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Amounts of Plant-Food Used by Different Crops and Proportion of Nitrogen Returned to the Land in Various Legumes

Purdue University Cooperative Extension Service

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HIGHER CROP YIELDS FROM IMPROVED SOILS

corn

soybeans

wheat

oats

legumes

grasses

Purdue University
Agricultural Extension Service

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AMOUNTS OF PLANT-FOOD USED BY DIFFERENT CROPS AND PROPORTION OF NITROGEN RETURNED TO THE LAND IN VARIOUS LEGUMES

Kind of Crop	Yield per acre	Plant-food removed, (pounds per acre)*		
		Nitrogen	Phosphoric acid	Potash
Corn, ears	80 bus.	76	32	19
Corn stover	2.5 tons	45	10	58
Total		121	42	77
Wheat, grain	30 bus.	36	16	10
Wheat straw	1.2 ton	12	4	18
Total		48	20	28
Oats, grain	50 bus.	31	13	9
Oats straw	1 ton	12	4	30
Total		43	17	39
Rye, grain	25 bus.	29	10	7
Rye straw	1.5 tons	14	5	27
Total		43	15	34
Barley, grain	30 bus.	27	12	12
Barley straw	.8 tons	9	3	19
Total		36	15	31
Soybean grain	30 bus.	109	24	32
Soybean straw	1.2 ton	14	8	20
Total		123	32	52
Alfalfa hay	4 tons	200	33	128
Clover hay	2 tons	82	16	65
Lespedeza hay	1.5 tons	61	9	34
Soybean hay	2 tons	94	20	40
Timothy hay	1.5 tons	30	9	45
Sudan grass	3 tons	85	16	78
Brome grass (W/alf.)	2 tons	82	17	110
Orchard grass	2 tons	40	19	100

*Compiled from Morrison's "Feeds and Feeding", 21st Edition, and Ill. A.E.S. Bulletin 518.

In general, legumes, if well inoculated, may secure up to two-thirds of their nitrogen from the air. They differ in the proportion removed in the tops and left in the roots and stubble.

Deep rooted legumes like the clovers, alfalfa, and sweet clover leave more nitrogen in the roots and stubble than shallow rooted crops like soybeans and possibly lespedeza.

A thick stand of spring seeded sweet clover plowed under in April the following spring will add from 75 pounds of nitrogen per acre from a fair stand and growth to 200 pounds from a thick heavy growth.

Roots and stubble of a full stand of clover contain about 40 pounds of nitrogen per acre, of alfalfa 50 pounds, of lespedeza 30 pounds and of soybeans 20 pounds.

When all top growth of inoculated soybeans is removed for hay or seed, more nitrogen is taken from the soil than the amount left in stubble and roots. When combined and the straw left on the ground, slightly more nitrogen is left than is removed in the grain.

About $\frac{2}{3}$ the nitrogen, $\frac{3}{4}$ the phosphoric acid, and $\frac{3}{5}$ the potash in the ration feed to livestock can be returned to the land in manure if properly handled and the liquid saved by absorption in bedding.

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