

Get the Dirt on Grassland Soils

by Tara Mulhern Davidson

Saskatchewan's native prairie grasslands are home to thousands of different species making these ecosystems some of the most biologically diverse in North America. Yet when we think of grassland biodiversity, it is easy to focus on the flora and fauna that one can see with the naked eye. Plants, birds, wildlife and even insects resonate strongly with people, perhaps because they are a visible example of life on the prairie. Less visible soil bacteria and fungi however, often go unnoticed, yet this group features some of the most unique and critically functional species out on the prairies.

The United Nations declared 2015 as the International Year of Soils with the goal of improving public awareness of the importance of soils for food production and ecological processes. Like all soils, grassland soils are a medium for growth and provide complex communities that support plants which can be grazed by livestock and other animals.

Dr. Christine Jones, an Australian soil ecologist, recently made several stops at workshops across western Canada to discuss the fundamentals of soils. At a recent event in Swift Current, Jones explained that plants have a very strong interrelationship with soil microflora. Bacteria and fungi live directly adjacent to plant roots in an area termed as the rhizosphere. Roots release substances that feed the rhizosphere and in turn, the bacteria and fungi can improve the amount and type of nutrients that a plant can metabolize. Jones says "plants have grown without the addition of [external nutrients] for millennia," and suggests that when it comes to uncultivated native prairie grasslands, these soil ecosystems are likely operating at high levels. "Natural grasslands could be an important source of soil functional groups in the future," Jones acknowledges.

Ranchers who want to maintain healthy soils on their prairie pastures can start by doing two things: ensure there is an

appropriate amount of litter, or dead plant material, left remaining on the pasture; and make certain that there is enough green and growing plant material left over following grazing.

Plant litter is broken down by soil organisms, releasing nutrients that can feed the plants as well as the belowground soil ecosystem. Litter improves water infiltration, prevents erosion and supports a diversity of soil microorganisms which also ensures the water that is in the soil is retained. All of these functions allow prairie pastures with adequate litter to be resilient during times of drought.

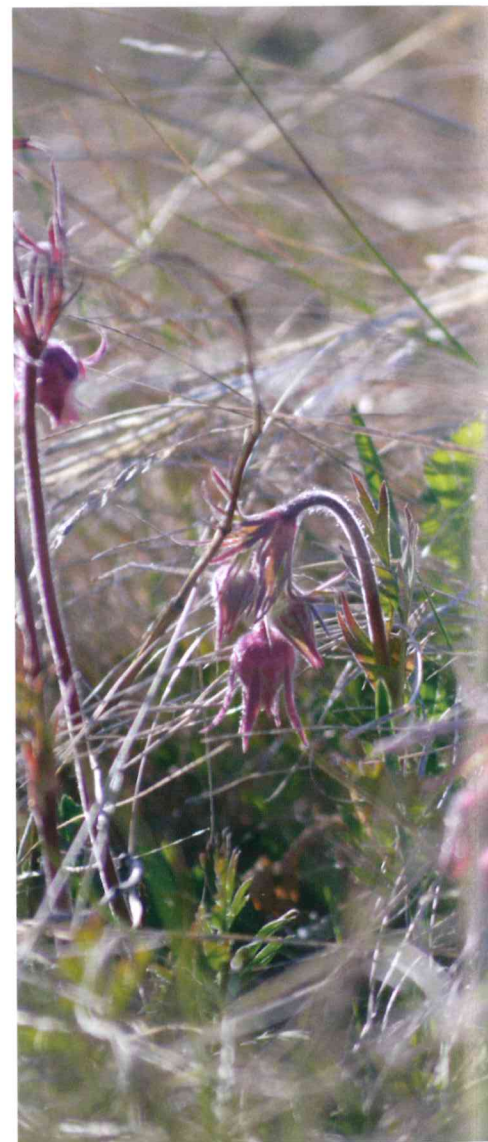
With respect to green and growing plant material remaining following grazing, pastures with adequate canopy cover are able to energize the ecosystem by capturing energy from the sunlight. At first, plants use the energy produced through photosynthesis to feed themselves. Once a plant's basic needs are met, the extra energy produced is used to feed the soil microbes.

For producers who farm or ranch on non-native grasslands, Jones demonstrated that soil can be improved and top soil can be created particularly on farms that incorporate tame pasture and crop land in conjunction with livestock grazing. Planting more than one species for either annual or perennial crops improves diversity below ground and adding grazing into the system can increase the variety of soil organisms, particularly the ratio of fungi to bacteria, which is sometimes a challenge.

As Saskatchewan's agricultural ecosystems are challenged and environmental pressures continue to build, the importance of healthy soils below ground may indeed become a top priority.

To learn more about Dr. Christine Jones' work, visit www.amazingcarbon.com. For more information on methods of

measuring rangeland health, including litter levels and canopy cover, see the Saskatchewan Rangeland Health Assessment Field Workbook which can be downloaded at http://www.pcap-sk.org/rsu_docs/documents/Native_Grassland_and_Forest-Red.pdf.



This prairie shrub, seemingly growing out of a rock, has a network of soil bacteria that enable it to access the nutrients it needs to sustain itself.