RAY AGRO & PETROLEUM LTD.

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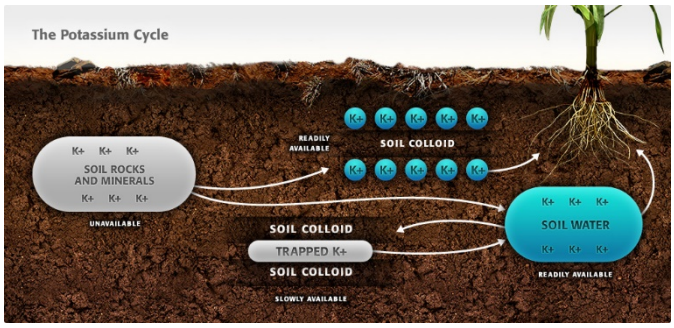
Vol 7

Hidden Hungers – Potassium Management

A four player curling team works together to win games. While possible to play with a missing player, it is challenging to play optimally. Likewise, the 4 macro nutrients of N, P, K, and S work together to provide plant nutrition for optimal yield. A missing nutrient limits the crops ability to reach maximum yield.

Most producers supply adequate crop nutrition however, potassium (K) is often under-applied on land where above ground biomass is removed and manure is not returned. Soil test levels help identify deficiencies, but given most soils have over 40,000 lbs/acre of K why have they become deficient?

Potassium is held in the soil in three forms: unavailable, slowly available, and readily available. Around 95% of potassium is unavailable and is released through soil weathering which is far too slow to meet annual crop needs. As its name implies, slowly available K is released too slowly to supply a crop's annual demand. Thus, it is the readily available fraction, which is less than 1% of all K sources, that provides annual plant K needs.



Plants require almost as much K as they do N. However, 75% of K remains in the straw and chaff. Under continuous cropping, these residues will become available K if spread back on the land. The slowly available K can then replace the annual amount removed in the seed. However, in the case of forages or baled straw, more K is removed than what is replaced from the other soil K reserves. This shortfall contributes to productivity losses after several high yielding years. Thus the addition of K will help maintain soil levels and boost productivity. Annual crops also have the potential to draw down the soil reserve if all the above ground biomass is removed each year.

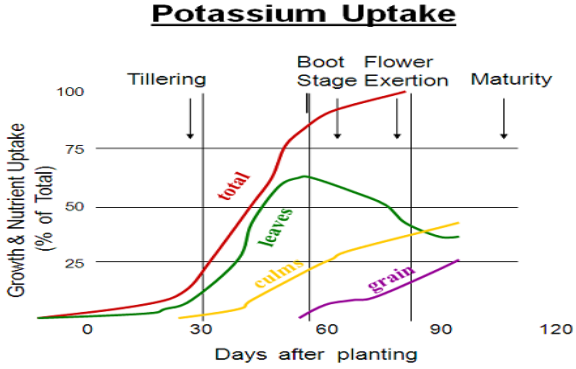
Soil testing can give us an indication if the soil can supply enough K to the crop throughout the year. K below 150 lbs/ac (75 ppm) in the top 6 inches will unlikely supply enough K during periods of high K uptake. Even a short term deficiency can negatively affect yield and will not present deficiency symptoms. K between 150 and 300 lbs is marginal at supplying K and over 300 lbs is adequate to meet annual peak demands.

Nutrient removal rates of select crops

Crop	Yield Goal		N	P	K	S
Grass	3.25	bales	141	44	202	19
Alfalfa	4	bales	281	66	270	30
Barley	80	bu/ac	111	45	122	15
Canola	60	bu/ac	139	66	137	24
Peas	60	bu/ac	180	94	151	13
Wheat	60	bu/ac	131	44	92	14

Applications that are side banded tend to be most helpful because they are in close proximity to the root system. K ions do not travel well in soil water thus, roots must be in close contact to take up the nutrient. If the K is broadcast and distributed throughout the soil profile, there is a good chance the roots will not come in contact with enough K and a deficiency could still exist.

While the soil has large K reserves, it typically has small amounts available. Depending upon management, deficiencies may be present. Soil testing is the best tool to determine this hidden hunger. Discuss with your agronomist the correct amount to apply and best application method that matches the existing soil reserves and crop management. Since K is not easily lost from the system, high amounts applied in one year will not easily be lost in subsequent years. Ensure your profitability calculations include enough K fertilizer to support optimal crop growth.



Laura Duncan is an agronomist and JP Pettyjohn is the Manager of Agronomic Services at Ray Agro & Petroleum. Contact Laura lduncan@rayagro.com and JP jppettyjohn@rayagro.com