BALANCE P AND K FOR HIGH YIELD

SITUATION

Crop harvest removes valuable nutrients from the soil. Understanding the amount of nutrients removed is crucial to understanding how to fertilize for the highest yield potential next season. With high input costs, it can be tempting to skimp on nutrients to save cost. Over time, however, this approach can reduce yield potential and profitability.

FACTORS TO CONSIDER

- Crop
- Yield potential
- Crop response
- ROI
- Soil test
- Manure and fertilizer analysis

Table 1. Phosphorus and potassium nutrient removal by crop

	Per unit of yield			Removal for given yield	
Crop (Unit)	P_2O_5	K_2O	Typical Yield	P_2O_5	K_2O
Corn (bu)	0.4	0.3	150 (bu)	60	45
Corn silage (T)[1]	5.0	11.0	21 (T)	105	230
Soybeans (bu)	1.0	1.4	40 (bu)	40	55
Wheat/Rye (bu)[2]	1.0	1.8	60 (bu)	60	110
Alfalfa (T)[3]	15.0	50.0	5 (T)	75	250
Cool season grass (T)[3]	15.0	50.0	4 (T)	60	200
Small grain silage (T)[1]	7.0	26.0	6 (T)	40	160

1. 65% moisture
2. Includes straw
3. 10% moisture

ACTION PLAN

1. **Understand nutrients removed by each crop.** Fifteen mineral elements are considered essential to plant growth. Nitrogen (N), phosphorus (P) and potassium (K) are usually the most limiting. Of these, N is often the most limiting nutrient and subsequently gets the most attention in any fertilizer program. Due to high fertilizer prices, it is tempting to cut rates of P and K to compensate for the necessary costs of N. Table 1 displays the amount of P and K removed by various crops. Pay special attention to the high amounts of K removed by silage and dry hay crops. A fertilizer program that does not supply these minimum amounts "mines" the soil of required nutrients. Soils that are high or optimal in P and K may not see yield drops immediately, but production will fall eventually. Remember that crops can only yield as much as the most limiting nutrient will allow. Low P and K contribute directly to lower grain fill and poor disease resistance and standability.

2. **Develop a soil testing program.** Nutrient removal is offset by the soil's ability to provide nutrients. Soil testing is critical to determining fertilizer requirements. Most soil testing labs will adjust fertilizer recommendations automatically based on test results. Deficient soils require higher fertilization rates to replace the nutrients removed at harvest and build fertility levels to achieve maximum return on fertilizer investment.

3. **Account for nutrients supplied.** Sample manure periodically to determine the exact nutrient supply applied to the field. All of the P and K in manure are considered available to the crop, while livestock manure, as with commercial fertilizer, is susceptible to N loss unless it's protected with a nitrification inhibitor such as Instinct® nitrogen stabilizer. Remember that manure application calibrated to P in high P soils will frequently require supplemental N fertilization. Fertilizing to N requirements with manure will almost always oversupply P and K. Depending on where you farm, this can be an environmental concern in high P soils.

SUMMARY

Compensating for nutrients lost through harvest is critical to maximizing return on fertilizer investments. Cutting P and K to make up for necessary costs of N may not result in immediate yield drops, but losses will occur eventually. Nutrients are essential to good corn and soybean crops, and applying the correct amounts will always help improve your profitability. For more information on replacing nutrients lost through harvest, contact your local Mycogen Seeds customer agronomist or trusted agronomic adviser.

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