

PREPARING A SITE AND PLANTING A MEADOW

By Vickie Wallace and Alyssa Siegel-Miles
UConn Extension

Several strategies can remove or kill unwanted existing vegetation within the confines of an area to be transitioned to meadow. **Time spent on site preparation, to rid the site of competing vegetation, leads to fewer weeds in the meadow in subsequent years.** Weed seeds can lay dormant for years. The soil surface should be left undisturbed, whenever possible, to minimize germination of weeds when exposed to sunlight at the soil surface. Less disturbance to the site also will maintain soil structure and retain organic matter.

To begin the process of creating and developing a meadow, first outline the shape of the intended meadow. Mowing or staking the perimeter edge should define the planting area. If there is a lack of vegetation, the outlined shape can be perimeter-staked with string or marked with field paint.

OPTIONS FOR BARE SOIL MEADOW ESTABLISHMENT

The establishment of bare soil is optimal for spreading a new seed mixture uniformly within the area. If the site has existing vegetation, that vegetation must be removed or killed, ideally in late summer or early fall. Once removed, the soil must then be prepared and planted immediately.

- If seeding is to be delayed until the spring, but the area must be tilled or cleared in the fall, a cover crop, such as winter rye or hairy vetch, can be planted to add nutrients to the soil. The cover crop must be harvested or turned under as part of final site preparation in the spring before seeding.
 - If preparing the soil in spring for a fall seeding, a cover crop, such as buckwheat, is recommended to keep spring annual weeds in check.
1. **If the area was originally part of a lawn, the sod can be cut into strips, undercut and removed** with a sod cutter, shovel or hand tools to a shallow depth of 1.5" (just deep enough to remove all turf rhizomes or stolons). Excised sod can be composted. Note that an area that has been in turf for many years may have a different pH compared to a non-turfed area. A soil test will identify the soil pH of the intended meadow area. Plants native to CT generally prefer acidic soils. Based on soil test results, it may be necessary to amend the soil for meadow plant establishment.
 2. **The area can be scalped/mowed very low to the ground, and the soil can be tilled.** However, tilling of the soil will bring dormant weed seeds to the soil surface, and when exposed to sunlight, they will germinate and compete with meadow flowers. Till the soil (in spring or fall) when the soil is at least 60 degrees F and the soil easily crumbles. Tilling may need to be repeated multiple times. Measures should be taken to minimize soil erosion by wind and water in and around the meadow site.
 3. **Treat the undesired existing vegetation in the meadow area with a non-selective herbicide, such as glyphosate (e.g., Roundup) or pelargonic acid (e.g., Scythe), following label directions. All herbicides, synthetic or organic, require proper handling.** A landscape operator that has a valid pesticide license should be hired to apply herbicides, whether synthetic or organic. Once plants have died or vegetation is injured, mow existing vegetation as low as possible. Remove excess vegetation and debris before seeding into the site to encourage good seed to soil contact. If excess vegetation is not removed, dispersed seed can be lodged in debris, rather than reaching the soil.



Buckwheat in flower (top) and a field planted with several mutually beneficial cover crops – buckwheat, winter rye, and clover (bottom).

- Minimum-risk burndown products may severely damage or kill the plant shoot, often with little damage to the roots of established perennial weeds. Best results occur on juvenile or tender plants, before permanent roots have established. Use of these non-selective, burndown products can also be considered for use in turf areas, taking into account the same limitations.
- Herbicides can be a useful approach on slopes where site preparation is a challenge.



An area that has been prepared for planting with glyphosate for planting a small meadow area.

4. **Smother existing vegetation with layers of organic materials or black plastic.**

- **Organic materials** can include newspaper (multiple layers thick), cardboard, plywood, or a 6 inch layer of seasoned wood chips. Cover newspaper or cardboard with 2-4 inches of weed free mulch or straw, preferably towards the end of spring. This method works well for a small to medium sized area. It is inexpensive, does not disturb weed seeds, controls erosion, adds organic matter to the soil, and minimizes site disturbance.

- **Black plastic** can be used in small or medium sized areas (less than a few thousand square feet) to solarize or kill plants. Disposing of the plastic after the solarization process may be problematic. This non-chemical approach requires **advance seasonal planning**, as a longer duration of time to completely kill unwanted vegetation is necessary. Best results occur if the **cover is applied in late spring and kept in place for at least 3 months**. Once the smothered plants are dead, remove the cover used to kill the vegetation. Immediately rake and remove dead vegetation with minimal disturbance to the soil and broadcast or slice seed into the soil. If planting with plugs or container plants, organic materials can be left in place and plants can be placed between or in holes.

OPTION FOR WORKING WITH AND AROUND EXISTING VEGETATION

It is possible to allow a meadow of existing plant communities to naturally emerge and develop on site, but this method will require a lot of attention and persistence for desired results. To optimize the establishment of the meadow with minimal tilling, minimize the growth of unwanted weeds. Minimal disturbance of the site is crucial to minimize weed encroachment and reduce initial labor and other maintenance costs. Plants can be added or removed as the meadow evolves. Over time, many wildflowers, such as goldenrod, aster, ironweed, Joe Pye weed, and milkweed, will appear on their own if a seed bank of these species exists in the soil. It is important to maintain a population of desired species, remove the most unwanted and aggressive species by mowing once in late winter or early spring, and consistently “edit” the site as needed. During the growing season, it is critical to discard seed heads of unwanted species before seeds mature, remove invasive plants, and add plugs or containers of native meadow plants as time or budget allows. Active, diligent “editing” maintenance may require persistent effort for several years.

PLANTING

Meadows can be planted by seed or established plugs. However, it is not recommended to establish a meadow stand by both seed and plugs at the same time, as the management tactics are distinct for each method. Complications often arise from the different management tactics required for juvenile and mature plant establishment.

PLANTING BY PLUGS

Plugs are typically used in small garden settings of under 1000 feet. Plugs are small plants and, in mass, are more economical to plant than larger container grown plants. Plugs are either started from seed and sown into small greenhouse flats, or are divided, pre-rooted pieces of more mature plants.

Plugs offer versatility, as they can be intermingled with larger-sized potted plants for a variation in establishment maturity that provides a realistic look to the stand. A benefit of using plugs and container plants is that the meadow can be designed with more detail compared to a meadow established by seed. Plugs are more expensive, more labor-intensive to install, and require more irrigation during establishment than planting

a seed mixture. (Plugs may be a challenge for homeowners to locate for purchase, as they are more frequently sold to wholesale buyers, while container plants are widely available.)



A flat of grass plugs.

- In most of the northeast, the best time to establish a meadow using container plants or plugs is in the spring. In Connecticut, mid to late April (or very early into May) is usually the ideal time to sow plugs. **Planting in early spring allows a full growing season for plants to establish, mature, and set seed.** It is imperative, particularly if irrigation is limited, that plugs be planted as early in the growing season as possible to establish root growth before the onset of hot summer weather.
- Typically, two or more plugs/ft.², on 6-8 inch centers, is recommended.¹ Planting equipment can be a trowel, bulb planter, dibble (for sandy, loamy soils only), or a soil auger. An auger bit attached to an electric drill can be used for quick and easy planting.
- After planting, mulch the area with a couple of inches of composted leaf mulch, shredded bark, or straw.
- For at least two weeks, water plugs thoroughly once every few days to supplement rainfall. Plugs and small container plants have limited root systems and need to be watered more frequently than larger plants.
- Plugs also may require the addition of some fertilizer at the time of planting, as many were grown in a greenhouse under pampered conditions. A starter fertilizer will help minimize transplant shock as the plugs acclimate to the new location.

PLANTING BY SEED

The most economical way to establish a meadow for larger, open areas is to plant by seed. **Manual seeding** is best done on small areas, or on sites where it is difficult to access with equipment. Once seeded, a light layer of mulch or straw can be dispersed over the area to help retain soil moisture and provide some shade for tender emerging seedlings. **Mechanical seeding, hydroseeding and terraseeding** are best for large areas, of 1/2 acre or more in size. Homeowners require the services of a professional landscape contractor for these seeding methods.

Considerations of planting by seed:

- There is less control of the aesthetic design and precise plant placement. The design depends on many variables: variation in successful germination, impact of rainfall or irrigation, and the viability and adaptability of the components of the seed mixture to the site. The aesthetic design also will evolve over time as certain species survive and thrive, while others may not.
- **Plants established by seed will require a longer duration to germinate, establish, and mature** than those planted from plugs. Be aware that each species will require a different length of time to germinate, and some perennial plants may not bloom for two or three years. The stand will not look like a mature meadow right away.
- More frequent maintenance is needed in the first two years of establishment, to control aggressive weeds and to give the desired species space and light to thrive.
- It may be difficult to distinguish young weeds from young meadow seedlings, **so correct weed identification is critical** before removal of any plant. View pictures of common juvenile weeds to support identification of desired meadow plants consistently during first and second year maintenance.
- **Late summer and early fall are recommended planting times for meadow grasses and perennials.** Sowing can be done in the spring after soils warm, but there will be an ever-present and constant challenge to reduce grassy weeds.
- Avoid the use of pre-emergent herbicides, which may affect the germination of meadow grasses and flowers.

Water is critical for successful germination and establishment of the stand. Irrigation needs to be available for the germination of all species for the duration of establishment. Each species has a different time requirement for germination and establishment. Water as frequently as needed during the first six to eight

¹ *Urban and Suburban Meadows: Bringing Meadows to Big and Small Spaces*, Catherine Zimmerman, 2010.

weeks to keep the soil surface moist. Irrigate lightly to minimize puddling or any potential runoff from the site, particularly on any uneven, sloped surface.

In general, the site needs irrigation to ensure the germination of the desired plants. If irrigation is unavailable, the population of the stand will be influenced by the amount of rainfall events during establishment. If supplemental irrigation is not available at the meadow site, then late summer or early fall may be a more appropriate time to seed the meadow, to reduce competition from annual grassy weeds. If planting in late summer or early fall, soils should be warm enough to encourage seed germination. Be aware, some desired meadow species are frost sensitive, and need to be established well before the onset of frost.

For summer annuals incorporated in a meadow, plants need the appropriate time to establish, produce and mature seed, therefore spring planting is preferable. If the appropriate time for establishment is not available in spring, then a dormant seeding in late fall, after the ground has frozen, may provide another seeding opportunity. Existing vegetation must be mowed and cleared before the first frost, to help ensure good seed/soil contact of the dormant seeding. Seed mixtures generally have a recommended seeding rate determined by the composition of the species in the seed mixture. However, this seeding rate can be increased if there is a concern that the population stand may be impacted by a late seasonal start or adverse environmental conditions.

Seeding Considerations:

- Generally, seed at a rate of ¼ lb. pure live seed (PLS) per 1,000 square feet.² Pure live seed is used to determine the correct seeding rate, as there is great variation in the purity of many species of native grasses and seeds. Often there is additional chaff and debris with harvested native seeds. This influences the amount of actual seed available in a seed mix.
- Due to the extreme varying size of the multiple seeds in a mixture, addition of an inert material (i.e., sawdust, vermiculite, peat moss, or perlite) is recommended to mix and aid in the dispersal of the seed. Nurse grass seeds also aid in dispersal.
- After the seedbed has been properly prepared, lightly rake the soil, and broadcast the seed and its inert carrier. Spread half of the mixture on the soil surface in one direction, and sow the other half of the seed mixture in the opposite direction.
- A roller can be used to firmly set the seeds onto the soil surface of the newly seeded area.
- Once seeded, the soil surface can be stabilized with weed-free straw mulch, erosion blankets, or hydromulch. This will prevent erosion and ensure some shade and protection as seedlings emerge.
- If possible, irrigate to keep the soil surface moist and enhance germination. Because there is a wide variation in the germination times for all seed species in a seed mix, continued irrigation is necessary until the majority of all seeds have germinated. Irrigate early in the morning, 10-15 minutes for 2-3 weeks.
- Late in the fall of the first year (if seeding was done in spring), after the field has been mown, mulch the area with 1" of clean leaf mulch to keep the establishment of winter annuals to a minimum. Refresh the mulch again in the spring to reduce the germination of annual grassy weeds.



Tiny seedlings emerge after germination.

MEADOW PLANTS AND SEED SOURCES:

American Meadows, (877) 309-7333; www.americanmeadows.com
Broken Arrow Nursery, Hamden, CT; (203) 288-1026; www.brokenarrownursery.com
Colonial Seed, East Granby, CT; (413) 355-0200; <http://colonialseed.com>
Earth Tones Native Plant Nursery, Woodbury, CT; (203) 263-6626; www.earthtonesnatives.com
Ernst Seeds, Meadville, PA; (800) 873-3321 (814) 336-2404; www.ernstseed.com
Harts Seed, Wethersfield, CT, 1-800-326-HART; hartseed.com
Natureworks, Northford, CT, (203) 484-2748; <http://naturework.com>
New England Wetland Plants, Amherst, MA; (413) 548-8000; <http://www.newp.com>
Perennial Harmony Garden Center, East Lyme, CT; (860) 440-3653; www.perennialharmony.com
Site One Landscape Supply, www.siteone.com
Valley Green, Inc., (413) 533-0726; valleygreenusa.com

For more information, contact:
Vickie Wallace, UConn Extension
Extension Educator
Sustainable Turf and Landscape
Phone: (860) 885-2826
Email: victoria.wallace@uconn.edu

Updated April 2017

UConn is an equal opportunity program provider and employer. © UConn Extension. All rights reserved.

² *Urban and Suburban Meadows: Bringing Meadows to Big and Small Spaces*, Catherine Zimmerman, 2010.