a voice for the natural landscaping movement

Wild Ones®
Native Plants, Natural Landscapes

Reprinted from the *Wild Ones Journal,* November/December 2002 issue.
Updated March, 2010.

For more information, or to join Wild Ones Natural Landscapers, here's how to reach us:

Phone
(920) 730-3986
(877) 394-3954 (Toll-Free)

Mail
P.O. Box 1274
Appleton, Wisconsin 54912-1274

E-Mail
ExecDirector@for-wild.org

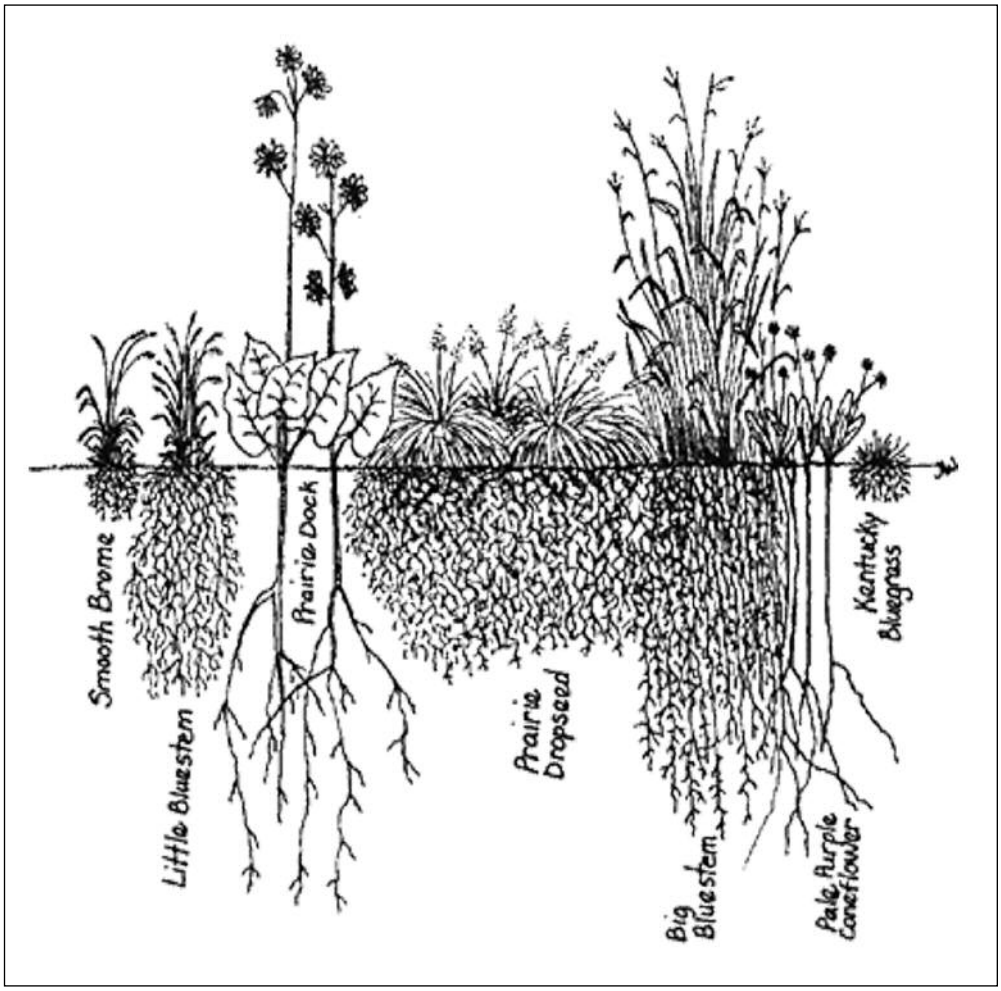
Web Site
www.for-wild.org

The membership fee is just $30 per year – and it's tax-deductible.

Celebrating 25 years restoring native plants and natural landscapes.

The Root of the Matter

By Randal Maurer



How low do they grow?
Compared to the roots of the non-native, smooth brome (far left) and the Kentucky bluegrass (far right), prairie plants and grasses have an extensive root system which helps them prevent erosion and absorb moisture deep in the soil. Prairie plants can withstand prolonged periods of dry weather and so require little or no watering.

We enjoy our North American prairies with a sense of awe and wonder for the beauty they add to our lives. Often I consider my native perennial plantings and am amazed by the diversity of insects and critters attracted to even my small yard in Ripon, Wisconsin. That awe is compounded when I visit a diverse prairie remnant or a large prairie restoration.

But what about the hidden complexity? The diversity of the microorganisms within the soil and their symbiotic relationship with the plants we love to see brings a new insight to the wonders of the prairie.

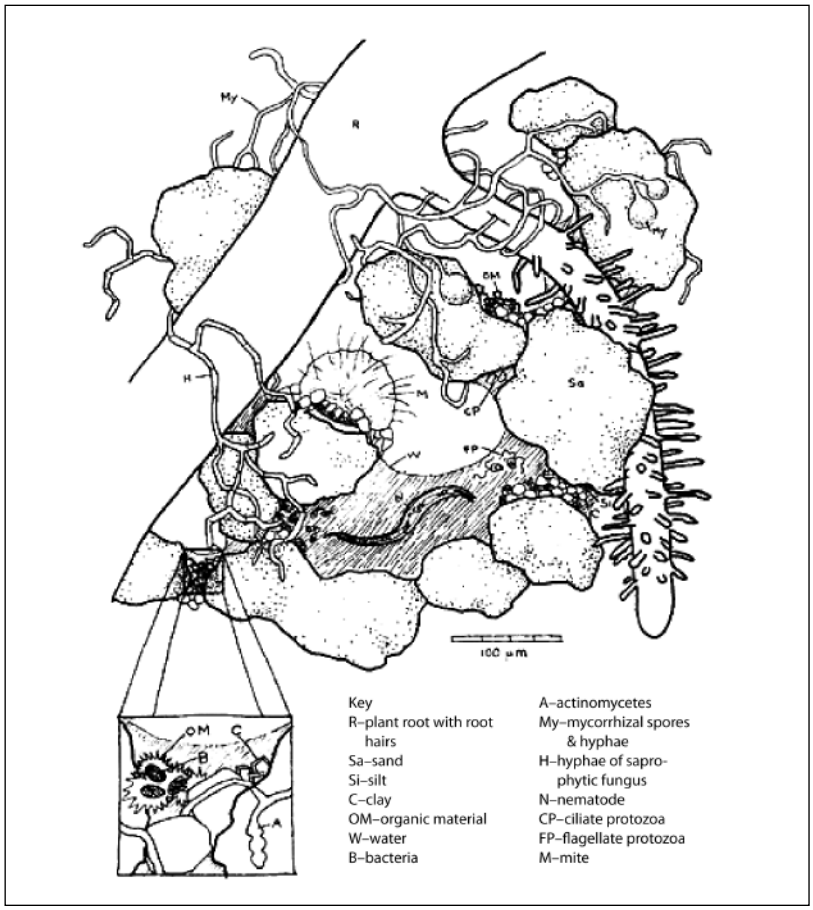
Continued on page 2.

Continued from page 1.

Those of us who have seeded our own prairie plots know about the inoculants provided to assist the plants in the legume (bean) family. The inoculants include a cocktail of soil bacteria that form an alliance with legume roots to assist in the uptake of nitrogen. The bacteria make nodules, or little bumps, on the plant roots growing closest to the soil's surface. Given that most soil nutrients are found in the top few inches of fertile soil, these bacteria are essential to the development of legumes and other plants that benefit from the additional nitrogen.

We have known about these benefits for some time. That's why a farm field planted with corn, a plant that rapidly depletes soil of its nitrogen, is rotated with legumes such as soybeans or alfalfa.

Recent research is now showing us the importance of fungi in a prairie ecosystem. The AM fungi, as they are known, are arbuscular micorrhizae. The name describes how the fungi interact with plant roots. The arbuscules are fungal projections into the plant cells, where exchange occurs; the fungal filaments, or "roots," probe into the soil and bring back water and nutrients to the arbuscules. These species of fungi affect predominantly the growth and development of warm season plants, such as those that grow in prairies.



The top inch of soil is teeming with activity as microorganisms go about their business, and in the process, help our plants grow.

The fungi live in the top few inches of fertile soil and send projections into the upper section of a plant's root mass. For prairie plants with their deep tap roots, the fungal growth greatly increases the roots' surface area just below the surface of the soil, allowing the plants to concentrate on deep growth. The fungi, in return for fixed carbon (a product of photosynthesis which the fungus cannot perform) and micronutrients the host plant is "mining" with its taproot, provide the plant with important nutrients found in the topsoil.

Scientists are studying the importance of these organisms at universities from Oregon to Virginia, including the University of Wisconsin in Oshkosh. In research conducted at three greenhouses, seed planted in soil infected with AM fungi had up to three times more top growth in the first twelve weeks after germination than those in non-infected soils. The phosphorus and other nutrient uptake also increased proportionately in the infected plants, allowing infected plants to grow more robust, even in nutrient-poor soils.

Unfortunately, between the degradation of our topsoil due to intense farming and the disappearance of all but a fraction of our native prairies, there is much we don't know about these organisms. Some restorationists and native plant companies are using or experimenting with AM fungi inoculants to increase native plant growth and seed production, and to help establish plantings in degraded soils.

However, this work must proceed with some caution. Almost all available fungal inoculants come from areas outside the Midwest where I live and work. As advocates of using native plants and opponents of invasive species, we must be aware of the implications of importing non-native species, including fungi. As with seeds and plants, local sources of inoculants are always the better choice.

Next time you plant that one more plant you simply must have in your prairie or garden, take time to examine the soil in your hands and admire it. Think of the unseen world, the host of beneficial bacteria, fungi, and other organisms that are all helping your prairie plants grow so that you can enjoy them. Continue to encourage your neighbors and friends to plant some prairie plants, even a small prairie garden, in place of a lawn. Let these invisible creatures assist our plants and help cure the soil and air for all living things large or small. ◆

Randal Maurer is a member of the Fox Valley (WI) Chapter. He is also a partner in Native Solutions, an ecological restoration company based in Appleton, WI, and an Adjunct Professor of Electronic Microscopy at Marian College in Fond du Lac.

The roots drawing is by Janet Wissink, a member of the Fox Valley Area (WI) Chapter.

The soil habitat drawing is by Sally Hiott, a member of the Detroit Metro (MI) Chapter.

Wild Ones Natural Landscapers
P.O. Box 1274 • Appleton, Wisconsin 54912-1274 • www.for-wild.org
Reprinted from the *Wild Ones Journal,* November/December 2002 issue. Updated March, 2010.