Heat Units and Harvest

Heat Units and Stages of Plant Development

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Temperatures were measured throughout the growing season and heat units recorded. (Example of heat unit calculation: average of max-min temperature minus 55° or some other base temperature). The limits used in this study were 55-86, 55-88, 55-90, 55-92, and 60-86. The heat units were measured and recorded continuously by an instrument called a biophenometer. The relationship of heat units and various stages of plant development for the four planting dates are shown in Table 1.

Table 1. Plant and Heat Unit Accumulation for Four Planting Dates

Event	4/16		5/3		5/24		6/18	
	dap*	HU**	dap	HU	dap	HU	dap	HU
50% emerg.			7	150	6	150	6	175
1 flower/M^2	68	1450	59	1430	51	1430	49	1440
Peak Flower	91	2145	75	1940	66	1865	70	2045
Cutout***	123	3060	111	2965	105	2960	115	2850

*dap -- days after planting
**HU -- heat units
***Cutout -- here defined as the date when flowering had dropped to one flower per square meter.

Starting in mid-July, a number of flowers were tagged on a weekly basis to measure the boll maturation period. The bolls were harvested as they opened and the number of days and number of heat units recorded since flowering. (Table 2) The number of days required to mature a boll increased as expected later in the season. However the number of heat units recorded decreased with the later bolls. One possible explanation is that more heat was available at the earlier dates than the plant needed for boll maturation. Restricting the rate of heat unit accumulation (e.g. 1 HU per hour) greatly reduces the discrepancy between dates. This is an area that needs further investigation.

Table 2. Boll Maturation

Flowering Date	Days to Open Boll	HU 55-86
7/15	56	1363
7/23	61	1438
7/30	64	1386
8/6	67	1336
8/12	66	1213
8/20	67	1092
8/27	63	941
9/3	84	890
9/10	73	751

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Harvesting Progress in 1985

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Cotton harvest in 1984-1985 finished behind a desirable schedule, with 38 percent of cotton acres being in violation of plow up regulations for boll weevils and pink bollworms in Maricopa County. At the end of January 1986, slightly more than 10 percent of cotton acreage appeared to be in violation even though more precipitation occurred in October and November 1985 than in 1984.

Comparison of ginning progress in four areas for the two years found the percent of crop ginned about equal on December 1 of each year. However, rain fell nine times in December 1984 for a total of 4.20 inches to further delay late-harvesting farmers. Although December 1984 was unusually wet, the probability of rainfall in December increases over the probability for either of the months October or November. At one farming location, the probability for .40 inch of rain in a 3-week period increases sufficiently to alter harvest schedules so second harvest is finished by late November.