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Auglaize County OSU Extension Weekly Agriculture Newsletter – October 9, 2019

Scouting and Latest Information

Current stage of most soybeans in county

Harvested soybeans

Corn at black layer = maturity

Nearly black layer corn

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What premature death kernels look like

Silage still being harvested

Hello!! Good afternoon! I pray you are well. We received little rain this past week!.

I'm down to 1 hay seller on the list now because the other forage is over ripe now and I had one buyer call this week, so I'm unsure how much is left. If you are a buyer and need some hay or have hay to sell, let me know. Call the OSU Extension office at 419-739-6580.

I will be out of the country for most of the next three weeks. I will try to get some type of a newsletter done each week, but it will not have much for current conditions. Sorry about this.

Joke: **Why did the scarecrow win the Nobel Prize??**

Rain fell 2 days in some parts of the county this past week. Rainfall on Wednesday, October 2nd ranged from 0" at 2 miles west of Minster and South of St. Marys on C.R. 66A to 0.13" at about 5 miles east of New Hampshire. Rainfall on Sunday ranged from 0.01" at about 5 miles east of Waynesfield to 0.3" at about 3 miles west of St Marys. Rainfall for the week ranged from 0.05" at Santa Fe – New Knoxville and Kettersville roads and at about 2 miles southeast of Fryburg to 0.35" at about 3 miles west of St. Marys. Average rainfall for the week was 0.16". Temperatures were cooler than normal for most of the week.

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Tasks for the week included: Tillage in preparation for winter wheat and cover crops, harvesting hay and corn silage, seeding wheat, hauling manure, harvesting corn and soybean, and tiling fields.

I drove part of the county on Sunday.

Wheat – Wheat is still being planted. Wheat stands are looking pretty good, but I'm concerned for this later planted wheat as to whether it will have enough moisture to emerge. Wheat can still be planted, but we are beyond the 10 days after fly free date for optimum yields.

Alfalfa – Alfalfa looks pretty good but it is moisture stressed in parts of the field.

Corn – Corn stage is from R5 (dent) to R6 (black layer) with most of it at the R5 (dent) stage of development. Within the dent stage most corn is nearly at black layer. About 35% of fields are at black layer. Crop development slowed drastically this past week due to the cooler temperatures. Only about 1% of corn has been harvested in the county. I have not heard any yields yet. Last year at this time 12% of the corn was harvested. I left the corn condition the same again this week since we are so close to harvest. The condition last week was 2% excellent, 14% good, 74% fair, 10% poor and 0% very poor.

Soybean – Soybean growth stage is from R6 (full sized soybean) with yellow leaves to R9 (all pods brown). Most fields are at the R8 (brown pods at one of the top 4 nodes). Crop maturity slowed this past week due to the cooler weather. About 23% of soybeans have been harvested in the county. Yields are ranging from 45 to 65 bushels per acre with most in the 50 to 55 bushel per acre range. Moistures are from 10 to 18% with most in the 11 to 13% moisture range. Last year 29% of soybeans were harvested at this time. I left the crop condition the same this week since there is little impact at this stage. The condition last week was 2% excellent, 20% good, 64% fair, 12% poor, and 2% very poor.

Weeds – Scout wheat fields for weeds. If summer annual weeds are not usually a problem in the spring in wheat then if you have weeds now, why not spray them this fall? The wheat has to be some minimum size before it can be sprayed and different herbicides have different minimum stages.

Insects - I'm now down to just monitoring brown marmorated stink bug. Numbers went through the roof this week:
2 to 8/trap with average of 4.7/trap; Last week was 0 to 4/trap with average of 1.3/trap

There were NO changes to the XtendiMAX, Engenia, FeXapan, or Tavium labels. The Engenia label still has the most approved products compared to XtendiMAX and FeXapan. No new herbicides were added to the XtendiMAX label this past week, which totals 152 herbicides. No new adjuvant was added the XtendiMAX label, now totaling 344. No new nozzles were added to the XtendiMAX label, which totals 26.

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No new Drift Reducing Adjuvant (DRA's) was added to the XtendiMAX label this week, making a total of 58 DRA's. No new nutritional products were removed from the XtendiMAX label which totals 203. No new products were added to the Insecticides, Fungicides, Plant Growth Regulator and Other group on the XtendiMAX label which totals 61. No new adjuvants were added to the Engenia label, which now totals 482. No new herbicides were added to the Engenia label, which brings the total herbicide count to 144. No new products were added to the Other category (growth regulators, and fungicides) on the Engenia label, which totals 29. No new insecticide were added to the label which currently has 28 products. No new Drift Reducing Adjuvants (DRA's) were added to the Engenia label, which totals 105. No new nozzles were added to the Engenia label, which totals 29. No new nutritional products were added to the Engenia label which totals 177 products. No new product was added to the pH Modifier group of the Engenia label which totals 16 products. The FeXapan label has many of same the products and nozzles as the XtendiMAX label, but NOT all are the same, so check the FeXapan label carefully. There are 120 herbicides, 49 DRA's, 312 adjuvants, 151 nutritionals, 44 insecticides, fungicides, and others, and 26 nozzles that have been approved for the FeXapan label. There are 13 herbicides, 66 DRA's, 181 adjuvants, and 41 nozzles approved for use with Tavium.

Answer to joke: Because he was out standing in his field!

Report from Brazil Trip

No further information at this time.

Estimating Harvest Loss of Corn and Soybean

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Corn and soybean harvest has begun in Auglaize County. Yields are very reasonable at this time, but some soybeans are getting too dry.

With the current price of corn and soybean, we can ill afford to leave corn and soybean seeds on the ground at harvest. This is lost profits. Keep corn and soybean harvest loss to 1-2 bushels per acre.

Two tools are needed to estimate corn yield loss and just one tool for soybean. A one-square foot frame made of any sturdy material is needed for both corn and soybean. A tape measure is also necessary for corn. To estimate yield loss begin combining at your normal settings and speed for at least a distance of 100 feet from the end rows. Suddenly turn off header and threshing unit of the combine. Then back up the combine 10 to 20 feet from where you stopped harvesting. Get out of the combine with your tools.

Take the square and throw it into the unharvested corn and soybean to count the number of seeds on the ground for preharvest shattering loss. In the case of soybean be sure to throw it in beyond where the reel was into the soybeans at the time of stopping the combine. Count the number of seeds in the square and record. Place the square on the ground 4 to 6 times in this area and calculate the average number of seeds in a square for preharvest loss. To be sure you averaged properly, just add up the number of seeds in each square and divide by the number of squares counted. For corn, observe the number of ears laying on the ground in 1/100 of an acre in the unharvested area. For 30-inch row corn and a 4-row head measure 43.5 feet. For a 6-row head measure 29 feet. For an 8-row head measure 22 feet. For a 12-row head measure 14 feet 8 inches. One ear in 1/100 of an acre is roughly equivalent to 1 bushel per acre.

To measure header loss, place the square on the soil within the area from the header to the unharvested crop. Count the number of seeds in the square and record. Repeat this process for a total of 4 to 6 times and obtain an average number of seeds per square for header loss. This loss is important because most of the losses

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occur at the header, especially for soybean. Knowing this information allows for proper header adjustments to be made.

Next take the square to the back of the combine and throw it on the soil and count the number of seeds in the square and record. This will give you the total seed loss. Repeat this step for a total of 4 to 6 times, carefully sorting through plant residue to find the seeds. Obtain an average of the number of seeds per square. For corn also count the number of whole ears per 100th of an acre.

For corn, two kernels per square foot equals a 1 bushel per acre loss. For soybean, 4 seeds per square foot equals a 1 bushel per acre loss. To figure out the loss in corn take the average number of seeds per square counted and divide by two to convert to bushels per acre. For soybean take the average number of seeds per square and divide by 4 to convert to bushels per acre.

Based upon the data collected, make a single adjustment targeting the greatest loss first. Harvest for at least 200 feet and repeat process to determine what other changes are necessary.

Shattering losses in soybean are most controlled by harvesting soybean at 15% moisture. Other things to reduce shattering include reducing travel speeds to 3 miles per hour and adjusting reel speeds to 25% faster than the ground speed. To reduce cracked seeds and pods in the grain adjust rotor or cylinder speed and adjust the gap between concave and rotor or cylinder.

To reduce ear loss in corn adjust snapping rolls to fit stalk diameter and change the speed of the snapping rolls to match ground speed. To reduce threshing losses, damaged kernels, and cobs in the grain, adjust cylinder or rotor speed and/or concave distance.

C.O.R.N. Newsletter

https://agcrops.osu.edu/newsletter/corn-newsletter

Stalk Quality Concerns

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Fig. 1. Stalk Lodging: Breakage of stalks below the ear.

2019 may be an especially challenging year for corn stalk quality in Ohio. Stress conditions increase the potential for stalk rot that often leads to stalk lodging (Fig. 1). This year persistent rains through June caused unprecedented planting delays. Saturated soils resulted in shallow root systems. Corn plantings in wet soils often resulted in surface and in-furrow compaction further restricting root growth. Since July, limited rainfall in much of the state has stressed corn and marginal root systems have predisposed corn to greater water stress.

Corn stalk rot, and consequently, lodging, are the results of several different but interrelated factors. The actual disease, stalk rot, is caused by one or more of several fungi capable of colonizing and disintegrating of the inner tissues of the stalk (Fig. 2). The most common members of the stalk rot complex are Gibberella zeae, Colletotrichum graminicola, Stenocarpella maydis and members of the genus Fusarium.

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Fig. 2 Stalk rot development at the crown.

The extent to which these fungi infect and cause stalk rot depends on the health of the plant. In general, severely stressed plants are more greatly affected by stalk rot than stress-free plants.

When corn is subjected to stress (due to weather, esp. drought, foliar diseases or insects) during grain fill, photosynthetic activity is reduced. As a result, the carbohydrate levels available for the developing ear are insufficient. The corn plant responds to this situation by removing carbohydrates from the leaves, stalk, and roots to the developing ear. While this "cannibalization" process ensures a supply of carbohydrates for the

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developing ear, the removal of carbohydrates results in premature death of pith cells in the stalk and root tissues, which predisposes plants to root and stalk infection by fungi.

The stalk rot fungi typically survive in corn residue on the soil surface and invade the base of the corn stalk either directly or through wounds made by corn borers, hail, or mechanical injury. Occasionally, fungal invasion occurs at nodes above ground or behind the leaf sheath. The plant tissue is usually resistant to fungal colonization up to silking, after which the fungus spreads from the roots to the stalks. When diseased stalks are split, the pith is usually discolored and shows signs of disintegration. As the pith disintegrates, it separates from the rind and the stalk becomes a hollow tube-like structure. Destruction of the internal stalk tissue by fungi predisposes the plant to lodging.

The presence of stalk rots in corn may not always result in stalk lodging, especially if the affected crop is harvested promptly. It is not uncommon to walk corn fields where nearly every plant is upright yet nearly every plant is also showing stalk rot symptoms! Many hybrids have excellent rind strength, which contributes to plant standability even when the internal plant tissue has rotted or started to rot. However, strong rinds will not prevent lodging if harvest is delayed and the crop is subjected to weathering, e.g. strong winds and heavy rains.

Nothing can be done about stalk rots at this stage; however, growers can minimize yield and quality losses associated with lodging by harvesting fields with stalk rot problems as early as possible. Scout fields early for visual symptoms of stalk rot and use the "squeeze test" to assess the potential for lodging. Since stalk rots affect stalk integrity, one or more of the inner nodes can easily be compressed when the stalk is squeezed between the thumb and the forefinger. The "push" test is another way to predict lodging. Push the stalks at the ear level, 6 to 8 inches from the vertical. If the stalk breaks between the ear and the lowest node, stalk rot is usually present. To minimize stalk rot damage, harvest promptly after physiological maturity. Harvest delays will increase the risk of stalk lodging and grain yield losses and slowdown the harvest operation. Since the level of stalk rot varies from field to field and hybrids vary in their stalk strength and susceptibility to stalk rot, each field should be scouted separately.

Some of the same stress conditions promoting stalk rots may also be affecting the integrity of corn ear shanks. Corn ears usually remain erect on plants prior to physiological maturity (black layer). Ear “drooping” (Fig. 3) occurs when shanks have collapsed or crimped. In such ears, the milkline is still evident (Fig. 4). This year drooping ears are evident in many fields, which have experienced late season drought stress. According to Dr. Bob Nielsen at Purdue University, this crimping of the shank (Fig. 5) suggests a loss of turgidity in the ear shank due to stress, possibly combined with some cannibalization of the ear shank similar to what occurs when the carbohydrates of the main stalk are cannibalized in response to severe stress (https://extension.entm.purdue.edu/newsletters/pestandcrop/article/do-you...). If droopy ears have not yet reached physiological maturity, collapsed ear shanks may cause kernels to black layer prematurely, which reduces grain yield.

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Fig. 3. Collapsed ear shanks resulting in drooping corn ears can lead to premature black layer and reduced yields.

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Fig. 4. Drooping ears and collapsed shanks associated with ears at ½ kernel milkline.

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Fig. 5. Collapsed shank gives ear shank a "crimped" appearance.

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Is a late soybean harvest in your future?

The variability of the 2019 cropping year is continuing into harvest. With a broad range of planting dates this spring, many soybean producers will be faced with variable harvest conditions. Additionally, the hot and dry conditions this late summer into early fall has sped up the senescence and dry down of many soybean fields. While seed quality is currently very good, a few weeks of wet weather can degrade quality quickly. Be sure you are ready when the soybeans are.

When harvesting soybeans, harvest loss can be a real concern. The ideal time to harvest soybeans is when the soybean seed reaches 12-15% moisture. This will allow for optimal threshing and reduced harvest loss. Harvest loss can be very simply calculated by getting out of the combine and counting the soybean seeds on the ground. By randomly selecting a 1-foot by 1-foot area in a harvested part of the field, a producer can estimate harvest loss. Counting 4 soybean seeds per square foot is equal to 1 bushel/acre of loss. Due to the mechanical nature of a combine it is nearly impossible to gather every soybean seed in the field. An acceptable level of loss is 3% of yield or less, which is equivalent to 1-2 bushels/acre. If harvest conditions and combine adjustments are not optimal, harvest loss can reach 10% of yield and that can become very costly to the producer.

It is important for the combine operator to be checking harvest loss as well has the quality of the grain in the combine grain tank. Harvest loss can occur in three areas: 1) pre-harvest, 2) header and 3) combine. One should check these three areas within different locations in a field. Checking behind the combine represents total harvest loss, but one must check pre-harvest loss before combining an area, as well as just behind the header after harvested (header loss). Combine loss equals the total harvest loss minus the pre-harvest loss and header loss. Checking all three areas determines if and what combine settings must be adjusted, especially header loss.

It is recommended to review the owner's manual and/or consult your local combine dealer for help on proper combine settings specific to the crop and harvest conditions. Fine tuning adjustments from these settings will help optimize the effectiveness of the combine. Adjustments should be based on harvest conditions and grain samples from the tank, looking for cracked or damaged soybeans seeds as well as the amount of pod material or unthreshed pods in the sample, see Table 1 below for acceptable levels.

80% of harvest loss occurs at contact with the header.

- The following are a few tips to help reduce or minimize harvest loss:
- A floating, flexible cutterbar and automatic header height control can improve the ability to maintain the header low and level to the ground during harvest.

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- Keep the cutter bar as low as possible for short soybeans and those that are dry. This point is important in areas with low plant populations and where more pods are on the lower portion of the plant, nearest the ground.
- Take time and slow the combine down. Slowing up 0.5 to 1.0 mph in areas where harvest loss might be risky.
- Shorter soybeans require smaller clearances between the reel, cutter bar, auger and the feed conveyor chain, to ensure stems are feeding through the platform and into the feeder house.
- Check knives, guards, ledger plates and wear plates, and keep spares handy.
- Ensure the sickle is sharp. Dull sickles tend to push stems over rather than cut them cleanly.
- Make sure to properly adjust guards and header to proper engagement angle as outlined in the operator's manual.
- Check that stems are being cleanly cut across the header. If not, check for dull blades, improperly set header angle, other incorrect header settings, or reduce your ground speed.
- Keep an eye on reel speed and adjust to match soybean conditions and ground speed within the field. The rule of thumb is to keep reel speed ~25% faster than ground speed.
- Make sure the feeder house relative to the header is at the proper adjustment to keep material feeding as efficient as possible.
- Importantly, make sure chains and bearings are properly lubricated and serviced on their stated time intervals. Belts should be tight and checked routinely.

Another risk of harvest this fall is harvesting soybeans that were killed by a frost before reaching full maturity or natural senescence. If this occurs, producers can expect a higher than normal moisture at harvest. This may require combine settings to be adjusted to minimize harvest losses. Reducing the concave clearance as well as increasing rotor or cylinder speed for more aggressive threshing may be needed for wet, tough soybeans.

Soybeans are recommended to be harvested between 12-15% moisture for optimum weight and minimal field loss. When soybeans are at 18% moisture or above, they can easily be crushed, so it's important to handle them with care to avoid any further losses. Soybeans that have not reached complete physiological maturity can cause issues as increased amounts of pods can enter the dryer. If beans are not properly cleaned before entering the bin, the excess pods and weed seed can result in decreased air flow and circulation and lead to increased insect population and mold growth. This can also increase the risk of a fire and the high oil content of soybeans makes a fire of this type tough to extinguish. Clean out the dryer frequently and keep a close watch when you suspect debris is entering the dryer. In cases like last year, if soybeans are severely damaged while still in the field, it is best to market them as soon as possible.

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We may find ourselves having to dry some of our later planted stands. Due to the late harvest last year, this was a struggle for us and many others. Regardless of how much fuel was burned, we couldn't get the moisture to drop. Ken Hellevang, an Agricultural Engineer for North Dakota State University Extension states that this happens due to "the moisture holding capacity of air being reduced at lower air temperatures. As average air temperatures approach 35°F, natural air drying becomes inefficient and not economical. Adding heat would cause the beans on the bottom of the bin to be dried to a lower moisture content and it would increase drying speed only slightly. Cool the soybeans to between 20°F and 30°F for winter storage and complete drying in the spring. Hellevang recommends starting drying in the spring when outdoor temperatures are averaging about 40°F."

It is also important to ensure good ventilation when drying during cold temperatures. Check vents and exhausts for ice or frost to avoid damage to the roof. Leave the access door open to relive pressure when operating the fan at temperatures near or below freezing. Over drying can also be an issue. It's important to not heat beans over 120 degrees Fahrenheit as high temperatures can cause damage to seed coats and lead to increased risk of the soybeans splitting. Hellevang also mentions that one study found temperatures of 130 degrees Fahrenheit caused 50-90% of seed coats to be cracked, increasing the amount of split beans to 20-70%. Table 1. outlines the grades and requirements for soybeans. If soybeans beans are already molded or discolored, over heating would only add more problems to the situation. As Table 1 shows, the limit of split beans is 10% for US No. 1 soybeans and 20% for US No.2 soybeans. Most molds and discolorations will grade as total damage and as shown below, only 2% is tolerated for US No. 1 soybeans and 3% for US No. 2 soybeans.

TABLE NO. 1 - GRADES AND GRADE REQUIREMENTS - SOYBEANS

Grade	Maximum Limits of -				
	Damaged Kernels		Foreign Material (percent)	Splits (percent)	Soybeans of other colors 1/ (percent)
	Heat (part of total) (percent)	Total (percent)			
U.S. No. 1	0.2	2.0	1.0	10.0	1.0
U.S. No. 2	0.5	3.0	2.0	20.0	2.0
U.S. No. 3	1.0	5.0	3.0	30.0	5.0
U.S. No. 4	3.0	8.0	5.0	40.0	10.0

U.S. Sample Grade:
U.S. Sample Grade is soybeans that:
(a) Do not meet the requirements for grades U.S. No.1, 2, 3, or 4; or
(b) Contains 4 or more stones which have an aggregate weight in excess of 0.1 percent of the sample weight, 1 or more pieces of glass, 3 or more crotalaria seeds (Crotalaria spp.), 2 or more castor beans (Ricinus communis L.), 4 or more particles of an unknown foreign substance(s) or a commonly recognized harmful or toxic substance(s), 10 or more rodent pellets, bird droppings, or an equivalent quantity of other animal filth in 1,000 grams of soybeans, or
(c) Contain 11 or more animal filth, castor beans, crotalaria seeds, glass, stones, or unknown foreign substance(s) in any combination, or
(d) Have a musty, sour, or commercially objectionable foreign odor (except garlic odor); or
(e) Are heating or otherwise of distinctly low quality.

1/ Disregard for Mixed Soybeans

Table 1

Harvested has already started for many producers across the state but it seems that several of us still have a few fields that were planted later than normal. As we begin to lose time for in-field drying, bin drying may

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be our next option. Bin drying is possible but must be done with care for our own safety and for grain quality. For storage, a normal soybean crop should be dried to 13% for a 6-month storage period, and 12% for 12 months of storage. For lower quality soybeans, experts suggest drying grain 1 or 2 points below that required for a normal crop. More information can be found at the following links.

Sources:

https://cropwatch.unl.edu/2018/ndsu-offers-soybean-drying-advice
https://crops.extension.iastate.edu/cropnews/2018/10/managing-wet-soybeans-late-harvest

https://agcrops.osu.edu/newsletter/corn-newsletter/2015-29/combine-adjus...

Author(s):
James Morris, Will Hamman, Jason Hartschuh, CCA, Elizabeth Hawkins

Nutrient Management Meetings Starting This Week

The Soil and Water Conservation Districts in Auglaize, Hancock, and Lucas Counties are offering nutrient management workshops starting this week.

The Auglaize Soil and Water Conservation District will be hosting an Understanding Your Nutrients Workshop on Tuesday October 8, 2019 at the Auglaize County Administration Building in the basement

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conference room. Topics discussed by Glen Arnold and Terry Mescher include Soil Test Recommendations, Value of Manure, Cost of Hauling Manure, and Research on Side-Dressing with Manure. Click here for a flyer and to make a reservation https://docs.wixstatic.com/ugd/856509_2f3b2749532a44ef8fc6c4d49a16308c.pdf
The Hancock Soil and Water Conservation District will be hosting a Nutrient Management Workshop on Thursday, October 10, 2019 in the Conference room of the Hancock Agricultural Service Center. Coffee and Donuts will be served at 8:30 am and the presentations will begin at 9:00 am. Lunch will be served following the presentations. Speakers will include Glen Arnold, Kip Studer, Justin McBride and Megan Burgess. Please RSVP by October 7, 2019 by calling 419-422-6569 or via email: awood@hancockswcd.com. Click here for a link to the flyer https://hancockswcd.com/
The Lucas Soil and Water Conservation District will be hosting a Breakfast & BMPs: Making Nutrients Work For You Workshop on Wednesday, November 13, 2019. You'll be able to get information on this meeting at the Lucas SWCD website https://co.lucas.oh.us/458/Soil-and-Water-Conservation

Author(s):
Glen Arnold, CCA

Managing Corn Harvest this Fall with Variable Corn Conditions

Thanks to the weather we had this year, corn is variable across fields and in some areas we will be harvesting corn at higher moistures than normal. Stalk quality may also be variable by field and amount of stress the plant was under, see the article Stalk Quality Concerns in this weeks CORN Newsletter. This variability and high moisture may require us to look harder at combine settings to keep the valuable grain going into the bin. Each ¾ pound ear per 1/100 of an acre equals 1 bushel of loss per acre. This is one ear per 6, 30 inch rows in 29 feet of length. A pre harvest loss assessment will help with determining if your combine is set properly. Initial settings for different combines can be found in the operator's manual but here are a few adjustments that can be used to help set all machines. Thanks to the weather we had this year, corn is variable across fields and in some areas we will be harvesting corn at higher moistures than normal. Stalk quality may also be variable by field and amount of stress the plant was under, see the article Stalk Quality Concerns in this weeks CORN Newsletter. This variability and high moisture may require us to look harder at combine settings to keep the valuable grain going into the bin. Each ¾ pound ear per 1/100 of an acre equals 1 bushel of loss per acre. This is one ear per 6, 30 inch rows in 29 feet of length. A pre harvest loss assessment will help with determining if your combine is set properly. Initial settings for

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different combines can be found in the operator's manual but here are a few adjustments that can be used to help set all machines.

Corn Head

Setting the combine starts at the header with an average of 66% of all machine harvest loss in corn occurring here. The major adjustments on the header are deck plate width and gathering chain speed. Setting deck plates in variable field conditions can be challenging, hydraulic adjust deck plates help a lot but if they are not automatic adjust you will have to keep up with changing conditions throughout the field. Under normal conditions deck plates should be set to 1 ¼ inches in the front and 1/8 inch wider at the back, 1 3/8 inches. While this is a starting point, a better method is to use actual stalks of corn and set the deck plates 1/16 of an inch wider at the front than the third node width of a corn stalk. If you check the best and the worst corn in the field you should be able to get an idea of how to vary deck plates on the go, possibly make marks on the indicator gauge to know where you want to be in each area. The basic goal is to keep deck plates narrow enough that we avoid butt shelling and ears slipping between the plates into the stock roll but still manage to be wide enough that most of the stalk and leaves get pulled though. If stalk lodging is present, increase deck plate taper, more open at the top will decrease fodder entering the combine. The other major setting is matching gathering chain and stalk roll speed to combine ground speed, which can be a challenge if you cannot vary header speed from the combine cab. The threshing system works best when full so we speed up in lower yielding areas but if the gathering chains/stalk rolls don't change speed our header loss will increase. This leads to another balancing act of increasing speed for harvest efficiency and seeing increased grain loss. If ground speed is 4 mph gathering chains should be running at 55 rpm. With the ratio staying constant across all ground speeds. Chain lugs should be opposite each other. With variable field conditions, making sure your rubber ear savers are present and flexible will retain whole ears from being lost.

Threshing

If the header worked properly there will not be a great deal of fodder in the threshing system, increased fodder leads to higher threshing losses. The first consideration in threshing settings is cob integrity, which is often compromised in stressed and high moisture corn. When setting concaves the goal is to not break cobs into more than 2 pieces crosswise and not break them length wise at all. The initial concave clearance on most machines is 3mm over cob diameter. Cobs should be coming out the back of the machine intact but when you break them in half, there should be signs of compression. Rotor or cylinder speed should be set using your book and only sped up if concave clearance is set and ears are still not threshed. Increasing rotor speed can increase threshing quality without breaking cobs, better than tightening concave settings. In wet corn, damaged grain is more often caused by high rotor speed than narrow concave settings. When harvesting high moisture corn, technically anything over 22%, according to most manufacturers, different concaves can help with threshing. Changing the large wire concaves to round bar, either straight or fish bone helps maintain cob integrity and grain quality in wet corn. Extremely wet corn, over 30% moisture, will need round bar concaves to maintain threshing grain quality. Wet corn can be damaged much more easily during threshing.

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Cleaning shoe

The last settings are in the cleaning shoe, fan speed and sieve opening. In corn, especially wet corn, most if not all of the separation and cleaning should take place on the top sieve. For dry corn, the lower sieve should be closed a little tighter than the top sieve. In wet corn, many manufacturers recommend opening the bottom sieve all the way so that corn easily moves into the clean grain elevator and does not over load the tailings auger. All the separation is then taking place on the top sieve. A common starting opening is 5/8 inch, then open until the first cob appears in the grain tank and shut one notch. A challenge this fall will be with kernel size. Even wet kernels may be smaller than average this year causing you to need a top sieve opening to be less than 5/8 inch. Kernel size will have increased variability, ears with many aborted kernels will have much large kernels than those on normal ears. Fan speed should be increased until all red chaff is gone from the grain tank then slowed down 30-50 rpms to keep grain from being blown out the back. This may actually be at lower rpms this year than most years due to low test weight which makes each kernel lighter than normal and more likely to blow out of the machine. Often fan speed settings are opposite of logic, increasing fan speed often decreases losses because chaff floats more allowing grain to fall through the sieves better.

Checking harvest loss and combine settings

When assessing combine settings there are four areas of loss to consider. The first is preharvest lost which is one ¾ pound ear per 1/100 of an acre which is one ear in 30 inch rows per 29 feet in 6 rows or 21.8 feet in 8 rows. The next source of loss is header loss, then threshing and sieve loss. When counting individual kernels, 2 kernels per square foot equally distributed equals one bushel per acre. In order to determine which part of the combine to adjust you need to calculate loss from each area. To check header loss stop the combine and back up the length of your combine. Then for 30 inch rows count the number of kernels in front of the combine from center of row to center of row for 4 feet of length which equals 10 square feet and divide by 20 to get bushels per acre. Each row of your header should be checked, since only one may be out of adjustment, record each row separately. Also check for additional ears that may have been lost by the header and not pre harvest, remember one ¾ pound ear per 1/100 of an acre equals a bushel. Record header loss to subtract from separator and cylinder loss. Preform the same kernel count behind the machine as you did in front subtract each row individually from header loss calculate separation loss. Watch for any cobs that still have corn on them this is threshing loss count these separate. A study conducted in Iowa found the best set combines have a total loss, pre and post-harvest loss, of 1.5 bushel per acre. Use the table below to calculate losses, remember kernels per 10 sq ft divided buy 20 equal bushels per acre.

Row number	Corn head and Separation loss	Threshing loss	Corn Head Kernel Loss	Separation Loss

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	(Total loss)		(kernels still on cob)					
	no/10 sq ft	Bu/A	no/10 sq ft	Bu/A	no/10 Sq ft	Bu/A	no/10 Sq ft	Bu/A
A	B	C	D	E	F	G	H	I
1								
2								
3								
4								
5								
6								
7								
8								
Total (sum of Column)								
	B/20=C		D/20=E		F/20=G		H/20=I	

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C-E-G=I or B-D-F=H

Setting Harvest Loss/Tattletale Monitors
Once your machine is set to expected harvest losses, adjust your loss monitors in order to use these monitors in the field. Harvest lost monitors work by sensing grain impact on the sensors, grain size and sensitivity can be adjusted to calibrate these loss monitors. Larger grain hits more area on the sensor increasing loss values. Larger harder grain also hits with more force. Usually you adjust grain size and then sensitivity. Good luck with harvest this fall.

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Potential for Nitrate Problems in Drought Stressed Corn

Have very dry soil conditions increased the potential for toxic levels of nitrates in corn harvested for silage? Nitrates absorbed from the soil by plant roots are normally incorporated into plant tissue as amino acids, proteins and other nitrogenous compounds. Thus, the concentration of nitrate in the plant is usually low. The primary site for converting nitrates to these products is in growing green leaves. Under unfavorable growing conditions, especially drought, this conversion process is retarded, causing nitrate to accumulate in the stalks, stems and other conductive tissue. The highest concentration of nitrates is in the lower part of the stalk or stem. For example, the bulk of the nitrate in a drought-stricken corn plant can be found in the bottom third of the stalk. If moisture conditions improve, the conversion process accelerates and within a few days nitrate levels in the plant returns to normal.

The highest levels of nitrate accumulate when drought occurs after a period of heavy nitrate uptake by the corn plant. Heavy nitrate uptake begins at the V6 growth stage and continues through the silking stage. Therefore, a drought during or immediately after pollination is often associated with the highest accumulation of nitrates. Extended drought prior to pollination is not necessarily a prelude to high accumulations of nitrate. The resumption of normal plant growth from a heavy rainfall will reduce nitrate accumulation in corn plants, and harvest should be delayed for at least 1 to 2 weeks after the rainfall. Not all drought conditions cause high nitrate levels in plant. If the soil nitrate supply is low in the dry soil surface, plant roots will not absorb nitrates. Some soil moisture is necessary for absorption and accumulation of the nitrates.

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If growers want to salvage part of their drought damaged corn crop as silage, it's best to delay harvesting to maximize grain filling, if ears have formed. Even though leaves may be dying, the stalk and ear often have enough extra water for good keep. Kernels will continue to fill and the increases in dry matter will more than compensate for leaf loss unless plants are actually dying or dead. Moreover, if nitrate levels are high or questionable, they will decrease as plant gets older and nitrates are converted to proteins in the ear.

If corn has been harvested and is suspected of being high in nitrates, it should be tested. Most labs that do forage testing can analyze samples.

The keys steps to collecting forage samples for nitrate testing can be found at https://fyi.extension.wisc.edu/forage/nitrate-poisoning-in-cattle-sheep-and-goats/ which is also in the Mark Sulc article below.
For more information, check out the following:

Be Alert to Late-Season Potential Forage Toxicities - Mark Sulc. Oct. 4, 2019 C.O.R.N. Newsletter. Available at: https://forages.osu.edu/news/be-alert-late-season-potential-forage-toxicities
Nitrates in Dairy Rations - Maurice L. Eastridge William P. Weiss, Ohio State University Fact Sheet AS-0003-99. Available on-line here.

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Other Articles

Biologists track the invasion of herbicide-resistant weeds into southwestern Ontario

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Source: University of Toronto
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A team including evolutionary biologists from the University of Toronto (U of T) have identified the ways in which herbicide-resistant strains of an invasive weed named common waterhemp have emerged in fields of soy and corn in southwestern Ontario.

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They found that the resistance -- which was first detected in Ontario in 2010 -- has spread thanks to two mechanisms: first, pollen and seeds of resistant plants are physically dispersed by wind, water and other means; second, resistance has appeared through the spontaneous emergence of resistance mutations that then spread.

The researchers found evidence of both mechanisms by comparing the genomes of herbicide-resistant waterhemp plants from Midwestern U.S. farms with the genomes of plants from Southern Ontario.

"We used modern methods of genome analysis to look at the genetic similarity of different populations of these plants," explains Julia Kreiner, a PhD candidate in the Department of Ecology & Evolutionary Biology (EEB) in U of T's Faculty of Arts & Science and lead author of a study published today in *Proceedings of the National Academy of Sciences*.

"To our surprise, we found that the genomes of some resistant plants in Ontario were nearly identical to those in very distant U.S. plants. This was evidence that the Ontario plants were very closely related to the U.S. plants and suggests that the former came from seeds that were just picked up from one field and dropped in another."

While Kreiner and her collaborators did not determine exactly how the seeds were physically transported, this propagation -- known as gene flow -- is typically accomplished in different ways. Seeds can be carried by water, or in the digestive tracts of animals, or from field to field by way of farm equipment. And especially with a wind-pollinated plant like common waterhemp, genes can also be spread via wind-borne pollen.

The same DNA analysis identified some resistant plants that did not genetically match any other plants suggesting they appeared through the independent emergence of a genetic mutation conveying resistance.

The researchers were surprised to discover both mechanisms at play.

"We have two regions, Walpole Island and Essex County in southwestern Ontario, where waterhemp populations evolved resistance," says Stephen Wright, a professor in ecology & evolutionary biology at U of T and a co-author of the study.

"Because of their proximity, our expectation was that they would have shared the same origin of resistance. But our results suggest different origins -- from the movement of seed from a source population in the U.S. as well as independent evolution of resistance in a local population."

According to John Stinchcombe, also a professor in ecology & evolutionary biology at U of T and a co-author, "One of the most striking findings is that we see both ways that weeds could become resistant happening on really short time scales. Evolution is happening very quickly, and using multiple mechanisms."

Detlef Weigel, a co-author from the Max Planck Institute in Germany added, "Because herbicide-resistant waterhemp had appeared in the U.S. long before such plants were found in Canada, we were convinced that evolution of herbicide resistance is very rare and had occurred only once. Now that we know that it can occur repeatedly, the next question is whether one can slow down the evolution of new genetic variants that make waterhemp herbicide resistance."

In addition to the U of T cohort, co-authors included weed scientists from the University of Illinois and the University of Guelph Ridgetown Campus; and genome and developmental geneticists at the Max Planck Institute for Developmental Biology in Germany.

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The researchers studied strains of the common waterhemp -- aka Amaranthus tuberculatus -- that are resistant to glyphosate, one of the most widely used herbicides in the world, commonly known by its trade name Roundup.

"Waterhemp is one of the most problematic agricultural weeds in North America," explains Kreiner. "In the U.S., common waterhemp and the closely related Amaranthus palmeri are causing all kinds of havoc in terms of crop productivity and crop yields."

"Waterhemp first appeared in one county in Ontario in the early 2000s. And as of this year, we've found them in seven different counties in the province. So, it's spreading."

Kreiner suggests that the findings underline the importance of strictly following agricultural practices designed to minimize gene flow and staunch resistant strains as they arise.

"The fact that we're seeing a spread involving all of these mechanisms shows that managing the problem is a real challenge and that it will require integrating management approaches across different scales," explains Kreiner.

For example, it illustrates the importance of thoroughly cleaning agricultural residue from rented farm equipment -- which is used on multiple farms in a season -- in order to minimize the transport of seeds from field to field.

"It also shows the importance of practices like rotating herbicides from season to season," says Kreiner. "And rotating crops between corn, soy and wheat. It's practices like these that will minimize the emergence of resistance and limit seed movement."

At the same time, Kreiner warns that the occurrence of herbicide resistance is an inevitable evolutionary process and that the challenge requires further study.

"Management practices still don't treat the underlying cause, which is that herbicide resistance is evolving repeatedly," she says. "And so with these new genomic resources and approaches, I'm now trying to understand what makes a weed a weed. What are the factors that might make these weeds more likely to evolve resistance and be more problematic than others?

"At this point, we're running out of herbicides. These plants have evolved resistance to pretty much every herbicide we've come up with. And it doesn't seem like there's ever going to be a herbicide that a weed can't eventually evolve resistance to.

"There may be other strategies for controlling these weeds -- like weed-control technologies based on robotics and machine learning," she suggests. "But even then, the weed has a way to evolve around that, so it's a really difficult challenge."

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