# GREEN AND GROWING

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Colorado State University has been conducting research on practical ways to farm using limited irrigation resources. I'm highlighting the results of one study in this week's news.

A study is being conducted on alfalfa at the Northern Colorado Water Conservancy plots at Berthoud. The alfalfa was established in the fall of 2005 and has now undergone four different irrigation treatments through the past two growing seasons. The treatments included full irrigation, stopping irrigation after first cutting and resuming it in the late summer prior to the fourth cutting, and two treatments which had irrigations cut off after the first or the second cuttings for the remainder of the season.

In 2006, the full irrigation treatment yielded 7.8 tons of dry hay per acre with 27 inches of applied water. The treatment receiving spring and fall irrigations yielded 77% of this yield but only received 13 inches. The treatment with irrigations for the first and second cutting yielded 84% with 14 inches of water applied. The driest treatment where irrigation was stopped prior to first cutting yielded 52% with only 5 inches of total irrigation water.

The 2007 season was surprising on how well these treatment plots held up after the drought stresses. The spring and fall irrigated treatment yielded 93% of the fully irrigated alfalfa plots with only 10.9 inches of irrigation while the fully irrigated ones received 22.4 inches. The treatment watered to the second cutting yielded 97% of the full treatment but used only 10 inches of irrigation. The driest treatment yielded the same as the fully irrigated treatment for the first cutting and produced 83% of the total season's yield with only 4.3 inches of water applied.

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Long time alfalfa growers have claimed that alfalfa quality is best with dryland alfalfa and next best when it has been stressed. The researchers verified this observation on this study: alfalfa quality was best when the alfalfa was not irrigated since the previous cutting.

The researchers may have found that the alfalfa stand could be stronger when it is stressed. They counted alfalfa crowns and stems in the different treatment plots and found that the highest counts were those receiving the most stress.

An economic return analysis of the net returns over production costs was done on the 2006 field data. They found that the fully irrigated alfalfa returned a net of $245/acre, spring and fall irrigated alfalfa returned $190/acre, alfalfa irrigated to the 2$^{nd}$ cutting returned $177, and the 1$^{st}$ cutting irrigated alfalfa only returned $60/acre. However, it should be noted that all plots were harvested four times.

In real life situations cuttings of very limited productions would be skipped saving their harvest costs. Not irrigating during the heat of the summer when alfalfa growth slows could be a management decision if the water used during that time were diverted to other more productive crops or leased out. Both of these options may bring more income than in raising summer hay.

Dr. Neil Hansen and Brad Lindenmayer, researchers in CSU's Soil and Crop Sciences department are the primary investigators on this study. Neil Hansen and others will be speaking on limited irrigation studies at the 2007 Limited Irrigation Workshop that will be held in Greeley on December 12$^{th}$ and 13$^{th}$. The early registration discount for this workshop lasts until Wednesday, December 5$^{th}$.

Please contact me, Bruce Bosley, about this or other cropping systems or natural resources topics at 522-3200, extension 285 in Sterling or 542-3540 in Fort Morgan.

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