Extension Pesticide Applicator Training Series #1: Pest Identification

Guide A-610

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Pest identification is the first step in any pest management situation. The practice of integrated pest management depends on "field scouting" or monitoring of pest populations and crop development. This step is critical since appropriate management methods may vary dramatically for each pest. Unfortunately, pest identification can be very difficult if you are not familiar with the weed, insect, or disease problems present within your area. In addition, many pests share similar traits, which makes identification extremely difficult. Specific pest identification is beyond the scope of this pamphlet; the objectives are to introduce how to identify pests and to provide references for further information.

SCOUTING METHODS

The tasks of field scouting include (1) making accurate identifications of pests and related crop injury present in the field, (2) determining the abundance of the pest populations, (3) recording crop stage and agronomic practices, and (4) carefully recording all field observations. These tasks require extensive hands-on experience before field scouting can be mastered. Specific scouting methods are dependent upon many factors including size of the area, characteristics of the area (e.g. row crop, orchard), management goals, and mobility of pests. Since surveying the entire area is typically not possible, pest populations are estimated by scouting smaller areas. Field scouting can be accomplished in many ways including entering a field from several different points and surveying into the center, or subdividing it into several small sections and making observations within each section. However, representative sampling of the whole field is important because pests tend to congregate in specific locations. If only one or two small sections are scouted, pests may not be detected until high levels of damage have already occurred. A field history of infestations is often helpful for scouting, as some pests prefer specific areas and may infest these areas first. Sampling early in the season and concentrating sampling in areas where pests have historically been a problem is recommended to detect pests before densities increase to damaging levels and spread.

Surveying for weeds and diseases can be done visually, while insect surveys frequently require special techniques. Most insects can fly or otherwise escape detection. Some monitoring methods depend on gathering insects in sweep nets or catching them in specially designed traps. Plants can also be checked closely, looking for feeding insects and signs of feeding activity. It is important to record the results for future references, as this will allow the land manager to better understand what conditions the pests prefer. Many observations should be recorded when scouting including the location in the field, identification of beneficials and pests present, density of pests, stage of pests, distribution of pests within the field, date of observation, and crop stage or site description.

SCOUTING AND IDENTIFYING INSECTS

Identification is critical to distinguish between insect pests and beneficials. Insect identification is based on morphological features such as the structure of mouthparts, wings, legs, antennae, etc. Some special equipment is required for effective scouting a: sweep net, forceps, and aspirator are needed for collecting samples; vials containing rubbing alcohol are used for killing and preserving collected specimens, and a magnifying lens will help with identification of specimens. The type of damage observed in the field and where the pest is located on the plant will also help determine which pests are present.

Many pests have chewing mouthparts and eat plant tissue. Caterpillars of many butterflies and moths as well as larval or adult stages of several beetles feed on leaves, fruit, roots or other specific plant parts. Most plants are also hosts to one

or more species of aphids, leafhoppers or plant bugs. These insects have sucking mouthparts for puncturing plant tissues and sucking out sap. This causes damage to leaves, flowers or fruit. Sucking insects can also cause crop losses by spreading diseases from infected to healthy plants. Typically, different pest species will attack a crop at a specific time of year or stage of plant growth or under specific environmental conditions. Information is available in printed or online guides for the identification of insect pests affecting a specific crop.

INSECT IDENTIFICATION RESOURCES

- www.wvu.edu/~agexten/ipm/identify/insectid.htm
- Insect Pests of Farm, Garden, and Orchard, 8th Edition, R. H. Davidson, W. F. Lyon. 1986. John Wiley & Sons, NY.
- NMSU Guide: H-243: Economic Insects of Chile

SCOUTING AND IDENTIFYING PATHOGENS

Several types of microorganisms can cause a reduction in plant health including fungi, bacteria, virus, and nematodes. Identification of these organisms in the field is usually very difficult, and lab identification is often required. Tools needed to aid in locating and determining pathogens are a sharp knife, a shovel, and a magnifying lens.

Diseases and disorders of plants occur when normal plant function is disrupted. For this reason pathogens can easily be confused with environmental (non-organism related) stresses. For example, wilt symptoms occur due to water stress caused by drought or rot caused by pathogens. Although symptoms between a disease and an environmental stress are often indistinguishable, they can often be separated by the pattern in which they are distributed within the field. Environmental stresses are typically distributed evenly, encompassing many plants, over large sections of the field. Alternatively, biotic organisms occur in clusters scattered in pockets throughout the field. Furthermore, these organisms typically infect a small number of plants within each cluster. In both instances, further examination of the entire plant is required.

Using a shovel, dig out both healthy and symptomatic plants with all possible roots attached. Examine the plant as a whole, noting differences between the two. Examples of some characteristic signs of disease are: knots, blackened areas or rot on the root system, discoloration in the inner stem tissue, stem lesions, leaf spots, cankers/blisters, and leaf malformation. Many different organisms can produce similar symptoms and signs. If the distribution or the symptom indicates the possibility of disease, it is recommended that a sample be collected and sent to a plant diagnostic lab for testing. Samples should be received by the lab within three days of collection; please refer to NMSU Guide H-158 for specifics on how to properly collect and send a sample. Remember, the lab's diagnosis of the disorder is only as good as the sample and the information submitted with it.

PATHOGEN IDENTIFICATION RESOURCES

- www.ent.iastate.edu/imagegal/plantpath
- Compendium of Pepper Diseases. Pernezny K., Robers P.D., Murphy J.F., & Goldberg N.P. 2003. APS Press (also see Cotton and Corn Compendiums)
- NMSU Circular 549: Chile Pepper Diseases
- NMSU Guide H-158: How to Collect and Send Plant Specimens for Disease Diagnosis. www.cahe.nmsu.edu/pubs/_h/h-158.html

SCOUTING AND IDENTIFYING WEEDS

Weeds by definition are plants growing out of place. They compete with desirable plants for limiting resources such as water, nutrients, and sunlight to reduce crop yield and quality. Due to this competition, weed species need to be identified and removed when they are young and have not had time to impact the crop.

Weeds are classified based on morphological features of the foliage, stems, and flowers; therefore visual inspection of the plant is all that is required for identification. A small magnifying lens may aid in the identification of small features of some plants. Weeds can be classified as annual, biennial or perennial plants. Annual plants will germinate, flower, set seed and die within one year, while biennials take two years. Perennials can grow for several years, storing energy in perennial tissue. Identification is critical as management strategies differ dramatically for annuals, biennials, and perennials. For example, perennial weeds can tolerate many management techniques such as mowing and cutting that are effective on annual and biennial weeds.

While weeds can occur anywhere, infestations are common in areas that are frequently disturbed or where crop growth is suppressed. These are excellent places to begin scouting for weed populations. Weeds also tend to occur in patches and grow at various times of the season; therefore several scouting trips through various locations in the field should be conducted. Identification of seedlings, while important, can be very difficult; several references are included to help with identification of weed seedlings and mature plants.

WEED IDENTIFICATION RESOURCES

- www.ppws.vt.edu/weedindex.htm
- Weeds of the West, 9th edition. T. D. Whitson, L. C. Burrill, S.A. Dewey D.W. Cudney, B.E. Nelson, R.D. Lee, and R. Parker. 2000. Jackson, WY.
- NMSU Circular 548: Weed Management in Chile