

Vernalization

Seeds of most temperate plants need to be vernalized, which is a fancy way of saying that they need cold treatment. The best way to give the required vernalization is through stratification. To stratify seeds place them in cold, moist potting soil (sterilized soil is best but not required) in a dark place for several weeks or even months. Since most people would like to avoid placing potting soil in their refrigerators, an alternative is to place the seeds between moist paper towels in a re-closable plastic bag. This works well, and with the paper towel method there are fewer fungi and bacteria available to attack the seeds. After the vernalization period the seeds should be planted in warm (70°F), moist soil. Without vernalization / stratification, the percentage of seeds that germinate is usually low. Seeds from tropical plant species do not require this treatment.

ADDITIONAL PLANT SPECIES

The following plants can add diversity to your Monarch Waystation habitat as larval host plants and/or nectar sources for monarchs and other pollinators:

Annuals

Lantana (*Lantana camara*) - Nectar source. Varied-colored flowers bloom from summer to fall in temperate regions. Lantanas will grow 18-30 inches tall and 24 inches wide. Perennial in subtropical regions where it can grow much larger.

Pentas (*Pentas lanceolata*) - Nectar source. Pentas are a warm season annual that will bloom from summer to early fall. The flowers vary in color from white, pink, purple, to red. There are numerous varieties ranging from 10-36 inches in height.

Salvia (*Salvia* spp.) - Nectar source. Flowers range from blue to red. Many different annual and perennial species ranging from 12-30 inches in height. Most attract butterflies and bees; however, *S. coccinea* is especially attractive to butterflies.

Perennials - Herbaceous

Fennel (*Foeniculum vulgare*) - Host plant for black swallowtail butterflies (other hosts include parsley, dill, and rue). This herb grows to height of 4 feet.

Garden Phlox (*Phlox paniculata*) - Nectar source. Fragrant flowers range in color from white, pink to red, and blue to purple. Grows to 20-40 inches in height. Blooms during midsummer to fall and attracts Hawk moths as well as butterflies.

Ironweed (*Veronia* spp.) - Nectar source. Purple flowers bloom during the summer months. Ironweed will reach heights of 3-6 feet.

Mallow (*Malva* spp.) - Host plant for painted lady butterflies. Hardy perennial; produces pink to purple flowers during the summer into the fall. Grows to 3-4 feet.

Sedum (*Sedum* spp.) - Nectar source. Sedums are hardy perennials 18-24 inches in height that bloom in late summer and fall with pink to rosy-red flowers. The fall blooming *Sedum spectabile* attracts numerous butterflies and moths.

Vetch (*Vicia* spp.) - Host plant (sulphur butterflies) and nectar source (bees). Vetches have a viney growth form and purple pea-like flowers in early summer.

Perennials - Shrubs

Blue Mist Spirea (*Caryopteris* spp.) - Nectar source. Produces light-blue flowers in late summer to fall, 24-36 inches in height. Attracts a broad variety of insects.

Butterfly bush (*Buddleia davidii*) - Nectar source. Blooms continuously from early summer to fall. Color varies by variety from purple to white and yellow. Should be pruned back in the spring. Will grow to 6-8 feet tall. Reported to be invasive in several Atlantic coast states and in Washington and Oregon.

Buttonbush (*Cephalanthus occidentalis*) - Nectar source. White flowers will bloom for several weeks in midsummer. Can grow to a height of 6-10 feet. Requires a low spot or lots of watering. Highly attractive to many seldom seen insects.

Chaste tree (*Vitex*) - Nectar source. Summer to fall blooming shrubs and small trees 3-8 feet tall with white to blue flowers. Grows best in southern regions and may die back in the winter. Must be pruned in the spring before new growth begins.

Leadplant (*Amorpha canescens*) - Host plant for dogface butterfly. Purple flower spikes appear in early summer when plants reach 2-4 feet tall.

Wild Plum (*Prunus americana*) - Host plant (several butterfly species) and nectar source. White flowers in spring and yellow fall color on small trees of up to 15 feet in height. Can produce unwanted suckers from roots and form clones. The plums attract wildlife.

CERTIFY YOUR MONARCH WAYSTATION

To show that you are contributing to monarch conservation, you may choose to have your new or existing monarch habitat certified as an official Monarch Waystation. Upon certification your site will be included in the International Monarch Waystation Registry, an online database of Monarch Waystations, and you will be awarded a certificate bearing your site's Monarch Waystation ID number. Furthermore, you become eligible to display a weatherproof sign that identifies your monarch habitat as an official Monarch Waystation. This display helps convey the conservation message to those who visit your Monarch Waystation and may encourage them to create their own monarch habitat.

Additional information about the Monarch Waystation program, including certification, Monarch Waystation Seed Kits, brochures, and other support materials, is available on our website at:

www.MonarchWatch.org/ws

or by writing to us at: Monarch Watch, University of Kansas,
1200 Sunnyside Avenue, Lawrence, KS 66045

Good Luck with your Monarch Waystation!

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CREATING A MONARCH WAYSTATION



INTRODUCTION

To create a habitat for monarchs, we need to provide milkweeds for the larvae, nectar plants for the adults, and sufficient vegetation to provide shelter for the larvae, pupae and adults. Our Monarch Waystation Seed Kit is designed to enable you to create a habitat suitable for monarchs within the context of a traditional garden. If you wish to restore milkweeds to large areas such as roadsides, natural areas, field margins, etc., please visit us online for instructions that apply to these conditions.

Selecting Your Monarch Waystation Site

If you are establishing a new garden, two things to consider are sunlight and drainage. Butterflies and butterfly plants need full sunlight for at least 6 hours per day; therefore, you should choose a sunny, wind-sheltered area for your garden. Most of the plants we've selected for our Monarch Waystation Seed Kit grow best in well-drained soils – for example, areas with a slight slope or even raised beds. The exception is swamp milkweed, which tolerates saturated soils and can be planted in areas with poor drainage.

Organizing Your Monarch Waystation

Once you have chosen a site, measure its dimensions and make a plan of the layout of the garden. When deciding where to place each type of plant, consider whether it is an annual or perennial, its height, and blooming time. Tall plants should be placed in the back, followed by medium height plants and then shorter plants in the front. This will create a stepped effect to ensure all plants are visible from the

primary viewing area. If you create a garden that allows viewing from all sides, i.e., a rounded bed, place the tallest plants in the center, with decreasing heights toward the edges. It is usually easier to manage a garden in which the perennials are toward the back, or center, with the annuals closer to the edge. Most of the annuals used in butterfly gardens bloom throughout the growing season while some of the perennials have shorter blooming periods. By careful placement of the continuously blooming annuals and perennials, the garden can have the appearance of always being in bloom.

Specialized Areas in the Garden

Monarchs do not need the water sources and nectar/fruit feeding sites that are known to attract numerous other species. If you would like to add these features to your garden to attract other species, please visit us online for information.

GENERAL INSTRUCTION

The seeds in our Monarch Waystation Seed Kit can be planted in prepared beds outdoors or started indoors in flats. We recommend the latter approach since germination rates are generally higher indoors and it is easier to establish your garden with transplanted seedlings that are well-rooted and therefore more resistant to weather extremes and pests.

Germinating, Growing and Transplanting

Seeds can be started indoors in a greenhouse or under artificial lighting and then transplanted outdoors after the average date of last frost. If seeds are started indoors, allow 4-8 weeks growing time before transplanting. Plastic flats can be used to start the seeds. Fill the flats with a soil mix suitable for seedlings (most potting mixes are), thoroughly soak the soil, and let the excess water drain. Sow the seeds by scattering them on the soil surface 1/4-1/2 inch apart, and then cover with about 1/4 inch of additional soil mix. Gently mist the soil surface with water to dampen the additional soil mix that has been added. In an effort to improve germination rates, many gardeners place seeds in packets made from paper towels and soak them in warm water for 24 hours prior to planting.

After the seeds are sown in the flats, cover each flat with a clear plastic cover, plastic wrap, or a plastic bag to keep the seeds from drying out while germinating. Then, place the flat under grow lights, in a warm sunny window, or in a greenhouse. Most seeds will germinate in 7-10 days if the flats are maintained at 75°F. After the seeds have germinated, remove the plastic covering from the flats. Once the seedlings have emerged, the soil should be kept moist by watering the flat from the bottom. You can water from the bottom by placing the flat in a sink or a larger flat filled with 2 inches of water until moisture appears on the soil surface. The soil should be kept moist but some care is needed to keep the seedlings from getting too wet - such conditions contribute to fungal growth that can kill the young seedlings ("damping off"). Thinning (see below) can reduce damping off.

The plants are ready to be transplanted when they are about 3-6 inches in height. Before transplanting, acclimate the plants to outdoor conditions for a few days by placing them in a sheltered location during the day and then bringing them indoors at night. The seedlings should be planted 6-24 inches apart depending on

the species (check your seed packets or other reference for information). Newly transplanted plants should be watered frequently.

When to Plant

The seeds in the Monarch Waystation Seed Kit can be sown outdoors after the danger of frost has passed. Refer to the seed packets for special instructions on sowing the seeds. Keep in mind that seeds have a range of soil temperatures at which they will germinate. Also, remember that under sunny conditions, the soil temperatures can be much higher in the daytime than the ambient air temperatures you experience. Plant the seeds early since those planted late in the season may not germinate because of high temperatures. In addition, new seedlings from late plantings can "dry off" before they are even noticed.

Preparation of the Seedbed

If you are gardening for the first time, it is wise to consult with your local county extension agent to see if your soil needs to be enhanced (amended) with soil additives before planting the seeds.

A smooth, clump-free, weeded soil bed will virtually guarantee a successful start for germination and seedling establishment. If vegetation exists in the future habitat location, it can be removed by using a tiller or by hoeing the area. To reduce clumping, do not work the soil when it is wet. The soil should be worked to a fine consistency to ensure good soil-to-seed contact.

The seedbed should be kept moist until germination. As the seedlings become established, it is important to avoid watering too much or too little. A light watering each morning until roots are well established (7-10 days) should be sufficient.

MANAGEMENT

Dead-Heading

If you would like to keep your plants producing an abundance of flowers throughout the season, you should pinch back (or otherwise remove) old withering flowers, developing fruits, or seed heads.

Fertilizing

If your soil has been properly amended with additives recommended by your county extension agent, fertilization can be kept to a minimum. Water-soluble fertilizer can be periodically applied while watering with the use of canister that attaches to the end of a hose. Granular, time-release, fertilizers are another choice and offer two advantages: they only need to be applied once during the season, and you can avoid fertilizing plants that do poorly when fertilized.

Growing from Cuttings

Many perennials can be grown from cuttings, which can provide a way of quickly adding new species to your Monarch Waystation habitat. To start cuttings, cut the stems underwater, then coat the bottom of the stem with a strong rooting hormone. The stems should be placed in sand, vermiculite, or potting soil that is kept continuously moist. Cuttings can usually be transplanted in 6-10 weeks. Survival is best when cuttings are made from green stems (1/3 inch diameter) obtained from plants fertilized two weeks earlier.

Pest Control

Pest control in a butterfly garden or monarch habitat can be tricky. Avoid pesticides of any kind, regardless of how selective or safe they are. Most treatments for pest species will also negatively affect the caterpillars and butterflies you are trying to attract and protect. The good news is that with proper planning and maintenance, you will probably not have to control insects. When you plant your Monarch Waystation, you are creating an ecosystem that has its own system of checks and balances. The insect most likely to get out of balance in your monarch habitat is *Apbis nerii*, the orange-colored Oleander aphid, which feeds on milkweed. This species does not affect monarch larvae but can retard the growth of plants. The number of aphids can be reduced by spraying the infested plants with warm soapy water or even by blasting the aphids from the plants with water from a hose.

Thinning

When small seeds are sown, they are often mixed with sand or fine soil to have better seed distribution. However, this method does not completely prevent crowding of seedlings and thinning will be necessary. Thinning provides more space between plants, increasing the amount of light reaching the plants and the air circulation around them. Seedlings may need to be thinned several times beginning 1-2 weeks after germination. Without proper thinning, you will end up with weaker plants.

Watering

Watering is the most important aspect in maintaining your Monarch Waystation habitat. In order to get your plants established and have healthier plants, you need deep watering. Deep watering is accomplished with the use of a soaker hose or a sprinkler. The idea is to let the water soak deeply into the soil and then not to water for several days. Deep watering, followed by a lack of water in the soil near the surface, encourages roots to go deeper into the soil, enabling the plant to draw moisture from the soil more readily. This practice creates stronger and healthier plants. Generally speaking, your Monarch Waystation should be watered at least weekly for an hour or two at a time; however, the frequency of watering ultimately depends on weather conditions, soil type, plant species, and size of the plants.

Weeding and Mulching

After your seedlings emerge, the battle with the weeds begins. Weeds will compete with your seedlings for light, space, and soil nutrients. The key is to control weeds when they are small by cultivation and mulching. Carefully cultivate around or near plants with a hoe or pull the weeds by hand. If you weed your habitat regularly, maintenance will be less of a chore.

Mulching can begin after the seedlings are well established (about 1 month), preferably after cultivation. A variety of mulches are suitable for such gardens, such as wood chips, barks, leaves, straw, or peat moss. We recommend wood chips, which can sometimes be obtained free of charge through your city. Mulching can reduce the time spent on cultivation, helps retain soil moisture, and keeps the soil temperature relatively constant.

Storage of Seeds

Store dried seeds in a cool, dry place protected from mice and insects - a plastic bag (reclosable) or other container in the refrigerator works well.

- ***Gardening for Butterflies:*** From *The Butterfly Gardener's Guide*, by Pat and Clay Sutton: "Understanding the complexities of butterfly migration is a major aspect of butterfly watching, and attracting migrants is one of the greatest pleasures of butterfly gardening. They may be here today and gone tomorrow, but a healthy and diverse butterfly garden can be an important pit stop where migrating butterflies can refuel for their continuing journey. This is particularly true for Monarchs and other "two-way" migrants such as Red Admiral and Painted Lady, but important even for emigrants. Nectar-rich fall-blooming flowers, such as goldenrod, *Solidago*, provide migrating Monarchs with much-needed nutrients to sustain them during their long journey to Mexico. While it is vitally important to support conservation efforts in Mexico, gardeners along the migration route can help Monarchs by growing milkweeds. The plants are sought for egg laying by northbound females in spring and by ensuing generations of Monarchs through the summer, while milkweed nectar attracts many species of butterflies, including Monarchs. As the last generation of Monarchs for the year makes its arduous journey south in the fall, individuals can cover long distances in a day. They need an energy boost from nectar-rich flowers that bloom late in the season, such as joe-pye weed (*Eupatorium*), asters, goldenrods (*Solidago*), and sedums. At night, they look for safe roosting spots in the branches of trees and shrubs. Join with your neighbors to create safe-travel wildlife corridors of pesticide-free milkweeds, nectar plants, hedgerows, and trees."