























## PECAN DISEASE CONTROL

DISEASE	CHEMICAL & FORMULATION	MOA	RATE/ACRE	REI/PHI (Hours or Days)	COMMENTS
<b>PRE-POLLINATION APPLICATIONS: EVERY 10-14 DAYS FROM BUD BREAK THROUGH NUT SET (continued)</b>					
Scab; Downy Spot (continued)	<i>propiconazole</i> + <i>azoxystrobin</i> Quilt Quilt Xcel	3 + 11	14–27.5 fl oz 14–21 fl oz	12 H/ Do not apply after shuck split or within 45 D of harvest	<b>MOA Group 1:</b> Risk for resistance is high. Use should be limited. When conditions are very favorable for scab, use in combination with either a full rate of TPTH or <i>dodine</i> . Limit the use to 1 or 2 applications per season. Available as Topsin M 70WDG, Topsin M 70 WP, and Topsin M WSB, and Topsin M 4.5 FL. Topsin XTR is a premix of <i>thiophanate methyl</i> and <i>tebuconazole</i> .  <b>MOA Group 3:</b> Resistance risk is moderate. For best results, tank mix <i>tebuconazole</i> with a surfactant. Do not add a surfactant if mixing with other fungicides. Increasing the rate of a Group 3 fungicide will be important if reduced sensitivity is known or suspected. Stand-alone use is not recommended where reduced sensitivity is known or suspected.  <b>MOA Group 11:</b> Resistance risk is moderate. Do not make more than 2 sequential applications. If only using solo products, Group 11 fungicides should not be used in more than 1/3 of the total number of fungicide applications. If using Group 3 tank-mixed with other modes of action, they should not be used in more than 1/2 of the total number of fungicide applications. Stand-alone use is not recommended where reduced sensitivity is known or suspected.  <b>MOA Group 30:</b> Resistance risk is low.  <b>MOA Group 33:</b> Resistance risk is low. For best control apply in 100 GPA by ground. Three to five applications are generally recommended. Check labels for potential limitations on maximum number of applications or amount of active ingredient allowed per season. Do not use when there is a phosphate deficiency. Do not use these as stand-alone sprays for nut scab on very susceptible cultivars or high disease pressure.  <b>MOA Group U12:</b> Resistance risk is low. Do not use on Moore, Van Deman, Barton, or Shawnee. Do not use a surfactant. Do not use with foliar zinc treatments.  For any tank mix combination of <i>dodine</i> , TPTH, Group 3, or Group 11 fungicides, the rates provided are the lowest recommended and will provide excellent control of scab under most conditions. When disease pressure is elevated, the rate of either mixing partner can be increased.
	<i>pyraclostrobin</i> Headline	11	6–7 fl oz	12 H/ 14 D	
	<i>tebuconazole</i> Folicur 3.6F Tebuzole 3.6F Monsoon Orius 3.6F Toledo 3.6F	3	8 fl oz	12 H/ Do not apply after shuck split	
	<i>tetraconazole</i> Andiamo	3	8.5 fl oz	12 H/ 30 D	
	<i>tetraconazole</i> + <i>azoxystrobin</i> Brixen	3 + 11	13–20 fl oz		
	<i>tebuconazole</i> + <i>azoxystrobin</i> Custodia Helmstar Plus	3 + 11	8.6–17.2 7.2–14.4	12 H/ 45 D	
	<i>tebuconazole</i> + <i>trifloxystrobin</i> Absolute	3 + 11	5–7.67 fl oz	12 H/ Do not apply after shuck split or within 30 D of harvest	
	<i>flutriafol</i> + <i>azoxystrobin</i> Topguard EQ	3 + 11	5.0–8.0 fl oz	12 H/ 45 D	
	<i>tetraconazole</i> + <i>triphenyltin hydroxide</i> Minerva Duo	3 + 30	16 oz	48 H/ 30 D	
	<i>thiophanate methyl</i> + TPTH or <i>dodine</i>	1 + 30 or U12	1 lb + half rate or 25 fl oz	3 D/ Do not apply after shuck split	
<i>triphenyltin hydroxide</i> (TPTH) + FRAC Group 3 fungicide	30 + 3	half rate + full rate	48 H/ 30 D		

DISEASE	CHEMICAL & FORMULATION	MOA	RATE/ACRE	REI/PHI (Hours or Days)	COMMENTS
<b>PRE-POLLINATION APPLICATIONS: EVERY 10 14 DAYS FROM BUD BREAK THROUGH NUT SET (<i>continued</i>)</b>					
Anthracnose	Anthracnose is a disease with a long latent period; symptom expression occurs many weeks after infection. Fungicides used for control of scab have been effective in suppressing anthracnose.				
<b>POST-POLLINATION APPLICATIONS: EVERY 10 21 DAYS FROM NUT SET TO SHELL HARDENING</b>					
Scab	<i>pydiflumetofen</i> + <i>difenoconazole</i> Miravis Top	7 + 3	13.6 fl oz	12 H/ 45 D	
	<i>pydiflumetofen</i> + <i>fludioxonil</i> Miravis Prime	7 + 12	6.8–9.1 fl oz	12H/ 14D	
	<i>dodine</i> Dodine 4L Elast 400F	U12	48 fl oz 48 fl oz	48 H/ Do not apply after shuck split	
	<i>dodine</i> + Group 3 or Group 11 fungicide	U12 + 3	25–48 fl oz + full rate	48 H/ Do not apply after shuck split	
	<i>dodine</i> + TPTH	U12 + 30	25–48 fl oz + 6–12 fl oz (liquid) or 3.75–7.5 oz (wetable)	48 H/ Do not apply after shuck split	
	<i>phosphorous acid</i> Kphite 7LP Phostrol ProPhyt Reliant Phiticide	33	highest label rate	4 H/ —	
	<i>propiconazole</i> + <i>azoxystrobin</i> Quilt Quilt Xcel	3 + 11	20–28 fl oz 20–21 fl oz	12 H/ Do not apply after shuck split or within 45 D of harvest	
	<i>tebuconazole</i> + <i>azoxystrobin</i> Custodia Helmstar Plus	3 + 11	8.6–17.2 7.2–14.4	12 H/ 45 D	
	<i>flutriafol</i> + <i>azoxystrobin</i> Topguard EQ	3 + 11	5.0–8.0 fl oz	12 H/ 45 D	

## PECAN DISEASE CONTROL

DISEASE	CHEMICAL & FORMULATION	MOA	RATE/ACRE	REI/PHI (Hours or Days)	COMMENTS
<b>POST-POLLINATION APPLICATIONS: EVERY 10-21 DAYS FROM NUT SET TO SHELL HARDENING (continued)</b>					
Scab (continued)	<i>tebuconazole</i> <sup>a</sup> + <i>trifloxystrobin</i> Absolute	3 + 11	5–7.67 fl oz	12 H/ Do not apply after shuck split or within 30 D of harvest	<p><b>MOA Group 1:</b> Risk for resistance is high. Use should be limited. When conditions are very favorable for scab, use in combination with either a full rate of TPTH or <i>dodine</i>. Limit the use to 1 or 2 applications per season. Available as Topsin M 70WDG, Topsin M 70 WP, and Topsin M WSB, and Topsin M 4.5 FL. Topsin XTR is a premix of <i>thiophanate methyl</i> and <i>tebuconazole</i>.</p> <p><b>MOA Group 3:</b> Resistance risk is moderate. For best results, tank mix <i>tebuconazole</i> with a surfactant. Do not add a surfactant if mixing with other fungicides. Increasing the rate of a Group 3 fungicide will be important if reduced sensitivity is known or suspected. Stand-alone use is not recommended where reduced sensitivity is known or suspected.</p> <p><b>MOA Group 11:</b> Resistance risk is moderate. Do not make more than 2 sequential applications. If only using solo products, Group 11 fungicides should not be used in more than ½ of the total number of fungicide applications. If using Group 3 tank-mixed with other modes of action, they should not be used in more than ½ of the total number of fungicide applications. Stand-alone use is not recommended where reduced sensitivity is known or suspected.</p> <p><b>MOA Group 30:</b> Resistance risk is low.</p> <p><b>MOA Group 33:</b> Resistance risk is low. For best control apply in 100 GPA by ground. Three to five applications are generally recommended. Check labels for potential limitations on maximum number of applications or amount of active ingredient allowed per season. Do not use when there is a phosphate deficiency. Do not use these as stand-alone sprays for nut scab on very susceptible cultivars or high disease pressure.</p> <p><b>MOA Group U12:</b> Resistance risk is low. Do not use on Moore, Van Deman, Barton, or Shawnee. Do not use a surfactant. Do not use with foliar zinc treatments.</p> <p>For any tank mix combination of <i>dodine</i>, TPTH, Group 3, or Group 11 fungicides, the rates provided are the lowest recommended and will provide excellent control of scab under most conditions. When disease pressure is elevated, the rate of either mixing partner can be increased.</p>
	<i>difenoconazole</i> + <i>azoxystrobin</i> Amistar Top	3 + 11	8–14 fl oz	12 H/ Do not apply after shuck split or within 30 D of harvest	
	<i>tetraconazole</i> + <i>azoxystrobin</i> Brixen	3 + 11	13–20 fl oz	12 H/ 45 D	
	<i>tetraconazole</i> + <i>triphenyltin hydroxide</i> Minerva Duo	3 + 30	16 oz	48 H/ 30 D	
	<i>thiophanate methyl</i> + TPTH <b>or</b> <i>dodine</i>	1 + 30 <b>or</b> U12	1 lb + half rate <b>or</b> 25 fl oz	3 D/ Do not apply after shuck split	
	TPTH + Group 3 or Group 11 fungicide	30 + 3	6–12 fl oz (liquid) or 3.75–7.5 oz (wetable) + full rate	48 H/ 30 D	
	<i>triphenyltin hydroxide</i> (TPTH) Agri Tin Agri Tin Flowable Super Tin 80WP Super Tin 4L	30	7.5 oz 12 fl oz 7.5 oz 12 fl oz	48 H/ 30 D	
	<i>ziram</i> Ziram		6–8 lb	48 H/ 55 D	

**POWDERY MILDEW:** For powdery mildew, the scab fungicide program can be adjusted if needed. The FRAC Group 3 fungicides or mixes containing FRAC 3 fungicides are the best options. Combining sulfur (4–6 lb/A) with fungicides used for scab control is also an option. **DO NOT** mix sulfur with *dodine*.

**ZONATE LEAF SPOT:** For zonate leaf spot, the scab fungicide program can be adjusted if needed. The FRAC Group 3 fungicides or mixes containing FRAC 3 fungicides are the best options. Topsin M also provides suppression of Zonate leaf spot.

**ANTHRACNOSE:** Anthracnose is a disease with a long latent period; symptom expression occurs many weeks after infection. Fungicides used for control of scab have been effective in suppressing anthracnose, particularly FRAC Groups 3 and 11 and the phosphorous acid-based fungicides

**NOTE:** In orchards where any nuts have any amount of scab by mid-June or in orchards where 10% or more of the nuts have any amount of scab by early July, the following measures should be taken:

- The interval between fungicide sprays should not exceed 14 days until shell hardening.
- On varieties with a summer growth flush, the spray interval should be tightened so that no more than 10 days pass from the onset of the growth flush until a fungicide spray is made.
- If the 5-day forecast shows the probability for several days of rain, close the interval to have as much acreage as possible treated within 7 days of the storm.

**AFTER SHELL HARDENING:** Fungicide coverage for crop protection is necessary to shell hardening. Beginning in early August, monitor for shell hardening and adjust fungicide needs accordingly.

**FOLIAR DISEASES:** Maintaining leaf health past shell hardening is important. If leaf scab, zonate leaf spot, or another foliar disease is of concern, refer to the previous sections for fungicide options and recommendations. Pay attention to use limitations and fungicide resistance management guidelines. **DO NOT** use Topsin in consecutive applications for leaf disease control.

DISEASE	CHEMICAL & FORMULATION	MOA	RATE/ACRE	REI/PHI (Hours or Days)	COMMENTS
Phytophthora Shuck and Kernel Rot	A treatment is advised in orchards with a history of this disease (primarily Houston, Peach, and Macon counties) during periods of extended wetness and moderate temperatures (<86°F) occurring between shell hardening and shuck split.				
	TPTH	30	full rate		
	<i>phosphorous acid</i> Fosphite, KPhite Phiticide, Phostrol Rampart	33	full rate	4 H/ —	The <i>phosphite</i> ( <i>phosphorous acid</i> based) fungicides listed are EPA approved and considered to be very safe products. Check labels for potential limitations on maximum number of applications or amount of active ingredient allowed per season.
	MOA Group 11 fungicides	11	full rate		
	<i>copper hydroxide</i> Kocide 3000 Kocide 2000	M1	0.75–1.75 lb 1.5–3 lb	48 H/ —	Use higher rates when disease pressure is high and large, mature trees.

# COMMERCIAL PECAN WEED CONTROL

Wayne Mitchem, Extension Associate—Weed Science  
Timothy Grey, Research Weed Scientist

FRUIT AND NUTS

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI/ PHI	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>PREEMERGENCE</b>					
<i>oryzalin</i> Surflan 4AS <i>Oryzalin</i> 4AS	3	2–6 qt	2–6	24 H/ not listed	Use on non-bearing and bearing trees for control of annual grasses and small seeded broadleaf weeds. Use low rate for short-term control (2–4 months); high rate for long-term control (8–12 months). <b>DO NOT</b> apply to newly transplanted trees until soil has settled and no cracks are present. Apply before annual weeds emerge in the spring or add <i>paraquat</i> or <i>glyphosate</i> for control of emerged weeds. Sequential applications may be used so long as total use rate does not exceed 12 qt/A/year and there are 2.5 months between applications.
<i>diuron</i> Karmex XP or Diuron 80DF Direx or Diuron 4L other brands	7	2–4 lb 1.6–3.2 qt	1.6–3.2	12 H/ not listed	Use for control of annual broadleaf weeds and some annual grasses only under trees established in the orchard at least 3 years. Apply in spring before annual weeds emerge; if weeds are present, include surfactant to improve contact activity. Make a single band or broadcast application as a directed spray. Use low rate on sandy loam soils. <b>DO NOT</b> use on sand, loamy sand, gravelly soils, or on exposed subsoils. <b>DO NOT</b> use on soils with less than 0.5% organic matter. <b>DO NOT</b> graze treated areas. Add <i>paraquat</i> , <i>glufosinate</i> , or <i>glyphosate</i> for enhanced control of emerged weeds.
<i>simazine</i> Princep, <i>Simazine</i> 90DF Princep, <i>Simazine</i> 4F	5	2.2–4.4 lb 2–4 qt	2–4	48 H/ 21 D	Use for control of annual broadleaf weeds and some annual grasses only under trees established for at least 2 years. Provides good control of annual ryegrass. Use low rates on sandy soils. <b>DO NOT</b> apply to gravelly, sand, or loamy sand soils. <b>DO NOT</b> apply when nuts are on the ground. <b>DO NOT</b> graze treated areas. Add <i>paraquat</i> , <i>glufosinate</i> , or <i>glyphosate</i> for control of emerged weeds.
<i>oryzalin</i> Surflan 4AS Oryzalin 4AS + <i>simazine</i> Princep, Simazine 80W 90DG 4L		2–4 qt + 2.5–5 lb 2.2–4.4 lb 2–4 qt	2–4 + 2–4	24 H/ not listed  48 H/ 21 D	Use for broad spectrum annual grass and broadleaf weed control. Provides good control of annual ryegrass. <i>Paraquat</i> , <i>glufosinate</i> , or <i>glyphosate</i> may be used with this tank mix to enhance control of emerged weeds. See remarks and precautions for each product.
<i>norflurazon</i> Solicam 80DF + <i>diuron</i> Karmex 80DF Direx 4L		2.5–5 lb + 2–3.8 lb 1.6–3 qt	2–4 + 1.6–3	12 H/ 60 D  24 H/ 60 D	Use for broad spectrum annual grass and broad leaf weed control only under trees established in the orchard for at least 3 years. Apply in the spring before annual weeds emerge. See remarks and precautions for each product.
<i>pendimethalin</i> Prowl H <sub>2</sub> O 4EC Prowl or Pendimethalin 3.3EC	3	2–6 qt 2.4–7.3 qt	2–6	24 H/ 60 D	Control of annual grasses and broadleaf weeds such as pigweed. Most effective when adequate rainfall or irrigation is received within 7 days after application. <b>DO NOT</b> apply to newly transplanted trees until ground has settled around roots. Sequential applications may be used as long as total use rate does not exceed 6 qt/A and there are 30 days between applications. Prowl H <sub>2</sub> O has a 60 day PHI for pecans; however, other <i>pendimethalin</i> formulations can only be used in non-bearing pecans.
<i>norflurazon</i> Solicam 80DF	12	2.5–5 lb	2–4	12 H/ 60 D	Use for control of annual grasses, broadleaf weeds, and suppression of some perennials under bearing, non-bearing, or newly set trees. Apply to newly planted trees only after soil has settled around roots, at least 6 months after planting. Avoid contact with roots. Apply in the fall or early spring-fall applications control a broader weed spectrum than spring applications. <b>DO NOT</b> apply when nuts are on the ground at harvest. Use low rate on coarse-textured soils, higher rates on fine-textured soils. Make only 1 application per year. <b>DO NOT</b> graze treated areas. May tank mix with <i>simazine</i> or <i>diuron</i> for broader spectrum weed control. Add <i>paraquat</i> , <i>glufosinate</i> , or <i>glyphosate</i> for control of emerged weeds. <b>DO NOT</b> apply within 60 days of harvest. Sequential applications can be used so long as total use rate does not exceed maximum use rate for soil texture and crop.

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI/ PHI	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>PREEMERGENCE (continued)</b>					
<i>rimsulfuron</i> Matrix 25WG Solida 25WG Pruvin 25WG Grapple 25 WG	2	4 oz	0.063	4 H/ 14 D	Provide pre- and post-control of broadleaf and annual grass weeds (see label for weed control POST). For broad spectrum residual control tank mix with <i>diuron</i> , <i>oryzalin</i> , or Prowl H <sub>2</sub> O. Use in orchards established at least 1 year. <i>Rimsulfuron</i> has a 14-day PHI for pecan. Sequential applications may be used so long as there are 30 days between applications and total use rate does not exceed 4 oz/A broadcast basis.
<i>flumioxazin</i> Chateau 51WDG Tuscany 51 WDG Flumi 51 WDG  Chateau EZ Tuscany 4 SC	14	6–12 oz  6–12 fl oz	0.19–0.38	12 H/ 60 D	<b>DO NOT</b> apply more than 6 oz/A/application to soils having a sand and/or gravel content >80%. Trees established less than 1 year must be shielded with a grow tube or waxed container. <b>DO NOT</b> apply second application within 30 days of initial application. Applications after bud break can only be made with shielded application equipment. Once trees break dormancy apply with <i>paraquat</i> or <i>glufosinate</i> for non-selective postemergence control. Must use shielded application equipment if using in non-dormant pecan trees. <i>Flumioxazin</i> has a 60-day PHI for pecans.
<i>penoxsulam</i> + <i>oxyfluorfen</i> Pindar GT	2 + 14	1.5–3 pt	0.75–1.50	24 H/ 60 D	Apply Pindar GT to pecan trees that have been planted at least 9 months and longer. Use trunk guards to protect plants until adequate mature bark has developed. Can be used as a bearing and non-bearing dormant application. Non-bearing are those trees which will not bear a crop within one year after treatment. Applications can be made beginning after pecan harvest up to emergence of green leaf tissue the following season. For best results, apply prior to weed emergence of broadleaf and grass species. Do not apply more than 4.5 pts per acre per year. Tank mix with <i>oryzalin</i> or <i>pendimethalin</i> for expanded redual control of annual grasses. See label for use rate restrictions.
<i>indaziflam</i> Alion 1.67SE	29	3.5–6.5 oz	0.045–0.085	12 H/ 14 D	Use in orchards established 3 years or longer. Sequential applications may be used as long as there are 90 days between applications and total use rate does not exceed 10.3 oz/A/year. Use rate cannot exceed 3.5 fl oz/A/application on soils having less than 1% organic matter. On soils with an organic matter content from 1–3%, no more than 5 fl oz/A can be applied in a single application and the total use rate for the year cannot exceed 8.5 fl oz/A. In order to apply more than 5 fl oz/A in a single application soil organic matter must be > 3%. Alion should be tank mixed with <i>glyphosate</i> , <i>glufosinate</i> , or <i>paraquat</i> for non-selective post-weed control. Alion has a 14-day PHI. Do not use on soils having a 20% or greater gravel content. Do not treat soil around trees with cracks or channels, or with depressions.
<i>indaziflam</i> + <i>rimsulfuron</i> Centrus WDG	29 + 2	3–5.6 oz	0.076–0.143	12 H/ 14 D	Centrus is a premix of the active ingredients in Alion and <i>rimsulfuron</i> . It will provide PRE and POST control of certain annual broadleaf weeds. Do not use on soils with 20% or more gravel content. Use on trees established 3 years or more. Tank mix with <i>glyphosate</i> , <i>glufosinate</i> , or <i>paraquat</i> for non-selective POST weed control.
<b>POSTEMERGENCE</b>					
<i>2,4-D amine</i> Various generic formulations 3.8SL	4	2–3 pt	0.8–1.2	48 H/ 60 D	<b>DO NOT</b> apply more than twice a year or within 60 days of harvest. Trees must be at least 1 year old. <b>DO NOT</b> allow spray to drift onto or contact foliage, fruit, stems, or trunks of trees. <b>DO NOT</b> apply to bare ground. <b>DO NOT</b> apply on light, sandy soils. Past research has shown concerns of injury when applying <i>2,4-D</i> on sandy soils, immediately before a large rain and during early bud or leaf break. Extreme caution must be taken to avoid off target movement of <i>2,4-D</i> . Certain crops, like cotton and vegetables, can be severely injured by <i>2,4-D</i> drift. Some formulations may limit use rate 2 pt/A. Sequential applications may be used as long as there are at least 30 days between applications. See product label for details.
<i>2,4-D choline</i> Embed Extra	4	1–4 pt	0.4–1.8	48 H/ 60 D	Embed Extra contains the same active ingredient used on <i>2,4-D</i> tolerant crops. Use only orchards established at least 1 year or longer. <b>DO NOT</b> apply within two weeks either side of bloom. Embed Extra has a 60 day PHI for pecan. Do not use on sandy or loamy sand soils. Allow 75 days between sequential applications. <b>DO NOT</b> allow spray to drift onto or contact foliage, fruit, stems, or trunks of trees.
<i>bentazon</i> Broadloom 4EC	6	1–2 pt	0.5–1		<b>For application in nonbearing orchards only!</b> Apply in a minimum spray volume of 20 gallons per acre. The addition of crop oil concentrate at 1% v/v (1 gal per 100 gal of spray solution) is necessary for optimum herbicide performance. Do not apply more than 2 pts per acre per application or more than 2 lb ai per acre per year. For yellow nutsedge control apply 1.5–2 pts per acre when yellow nutsedge has 4–6 leaves and is less than 6" tall. Make second application 10 days after the initial application.



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