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entomology

HESSIAN FLY TRAPPING 2024

A pheromone trapping network for Hessian fly was coordinated by the IPM Crop Survey Program in 2024. A total of 27 trapping sites in 21 counties of North Dakota were monitored by the IPM scouts and insect trappers. Hessian fly is an economically important insect pest of wheat (all types – spring, winter, durum) in North Dakota. Other hosts are barley, rye, triticale, winter rye, and winter barley. Volunteer wheat and wild grasses (quack grass, ryegrass) also can be infested by Hessian fly.

Life Cycle: Hessian fly is a small ($\frac{1}{8}$ inch long), brown fly, often described as mosquito-like. This cereal insect pest has two **generations per year in the Northern Great Plains.** The second-generation flies emerge in mid-August into September from the pupal ‘flax seed stage’ (so named because it looks like a flax seed) between the outer leaves and the stem. Female flies search for suitable hosts to lay eggs in like winter wheat, volunteer



Adult Hessian fly (Scott Bauer, USDA ARS < Bugwood.org)



Flax seed pupae stage of Hessian fly at the base of spring wheat seedlings (A. Chirumamilla, LREC)

wheat, rye cover crops, grassy weed hosts and other seeded grass crops in the fall. Larvae will hatch from the eggs in 3 to 10 days and feed on the plant for two weeks before pupating. They overwinter in the puparium ‘flax seed’ stage. Fall planted grass crops that are infested with Hessian fly larvae are stunted, and will generally die in the four-leaf stage during the winter. Next May, adult flies will emerge and females will lay eggs in spring planted grass crops to continue their life cycle.

Trapping results indicated that these flies are present throughout the wheat growing areas of North Dakota (see map). A total of 12,530 Hessian flies were captured on sticky trap bottoms monitored by IPM insect trappers from June through mid-August (near wheat harvest). Actual monitoring dates varied for each trap site. We were surprised by the high number and the dramatic increase from 2023. We trapped 12,530 total Hessian flies at 27 trapping sites in 2024 compared to 1,527 total Hessian flies at 37 trapping sites in 2023!

The northeast and east central areas of North Dakota had the highest trap catches of over 1,000 total Hessian flies per trap per season. Counties included Pembina, Rolette, Grand Forks and Steele, which represented about 15% of the trap sites. About 7% of the trap sites had 501-1,000 total flies per trap per season in Cavalier and Nelson counties. About 41% of the trap sites had a total number of Hessian flies between 101 and 500 flies per trap per season. This still is a fairly high number. The remaining sites (about 30%) had lower numbers between 1 and 100 total flies per trap per season. Only two sites (7%) in Williams and Cass counties had no Hessian flies.

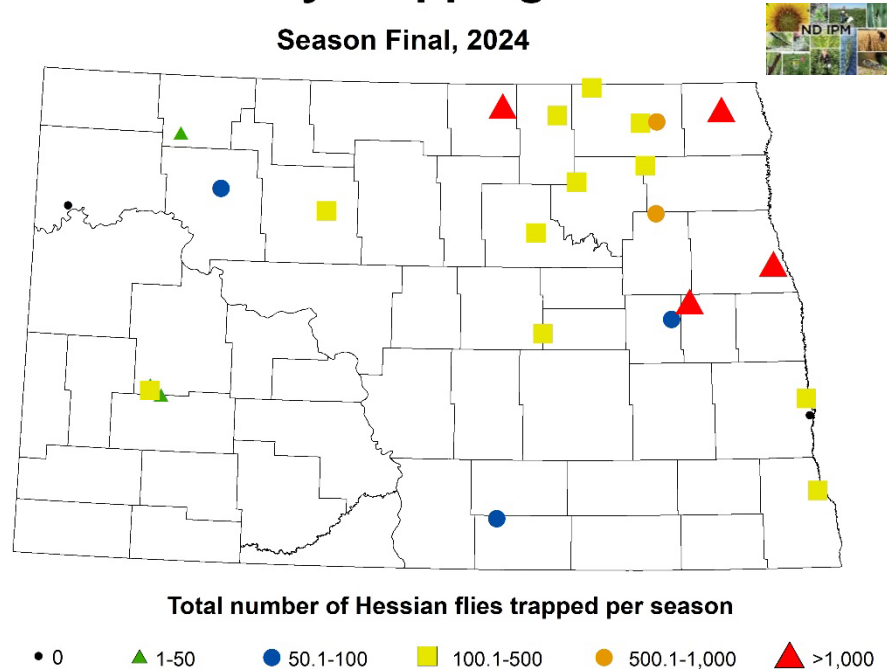
Thanks to the North Dakota Wheat Commission, the USDA NIFA CPPM EIP grant, and the North Dakota Department of Agriculture CAPS Program for support.

Some sustainable pest management strategies include:

- **Destroying volunteer wheat in spring before planting**
- **Choose suitable cover crops that are not known hosts of Hessian fly.** Do not use wheat, barley or rye as cover crops since they are infested by Hessian fly for reproduction and feeding. Oats are less favorable to Hessian fly oviposition and feeding. However, Hessian fly appears to be adapting to rye since it is commonly planted as a cover crop and is available in the fall for female egg laying.
- **Planting winter wheat and grain cover crops after the “Hessian fly free planting dates”:** after September 15 in the northern ND and after September 30 in the southern ND. By destroying the volunteer wheat and planting winter wheat later, the life cycle of Hessian fly is broken. As flies emerge in late summer, there is no place for them to lay eggs.

Hessian Fly Trapping Network

Season Final, 2024



Stunted spring wheat due to hessian fly larval feeding (A. Chirumamilla, LREC)



Bent-stems and lodged spring wheat due to hessian fly larval feeding in late summer (A. Chirumamilla, LREC)

- The high labeled rate of **insecticide** seed treatments on wheat (Cruiser and Gaucho) can be used at planting time to reduce Hessian fly infestations. Research has shown that a pyrethroid insecticide applied shortly after wheat emerges (at or before the two- to three-leaf stage) has been effective against Hessian fly adults. If applied at the right time, a pyrethroid insecticide can kill the adult flies and may also kill young larvae before they become embedded behind the leaf sheaths. However, insecticide application is rarely warranted in ND due to typical low populations of Hessian fly. Based on our 2024 trapping network, the exception would be in the northeastern areas of North Dakota where we captured large numbers, >1,000 flies per trap per season, suggesting a HIGH risk for Hessian fly infestation in wheat in 2025.
- **Resistant/Tolerant varieties** are the most inexpensive and effective way to reduce Hessian fly infestations/damage. Currently, varieties grown in ND do not have any known resistance genes. However, the spring wheat breeding program at NDSU is in the process of testing some varieties with Hessian fly resistance genes. Good news for wheat growers!

WHEAT MIDGE TRAPPING 2024

Wheat midge pheromone traps indicate adult emergence timing, and can be used as an ‘early warning’ system to trigger field scouting during the susceptible stage of heading to mid-flowering. If more than 10 midge per trap per 3 days after heading are observed then scouting should be initiated to determine if a field is at an economic threshold for wheat midge. Trapping serves to document the distribution of the wheat midge and parasitoids captured, as well as the need for field scouting and making IPM decisions.

Twenty pheromone traps were monitored in 18 counties in North Dakota in 2024. Traps showed the presence of the wheat midge and its parasitoid wasp at each trap site (Table 1 and map on next page). A total of 2,287 adults were captured in traps (average of 114 adults per trap) in 2024. Wheat midge continues to decline in 2024 from 8,446 adults captured (average of 313 adults per trap) in 2023 and from 22,952 (average of 998 adults per trap) in 2022. The highest wheat midge counts, over 200 wheat midge per trap, were concentrated in the northwest, northeast and east central counties of North Dakota (see green highlights in Table 1). It was surprising to see Cass County with a total of 339 wheat midge

Table 1. Summary of Wheat Midge Trapping in North Dakota, 2024.

District	County	Number of Traps	Total Trap Count	Parasitoid Observed (Yes/No)
East Central	Cass	1	339	Yes
East Central	Steele	1	117	Yes
North Central	Benson	1	11	No
North Central	Rolette	1	37	No
Northeast	Cavalier	2	69	No
Northeast	Grand Forks	1	2	No
Northeast	Nelson	1	28	No
Northeast	Pembina	1	201	No
Northeast	Ramsey	1	6	No
Northeast	Towner	1	85	No
Northeast	Walsh	1	1	No
Northwest	Burke	1	572	Yes
Northwest	Divide	1	262	Yes
Northwest	Mountrail	1	3	No
Northwest	Ward	1	348	Yes
Northwest	Williams	1	151	No
Southeast	Richland	1	31	Yes
West Central	McKenzie	2	24	Yes
Total	18 counties	20	2287	7 positive (35%)

per trap; however, there has been more wheat production in this area over the past several years. The parasitoid wasp of wheat midge, *Macroglanes penetrans*, was stable and observed on sticky trap bottoms in 7 trap sites (or 37%) in 2024 and 12 trap sites (or 37%) in 2023, however, in 2022 levels were higher at 14 trap sites (or 61%).

These results indicate the wheat midge populations have continued to decline, but are still widespread throughout the wheat growing areas of the state. The decline is probably due to the extended severe drought of 2019-2023 affecting midge survival in wheat production areas. The prevalence of the parasitic wasps also declined, as its main food source, wheat midge larvae, dropped over the last three years. Trap monitoring for this beneficial insect helps to identify its distribution in North Dakota.

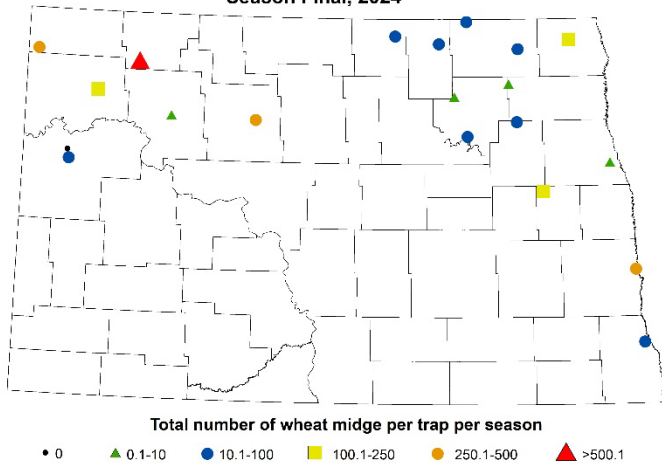


Green delta pheromone trap for monitoring wheat midge.

Thanks to the North Dakota Wheat Commission, the USDA NIFA CPPM EIP grant, and the North Dakota Department of Agriculture CAPS Program.

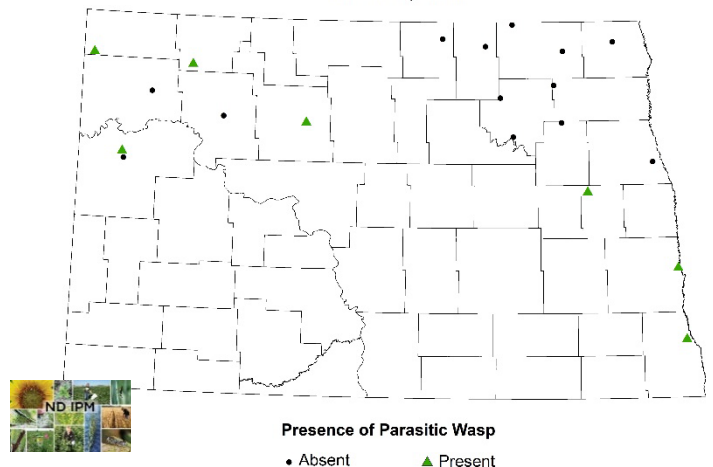
Wheat Midge Trapping Network

Season Final, 2024



Parasitic Wasp Observed on Wheat Midge Trap

Season Final, 2024



CANOLA INSECT TRAPPING 2024

Pheromone traps for bertha armyworm and diamondback moth were monitored by IPM scouts, insect trappers and Extension agents/Specialists through the IPM Crop Survey Program at 13 trap sites in 13 counties of North Dakota and at two trap sites in one county in Minnesota.

The season final trap counts for **bertha armyworm** indicated a low infestation risk (<300 total cumulative moths per trap per season) at all trap sites in North Dakota and Minnesota (Table 1). This represented a 50% decline in the total number of bertha armyworm captured per season from 2023 (517 total moths or average of 24 moths per trap) to 2024 (256 total moths or average of 18 moths per trap). The highest trap catches were observed at Roseau County in Minnesota for both years. For North Dakota, the highest total trap catches occurred at Ward, Towner and Cavalier counties.



Green unitrap for monitoring bertha armyworm.

For **diamondback moth**, the season final trap counts were also lower in 2024 (1,345 total moths or average of 96 moths per trap) compared to 2023 (5,465 total moths or average of 248 moths per trap) in North Dakota and Minnesota (Table 1). This represents a 25% decline in the total number of diamondback moth captured per season from 2023 to 2024. The season final trap catches listed from highest to lowest were at Pembina County, Roseau County MN, Cass, Cavalier, Rolette and Nelson counties. The northeastern area of North Dakota has been a ‘hot spot’ for diamondback moth infestations in canola over the recent years.



Diamondback moth wing pheromone trap and closeup of moth on sticky trap bottom.

Bertha armyworm and diamondback moth are occasional insect pests of canola in North Dakota and northwestern Minnesota. Routine monitoring using pheromone traps in canola fields can help predict when scouting is necessary and when populations are economic to canola yield using thresholds based on larval densities in fields.

Thanks to the Northern Canola Growers Association, the USDA NIFA CPPM EIP grant, and the North Dakota Department of Agriculture CAPS Program for support.

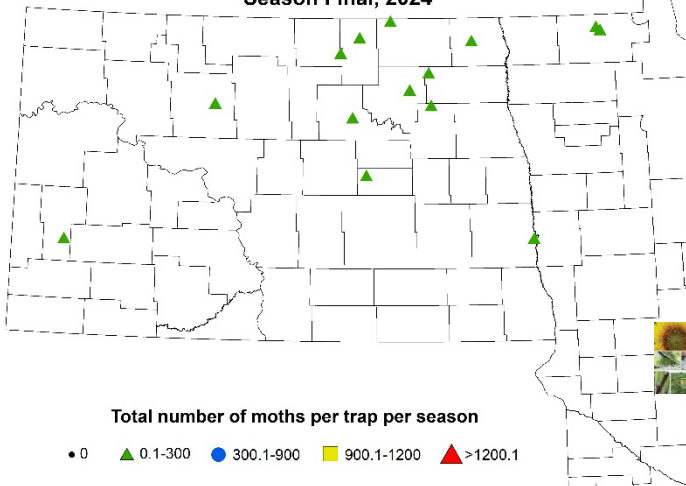
- [Janet J. Knodel](#), Extension Entomologist
- [Patrick Beauzay](#), State IPM Coordinator & Research Spec.
- [Anitha Chirumamilla](#), Ext. Cropping Systems Spec., LREC
- [Victor Gomes](#), Ext. Cropping Systems Specialist, DREC
- [Scott Knoke](#), Ext. County Agent, Benson County
- [Charlemagne “Charlie” Lim](#), Ext. Weed Spec., WREC
- [Greg Endres](#) (retired), Ext. Cropping Systems Spec., CREC
- [Dave Grafstrom](#), Agronomist, UMN, Roseau

Table 1. Summary of Canola Insect Trapping in ND and MN, 2024.

State	District	County	Number of Traps	Total Number	
				Bertha armyworm	Diamondback moth
ND	Central	Foster	1	7	0
ND	East Central	Cass	1	3	165
ND	North Central	Benson	1	5	2
ND	North Central	Rolette	1	12	128
ND	Northeast	Cavalier	1	52	144
ND	Northeast	Nelson	1	15	108
ND	Northeast	Pembina	1	20	455
ND	Northeast	Ramsey	1	5	95
ND	Northeast	Towner	1	54	95
ND	Northeast	Walsh	1	14	19
ND	Northwest	Ward	1	62	94
ND	Southwest	Billings	1	7	40
MN	Northwest	Roseau	2	80	382

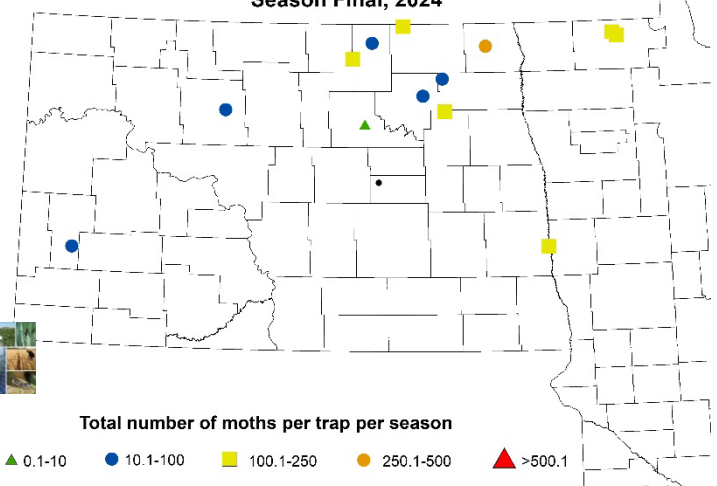
Bertha Armyworm Trapping Network

Season Final, 2024



Diamondback Moth Trapping Network

Season Final, 2024





plant pathology

TAR SPOT OF CORN FOUND IN NORTH DAKOTA!

Corn leaves with suspicious black spots from Richland County were submitted to the Plant Diagnostic Lab on September 20 by Grant Mehring (Technical Agronomist with Dekalb and Asgrow). The black spots were examined for the presence of pathogen signs and spores. Several lesions had a dried orange mass (Figure 1), and when viewed under the microscope, had spores resembling those of the tar spot pathogen.

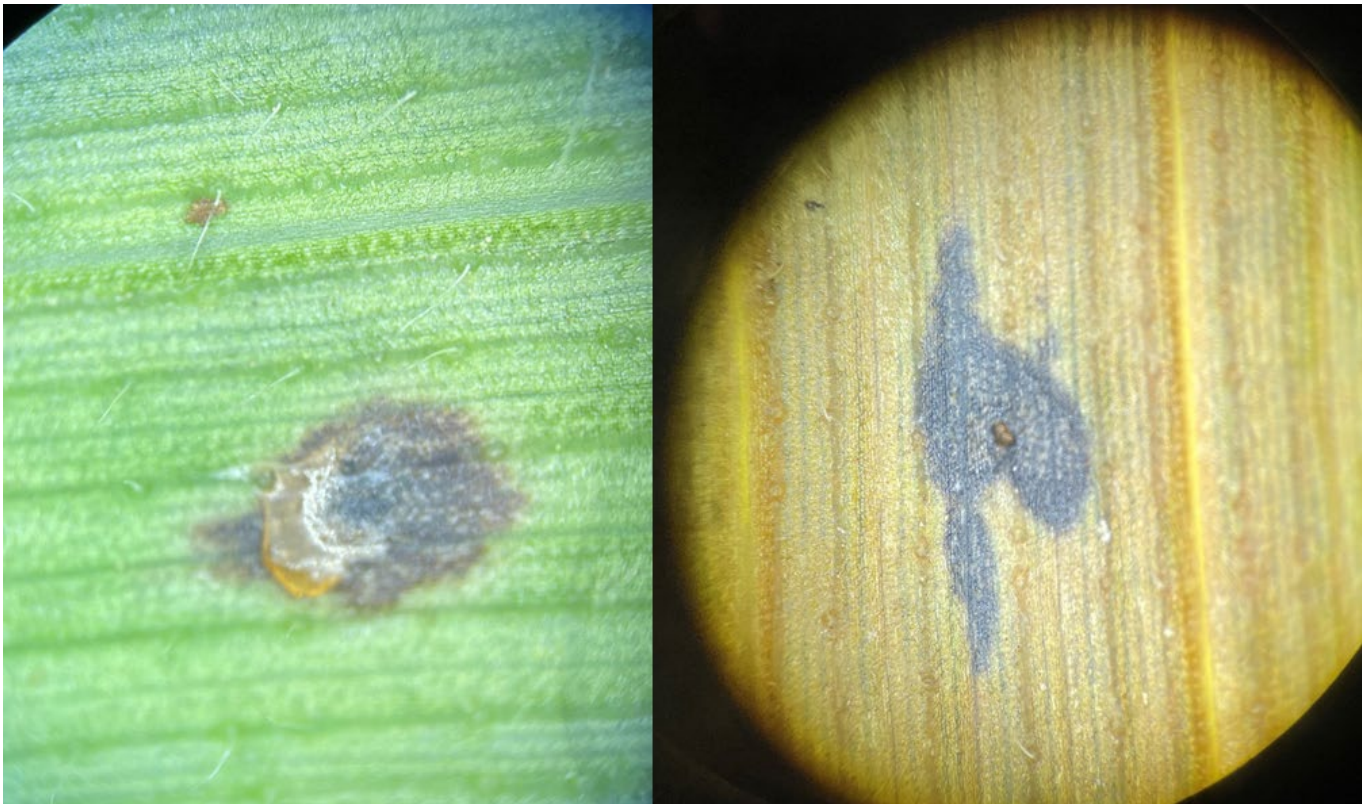


Figure 1. Tar spot stroma with orange masses of dried spores.

What is tar spot?

Tar spot (*Phyllachora maydis*) is fungal leaf disease of corn that commonly appears throughout Central America, Mexico and South America. The disease was first identified in the USA in 2015 in both Indiana and Illinois. Since then, the disease has been documented in 19 states. The disease disrupts photosynthesis on corn leaves and can lead to significant yield loss.

Where has it been found in ND?

After the initial report from Richland County, we have identified tar spot in an additional 8 counties including Sargent, Ransom, Dickey, LaMoure, Barnes, Cass, Traill, and Steele. Both incidence (how many plants in a field) and severity (how

many lesions on a leaf) have been very low. Greater amounts of incidence and severity have been found in Richland County.

How can I identify tar spot?

At this point in the growing season, the best place to scout for tar spot is in corn that still has green leaf tissue (ie: late-planted corn or hybrids with long relative maturity). Tar spot will appear as raised, irregular to diamond shape black spots (stromata) that appear on both the upper and lower side of a leaf (Figure 2). The disease can be confused with insect frass and rust telia on corn (Figure 3). However, tar spot will not be able to be removed with a thumb (insect frass will) and will not have dusty black spores (like rust).



Figure 2. Corn leaves with typical tar spot symptoms. Notice small irregular to diamond shaped lesions that appear on both the upperside and underside of the leaf.

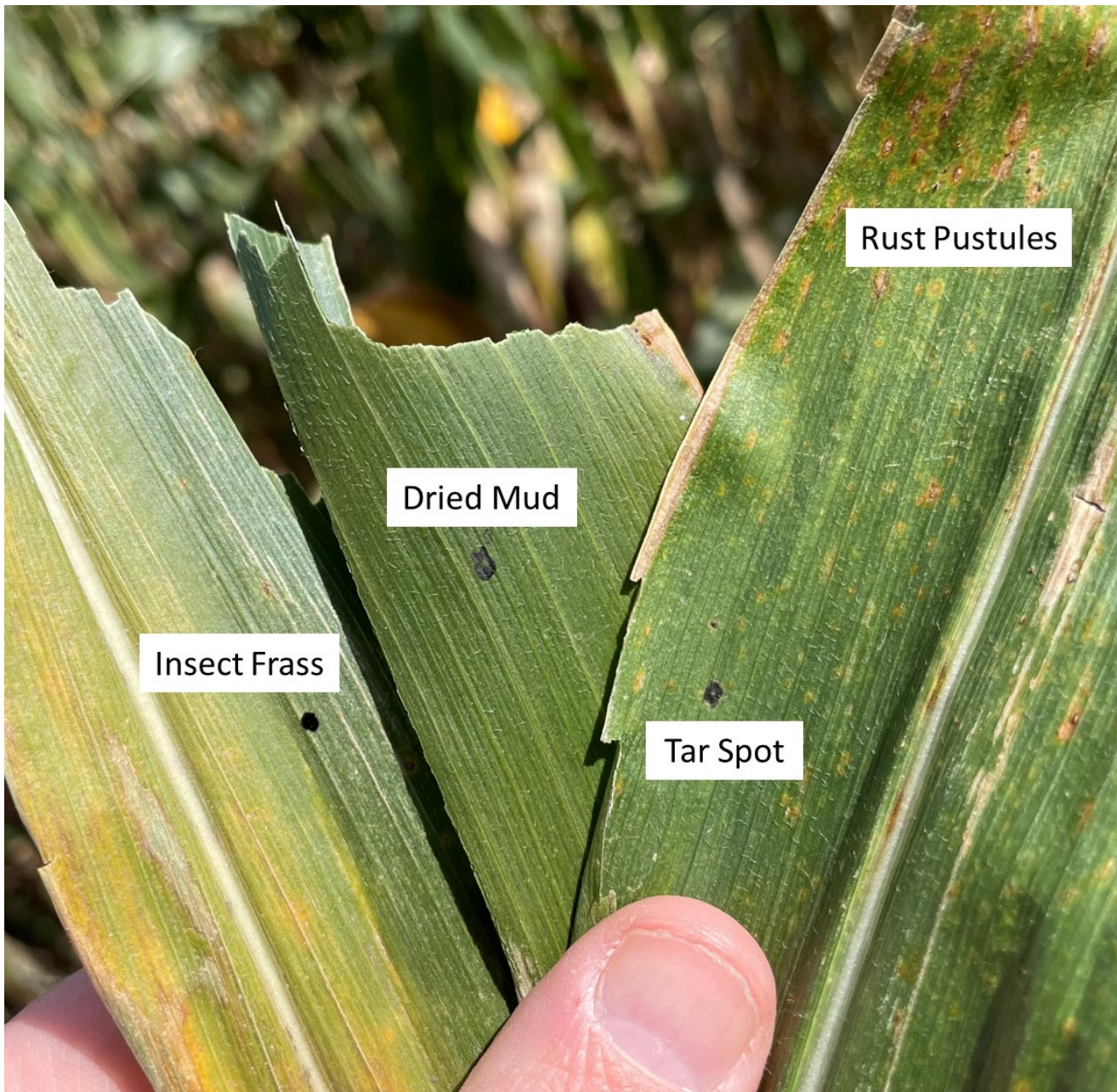


Figure 3. Corn leaves with tar spot and tar spot look-alikes.

What should we do if we think we have found tar spot?

Please reach out to your local Extension ANR agent and work with them on tar spot identification.

What should I do if I find tar spot in my fields this year?

There is no need to manage tar spot in 2024. The best thing you can do is familiarize yourself with tar spot identification.

Will it survive in ND? What about next year?

We are not able to determine how well it will overwinter and survive in ND. However, given what has been reported by Extension colleagues in other states, it is very likely the pathogen will survive and lead to tar spot observations in 2025.

Can we manage tar spot in corn?

The good thing is that there has been substantial research on tar spot management in other states. The best management tools are avoiding highly susceptible hybrids (talk with local agronomists, crop consultants, seed dealers, etc) and using a well-timed fungicide when needed. Research has suggested the most optimal fungicide timing for tar spot management is between VT-R3 and using fungicide products that contain multiple FRAC groups such as 3 (DMI), 7 (SDHI), and 11 (QoI). However, with shorter day hybrids in North Dakota, we will have to conduct field research to validate management recommendations for tar spot.

[Andrew Friskop](#)

Extension Plant Pathology, Cereal Crops

PLANT PATHOGENS AND MICROBES CAN IMPACT AN ALREADY CHALLENGING YEAR FOR SUGARBEET HARVEST

As the sugarbeet growing nears completion in North Dakota and Minnesota, growers and processors will harvest approximately 725,000 acres. Maintaining high quality roots throughout the latter part of the growing season and at harvest will reduce respiration and loss of sucrose during storage. Excess heat, from either respiration of the beet itself or microbes on the beet surface and any remaining tare soil, creates a feedback loop that speeds up beet spoilage and sucrose losses. During warm periods, harvest and piling operations may cease in order to minimize the temperature of beets going into stockpile storage. In 2024, sugarbeet cooperatives have already delayed and modified harvest and piling plans in order to keep root temperatures below 55°F as much as possible.



Figure 1. Sugarbeet root demonstrating two sources of microbes that may impact storage: *Rhizoctonia* root rot and tare soil still attached to the beet

Although heat and respiration are the largest contributor to post-harvest sucrose losses, plant pathogens also play a role. Poor root quality due to *Rhizoctonia* root rot, *Aphanomyces* root rot, or *Fusarium* root rot can contribute to festering “hot spots” of decaying beets within a pile. In addition to metabolizing sucrose directly, root rot serves as an entry for other bacteria and fungi to enter the beet root and access sucrose. Otherwise, healthy roots with low-to-moderate disease severity (Figure 1) are the most concerning since these roots are most likely to pass through the lifter and introduce plant pathogens and other microbes into the pile. Proactive control of soilborne diseases through: 1) crop rotation; 2) careful variety selection; 3) seed treatments; 4) in-furrow fungicides; and 5) post-emergent fungicide applications.

Dr. Shyam Kandel (USDA-ARS Sugarbeet Research, Fargo) has surveyed bacteria and fungi active in sugarbeet post-harvest. Common fungi prevented *Penicillium* spp., *Botrytis cinerea*, and *Fusarium* spp. *Leuconostoc* and *Lactobacillus* were among the most frequently isolated bacterial genera. Dr. Kandel’s program is also investigating the role tare soil and associated microbes play in the beet storage process.

What about impacts of *Cercospora* leaf spot on sugarbeet storage?

Despite the relatively dry September, warm temperatures and dew contributed to the risk of *Cercospora* leaf spot development in some areas. There is no established link between foliar diseases such as *Cercospora* leaf spot and respiration rate of sugarbeet roots in storage. However, *Cercospora* leaf spot reduces sugar content in sugarbeet roots going into storage, and preservation of remaining sucrose by cooling may be prioritized.

[Eric Branch](#)

Extension Plant Pathologist and Sugarbeet Specialist



HOW FAST SOYBEANS DRY?

In the latest USDA's National Agricultural Statistics Service Field Crops Report, soybean condition was rated as follows: 2% very poor, 5% poor, 26% fair, 58% good, and 9% excellent. Soybeans dropping leaves were 95%, near 94% last year, and equal to the five-year average. The soybean harvest was 52%, ahead of 36% last year and 42% on average (Figure 1).

When soybeans reach maturity, the pods turn to a mature color and seed dry matter accumulation is complete with the appearance of the black-layer in the seeds. At this point, the grains have around 60% water content. Studies in Kansas and Iowa estimated that the water content decreases by approximately 3% per day from this point until harvest, taking around 15 days to reach 13% moisture. This dry-down rate is approximately three times faster than corn, estimated at 1% daily.

However, reaching grain moisture adequate for harvest can occur as early as nine days after maturity, depending on several factors such as the maturity group, planting date, weather conditions (primarily temperature and humidity), and the overall water content at the time of black layer formation. Last September, there was a high vapor pressure deficit (warm temperatures with low humidity), with the monthly average temperature across the state being 4 to 7 °F above the 10-year average (Figure 2). These weather conditions caused soybeans to dry faster, reaching 8% to 10% grain moisture in some fields. This underscores the importance of scouting for soybean maturity and paying attention to the weather conditions to schedule harvest.



Figure 1: Soybean field near Fargo, ND. Picture taken September 26th, 2024.

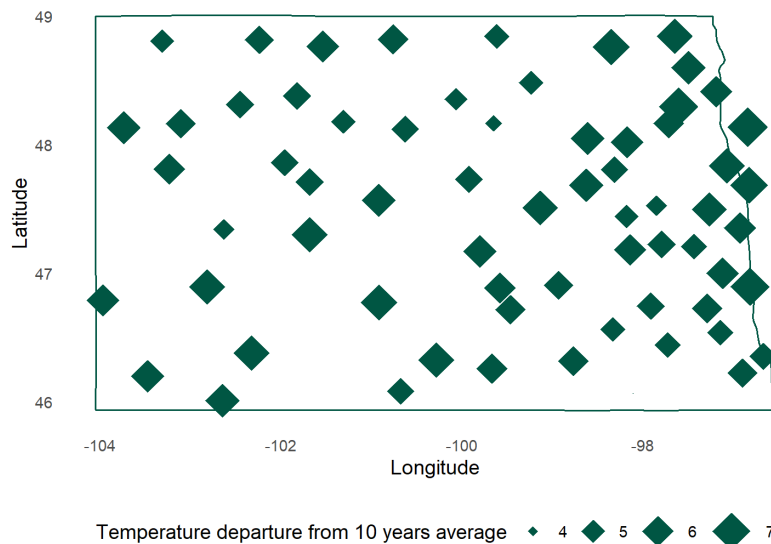


Figure 2: North Dakota weather stations. Diamond size represents the monthly average temperature departure respect to the 10-year average for the month of September. Weather data obtained from the North Dakota agricultural Weather Network (ndawn.ndsu.nodak.edu).

[Ana Carcedo](#)

Extension Broadleaf Agronomist



HELPFUL QUOTES THAT I HAVE USED OVER MY CAREERS

I was recently urged by a colleague to write these into a *Crop and Pest Report*. One of more may be relevant to whatever activities you are doing now, but I would be surprised if using one of more as a guide in your future work will not be helpful. Some of these were absorbed by me during my time as agronomist/manager in the retail fertilizer/ag-chemical industry over 30 years ago. Some I learned during my NDSU career.

1. 'There are truck drivers and guys who drive trucks. It seems we mostly hire guys who drive trucks.' This was shared to me from one of our few long-time truck drivers after I lamented over the rash of recent accidents and lack of vigor from some drivers to resupply our retail facilities with fertilizer/lime. Maybe you remember a version of this 20+ years ago in a *Crop and Pest Report* titled 'Corn growers and farmers who grow corn'. You can use the idea in any number of situations.
2. 'Go until the weather tells you to stop'. This was shared with me by a farmer when I drove to the field and asked if we should go ahead with the 300 acres of fertilizer application when the weather people called for rain the next day. I have used this countless times and worked many days productively when if I would have listened to the weather people I would have stayed in bed. Exceptions to this would be application of non-rainfast crop

- protection products when rain is expected. However, it is definitely helpful in most tillage, planting, fertilizing and harvest activities.
3. 'The dollar you make or save in a good year is the same dollar you make or save when times are tough'. This was shared with me by the person I worked for when I spent more on a piece of equipment than he thought reasonable. I had just remarked that we had made very good money that year and what difference did it make (big mistake!). A person should be just as frugal in good times or bad. If so, bad won't seem so bad when it comes.
 4. 'It is impossible to know everything. But there comes a time when you use what you think you know, roll up your sleeves and get to work.' Spoken to me by my PhD mentor and friend Dr. Ted Peck, University of Illinois. Generally, it means to follow your data and that of others, make the best recommendation you can, and if new data indicates a change is necessary don't be afraid to make it.
 5. 'What is the most important step in any research project? Whatever you are doing at the moment. If you mess this up, nothing else you do all season will matter.' This is one of mine I always shared with graduate students and research helpers. It is so true, and it also applies to farming generally. If you mess up planting, you can't fix it later (for example).
 6. I asked Dr. George Rehm (University of Minnesota) one time early in my career how he could be so bold to speak against the use of certain products claiming unusual properties. He told me 'I have the data, and they do not'. Follow the data from replicated research, using it all, not just what agrees with your original assumptions and expectations. If the data indicate supporting or not supporting a practice, product or group of products, do not be afraid to share results.

[Dave Franzen](#)

Professor of Soil Science, Emeritus, NDSU

BRINGING K BACK INTO THE CONVERSATION.

When margins for crop production are tight, cuts to inputs are inevitable. More often than not, I see these cuts come in the form of reduced fertilizer rates or reductions in soil sampling. If fertility levels for phosphorous (P) and potassium (K) are adequate, many times we can get away with a year or two of reductions in fertilizer applications—but eventually we must “pay the piper.” The only way to know how much fertility we need to apply to replace what we have taken is through soil sampling.

I visited several sites this growing season with severe K deficiency, mostly in east-central North Dakota (Image 1). The deficiency symptoms manifested themselves mostly in soybeans. Considering a 35 bu/ac soybean crop removes approximately 55 lb/ac of K, it is not entirely unexpected, especially in high soybean production areas. After collecting several samples from both the “good” and “bad” areas of several fields in Griggs County, soil test results reported from 77ppm K up to 116 ppm K in the poor areas and as high as 168ppm K in the good areas of the fields. For most crops in North Dakota, K fertilizer recommendations set a critical level for soil K ranging from 150-200 ppm K depending on clay mineralogy ([North Dakota Clay Mineralogy Impacts Crop Potassium Nutrition and Tillage Systems](#)). With soil test results above the given critical levels, we are unlikely to see economically feasible yield gains, below these levels however, it is likely we are not reaching our full economic yield potential.

Some reports indicate potash prices may continue to decline as we go into the winter months, if this is true, it would be an ideal opportunity to review your soil tests and book fertilizer for K applications where needed. If you can't review the soil tests for the fields you manage, because you don't have them, take this as an invitation to have the samples



Image 1: Potassium deficiency symptoms on soybean leaves in Griggs County, ND.

collected and analyzed (the weather forecast is showing several more weeks of great soil sampling conditions!). The *only* way to make the best decisions with your soil fertility management is the know what you have available so you know what you need—or don't need—to apply to reach your economic maximum yield potential.

With soil K, we are fortunate and can consider it to be “money in the bank,” if we build it up when times are good (keeping the maximum application rate of potash below 200 lb/ac per year), we can rely on it when times are lean. Unfortunately, too many deductions over the years and not enough deposits have led to deficient soil test levels in some areas which can only be corrected by applications now.

[Brady Goettl](#)

Assistant Professor of Extension Soil Science



FALL HERBICIDE APPLICATIONS FOR WILD OAT CONTROL IN THE SPRING

Wild oat had a resurgent year for most of North Dakota in 2024. Prolonged cool, wet weather through May and June were particularly suited for growth and development of this weed. Many populations have resistance to Group 1 and/or Group 2 herbicides that have been the backbone for control of wild oat in small grains and other crops. It has also become more common in recent years for folks to return to using triallate (Far-Go/Avadex), a Group 15 herbicide that is either applied in the late fall as a granular formulation, or as a liquid formulation in the spring that needs to be mechanically incorporated. The Weed Science team at NDSU has been evaluating the use of pyroxasulfone (Zidua, others) applied in the fall for the last several years. Pyroxasulfone is applied on many acres in the spring to control grasses and broadleaf weeds in many crops, but results have been variable in our research plots for control of wild oat in these spring applications. This is, in part, due to this product requiring a minimum of 0.5” of rain for proper incorporation, which has been hit or miss at many sites in recent springs. Wild oat also germinates early compared to other weeds like waterhemp, so it can be difficult to make the application and receive adequate rainfall for optimal control. Hence, we have evaluated late fall applications to allow for winter and early spring precipitation/snowmelt to help incorporate pyroxasulfone before wild oat has begun to emerge.

Between fall 2020 and spring 2024, we have evaluated 4 different rates of pyroxasulfone (applied as Zidua SC) under a wide range of conditions. At a site in Fargo, treatments were applied in a conventionally tilled system, with a mix of mechanical incorporation in the fall, or surface applied with no mechanical incorporation in the fall. At Valley City, the site is in no-till production, and no treatments were mechanically incorporated. In general, treatments were applied between October 20 and November 1 of each year (approximately when soil temperatures were at or below 50 degrees F), and wild oat ratings were recorded between May 20 and May 31 of each year.

The rainfall patterns were quite variable across years. There were years with 6" moisture deficit, average years, and years with 12.5" above normal precipitation. Some years were dry in both fall and spring, wet in both fall and spring, or one season wet, one season dry. Rather than tease out each individual season, we decided to present the range of control observed based on rate, incorporation method, and site.

Table 1. Control of wild oat in late May from applications of Zidua SC applied in late October/early November from 2020-2024.

Zidua SC Rate (fl oz/A)	Fargo – fall PPI ^A	Fargo – fall PP	Valley City – fall PP
2	-	P	P-E
3.25	P-G ^B	P-E	F-E
4	G-E	F-E	F-E
6	E	E	E

^AAbbreviations: PPI = preplant incorporated (with field cultivator). PP = preplant surface applied with no mechanical incorporation.

^BLetters represent rating scores based on NDSU Weed Guide rating system. P=poor, F=fair, G=good, E=excellent.

To summarize, based on rate, year, and tillage system, our results have been poor to excellent. That being said, most of times we apply 3.25 to 4 fl oz of Zidua SC (or equivalent pyroxasulfone from other products) the results are fair to excellent. The 2 fl oz rate does not provide consistent control. The 6 fl oz rate has provided excellent control each time it has been tested, but that will limit crop rotation options, as the higher rates extend the months before planting to 4-6 months for crops like spring wheat and flax. Please refer to page 6 in the Weed Guide for plant-back interval for various rates of Zidua and desired crops (of note, we can include the time the ground is frozen for calculating plant-back intervals for Zidua SC).

Overall, this treatment has shown value in wild oat control. Even in cases where control has been poor or fair, this still results in fewer wild oat plants that need to be controlled with herbicides or tillage. Given that some populations in the state are resistant to most, if not all, Group 1 and Group 2 herbicides, this treatment can be a solid foundation for control of wild oat.

[Joe Ikley](#)

Assistant Professor/Extension Weed Specialist

[Kirk Howatt](#)

Associate Professor

TIPS FOR THE SPRAYER OFFSEASON

Despite the warmer-than-average fall and the resulting extension of our growing season, it will soon be time to prepare your sprayer for next year.

Below are two resources from [Sprayers101](#) to help guide you the process. Sprayers101 is an excellent resource authored and maintained by two application specialists in Canada, Drs. Tom Wolf (Saskatchewan) and Jason Deveau (Ontario). Although some of the tips shared throughout the site are specific to the Canadian audience, most advice is also applicable to North Dakota.

- [End of Spraying Season Checklist](#). This convenient checklist outlines processes for winterization, sprayer inspection, and reflecting on your experiences during the past spray season.
- [Clean Your Nozzles](#). Consider cleaning your nozzle tips during the offseason, and this article offers helpful tips. Nozzle tip cleaning can be delayed until winter rather than competing with fall's numerous time-sensitive tasks, as long as you remove and set aside the tips after winterizing your sprayer.

[Rob Proulx](#)

Extension Agriculture Technology Systems Specialist



THE WINDS OF CHANGE

As the season changes and there is a crispness in the air first thing in the morning, so is there a changing of the guard in the NDSU Pesticide Program. As of October 2nd, I have taken on the role of Extension Pesticide Program Specialist. Over the last 26 years under the expert guidance of Andrew Thostenson, the Pesticide Program has delivered critical training and education as well as required certification for both the private and public applicators in the state applying restricted-use pesticides. Through the certification process applicators gain knowledge on safe pesticide handling and keep updated on the latest regulatory, compliance and management issues.

I have worked in Extension for nearly 15 years because of my passion for helping those in the Ag Industry meet their goals and succeed. As a former Extension Specialist at the University of Minnesota working on diseases of small grains and canola, I have worked with direct testing of efficacy of fungicides for control of diseases such as Fusarium head blight. For the last four years, I have been directly involved at the county level in delivering private pesticide applicator training and certification to our farmers, ranchers and other applicators in the county. It is the relationships built and stories shared at the county level that leave me in no doubt that the impact of the program is vital in helping our applicators work safely, effectively and remain in compliance with state and federal laws.

Now more than ever, the pesticide program has a critical role to play in supporting our applicators navigate changing times. Many pesticide labels are now incorporating changes aimed at protecting endangered species' exposure to pesticides which require additional steps on the part of the applicator. In addition, the program must flex to develop education on newer application technologies such as drones which are increasingly in demand. The demand for safety education by operations employing immigrant farm workers also continues to grow. This was reflected in August of this year when EPA published resources for bilingual pesticide labelling in preparation for product labels on restricted use pesticides with the highest toxicity to bear Spanish language translation for the health and safety sections by the end of December 2025.

The program also has to be responsive to emerging situations such as the label vacation earlier this year for over-top Dicamba applications. In situations such as these, working with specialists at NDSU, local Extension Agents and industry partners the program to get the right information and message out to our applicators.

I want to thank Andrew Thostenson for his years of service and for building the pesticide program into the successful operation you see today. I look forward to continuing to move the program forward and meet the changing needs of our applicators in the state. I wish you all a safe harvest and I hope to see many of you as our training season starts in earnest!

[Madeleine Smith](#)
Extension Pesticide Specialist



EXTENSION MASTER GARDENER PROGRAM ACCEPTING APPLICANTS THROUGH NOVEMBER 1ST

If you love gardening and want to make your community a better place, consider becoming a North Dakota State University Extension Master Gardener. Convenient online training starts in 2025 offering a great learning experience for adults.

The Extension Master Gardener Program is a national volunteer service organization that works in cooperation with land grant universities. The program trains and empowers volunteers to teach others how to garden, to conserve natural resources, to beautify communities and to fight food insecurity.

The program is now accepting applications for the 2025 Extension Master Gardener Core Course. Accepted applicants will take a 40-hour horticultural training course designed to provide participants with the knowledge and skills necessary to complete volunteer projects. Weekly classes will be held from January 24 to April 4, 2025.

Course topics include vegetable and fruit production, soil health, composting, plant diseases and insects, annual and perennial flowers, tree selection and maintenance, landscape design, houseplants and lawn maintenance. NDSU faculty and Extension personnel teach the classes.

“The ten-week training is designed to be flexible for both working individuals and for those wintering in other states,” says Esther McGinnis, NDSU Extension horticulturist and Extension Master Gardener director. “Students can participate from their computers in the live classes on Friday mornings. Alternatively, students can watch the recorded lectures at their convenience. Students near Fargo have the option to be present in the NDSU campus classroom.”

Once participants complete the 40-hour training, they are known as Extension Master Gardener interns. They are committed to volunteer 48 hours of time during a two-year period on horticultural projects in cooperation with NDSU Extension. After that, they will be certified Extension Master Gardener volunteers.

Potential volunteer projects include answering gardening questions at county fairs, organizing gardening workshops and tours, teaching children to garden, growing fresh produce for food pantries, designing and maintaining pollinator gardens, and conducting citizen science projects. Newer projects include conducting therapeutic horticulture workshops at senior facilities and encouraging water conservation.



The program fee (\$225) for the 2025 class remains the same as 2024 to make the class more accessible to individuals. A non-volunteer option which leads to a Pro-Horticulture certificate is available for \$450.

Twenty-six North Dakota counties will be accepting a limited number of Extension Master Gardener applications. The process will be more competitive in urban counties. The application deadline for the volunteer program is November 1st at noon.

The Pro-Horticulture Course is available in all North Dakota counties and the application deadline is December 13th at noon.

Application forms and a list of counties that are accepting applications are available at [Master Gardener Program](#)

[Esther McGinnis](#)
Extension Horticulturist



AROUND THE STATE

SOUTH-CENTRAL/SOUTHEAST ND

Rainfall in the region since September 15th has ranged from 0.01 inch near McKenzie in Burleigh County and near Streeter in Kidder County to 1.05 inches near Harvey in Wells County with an approximate average for the region of only 0.12 inch. Only locations in Wells County received greater than 0.57 inch of rainfall since September 15th! Most of the region is getting quite dry again and has allowed for quick dry bean and soybean harvest. The average daily low temperature for September set a record or a near record in most of the region which helped to push crop maturity in addition to the lack of rainfall. Significant wind damage occurred to crops last Saturday, October 5th especially the farther west in the region you went. Late-planted silage corn was shredded in most of the region as seen in the photo from the Carrington Research and Extension Center. Light frosts have occurred in the northern parts of the region and in lower-lying areas to the south, but no killing freeze yet anywhere in the region yet. That is amazing! That may change early next week.

All spring wheat and barley and canola have been harvested in the area now with much of the dry beans harvested in the region, particularly the southern half of the region!

Soybean harvest is progressing rapidly! The entire region is over 50% harvested with areas farther south nearly completed. Soybean yields are ranging from 28 to 66 bushels per acre in the region with the highest yields coming from well-drained soils having received good and timely rainfall. The poorer yields are coming from areas receiving too much rain early in the growing season! A potential average soybean yield for the region could be over 40 bushels per acre which would be better than 2023 and some of the highest yields in some counties. Soybeans have been very dry being as low as 7 percent moisture with most being just over 10%! Soybean test weights are over 57 pounds per bushel.

Despite all of the late-season soybean diseases, it looks like minimal yield loss is occurring, but we will never know that for sure.

Thanks to the great warm weather, all corn should reach maturity now in the region and be much drier than I anticipated at the time of the last newsletter! Corn harvest has begun already in the southern parts of the region and up into southern Griggs County. Early corn yields are coming in over 160 bushels per acre with some reports of 200+ bushels per acre. Corn in the southern part of the region is already down to 13 to 18 percent moisture and corn in Griggs County is between 18 and 20 percent. Test weights seem to be on the lower side at the moment, but we'll see as harvest continues.

Due to the warm temperatures sugarbeet harvest is still in the pre-pile stage. Full harvest may begin towards the end of the week.

Most sunflowers are getting close to physiologic maturity now and all should be far enough along prior to any killing freeze.

The Central Dakota Ag Day meeting will occur December 16, 2024 at the Carrington Research Extension Center from 9:30 AM to 3:30 PM. Great information will be presented related to Agronomic, Livestock, and Home Life topics. Please plan to attend. Visit the following website for more details: <https://www.ndsu.edu/agriculture/ag-hub/events/2024-central-dakota-ag-day>

I have switched roles with NDSU Extension. I started October 1, 2024 as the Extension Cropping Systems Specialist at the Carrington Research Extension Center. If you need any agronomic information or have any questions, feel free to contact me regarding this information at jeff.stachler@ndsu.edu or 701-652-2951.

Have a great winter season and be sure to properly prepare for the 2025 growing season.



Soybean harvest is nearly completed.



Excellent Corn at physiological maturity.



Silage corn severely damaged by October 5th winds.



Horseweed (mare's tail) in spring wheat stubble.



Waterhemp not controlled or emerged late in spring wheat stubble. These fields must be properly managed in 2025.



My new office at the Carrington Research Extension Center.

[Jeff Stachler](#)
Griggs County Extension Agent

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