UNIVERSITY OF MARYLAND EXTENSION | AgFS Agriculture & Food Systems

Agronomy News

A research-based publication from the University of Maryland Extension Agronomy Team

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Inside this issue:

Can Flame Weeding be used for Early-Season Weed Control in Soybean?

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Figure 1. A flame treatment is applied to control emerged weeds in soybean.

Starting clean or weed-free is the key to a good weed control program, especially when noxious weeds, such as Palmer amaranth are present. While conventional growers can use soil-active herbicides to manage these weeds, control is more complicated in organic systems. Flame weeding is a non-chemical tactic that has been shown to control several grass and broadleaf weed species. The majority of flame weeding treatments are applied to emerged weeds; however, studies have also shown flame treatments to have detrimental effects on the seeds of certain weed species post-dispersal. Furthermore, seeds from species such as horseweed (marestail) and Palmer amaranth tend to germinate from shallower depths in the soil profile, and may be more readily controlled by flaming on or near the soil surface. Cultivation/tillage is another tactic that can be used to control weeds in both conventional and organic systems. However, cultivation can lead to additional weed emergence and cannot be used when the soil is wet. Flame weeding may help to supplement weed control when cultivation is not an option.

In 2023, a study funded by the Maryland Soybean Board was conducted at sites in Caroline and Kent county Maryland to evaluate flame-weeding as an integrated tactic for early-season weed control in soybean (Table 1). All plots were flamed immediately after planting followed by 1 or 2 additional flame treatments or flame treatments integrated with a cultivation treatment when weeds reached 3” in height. In addition, different walking speeds (1 and 2 mph) were tested to determine if longer flame exposure improved weed control. All flame treatments were made using a propane-powered Inferno Flame Weeder (Neversink Farms, Figure 1), and cultivation was done using a 25cc 2-cycle gas-powered cultivator (Craftsman).

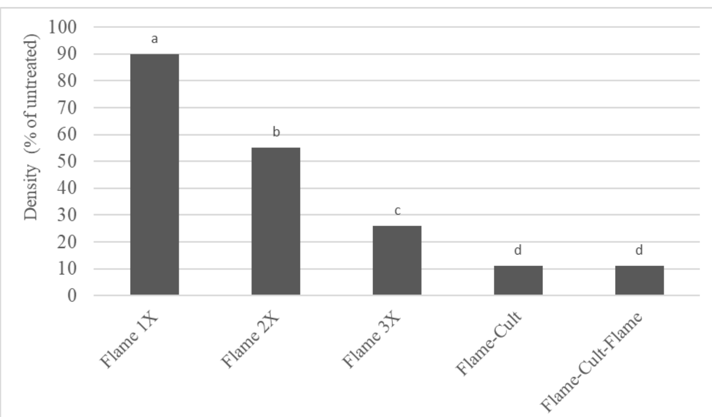
Table 1. Integrated flame-weeding treatments.

Treatment No.	Treatment	Speed (mph)
1	Flame at planting	1
2	Flame at planting fb* flame 3” weeds	1
3	Flame at planting fb flame 3” weeds fb flame 3” weeds	1
4	Flame at planting fb cultivation 3” weeds fb flame 3” weeds	1
5	Flame at planting fb cultivation 3” weeds	1
6	Flame at planting	2
7	Flame at planting fb flame 3” weeds	2
8	Flame at planting fb flame 3” weeds fb flame 3” weeds	2
9	Flame at planting fb cultivation 3” weeds fb flame 3” weeds	2
10	Flame at planting fb cultivation 3” weeds	2

*fb= followed by

Results from both studies showed that flame treatments affected overall broadleaf density, but cultivation was needed to attain higher levels of control. Flame treatments alone helped to reduce weed density at the Kent County study relative to the untreated check, with three subsequent flame treatments showing a reduction in broadleaf weed density compared to one or two flame treatments (Figure 2).

While a diversity of species were present at the Kent County site, Palmer amaranth was the dominant species at the Caroline County site. At this site both treatment and walking speed had an effect on Palmer amaranth density 4 weeks after planting. While the majority of flame treatments did not differ from one another, Palmer amaranth density was lower with 3 subsequent flame treatments at 1 mph compared 3 subsequent flame treatments at 2 mph (Figure 3). Similar results were observed with the flame followed by cultivation followed by flame treatment suggesting that longer flame exposure may be needed for effective Palmer amaranth control. It should also be noted that Palmer amaranth varied in height at the time of postemergence applications, with flame treatments having a reduced effect on larger weeds (Figure 4).



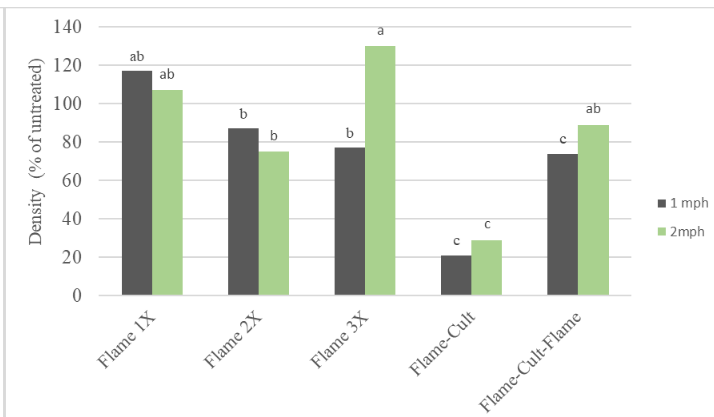


Figure 2 (left). Broadleaf weed density at the Kent County site 5 weeks after planting. **Figure 3 (right).** Palmer amaranth density at the Caroline County site 4 weeks after planting. Values followed by the same letter are not significantly different according to Student’s T-Test (α = 0.05).

While results from both sites showed that flame treatments can reduce weed density, weed control was not maintained at acceptable levels throughout the growing season. In the case of the Caroline County site, the level of the Palmer amaranth infestation was too high to produce a viable crop. These results suggest that preemergence flame treatments are not a viable option for weed management compared to postemergence flame treatments. However, additional research is needed to determine how postemergence flame treatments may be better integrated into a more comprehensive weed control program.

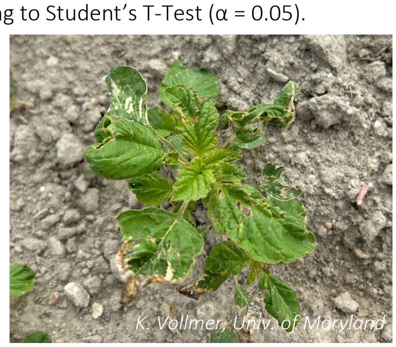


Figure 4. Palmer amaranth injury following flame weeding.

Optimizing Early Season Pest Management for Maryland Field Corn

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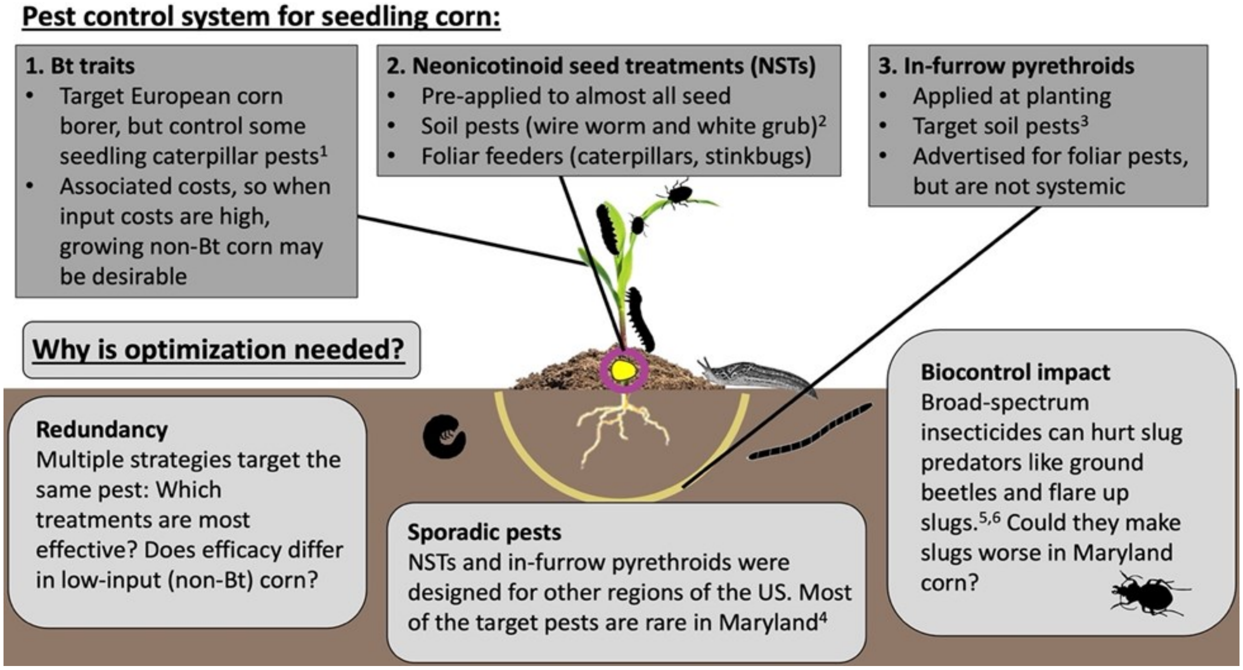
Background



Research Questions

1. Are the NST Poncho 250® and the in-furrow pyrethroid Capture LFR® effective at controlling pests and increasing yield in high-input (Bt) or low-input (non-Bt) field corn in Maryland?
2. Do Poncho and Capture hurt slug predators and flare up slug damage?

Study Design

In order to capture the range of pest pressures and growing conditions in Maryland, we replicated our study across 3 UMD research farms (Keedysville, Beltsville, and Queenstown) and over 3 years (2020-2022). At each location we planted one field of a Bt hybrid and one field of a similarly-yielding non-Bt hybrid as early as possible in the growing season (Table 1). In 2020 our Bt hybrid was LC1196 VT2P (Local Seed, Memphis, TN) which expresses Cry1A.105/Cry2Ab2 proteins. In 2021 and 2022 we planted P1197YHR (Pioneer Hi-bred International. Johnston, IA) which contains Cry1Ab and Cry1F proteins. We planted P1197LR (Pioneer Hi-bred International, Inc. Johnston, IA) for our non-Bt hybrid all three years. All hybrids had excellent yield potential and were grown with standard no-till practices.

Table 1. 2020-2022 planting and seedling sampling dates at UMD research farms (both Bt and Non-Bt plots).

Year	Location	Planting date	Sampling dates
2020	Keedysville	May 18	June 8
	Beltsville	May 21	June 10
	Queenstown	May 13	June 3 and 4
2021	Keedysville	May 14	June 1 and 3
	Beltsville	May 17	June 2
	Queenstown	May 4	May 25 and 26
2022	Keedysville	May 26	June 10
	Beltsville	June 2	June 21
	Queenstown	May 12	May 31

In each field we established 3 replicates of 3 treatments at planting: 1) an **untreated control**, with bare seed and no in-furrow product, 2) an **in-furrow pyrethroid** treatment using Capture LFR® (active ingredient: bifenthrin, rate: 13.6 fl oz/acre), and 3) an **NST** treatment using Poncho® (active ingredient: clothianidin, rate: 0.25 mg/seed). Each replicate consisted of 24 rows of corn at 30 inch row spacing, and was 200 feet long.

Question 1: Are the NST Poncho 250® and the in-furrow pyrethroid Capture LFR® effective at controlling pests and increasing yield in high-input (Bt) or low-input (non-Bt) field corn in Maryland?

Data Collection

In order to evaluate how the treatments affected pest pressure, we visually sampled V2-V3 corn for types of pest damage (Figure 1), recording the number of plants and area damaged. We counted the number of healthy and stunted plants to determine if the treatments impacted stand. Because neonicotinoids can sometimes stimulate plant growth unrelated to pest damage[7,8], we measured plant height to determine if plant growth was impacted by either treatment. At the end of the growing season, we measured stand again and harvested the corn to collect yield data.

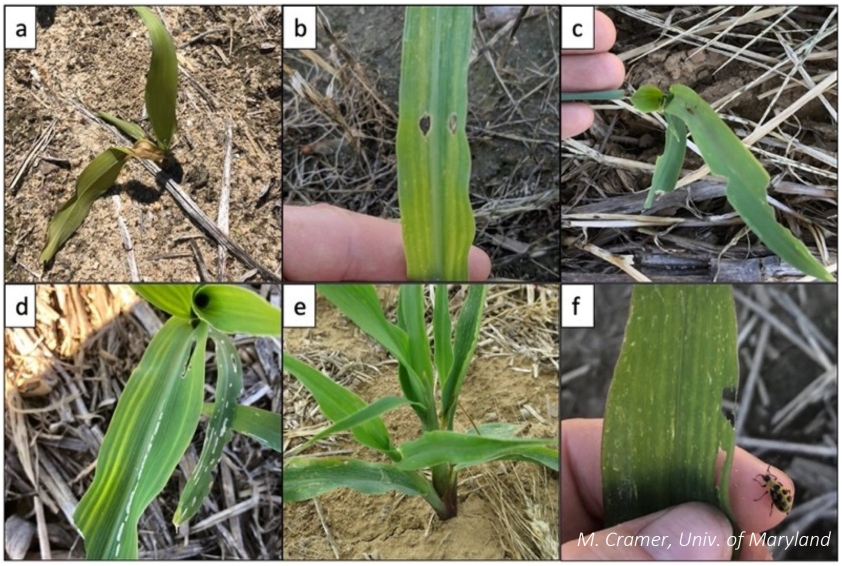


Figure 1. Diagnostic seedling pest damage: a) soil pest, b) cutworm, c) armyworm, d) slug, e) stinkbug, f) miscellaneous feeding damage from a spotted cucumber beetle.

Results and Takeaways for Question 1

Poncho reduced insect damage more consistently than Capture LFR (in both Bt and non-Bt corn) and increased Bt corn stand. Capture LFR sometimes reduced insect damage (in non-Bt corn), but never improved stand.

We compared the number of seedlings with any type of pest damage between treatments and found that Poncho decreased damage about 62% in Bt corn and about 66% in non-Bt corn (Figure 2a and 2b). Compared to the control, Capture did not reduce damage in the Bt corn, but did reduce damage by about half in the non-Bt. Poncho increased stand about 8% compared to control in the Bt corn (25,731 ± 456 plants per acre and 23,623 ± 714 plants per acre, respectively), but did not improve it for non-Bt. Capture did not impact stand for either Bt or non-Bt corn.

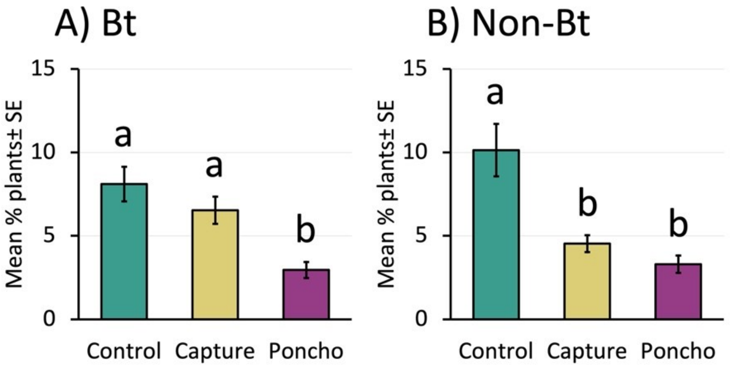


Figure 2. Mean % ± SE of seedling A) Bt and B) non-Bt corn plants damaged by pests. Data were collected across three UMD research farms from 2020-2022. Within each graph, treatment bars with different letter above them are significantly different from each other.

There were no yield benefits from using either insecticide in either corn. This was likely due to a lack of economic pest pressure.

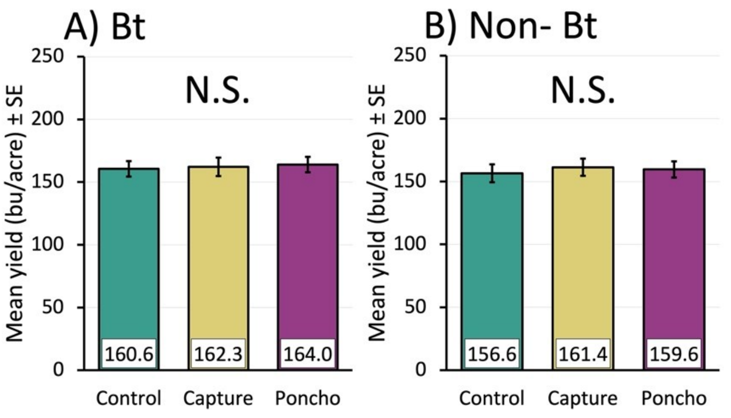


Figure 3. Mean yield ± standard error in bushels per acre corrected to 15.5% moisture of A) Bt corn and B) non-Bt corn. Yield data from 2020-2022 across three UMD research farms. Treatments did not significantly impact yield.

Non-Bt and Bt yields were the same across treatments (Figure 3A and 3B). This was probably because pest pressure was so low. Even though Poncho and Capture decreased pest damage, pests were below treatment thresholds—for example, armyworm damage in the control ranged from 0% to 5.4% of Bt plants, and 0% to 22.9% of non-Bt plants, in both cases below the treatment threshold of 35%[9]. Cutworm damage was similarly low ranging from 1% to 6.3% in Bt control and 0.5% to 3.8% in non-Bt control, also below the treatment threshold of 10% feeding damage[9].

Takeaway: Pest pressure and yield were similar between the Bt and non-Bt varieties, and non-Bt yielded well without any insecticides. In general, without pre-existing pest problems in a given field, at-planting insecticides are unlikely to pay off in Maryland.

Question 2: Do Poncho and Capture hurt slug predators and flare up slug damage?

Data Collection

To assess the effect of treatments on slug biocontrol agents, we measured slug predatory ground beetles and predation. We measured predatory beetles with pitfall traps for three consecutive weeks. Because the predators that eat slugs also attack caterpillars, we used sentinel caterpillars to see how much predation was occurring (Figure 4). We placed sentinel caterpillars in the plots overnight, collected them the following morning, and assessed signs of damage from predators. To determine if slugs were flared up by the treatments, we measured slug abundance once a week for 6 weeks beginning between 14 to 21 days after planting and measured slug-damaged seedlings during V2-V3.

Figure 4. Sentinel caterpillars placed in field overnight and collected in the morning to determine predator activity.

Results and Takeaways for Question 2

Predation on sentinel caterpillars was not decreased by insecticides.

We measured the percent of sentinel prey that were damaged by predators overnight (Figure 5) and saw no relationship between treatment and predation rates (Figure 6). This suggests that the insecticides did not decrease predator activity in treated plots. We did generally see some level of predation all weeks at our locations, indicating that predators are usually present in seedling corn.

Figure 5. Top: predators feeding on sentinel prey. Bottom: examples of damaged prey proportions. Images: M. Cramer, University of Maryland.

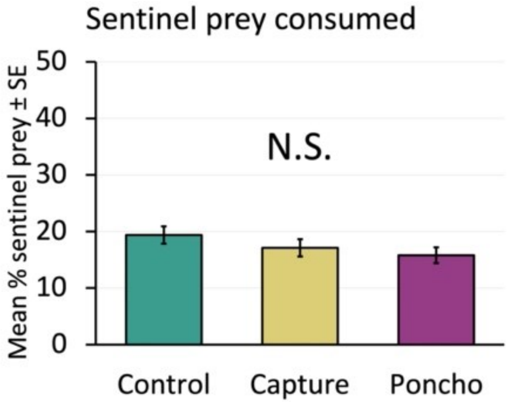


Figure 6 (left). Mean ± SE % sentinel prey caterpillars consumed across three UMD research farms from 2020-2022. Control, Capture, and Poncho did not significantly differ.

Predator abundance was not altered by insecticides.

When we measured the weekly counts of ground beetles, we found similar results between treatments. This was true when we looked at all ground beetles (predators, omnivores, and seed-eaters), as well as when we looked only at predatory beetles (Figure 7A and 7B).

Slug natural enemies did occur throughout the study, suggesting that biocontrol could be more intentionally leveraged.

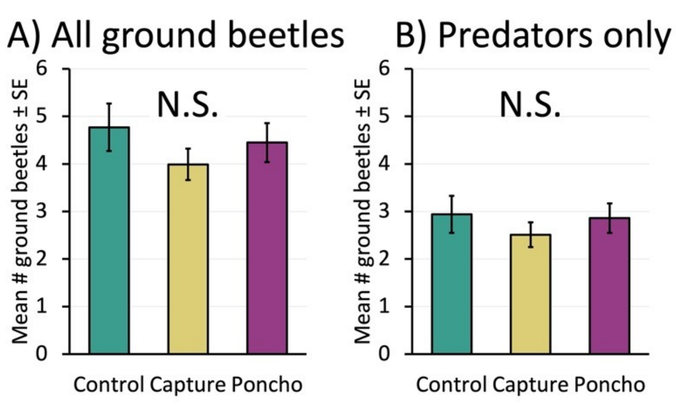


Figure 7. Mean ± SE count of A) all ground beetles, and B) specifically predatory ground beetles, caught per week in pitfall traps across three UMD research farms from 2020-2022. No significant differences.

The two most abundant ground beetle species in our study were both predators. One of these species, *Chlaenius tricolor* (Figure 8) is a slug predator that consumes slugs in agricultural ecosystems[5,10]. Although its abundance was not affected by treatments, it was present at all locations in all years, suggesting that it is a particularly important slug natural enemy in Maryland crops.

Figure 8. *Chlaenius tricolor*, a slug predator that was found throughout the study. Photo credit: ©Molanic 2023: https://www.inaturalist.org/photos/314013175.

Neither insecticide increased slug abundance or slug damage.

If treatments had negatively affected predators, we would expect to see more slugs and damage in the insecticide plots. However, when we compared slug counts between treatments, we found that the insecticide treatments were not different from the control (Figure 9). Slug damage to the seedling corn was also similar across the control and insecticide treatments (Figure 10).

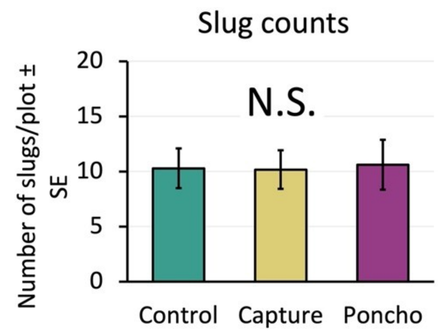


Figure 9. Mean number of slugs per replicate plot ± SE the week closest to seedling sampling across three UMD research farms from 2020-2022. No significant differences.

While slugs can be damaging in many crops, the worst slug damage in our study did not affect corn stand or yield, suggesting that corn is generally tolerant of slug damage at the levels we observed in this study.

Slug damage was scarce across years and locations except in 2021 at Keedysville. Even in that case where a high proportion of seedlings (42% ± 4% on average) were damaged by slugs, we did not see an associated decrease in stand or yield. Corn seedlings were able to outgrow the slug damage as the weather warmed, even when they appeared severely defoliated. The seedling resilience we observed is supported by work on hail damage in corn which shows that as long as the growing point is intact, corn can regrow from complete defoliation[11].

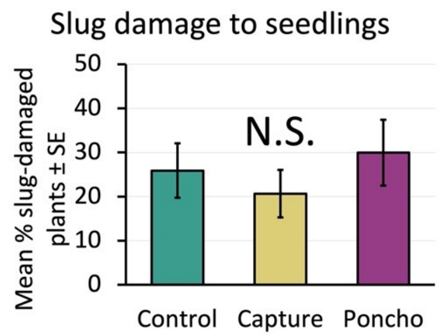


Figure 10. Mean ± SE % of corn seedlings damaged by slugs across three UMD research farms from 2020-2022. Control. No significant differences.

Even though we did not see non-target effects in this study, both pyrethroids and neonicotinoids can decrease natural enemies in crop fields[6,12–14].

Acknowledgments

We would like to thank the farm managers and staff of WYEREC, WMREC, and CMREC Beltsville for their expertise and assistance. We would also like to thank the Hamby lab's many undergraduate researchers for helping complete this project with all their hard work.

Sources:

1. Kullik, S. A., Sears, M. K. & Schaafsma, A. W. Sublethal Effects of Cry 1F Bt Corn and Clothianidin on Black Cutworm (Lepidoptera: Noctuidae) Larval Development. *J. Econ. Entomol.* **104**, 484–493 (2011).
2. North, J. H. *et al.* Value of neonicotinoid insecticide seed treatments in mid-south corn (Zea mays) production systems. *J. Econ. Entomol.* **111**, 187–192 (2018).
3. Reisig, D. & Goldsworthy, E. Efficacy of Insecticidal Seed Treatments and Bifenthrin In-Furrow for Annual White Grub, 2016. *Arthropod Manag. Tests* **43**, 1–2 (2017).
4. Sappington, T. W., Hesler, L. S., Clint Allen, K., Luttrell, R. G. & Papiernik, S. K. Prevalence of sporadic insect pests of seedling corn and factors affecting risk of infestation. *J. Integr. Pest Manag.* **9**, (2018).
5. Douglas, M. R., Rohr, J. R. & Tooker, J. F. Neonicotinoid insecticide travels through a soil food chain, disrupting biological control of non-target pests and decreasing soya bean yield. *J. Appl. Ecol.* **52**, 250–260 (2015).
6. Dubey, A., Lewis, M. T., Dively, G. P. & Hamby, K. A. Ecological impacts of pesticide seed treatments on arthropod communities in a grain crop rotation. *J. Appl. Ecol.* **57**, 936–951 (2020).
7. Ding, J. *et al.* Thiamethoxam, clothianidin, and imidacloprid seed treatments effectively control thrips on corn under field conditions. *J. Insect Sci.* **18**, (2018).
8. Preetha, G. & Stanley, J. Influence of neonicotinoid insecticides on the plant growth attributes of cotton and okra. *J. Plant Nutr.* **35**, 1234–1245 (2012).
9. Flessner, M. & Taylor, S. V. 2021 Field Crops Pest Management Guide. *Virginia Cooperative Extension* (2021) doi:10.1016/B978-0-12-394807-6.00031-9.
10. Eskelson, M. J., Chapman, E. G., Archbold, D. D., Obrycki, J. J. & Harwood, J. D. Molecular identification of predation by carabid beetles on exotic and native slugs in a strawberry agroecosystem. *Biol. Control* **56**, 245–253 (2011).
11. Thomason, W. & Battaglia, M. Early defoliation effects on corn plant stands and grain yield. *Agron. J.* 5024–5032 (2020) doi:10.1002/agj2.20402.
12. Disque, H. H., Hamby, K. A., Dubey, A., Taylor, C. & Dively, G. P. Effects of clothianidin-treated seed on the arthropod community in a mid-Atlantic no-till corn agroecosystem. *Pest Manag. Sci.* **75**, 969–978 (2019).
13. Bhatti, M. A. *et al.* Field Evaluation of the Impact of Corn Rootworm (Coleoptera: Chrysomelidae)–Protected <I>Bt</I> Corn on Foliage-Dwelling Arthropods. *Environ. Entomol.* **34**, 1336–1345 (2006).
14. Taravati, S., Mannion, C., McKenzie, C. & Osborne, L. Lethal and Sublethal Effects of Selected Systemic and Contact Insecticides on Nephaspis oculata (Coleoptera: Coccinellidae), in a Tri-Trophic System. *J. Econ. Entomol.* **112**, 543–548 (2018).

Effects of Cover Crops and Nitrogen Rates on Corn Yields

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Quick summary: When available soil N is lower, rye cover crops may occasionally reduce yields while clover cover crops may occasionally improve yields. At adequate fertilizer levels, yields are not affected by cover crops on sandy, Delaware soils.

As part of the Precision Sustainable Agriculture network (https://www.precisionsustainableag.org/), a study was deployed across multiple states to examine the nitrogen (N) cycling that occurs with cover crops. Plots of rye, clover, and a rye-clover mix were seeded each fall over three years (2020-2023). In the spring, plots were terminated two weeks prior to corn planting and then sidedressed to reach total N rates between **zero to 320 lbs N/acre**. The visual response of the variable N-rates can be observed in Figure 1.

Figure 1. Corn nitrogen rate trials following cover crops in Georgetown, DE in the summer of 2023.

During the first year of the project, the multi-state PSA network observed that when no fertilizer was applied (0 lbs N/acre), the corn yielded less following mix or rye cover crops, but yield was similar across all cover crops with high N rates. At our study site in Georgetown, DE, results varied each year (Figure 2), as our soils are sandy with 1% organic matter and are often lacking residual N. Under irrigation, individual plot yields could be as high as 250 bushels, but the highest N-rates would only average around 200 bushels across all plots (Figure 2, next page).

On our sandy soils in 2021, we had no differences among cover crop types, but were also missing our 0 N-rate treatment (Figure 2a). Although not statistically significant, the no-cover control and rye plots did trend lower in yield when fertilizer rates were less than 250 lbs N. Applying 320 lbs of N produced the highest yields in control and rye plots, while clover and mixed plots only need 240 lbs of N. This is based on treatment values, and not agronomic or economic maximum N derived from calculated plateaus.

Following expected annual variability in weather and fields, 2022 had different trends (Figure 2b). We did observe differences by cover crop types, with clover and mixes producing greater yields between 0 to 80 lbs of N/acre. Above that rate, cover crop type didn't matter. Only the control plots needed the maximum rate of 340 lbs, while all cover crop plots were similar at 240 lbs N/acre.

In 2023 (Figure 2c) we observed no differences by cover crop type, although the control plots again trended lower in yields (grey points). For all plots, a rate of 240 lbs of N would be sufficient to reach maximum yields.

As is typical in crop production, response to management varies each season. While rye may contribute to a tying up N, it didn't occur every year and was more of an issue with very low N-rates. Similarly, clover can contribute to N, but this may be most beneficial when N is lacking in the soil or leaching has removed starter or sidedressed N. Nationwide recommendations from the PSA network should be forthcoming for both corn and cotton.

This research was funded by a USDA-AFRI Sustainable Agricultural Systems grant.

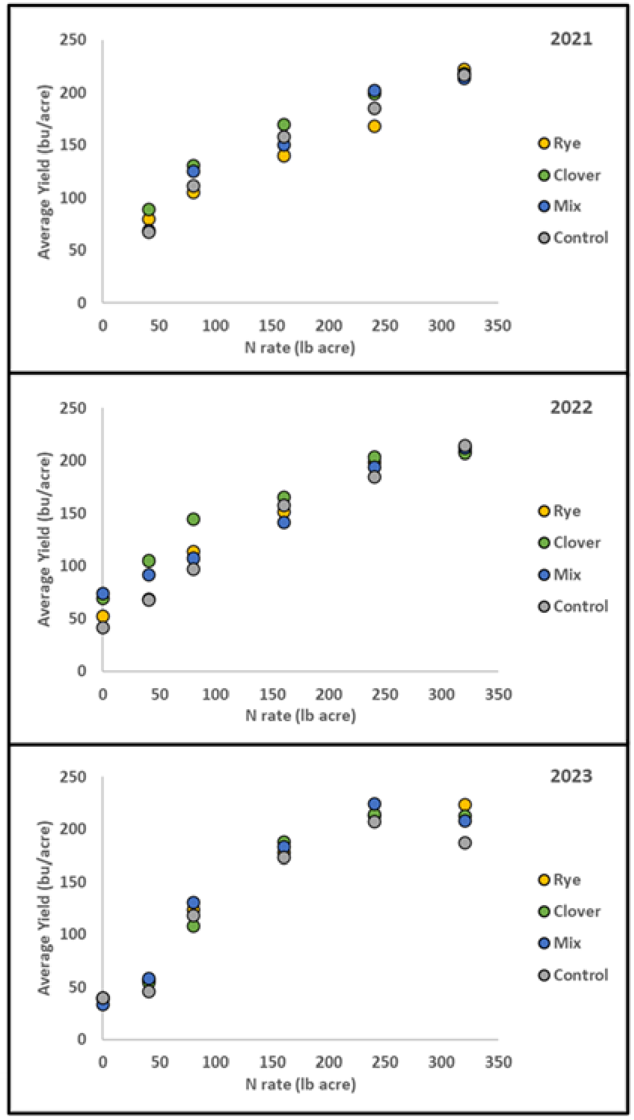

Figure 2. Corn yields based on N-rates and cover crop type in a) 2021, b) 2022, and c) 2023. Control = no cover crop

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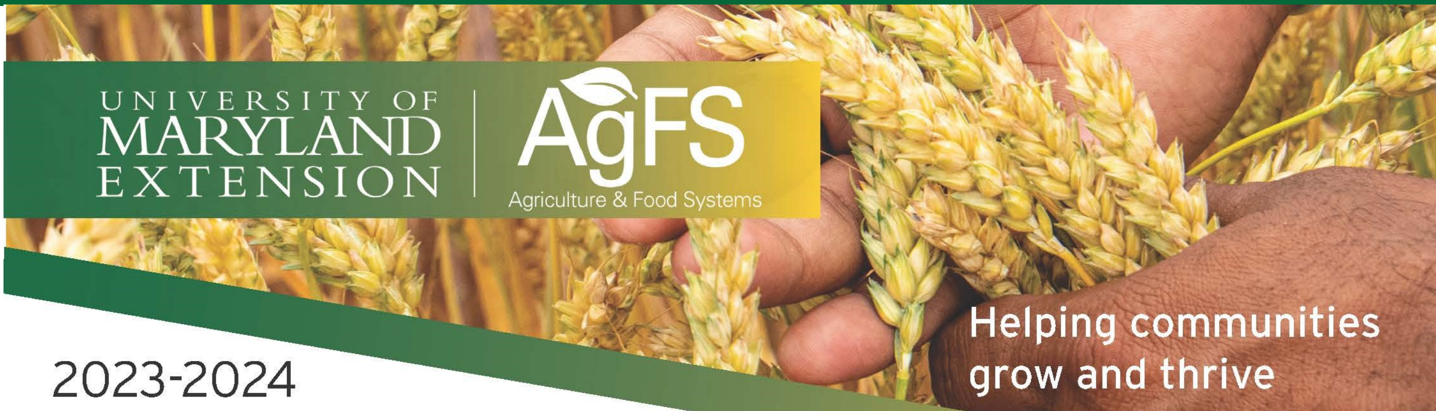

2023-2024 CROP PRODUCTION MEETINGS

University of Maryland Extension is excited to host local, in-person meetings along with statewide virtual meetings for the 2023-2024 production season!

AGRONOMY

11-29-23	Washington Co. Agronomy Day
12-07-23	Kent Co. Agronomy Breakfast
12-07-23	Northern MD Field Crops Day
12-07-23	Southern MD Crops Conf. & Dinner
01-10-24	Talbot County Agronomy Program
01-11-24	Carroll Co. Mid-Winter Mtg.
01-26-24	Lower Shore Agronomy Day
02-08-24	Cecil Co. Winter Agronomy Mtg.
02-20-24	Harford Co. Mid-Winter Agronomy Mtg.
02-21-24	Central MD Agronomy Mtg.
02-22-24	Mid-Shore Agronomy Mtg.
03-01-24	Queen Anne's Agronomy Day

FORAGE

01-16-24	Southern MD Forage Conf.
01-17-24	Western MD Forage Conf.
01-18-24	Central MD Forage Conf.

FRUIT & VEGETABLE

01-25-24	Central MD Veg. Growers Mtg.
01-27-24	Urban Farmer Winter Mtg.
02-20-24	Mid Shore Veg. Growers Mtg.
02-15-24	Western MD Regional Fruit Mtg.

GRAIN MARKETING

01-05-24	Virtual Meeting

Pesticide Certification, Nutrient Management Voucher, and Certified Crop Advisor credits will be offered!

This institution is an equal opportunity provider.

ORNAMENTAL HORTICULTURE

12-08-23	Advanced IPM Conf.
01-8/11-24	2024 Advanced Landscape IPM PHC Short Course
01-18-24	Operator Cert. (FTC) for Writing Nursery Nutrient Mgt. Plans for Nurseries, Greenhouses and Controlled Environments
02-14-24	Eastern Shore Pest Management Conf.
02-29/03-1-24	Biol. Control Conf. (Greenhouses, Nurseries, & Landscapes)

Manure

01-24-24	Manure Meeting

For more information

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Effect of Foliar Fungicides on Frogeye Leaf Spot in Three Maryland Geographies in 2022

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Trials were established at the Wye Research and Education Center in Queenstown, MD (WYE), Central Maryland Research and Education Center in Ellicott City, MD (CMREC), and Western Maryland Research and Education Center in Keedysville, MD (WMREC) in 2022 to assess the efficacy of select fungicides for the suppression of soybean foliar diseases. Soybean 'MAS3521E3' were no-till planted into soybean residue at 150,000 seeds/A on 1 Jun at WMREC and 31 May at CMREC and WYE. All plots were 30 feet long and arranged in a randomized complete block design with 5 replications. Data was collected from the center 5-ft of each plot. The trial consisted of eight foliar fungicide treatments and a non-treated control. Fungicides were applied with a backpack CO_2-pressurized sprayer. Fungicides were applied at the R3 growth stage on 5 Aug at CMREC and WYE and 8 Aug at WMREC. Treatments with subsequent applications were made 14 days later. Yields were collected by harvesting the center 5-ft of each plot and adjusted to 13% moisture. Plots were harvested on 8 Nov at WYE, 18 Nov at CMREC, and 22 Nov at WMREC. Data were analyzed using ANOVA, and significant differences between treatments were separated using Fisher's Least Significant Difference (LSD; a=0.10).

The most predominant foliar pathogen at all locations was frogeye leaf spot (*Cercospora sojina*); however, growing conditions were generally very favorable and no disease was observed at a ratable level. This is likely due to the weather conditions around pod fill, as well as the resistance package in the soybean variety, which has a frogeye leafspot resistance rating of 7 on a 10-point scale (10 being the most resistant). Yields were above average, and no significant differences were observed between treatments at any location. No phytotoxicity was observed with any of the fungicide treatments. Data for 2023 is being processed and will be uploaded to the Agronomy News Blog once available. This work was funded by the Maryland Soybean Board.

Treatment, rate/A and timing	Grain Moisture (%)			Test Weight (lb)			Yield (bu/A)		
	WMREC	CMREC	WYE	WMREC	CMREC	WYE	WMREC	CMREC	WYE
Non-treated control	10.6	12.6	10.7	54.7	56.3	54.3	78.4	72.1	52.0
Headline 2.09 EC/SC, 6.0 fl oz at R3	10.5	12.2	10.5	54.7	56.5	54.4	91.0	74.0	59.8
Veltyma 3.34 S, 7.0 fl oz at R3	10.5	12.5	10.5	54.2	56.5	54.3	90.3	72.0	70.9
Miravis Top 1.67 SC, 13.7 fl oz at R3	10.6	12.2	10.5	55.4	54.0	54.3	86.5	63.0	59.2
Adastrio, 8.0 fl oz at R3	10.5	12.7	10.5	54.9	55.4	54.7	84.6	58.0	58.0
Revytek 3.33 LC, 8.0 fl oz at R3	10.6	12.4	10.4	54.9	55.2	54.3	82.3	76.1	62.9
Revytek 3.33 LC, 8.0 fl oz at R3 fb Revytek 3.33 LC, 8.0 fl oz 14 days after R3	10.6	12.7	10.5	54.8	55.4	54.2	83.6	58.9	60.9
Lucento 4.17 CS, 5.0 fl oz at R3	10.5	12.4	10.5	54.6	55.4	54.4	83.4	67.2	62.6
Lucento 4.17 CS, 5.0 fl oz at R3 fb Lucento 4.17 CS, 5.0 fl oz 14 days after R3	10.6	12.4	10.5	54.6	55.7	54.4	81.9	64.0	55.5
p-value	0.8716	0.3464	0.7067	0.2440	0.7375	0.9531	0.6583	0.7095	0.3133

[z] Means followed by the same letter are not significantly different based on Fisher's Least Significant Difference (LSD; α=0.10).

2023 Maryland Tar Spot of Corn Research

Andrew Kness, Senior Agriculture Agent | akness@umd.edu
University of Maryland Extension, Harford County

Summary

Tar spot is a new foliar fungal disease of corn first discovered in the United States in 2015 and confirmed in Maryland in 2022 and was estimated to be the most significant yield-limiting disease of corn in the US in 2021 and 2022. As a new disease for our state, this project collected preliminary data on the distribution of tar spot in our state and compared the efficacy of different fungicide application timings. Through field surveys we identified and confirmed tar spot in eight Maryland Counties at a frequency of approximately 47% and at a relatively low severity rate (not exceeding 30%). These observations suggest that the tar spot pathogen can overwinter in Maryland, as it has expanded its range from two counties in 2022 to at least eight in 2023. Field evaluations of two fungicide programs: one pass program at VT and a two-pass program at VT followed by R2, we observed a significant difference in tar spot severity and plant lodging compared to the control; however, there was no difference in yield. Additional research on fungicide timing and the spread of this disease should be conducted in the future to help develop improved management recommendations.

Survey of Tar Spot Distribution in Maryland

Several fields were scouted for tar spot starting during late vegetative growth stages and frequency and intensity of scouting was increased from tassel through harvest. Initial scouting was focused in fields in Harford County near fields where tar spot was confirmed in 2022. In addition, reports were solicited from other Extension Agents and crop consultants/scouts throughout the state. Suspected positive samples were confirmed by laboratory technique and all positive samples were uploaded to the tar spot tracker map on corn.ipmpipe.org.

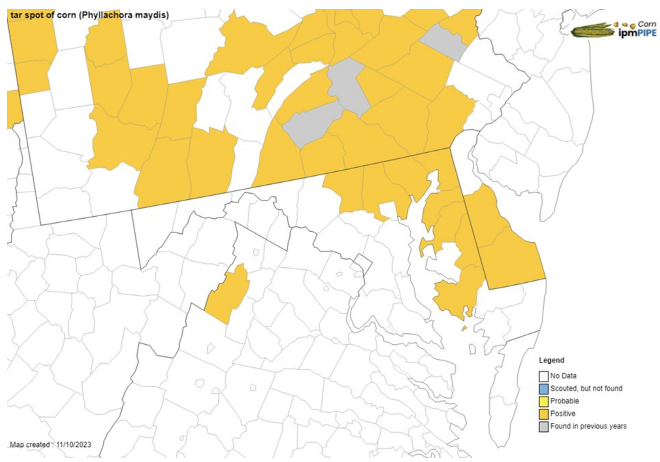

Figure 1. Map showing confirmed distribution of tar spot for the 2023 growing season (yellow). Map from corn.ipmpipe.org.

The first reported and confirmed incidence of tar spot in Maryland for 2023 came from a corn field in Cecil County on August 22. The second came from Carroll County on August 31, followed by Harford County on September 3. We confirmed tar spot in the additional counties of Kent and Queen Anne's on September 19; Baltimore County on September 22; Caroline County on September 25, and Dorchester County on October 6 (Figure 1).

Figure 2. Corn leaf with approximately 10% tar spot severity. Tar spot symptoms include raised, black specks on the leaves.

Several fields were scouted in Northern Harford County throughout the year surrounding fields where tar spot was confirmed in 2022. By the end of the season, tar spot was found in over 50% of these fields (9/16) at levels ranging from 2% to 25% severity (Figure 2). It was observed that tar spot severity continued to increase after black layer for as long as there was green, living tissue remaining on the plants. This increase in severity after physiological maturity does not affect yield but does make for a notably increased level of severity present at harvest and thus the potential for an increase in overwintering spores that will provide inoculum for the following year.

An additional survey of 12 fields on Maryland's Eastern Shore from Cecil to Queen Anne's County was conducted on September 19. During this time, two fields were confirmed with tar spot. Severity was very low (<2%) in the field in Queen Anne's County, and high in the field in Kent County (30%).

Altogether, tar spot was confirmed in 16 out of 34 fields (47%) scouted/reported throughout the state (Figure 3), with samples coming from as far west as Washington County (no confirmed samples) east to Cecil County (two confirmed samples) and south on the Maryland Eastern Shore as far as Dorchester County (one sample confirmed).

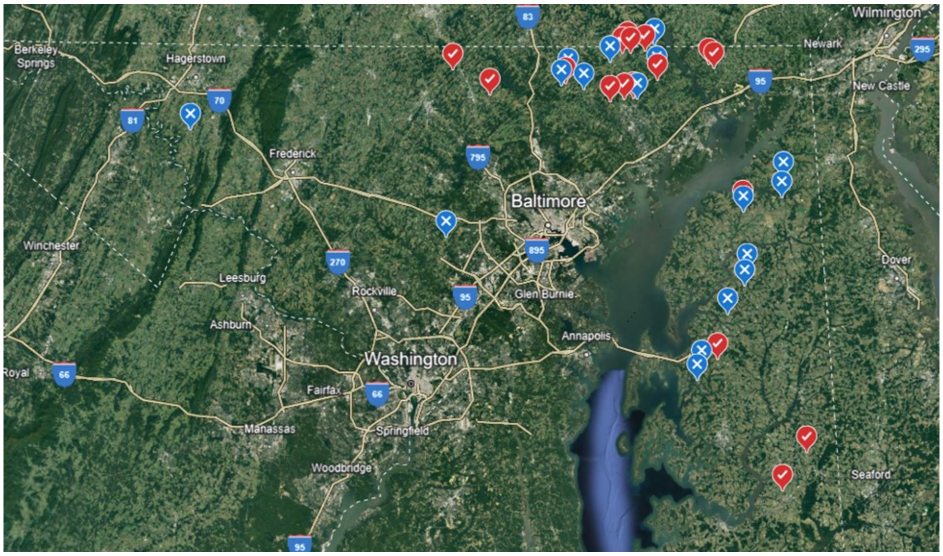

Figure 3. Google Earth map of fields scouted (blue markers) and confirmed (red markers) presence of tar spot. Markers are approximate locations and not precise to protect the identity of the landowner and/or farmer.

Weather conditions were favorable for tar spot on the Eastern Shore and Northern Maryland; however, severe drought conditions from Frederick County west may have prevented its widespread establishment in Western Maryland.

Based on this survey, tar spot appears to be established in all the northern counties east of Frederick and south on the Eastern shore to at least Dorchester County, at a frequency of approximately 40-50%. Judging by the confirmed occurrences in other counties in different states, it is likely that tar spot is present in more Maryland Counties than determined by this survey.

On-Farm Fungicide Trials

Fungicides are an effective management tool for foliar diseases of corn, including tar spot. Research from the Midwest has shown a positive response to fungicide applications in fields where tar spot disease severity is high. However, there is debate as to if one fungicide application made around VT is sufficient to control tar spot, as yield losses have been reported as late as R4. In 2023 we established an on-farm trial to evaluate the response to a single fungicide application compared to a two-pass program for managing tar spot in corn.

Field plots were established at a farm in Harford County, MD in a field immediately adjacent to where tar spot was found in 2022. Corn (Revere Seed '1307 TCRIB') was no-till planted into soybean residue with a John Deere 1775 NT ExactEmerge™, 30-inch, 16 row planter at the rate of 35,000 seeds/acre. Rows 1, 2, 15, and 16 on the planter were shut off to create alleys between adjacent plots and to eliminate treatment overlap, as well as to ensure harvest accuracy. This resulted in 12-row plots that were between 75 and 150 feet long. Plots were arranged in the field in a randomized block with three treatments and five replicates (Figure 4).

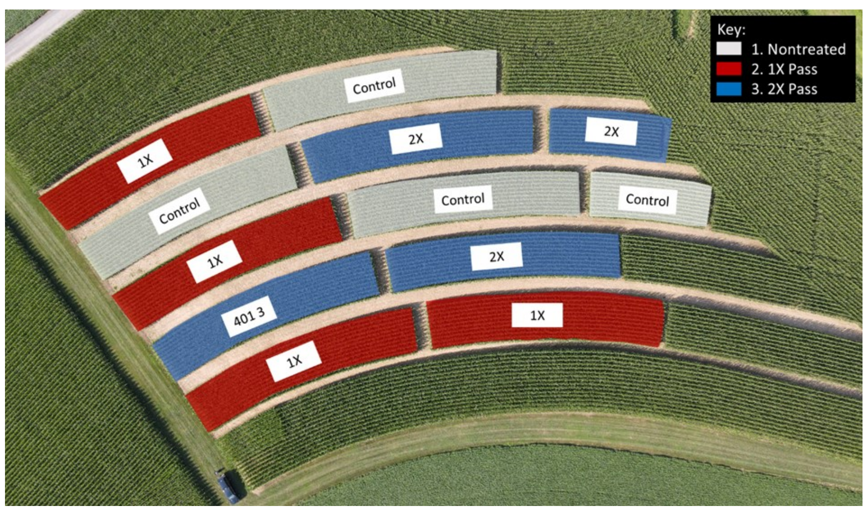

Figure 4. Tar spot fungicide timing research plot layout.

Fungicides (Table 1) were applied at the VT and R2 growth stages using a DJI T30 drone calibrated to deliver 2.8 gallons per acre spray volume to the entire length of the 12-row plots. VT applications were made on July 12 and R2 applications were made on August 5. Trivapro 2.1 SE was used for all applications. Trivapro was selected because previous research has demonstrated that multi-mode-of-action products have the best efficacy against tar spot.

Foliar diseases were rated prior to fungicide application and approximately every two to three weeks following until harvest. Disease severity from tar spot was visually rated as the percent leaf area infected in the canopy from 10 random plants from the center two rows of each plot.

Table 1. Fungicide treatments.

Treatment	Product Name *Active Ingredient(s)*	Application Rate (& Timing)
Nontreated Control	N/A	N/A
1X Pass	Trivapro 2.1 SE *Benzovindiflupyr + Azoxystrobin + Propiconazole*	13.7 fl oz/A (VT)
2X Pass	Trivapro 2.1 SE *Benzovindiflupyr + Azoxystrobin + Propiconazole*	13.7 fl oz/A (VT) & 13.7 fl oz/A (R2)

Lodging scores were collected at harvest by conducting a "push test" on 10 plants from the center two rows of each plot. The push test consists of pushing a corn plant approximately 30 degrees from vertical; plants that break have compromised stalk strength and were considered lodged.

Yield data were collected by harvesting 12 rows of each plot using a John Deere S780 combine on October 13, 2023. Yield data was exported from the combine monitor and RTK was used to correlate yield with plot locations since we were not able to collect individual plot weights. All yields reported are adjusted to 15.5% moisture. All data were analyzed using ANOVA and significant differences between treatments were separated using Fisher's Least Significant Difference (LSD; α=0.10).

On-Farm Trial Results

Tar spot was first observed in the plots on August 29 present at a very low level (less than 2% severity). Overall tar spot disease severity was low throughout the season in these plots. One possible explanation for this is the early planting date, which likely allowed the corn to complete its critical reproductive growth stages before weather conditions were favorable for tar spot development.

Early disease ratings revealed a significant difference in tar spot severity (P=0.0176) in treated plots vs nontreated plots (Table 2). However, late disease ratings collected at harvest show an overall increase in tar spot severity, but no difference between treated and nontreated plots. This is likely due to the fact that fungicides can only offer around 14-21 days of protection. In this trial, the second fungicide application did not provide improved tar spot control compared to the single pass treatment; however, the single fungicide application at VT delayed tar spot infection compared to the nontreated control.

Table 2. 2023 Tar Spot Disease Rating and Harvest Data.

Treatment	Tar Spot Severity (%)		Lodged Plants (%)	Grain Yield (bu/acre)	Grain Moisture (%)
	9/11/23	*10/12/23*			
Control	3.05 a*	3.75	10.0 a	192.56	19.06
1X Pass	1.18 b	2.88	5.0 a	199.05	19.41
2X Pass	0.85 b	4.00	0.0 b	201.56	20.31
p-value	*0.0176*	*0.4133*	*0.0680*	*0.2123*	*0.4343*

*Treatments connected by the same letter are not significantly different from each other (α=0.10).

The control plots averaged 192.56 bu/acre with a low of 169.7 and high of 214.6; the single pass (1X pass) program yielded an average of 199.05 bu/acre with a low of 177.5 and high of 228.6 bu/acre; and the two-pass (2X pass) fungicide treatment yielded an average of 201.56 bu/acre with a low and high of 194.4 and 222.7 bu/acre, respectively. However, there are no statistically significant differences in yield between treatments (P=0.2123). Likewise, there was also no significant difference in grain moisture. Tar spot disease severity was relatively low; likely too low to impact yield in this trial, leading to no yield response.

The 2X pass fungicide program did improve standability of the crop at harvest, with 0.0% lodging, significantly better than the 1X program (5.0%) and the control (10.0%).

This work was supported by funding through the Maryland Grain Producer's Utilization Board and in-kind support from The Mill. Special thanks to Clear Meadow Farm for their use of land and equipment making this research possible.

MARYLAND GRAIN PRODUCERS UTILIZATION BOARD

Effects of Increasing Corn Tissue Boron and Sulfur Concentrations on Nitrogen and Yield

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University of Delaware

As anions, sulfate (SO_4) and boron (B) leach easily from the soil surface (particularly sandy loams), potentially leading to sulfur (S) deficiencies in grain crops. In this study we observed whether increasing S and B fertilizer applications affected tissue Nitrogen (N), S and B concentrations as well as overall yield. Sulfur was added in small amounts as starter, with an additional treatment with S in sidedress. Then the same treatments were repeated with 0.5 lbs of B at sidedress (Table 1).

Table 1. Treatments applied each year as starter

Starter + Sidedress	Starter	Sidedress	Total N (lbs/acre)	Total S (lbs/acre)	Total B (lbs/acre)
1 - (N + N)	UAN	UAN	230	-	-
2 - (N/S + N)	Nsul	UAN	230	4	-
3 - (N/S + N/S)	Nsul	Nsul	230	4+18	-
4 - (N +N/B)	UAN	UAN + B	230	-	0.5
5 - (N/S + N/B)	Nsul	UAN + B	230	4	0.5
6 - (N/S + N/S/B)	Nsul	Nsul + B	230	4+18	0.5

Over the three years (2021-2023) of the study, yield did not increase based on S or B additions (Figure 1). There was an upward trend with yield for B additions in 2023, but it was not significant. This trend was not observable in 2021 or 2022. Even within our sandy coastal Delmarva soils, neither S or B appeared yield limiting within this study.

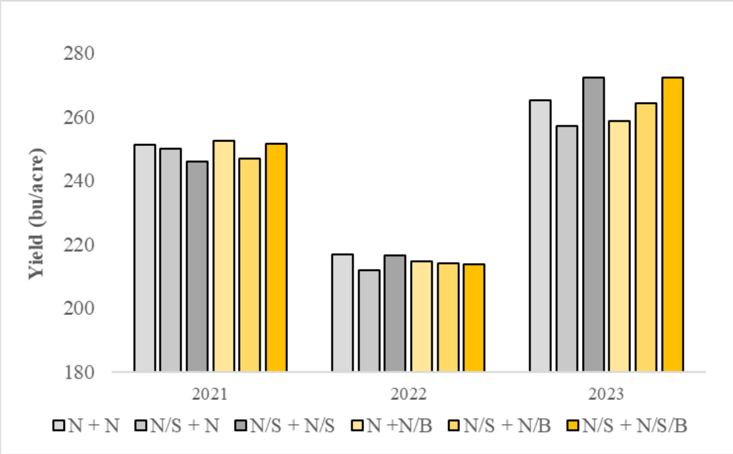


Figure 1. Yields each season (2021, 2022, 2023) across the six treatments of N, S, and B (starter + sidedress).

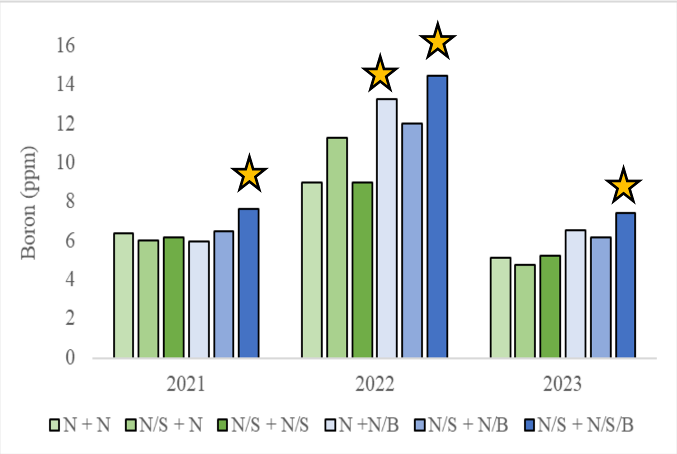


Figure 2. Tissue boron (ppm) each season (2021, 2022, 2023) across the six treatments of N, S, and B (starter + sidedress). Only the statistically highest B concentrations (a = 0.10) within each year are marked with a star.

Additionally, neither N or S varied within the corn ear leaf tissue, although they were lowest in 2023 (data not shown). However, B did increase in the corn leaves with fertilizer applications, particularly for the treatment with both S and B additions at sidedress. This treatment had the highest B concentrations in the ear leaf each year (Figure 2). Although neither B or S had an effect on yield in this study, if you are experiencing a B deficiency, additions with S at sidedress may assist in plant uptake.

This project was funded by Maryland Grain Producers https://marylandgrain.org/.

MARYLAND GRAIN PRODUCERS UTILIZATION BOARD

Corn Planting Timing Effects on Yield and the Relationship to Deer Feeding

Jarrod Miller, Extension Agronomist | jarrod@udel.edu
University of Delaware

Based on some observations in prior years, we planted irrigated corn on three different timings (April, May, and June) to observe three outcomes 1) yield, 2) nutrient uptake, 3) herbivory by deer. Average yields were all below 200 bushels, at 143, 175, and 128 bu/acre in the April, May, and June planted plots, respectively. Yield losses are potentially related to a range of factors, including deer feeding, weather, and soil nitrogen.

Figure 1. Deer feeding in plots in Georgetown, DE, June 2023.

Deer feeding focused on the earliest planted plots (April), with some feeding occurring in the May planted plots. It is deer feeding that most likely limited the April and May yields (Figure 1). The June planted plots received very little deer feeding through the season, but ears were stunted due to the interactions with summer weather and planting timing. Tissue nutrient analyses will be completed this winter to examine interactions with uptake, particularly as nitrogen appeared to be limiting.

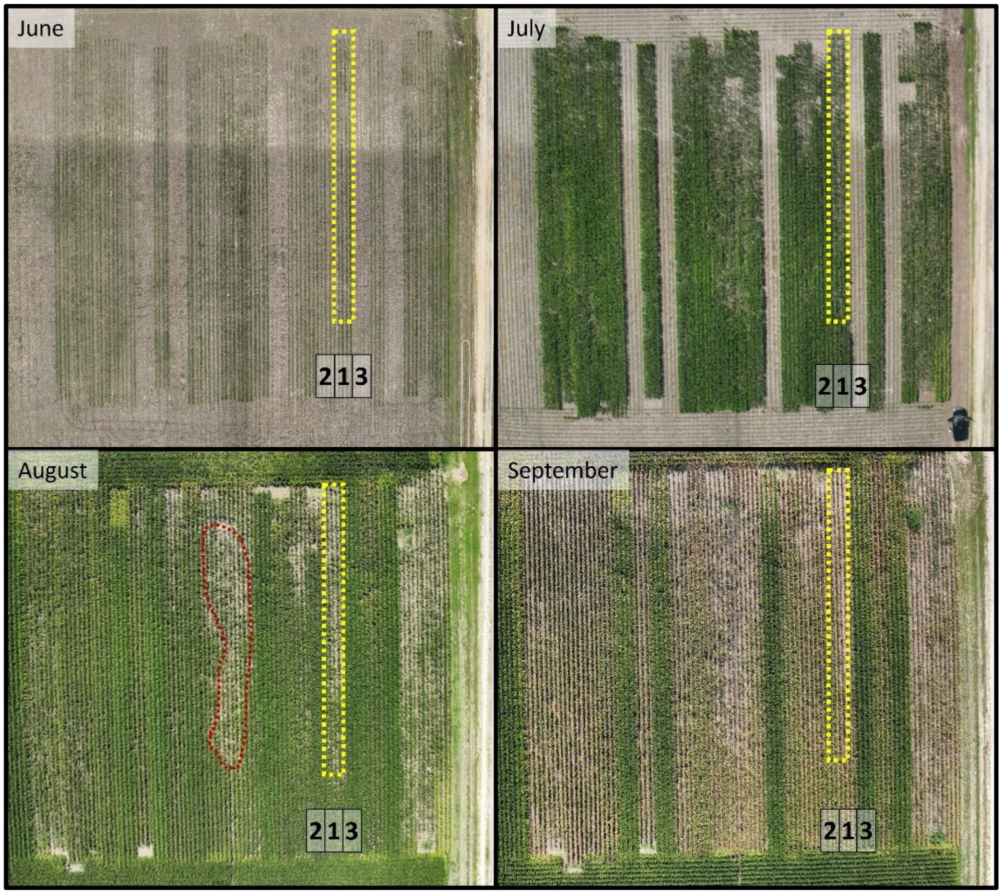


Figure 2. Plots planted in (1) April, (2) May, and (3) June. Yellow box and red outline are April plots. Drone flight month is in the upper left hand corner.

Evidence of concentrated feeding can be observed in Figure 2, where the dotted yellow box represents the first (1) planting timing in April. Plots were side by side, so deer had the opportunity to feed on June planted corn (3), but preferred the more mature corn through most of the summer. I am not a wildlife expert, and cannot give advice on what this means outside of watching your earlier planted fields and testing out planting timings along wood edges.

This project was funded by Maryland Grain Producers https://marylandgrain.org/.

MARYLAND GRAIN PRODUCERS UTILIZATION BOARD

Soil Texture Relationships to Grid Sampled Coastal Soils

Jarrod Miller, Extension Agronomist | jarrod@udel.edu and James Adkins, Irrigation Engineer
University of Delaware

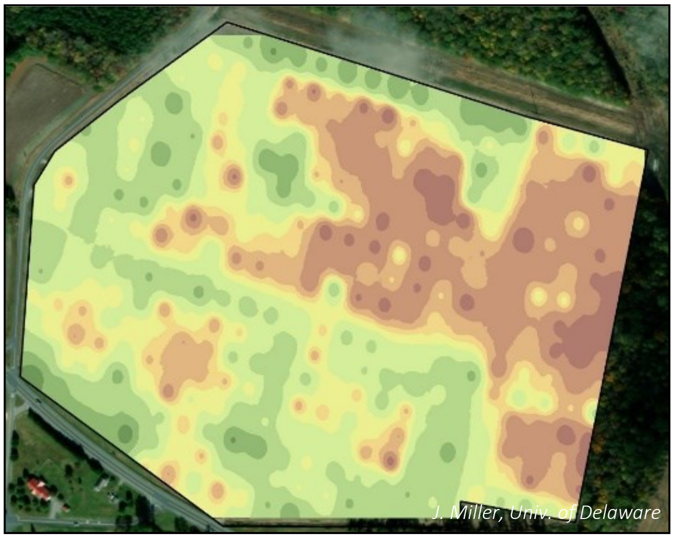


Figure 1. Cation exchange capacity (2-8 meq/100g soil) based on ¼ acre grids at the Warrington Research Farm. Higher CEC is green.

Over four hundred soil samples were collected in 2022 for a grid sampling project at the Warrington Irrigation Research farm. Based on the range in cation exchange capacity (CEC) on the farm, 31 of the samples were analyzed for soil texture (sand, silty, clay %). Of those samples, sandy loams were the dominant texture (23 locations), followed by loamy sand (7) and one silty clay loam sample. Clay contents ranged from 5 to 27%, with an average content of 10% across the research farm.

The goal was to determine if texture could help predict some contents of nutrients as well as soil properties. Characteristics that increased with clay content (Figure 2) include CEC, organic matter (OM), potassium (K), sulfur (S), and aluminum (Al). It is well known that CEC is associated with greater clay content, as well as the ability of clay to bind and protect OM from decomposition. It is a little more difficult to determine whether the increased CEC is from clay alone, or in connection with greater soil OM. Similarly, the greater S with clay content could also be related to OM contents.

The greater K associated with clay indicates how important higher CEC is for adequate fertility, as it probably leaches easier from lower CEC soils. It could also be related to the type of clays in the soil. Not show here are increases in Al, Mg, and B with clay, and a decrease in the soil buffer pH.

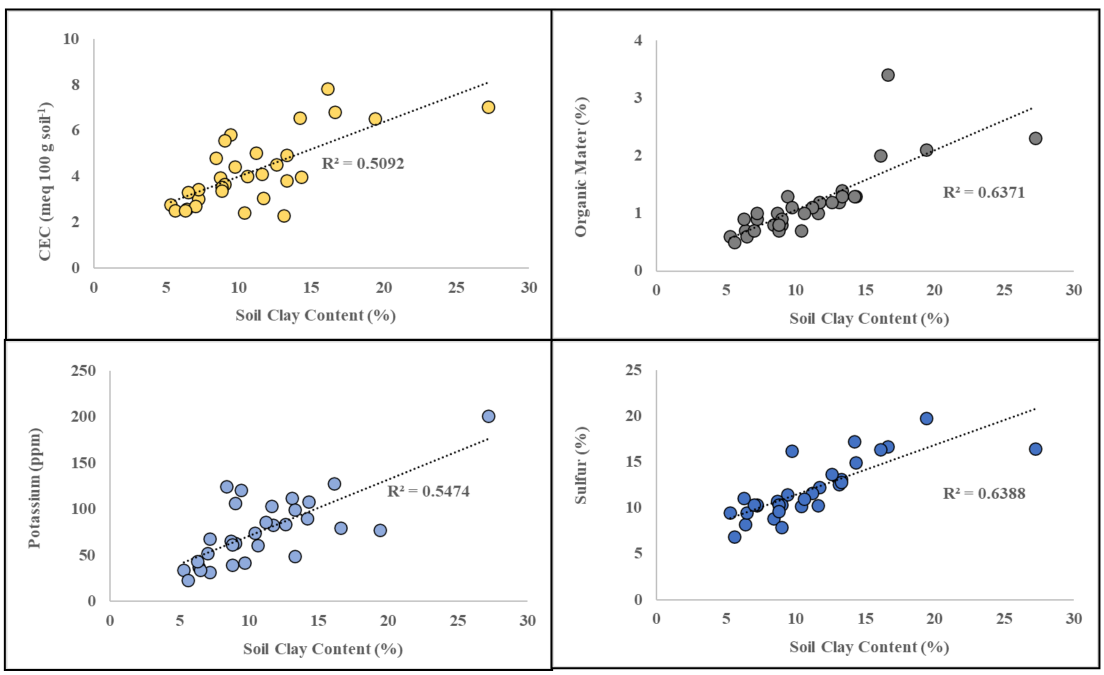


Figure 2. Clay content comparisons to CEC (yellow), organic matter (grey), potassium (light blue), and sulfur (dark blue) across the research farm.

Coastal soils do not represent the entire region, and some of these relationships may be stronger due to the lower CEC found in our sandy Delmarva soils. However, this does highlight the need to understand soil variability and the effects on leaching and loss when making fertility decisions, including variable rate applications.

This project was funded by Maryland Grain Producers https://marylandgrain.org/.

MARYLAND GRAIN PRODUCERS UTILIZATION BOARD

University of Maryland Extension Leads the Next Generation of the Statewide Nutrient Management Program

University of Maryland Extension press release

University of Maryland Extension (UME) has launched an enhanced nutrient management planning process designed to adapt to modern farming practices and operations that better align with Maryland's agricultural regulations and environmental goals. Moving forward, UME will now administer and coordinate statewide nutrient management planning following the finalization of the agreement between the College of Agriculture and Natural Resources (AGNR) and the Maryland Department of Agriculture.

This reinvigorated effort marks a significant opportunity for enhanced collaboration between UME led advisors and the farming community. The program will build on its prior successes and service model that includes no cost nutrient management plans; soil, manure and tissue sampling assistance and guidance; farmer training and certification; continuing education training opportunities, and much more.

Maryland law requires farmers grossing at least $2,500 a year or livestock producers with at least 8,000 pounds of live animal weight to follow nutrient management plans when fertilizing crops and managing animal manure. Nutrient management plans specify how much fertilizer, manure or other nutrient sources may be safely applied to crops to achieve yields and prevent excess nutrients from impacting waterways.

Key highlights of the reinvigorated program:

Statewide Coverage: UME will increase staffing to provide nutrient management planning coverage across the entire state. Farmers across Maryland can benefit from this service, ensuring sustainable and responsible agricultural practices.

Staffing and Training: As part of this initiative, the university is in the process of hiring and training additional nutrient management advisors. These advisors will play a crucial role in assisting farmers and facilitating compliance with Maryland's regulations. There are multiple positions statewide at various locations, with more information available at https://ejobs.umd.edu/postings/113947.

Scientifically Grounded Plans: Nutrient management plans developed through this program are rooted in scientific principles and adhere to Maryland's regulatory framework, promoting both profitable and sustainable farming practices.

"The University of Maryland Extension is committed to the improvement of this program and increasing farmer accessibility to help them meet their regulatory goals and preserve Maryland's waterways," said Craig Beyrouty, dean and director of AGNR. "We are thrilled to launch this new model in our ongoing efforts to support Maryland's agricultural community."

FREE FIELD DAY!
includes coffee, light breakfast, and lunch!

Advanced Cover Cropping

December 6, 2023 | Queen Anne, MD

Farmers and ag service providers are invited to learn about cover cropping strategies from two successful farmers and how they came to their current practices.

Tour stops include:

- Arnold Farm - Conventional Vegetable Operation
- Mason's Heritage Farm- Organic Grain Operation

When: Wednesday, December 6, 2023 9:00 am - 3:00 pm

Where: Tour starts at Arnold Farm
219 Double Creek Point Rd, Chestertown, MD 21620

For more information or to register visit **go.umd.edu/advancedcovercropping** or call 410-651-1350. Approved for 4 nutrient management credits (MD & DE) and 5 CCA credits.

Funding for this project provided by Maryland NRCS Conservation Innovation Grant, NFWF Chesapeake Bay Small Watershed Grant, NIFA 1980 Capacity Building Grant. This is a partially outdoor event. For questions or to request special accommodations email Sarah Hirsh at shirsh@umd.edu. Please request special accommodations at least two weeks prior to event.
University programs, activities, and facilities are available to all without regard to race, color, sex, gender identity or expression, sexual orientation, marital status, age, national origin, political affiliation, physical or mental disability, religion, protected veteran status, genetic information, personal appearance, or any other legally protected class.

2023 Maryland Corn Hybrid Trial Results

Nicole Fiorellino, Extension Agronomist| nfiorell@umd.edu
University of Maryland, College Park

Linked below is the 2023 University of Maryland Corn Hybrid Trials results performed annually at multiple UMD Research and Education Centers. The factsheet can also be downloaded from the MD Crops website at https://psla.umd.edu/extension/md-crops. To request a hard copy, please contact your local UMD Extension office. Many thanks to Louis Thorne and Joe Crank for their leadership and management of the trials, from seed organization, to planting, to harvest. These trials could not be completed without them.

We are grateful for the funding provided by Maryland Grain Producers Utilization Board to support these trials. MGPUB provides our program with checkoff funding to support applied agricultural research and generate results that directly benefit Maryland producers.

For more information on how to interpret and utilize hybrid/variety trial data, check out our fact sheet, *What do the numbers really mean? Interpreting variety trial results*.

Click here for the report

Soybean Pesticide Survey

The U.S. Soybean Export Council is seeking external assistance in assessing the use and importance of pesticides, fungicides and insecticides in the production of U.S. soybeans. With this information, USSEC seeks to quantify the risks posed by misaligned or non-existent Maximum Residue Limits for pesticides in the international trade of soybeans. As part of this effort, USSEC is collecting information on the importance of different pesticides in U.S. soybean producing areas to better understand which chemistries are most important to U.S. farmers. This information will allow USSEC to better assess risks associated with differences in global MRLs and improve U.S. soy marketability.

This survey link below has a list of chemistries that are important to soybean production in the U.S. in the form of insecticides, herbicides, fungicides, pesticides, and other biological agents. Please feel free to share this link with other extension staff who also may be able to provide guidance on the importance of the chemistries. As you are filling out the survey, if a chemistry doesn't apply to your area of expertise, please feel free to skip it.

https://forms.gle/4CnWbzwgTo5NGxxZA

We are looking to collect all responses by **November 27** at the latest.

Maryland Drought Activates SBA Disaster Loan Program

U.S. Small Business Administration press release

The U.S. Small Business Administration (SBA) announced today that federal Economic Injury Disaster Loans (EIDLs) are available in **Maryland** for small businesses, small agricultural cooperatives, small businesses engaged in aquaculture, and most private nonprofit organizations with economic losses due to the drought conditions that began on Sept. 5, 2023.

The declaration includes Frederick and Washington counties and the contiguous Allegany, Carroll, Howard, and Montgomery in **Maryland**; Loudon in **Pennsylvania;** Jefferson, Morgan, and Berkeley in **West Virginia**.

"Working capital loans from the SBA are essential to eligible small businesses when the Secretary of Agriculture declares a disaster due to farmers' crop losses," said Francisco Sanchez Jr., associate administrator of SBA's Office of Disaster Recovery & Resilience. "These loans help sustain rural economies when a disaster occurs."

Under this declaration, the SBA's Economic Injury Disaster Loan (EIDL) program is available to eligible farm-related and nonfarm-related entities that suffered financial losses as a direct result of this disaster. Apart from aquaculture enterprises, SBA cannot provide disaster loans to agricultural producers, farmers, and ranchers. Nurseries are eligible to apply for economic injury disaster loans for losses caused by drought conditions.

The loan amount can be up to $2 million with interest rates of **4%** for small businesses and **2.375%** for private nonprofit organizations, with terms up to 30 years. Interest does not accrue, and payments are not due until 12 months from the date of the first loan disbursement. The SBA sets loan amounts and terms based on each applicant's financial condition.

Eligibility is based on the size of the applicant, type of activity and its financial resources. These working capital loans may be used to pay fixed debts, payroll, accounts payable, and other bills that could have been paid had the disaster not occurred. The loans are not intended to replace lost sales or profits.

Applicants may apply online via the SBA's secure website at sba.gov/disaster and should apply under SBA declaration **# 20069**.

Disaster loan information and application forms may also be obtained by calling the SBA's Customer Service Center at 800-659-2955 (if you are deaf, hard of hearing, or have a speech disability, please dial 7-1-1 to access telecommunications relay services), or sending an email to DisasterCustomerService@sba.gov. Loan applications can be downloaded from the SBA's website at sba.gov/disaster. Completed applications should be mailed to: U.S. Small Business Administration, Processing and Disbursement Center, 14925 Kingsport Road, Fort Worth, TX 76155.

Submit completed loan applications to the SBA no later than **July 1, 2024.**

About the U.S. Small Business Administration

The U.S. Small Business Administration helps power the American dream of business ownership. As the only go-to resource and voice for small businesses backed by the strength of the federal government, the SBA empowers entrepreneurs and small business owners with the resources and support they need to start, grow, expand their businesses, or recover from a declared disaster. It delivers services through an extensive network of SBA field offices and partnerships with public and private organizations. To learn more, visit www.sba.gov.

Novemeber 2023 Grain Market Report

Dale Johnson, Farm Management Specialist | dmj@umd.edu
University of Maryland Extension

Information summarized from the USDA WASDE report

Corn

This month's 2023/24 U.S. corn outlook is for larger production, domestic use, exports, and ending stocks. Corn production is forecast at 15.2 billion bushels, up 170 million from last month on a 1.9-bushel increase in yield to 174.9 bushels per acre. With larger supplies, feed and residual use is raised 50 million bushels to 5.7 billion and corn used for ethanol is raised 25 million bushels to 5.3 billion. Exports are raised 50 million bushels to 2.1 billion. With supply rising more than use, corn ending stocks are up 45 million bushels to 2.2 billion. The season-average corn price received by producers is lowered 10 cents to $4.85 per bushel.

Soybeans

The U.S. soybean outlook for 2023/24 includes increased production and ending stocks. Soybean production is forecast at 4.13 billion bushels, up 25 million on higher yields. The largest production changes are for Wisconsin, Tennessee, North Dakota, South Dakota, and Ohio. With crush and exports unchanged, soybean ending stocks are raised to 245 million bushels. The U.S. season-average soybean price for 2023/24 is forecast at $12.90 per bushel, unchanged from last month.

Wheat

The outlook for 2023/24 U.S. wheat this month is for larger supplies, decreased domestic use, unchanged exports, and higher ending stocks. Supplies are raised on increased imports, up 10 million bushels to 145 million, on a strong pace to date and expectations for the rest of the marketing year. Total domestic use is projected 4 million bushels lower to 1,155 million, all on a reduction in food use following the release of the latest NASS Flour Milling Products report. July-September wheat used in milling is the smallest for this quarter since at least 2014 when NASS began reporting this series. With no other changes to the U.S. balance sheet, projected ending stocks are raised 14 million bushels to 684 million. The projected 2023/24 season-average farm price is lowered $0.10 per bushel to $7.20 on lower expected prices for the remainder of the marketing year.

CORN	Nov Proj. 2023/24	Oct Proj. 2023/24	Est. 2022/23	2021/22	2020/21	2019/20
Planted (Million acres)	94.9	94.9	88.6	93.3	90.7	89.7
Harvested (Million acres)	87.1	87.1	79.1	85.3	82.3	81.3
Bushel yield/harvested acre	174.9	173	173.4	176.7	171.4	167.5
Supply (Million Bushels)						
Beginning stocks	1,361	1,361	1,377	1,235	1,919	2,221
Production	15,234	15,064	13,715	15,074	14,111	13,620
Imports	25	25	39	24	24	42
Supply, total	16,621	16,451	15,130	16,333	16,055	15,883
Demand (Million Bushels)						
Feed and residual	5,650	5,600	5,549	5,726	5,602	5,900
Feed % of Production	37.1%	37.2%	40.5%	38.0%	39.7%	43.3%
Food, seed & industrial	6,740	6,715	6,558	6,757	6,472	6,286
Ethanol for fuel	5,325	5,600	5,176	5,320	5,033	4,857
Ethanol % of Production	35.0%	37.2%	37.7%	35.3%	35.7%	35.7%
Domestic, total	12,390	12,315	12,108	12,483	12,704	12,186
Exports	2,075	2,025	1,661	2,472	2,747	1,777
Use total	14,465	14,340	13,769	14,956	14,821	13,963
Ending stocks	2,156	2,111	1,361	1,377	1,235	1,919
Ending stocks to use ratio	14.9%	14.7%	9.9%	9.2%	8.3%	13.7%
Average farm price/bushel	$4.85	$4.95	$6.54	$6.00	$4.53	$3.56

SOYBEANS	Nov Proj. 2023/24	Oct Proj. 2023/24	Est. 2022/23	2021/22	2020/21	2019/20
Planted (Million acres)	83.6	83.6	87.5	87.2	83.4	76.1
Harvested (Million acres)	82.8	82.8	86.2	86.3	82.6	74.9
Bushel yield/harvested acre	49.9	49.6	49.5	51.7	51	47.4
Supply (Million Bushels)						
Beginning stocks	268	268	274	257	525	909
Production	4,129	4,104	4,270	4,465	4,216	3,552
Imports	30	30	25	16	20	15
Supply, total	4,428	4,403	4,569	4,738	4,761	4,476
Demand (Million Bushels)						
Crushings	2,300	2,300	2,212	2,204	2,141	2,165
Exports	1,755	1,755	1,992	2,152	2,261	1,682
Seed	101	101	97	102	101	96
Residual	26	27	-	6	(4)	9
Use, total	4,182	4,183	4,301	4,464	4,504	3,952
Ending stocks, total	245	220	268	274	257	525
Ending stocks to use ratio	5.9%	5.3%	6.2%	6.1%	5.7%	13.3%
Average farm price/bushel	$12.90	$12.90	$14.20	$13.30	$10.80	$8.57

Corn and soybean crop marketing year begins September 1 and ends on August 31

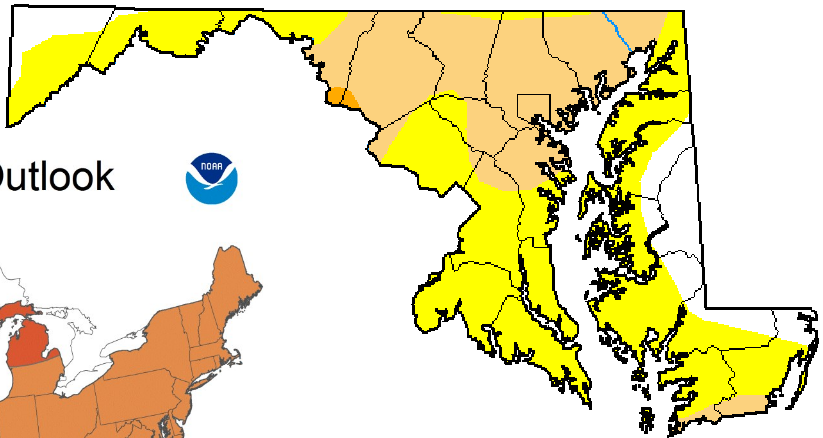
WHEAT	Nov Proj. 2023/24	Oct Proj. 2023/24	Est. 2022/23	2021/22	2020/21	2019/20
Planted (Million acres)	49.6	49.6	45.7	46.7	44.5	45.5
Harvested (Million acres)	37.3	37.3	35.5	37.1	36.8	37.4
Bushel yield/harvested acre	48.6	48.6	46.5	44.3	49.7	51.7
Supply (Million Bushels)						
Beginning stocks	582	582	698	845	1028	1,080
Production	1,812	1,812	1,650	1,646	1,828	1,932
Imports	145	135	122	96	100	105
Supply, total	2,539	2,529	2,470	2,588	2,957	3,117
Demand (Million Bushels)						
Food	970	974	973	971	961	962
Seed	65	65	68	58	64	60
Feed & Residual	120	120	89	64	93	102
Domestic, total	1,155	1,159	1,130	1,093	1,117	1,123
Exports	700	700	759	796	994	965
Use, total	1,855	1,859	1,888	1,889	2,111	2,089
Ending stocks, total	684	670	582	698	845	1,028
Ending stocks to use ratio	36.9%	36.0%	30.8%	37.0%	40.0%	49.2%
Average farm price/bushel	$7.20	$7.30	$8.83	$7.63	$5.05	$4.58

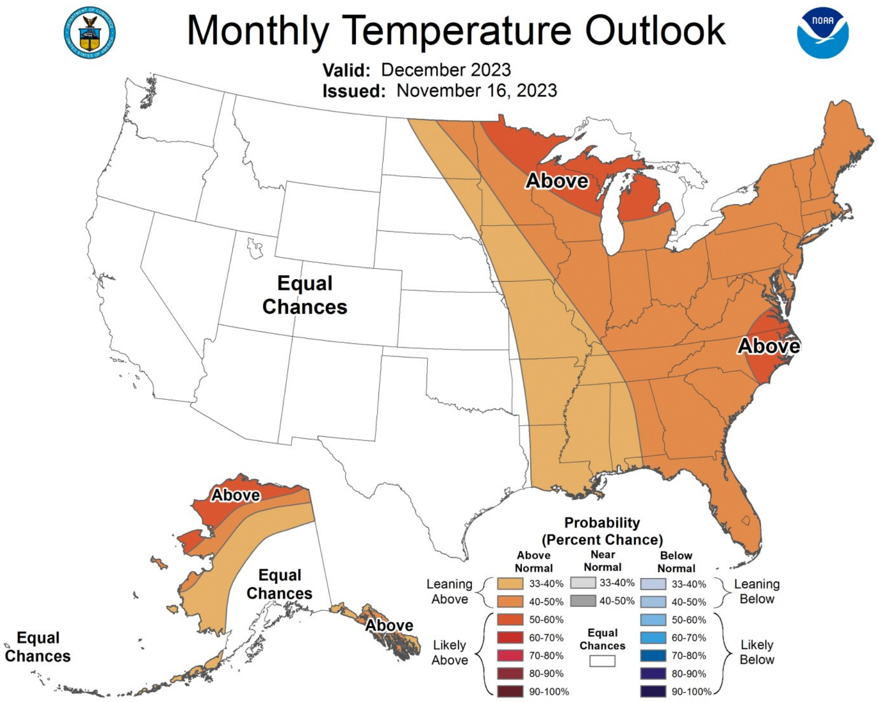
Wheat crop marketing year begins June 1 and ends on May 31

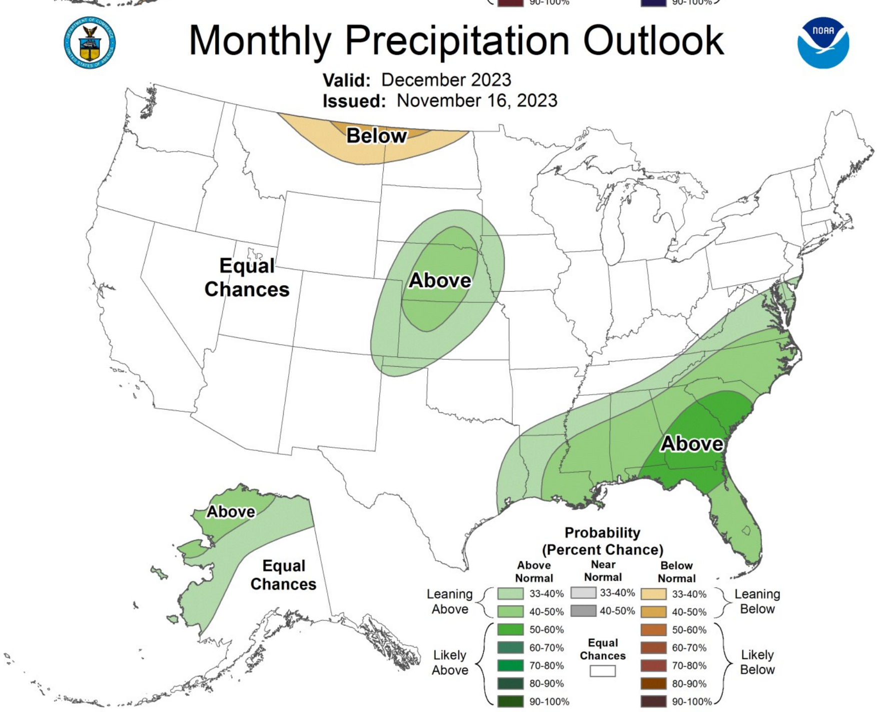
MARYLAND
WEATHER OUTLOOK

Dry weather has persisted this fall and as a result, over 87% of the state is in a drought condition, with the most severe being from parts of Washington County east to Cecil. The one month outlook for precipitation shows slightly above normal probability for the southern half of the state and above normal temperatures for the entire state.

Weather outlooks are courtesy of the US Drought Monitor at University of Nebraska, Lincoln and the National Oceanic and Atmospheric Administration.







November 14, 2023

(Released Thursday, Nov. 16, 2023)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	12.57	87.43	33.19	0.47	0.00	0.00
Last Week 11-07-2023	12.82	87.18	9.86	0.47	0.00	0.00
3 Months Ago 08-15-2023	73.81	26.19	15.68	0.00	0.00	0.00
Start of Calendar Year 01-03-2023	100.00	0.00	0.00	0.00	0.00	0.00
Start of Water Year 09-26-2023	63.11	36.89	3.30	0.47	0.00	0.00
One Year Ago 11-15-2022	88.79	11.21	0.00	0.00	0.00	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

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MARYLAND

Regional CROP REPORTS

Harvest is winding down. Nearly all of the corn and full-season beans are in the bins. Some of the double-crop beans weren't even worth the cost of the fuel to harvest them. Cover crops are looking good as is the commodity wheat and barely. There are still a few acres that will get some rye. Manure is flying as we race to beat the December 15 deadline. Hay stocks are short but FSA has had the county designated a disaster area so there is some assistance available to make up for the shortfalls. Yields are all over the place depending on when the crop was planted and when the showers arrived. As always everyone is looking forward to 2024 being a better year.—Jeff Semler, Washington Co.

.—Kelly Nichols, Montgomery Co.

2023 harvest has been about as smooth as anyone could ask for with very few weather interruptions. All but a few acres of corn and double-crop soybeans remain. Some rains here and there have been just enough to get cover crops and small grains off to a good start, especially those fields planted early, which have put on substantial growth and tillers. Corn yields have been very strong across most of the region and even record-setting on some farms.

Soybeans on the other hand are average to below average in many fields and double-crop beans range from very poor to good. All things considered, yields (especially corn) were impressive considering how dry we started and finished the season; timely rains sure do make or break yields!—Andy Kness, Harford Co.

Both corn and soybean harvest is finishing up. The high yields across the region have made grain delivery the last few weeks a little frustrating. Tanks and piles are full. Granaries have been working to move grain out, but purchasing grain with reduced hours. On a positive note, that seems to be resolved now. The weather has cooperated to make harvest as easy and stress free as possible. We are finally receiving some rain to replenish ground water. Small grains are off to a good start. —Jim Lewis, Caroline Co.

Corn harvest is 95% complete. Most full season soybean has been harvested. It has been very dry in the region, and soybean moisture is below 13%. Soybeans are dusty and farmers are blowing off combines due to fire hazard. Soybean yields are coming in average to slightly above average depending on how much rain fields received. Double crop soybean following wheat is still a few weeks from being harvested. Wheat planting is underway and farmers are planting into dry fields. In many fields, cover crops are already seeing substantial growth and some farmers continue to drill winter cereal cover crops following soybean harvest.—Sarah Hirsh, Somerset Co.

Season Wrap-up: The last acres of soybeans and corn are making their way off fields as we wind into the last chapters of 2023 season. The season started early, with ideal planting conditions in early April. Many growers planted beans and corn during that early window. Conditions turned dry and cooler through the latter part of April and into May and June. Growers struggled with annual ryegrass burndown control. Rains returned as we turned the page into summer and crops responded well. Concerns over the wheat and barley crop, which appeared uneven through he late spring, were unfounded. The small grain crop was of great quality and yield. Growers struggled during the later harvest period as rains delayed harvest well into July. Most corn made it through the pollination window with adequate moisture. Dry conditions returned once again in August and September, resulting in drought stress to beans and corn. Corn harvest started a little earlier than normal. Overall yield reports are above average, and something to be grateful for given the dry conditions later in the season. Beans were more of a mixed bag. Early planted beans performed well for the second year in a row, with most of the crop made by the time the rain ran out. Double crops beans ranged from very poor to very good depending on rain timing and stage of beans. The fall harvest season has been good. Wheat and barley has germinated well and is growing fast with warmer than normal fall temperatures.—Ben Beale, St. Mary's Co.

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