Where does Miravis fit?

Growers continue to have questions about how Miravis fits into their overall disease control programs. Since Miravis offers protection against leaf spots for 21 to 28 days, growers have the opportunity to make fewer sprays per season. In addition to the potential convenience and time saving devoted to leaf spot sprays, growers should also consider efficacy, yield, and cost relative to other products, while also using good resistance management strategies.

Miravis is very effective against leaf spots, but it does not control stem rot and should be tank mixed with a good stem rot fungicide. Fortunately, stem rot pressure is usually moderate in North Carolina and can be handled with one or two sprays during mid-July to mid-August. However, continuous protection may be needed when the risk of stem rot is high. This means that a fungicide might need to be reapplied after tank mixing with Miravis to maintain stem rot control. Alternatively, growers could tank mix Miravis with a longer-lasting fungicide such as Convoy at 32 oz/A or Elatus at 9.5 oz/A.

Tables 1 and 2 are from trials at Lewiston in 2019 and illustrate that growers can use Miravis over a 28-day interval and attain very good leaf spot control. Stem rot and leaf spot pressure were moderate in the trial shown in Table 1. This trial had four programs with conventional fungicides applied every 14 days and three programs where Miravis 3.4 oz + 9.5 oz Elatus were used at 28-day intervals. All programs provided excellent disease control and all treatments produced similar yields. All treatments yielded more than the untreated control.

The data in Table 2 are from another trial that compared different timings of Miravis + tebuconazole applications (approximately 45/75 days after planting or 60/90 DAP) with similar timing of Provost Silver or Bravo + tebuconazole. It also included programs where Miravis + tebuconazole was used once at about 45, 60, 76, or 90 DAP. The resulting programs had six sprays for the conventional fungicides, five sprays were Miravis was used once, and 4 sprays were Miravis was used twice. Leaf spot pressure was high in this trial and stem rot pressure was moderate. Excellent disease control was maintained in all treatments. Yields were averaged for different combinations of treatments and compared as shown in Table 3. Average yields were similar for two vs. one sprays of Miravis + tebuconazole and for Miravis programs vs. Provost or Bravo + tebuconazole programs. Yields among all programs did not differ from each other, but when averaged together, programs produced higher yield by 661 lb/A than the untreated control.

The results from these two trials are consistent with results across additional trials and years, showing that Miravis + Elatus or Miravis + tebuconazole provide leaf spot control, stem rot control, and yield similar to programs with more conventional fungicides. Given that control and yields among programs are similar, the main difference between programs with Miravis and others appear to be cost and convenience. We estimate the cost of an application of Miravis 3.4 oz + 9.5 oz Elatus at $46/A. Spread out over 28 days compared to 14 days with a more conventional program, the cost per “spray” is approximately $23. After adding the cost of applying a spray, estimated as $5.00, growers can compare the cost of Miravis + Elatus with other treatments. Given that stem rot pressure usually is low to moderate in NC, a lower rate of Elatus (e.g. 8 oz/A) or a Miravis + tebuconazole program (about $25 per spray) may be sufficient for stem rot control, reducing costs. Growers may also want to compare the cost of Miravis 3.4 oz + 9.5 oz Elatus with Miravis + 32 oz/A Convoy for high risk fields.

While both trials discussed in this article had treatments where Miravis was applied two times consecutively, this is a very risky practice in the long run and is *not* recommended. Prolonged exposure to a single a.i. over the season puts very high selection pressure on populations of leaf spot fungi and could result in rapid development of resistance. Given our somewhat shortened application season in North Carolina relative to the Southeast, we

have little flexibility for resistance management other than reducing the number of Miravis applications. As seen in Table 3, we had good results by using Miravis + tebuconazole for one of 5 sprays in 2019. Shortening the interval between Miravis sprays to 21 days so that two Miravis sprays could be alternated with another product is another option. This could potentially save a spray but make the cost of the overall program less competitive with conventional fungicides.

Table 1. Peanut disease control at Lewiston, NC in 2019 with Miravis + Elatus compared with selected standard disease control programs in Trial 1

Treatments	Sprays (DAP)	Leaf spot 9/11	Defolia-tion 9/11	Leaf spot 9/19	Defolia-tion 9/19	Plant Cond 10/1	Stem rot 10/2	Yield/A 10/15
Untreated	--	47.8 a	21.9 a	91.0 a	51.3 a	8.8 c	32.0 a	4910 c
Absolute 3.5 oz Provost Silver 13.5 oz Bravo 24 oz	47 62, 76, 90 103, 118	1.4 b	1.9 b	5.9 b	6.3 b	88.5 b	3.3 b	5689 ab
Priaxor 6 oz Provost Silver 13.5 Bravo 24 oz + Abound 24 oz Bravo 24 oz	47 62, 90 76,103 118	1.0 b	0.6 b	2.5 b	5.0 b	93.8 a	4.0 b	5598 abc
Propulse 13 oz Bravo 24 oz Priaxor 8 oz Bravo 24 oz +Tebuzol 7.2 oz Bravo 24 oz	47 62 76 90, 103 118	1.0 b	0.0 b	1.5 b	5.0 b	93.8 a	3.0 b	6238 a
Propulse 13 oz Umbra 36 oz + Bravo 24 oz Priaxor 8 oz Bravo 24 oz +Tebuzo 7.2 oz Bravo 24 oz	47 62, 90 76 103 118	1.0 b	2.5 b	1.0 b	5.0 b	93.8 a	1.8 b	6047 ab
Alto 5.5 oz + Bravo 24 oz Bravo 24 oz Elatus 9.5 oz + Miravis 3.4 oz	40 47, 118 62, 90	0.8 b	1.9 b	0.9 b	5.0 b	93.0 a	1.8 b	6109 a
Bravo 24 oz + Elatus 7.3 oz Elatus 7.3 oz + Miravis 3.4 oz Bravo 24 oz	40 54, 83 103, 118	1.0 b	1.3 b	1.0 b	5.6 b	91.8 ab	1.0 b	5851 ab
Alto 5.5 oz + Bravo 24 Elatus 9.5 + Miravis 3.4 oz Bravo 24 oz	40 62, 90 118	0.8 b	0.0 b	1.0 b	5.6 b	91.0 ab	1.0 b	5321 bc
LSD P $\leq$ 0.05		18.4	9.1	6.9	15.5	4.2	12.7	740

36 oz Umbra contains 3 lb/Gal flutolanil + .37 lb/Gal flutriafol; flutolanil content ~ equal to 28 oz Convoy

Table 2. Peanut disease control at Lewiston, NC comparing Miravis + tebuconazole with other products when applied at different timings in 2019 in Trial 2

Treatment	Sprays (DAP)	Leaf spot 9/18	Defolia-tion 9/18	Leaf spot 9/25	Defolia-tion 9/25	Stem rot Count 10/2	Plant Condition Rating 10/2	Yield/A 10/15
Untreated control	--	93.5 a	65.0 a	99.0 a	90.5 a	15.5	8.8 d	4676
Alto 5.5 oz + Bravo 16 oz Miravis 3.4 oz + Tebuzol 7.2 oz Bravo 24 oz	47 61,89 117	1.0 c	5.0 b	3.0 c	6.5 c	9.5	83.3 c	5354
Alto 5.5 oz + Bravo 16 oz Provost Silver 13 oz Bravo 24 oz	47, 103 61,89 75, 117	1.1 c	5.0 b	1.6 c	11.3 b	3.8	87.5 abc	5349
Alto 5.5 oz + Bravo 16 Tebuzol 7.2 oz + Bravo 24 oz Bravo 24 oz	47,103 61,89 75,117	1.8 c	5.3 b	2.1 c	8.1 bc	3.5	88.8 abc	5278
Miravis 3.4 oz + Tebuzol 7.2 oz Alto 5.5 oz + Bravo 16 oz Bravo 24 oz	47,75 103 117	7.0 b	5.6 b	6.8 b	6.9 c	11.8	88.8 abc	4948
Provost Silver 13 oz Bravo 24 oz Alto 5.5 oz + Bravo 16 oz	47,75 61,89, 117 103	2.3 c	5.0 b	2.3 c	8.1 bc	4.5	91.3 a	5603
Tebuzol 7.2 oz + Bravo 24 oz Bravo 24 oz Alto 5.5 oz + Bravo 16 oz	47,75 61,89,117 103	1.0 c	5.0 b	1.1 c	6.3 c	8.8	91.3 a	5693
Miravis 3.4 oz + Tebuzol 7.2 oz Tebuzol 7.2 oz + Bravo 24 oz Alto 5.5 oz + Bravo 16 oz Bravo 24 oz	47 75,89 103 117	1.0 c	5.0 b	1.1 c	6.3 c	9.5	90.0 ab	5526
Alto 5.5 oz + Bravo 16 oz Miravis .4 oz + Tebuzol 7.2 oz Tebuzol 7.2 oz + Bravo 24 oz Bravo 24 oz	47,103 61 89 117	1.0 c	5.0 b	1.0 c	8.1 bc	10.8	86.3 abc	5125
Alto 5.5 oz + Bravo 16 oz Bravo 24 oz (2,6) Miravis 3.4 oz + Tebuzol 7.2 oz	47,103 61,117 75	1.0 c	5.6 b	1.0 c	8.1 bc	15.0	85.0 bc	5072
Alto 5. oz +Bravo 16 oz Bravo 24 oz Tebuzol 7.2 oz + Bravo 24 oz Miravis 3.4 oz + Tebuzol 7.2 oz	47 61,117 75 89	1.0 c	5.0 b	2.5 c	7.5 bc	7.5	86.3 abc	5254
Tebuzol 7.2 oz + Bravo 24 oz Alto 5.5 oz + Bravo 16 oz Bravo 24 oz	47,61,75,89 103 117	1.0 c	5.6 b	1.0 c	5.6 c	7.3	89.8 ab	5502

Table 3. Comparisons of yields in Trial 2 averaged across combinations of application timings and products		
Yield comparisons (mean of 1st – mean of 2nd)	Difference	Probability
Others 2x – Miravis 2x	329.6	NS
Others – Miravis	271.8	NS
Miravis 1x – Miravis 2x	93.1	NS
Untreated – All treated	-660.9	0.0229