...FROM THE DESK OF
SCOTT SCHAFFERT P.AG.
CCA 4R

Between the Rows

VOLUME 3 ISSUE 5 MARCH 15, 2025

INSIDE THIS ISSUE:

Diagnosing Sulphur Deficiency

In the past, your crop received plenty of sulphur from the environment, industrial pollution pumped sulphur dioxide into the atmosphere and rain brought it down into the soil. Today's pollution regulations have cleaned up our air, good thing, but as a result less sulphur is entering our soil. Since our soils tend not to get much sulphur from our parent materials, they are often depleted of sulphate our time.

So what happens when a crop is deficient in sulphur. In the last edition I discussed the importance of sulphur by our crops and today I will discuss how to diagnosis sulphur deficiency.

When a crop is suffering from sulphur deficiency, symptoms will start appearing in the plant. Leaves become pale-yellow or light green, plants are small and spindly with slender stems, sort of like nitrogen deficiency symptoms. In canola you'll get cupped reddish leaves or if the crop runs out of sulphur later in the year; poor flower development and blasted flowers.

One key difference between sulphur and nitrogen is that with sulphur deficiency the symptoms will appear in the younger leaves, unlike nitrogen deficiency which will show on older leaves. This is because sulphur is not as mobile in the plant as nitrogen. Therefore the plant is unable to rob from the older leaves to feed the younger leaves. If you think like a plant, you only goal in life is to produce seed. So your focus is ensuring the reproductive process has enough of everything to produce seed. So if you're able to, you will rob nutrients from parts of the plant not directly associated with seed production. However sulphur can not be robbed from the older leaves. As a Professional Agrologist I can accurately access possible deficiency situation and recommend corrective actions.

There is some good news in treating sulphur deficiency. That same property of sulphate that enables it to move so readily in the soil (messing up our soil test results) also means that in-season applied sulphate forms of sulphur, such as ammonium sulphate (21-0-0-24) can be readily taken up by the crop and crop recovery is excellent.

Since canola requires more sulphur than cereals you should always have it in your canola fertilizer blend. Pulse crops also require an adequate amount and in especially low sulphur or low CEC (light) soils I would also recommend some in your pulse blend. Cereals tend not to need as much, so unless your soil is especially light (<9 CEC) you are probably okay.

Agronomy Research Focus: Hairy Canola

Researchers with Ag Canada are currently developing canola plants with trichomes (hairs). Why you may ask? Well it turns out the plants with hairy stems are less susceptible to small feeding insects like flea beetles.

Flea beetles are picky eaters, they actually follow a strict ritual of steps before eating, such as tapping and probing the plant. If this routine is interrupted, they start the whole process over again. The hairs mess up this sequence and the flea beetles are apt to simply leave without feeding.

Researchers tried using gene modification to introduce hairs, however cost and complexity prevented them from developing a commercial variety.

The researchers also found that by breeding in other characteristics such as anthocyanin (red cabbage pigment) and higher wax levels further feeding from flea beetle was reduced.

So they are now using tradition methods of breeding to someday introduce a hairy canola line.

Using Sulphur as a soil amendment

Using Sulphur as a soil amendment

Sulphur is an essential plant nutrient and is required to maximized yields especially in canola. However sulphur can also used as a soil amendment is certain situations to improve the overall productivity of a problem soil.

Optimum nutrient uptake for nutrients occurs in a pH range of 6.0-7.0. pH is a logarithmic measurement of H^+ ions. The lower the pH the more H^+ ions are present (the more acidic your soil is) and vise-versa. If your soil has a pH higher than 7.0, it is considered alkaline. The higher the pH, the more alkaline a soil is. At a pH above 7.5, the plants ability to take up nitrogen, phosphorus and several micronutrients drops off a cliff. So you can add all the N,P and micros you want in your fertilizer blend, but the plants simply can not take them up.

Elemental Sulphur has a unique characteristic that as it undergoes its conversion by soil bacteria to the sulphate (SO_4^-) form it releases sulphuric acid (H_2SO_4) and carbonic acid (H_2CO_3) and lower the pH of the soil. This enables other soil bacteria to then react with calcium carbonate ($CaCO_3$) with sulphuric acid forming calcium sulphate ($CaSO_4$), which in soil water quickly breaks down into Ca^{+2} and SO_4^{-2}. The carbonic acid splits apart into water (H_2O) and carbon dioxide (CO_2). Therefore in a highly alkaline soil, elemental sulphur will lower the pH and can be used as a soil amendment to enhance overall nutrient availability on these soils. It should be noted that this process is dependent on a biological process with soil bacteria, and therefore takes time (several years) and can vary by your soil type and moisture conditions.

Elemental sulphur can also help with a sodic soil. A sodic soil is a soil that contains high amounts of sodium (Na), not to be confused with a saline soil that has a level of salts in general, a sodic soil is just high in sodium. A good soil test will express this in 2 ways. Overall sodium levels (in ppm) and as a percentage of the overall cation levels (Base Saturation percentage). If the overall BS% of sodium is above 2%, soil structure issues will occur.

What elemental sulphur does in sodic soils is have the calcium replace the sodium in the base saturation complex, allowing the sodium to leach out of the rooting zone. Remember in the series of reactions of elemental sulphur breaking down, calcium sulphate ($CaSO_4$) is produced. This dissolves in water to releasing the Ca^{2+} which replaces the Na^+ cation on the clay particle. An elemental sulphur product such as Tiger 90, has a high percentage of sulphur (90%) and clay content to enhance this soil reaction. If however the soil is low in calcium (free lime, $CaCo_3$), you should apply calcium sulphate ($CaSO_4$, gypsum) instead. One other caveat on using elemental sulphur to lower soil sodium levels, that sodium has to be able to go somewhere. Even if the sodium is freed by the calcium to leach out of the rooting zone, soil physical and hydrological properties have to be such to allow this. In a heavy (high CEC soil,>20), then the sodium will have a hard time penetrating to lower depths. Tile drainage is a sure fire way to ensure this removal of sodium, however the cost of installing them can be prohibiting.

The first step, as in all soil rehabilitation efforts, is to have a good complete soil sample. Coupled with a Professional Agrologist to interpret the results, we can determine if a problem exists and if elemental sulphur will provide a remedial affect.

2025 Agronomic Packages

Interested in having a professional Agrologist scout your field, provide instant updates and recommendations? We have 3 different levels of Agronomic packages available for 2025.

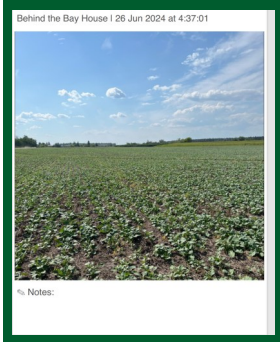
B (Basic) Plan includes 4-5 scouting visits at key timings during the season such as : pre-seed burn off, in-crop herbicide application, fungicide/insecticide timings and pre-harvest timing. The plan can also be customized to suit your needs. Are you planning a month long fishing trip or holiday during the season? You can rest easy knowing that I am your eyes and ears back on your farm. This package also gives you 24hr access to me for any agronomic questions you have. This plan is $2.00/ac.

Plan 50 is a guarantee of scouting visits to each field at least every 2 weeks and more often during "crunch" times like fungicides and pre-harvest timing. This level of protection allows me to really get to know your field corner to corner and to ease your mind and protect your crop input investment. This plan is available for $3.50/ac.

Plan 65 is the Cadillac plan that guarantees a weekly scouting visit to each field, comprehensive reporting and updates. This plan is well-suited for high value crops or problem fields that just need more watching.

In 2024 we purchased access to the Ag Grow scouting app that allows me to instantly create pdf files: listing my observations, recommendation and pictures right from the field to your email or text messages. This app also allows me to put together all of the data from your fields for a comprehensive overview of the entire season. Aa a grower we can also set up the app to allow you to input field operations as they occur, so field record keeping is accurate, consistent and stored safely. For more information or to sign up for our Agronomy packages call Courtney at the Fort Office or myself.

2025 Agronomic Packages



Farming is Fun

Farming is Fun