

## PRODUCING MAXIMUM YIELDS OF IRRIGATED ALFALFA HAY



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Are your irrigated alfalfa hay yields in the 3- to 4-ton-per-acre category? This is the average level of production as indicated by 1964 agricultural census data for alfalfa hay grown in southern Idaho. Idaho has the climatic conditions and favorable day lengths and temperatures for high yields of alfalfa. Suggestions offered in this publication are designed to help you double the average yield and to make alfalfa hay production a profitable cash crop as well as a soil-building rotation crop.

### STAND ESTABLISHMENT

Top yields of alfalfa hay cannot be produced without a thick, dense stand of an adapted disease-resistant variety.

**Fertilizer needs:** a University of Idaho soil test can help determine fertilizer needs. Alfalfa hay production removes large quantities of nutrients

from the soil. Therefore, adequate fertilizer should be applied during seedbed preparation and thoroughly incorporated into the soil by plowing or disking into the surface 4 to 6 inches.

Alfalfa fixes and supplies its own nitrogen during growth. To make sure this takes place, all new seedlings should be carefully inoculated with a high quality live Rhizobia inoculum. However, during seedling establishment, improperly inoculated seedlings may suffer lack of nitrogen and may respond to 30 to 40 pounds of fertilizer nitrogen.

Soil samples were taken from many alfalfa fields in southern Idaho recently, and over 60 percent tested low in phosphorus. This indicates a tendency to fertilize the row crops and neglect the fertilization of alfalfa in the rotation. Such a practice will not produce maximum tonnages of hay.

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**Seedbed preparation:** the seedbed for alfalfa should be firm and well packed. The top  $\frac{1}{2}$  to 1 inch of soil should be granular. A firm seedbed will provide good contact between seed and moist soil particles. This is important for good germination and early seedling growth. A firm seedbed will reduce the possibility of planting the seed too deep and will hold moisture closer to the soil surface.

**Depth and rate of seeding:** time of seeding will vary from area to area, depending largely upon elevation. Plant your seed as early in the spring as possible, consistent with seedbed preparation and frost hazard. In addition, many western Idaho growers successfully establish seedings during September.

Drill the seeds into moist soil with optimum depths varying from  $\frac{1}{4}$  to  $\frac{3}{4}$  inch on clay soils,  $\frac{1}{2}$  to 1 inch on loam soils, and  $\frac{3}{4}$  to 1 $\frac{1}{2}$  inches on sandy soils.

Alfalfa planted without a companion crop normally results in the best stands of hay. Seeding rates of 10 to 12 pounds per acre will provide about 50 to 60 seeds per square foot. A good thick stand is important for rapid establishment and production of fine-stemmed, weed-free, high-quality alfalfa hay.

Alfalfa seeded with a small grain crop can result in thin or spotty stands. If alfalfa is to be planted with a wheat or barley companion crop, it should be planted in alternate rows at about 6 pounds per acre. Bale the heavy straw residue from the field soon after grain harvest. This allows the alfalfa seedlings to thrive. Irrigate the field immediately following the removal of the grain crop. This is important so the seedlings can become well established.

**Choice of alfalfa varieties:** many improved varieties, brands and blends are available for use in Idaho.

In choosing a variety, consider disease and insect resistance, winter hardiness, regrowth rate and length of time stand is to be maintained.

Varieties have a definite genetic make-up that is maintained by private companies or public agencies. Private brands, on the other hand, usually refer to specific lines or blends. A blend is a mixture of varieties or seed sources that may or may not be constant with time. In tests, mixtures of varieties have not performed better than any of the component varieties of the mixture. Mixtures or blends are definitely undesirable when inferior performing varieties are included in the mixture.

Grass-alfalfa mixtures are not desirable, because such mixtures produce less hay of lower quality than is normally produced. However, if grass is desired in the hay, Latac orchardgrass, Regar bromegrass and Manchar smooth bromegrass are compatible with alfalfa.

## MANAGING YOUR STAND FOR TOP PRODUCTION

**Irrigation:** water consumption is lowest immediately following cutting and reaches a peak at

the pre-bud stage. The water-use rate declines after pre-bud stage as the plant approaches maturity.

The frequency of irrigation may vary between two and three irrigations per cutting depending somewhat on soil type. It is important to irrigate as close to cutting as possible to meet the needs of the peak-use period and to have sufficient moisture remaining to start regrowth. Fall irrigation after removal of the last cutting is also important. This provides adequate moisture to start spring regrowth before irrigation water is available.

**Insect control:** the alfalfa weevil is the most serious insect pest attacking alfalfa in Idaho. Each year this insect damages millions of dollars worth of alfalfa. Alfalfa weevil populations and the amount of damage varies from year to year and between areas. Even fields of different ages on the same farm can show varying amounts of damage. Only part of the alfalfa acreage in Idaho needs treatment for the weevil in any one year. But much of the acreage needing treatment is left untreated or treatment is poorly timed, resulting in little or no control.

Timing insecticide treatments is essential for controlling the alfalfa weevil. Inspect each field twice weekly for a 3-or-4 week period every spring. This period can occur between mid-May and mid-July, depending on the growing area. The following guidelines will help determine proper timing and treatment.

- Cut hay in the early bud stage before 50-75 percent of the tips show weevil-feeding injury (this ranges from pin holes in leaflets to damage of the entire tip).

OR

- Cut hay when 50-75 percent of the tips show feeding injury and treat the stubble: (1) Consider a Sprayrower (see Idaho Current Information Series No. 46); (2) or treat within 2 to 3 days of cutting with a recommended insecticide (see your county Extension Agent).

OR

- If hay cannot be cut with 50-75 percent of the tips showing feeding injury, apply a recommended insecticide to the standing hay and observe limitations of days before harvest for the material used (see your county Extension Agent).

The pea aphid can be a problem on alfalfa regrowth. Wilting foliage and shiny, sticky leaves are signs of heavy populations. A black, sooty mold may also develop on this sticky honeydew. Alfalfa growth is stopped and plants are weakened and even killed by high populations. Heavily infested fields should be sprayed to destroy aphids and then mowed to stimulate new growth. Where the hay is to be fed, be sure to select a pesticide that has clearance on this crop. Follow all label directions.

Some other insects that can seriously damage alfalfa include the alfalfa caterpillar, alfalfa looper, cutworms, grasshoppers, spider mites, western yellow-striped armyworm and white-lined sphinx.



**Weed control:** alfalfa, like other crops, suffers from weed competition. Furthermore, alfalfa yields and quality are reduced by weed content. The initial damage from weeds is reduced seedling stand and growth. Every space in established fields not occupied by alfalfa plants is a home for weeds. Therefore, one of the best practices to reduce weeds in alfalfa is to have a dense, thrifty stand.

Proper cultivation practices do a great deal to control weeds in both seedling and established alfalfa. In addition, herbicides are available and registered for weed control in alfalfa. Correct use of the proper herbicides is the most practical and economical control for weeds in alfalfa.

Alfalfa is a vigorous competitor and it is often used to fight Canada thistle. A thick vigorous stand, combined with timely cutting (at least three per season) for three seasons, provides good control of Canada thistle.

**Fertilizer needs of alfalfa:** a soil test will help estimate the fertilizer needs of your soil. Established stands of alfalfa can be top-dressed with phosphorus and potassium. Fall fertilizer applications are recommended on established stands for best results.

● **Nitrogen** — Alfalfa utilizes large quantities of nitrogen (Figure I), which is provided by nitrogen-fixing bacteria.

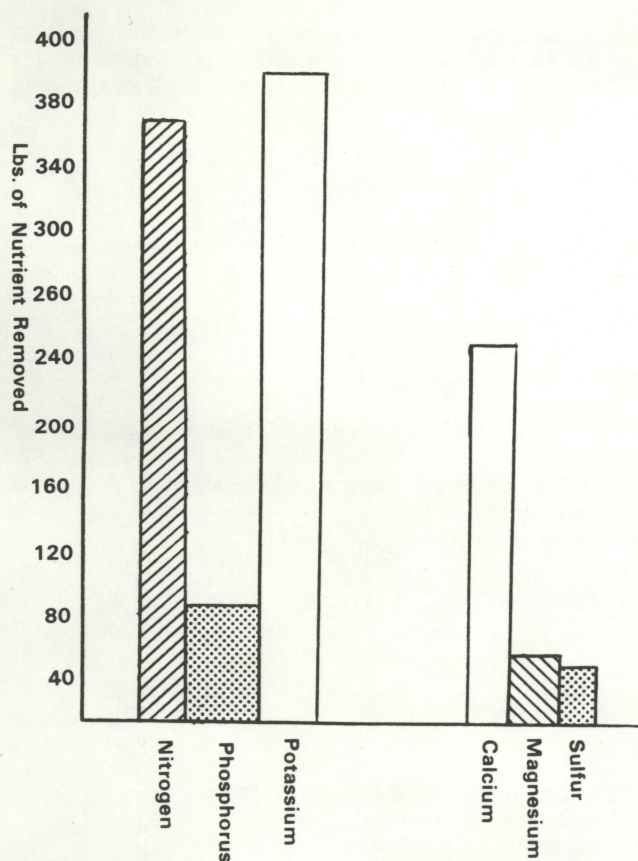
● **Phosphorus** — The amount of fertilizer phosphorus needed for high yields is much greater than the actual amount removed from the field in the forage (Figure I). Efficiency of phosphorus uptake from applied phosphorus on calcareous soils of southern Idaho may be less than 25 percent. The soil test (Table 1) is an excellent indicator of phosphorus needs.

● **Potassium** — Potassium needs and removal by alfalfa are high (Figure I). Alfalfa will remove about 50 pounds potassium oxide ( $K_2O$ ) per ton of hay. Research is showing that alfalfa responds to application of potassium in certain areas of Idaho. Potassium application should be based on need as determined from a soil test (Table 1).

**Alfalfa stand maintenance:** alfalfa stands must be thick and dense to produce maximum tonnage. Don't allow livestock to overwinter on established alfalfa stands. This practice compacts soil, damages the crown of the alfalfa plant and favors disease development. The alfalfa plant cannot produce vigorous early spring regrowth and sustain production throughout the year.

FIGURE I

Nutrients Used by 8 Tons of Alfalfa Hay



Most of the nitrogen will be provided by nitrogen-fixing bacteria on nodulated plants. Few areas will require supplemental nitrogen if properly inoculated seed is used.

TABLE I

Fertilizer Guide Rates for Alfalfa Based on University of Idaho Soil Test

If University of Idaho soil test for P reads:	Apply this amount (lbs./A) of:
ppm P	$P_2O_5$
0 - 4	220
5 - 8	160
8 - 12	120
12 - 20	60
20 or more	0

If University of Idaho soil test for K reads:	Apply this amount (lbs./A) of:
ppm K	$K_2O$
0 - 75	240
76 - 150	160
150 - 200	80
200 +	0



## HARVESTING TOP YIELDS OF HIGH-QUALITY HAY

High yields of excellent quality forage mean harvesting the forage during bud stage development, or about the time new growth starts to appear from the crown. Harvesting at this early stage of maturity will produce the maximum number of tons of quality forage.

Weather and growing conditions vary from year to year. Therefore, don't cut your hay according to a day on the calendar, but rather when new growth starts from the plant crown.

However, as a general guideline in the Boise Valley, the first cutting would be made between May 20 and May 30. In the Twin Falls area, harvesting of the first cutting will start about 10 to 15 days later than in the Boise Valley. The upper Snake River Valley would start cutting about 10 to 15 days later than the Twin Falls area.

The intervals between first and second cutting should be about 35 days and between second and third cutting about 40 days. In the Boise area, a fourth cutting can be made around October 1.

A hay conditioner will shorten the drying time so the crop can be removed from the field sooner. This means you can resume irrigation sooner and the next crop can be started without delay.

Remember, harvest each cutting during bud stage or just as the first bloom is noticed. This makes it possible to produce more total tons of good quality alfalfa during the growing season.

## COST OF PRODUCTION AND RETURNS TO MANAGEMENT

According to figures from various economic studies, the total cost of producing 5 tons per acre of alfalfa hay is about \$100. Assuming alfalfa hay is worth \$22 per ton, this gives a return to management, or profit, of about \$10 per acre. The costs of producing 8 tons per acre are \$120.60. However, 8 tons of alfalfa return a profit of \$55.40 per acre at the \$22 per ton sale price. Thus, the profit return is over five times as great from the production of 8 tons of hay per acre as from 5 tons of hay per acre. Table II shows some of the cost and return estimates at various levels of hay production.

TABLE II  
Estimated Alfalfa Production Costs and Returns per Acre

Tons	Fert. & Chem. costs	Other costs	Total costs	Value @ \$22	Mgt. ret. or profit
4	7.00	87.20	94.20	88.00	-6.20
5	8.00	92.00	100.00	110.00	10.00
6	9.00	96.50	105.50	132.00	26.50
7	11.00	103.70	114.70	154.00	39.30
8	13.00	107.60	120.60	176.00	55.40
9	16.50	111.20	127.70	198.00	70.30
10	20.00	114.50	134.50	220.00	85.50

## SUMMARY

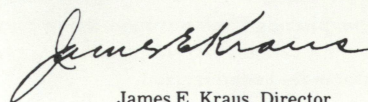
1. Idaho has the climatic conditions of favorable day-length and temperatures for high yields of alfalfa.
2. Adapted alfalfa varieties are available for the different areas of the state.
3. Soils and water are not limiting factors in most areas.
4. Addition of fertilizers can correct soil fertility needs.
5. Chemicals provide effective weed and insect control when applied at the proper time according to directions.
6. Maximum production of high quality and high protein forage results from early cutting of vigorous stands.
7. Alfalfa can become a cash crop in the rotation by the application of needed management inputs such as water, fertilizer and pesticides, and by timely harvesting.

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COVER PHOTO . . . provided through the courtesy of Rudy Patrick Co. - Northwest Division.

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James E. Kraus, Director