Possible Chlorothalonil Shortage in Peanut and New Fungicides

Austin Hagan
Department of Entomology and Plant Pathology, Auburn University, AL

Multiple sources are reporting that there will be a shortage of the fungicide chlorothalonil, which is widely used in peanut and vegetable crops, and marketed under numerous trade names such as but not limited to Bravo WeatherStik, Bravo Ultrex, Echo 720, Equus 720, Chloronil, Chlorothalonil 720, etc. Issues with product formulation are the likely cause of chlorothalonil shortage but I’m not sure it refers to U.S. or foreign sourced material. There are also chlorothalonil combination products such as Muscle ADV and Echo Eminent Co-Pack that are available for use in peanut but supplies of these products are also likely to be limited. In peanut, chlorothalonil is a critical broad-spectrum anchor in nearly all fungicide programs due its good activity at relatively low cost against early and late leaf spot diseases as well as peanut rust, and value as a resistance management tool with strobilurin and triazole fungicides.

Due to the existing risk of resistance-related control failures for triazole fungicides like tebuconazole, metconazole (Quash), and propiconazole (Bumper, Propimax, Tilt) as well as potential for risk for resistance-related control failures with the strobilurin fungicides azoxystrobin (Abound 2SC and Azaka), pyraclostrobin (Headline 2.09SC), and fluoxastrobin (Evito), total application numbers of these fungicides is limited to half or less of the total number of fungicide applications in a peanut disease control program. With the limitations to the use of above systemic, single site fungicides, there are not a lot of broad-spectrum alternatives to chlorothalonil in peanut or other crops with a similarly high efficacy level. Some options for stretching chlorothalonil supplies are listed below.

1. Reducing chlorothalonil application rates from 1.5 to 1.0 pints/A is a possibility. Field trials over the past few years have shown that there’s little drop off in leaf spot control at chlorothalonil application rates of 1.0 vs. 1.5 pt/A (0.9 vs. 1.4 lb/A for Bravo Ultrex). Going with reduced chlorothalonil rates season-long will be much riskier where peanuts are cropped every year or every 2nd year, irrigated peanuts regardless of location, as well as high rainfall areas such as Baldwin, Mobile, and Escambia Co. A tropical storm can also trigger a leaf spot or rust control failure when using reduced rates or numbers...
of applications of chlorothalonil. Combining a reduced rate of chlorothalonil with a 3 spray block program with Fontelis at 12 to 24 fl oz/A, 4 spray block with Provost 433SC at 8 to 10.7 fl oz/A, or 2 spray program with Headline 2.08SC at 9 or 12 fl oz/A, 2 sprays of Abound 2SC (and generic azoxystrobin [Azaka]) at 18.2 to 24 fl oz/A (or 18.2 fl oz Abound 2SC + 5.5 fl oz/A Alto), 2 or 3 spray program with Priaxor at 4 to 8 fl oz/A, or possibly, Custodia at 15 fl oz/A should work fine. Producers should go with the higher rate of the above leaf spot/white mold fungicides in previously described at-risk settings.

2. Replace one or two early season chlorothalonil applications with 3.5 fl oz/A of Absolute 500SC or 1.5 to 2.25 pt/A of Tilt/Bravo, then switch to a recommended rate of Provost 433SC, Headline 2.08SC, Abound 2SC (or generic azoxystrobin Azaka) alone or plus Alto, Fontelis, or Priaxor, and finish with a single chlorothalonil application.

3. It’s difficult to say what impact the chlorothalonil shortage will have on combination products like Tilt/Bravo, Echo Eminent Co-Pack, and Muscle ADV. All of the above fungicides are direct replacements for chlorothalonil but the Muscle ADV would be more useful for mid- to late season white mold control and could be alternated with Abound 2SC (or generics) alone or tank-mixed with Alto, or Priaxor for extra punch against leaf spot, rust, and white mold.

4. Another possibility is a copper fungicide such as 1.25 lb/A of Kocide 3000 or 2.0 lb/A of Cuprofix UltraDisperss. Copper fungicides were widely used in peanut for leaf spot control but were quickly replaced with the more effective fungicides chlorothalonil and benomyl (for 1 year until resistance reared its ugly head). Since then, copper fungicides have not being screened for leaf spot control in Alabama fungicide trials (due to absence of space and time) and are not listed in the Alabama peanut leaf spot recommendations (http://www.aces.edu/pubs/docs/I/IPM-0360/IPM-0360.pdf). Copper fungicides probably fit best on rotated dryland fields in a two or three year-out rotation in SE Alabama but they may not give acceptable leaf spot control in high leaf spot pressure situations such as continuous peanuts. While it’s not been tested, tank mixing a copper fungicide with a generic tebuconazole may provide acceptable leaf spot and white mold control. Be advised that phytotoxicity or incompatibility issues may pop up anytime that multiple pesticides are mixed with antifoaming agents and other adjuvants.

5. Thiophanate-methyl fungicides such as T-Methyl and Topsin M are partial replacements to chlorothalonil. There is an issue with their use in peanuts as this a.i. is in the same fungicide class as Benlate (benomyl), which failed miserably in the mid-70’s. While a sizable portion of the population of leaf spot fungi are sensitive to thiophanate-methyl, the rest are still highly resistant after 40 years to thiophanate-methyl and now departed benomyl. As a result, thiophanate-methyl cannot be applied to peanut for leaf spot control without a tank-mix partner. One widely recommended tank mix partner is chlorothalonil, which can be combined at a rate of 1.0 pt/A with 10 fl oz/A of the 4.5F formulation of T-Methyl or Topsin M or 0.5 lb/A of the 70 WSB (WDG) formulations of
these same fungicides. While it’s not been tried, tank mixing thiophanate-methyl with a copper fungicide might work as would a tank mixture of full rate of a triazole fungicide like tebuconazole, metconazole (Quash), propiconazole (Tilt, Bumper, Propimax), flutriafol (Topguard) plus the above rates of the 4.5F or 70WSB formulations of either T-Methyl or Topsin M.

6. Artisan is a mixture of propiconazole + flutolanil (Convoy) that has activity against leaf spot diseases and white mold. This product is more widely used on peanut in Georgia than Alabama. To enhance leaf spot control, it has been recommended that Artisan be tank mixed with 1 pt/A of a chlorothalonil fungicide. If two or three applications of Artisan was applied in mid- to late-summer on peanut, possible tank-mix partners include 10 fl oz/A of T-Methyl or Topsin M, 6 to 9 fl oz/A of Headline 2.09SC, Abound 2SC, or Azaka, Evito or Evito T, Koverall (mancozeb), Elast at 15 fl oz/A, and either Kocide 3000 or Curpofix UltraDisperss copper fungicides.

7. Elast (dodine) at 15 fl oz/A has been screened for leaf spot control in Alabama. This fungicide alone is not quite as effective as chlorothalonil but would be a possible tank mix partner with tebuconazole, Quash, or Topguard as a direct replacement for chlorothalonil when included in a Fontelis, Provost 433SC, Headline 2.08SC, Abound 2SC (and generic azoxystrobin [Azaka]), Evito/Evito T, Custodia, or Priaxor program.

8. Peanut Rx programs have been promoted by nearly all brand-name fungicide distributors (BASF, Bayer CropScience, Nichino, Syngenta, etc.) as a means of managing fungicide program costs by eliminating two or more applications of chlorothalonil. These programs work best in rotated fields on peanut varieties such as Florida-07 and possibly Georgia-06G that have improved leaf spot tolerance as compared with the more leaf spot susceptible cultivar Georgia-09B.

9. Another option is making an application of 9.0 fl oz/A of Headline 2.09SC at 45 DAP (days after planting), thereby eliminating the 30 DAP applications of chlorothalonil. Producers also have the option of applying 9 fl oz/A of Headline 2.09SC and waiting 21 days to make the next fungicide application. Two applications of Headline 2.09SC split by an application of another fungicide on the above schedule will save one fungicide application.

10. Last but not least, a mancozeb fungicide such as Koverall or Manzate Flowable may be substituted as a tank mix partner with a thiophanate-methyl or triazole fungicide (i.e. generic tebuconazole) in place of chlorothalonil. Application rate for Koverall is 1 to 2 lb/A and Manzate Flowable at 0.8 to 1.6 qt/A but the higher rate of either fungicide would have better activity against leaf spot diseases and rust. Efficacy and residual activity of mancozeb is limited when compared with chlorothalonil and it should not be applied alone for foliar disease control on peanut.
Regardless of the program chosen, growers are advised to scout their peanuts weekly for leaf spot diseases and to shorten the spray schedule, increase fungicide rates, and if necessary insert an extra application of Headline 2.09SC at a minimum of 9 fl oz/A. Producers also need to be advised to scout their peanuts starting in mid- to late-July for leaf spot diseases and rust. Should leaf spot or rust appear, they are advised to shorten the time interval between fungicide applications or switch to a more effective fungicide.

**Tropical Storm Rule** - It’s also been four or more years since Alabama’s been visited by a tropical storm and we’re due. As a result, a lot of growers have probably forgotten about the leaf spot and rust outbreaks that usually follow a tropical storm. If peanuts have received a fungicide application within 5 to 7 days of a tropical storm strike, then they should be ok. If more than 7 days have passed, then growers are advised to make another fungicide application before the storm is scheduled to hit. When a pre-storm application is needed, I’d suggest an application of 9 fl oz/A of Headline 2.09SC as this fungicide has the best leaf spot and residual activity of all the products on the market.

**New Fungicides**

Patents on the widely used strobilurin fungicides Abound 2SC (azoxystrobin), Headline 2.09SC (pyraclostrobin), and less used Evito (floxastrobin) either have or will soon end. The first patents to go are those for azoxystrobin. Two new azoxystrobin products are Azaka from Cheminova and Custodia from MANA.

Azaka is a 2.08 lb a.i./gal product just like Abound 2SC and the use rates are identical to those for the latter fungicide. Since the a.i. for Azaka is being sourced from Syngenta, product pricing will probably a little, but not a lot lower, than Abound 2SC. As is the case with the latter fungicide, two mid-summer applications of Azaka should have good activity against leaf spot diseases and white mold (stem rot). When used in rotation with another strobilurin fungicide in the same year on peanut, it is recommended that Azaka be tank mixed for resistance management with ¾ to 1 pt/A of a chlorothalonil fungicide.

Custodia is a combination of azoxystrobin and tebuconazole (old Folicur), which should give good activity against leaf spot diseases and white mold. While the application rate is 15.5 fl oz/A, the label does state that an additional 4.5 to 17 fl oz/A of azoxystrobin (Azaka or Abound 2SC) could be added to Custodia in high disease pressure settings. I have no information on the price of Custodia but it should be competitive with Azaka. Given that this combination product contains two fungicides with different modes of action, there should be no need for tank mixing Custodia with chlorothalonil for resistance management.

**Tomato Spotted Wilt Update** – Despite fairly high thrips pressure through early June, the occurrence of tomato spotted wilt Alabama’s peanut crop appears to be minimal. The number of symptomatic plants in April planted peanuts in thrips trials at Headland and Fairhope have been very low. Due to heavy spring rains, the seed treatment and in-furrow insecticides did not perform well in Fairhope. In Headland, Thimet 20G and Temik 15G proved more effective in
protecting peanuts from thrips damage with the former fungicide giving the best thrips control. With pretty good rainfall patterns through this week, thrips-damaged peanuts will quickly outgrow the damage and yield well...pending timely rains through the rest of the summer.