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INSECTS, MITES, & NEMATODES

Armyworm Outbreaks Reported – *(Christian Krupke and John Obermeyer)* -

- Abundance of moths captured this spring has led to localized outbreaks.
- Moths lay eggs on grassy crops, covers, and weeds.
- Corn can be quickly consumed when grass cover crop is burned down.
- Wheat defoliation and head clipping can result, grass pastures can be denuded in days,

As reported in previous issues, impressive armyworm moth numbers captured in pheromone traps (see “Armyworm Pheromone Trap Report”) have led to hungry caterpillars. Moths prefer to lay their eggs on dense grassy vegetation (e.g., wheat, grass hay, and grass cover crops). Initially, tiny larvae and their damage are hard to find. Larval development, except in extreme northern counties, should now have advanced to the point that high-risk fields should be assessed for feeding damage. As of May 24, multiple reports of armyworm outbreaks have been received from central and southwestern counties. All have been at levels requiring treatment. Currently, armyworms are about ½” long in West Central Indiana. This is the time to treat them, when larger they are more difficult to kill.

Corn - Corn that has been no-tilled into, or growing adjacent to, a grass cover crop (especially rye) should be inspected immediately for armyworm feeding. Hatched larvae will move from the dying grasses to emerging/emerged corn. Armyworm feeding gives corn a ragged appearance, with feeding extending from the leaf margin toward the midrib. When larvae are numerous and/or large, damage may be so extensive that most of the plant, with the exception of the midrib and stalk, is consumed. A highly damaged plant may recover if the growing point has not been destroyed. If more than 50% of the plants show armyworm feeding and live larvae less than 1-1/4 inches long are numerous in

the field, control may be necessary. Larvae greater than 1-1/4 inches consume a large amount of leaf tissue and are more difficult to control. If armyworm are detected migrating from border areas or waterways within fields, spot treatments in these areas are possible if the problem is identified early enough. Don't rely on Bt-corn for protection, as all are vulnerable to armyworm damage.

Young armyworm and feeding on corn seedling.

Wheat & Grass Pasture - Examine plants in different areas of a field, especially where plant growth is dense. Look for flag leaf feeding, clipped heads, and armyworm droppings on the ground. Shake the plants and count the number of armyworm larvae on the ground and under plant debris. On sunny days, the armyworm will take shelter under crop residue or soil clods. If counts average approximately 5 or more per linear foot of row, the worms are less than 1-1/4 inches long, and leaf feeding is evident, control may be justified. If larvae are present and they are destroying the flag leaves or the heads, treat immediately.

Armyworm feeding damage on grass forage.

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Armyworm Pheromone Trap Report

County	Cooperator	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	Wk 12
Dubois	SIPAC Ag Center	0	0	0	101	193	16	0	3	31			
Jennings	SEPAC Ag Center	0	1	1	56	57	9	4	32	4	4		
Knox	SWPAC Ag Center	0	13	26	42	189	57	2	10	20			
LaPorte	Pinney Ag Center	0	0	3	352	936	382	154	445	750	100		
Lawrence	Feldun Ag Center	4	108	216	246	650	348	112	31	40	74		
Randolph	Davis Ag Center	0	29	41	528	1232	300	72	10	298	44		
Tippecanoe	Meigs	0	2	15	107	730	243	98	95	86	21		
Whitley	NEPAC Ag Center	0	34	90	537	1689	1349	855	665	1265	334		

Wk 1 = 3/16/17 - 3/22/17; Wk 2 = 3/23/17 - 3/29/17; Wk 3 - 3/30/17 - 4/5/17; Wk 4 - 4/7/18 - 4/12/17; Wk 5 - 4/13/17 - 4/19/17; Wk 6 - 4/ 20/17 - 4/26/17; Wk 7 = 4/27/17 - 5/3/17; Wk 8 = 5/4/17 - 5/10/17; Wk 9 = 5/11/17 - 5/17/17; Wk 10 = 5/18/17 - 5/24/17

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Cressleaf Groundsel (*Packera glabella*) – *(Joe Ikley, Travis Legleiter and Bill Johnson)* -

Every spring we receive several calls and e-mails about a certain 3-foot tall weed with yellow flowers. Cressleaf groundsel is once again in full bloom across the entire state of Indiana in many no-till fields and pastures. This article is meant to provide information on the biology and life cycle of cressleaf groundsel, as well as how to control it in fields and pastures.

Field of cressleaf groundsel.

Biology and Identification

Cressleaf Groundsel is a winter annual weed that has been becoming more prevalent in Indiana pastures and agronomic crop ground over the past couple of years. The small seeds produced by this weed allow it to thrive in reduced and no-till systems as well as poorly established pastures. Cool and wet springs of the past couple of years have also favored cressleaf groundsel, as it is a weed that prefers moist soils and typically struggles in hot and dry weather.

Flower cluster of cressleaf groundsel.

Much like most winter annual weeds, cressleaf groundsel emerges as a rosette in the fall then bolts, flowers, and produces seed in the spring. Basal rosette leaves are deep pinnate serrations with roundly lobed leaf margins. Leaves are typically 2 to 10 inches in length (Britton and Brown 1970). Bolting stems are hollow and can reach up to three feet in height with inflorescences that contain six to twelve yellow ray flowers that are often compared to the flowers of common dandelion. When looking for cressleaf groundsel in older weed id or taxonomic guides be aware that it has traditionally been placed in the ***Senecio*** genus and only recently was placed into the ***Packera*** genus.

Rosette and lower leaves of cressleaf groundsel.

Toxic Properties

The competitiveness of cressleaf groundsel with agronomic crops has not been researched, though its presence as a winter annual in no-till fields will have the same implications of slowing soil warming and drying as other winter annual weeds. The presence of this weed in pastures and hay fields should be of more concern as it does contain toxic properties when ingested by livestock. Leaves, flowers, and seeds of cressleaf groundsel contain alkaloids that will cause liver damage in livestock that is termed seneciosis and typically occurs on a chronic level (Kingsbury 1964). Symptoms of seneciosis are loss of appetite, sluggish depressed behavioral patterns, and in extreme cases aimless walking without regard to fences or structures. Although cressleaf groundsel is not as toxic as many of its relatives in the ***Packera*** genus, livestock producers encountering this weed in pastures or hay should take steps to avoid prolonged ingestion by animals.

Control

Herbicide applications to control of cressleaf groundsel are most effective when applied to plants in the rosette stage, bolting plants are very difficult to control with herbicides. Infestations in pastures can be controlled with 2,4-D or a combination of 2,4-D and dicamba applied to rosettes in the fall or early spring prior to bolting (Nice 2008). Producers should be aware that applications of these herbicides will also kill favorable broadleaves that are present in pastures.

Control recommendations for cressleaf groundsel in no-till agronomic crop fields has typically been to apply 2,4-D @ 1 qt/A to actively growing rosettes in the fall. Research at University of Illinois (Lake and Hager 2009) has shown that fall or spring applications to 2-8 inch diameter rosettes with the following herbicides and rates can achieve 94% or greater control of cressleaf groundsel:

1 oz/A Canopy EX

1-2 qt/A glyphosate (4lb ai formulation)

1-2 qt/A glyphosate + 1-2 pt 2,4-D (4 lb ai formulation)

3 pt Extreme

In general the treatments applied in the fall resulted in greater biomass reduction of cress leaf groundsel, although all treatments and timings prevented plants from producing seed.

Reference:

Britton, N. and A. Brown. 1970. An Illustrated Flora of the Northern United States and Canada. Volume 3. Dover Publications, Inc., New York. Pp 540-544.

Kingsbury K.M. 1964. Poisonous Plants of the United States and Canada. Pentice-Hall, Inc., Englewood Cliffs, N.J. pp 425-435.

Lake, J.T. and A.G. Hager. 2009. Herbicide Selection and Application Timing for Control of Cressleaf Groundsel (Packera glabella). Weed Technol. 23:221-22.

Nice, G. 2008. Guide to Toxic Plants and Forages. Purdue Extension Pulbication WS-37.

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Wet Weather Corn Weed Management Challenges – *(Joe Ikley, Travis Legleiter and Bill Johnson) -*

Recent wet, rainy weather has created some weed management challenges for Indiana growers. In this article we will hit on a few key points to consider in corn based on current challenges.

Delayed weed control in corn

Indiana corn growers rely heavily on atrazine premixes in corn. Rain will not have completely washed all of the herbicide away, but may have compromised overall activity. Scout fields as soon as possible to determine if weeds are escaping. Obviously giant ragweed is a big concern, but wet conditions and dilution of atrazine can result in failures to control cocklebur, sunflower, velvetleaf, burcucumber, morninglories, and waterhemp. If corn is less than 12 inches tall and you haven't used all of the atrazine allowed by the label, it would be wise to add atrazine to the other postemergence herbicides being applied to corn to control the above mention weeds and provide some soil residual activity. If corn is more than 12 inches tall, you cannot use any additional atrazine.

Weed escapes in large corn in all of Indiana

Whenever the warm weather finally hits us, we can expect emerged corn will grow rapidly. Postemergence corn herbicide options become limited when corn is 12 inches tall, and really limited on corn at the V6 or later growth stage. Also keep in mind that large weeds are much more difficult to control. To avoid crop injury on corn under other stresses, try to keep spray out of whorls, especially with ALS inhibitors and contact products. See table 8 in the weed control guide for the height restrictions of postemergence corn herbicides.

See Table 8. Rainfast Intervals, Spray Additives, and Maximum Crop Size for Postemergence Corn Herbicides from the Weed Control Guide For Ohio, Indiana, and Illinois .

Table 8. Rainfast Intervals, Spray Additives, and Crop Size for Postemergence Corn Herbicides

This table shows the required time interval between herbicide application and rainfall and summarizes label recommendations for spray additives and maximum crop stage. Check herbicide labels for additive rates. Information in this table applies to field corn only.

Herbicide	Rainfast Interval (hrs)	Spray additives	Maximum Crop Size (field corn)
2,4-D Amine	6-8	No additives.	Broadcast up to 8-inch corn; directed spray before tassel stage.
2,4-D Ester	2-3	No additives.	Broadcast up to 8-inch corn; directed spray before tassel stage.
Accent Q, NIC-IT	4	MSO, COC or SURF (Addition of UAN or AMS is recommended).	Broadcast up to 6 collars or 20-inch corn; directed spray up to 10 collars or 36-inch field corn.
Aim	1	SURF. AMS or UAN may be added if required by tank-mix partner. Do not use COC or tank-mix with EC formulations of other crop protection chemicals except as specifically directed by label.	Apply up to 8-collar corn.
Armezon PRO	1	MSO or COC plus UAN or AMS. Can use SURF in mixtures.	Up to the V8 stage or 30-inch corn, whichever occurs first.
Atrazine	2	MSO or COC.	Apply before corn is 12 inches tall.
Basagran	8	COC + UAN or AMS, depending on weed species present.	-
Beacon	4	COC or SURF (UAN or AMS may be added).	Broadcast 4 to 20-inch corn; directed spray before tassel emergence.
Bestow	4	NIS + UAN or AMS.	Broadcast up to 12 inches or 5-collar stage.
Bromoxynil	1	No additives.	Apply before tassel emergence.
Bromoxynil+atrazine	2	No additives.	Apply before corn is 12 inches tall.
Cadet	4	NIS, COC, or MSO. UAN or AMS can be added.	Preplant up to 48 inches tall, and before tassel emergence.
Callisto	1	COC + UAN or AMS.	Apply up to 30-inch or 8-leaf corn.
Callisto GT	-	NIS + AMS. COC can be used instead of NIS but increases risk of crop injury.	Broadcast up to 30-inch or V8 corn.

Callisto Xtra	-	COC or NIS + UAN or AMS.	Apply up to 12-inch corn.
Capreno	1	COC + UAN or AMS.	Apply broadcast from V1 to V6 corn; directed spray up to V7 corn.
Dicamba	6-8	Add UAN if velvetleaf is present. SURF, COC, or UAN may be added under dry conditions.	Do not apply with COC when corn height exceeds 5 inches. Broadcast up to 5th-leaf stage or 8-inch corn; directed spray up to 36-inch corn.
Dicamba/atrazine	6-8	Add UAN if velvetleaf is present. SURF, COC, or UAN may be added under dry conditions.	Do not apply with COC when corn height exceeds 5 inches. Apply broadcast up to 5-leaf stage or 8-inch corn.
DiFlexx	6-8	Can add SURF, COC, or MSO + UAN or AMS.	Broadcast spray from spike through V10 stage and corn less than 36 inches tall.
DiFlexx DUO	4	COC or MSO is recommended, plus UAN or AMS. HSOC can also be used.	Broadcast up to but not including V7 stage, or 36 inches tall; directed spray up to V10 or 36 inches tall, or 15 days prior to tassel, whichever occurs first.
Glufosinate	4	AMS.	Broadcast or directed up to 24-inch or V7 corn. Directed spray up to 36-inch corn.
Halex GT	2	SURF + AMS.	Broadcast up to 30-inch or 8-leaf corn.
Harrow	4	SURF, COC, or MSO plus UAN or AMS.	Broadcast from spike to 2-collar stage, and not more than 6 inches tall.
Hornet	2	SURF, COC, or MSO. UAN or AMS may be added under extremely dry conditions.	Broadcast up to 20-inch corn or 6 collars; directed spray up to 36-inch corn.
Impact/Armezon	1	MSO or COC + UAN or AMS. SURF can be used in combinations with other broadleaf herbicides.	Apply broadcast or directed up to 45 days before harvest.
Laddok	8	MSO, COC, UAN, AMS, DASH, or combinations of these.	Apply before corn is 12 inches tall.
Laudis	1	MSO + UAN or AMS.	Broadcast up to V8 corn.
Laudis + atrazine	2	COC + UAN or AMS.	Broadcast up to 12-inch corn
Northstar	4	SURF, COC or MSO up to 12-inch corn. Only SURF between 12 and 36-inch corn. UAN or AMS may be added.	Broadcast 4 to 20-inch corn; directed spray up to 36-inch corn.
Peak	4	COC unless mixed with glyphosate.	Broadcast up to V6 or 20-inch corn; directed spray up to 30 inches.
Permit/Sandea/ Halomax	4	SURF, MSO, or COC. UAN or AMS may be added.	Apply through layby stage of corn.
Realm Q	4	SURF or COC + UAN or AMS.	Broadcast or directed up to 20 inches and prior to the 7-collar stage.
Revulin Q	4	COC or HSOC + UAN or AMS.	Broadcast up to V5 stage or 20 inches tall, whichever occurs first.
Resolve Q	4	NIS + UAN or AMS, unless mixed with a glyphosate product or Ignite.	Broadcast up to 20-inch or 6 collar corn.
Resource	1	COC. UAN or AMS may be added to improve control of certain species.	Apply up to the 10-leaf stage.
Shotgun	6	No additives.	Apply before 12-inch corn.
Solstice	1	COC or NIS + UAN or AMS. COC is preferred adjuvant. Do not use MSO.	Up to V8 or 30-inch corn.
Spirit	4	COC, MSO or SURF.UAN or AMS may be added.	Broadcast 4 to 20-inch corn; directed spray up to 24-inch corn or after 6 collar corn.
Starane	1	An adjuvant can be used if required by tank-mix partner.	Broadcast up to the V5 stage; directed spray after the V5 stage.
Status	4	SURF, COC, or MSO + UAN or AMS.	Broadcast from 4 to 36-inch corn (rates up to 5 oz/A)
Steadfast Q	4	COC, MSO, or SURF + UAN or AMS. COC or MSO is preferred over SURF.	Broadcast up to and including 6 collars or 20-inch corn
Stinger	6-8	No additives.	Up to 24-inch corn.
WideMatch	6	No additives.	Broadcast up to the V5 stage; directed spray after the V5 stage.
Yukon	4	SURF or COC. UAN or AMS may be added.	Apply broadcast or directed up to 36-inch corn.

Zemax	1	SURF or COC.	Apply up to 30-inch or 8-leaf corn.

How do I pick a postemergence herbicide for corn?

Going on the assumption that most of the corn grown in Indiana is Roundup Ready or Liberty Link, we assume growers will use glyphosate or glufosinate as the base herbicide. Many different herbicides can be tankmixed with glyphosate or glufosinate to broaden the spectrum of weeds controlled and provide residual activity in the soil. The best advice we can give you is to consult tables 5 and 6 of the weed guide to help in selecting tankmix partners for weeds you are trying to control.

See Tables 5 and 6. Weed Response to Postemergence Herbicides in Corn from the Weed Control Guide For Ohio, Indiana, and Illinois.

Table 5. Weed Response to Postemergence Herbicides in Corn—Grasses

	Grasses													Yellow nutsedge
Postemergence	Site of Action	Crop tolerance	Barnyardgrass	Crabgrass	Fall panicum	Field sandbur	Giant foxtail	Yellow foxtail	Shattercane	Seedling johnsongrass	Rhizome johnsongrass	Quackgrass	Woolly cupgrass	
2,4-D	4	2	-	-	-	-	-	-	-	-	-	-	-	-
Aim	14	2	-	-	-	-	-	-	-	-	-	-	-	-
Atrazine	5	1	7	-	-	-	8	8	-	-	-	7	-	7
Basagran/Broadloom	6	0	-	-	-	-	-	-	-	-	-	-	-	8
Beacon	2	2	-	-	8	6	7	7	9	9	7	8+	-	6
Bestow	2	2	7	-	7	6	7	7	7	7	-	-	7	-
Bromoxynil	6	1	-	-	-	-	-	-	-	-	-	-	-	-
Bromoxynil + atrazine	5/6	1	-	-	-	-	-	-	-	-	-	-	-	-
Cadet	14	2	-	-	-	-	-	-	-	-	-	-	-	-
Callisto/Zemax	15/27	1	-	7*	-	-	-	-	-	-	-	-	-	-
Callisto GT2	9/27	1	8	8	8	9	9	9	9	9	9	9	9	7
Callisto Xtra	5/27	1	-	7*	-	-	-	-	-	-	-	-	-	-
Capreno	2/27	1	8	8	8	8	8+	9	8	8	7	7	6	-
Dicamba	4	2	-	-	-	-	-	-	-	-	-	-	-	-
Dicamba + atrazine	4/5	2	-	-	-	-	-	-	-	-	-	-	-	-
DiFlexx DUO	4/27	0	8	8	-	6	7	9	8	8	7	7	7+	-
Glufosinate1	10	0	6	8	8	7	8	6	8	8	7	6	8+	-
Glyphosate2	9	0	8	8	8	9	9	9	9	9	9	9	9	7
Halex GT2	9/27/15	1	9	9	9	9	9	9	9	9	9	9	9	7
Hornet/Stanza	2/4	1	-	-	-	-	-	-	-	-	-	-	-	-
Impact/Armezon/ Armezon PRO	27	0	7	7	6	-	7+	7	6	7	-	-	6	-
Impact/Armezon + atrazine	27/5	0	8	8	6	-	8+	7+	6	7	-	-	6	-
Laudis	27	0	8	8	-	6	7	9	8	8	7	7	7+	-
Laudis + atrazine	27/5	0	8	8	-	6	8	9	8	8	7	7	7+	-
Laddok	5/6	1	-	-	-	-	-	-	-	-	-	-	-	8+
Nicosulfuron	2	1	8+	4	8+	8	9	9	9	9	9	9	8	6
NorthStar	2/4	2	-	-	7	6	6	6	9	9	6	7	-	-
Permit/Sandea/Halomax	2	1	-	-	-	-	-	-	-	-	-	-	-	9
Realm Q	2/27	1	7	-	7	6	7	7	7	7	-	-	7	-
Resolve Q	2	1	7	-	7	6	7	7	7	7	-	-	7	-
Resource	14	2	-	-	-	-	-	-	-	-	-	-	-	-
Revulin Q	2/27	1	8+	7*	8+	8	9	9	9	9	9	9	8	6
Shotgun	4/5	2	-	-	-	-	6	6	-	-	-	-	-	-
Solstice	14/27	2	-	7*	-	-	-	-	-	-	-	-	-	-
Spirit	2	2	-	-	7	-	6	6	9	9	6	7	-	-
Starane	4	1	-	-	-	-	-	-	-	-	-	-	-	-
Status	4/19	1	6	6	6	-	6	6	-	-	-	-	-	-

Steadfast Q	2	1/2	8	-	8	8	9	9	9	9	8	8	7	-
Stinger	4	0	-	-	-	-	-	-	-	-	-	-	-	-
WideMatch	4	1	-	-	-	-	-	-	-	-	-	-	-	-
Yukon	2/4	2	-	-	-	-	-	-	-	-	-	-	-	9

*[1] Apply to Liberty Link (glufosinate-resistant) corn only. [2] Apply to glyphosate-resistant (Roundup Ready, AgriSure GT, etc.) corn only. *Large crabgrass only*

Table 6. Weed Response to Postemergence Herbicides in Corn—Broadleaf Weeds

	Broadleaf Weeds																			
Postmergence	**Annual morning-glory**	**Eastern black nightshade**	**Burcu-cumber**	**Cockle-bur**	**Common ragweed**	**Common ragweed (group 2-R)**	**Giant ragweed**	**Giant ragweed (group 2-R)**	**Jimson-weed**	**Kochi**	**Lambs-quarters**	**Lambs-quarters (group 5-R)**	**Palmer amaranth (group 2-R)**	**Palmer amaranth (group 2+9-R)**	**Pigweed (redroot/ smooth)**	**Smart-weed**	**Velvet-leaf**	**Water-hemp (group 2-R)**	**Water-hemp (group 2+9-R)**	**Water-hemp (group 2+9+ 14-R)**
2,4-D	9	7	-	9	9	9	9	9	7	7+	9	9	8	8	9	6	8	8	8	8
Aim	8	8	-	-	6	6	-	-	-	7+	7	7	-	-	8+	-	9	-	-	-
Atrazine	9	9	8	9	9	9	8	8	9	9	9	-	8+	8+	9	9	8	8+	8+	8+
Basagran/ Broadloom	-	-	-	9	7	7	6	6	9	7	6	6	-	-	-	9	8+	-	-	-
Beacon	6	8	9	9	9	-	9	-	9	8	-	-	-	-	9	8	8	-	-	-
Bestow	-	-	-	6	6	-	-	-	-	7+	6	6	-	-	8	6	6	-	-	-
Bromoxynil	8	9	7	9	9	9	8	8	9	8	9	9	-	-	7	8	8	-	-	-
Bromoxynil +Atrazine	9	9	9	9	9	9	9	9	9	9	9	9	8	8	9	9	9	8	8	8
Cadet	7	-	-	-	-	-	-	-	-	8	7	7	-	-	7	-	9	-	-	-
Callisto/Zemax	7	9	8	7+	7	7	8	8	9	8	9	9	8	8	8	9	9	8	8	8
Callisto GT2	8	9	8	9	9	9	9	9	9	8	9	9	9	8	9	9	9	9	8	8
Callisto Xtra	8	9	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Capreno	7	9	8	8	8	8	8	8	9	8+	9	9	8	8	9	8	9	8	8	8
Dicamba	9	8	7	9	9	9	9	9	9	8	8	8	8	8	8	8	7+	8	8	8
Dicamba+atrazine	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
DiFlexx DUO	9	9	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Glufosinate1	8	9	8	9	9	9	9	9	9	8	7	7	8	8	8	9	8	8	8	8
Glyphosate2	6	8	8	9	8+	8+	8+	8+	9	8	8+	8+	8	-	9	8	8	9	-	-
Halex GT2	8	9	8	9	9	9	8+	8+	9	8	9	9	9	8	9	9	9	9	8	8
Hornet/Stanza	7	7	6	9	9	9	9	9	7	7	7+	7+	-	-	7+	9	8+	-	-	-
Impact/Armezon/ Armezon PRO	7	9	7+	8	7	7	7	7	9	8+	9	9	8	8	9	6	9	8	8	8
Impact/ Armezon + atrazine	8	9	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Laudis	7	9	7	8	8	8	8	8	9	8	9	9	8	8	9	8	9	8	8	8
Laudis + atrazine	8	9	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Laddok	8	8	6	9	9	9	9	9	9	9	9	5	7+	7+	9	9	9	7+	7+	7+
Nicosulfuron	7	-	8	-	-	-	-	-	8	-	-	-	-	-	9	8	-	-	-	-
NorthStar	8	9	9	9	9	7	9	6	9	8	9	9	7	7	9	9	8+	7	7	7
Permit/Sandea/ Halomax	6	-	-	9	8	-	8	-	8	7	-	-	-	-	9	7	8	-	-	-
Realm Q	7	9	7+	8	8	7	8	8	9	8	9	9	8	8	9	9	9	8	8	8
Resolve Q	-	-	-	6	6	-	-	-	-	7+	7	7	-	-	8	6	7	-	-	-
Resource	-	-	-	7	7	7	-	-	7	-	7	7	-	-	7	-	9	-	-	-
Revulin Q	8	9	8	7+	7	7	8	8	9	8	9	9	8	8	9	9	9	8	8	8
Shotgun	9	9	7	9	9	9	9	9	9	8	9	9	8	8	9	9	8+	8	8	8
Solstice	8	9	8	8	7	7	8	8	9	8	9	9	9	8	9	9	9	9	9	8
Spirit	7	8	9	9	9	-	9	-	9	8	6	6	-	-	9	8+	8+	-	-	-
Starane	9	7	7	8	9	9	-	-	7	9	-	-	-	-	-	7	8	-	-	-
Status	9	8	7	9	9	9	9	9	9	8	9	9	8	8	9	8+	8	8	8	8
Steadfast Q	6	-	7	6	-	-	-	-	6	-	-	-	-	-	9	7	-	-	-	-
Stinger	-	8	-	9	9	9	9	9	8	-	-	-	-	-	-	-	-	-	-	-

WideMatch	9	7	7	9	9	9	9	9	8	9	-	-	-	-	-	7	8	-	-	-
Yukon	8	7	7	9	9	7	9	7	9	8	8	8	7+	7+	9	9	9	7+	7+	7+

*[1] Apply to Liberty Link (glufosinate-resistant) corn only. [2] Apply to glyphosate-resistant (Roundup Ready, AgriSure GT, etc.) corn only. *Large crabgrass only*

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Agronomy Tips

Corn Emergence Assessment in Crusted Soils – *(Bob Nielsen and John Obermeyer)* -

The recent spate of rainy weather and chilly temperatures does not bode well for some corn fields planted prior to the onset of the nasty weather. Problems with germination, emergence, or survival of emerged seedlings are likely to occur in fields that received truly excessive rainfall and / or are poorly drained and susceptible to ponding or soil saturation for days on end. Significant surface soil crusting often develops in conventionally-tilled fields and restricts emergence of the corn plants. There can be some imbibitional chilling injury to seed in fields planted just ahead of the cold, wet spell. Other fields planted a bit earlier may exhibit corkscrewed elongation of mesocotyls and underground leafing out in response to cold temperature shock during emergence.

Please refer to "Corn Replant Considerations 2017, Pest&Crop Issue 7, May 12, 2017.

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Update on "Safe" Hybrid Maturities for Late Plantings – *(Bob Nielsen)* -

Time is running out for some Indiana fields not yet planted to their intended corn crop or those fields already planted to corn that now require replanting. Many fields are currently too wet to allow for planting. Forecast rains the remainder of the week and over the coming weekend threaten to keep corn planters out of some fields until early June.

There are two challenges with regard to choosing hybrid maturities to plant in early June in Indiana. One relates to whether the chosen hybrid maturity will mature safely (i.e., kernel black layer) before a killing fall freeze. The other is whether the chosen hybrid maturity will mature early enough to allow enough time for the grain to dry to acceptable harvest moistures.

In another, lengthier, article I describe the process for estimating “safe” hybrid maturities suitable for late planting (Nielsen, 2017). The purpose of this brief article is to simply offer a little more insight to the thought process.

As indicated above, the choice of the desired date to reach kernel black layer influences not only the estimate of available GDD from planting, but also the likely grain moisture loss (drydown) per day after maturity. If your primary objective is to simply mature the crop before a killing fall freeze in early to mid-October, then you can use a later maturity hybrid and take advantage of another couple weeks of GDDs. If you want the crop to mature in late September to take advantage of relatively better field drydown conditions, that will by necessity require planting an earlier relative maturity hybrid because of the fewer available GDDs. The difference in estimated "safe" relative hybrid maturities between the two decisions can be dramatic.

The accompanying table provides estimates of "safe" relative hybrid maturities for two planting dates (June 5 and 10) for six select counties across the state (different geographic locations) and three targeted crop maturity dates in the fall (Sept 20, Sep 30, and Oct 10). These estimates are based on the procedure described in my lengthier article (Nielsen, 2017).

Bottom line is that the time is approaching when the "safe" relative hybrid maturities for delayed corn planting will simply be too unadapted for most growers' liking, both from the lower yield potential perspective and typically unsatisfactory genetic disease resistance. Factor in the economics and crop insurance considerations (June 5 cutoff for full coverage, same for prevented planting with some policies), then the window for corn planting is beginning to close.

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Approximate "Safe" Hybrid Maturities By Planting Date & Target Maturity Date for Select Indiana Counties

5-June Planting

Available GDD From Planting

Target BL Date	LaPorte	Whitley	Tippecanoe	Randolph	Posey	Jennings
20-Sept	2091	2058	2234	2140	2584	2306
30-Sept	2209	2172	2366	2264	2741	2443
10-Oct	2307	2266	2478	2369	2878	2561

Approx. Hybrid CRM That Would Blacklayer By Date

Target BL Date	LaPorte	Whitley	Tippecanoe	Randolph	Posey	Jennings
20-Sept	95	95	101	7	117	106
30-Sept	101	99	108	103	123	110
10-Oct	106	103	112	108	127	117

10-June Planting

Available GDD From Planting

Target BL Date	LaPorte	Whitley	Tippecanoe	Randolph	Posey	Jennings
20-Sept	2016	2000	2155	2066	2489	2229
30-Sept	2134	2102	2287	2190	2646	2366
10-Oct	2232	2196	2399	2295	2783	2484

Approx. Hybrid CRM That Would Blacklayer By Date

Target BL Date	LaPorte	Whitley	Tippecanoe	Randolph	Posey	Jennings
20-Sept	94	94	101	96	114	103
30-Sept	98	98	105	101	120	109
10-Oct	103	101	109	105	127	114

Target BL date for hybrid to reach physiological maturity aka Kernel Black Layer.

"Safe" hybrid maturities based on research that indicates GDD requirements from planting to maturity decreased by 6.8 GDD per day after May 1.

Available GDDs estimated with online U2U@MRCC: Corn GDD tool.

Hybrid CRM as defined by DuPont Pioneer.

Related Reading

Nielsen, RL (Bob). 2017. Hybrid Maturities for Delayed Planting. Corny News Network, Purdue Univ, Agronomy Extension. URL:

http://www.kingcorn.org/news/timeless/HybridMaturityDelayedPlant.html. Accessed May 2017.

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Historical Corn Grain Yields for the U.S. – *(Bob Nielsen)* -

- Corn grain yields have steadily increased in the U.S. since the late 1930's.
- Only two major shifts in corn yield trends have occurred since records were first published in 1866.
- Year-to-year departures from trend yield are influenced primarily by year-to-year variability in growing conditions.

Historical grain yields provide us with a glimpse of yields yet to come, although like the stock markets, past performance is no guarantee of the future. The historical yield data for corn in the U.S. illustrate the positive impact of improved crop genetics and crop production technologies.

From 1866, the first year USDA began to publish corn yield estimates, through about 1936, yields of open-pollinated corn varieties in the U.S. remained fairly stagnant and averaged about 26 bu/ac (1.6 MT/ha) throughout that 70-year period. Amazingly, the historical data indicate there was no appreciable change in productivity during that entire time period (Fig. 1), even though farmers' seed-saving practices represented a form of plant breeding.

Rapid adoption of double-cross hybrid corn by American growers began in the late 1930's, in the waning years of the Dust Bowl and Great Depression. Within a very few years, the yield data indicated that a significant improvement in corn productivity had occurred, that resulted in an annual rate of yield improvement of about 0.8 bu/ac/year from about 1937 through about 1955 (Fig. 1).

A second significant improvement in the annual rate of yield gain began in the mid-1950's in response to continued improvement in crop genetics, increasing adoption of N fertilizer and chemical pesticides, and agricultural mechanization (Fig. 1). Since 1955, corn grain yields in the U.S. have increased at a fairly constant 1.9 bushels per acre per year, sustained primarily by continued improvements in genetics and crop production technologies (Fig. 1).

Some speculate that a third significant improvement in the annual rate of yield gain is "on the horizon", in part due to the advent and adoption of transgenic hybrid traits beginning in the mid-1990's. However, the USDA-NASS yield data show little evidence that the yield trend has deviated since the last big shift beginning in the mid-1950's (Fig. 1).

Annual yield estimates fluctuate above and below the yield trend line over the years (Fig. 2). The annual departure from yield is primarily in response to variability in growing conditions year to year (weather, pests). The Great Drought of 2012 certainly resulted in dramatic and historic reductions in corn grain yield relative to trend lines, but the greatest negative departure from trend yield actually occurred more than 100 years earlier during the Great Drought of 1901. The annual departures from trend yield since the mid-1950's reinforce the evidence from Fig. 1 that the advent and adoption of transgenic hybrid traits beginning in the mid-1990's has not resulted in noticeably greater departures from trend yield.

So, the good news is that corn grain yields in the U.S. have steadily increased since the 1950's. The sobering news is that, in order to support the ever-burgeoning world population in the years to come, a third and MAJOR shift in the annual rate of yield gain will be required.

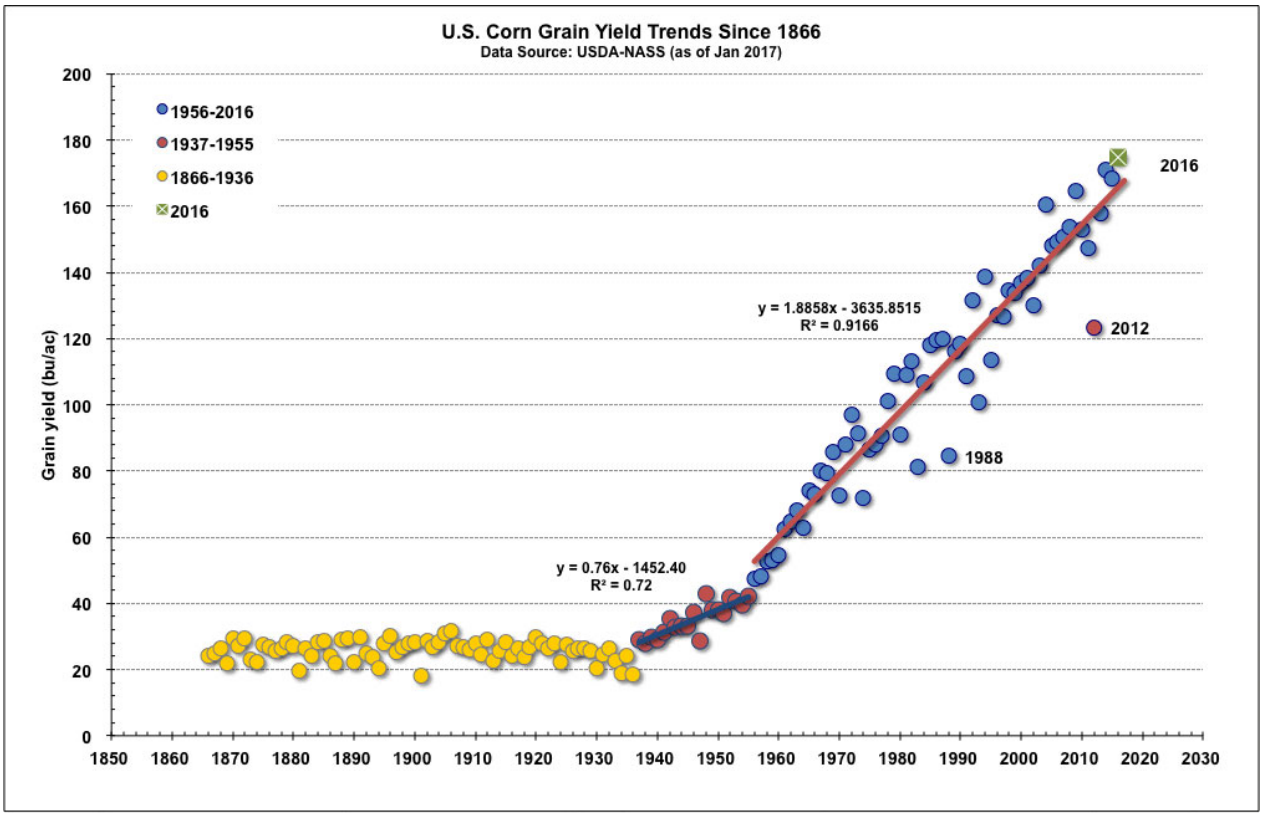

Figure 1.

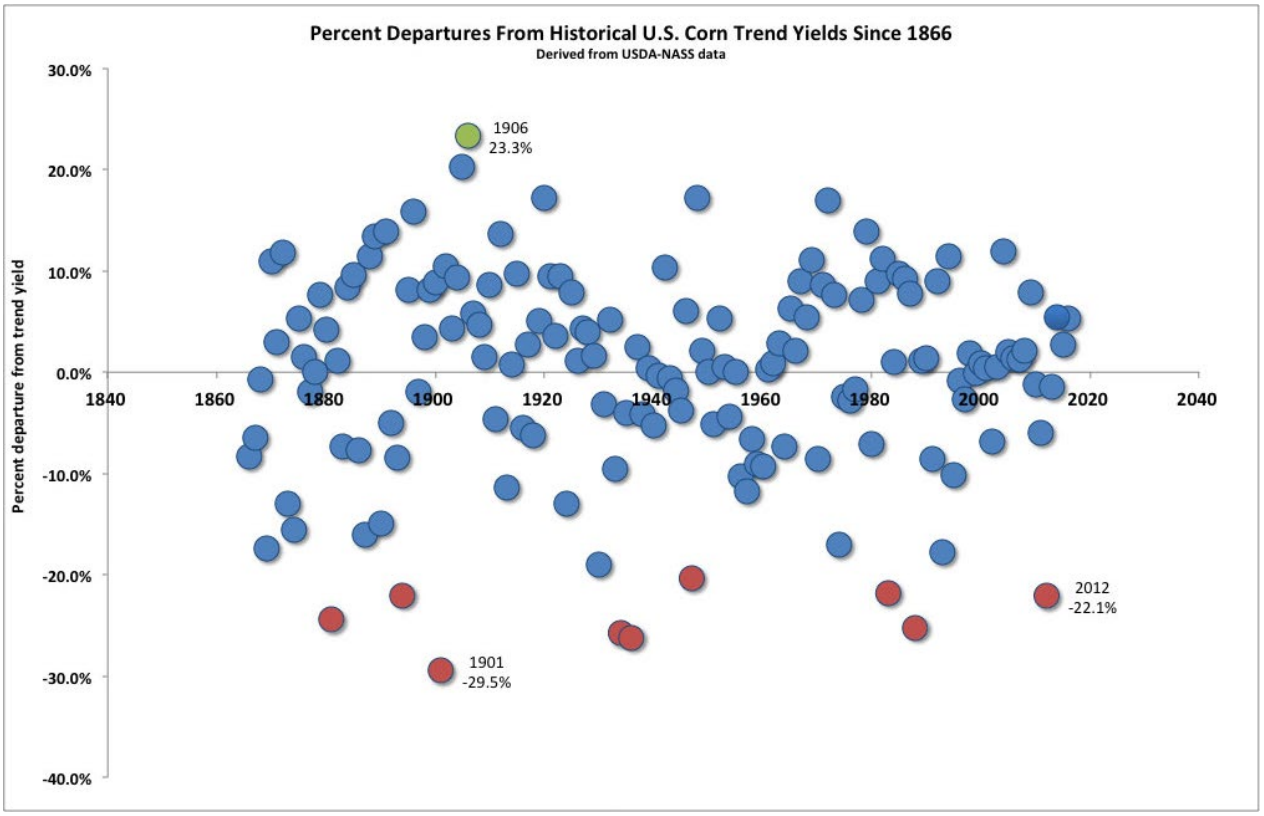

Figure 2.

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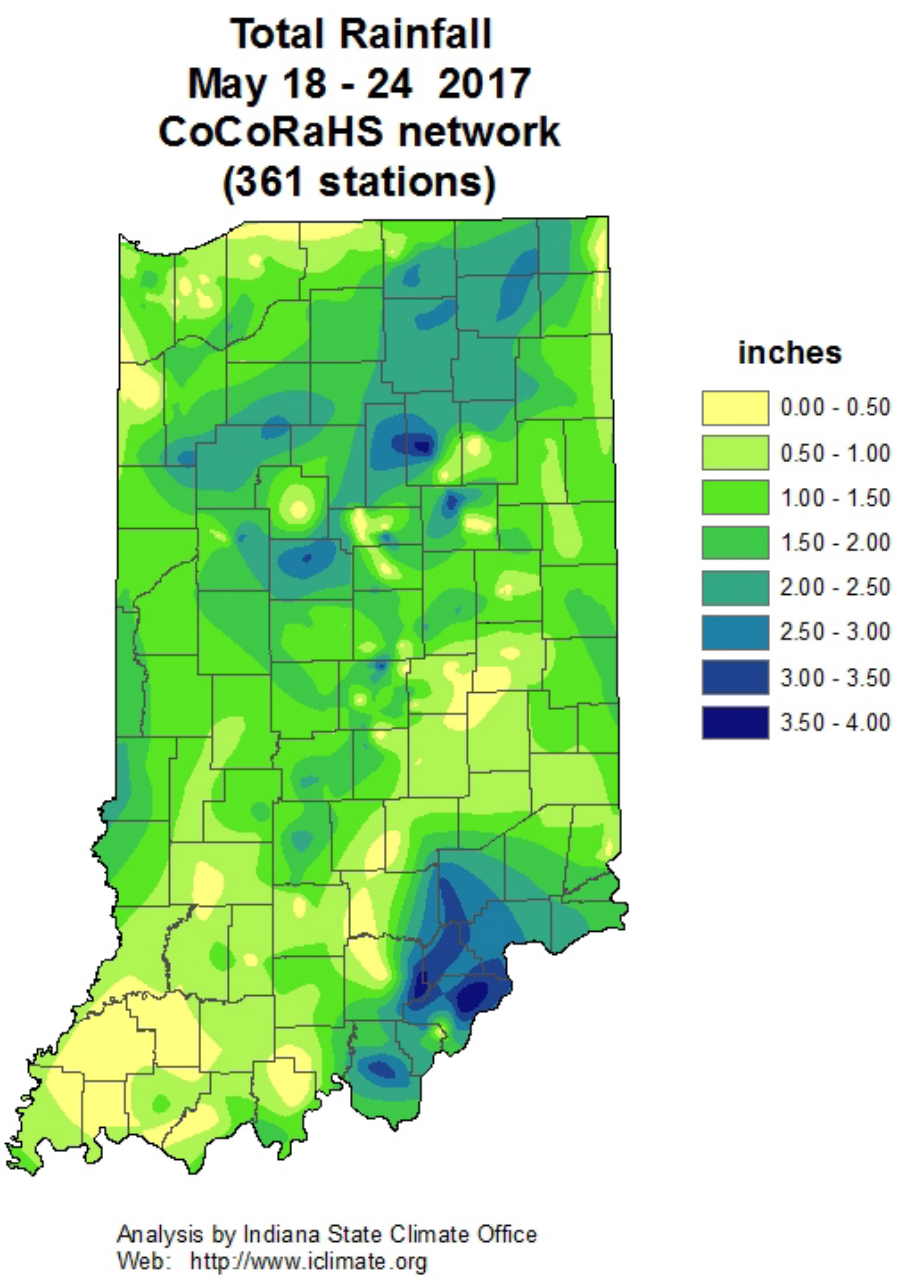
WEATHER UPDATE

Precipitation



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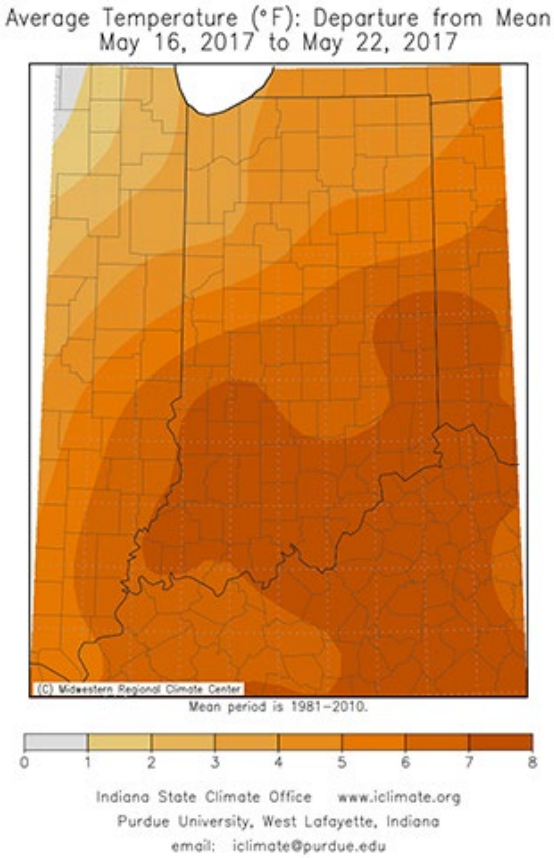
Temperature



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THANKS FOR READING

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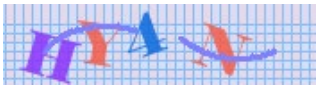

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