

ESTABLISHING AND MAINTAINING ORNAMENTAL FLOWER MEADOWS FOR LOW MAINTENANCE SITES



University of Maryland
Turfgrass Technical Update
TT-70 October 2003

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Over the past decade, the use of flowering plants for low-maintenance ornamental groundcover has become an established landscaping practice. Many species included in commercially packed 'wildflower' seed mixes have been evaluated for use in Maryland.

Although the availability of seed of flower species suitable for meadows has increased significantly over the years, much of this increase involves native species that were not previously grown for seed, but which have recently been domesticated. The seed of many of these newly available native species are used in environmental restoration projects, but because of high cost, slow establishment rates, or low ornamental value, many are not appropriate for use in ornamental flower meadows.

For ornamental low-maintenance flower meadows in Maryland, a mixture of native, European, and Asian species usually provides the most satisfactory results. The species recommended in this publication are well adapted to the climate and soils of Maryland, and are usually available at modest cost. Many of these species provide excellent color, variety, and length of bloom, as well as shelter and food sources for birds, butterflies, beneficial insects, and small mammals.

Flower species and the rates recommended in Maryland for Fall or Spring seeding are shown in Tables 1 & 2.

With these species, the first season after seeding is usually the most colorful, with annual species tending to dominate the mix. In following years, perennial species provide most of the color, while the annual species typically decline and fail to return.

When selecting flower species for a seed mix, refer to the comments following each species. For permanent flower meadows it is best to include most or all of the perennial species listed, and then include annual species based on the season of seeding, their color and ability to return in following years.

When purchasing packaged flower seed mixes, bear in mind that both the components and composition of these mixes may vary widely from those shown in Tables 1 & 2.



Construction site for ornamental flower meadow

KEY POINTS

Careful site preparation, including removal of existing vegetation, tilling, and correction of soil pH and nutrient deficiencies is required before flower meadows are seeded

Flower meadow establishment is best when seeding is completed from 15 Sept - 31 Oct. (Fall) or 15 March - 31 April (Spring).

If irrigation is not available, flower meadows should not be seeded from 1 May - 15 Sept.

Species selection and seeding rates are critically important for successful long-term flower meadow establishment.

Flower seed mixtures must be formulated to allow appropriate seeding rates for each species included in the mix.

If possible, purchase a flower seed mix that conforms to these recommendations.

Ornamental flower meadows must receive weed control and mowing in order to provide attractive groundcover.

Table 1: Flower Meadow Species for Fall Seeding (15 September to 31 October)

| Pure Live Seed (PLS) in Pounds per Acre | | | | |
|--|--------------------|-------------------|---------------------|--|
| Perennials | Target Rate | Good Range | Don't Exceed | Comments: Native region, color, persistence |
| Perennial Gaillardia | 2.00 | 1.50 - 2.50 | 4.00 | North America. Red, yellow. Long-lived. |
| Purple Coneflower | 1.80 | 1.35 - 2.25 | 3.60 | North America. Purple. Long-lived. |
| Lanceleaf Coreopsis, dwf./std. 50/50 mix | 1.60 | 1.20 - 2.00 | 3.20 | North America. Yellow Long-lived. |
| Dame's Rocket | 1.50 | 1.10 - 1.90 | 3.00 | Eurasia. Purple. Short-lived, persists |
| Siberian Wallflower | 1.50 | 1.10 - 1.90 | 3.00 | Eurasia. Short-lived, persists. |
| Sweet William | 1.30 | 1.00 - 1.60 | 2.60 | Eurasia. Red, pink, white. Long-lived. |
| Black-eyed Susan | 0.40 | 0.30 - 0.50 | 0.80 | Md. flower. Yellow. Short-lived, persists. |
| Shasta Daisy | 0.30 | 0.22 - 0.38 | 0.60 | Eurasia. White. Long-lived. |
| New England Aster | 0.20 | 0.15 - 0.25 | 0.40 | North America. Purple. Long-lived. |
| Yarrow | 0.10 | 0.07 - 0.13 | 0.20 | Eurasia. White or pink. Long-lived. |
| Annuals | Target Rate | Good Range | Don't Exceed | Comments: Native region, color, persistence |
| California Poppy | 1.80 | 1.35 - 2.25 | 3.60 | California. Orange. Persists. |
| Baby's Breath | 1.20 | 0.90 - 1.25 | 2.40 | Eurasia. White. Rarely returns. |
| Queen Anne's Lace | 0.60 | 0.45 - 0.75 | 1.20 | Eurasia. White. Returns for years. |
| Cornflower, dwarf blue | 0.60 | 0.45 - 0.75 | 1.20 | Eurasia. Blue. Often returns for years. |
| Pink Catchfly | 0.50 | 0.38 - 0.63 | 1.00 | Eurasia. Pink. Rarely returns. |
| Lemon Mint | 0.40 | 0.30 - 0.50 | 0.80 | Mexico. Pink. Often returns. |
| Corn Poppy | 0.30 | 0.22 - 0.38 | 0.60 | Eurasia. Red, pink, white. Rarely returns. |
| Baby Blue-eyes | 0.20 | 0.15 - 0.25 | 0.40 | California. Blue. Rarely returns. |
| Plains Coreopsis, dwf./std. 50/50 mix | 0.10 | 0.15 - 0.25 | 0.40 | North America. Yellow, red. Often returns. |
| Forget-me-not | 0.10 | 0.07 - 0.13 | 0.20 | Eurasia. Blue. Often returns for years. |
| Ox-eye Daisy | 0.10 | 0.07 - 0.13 | 0.20 | Eurasia. White. Often returns for years. |

Table 2: Flower Meadow Species For Spring Seeding (15 March to 31 April)

| Pure Live Seed (PLS) in Pounds per Acre | | | | |
|--|--------------------|-------------------|---------------------|---|
| Perennials | Target Rate | Good Range | Don't Exceed | Comments: Native region, color, persistence |
| Perennial Gaillardia | 1.80 | 1.35 - 2.25 | 3.60 | North America. Red, yellow. Long-lived. |
| Dame's Rocket | 1.80 | 1.35 - 2.25 | 3.60 | Eurasia. Purple. Short-lived, persists. |
| Siberian Wallflower | 1.50 | 1.10 - 1.90 | 3.00 | Eurasia. Orange. Short-lived, persists. |
| Lanceleaf Coreopsis, dwf./std. 50/50 mix | 1.20 | 0.90 - 1.50 | 2.40 | North America. Yellow. Long-lived. |
| Purple Coneflower | 1.00 | 0.75 - 1.25 | 2.00 | North America. Purple. Long-lived. |
| Sweet William | 0.90 | 0.67 - 1.13 | 1.80 | Eurasia. Red, pink, white. Long-lived. |
| Shasta Daisy | 0.40 | 0.30 - 0.50 | 0.80 | Eurasia. White. Long-lived. |
| Black-eyed Susan | 0.30 | 0.23 - 0.38 | 0.60 | Md. flower. Yellow. Short-lived, persists. |
| New England Aster | 0.20 | 0.15 - 0.25 | 0.40 | North America. Purple. Long-lived. |
| Yarrow | 0.10 | 0.11 - 0.19 | 0.30 | Eurasia. White, pink. Long-lived. |
| Annuals | Target Rate | Good Range | Don't Exceed | Comments (Native region, color, persistence) |
| California Poppy | 1.40 | 1.05 - 1.75 | 2.80 | California. Orange. Persists. |
| Cornflower, dwarf blue | 1.00 | 0.80 - 1.25 | 2.00 | Eurasia. Blue. Often returns for years. |
| African Daisy | 0.80 | 0.60 - 1.00 | 1.60 | South Africa. Yellow. Rarely returns. |
| Pink Catchfly | 0.70 | 0.53 - 0.88 | 1.40 | Eurasia. Pink. Rarely returns. |
| Queen Anne's Lace | 0.60 | 0.45 - 0.75 | 1.20 | Eurasia. White. Often returns for years. |
| Sulphur Cosmos | 0.40 | 0.30 - 0.50 | 0.80 | Mexico. Orange. Rarely returns. |
| Lemon Mint | 0.40 | 0.30 - 0.50 | 0.80 | Mexico. Purple. Often returns. |
| Cosmos | 0.30 | 0.23 - 0.38 | 0.60 | Mexico. Red, pink, white. May persist. |
| Baby Blue-eyes | 0.20 | 0.15 - 0.25 | 0.40 | California. Blue. Rarely returns. |
| Plains Coreopsis, dwf./std. 50/50 mix | 0.20 | 0.15 - 0.25 | 0.40 | North America. Red, yellow. Often returns. |
| Spurred Snapdragon | 0.20 | 0.15 - 0.25 | 0.40 | Eurasia. Purple, Red, yellow. Rarely returns. |
| Forget-Me-Not | 0.15 | 0.11 - 0.19 | 0.30 | Eurasia. Blue. Often returns for years. |
| Ox-eye Daisy | 0.15 | 0.11 - 0.19 | 0.30 | Eurasia. White. Often returns for years. |

Grasses

Flower seed mixes are sold with their component species listed as a percentage, and must include germination rates for each species.

Thus, 1.0 lb. of a mix with 5% Cosmos will contain 0.05 lb. of Cosmos seed. If the Cosmos seed has a 75% germination rate, then 1 lb. of the seed mix will have $0.05 \times 0.75 = 0.0375$ lb. of pure live Cosmos seed.

It is important that the actual seeding rate be calculated as a check for each species included in the mix, because each species must be seeded at an appropriate rate. This is a critically important factor in the success of a flower meadow, but is often neglected.

Although some reduction in seeding rates may allow a satisfactory display for large areas (sites over 0.5 acre), many seed mixes include too much of one or more species, which can cause serious problems. Therefore, the suggested 'Target Rate' is strongly recommended for each species. Planting rates over the 'Don't Exceed' rate should be avoided, especially for vigorous species such as cosmos, shasta daisy, and cornflower.

In the case of cosmos, the 'Target Rate' for a Spring seeding is 0.30 pounds per acre, with an acceptable range of 0.23 to 0.38 pounds per acre, and a 'Do Not Exceed' rate of 0.6 pounds per acre.

If our sample seed mix included 0.0375 pounds of pure live cosmos seed per pound, then 8 pounds of the sample seed mix would be needed per acre to hit the 'Target Rate' for cosmos, and anywhere from 6 to 10 pounds of this mix could be seeded per acre with generally acceptable results.

But if more than 16 lbs. of this mix were used per acre, it would be more than the 'Do Not Exceed' rate for cosmos ($16 \text{ lbs.} \times 0.0375 = 0.6 \text{ lb.}$ of cosmos seed).

Purchase a Recommended Flower Meadow Seed Mix

1. If the seed mix includes recommended species with seeding rates of all component species within the 'Good Range', then satisfactory performance is likely.
2. If the mix is composed largely of non-recommended species or if the seeding rates vary widely from the 'Good Range', then poor performance is likely.
3. To reduce the need for detailed calculations, the purchaser is encouraged to obtain flower seed mixtures that are guaranteed to conform with TT-70 when seeded at rates suggested by the seller.

The use of grasses in ornamental flower meadows is a matter of preference. Some feel that grasses make a unique aesthetic contribution to a meadow, while others are indifferent. Because grasses are often competitive and low in ornamental value for much of the growing season, only a few species are appropriate for this use.

Little bluestem (*Schizachyrium scoparium*) and broomsedge (*Andropogon virginicus*) are grasses that grow primarily in the late summer. Both reach a maximum height of about three feet, and turn an attractive orange color in the Fall. These species may be seeded together or separately, but no more than 0.25 pounds of seed per acre should be sown.

Hard fescue (*Festuca trachyphylla*) and sheep fescue (*Festuca ovina*) are also appropriate for flower meadows. Both species grow primarily in the spring and early summer when they achieve a maximum height of about 2 feet. Although sheep fescue has an attractive bluish color all year, neither of these species are noted for their fall color, and both tend to form a tough low-growing sod over time. These species may be seeded together or separately, but no more than 1.0 pounds of seed per acre should be sown. In very hot or dry sites, the total seeding rate of these grasses may be increased to 5.0 pounds per acre to ensure permanent groundcover for soil erosion protection. If the site is returned to regular mowing, these grasses will form a satisfactory low maintenance turf.

At this time, no other grasses are recommended for use in ornamental flower meadows.

Site Preparation and Seeding

In order to grow vigorously and flower over an extended period, most flower species require full sun exposure. Most also prefer well drained soils with moderate fertility. Poor performance with these species is likely in shaded sites, or sites that are excessively wet or dry.

Unless a soil is very acid or deficient in specific nutrients, an application of fertilizer or limestone for flower meadow seeding is not recommended. Sites with a pH below 5.0 will require amendment with limestone. A pH of 6.0 to 7.0 is ideal. For best results, the soil should be tested by a soil testing service, and the modifications recommended by the testing service should be made before seeding operations are begun.

Contact your local seed seller or the Maryland Cooperative Extension for further information about soil testing services.

Careful site prep is essential for the long term success of flower meadows. Areas chosen for seeding must be cleared of all vegetation. The elimination of existing vegetation may require significant expenditure of time and energy, but the effort will ensure superior flowering and appearance in the coming years. Failure to remove vegetation prior to establishment may limit the attractive life span of the seeding to as little as a few months.

The use of a non-selective herbicide such as glyphosate (Roundup Pro™, and others), followed by rototilling, is recommended. A second application of glyphosate and/or retilling is frequently necessary for the removal of more aggressive perennial weeds.

An alternative to this method involves the use of a wildflower or grassland seeder, which is a specialized disk-seeder that allows seeding in sites that have received a herbicide treatment, but which have not been tilled. Several of these seeders have been developed, but all are costly and require the use of pure (unmixed) seed. Whether these seeders reduce weed competition under Maryland conditions has not been verified, but they do eliminate the cost of tilling and much of the potential for soil erosion.

The seeds included in flower meadow seed mixes vary greatly in size and shape, and consequently are difficult to spread with most turfgrass seeders or spreaders. Broadcasting by hand or with a rotary-type spreader is made much easier, however, when a non-toxic bulking agent such as calcined clay is mixed with the seed. Kitty Litter™ is a calcined clay product that works well in this application. A good ratio is 4 pounds of calcined clay per pound of seed. Drop-type spreaders usually do not handle flower seed mixtures effectively.

After the seed is spread, a light raking (less than 1/4" deep) followed by rolling will improve seed to soil contact and enhance rapid and strong germination. The area should receive a thorough watering after seeding and be kept moist for 2 to 4 weeks thereafter.

If natural rainfall is insufficient, the use of irrigation to achieve a thoroughly moist soil is recommended. Since the overseeding of poorly established flower meadow seedings is rarely beneficial, every effort should be made to establish a strong stand during this period.

Seeding undertaken at cooler times of the year will conserve water and enhance seed establishment. Seeding from 15 September to 31 October (Fall) or from 15 March to 30 April (Spring) is recommended for central Maryland. Successful seeding during the summer months (1 May - 15 September) is rarely possible because of drought and weed competition; unless irrigation is available, flower meadows should not be seeded during the summer months.

Depending on the seeding season, some adjustment of the composition and seeding rate of species in the mix may be necessary for economy and best results. Many flower species are sensitive to the season of seeding, and some will fail when others are at their best.

Hydroseeding of flower meadow seed mixtures is not as dependable as the establishment methods previously discussed. The use of fiber mulch in the hydroseeding mix can significantly reduce seedling emergence and establishment.

If hydroseeding methods are used, no more than 150 lbs of fiber mulch per acre should be included in the seed slurry. If a soil erosion mulch is required, then straw should be blown over the seed in a separate operation, so that the straw is uniformly applied to a maximum depth of about 2 inches.

Maintenance

Once a flower meadow is established from seed, routine irrigation is not necessary. Watering deeply once or twice in time of drought, however, is helpful to maintain flowering and live green groundcover of the meadow. Routine applications of fertilizer and limestone to mature flower meadows are not recommended. Correction of soil pH and fertility deficiencies should be completed before seeding.

Weed encroachment is one of the most important factors in the decline and failure of flower meadows. Weeds are a problem because they reduce the growing space of more desirable flowering plants. Although many weeds have some ornamental value, many colonial weeds that spread by rhizomes often have little ornamental value and can be very difficult to remove once they have become established.

Perennial colonial broadleaf weeds such as Canada thistle, dogbane, and certain goldenrods should be removed with appropriate herbicides or digging when they are first observed. Every effort to remove these species should be undertaken in the first year after planting, as they do not tend to invade mature flower meadows. However, if their growth and spread is not checked in the first year, they will tend to dominate the meadow to the detriment of the flowers.

Perennial non-colonial broadleaf weeds that grow less than 2 feet tall such as dandelion, plantain, and dock are rarely troublesome, and warrant little effort for their control. Taller broadleaf weeds such as pokeweed may be removed by digging or with appropriate herbicides if they are very numerous or objectionable. Tree saplings should be removed before they get large enough to damage mowing machinery.

Perennial bunchgrass weeds such as tall fescue, orchardgrass, and may be removed by hand or spot-treated with appropriate herbicides, but unless very numerous, they are rarely objectionable. Perennial colonial grasses such as reed canarygrass and Johnsongrass must be controlled when they appear with appropriate herbicides; hand pulling is rarely effective, and their aggressive pattern of growth is poorly tolerated by ornamental flower species.

Annual grass weeds such as crabgrass and goosegrass can often be safely ignored unless they are unusually abundant or if the seeding was established in the Spring, in which case they should be controlled with appropriate herbicides. Larger annual grasses such as giant foxtail or barnyard grass should be controlled with herbicides or removed by cutting or pulling. All of these grasses should be controlled before they outcompete desirable species or go to seed. Annual grasses do not tend to return in large numbers after the first or second year unless the site is disturbed or if the desirable species have not made a thick groundcover.

Annual broadleaf weeds such as ragweed, marestalk, lambsquarters, and pigweed should be pulled out by hand, or their stems cut low to the ground before they set seed.

Mowing in November or December to a height of 7-10 inches with a rotary or flail mower is recommended. The cuttings should be dispersed so that overwintering

plants are not matted under thick clumps of debris. Fine and thinly spread cuttings tend to deteriorate rapidly, and will not interfere with spring regrowth. Mowing at this time tends to encourage desirable perennial groundcover, as many flower species grow actively in the winter months. As a result, weeds that germinate in the spring will be reduced.

Mowing may be delayed for several months if desired, and this tends to increase the habit value of the planting by providing food and shelter for wildlife and beneficial insects. However, the mouse population may also be increased, and unmowed flower meadows tend to collect wind-blown litter during the winter months when they are least attractive. Mowing should not be performed after March, when flower meadows begin to grow vigorously and develop flowers.

With proper care during establishment and reasonable efforts at weed control, a flower meadow may be kept attractive for many years, perhaps indefinitely. However, the composition of the planting will change with time, and many grass and broadleaf species will become permanent members of the meadow.

The point at which a full renovation is warranted is entirely dependent upon the site, the weeds that have invaded, and the needs of the property owner. As long as mowing is performed at least once every two years, the meadow will not revert to woodland.

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