

THE AG EXTENSION LADDER

"THE BOUNDARIES OF THE UNIVERSITY ARE THE BOUNDARIES OF THE STATE"

July 2014

Vol. 1 No. 2



Hello!



The purpose of *The Ag Extension Ladder* is to reach out to the residents of Pepin County with relevant and research-based knowledge and assistance. While focusing on agriculture, this resource stretches beyond farming to encompass other topics important to our Western Wisconsin community. This month's *Ladder* highlights **SOIL HEALTH** along with other timely subjects. I trust you will find the information helpful to your farm or home.

As always, if you have any questions, please feel free to contact *your* local UW-Extension Office.

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Upcoming events

July 25-27	Pepin County Fair
August 8	LCD Japanese Knotweed Work Day
August 12-14	Farm Technology Days, Portage Co.
TBA	Summer Cover Crop Field Day
TBA	Fall Cover Crop Field Day



CONTENTS

	PAGE
What is Soil Health?	2
Keys to Soil Health	3
2014 Apple Tree Die-Off	4
Growing Your Couple Relationship	5
LCD Invasive Species Watch	6

The **Wisconsin Custom Rate Guide 2013** was published in March of this year. It can be accessed at http://www.nass.usda.gov/Statistics_by_State/Wisconsin/Publications/custom_rates_2013.pdf or at the UW-Extension Office.

WHAT IS SOIL HEALTH?

The Soil Science Society of America defines soil health as “*the capacity of a specific kind of soil to function . . . to sustain plant and animal productivity, [and] maintain or enhance water and air quality*”.

How does a healthy soil maintain productivity and enhance environmental quality? What are the functions of a soil necessary for agricultural sustainability? Consider these four key roles:

1. Soil supports the growth of plants. This includes physical support that anchors the plant, but soil also provides for air, water, and mineral nutrient access by the plant roots. Healthy soil also moderates temperature, and provides protection as a buffer from toxins present in the environment.

2. Soil controls the fate of water in the environment. Infiltration, runoff, purification, and contamination of rainwater are all controlled ultimately by the soil. Healthy soil is an effective water manager.

3. Soil is nature’s recycling system. Crop residue, manure, nutrients, and other organic or inorganic materials are processed and made available for reuse within a healthy soil.

4. Soil is the habitat for many organisms. Research has reported 10,000 to 50,000 different species of microorganisms in a single gram of soil! In addition to microorganisms (such as bacteria, fungi, and algae), insects, springtails, worms, etc. make the soil their home and contribute to soil’s amazing abilities.

So then, what are indicators of healthy soil?

I had the opportunity this month to spend a couple of hours in the field with Ray Archuleta, a national soil

health specialist with NRCS. He talked of several easily observed indicators for soil health:

Healthy soil is **soft and friable**. Use a garden fork to loosen a piece of soil. It should not be hard or massive, but should easily crumble in your hand.

Healthy soil is made up of **stable aggregates**. Even though the soil is soft and easily crumbled, these crumbles are stable in water. This improves water infiltration and water holding capacity of the soil, and protects against erosion.

Healthy soil has the **rich, earthy smell** of geosmin. See the box below for a description of geosmin. Healthy soil does not smell septic nor strong of ammonia.

Healthy soil is **covered with organic residue** and/or cover crops. This cover provides food for soil organisms, and keeps soil from overheating, which is detrimental to plants and other soil life.

Geosmin is a

compound produced by Actinobacteria and is characterized as a



distinct, earthy aroma. This compound is responsible for the strong, fresh smell of rain after a dry spell of weather. **The smell of healthy soil is rich in geosmin.** Our nose is extremely sensitive to geosmin; we are able to detect concentrations as low as 5 parts per trillion!

“The soil is the great connector of lives, the source and destination of all. It is the healer and restorer and resurrector, by which disease passes into health, age into youth, death into life. Without proper care for it we can have no community, because without proper care for it we can have no life.”

KEYS TO SOIL HEALTH

Soil is the cornerstone of agriculture production. Yet science has only begun to scratch the surface in our understanding of what makes for healthy soil. There are a number of principles to keep in mind for managing soil health:

Keep it covered. Bare soil heats and cools rapidly, which can be detrimental to both soil biology and plant health. Uncovered soil also can quickly dry out, which again hampers growth of both the crop and beneficial soil organisms. Erosion by wind or water is increased in uncovered soil.

Minimize disturbance. Tillage breaks up soil aggregates, increases organic matter loss, and in general creates a more inhospitable environment for valuable organisms like earthworms and fungi. No-till methods create an environment that is conducive to soil building.

Increase plant diversity. In typical farming systems, diversity can be accomplished through planned crop rotation and using cover crops. Increasing yield through rotational diversity has been well-documented in research.

Maintain living roots throughout the year. Living roots feed soil organisms through a mutualistic relationship – both the crop and the soil biology benefit. Cover crops keep soil biology “up-and-running” before and after the production crop is grown.

Include livestock grazing. Grazing animals have a profound positive effect to build, improve, and maintain the health of soil. Where possible, use their movement, grazing habits, and manure deposition as catalysts to soil health.

Did you know that microorganisms residing *within* an acre of topsoil may equal the weight of **two cows**? These organisms are crucial to nutrient cycling, soil tilth, and crop health. Cover crops help feed *the underground herd*.

unlock the secrets in the soil
www.nrcs.usda.gov

“We know more about the movement of celestial bodies than about the soil underfoot.”
-Leonardo da Vinci

science of soil
soil is made of about
25% water 45% minerals
5% organic matter 25% air

what's underneath
Living in the soil are plant roots, bacteria, fungi, protozoa, algae, mites, nematodes, worms, ants, maggots, insects and grubs, and larger animals.

Healthy soil has amazing water-retention capacity.
Every 1% increase in organic matter results in as much as 25,000 gal of available soil water per acre.

One teaspoon of healthy soil contains 100 million-1 billion individual bacteria.

Earthworm populations consume 2 tons of dry matter per acre per year, partly digesting and mixing it with soil.

what it does
Healthy soil is key to feeding 9 billion people by 2050.

Source: Conservation of Soil: The NRCS & Private Landowners; 17 Pages, 2004; by R. Weil | Water holding capacity: Source: NRCS Extension Agency & USDA, National Soil Survey Center, 2012 | Bacteria in a teaspoon: Soil Biology Primer, 2004; by R. Howell, Andrew R. Moldenhauer, Chris Edwards | Microbes weigh: The NRCS & Private Landowners | Earthworm population consumption: Earthworms & Farm Soils, published by United States Acad. Prof. of Soil Management and Michael Moldenhauer, Assoc. Prof. Environmental Soil Science, Peering pages: The United Nations | USDA is an equal opportunity provider and employer.

“We know more about the movement of celestial bodies than about the soil underfoot.” – Leonardo da Vinci

2014 APPLE TREE DIE-OFF

It seems that these past couple years provided a “perfect storm” resulting in a lot of apple tree die-off this spring/summer throughout the state. The “perfect storm” included:

- Drought 2012
- Heavy crop 2013
- Brutal winter 2013-2014

Across the state apple trees have shown:

- tree death (whole or in part)
- slow leaf emergence
- leaf drop

The problem could become worse this summer as the trees’ water demand increases. Dr. Patricia McManus, Professor of Plant Pathology at UW-Madison recommends the following action to reduce stress on your trees:

- 1) *Avoid a heavy crop on already stressed trees.* If a tree’s crop is heavy, remove a portion. Pick some of the immature apples now; thin out throughout the tree and save the best apples.
- 2) *Irrigate if we get a dry spell.* The tree may have root or cambium damage due to the harsh winter. Make sure the tree is well-watered this summer.
- 3) *Do not apply nitrogen in an attempt to stimulate trees.* Increased growth at this time can further stress the tree.
- 4) *Control weeds and especially grass within the drip line of trees.* If the tree is located in a lawn, make sure that you water much more than what the grass will use.



“For decades, it has been the most vilified nutrient in the American diet. But new science reveals fat isn’t what’s hurting our health.” *Time* magazine, June 23, 2014

From Mary Wood, Family Living Agent

Growing Your Couple Relationship

Summertime is a time of great growth on the farm. It's also a very busy time with days that are filled with work and activities. Just like tending crops, animals and finances is critical to the success of a farm operation, marriage and couple relationships also require work, nurturing, care, attention and time in order to grow and yield a successful harvest. Great relationships don't happen by accident and they can wither from neglect.

Below are a few suggestions shown by research to increase satisfaction and strength for marriages and couple relationships. These things are as necessary as water, sunlight, nutrients and healthy soil.

- **Focus on the positive.** Positivity is like sunlight in relationships. We need ten positives to offset the harmful effects of negatives in relationships. Everyone has things that bugs them about their partner. Focusing on the negative can take relationships down an unhappy path and cloud our perception of our partner and relationship. Focusing on the positive and problem-solving is a good goal. Express your appreciation more easily than your frustration.
- **Make time for one another.** Set aside time each day to talk and reconnect. Confide in and support one another. Don't become strangers. Keep learning about each other's thoughts, feelings, hopes and ideas.



- **Remain good friends and have fun together.** Share care-free time where you aren't arguing, distracted or working on anything ... just enjoy each other and being together. Value, respect, accept and listen to one another.
- **Observe rituals and traditions in your relationship and family.** Traditions and rituals serve many important functions in families. They celebrate what is important for you and your family. They give meaning and predictability and help to build a shared history. Rituals help recharge from the stresses of everyday life and increase the amount of intimacy. Relationships marked by traditions and rituals are often richer and more purposeful than those that are not.

Try these suggestions and enjoy the benefits!

Mary Wood

Pepin County LCD Invasive Plant Alert:

Wild Parsnip is on the “wild” side this season – Let’s help to “tame” it down!



DESCRIPTION: Wild parsnip is a member of the Umbelliferae (parsnip) family. In the rosette stage the plant grows close to the ground with leaves averaging six inches in height. The plant has a long, thick taproot, which is edible. Flowering plants produce a single, thick stem that contains hundreds of yellow umbellate flowers. The lateral flowers often overtop the terminal flowers. Depending on the habitat and growing conditions, individual flowering plants may reach over four feet in height. Leaves are alternate, pinnately compound, branched, and have saw-toothed edges. Each leaf has 5-15 ovate to oblong leaflets with variable toothed edges and deep lobes.

CAUTION: Wild parsnip can cause phytophotodermatitis. If the plant juices come in contact with skin in the presence of sunlight, a rash and/or blistering can occur, as well as skin discoloration that may last several months.

CONTROL: The best way to control wild parsnip is early detection and eradication. A very effective control method is to cut the entire root just below ground level with a sharp shovel or spade. Cutting below ground level prevents resprouting.

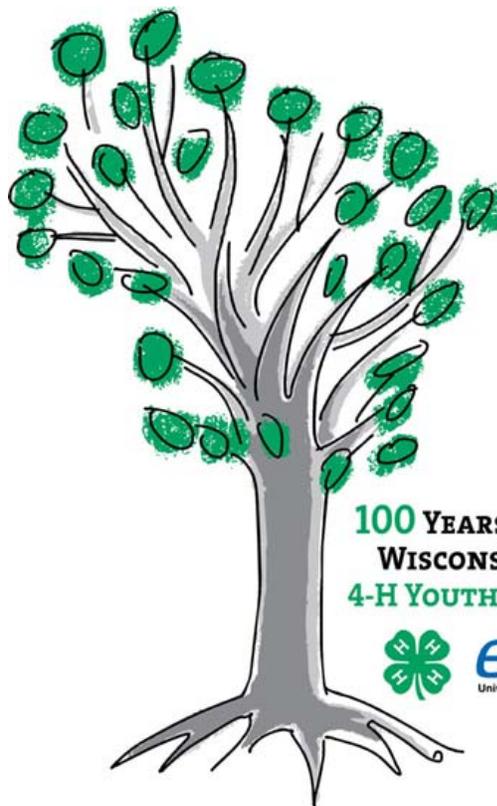
More information on invasive species in Wisconsin can be found at:

Celebrate 100 Years of 4-H at the Pepin County Fair!

July 25-27



** Visit the UW-Extension Cover Crop Plot and learn more about Soil Health. **



**100 YEARS OF GROWING
WISCONSIN LEADERS:
4-H YOUTH DEVELOPMENT**



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