Introduction to IPM

Pecan IPM Toolbox
Integrated Pest Management (IPM) is a pest management approach.

In IPM, the type of plant or animal to be grown is evaluated and a management strategy is devised using physical, cultural, biological, chemical and other available methodologies as needed to maintain pests below economic injury densities while profitably and consistently producing the human valued resource with minimum adverse effect on the environment.
Costs of production have risen sharply in recent years. Agricultural producers have been forced to make production decisions based on, not just increasing yields, maximizing profits through cost effective management. Pecans are no exception to this inflationary trend. Even though prices for pecans have improved, providing fair profits to growers, increasing costs of production have translated even small cost reductions into larger dollar savings. The role of integrated pest management in pecans is not only to increase yields but also to help producers reduce their pest management costs and thereby increase profits.
The most common approaches to managing pests today can be characterized by three basic descriptions:

- The No Management Approach
- The Crop Management Approach
- The Pest Management Approach
The “No Management” Approach

The "no management“ approach to pecan pest management capitalizes on the natural rhythm of the pecan system to produce a crop every 3-4 years.

This “gift of Nature" approach can work for some producers, but most want to increase yield frequency and improve quality by selective tree-thinning to improve sunlight penetration, fertilization, and pest control in "on" years of production.

Prices for native pecans will usually justify developing a more intensive program on productive trees.
Many producers apply sprays from budbreak to shuck split at routine intervals, whether pests are present or not.

In any given year some sprays may not be justified.

The avoidance of unnecessary sprays can provide three beneficial outcomes:

1. **The practice immediately saves money.**

2. **Pest resistance to the chemical develops more slowly, or not at all, so that an effective chemical remains effective when needed.**

3. **Natural enemies that could be killed by unnecessary spraying are conserved and remain to help keep all pest densities below economically damaging levels.**
The IPM Approach

Anticipate Problems
- Producers who use the IPM approach anticipate how and when pest problems may arise during the growing season.
- Their programs are designed to address all expected pest problems (resistance, resurgence, avoidance of flaring non-target pests, etc.).

Prune and Thin
- Pruning and thinning to improve air circulation and drainage can help achieve pest risk avoidance.
- Pruning and thinning affects pecan scab risk and improves sunlight penetration.
- Too little sunlight affects risk of black aphid.
- Avoid over-fertilizing to reduce risk of yellow aphids.

Assess Action Levels
- Using action level assessments to evaluate risk of economic damage from pests will determine pesticide application.
- If prescribed action levels are met or exceeded by target pests, then treatment with the correct amount of the best product at the right time and place is made. Otherwise, pesticides are withheld.
- Savings in labor and pesticides allows producer to lower production cost, reduce risk of resistance, resurgence, conserve natural enemies to control non-target pests and reduce health risks to the applicator and the environment.
Applying pesticides, regardless of the actual presence of a pest, is neither economical nor effective.

If there are no pests present, no pests will be controlled when a pesticide is applied.

Spraying without monitoring pest populations is a hit-or-miss proposition.

Even pests that are economically important every year should be monitored.

For example, the first generation pecan nut casebearer or the pecan weevil almost always causes economic damage if left unsprayed.

But the precise time to control these pests may vary by two or more weeks from one year to the next.

Orchard monitoring provides for more effective timing of pesticide applications.
The objective of a sound pecan management program is to build a strong, productive tree through sound horticultural practices and then to protect that production potential through effective disease and insect control.

The three fields of horticulture, pathology, and entomology are interrelated. For instance, effective weed control, traditionally used to prevent competition for soil resources, also prevents harmful accumulations of stink bugs. Proper variety selection and tree spacing, primarily used to increase per acre yields, also lowers the incidence of pecan scab and other diseases. IPM integrates the different disciplines so they complement each other.
Integrated Pest Management combines all management techniques in pecan culture and pecan pest control into a unified approach.

The disciplines of horticulture, plant pathology and entomology as well as weed science, economics and others complement IPM, as well as one another.
For years, research and demonstration efforts in pecan production and pecan pest management have sought to increase production and prevent damage to the foliage and nut crop. However, in economic terms, it has become apparent that more is not always better.

For instance, from an economic standpoint, a straight nitrogen fertilizer is better than a complete fertilizer. And, on sandy upland soils 120 pounds of actual nitrogen is better than 300 pounds of actual nitrogen.

Also apparent, depending on insect and mite pressure, is that two insecticide applications per year will prevent as much pest damage as eight applications per year.
**Horticulture** promotes the general health and productive capacity of the pecan tree.

**Plant Pathology** works to prevent deterioration of the tree’s productive capacity by disease.

**Entomology** works to prevent deterioration of the tree’s productive capacity by insects and other arthropods.
In horticulture, cultural and physical practices are those activities involved in caring for plants, such as site and cultivar selection, creating habitats for beneficial insects, weeding, irrigation, nutrition, etc.

The cultural aspects of IPM are directed at improving the health and yield potential of pecan trees.

Cultural recommendations are basic building blocks that are often dictated by factors such as age, vigor of the orchard, tree spacing and varieties.
The plant pathology aspect of IPM also works to improve and maintain tree health through disease prevention.

Sanitation, variety selection, sound cultural practices and fungicides must all be employed to prevent disease.

Pecan nut scab shown covering over 50 percent of the nut. These nuts will not open during shuck split, therefore are not marketable pecans. Photo and caption courtesy of the Noble Foundation.
Entomology’s role in pecan IPM is to manage insect and mite pests.

Insect foliage feeders indirectly reduce the current season's crop as well as those of succeeding years by weakening the tree's ability to produce food for nuts.

Nut feeders directly affect the number and quality of pecans produced in the current year.

Pecan nut casebearer moths. Photo courtesy of Allen Knutson.
Objectives of Pecan IPM

- Exceed or maintain yields equal to those obtained by conventional spray programs.
- Time pesticide applications to achieve maximum pest control.
- Conserve natural enemies of pests by withholding sprays on sub-economic pest populations.
- Minimize pest resistance to labeled pesticides and reduce potential for outbreaks of secondary pests.
- Reduce environmental contaminants.
- Increase net profits.
The primary ingredient in the IPM approach is monitoring crop, weather, and pest conditions that relate to pest management decisions.

This means someone must scout the orchard and inform the grower as to the pest status in his orchard.

In many instances, the grower can monitor his or her own orchard. If the orchard is small, it can be covered by one person. In larger orchards, the grower can train an additional person to help with monitoring duties.

Where the grower has neither time nor personnel already hired, he/she may want to contract with a scout.

If there is not enough acreage to attract and support a scout, other growers in the area could hire someone to scout all their orchards.

Each grower, in that case, only pays the scout for the number of acres that are actually scouted.
Pest management organizations in other commodities have often formed corporations.

Operated through a board of directors and officers, the corporation issues common stock purchased by the participating growers at a price set by the board of directors or the voting membership.

The amount of stock purchased entitles the owner to a prescribed amount of scouting and other services provided by the pest management corporation.

Other avenues for scouting services include expansion of services by cooperatives to include pest monitoring.

An agreement between the grower and the cooperative is signed and fees collected on a per acre basis to cover membership and scouting fees.

Chemical dealerships, custom sprayer companies, grove care operators, pecan accumulators, cooperatives, shellers or brokers could expand their services to include pest monitoring.
Texas Pest Management Association

A statewide grower association has been organized to provide pest monitoring services and technical support in pest management.

In 1978, the Texas Pest Management Association (TPMA) was established by growers to serve growers in all commodities who wanted to participate.

In 1982, cotton, sorghum, and peanuts were represented in TPMA, and other commodities have been added as growers continue to pursue participation in the program.

Pecan producers in other areas may want to consider this approach to support their efforts in pecan management.