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Corny News Network

Published at the Chat 'n Chew Café, 4 Sep 2004
URL: http://www.kingcorn.org/news/articles.04/LateSeasonFearmonger-0904.html

Fearmonger Alert:
High Yield Potential Tempered For Some Fields

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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's 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 "anchoring" 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

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Don't forget, this and other timely information about corn can be viewed at the Chat 'n Chew Café on the Web at http://www.kingcorn.org/cafe. For other information about corn, take a look at the Corn Growers' Guidebook on the Web at http://www.kingcorn.org.