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Quantities of Plant Nutrients Contained in Crops

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When planning your fertilizer or crop residue program, it's useful to estimate the nutrients that last year's crop removed from the soil and this year's crop will need.

Table 1 lists the estimated nutrient content of common South Dakota crops on a per-bushel, 100-weight (cwt), or ton basis. The nutrient content is divided between grain or harvested portion of the crop and the straw.

Table 1. Quantities of plant nutrients contained in crops.

Crop	Plant Part*	Nutrient				Crop	Plant Part*	Nutrient			
		N	P_2O_5	K_2O	S			N	P_2O_5	K_2O	S
		(lb/bu unless noted)						(lb/bu unless noted)			
Corn	Grain	0.9	.37	0.3	.08	Canola	Grain	1.9	.85	0.5	.25
	Stover	0.5	.16	1.1	.08		Straw	0.6	.25	1.3	.30
	Total	1.4	.53	1.4	.16		Total	2.5	1.1	1.8	.55
Soybean	Grain	3.8	.85	1.4	.23	Sorghum	Grain	0.7	.40	0.3	.05
	Stover	1.1	.25	1.0	.17		Stover	0.6	.16	0.8	.10
	Total	4.9	1.1	2.4	.40		Total	1.3	.56	1.1	.15
Wheat	Grain	1.6	.56	0.3	.11	Millet	Grain	1.4	.40	0.4	.08
	Straw	0.7	.20	1.2	.14						
	Total	2.3	.76	1.5	.25						
Barley	Grain	1.0	.40	0.4	.10	Sunflower (cwt)	Grain	2.8	1.14	0.8	.30
	Straw	0.4	.16	1.2	.10		Stover	2.4	.68	2.8	.50
	Total	1.4	.56	1.6	.20		Total	5.2	1.82	3.6	.80
Oat	Grain	0.8	.25	0.2	.08	Alfalfa (ton)	Total	55	12	50	5.2
	Straw	0.3	.14	1.0	.10						
	Total	1.1	.39	1.2	.18	Bromegrass (ton)	Total	32	8.4	43	5.0
Rye	Grain	1.4	.48	0.3	.10	Sudangrass (ton)	Total	33	12	43	5.0
	Straw	0.8	.21	1.5	.14						
	Total	2.2	.69	1.8	.24						

* Values in table do not account for nutrients contained in root system.

The listed nutrients are used in relatively large amounts by crops. For example, a 180 bu/a corn crop contains 252 lb nitrogen, 95 lb P_2O_5, 252 lb K_2O, and 29 lb sulfur per acre in the grain and stover. A 70 bu/a wheat crop contains 161 lb nitrogen, 53 lb P_2O_5, 105 lb K_2O, and 18 lb sulfur per acre in the grain and straw. Even though these nutrients are used in large amounts by crops, some of them, such as potassium and sulfur, are usually found in such large quantities in the soil that applying them as fertilizer is not necessary unless indicated by a soil test. Calcium and magnesium are also taken up in large quantities by crops; however, supplies in the soil are so large that nutrient removal is not a concern.

Micronutrients such as zinc, iron, copper, manganese, chloride, and boron are used in very small amounts by crops. Removal of these nutrients, therefore, is not usually an important consideration in crop management, even though some crops will respond to zinc and chloride fertilization under certain conditions. Corn, for example, will respond to zinc fertilization when soil test levels are low, even though a 160 bu/a corn crop will contain only about 2 ounces of zinc per acre in the aboveground portions of the plants.

Knowing the nutrient content of crops can help in making some crop management decisions. If fertilizer recommendations are to be reliable, however, they must always be made on the basis of a soil test.

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