

SOIL pH IS THE BIG ISSUE

ELEVATING SOIL pH IS ONE OF THE MAIN GOALS IN WA'S WHEATBELT.

But there's a salient message for Australian wheatbelt farmers dealing with the jigsaw puzzle of growing crops and pastures.

According to long-time Ausplow associate and soil chemist Dave Seagreen, there's part of the jigsaw puzzle missing that relates to balanced soil pH (percentile hydrogen), and that's calcium.

It is not just any calcium it has to be calcium carbonate "Until very recently, growing crops and pastures has been mainly a N,P,K story with the common trace elements such as copper, zinc, molybdenum, manganese, etc.," Dave said.

"But productivity is measured by the amount of calcium in the soil because it is one of the main movers of nutrients in the soil; it makes everything happen and it has been described as the prince of nutrients.

"There's a huge interplay between calcium, nutrients and microbes, which sets up a symbiotic relationship leading to building soil humus, carbon building and retention of moisture.

"Calcium is one of the main keys, although I am quick to acknowledge it's not a silver bullet.

"And that's where soil pH comes into the story because levels below 4.5pH, expressed as calcium chloride, makes it impossible to build soil humus.

"The ideal is a soil pH of 5.5 and upwards which is where we see calcium really switch on."

The problem is that calcium is not naturally occurring and is probably why it is neglected in discussions on nutrients in the soil.

According to Dave, typical sandy soils such as those in WA have calcium concentrations between 300 and 400 parts per million (ppm), with some areas as low as 150ppm.

"The Holy Grail is about 1800ppm," Dave said.

It is true that lime can increase calcium levels but until recent years the issue was that lime quality was "not great" and it was spread on the soil surface, effectively of no use to subsoil.

"It has to be incorporated to depths between 300 and 400 millimetres," Dave said. "And that's a very costly operation which a lot of farmers simply cannot afford to do.

"With a lot of our lime, which is dispensed in a bigger micron form, soil pH changes are minimal particularly if the lime particles are too coarse and can remain unreactive for years. Surface area is key to lime reactivity.



While precision seed establishment is vital for improved crop production, it goes hand-in-glove with balanced soil pH.



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"This in turn means calcium will may remain unreactive for years in a low pH environment, resulting in little reaction with the microbial community, thus inhibiting soil humus growth."

One of the issues with lime, which Dave says is now coming into focus, is lab testing.

Farmers send in a soil sample for soil pH testing, with coarse lime particles present.

"Generally, the soil particles are ground down to a smaller form for testing and suddenly the lime becomes available in lab tests," he said. "So, there's a potential error between land and lab that can create a false positive.

"Fortunately, things are changing and some labs are now altering changing their testing protocols because of this issue.

"However, unless the correct lab protocols are used, there is a danger that farmers may think they have sufficient lime when in fact they don't.

"So there needs to be a lot more focus on soil pH while keeping in mind that there are a few complications such as the high use of nitrogen, which decreases soil pH.

"The main reason there's a high demand for nitrogen throughout the world, is because of quick visual results.

"Getting a good calcium magnesium ratio - provided the calcium and magnesium levels are good - will increase the nitrogen performance thereby making pH management a little easier.

It has been surmised by well-known US agronomist Dr Arden Anderson, that the overuse of nitrogen is the wrong pathway.

He told Australian farmers two years ago at a conference in Queensland that agriculture should be calcium-led not nitrogen-led.

IN THE NEXT ISSUE OF AUSFACTS DAVE WILL CONTINUE ASSESSING THE ROLE OF CALCIUM AND ITS IMPORTANCE IN A BIOFURROW™ 'POT PLANT' ENVIRONMENT.

HOLISTIC FARMING CAN INCLUDE BIOFURROW™

KWEDA AND DBS OWNER JEFF EDWARDS BELIEVES A HOLISTIC APPROACH IS HIS BEST PATHWAY TO A SUSTAINABLE AND PROFITABLE FARMING ENTERPRISE.

The family crops 5000 hectares and manages 3000ha of pasture, running 6500 Merino breeding ewes, 'maxxing' out the flock at 14,000 head.

Soils comprise mainly duplex sandplain with some heavy country.

The holistic approach comes from Jeff's desire to improve soil health.

He is a big fan of digging soil pits which have revealed weaknesses in the sandplain soils.

"I have always been concerned about the impact of current farming systems on soils, particularly from chemicals, compaction and other practices," he said.

"If we want to keep producing more from less rainfall, we really need to look at our soil health and what is happening down at depth, not just on the surface.

"That's why I believe the Ausplow hypothesis of the BioFurrow™ is credible.

"To me it's a logical way to increase soil health, which is my main goal.

"And if I can achieve that I will be evening out the highs and lows of seasons with improved water-use efficiency during the growing season."

While Jeff is a strong advocate of the DBS he also believes that there is a "first step" before setting up the BioFurrow™, which is basically near-row sowing but using the same "pot plant" created by the DBS each year.

"Digging the soil pits showed me our subsoils were basically dead and that's why I started incorporating lime and gypsum," he said.

"Last year I used a Bednar Terraland to mix the gypsum and lime on a 500ha test paddock at a depth of 450 mills and then sowed with the DBS.

"The result was very encouraging and the return on investment was definitely there with a one

tonne a hectare average above yields we got in the paddocks we didn't work.

"And we have seen faster elevation of soil pH in the 500ha paddock moving to around 5.5pH.

"This year we will rip lime in at 250mm as we expand our trial to 1000ha.

"The 60-foot DBS on 10 inch spacings easily handled the softer area we Terralanded; we just fitted the bigger 90mm press wheels and reset the chocks so there was no room for error.

"Next year we may have a crack at setting up for near-row sowing employing the BioFurrow™ hypothesis.

"My thoughts are that if we do set up for the BioFurrow™ we will bring country into that regime after we have set it up with lime and gypsum applications.

"This year we'll trial cross-tracking (sowing at an angle over last year's plants) and assess. (Jeff doesn't see stubble issues because crops are harvested at beer can height and stubbles grazed).

"It makes sense to me to get the soil in a better state before we start on the BioFurrow™.

"And I think there should be more focus on the plant availability of nutrients which logically involves having healthy populations of micro biota in the soil.

"Soil health is our main goal because it will lead to increased profits with more stable production in moisture-limiting years.

"Importantly financiers will be on board because of that and the resultant increase in land values."



Kweda farmer and DBS owner Jeff Edwards says his main goal is improving soil health on his property.

DBS IMPROVES SOIL BY RENOVATING PASTURES

IRONICALLY, JEFF EDWARDS' FARM USED TO BE CALLED CLOVERDALE.

And naturally he's a fan of clovers.

While his property is now called Brooklands, 10 to 12 years ago he started to improve sub clover populations earmarking those paddocks for long term pastures.

"But we also need legumes in our rotations, being either clover-based pastures or lupins," Jeff said.

And hand-in-glove with growing pastures is renovating them with the DBS, to improve soil structure through aeration and moisture-holding.

"While it's early days, Jeff does see value in renovating his pastures having already witnessed a better flush of quality plants.

"If you provide quality feed, you get quality animals," he said.

"And the bonus is the nitrogen benefit for following crops.

"We generally manipulate our annual pastures on the second year with a lot of year-in, year-out rotations.

"For us the old sub clovers are the way to go because they are tough and seed set is good, even on a tight finish."

According to Ausplow managing director John Ryan, renovating pastures with the DBS has another benefit in creating defacto BioFurrows™ because of the presence of old roots in the soil.

The roots have established pathways for air and moisture which is the basis of promoting beneficial bacteria populations.

Trials already have shown the often-quoted 'flush'

of new growth following renovation is directly attributable to air and moisture.

Creating such an 'environment' also enables improved establishment of other pasture and crop plants.

"And weed control is easier with more options for things like chicory, radish and grass varieties," John said.

According to Jeff, "you know you're on the right track in building healthier soils when cereal crops return higher yields and higher hectolitre weight.

"Last year our barley went almost 100 per cent Malt," he said.

"It's still early days but I can see our goal to improve our soils will lead to increased organic matter and the ripple effect of increased organic carbon, increased water-holding capacity and healthier plants.

"We're not there yet because we still have issues with compaction and the problem at depth is low pH and high aluminium levels."



This example of near-row sowing is where Kweda farmer Jeff Edwards is heading with trials this year leading towards establishing the BioFurrow™ system.



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