**Risky or Not?**

People around North America are planting milkweed because they want monarchs to be able to find food and habitat for their caterpillars. But does it matter where the milkweed comes from? If I live in Minnesota, should I order milkweed seeds from Washington State, the first place a google search sends me? Is it better to get them from a farm in Vermont that sells seeds on Amazon? Or, do I need to find a local source in Minnesota or even in my community?

The answer to this question depends on whether or not milkweed is locally adapted.

By now, you know what local adaptation is. Science doesn’t yet know whether common milkweed populations are locally adapted. That’s what our lab experiment is all about. In this activity, we’ll ask you to think about how what our findings might mean.

When populations are locally adapted, if individuals from different populations mate, their offspring might not do so well because they won’t be adapted to either location. In severe cases, demographic swamping can occur, where the introduction of non-locally adapted genes causes the population to become less-well adapted and to decrease in abundance. On the other hand, if populations are not locally adapted, when new individuals enter a population and mate, they bring in new genes and gene combinations, which can often result in higher performing offspring.

Discuss each of the scenarios describing some kind of gene flow in the milkweed population, and decide whether you think the scenario is likely to affect the survival or evolution of a milkweed population. Rank the outcome of each scenario on a scale from +3 to -3, with +3 being highly beneficial to the local population, -3 being very risky for the local population, and 0 indicating no predicted effect. Justify your answers.

1. A farm in Washington cultivates fields of common milkweed. They started with a mixture of seeds collected from a few sources around the country and selected the varieties with the highest germination rate to plant. They now cultivate fields of milkweed plants that are open pollinated and harvest the seeds each fall to package and sell.

\_\_\_\_\_\_\_\_ a. Suppose large numbers of these seeds are planted at a Minnesota site where a few locally adapted-common milkweed plants are found along a roadside.

\_\_\_\_\_\_\_\_ b. Suppose a few of these seeds are planted at a Minnesota prairie site where a large and healthy population of locally-adapted common milkweed plants exists.

\_\_\_\_\_\_\_\_ c. Suppose common milkweed populations are not locally adapted, and many of these seeds are planted in a Minnesota prairie to supplement an existing healthy population of common milkweed.

1. A seed company in Vermont plants a field with common milkweed collected from roadsides and old fields within a 20-mile radius of the site. They harvest the seeds and keep them in cold storage before distributing them to customers on Amazon.

\_\_\_\_\_\_\_\_ a. Suppose large numbers of these seeds are planted at a Minnesota site where a few locally adapted-common milkweed plants are found along the side of a road.

\_\_\_\_\_\_\_\_ b. Suppose a few of these seeds are planted at a Minnesota prairie site where a large and healthy population of locally-adapted common milkweed plants exists.

\_\_\_\_\_\_\_\_ c. Suppose common milkweed populations are not locally adapted, and many of these seeds are planted in a Minnesota prairie to supplement an existing healthy population of common milkweed.

1. A Minnesota based seed company grows common milkweed plants from seeds collected around the Midwest. They allow the plants to be naturally pollinated every summer, collecting seeds in the fall for distribution.

\_\_\_\_\_\_\_\_ a. Suppose large numbers of these seeds are planted at a Minnesota site where a few locally adapted-common milkweed plants are found along the side of a road.

\_\_\_\_\_\_\_\_ b. Suppose a few of these seeds are planted at a Minnesota prairie site where a large and healthy population of locally-adapted common milkweed plants exists.

\_\_\_\_\_\_\_\_ c. Suppose common milkweed populations are not locally adapted, and many of these seeds are planted in a Minnesota prairie to supplement an existing healthy population of common milkweed.