



## 2001 Cotton Management Economic Notes

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### ***Agronomics vs. Markets: Irrigation Termination***

With low cotton prices, you may be inclined to terminate this year's crop as timely as possible to minimize production costs. Indeed, individuals with crop revenue coverage or multi-peril crop yield insurance may have a hard time justifying the production of a "top crop," depending on insured levels of yield or revenue coverage. But given that most production inputs have already been applied, additional yield and enhanced quality have the potential to improve your bottom line, even with low cotton prices. With the current loan deficiency payment rate at 21.70¢/lb., an extra 100 lbs. of lint will increase revenues by over \$50/acre. An improvement in line quality of 4¢/lb. on a 1250 lb. yield is another \$50/acre. This study addresses the profitability and risks associated with extending the season for upland.

**Micronaire.** Mike or fiber fineness is influenced by variety, environment, and management. As shown in the table to the right, Arizona has been hit quite hard with discounts for high micronaire cotton in recent years. Given that one way to obtain higher yields is to produce a fiber with a thicker cell wall thickness which weighs more, it is not surprising that micronaire has trended upward for the U.S. and Arizona. From 1975 to 1999, average micronaire has trended upward by .0092 and .0102 each year, for the U.S. and Arizona respectively. In 1999, 38.6% of Arizona's crop was discounted due to high micronaire. In 1991, about half of this percentage or only 19.4% of Arizona's crop was discounted due to high micronaire.

**Production Data.** Irrigation termination studies conducted in central Arizona by Jeff Silvertooth and Steve Husman for the years of 1991, 1992, 1994, 1995, 1996, 1997, and 2000 are the basis for the agronomic components of this analysis. To quantify the progression of each crop among different years on an equal basis, Heat Units After Planting (HUAP) accumulated by the irrigation termination date of each study were obtained from the nearest AZMET weather station. A total of 198 irrigation termination experiments were available with lint quality measures that included at least micronaire. The deviations in lint yield, quality, and production costs between the baseline irrigation termination treatment (IT-1) and the 2nd (IT-2) or 3rd (IT-3) irrigation termination dates for the same field trial are the basis for this analysis.

**Production Costs.** Assumptions used to calculate the return for extending the season were the following: additional harvest and ginning costs at \$.10/lb.; cottonseed priced at 6.5¢/lb. and equal to 175% of lint weight (turnout of 36.36%); .3 hrs. of labor per acre at a wage of \$5.75/hr. for each irrigation required; opportunity cost of funds beyond the first irrigation termination date at .1/365 per day; and insecticide, fertilizer, defoliation, and any other remaining costs at \$.75 per day. This value of \$.75 per day is on the lower end of what was actually experienced for most of the crop years considered to reflect the recent widespread adoption of Bt cotton and the accompanying reduced insecticide spray require-

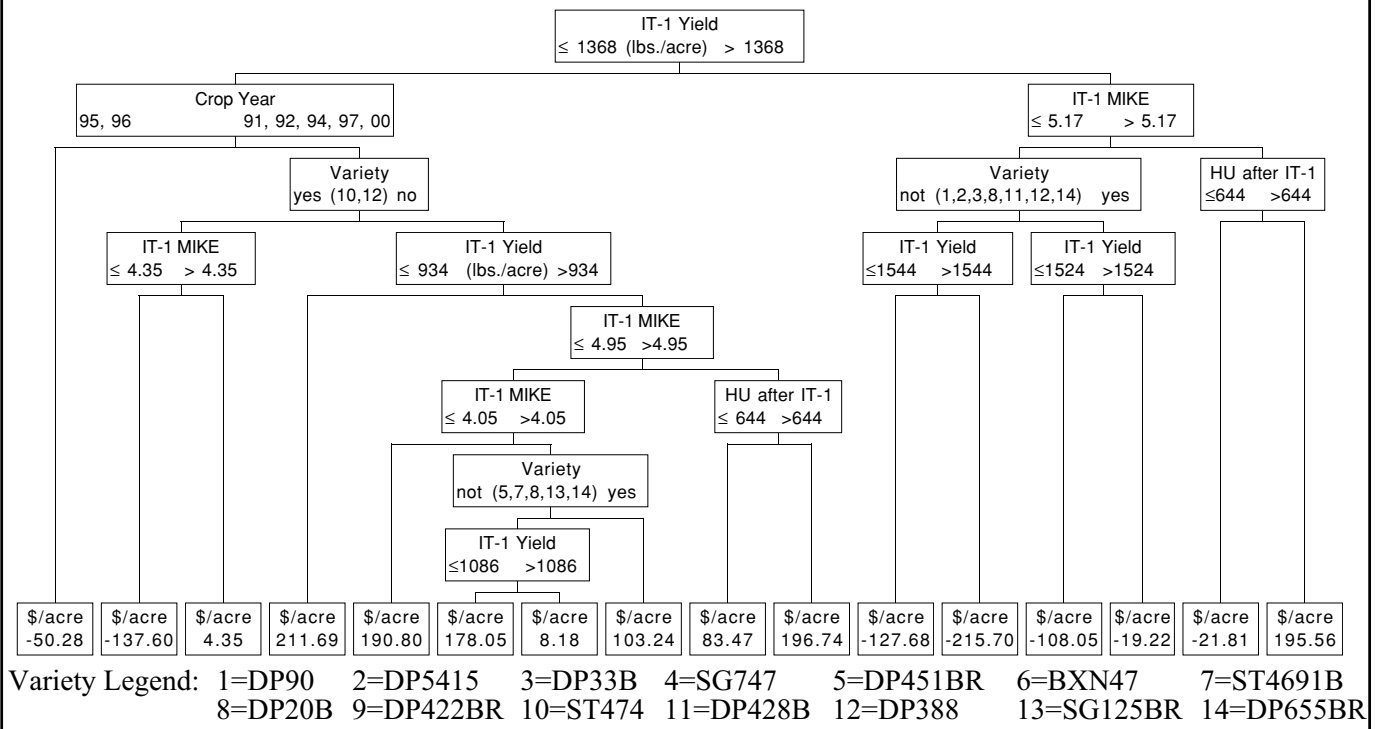
Recent Prices (August 13, 2001)	Upland (¢/lb)	Pima (ELS) (¢/lb)
Spot - uncompressed	35.65	84.50
Oct '01 Futures	38.40	
Dec '01 Futures	39.88	
Dec '02 Futures	45.70	
Adj. World Price	30.22	

Note: Upland Spot for Desert SW grade 31-3, staple 35, add 300 points for compressed bales, Pima Spot for DSW grade 03, staple 46.

Year	DSW 31/35	High MIKE Discounts (¢/lb.)		
		4.3-4.9	5.0-5.2	>5.3
1990	76.03	0.0	-1.0	-1.5
1991	56.58	0.0	-1.0	-2.0
1992	51.30	0.0	-2.0	-3.0
1993	55.68	0.0	-3.5	-4.5
1994	75.03	0.0	-1.5	-2.25
1995	85.34	0.0	-3.5	-5.0
1996	72.32	0.0	-3.5	-7.0
1997	69.48	0.0	-2.0	-4.0
1998	64.00	0.0	-2.0	-4.0
1999	47.51	0.0	-8.0	-10.0
2000	50.40	0.0	-7.0	-9.0

Prices are for the last week in November, uncompressed bales.

## Irrigation Termination Guidelines: 31/35 Lint Price of 50¢/lb. and 1999 MIKE Schedule



ments for pink boll worm late in the season. Profitability of each experiment was also calculated using the three water cost levels of either \$10, \$35, or \$60 per acre foot. A base lint price of 50, 60, or 70 cents per lb. and a discount/premium schedule for lint quality that existed in November of 1994, 1996, or 1999 was also applied to each experiment to determine the profitability of extending the season.

**Markets vs. Agronomics.** In classifying the relative importance of variables using the statistical procedure of CART, agronomic factors relating to variety, additional heat units, and yield associated with IT-1 experiments were more important signals than economic factors of water cost, base lint price, and quality discount/premium year. In addition, crop year was near the top of importance for determining whether extending the season was profitable or not, indicating that significant risks are associated with producing a top crop. Because many inputs are already sunk in getting the crop to the first irrigation termination date or IT-1, the marginal cost associated with extending the season is relatively small in relation to the potential yield and quality changes associated with extending the season. These are the primary reasons why agronomic factors were found to be more influential than the economic factors considered for explaining the profitability of extending the season for upland.

**Termination Guidelines.** The above chart has statistically categorized the outcomes of the irrigation termination experiments applying a base lint price of 50¢/lb. and November 1999 lint quality discounts/

premiums. To illustrate the results, consider a situation where the variety planted is ST474, IT-1 yield is estimated at 1,300 to 1350 lbs., IT-1 micronaire is expected to be 5.0 to 5.1, and growing conditions repeat from 2000. Yield is less than 1368 lbs. so proceed left down the decision tree. Then proceed right for crop year 2000, left for variety ST474, and right for IT-1 mike being above 4.35. The expected profit associated with extending the season for this scenario is estimated at \$4.35/acre.

Note that when IT-1 micronaire is relatively high (i.e., greater than 4.95 or 5.17), extending the season at least 644 heat units often pays a dividend. On average, 644 heat units equaled 24 days for all the experiments considered. If IT-1 micronaire is low or less than 4.05, extending the season is also likely to be profitable since high micronaire is not likely to be a problem. However, if IT-1 micronaire is less than 4.35 and IT-1 yield is less than 1368 lbs./acre with a variety type of ST474 or DP388, extending the season results in a negative return of -\$137.60/acre. In addition, extending the season is generally unprofitable when IT-1 yields are greater than 1368 lbs./acre and IT-1 micronaire is less than 5.17. If a crop has already attained a good load of bolls and micronaire is not very high, the potential to add profit through extending the season appears limited. However, if micronaire is above 5.17 with a high boll load, extending the season at least 644 heat units can pay a dividend. This result supports the notion that a top crop can enhance returns through additional yield and improving the quality of the base yield, even with low lint prices.