

# Field-scale Demonstrations of the Timing of the Last Irrigation in Wheat

S. H. Husman and M. J. Ottman

## Summary

*The last irrigation of wheat can be applied at the soft dough stage or for a sandy loam soil according to crop water use calculations. The purpose of this study is to verify at what stage the last irrigation of wheat should be applied. Studies were conducted on 7 commercial fields where the last irrigation was applied at the soft dough stage or about 10 to 14 days after soft dough. Applying the final irrigation after the soft dough stage does not appear to increase yield on average according to the results of this study.*

## Introduction

When to apply the last irrigation to wheat is commonly a difficult decision for growers. Applying an irrigation that is not necessary wastes resources and could induce lodging. Conversely, not applying a final irrigation can result in shrunken kernels and reduced yield. Previous work (Ottman and Husman, 1997) and calculation of crop water requirements at the end of the season suggest that the last irrigation of wheat should be applied at the soft dough stage. The objective of this work is to verify in a commercial setting when the last irrigation should be applied to wheat based on crop growth stage and soil type.

## Procedure

This work was conducted on 7 commercial durum fields in Pinal County. The variety planted was Ocotillo at the Pacheco and Schlittenhart locations. The fields were treated normally until the last irrigation. In some cases one more irrigation was applied than the standard farm practice, and in other cases, one less irrigation was applied than standard farm practice. In either case, an irrigation was applied near soft dough, and additional irrigation was applied 10 to 14 days thereafter. The size of the plots was about 3-4 acres each or the size of an irrigation set. The soil was sampled at these sites to a depth of 4 feet to characterize them in terms of soil texture and water holding capacity. Grain heads were sampled and analyzed for moisture content to obtain a more accurate estimation of growth stage. The grain was harvested in a strip in the plot area with a commercial combine and weighed for yield determination. Grain samples were analyzed for test weight, kernel weight, HVAC, and protein content.

## Discussion

The influence of the final irrigation on grain yield and kernel characteristics is presented in Table 1. Applying an additional irrigation after the soft dough stage did not affect yield on average. At the Schlittenhart farm, however, applying an irrigation after soft dough appeared to increase or decrease yield depending on the field. Test weight and HVAC were not affected by the timing of the last irrigation. Kernel weight was increased slightly by applying an irrigation after soft dough. Protein was also increased by the additional irrigation. These results suggest that applying an irrigation after soft dough is usually not beneficial.

## Reference

Ottman, M. J., and S. H. Husman. 1997. The last irrigation in durum at Buckeye, Casa Grande, and Marana, 1996-97. pp. 137-140. Univ. Ariz. Coop. Ext. Ag. Exp. Stn. Report Series P-110, Tucson.

## Acknowledgments

The cooperation of the following growers is appreciated: Marvin Wuertz, Paul Ollerton, Bill Scott, Dan and Todd Thelander, Brian Hartman, Russ Schlittenhart, and Pat and Lyall Pacheco. The technical assistance of Mark Rogers and Randy Wegener was critical to completion of these trials. Financial support for this project was received from the Arizona Grain Research and Promotion Council.

Table 1. The influence of the last irrigation on durum yield, kernel characteristics, and quality.

Grower	Location	Field	Soil type	Stage at	Yield	Test	1000	HVAC	Grain
				final irrigation		weight	kernel wt.		Protein
					lbs/a	lbs/bu	grams	%	%
Hartman	Maricopa	---	Loam	Soft dough	7961	63.4	54.1	91.0	12.20
				Soft dough + 10-14 d*	7850	62.8	55.2	98.9	13.52
Ollerton	Stanfield	---	Sandy clay loam	Soft dough	5820	63.0	53.8	97.8	11.29
				Soft dough + 10-14 d*	6136	64.1	57.8	97.0	11.25
Pacheco	Marana	1	Loam	Soft dough	5424	63.9	46.1	96.2	12.63
				Soft dough + 10-14 d*	5503	64.1	44.6	98.1	12.46
Pacheco	Marana	2	Sandy loam	Soft dough	3963	63.9	46.8	99.0	13.02
				Soft dough + 10-14 d*	3836	63.8	46.8	98.1	13.54
Schlittenhart	Eloy	5 mid	---	Soft dough*	5055	63.5	47.5	96.9	12.90
		5 east	Sandy loam	Soft dough + 10-14 d	4862	64.3	47.7	87.3	10.68
		5 west	Clay loam	Soft dough + 10-14 d	6690	63.3	50.8	99.0	15.94
		5 avg	Loam	Soft dough + 10-14 d	5776	63.8	49.2	93.2	13.31
Schlittenhart	Eloy	7	---	Soft dough*	5555	63.5	43.3	97.7	13.59
				Soft dough + 10-14 d	4929	63.6	46.1	93.6	14.18
Schlittenhart	Eloy	9	Loam	Soft dough*	4776	63.6	45.5	100.0	14.03
				Soft dough + 10-14 d	4184	63.6	45.9	99.1	14.38
AVERAGE				Soft dough	5508	63.6	48.1	97.0	12.81
				Soft dough + 10-14 d	5459	63.7	49.4	96.8	13.23

\* = standard farm practice