

Alfalfa Yield/Quality: Relationships within Individual Harvests

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The improving knowledge of relationships among alfalfa yield, quality, and persistence has greatly influenced harvest recommendations. Consider the timeline of how alfalfa harvest management has evolved through the years (Table 1).

Table 1. Evolution of alfalfa harvest management

Time Frame	Farmer's Goal	No. Harvests	Growth Stage at Harvest
1920-1950	Persistence, Yield	1-2	Full Flower
1950-1960	Nutrient Yield, Persistence	3	First Flower
1970's	Nutrient Yield*	4	First Flower
1980's	Nutrient Concentration**	4	Bud

*Total amount of nutrients harvested; **Favorable % of nutrients in the plant
Sheaffer, 1990

within the growing season. In addition, it examined when harvest management has the greatest impact on milk production.

The recent study was conducted at central Pennsylvania (PA), south central Wisconsin (WI), and south central Idaho (ID) during the 2005 crop season. Three varieties with similar fall dormancy, disease resistance and recovery after cutting were planted at each location.

At each location, alfalfa was harvested during spring, early summer, late summer, and fall. During each harvest period, different plots were cut five times, each cut five days later than the previous cut. First cut for each harvest period was May 11 (spring), Jun 18 (early summer), Aug 4 (late summer) and Sept 12 (fall).

Results showed yield was highest for spring harvest at all three locations. Quality (measured as NDFD, the portion of total NDF that is digested) was highest for spring harvest for two of the three locations. In PA and WI, the greatest rate of DM production occurred during spring or early summer harvests due to optimum temperatures and moisture. In ID, forage production was maximized under irrigation beginning in early summer. At all three locations, forage quality declined most rapidly in early summer. Finally, the decline in forage quality was slowest in late summer in PA and WI.

Results were also expressed by using an index (Milk 2000) combining forage yield and quality to estimate milk production (Figures 1 and 2).

Summary Comparison of Four Harvest Periods:

1. Yield and quality are usually highest in the spring.
2. Under conventional management (no irrigation), yield increases and quality declines most rapidly as alfalfa matures during spring and early summer.
3. Harvesting within 10 days after vegetative stage in spring and early summer provides optimum milk production and dairy quality hay.
4. Harvest in late summer can be delayed because digestibility declines more slowly than during spring and early summer.

Known facts:

- When the plant has more time to grow before harvesting, yield increases at the expense of feed quality.
- When the plant is cut early, a higher quality feed is captured at the expense of total yield.

Previous studies of the trade-off between yield and quality usually examined the relationship on an annual basis. However, a recent study examined the trade-off between yield and quality for each cutting

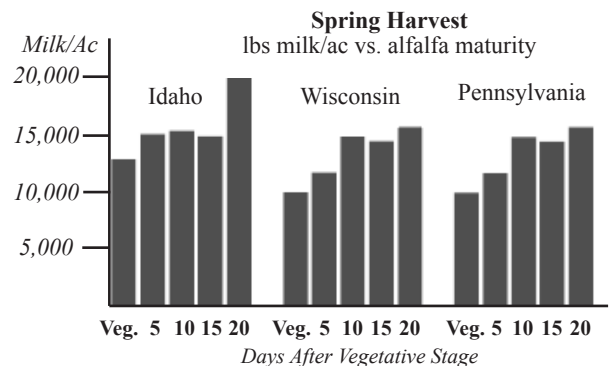


Figure 1. During spring harvest, milk/ac plateaus apx. 10 days after vegetative stage.

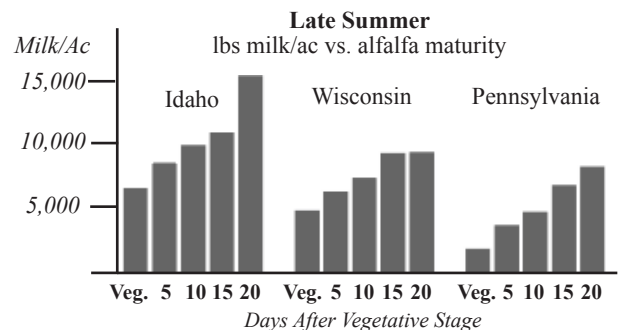


Figure 2. During late summer harvest, milk/ac continues to increase because DM is increasing while forage quality does not decline as rapidly as in early summer.