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### **Priority One: Nutrition**

*By Dr Arden Andersen, May 2006*

Diseases of the elderly continue to be visited upon younger and younger people. The generation being born today, for the first time in American history, is predicted to have a shorter life expectancy than their parents.

Many people want to believe that it is medical technology that has given the current senior generation the longer life expectancy than the previous generations. The reality is that it has been sanitation, safety, and modern shelter that has accounted for the gains in life expectancy.

The current generation's problem is not genetic. It is the lack of nutrition. Nutrition is the building block of every body, organ, tissue and cell. It is the foundation of the immune and repair system. It is the essence of our physical life.

Unfortunately, the nutritional status of the world, especially the developed world, continues to decline as conventional medical and agricultural technologies gain an even greater stranglehold around the world.

An ABC News article by Megan Carpenter, March 1, 2006 discusses a study done by Donald Davis at the University of Texas at Austin. Davis found that USDA data proves what several other studies and I have repeatedly stated before, that fruits and vegetables are significantly less nutritious than in past decades.

Heart disease, stroke, Parkinson's, Alzheimer's, diabetes, obesity and cancer are more prevalent than ever and increasing every year. Children are the age group with the fastest increase in cancer rate. There are literally thousands of scientific journal articles linking all these diseases to nutrition.

Nutrition is the absolute core issue regarding disease, birth defects, life expectancy and quality of life. Nutrition is Priority ONE!

I recently had the pleasure of reading Allan Yeoman's book *Priority One: Together We Can Beat Global Warming*. His premise is that all the hoopla regarding global warming is even more serious than suggested due to the increase in carbon dioxide concentration in the atmosphere.

This marked increase in atmospheric carbon dioxide is causing ecosystem alterations on the surface of the earth and dramatic change in the flow of the ocean currents, which in turn, is causing significant change in our global climate.

He predicts major global disaster for all living species on the planet if the current trend continues, perhaps for just as little as another 10 years or so. His conclusion is that only agriculture can reverse this date with disaster by capturing the atmospheric carbon dioxide and storing it in the soil as organic matter and humus.



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Global weather changes are, indeed, a concern and agriculture really is best suited to correct this problem. I contend however, that Priority One is a focus on nutrition, from soil to human. Get the soil nutrition right and the transformation of carbon dioxide to humus will occur as a matter of course.

In fact, getting the soil nutrition right corrects a long list of problems associated with agriculture and industrial development including environmental integrity, food safety and human health, chemical pesticide poisoning and, insect pests, diseases and weeds.

Whether we are discussing people and animal health, soil health, erosion, atmospheric carbon dioxide, economic viability, pesticide and drug use and pollution, or microorganism selection and presence, it all comes back to nutrition. Nutrition is the core.

It is easy to get side tracked into debates about products, tillage approaches, tree planting, animal rights, and so forth. For some, this is an intentional effort to divert attention away from the real solutions to all these problems, that being nutritional balance. Get the nutrition right in the soil and all, literally all, these details resolve in the natural course of re-establishing soil balance.

Ultimate nutrient balancing begins with looking at the soil nutrient status. Just as in business we look at our capital reserve and our cash flow when evaluating our business health, I look at the capital reserve and cash flow nutrient status in the soil.

To do this I use two systems of soil testing: the Albrecht or Cation Exchange Capacity system and the Reams system or water-soluble testing system.

William Albrecht was a trailblazer in soil science in the 1940s linking animal health and production directly to soil health and nutrition. He arrived at a model of soil nutrient ratios using the cation exchange capacity of the soil and the percentage each major cation occupied in the whole of that CEC.

He found that calcium should occupy 65 to 80 percent of the base saturation, magnesium 10 to 15 percent, potassium two to five percent and then hydrogen, sodium and trace elements would make up the remaining portion to total 100 percent. His system worked well in the context in which he researched it; Missouri soils in the 1940s with the common assumption that manure would be used on most soils because the farms were predominantly mixed farms.

Out of Albrecht's work came, most notably, the Brookside system. Albrecht and Brookside's approach were certainly reasonable and there are some very important concepts to be learned from Albrecht.

In fact I recall that in the early 1970s, Brookside testing was a step my father took away from the County Extension Service model, knowing he had to make positive changes in his soil nutrition. For additional specifics on Albrecht's work, I suggest reading the Albrecht Papers.



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Just as Einstein's theory of relativity was ground breaking in the 1920s, Albrecht's concepts were equally groundbreaking for his time. However, just as Nicola Tesla's understanding and principles of physics and free energy dwarfed Einstein's  $E=mc^2$ , Reams' understandings of nutrition, cause and effect, biochemistry and energy were a natural advancement beyond Albrecht's approaches to plant production.

Many people are totally unaware of Tesla and his advancements in physics and modern technology, and likewise are totally unaware of Carey Reams and his concepts of soil and plant nutrition. As I view Albrecht's testing approach akin to doing a capital reserve assessment and Reams' akin to doing a cash flow assessment. Both are very important to evaluating one's business, yet in reality neither guarantees success of the business.

Dr Reams realised that perfect Albrecht numbers did not necessarily equate to yield, brix readings and nutrient density or, subsequently, to reduction / elimination of disease, weed and insect pest infestation. Reams recognised that capital assets did not equal cash flow. More importantly he recognized that cash flow did not always translate to the desired outcome. He recognised what Dr Elaine Ingham has so elegantly taught around the world, that biology was the intimate link between nutrient capital reserve, nutrient cash flow and final outcome.

Many students of Albrecht and Reams fail to recognise that both gentlemen did integrate biology into their programmes. Both had animal manure in their programs. However it was manure before the wholesale use of antibiotics, growth hormones, insecticides, fungicides, herbicides, genetically engineered Franken-feeds, salt fertilisers, and no-till.

Manures at that time were actually microbiological inoculants. Reams was a visionary with an advantage over Albrecht. Reams also treated people and developed nutritional programmes to help patients recover from severe diseases.

In this context, he developed a deeper understanding, as did Dr. Charles Northern, of the importance of the nutrient density of plants for human health. He saw that the typical soil test numbers and practices did not routinely result in high nutrient density in food nor subsequently, to the ill consumer recovering.

Reams recognised the important role microbiology plays in the digestive system of the soil as well as in humans and animals. He used plant "medicinals" as much as he could, but later in his life he recognised the importance of higher therapeutic levels of nutrition delivered via supplements or intravenously in order to get the healing response from ill consumers.

This is where we must recognise that though there may be a lot of capital nutrient asset already in the soil and that microbiology may potentially be able to convert that capital soil asset to cash crop production, the natural liquidation process may take more time than we have.

As such, we need immediate cash flow to get results so we will add 'cash' amendments to the soil in the form of minerals just as a farmer may go to the bank



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for a short-term operating capital loan even though he has plenty of reserve funds in the bank. It is about timing, desired outcome, logistics, and management decisions.

Recently an article from Australia in the Goondiwindi Grains Research Update 2006, 28<sup>th</sup> Feb - 1<sup>st</sup> March 2006, entitled "*Cation Balance, Lime, Rock Dust and other Amendments*" by Neal Menzies, School of Land and Food Sciences, University of Queensland, lambasted the Albrecht model of ideal base saturation percentages for calcium, magnesium, potassium, etc.

Mr Menzies states that from a review of the literature and ag research done in Australia, it can be concluded that crop production is not correlated to any set ideal base saturation percent or ratio. Reading through his article, I could not find significant fault with his conclusions, which are what Reams also concluded, and what Dan Skow, Phil Wheeler, myself, and others, has taught for years.

Carey Reams and Dan Skow have taught us that it is plant available nutrient **ratios** that count and correlate to plant growth and health; not simply percent base saturation of cations on a soil test.

I understand that this really unnerves the strict Albrecht adherents. This group insists that soil science is strictly cut and dried regarding the CEC and base saturation percentages for calcium, magnesium, potassium, sodium, hydrogen and trace minerals.

However, as Reams discovered, plants don't read soil test reports. Though one may have the desired base saturation percentages for those minerals on a soil test; that did not mean there would be healthy crops grown in that soil. It did not mean the brix reading of that crop would be anything more than poor. It did not mean there would or would not be weed proliferation in that soil.

The only thing it really meant or means today is that we have those ratios for cations on a soils test and can calculate the grams per hectare for each cation in capital reserve, period. Reams recognized that we had to know what was functionally available for plant growth because that would correlate to actual plant production, plant health and brix reading, weed, disease and insect infestation and biological activity of the soil.

In any process of learning, we understand basic principles first and then move to more complex concepts and understandings. We incorporate these basic principles or meanings for what they contribute to our advanced learning without being limited by them.

In the same way we take the basic principles Albrecht taught and incorporate them into a "graduate programme" as taught by Reams / Skow. The Reams' principles help us to solve and explain problems otherwise not solved or explained in the Albrecht model.

This advanced program produces competitive yields with the highest nutrient density / brix without insect pests, disease and weeds by using nutrition, biology, minerals,



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timing, finesse, artistry, management and consistent execution without having to wage daily war with nature on the chemical weapon treadmill.

Dr Reams found that the soil testing method developed by Dr Morgan at the University of Connecticut better reflected functional plant available nutrient values in the soil. Subsequently, Reams evolved the Morgan test into what is called the Reams testing system today and recommended by International Ag Labs, Agri-Energy Resources, Phil Wheeler, myself, and a number of others who have confirmed its value in high quality crop production.

Keep in mind, plants don't read soil tests, so as Reams emphasised, one must "read" the field and crop to determine the final diagnosis and treatment plan.

Driving this point home, I taught a two-day advanced course in New Zealand this past February and we had a gentleman bring in a Reams soil test report that showed over 1500 pounds per acre of phosphorus, several thousand pounds of calcium, 500 or so pounds of potassium, yet he had problems he could not solve.

He was producing a better crop than he had been previously, but just couldn't get the brix, colour or quality up to what he needed. My recommendation after seeing the crop, looking at the soil test reports, hearing the history, was for biology, liquid calcium and some spoon feeding of phosphorous; seemingly quite contrary to what the soil test showed. He followed the recommendation and had great success.

One mistake that people make, seemingly more often than anything else today, is relying upon tests, equipment and technology to make decisions for them rather than using their own deductive understanding, observation skills, and intuition.

A medical example comes to mind. If a person comes into the ER in diabetic ketoacidosis they will be very ill, soon possibly, ill to the point of death. If we rely upon or even wait for lab blood values to come back before administering treatment, it will be too late, the person will be dead. The therapy that must be started is IV fluids with insulin and potassium.

Now for most people the insulin makes sense because the blood sugar is, as expected very high in this person. However, the potassium is perhaps the most important component, yet the person's blood test will show normal to high potassium levels.

This is because insulin is needed to get potassium into the cell and if insulin is given without potassium, the blood potassium will get sucked into the cell, the heart rate will accelerate rapidly to the point of death. The lab test does not reflect the true potassium status.

Know the patient, treat the patient, not the lab test. Your patient is the soil and plant.

The plants I saw in the New Zealand example were akin to the diabetic ketoacidosis patient. The plants were sick, weak and in trouble regardless of what the soil test showed.



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Reams recommends phosphorous levels of 200 to 400 pounds per acre and potassium levels of 100 to 200 pounds per acre and a P:K ratio of 1:1 for row crops or 2:1 for permanent pasture. At a 3:1 P:K ratio we should be fine, especially with 1500 pounds of phosphorous present.

We also had over 3000 pounds of calcium. The plant had purpling of the leaves, poor colouring maturity, poor growth and production. Purpling indicates a phosphorous deficiency, colouring problems relate to potassium and traces imbalances and growth / quality problems start with calcium deficiency.

The phosphorous was not getting into the cells and phosphorous is the “power” that drives the plant factory. Without the phosphorous, the potassium, calcium, traces just sit idly by. The farmer had applied compost tea (tested and verified good quality), fish, seaweed, humic acid, etc. without solution to his problem.

So like the potassium in the diabetic, we appear to have plenty via testing, but plants don't read test reports. We only **appear** to have plenty of phosphorous, potassium and calcium, but it's all dammed up sitting unusable. As with the potassium in the diabetic, I must give insulin. In the soil I must give a cocktail of a little soluble phosphorous, calcium, potassium, biology and sugar to get the desired nutrient movement / transport / cell uptake, which the grower did and got the desired results.

Mr Menzies' article simply confirms what we have been teaching for years - treat the patient: in this case the soil and plant, not the lab test.

This is particularly true in some of the soils we see in the cotton belt of Australia - clay-loam soil with CEC's ranging from 30 to 70. If we attempt to fertilise / lime to the point of creating the ideal Albrecht numbers, we would be applying truckloads of lime per hectare. This would be a ridiculous financial strain on the farmer and would not guarantee any better crop, and perhaps result in complete failure for a year or two.

Many of these high CEC soils already have 10,000 to 15,000 pounds per acre of calcium growing 25 to 50 percent better long staple cotton crops than any found in the US. This is a tremendous reserve capital asset. The key is functional nutrient status and converting this reserve asset to cash flow. Biology is a big player in this conversion, but not the only player particularly when we need fast results that are feasible and logistically realistic.

In these types of soils, we frequently see calcium to magnesium ratios of 1 to 1 or 2 to 1 on conventional or Albrecht tests, yet much different ratios on the Reams test. It is possible and not uncommon to have a 2 to 1 calcium to magnesium ratio on the Albrecht CEC test which can be shifted to a 7 to 1 ratio on the Reams test once the appropriate remedial program has been put in motion and proper management allows for good aerobic micro-organism proliferation.

A very important side note regarding this discussion is the assertion by Mr Menzies, repeated by others in the industry, including the organic and biological industry, that a soil-mining assay is reflective of realistic soil nutrient cash flow.



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The contention is that one simply needs to apply compost and compost tea / extract to any agricultural soil in the world and every pound or kilogram of nutrient needed by the plant will magically become available and plentiful. No fertiliser is or will be needed.

That is a great theory and works just fine for those satisfied with mediocrity, ok with failed crops, invested heavily in the hippie approach, but it will spell crop and / or economic failure more often than not. It takes thousands of years for nature to change soil in that manner and we don't have that time luxury.

We need to combine both the biological approach and the appropriate nutrient supplementation approach to make this change in three to five years. Just as some will say we cannot use synthetic vitamins and mineral supplements, orally or IV on sick patients; some will contend we should not use any supplemental fertilisers beyond compost and compost tea on sick soils.

Mr Menzies ends his article with a mention of D.C. Edmeades article discrediting MaxiCrop seaweed use in agriculture. His article claims 810 review trials in various crops with seaweed and found no significant benefits.

Mentioned is a lawsuit in which the New Zealand courts found against MaxiCrop. Mr Edmeades additionally commented that similarly, liquid fertilisers applied to the pastures had no effect on animal production. This conclusion to his paper is unfortunate and really discredits both Mr Menzies and Mr Edmeades, because it epitomises the statement that common sense is not so common today.

Biological systems are not one-dimensional and do not fit into the pigeonhole, reductionist, box of chemical agriculture. If either of these gentlemen had taken the time to research the scientific literature rather than towing the chemical industry line, they would have seen the thousands of articles supporting the legitimacy, efficacy, and science of seaweed use in agriculture.

T.L. Senn at Cornell University was an icon in this work and almost every land grant university in the US has followed suit with further support of seaweed in commercial crop production. Further, gentlemen such as Joe Bradford at USDA in South Texas have proven the efficacy of biological plant production incorporating seaweed and liquid fertilisers into their programmes.

The eye opener Mr Menzies and Mr Edmeades completely miss is that if seaweed and the tested liquid fertiliser are not what the plant needs at that point in time, they won't produce an effect, but that doesn't discredit their legitimacy as plant feeding materials.

They never consider that perhaps the studies are flawed, not the seaweed and liquid fertilisers. Unfortunately, Mr Menzies took what was a good article on soil testing and base saturations of cations and blemished it with an off the wall, sweeping condemnation of seaweed and liquid fertilisers. It hints of an ulterior motive or hidden agenda or third party driven political obligation rather than an independent, public education report.



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The take-home message from this entire discussion is that growers must get back to the realisation that they are growing food for people; that they are positively or negatively (there is no neutral) impacting the healthfulness of the environment in which all humankind, animals and plants live; that they are impacting the genetic expression, longevity and development of every future generation to come; that they are responsible and liable for the consequences of their actions and inactions.

Food production is about medicine and healthcare, environmental pollution, birth defects, local and national economies. It's about all sciences integrated into an understanding of life's wondrous processes. This is why I moved beyond the basic teachings of Albrecht and into the teachings of Reams.

Reams encouraged an unending expansion of knowledge and study. Dr Reams always drew a direct connection between human health and soil health, between soil nutrition – plant nutrition – human nutrition.

He repeatedly told me to study medicine and every area of science I could because they all added to the art of farming; they all added to my understanding of how nature functions. So it is that I encourage people to study Albrecht, Reams / Skow, Callahan, Senn, Tesla, Ingham, and whoever else adds to their knowledge base.

It is unwise and unscientific to stay stuck in a single school of thought while the awareness and understanding of nature grows around us.

With that in mind, Acres USA will be sponsoring a three-day Soils and Agronomy Laboratory Course immediately preceding their annual Conference in Minneapolis, Minnesota in December.

This will be an intensive course in which I will cover the basics of the above named teachers, plus much more in our quest to assist the grower to produce nutrient dense, tasty gourmet, safe, clean, bountiful food and drink, while increasing profit per unit of input, addressing weeds, diseases and insect pests appropriately and safely, rehabilitating the environment including building carbon stores in the soil as humus. All reducing atmospheric carbon dioxide levels as Mr Yeomans prophetically encourages.

We shall ever keep in mind, however, that the real Priority One for food and fibre production is nutrition. Without restoring the nutrition to agriculture, even if we did reduce atmospheric carbon dioxide levels, the human population would be too sick to benefit.

Even if we did manage to reduce atmospheric carbon dioxide levels by some other method, if we don't restore the nutrition, mineral balance and humus levels to our soils, the human population would still be too sick to benefit from the reversal of global warming.