three (3) applications of QoI fungicides in one season.
	Trifloxystrobin (11)	Gem 500 SC: 2.9 – 3.8 oz	60 days	Same as previous.
	Pyraclostrobin (11)	Headline: 6 -7 oz	14 days	Same as previous.
	Pyraclostrobin (11) + Boscalid (7)	Pristine: 10.5 – 14.5 oz	14 days	Same as previous.
	Kresoxim-methyl (11)	Sovran 2.4 – 3.2 oz	45 days	Same as previous.
	Propiconazole (3)	Bumper 41.8 EC: 4.0 oz Propimax EC: 4.0 oz	Bumper 41.8EC and Propimax EC: 21 days Tilt: 4.0 – 8.0oz (DO NOT apply after shuck split) Tilt: 14 days (Do not apply after shuck split)	DO NOT apply more than four (4) applications of Propimax EC in one growing season. Do not graze livestock in treated areas or use cover crops for feed.
	Propiconazole (3) + Triphenyltin hydroxide (30)	Orbit 45WP Agpak/ Super Tin 80WP Agpak: 4.0 oz + 3.75 oz	30 days	Also has activity on Powdery mildew. Do not exceed 6 applications in areas WEST of Interstate 35, or 9 applications for areas EAST of Interstate 35 in one season. Do not graze livestock in treated areas or use cover crops for feed.
	Propiconazole (3) Azoxystrobin (11)	Quilt: 14.0 – 27.5 oz	45 days (DO NOT apply after shuck split)	Do not apply more than two (2) consecutive applications of QoI (strobilurin) fungicides without alternating to a non-QoI labeled fungicide. Do not make more than three (3) applications of QoI fungicides in one season. Do not graze livestock in treated areas or use cover crops for feed.
	Propiconazole (3) + Trifloxystrobin (11)	Stratego: 10.0 oz	30 days (DO NOT apply after shuck split)	Do not apply more than two (2) consecutive applications of QoI (strobilurin) fungicides without alternating to a non-QoI labeled fungicide. Do not make more than three (3) applications of QoI fungicides in one season. Grazing restrictions may apply.
	Fenbuconazole (3)	Enable: 8.0 oz	28 days (DO NOT apply after shuck split)	Also has activity on Powdery mildew. Do not apply more than 1.5 qt per acre per season. Do not graze livestock in treated areas or use cover crops for feed.
	Fenbuconazole (3) + Triphenyltin hydroxide (30)	Enable 75WSP + Agritnr: 1.31 oz/3.75 oz	30 days (DO NOT apply after shuck split)	Also has activity on Powdery mildew. Do not exceed eight (8) applications during one season. Do not graze livestock in treated areas or use cover crops for feed.
	Tebuconazole (3)	Folicur 3.6F: 4.0-8.0oz	DO NOT apply after shuck split	Use lower rates of fungicides preventatively and on smaller trees. For larger trees and trees highly susceptible to scab use higher rates. Do not use surfactant if tank mixed with triphenyltin hydroxides. Do not apply more than 32 fl. oz per acre per season. Do not graze livestock in treated areas or use cover crops for feed.

SPRAY SCHEDULE FOR VARIETIES SUSCEPTIBLE TO SCAB (con'td)

APPLICATION AND TIMING *	COMMON NAME (Fungicide MOA Group**)	FORMULATION: RATE/ACRE	PRE-HARVEST INTERVAL	COMMENTS
	Thiophanate-methyl (1)7	Topsin M WSB: 1.0 lb Topsin M 70 WP: 0.5 – 1.0 lb	DO NOT apply after shuck split	Follow Resistance Management Guidelines. Do not apply more than 3 lbs. per acre per season.
	Ziram (M)	Ziram 76 DF: 6.0 – 8.0 lb Ziram Granuflo: 6.0 – 8.0 lb	55 days	Do not graze livestock in treated areas or use cover crops for feed.
COVER SPRAYS	Same as Pre-pollination except:			
	Propiconazole (3)	Bumper 41.8 EC: 6.0 oz Propimax EC: 6.0 oz Tilt: 6.0 – 8.0 oz	Bumper 41.8EC and Propimax EC: 21 days (DO NOT apply after shuck split) Tilt: 14 days (Do not apply after shuck split)	Do not graze livestock in treated areas or use cover crops for feed. DO NOT apply more than four (4) applications of Propimax EC in one growing season.
	Kresoxim-methyl (11)	Sovran 3.2 – 4.8 oz	45 days	Do not apply more than two (2) consecutive applications of QoI (strobilurin) fungicides without alternating to a non-QoI labeled fungicide. Do not make more than three (3) applications of QoI fungicides in one season.

* All Fungicides should be sprayed according to the schedule indicated by the label and/or by the aid of the OSU Pecan Scab Model.

** Fungicide MOA groups begin on page 56.

r Restricted Use Pesticide

- 1 See table at end for pre-harvest intervals and grazing restrictions.
- 2 Gal = gallon; lb = pound; pt = pint; qt = qt; oz = ounces.
- 3 The insecticides listed for casebearer control may be safely combined with some of the fungicides for scab control. Check label instructions for each product prior to use.
- 4 Imidan insecticidal activity is reduced when spray solution has a pH of 7 or higher. The pH of the spray solution can be corrected by adding a suitable buffering or acidifying agent (e.g., AG44M). The pH should be adjusted to 5.0 if possible, to increase residual activity.
- 5 Pecan Weevil: This insect is a serious problem in most sections of the state. The damage may be observed in two ways: (1) shedding of the immature pecans because of the feeding punctures of the adult weevils; and/or (2) mature pecans with a hole cut into the side. The presence of adult weevils may be found by shaking or jarring the branches of the pecan trees to dislodge the weevil or by spraying a tree or a portion of a tree which has been known to be infested with weevils. A sheet or tarp placed on the ground under the tree will collect weevils when they are dislodged. The most dependable method of monitoring pecan weevil populations is to use wire cone emergence traps, pyramid traps or circle traps. Their use and utility are in Fact Sheet 7190, Monitoring Adult Weevil Populations in Pecan and Fruit Trees in Oklahoma. A good rain following a dry spell in August or September usually results in the emergence of large numbers of weevils from soil, and a spray should be made 2-3 days after the rain.
- 6 When Lorsban or Guthion are used for aphid control they should be combined with a synthetic pyrethroid (e.g., Asana XL, Ammo or Centric) for best results.
- 7 Widespread resistance to benzimidazole throughout the state restricts the use of fungicides such as Topsin M to new orchards. These fungicides must be alternated with other kinds of fungicides to help prevent development of resistance.

Recommended Intervals Between Last Application, Harvest and Other Restrictions

<i>Chemical</i>	<i>Interval Between Last Application and Harvest and Other Restrictions</i>
Acramite	Only one application per year. 14 day pre-harvest interval.
Admire	Do not apply more than 32.0 oz/acre/season. Do not apply after July 15.
Asana ^r , Ammor	21 days. Do not graze livestock on treated orchard floors or cut treated cover crops for feed.
Altacor	10 days to harvest. Do not apply more than 9 oz per acre per year. Do not apply in less than 30 gal per acre.
Battalion ^r	Do not apply more than 105.6 ounces of Battalion per acre per season. Allow 7 days between applications. Do not apply within 21 days of harvest.
BaythroidXL ^r	14 days to harvest. Do not exceed 2.8 ounces per acre per season
Centric	14 days to harvest. Do not use less than 50 gallons of mixed spray material per acre when applied by ground equipment. Do not exceed 5.0 oz/acre per season.
Closer SC	7 days to harvest. Do not apply more than 17 fl oz per acre per year. Do not make more than 2 consecutive applications.
Cobalt Advanced ^r	28 days to harvest. Do not graze in treated areas.
Confirm	14 days to harvest. Do not graze livestock in treated areas or feed cover crops grown in the treated area to livestock.
Dimethoate	Do not apply within 21 days of harvest. Do not graze livestock in treated areas.
Dipel	No grazing restrictions. 0-day waiting period.
Heror	Do not apply within 21 days to harvest. Do not graze livestock on cover crops in treated areas.
Imidan	Do not apply within 14 days of harvest. Do not graze livestock on cover crops in treated areas. Do not enter treated areas for 3 days after application.
Intrepid	14 days. Do not apply more than 16 oz/acre/application or 64 oz per acre/season.
Lorsban ^r	Do not apply more than 4 qts/A (4lbs A.I./A) /season and do not graze livestock in treated areas. Do not apply within 28 days of harvest. Allow for a buffer zone when spraying near water using the following guidelines: orchard air-blast sprayer allow 50-foot buffer; Aerial application allow 150-foot buffer.
Malathion, Sevin, Javelin	No grazing restrictions. Sevin has a 14-day waiting period before harvest. Malathion 7 day PHI. Javelin 4 hour re-entry interval.
Mustang-MAX ^r	Do not apply within 7 days of harvest. Do not graze livestock on cover crops in treated areas. Other restrictions relating to use around bodies of water, may be found on the label.
Onager	Do not graze or feed livestock on cover crops growing in treated area. Do not apply within 7 days of harvest.
Pasada	7 day pre-harvest interval. Do not graze in treated areas.
Proaxis ^r	Do not apply within 14 days of harvest
Provado	Do not graze in treated areas. 0 days waiting between application and harvest.
Silencer ^r	Do not apply within 14 days of harvest.
Spintor	1 day. Do not apply treatments less than 7 days apart. Do not apply more than 29 total ounces per acre/crop/year. Product is toxic to bees and aquatic invertebrates.
Thiodan	Do not graze cattle in treated groves and do not apply after shuck split.
Warrior ^r	14 days. Do not apply more than 1.28 pts/A/year.

^r Restricted Use Pesticide.

The Oklahoma Cooperative Extension Service

Bringing the University to You!

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
 - It is administered by the land-grant university as designated by the state legislature through an Extension director.
 - Extension programs are nonpolitical, objective, and research-based information.
 - It provides practical, problem-oriented education
- for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
 - It utilizes research from university, government, and other sources to help people make their own decisions.
 - More than a million volunteers help multiply the impact of the Extension professional staff.
 - It dispenses no funds to the public.
 - It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
 - Local programs are developed and carried out in full recognition of national problems and goals.
 - The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
 - Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

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