SDSU Extension

iGrow Soybean

BEST MANAGEMENT PRACTICES

Chapter 29:
Field Crop Scouting Basics for Soybean Production

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Field scouting along with good field records provides excellent information for current and future management decisions. The purpose of this chapter is to discuss the basics of field scouting (Table 29.1).

Table 29.1. Key factors to consider when field scouting.

- Provide information when pest population thresholds exceed cost of control.
- Frequency and intensity of field scouting should be based on the crop, pest, and control practices.
- Provide location, intensity, and extent of pest problem.
- Avoid costly mistakes by checking field records and the soybean trait package.
- Put the information into your field records.
- Use pest specific sampling protocols.

Field history and scouting

The purpose of field scouting is to provide information, from which economically-based recommendations are developed. The economic-based pest threshold is the population level at which the yield loss equals the cost of the controlling the pest (Clay et al., 2011). Examples for determining the threshold levels are available in Clay et al. (2011).

Scouting can be conducted by a variety of people including the grower, a crop consultant, and/or a commercial agronomist. With the wide range of soybean genetic trait packages available (Roundup Ready®, LibertyLink®, Banvil® tolerance, HPPD herbicide tolerance, 2,4-D tolerance), it is important to check the recommendation for genetic compatibility.

Scouting starts by assembling the needed tools. A list of recommended tools is provided in Table 29.2. In addition to these tools, a recent image of the field is very useful. These images can be used to direct scouting activities (Chapter 16). Images can be obtained from a number of sources including Google Earth (http://www.google.com/earth/index.html).

Table 29.2. Useful tools to use when scouting production fields.

- Clipboard or notebook
- Clear plastic ziplock bags or screw-top vials
- Scouting sheet
- Isopropyl alcohol
- Plastic bucket
- Forceps or tweezers
- A good sweep net
- Trowel or hand spade
- Drop (beat) cloth (2 feet long)
- Hand counter
- Hand lens – (at least 10X magnification)
- Shovel
- Measuring wheel
- Soil sampling probe
- Sampling square (20 X 20 inches)
- Paper bags
- Tape measure or yard stick
- Pest ID guides
- GPS
- Field flags
- Sharp pocket knife or single-edged razor
- Camera/video recorder
- Marker for writing on paper and/or plastic bags

Scouting frequency and guidelines

Scouting frequency will vary by crop, crop stage, pest species, and their severity. In general, scouting should be conducted weekly. However, when a pest infestation approaches the economic threshold or when weather conditions favor rapid development, daily monitoring is recommended. Scouting can be conducted for specific pests or all pests. In most areas, different pest species invade at different times. Refer to the pest calendar (Chapter 28) for information on pest timing. When scouting for pests, the number of observations collected in a field is dependent on field size, pest, date, and grower expectations. Generally, your recommendation improves with the number of observations collected.

With field scouting, it is a good idea to break a field into sections of 40 to 50 acres that have similar field characteristics and management systems. Don't sample field borders, fencerows, ditch banks, or other non-typical areas of the field unless specific pest protocols suggest this.

Go into the field at least 75 feet or about 30 rows before you start sampling. While walking through field borders, ditches, and fence lines, note any signs of developing problems. This may be an opportunity to prevent future problems. For fields of less than 100 acres, check or sample a minimum of five locations unless pest-specific protocol is suggested. Fields larger than 100 acres need to have a minimum of ten locations checked or sampled. Differing landscape characteristics and information from field history can also be used to subdivide a field. If the field was in two different crops the previous year and one crop the current year, it should be subdivided as the previous year's crop area.

Sampling methods also vary according to pest and crop. Sampling options include sweeps of a sweep net for a specific area, insects on a drop or beat cloth, insects on leaf or specific plant part, disease symptoms on plants, weeds per row length (100'), or some measure of land area. A common method for counting insects is using a sweep net. To use a sweep net, swing the net from side to side in a full 180º arc. Tilt the net opening so that the lower edge of the rim is slightly ahead of the upper rim to catch insects as they fall from the plants. Sampling data is generally reported as average number of insects per sweep. A video demonstrating how to use the sweep net is available at http://www.youtube.com/watch?v=-4o2_ym2L0c.

Some insects are easier to count if they are dislodged from the plants by shaking and allowing the insects to fall into a bucket or onto a white drop cloth or beat cloth. This works well for insects that have coloration that enables them to blend in with crop foliage. The cloth can be unrolled on the ground and placed between rows. Plants or both sides of the row are vigorously shaken to dislodge the insects. The same procedure can be done with a white bucket and counts are measured as insects per plant. Count the insects; if you don't know what they are, they can be identified later. For assistance in identifying insects, contact an expert at https://extension.sdstate.edu/about/our-experts.

The most common means of sampling (scouting) soybean plants in the field is through visual observation, which works well with many insects and diseases. Specific plant samples can be taken and visual observation of insect and insect stages can be used to predict pest severity and development. Plant nutrient symptoms can also be detected through observation, and plant samples can be taken for analysis. Refer to Chapters 28 to 41 for specific information about individual pests, sampling procedures, and economic thresholds.

Scouting patterns in the field units will help to ensure that the sampling results are representative of the whole field. There are several possible data collection and observation patterns that can be used when scouting fields. These are based on various pest distribution patterns and field layout configurations. As with the sampling options, scouting patterns are specific to pests and soil fertility programs. The three most common field scouting patterns are described below.

W scouting pattern

Use the W pattern when scouting for pests that are uniformly distributed throughout the field (Fig. 29.1). The sampling sites should be evenly distributed across the field excluding obvious influencing factors such as field edges, hills, and low-lying areas. Alternative patterns may follow an X, Y, W, or Z shape. This pattern is used for identifying leaf diseases, soybean aphids, and armyworms. The value of scouting can be increased by finding your sampling locations with a GPS. At these locations, images can be collected with your smart phone to identify problems.

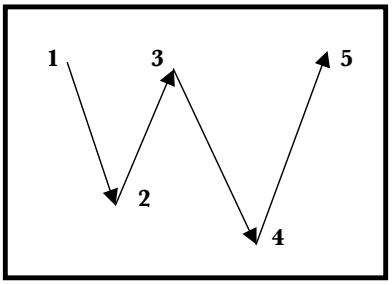

Figure 29.1. A W sampling pattern. This pattern is most appropriate when pests are uniformly distributed across a field.

Targeted sampling protocol

A targeted sampling pattern is used to target pests that favor specific characteristics such as highlands, lowlands, excessively wet or dry areas, or areas high in organic matter (Fig. 29.2). Targeted sampling can be used based on pest characteristics, prior sampling procedures, or remote sensing that identifies where pest populations may be high (Chapter 16). This sampling protocol is designed to concentrate scouting in areas most likely infected with the pest. In this sampling approach, compare pest populations in areas with good growth with areas with poor growth. Some examples of pests that fit this sampling pattern include quackgrass, root rots, and cutworms.

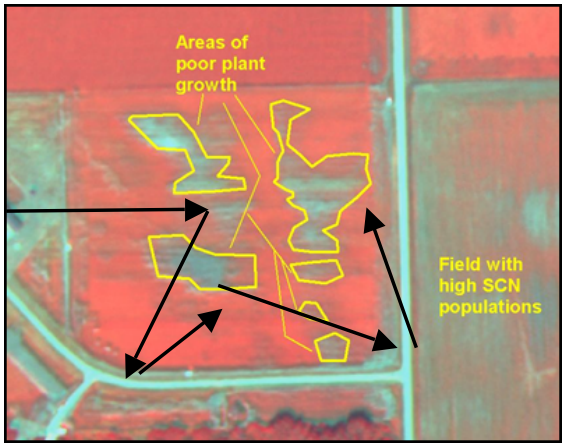

Figure 29.2. IKONOS false color image (July 10, 2002) of a soybean field in southeastern South Dakota. Areas of very poor plant growth due to SCN and other factors are highlighted. The field across the road to the right was heavily infested with SCN; note poor reflectance in this field.
(Source: http://www.umac.org/agriculture/ss/DeterminingtheExtentofSCNInfestationinSoybeanFields/detail.html)

Targeted sampling—field borders

This pattern is used when pests are at the edges of fields (Fig 29.3). Scout these pests by walking along the field edges, fence lines, or ditches. Examples of pests that invade fields from the boarders include grasshoppers, flea beetles, cheatgrass, and Canada thistle.

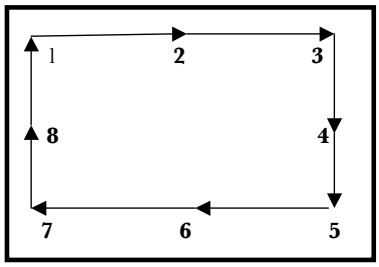

Figure 29.3. A design example for target sampling field borders.

Other considerations

Scouting reports may show high populations in one field and not another. These differences may be caused by any number of factors including the soybean trait package, soybean planting date, row spacing, incorrect sampling protocol, and alternate pest hosts around the field. For example, one field may routinely have a higher aphid population than another. These differences may be caused by a winter host, such as buckthorn along the field borders. Soybean acts as the summer host while buckthorn, a shrub common in shelterbelts and woods, serves as the winter host. In South Dakota, aphids migrate to buckthorn in early autumn where they overwinter. Aphids are also important because they can be a vector for spreading the soybean alfalfa mosaic and alfalfa mosaic viruses.

When scouting for insects, the objective is to identify the insects present in that field and determine which ones maybe problematic. It is very important to determine the insect species and refer to local information

on life cycles and economic thresholds prior to designing an appropriate control action. This information is provided in Chapters 28 through 41.

It is helpful to be aware of the presence of any beneficial insects and to estimate if they are influencing the pest population. The beneficial insects have potential to keep the insect pests in check on their own. Because pest populations can change rapidly, it is important to check fields at least weekly during times that insect pest populations are increasing.

Fields can be scouted simultaneously for insects, weeds, and diseases. When scouting for crop diseases, be aware of the disease symptoms, which are common to the area. Plant diseases can be influenced by weather, fertilizers, nutrient deficiencies, herbicides, and soil problems. In many cases, the cause of the problem may not be obvious and may require samples to be taken to a diagnostic laboratory.

Disease scouting may require specific sampling techniques. Tips for scouting soybean fields for diseases are available at https://www.pioneer.com/home/site/us/agronomy/crop-management/soybean-insect-disease.

The goal of weed scouting is to assess/monitor the infestation level in the field, detect new weeds, and provide weed control recommendations. When new weeds show up, even at low levels, it should be noted so actions can be taken to control or prevent them from becoming a concern. Early detection of new weed problems will allow the implementation of control strategies to prevent future major problems.

South Dakota soybean growers need to implement management plans that minimize the risks of soybean cyst nematodes (SCN) (Chapter 57). SCN can cause above-ground symptoms that are similar to other problems. Some of these symptoms would include streaking, yellowing, and early crop maturation. SCN can be confirmed by using two different sampling approaches. In the first approach, the roots should be checked for living female nematodes. These tiny, lemon-shaped, white to yellow females can be observed four to five weeks after planting. They reach maximum population in July and August.

The second approach is to collect soil samples that will be analyzed for nematode eggs. To collect these samples, a one-inch diameter soil probe should be used to collect soil samples from the surface eight inches of soil. Placement of the probe into the soil can have a tremendous effect on how many egg clusters are removed. Angle the soil probe underneath the soybean row into the root zone. If corn or another non-host crop was the last crop grown in the field, soil cores do not need to be collected from beneath the crop row. However, if soybeans were the previous crop, then collect soil cores from underneath the soybean crop rows. Collect about 15 to 20 samples in a zigzag pattern from no more than 20-acre areas in the field. Be sure these areas are representative of the sampling area. Mix multiple soil cores very well in bucket before placing in the sampling bag. Soil samples can be sent to the South Dakota State University Plant Disease Clinic for SCN analysis. Contact information is below.

SDSU Plant Disease Clinic
605-688-5545
sdsu.pdc@sdstate.edu
Box 2108, PSB 117
South Dakota State University
Brookings, SD 57007-1090

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