

This is a printer-friendly version of an article from Zip06.com.

Article Published October 23, 2019

## **The Hidden Half of the Plant World Gets an Image Makeover**

Kathy Connolly

You'd think the sixth element of the periodic table, carbon, has joined the Most Wanted list. Headlines abound with the quest for solutions to the current problem of carbon overload, which contributes to climate change, rising sea levels, and extreme weather patterns.

To help solve the problems associated with carbon, some are even searching underground, in the hidden, rooted half of the plant world. Though out of sight and lacking in charisma, the roots of trees, shrubs, grasses, and flowering plants are natural carbon-hoarders. That's a convenient truth, especially true in autumn. This time of year roots, like chipmunks and squirrels, are putting by food for the winter. And there are things we can do right here on the shoreline to help those carbon hoarders.

Roots are challenging study subjects, though, and not a focal point for most plant scientists. The last time they attracted this much attention was during the disastrous midwestern Dust Bowl of the 1920s and '30s. Researchers such as Dr. John Earnest Weaver, a grassland ecologist, devoted years of study to the underground lives of prairie plants in a quest to understand the process that destabilized millions of acres, and to suggest ways to heal the land.

Dust Bowl-era investigators made some stunning discoveries, such as the fact that prairie plant roots sometimes burrow three to five times as deep as their top-growth is tall. A University of Rhode Island research team published similar results in 2010 after regional grass trials both along unattended highway corridors and in the lab. (Find references in "Further Reading" sidebar.)

For instance, Indian grass (*Sorghastrum nutans*) usually matures above-ground at five feet, but its roots may go down as much as 18 feet. In other words, the grass seems to be shorter than most adults but, including the roots, maybe two to three times our height. The same is true for little bluestem, a popular ornamental grass in our region.

Furthermore, warm-season grass species such as Indian grass and little bluestem grow more quickly than trees. They use sunlight, and store carbon, more efficiently than common lawn grasses.

### **Try This at Home**

Anyone's land can capture and store carbon by using land care techniques that put more carbon underground and release less. When it comes to roots, here are two ideas to minimize carbon loss and three ideas to maximize carbon capture:

To minimize carbon loss, turn soil as little as possible. Avoid exposing subsoil to air. When we turn soil, carbon can combine with oxygen through a complex process and escape to the atmosphere as CO<sub>2</sub>. Nitrogen, a common part of fertilizers, escapes as well. These are two of many reasons farmers adopt low-till and no-till methods.

To further minimize soil disturbance and carbon loss, keep soil covered. Use straw, pine needles, wood chips, or decorative bark mulch—but keep it covered. Better yet, why not use fallen leaves? Chopped leaves insulate against temperature and moisture extremes. (Remember, though, never place mulch directly against tree or shrub trunks. Allow breathing room around the base.)

### **How To**

To promote soil carbon, choose perennial flowers and grasses that likely to grow deep. For some ideas, see the sidebar. Hint: Deep-rooted grasses can be very helpful on slopes. Another hint: If you use native plants, you'll also support pollinators, birds, and other wildlife.

If you are planting new trees and shrubs this fall, promote root growth by using the latest science-based planting and transplanting techniques. Wash the roots to assure they are not circling and crossing, particularly on the root balls of pot-grown trees and shrubs.

Avoid harming roots by keeping lawn fertilizers and herbicides away from trunks and stems. Lawn fertilizers, if over-applied, can harm tree and shrub roots—particularly those of young, newly planted specimens. The movement of herbicides in soil is sometimes unpredictable.

If you are involved with land care—at home, in business, or the community—now's a great time to do your best for the hidden half of the plant world. By protecting and promoting root health, you can also help capture and store that most-wanted element: carbon.

### **Planting for Deep Roots**

Here is a list of deep-rooted native grasses:

- Little bluestem, *Schizachyrium scoparium*
- Indian grass, *Sorghastrum nutans*
- Switchgrass, *Panicum virgatum*
- Prairie dropseed, *Sporobolus heterolepis*
- Purple love grass, *Eragrostis spectabilis*

Here are some deep-rooted native flowering perennials:

- Goldenrod, *Solidago* species
- Common milkweed, butterfly weed, and swamp milkweed, *Asclepias* species
- Lupines, *Lupinus perennis*
- Asters, *Symphotrichum* species
- Black-eyed Susans, *Rudbeckia* species

Here are some deep-rooted trees and shrubs:

- Eastern red-cedar, *Juniperus virginiana*
- Oaks, *Quercus* species
- American elm, *Ulmus americana*
- Apple trees, *Malus* species
- Eastern white pine, *Pinus strobus*

## For Further Reading

If you'd like to know more about how plants store sunlight and which plants to choose, visit these books and articles:

- John E. Weaver contributed hundreds of root tracings and photographs from careful, laborious excavations over 40 years. His last book, *The North American Prairie*, is available as a free download from <https://digitalcommons.unl.edu/agronweaver/15/>. Among his other talents, Weaver was a good writer.
- *Relative Rooting Depths of Native Grasses and Amenity Grasses with Potential for Use on Roadsides in New England*, University of Rhode Island. Published in *HortScience* 45(3):393-400. 2010.
- *Bare Root Primer* slide show on the benefits of root washing and bare-root tree planting by Dr. Linda Chalker Scott: <https://www.slideshare.net/LindaCS/bare-root-primer>.
- *Understanding Roots* by Robert Kourik, Metamorphic Press 2015

*Kathy Connolly is a writer and speaker from Old Saybrook who specializes in horticulture and landscape design. Reach her through her website, [www.SpeakingofLandscapes.com](http://www.SpeakingofLandscapes.com).*