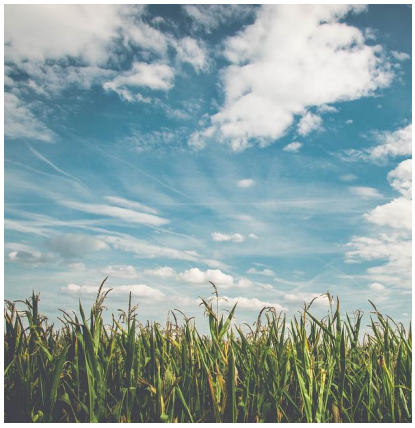
Plant Scouting Activity

Crop Pests and Diseases

Grade Level
5th - 12th grade

Lesson Length
~45 minutes

STEM Careers
- Entomologist
- Crop consultant
- Agronomist
- Insurance agent
- Farmer



This lesson is part of the Insect Biology Curriculum. These lessons can be adapted for use with a variety of ages.

Learning Objectives

By the end of the lesson, students should be able to:
- define beneficial vs. pest arthropods
- define entomology and its importance
- demonstrate the importance of scouting when making management decisions
- discuss EIL and ET and why they are so important
- define IPM and how a multi-faceted approach to pest management (biocontrol, pesticides) is important

Educational Standards Supported

(Nebraska Early Learning Guidelines)

- SC.7.7.3.A Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
- SC.7.7.3.D Apply scientific principles to design a method for monitoring and increasing positive human impact on the environment.
- SC.7.8.4.E Construct an argument supported by evidence that changes to physical or biological components of an ecosystem affect populations.
- AFNR.HS.5.3.a Describe pest control strategies associated with integrated pest management.
- AFNR.HS.5.3.c Explain integrated pest management practices.

Materials List

- model corn plants (see building instructions in supporting materials folder)
- crop scouting activity data sheet
- crop scouting activity explanation sheet
- scouting guide (images of common pests and diseases)
- writing utensils

Lesson

Introduction

Crop scouting is one of the ways that farmers can make real time management decisions to improve their field performance. If they wait until the end of the season to look at yields, it's past the point where they can take steps to address pest and disease problems. Soil science and pest identification is an extremely important part of this process. Different types of damage, disease, or nutrient deficiency should be addressed taking in account the cost, long-term control, and ecological and environmental concerns. Thus it is crucial that growers are able to identify the source of that is causing plants harm.

Insects can damage ornamental or crop plants through feeding on plants leaves, stocks, grains, seeds or fruit. Some insects damage plants by spreading disease while feeding on a plant. In other cases, the damage is purely cosmetic but undesirable as it affects the beauty or resale of a plant's flowers or fruit.

Pest insects can be controlled in several different ways. One way is to use a **natural enemy**, like a parasitic wasp, to attack pest insects. Using a predatory or parasitic animal or other natural organism to control a pest is called a **biocontrol.** Another common control method is the use of chemical pesticide applications to kill insects.

Some insects damage crops in only one stage of their lifecycle or differently based on their **metamorphosis** stage. For example, the **egg, pupa** and **adult** stage of the alfalfa caterpillar don't cause damage, but the **larvae** stage does. The adult is a butterfly, and is actually a **pollinator**! All growers are encouraged to use **integrated pest management (IPM)**, a step-by-step process that includes; identification of the pest, its lifecycle, sampling, establishing

Glossary words:

Biocontrol - controlling pests using other organisms that naturally attack the pest

Diseases - abnormal conditions caused by viruses, bacteria, or fungal organisms that harm plants and/or insects

Egg – an oval or round thing from which a snake, frog, insect, etc., is born

Egg mass - A cluster or of eggs laid by different organisms

Insect - a small animal that has six legs and a body formed of three parts and an exoskeleton

Integrated pest management - a science-based decision-making process that combines tools and strategies to identify and manage pests

Larva - a very young form of an insect

Metamorphosis - a major change in the form or structure of some animals or

an action threshold (economic, aesthetic, or health), choice of pest management strategies, and evaluation of pest control before the use of any pest control strategies.The proper use of IPM saves growers money and helps protect the environment.

Opening Questions

- *What is a pest?*
- *How do pests affect food production?*
- *What is IPM (integrated pest management)?*

Activity #1: crop scouting activity

1. Set up fake corn fields #1-4 with included labels in the supporting materials folder. Also refer to supporting materials for details on how to set up each field's "problem sets".
2. Break students into groups of 4-5, give each group one worksheet.
3. Allow groups 5-7 minutes to evaluate each "corn field" for what they notice (see worksheet) and note their findings/suggestions. Rotate through all of the fields so that each group has a chance to evaluate them.
4. Have each group share what they saw and how they would address the issues in each field.

Scouting is a method to gauge pest insect infestation rates. It provides farmers with information that allows them to make efficient pest management decisions. Being able to identify specific pests and the numbers present allows producers determine if the cost of treating insects outweighs the benefits that they will see in yield production or crop quality.

insects that happens as the animal or insect becomes an adult

Natural Enemies - parasites, diseases or predators that attach a pest

Parasite - an organism that lives in or on another organism and benefits from the other organism's destruction

Pest - a destructive organism that attacks crops, food, livestock, structures, etc.

Pupa - an insect that is in the stage of development between larva and adult

Secondary pest - pests that are usually present at low levels and is normally not significant

Elaborate/Extend

Ask students to research crop diseases and pests. Have them reach out to farmers for permission to tour a crop field and take samples of specific deficiencies and diseases.

Students can identify discoloration and damage to assess what is causing damage in the field.

Evaluate/Reflect

- *Why do farmers need to be able to identify pests and diseases in their crop fields?*
- *How do farmers use the information they receive from crop scouting?*
- *How do we use science to improve crop health?*

We want to hear from you!

Let us know what you thought of the lesson or send us a picture of youth participating in the lesson. Please send to **julie.peterson@unl.edu**!

County Fair Project:

Document growth of crops with photos or videos. Complete a crop project based on management decisions and enter a display with the plants from your field. Join a crop scouting team and compete in competitions.

Supporting materials:

- https://drive.google.com/drive/folders/1ZZYV-qwZSwdk40hd4-ajrP7ppJUOdHWn?usp=sharing
- View only - Make a copy of the folder and then print or edit as necessary
- Integrated Pest Management Kahoot - https://play.kahoot.it/v2/?quizId=b368da7b-5705-40f9-aca8-059ecd471ca3
- Activity instructional video - https://www.youtube.com/watch?v=zcTVmpzDkeI

References/Resources:

- https://www.pioneer.com/us/agronomy/corn-ve-v2.html#VEV1_1
- https://farmdocdaily.illinois.edu/2018/10/integrated-pest-management-what-are-economic-thresholds-and-how-are-they-developed.html
- https://crops.extension.iastate.edu/cropnews/2020/05/crop-scouting-basics
- Nebraska Science Standards Guideline https://www.education.ne.gov/wp-content/uploads/2017/07/Nebraska_Science_Standards_Final_9-8-17.pdf

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