Monarch Larva Monitoring Project

ACTIVITY #4: COMPARING PLANTS OCCUPIED BY MONARCHS TO RANDOM PLANTS

Objective: To assess whether female monarchs choose milkweed plants randomly within a site, or if there are characteristics of milkweed plants that make some more likely to be chosen as sites for oviposition. This will help us to understand what characteristics make milkweed "good" host plants for monarchs.

Methods: Measure and compare the same characteristics (height, reproductive status, age, herbivore damage, and the presence or absence of invertebrates) of plants with monarchs and randomly-selected plants. You will measure all (or a subset if you find over 30 plants with monarchs) of the plants you observe with monarchs and a random set of 30 plants at your site.

You will fill out **Datasheets 4A and 4B** every week if you do this activity. Complete datasheet 4A (milkweeds with monarchs) while you are doing your weekly Activity 1 monitoring (Measuring Monarch Density). If you find more than 30 plants with monarchs, you can stop recording when you get to 30 to save time.

Since it will be hard to record characteristics of random plants simultaneously, use one of the methods described below AFTER you have completed your weekly monitoring activities to complete the 4B datasheet (random milkweed plants).

It works well to copy the two datasheets below on two sides of one paper.

DIRECTIONS FOR FILLING IN PLANT CHARACTERISTICS ON BOTH DATASHEETS (4A AND 4B):

1. For datasheet 4A, record the stage of monarch(s) on the plant, then fill out the other characteristics as described below. If monarch densities are very high at your site, you can stop recording plant characteristics after the first 30 occupied plants. Keep looking for monarchs for Activity 1 (Measuring Monarch Density) and recording the number of monarchs you observe and the total number of milkweeds examined. For datasheet 4B, most plants probably won't have monarchs, but it's okay if they do (as long as they are selected randomly).
2. Look at the plant to determine what, if any monarchs or other invertebrates are on it, and record what you see on the datasheet. It is important to do this first, since your presence and plant manipulation will disturb some of the invertebrates. The Milkweed, Monarchs, and More Field Guide (available at: http://monarchjointventure.org/store) is helpful for identifying invertebrates you are likely to encounter.
3. Record the species of milkweed. Here is a helpful webpage courtesy of the Monarch Joint Venture (see Milkweed Resources category): http://www.monarchjointventure.org/resources/downloads-and-links/
4. Measure the plant height in cm to the top of the top set of leaves; if the plant is not standing straight, or if it is a recumbent species (growing horizontally along the ground), measure its length. If it has several branches, measure the height of the tallest branch (see photo).

Photo courtesy of Janet Allen

5. Note the presence/absence of buds, flowers, and seed pods.
6. Evaluate the percentage of leaf material that is yellowed and senescing (growing old). This is a subjective measurement, but use the categories provided on the datasheet for percentages.
7. Evaluate the percentage of leaf material that is eaten by herbivores or infected by a disease or air pollution. Use the categories provided on the datasheets for percentages.
8. For each milkweed plant you record, measure out a one meter square with that plant directly in the center of the plot. Count the number of other milkweed plants inside the one meter square plot and record this on the datasheet.

IF YOU HAVE A BIG FIELD WITH LOTS OF PLANTS YOU WILL NEED TO SAMPLE PLANTS RANDOMLY TO FILL IN DATASHEET 4B:

Once you are done monitoring for monarchs, choose another random transect(s), and measure the characteristics of 30 random plants. This can be done by standing at some point in the site or on the edge and tossing your ruler, butterfly net, or pencil up into the air and walking in the direction it points. It is important to do this randomly so that you don't subconsciously start walking in a direction with good-looking or otherwise nonrandom plants. Random milkweed plants that you record can have monarch eggs or larvae on them; the point is that they are a random sample of the plants in your site.

Walk 10 paces (or 5 if your site is small) in your randomly selected direction, and follow steps 2-8 above for the closest milkweed plant to your feet. Be sure to look for plants of all sizes, including very small plants, and not to measure a more noticeable plant if an inconspicuous one is closer to your feet. Walk 10 (or 5) more paces and repeat this process. Continue until you have measured up to 30 random plants (in addition to the ones you've already recorded on Datasheet 4A). If you reach the edge of the field before you have measured 30 plants, then randomly choose another direction and begin again, or simply turn 90 degrees back into your site and walk another transect in that direction.

IF YOU HAVE A SMALL AREA FIELD WITH FEWER THAN 30 PLANTS, YOU SHOULD MEASURE ALL OF THE PLANTS:

All of the milkweeds at your site should be measured if you have fewer than 30. In this case, your plants that are occupied with monarchs will be part of the "random plant" survey, since you will measure all plants. You should record the data on these plants on both datasheets – you don't have to actually write the data down twice, but enter them onto the web site for both 4A and 4B. We will then be able to determine if your "occupied" plants are a non-random subset of all of the plants.

DATASHEET #4A: CHARACTERISTICS OF MILKWEED PLANTS WITH MONARCHS

Date: _____ **Observers:** _____ **Site Name:** _____

City: _____ **State:** _____

#/stage of egg/larva on plant	Other invertebrates on plant	Plant Height (cm)	Buds (Y/N)	Flowers (Y/N)	Seed Pods (Y/N)	Condition (1 = <5%, 2 = 5-40%, 3 = 41-80%, 4 = 81-100% yellowed or dying)	Herbivory/Disease (1 = 0%, 2 = <5%, 3 = 5-25%, 4 = >25% damaged)	# other milkweeds within 1 m^2	Milkweed Species
Example: 1egg, 1 4th	*Aphids, spider, tussock moth caterpillars*	*52*	*Y*	*N*	*N*	*1*	*2*	*1*	*Asclepias syriaca*

DATASHEET #4B: CHARACTERISTICS OF RANDOM MILKWEED PLANTS

Date: _____ **Observers:** _____ **Site Name**: _____

City: _____ **State:** _____

Plant #	Invertebrates on Plant	Plant Height (cm)	Buds (Y/N)	Flowers (Y/N)	Seed Pods (Y/N)	Condition (1 = <5% 2 = 5-40% 3 = 41-80% 4 = 81-100% yellowed or dying)	Herbivory/ Disease (1 = 0% 2 = <5% 3 = 5-25% 4 = >25% damaged)	# other milkweeds within 1 m^2	Milkweed Species
Ex:	*Monarch egg, lacewing egg, earwigs*	*30*	*N*	*N*	*N*	*1*	*1*	*12*	*Asclepias syriaca*
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