United States Department of Agriculture
NRCS Natural Resources Conservation Service

Pest Management

IPM with Precision Agriculture

Alabama Job Sheet No. AL595B

What is Pest Management?

Pest management is defined as “utilizing environmentally sensitive prevention, avoidance, monitoring, and suppression strategies, to manage weeds, insects, diseases, animals and other organisms that directly or indirectly cause damage or annoyance.” Effective pest management relies on the use of many tools or strategies to reduce the impacts of pests on crops in order to meet landowner objectives..

Purpose

Pest management is applied as part of a resource management system to support one or more of the following purposes:

- Enhance quantity and quality of crops and forages grown for food and fiber.
- Minimize negative impacts of pest control on soil resources, water resources, air resources, plant resources, animal resources, and/or humans.

Integrated Pest Management - IPM

Agricultural pesticides are potential pollution threats to surface and groundwater quality. Integrated pest management (IPM) can help protect water quality by minimizing the amounts of pesticides that producers use and by helping producers to apply pesticides in ways that decrease the risk of chemicals washing off fields into lakes and rivers or leaching into groundwater. This High Intensity IPM practice provides an opportunity for the producer to develop multiple management strategies that will integrate all aspects of pest management within the agricultural production system – this is called Integrated Pest Management, or IPM.
The IPM philosophy of pest management involves three fundamental steps:

1. Use cultural methods, biological controls, and other alternatives to conventional chemical pesticides when practical.
2. Use field scouting, pest forecasting, and economic thresholds to ensure that pesticides are only used against real and not perceived pest problems.
3. Match pesticides with field site features so that the risk of contaminating water is minimized. Substitute lower risk pesticides when feasible, and alternate the use of pesticides from different chemical classes.

Practice Specifications

This practice applies to cropland and hayland. Producers eligible for this practice have an identified water quality or plant condition concern, and must meet all criteria in the Pest Management (595) Standard. This includes an environmental risk analysis, and implementation of mitigating practices if an Intermediate or greater hazard is identified. Recommended mitigating or companion practices include grassed waterways, filter strips, riparian buffers, irrigation water management, residue management, or other appropriate practices to fully address the water quality concerns. Development and implementation of an IPM plan for the major pest(s) of concern is required. When an IPM plan is not available through a qualified professional, then IPM guidelines will be followed and documented using

IPM principles identified through the Alabama Cooperative Extension System (ACES) publications http://www.aces.edu/pubs . Evaluation and treatment methods will be fully documented and are subject to review.

Non-Chemical Alternatives

Over-reliance on any single pest control measure can have undesirable effects. Pesticides can contribute to pest outbreaks by eliminating natural enemies and allowing pests to rebound without checks. Cultural methods are those good farming practices that make the environment less suitable for pest colonization and survival. Biological control involves using predatory, parasitic, and disease-causing organisms for insect pest control as well as using competitive or antagonistic organisms for weed suppression. It also includes conservation of naturally occurring beneficial insects.

The goal of IPM is to take maximum advantage of farming practices that promote plant health (e.g., nutrient and irrigation water management) and allow crops to escape or tolerate pest injury, and to enhance the impact of beneficial insects and other natural controls already present. This minimizes the need for chemical pesticides to control pests. At least three of these alternative strategies are required. These alternatives must be based on crop-pest specific recommendations or other science-based information sources such as ACES.

Scouting

A crucial component in any IPM program is to identify the pest. The effectiveness of both proactive and reactive pest management measures depend on correct identification. For this reason, scouts must be properly trained. Proper monitoring (scouting) can determine pest population levels and locations within the field and whether infestations are at the Economic Threshold, the point where the cost to control the pest equals the crop damage caused by the pest. Controlling a pest prior to this level is therefore not cost effective.

Field scouting, pest forecasting, and economic thresholds will be described in the IPM plan to ensure that pesticides are only used against real (not perceived) pest problems. Descriptions of pest damage and economic thresholds can be found in ACES IPM publications.

On dry cropland and irrigated or non-irrigated hayland, frequency of field scouting will be based on pest biology.

Field scouting uses different techniques to classify the status of a pest population for decision-making purposes. Field scouting procedures are available for many of the major pests in Alabama. If no specific guidance is available, field sampling should be done randomly, with samples taken from across the entire field. Take at least 5 samples and preferably 25 – 30 samples per field. Sweep nets, sticky traps, and pheromone traps can be used. Leaf counts are one method for recording plant growth stages. Square-foot or larger grids laid out in a field can provide a basis for comparative weed counts.

Pest forecasting uses information or data to predict pest problems early. For example, records of rainfall and temperature are sometimes used to predict the likelihood of disease infections. Regional pest monitoring systems can complement scouting. In addition, various models have been developed which can help determine when scouting should begin, or when pesticide application will have the maximum control.

Scouting reports must be kept, along with the management decision based on the individual scouting report. Decisions to suppress a pest need to be based on economic thresholds, when available from ACES or other science-based source. If no threshold is available, then the basis for the decision to suppress should be included. For example, “Past experience indicates that insect damage beyond this point will lead to significant crop yield loss.” All decisions made to use a pesticide to suppress an insect pest must be made on the basis of a scouting report. Where feasible, use lower risk or “Reduced Risk” pesticides or reduce use of pesticides through spot spraying, seed treatments, etc.

Use of Advanced Technologies
The use of advanced technologies in support of IPM practices is required. GPS systems should be used for mapping pest infestations based on scouting reports. Mapping infestations over time is a good way to document scouting activities, and may help in predicting pest populations in future years. Some scouting activities, such as grid sampling for nematodes, will complement advanced technologies for pesticide application. GPS in combination with Precision Agriculture technologies to reduce the amount of pesticide applied (reduced spray overlap technology.) is required.

Recordkeeping
Records are an important tool to track pest populations over time, and can document reduction in pesticide use. An IPM plan must be developed or IPM principles followed and documents provided to NRCS. Non-chemical pest management practices must be recorded. Documentation shall include target pest, method or technique used, date and/or crop stage when used. All pesticide use must be recorded. Documentation shall include product name or active ingredient, application location (field identification), target pest, application rate, application timing, and extent of application (entire field vs. spot treatment, for example).

The attached worksheets will document scouting and management decisions, and pesticide use. The producer may use blank copies of the worksheets to keep annual records, or may use any format for record keeping that provides the required information. Also, documents similar to the NRCS *Idaho Checklist/Guidance for Integrated Pest Management* (http://www.id.nrcs.usda.gov/technical/guidance_ipm.html) can be used to assist in the development of an IPM plan.

CLIENT'S ACKNOWLEDGEMENT STATEMENT

The Client acknowledges that:

a. The implementation of an IPM plan for the major pest(s) of concern is required following a prepared IPM plan or IPM guidelines established by ACES. At least three non-chemical strategies must be used. An agriculture professional must develop the plan and properly trained persons perform pest scouting.

b. The producer must keep scouting reports, along with the management decision based on the individual scouting report. Decisions to suppress a pest need to be based on economic thresholds, when available, from ACES or other science-based source.

c. The use of advanced technologies (GPS combined with technologies to reduce pesticide use) is required. A Certified Crop Advisor (CCA) or agriculture professional will assist with the application of advanced technologies.

d. The producer must keep annual records of all pesticides applied, as well as records of non-chemical pest management practices.

e. The producer has received a copy of this practice specification and understands the contents and requirements.

Accepted by:_____ Date:_____

PEST MANAGEMENT WORKSHEET

Producer_____ Date _____ Time _____ am/pm

Field ID _____ County _____ Scout_____

PLANT POPULATION Set Counts Total Plants/Acre

Plants per 1/1000 of an acre* | | | | | | | | | | | _____ ÷ # Set x 1,000 _____

36“ row width = 14’ 6” length of row, 30” = 17’ 5”, 20” = 26’ 2”, 15” = 34’ 10”, 10” = 52’ 3”, 7” = 74’ 8”

INSECTS	Plants/Set	Set Counts										Total	%	# per Plant
	/set													
	/set													
	/set													
	/set													
	/set													

WEEDS			SOIL CONDITIONS
Grasses (Scattered, Slight, Moderate, Severe)			Wet Moist Dry
_____ SC SL MD SV	Avg. height _____		Loose Light Crust Hard Crust
_____ SC SL MD SV	Avg. height _____		**WEATHER**
Broadleaves			Cool Warm Hot
_____ SC SL MD SV	Avg. height _____		Partly Sunny Cloudy Rainy
_____ SC SL MD SV	Avg. height _____		Calm Light Wind Strong Wind

DISEASES **(Rating 1, 2, 3, 4 or 5)**

_____ _____

_____ _____

CROP GROWTH STAGE _____

Comments:

MGT. DECISION BASED ON SCOUTING REPORT:

Map (or attach map)

NOTE: COMPLETION OF SHADED AREAS IS OPTIONAL.

PESTICIDE DATA COLLECTION SHEET

Crop	Target Pest	Product Name or Active Ingredient (AI)	% AI	Broadcast or Banded	Application: Surface, Foliar, or Soil Incorporated	Rate Used (Note if Reduced Spray Technology Used)