BIG YIELDS REQUIRE GOOD FERTILITY…

Eight to ten tons per acre alfalfa yields are possible with precision management, but pay attention to fertilizer practices and use good alfalfa soils. These research data show the high nutrient demands of the crop.

Nutrient demand varies from one location to another depending on soil type, variety used, soil test levels, and – most importantly – yield level. Observe the nutrient removal of alfalfa over a six-year period for farmers in the Pennsylvania Alfalfa Growers Program

Note how nutrient removal rises rapidly with yields. Compare the removal figures with those in the previous table. While location can make a difference, high yielding alfalfa still demands high amounts of nutrients.

Nutrient removal by alfalfa increases with yield level

Yield Group	N	P_2O_5	K_2O	Ca	Mg	S
T/A	lb/A					
Up to 4	203	51	229	88	15	16
4 to 5	226	66	301	108	19	20
5 to 6	313	78	382	132	24	25
6 to 7	373	92	423	145	26	29
7 to 8	429	108	503	167	30	34
Over 8	499	124	585	202	35	42

FERTILIZER BY … SHUR-GRO™ provides the grower with vital elements for use in a complete program to increase yields and crop quality. We stress the importance of balancing the soil as opposed to just feeding the plant.

The most accurate way to determine the condition and needs of your soil is through soil testing. We offer soil testing services to our customers through prominent soil testing laboratories. To balance major mineral imbalances we recommend the use of natural materials for long term corrections.

BREAKDOWN OF NUTRIENTS FOR ALFALFA

PHOSPHORUS

Phosphorus (P) is important for early growth, cell division, all metabolic energy transfers, and the formation of carbohydrates and proteins. Eight to ten tons per acre alfalfa yields remove 12.5 to 15 lbs. per ton of P_2O_5. Phosphorus moves very little in the soil and has a tendency to become fixed. This means plenty of Phosphorus must be available throughout the rooting zone to avoid Phosphorus shortages. Shortages are likely to occur:

- During early growth when alfalfa roots are small
- During periods of drought when part of the rooting zone may be inactive
- During cool periods when Phosphorus uptake is less

POTASSIUM

Alfalfa requires larger amounts of Potassium (K) than any other nutrient, from the soil or from fertilizer. In higher yield alfalfa systems, the crop is cut more frequently and harvested at a younger growth stage.

This leads to higher Potassium concentrations in the harvested forage and much greater Potassium removal than once considered adequate. Removal data for intensively

managed alfalfa suggest each ton of hay harvested will remove from 55 to 75 lbs. Potassium. That is 10 to 30 lbs. per ton more than considered adequate a few years ago.

Phosphorus (P) and Potassium (K) are a vital team to alfalfa stand life. Many studies, especially with Potassium, show thicker stands, fewer weeds, less heaving and winterkill and more root development as soil Potassium and Phosphorus levels increase.

Like Phosphorus, the Potassium soil test level should be built up to the high level before establishment. Apply 60 lbs. K_2O per ton of yield goal. Split Potassium applications increase fertilizer efficiency and availability throughout the growing season. A good program is to apply half the Potassium after first harvest and the remainder after the next to last harvest in fall.

SULFUR

Sulfur (S) has emerged as a major nutrient requirement for big alfalfa yields with 4.5 to 6.5 lbs. per ton being removed. Sulfur is important in nitrogen fixation and in nitrogen metabolism processes. Thus, it is essential for protein level and high quality alfalfa feed. The nitrogen to sulfur ratio (N:S) in alfalfa tissue is considered to be an important diagnostic tool in producing a high yielding, high quality crop. The optimum ratio is 11:1.

BORON

Like with major nutrients, micronutrient removal increases with yield. As a precision manager, you should monitor micronutrient levels in your soil and crop to keep them from becoming limiting production factors. Boron (B) is the micronutrient most likely to limit yields. Compare the Boron removal in high yields to the standard at lower yield levels.

Boron removal increases with yields

Yield	Nutrient Removal Amounts		
T/A	lb/A	lb/T	Location
6	0.09	0.015	Standard
8	0.43	0.053	New Jersey
8.5	0.44	0.052	Pennsylvania
9	0.63	0.070	Michigan
10.8	0.54	0.050	Kansas

PUTTING IT ALL TOGETHER

Precision managers know that adequate fertility alone cannot produce big yields. It takes all growth factors working together to get the job done.

In Michigan, a top variety yielded a two-year average of 10 ton per acre compared with the standard variety yielding 8 ton per acre using similar management. In New Jersey,

alfalfa yielded 8 ton per acre in the 5th harvest year where soil pH was maintained near 7.0. When the pH was below 6.0, yields dropped to 5.5 ton per acre.

Alfalfa hay returns increase with higher yields

Yield Range	Cost	Net Return
T/A	$/T	$/A*
3 to 4	76.42	15.93
4 to 5	67.12	55.92
5 to 6	55.22	119.55
6 to 7	51.79	167.54
7 to 8	53.81	173.54
8 to 9	41.47	283.19

*Hay value: $80/T

PA Alfalfa Growers' Program

The question is: Do big yields pay? Precision managers know the answer is yes and they know they must consider all interacting factors in modern alfalfa production. Compare the returns for Pennsylvania alfalfa growers and the reduced cost per ton to produce the crop.

Plan a total production system using high yield goals and adequate fertilization. It is the best way to beat those ever-rising production costs…the best way to maximum economic yields.