

PEANUT DISEASE MANAGEMENT

Dan Anco, Extension Peanut Specialist

Seedling Diseases:

All peanut seed should be treated with a fungicide to reduce the incidence of seed-transmitted and soilborne seedling diseases such as *Aspergillus* crown rot, *Cylindrocladium*, *Pythium* and *Rhizoctonia*. **Dynasty PD** (mefenoxam + fludioxonil + azoxystrobin), **Rancona V PD** (ipconazole + carboxin + metalaxyl), **Vitavax PC** (Captan + PCNB + carboxin), **Trilex Star** (Captan + trifloxystrobin + metalaxyl + thiophanate-methyl), and **Trilex Optimum** (Captan + trifloxystrobin + metalaxyl) seed treatments are all effective in reducing seedling disease and protecting stand counts. Adequate stand counts reduce the risk of tomato spot wilt virus.

Tomato spotted wilt virus (TSWV):

This virus is transmitted to peanuts by thrips, primarily tobacco thrips. TSWV stunts plants, reduces yield and causes shriveled, misshapen pods. All peanut fields in S. C. are vulnerable to yield loss from TSWV regardless of whether the farm has any history of peanut production.

A 6-step program is recommended to reduce Tomato Spotted Wilt:

Using more of these together will improve chances of minimizing TSWV risk and yield loss.

1. **Varietal Resistance** – Varieties with partial resistance to TSWV are listed in the variety characteristic chart of the peanut production guide. No variety is immune.
2. **Planting Date Window** – Early planting (Late April – 10 May) has greater risk of virus infection, but with large acreage, we must start planting the first week of May. Late planting (1 June) may also increase virus risk.
3. **Plant Population/Seeding Rate** – The goal is a uniformly emerged stand of 4 plants per row ft. Plant 6 seeds/row ft (or at least 5/row ft for large seeded Virginia types) into good soil moisture. Uniform emergence and vigorous early growth reduce virus risk.
4. **Insecticide Treatment** – Apply in-furrow treatments of Thimet 20G (4.7 lb/A on 38" rows) to all fields. See insecticide table for phorate rates by row spacing. Admire Pro (10 fl oz in-furrow) or Velum Total (18 fl oz/A) tank mixed with inoculant is an alternative for preventing thrips stunting under low virus risk (e.g., Bailey, Sugg). However, imidacloprid (Admire Pro or Velum Total) usually increases severity of virus infections.

If thrips are stunting peanut seedlings, treat immediately with acephate: Orthene 75S (0.5-1.0 lb/A) or Orthene 97SP (6-12 oz/A).

5. **Strip-tillage** – Surface crop residue reduces the number of thrips landing in peanut fields, in turn reducing virus infection.
6. **Twin-row planting** – faster ground cover reduces virus risk. Twin-row planting requires a specialized planter.

Tomato Spotted Wilt management is mostly over when the planter leaves the field.

Late Leaf Spot:

Foliar disease control programs for S. C. are targeted primarily at **late leaf spot** (*Cercosporidium personatum*) because this disease most consistently causes economic loss. Late leaf spot spores can be carried for many miles in the wind and therefore any field is at some risk regardless of peanut history. However, field history greatly affects late leaf spot risk because leaf spot spores persist on peanut residue in the soil. All fields should be rotated out of peanut for a minimum of two years to reduce late leaf spot pressure. Adjacent fields which had poor late leaf spot control at the end of the previous season can also be a source of significant infection, especially if upwind. Fortunately, other row crops and weeds are not significant hosts for late leaf spot. Late leaf spot is diagnosed by the black spores on the underside of dark brown to black lesions on leaves. Yellow halos may or may not surround late leaf spot lesions.

Other foliar fungal diseases include **early leaf spot, pepper spot, web blotch and rust**. There are also several physiological leaf spot symptoms which commonly occur, often in response to stress, such as "**irregular leaf spot**". Physiological leaf spots do not respond to fungicides and can be difficult to distinguish from fungal diseases in the field. The best and simplest management approach is that if our fungicide program is good enough to prevent the most common and aggressive disease (late leaf spot), then we will usually be OK on the other foliar diseases.

Risk factors for late leaf spot:

- Short rotations (less than 2 years out of peanuts)
- Highly susceptible variety (e.g., Champs, Georgia 13M, Gregory, Spain, TUFRunner 511)
- Late planting (May 26 and later)
- Poor control of volunteer peanuts in rotational crops
- Poor end of season control of late leaf spot in an adjacent upwind field the previous year
- Starting fungicide programs any later than 45 DAP; better a little early than late
- Extending spray intervals beyond 15 days
- Repeated, frequent periods of leaf wetness: excessive rain, frequent irrigation
- Rain off immediately after application – wait 24 h to irrigate
- Consecutive use of fungicides with the same mode of action (except chlorothalonil)

Importance of Chlorothalonil (Bravo and generics): Chlorothalonil is the foundation of peanut leaf spot control programs because it is the only product proven to have multiple modes of action to reduce the risk of developing leaf spot resistance. Multiple sequential chlorothalonil applications have been used for over 40 years without resistance development. Alternating or tank mixing chlorothalonil with other products can delay development of resistance towards those alternative compounds. Chlorothalonil in the last spray (105 or 120 DAP) can also help prevent resistant leaf spot strains from overwintering and causing infection in the following year.

Alternative to Calendar Spray Programs: An alternative to calendar-based leaf spot sprays is to spray based on weather. General rules for weather-based application are: First spray: treat when 5 daily rain events (≥ 0.1 "") have occurred since cracking. Each subsequent spray: wait 10 days since the last application, then treat whenever 2 rains occur after the 10-day interval. However, under S. C. conditions, the importance of applying preventative soil disease treatments before rain events has made calendar-based programs more effective for most growers.

Slowing a Growing Leaf Spot Epidemic: Effective fungicide programs are designed to prevent disease, not "cure" it after the fact. If something goes wrong and you find late leaf spot lesions in the bottom of the canopy (particularly with > 30 days until harvest) treat immediately with Topsin 4.5FL 10 fl oz + 1.5 pt Bravo, Provost Opti 10.7 oz + Bravo 1.5 pt, or Priaxor 8 fl oz. Retreat in 10 days.

White Mold:

White mold (*Sclerotium rolfsii*) is the most consistently damaging soil disease under S. C. conditions. This fungus invades peanut lateral branches in contact with the soil, as well as pods and pegs. White mold infections are driven primarily by high soil temperatures and humidity. Dry weather offers no protection from white mold. Drought can prevent infection from being noticed aboveground, but infection underground on pegs and pods can continue where it may not be noticed until harvest. Our most severe white mold outbreaks often occur under drought with excessive canopy temperatures.

Symptoms include dark brown lesions on stems and pods, rotted pods and pegs, wilting of individual or multiple stems and plant death. Unless severely infected, tap roots generally remain intact and flexible with white mold, whereas CBR infection decays tap roots much quicker.

Signs: Mycelium of *S. rolfsii* is white and produces a fan-like growth as it spreads. The resting stage of white mold (sclerotia) persists in the soil from year to year making rotation out of host crops (peanut, soybean and other legumes including many weeds) highly important. Sclerotia are small (< 5/64" = 2 mm), round structures that are initially white and later become tan to dark brown. With ample moisture, sclerotia can be found on infected peanut tissues or leaf litter. **Note:** A similar looking fungus, false white mold (*Phanerochaete*), also produces white mycelium and can be found in peanut fields. False white mold does not produce sclerotia and does not damage peanuts; if it is found on peanuts and scraped away, tissue beneath it will look healthy.

Risk factors for white mold:

- Peanut or soybean history
- Less than 2 years rotated out of peanut, soybean or other legume
- Any variety other than Bailey, Sullivan, Sugg, Wynne or Georgia 12Y should be considered highly susceptible. Georgia 07W and TUFRunner 511 also show some tolerance though not as good as the previous group.
- Early planting (first week of May or earlier); delaying planting until mid-May may help suppress white mold due to higher seedling soil temperatures and faster early root growth
- Lack of rain preventing fungicide from being washed into the soil
- Extended, unusually hot temperatures in July and August

Variety resistance (particularly Bailey, Sugg, Sullivan and Georgia 12Y) is far more effective than any chemical treatment in suppressing white mold. These varieties typically control white mold with standard fungicide programs.

Early Season Banded Sprays: Banded application of Proline (38" rows: 5.5 fl oz/A in 20 gal/A on 12" band) OR Elatus (38" rows: maximum 8.9 oz/A in ≥ 10 gal/A, 7 - 10" band) to peanut seedlings at 21 - 35 DAP can improve white mold control under extreme disease pressure. See table on Early Season Band Treatment Options for row-spacing banded rates. **Note:** In-furrow fungicide treatments have not been effective in suppressing white mold (see details below regarding CBR control). See following tables for fungicide efficacy and comments.

Night/Pre-Dawn Spraying: Peanut plants fold their leaves at night making it easier for soil fungicide treatments to reach the base of the plant and soil surface. Applying white mold treatments at night has been shown to increase control effectiveness, at least under severe white mold pressure. If Bravo (a non-systemic) is being relied on for leaf spot control, control of this foliar disease may be reduced with night spraying because of reduced leaf coverage. For growers interested in trying night applications, we recommend the 60, or 60 and 75 DAP treatments as priorities.

Cylindrocladium Black Rot (CBR):

CBR is caused by a soil fungus (*Cylindrocladium parasiticum*) that occurs in the same field areas from year to year, often in low spots. CBR is transmitted from field to field by contaminated seed and equipment. **Rotation**

(≥ 2 years out of peanuts and elimination of soybean from the rotation) and **resistance** are the best defenses against severe CBR. Rotation alone will not eliminate significant injury.

Symptoms and signs: When first infected, peanut plants can turn light green or yellow. As CBR infections progress, peanut stems or entire plants wilt and eventually die. CBR rots roots, including the tap root, causing them to turn black and fall apart (tap roots infected by white mold remain intact and flexible much longer). Under drier conditions, symptoms of CBR infection may be limited to chlorotic yellowing and plant stunting. Following moist conditions, brick-red reproductive structures (perithecia) might appear on crowns, lower stems, pegs and pods. Infected seed can develop cinnamon-colored speckles (microsclerotia) on seed coats before rotting.

Risk factors for CBR:

- Confirmed history of economic CBR loss in the field
- Soybean or peanut history
- Short rotations out of peanut, soybean or other legumes
- Poorly drained, more organic soils such as found in low areas of a field
- Any variety other than Bailey, Perry or Sugg (Champs is particularly susceptible to CBR)
- Lack of control over seed source (seed transmission)
- Early planting (April); delaying planting until mid-May may help suppress CBR due to higher seedling soil temperatures and faster early root growth

CBR Control:

Variety resistance (Bailey) is far more effective than any chemical treatment in suppressing CBR. Bailey often adequately suppresses CBR without fumigation or in-furrow fungicides.

On susceptible varieties in fields with a proven history of CBR loss, use **Propulse** (13.6 fl oz/A) OR **Proline** (5.7 fl oz/A) **in-furrow** (with inoculant), OR **fumigate with Vapam (10 gal/A)**. Vapam must be shanked into a bed at ~10" depth 14 days prior to planting. Soil temperature at 4" depth should be at least 60° F. Avoid fumigating when there is a high risk of heavy rain (> 1.0") within 2 days. See the following tables for fungicide efficacy and comments.

Rhizoctonia Limb Rot:

Rhizoctonia Limb Rot is caused by naturally-occurring soil fungi, *Rhizoctonia* spp. (*R. solani*), that can cause lesions and rot on limbs/stems, leaves, pegs and pods. Lesions on stems are light to dark brown and often have a target pattern. Dense canopies and prolonged moisture (irrigation) encourages disease development. Tractor traffic damage increases occurrence of limb rot. Management recommendations are similar as for white mold (see Disease Response Chart for fungicide activity).

Web Blotch:

Web blotch, caused by *Phoma arachadichola*, produces lesions on upper leaf surfaces. Symptoms start as small, tan to dark brown blotches with irregular edges or netlike gray-brown lesions that can become large (0.5") and cover entire leaves. Older lesions darken and have rough, dull surfaces. Severe infections cause leaves to become brittle, which can lead to substantial defoliation. Web blotch development favors cool, moist conditions and is more common under irrigation. Many of the fungicides effective against late leaf spot share activity towards web blotch (see Disease Response Chart for fungicide activity).

General Guidelines for Fungicide Programs:

- Begin leaf spot control **absolutely no later than 45 DAP**. For high risk situations such as highly susceptible varieties (e.g., Gregory, Champs, Georgia 13M, TUFRunner 511), or short rotations, particularly under irrigation, increase late leaf spot protection using one of the options listed in footnotes of the following tables.
- **Apply a soil fungicide (see following disease control table) starting absolutely no later than 60 DAP**. White mold must be prevented, and hot weather accelerates white mold growth.
- If premium fungicides (e.g., Elatus, Priaxor, Provost Opti) are substituted for basic tebuconazole + chlorothalonil treatment, prioritize their use starting at 60 DAP rather than later to get the most potential for improved white mold and/or leaf spot control.
- Soil fungicides must be washed into the soil to be effective against white mold, but **wait 24 – 48 h before irrigating** to also help control leaf spot.
- **Except for treatments containing chlorothalonil (Bravo), do not make consecutive applications of the same mode of action (MOA)**. Bravo has multiple modes of action which has allowed for many years of use without leaf spot resistance. In each field, do not apply more than a combined total of 2 strobilurin-containing products (Abound, Elatus, Evito, Headline, Priaxor or Stratego) in any growing season to reduce risk of resistance.
- **Never apply Topsin or tebuconazole alone, and do not make more than 2 tank-mixed Topsin applications per season**. Topsin is very susceptible to development of resistance. Late leaf spot is already resistant to tebuconazole.
- **No fungicide program is fool-proof**. Spot check fields for leaf spot and white mold, particularly from 60 DAP to two weeks before anticipated digging date.
- A final leaf spot application at 105 DAP is usually adequate to provide control through at least a 135 DAP harvest date, but check fields at 120 DAP. If leaf spot is present on 5% of lower leaves and harvest will be delayed > 135 DAP, apply an additional chlorothalonil treatment. If no leaf spot is present and harvest will be delayed > 145 DAP, apply an insurance treatment.

Preventative Calendar Spray Programs:

The key to peanut disease control is preventing diseases from getting started. This is true for both soil and foliar diseases. Alternating or tank mixing different fungicide chemistries reduces the potential for developing resistant strains of leaf spot diseases. Alternating or tank mixing fungicides also provides some insurance against the failure of one product alone.

Note: The disease control programs on the following pages are guidelines. Timing (DAP = days after planting) should be modified to account for opportunities to wash soil fungicides into the pegging zone if no irrigation is available. Under drought conditions, growers have to rely on judgment of the 5-day weather forecast to decide when to apply a soil fungicide before a rain.

Ideally, fungicide treatments would be washed into the soil after 1 – 2 days to get both maximum foliar and soil disease suppression.

DISEASE CONTROL PROGRAM OPTIONS

If premium fungicides are substituted for basic tebuconazole + chlorothalonil (generic Folicur + Bravo), prioritize their use starting 60 DAP rather than later to maximize potential benefits.

Treatment options and timing (days after planting)							
30	45*	60*	75	90	105	120	
Optional Bravo (1-1.5 pt) (+ Cadre) for high leaf spot risk	Bravo 1.5 pt	tebuconazole 7.2 + Bravo 1.5 pt	tebuconazole 7.2 + Bravo 1.5 pt	tebuconazole 7.2 + Bravo 1.5 pt	tebuconazole 7.2 + Bravo 1.5 pt	Bravo for late maturing peanuts**	
	tebuconazole 7.2 fl oz + Bravo 1.5 pt	tebuconazole 7.2 + Bravo 1.5 pt	tebuconazole 7.2 + Bravo 1.5 pt	tebuconazole 7.2 + Bravo 1.5 pt	tebuconazole 7.2 + Bravo 1.5 pt		Bravo 1.5 pt
		Substitute, see below	tebuconazole 7.2 + Bravo 1.5 pt	tebuconazole 7.2 fl oz + Bravo 1.5 pt	tebuconazole 7.2 fl oz + Bravo 1.5 pt		
		Substitute, see below	Substitute, see below				
		Substitute, see below	tebuconazole 7.2 + Bravo 1.5 pt	Substitute, see below			
		Substitute, see below	Substitute, see below	Substitute, see below			
		Substitute, see below	Substitute, see below	Substitute, see below			
Substitute, see below	Substitute, see below	Substitute, see below	Substitute, see below				

*Under high leaf spot risk (e.g., very susceptible variety, irrigated or with frequent rain-off and leaf wetting, or late planting) use a premium fungicide with strong leaf spot activity at 60 DAP; use of additional premium products can improve management. Spray intervals can be reduced to 10 days for improved leaf spot control under frequent rain-off conditions. **Make sure leaf spot prevention begins no later than 45 DAP and soil fungicide is applied no later than 60 DAP.** White mold must be prevented; hot weather and a closed canopy in Jul – Aug accelerates white mold growth. Do not use surfactants or crop oil with fungicides unless necessary for herbicide performance in tank mixes. The goal is to wash white mold fungicides into the soil. Spray **before** irrigation or rain when possible.

**An extra late season Bravo application may be needed for late maturing peanuts. If it has been 15 days since the last application and peanuts will be dug within the next 25 days, do not treat unless > 5% of leaflets in the bottom of the canopy have late leaf spot lesions. Never spray fungicide within 2 weeks of harvest – it is off-label and is too late to affect defoliation.

Note: Use of chlorothalonil in the last spray (105 or 120 DAP) can help prevent resistant leaf spot strains that may have developed from overwintering and causing infection in the following year.

The treatments in the following tables can be substituted for tebuconazole + Bravo from 60 DAP to 105 DAP. Except for treatments containing Bravo (chlorothalonil), consecutive use of the same mode of action (MOA) group is not recommended in order to delay leaf spot resistance. Bravo has multiple modes of action and there has been no evidence of resistance in 40+ years of use.

MOA = Fungicide Resistance Action Committee (FRAC) Mode of Action Group. Having the same mode(s) of action does not mean treatments are equally effective.

Generic chlorothalonil, Tilt + Bravo, Topsin + Bravo, or other alternatives (see Disease Control table) can be substituted for Bravo. Avoid consecutive use of the same MOA if Bravo is not tank mixed.

PEANUT DISEASE CONTROL

FOLIAR DISEASE CONTROL ONLY (Early and late leaf spot, pepper spot, web blotch, rust)			
Product	Rate/A	MOA*	Comments
Bravo Weather Stik 6SC (and chlorothalonil generics)	1.5 pt	M5	Chlorothalonil products are preventative only against leafspot and require excellent coverage. Rust infection is rather rare in SC peanut production, but if rust is detected with more than 3 weeks to harvest, include chlorothalonil every 10 days until 2 weeks before harvest.
Bravo + Topsin 4.5 FL or Topsin M 70W	1 pt + 8-10 fl oz 0.33-0.5 lb	M5 + 1	Topsin should only be used in Bravo tank mixes. Maximum 2 appl. per season.
Alto 100 SL + Abound 2.08 F	5.5 fl oz + 18 fl oz	3 + 11	Systemic triazole and strobilurin activity.
Elatus 0.45 WG	7.3-9.5 fl oz	7 + 11	Excellent leaf spot activity. Systemic.
Provost Opti 3.6	7-8 fl oz	3	Highly effective against soil and foliar diseases.
Priaxor 4.17	4-6 fl oz	7 + 11	Systemic activity against leaf spot.
Bravo + Topguard	1 pt + 7-14 fl oz	M5 + 3	Topguard adds systemic leaf spot control to Bravo.
Absolute 500 SC	3.5 fl oz	3 + 11	Systemic triazole and strobilurin activity.
Headline 2.08	6-9 fl oz	11	Highly systemic and rain-fast. We may be seeing the reduced Headline (strobilurin) effectiveness against leaf spot due to strobilurin use patterns.
Custodia 2.67 SC	15.5 fl oz	3 + 11	Add 1 pt/A Bravo for late leaf spot use. Max 2 appl.
Muscle ADV 3.84	2 pt	3 + M5	Add 0.5 pt/A Bravo for late leaf spot use.
Elast 400F	15 fl oz	U12	Elast not recommended on varieties highly susceptible to leaf spot.
Stratego[†]	10-14 fl oz	3 + 11	Systemic triazole and strobilurin activity.
Tilt Bravo SE 4.3[†] (jug mix)	1.5 pt	3 + M5	Tilt adds some systemic leaf spot control to Bravo. Tilt mixes not recommended for rust.

FOLIAR AND SOIL DISEASE CONTROL (Other than CBR)			
Product	Rate/A	MOA*	Comments
Tebuconazole (generic Folicur 3.6) + Bravo	7.2 fl oz + 1.5 pt	3 + M5	Tebuconazole alone no longer controls leaf spot or web blotch. Must be tank mixed with Bravo.
Convoy 40SC + Bravo	13-16 fl oz + 1.5 pt	7 + M5	Must be tank mixed with Bravo for adequate leaf spot control. Excellent white mold suppression.
Quash 50 WDG + Bravo	4 oz + 1 pt	3 + M5	Must tank mix with Bravo to manage leaf spot.
Provost Opti 3.6	10.7 fl oz	3	Highly effective against soil and foliar diseases.
Elatus 0.45 WG	7.3-9.5 fl oz	7 + 11	Excellent white mold and leaf spot activity.
Priaxor 4.17	8 fl oz	7 + 11	Systemic activity against white mold and leaf spot.
Fontelis 1.67	16 fl oz	7	Systemic activity against white mold and leaf spot.
Alto 100 SL + Abound 2.08 F	5.5 fl oz + 18 fl oz	3 + 11	Erratic against white mold. Systemic for leaf spot.
Propulse 3.34	13.6 fl oz	3 + 7	Systemic activity against soil and foliar disease.
Evito 480SC	5.7 fl oz	11	Strobilurins are more erratic against white mold.
Custodia 2.67 SC	15.5 fl oz	3 + 11	Add 1 pt/A Bravo for late leaf spot use. Max 2 appl.
Muscle ADV 3.84	2 pt	3 + M5	Add 0.5 pt/A Bravo for late leaf spot use.
Headline 2.08	12-15 fl oz	11	Highly systemic and rain-fast. We may be seeing reduced Headline (strobilurin) effectiveness against leaf spot due to use patterns of strobilurins. Headline erratic on white mold due to rapid uptake on leaves.
Artisan[†] + Bravo	16-20 fl oz + 1.5 pt	7 + M5	Must be tank mixed with Bravo for adequate leaf spot control. Excellent white mold suppression.

[†]Check with your buying point: peanuts treated with propiconazole may not be accepted for international export (European Union).

*Except for treatments containing Bravo (chlorothalonil), consecutive use of the same mode of action (MOA) group is not recommended in order to delay leaf spot resistance.

PEANUT DISEASE CONTROL (cont.)

Early Season Banded Treatment Options for Improved White Mold and Leaf Spot Management			
Product	Rate/A	MOA	Comments
Elatus 0.45 WG	8.9 oz (38" rows)	7 + 11	<p>Recommended as early season (approximately 21 DAP) banded application for high risk white mold fields. Also provides early season leaf spot control. Apply in a minimum of 10 gal/A. Set band width at 7 - 10" for single rows (twin-rows: widen band to cover both rows).</p> <p>Banded rates are 0.5 - 0.65 oz/1,000 row ft, which is equivalent to 8.7 - 9.5 oz/A on 30" rows, 7.3 - 9.4 oz/A on 36" rows, and 6.9 - 8.9 oz/A on 38" rows. Do not exceed 9.5 oz/A.</p>
Proline 480 SC	5.5 fl oz (38" rows) 5.7 fl oz (30", 36" rows)	3	<p>Recommended as early season (21-35 DAP), high volume (20 gal/A) banded application (up to 12" band) for high risk white mold fields. Also provides extended (21 day) early season leaf spot control.</p> <p>Banded rate is 0.4 fl oz/1,000 row ft (maximum 5.7 fl oz/A), which is equivalent to 5.7 fl oz/A on 30" or 36" rows and 5.5 fl oz/A on 38" rows.</p> <p>Proline must be used in-furrow for CBR suppression (see below) and over the top for white mold control.</p>

CBR CONTROL			
Product	Rate/A	MOA	Comments
Proline 480 SC (in-furrow, suppression)	5.5 fl oz (38" rows) 5.7 fl oz (30", 36" rows)	3	<p>Resistance: Bailey variety is more effective than any chemical treatment in reducing CBR loss and often provides adequate control without fumigation or in-furrow fungicide treatment.</p> <p>Crop rotation is extremely important in reducing CBR risk. Delaying planting until mid-May can suppress CBR by increasing soil temp.</p> <p>Proline is applied in-furrow with inoculant. In-furrow rate is 0.4 fl oz/1,000 row ft (maximum 5.7 fl oz/A), equivalent to 5.7 fl oz/A on 30" or 36" rows and 5.5 fl oz/A on 38" rows.</p>
Propulse 3.34 (in-furrow, suppression)	13.6 fl oz	3 + 7	<p>Resistance: Bailey variety is more effective than any chemical treatment in reducing CBR loss and often provides adequate control without fumigation or in-furrow fungicide treatment.</p> <p>Crop rotation is extremely important in reducing CBR risk. Delaying planting until mid-May can suppress CBR by increasing soil temp.</p> <p>Propulse is applied in-furrow with inoculant.</p>
Vapam HL (metam sodium 42%)	10 gal	NC	<p>Resistance: Bailey variety is more effective than any chemical treatment in reducing CBR loss and often provides adequate control without fumigation or in-furrow fungicide treatment.</p> <p>Vapam must be shanked into the soil (8" depth) and bedded at least 14 days prior to planting. Soil temperature at 4" depth should be 60°F. Do not fumigate when rain (1.0" or more) is expected within 48 hrs.</p>

GUIDE TO PEANUT FUNGICIDES

Product	Chemistry	MOA*	Risk of leaf spot resistance	Feed hay	PHI (days)	Strengths	Limitations
Abound	Strobilurin (azoxystrobin)	11	High	Y	14	Has white mold activity and may be the best Rhizoctonia material. Systemic leaf spot and web blotch activity.	Erratic against established white mold infections 75 – 90 DAP. Mix with Alto to improve leaf spot activity.
Absolute	Triazole (tebuconazole) + Strobilurin (trifloxystrobin)	3 + 11	Already resistant + high	N	14	Systematic leaf spot activity.	Less effective against white mold.
Alto	Triazole (cyproconazole)	3	High	Y	30	Systematic leaf spot activity.	Minimal if any soil disease control.
Artisan	Benzamide (flutolanil) + Triazole (propiconazole)	7 + 3	High	N	40	Excellent against white mold and limb rot, has activity against early leaf spot.	Will not control late leaf spot, must tank-mix with chlorothalonil. No CBR suppression.
Bravo/ generics	Chloronitrile (chlorothalonil)	M5	Low	N	14	Low cost, reliable leaf spot control. Multiple modes of action reduce risk of leaf spot resistance. Can make multiple consecutive appl.	No soil disease activity. Not curative or systemic. Less effective than many systemics on web blotch. Preventative activity only against leaf spot.
Convoy (or Moncut)	Benzamide (flutolanil)	7	Low	N	40	Excellent white mold and Rhizoctonia activity.	No activity against foliar diseases or CBR. Must tank-mix with chlorothalonil.
Custodia	Triazole (tebuconazole) + Strobilurin (azoxystrobin)	3 + 11	Already resistant + high	N	14	Activity against foliar and soil diseases.	Needs Bravo tank-mix for adequate leaf spot control. Max 2 appl. recommended.
Elast	Guanidine (dodine)	U12	Low to medium	Y	14	Leaf spot alternative to Bravo.	Less effective than Bravo for leaf spot on highly susceptible varieties. No soil efficacy.
Elatus	Carboxamide (benzovindiflupyr) + Strobilurin (azoxystrobin)	7 + 11	Medium to high	Y	30	Excellent late leaf spot activity. Alternative chemistry for both leaf spot and soil disease.	Should be alternated with MOA alternative to strobilurin and carboxamide.
Endura	Carboxamide (boscalid)	7	Medium to high	N	14	Activity against Sclerotinia blight (not common in SC). Good leaf spot activity.	Inadequate against white mold.
Evito	Strobilurin (fluoxastrobin)	11	High	Y	14	Performance of 5.7 oz similar to 18 oz Abound.	Performance of 5.7 oz similar to 18 oz Abound.
Folicur/ generics	Triazole (tebuconazole)	3	Already resistant	N	14	Very cost-effective control of white mold and limb rot.	Not effective against web blotch. No longer effective against late leaf spot; must tank-mix with Bravo.

***MOA = Mode of action group. Treatments without Bravo (chlorothalonil) that share the same MOA should not be used consecutively to delay leaf spot resistance.** There is no single perfect fungicide. The best programs combine several products that complement each other to minimize disease and resistance risk at reasonable cost.

GUIDE TO PEANUT FUNGICIDES (Cont.)

Product	Chemistry	MOA*	Risk of leaf spot resistance	Feed hay	PHI (days)	Strengths	Limitations
Fontelis	Carboxamide (penthiopyrad)	7	Medium to high	Y	14	Excellent white mold activity and effective against leaf spot.	Rotate with alternative chemistry to reduce leaf spot resistance risk.
Headline	Strobilurin (pyraclostrobin)	11	High	N	14	Systemic leaf spot activity at 6-9 oz, some white mold activity at 12-15 oz rates. Rapid uptake for systemic activity in leaves.	White mold activity erratic. Leaf spot activity of Headline (and other strobilurins) may have declined. Do not exceed 2 strobilurin appl. per season.
Lorsban 15G	Organophosphate (chlorpyrifos)	?	Low	N	21	White mold suppression. Preventative control of soil insects.	Causes worm and spider mite outbreaks. Requires granular band appl. Increases Rhizoctonia limb rot.
Muscle ADV	Triazole (tebuconazole) + Chloronitrile (chlorothalonil)	3 + M5	Already resistant + low	N	14	Activity against foliar and soil diseases.	Needs Bravo tank-mix for adequate leaf spot control.
Priaxor	Carboxamide (fluxapyroxad) + Strobilurin (pyraclostrobin)	7 + 11	Medium to high	N	14	White mold and leaf spot activity at 8 oz. Has demonstrated excellent late leaf spot control.	Maximum of two appl. per season recommended.
Proline	Triazole (prothioconazole)	3	Medium	N	14	Excellent leaf spot and white mold activity in early season band. CBR suppression in-furrow.	Rotate with alternative chemistry to reduce leaf spot resistance risk.
Propulse	Triazole (prothioconazole) + Carboxamide (fluopyram)	3 + 7	Medium to high	N	14	Excellent leaf spot and white mold activity. CBR suppression in-furrow.	Rotate with alternative chemistry to reduce leaf spot resistance risk.
Provost Opti	Triazole (prothioconazole + tebuconazole)	3	High	N	14	High level of control for major foliar (leaf spot) and soil (white mold, Rhizoctonia) diseases. Reformulated for improved tank-mixing compatibility.	Triazoles vulnerable to leaf spot resistance. Must be rotated or tank-mixed with other chemistry.
Quash	Triazole (metconazole)	3	Medium	N	14	Effective against white mold.	Needs Bravo tank-mix for leaf spot control.
Stratego	Triazole (propiconazole) + Strobilurin (trifloxystrobin)	3 + 11	Medium	Y	14	Combination of Tilt and Flint – has good systemic activity against leaf spot.	Little or no white mold activity.

***MOA = Mode of action group. Treatments without Bravo (chlorothalonil) that share the same MOA group should not be used consecutively to delay leaf spot resistance.** There is no single perfect all-around fungicide. The best programs combine several products that complement each other to minimize disease and resistance risk at reasonable cost.

GUIDE TO PEANUT FUNGICIDES (Cont.)

Product	Chemistry	MOA*	Risk of leaf spot resistance	Feed hay	PHI	Strengths	Limitations
Tilt Bravo SE	Triazole (propiconazole) + Chloronitrile (chlorothalonil)	3 + M5	Low	N	14	Tilt adds systemic leaf spot control to Bravo's contact protection.	Tilt has very weak activity against soil diseases and Bravo has none. Tilt alone will not control late leaf spot.
Topguard	Triazole (flutriafol)	3	Medium	N	7	Systemic leaf spot control, active against white mold.	Triazoles vulnerable to leaf spot resistance. Must be rotated or tank-mixed with other MOA.
Topsin 4.5FL	Benzimidazole (thiophanate-methyl)	1	Very high	Y	14	Topsin adds systemic activity to Bravo. Cost effective, high risk treatment for leaf spot.	Topsin alone very susceptible to resistance. Must be tank-mixed and limited to two applications per year. Little or no soil activity.
Velum Total	Carboxamide (fluopyram)	7	Medium to high	N	14	Provides in-furrow control of thrips and nematodes.	Less effective early season leaf spot control than banded appl. of Proline or Elatus. Imidacloprid component often increases TSWV severity.
<p>*MOA = Mode of action group. Treatments without Bravo (chlorothalonil) that share the same MOA group should not be used consecutively to delay leaf spot resistance. There is no single perfect all-around fungicide. The best programs combine several products that complement each other to minimize disease and resistance risk at reasonable cost.</p>							

Disease Response Chart for Peanut Fungicides

Product	Rate/A	Late leaf spot	White mold	Rhizoctonia limb rot	Cylindrocladium black rot (CBR)	Web blotch
Abound + Alto	18 oz + 5.5 oz	V. Good	Good	Ex.	Poor	Good
Absolute	3.5-7 oz	Good/V. Good	Poor	Good? (7 oz)	None	Good?
Alto	5.5 oz	Good/V. Good	Fair/Poor	Fair/Poor?	Poor	Good
Artisan ^{1,2} + Bravo	16-20 oz + 1 pt	V. Good	Ex.	V. Good	None	Fair/Good
Bravo (or generics)	1.5 pt	V. Good	None	None	None	Fair
Convoy ¹ + Bravo	13-26 oz + 1.5 pt	V. Good	Ex.	V. Good	None	Fair
Evito	5.7 oz	Good/V. Good	Good	?	Poor	Good?
Elast ³	15 oz	Fair	None	None	None	None
Elatus	7.3-9.5 oz	Ex.	V. Good/Ex.	V. Good/Ex.?	Poor	Good
Endura	8-10 oz	Good	Fair	?	Poor	Good
Fontelis	16 oz	V. Good	Ex.	V. Good/Ex.?	Poor	?
tebuconazole + Bravo	7.2 oz + 1-1.5 pt	V. Good	V. Good	V. Good	Poor/Fair	Good?
Headline	6-12 oz	Good/V. Good	Fair (12-15 oz)	Good/V. Good?	Poor	Ex.
Moncut + Bravo	0.5 lb + 1.5 pt	V. Good	Ex.	V. Good	None	Fair
Priaxor	4-8 oz	Ex. (6-8 oz) V. Good (4 oz)	V. Good/Ex. (6-8 oz)	V. Good/Ex.? (8 oz)	Poor	Good?
Proline	5.7 oz	Ex.	Ex.	V. Good	Good (in-furrow)	Good?
Propulse	13.6 oz	Ex.	Ex.	V. Good	V. Good/Ex. (in-furrow)	Good?
Provost Opti	8-10.7 oz	V. Good/Ex.	V. Good (8 oz) Ex. (10.7 oz)	V. Good	Poor/Fair	Good?
Quash + Bravo	3-4 oz + 1 pt	V. Good	V. Good	?	Poor?	Good?
Stratego ²	10-14 oz	V. Good	Poor	Good (14 oz)	None	Good?
Tilt Bravo SE (or generics) ²	1.5 pt	V. Good	Poor	Poor	None	Fair
Topguard	7-14 oz	Good/V. Good	Good	?	None	Good?
Topsin 4.5FL ⁴ + Bravo	8-10 oz + 1.5 pt	V. Good/Ex. ⁴	None	Fair?	None	Fair?

***Ratings are based on the relative performance of the listed application rates. Effective disease control and resistance prevention requires multiple application programs with a combination of materials. None** = no control; **Poor** = low level of control; **Fair** = erratic control or suppression only; **Good** = controls typical disease pressure; **V. Good** = very good: better than average disease control; **Ex.** = excellent: consistent superior control.

¹**Artisan or Convoy** can be applied up to 32 oz/A for maximum white mold control, but both must be tank-mixed with Bravo or alternative for leaf spot control.

²Check with your buying point: peanuts treated with **propiconazole** may not be accepted for international export (European Union).

³**Elast** is not recommended for highly susceptible Virginia-type varieties.

⁴**Topsin** is highly effective against leaf spot as a tank-mix with Bravo. Never use Topsin alone, and never exceed 2 total Topsin applications per season.