

be clean with no soil particles, and the container (basket) in which the clippings are caught must be very clean with no fertilizers apparent and they must be properly handled all the way to the laboratory. Likewise, the same advice is applicable for soil tests. The soil test will also be a good means of determining micronutrient deficiency provided you take into account the soil reaction - whether the soil is acidic or alkaline.

There is no question that on sand profiles micronutrients will be limiting if not supplied. For this reason, we have tried to develop a formulated fertilizer that supplies extremely small amounts of micronutrients with each application and can essentially be used every time a putting green or sand-based sports field is fertilized. This fertilizer formulation has proved very successful for practitioners in the Pacific Northwest for approximately 5 years at this point and we feel it is doing a good job on sand root zones with no deficiencies ever having been observed under this program.

In conclusion, we must keep reminding ourselves that there are 16 nutrients that are required for plant growth, three of these being available from air and water, N, P and K from fertilizers, calcium and magnesium are available from liming materials and sulfur is available from any number of sources including elemental sulfur materials. The other 7 considered to be micronutrients must be supplied in very small amounts where required and on a frequency that the plant does not become deficient.

## THE EXTENSION LINE

*Bob Mugaas of the University of Minnesota Extension Service is a regular contributor to Hole Hotes. As Hennepin County Extension Agent, Mr. Mugaas compiles various articles related to the golf field for our information. Bob is an excellent source for answers to many questions on horticultural problems. He may be reached at 612/542-1420. Written requests should be sent to:*

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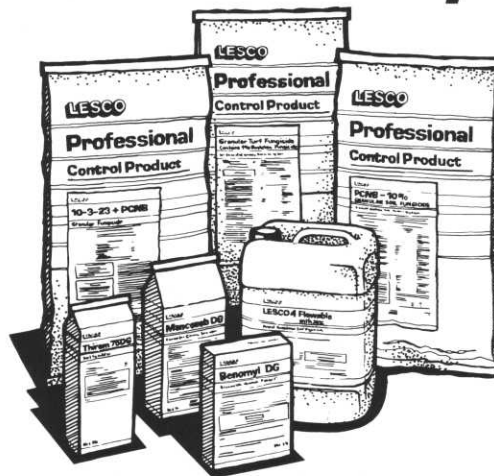
This month's articles cover Perennials, Oak Wilt, and Purple Loosestrife.

## PERENNIALS

by **Don Selinger**  
**Plant Materials Committee**  
**Minnesota Nursery and Landscape Association**

Perennials that provide us with color throughout the better part of the summer have been gaining rapidly in popularity. In many respects they combine the flowering attributes of annuals with the benefit of not having to replant each year. This is especially true of those that are reliably hardy, relatively maintenance free and will tolerate or thrive under the hot, dry conditions we have been ex-

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perencing the last few years.

**MOONBEAM COREOPSIS** (*C. verticillata* 'Moonbeam'), **PURPLE CONEFLOWER** (*Echinacea purpurea* 'Bright Star') and **BLACK EYED SUSAN** (*RUDBECKIA fulgida* 'Goldstrum') are three that have been gaining in popularity because they do satisfy the criteria mentioned. They can provide a bold display of color by planting them in mass or they are attractive enough to use as individual specimens.

**COREOPSIS MOONBEAM** forms a very attractive clump with finely textured foliage that is covered in summer with creamy yellow daisy-like flowers. Various cultivars of Coreopsis (Tickseed) have long been used in the perennial garden to provide summer color and as a good source of cut flowers. Most of the cultivars of Coreopsis used as a cut flower possess a deeper golden yellow and have their blooms borne on stems of 18 to 24 inches that are ideal for cutting. While the other cultivars are superior as a cut flower, Moonbeam is unsurpassed for use as a landscape plant. Besides having a paler yellow flower, Moonbeam forms a more compact plant of up to 18 inches with almost fern-like foliage that lends itself to landscape use and makes an attractive plant whether it is in or out of flower. Moonbeam will do well in sun or light shade and in any well drained soil. It is relatively insect and disease free and will tolerate the heat and drought quite well.

**PURPLE CONEFLOWER** is a member of the sunflower family that is native to much of the eastern United States including Minnesota. Several cultivars are available, with Bright Star being the more common one. Bright Star produces an abundance of blooms of deep rosy-purple with a maroon cone-like center that remains attractive even after the flower fades. The flowers are produced on plants of 2 1/2' to 3' from midsummer until frost. In addition to making an attractive landscape plant it can also be used as a cut flower, either fresh or dried. Being a native of prairie conditions Purple Coneflower will withstand heat and drought extremely well and does not have any serious insect or disease problems. It does require full sun and will do well in most any well-drained soil.

**BLACK EYED SUSAN** (*Rudbeckia*) is a very common native of the prairie in a good part of the United States. The cultivar Goldstrum was selected for the deep yellow flowers, up to 3 to 4 inches in diameter, that are set off by a deep bronze black cone in the center. The flowers, which are also good for cutting, are produced freely during August and September on an attractive plant of 2 to 2-1/2 feet. It will also withstand the heat and dry conditions that are common to the prairie and does best in full sun to light shade. Insects and diseases are generally not a problem.