

**Agronomy Technical Note #16 INTEGRATED PEST (DISEASES) MANAGEMENT IN HIGH RESIDUE CROPPING SYSTEMS**

 **November 2018 Natural Resources Conservation Service – Indiana**

***AGRONOMY TECHNICAL NOTE – Soil Health Series***

The *Soil Health Series* provides management techniques for the successful integration of Quality No-till Cropping Systems, Adaptive Nutrient Management, Prescriptive Cover Crops, Integrated Pest (Insects / Weeds / Diseases) Management and Diverse Crop Rotations. This information is applicable to most Indiana soils and cropping conditions and covers broad application.

**Implementing INTEGRATED PEST (DISEASE) MANAGEMENT (IPM) during the Transition(s) to a High-Residue** **Cropping System**

Disease management can be challenging in all cropping systems, and significant time and money may be spent on a variety of control practices. It is critical to use scouting to establish if economic treatment thresholds have been met prior to making foliar fungicide applications. Develop long-term Prevention, Avoidance, Monitoring and Suppression (PAMS) strategies to reduce the potential of crop diseases from developing resistance to fungicides. Understand why and how extreme situations (e.g., disease outbreaks) happen prior to using to short-term fixes such as unnecessary chemical treatments and / or tillage.

High-residue cropping systems (Never/No-Till, Strip-Till, Reduced-Till and/or cover crops) require different understanding of crop diseases. During the first 3-4 years, the soil biology and chemistry undergoes significant changes. Soil microbial populations shift as soil disturbance decreases and the organic matter stabilizes. In addition to diseases, also understand the different changes that will happen with nutrients, insects and weeds while making the transition(s) to these systems.

**Management Strategies During Transition to High-Residue Systems**

* Healthy crops are more resilient against diseases which equates to enhanced cash crop health and growth.  Transition items to keep in mind include but are not limited to: improve drainage where needed; minimize compaction and surface crusting by using cover crops; provide proper soil pH and fertility; control weeds and insects; and pay attention to planter depth, speed and seed-slot closure to promote consistent crop emergence.
* What are the current disease problems in the field? Identify “hot spots” and diagnose why those diseases are present. A review of the past year(s) is important to plan for future disease management.
* Some corn leaf blights, stalk rots, soybean leaf disease, and stem rots have been shown to be more problematic in high-residue cropping systems because there will not be annual tillage. Residue increases inoculum (spores) levels. If these types of diseases currently exist, consider strategies to address them prior to switching to a high-residue system.
* Spread harvested residues evenly across the full width of the combine header. This will better ensure more uniform soil temperatures and moisture that favor crop growth and development.
* Plant when soils are ready – too early, cold, or wet conditions can slow germination and plant emergence, making plants more susceptible to early season diseases (such as seed rots, seedling blights and root rots).
* Carefully select all crops (both cash and cover crops) to reduce chances of cross-hosting diseases.
* As with all integrated pest management programs, an important item to keep in mind includes:
	+ Properly identify all pest species. Scouting, early and often, is key to any IPM program
* Scout for diseases to determine if economic thresholds have been met to warrant treatment. The degree of control depends on proper application timing, rate and application method (as determined by the product label) and level of disease in the field. Understand that crops can sustain some damage without yield loss however, weather conditions (temperature and humidity) should be monitored closely.
* Use multiple cultural methods for long-term, sustainable control (diverse crop rotation).
* **Seed Rots, Seedling Blights and Root Rots** – plant high-quality and disease-free seed. Use resistant varieties planted into warm (above 50° F) and dry soils to minimize disease impact. Fungicidal seed treatments are available to help prevent these diseases. Consider potential impacts of fungicides to other soil biology. Avoid adverse planting conditions as much as possible.
* **Corn Leaf Blights and Stalk Rots & Soybean Leaf Diseases and Stem Rots**:
	+ Select resistant hybrids / varieties. Select disease-free seed.
	+ Use a more diverse crop rotation:
		- Avoid corn after corn, especially in high-residues. Avoid soybean after soybean.
	+ Control of flea beetle will improve management of Stewart’s disease.
* If scouting determines that a foliar fungicide application is justified to treat a crop disease, do not also add insecticides to this treatment unless economic thresholds have also been met for an insect or other pest, as appropriate.
* If economic treatment thresholds have been met and foliar fungicide applications are planned, be sure to follow these recommendations, as applicable:
	+ Determine if spray tank water quality (hardness, pH) is an issue and address it.
	+ Pay attention to different product formulations. Determine the application rate and correctly measure the amount of product needed. Calibrate the sprayer.
	+ Determine the proper coverage, spray solution volume and pressure. Select the proper nozzle (droplet size). If applicable, select the proper spray additives (AMS, surfactant).
	+ Identify and follow the proper mixing order of products to be used. Beware of potential antagonism between pesticide products and additives.
* Environmental conditions such as, but not limited to: rain, dew, dust, drought, and temperature greatly impacts the presence of diseases and the effectiveness of the fungicides to be used.
* To reduce the potential of pests (disease, insects and weeds) developing resistance, it is important not to use the same class of pesticides repeatedly. For more details see: <http://www.frac.info/home>.
* **Follow all pesticide label instructions.**

Proper identification and treatment of problematic pests along with IPM strategies by utilizing a PAMS approach can help to reduce damage from pests and from making unnecessary pesticide applications. Integrated Pest Management is important to maintain the gains that have been made in conservation agriculture and to improve all conservation cropping systems.

**References**

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Fungicide Resistance Action Committee <http://www.frac.info/home> (website)

Sustainable Management of Soil-Borne Plant Diseases ([**Download PDF**](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwjbuYCb1pDeAhUCh-AKHcYjCqcQFjAAegQICBAC&url=https%3A%2F%2Fattra.ncat.org%2Fattra-pub%2Fdownload.php%3Fid%3D283&usg=AOvVaw2pMNfYbRhPbta8Ci5zJG6e)) – ATTRA (2004).