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Newsletter

BLWK/CAWC: Your monthly guide



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Upcoming farmers' days and events:

- » Southern Cape Brown tour – 8 Maart 2017
- » Langgewens Walk & Talk – 13 July 2017
- » CAWC Lecture day – 1 August 2017
- » CAWC Practical day – 3 August 2017

Hi Everybody

In the November newsletter we indicated that the first newsletter for the year would only be published in February, but so much information is floating around, that we decided to start early this year. So SURPRISE!

We hope that the New Year brings you joy and success and that we are blessed with good rains.

The planned summer cover crop tour will unfortunately not take place. The summer was too dry for germination. We also expect to bring you more tours in the Swartland during the year. Our conference in August also promises to deliver some interesting talks and the conference field day will be held at Boland Landbouskool. The dates are to the left of this message.

Regards
The editor



Western Cape Government

Agriculture

BETTER TOGETHER.



When is it Time for a No-Till Field to Be Tilled? Never!



By Laura Barrera posted on December 6, 2016 on No-till Farmer website
Posted in Seeding & Planting, Residue Management

In the nearly 4 years I've been with No-Till Farmer magazine, I've viewed Ohio State University Extension's website as a great source of quality information, especially for no-tillers. So I was disappointed to see a recent article suggesting that no-tillers consider tilling their fields. The article, "When is it Time for a No-Till Field to Be Tilled?" lists four problems that can occur in no-tilled fields and be "remedied" by tillage: disease pathogens and insects that survive on crop residue, weeds and soil drainage. While I won't argue whether tillage can or can't help resolve these problems, why not look at some possible solutions that allow no-tillers to maintain their tillage-free systems? Diseases and Insects on Crop Residue As Dakota Lakes Research Farm director Dwayne Beck explained in a recent podcast episode, if there's a weed, disease or insect in your field, it's there because your system is lacking diversity. It's something agronomist and no-tiller Dan Davidson has seen as well, noting that most corn disease problems occur in continuous corn rotations — so the longer the rotation, the less risk of an outbreak.

Davidson also recommends no-tillers be observant about potential disease outbreaks and have a plan in place in case one occurs. Growers can plant varieties that are resistant or have good tolerance scores against diseases that might be a threat. They should also consider ways they can promote plant health and, if necessary, use fungicides. For more tips and information on battling no-till diseases, read Davidson's No-Till Notes column. When it comes to weeds, the Ohio State article names true armyworm — which likes grassy weeds and cover crops — and fall armyworm as some of the top insect culprits in no-till, along with slugs. Scouting is critical with both pests, and for armyworms it may be better to make early herbicide applications to terminate weeds and cover crops, as this removes a site for the pests to lay their eggs, says Michigan State University Extension entomologist Christina DiFonzo. For slugs, check out the article, "6 Tips to Help No-Tillers Eradicate Yield Robbing Slugs." Weed Issues The Ohio State article admits that most weeds are adequately controlled in no-till systems with herbicides, but tillage can be effective for biennial

and perennial weeds, and may control marestail for a season. While there are a lot of factors that determine how a grower should manage a specific weed, generally we know that no-till can sometimes help reduce weed problems because it keeps their seeds on the soil surface, which promotes seed predation. Using cover crops, a diverse rotation and multiple herbicide modes of action are also key to battling no-till weeds. If you're a subscriber of our print publication, you'll know we're currently running a series on how to manage some of the most problematic weeds in no-till — and tillage is not one of the solutions. So far we've covered marestail, waterhemp and Palmer amaranth. Soil Drainage The article says that in poorly drained fields, tillage can help reduce yield losses from late planting by warming up and drying out the soil quicker in the spring. But I've heard from some no-tillers that they're actually planting earlier than their conventional neighbors, thanks to good soil structure and soil health they've built over the years.

Yes, it may take a while for no-till soils to develop a good structure and microbial life. But using tillage sets the process back to square one. Instead, growers could consider using cover crops, which can help dry out fields earlier by taking up soil moisture, increase water infiltration due to their root growth, and aid in the overall

development of soil health. Installing tile is another solution no-tillers have adopted to manage water in their fields. I think it's also important to note that even if no-tillers plant later, it doesn't automatically mean there will be a yield lag. And let's not forget that even if a yield lag does occur, growers may still earn a better profit over conventional tillage due to the reduction in equipment, labor and fuel costs required for tillage.

Final Thoughts I understand that no-till isn't a perfect practice — and there may be some instances where tillage is necessary to resolve a specific problem in a field — but I think tillage should be viewed as an ultimate last resort, after all other management options have been tested and failed. Given the damage tillage does to the soil and other aspects of the environment, suggesting that no-tillers consider tilling their fields to resolve certain issues without offering alternative solutions is disappointing. It's these types of articles I fear scare and discourage some growers away from trying no-till in the first place.

Links of the month

Click on the button to visit the website.

Please note you will need an internet connection

No-Till.uk
Case Study- A
Nuffield Farming
Scholarships Trust
Report

Flower power
prunes pests

Thriplow Farms Annu-
al Report XLIII – 2016:
Flattering to deceive

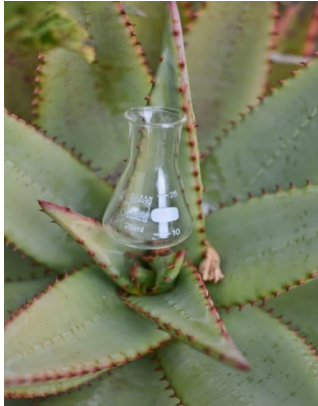
Dyland No-Tiller
Newsletter

Healthy soils for a
healthy, food secure
future

Direct evidence for
microbial-derived
soil organic matter
formation and its
ecophysiological
controls

Triticale: A Useful
Component of a Cover
Crop

Become a Soil Health Support Centre Associated Agricultural



Soil is the one universal linking all crops to a common denominator.

It is our mission to instil awareness of the fact that it is a vital extension of almost all facets of crop production influencing all phases of the growth cycle.

As Soil Health is our area of expertise, we aim to keep all agricultural consultants, associated with the Soil Health Support Centre, updated and informed of the latest research and knowledge associated with this very important, multi-disciplined science.

To achieve our objective, we will:

- conduct regular training sessions at no charge for Associated Agricultural Consultants interested in providing a soil health service to their clients
- assist Associated Consultants with the identification of specific problems in the field
- assist in establishing the gaps of nature-provided mineral and other resources and optimize the efficacy of the external applied shortfalls
- assist in finding solutions with the specific objective to improve the soil health of the client
- make our services available to conduct research projects aimed at solving specific problems
- assist with the selection of cover crop mixes to achieve a wide variety of objectives
- provide complete soil health test analyses for our consultants

Consultant

The training program starting in the new year (dates to be advised) will cover the following:

- The functions of a healthy soil
- Soil degradation and practices that exacerbate this
- Soil Microbiology - the driver of soil health (bacteria, fungi, protozoa, nematodes and other)
- Mycorrhizae
- Analysing soil health and how to interpret the results
- Cover crops
- Case studies

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Word 'n “Soil Health Support Centre” Geassosieerde Konsultant



Grond is die universele substraat wat as gemene deler vir alle gewasse dien.

Ons missie is om bewustheid te kweek dat grond 'n onmisbare komponent is van amper alle fasette van gewasproduksie, wat al die fases van die groeisiklus beïnvloed.

Omdat Grondgesondheid ons area van kundigheid is, het ons ten doel om al die landbou konsultante, wat met die “Soil Health Support Centre” geassosieer is, ingelig te hou oor die nuutste verwickelinge en navorsing in die belangrike, multi-dissiplinêre wetenskap.

Om ons doel te bereik, sal ons:

- gereelde, gratis, opleiding sessies hou vir Geassosieerde Konsultante wat geïnteresseerd is om 'n Grondgesondheids diens aan hul kliënte te bied
- Geassosieerde Konsultante help met identifikasie van spesifieke probleme in die veld
- help om gapings te identifiseer van natuur-voorsiende minerale en ander hulpbronne en om die effektiwiteit van toegevoegde hulpbronne te verbeter
- help om oplossings te vind vir spesifieke doelwitte om die Grondgesondheid van die kliënt te verbeter
- ons dienste beskikbaar stel om navorsing te doen met die oog op die oplossing van spesifieke probleme
- help met die seleksie van dekgewas mengsels om 'n wye reeks doelwitte te bereik
- 'n volledige Grondgesondheids analise vir ons konsultante beskikbaar stel

Die opleidingsprogram wat in die nuwejaar sal afskop (datums sal deurgegee word) sal die volgende dek:

- Die funksies van gesonde grond
- Grond degradasie en die praktyke wat dit vererger
- Grond mikrobiologie – die drywer van grondgesondheid (bakterië, swamme, protozoa, nematodes en ander)
- Mycorrhizae
- Grond analise – interpretasie van resultate
- Dekgewasse
- Gevalle studies

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Celebrating Soil Builders on World Soil Day



December 05, 2016 Lara Bryant
Expert Blog › Lara Bryant

Ranchers learn how to rotate their cattle to build better soil health.

December 5th is World Soil Day. If you've never taken the time to say "thank you" to your soil for all the good food, clean water, biodiversity, and carbon sequestration it provides, today's a good day to do it. Today, I'd like to thank the food producers who are actually building healthy soil and taking extra time to teach others how to do it.

I spent the past week attending the Southern Soil Health Conference in Belton, Texas, organized and led by Green Cover Seed and the White House Champions of Change Keith and Brian Berns. Keith opened the conference with a stunning call to rebuild 900 million acres of degraded American soils; Mr. Berns made it clear that it would take good leadership, preparation, and hard work to rebuild soils, but there was never any question that it can be done. NRDC has helped sponsor the conference for three years now, and this was my second time attending. Once again, I was awestruck by the leadership and dedication of the food producers who are putting their all into rebuilding healthy soils.

We kicked off the conference with a hands-on soil workshop at Green Fields Farm. (Read this NRDC guest blog by owners Jonathan and Kaylyn Cobb to learn more about the farm.) My first stop was the grazing tutorial; livestock are an important part of healthy soil management. The key is to use a grazing rotation that keeps cattle on a small portion of a pasture where they can graze intensively for a short time, then move on to the next paddock of fresh grass while the recently disturbed area rests. The disturbance is

actually good for the grass roots and the soil, mimicking the prairie ecosystems grazed by bison and antelope in the past. Producers learned how to calculate available forage dry matter in a paddock, and the number of cows to graze per acre. Jonathan Cobb demonstrated building a simple paddock with wire and stakes. I heard from a lot of producers who use this method, and all of them expressed that it's very low-stress, once you get the hang of it. "Put the cattle to work for you," one speaker said. The general concept is that if you graze cattle the right way, they will help create a healthier soil system and you will have better forage to feed your cattle throughout the winter.



Lara Bryant, NRDC

Demonstration of how to build a rotating grazing paddock at Green Fields Farm

Next, we took a closer look at the soil on Green Fields Farm. Healthy soil biology is important; earthworms, insects, fungi, and microbial life all play a part in building soil organic matter, breaking down manure, soil mineral balance, and pest control. The Cobb's soil has about 4-5% organic matter on average, up from 1-2% since they started using regenerative soil techniques about 5 years ago. Another key principal of good soil health is not to disturb the soil, and I heard that repeated throughout the conference. Healthier soil holds nutrients and filters water, so that water runoff from a healthy soil farm will be cleaner than farms that use conventional tillage methods. A nitrate strip test compared runoff on Green Fields farm to a neighboring conventional

farm, and the difference was clear—literally. Finally, we heard from a local commercial honey producer who is partnering with Green Fields Farm by keeping some of his bee hives on site. One of the benefits of healthy soil systems is that biodiversity goes to work to control pests and weeds, so farmers can cut back on the use of pesticides and other chemicals that are harmful to the environment. The [Walker Honey](#) bees that live on the Cobb's farm can do their important pollination work and make their honey without the danger of pesticides. Another recurring theme of the conference was the need to get away from



Earthworm casts are a sign of healthy soil



Clear runoff from Green Fields Farm compared to cloudy runoff from neighboring conventional farm. The red color on the paper nitrate test strips shows the high nitrate content of the conventional farm.



Walker Bees keeps hives on Green Fields Farm. Plant and insect diversity is a key principle of good soil health.



I held the future in my hands. Healthy soil feels and smells great.

chemical inputs. Eventually, pests become resistant to these chemicals and then they aren't effective anymore; meanwhile beneficial insect populations are decimated. Producers pay tons of money for pesticides and neonicotinoid treated seed, and it all ends up coming to nothing when the soil ecosystem isn't functioning anymore.

The good news is, soil is resilient and can be rebuilt with a little care. Most of the producers who spoke at the conference believe in working with nature instead of against nature. They want to protect the environment and be good stewards for land that their children will inherit. But that's not the only reason to get into soil health; many of the producers at the conference had a

moment when they realized that spraying and tilling over and over just wasn't working. The soil was depleted, and the expense and stress of continuous chemical inputs and tillage weren't cutting it anymore.

I'm very grateful that we have leaders like the Berns family and the Cobbs to show us how to build healthier soils. But there is still a lot to be done, and we all can play a part by being more engaged in our food system. Find out where your food is coming from, and purchase from producers and suppliers that use regenerative farming, as often as possible. At NRDC, [we are going to support their work by advocating for farm policies](#) that invest in healthy soil and a more climate resilient future.

Nitrogen pollution: the forgotten element of climate change

Published on EconoTimes website
Sunday, December 4, 2016 7:21 PM UTC

While carbon pollution gets all the headlines for its role in climate change, nitrogen pollution is arguably a more challenging problem. Somehow we need to grow more food to feed an expanding population while minimising the problems associated with nitrogen fertiliser use.

In Europe alone, the environmental and human health costs of nitrogen pollution are estimated to be €70-320 billion per year.

Nitrogen emissions such as ammonia, nitrogen oxide and nitrous oxides contribute to particulate matter and acid rain. These cause respiratory problems and cancers for people and damage to forests and buildings.

Nitrogenous gases also play an important role in global climate change. Nitrous oxide is a particularly potent greenhouse gas as it is over 300 times more effective at trapping heat in the atmosphere than carbon dioxide. Nitrogen from fertiliser, effluent from livestock and

human sewage boost the growth of algae and cause water pollution. The estimated A\$8.2 billion damage bill to the Great Barrier Reef is a reminder that our choices on land have big impacts on land, water and the air downstream.

Lost nitrogen harms farmers too, as it represents reduced potential crop growth or wasted fertiliser. This impact is most acute for smallholder farmers in developing countries, for whom nitrogen fertiliser is often the biggest cost of farming. The reduced production from the lost nitrogen can represent as much as 25% of the household income.

The solution to the nitrogen challenge will need to come from a combination of technological innovation, policy and consumer action.

The essential ingredient

Nitrogen is an essential building block for amino acids, proteins and DNA. Plant growth depends on it; animals

and people get it from eating plants or other animals. Nitrogen gas (N₂) makes up 78% of the air, but it cannot be used by plants. Fertilisers are usually made from ammonia, a form of nitrogen that the plants prefer.

A century after the development of the Haber-Bosch process gave us a way to manufacture nitrogen fertiliser, our demand for it has yet to level off.

The use of nitrogen fertiliser has risen from 11 million tonnes in 1961 to 108 million tonnes in 2014. As carbon dioxide levels continue to rise in the atmosphere, some plants such as grains will also likely demand more nitrogen.

Wheat with and without nitrogen fertiliser. Deli Chen/
The University of Melbourne

In fact, nitrogen from fertiliser now accounts for more than half the protein in the human diet. Yet some 50% of applied nitrogen is lost to the environment in water run-off from fields, animal waste and gas emissions from soil microbe metabolism.

These losses have been increasing over the decades as nitrogen fertiliser use increases. Reactive nitrogen causes wide-ranging damage, and will cause more damage if nitrogen losses are not reined in.

Faced with a growing population and changing climate, we need more than ever to optimise the use of nitrogen and minimise the losses.

From farm to fork

One way to understand our nitrogen use is to look at our nitrogen footprint – the amount of nitrogen pollution released to the environment from food, housing, transportation and goods and services.

Research by University of Melbourne PhD candidate Emma Liang shows Australia has a large nitrogen footprint. At 47kg of nitrogen per person each year, Australia is far ahead of the US, which came in with 28kg of nitrogen per person.

A high-animal-protein diet appears to be driving Australia's big nitrogen footprint. The consumption of animal products accounts for 82% of the Australian food nitrogen footprint.

Animal products carry high nitrogen costs compared to vegetable products. Both products start with the same cost in nitrogen as a result of growing a crop, but significant further losses occur as the animal consumes food throughout its life cycle.

The N-Footprint project aims to help individuals and institutions calculate their nitrogen footprints. It shows how we can each have an impact on nitrogen pollution through our everyday choices.

We can choose to eat lower nitrogen footprint protein diets, such as vegetables, chicken and seafood instead of beef and lamb. We can choose to reduce food waste by buying smaller quantities (and more frequently if necessary) and composting food waste. The good news is, if we reduce our nitrogen footprint, we also reduce our carbon footprint.

Back to the farm

In the meantime, efforts to use nitrogen more efficiently on farms must continue. We are getting better at understanding nitrogen losses from soil through micrometeorological techniques.

From sitting in the sun with plastic bucket chambers, glass vials and syringes, scientists now use tall towers and lasers to detect small changes in gas concentrations over large areas and send the results directly to our computers.

Eddy covariance tower. Mei Bai/ The University of Melbourne

We now know nitrification (when ammonia is converted to nitrate) is an important contributor to nitrogen losses and therefore climate change and damage to ecosystems. It is a process researchers – and farmers – are targeting to reduce nitrogen losses.

Nitrification inhibitors are now used commercially to keep nitrogen in the ammonium form, which plants prefer, and to prevent the accumulation of nitrate, which is more easily lost to the environment.

As this technology advances, we are starting to answer the question of how these inhibitors affect the microbial communities that maintain the health of our soil and form the foundation of ecosystems.

For example, our research shows that 3,4-dimethylpyrazole phosphate (better known as DMPP) inhibits nitrification without affecting soil microbial community diversity.

There have also been exciting observations that the root systems of some tropical grasses inhibit nitrification. This opens up a management option to slow nitrification rates in the environment using genetic approaches.

Solving the challenge of nitrogen use will require research into more efficient ways for primary producers to use nitrogen, but it will also need government leadership and consumer choices to waste less or eat more plant protein. These tools will make the case for change clearer, and the task of feeding the world greener.

The Obama Administration Announces New Steps to Maintain and Create Healthy Soils

December 5, 2016 at 6:02 AM ET by Parker Liautaud , Jo Handelsman

The White House Office of Science and Technology Policy is releasing a framework for Federal soil science, and announcing new actions to protect soil health.

Soil is essential to human life. Not only is it vital for providing most of the world's food, it also plays a critical role in ensuring water quality and availability; supports a vast array of non-food products and benefits, including mitigation of climate change; and sustains the biodiversity needed for ecological resilience. These roles make soil essential to modern life. Thus, it is imperative that everyone--city dwellers, farmers and ranchers, land owners, and rural citizens alike--take responsibility for caring for and investing in our soils. Given their importance, soil must be protected from degradation, as the alternative is the loss of an array of important ecosystem services.

Today, the White House Office of Science and Technology Policy (OSTP), in collaboration with Federal agencies and private-sector stakeholders, is announcing new steps to promote the long-term health and sustainable use of one of America's most important natural resources: its soil. The new actions being announced today aim to advance scientific understanding of soils to better care for them and their ability to support food security, climate mitigation, ecosystem services, and public health. These efforts focus on three key areas:

1. **Promoting interdisciplinary research and education**, to answer key questions on rates of soil genesis and erosion, the role of soils in bioenergy production, the development of advanced soil sensors, and research to better understand non-agricultural soils.
2. **Advancing computational tools and modeling**, to

improve analytical capacity and develop a robust predictive framework in studying soil properties, including pursuing a more sophisticated understanding of soil-carbon fluxes and the potential for soil-carbon sequestration.

3. **Expanding sustainable agricultural practices**, to ensure farmers and ranchers have the information and tools they need to protect and enhance agricultural soils and ensure global soils can continue to provide food security and climate benefits for future generations.

A full list of actions being announced today can be found here. They build on decades of experience, research, and conservation efforts of farmers, ranchers, and land owners along with States and the Federal Government. Since the 1930s, when the onset of the Dust Bowl led to the creation of the Soil Conservation Service, Federal agencies have invested tens of billions of dollars in soil conservation and research initiatives. During this Administration, farmers, ranchers, and land owners have increased the number of acres of farmland enrolled in the U.S. Department of Agriculture's (USDA) conservation programs by nearly 200 million acres. Federal soil-science efforts are not limited to agricultural soils—across the Federal research enterprise, more than a dozen agencies work to protect soils in rangelands, cities, forests, coasts, and other areas—often hand-in-hand with citizens, universities, local organizations, and other private sector partners.

Federal Strategic Plan for Soil Science

The National Science and Technology Council's Soil Science Interagency Working Group (SSIWG) is releasing today a Framework for a Federal Strategic Plan for Soil Science, which aims to identify needs, gaps, and opportunities in soil science; develop opportunities for expanding soil conservation practices and enhancing soil carbon sequestration; and coordinate Federal research priorities for the future.

The Framework identifies three overarching "Challenge and Opportunity" categories: (1) land use and land cover change; (2) unsustainable land management practices, and (3) climate and environmental change. In response to these challenges, the SSIWG makes five recommendations for future research priorities, focusing on: (1) improving data storage and analytics tools, (2) studying the influence of soils on the global climate, (3) expanding long-term coordinated research programs on land use and land cover change, (4) supporting the applied social sciences, and (5) developing programs to minimize unsustainable land management practices.

More than a dozen Federal agencies, including four USDA agencies, collaborated to develop the Framework. In writing it, members considered input from diverse stakeholders from academia, industry, non-profit organizations, and the agricultural community who attended an OSTP Soil Science Workshop on August 1, 2016. Today, the National Science and Technology Council, on behalf of the SSIWG, published a Request for Information in the online Federal Register seeking public comment on the Framework. The public comment period is open until January 10, 2017.

New and Expanded Federal Actions to Support Soil Science

In support of the development of the Framework, several Federal agencies will launch or expand research, education, and conservation programs. A few examples of the diverse projects announced today include:

- \$20 million in new investments in interdisciplinary soil science by the Department of Energy (DOE)'s Pacific Northwest National Laboratory.
- The expansion of more than two dozen soil-focused research projects led by USDA's Agricultural Research Service.
- A memorandum of understanding between DOE's Advanced Research Projects Agency—Energy (ARPA-E) and The Nature Conservancy to boost the development and deployment of soil-carbon sequestration and crop breeding technologies.

- New educational materials developed by the Smithsonian Institution to teach up to 6.5 million students across more than 1,400 school districts children about the effects of, and solutions to, soil erosion.

External Actions in Response to the Call to Action

Numerous universities, businesses, and non-governmental organizations developed new projects in response to OSTP's Call to Action to protect soil resources. These actions include new research initiatives in a wide range of academic disciplines across the earth and life sciences, expanded soil conservation practices on more than 8 million acres of agricultural land, and technology and knowledge transfer to help thousands of farmers in Kenya and Rwanda better protect their soils. Specific examples include:

- A \$200 million effort from Fall Line Capital to expand modern soil conservation practices, including through the use of precision agriculture tools, onto degraded agricultural land.
- The creation of the Southern Urbanism and Policy Initiative, a collaboration of more than 15 organizations led by the University of Alabama, which aims to develop innovative strategies to sustainably manage urban soil resources and restore soil health in cities.
- New faculty hires at Colorado State University, the University of Alabama, and Oregon State University in fields related to soil science, with research foci ranging from the applications of big data in sustainable agriculture to the development of passive sensors for measuring soil pollutants.
- A collaboration between Patagonia and The Carbon Underground to restore soil health to 4 million acres of agricultural land.

The combined efforts of Federal and private-sector initiatives announced today will have a substantial impact on ensuring the sustainability of soil resources in the United States and around the world. Collectively, they will help build a more sustainable and resilient future.

Jo Handelsman is Associate Director for Science in the White House Office of Science and Technology Policy



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