Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Sweep Method

**Purpose**

The use of a sweep net is a very common method of monitoring insects in a field. In crops such as alfalfa and cotton, insects are collected and counted to estimate the population levels. Field monitoring is important to determine if treatment is necessary.

In this exercise the use of a sweep net is demonstrated in alfalfa. Insects of concern are the alfalfa weevil larvae (*Hypera postica*) or Egyptian alfalfa weevil (*Hypera brunneipennis*), alfalfa caterpillars (*Colias eurytheme*), beet armyworm (*Spodoptera exigua*) and western yellow-striped armyworm (*Spodoptera praefica*). Other insects, including predators and parasitic wasps (which are the ‘good guys’ in this case) can also be detected. [[1]](#endnote-1)

**Procedure**

 **Materials**

1. Hand lens 10-30X power or a dissecting scope
2. Sweep net (can be purchased from any biological educational catalog)
3. Stapler
4. Paper bags (large grocery store size)
5. Glass jars with screw top lids
6. Ethanol or isopropyl alcohol (rubbing alcohol)
7. Use of a freezer (optional)
8. Glass dish or Petri dish

**Sequence of Steps**

A standard sweep net consists of a cone shaped cloth bag approximately 2 feet deep fitted to a 15-inch wire loop and attached to a 26-inch handle. To sweep, tilt the rim of the net so that the lower edge is 1 to 2 inches ahead of the upper edge of the rim. This allows the net to catch insects falling from the plant. The lower rim of the net should be kept about 10-inches below the top of the plant during sweeping. A single sweep is on a 180-degree arc taken during a step forward. At the end of this sweep raise the net and reverse the direction of the swing. Swing the body from side to side during sweeping, making natural swings. Sweeps may be taken singly or consecutively.

1. To check a field, divide the field into four or more sections depending on the size of the field.
2. Take five sweeps in each section and deposit the contents of the net into a paper bag and staple the bag closed.
3. Place the paper bags from each section of the field into a freezer for 10-minutes.
4. Open the bags and discard the plant material.
5. Pour the insects into the glass jars and add enough alcohol to cover the insects.
6. Seal the jars tightly to prevent the alcohol from evaporating. The alcohol preserves the samples for counting and identification at a later time.
7. To count and identify the insects, carefully pour off as much alcohol as possible without losing any insects.
8. Place the insects in a shallow glass dish or Petri dish. If the insects float, there is too much alcohol remaining in the sample.
9. Put the dish under the microscope and examine the sample.
10. ![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()Identify the different insects and count the number of each species. To determine the average number per sweep, add the number of each species from each section of the field and divide by the total number of sweeps taken from the field.

**![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()**

**Observations**

|  |
| --- |
| **Average Number Per Sweep** |
| Insect |  |  |  |  |
| Number per sweep |  |  |  |  |
| Average number per sweep |  |  |  |  |

**Background Information**

* The recommended treatment threshold for **weevils** is an average of 20 larvae per sweep.
* **Caterpillars** have a number of predators, parasites, and pathogens that may occur in a field that will keep the populations below economically damaging levels. The treatment threshold for alfalfa caterpillars is an average count of 10 nonparasitized or disease-free caterpillars per sweep.
* **Beet armyworm** or western yellow-stripe armyworm need to be controlled when an average of 15 nonparasitized armyworms of more than ½ inch in length per sweep are found.

Control of these insects could be obtained with early harvest of the hay or with an insecticide. When economically practical, many growers choose to harvest early to minimize the killing of predators and parasites of aphids

**Conclusion**

1. Based on your observations, describe your findings using complete sentences.

2. Based on your observations, what course of action do you recommend? Are you below the level of threshold for this field?

3. How does population size of a specific pest affect the surrounding ecosystem?

4. Why is effective control of pests an important aspect of production agriculture?

1. Dickson, Chris (2008). Sweep Method. *North High School, Bakersfield, Agriculture Department* [↑](#endnote-ref-1)