

MANAGING ALFALFA FOR YIELD-QUALITY-PERSISTENCE

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Alfalfa is a premier forage legume that has played an important role in Kentucky's forage-livestock program for many years. It's role at present is increasing and it's most significant role is yet to come.

Alfalfa is presently grown on approximately one-fourth million acres in the state. Survey's show that we have over two million acres that could potentially grow alfalfa successfully and economically as cash hay or for pasture, hay, or haylage to be used on the farm where it is grown for livestock. Alfalfa's versatility also permits it to be used on the same farm and even in the same field for pasture, hay, and/or haylage in the same year.

When we consider Yield-Quality-Persistence, we immediately realize that we cannot maximize all three simultaneously. Over the past five years, average state yield has been about 3.5 tons per acre. Average stand life is about 3.5 years and overall quality has improved but still below our realistic potential. These numbers are indeed low for this remarkable forage legume; however, Kentucky ranks about the same as some of the larger alfalfa states in the North. Over the years, we have conducted surveys of participants attending the alfalfa conference (I consider our regular attendees to be some of the best alfalfa producers in the state) and find that their yields on the average are over one ton above the state average with an average year added to stand life. Hay contest winners each year show progress in their ability to produce a high quality hay.

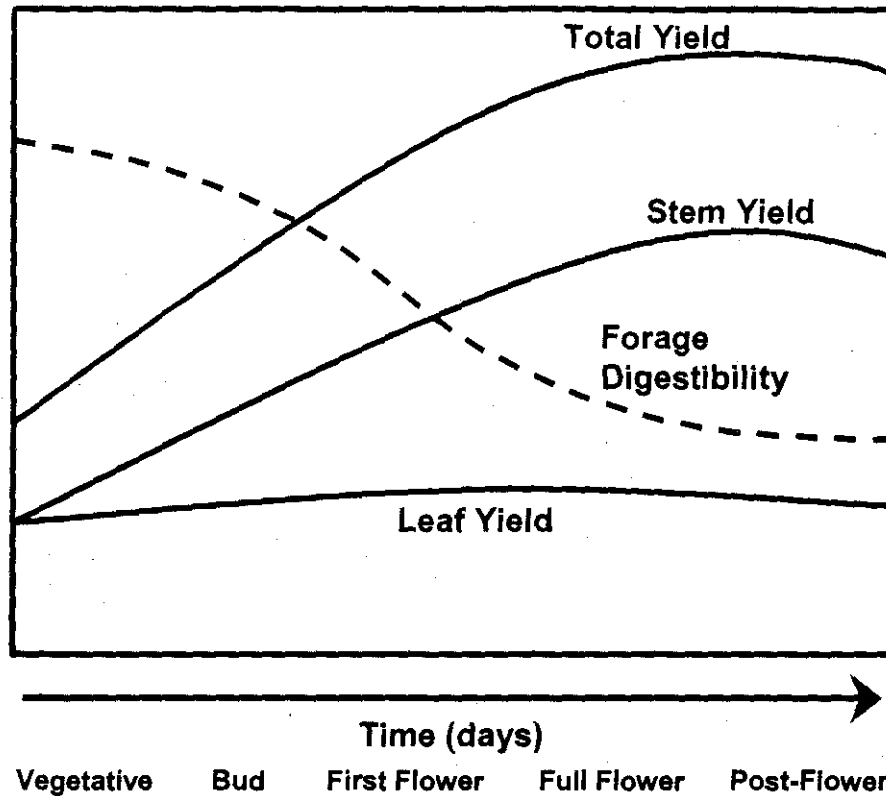
My challenge is to do those practices that are necessary during establishment, that will increase your chances of getting a good stand and harvest as the highest quality possible, over at least a five year period with production of at least five tons per acre per year. Many of you are exceeding these goals at present and I compliment you on that success and encourage you to set higher personal goals.

Yield-Quality-Persistence: A compromise

Since we cannot maximize yield, quality, and persistence at the same time our challenge as managers is to optimize for success. The overall relationship between

yield and quality is shown in Figure 1. This classic research illustrates that as yield increases, quality decreases. This quality decline is closely related to stem yield.

Figure 5. Relationship between yield and quality.



Research in Wisconsin over a decade ago showed that over the entire growing season it was possible to have both high yield and high quality (Table 1). In this study, the highest yield and highest quality occurred with the most frequently cut treatments.

Table 1. Estimated Grade, Average Concentration of Crude Protein (CP), Acid Detergent Fiber (ADF), Neutral Detergent Fiber (NDF) and Milk Yield in Wisconsin Forage Council Green Gold Project.

| Estimated Grade | Number of Cuts | CP% | ADF % | NDF% | Milk lbs/A |
|-----------------|----------------|-----|-------|------|------------|
| Prime to 1 | 5 | 22 | 31 | 43 | 10,688 |
| No. 1 | 4 | 21 | 32 | 44 | 9,120 |
| No. 1 to 2 | 3 | 19 | 35 | 46 | 7,022 |
| No. 2 | 2 | 17 | 36 | 48 | 4,259 |

SOURCE: Adapted from D.A. Rohweder, et al., University of Wisconsin.

This relationship was summarized by Dr. Neal Martin, Director of the Dairy Forage Research Center in Table 2. As alfalfa plants mature, quality declines. Value (dollars per ton) was reduced by one-half as the plants matured from the vegetative to seed pod stage.

Table 2. Forage Quality Values as Alfalfa Advances in Maturity.

| Stage of maturity | Crude protein | Acid detergent fiber | Neutral detergent fiber | Digestible dry matter | Relative feed value | Market value ¹ average |
|-------------------|-----------------------------|----------------------|-------------------------|-----------------------|---------------------|-----------------------------------|
| | ----- % of dry weight ----- | | | | index | \$/T |
| Vegetative | >22 | <25 | <34 | >69 | >189 | 144 |
| Bud | 22-20 | 25-31 | 34-41 | 69-65 | 189-147 | 126 |
| Early Bloom | 19-18 | 32-36 | 42-46 | 64-61 | 146-123 | 96 |
| Late Bloom | 17-16 | 37-40 | 47-50 | 60-58 | 122-107 | 78 |
| Seed pod | <16 | >41 | >50 | <58 | <107 | 72 |

¹Market value based $Y = .88X - 22.3$ where, $Y = \$/T$ and $X = RFV$ index.
SOURCE: Dr. Neal Martin, personal communications.

As we develop our management strategies, we must go back to our overall goals. If we are striving for the highest quality, we are likely to cut early and over time sacrifice stand persistence. Research over many years has examined the yield-quality-persistence issue (Figure 2). If plants are consistently harvested in a pre-bud stage, persistence can be reduced; however, recent research has shown that with good varieties, grown on deep, well-drained-fertile soils, where pest (disease, insects & weeds) are controlled acceptable stand life, yield, and quality can be achieved.

Figure 2. Relationship of yield and quality as impacted by maturity

