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Nitrogen Management Guidelines for Corn in Indiana – *(Jim Camberato, and Bob Nielsen)* -

11-YEAR SUMMARY OF CORN RESPONSE TO NITROGEN FERTILIZER

This report summarizes corn yield response to fertilizer nitrogen (N) rate in field-scale trials conducted around the state of Indiana since 2006. These results are applicable to N management programs that use efficient methods and timings of N fertilizer application. The average Agronomic Optimum N Rate (AONR) for corn/soy in 53 trials conducted on medium- and fine-textured soils in southwest, southcentral, southeast, and westcentral Indiana was 208 lbs N/ac. The average AONR for 30 trials conducted on medium- and fine-textured soils in northwest and northcentral Indiana was 212 lbs N/ac. The average AONR for trials conducted on medium- and fine-textured soils in other regions of the state were 232, 251, and 263 lbs N/ac for central (23 trials), east central (26 trials), and northeast (11 trials) Indiana, respectively. The average AONR for 16 trials on non-irrigated sandy soils was 202 lbs N/ac. At five Purdue Ag. Centers where we conducted paired trials of corn following soybean (corn/soy) and corn following corn (corn/corn) from 2007 to 2010, the average AONR for corn/corn was 44 lbs greater than for corn/soy while average corn/corn yields were 18 bu/ac less than the corn/soy yields.

Economic Optimum N Rates (EONR) calculated for various combinations of N fertilizer cost and grain price are listed in Tables 2-7 for regions of the state.

Nitrogen fertilizer is one of the significant variable production costs for corn. Applying "more than enough N" is no longer cheap "insrance" as it once was many years ago. Applying "more than enough N" is also not environmentally friendly. High N fertilizer costs and environmental impacts should encourage growers to critically evaluate their N management program, including application rate, fertilizer material, and timing.

(Continue Reading...)

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Wheat And Cold Weather – *(Charles Mansfield)* -

- Cold night temperatures may have caused injury to wheat.
- Jointed wheat is most vulnerable.
- Evaluate for extent of injury after a few days of good growing weather.

Wheat may have been injured by recent cold weather. Low temperatures ranged from the upper teens to low 20s in southern Indiana to single digits in central and northern Indiana on Wednesday and Thursday mornings this week. Injury to jointed wheat normally occurs when low temperatures fall to 24^{o}F or below for 2 hours or more. The rule of thumb threshold temperature that may cause injury to wheat that is not yet jointed but out of dormancy is 12^{o}F or less. See table below for critical temperatures that cause injury to wheat and associated injury implications.

Many wheat fields in southern Indiana are at the jointing growth stage (Feekes 6). The first node is still close to the soil surface in some fields. In others, the first node is up to 1.5” above the soil. The embryonic head/growing point sits directly on top of the uppermost node, positioning it up to 2” above the soil surface in some cases. Therefore, exposed growing points and lower stems are susceptible to freeze injury.

Healthy tissue of the lower stem and growing point is a light green color and comprised of firm tissue. Damaged tissue will be mushy and watery, showing signs of tissue damage from ruptured cells. For wheat that is out of dormancy, but not jointed air temperature lower than 12^{o}F may result in leaf tissue injury and/or injury to the crown. It usually takes a few days of good growing weather with daytime temperatures in the 40's - 50's to evaluate extent of injury.

Temperatures that cause freeze injury to wheat at spring growth stages, and symptoms and yield effect of spring freeze injury.

Growth Stage	Approx. Injurious Temp. (2 Hours)	Primary Symptoms	Yield Effect
Tillering	12^{o}F(-11^{o}C)	Leaf chlorosis; burning of leaf tips; silage odor; blue cast to field	Slight to moderate
Jointing	24^{o}F(-4^{o}C)	Death of growing point; leaf yellowing or burning; lesions, splitting, or bending of lower stems; odor	Moderate to severe
Boot	28^{o}F(-2^{o}C)	Floret sterility; head trapped in boot; damage to lower stem; leaf discoloration; odor	Moderate to severe
Heading	30^{o}F(-1^{o}C)	Floret sterility; white awns or white heads; damage to lower stem; leaf discoloration	Severe
Milk	28^{o}F(-2^{o}C)	White awns or white heads; damage to lower stems; leaf discoloration; shrunken, roughened, or discolored kernels	Moderate to severe
Dough	28^{o}F(-2^{o}C)	Shriveled, discolored kernels; poor germination	Slight to moderate

Field of wheat at Feekes 6. First node is approximately 1.5" above soil surface.

Ruptured cells in the lower stem - definitely injured. These plants were cut off at the soil surface.

A couple nodes and the light colored embryonic head on top of the uppermost node. These plants were cut of at the soil surface.

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WEEDS

Spring Herbicide Applications on Winter Wheat – *(Joe Ikley, Travis Legleiter, and Bill Johnson) -*

The date on the calendar may indicate that we are still in the winter season, but the weather outside would indicate otherwise. The temperatures of the past winter have been mild especially throughout late February. The mild winter and early spring like conditions are not only favorable for a good wheat crop, but also for winter annual weeds. Winter annual weeds that occur in wheat fields over the winter will also be taking full advantage of the spring like conditions to get a jump-start to the season. Many wheat producers, especially in the southern regions of Indiana will soon be or already are topdressing their wheat to take advantage of this favorable weather. Those looking into topdressing need to also be scouting for weeds and determining if a herbicide application is necessary on any existing winter annual weeds. The following information will outline winter annual weeds to look out for, weed scouting tips, crop stage restrictions, and herbicide recommendations.

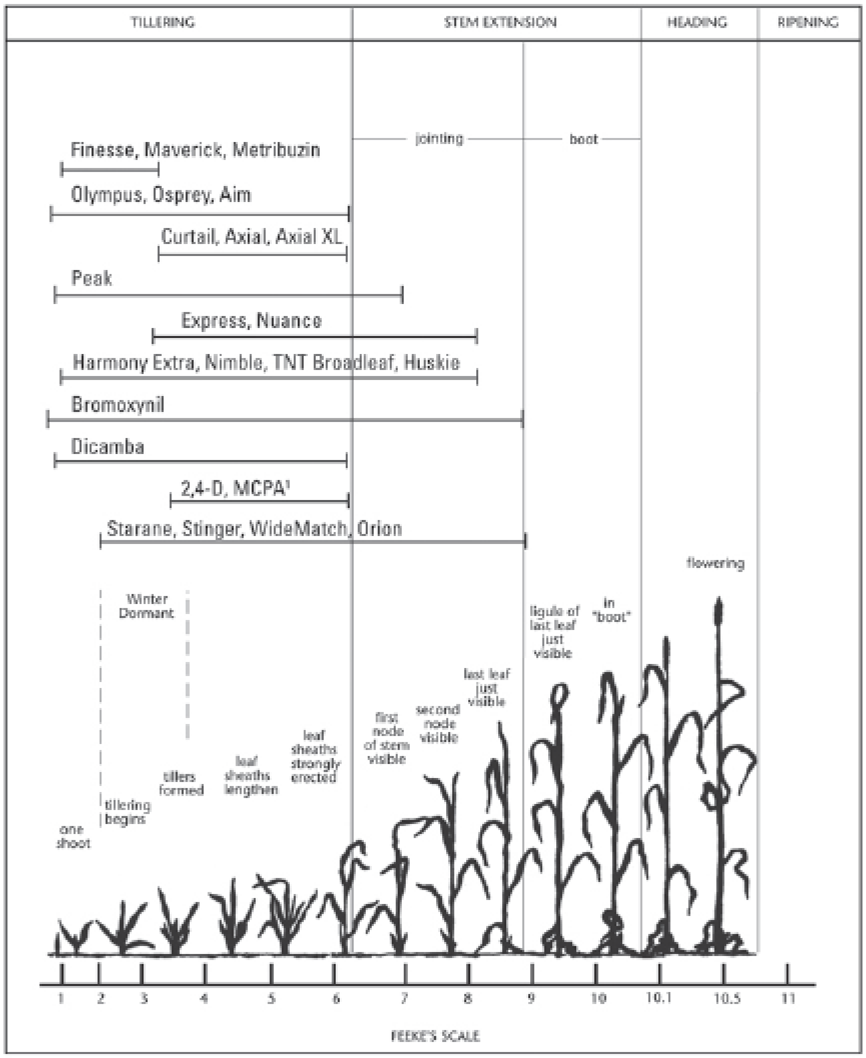
Some common broadleaf weeds to scout for in your winter wheat are dandelion, purple deadnettle, henbit, chickweed, Canada thistle, and wild garlic. These winter annual species that emerge in the fall can remain relatively inconspicuous though the winter and become competitive and troublesome during the spring if not controlled early in the spring. Summer annual weeds such as ragweed will be of less concern in the early spring and will be outcompeted by the wheat crop if managed properly, especially in the favorable conditions currently being experienced. Grass weeds to be aware of and scouting for are: annual bluegrass, annual ryegrass, cheat, and downy brome.

Determining the severity of weed infestations in your wheat fields is key in determining the necessity of a herbicide application. As with all agronomic crops, you should scout your entire field to determine what weed management practices need to be implemented and determine any areas of severe weed infestations. Wheat fields that contain uniform infestations of at least one broadleaf weed and/or three grass weeds per square foot should be taken into consideration for a herbicide application to avoid yield loss and harvest interference problems. Some fields that have less uniform infestations, but rather pockets of severe infestation should be managed to reduce weed seed production and future infestations.

When determining your herbicide program for spring applications, the stage of the wheat crop should be considered. The majority of wheat herbicides are labeled for application at certain wheat growth stages and some commonly used herbicides have very short windows in which they can be applied. The popular broadleaf weed herbicides 2,4-D and MCPA are efficient and economical, but can only be applied for a short period of time between tillering and prior to jointing. This is a short window that occurs early in the spring and may occur even earlier this year if current weather conditions hold into the spring. Wheat growth stages and herbicide timing restriction are outlined in Figure 1.

If weed infestations are severe enough to require a herbicide application, the use of liquid nitrogen fertilizer solution as a carrier is a popular option for applying herbicides and topdressing the wheat crop in a single pass over the field. Caution should be taken when using a liquid fertilizer as a herbicide carrier as moderate to severe crop injury can result, especially in saturated conditions. Many post applied wheat herbicide labels allow for liquid nitrogen carriers, but require different rates and types surfactants than if the herbicide was applied with water as the carrier. Table 1 includes precautions to be taken when applying wheat herbicide using liquid fertilizer as a carrier; further details and directions can be acquired from the herbicide label.

Another consideration growers should take into account when planning early spring herbicide applications is the plant back restrictions to double crop soybeans. A large percentage of the herbicides listed in Table 1, especially those with activity on Ryegrass and Brome, have soybean plant back restrictions greater than the typical three month time period between spring applications and double crop soybean planting. The soybean plant back restrictions greatly reduce the number of options available to wheat producers who double crop soybeans after wheat. Refer to Table 1 for more specific plant back timing restrictions.



[1] Labels of some 2,4-D products allow application after jointing but before early boot. (See text for more information.)

Figure 1. Feek's scale of winter wheat stages and herbicide application timings.

Table 1. Spring applied wheat herbicide rates, crop stage restrictions, weed control spectrum, soybean plant back timing, and liquid fertilizer carrier recommendations.

Active Ingredient	Trade Name(s)	Rate Per Acre	Application Timing	Winter Annual Weeds Controlled	Liquid Fertilizer Carrier Recommendations	Soybean Plant Back Restriction
2,4-D	Weedar, Weedone, Formula 40, others	1 to 2 pts.	Tillering to before jointing	Prickly and wild lettuce, mustards, field pennycress, shepherd's purse, horseweed (marestail), dandelion*	The use of a liquid fertilizer as a carrier will increase the risk of crop injury	No restriction for early spring applications
Bromoxynil	Buctril, Moxy	1 to 2 pts.	Emergence to boot	Mustards, henbit, field pennycress, shepherd's purse	UAN used as a carrier in early spring may increase leaf burn, do not use fertilizer carrier after jointing	No restriction

			stage			for early spring applications
Bromoxynil + pyrasulfotole	Huskie	13.5 to 15 oz.	After 1-leaf stage up to flag leaf emergence	Purple deadnettle, henbit, prickly and wild lettuce, horseweed (marestail), mustards, field pennycress, shepherds purse, chickweed	Can be applied in a liquid fertilizer solution that does not exceed 50% nitrogen and is not being applied above 30 lb/Acre	4 Months
Bromoxynil + fluroxypyr + 2,4-D	Cleansweep D	1 to 1.5 pts.	Tillering to before jointing	Henbit, horseweed (marestail), mustards, field pennycress, shepherd's purse, Canada thistle	N/A	4 Months
Bromoxynil + fluroxypyr + MCPA	Cleansweep M	1 to 1.5 pts.	2-leaf to flag leaf emergence	Henbit, horseweed (marestail), mustards, field pennycress, shepherd's purse, Canada thistle	N/A	4 Months
Clopyralid	Stinger	0.25 to 0.33 pts.	After 2-leaf stage until boot stage	Horseweed (marestail), Canada thistle, dandelion*, prickly and wild lettuce	N/A	10.5 Months
Clopyralid + 2,4-D	Curtail	1 to 2.67 pts.	Tillering to jointing	Prickly and wild lettuce, mustards, field pennycress, shepherd's purse, Canada thistle, dandelion*, horseweed (marestail)	UAN can be used as a liquid fertilizer carrier	10.5 Months
Dicamba	Banvel, Clarity, Sterling Blue, others	0.125 to 0.25 pt.	Emergence to before jointing	Prickly and wild lettuce, horseweed (marestail), shepherd's purse, dandelion*	Conduct compatibility test as outlined by label prior to application	No restriction for early spring applications
Florasulam + MCPA	Orion	l17 oz.	3-leaf to preboot stage	Prickly and wild lettuce, chickweed, field pennycress, shepherd's purse, mustards	N/A	9 Months
Halauxifen-methyl + florasulam	Quelex	0.75 oz.	2-leaf to flag leaf emergence	Horseweed (marestail, henbit, chickweed, field pennycress, shepherd's purse, mustards	Maximum of 0.25% v/v NIS should be used when applying with a liquid fertilizer	3 Months
MCPA	Chiptox, Rhomene, Rhonox, others	1 to 4 pts.	Tillering to before jointing	Field pennycress, shepherd's purse, mustards pigweed, prickly lettuce, horseweed (marestail)	The use of a liquid fertilizer as a carrier will increase the risk of crop injury	No restriction for early spring applications
Mesosulfuron-methyl	Osprey	4.75 oz.	Emergence to preboot stage	Ryegrass, bluegrass, wild oat, field pennycress, wild oat	Can be applied in a liquid fertilizer solution that does not exceed 15% nitrogen fetilizer. Maximum of 0.25% v/v NIS should be used when applying with a liquid fertilizer	90 Days
Pinoxaden	Axial XL	16.4 oz.	2-leaf to preboot stage	Ryegrass	Can be applied in a liquid fertilizer solution that does not exceed 50% nitrogen fertilizer. Crop injury may be possible.	120 Days
Pinoxaden + fluroxypyr	Axial Star	16.4 oz.	2-leaf to preboot stage	Ryegrass	Can be applied in a liquid fertilizer solution that does not exceed 50% nitrogen fertilizer. Crop injury may be possible.	4 Months
Propoxycarbazone-sodium	Olympus	0.6 to 0.9 oz.	Emergence to before jointing	Cheat, downy brome, purple deadnettle, horseweed (marestail), mustards, field pennycress, shepherd's purse	Maximum of 0.25% v/v NIS should be used when applying with a liquid fetilizer carrier. Temporary crop injury may occur.	12 Months and 24% of precipitation
Propoxycarbazone-sodium + mesosulfuron-	Olympus Flex	3 to 3.5 oz.	1-leaf to before jointing	Cheat, downy brome, purple deadnettle, horseweed (marestail), mustards, field	Maximum of 0.25% v/v NIS should be used when applying with a liquid fertilizer solution. Carrier solutions should not contain more than 15% nitrogen	5 Months and 18% of precipitation

methyl				pennycress, shepherd's purse, annual bluegrass, ryegrass	fertilizer.	
Prosulfuron	Peak	0.5 oz.	Emergence to second node visible	Mustards, field pennycress, prickly and wild lettuce, shepherd's purse, wild garlic, wild onion	Apply with NIS at 1-2 qt/100 gal when using a liquid fertilizer carrier	10 Months
Pyroxsulam	PowerFlex, PowerFlex HL	3.5 oz.	3-leaf to jointing	Cheat, downy brome, ryegrass, chickweed, mustards, field peycress, shepherd's purse	Can be applied in a liquid fertilizer solution that does not exceed 50% nitrogen and is not being applied above 30 lb/Acre. NIS at 0.25% v/v should be added to solution.	3 Months
Thifensulfuron + tribenuron	Harmony Extra TotalSol	0.45 to 0.9 oz.	After 2-leaf stage but before flag leaf becomes visible	Wild garlic and onion, field pennycress, mustards, chickweed, henbit shepherd's purse, prickly and wild lettuce, horseweed (marestail), purple deadnettle	Include a surfactant at 0.5-2 pts/100 gal when applying in a carrier that consist of less than 50% nitrogen fertilizer. Consult DuPont representative if carrier contains greater than 50% nitrogen fertilizer	45 Days
Tribenuron	Express TotalSol	0.25 to 0.5 oz.	After 2-leaf stage but before flag leaf becomes visible	Chickweed, deadnettle, henbit, wild lettuce, mustards, field pennycress, shepherd's purse	Liquid fertilizer carriers should have 0.06-0.25% v/v NIS added. Temporary crop yellowing and stunting may occur when applied in liquid fertilizer. This injury is occasionally severe, and risk of sever injury may increase under saturated soil conditions.	45 Days
*The highest labeled herbicide rates should be used to achieve control of dandelion plants with spring applications.						

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2017 Popcorn Agri-Chemical Handbook – *(Genny Bertalmio, The Popcorn Board)* -

The 2017 Popcorn Agri-Chemical Handbook is now available to ensure everyone in the popcorn industry is informed about products registered for use on popcorn or in popcorn storage facilities. The handbook lists agri-chemicals registered and the regulatory status or special use restrictions.

The handbook continues to provide appendix information on residue tolerances, as may be found in the Global MRL Database, which includes popcorn (corn, pop) and denotes established levels by the US, Codex, and 120 markets.

The handbook notes the Mode or Mechanism of Action (MOA) numerical classification of each listed chemical when used on a product label. The classification schemes are published by the Insecticide Resistance Action Committee, the Herbicide Resistance Action Committee and the Fungicide Resistance Action Committee. The handbook also highlights the Signal Word "Danger" when used on a product label as required by the EPA's Label Review Manual.

The Popcorn Board urges you to provide the above links to growers or download, print and distribute the updated version of this critical information to them. Contact Genny Bertalmio, +1.312.821.0217 or gbertalmio@smithbucklin.com, for further information.

The Popcorn Board accepts voluntary contributions to ensure continued funding of its efforts to provide this important information to the popcorn industry. Checks should be mailed to The Popcorn Board, 8333 Solutions Center, Chicago, IL 60677-8003.

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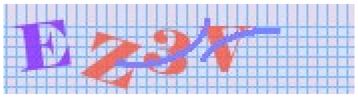

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