Issue/Uitgawe 109

UPCOMING EVENTS FOR 2023

- 11TH CAWC/BLWK CONFERENCE: 1-2 AUGUST
- SSK WINTERGRAANDAG RIVERSDALE: 23 AUGUST
- SKOG FARMER'S DAY LANGGEWENS: 24 AUGUST
- HOPEFIELD FAMER'S DAY WATERBOERSKRAAL: 1 SEPTEMBER

2024

- 9TH WORLD CONGRESS ON CONSERVATION AGRICULTURE: 22-25 JULY

blwk - cawc

APRIL 2023

BLWK/nuusbrief CAWC/newsletter

Inhoud/Contents

VOORWOORD/PREFACE

Hallo almal,

'n Derde van die jaar is amper verby en oral het daar goeie reën geval, selfs in die Swartland. Vir die eerste keer in 'n lang tyd kan ons voor plant onkruidbeheer doen op die proewe by Langgewens. Op Tygerhoek het die dekgewasse al ontkiem en staan daar n belowende stand. Ons hoop en vertrou dat planttyd julle almal goed sal behandel en dat die seisoen sommer bakgat gaan wees.

Let asb op die datums van al die groot boeredae en konferensies vir die jaar.

Groete van huis tot huis.

Hello everyone,

With all the rain we received on both sides of the Western Cape production area, planting has begun, especially in the Southern Cape. Nearly a third of the year is done; amazing! It is the first time in a long while that we were able to do pre-plant weed control at the Langgewens trial site, and with the excellent rain, the cover crops are already germinating at Tygerhoek. We wish you all a successful planting season and hope that the season treats you well.

Please remember to look at the important farmers' day and conference dates during the year and make a note in your calendars.

All the best!

Dr Johann Strauss

EDITOR

LINKS OF THE MONTH

02

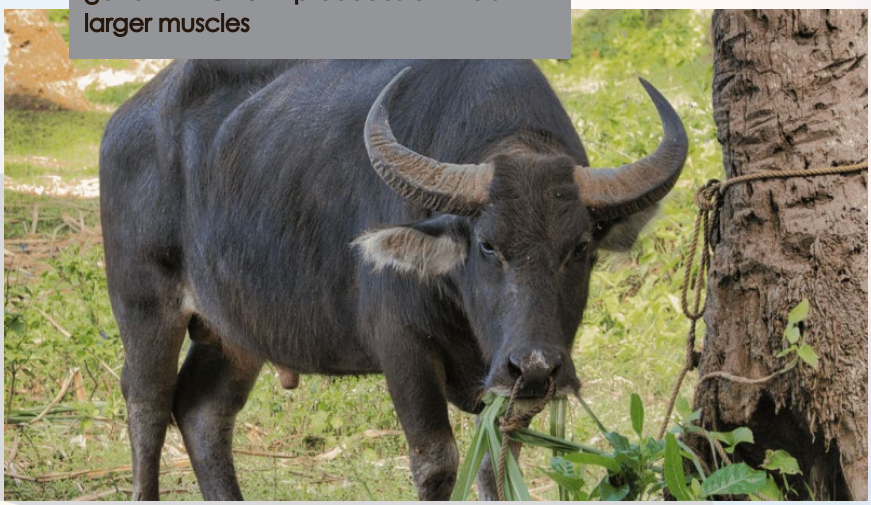
CLICK ON THE BUTTON TO VISIT THE WEBSITE. PLEASE NOTE YOU WILL NEED AN INTERNET CONNECTION.

Seminar: Can we reduce dependence on herbicides for cropping? A Canadian perspective

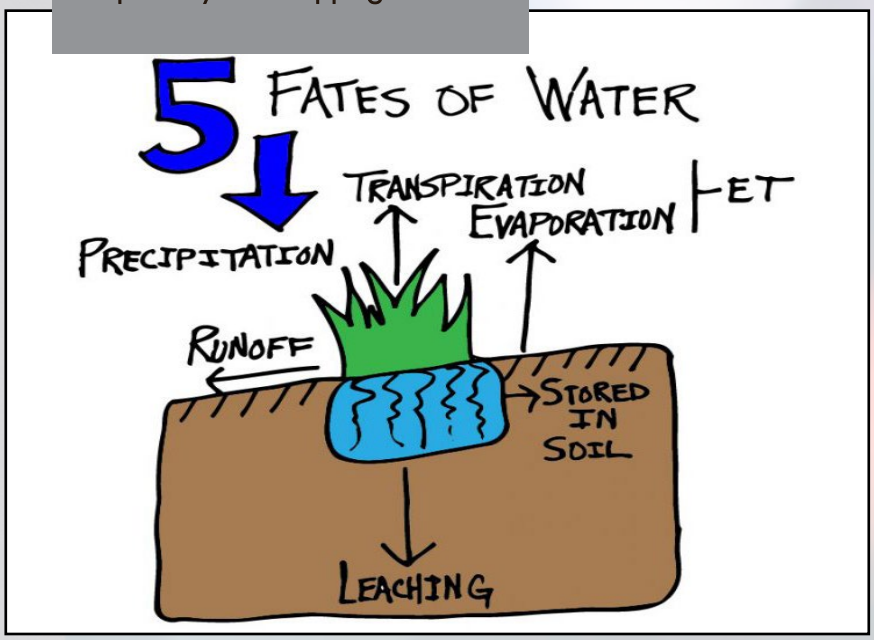
Nematodes are very hardy and fascinating animals. They are microscopic roundworms* that live in the soil.

grounded in SOILS
published by the Canadian Society of Soil Science

30% more meat: Switching off just one gene with CRISPR produces animals with larger muscles



Water Use Limitations of Cover Crops in Dryland Cropping



New "Potato-LITE" project aims to deliver novel, sustainable cultivation approaches to minimise tillage intensity throughout the UK

ARE WE GAINING GROUND AGAINST HERBICIDE RESISTANT WEEDS?

AUTHOR: CINDY BENJAMIN
MARCH 14, 2023

There's no doubt that weed management is a numbers game, first and foremost. Overlooking this fact is the underlying cause of herbicide resistance.

Dr Ken Flower, director of the Australian Herbicide Resistance Initiative, says random weed surveys carried out in Australia since 2003 show an upward trajectory in the percentage of samples that register as resistant or developing resistance to a suite of common herbicides.

GRDC invests in a national herbicide resistance survey led by Dr John Broster at CSU with teams from DAF Qld, Adelaide University and UWA. "In Western Australia, for example, in 2020, random surveys conducted by AHRI's Dr Mechelle Owen found over 70 per cent of wild radish samples had some level of resistance to diflufenican and 2,4-D," Ken says.

"In annual ryegrass, over 90 per cent of samples were resistant or developing resistance to diclofop. Between 2015 and 2020, glyphosate resistance in annual ryegrass has jumped from 1 per cent to about 12 per cent."

The jump in glyphosate resistance is likely due to increased applications of glyphosate in herbicide-tolerant canola hybrids and in summer fallow spraying programs. "Herbicides are by far the most efficient weed control tactic to apply over large tracts of land, and, understandably, growers rely heavily on herbicides. Unfortunately, this is how herbicide resistance gains a foothold," he says.

"Rather than just looking for new broadacre herbicides or technological fixes, we need to get better at locating and mapping the weeds that escape the main control tactics. Treat weed patches in the current crop to stop seed set and strategically in future crops." Herbicides work more effectively when crop competition does the heavy lifting to suppress weed germination and seed set.

The WeedSmart Big 6 is built on robust and diverse crop rotations where each crop provides opportunities to drive down the weed seed bank. Monitoring and managing individual weeds or small patches is essential in an effective control strategy.

HOW CAN WE GET A BETTER BANG FOR OUR HERBICIDE BUCK?

In brief:
Less herbicide overall, with more-targeted application. Unfortunately, 30 or 40 years of integrated weed management research has not reduced the reliance on herbicides in Australia (or elsewhere).

The details:
Herbicides are the most heavily used agrochemicals in Australian agriculture, with over six applications per paddock per year, on average, in WA broadacre cropping systems.

Worldwide there is increasing pressure to reduce the quantity of agrochemicals applied. Some countries are banning certain products, and the European (Union) Green Deal Farm to Fork Strategy has set a target to halve agrochemical use by 2030.

Similarly, the WA Agricultural Research Collaboration has an aspirational target for the state's grain farmers to produce an average crop of 25 million tonnes per annum by 2035, using 50 per cent less fertiliser, crop protection and fuel inputs compared to 2022 inputs.

Precision agriculture in low weed environments may go some way to achieving such targets. Efficient scouting and identification of individual weeds and weedy patches for targeted control with herbicide or non-herbicide tools will be the basis for success, but it is easier said than done.

WHAT IS THE ULTIMATE CHALLENGE IN PRECISION WEED CONTROL?

In brief:
Weeds that mimic the crop are the ultimate challenge for in-crop weed detection.

The details:
Green-on-green optical spraying is revolutionary technology and a valuable addition to the weed management toolbox. Like all other tools, it has limitations and will apply selection pressure to favour weeds that look most like the crop or can 'hide' beneath the crop canopy and still set seed.

We see this phenomenon in hand-weeded rice paddies overseas, where barnyard grass can proliferate because it is difficult for workers to distinguish between the crop and weed.

Green-on-green weed detection requires the support of other tactics to reduce selection pressure on weeds.

Another way to reduce herbicide reliance is to harness some of the new molecular technologies and genome mapping of our main weeds. Who knows, it may even be possible to reverse herbicide resistance.

WHAT SHOULD BE MY WEED CONTROL FOCUS FOR THIS SEASON?

In brief:
Use whatever means you have available to map weedy areas and treat them differently to the rest of the field.

The details:
Mapping weed patches over time helps you gauge the success of tactics you implement. Consider using cultural controls such as very high seeding rates to increase crop competition, even at the expense of increased screenings for a small portion of the paddock.

Inter-row cultivation or crop topping may be other options to consider. Running down the seedbank in targeted areas needs to factor in potential seed dormancy, so be prepared to treat these patches for several years in a row.

HIGH FIBRE WHEAT TO ENTER THE AUSTRALIAN MARKET WITH SIX TIMES MORE FIBRE THAN STANDARD WHEAT FLOUR

LEADING FLOUR AND BAKERY MANUFACTURER ALLIED PINNACLE ANNOUNCES EXCLUSIVE RIGHTS TO CSIRO-DEVELOPED HIGH FIBRE WHEAT THAT YIELDS FLOUR WITH SIX TIMES THE FIBRE OF REGULAR FLOUR.

Australia will soon have access to High Fibre Wheat – a natural grown wheat that is high in amylose, where the resulting flour contains six times more fibre than standard wheat flour, without any compromise on taste. Currently grown by wheat farmers across Australia, the wheat was developed over 20 years by Arista Cereals, a joint venture between Australia's national science agency, CSIRO, and French farmer-led cooperative, Limagrain.

It will enter the Australian market in 2023, available exclusively through Allied Pinnacle, Australia's leading flour and bakery manufacturer, who have exclusively licensed patents for High Fibre Wheat in Australia.

In a first of its kind, High Fibre Wheat delivers health benefits for consumers relating to both the amount of fibre, and the type of fibre, specifically for good gut health. The naturally high fibre content is delivered through conventional breeding to provide more resistant starch than traditional wheat, with a host of preventative health benefits.

Allied Pinnacle CEO David Pitt says, "We are investing in the future health of Australia by bringing the CSIRO-developed High Fibre Wheat to Australians. Unlike other 'healthy' flours, High Fibre Wheat and the resulting flour it yields, looks, tastes and bakes like regular flour, answering consumer demand for healthier products that don't require any new eating habits. It's a true grain to table solution that we're proud to provide."

The Australian Dietary Guidelines recommend Australians consume 3-4 serves of grain foods a day, choosing at least half as wholegrains or high fibre grain foods.

Allied Pinnacle General Manager Innovation Robyn Murray says, "We know consumers are looking for healthier choices that are minimally processed. Using High Fibre Wheat in your favourite grain foods is an easy way for Australians to increase their intake of fibre without having to sacrifice taste or texture. This is a big win for the grain food industry and the Australian consumer." High Fibre Wheat products are already available in the US and currently being developed in both European and Japanese markets. Allied Pinnacle business owner Nisshin Seifun Group, a trusted global company that builds the food infrastructure of the future, has the exclusive rights to High Fibre Wheat in Japan.

On the Australian partnership Arista CEO Eric Vaschalde says, "Following the introduction of this High Fibre Wheat in the USA, Japan and Europe, I am delighted to announce a long-term partnership in Australia, home of our shareholder CSIRO. Thanks to Allied Pinnacle, High Fibre Wheat flour will be soon available to the Australian market. Consumers will now be able to enjoy the benefits of increased fibre in their favourite white bread, using only wheat, with no compromise to taste."

For more information, please contact humann. comms: Melissa Shedden on melissa.shedden@humanncomms.com or 0481 459 850 and Seon Peberdy seon.peberdy@humanncomms.com or 0400 000 064.

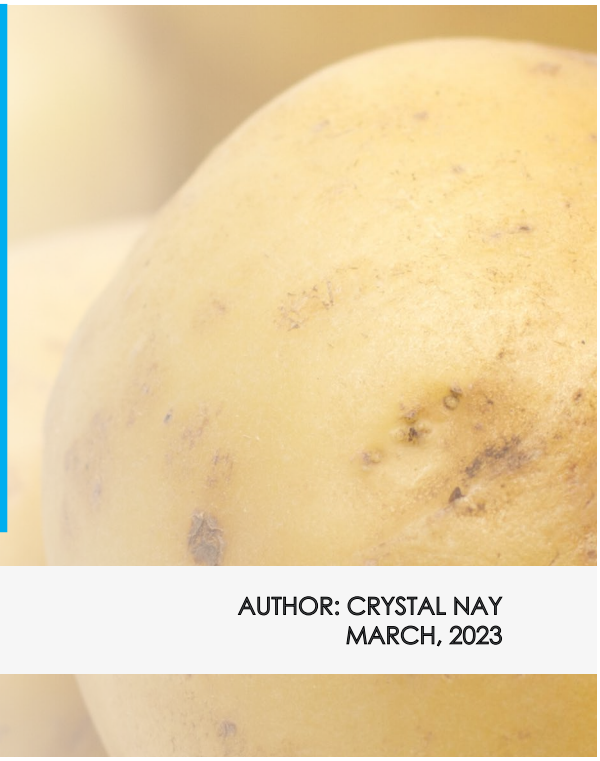
ABOUT ALLIED PINNACLE

Allied Pinnacle is a world-class flour milling and bakery business with more than a 100 year history. We bake the future from flour. Backed by Japan's largest milling business, Allied Pinnacle transforms Australian grains into iconic and much-loved household products, providing market leading solutions from grain to table. Visit www.alliedpinnacle.com

ABOUT ARISTA CEREAL TECHNOLOGIES PTY LTD

ARISTA is a joint venture company formed by Limagrain, a cooperative, founded and directed by farmers, and a world player in wheat breeding, and the CSIRO, Australia's national science agency and one of the largest research agencies in the world. With the Grains Research and Development Corporation, the companies began collaborating in fundamental research in wheat starch more than 20 years ago and joined their efforts and expertise in 2006 to develop and commercialise wheat with direct consumers. Visit www.aristacereals.com. This media release was first published on Allied Pinnacle's website

REDUCING NITROGEN TO IMPROVE SOIL AND PLANT HEALTH



AUTHOR: CRYSTAL NAY
MARCH, 2023

COULD TOO MUCH N BE CAUSING PROBLEMS IN POTATO FIELDS? ADVANCING ECO AGRICULTURE SAYS YES.

Potato health and marketability are constants at the forefront of growers' minds. Whether it's high bruise-free percentages and high yields or the reduction of roadmapping in colored potatoes, potato health and soil health go hand in hand.

While there's a historical approach of farming culture that developed around treating symptoms, boosting soil health and reducing the application rate of nitrogen (N) on a field could increase overall improvements. But the reduction in N use can be a scary proposition, particularly if there is conflicting information and a questioning of long-held farming beliefs.

"There is very little attention given to the idea that too much nitrogen is a cause of problems," said Kevin Tulley, farm consultant at Advancing Eco Agriculture. "Both nitrogen and potassium overapplication cause some of the biggest problems for farmers." What happens when too much nitrogen is applied, explained Tulley, is that plants grow in an overly vegetative way, instead of in a reproductive fashion. And when they are grown in that way — with very high levels of N — they can develop weak, watery cells that are more susceptible to disease.

"The plant can't process it all," said Tulley, "so then you have these unprocessed forms of nitrogen floating in the sap, specifically nitrate and ammonium, and that's what brings in pests and disease." This is what can attract aphids and mites, and can make plants susceptible to mildew. But when nitrogen is more accurately managed for the plants' actual needs, the nitrate and ammonium are processed into amino acids, peptides and proteins.

When all that nitrogen is converted, the plants are inedible to these sucking and chewing insects, said Tulley. Tulley has seen reduced N in a field yield amazing results, sometimes with half or less than half of traditional recommendations. When used in combination with applied micronutrients, insect infestations and the need for pesticides were reduced. "There can be pests all around, and in all the pivots, but no pests in these fields. It's shocking," he said. Sap analysis has been available for a number of years, but it's still new enough to the industry that it isn't standard practice. It is, however, gaining traction as a more accurate method to determine the needs of the plant. Tissue analysis is still the norm, but in comparison, it paints a more historical view of what's been nutritionally built into the leaf prior, in addition to what's currently present. A sap analysis is more akin to a blood test, providing a view of what's running through the plant now, with an up-to-date, real-time data point.

"We use sap analysis to realistically determine what sort of nitrogen applications are needed, because it's going to be different from field to field and crop to crop," Tulley said. "There isn't a magic number of what the right amount of nitrogen is. We test, the plants tell us, and we go from there." Another significant piece of this puzzle are the micronutrients used to process the nitrate and ammonium into proteins, and sap analysis is also used to determine which micronutrients are missing so they can be supplied.

CHANGING THE TRADITION

Reevaluating historical practices can have a positive effect for growers. Take, for example, pesticide sprays. If growers have the resources, it's better to spray reactively based on scouting rather than prophylactically based on the calendar, said Tulley.

So, what would a season look like? A biological application would follow a fall fumigation to reestablish biology. Then, at planting, there would be a reduction in nitrogen with a stronger biological planter band accompanied by a biological seed coat.

"Growers can still do the biological planter band even if they're using mancozeb or other fungicides on the seed," said James Dunlop, Advancing Eco Agriculture consultant. "The biological planter band will still be effective."

COMBINING BIOLOGY WITH CHEMICAL SPRAYS

If the introduction of biology is followed up with something like a broadleaf herbicide or fungicide, how are these two methods supposed to work hand in hand?

It's a legitimate question, said Tulley, and in his experience, the workaround has been to follow up chemical sprays with the reintroduction of biology.

For potato growers, the reintroduction of biology often translates into stronger, healthier potatoes, which can increase bruise-free percentages. When there's been too much applied N contributing to those leaky cells, potatoes become less dense and less durable.

IMPORTANCE OF CALCIUM

Both Tulley and Dunlop stress the importance of calcium (Ca) in potatoes, and if there is an over application of potassium, calcium uptake will be inhibited. "If there's a ton of potassium in the soil, the plant will uptake that instead of the calcium," said Tulley. "Just like nitrogen, potassium contributes to vegetative-dominant growth."

Calcium is important for stronger cells early in the potato growth cycle, as cell walls and membranes require high levels of calcium. If the soil environment supports the uptake of calcium, potatoes will make more cells, allowing them to be firmer, denser and less prone to bruising.

The potassium-calcium relationship is one of the most important ones Tulley and Dunlop come across, and this is true for a lot of different crops. "We typically want a lot of calcium early on in the season, like with tuber initiation, but then after that, when we're bulking, then it's okay to have some potassium out there," said Dunlop.

A lot of this has to do with timing, and there is often plenty of nitrogen available for young plants because bacteria are still working in the soils over the winter period. Sap analysis can accurately confirm (or refute, depending on the field) a farmer's ability to reduce upfront nitrogen.

Underneath all these systems is an overall goal to increase yield and ROI while ximproving soils and plant health. It's a ripple effect, where growers can take money that would have been spent on nitrogen and apply it toward soil biological inoculants and micronutrients that improve overall plant health. "We try to farm in a way that supports the biological system," Tulley said.

A reduction in N and increase in Ca in preplant and early growth often produces healthier, more resilient potatoes.
Photo: Advancing Eco Agriculture

SHORT COMMENTS

Tira Cole

As someone who has studied environmental science, I am so tired of hearing that cow farts are causing climate change. The public is misinformed because they are fed their "science" from news headlines. Here are some facts based on real science.

Greenhouse gases are Carbon dioxide released during ploughing, cutting trees and burning fossil fuels; Methane mostly from rice farming and cow belches (not farts – yes, I'm nitpicking); Nitrous oxide from fertilisers Because of the amount of heat each of these gases traps and the length of time each stay in the atmosphere, these can be measured in terms of greenhouse warming potential.

The carbon cycle is one of the first things we learn in environmental science. Above, I acknowledged that cow belches emit methane. Methane contains carbon and is part of a natural carbon cycle – think about how many buffalo used to roam the plains. Notice the word "cycle". Cattle transform existing carbon from grass into methane as part of their digestive process. After about ten years, the methane is broken down into water and carbon dioxide, which then gets taken up by more grass to continue the cycle. This is how nature works! On the other hand, fossil fuels come from ancient carbon locked underground for millions of years and should stay there. When this carbon is released into the atmosphere, it remains for thousands of years.

Studies show that atmospheric methane has levelled off, even though the number of cattle has increased! The plant-based industry wants you to believe that 18%–51% of greenhouse emissions are due to cattle. It is not! The EPA states that it is 2%. All livestock is only 3.9%.

Compare this with crops 4.7%, industry 21.6%, electricity 28.4% and transportation 28.5%. You can find all the science that backs this up in Sacred Cow, by Diana Rodgers (@SustainableDish) and Robb Wolf (@ robbwolf), as well as a whole lot more detail.

If you read the book, you will learn how cattle can benefit the environment! The book also addresses ethics and nutrition. It's time we stop blaming meat for what fossil fuels are doing.

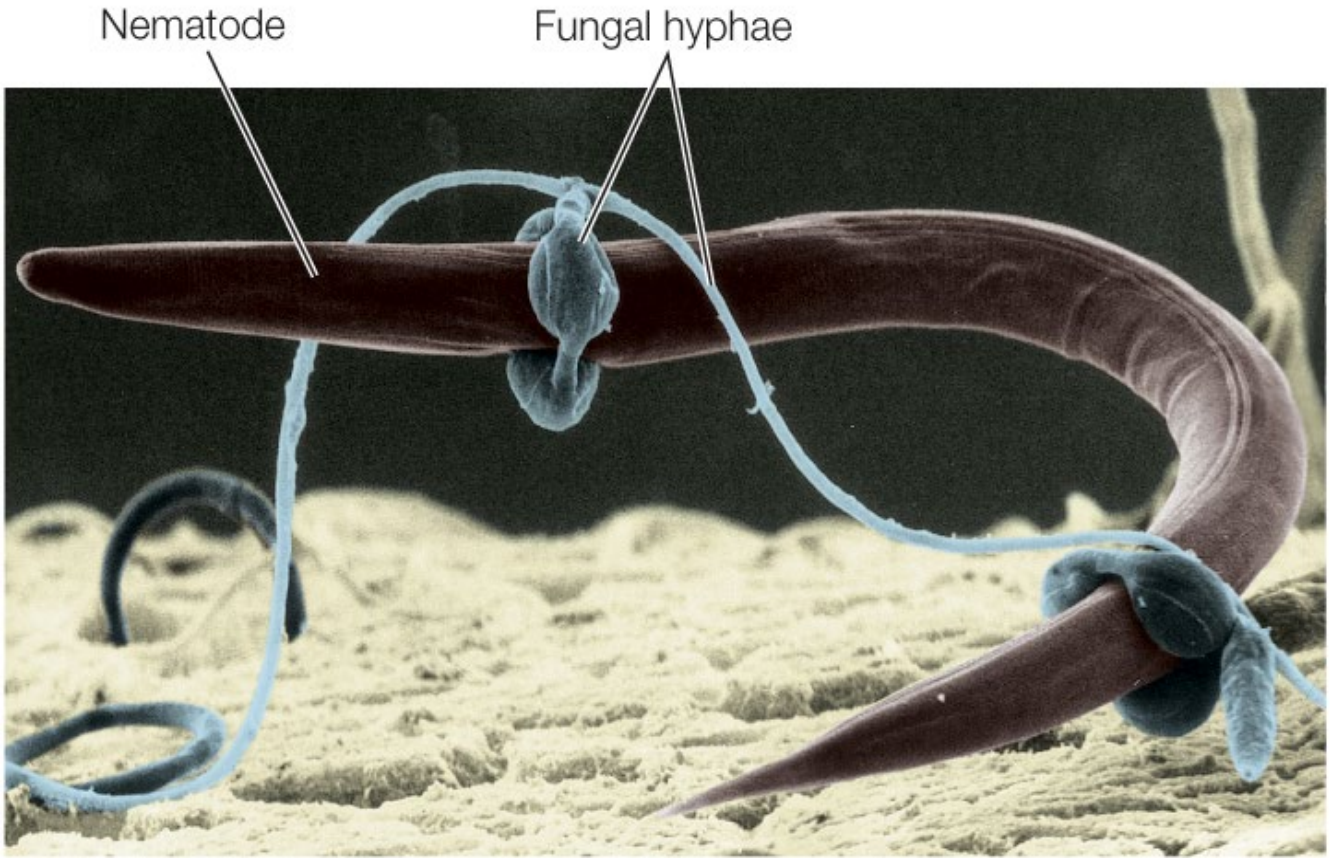
SHORT COMMENTS

Sam Knowlton

A soil-dwelling nematophagous (nematode-eating) fungus trapping and consuming a pathogenic nematode. These specialist fungi detect the presence of nematodes in the soil by perceiving the pheromones the microscopic worms use to communicate.

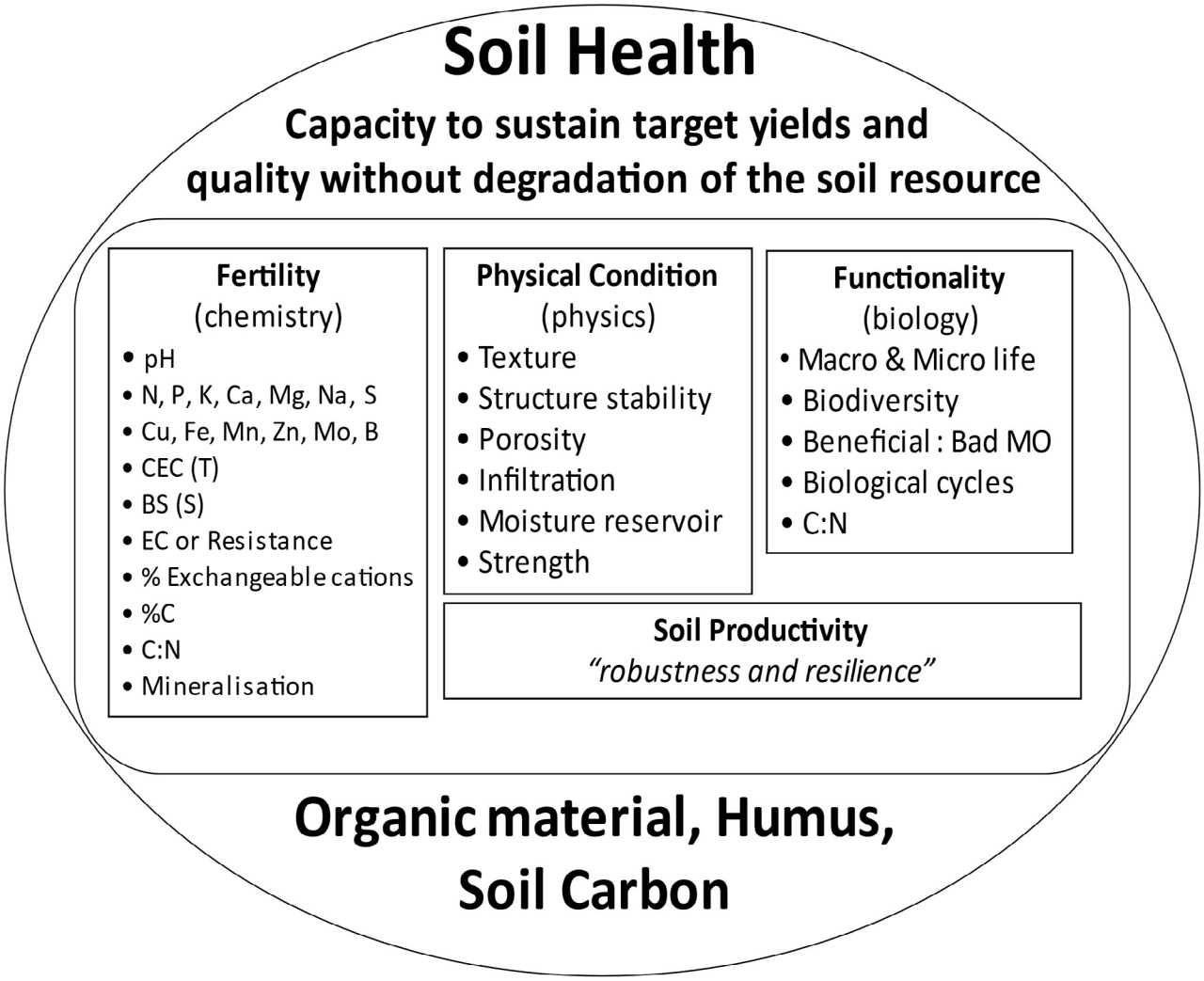
The fungi modify their hyphae into hooklike snares to trap and constrict their prey. When the snare is ready, the fungi lure the pathogenic nematodes in by producing olfactory cues that mimic those nematodes used to eat and reproduce. Then the nematode slithers through the snare, and the fungal hyphae constrict, immobilising the nematode.

Sometimes referred to as carnivorous, nematophagous fungi exist in healthy soil ecosystems and provide a vital bio-control against pathogenic nematodes that would otherwise cause significant crop damage. And to think we've only named and described ~2% of the life in the soil...meat for what fossil fuels are doing.



SOIL IS LIFE: "BOKANT DIE DWARSLAT"

PETER GREEFF



In nature, life in the soil is sustained by the constant supply of organic matter in the form of leaf litter and decayed roots from the diverse covering vegetation, e.g. deciduous trees and annual grasses.

This plant material is the food source for the macro and micro-organisms which abound in the litter layer and topsoil horizon. In this note, we look at the role of the soil as a component in a sustainable farming system.

Since the UN report on issues regarding global sustainability, the soil science fraternity has developed a holistic approach to soil, land use and best management practices. Soil Health is a modern concept whereby the capacity of the soil (a more substantial factor than soil potential) within a managed ecosystem, i.e. the farm boundaries, is linked to the achievement of sustainable outcomes in farming systems and healthy habitats.

This concept is presented as a mind map whereby the soil's various chemical, physical and biological properties are integrated with the productivity level of the relevant units to create an exponential strength to support the farming system.

The presence of organic matter (soil carbon content) is the energy source for the various forces at play in a unit of soil.

A standard soil analysis reflects the status of the various chemical properties in the relevant sample, e.g. pH, salt load, phosphorus, potassium, calcium, magnesium and trace elements.

The ability of the soil to supply the essential nutrient elements required for plant growth is merely the fertility status. Farmers can supplement deficient levels using fertilisers and other soil ameliorants. Oversupply will have a knockdown effect on the overall quality of the soil.

The physical status of the soil unit is equally important. Porosity (macro- and micropores) allows for water and air infiltration throughout the profile. This movement facilitates the distribution of nutrient elements (in an ionic state) and micro-organisms.

The critical factor here is the stability of the aggregate units. This condition is primarily the result of the binding properties of humic substances, fungal hyphae, and calcium. Oxygen is present well aerated and drained soils, i.e. 19 to 21 per cent.

The biological properties of the soil have been overlooked during the post-WWII years. Yield increases were attributed to good ploughing and plenty of fertilisers. Concerned voices that raised the issue of habitat destruction and degradation of the soil base were ignored.

As proof of these issues became evident, coupled with the energy crisis in the seventies, change has become invertible - we are now at that point where soil biological functionality must be understood and nurtured by all land users.

We need a healthy and diverse spectrum of soil bacteria, fungi and mites. These organisms need carbon compounds as their food source. Tiny organisms, e.g. protozoa, eventually are stable food for the microscopic mites in the soil pores.

Resilience and robustness regarding soil quality result from sound ecologically based land use management and a high level of biological activity maintained in the soil. Soil productivity is sustained by adding organic matter through "mulches" or aggressive levels of compost. The organic matter on the surface is transformed into humus in the soil as the result of the everyday life activities of all the organisms.

Take a block of undisturbed soil and examine it with a 10x magnification lens. Tread carefully. You will be astounded by what suddenly becomes visible, i.e., life in the underground.

"Die dag wat jy te ruste kom, word jy in goeie of vrot grond begrawe?"

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