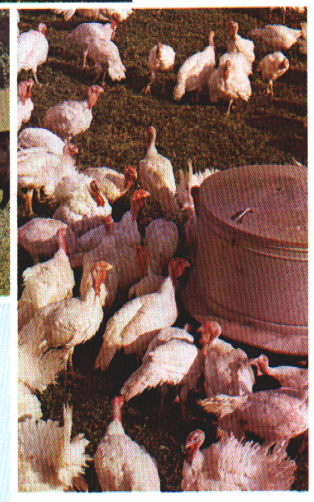


# ALFALFA

Quality  
Means  
Profits



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# PRODUCING HIGH QUALITY, HIGH YIELDING ALFALFA FOR MICHIGAN

by Z. R. Helsel\*, M. B. Tesar, R. Leep and J. W. Thomas, MSU

Michigan soil and climate suggest high yields of alfalfa. However, the average yield in Michigan over the past five years (alfalfa or alfalfa-grass) is about 2.8 tons/acre/year. Research at MSU indicates that yields can be maintained at the 6 to 8 ton level by proper management--getting more cuts/year from a properly-fertilized, vigorous stand of alfalfa.

There are five "keys" to obtaining high yielding, high quality alfalfa: 1) establish superior stands of high yielding varieties, 2) provide adequate annual fertilization, 3) harvest early, 4) control pests (weeds, insects or disease), and 5) harvest and store properly. These keys also apply to most other forages.

## FIVE KEYS TO HIGH QUALITY, HIGH YIELDING FORAGE

### Key #1. HIGH YIELDING VARIETIES, PRODUCTIVE SOILS, GOOD MANAGEMENT

High yielding varieties planted on productive soils with good planting practices are necessary for top yielding stands of alfalfa. Select varieties on their a) yield potential, b) maturity, c) stand persistence, and d) pest resistance. Information on top performing alfalfa varieties for short- and long-term stands in Michigan can be found in MSU Extension Bulletin E-1098 "Recommended Varieties of Alfalfa for Michigan". Certified seed of many of these varieties can be easily obtained from reputable seedsmen.

Establish alfalfa on well-drained, productive soils for top yields. Soil pH should be corrected, if necessary, by liming to a pH of 6.8 or above, preferably 6 months before seeding. Apply fertilizer at the time and rates recommended by a soil test. Band seeding alfalfa in a well-prepared seedbed with a starter fertilizer followed by press wheels or a cultipacker usually produces best stands. Clear seeding of alfalfa, using preplant incorporated herbicides, in the early spring is the best method of seeding (see MSU Ext. Bull. E-961 "Clear Seeding of Alfalfa" for more details). However, continue to seed alfalfa with small grains in the spring or alone in the summer if this has been a successful practice in the past. For more information on these seeding methods and other recommended practices (seeding rate, depth, etc.), consult MSU Ext. Bull. E-1017 "Good Stands for Top Alfalfa Production" and E-489 "Seeding Practices for Michigan Crops".

### Key #2. PROPER FERTILIZATION

Proper fertilization is the second key. Each ton of harvested alfalfa removes about 12 pounds of phosphate ( $P_2O_5$ ) and 50 pounds of potash ( $K_2O$ ). Nitrogen, although removed, is obtained free via the inoculant that was applied at planting time and forms nodules to fix nitrogen from the air. Determine the best rates of annual application of fertilizer through a soil test and fertilize (and lime, if necessary) at recommended rates. In the absence of a soil test, replacing the nutrients removed by harvest may suffice. The increased yield from applying high levels of potash on frequently cut alfalfa is indicated in Figure 1. Potash helps alfalfa remain vigorous, thus providing good winter hardiness and productive stands for many years. Quality of forage remains high under adequate potash fertilization by maintaining a greater amount of high-quality legume (thus less weeds) in the stand.

FIGURE 1. THREE CUTTINGS ALFALFA YIELD MORE THAN TWO WITH HIGH POTASSIUM 3 YEARS - MICH.

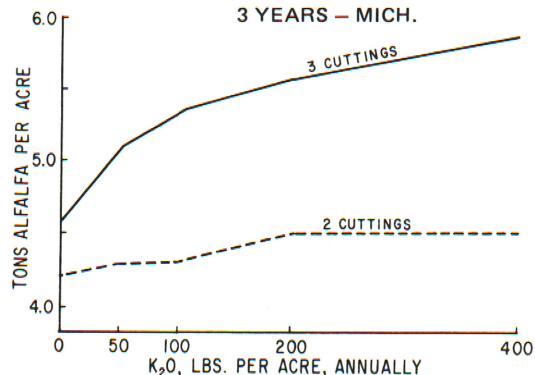


TABLE 1  
ALFALFA CUTTING DATE, NUTRIENT CONTENT AND VALUE

	DATE CUT					
	5/25	6/1	6/13	6/20	6/27	7/10
CRUDE PROTEIN, %	18.0	17.2	15.3	14.1	12.9	11.2
CRUDE FIBER, %	20.0	22.0	26.0	29.0	32.0	35.0
DIGESTIBILITY, %	63.0	61.0	57.0	54.0	51.0	48.0
PROBABLE VALUE \$/TON	80	74	60	51	41	30

FROM BARRY COUNTY FARMS. \$ VALUE FOR 6/13 GIVEN AS \$60/TON AND DIFFERENCE FROM THAT DATE AT \$4.50/CWT FOR CORN OR \$0.0558/LB TDN AND \$11.00/CWT FOR SOYBEAN MEAL OR \$0.25/LB PROTEIN.

Apply fertilizer to an established stand in the early spring, after a harvest, or in late fall. When applying high rates of fertilizer (above 400 lbs/A of potash) a split application may be beneficial. One application can be made after the first harvest and a second after the third harvest in late August to early September. Boron, a micro-nutrient, may be necessary for maximum alfalfa production on coarse-textured, droughty soils. Apply boron annually, but not at seeding, at a rate of 1 to 2 lbs/acre/year.

### Key #3. EARLY HARVEST

Early cutting is the third key. Make the 1st cutting in late May or early June in southern Michigan and early to mid-June in northern Michigan. A 4-cut system (3 cuts by late August and a 4th in mid- to late October) in southern Michigan will produce about 10% more forage than a 3-cut system. A 3-cut system will produce approximately 25% more forage than a 2-cut system (see Figure 1).

Recommended cutting times vary for different parts of the state. Figure 2 gives average recommended harvest times for first cutting in Michigan. These, of course, vary with weather conditions each year but can help you know when to make the first harvest. Make 2nd and 3rd harvests 30 to 40 days after the previous harvest. Another method of judging the proper time to cut is by the stage of plant growth. Make 1st cutting at approximately full bud to very early bloom, later cuttings at early bloom. Alfalfa stands are in very early bloom when just one flower on 1 of every 10 plants is recognized. It is necessary to walk fields to determine this early bloom stage of alfalfa.

Recommended cutting schedules are based on a compromise of yield, quality and stand persistence. If harvest is too early, quality will be higher, but yield and stand vigor may be decreased. As harvest is delayed, forage quality continues to decline in crude protein, digestibility and potential intake by the animal. Yield may also be decreased if leaves are dropping or one future cutting is lost because insufficient regrowth time was available during the growing season. For every day that harvest

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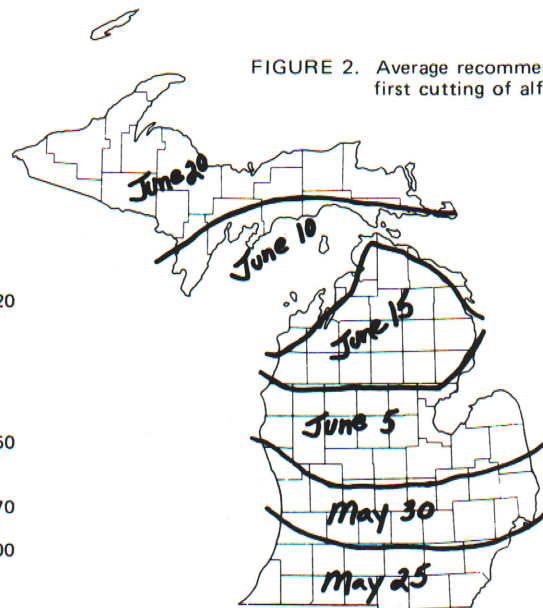
is delayed, total digestible nutrients (TDN), crude protein and intake decrease at a rate of about 1/2% per day. Dollar value of the forage, whether for hay or haylage, decreased greatly when cut late (Table 1 and 2). Therefore, timely harvest, 4 times a year in southern Michigan and 3 times in northern, lower Michigan and the Upper Peninsula will result in increased profits through higher yields and higher forage quality.

TABLE 2 VALUE OF EARLY HARVESTED ALFALFA FOR HAYLAGE

Assume 2000 lbs. of Haylage @ 50% DM = 1000 lbs. DM

	Early Cut	Late Cut	
1. PROTEIN %	18	14	
LBS.	180	140	
Difference (early vs. late) = Soybean oil meal at \$10/CWT. or \$0.23/Lb of Protein Dollar Difference =			40 lbs. \$9.20
2. TDN %	53	50	
LBS.	530	500	
Difference = Corn at 2.25/BU or \$0.05/Lb of TDN Dollar Difference =			30 lbs. \$1.50
Total Dollar Advantage for early cut per ton of Haylage =			\$10.70
a 20 x 60 Silo with 450 Tons =			\$4,815.00

FIGURE 2. Average recommended date of first cutting of alfalfa.



**Key #4. PEST CONTROL**

Control weeds, insects and disease to maintain high yielding, good quality forage. Pest control should be systematic beginning with the cultural practices as outlined in the first 3 keys.

**Weeds.** Weed control is especially important where high quality forage is desired. Begin control as soon as weed problems are observed and identified. Start with the simplest and most economical weed control methods (good stands, frequent cutting and adequate fertilization). MSU Ext. Bull. E-434 "Weed Control Guide for Field Crops" outlines herbicides that can be used on various forages to control weeds not adequately controlled by cultural practices.

**Insects.** The two major insects, alfalfa weevil and potato leafhopper, reduce yield, vigor and quality of alfalfa in Michigan. MSU Ext. Bull. E-789 "Alfalfa Weevil Control in Michigan" outlines methods of controlling the Alfalfa Weevil economically and also suggests some insecticides for control of the Potato Leafhopper.

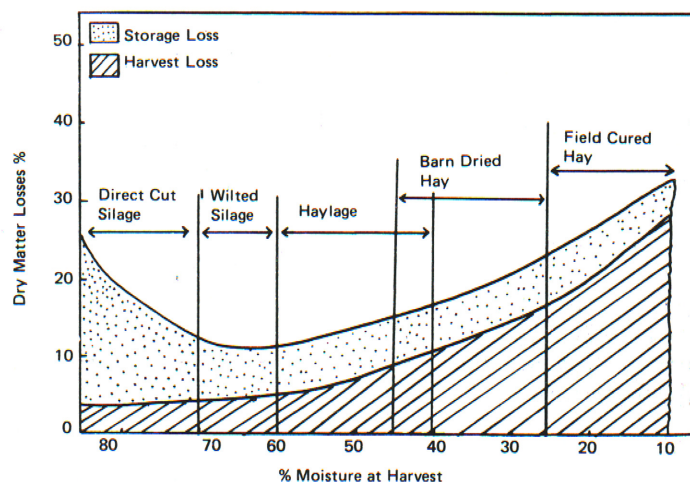
**Diseases.** When alfalfa is planted on well-drained soils of adequate fertility and is harvested on time, diseases normally are of little significance. On wet soils with poor drainage, a very common disease, Phytophthora root rot, frequently occurs. Resistant varieties are now available to reduce stand loss as a result of this disease (see MSU Ext. Bull. E-1098). Information on other disease and insect problems can be found in MSU Ext. Bull. E-744 "Alfalfa Analyst".

**Key #5. PROPER HARVEST AND STORAGE**

The final key is proper harvest and storage. Proper moisture content is perhaps the most important factor involved in harvesting and storing forage. The relationship of moisture content at harvest to dry matter losses during harvesting and storage is shown in Figure 3. Harvest losses increase as the forage dries because leaf shattering results from mechanical impact of the forage equipment. Storage losses, however, decline as the moisture level of the forage decreases. The least total dry matter losses in forages occur at the 50% to 65% moisture range.

Put haylage in the silo at proper moisture content--50% to 65%. Chop the forage at a 1/4 to 3/8" theoretical length and place in an air-tight enclosure. To exclude air in a bunker or open, upright silo, place higher moisture forage on the top and cover with weighted plastic. Harvest forage as hay at the highest moisture content possible without incurring mold and heating damage during storage. Raking hay when too dry can result in leaf loss and stem breakage, which reduces yield and quality. To reduce losses, rake at the highest moisture possible without delaying drying. Good ventilation in storage of hay is also important.

FIGURE 3. Dry Matter Losses Occurring in Forages by Haying System and Moisture.



FOOTNOTES to Tables and Figures

Table 1 D. Hillman, J. W. Thomas, B. Bean, E. J. Benne. Nutritional Differences in Hay MSU Ext. Bull. 626. 1968

Table 2 J. W. Thomas, Dairy Science, M.S.U.

Figure 1 M. B. Tesar, Crop and Soil Sciences, M.S.U.

Figure 3 C. R. Hogland, Mi. Agr. Exp. Sta. Econ. Rept. No. 947. p 16. 1964



# ALFALFA

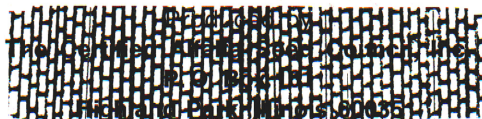
## High Quality Means Greater Profit

The goal of most dairymen and livestock producers is to generate greater profits. But, it is becoming increasingly more difficult to achieve this goal. Why? Because the cost of everything is increasing—the inputs you purchase, the grain you feed, the land you farm.

Producing and feeding HIGH QUALITY ALFALFA are means for increasing profits on your farm. This sounds like a simple solution but top management is required to produce 6 to 8 tons or more of high quality alfalfa year after year. A producer must plant quality seed of high yielding disease and insect resistant varieties, use recommended fertilizer and pest management programs, reduce field harvest losses and, most important, harvest at the right stage of maturity. Then back this up with a feedstuffs testing program to insure that livestock receive a balanced ration.

You can reduce your reliance on fluctuating priced purchased feeds and feed-grains by producing and feeding HIGH QUALITY ALFALFA. Most importantly, you can generate more profits per acre from your farm. And isn't this your goal? If it is, there's a place for HIGH QUALITY ALFALFA on your farm.

Produced by  
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