COTTON LINT QUALITY AND RELATIVE VALUE AT DIFFERENT HARVEST DATES

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Early termination of cotton (Gossypium spp.) growth, early harvest and early residue disposal are suggested by many entomologists as a means for reducing overwintering insect populations and reducing insect infestations and control costs in the subsequent year. Other advantages of early cotton termination are reduced irrigation costs and reduced insecticide costs in the current year. However, when autumn weather is warm and dry allowing boll maturation and late harvest the yields are higher with normal termination. Therefore, the termination decision for growers involves weighing the yield loss and reduction in inputs (irrigation, insecticides, operating capital) associated with early termination against the greater yields likely with later termination, recognizing the adverse impacts on yield and quality that occur when a cold wet fall is encountered following later termination.

The adverse impacts that must be considered are the effects of "storm damage" - direct seed cotton loss and/or reduced cottonseed and lint quality. When analyzing harvesting strategies and equipment sets that will achieve early residue disposal and plowdown (regardless of the timing of crop termination), it is necessary to know the effects of harvest timing on lint value. It is commonly accepted that delayed harvest increases the chances of storm damage and that any resulting loss in quality will incur a discount in cotton price received. This work is an effort to estimate the premium/discount that is typical for cotton harvested at different periods of the harvesting season. The results are reported by relating lint quality to week of harvest. The premium/discount for the individual quality factors are identified using historical cotton quality data on Arizona cotton.

Two sources for quality data were used in this study. Fiber quality data were obtained from "Quality of Cotton Classed under Smith-Doxey Act", a weekly USDA report, that includes annual summaries for 1964 through 1982 (19 years) and weekly reports for 1976 through 1982 (seven years) for cotton classed at the Phoenix classing office. In addition, actual farm data were acquired showing the fiber quality at different harvest dates for 1982 production. One data set was from a farm near Thatcher in Eastern Arizona (Farm A) and the other set was from a farm near Wenden in Central Arizona (Farm B).

All price adjustments were related to the price of the standard: strict low middling white cotton (41), with staple of 1-1/16 (34) and micronaire of 3.5 to 4.9. This standard was given an arbitrary value of 1.0 and the relative values of all other grades, staples, and micronaires were adjusted proportionally to the standard. Lint prices, including the

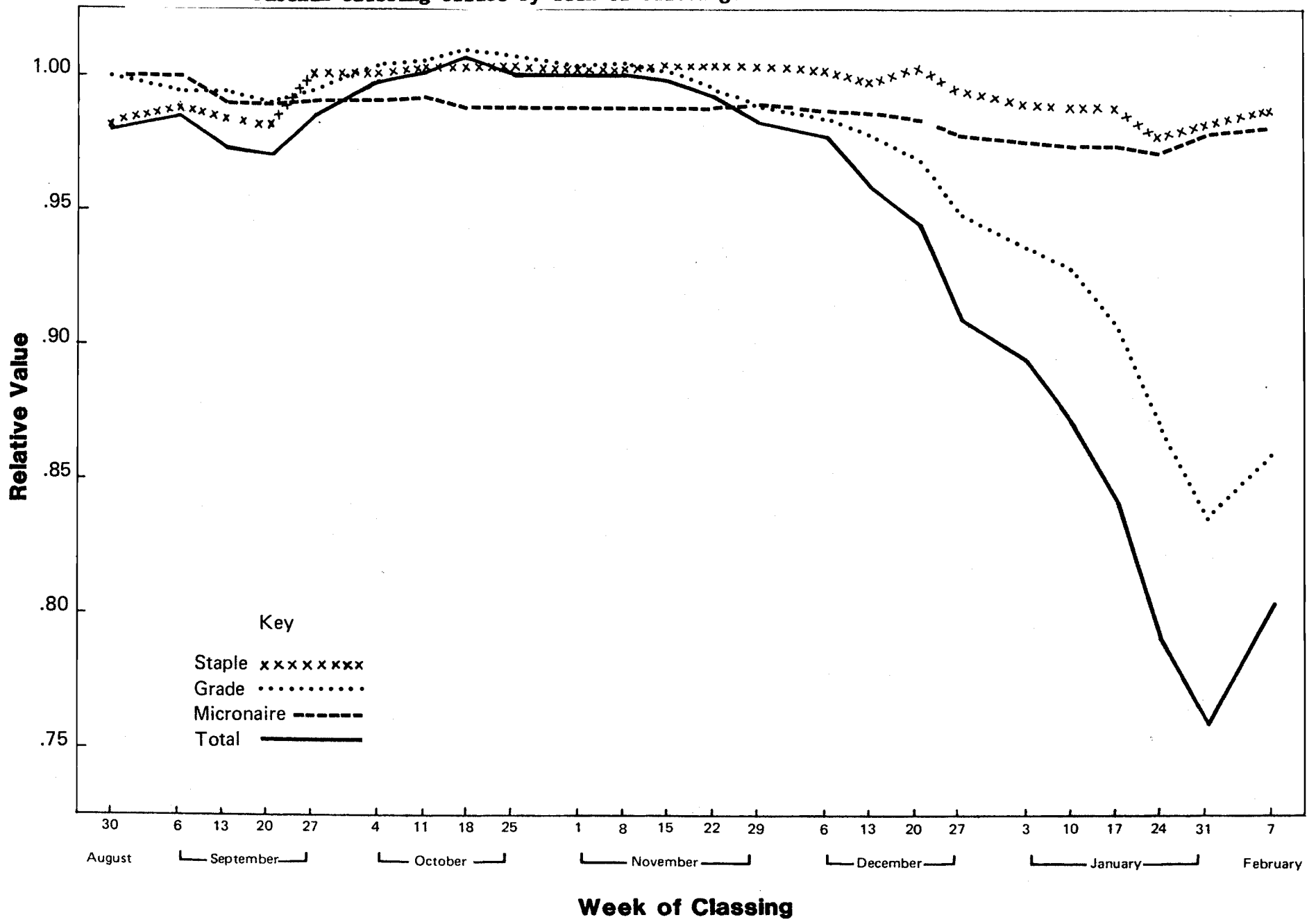
premiums and discounts for quality factors were obtained from three sources and merged to establish the variation from the standard price. These sources reflect the historical price adjustments that have been established in the marketplace. The source file price data by grade was the 1982 cotton loan and redemption worksheet obtained from Pima County ASCS. Staple and micronaire discounts were obtained from the 1982 supplement to "Statistics on Cotton and Related Data, 1960-78, USDA ERS Bull. No. 617. Below grade prices and bark and grass discounts were obtained from Calcot Incorporated. Relative grade values varied from 1.034 for strict middling white (21) to 0.541 for some below grade categories.

The seasonal average annual value of upland cotton harvested during each of the 19 years compared was lower than the standard (strict low middling white (41), staple of 1 1/16 inch (34) and a micronaire between 3.5 and 4.9. Price discounts ranged from 2.48% (1979) to 8.67% (1964). The annual discounts during the 19 years were approximately normally distributed with an average reduction of 5.46% and a median of 5.3%. Grade discount contributed most to value reduction, micronaire was second, staple third, bark discount fourth, and grass discount fifth.

The seven-year average of weekly values 1976-1982, including total discount and the portions due to grade micronaire and staple, are presented in Figure 1. These seven years represent the approximate range of data experienced in annual averages for 1964 through 1982. Cotton classed in September encountered some discount, primarily due to shorter staple. Cotton classed in October and in early November had little premium or discount. Cotton classed subsequently had reduced relative value each succeeding week. This is considered to be the result of second pick and rood cotton, though weathering may have reduced quality of a late first pick. Reduced grade was the main reason for lower value of cotton classed late in the season. Staple and micronaire each had less than 2% discount at the end of the season as compared to their peak values. Cotton classed in late January was discounted to about 80% of the standard and October classed cotton.

These data are not segregated by first pick, second pick or rooded cotton and so the effects of these factors on quality can not be evaluated. It was assumed that the cotton classing date was close to the harvesting date, with the date of classing delayed due to hauling, ginning, and delivering the sample to the classing office. With the advent of modules in the mid-1970's, there often were long delays between picking and classing.

Figure 1. Seven year mean relative value of upland cotton lint classed at the Phoenix calssing office by week of classing.



The relative value of lint was calculated by week of picking in 1982 for two cotton farms to clarify the relative value of different picks (Figure 2). The date of picking had no apparent effect on quality or value of lint for first pick on Farm B. On Farm A the value of first pick decreased slightly each week, with a sharp drop in value the week of December 8. First pick was completed too early on both farms to permit adequate study of the effect of weathering on quality of first pick cotton.

Second pick cotton had lower value on both farms and discounts became greater with later picking. Rood cotton on Farm B had even lower value. An overall evaluation of factors affecting relative lint value is given in Table 1. The lower value of Farm A first pick on the week of December 8 was primarily due to lower grade. Both grade reduction and micronaire were major factors in reduced value of second pick. About two/thirds of the value reduction was from grade and one/third from micronaire. Reduced value of rood cotton came mostly from lower grades.

Table 1. Relative value of lint for cotton harvested on two Arizona farms in 1982

Farm	Pick	Grade	Mike	Staple	Total
A	1st	.9830	.9943	.9901	.9673
B	1st	1.0193	.9999	1.0075	1.0267
A	2nd	.8425	.9033	.9661	.7119
B	2nd	.8708	.9312	1.0096	.8116
B	Rood	.5851	.9703	.9869	.5424

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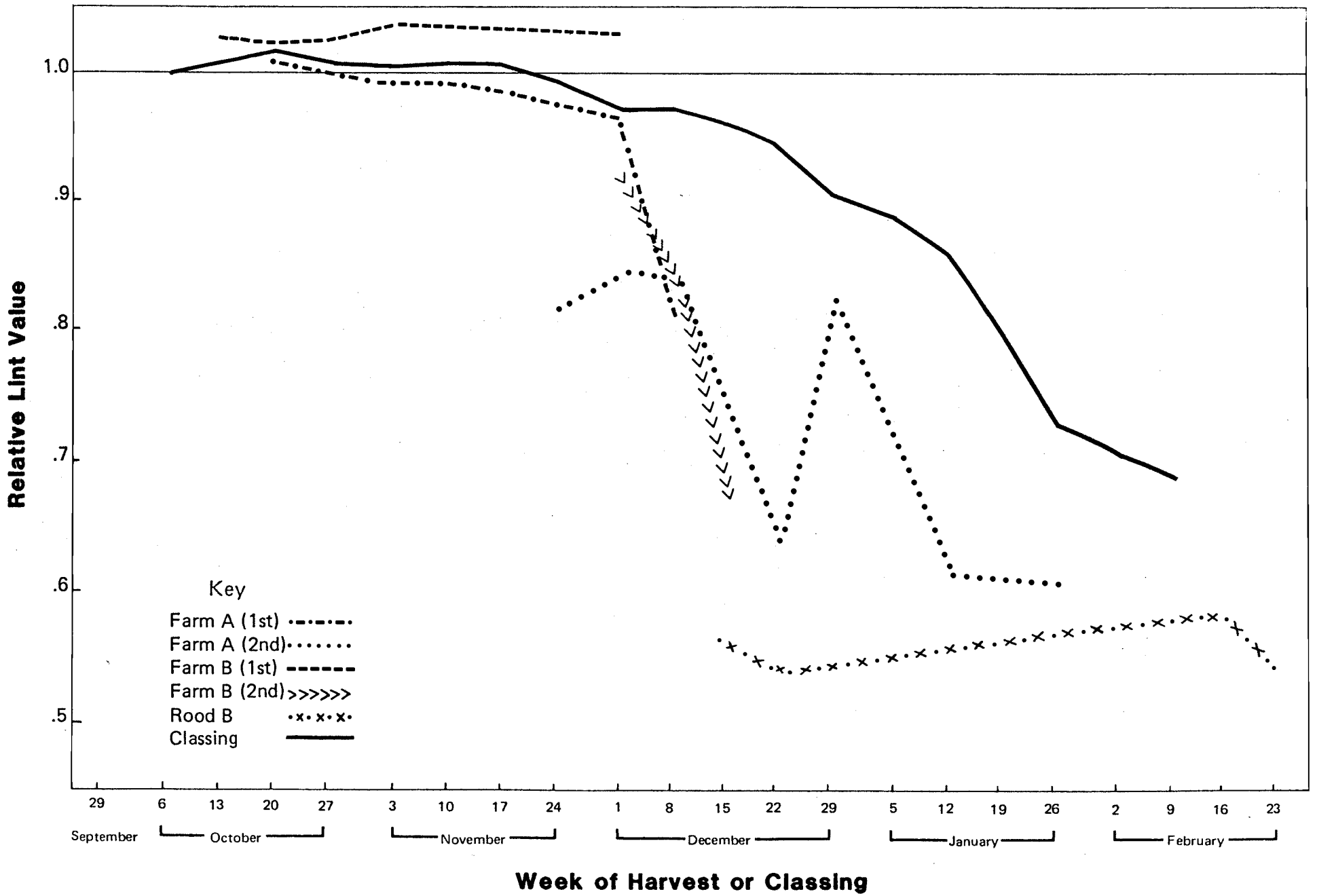
Figure 2. Relative value of upland cotton lint for week of classing at Phoenix classing office and by week of pick on farms at Pima (A) and Wenden (B) Arizona in 1982.



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THE RELATIONSHIP BETWEEN HEAT UNITS AND YIELD IN ARIZONA COTTON COUNTIES

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Heat units are used to predict emergence of cotton seedlings, appearance of the first flower and the application of certain plant growth regulators. They are also used to predict the emergence of pink bollworms and development of cotton bollworms and boll weevil. They provide a method of studying the relationship of plant and insect development with temperature.

Cotton grows best in a warm climate and requires a relatively long season to produce optimum yields. The highest average upland cotton lint yield for the past 25 years was in Yuma County, 1192 pounds per acre, and the lowest of 719 pounds per acre was in Cochise County. The yields in the remaining counties fell in between these extremes and generally were proportional to the length of the growing season and therefore seasonal total heat units (Figures 1, 2, 3, 4, 5, 6).

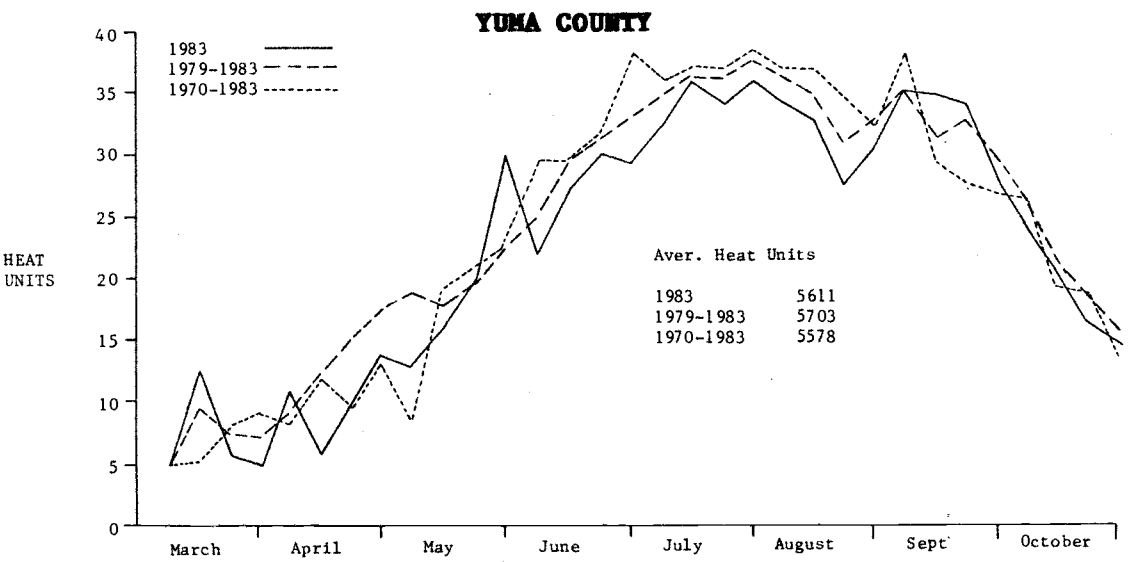

Figure 1. Heat unit accumulation on a daily basis beginning 1970 with a 14-year average, 5-year average, 1983 average with lower and upper threshold temperatures of 55F and 95F, respectively.