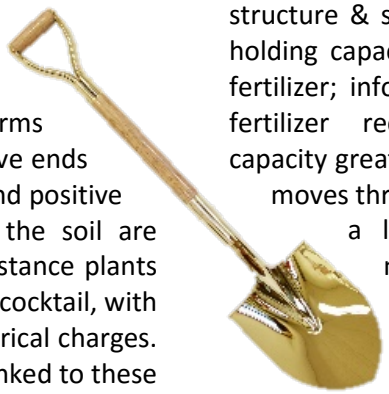
And the Golden Shovel Award Goes To…. By JP Pettyjohn and Laura Duncan

Time and again your neighbor claims to get 70 bu/ac canola and 90 bu/ac Red Spring wheat while you listen skeptically, shaking your head, and muttering bull$#!&. Can you and your neighbor plant identical crops, use identical inputs, receive identical moisture and still have vast yield differences? Absolutely! Soil property differences represented by the cation exchange capacity (CEC) will verify this.



Some concepts are challenging to explain like cold fusion; The CEC is also difficult. Consider the CEC in terms of magnetic fields where two positive ends repel each other while a negative and positive end attract. Electrical charges in the soil are similar. Soil is not just an inert substance plants grow in, but a chemical and organic cocktail, with a minefield of mostly negative electrical charges. Your farm's profitability is directly linked to these charges, just as much as the red and black of your bank account.

It's not just in love stories that opposites attract. Soil's predominately negative electrical charges attract positively charged particles in the soil such as nutrients (calcium, phosphorous, potassium), metals (aluminum), or other substances (hydrogen) all of which are called ions. Positively charged ions are called cations and negative ions are called anions. These are not to be confused with onions, a traditional garden vegetable.

It's soils ability to attract these ions that allows crops to receive nutrients during the growing season. Ions can be replaced by other ions of the same charge, making them exchangeable. For example, potassium, calcium, and hydrogen can replace each other depending on their relative. We term the whole process regarding cations as the cation exchange capacity, or CEC. To improve farm profitability you got to keep your ion the ball or CEC in this case. (Bad pun intended).

Labs routinely determine the CEC on soil samples by determining the number of electrical charges the soil can hold, reported as meq/100g (meq). Sandy soils normally have lower CEC (5-13 meq) than clay soils (15-20 meq), which are lower than organic matter (100-300 meq). CEC influences soil structure & stability, nutrient availability, water holding capacity, soil pH, and soil's reaction to fertilizer; information important in determining fertilizer recommendations. Water holding capacity greatly influences yield potential. Water moves through the soil profile more quickly in a low CEC soil, leaching ions, like nitrate, faster than your university kids can drain your wallet. No matter how much you put in your wallet it never stays full.

Does that mean you are unable to generate profit on low CEC soils? With appropriate management techniques low CEC soils can be productive. First, set realistic yield goals for soils with low CEC then apply nutrients based on those yield goals. Second, retain as much organic matter (OM) as possible by reducing tillage to preserve OM, which over time will slowly increase the CEC. Three, watch the pH. Low CEC combined with low pH can benefit significantly from additions of calcium to increase pH. Of course to know any of this you need to obtain soil samples. Soil samples, quite simply, are the single greatest investment you can make on your farm. Read my previous article on soil sampling benefits.

So before you decide to scoff at your neighbor, better to ask him what his CEC is. If it is low, inform him he is this year's winner of the golden shovel award.

JP Pettyjohn is Manager of Agronomic Services and Laura Duncan is an Agronomist at Ray Agro & Petroleum Ltd