



A Guide to Growing Milkweeds and other Native Plants in the Classroom

Growing milkweeds and other native plants is an enjoyable venture that provides a wealth of learning opportunities for students along the way. Hands-on experience is one of the best ways to bring milkweeds, monarchs, pollinators, prairies and restoring critical habitat to life for students of all ages. Growing milkweeds and other native plants is also a critical piece of the puzzle when it comes to restoring prairie ecosystems. Most milkweeds and native plants are relatively easy to grow

ecosystems. Most milkweeds and native plants are relatively easy to grow and will establish well in a pollinator garden or prairie restoration given some simple instructions are followed. This guide aims to provide teachers with the information they need to know about growing milkweeds or other native plants in the classroom as a part of the milkweed in the classroom curriculum.

Getting Started — What Do You Need in the Classroom?

The following items are needed for growing milkweeds in the classroom:

- Flat for starting the seedlings in (use the flat with drainage holes in the bottom)
- Growing medium / seed starting mix (Berger BM7 commercial mix or other seed starting mix)
- Milkweed seeds
- Grow light and light timer for the classroom (probably not necessary if plants are grown in a school greenhouse)
- Containers for transplanting seedlings into and a flat to hold them (or cone-tainers with a rack)
- · Access to water
- Spray bottle for misting and/or a fine-misting spray nozzle and a hose
- Access to a sunny and protected outdoor area near the classroom
- Optional: Access to refrigerator/freezer (if preferred to using outdoor location for cold stratifying the seeds) and a large plastic Ziploc bag and paper towels for cold stratification
- Optional: Wooden dowel for tamping down soil in the cone-tainers (if cone-tainers are being used)

The following sections will describe how to successfully grow milkweeds in the classroom using these items. Many other native plants can be grown using the same methods and materials, though there are some other considerations - for example, scarifying (scraping with sandpaper) hard-seeded legumes. If you would like more specific information on growing native plants other than milkweeds, see page 8 and for any questions see page 10 for "Contact Information".

Timing of Growing Milkweed Seedlings in the Classroom

The best time to plant milkweed seeds indoors is anytime during the month of January. After planting, the seeds will need at least a two week period of cold stratification - cold and moist conditions (this will be explained in detail in the next section). Within the first couple weeks of February, the planted flats should be brought into the classroom after being cold stratified. After about two weeks of warm and bright conditions (near a window and under a grow light in the classroom) the seeds will germinate and begin sprouting out of the flats (This will likely occur by late February or early March). It will likely take about 2-3 weeks of the seedlings growing in the flats for them to get big enough for transplanting into separate containers (by mid to late March). Once the seedlings are planted into separate containers, they will need around 4-6 weeks of growth before they are ready to be planted outdoors into a pollinator garden or habitat restoration site. On this schedule, the seedlings can be planted outdoors about the end of April or early May.

Planting Seeds

(Also see Page 3 for a photo guide to planting seed)

Fill the flat (the one with drainage holes in the bottom) with growing medium (seed starting mix) and lightly pack it down. Most commercial mixes work well, like the one provided in the milkweed growing kits or Berger BM7 mix or something similar. Once the flat is filled, saturate the growing medium with water before planting. Make sure the water soaks through the flat completely. You may need to even out the moistened growing medium across the flat and lightly pack it down prior to planting. This saturation of the growing medium ahead of planting is important so the flat doesn't dry out quickly between watering and there are not persistent problems with dry patches of growing medium. After watering, the flat is ready for planting.

When planting milkweed seeds in a flat, you will want to scatter the seed evenly across the surface of the growing medium (see photo 6 on page 3 for recommended thickness of seed on a flat). After seeds are scattered across the flat, use a small amount of growing medium to cover the seeds. Use just enough growing medium across the flat to barely cover all the seed. Having a very thin layer of growing medium covering the seed will ensure optimal conditions for germination. Too much growing medium on top of the seed will negatively impact the rate and speed of germination. After the seeds have been covered with growing medium, lightly water the flat again with a mist of water. See page 3 for a photo guide to starting seeds.

Germination rates and the speed of germination of native prairie plants typically increases dramatically with a period of cold stratification (i.e. a period of cold and moist conditions). They are adapted to these conditions on the prairie in the wintertime and the back-and-forth freezing and thawing of surface soils. It is best to expose the seed you plant in flats to cold and moist conditions before you allow them to warm up and germinate in a classroom or greenhouse. The flat can even be allowed to freeze. See "Care Before the Seeds Germinate" below for more instructions on cold stratification.

Care Before the Seeds Germinate

After planting in the flat, keep it moist but don't over-do the watering. Typically this means watering or misting every couple days or so, but this depends on the conditions the flat has been kept in the days leading up to watering. Examine and touch the soil surface and if it appears somewhat dry it will be time to water. When watering, go over the flats with a light mist of water as not to disturb the surface soil or seed.

You can keep the flat outdoors in the winter months or in a refrigerator/freezer for a period of cold stratification. Cold stratification should last for two weeks or so. If preferred, cold stratification can even be done ahead of planting seeds in the flat. If you plan to use a refrigerator/freezer with limited space and don't want to deal with a flat of soil in the fridge, it will work to place seeds into a plastic bag with moistened paper towels. Make sure to seal the bag and place it in the refrigerator. It is recommended that you alternate between the freezer and refrigerator a few times during the period of cold stratification. Consider placing the seed into the freezer for about a day at a time and then place it back into the refrigerator for a few days before freezing again. This will allow freezing and thawing conditions, mimicking what happens naturally outdoors. Check a couple times during this period to ensure that the paper towels remain moist. After at least two weeks of cold stratification, remove the seeds from the bag and plant them into a flat, or remove the planted flat from the refrigerator /freezer. Flats can then be placed in their warm, indoor growing location to promote germination.

If you choose to place the flat outdoors for the period of cold stratification, make sure it is well protected from high winds, heavy rain or anything that may disturb it like critters digging around. You may consider wrapping window screen around the flat outdoors so it is protected but still gets airflow and light. Make sure to check back and water lightly every few days or so to ensure the soil in the flat stays moist during this time. You will want the flat to get some sunlight outdoors to promote some thawing in the flat followed by freezing again. Or you can occasionally allow the flat to warm up inside during the daytime and place it back out to freeze again if temperatures remain cold for a number of days. If the actual temperatures are forecast to dip below 5 - 10 degrees F, it may be best to bring the flat indoors or to a refrigerator until a bit warmer temperatures return – the seed is more susceptible to damage from extreme cold when planted in a flat versus in the ground where there is more thermal mass. After at least two weeks of cold stratification outdoors, bring the flat inside to the warm and bright growing location to promote germination.

A Photo Guide to Planting Milkweed Seed in Flats



 Most growing mediums/seed starting mixes work well for starting seeds



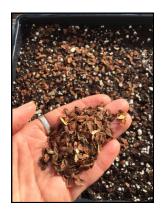
2. Use standard flats with good drainage for seed starting



3. Fill the flat with growing medium and pack it down



4. Water the flat well - make sure all of the growing medium has been saturated



5. Scatter milkweed seeds across the growing medium in the flat



6. Scatter plenty of seed but don't overdo it The flat should look something like this



 Lightly cover the seeds with growing medium - cover with just enough growing medium so that the seeds are not exposed - don't overdo it



8. Gently water the flat again to moisten the light cover of growing medium over the seeds. Remember to check the flat often and lightly water or mist over the flat when needed so the growing medium stays moist (likely every other day or so).

Care After Seeds Germinate

Using a grow light is best when growing seedlings in the classroom. Even seedlings growing in a south facing window will need supplemental light in the late winter / early spring months. Once you bring the flat in to the warm growing location, place an LED grow light about 6 inches above the plants or a fluorescent grow light about 12 inches above the plants. This will ensure the plants will grow properly and that they don't get too tall and spindly reaching for light. As the plants grow in the flat, the grow light can be raised a few inches or so in



Milkweed seedlings sprouting up out of a flat

relation to the height of the plants. It is best if milkweed seedlings get at least 12 hours of light



© Janet Allen

from a grow light per day. It is equally important that the seedlings have a period of darkness each day to ensure proper growth and health - so make sure the grow light goes off at the end of the day. The best way to ensure this is by using a simple timer set up with the grow light.

Timing of watering the flat depends on current growing conditions, so it is important that the class monitors the seedlings each day they are at school. If the surface of the growing medium becomes dry in the flat, make sure to mist or lightly water until the growing medium is saturated again.

Transplanting Seedlings Into Individual Containers

Once the milkweeds get their first true leaves and are about 1 - 2 inches in height, it is time to transplant them out of the flat and into separate containers (see photos at the top of page 5 for a reference of seedling size at transplanting time). The containers or pots (pictured to the right) will work well for arowing the milkweeds in. You will need to fill each pot/ container up with growing medium and pack it down. After they are filled, water them in very well, saturating all of the growing medium before you do any transplanting. In some cases you may choose to use cone-tainers (pictured to the left) for milkweeds and other native



© Drew Larsen



plants. Cone-tainers allow for good root development but take up less space than other pots/containers. If you are using cone-tainers, you will also need to fill them with growing medium and water them very well ahead of transplanting. To fill the cone-tainers, spread the growing medium out across the top of the cone-tainers in the rack - filling each cone flush with the top rim (see photo to the left). Once all the cone-tainers are filled up, use a wooden dowel to very firmly tamp the growing medium down into the cone-tainer. Do this for all the cone-tainers in the rack. You will then need to fill the conetainers to the surface again (a second time) with growing medium. Take the wooden dowel and very firmly tamp the growing medium down into the

cone-tainers again. The result should be cone-tainers that are filled most of the way up leaving about \(^{3}\)4 inch with no growing medium at the top of the cone-tainer. Add a little more growing medium and tamp it down again if you need to get it up to this level. Leaving the extra 3/4 inch space unfilled makes for easier watering and moisture retention as the cone-tainers can be filled with water and allowed to slowly soak in.

You will need to water the filled pots or cone-tainers before transplanting into them. Use a lighter mist (hose with a nozzle) to go over the pots or cone-tainers a number of times making sure the water soaks through. It is important to really saturate the growing medium in the pots or cone-tainers the first time so they don't dry out quickly after transplanting or have persistent dry patches. After watering, prepare the pots or cone-tainers for new transplants by taking a sharpie pen or similar sized object and press down into the growing medium to make holes that are about 2 inches deep in each pot or cone-tainer.

To prepare seedlings for transplanting into the pots or cone-tainers, remove a small handful of seedlings from the flat by digging down into the flat and carefully removing a clump of growing medium containing the roots. Approach this slowly and cautiously as to cause as little disturbance as possible to the roots. Carefully break apart the growing medium with your hands and begin pulling individual seedlings out of the clump with roots intact. Place an individual seedling into each hole you made in the pots or cone-tainers. Take care so that all of the roots of a seedling get down into the hole and that the seedling sits low enough so no roots are exposed above the growing medium. Then fill in the growing medium already in the pot or cone-tainer around the seedling, pressing down firmly so that it is stable and growing medium will not be easily disturbed when watering. See the photos below showing part of the transplanting process.



Carefully remove the milkweed seedlings from the flat one chunk at a time. This will make it easier to see the roots and allow you to carefully pull the seedlings apart from one another.



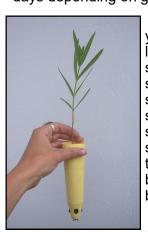
Milkweed seedlings after they have carefully been pulled apart with the roots intact and soil from the flat has been removed



After making holes in the growing medium in the pots or cone-tainers, place one milkweed seedling in each hole. Take care so that all the roots get down into the hole and that the seedlings sit low enough so no roots are exposed when you fill in the growing medium around the plants.

Care of Seedlings As They Grow

As the seedlings grow, make sure to monitor them to ensure they are getting watered properly and have enough access to light. You will want to monitor how moist the growing medium in the pots or cone-tainers is every other day or so. Once you notice the surface growing medium is starting to dry out, you will want to water. When watering, fill each pot or cone-tainer up to the top with water so it can soak in gradually. This should keep the plants happy for about 2-3 days depending on growing conditions like temperature.



To keep the seedlings growing properly, you will need to ensure they are getting enough light. Using the grow light properly during this stage will ensure the plants are healthy and sturdy. Not getting enough light can cause seedlings to become spindly with weakened stems. Again, it is best if the growing milkweed

seedlings get at least 12 hours of light from a grow light per day. As the seedlings continue to grow in the pots or cone-tainers, make sure to raise the grow light up to the proper distance (around 6 inches of space between the plants and an LED light or around 12 inches of space between the plants and a fluorescent light).

Fertilizing the milkweed seedlings is not typically necessary if they are growing in the pots or cone-tainers for 1.5 - 2 months or so and then

being transplanted outdoors. If for some reason you plan keep them in the pots or cone-tainers longer and delay planting until fall, for example, you may consider fertilizing them after 2-3 months in the pots or cone-tainers. A standard liquid fertilizer (organic or otherwise) can be used by watering it into the pots or cone-tainers per recommended instructions.

Preparing for and Planting Seedlings in a Restoration Site or Pollinator Garden

Hardening off the seedlings before planting outdoors is a critical step to ensuring these plants are successful in their new home. Hardening off is a process where you gradually allow the plants to get used to harsher conditions like bright sunlight, heat/cold and wind. They will encounter these conditions once planted outdoors and if they are slowly exposed to them ahead of planting, they will fair much better. Hardening off your plants should generally last around one week. Once the plants are large enough and have grown enough root mass (see photo to right), it is time to harden them off. Around one week ahead of your outdoor planting date, place the seedlings outside in direct sunlight – start by placing them outdoors for a half day or so and then after a couple days keep the plants outside day and night until it's time to be planted. Make sure to check on the seedlings while they harden R off as they may need watered a few times during this period.



Root development of a milkweed plant prior to planting it outdoors in a restored site

It is best to water the plants very well just ahead of planting so that the soil around the roots stays moist after planting for as long as possible. In a pollinator garden setting, it may be feasible to provide some water for newly planted seedlings. However, if the seedlings are planted in a larger habitat restoration site away from school, they will need to rely on moisture reserve from the growing medium and soil before it rains again.

Planting seedlings in the ground is a fairly straight forward process but a few simple pointers should be followed to ensure success. To get the seedlings out of the pots or cone-tainers, it is best to work around the sides, lightly pressing or squeezing in – this will help loosen some of the grow medium and roots from the side of the cone-tainer.





Removing a seedling from the cone-tainer

With one hand, hold the seedling upside-down and hold your other hand out flat (palm up) with space between your thumb and index finger. Firmly hit the edge of the top of the pot or cone-tainer on the side of your palm allowing the plant to go between your thumb and index



finger. You may need to firmly hit the edge of the pot or cone-tainer a few times before it starts to slide out. The roots should hold most of the grow medium in place as you remove the plant from the cone-tainer. It is recommended that adults handle this step in the planting process if cone-tainers are being used instead of pots, as it can be a little tricky to get the plants to slide out of the cone-tainers while not causing any damage to the plants or roots.



Students can plant the seedlings in the ground by simply using small garden trowels and their hands. It is important that students follow a couple instructions while planting to ensure success. First, they will need to make sure they dig a hole in the ground that is deep enough. The roots and growing medium on each seedling is probably about 4 - 5 inches long and they will need to dig at least that far down with a trowel. Make sure that students pile up the loose soil from the hole next to it so it can be used to fill in around the plants. Once the hole is dug, have the student place their seedling down into it. It is important that the top of the grow medium / root mass sits just under the top of the hole (or just slightly lower than being flush with the ground at the top of the hole). Then it is just a

matter of filling in around the plant with the loose soil from the hole. Make sure the plant stays upright as dirt is filled in around it. Spread a little dirt over the top of the growing medium on the seedling so that the roots are completely covered and then firmly press down the soil around it.

Planting Seedlings in a Restoration Site or Pollinator Garden

If students are planting seedlings into a larger habitat restoration site, additional instruction on where seedlings should be planted will likely be given by a coordinating biologist or manager of the site. Generally, students work together in small groups to plant their seedlings across the site. They may plant a few seedlings of a particular species together, maybe 5-10 feet apart, and then move on to plant others across the area.

Planting seedlings into a pollinator garden takes a little planning so that the area looks attractive and functionally fits with the needs of all outdoor spaces around the school. When

selecting a pollinator garden site, make sure it is in a mostly sunny or full sun area. Milkweeds and other native prairie plants need sunny conditions to thrive. Once a pollinator garden space is selected. you may consider creating a planting map of where you want milkweeds and possibly any other native plants placed. For reference, common milkweed can grow to be 3-5 feet tall and as it gets older it will spread out by creating new stems across the area. You will want to balance providing enough space for the plants to expand, with planting them close enough that they fill up the spaces and provide structure. Typically, seedlings can be planted about 2 feet from each other in a pollinator garden. It is recommended that some native grasses are planted between milkweeds and native wildflowers in a pollinator garden to provide more structure - like



A regal fritillary butterfly visits prairie blazing star in an ecological restoration site near Denton, NE

what you would see out in the prairie. There are a number of resources online, showing various pollinator garden designs that feature milkweeds. Please see page 9 for a list of some pollinator garden resources and sources for purchasing other native wildflowers and grasses in Nebraska.

One of the most exciting parts of growing milkweeds and native plants for pollinators is to see all the hard work pay off as you watch the plants grow. If students are planting their seedlings into a pollinator garden at the school, make sure to invite them to visit the site regularly and see how the plants are growing. If the seedlings are being planted in a larger habitat restoration site, consider allowing the students extra time on your trip out to the site to explore prairie habitat and the plants already growing there so they can see how their hard work growing seedlings with benefit the ecosystem. As perennials, milkweeds and other native plants take their time growing at the start - but watching them grow and observing insects or other visitors to the garden or habitat restoration over time will spark interest and get students excited about the natural world and the positive impact they can have by restoring critical habitat.



Common milkweed in bloom



A monarch butterfly visits swamp milkweed in an ecological restoration site in Nance County, NE



A yellow bumble bee (Bombus fervidus) male visits tall thistle in a restored site

Milkweed Species and other Native Plants that are Great for Pollinator Gardens and Restoration Sites

The following species attract a wide array of pollinators and are fairly easy to grow. Keep in mind the considerations noted below for planting (preferred soil conditions) and the different bloom times for different species. Consider planting a variety of native plants in a pollinator garden or habitat restoration that provide blooms throughout the growing season. Not only will this create a beautiful garden or landscape, it will ensure that nectar and pollen resources are available to pollinators at all times.

Please reach out to Prairie Plains Resource Institute with any questions regarding growing of native plants. The following page provides contact info to get in touch with any questions.

Common Name	Scientific Name	Bloom Color	Bloom Time	Planting Considerations
Common milkweed	Asclepias syriaca	Pink	Mid-June—early July	Fares well in a variety of soil types Slightly moist to dry soils
Butterfly milkweed	Asclepias tuberosa	Orange	Late June - July	Grows best in eastern NE or protected pollinator garden further west. Non-sandy soils
Sullivant's (prairie) milkweed	Asclepias sullivantii	Pink	Late June - July	Fares well in a variety of soil types Slightly moist to drier soils
Swamp milkweed	Asclepias incarnata	Pink	July	Fares well in a variety of soil types Favors wetter soils
Whorled milkweed	Asclepias verticillata	White	July	Fares well in a variety of soil types Moist to drier soil
Ohio spiderwort	Tradescantia ohiensis	Purple	Mid May - early June	Fares well in a variety of soil types, Eastern NE Moist to drier soils
Stiff goldenrod	Solidago rigida	Yellow	September	Fares well in a variety of soil types Slightly moist to drier soils
Purple prairie clover	Dalea purpurea	Purple	July	Fares well in a variety of soil types Mostly dry soils
Purple coneflower	Echinacea angustifolia	Pink	June	Fares well in a variety of soil types Favors dry soils
Bee balm	Monarda fistulosa	Light pink	Late July - Early August	Fares well in a variety of soil types Slightly moist to dry soils
Spotted Joe Pye weed	Eutrochium maculatum	Pink	Early September	Fares well in a variety of soil types Favors moist to wet soils
Baldwin's ironweed	Vernonia baldwinii	Purple	August	Harder soils to occasional fine/sandy soils Slightly moist to dry soils
Bracted wild indigo	Baptisia bracteata	Cream/white	May	Grows best in southeastern NE Hard, non-sandy soils that are drier
Buffalo bean	Astragalus crassicarpus	Pink	Mid - late April	Fares well in a variety of soil types Favors dry soils
New Jersey tea	Ceanothus americanus	White	Late June - early July	Grows best in southeastern NE Hard, non-sandy soils that are drier
Leadplant	Amorpha canescens	Purple	Late June - early July	Fares well in a variety of soil types Favors dry soils
Purple poppy mallow	Callirhoe involucrata	Dark pink/purple	June - July	Fares well in a variety of soil types, does well in sandy soils - somewhat moist to dry soils
Heath aster	Symphyotrichum ericoides	White	Early September	Fares well in a variety of soil types Favors dry to somewhat moist soils
New England aster	Symphyotrichum novae-angliae	Purple	September	Fares well in a variety of soil types Favors moist to wet soils
Willowleaf aster	Symphyotrichum praealtum	White/lavender	September	Fares well in a variety of soil types Favors moist to wet soils
Rough blazing star	Liatris aspera	Purple	Late August - early September	Fares well in a variety of soil types Favors dry soils
Dotted blazing star	Liatris punctata	Purple	Early September	Fares well in a variety of soil types Favors dry soils
Large flowered penstemon	Penstemon grandiflorus	Light purple	Mid - late May	Grows best in sandy, fine or some hard soils Favors dry soils
Foxglove penstemon	Penstemon digitalis	white	Late May - early June	Fares well in a variety of soil types Favors moist to drier soils
Black-eyed Susan	Rudbeckia hirta	Yellow	June - early July	Fares well in a variety of soil types Favors moist to drier soils
Pitcher sage	Salvia azurea	Blue/purple	September	Fares well in a variety of soil types Favors slightly moist to dry soils
Prairie ragwort	Packera plattensis	Yellow	Late April - mid May	Fares well in a variety of soil types Favors moist to dry soils
Showy goldenrod	Solidago speciosa	Yellow	Early—mid September	Fares well in a variety of soil types, does well in sandy soils, Favors dry soils

Resources for Your Pollinator Garden

Nebraska Statewide Arboretum website: https://plantnebraska.org/plants/ See "Gardening with Prairie Plants" PDF and "Native Prairie Plants of NE" PDF

Xerces Society pollinator resources:

https://xerces.org/sites/default/files/2018-05/17-052_01_XercesSoc_PollinatorPlants_Northern-Plains_web-3page.pdf https://xerces.org/bring-back-the-pollinators

UNL - Nebraska Pollinator Habitat Certification:

https://entomology.unl.edu/pollinator-habitat-certification

Monarch Gardens LLC: https://www.monarchgard.com/

Contact: Benjamin Vogt monarchgard@att.net

Prairie garden consulting and design

Prairie Plains Resource Institute:

Contact: Sarah Bailey

sarahppri@hamilton.net (402) 694-5535

Consulting on prairie / pollinator gardens and supplier of native plant plugs

Sources for Purchasing Native Wildflowers and Grasses in Nebraska

Note: local ecotype means seed or plants grown from seed that is harvested locally in various regions of NE, etc. from wild populations of native plants. These are not cultivar varieties and they are well adapted to localized growing conditions.

Prairie Plains Resource Institute

Contact: Sarah Bailey

sarahppri@hamilton.net (402) 694-5535 https://www.prairieplains.org/

Location: Aurora, NE

Local ecotype native plant plugs from hand harvested seed in central and eastern NE

Little Beaver Nursery & Gardens

Contact: Laura Dell-Haro

littlebeavernursery@gmail.com (402) 806-2923 https://www.littlebeavernursery.com/

Location: Beatrice, NE

Local ecotype native plant plugs from hand harvested seed in southeast NE and northeast KS

Prairie Legacy Inc.

Contact: Kay Kottas

info@prairielegacyinc.com (402) 310-8167 https://prairielegacyinc.com/

Location: Western, NE

Local ecotype seed sales and native plants from hand harvested seed in eastern NE

Midwest Natives Nursery

Contact: Nathan Duffy

(402) 682-2955 https://www.facebook.com/midwestnatives/

Location: Lincoln, NE

Native plants (some plants from local ecotype seed sources)

Nebraska Statewide Arboretum

Contact: Bob Henrickson

rhenrickson2@unl.edu (402) 472-7855 https://plantnebraska.org/store/

Location: Lincoln, NE

Native plants, shrubs and trees

Milkweed Growing Guide brought to you by



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Contact Information

Please reach out with any questions on growing milkweeds and other native plants. Contact:

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