



Current Report

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Commercial Pecan Insect and Disease Control – 2008

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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/are 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:

Tree diameter	Trees per acre equivalent
13"	30
19"	15
23"	10

For additional information on calculating cross sectional trunk area consult OSU Fact Sheet HLA-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 ensure 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.

COMMERCIAL PECAN INSECT CONTROL

<i>Pest/time To Spray</i>	<i>Insecticide (MOA Group)* and Formulation¹</i>	<i>Amount of Material Needed² Per Acre</i>	<i>Comments</i>
PHYLLIXERA (GALLS) Apply from bud break to when new shoot growth is 2 inches long. Controls are <u>not</u> effective when typical symptoms appear (July).	Asana XL ^r (3) Centric 40 WG (4A) Cobalt ^r (1B+3) Hero ^r (3) Lorsban 4E ^r (1B) Malathion 57 EC (1B) Mustang-Max ^r (3) Pasada 1.6F (4A) Provado 1.6F (4A) Proaxis ^r (3) Warrior 1EC ^r (3)	4.8-14.5 oz 2-2.5 oz 26-57 oz 10.3 oz 2.0-4.0 pts 1.2 pts 3.2-4.0 oz 3.5-7.0 oz 3.5-7.0 oz 2.56-5.12 oz 2.56-5.12 oz	Make one or two applications. For best results with Lorsban, apply 1 pt/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 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 CASEBEARER³ First Generation May 20 to June 10 when eggs appear (when tips of nuts turn brown). Second Generation July 15-25.	Ammo 2.5 EC ^r (3) Asana XL ^r (3) Battalion 0.2 EC ^r (3) Cobalt ^r (1B+3) Hero ^r (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) Pennncap-M ^r (1B) Intrepid 2F (18) Dipel ES (11B2) Mustang-MAX ^r (3) Warrior 1 EC ^r (3)	3-5 oz 4.8-14.5 oz 12.8-21.1 oz 19-57 oz 10.3 oz 0.25-4.0 lb 1.2 pts 8.0-16.0 oz 1-3.125 lbs 2.56-5.12 oz 4-10 oz 1.5-4 pts 3-8 pts 4-8 oz 1-4 pts 2.56-4.0 oz 2.56-5.12 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.	Ammo 2.5 EC ^r (3) Asana XL ^r (3) Battalion 0.2 EC ^r (3) Cobalt ^r (1B+3) Confirm 2F (18) Hero ^r (3) Mustang-MAX ^r (3) Sevin 80S (1A) Intrepid 2F (18) Spintor 2SC (5) Warrior 1EC (3) Pennncap-M 2E (1B) Imidan 70WSB ⁴ (1B) Proaxis ^r (3)	3-5 oz 4.8-14.5 oz 12.8-21.1 oz 26-57 oz 8.0-16.0 oz 10.3 oz 3.2-4.0 oz 2.5-6.25 lbs 4-8 oz 4-10 oz 2.56-5.12 oz 3-8 pts 1-3.125 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).
PECAN WEEVIL⁵ Late July, early August or when weevils appear, but before shuck split.	Ammo 2.5 EC ^r (3) Battalion 0.2 EC ^r (3) Hero ^r (3) Imidan 70WSB ⁴ (1B) Sevin 80S (1A) Mustang-MAX ^r (3) Asana XL ^r (3) Pennncap-M 2E (1B) Warrior 1EC ^r (3) Proaxis ^r (3)	3-5 oz 12.8-21.1 oz 10.3 oz 1-3.125 lbs 2.5-6.25 lbs 2.56-4.0 oz 4.8-14.5 oz 3-8 pts 2.56-5.12 oz 2.56-5.12 oz	The majority of weevils emerge immediately after a heavy rain (1" to 2") and populations can continue emerging from late July to mid-Oct. depending on rainfall and/or soil type. Pecans are most susceptible to injury from weevils during the dough stage till shuck split.
APHIDS When they appear.	Admire 2F (4A) Ammo 2.5 EC ^r (3) Asana XL ^r (3) Battalion 0.2 EC ^r (3) Centric 40 WG (4A) Cobalt ^r (1B+3) Dimethoate 4E (1B) Di-Syston 15 G ^r (1B) Hero ^r (3) Mustang-MAX ^r (3) Pasada 1.6F (4A) Provado 1.6F (4A) Proaxis ^r (3) Pasada 1.6F (4A) Provado 1.6F (4A) Lorsban 4E ⁶ (1B) Malathion 57EC (1B) Mustang-MAX ^r (3) Warrior 1EC ^r (3)	16.0-32.0 oz 3-5 oz 4.8-14.5 oz 12.8-21.1 oz 2-2.5 oz 19-57 oz 0.66 pt 10-20 lbs 10.3 oz 3.2-4.0 oz 3.5-7.0 oz 3.5-7 oz 2.56-5.12 oz 7.0-14.0 oz 7-14 oz 1-4 pts 1-2 pts 3.2-4.0 oz 2.56-5.12 oz	Chemigation into root zone or subsurface side-dress shanked into root zone near emitter line. Higher rate for Black Pecan Aphid (Centric). Do not use less than 26 oz of Cobalt for black pecan aphid. Soil application in May. Work granules into upper two to three inches of soil. For yellow aphids. For yellow aphids. Do not make a foliar application of Provado after a soil application of Admire in the same year. For black aphids. For black aphids. Avoid controlling sub-economic infestations of aphids early in the season. This destroys beneficials and may cause flare-ups of mite 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>
WEBWORM OR WALNUT DATANA When caterpillars appear feeding on leaves (June to late August).	<i>Bacillus thuringiensis</i> products: Dipel ES (11B2) Cobalt ^r (1B+3) Javelin WG (11B2) Spintor 2 SC (5) Confirm 2F (18) Intrepid 2F (18) Sevin 80S (1A)	1.0-4.0 pt 0.25-4.0 lb 19-57 oz 4-10 oz 8.0-16.0 oz 4-8 oz 2.5-6.25 lbs	1 or 2 applications. Fall webworm only. Cobalt is not labeled for webworms. 1 or 2 applications. Follow label directions.
TWIG GIRDLER When damage first occurs - late August or early Sept.	Sevin 80S (1A)	2.5-6.25 lbs	Dedicated sanitation of orchard floor (sticks) can dramatically reduce twig girdler and pruner populations.
STINK BUGS and LEAF-FOOTED BUG (True Bugs)	Battalion 0.2 EC ^r (3) Cobalt ^r (1B+3) Mustang-MAX ^r (3) PennCap-M ^r (1B)	12.8-21.1 oz 26-57 oz 3.2-4.0 oz 2-4 pts	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. pear millet) where control can be implemented on a much smaller scale.
MITES During hot, dry periods-late in season	Acramite 4SC (25) Onager 1EC (10A)	12-16 oz 12-24 oz	1 application per year. 1 application per year.

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	21 days (DO NOT apply after shuck split)	NO 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 45 WP Agpak/Super Tin 80WP Agpak ^r : 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 in 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 + Agritin ^r : 1.31 oz/3.75 oz	30 days (DO NOT apply after 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.
	Thiophanate-methyl (1) ^r	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	21 days (DO NOT apply after 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 Scap Model.

** Fungicide MOA groups begin on

r Restricted Use Pesticide.

- ¹ See table at end for pre-harvest intervals and grazing restrictions.
² Gal = gallon; lb = pound; pt = pint; qt = quart; 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 discussed in OSU Extension Fact Sheet EPP-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 the soil, and a spray should be made two to three 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

Chemical	Interval Between Last Application and Harvest and Other Restrictions
Acrامة	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 , Ammo ^r	21 days. Do not feed or graze livestock on treated orchard floors.
Battalion ^r	Do not apply more than 105.6 oz of Battalion per acre per season. Allow 7 days between applications. Do not apply within 21 days of harvest.
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/season.
Cobalt ^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.
Di-Syston ^r	Do not harvest nuts within 80 days of treatment.
Guthion ^r	Do not apply after shuck split. Allow 21 days before grazing livestock
Hero ^r	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.
Intrepid	14 days. Do not apply more than 16 oz/acre/application or 64 oz/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.
Mustang-MAX ^r	Do not apply within 21 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 fee livestock on cover crops growing in treated area. Do not apply within 28 days of harvest.
Pasada	7 day pre-harvest interval. Do not graze in treated areas.
PennCap-M ^r	Do not apply after shuck split. Do not graze or feed cover crops within 15 days after application. Do not apply more than 64 pts/acre/year.
Proaxis ^r	Do not apply within 14 days of harvest
Provado	Do not graze in treated areas. 0 days waiting between application and harvest.
Stratego	Do not apply after shuck spit or within 30 days of harvest. Grazing restrictions may apply.
Spintor	14 days. Do not apply treatments less than 14 days apart. Do not apply more than 29 total ounces/acre/crop/year. Product is toxic to bees and aquatic invertebrates.
Thionex	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/acre/year.

^r Restricted Use Pesticide

*Chemical Group classifications can be found at the following Web sites: **Herbicides:** <http://www.plantprotection.org/hrac/>
Insecticides: <http://www.irc-online.org/> **Fungicides:** <http://www.frac.info/>.

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