



Can your operation benefit from a field crop monitoring program?

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In order to minimize economic impact and protect their investment, farmers can benefit from in-field crop monitoring by identifying issues before they become problematic. Detailed in-field observations and the knowledge to make data driven management decisions are key to optimizing crop quality and yield. One of the most important factors in any crop monitoring program is knowing the Economic Threshold (ET). The ET is pest and crop specific; it is the point at which the pest population or damage equals the cost of the control (Figure 1). Action should be taken only if the ET is exceeded to reduce negative return on investment and to prevent pesticide resistance. A crop monitoring program based on economic thresholds requires in-field observations of stand counts, weeds, pests, disease, nutrient deficiencies, and environmental impacts that can only be collected by lacing up your boots and heading into the field.

Stand Population and Health

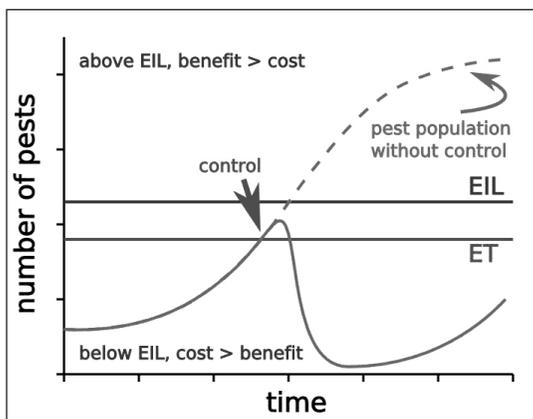


Figure 1: Economic Threshold (Ed Zaborski, University of Illinois)

When it comes to annual crops such as corn and soybeans, determining plant populations as soon as plant emergence occurs is essential. If observed stand counts are significantly less or even greater than expected, further investigation is necessary. Plant populations can be affected by a number of factors; equipment issues, poor germination due to pests, plant disease and weather conditions. In fields with lower than expected plant populations it can be challenging to determine if a replant is necessary. For example, in field corn with 30 inch row spacing, the number of plants per acre can be determined by counting the number of emerged plants in a 17.5 foot row section and multiplying by 1000. Taking at least three measurements in random areas of the field will provide the best average population. By comparing the value of the current yield to the value minus the cost of a replant and consulting with an agronomist or referencing a local replant guideline provided by a university extension, a grower can make an educated decision to whether a replant is necessary based on the crop's yield value.

Weed Management

Another challenge farmers face, especially early in the growing season, is the persistence of weeds. Crop yields at harvest can be significantly impacted

by weeds that compete with planted crops for sunlight, nutrients and water. Proper weed identification is essential to create appropriate herbicide spray mixtures which minimize weed escapes and reduce the number of post-emergent applications. Being able to accurately identify herbicide resistant species and choosing a different mode of action for treatment is also important to any crop monitoring program. Timing is crucial for any herbicide program. In some crops, such as corn, a higher weed pressure during earlier growth stages have the greatest impact on yield and ultimately on profit (Table 1). Delaying treatment until weed height exceeds the 2-4 inch window, may achieve lasting weed control throughout the rest of the season but at the expense of yield loss due to earlier weed competition. In conventional (non-GMO) crops it is even more essential to properly identify and gauge weed pressures. Herbicides used in conventional fields post-emergence are more species selective and, in the case of grasses, are most effective before the weeds reach 4 inches. Consistent weed scouting not only provides valuable data throughout the growing season but allows a producer to maximize the effectiveness of future herbicide applications.

Pest Management

Along with weeds, pests pose a threat to the quality and yield of nearly every crop. Crop pests are insects, wildlife, nematodes, etc. that cause damage to all areas of a plant including roots, stems, leaves and reproductive structures. Because damage can be so widespread it is crucial to monitor for pests from planting all the way through harvest. Along with proper identification of pest species it is necessary to quantify the population and severity of damage to the plant. Pests such as potato leafhopper, follow a fine line between making a pesticide application or opt for a re-scout based on the economic threshold. In the case of potato leafhopper, both the adult and nymph stage populations can cause significant forage losses in recently cut alfalfa stands. By following proper sweep net procedures an effective scout can quantify a leafhopper population, providing farmers and agronomists with the data needed to make an economically viable decision. An additional benefit of using a sweep net in a hay field is early indication of potential pests such as armyworm that have the risk of migrating to adjacent corn fields. Vegetable producers are especially wary of field pests because even minor damage can limit their ability to sell products on the market. For vegetable growers, scouting can be extremely intensive and may require several trips to the field a week in order to keep up with constantly changing pest populations.

Disease Management

Proper identification of diseases can be challenging as they are caused by a variety of bacteria, viruses and fungus that display similar symptoms. Much like pests, plant diseases can affect crops at all stages of

Application Timing (Weed Size)	Weed Control	Yield Loss ¹	
		Early Season	Early + Late Season
inches	----- % -----		
2	73	0	7
4	83	3	6
6	90	6	7
9	93	14	11
12	95	22	21

Table1: Treatment application effects on yield (Gower et al. 2003)

development which may negatively impact germination, plant growth, and grain quality in storage. Mycotoxins, which are harmful chemicals produced by fungus, can be present in stored grains. Elevated levels of mycotoxins can be harmful to animal and human health if ingested. It is important to monitor grain crops before harvest to identify if mycotoxin producing fungus is present, such as Fusarium head blight in wheat. Northern corn leaf blight (NCLB), a commonly discussed disease among agronomists and farmers in the northeast, is caused by a fungus that overwinters in corn debris. The grayish-tan cigar shaped lesions on the leaves are a tell-tale sign that your corn may be infected with NCLB. Although there is no set threshold for NCLB, a combination of quality field observations and the help of a certified agronomist can estimate the severity of an infected field. With any in-field crop monitoring program it is vital to determine if a plant disease surpasses an economic threshold to justify the additional cost of fungicide application to a grower.

Scouting Program Overview and Benefits

In-field scouting following planting is essential to keeping fields weed free, predominantly in the early part of the growing season. Pests and disease can be present from planting into harvest so it's important to be in the field and recognize economic thresholds. Nutrient deficiencies can also be identified at any

5 Tips For Effective Scouting

- Scout early and frequently
- Be educated about economic thresholds
- Watch for common deficiencies
- Take good notes and pictures
- Communicate often with your agronomist



point during the growing season. Scouting a field every 10-14 days is recommended to maximize the effectiveness of an in-field crop monitoring program. Observing nutrient deficiencies, plant disease, pests, and weeds is crucial to ensure timely and accurate decisions are made to ensure the health of a crop. The data collected can be used to increase crop quality and yield, ultimately providing monetary value to a farm. Detailed note taking and record keeping is important to not only help an agronomist make sound recommendations but also allow a farmer the ability to evaluate past growing seasons and plan for the future. Having a purposeful crop monitoring program and knowledgeable professional consultants at one's disposal can be beneficial to any size farm in any market.

If you have questions contact us at info@acscrops.com or 800-496-3344.