

UGA PEANUT PRODUCTION

The 2024 Pest Management Quick Reference Guide

ugapeanutteam.org

PEANUT WEED CONTROL UPDATE

Eric P. Prostko, Extension Weed Specialist

Important Things to Consider:

1. Start clean using a combination of tillage, cover crops, and/or herbicides.
2. Planting in twin rows will improve weed control by ~5-10%, depending upon the weed.
3. Use multiple residual herbicides in the system.
4. Cracking or early-postemergence applications of paraquat may not always be needed in peanut fields that started off weed-free and where at-planting residual herbicides (Dual Magnum, Prowl, Outlook, Sonalan, Strongarm, Valor, and Warrant) were moisture activated with timely rainfall or irrigation.
5. Make timely postemergence applications (weeds ≤ 3" tall, **not the average**).
6. Hand-remove weed escapes before seed is viable.

Classic Herbicide Update

- Research and field observations in Georgia have confirmed that the use of Classic (chlorimuron) in peanut can occasionally result in an increased expression of tomato spotted wilt virus (TSWV). The effects of Classic on TSWV have been documented in 36 UGA field trials. In these trials, Classic caused a ≤10% increase in TSWV ~87% of the time and >10% increase in TSWV ~13% of the time. These results suggest that the effects of Classic on TSWV are minimal in comparison to the other production practices that influence this disease. Late-season Florida beggarweed populations that have the potential to reduce harvest efficiency and/or fungicide spray deposition should be treated with Classic. Late-season Florida beggarweed plants can also be controlled using Gramoxone (paraquat) in a non-selective applicator (i.e.

wiper, sponge, wick-bar) or with mowing. Other herbicides have not been shown to have an influence on the incidence of TSWV in peanut.

- Classic should **NOT** be used on GA-06G, GA-12Y, and Tifguard due to potential yield losses (7-13%). The following peanut varieties have demonstrated adequate tolerance to Classic in UGA replicated/weed-free field trials: Florida-07; GA-Greener; GA-07W; GA-18RU; AUNPL-17; TIFNV High O/L; GA-20VHO; and FloRun™ 331. For GA-09B, peanut yields were reduced by 5% when Classic was applied 75 days after emergence (DAE) but no yield loss occurred when applied 60, 90, or 105 DAE. For GA-16HO, peanut yields were reduced by 17% when Classic was applied at 75 DAE but no yield loss occurred when applied at 60 or 85 DAE.

How Do High-Yielding Georgia Peanut Growers Manage Weeds?

- In 2022, 17 growers in the *Georgia Peanut Achievement Club* produced an average peanut yield of **5688 lbs/A (4718-6493 lbs/A range)**. The state average peanut yield in 2022 was 4250 lbs/A. Survey results from these high yield producers indicated the following production practices were used to help manage weeds in their peanut fields:
 - **Irrigation:** 94%
 - **Bottom plow:** 59%
 - **Twin rows:** 76%
 - **Herbicides:** Valor = 76%; Cadre = 65%; 2,4-DB = 65%; Sonalan = 53%; Dual = 53%; Prowl = 41%; Strongarm = 35%; Paraquat = 29%; Zidua = 12%; and clethodim = 12%.

2024 UGA RECOMMENDED HERBICIDE PROGRAMS FOR PEANUT

		TIMING					
System	Tillage Method	Preplant Burndown ¹	PPI	PRE	EPOST (~10-20 DAP ²)	POST (~30-45 DAP)	Late-Postemergence ⁶ (~60 DAP) (for the extended residual control of Palmer amaranth, tropical spidewort, and annual grasses)
Non-Irrigated (Dryland)	strip-till ³	Glyphosate or Paraquat + 2,4-D amine + Valor		No Rain in 7-10 DAP	Paraquat + either Storm or Basagran + either Dual Magnum or Warrant or Zidua or Anthem Flex or Outlook ⁶	ALS Resistance: Cobra or Ultra Blazer + (either Dual Magnum or Warrant or Zidua or Anthem Flex or Outlook ⁶) + 2,4-DB	Dual Magnum or Outlook PHI (days) Dual Magnum = 90 Outlook = 80 Max Total Rate/A/Season (oz) Dual Magnum = 44 Outlook = 21
				Paraquat + Prowl			
				Rain in 7-10 DAP			
				Paraquat + Prowl + Valor + Strongarm ⁴ or Paraquat + Brake + Strongarm ⁴ or Paraquat + Valor + Brake ⁵		No ALS Resistance: Cadre ⁴ + (either Dual Magnum or Warrant or Zidua or Anthem Flex or Outlook ⁶) + 2,4-DB	*Use of other Group 15 herbicides is limited by peanut stage of growth and should not be applied late-postemergence:
	conventional		Prowl or Sonalan + Strongarm ⁴	No PRE if rain is not expected in 7-10 DAP Rain in 7-10 DAP	Paraquat + either Storm or Basagran + either Dual Magnum or Warrant or Zidua or Anthem Flex or Outlook ⁶		Anthem Flex = R3 (beginning pod) Warrant = R1 (beginning bloom) Zidua = R3 (beginning pod)
Irrigated	strip-till ³	Glyphosate or Paraquat + 2,4-D amine + Valor		Paraquat + Prowl + Valor + Strongarm ⁴ or Paraquat + Brake ⁵ + Strongarm ⁴ or Paraquat + Valor + Brake ⁵	Paraquat + either Storm or Basagran + either Dual Magnum or Warrant or Zidua or Anthem Flex or Outlook ⁶	**A 4-way tank-mixture can be used if required (Cadre + Cobra or Ultra Blazer + 2,4-DB + either Dual Magnum or Warrant or Zidua or Outlook⁶)	
	conventional		Prowl or Sonalan + either Valor + Strongarm ⁴ or Brake ⁵ + Strongarm ⁴ or Valor + Brake ⁵				

¹Apply at least 7 days before planting. ²DAP = days after planting. ³Annual grass control in strip-tillage systems is often more difficult thus additional applications of a postemergence grass herbicide (i.e. Fusilade, Poast, and Select) will be needed. ⁴Before using Cadre and/or Strongarm, rotational crop restrictions must be considered. ⁵Do not apply Brake to the same field more than 2 years in a row. ⁶Dual Magnum/Warrant/Outlook are in the same herbicide family (chloroacetamide) and have the same mode of action (inhibit very long chain fatty acids). Zidua/Anthem Flex are not in the same herbicide family (isoxazoline) but have the same mode of action. Multiple applications (> 2) of these herbicides in a single year should be avoided when possible to prevent or delay the evolution of resistance. These residual herbicides have no postemergence activity.

INSECT MANAGEMENT

Mark Abney, Extension and Research Entomologist

Insect and mite infestations in peanut can result in severe economic loss, but not every field will be infested with damaging pest populations every year. The complex of pests present in peanut can also vary significantly from year to year and even from field to field within a year. An understanding of the risk factors that contribute to pest outbreaks combined with weekly scouting provide a foundation for a successful insect management program in peanut. Below is a quick reference for some of the most common and/or economically important arthropod pests of peanut, conditions that favor their development, and tips for scouting for them in the field.

Thrips:

- **Favorable Conditions:** Thrips can be found in almost every peanut field every year. Injury is most common and noticeable on seedling plants between emergence and 30 days after planting. Early planting, conventional tillage, single row pattern, and no at-plant insecticide increase the risk of thrips injury.
- **Scouting Tips:** Examine fields for the presence of adult and immature stages in the first three to four weeks after emergence. Immature thrips will usually be found in folded terminal leaflets.



Adult thrips

Lesser Cornstalk Borer (LCB):

- **Favorable Conditions:** hot, dry, well drained sandy soils, open crop canopy.
- **Scouting Tips:** Look for wilted stems, check stems for silk tubes, remove plants and check tap root, pods, and stems for feeding/tunneling injury and larvae. Moths are a good sign of LCB infestation. Plants in a "skip" or at the ends of rows with bare soil around them will usually be attacked first.



LCB moth



LCB larva

Three Cornered Alfalfa Hopper (TCAH):

- **Favorable Conditions:** TCAH can be found in most Georgia peanut fields, but densities tend to be highest when soil moisture is adequate for optimum peanut growth. Low numbers of adults can be found in fields in late spring, but populations increase as the summer progresses.
- **Scouting Tips:** Adults are highly mobile and readily seen as they fly when disturbed; they are also easily collected in sweep nets. Nymphs are responsible for much of the injury to peanut, but they are difficult to see. Beat sheet sampling or careful examination of vines is required to find nymphs. Decisions to treat TCAH populations with insecticide should consider the relative abundance of adults, nymphs, and stem injury.



TCAH adult



TCAH nymph

Southern Corn Rootworm (SCRW) & Banded Cucumber Beetle (BCB):

- **Favorable Conditions:** Soil moisture is critical to the development of SCRW and BCB, and they are almost always found in heavy-textured soils with good moisture. Irrigated fields are at increased risk of rootworm, but non-irrigated fields can be infested in seasons with ample rainfall. Low spots in fields with high water holding capacity are at increased risk from this pest.
- **Scouting Tips:** The immature stage of the beetle lives entirely below ground. Dig adjacent to peanut rows or remove plants to examine pods for damage and check the soil for larvae.



SCRW adult



BCB adult

Potato Leafhopper (PLH):

- **Favorable Conditions:** PLH is found sporadically in peanut fields every year in Georgia. Infestations often begin along field margins and spread inward.
- **Scouting Tips:** Adults are small but can be seen flying when disturbed; nymphs are similar in appearance to adults but cannot fly. Look for hopperburn (V-shaped yellowing of leaflet tips associated with leafhopper feeding), especially near field edges. Hopperburn will persist after the insects have left the field, so it is important to determine if infestations are active before making a treatment decision.



PLH

Two Spotted Spider Mite (TSSM):

- **Favorable Conditions:** TSSM can be found in some peanut fields in Georgia every year, but infestations are more likely to develop and cause injury when conditions are hot and dry. In out-break years, non-irrigated corners of irrigated fields are often severely injured while the irrigated portion of the field has few or no mites. Areas near field margins, especially near dirt roads or paths, are usually infested first. Mowing infested weedy vegetation adjacent to peanut fields can result in mites migrating to the crop in large numbers.
- **Scouting Tips:** Be sure to watch field edges for signs of mite infestation. Small patches of yellowing peanuts are an early indication of infestations. Mites are usually found on the lower surface of leaves, and they can be difficult to see at low densities. Early detection is critical to achieving effective control.



TSSM

Foliage Feeding Caterpillars

- **Scouting Tips:** Scouting is best accomplished by vigorously shaking peanut vines and foliage to dislodge the insects onto the ground or a beat sheet. Sampling three feet of row at ten locations in a field is sufficient for a typical 40 to 80 acre field. All caterpillars should be counted, and their size and species composition should be noted. The threshold is 4 to 8 foliage feeding caterpillars per foot of row. Use lower threshold range when vines are small and/or stressed.

Beet Armyworm:

- ID: caterpillar up to 1.25 inches; generally green with or without dark stripes running lengthwise down the body; small black dot on each side of the body directly above the 2nd pair of true legs. Eggs laid in masses.



Beet Armyworm

Corn Earworm/Tobacco Budworm:

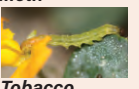
- ID: caterpillar up to 1.75 inches; color variable and not reliable for identification; 4 pair abdominal prolegs; skin coarse and covered with short black hairs. The caterpillars of these species cannot be distinguished in the field without dissection and magnification, but positive identification is important for selecting insecticides. Moths are similar in size but are easily distinguished.



Tobacco Budworm Moth



Corn Earworm Moth



Tobacco Budworm

Fall Armyworm:

- ID: caterpillar up to 1.5 inches; gray, light brown, or mottled green; skin smooth without hairs; four abdominal prolegs; prominent inverted "y" on the head capsule; eggs laid in masses.



Fall Armyworm

Granulate Cutworm:

- ID: caterpillar up to 1.5 inches; brown to gray; smooth skin may appear "greasy"; curl into a tight ball when disturbed.
- Feeds on foliage at night and rests in the soil during the day; minor, sub-economic feeding injury is common; occasionally, heavy infestations cause severe defoliation.



Cutworm Larva

Rednecked Peanutworm (RNPW):

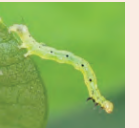
- ID: caterpillar up to 0.25-0.3 inches; white to cream color with reddish pro and mesothorax.
- Larvae usually found in folded leaflets in terminal buds; feeding injury often seen as symmetrical holes the unfurled leaflets. Beat sheets do not provide a reliable estimate of RNPW populations.



RNPW

Soybean Looper (SBL):

- ID: caterpillar up to 1.5 inches; green with faint white stripes; body tapers toward the head; "loops" when it crawls, and is sluggish when disturbed; two pair of abdominal prolegs.
- SBL infestations typically start low in the peanut canopy where they can be missed if fields are not scouted properly. SBL can be difficult to control because of their location in the canopy and limited susceptibility to some insecticides.



SBL

Velvetbean Caterpillar (VBC):

- ID: caterpillar up to 2 inches; pale head capsule; body typically green with yellow or white stripes running down its length (VBC can be black or brown); wiggle violently when disturbed; 4 pair of abdominal prolegs; anal prolegs project backwards like a "V". Small VBC can be confused with soybean looper, but loopers have only two pair of abdominal prolegs.
- Favorable conditions: VBC does not overwinter in Georgia, but it migrates into the state each year. The first moths are often detected in June in South Georgia, but infestations do not typically reach threshold densities until later in the summer.



Dark colored VBC



VBC



VBC moth

DISEASE AND NEMATODE MANAGEMENT

Bob Kemeraït, Extension Plant Pathologist

Critical Points to remember for the 2023 season:

- Diseases will be a threat to every peanut grower's crop in 2024. Nematodes, both the peanut root-knot and, perhaps, the lesion could be a problem in a number of fields. Tomato spotted wilt, white mold, and late leaf spot will have impact across the Georgia peanut production region in 2024. It is important to remember that once the furrow is closed, all of the management decisions to protect your crop from tomato spotted wilt disease (see Peanut Rx section) have been made and nearly all of the decisions to protect your crop from root-knot nematodes (use of a nematode-resistant variety or use of a nematicide) have been made. The same is true for seedling disease, and in-furrow use of a fungicide. Once the furrow is closed, growers watch the struggles with tomato spotted wilt, nematodes, and seedling diseases from the "sidelines". Key points for protecting your peanut crop in 2024 from leaf spot and white mold diseases include 1) timeliness of application, 2) coverage, and 3) choice of product.
- Below are key "take-away" points from 2023.
 - Tomato spotted wilt** continued to cause significant damage and was as severe in Georgia peanuts as it has been at any time since 1997. Region-wide, losses were estimated at 5% (down from 7% in 2023); however, losses were much greater in some fields. Growers are encouraged to make sound-management decisions at planting. **Management Tip:** Growers should consult the 2024 version of Peanut Rx for tactics to reduce risk to Tomato spotted wilt disease. Key considerations are planting date, variety selection, and choice of at-plant insecticide. Once the furrow is closed, the die is cast for management of Tomato spotted wilt.
 - Losses to nematodes**, both the peanut root-knot nematode and lesion nematodes, occurred across the state. Growers should recognize that important management options for the root-knot nematode include crop rotation, resistant varieties (example TifNV-HiOL and Georgia-14N), and use of nematicides at planting (example Velum and AgLogic 15G). A later Propulse to reduce damage to the pods and pegs does not replace management decisions made before the furrow is closed. Propulse and Vydate-CLV are labeled for application later in the season; use of Vydate-CLV in-furrow at-planting for management of nematodes looks promising though data, for now, is limited.
 - Peanut leaf spot diseases**, especially late leaf spot, were problematic in 2023 but were severe as in 2021. Leaf spot diseases remain a critical threat to profitability. Factors that increase threat to leaf spot diseases include environmental conditions (rain followed by more rain) favorable for development and spread of disease, weather that affects a grower's ability to make timely fungicide applications, and short crop rotations. Combinations of these factors put tremendous pressure on some fungicide programs. **Management Tip:** to prevent losses to leaf spot, especially late leaf spot, it is imperative to a) stay on a timely, proven program, and b) select fungicides or mixtures of fungicides based upon threat of disease in the field, and c) continue appropriate management programs through the end of the season. NOTE: Because of increased threat from late leaf spot in recent years, some fungicide programs may have changed; carefully note choice of product and timing for application throughout the season to minimize losses to disease.
 - White mold** was generally more severe in 2023 than in 2022 possibly because of the hotter conditions. Also, with peanuts "staying in the ground" for nearly 160 days, MORE attention must be given to protecting the crop from white mold even after the traditional "4-block- 60-to-104-days-after-planting" window ends.
- Growers should continue use **Peanut Rx** to develop strategies to reduce risk to Tomato spotted wilt, white mold, and leaf spot in their peanut crop.
 - Peanut Rx has been fully reviewed for the 2024 season.
 - Prescription fungicide programs based on Peanut Rx are an effective way to reduce costs of a fungicide program. Specific prescription programs based upon your results from Peanut Rx will be available from companies, to include, Syngenta, CORTEVA, FMC, Valent, Bayer CropScience, Nichino, BASF, and SipCam.
 - An on-line calculator for Peanut Rx is available at www.peanutrx.org.
- Critical components of a leaf spot fungicide program include a) variety, b) crop rotation, c) timeliness of fungicide application, and d) selection of fungicide.
 - In UGA small-plot research trials from 2023, fungicide programs that were assessed for management of leaf spot generally performed as they have in previous years of study. However, there is some concern that extended spray intervals should be considered carefully if fields are at high-risk as from short rotations and/or a more susceptible variety.
 - In large plot, on-farm fungicide studies conducted by county agents, leaf spot was generally well-controlled by all programs, though leaf spot was more severe in 2021 than in 2023.
 - Late-leaf spot was severe in some fields in southwestern Georgia. Growers there are encouraged to consult with UGA Extension and with your Ag-chemical representatives to best understand modifications to fungicide programs during the 2024 season.
- There is increased interest in adding sulfur to fungicide programs for management of leaf spot.
 - Some sulfur formulations (generally at a rates of 3-5 lb/A) have significantly improved the control of leaf spot when tank-mixed with products azoxystrobin (Abound), Headline, Umbra, EXCALIA, and tebuconazole.
 - Sulfur formulations at (5 lb/A) to include Microthiol Dispers, Microthiol 80W, Drexel Sulfur 80W, Drexel Suffa 6F, TechnoS 90W, and Accoidal 80 WG, performed similarly when mixed with either azoxystrobin or tebuconazole.
 - Kolla 6F performed well; however was not as effective as the Microthiol products.
- Critical components of a white mold fungicide program also include timeliness of application and timelines of irrigation or rainfall following applications, preferably within 12-24 hours.
- Management of white mold can be improved by
 - early-season banded applications of Proline,
 - protecting the crop during the critical time 60-105 days after planting
 - initiating a program prior to 60 DAP and extending beyond 105 DAP when conditions favor development of white mold or where disease is active in the field later in the season
 - using products known to be more effective against white mold
 - timely irrigation between 8-24 hours after a fungicide application
 - applying fungicides for white mold control at night
- Management of nematodes includes a) variety selection, b) crop rotation, and c) selection of nematicides. Products for management of nematodes in 2024 include
 - Telone II (4.5-9 gal/A),
 - AgLogic (7 lb/A in-furrow),
 - Velum Total (18 fl oz/A in-furrow)
 - Velum (6.5 to 6.84 fl oz/A in-furrow)
 - Propulse (13.6 fl oz/A pegging-time) Note: also effective for control of white mold and leaf spot
 - Vydate CLV (for directions on in-furrow and foliar applications, see label)
 - Return XL (for application information, see label)
- Lesion nematodes are an emerging problem on peanuts in some areas, especially when high numbers are present in a field and damage occurs to the pegs. Research continues; however use of Propulse or perhaps, Vydate-CLV at pegging time is likely to be an important management tool.
- Aspergillus crown rot is an important seedling disease, especially when conditions are hot and dry at planting, or when seed-quality is a concern. Farmer-saved-seed is often at greatest risk. To manage Aspergillus crown rot,
 - ensure quality of seed
 - ensure effective fungicide seed treatment with excellent seed coverage
 - in 2024, Rancona and Trebuset will be the dominant seed-treatment fungicides.

Continued >

DISEASE AND NEMATODE MANAGEMENT, CONTINUED

- d. use in-furrow products such as Velum and Proline. Note that azoxystrobin products (Abound, etc.) have been widely used as in-furrow treatments in peanut, but are less effective against *Aspergillus* crown rot now than in the past
- e. manage insects such as Lesser Cornstalk Borers
- f. avoid planting into hot and dry soils
- g. irrigate to cool hot soils.

11. Other diseases of importance include *Cylindrocladium* Black Rot (CBR), Peanut Rust, *Pythium* Pod rot and *Diplodia* Collar Rot,

12. For more information and timely updates, consult your local UGA Extension agent.

NOTE 1:

Exchange applications:

To include systemic activity, chlorothalonil (1.5 pt) on a 14-day spray interval can be replaced with products such as with:

1. Chlorothalonil, 1.0 pt + Alto, 5.5 fl oz (Note PHI for Alto is 30 days)
2. Chlorothalonil, 1.0 pt + thiophanate methyl, 5 fl oz (no more than two applications)
3. Chlorothalonil, 1.0 pt + Domark 230ME, 2.5 fl oz
4. Chlorothalonil, 1.0 pt + Provysol, 3 fl oz/A
5. Andiamo Advance (Mazinga ADV) (32 fl oz/A)
6. Thiophanate methyl, 10 fl oz (no more than one application)
7. Aproach Prima, 6.8 fl oz (best used earlier in season). If applied later in the season consider mixing with sulfur or chlorothalonil.
8. Priaxor, 4 fl oz (or 6 fl oz replaces two early applications. Priaxor at 8 fl oz/A provides leaf spot and white mold control)

9. Absolute MAXX, 3.4 fl oz (early season use only). If applied later in the season, consider a tank mix with chlorothalonil.

10. Tebuconazole, 7.2 fl oz + chlorothalonil, 1.0 pt (replaces 1.5 pt chlorothalonil and fights white mold)

11. Provysol (3-5 fl oz/A) likely tank-mixed with EXCALIA, Convoy, or tebuconazole.

Older products that can be used for leaf spot control (sometimes mixed with chlorothalonil include sulfur (e.g. Microthiol Microthiol Disperss, 5lb/A) and mancozeb (Koverall)

NOTE 2:

Microthiol 80 WDG or Microthiol Disperss may be tank mixed at 3-5 lbs. per acre with FRAC 3,7, 11 fungicides or combinations of those.

Topsin 4.5 FL, 10 ounces per acre as tank mix with Manzate Pro-Stick or Penncozeb 75 DF at 1.5 lbs. per acre in either the 105 or 120 DAP applications.

NOTE 3: Below are examples of fungicide programs and the list does not include all possible products. Generic azoxystrobin products exist as do many generic formulations of tebuconazole. Further information on all products can be obtained from your local UGA Extension office.



FUNGICIDE APPLICATIONS

Days After Planting	Planting (0)	30	45	60	75	90	105	120
Basic full season fungicide program		Chlorothalonil 1.5 pt/A	Chlorothalonil 1.5 pt/A	Tebuconazole 7.2 fl oz/A Chlorothalonil 1.0 pt/A	Tebuconazole 7.2 fl oz/A Chlorothalonil 1.0 pt/A	Tebuconazole 7.2 fl oz/A Chlorothalonil 1.0 pt/A	Tebuconazole 7.2 fl oz/A Chlorothalonil 1.0 pt/A	Chlorothalonil 1.5 pt/A
Sipcam		ANDIAMO ADV 32 fl oz	ANDIAMO ADV 32 fl oz	Muscle ADV 2.0 pt/A	Muscle ADV 2.0 pt/A	Muscle ADV 2.0 pt/A	Muscle ADV 2.0 pt/A	chlorothalonil 1.5 pt
SipCam		ANDIAMO ADV 32 fl oz	ANDIAMO ADV 32 fl oz	Elatus 7.3 oz Miravis 3.4 fl oz/A	Muscle ADV 2.0 pt/A	Elatus 7.3 fl oz Miravis 3.4 fl oz	Muscle ADV 2.0 pt/A	chlorothalonil 1.5 pt
Bayer Nematode	Velum 6.5 fl oz		Absolute MAX 3.5 fl oz	Propulse 13.7 oz	Provost Silver 13 fl oz	Elatus 7.3 oz	Provost Silver 13 fl oz	chlorothalonil 1.5 pt
Bayer Foliar Only		chlorothalonil 1.5 pt	Absolute MAX 3.5 fl oz	Elatus 7.3 oz	Provost Silver 13 fl oz	Elatus 7.3 oz	Provost Silver 13 fl oz	chlorothalonil 1.5 pt
Nichino			Priaxor 6 fl oz/A	Umbr 36 fl oz Echo 1.0 pt	Muscle ADV 2.0 pt/A	Umbr 36 fl oz Echo 1.0 pt	Muscle ADV 2.0 pt/A	chlorothalonil 1.5 pt
Nichino sulfur			Priaxor 6 fl oz/A	Umbr 36 fl oz Microthiol Disperss Micronized 5 lb	Muscle ADV 2.0 pt/A	Umbr 36 fl oz Microthiol Disperss Micronized 5 lb	Muscle ADV 2.0 pt	chlorothalonil 1.5 pt
FMC			LUCENTO 5.5 fl oz	Convoy 32 fl oz chlorothalonil 1.5 pt	LUCENTO 5.5 fl oz/A	Elatus 9.5 oz	Muscle ADV 2.0 pt	chlorothalonil 1.5 pt
CORTEVA		Aproach Prima 6.8 fl oz	Muscle ADV 2.0 pt	Fontelis 16 fl oz	Fontelis 16 fl oz/A	Fontelis 16 fl oz	Muscle ADV 2.0 pt	chlorothalonil 1.5 pt
Syngenta		chlorothalonil 1.5 pt	Chlorothalonil Alto 5.5 oz	Elatus 9.5 fl oz Miravis 3.4 fl oz		Elatus 9.5 fl oz Miravis 3.4 fl oz		chlorothalonil 1.5 pt
Syngenta		chlorothalonil 1.5 pt	Elatus 7.3 fl oz	Elatus 7.3 fl oz Miravis 3.4 fl oz		Elatus 7.3 fl oz Miravis 3.4 fl oz		chlorothalonil 1.5 pt
Syngenta		chlorothalonil 1.5 pt	Elatus 7.3 fl oz	Elatus 7.3 fl oz Miravis 3.4 fl oz	chlorothalonil 1.0 pt tebuconazole 7.2 fl oz	Elatus 7.3 fl oz Miravis 3.4 fl oz	chlorothalonil 1.0 pt Alto 5.5 fl oz	chlorothalonil 1.5 pt
BASF			Priaxor 6 fl oz/A	Convoy 32 fl oz Provysol 5 fl oz	Priaxor 8 fl oz/A	Convoy 32 fl oz Provysol 5 fl oz	Muscle ADV 2 pt/A	chlorothalonil 1.5 pt
BASF			Priaxor 6 fl oz/A	Excalia 3 fl oz Provysol 5 fl oz	Priaxor 8 fl oz/A	Excalia 3 fl oz Provysol 5 fl oz	Muscle ADV 2 pt/A	chlorothalonil 1.5 pt
BASF			Priaxor 6 fl oz/A	Convoy 32 fl oz Echo 1.5 fl oz	Provysol 5 fl oz Teb 7.2 fl oz	Convoy 32 fl oz Echo 1.5 fl oz	Provysol 5 fl oz Teb 7.2 fl oz	chlorothalonil 1.5 pt
Valent		Leaf Spot Fungicide	Leaf Spot Fungicide	Excalia 4 fl oz/A LS Fungicide	Leaf Spot Fungicide	Excalia 4 fl oz/A LS Fungicide	Leaf Spot Fungicide	chlorothalonil 1.5 pt
Valent		Leaf Spot Fungicide	Excalia 2 fl oz/A LS Fungicide	Excalia 2 fl oz/A LS Fungicide	Leaf Spot Fungicide	Excalia 2 fl oz/A LS Fungicide	Leaf Spot Fungicide	chlorothalonil 1.5 pt
Gowan		Domark 2.5 fl oz	Domark 2.5 fl oz	Standard*	Standard*	Standard*	Domark 5.25 fl oz	chlorothalonil 1.5 pt
*white mold product as needed		chlorothalonil 1.0 pt	chlorothalonil 1.0 pt/A	white mold program	white mold program	white mold program		

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