Pest & Crop

http://www.entm.purdue.edu/Entomology/ext/targets/newslett.htm

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In This Issue

Insects, Mites, and Nematodes

Corn Fields NEEDED for Annual Corn Borer Survey - (*John Obermeyer and Larry Bledsoe*)

Since 1961, Purdue's Entomology Department has been conducting the European corn borer (ECB) fall survey. Observations of both stalk damage and larvae attempting to overwinter are recorded for each of nine districts in the state. This data gives us a rough hindsight of ECB activity during the season and foresight of first-generation populations for the following year. Southern Indiana counties take-heart, we include southwestern corn borer in this survey.

BE A PART OF HISTORY! We need your help in locating and securing permission to enter some non-*Bt* cornfields in your area. We destroy up to 20 total plants / field, so the impact on yield will be minuscule. Besides non-*Bt* corn, we leave it up to you to decide what yellow-dent variety, planting date, tillage, etc that we inspect. Multiple fields to be sampled must be separated by several miles.

Data from individual fields will be shared with you. District and state data will be combined and shared with everyone in the October issue of the *Pest&Crop*. Because we are beginning this survey September 15, we request your field locations ASAP.

Please call, we want to dissect your corn!

Please e-mail (obe@purdue.edu), call (765-494-4563), or FAX (765-494-2152) specific directions soon. Again, we need representation from ALL areas of Indiana. Thanks in advance!

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Proper Grain Storage, Part 1 - (*Linda Mason and Dirk Maier*)

The time to start thinking about this year's harvest is upon us, and the management practices that we utilize after harvest are just as important as those used before. Farmers and elevator managers are in a unique position to apply integrated stored-grain management programs successfully, if they take advantage of the ability to control the critical system parameters such as grain temperature and moisture content, storage time, market destination, and pest movement into their facilities.

Temperature Management Practices

One of the primary management practices to maintain quality is aeration. For aeration to be successful the grain has to be level and at moisture contents safe for storage because normal airflow in storage bins, silos, and flats is not enough to dry the grain. Go to <www.ces.purdue.edu/extmedia/GQ/GQ-12.html> for information on recommended maximum moisture contents for aerated grain storage in Indiana and the recommended airflow rates in upright and flat storages. Non-uniform temperatures in the grain bulk generate air currents that can lead to moisture migration when the stored grain is cooling.

Most storage problems result from improperly cooling the grain in the storage bin. The most common mistake is to stop running the aeration fan before the cooling front has moved through the entire grain pile. This can lead to condensation and crusted layers of spoiled grain in the bulk.

In the fall it may take up to two aeration cycles to cool the grain to below 45°F by mid November. At 0.1 cfm/bu it would require 150 hours per cycle regardless of grain depth. For winter storage in Indiana, the grain should be cooled below 35°F before the end of December.

The fan operation time depends solely on the airflow rate in the storage bin. An aeration fan is usually sized for about 1/10 cfm/bu, while an inbin drying fan is usually sized for 1 cfm/bu. It is very important to recognize the difference in order to operate the fans long enough to move the cooling front completely through the bulk, and yet not so long as to waste electricity.

Next week we will cover Pest Management Practices.

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Black Light Trap Catch Report - (John Obermeyer)

County/Cooperator	8/24/04 - 8/30/04							8/31/04 - 9/7/04						
	VC	BCW	ECB	SWCB	CEW	FAW	AW	VC	BCW	ECB	SWCB	CEW	FAW	AW
Dubois/SIPAC		3	7		31		3							
Jennings/SEPAC			1		14		2							
Knox/SWPAC		1	5	1	1		1			4		7		1
LaPorte/Pinney Ag Center			24		1					28		4		
Lawrence/Feldun Ag Center		3			24		2		1			10		1
Randolph/Davis Ag Center			31		5		3			8		1		1
Tippecanoe/TPAC Ag Center		1	17		52		4		4	3		9		2
Vermillion/Hutson														
Whitley/NEPAC		1	60		15		8							

VC = Variegated Cutworm, BCW = Black Cutworm, ECB = European Corn Borer, SWCB = Southwestern Corn Borer, CEW = Corn Earworm, FAW = Fall Armyworm, AW = Armyworm

Agronomy Tips

High Yield Potential Tempered for Some Fields - (*Bob Nielsen*)

With all the hoopla about record or near-record Indiana corn yields this year, it may be prudent to recognize that late-season stresses will temper the high-yield excitement for some growers. As you read through this short list of fearmonger items, recognize that yield loss is a relative thing. Five or ten bushels lost from a 220 bu/ac potential still leaves you with very good yields and you may never realize that the yield loss occurred.

Just as importantly, many of the following stresses tend to increase the risk of stalk rots and weaker stalks by virtue of their negative effects on late-season photosynthetic capacity. A loss of photosynthetic capacity during the midst of grain fill can cause plants to remobilize carbohydrates stored in their stalk tissue to the developing grain. Such carbohydrate remobilization weakens the structural integrity of the stalks and increases the risk of subsequent stalk rot development. Growers should continue to inspect fields for compromised stalk strength or the development of severe stalk rots and adjust their harvest schedules accordingly.

- Many areas of central and northern Indiana experienced five or six consecutive nights in mid-August where air temperatures dropped to the mid- to high 40°F. Cool temperatures in August, in and of themselves, are often considered beneficial for corn yields (Nafziger, 2004), but such a string of unusually cool nights likely reduced photosynthetic rates more than 20% per day during that time period (T. Tollenaar, Univ. of Guelph, personal communication). The direct effect of such a reduction of daily photosynthesis and grain filling rate on grain yield is probably minimal assuming that the remainder of the growing season is sufficiently long for normal grain maturation. However, it is fair to say that overall leaf health (photosynthetic capacity) began to deteriorate rapidly in some fields following this bout with cold temperatures.

- Late-developing leaf diseases, especially northern corn leaf blight and gray leaf spot, have rapidly destroyed photosynthetic capacity in some fields in central and southern Indiana. The severity of leaf destruction and the timing of the infestation relative to grain fill stages are the primary factors influencing the direct yield loss due to such diseases. One can use estimates of yield loss due to defoliation by hail as a proxy for yield loss due to leaf blights. The effect of 50 to 60% defoliation at mid- to late dent stages of kernel development would be 5 to 10% yield loss; primarily in the form of lower weight kernels. Later-occurring disease development would incur less yield loss; earlier disease development would incur more yield loss. Equally important for growers to recognize is the greater risk of stalk rot development due to the decreased photosynthetic capacity to finish the grain filling process.

- During the latter half of August, many fields or areas of fields began exhibiting the telltale signs of nitrogen deficiency in the form of yellowing of whole plants. Such N loss is not surprising given the heavy rainfall events back in late May and June. Dramatic yellowing of the plants signals lower overall photosynthetic capacity that can cause direct yield loss in the form of lower kernel weights and also increases the risk of stalk rot development.

- More recently, a number of areas around the state have experienced heavy rainfall or "toad-strangler" events that left behind areas of fields with standing water for days. Warm soils that are ponded or saturated for days cause a rapid deterioration or outright death of root systems that are already on their "last legs" as the grain filling period winds down. The consequences of significant root death are a reduced ability of the plant to sustain its photosynthetic capacity and a diminished ability to sustain its ìanchoringî ability during subsequent strong windstorms.

- Finally, high yield potential itself can be a significant physiological stress on a corn plant as it attempts to complete its grain filling process. Large ears with many kernels require a lot of photosynthate to maximize kernel weights. If the photosynthetic capacity is otherwise stressed, remobilization of stored carbohydrates is more likely to occur and the risk of stalk rots increases.

Related References

Nafziger, Emerson. 2004. Toward the Finish Line. The Bulletin (Sep 2). Univ. of Illinois Extension. Online at <www.ipm.uiuc.edu/bulletin/article.php?issueNumber=22&issueYear=2004&articleNumber=6>. (Verified 9/3/04).

Shaner, Greg. 2004. Northern Corn Leaf Blight on Corn. Purdue Pest & Crop Newsletter (Aug 20). Purdue Univ. Extension. Available online at <www.entm.purdue.edu/entomology/ext/targets/p&c/P&C2004/P&C23_2004.pdf>. (URL verified 9/3/04).

Shaner, G. and D. Scott. 1998. Stalk Rots of Corn. Purdue Univ. Extension Publication BP-59. Available online at <www.ces.purdue.edu/extmedia/BP/BP-59.pm65.pdf>. (URL verified 9/3/04).

Shaner, G., P. Sellers, and D. Scott. 1998. Gray Leaf Spot. Purdue Univ. Extension Publication BP-56. Available online at <www.ces.purdue.edu/extmedia/BP/BP-56.pdf>. (URL verified 9/3/04).

Vincelli, Paul. 2004. Factors That Could Enhance Stalk Rots in Corn. Kentucky Pest News (Aug 2). Univ. of Kentucky. Available online at <www.uky.edu/Agriculture/kpn/kpn_04/pn040802.htm#corrot>. (URL verified 9/3/04).

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Arrested Ear Development (Again!) - (*Bob Nielsen*)

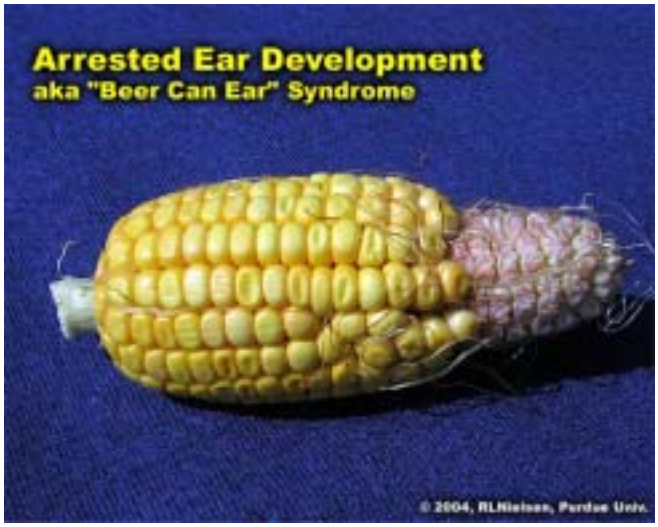
Reports of arrested ear development in corn seem to return every year like the swallows of Capistrano. Arrested ear development goes by several other names: blunt ear syndrome (BES), beer can ears, and hand grenade ears to name a few. When growers discover the problem in their fields, they sometimes use other names that I cannot repeat in this article.

I won't go into details about the symptoms of BES, other than kernel row number is usually normal for the hybrid, but kernels per row and overall cob length are abruptly truncated. The abrupt arrest of ear development suggests a single stress event as the causal agent. I wrote a more extensive treatise on the subject last year (Nielsen, 2003) that included some references on possible causes of the problem.

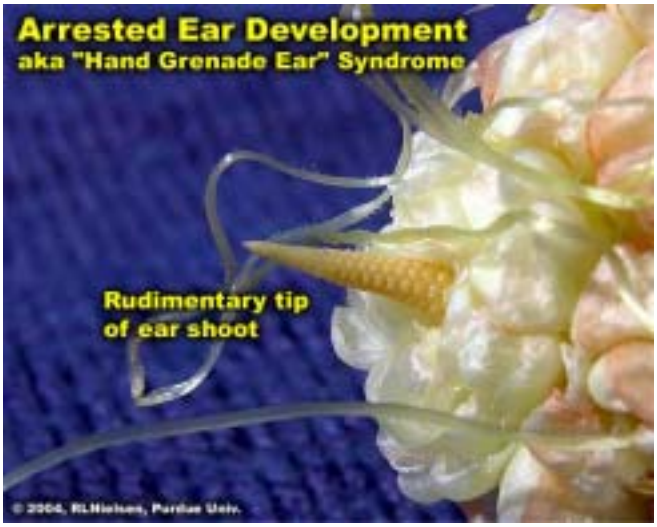
In the past week, I discovered classical BES symptoms in a commercial hybrid and an apparent severe expression of the oddity in a seed production field, both in southern Michigan. I have also received reports of arrested ears in commercial hybrids from Ohio and Pennsylvania. If you come across this oddity yourself, please contact me with any details you can provide about the affected field (see below).

Desired Information About BES-Affected Fields:

- State & county of affected field.
- Planting date of affected field.
- Seed company (e.g., Bob's Pretty Good Hybrids)
- Hybrid number (e.g., BN2821)
- Approximate percent of field affected.
- Approximate percent of ears affected within affected area.
- Average length (inches) of affected cobs.
- Average number of kernels per row on affected ears.
- Average number of kernel rows on affected ears.
- Daily high/low temperatures from planting to July 1.
- Daily rainfall amounts from planting to July 1.
- Soil pH levels of affected field.
- Other soil test information from affected field.
- Landscape position of affected area (high, low, sloping).
- General location of affected area within field (throughout, field edges, etc.).
- Relative soil drainage of affected area (good, bad, intermediate).
- Herbicides applied this year (product, rates, application times)
- Insecticides applied this year (including seed treatments)



Classical symptom of "beer can" ear syndrome.



Closer view of rudimentary tip of ear shoot commonly found on arrested ears.

Classical symptom of "hand grenade" ear symptom.

Closer view of "bony" cob structure and rudimentary ear shoot at tip of ear.

Arrested ear exhibiting "bony" cob structure and rudimentary ear shoot at tip of ear.

Related References

Nielsen, R.L. (Bob). 2003. Blunt Ear Syndrome in Corn. Corny News Network, Purdue Univ. Available online at <www.kingcorn.org/news/articles.03/BeerCanEars-0812.html>. (URL verified 9/6/04).

For other Corny News Network articles, browse through the CNN Archives at <www.kingcorn.org/news/index-cnn.html>.

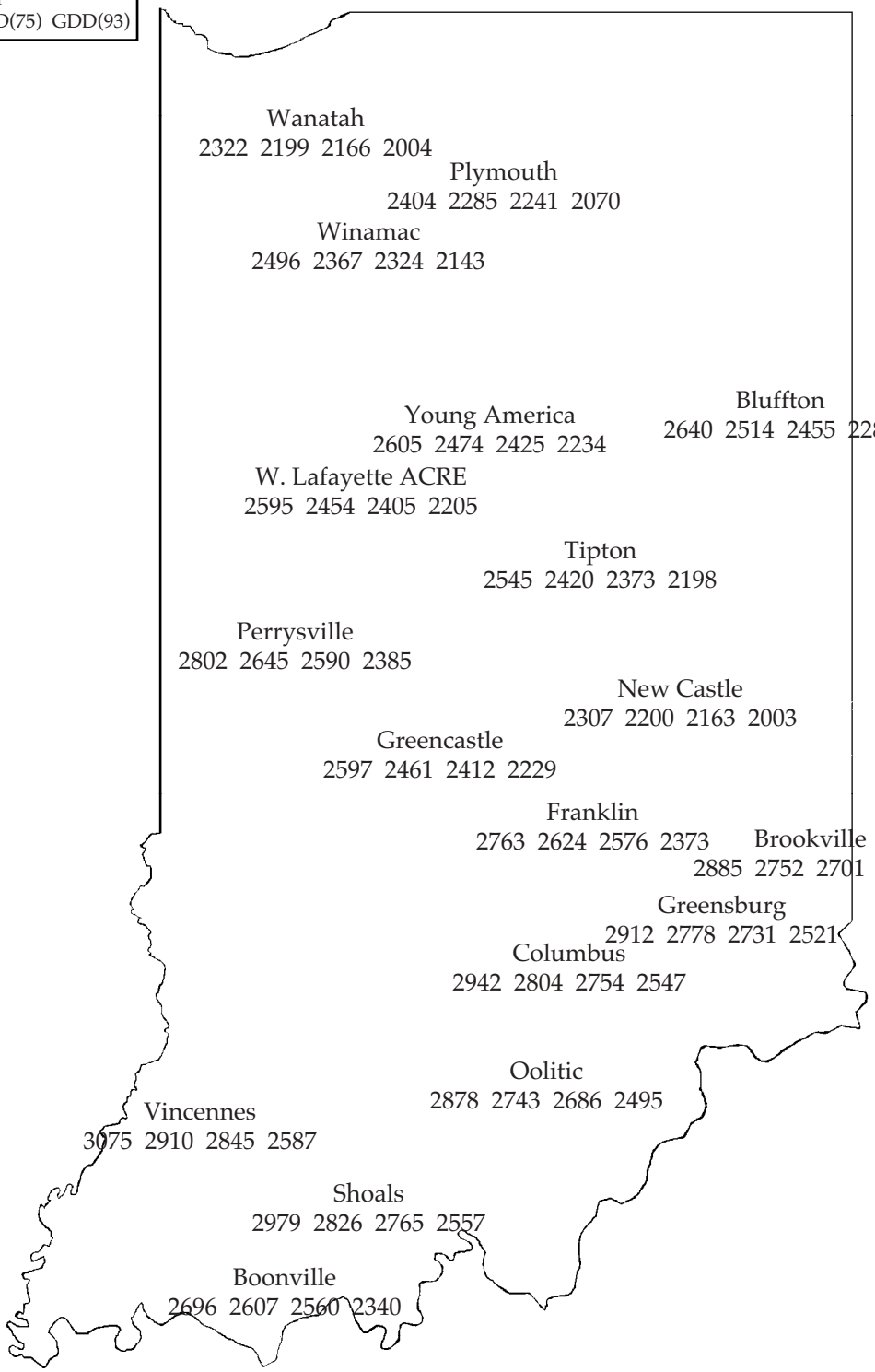
For other information about corn, take a look at the Corn Growers' Guidebook at <www.kingcorn.org>.

Weather Update

Temperatures as of September 8, 2004

GDD(5) = Growing Degree Days from April 7 (5% of Indiana's corn planted), for corn growth and development
GDD(42) = Growing Degree Days from April 21 (42% of Indiana's corn planted), for corn growth and development
GDD(75) = Growing Degree Days from April 30 (75% of Indiana's corn planted), for corn growth and development
GDD(93) = Growing Degree Days from May 14 (93% of Indiana's corn planted), for corn growth and development

MAP KEY
Location GDD(5) GDD(42) GDD(75) GDD(93)



4" Bare Soil Temperatures 9/9/04

Location	Max.	Min.
Wanatah	77	63
Winamac	60	50
Chalmers	67	64
Tipton	53	49
Crawfordsville	76	71
Liberty	69	66