How Cutting Date Affects Yield, Quality and Profitability of a Hay Crop

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Nutritional quality of first-cutting hay tends to decline as the harvest date is delayed, however, the physical quantity of the crop increases. The quantity increase and quality decline present the grower with a tradeoff. This tradeoff can be analyzed by means of an Excel spreadsheet (see sample below), HAYCUTDATE.XLS, which is downloadable at http://www.apec.umn.edu/faculty/wlazarus/machinery.html.

Suppose the earliest feasible harvest date is May 20, at which point the crop is expected to yield 1 ton/acre. The yield is expected to increase by 100 pounds/acre over the next three weeks. On June 9, the yield is up to 2 tons/acre.

The relative feed value (RFV) on May 20 is estimated at 200 when evaluated in scissors-cut samples, or 170 after the harvesting operations. Suppose this 170 RFV value is expected to decline by five points each day harvest is delayed past May 20. By June 9, then, the RFV value is down to 70.

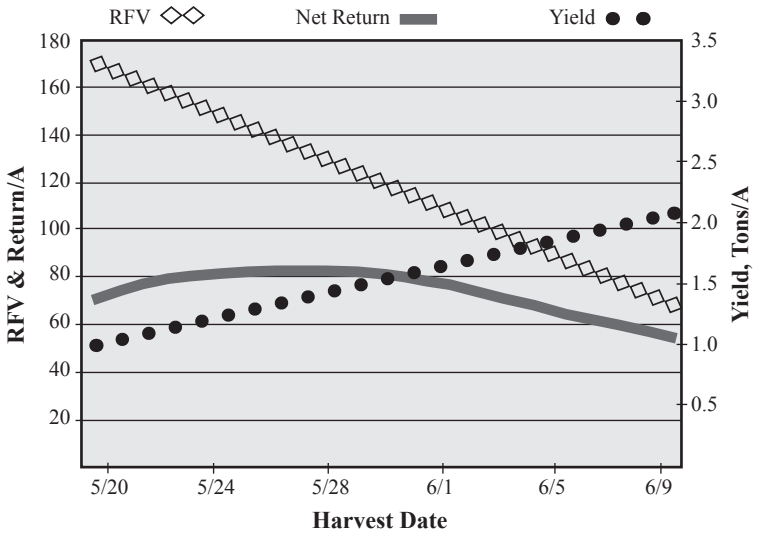

Figure 1. *Change in Hay Crop Quantity, Nutritional Quality, and Net Return Per Acre as Harvest Date is Delayed*

A way to put an economic value on this change in quality is to look at data from quality-tested hay auctions. Jim Linn, U of MN nutritionist, did a regression analysis of 2002/03 data from the Sauk Centre, MN hay auction. He found that 150 RFV hay sold for ~$90/ton. The selling price increased by ~$0.58/ton for each one-point change in the RFV value above or below 150.

An estimate of ~$30/acre to mow, merge windrows, and bale a first-cutting haylage crop of 1.5 tons/acre was used. A more important but more difficult number to arrive at is how much the harvesting cost/acre varies if harvest date is delayed and yield increases. Suppose the harvesting cost increases by $5/ton/acre for each additional ton of yield.

In summary, four factors are expected to change as the harvest date is delayed: 1) physical yield; 2) RFV; 3) value/ton; 4) the harvest cost/A. These factors are fairly easy to compare and graph in a simple spreadsheet. In this example, the profit-maximizing harvest date is May 27. On that date, yield increased to 1.35 tons/A, while RFV declined to 135. It is estimated that hay of that quality would be worth $81/ton or $109/acre on that date. The 1.35-ton yield costs $28/acre to harvest, so net returns are $82/acre.

The right vertical axis of the graph shows how yield increases as harvest date is delayed. The left vertical axis shows how RFV declines. The combined effect of these two changes, along with the slight increase in harvesting cost as yield increases, causes net return/A to increase until around May 27, and then decline.