Vegetable Pest Scouting
Michigan State University Cooperative Extension Service
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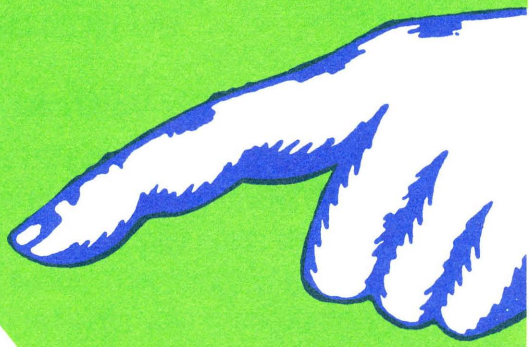

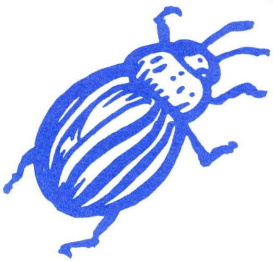

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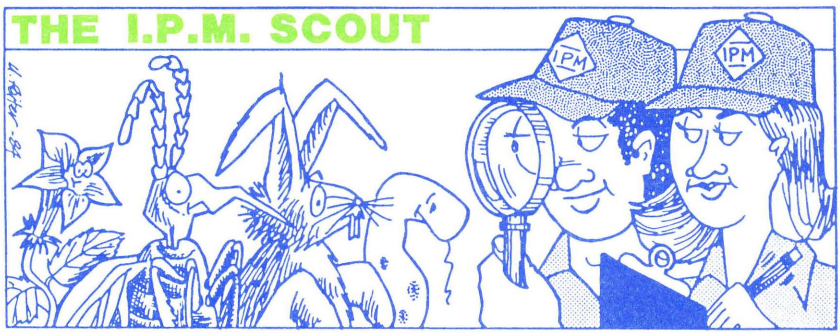
Vegetable Pest Scouting

Crop scouting involves making regular visits to a field to locate, diagnose and evaluate pest and soil problems of that crop. Growers and consultants use scouting information to make management decisions about pest control.

Crop scouting consists of:

- Making regular field visits.
- Sampling for pests and crop conditions.
- Identifying pests and field conditions.
- Recording observations.
- Communicating these observations to the grower.

Crop scouting is the core of a pest management program because it provides information for management decisions. The integrated pest management philosophy holds that controlling insects, diseases and other pests is necessary only when they reach threatening levels (thresholds), and it encourages using a variety of crop management practices to keep pest levels low.



Look for cartoons and timely scouting information in the *Great Lakes Vegetable Growers News.*

Pest Thresholds

"Threshold" is an important concept in crop scouting and pest management. It is impractical and usually impossible to eliminate all pests from a crop. Most crops can tolerate pests up to a certain point before control measures are necessary to avoid economic damage. This point is called the **action threshold.** Some of the factors influencing action thresholds include crop stage of development, days to harvest, other pests involved, presence of parasites and predators, market price, pesticide costs and weather. Therefore, the numbers given for thresholds are not fixed but may change, based on these factors. Values given as thresholds are based on research and experience. The numbers are always conservative, allowing for errors in sampling, delay in treatment applications, etc. Using threshold guidelines means better timing of pesticides with no reduction in produce quality. Improved selection, timing and use of pesticides can reduce costs of pest control, keep pesticide effectiveness high and protect the environment.

There may be better management strategies than using only pesticides for control, however. Pesticide efficiency usually is increased when pesticides are used in combination with other management tactics. For example, crop rotation, mowing ditch banks and field borders, using resistant varieties or growing trap crops can often be used to manage pest populations more effectively than using pesticides alone. The grower benefits from sound pest management practices through either increased production, reduced costs or both. Using multiple pest controls can also reduce pest "boom and bust" cycles, reducing frequency and severity of outbreaks and reducing risk to the grower.

Scout Training

Growers are encouraged to scout their own crops because they usually know the history of their farms and the unique characteristics of each field. However, most find it difficult to check their fields intensively on a regular basis. Growers in many areas hire scouts through local cooperatives. Scouts are usually local agriculture students who have been extensively trained in crop scouting. Private consulting firms and pesticide companies also offer scouting services in some vegetable growing regions. Your county Extension agent can help you find the best scout for your farm.

Pesticide Safety

A scout may be walking through fields day after day, so exposure to pesticide residue is a major concern. Residue on the plant can be as toxic as the spray itself, so scouts should take precautions:

- Do not enter a field for a minimum of 24 hours after spray has been applied or 48 hours if any toxic category 1 (labels will read Danger—Poison) pesticides are used.
- Do not enter a field if it's still wet from a pesticide spray.
- Wear clothes that protect the skin from pesticide residue.
- Wear clean clothes every day.
- Don't smoke while scouting.
- Wash hands before eating.
- Keep safety telephone numbers available.

THE I.P.M. SCOUT

Guidelines for Vegetable Scouting

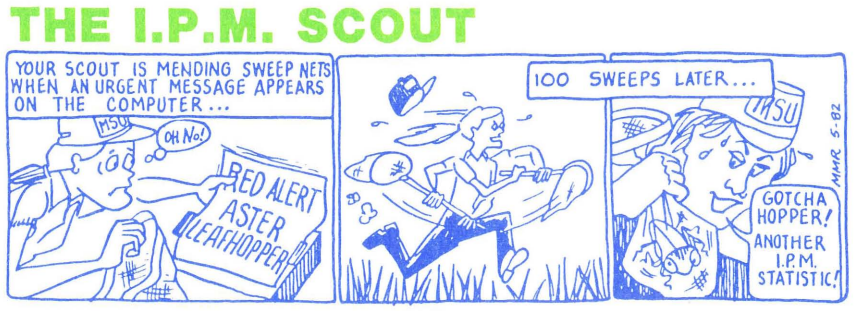
If vegetable transplants are used, scouting should begin with a thorough inspection of the transplants before they are moved to the field. Home-grown transplants can be monitored in the greenhouse or transplant bed using the same sampling techniques as described below for the field. Southern-grown transplants should be inspected on site, if possible. When they arrive, check for excessive heat within the boxes of plants. Finally, survey the plants just prior to planting.

Field scouting should begin within two days after transplants are planted in the field or as soon as seeded plants are emerging from the soil. Some insects—cutworms, for example—can severely damage plant stands within three or four days of transplanting or plant emergence. Schedule weekly visits to each field until pest management decisions reach a crucial point. Then it may be necessary to monitor certain pests almost daily.

Scouting crops within two days of the last pesticide application is not usually recommended to avoid contact with spray residue. Scout one to two days before routine spraying so that pesticide usage may be altered to fit pest conditions.

Scan the field for potential problem areas and abnormal crop conditions such as low, wet areas. Plan to investigate these areas as you walk the field.

Divide each field into five regions. Avoid the borders for these samples to ensure a good representation of the whole field.

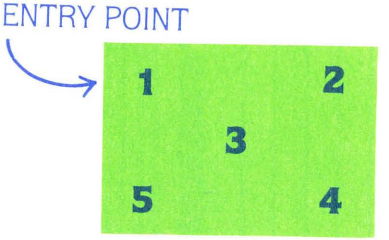


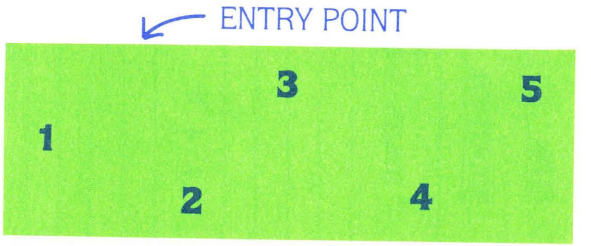
You can walk any pattern through the field that will take you into the five field regions efficiently (see examples below).

Alter your walking pattern each week so that you are not always checking the same plants each time.

Note: Below are various field shapes with sampling regions indicated.

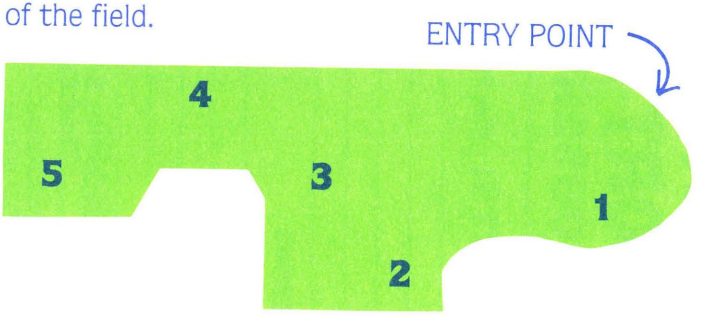
Typically shaped fields





Unusually shaped field:

Pick regions that represent all parts of the field.



GROWER REPORT FORM:
PEST OBSERVATIONS

GROWER: _____ DATE: _____

SITE: _____ CROP: _____

WEATHER: _____ CROP STAGE: _____

INSECTS: PER PLANT SAMPLING | STAGE | NO. OF SAMPLED PLANTS | TOTAL NO. INSECTS | THRESHOLD ( )

SWEEPING | FIELD REGION 1 2 3 4 5 | NO./100 SWEEPS | THRESHOLD ( )

TRAPS (PHEROMONE, BAIT, ETC.)

INSECTS	TRAP #1	#2	#3	TOTAL	INSECTS/TRAP #1	#2	#3	TOTAL

DISEASES:

	NO. OF PLANTS OR LEAVES INFECTED	NO. OF PLANTS INFECTED	% OF PLANTS IN FIELD INFECTED

WEEDS:

ABUNDANCE RATINGS
0 = NONE
1 = 1 WEED/3 ROW FT.
2 = 2 WEED/3 ROW FT.
3 = 1 WEED/1 ROW FT.
4 = 3 BROADLF/1 ROW FT.
5 GRASSES/1 ROW FT.

SPECIES	HEIGHT	RATING	SPECIES	HEIGHT	RATING

COMMENTS:

MAP:

NORTH

Intensely scout each region using the following methods.

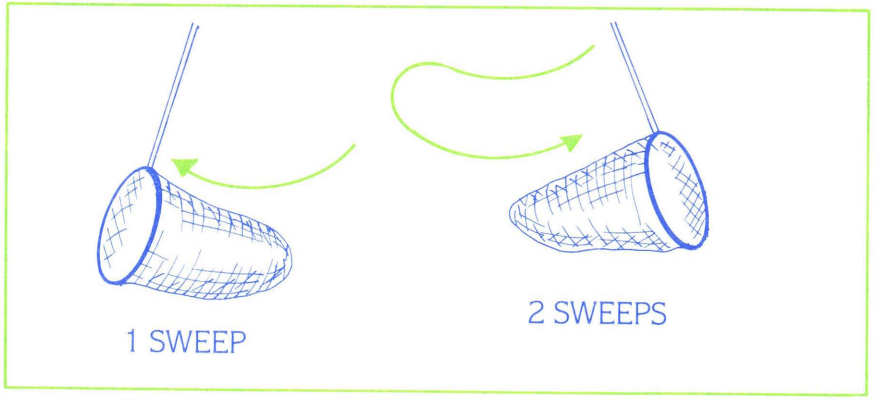
Plant sampling

In each region, examine at least 10 randomly selected plants. If individual plants cannot be distinguished (e.g., cucumbers, melons, etc.), examine the length of row that should contain 10 plants. If the plants are very dense (e.g., onions or radishes) examine every plant in a 5-ft. length of row in each region of the field. Look at lower and upper leaves, top and bottom sides, stems, branches, lateral shoots, flowers and fruits and occasionally the roots. You can examine most crops without destroying them.

Sweeping

This sampling technique is used particularly for foliage feeders that are easily dislodged, such as aster leafhopper, tarnished plant bug and a few other insect pests. Ask for a "beating net" when ordering from a supply house. This is a strong net with a 15-inch diameter mouth and a bag made of a heavy material.

Make 20 sweeps in each of the five field regions for a total of 100 sweeps per field. Swing the net back and forth in front of you as you walk down the field. Sweep the tops of plants vigorously. Each sweep in one direction across the plants counts as a sweep.



After completing the set of 20 sweeps, snap the net sharply to move all the insects to the bottom for counting.

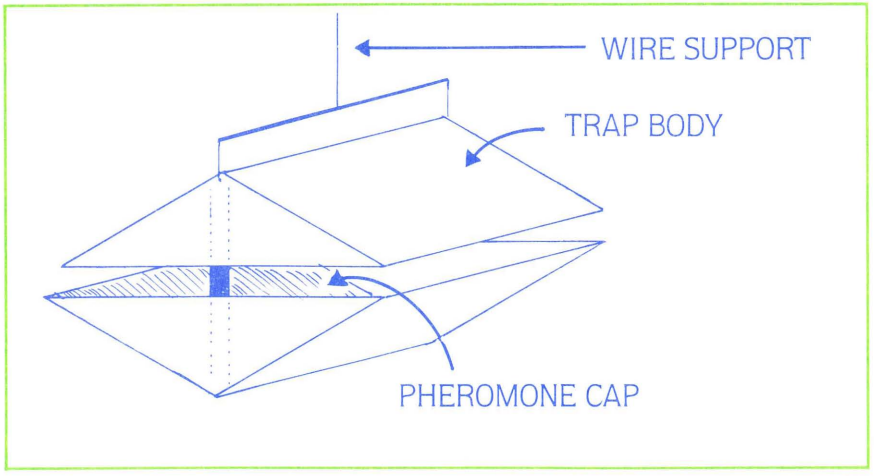
It is generally useless to sweep on very windy days or when the foliage is wet from dew or rain.

Use other scouting methods for specific pests of the field.

Pheromone Trapping

Pheromone traps use scented lures (sex attractants or pheromones) to draw male insects to where they are caught in sticky traps. A variety of these traps are available for many moths and other insects whose larvae feed on crops. They are used to detect the presence of an insect species. Count the number of moths on each field visit. Sometimes that number can be used as a guide for control action. Only males are attracted, however, and numbers may not completely reflect female populations or egg laying, hatching or larvae survival.

Usually three or four traps per farm are set up for each pest species, though the number may vary, depending on the crop.



Bait Trapping

Bait trapping uses an attractive food—sugar, rotten fruit, etc.—to lure insect pests into a trap.

This technique is useful for detecting carrot weevil adults

on the perimeters of fields of susceptible crops. Slugs can also be captured using this method.

As you walk between sample regions, scan the foliage and investigate anything that appears suspicious—field borders, fencerows and ditch bank areas are prime targets. If you find a trouble spot, determine what the problem is and evaluate the number of plants affected and the relative damage. Diagnosing a plant problem requires the skills of a detective. You must gather facts before you can accurately identify the problem.

First: What is the nature of the problem—holes in leaves? stunted growth? discolored fruit? wilt? Some symptoms—e.g., stunted growth—can be caused by several pests, soil conditions or weather.

Second: What pests are visible? Pests are the living organisms—insects, molds, bacteria, nematodes, weeds, woodchucks, etc.—that directly or indirectly interfere with the growth, yield or quality of a crop or its harvest. Many living organisms, especially insects, may be present but harmless or even beneficial.

Third: Some symptoms are distinctive enough to identify the pest or condition responsible. If no pests or identifying symptoms are present, you must go through a process of elimination of potential pests, soil conditions and weather. Record your observations but keep them separate from routine plant sampling observations.

THE I.P.M. SCOUT

Accurate identification of pests: Pests must be correctly identified before proper control measures can be taken and satisfactory results achieved. Many instances of mistaken identification have led to expensive and sometimes disastrous results. If you find pests you do not recognize, take samples and send them to your county agent.

If possible, collect live insects, keep them cool or refrigerated, and take them to the diagnostic lab as soon as possible. Kill adult insects by freezing and keep them dry. Kill larvae in boiling water (1 minute). To prevent decomposition, keep them in isopropyl (rubbing) alcohol.

Plant disease samples can be collected and stored in plastic bags to maintain freshness, but mail them in paper bags or boxes to avoid deterioration. Collect a range of plants showing different degrees of the problem. In most cases, roots should also be included. Again, record the field, crop, variety and date for each sample.

Weed samples should be taken with roots, if possible. Place roots and soil in a plastic bag to keep the plant fresh and tie off the bag above the roots.

Record your observations! A sample of a grower report form is included (see center spread). Make more copies. Pay particular attention to the plant stage, the insect stage and the location of all pests in the field. A map area is included on the grower report form. Indicate here where you walked and sampled and where pests were located.

Evaluating and Reporting

Tally up the insects, disease and weed counts. Compare these numbers (insects and diseases) to thresholds tables of

pests for the appropriate crop. If your counts exceed the threshold values given for the respective pests, then probably some control measure is needed. **The final control/no control decision should be left to the grower.**

If your pest counts do not exceed the threshold values for the various sample methods you used, then consider the pests and crop conditions you found between sample points. Do your samples seem to reflect what you saw elsewhere in the field?

Control measures may be needed even though thresholds aren't exceeded. This decision is sometimes difficult to make. It depends on the pests present, the experience of the scout and grower, and the stage of growth of the crop. Action threshold numbers are not yet available for every pest on every vegetable crop. Even where information is available, it must be used only as a guideline and adapted to your particular area.

Regular scouting will increase the grower's confidence in his/her control program. Knowing exactly what is happening in each field is the best insurance a grower could possibly have for valuable vegetable crops.

Scouting Equipment

Equipment needed for scouting: 10x hand lens; jackknife; sweep net (for some crops); small vials for insects; plastic and paper bags for disease and weed samples; identification books for insects, diseases and weeds; pheromone traps.

Materials can be obtained from:

Great Lakes IPM, 10220 Church Rd. NE, Vestaburg, MI 48891 (517) 268-5963.

Bio-Quip, P.O. Box 61, Santa Monica, CA 94096 (213) 322-6636.

MSU Bookstore, MSU, E. Lansing, MI 48824 (517) 355-3450.

American Biological, 1330 Dillon Heights Ave., Baltimore, MD 21228.

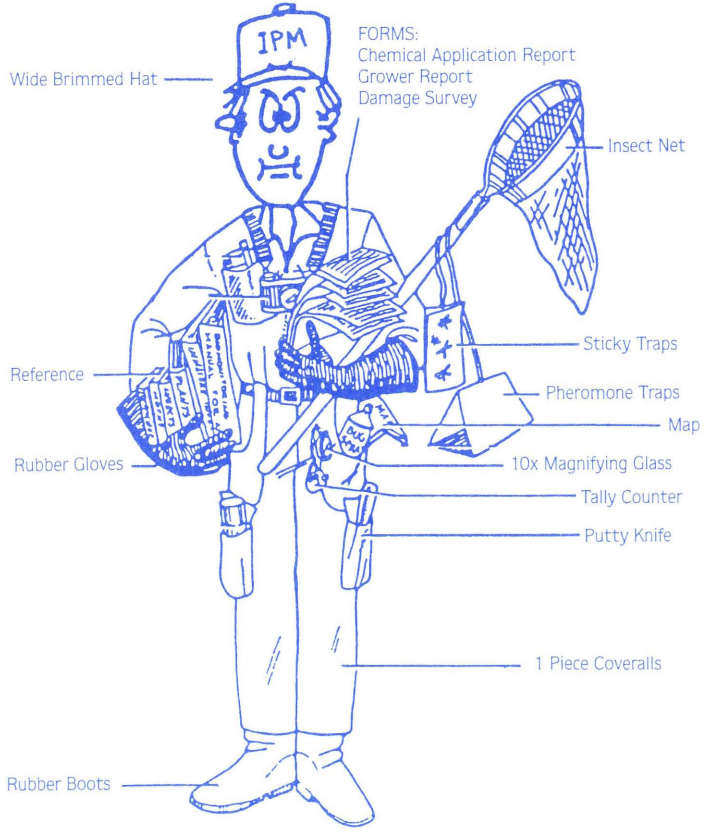
Other biological supply companies.

Michigan State University offers vegetable integrated pest management scout training in various regions of the state for growers, farm employees and commercial scouts. For more information, contact:

Office of Integrated Pest Management
Michigan State University
East Lansing, MI 48824
(517) 355-0117

The Well Equipped Scout

Proper equipment is important for safe, effective scouting.



New-8:87-5M-KMF-HP, Price 45 cents
File: 27.34 (Vegetables-Commercial)