

wanted to know about the soils of Wisconsin, it is in this book. It covers everything from the factors forming Wisconsin soils, to their properties, to covering the nine different soil regions. In addition to this, there are large numbers of maps, pictures and profiles to aid the reader. In my opinion, it is one of the more interesting soils books I have read in a long time.

During the course of the last three articles we have

covered many different books on the topic of turfgrass management and golf courses. The intention of this was to make the readers aware of the amount of written material concerning our profession and hopefully guide you to some of the better books available to us. I hope in the very least that your interest has been stimulated and that they will serve as some type of guiding light to finding that perfect book.

## The Other Plants

### *Chrysanthemum Culture on the Golf Course*

By Dr. Lois Berg



The chrysanthemum is truly the 'Queen of Autumn.' If cultivars and planting locations are carefully selected, mums can be permanent additions to the landscape, requiring less work than most other herbaceous plants. This flower deserves consideration on the golf course, where it can provide an interesting and beautiful variety of color, size and shape from August to hard frost.

The genus *Chrysanthemum* includes several familiar plants: Costmary, an herb; Pyrethrum and Painted Daisy, both sources of pyrethrum insecticide; and Marguerite, Oxeye Daisy, Nippon Daisy, Feverfew and Shasta Daisy, all used as ornamentals. But by far, the most important member of the genus is *Chrysanthemum x morifolium*, the *Chrysanthemum*. This hybrid, probably originating in China, is used as a greenhouse potted plant, as a commercial cut flower and as a much-loved hardy perennial. A more recent use is as an annual bedding plant. . .but more on that later.

The chrysanthemums we plant outdoors are called "garden mums," a term that refers to those mum cultivars which will naturally flower in most of the country early enough in the fall to be showy before the first heavy frost. On the other hand, most greenhouse mum cultivars flower naturally in late October or November, and would be nipped by frost if grown outside. Many garden mums are winter hardy, and while this may vary greatly from one location to another and from one

season to another, there are many excellent cultivars for the upper Midwest.

#### **Variety of color, size, habit and bloom season**

Chrysanthemum flowers vary tremendously in color, type and size. Most garden mums have small flowers, 3/4 to 2" in diameter. A few cultivars bear flowers up to 5" across, but these generally are not as durable outdoors. Flower types range from tiny 'buttons' to huge, shaggy pompons. Singles have daisylike flowers; anemones are much like singles but have a rounded center of deeper colored petals; pompons are nearly globular flowers with short, closely packed petals; decoratives have close regular petals curving inward toward the center or outward toward the edge of the flower; spoons' petals have spoon-shaped tips; spiders have long, tubular petals with hooked ends; and quills have straight, long, tubular petals. In general, most singles and anemones are hardy, and some pompons, decoratives and spoons are hardy. Few spiders and quills are hardy in the upper Midwest.

Not all mums have the same growth habit. Some are classified as 'cushion mums,' meaning that they form a rounded mound when grown in an uncrowded, full-sun location. A second type of habit is 'upright,' meaning that the plants display a stiff vertical character.

Colors include white, yellows, pinks, lavenders, bronze, oranges and reds. There are also bicolors, with petals of

one color on top and another color underneath. Newer introductions are more resistant to fading.

Chrysanthemums' flowering season is determined by daylength. In the long days of summer, mums produce stems and leaves. During the short days of autumn, they initiate and develop flower buds. Mums are classified according to the number of weeks required for flower development. Because late-season varieties which require many weeks for flower development will not bloom before hard frost, it is important to select only early- or mid-season mums.

#### **History of the mum**

The chrysanthemum has a long history as an ornamental. It was cultivated in China over 2000 years ago. The Japanese subsequently adopted the flower, contributing much to its culture, hybridization and improvement. It was introduced to the U.S. around 1820, primarily as a garden plant. By 1880 its value as a greenhouse crop was fully realized, and many new varieties were developed every year. Today, the mum is grown by a greater number of florists than any other commercial crop, and is among the top three commercially grown flower crops.

Over the years, more than 3000 cultivars of garden mums have been available in the U.S. Plant breeders have responded to the public's demand for shorter, sturdier, more compact plants, and have developed excellent cultivars that are self-branching and free-flowering, with longer lasting flowers in a wider range of color and form. The season of bloom has been extended, and winter hardiness has been much improved.

#### **Choosing the right mum**

Study your landscape needs first, and learn which types and cultivars are best suited for your conditions. A good

way to make a selection is to visit a trial ground during flowering season to evaluate mums in flower.

Select mums first for hardiness and earliness, and second for plant habit and flower characteristics. As much as possible, buy locally from a reputable dealer. Buy only high-quality plants that are properly labeled. Be cautious of plants labeled only "white" or "early."

### Culture

Garden mums are very reliable if a few simple rules are followed, and nearly impossible if they are not.

Mums are best planted in spring after danger of hard frost, usually mid-May. In any event, they should be planted early enough in the season that their roots have time to become well-established before the heat of midsummer. Further south, mums can be planted in fall, but in the north, fall-planted mums do not reliably survive the first winter unless they are field-grown clumps rather than pot-grown greenhouse plants. If you must plant mums in the fall, do so no later than early August, water the plants well for the duration of the season, and mulch thickly for the winter.

Space mums according to their type and size. Generally, the taller, more spreading varieties need 18-24" spacing, while the shorter, more compact plants need about 12" spacing. Plant the soil ball just slightly below the level of the garden soil.

The healthiest plants are grown in full sun. Shaded plants grow taller, have weaker stems, and bloom later in the fall. Most soils are acceptable if well-drained. Mums grown in wet soil are likely to winterkill. Avoid low, poorly drained spots.

Prepare the soil to a depth of 8-12" before planting, and mix in organic matter. Soil fertility will determine the amount of fertilizer needed. Mums need a fairly rich soil. If the soil is naturally rich, or if you've added a quantity of compost, commercial fertilizer need not be applied at planting time. However, if the soil is not rich, or if you added peat moss rather than compost, fertilize with 5-10-5 or 10-10-10 fertilizer at a rate of 3-4 pounds material per 100 ft<sup>2</sup> soil. Fertilize established plantings at this rate each spring, after danger of late frost, and again in early July.

During a hot, dry summer or in areas with light soil, mums must be watered thoroughly every 7-10 days. A 2-3"

layer of mulch (shredded bark, cocoa bean hulls and peat moss are excellent) retains soil moisture and reduces the necessity to weed.

In spring, when young shoots are 6-8" tall, pinch back the tips. When the new shoots resulting from this first pinch are 6-8" tall, pinch them back. Continue this pinching until mid-June for early flowering cultivars, late June for late September cultivars, and early July for early October cultivars. Pinching too late will delay and possibly prevent blooming, since the buds will not develop until after hard frost.

Perhaps the most common insect pests of mums are aphids, which distort growth, cause leaf drop, and sometimes affect flowering. Leafhoppers cause leaves to become mottled, curled or withered due to removal of plant sap. Leaf miners eat tunnels through leaves, reducing photosynthesis and plant vigor. A serious attack can result in stunted, poor quality flowers. Plant bugs remove plant sap,

causing deformed leaves and flowers. Spider mites cause foliage to lighten in color and turn brown along leaf margins. Always identify insect infestations before treating. Most of these insect problems can be controlled with either a spray like malathion or diazinon, or with a granular systemic.

Mum diseases can be quite serious. Fungal problems include verticillium wilt, septoria leaf spot and powdery mildew. It is much easier to prevent these problems than to treat them. Overcrowded and shaded sites increase the problems, and good culture goes a long way in minimizing diseases. Buy only clean stock, select a growing location carefully, and maintain good culture. Several viruses such as mosaic, stunt and yellows can attack mums, but are only an occasional problem.

Once you have determined which insects and diseases are perennial problems in your plantings, you can control them with an insecticide-fungicide mixture as needed.

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50	25.0
70	51.8
100	10.0
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Late flowering may be caused by several factors, including late pinching, selection of a late cultivar which does not flower before frost, too much shade, insufficient fertilizer or water, root competition from nearby trees and shrubs, unusually hot weather in July and August, unusually cold weather in late August and September, and insect or disease injury. Evaluate the situation before taking any action.

Garden mums can winterkill easily. Select only hardy varieties. Avoid poorly drained locations, since alternate freezing and thawing of wet grounds in winter can destroy mums' shallow root systems.

After most of the leaves have turned brown from hard frost, mound the soil 8" high around the base of the plants. Cut the branches back to 10" above the mound. Apply a 2-4" mulch around the plants after the soil surface has frozen. Do not mulch earlier, as this provides nests for rodents which will destroy the plants. Appropriate mulches include evergreen branches, marsh hay and clean straw. Do not use materials which will compact and pack solid when wet, like leaves or grass clippings. In spring, remove the protective mulch and soil mound gradually. By the time new green shoots develop, the plants should be entirely exposed.

An alternative method of overwintering in the far North is to dig plants in late fall, plant them in large pots and hold them in a cold cellar (33-38°F) for the winter. Plants can also be placed in a cold frame with a thick layer of mulch. If you have a greenhouse, you can remove rooted suckers from around the base of the plants in late fall, place them in small pots and keep them actively growing through the winter, pinching as needed.

Established clumps of mums can be divided in spring. Dig the clumps when new growth is 4" tall, and after danger of late frost. Stronger shoots are generally on the outside of the clump. Remove them with a good root system and replant where desired, with the growing tip of each division just above the ground level. Vigorous plants may require annual division.

### Design considerations

Mums are generally available at Mother's Day as potted flowering plants. Buying plants in flower is usually a bit more expensive, but there is a bonus. You can plant the mums in full flower in spring (or keep them on dining tables in the club house). When the flowers fade, cut the plants back to

6-8" and continue caring for them as described above. The plants will bloom again in the fall. (In subsequent years, the plants will bloom only in the fall.) If you are too far north to reliably overwinter mums, this is a good way to get a double season from the plants and still treat them as annuals.

Use mums as accent plants in shrub borders, along with Siberian iris for spring bloom, daylily for summer flowers and showy sedum for late summer bloom. These plants are all high quality when green, and provide a splash of color when in flower. If given good drainage and full sun, they will need minimum maintenance.

Plant mums as a backdrop for annual flower beds. Mums will provide a green background during the season when the annuals are at their best, and will continue to flower later in the fall after many annuals have died.

If you have an annual flower bed with a shrub backdrop, plant a staggered line of mums about 2½' in front of the shrubs. Fill in the front of the border with annuals, and seed a line

of flowering kale between the mums and the shrubs. The kale will develop its color at the same time the mums are flowering in the fall. It's a great way to extend the life of your annual flower beds.

Use mums with groundcovers. Vinca and euonymus do very well in full sun, but large beds of these plants can be monotonous. Add mums, daylilies and spring-flowering bulbs for some seasonal color.



*Editor's Note: Dr. Lois Berg is a floriculture consultant with Stack Landscaping in Verona, Wisconsin. She received her M.S. and Ph.D. from the University of Wisconsin's Department of Horticulture, where she taught floriculture classes and worked with the greenhouse industry for several years.*

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