

## Summary of Research Trials in 2021

David Jordan

This past year we had some interesting results from trials in North Carolina. In this article I plan to make a few comments about some of the trials, especially trials associated with contact and residual herbicides and fungicide programs. We also conducted ten on-farm trials with large-scale plots. All of these trials were possible because of support by the North Carolina Peanut Growers Association and National Peanut Board, investment in time and resources by NC State Extension agents and farm cooperators, and staff at three of our NCDA&CS research stations (Peanut Belt Research, Border Belt, and Upper Coastal Plain Research Stations.) We have also been supported by various agribusiness companies, but for this column I will focus on the NCPGA/NPB projects.

For the past two growing seasons I've been helping fill in the gap on research associated with disease management. In 2021 we conducted a trial that included Bailey II, Emery, and Sullivan with five fungicide programs at three locations. Along with a non-treated control, we had what I am calling the NCSU-Miravis program (chlorothalonil, Miravis plus Elatus giving protection for 4 weeks, Provost Silver and then chlorothalonil.) We also had a bi-weekly program of chlorothalonil-Provost Silver-Revytek-Lucento-chlorothalonil and a program with the first and last sprays with chlorothalonil and three sprays of chlorothalonil plus tebuconazole in between. A final program (that we do not recommend but we had in place to see if differences in varieties occurred) was chlorothalonil then chlorothalonil plus tebuconazole 4 weeks later and then chlorothalonil 4 weeks later at the end of the season. Bailey II was less susceptible to leaf spot than Sullivan or Emery; Sullivan was less susceptible than Emery. In many cases differences in yield mirrored differences in disease control. The fungicide program that was the most consistent across the three locations included chlorothalonil applied at the first and fifth spray (5-spray program) with three sprays of chlorothalonil plus tebuconazole applied for sprays 2-4. Other programs that performed well included chlorothalonil-Miravis plus Elatus-Provost Silver-chlorothalonil and chlorothalonil-Provost Silver-Revytek-Lucento-chlorothalonil. One thing that stood out was the control and protection of yield by the bi-weekly program of chlorothalonil/chlorothalonil plus tebuconazole. There are issues with spraying this much chlorothalonil (flaring Sclerotinia blight or spider mites in some instances) but the cost is really attractive.

We also looked at differences in leaf spot control and yield based on when a follow up application of fungicide was made after Miravis plus Elatus was applied. In these tests we had a non-treated control, chlorothalonil followed by Miravis plus Elatus without follow up fungicides, and three treatments that included follow up applications of chlorothalonil plus either azoxystrobin (Abound) or tebuconazole (generic Folicur) at 3, 4 and 5 weeks after Miravis plus Elatus was applied. In one trial repeated over 10 site/years (2019-2021) with Bailey or Bailey II, follow up sprays at 3 and 4 weeks were needed to minimize canopy defoliation and protect yield. When delayed to 5 weeks (we were simulating a delay in application due to weather or logistics – we do not recommend this), leaf spot and peanut yield dropped off slightly. In 2021, we decided to expand the trial to include Emery and Sullivan along with Bailey II. While there were some differences in leaf spot control and yield depending on location, there was more disease with Emery (we expected this) than Bailey II or Sullivan, but there was also more “escapes” (to use my weed science terminology) when it came to lesions being present late in the season than we would like to see even with the intensive fungicide programs (regardless of variety.) There was also a suggestion in the data, especially based on peanut yield that the 4-week interval may not be as effective as the 3-week interval (referring to follow up sprays after Miravis plus Elatus.) I wouldn't want to

speak for colleagues in the southeastern US, but my understanding is that they are seeing challenges with the 4-week interval under some conditions. With that said, a natural question is how does a 3-week interval compare finically to the 4-week interval and with other fungicide programs? We will keep looking at these programs in 2022, but we need to protect this chemistry (Miravis has a lot to offer logistically but it needs to hold up in a consistent manner.)

From a weed management standpoint, we looked at combinations of paraquat plus Basagran or paraquat plus Storm for early season weed control when applied alone or with Dual Magnum, Warrant, Outlook, Zidua, or Anthem Flex. In almost all cases the residual herbicides increased injury at 1 and 2 weeks after application compared with the contact herbicides alone. But we have always felt like this degree of injury was minimal and transient and does not affect yield. When looking at the combinations, control of most weeds (including common ragweed, Palmer amaranth and morningglory) was about the same in August regardless of the residual herbicide. We did notice that annual grass control (mostly crabgrass but some broadleaf signalgrass and goosegrass) was greater with the combination of paraquat plus Basagran compared with paraquat plus Storm. At one location we had Texas panicum (also called Texas millet), and control late in the season was the same with Dual Magnum, Outlook, Zidua, and Anthem Flex. Control by Warrant was substantially lower. Over the years, weed control has bounced around with these herbicide combinations, and in most cases the key is to get something out there with the contact herbicide. We'll look closely at Texas panicum again this coming year, but in general control of Palmer amaranth and common ragweed (perhaps our two most critical weeds to control in peanut) was similar across these residual herbicides.

We had a great set of on-farm trials this past year. The dump cart with weigh capacity we purchased in spring 2021 allowed us to expand our research with farmers (Figure 1). Funds for purchase were provided by the NCPGA; NC State Extension administration; Department of Crop and Soil Sciences and Entomology and Plant Pathology – Shew and Jordan projects; Birdsong and Severn peanut companies; and BASF, Bayer, and Syngenta.) Results from these trials are presented in the table. Briefly, no difference in yield was noted when comparing Bailey II, Emery, and Sullivan in three trials (Chowan, Columbus and Martin Counties) and Bailey II, Emery, Sullivan, Wynne and Walton in one trial (Bertie County). Peanut yield at seeding rates of 4, 5, and 6 seed per foot did not differ in two trials (Bertie or Martin Counties) or when seeded at 5.1, 5.5, and 6 seed per foot in one trial in Northampton County. Two applications of Apogee increased peanut yield in two trials (Columbus and Martin Counties). Digging at 4.0 mph with a KMC digger resulted in lower yields compared with digging at 2.6 mph in one trial in Columbus County. NC State Extension agents and on-farm cooperators did a great job initiating and completing these trials. We look forward to expanding this work in 2022 with new trials and more counties. While we want to expand our on-farm work, the logistics of getting the dump cart to the right place in a timely manner can be a challenge. We do think we will learn a lot from the larger plots in farmer's fields. Small-plot research tells us a lot, but we miss some things in the small plots.

We look forward to discussing our findings at county meetings this winter and improving our recommendations going into the 2022 cropping season.