

# Variety and Date-of-Planting Test

E.J. Pegelow, Jr.

## ABSTRACT

*Three upland cotton varieties--Stoneville 506, Deltapine 20, and Deltapine 77--were planted on 4 dates in 1988 at the Maricopa Agricultural Center and observed for flowering, boll opening, and lint yield. Results from the 1988 studies and those from similar tests in 1985-1987 are being used to determine the relationship of accumulated heat units to the timing of key stages in crop development.*

## MATERIALS AND METHODS

The 3 varieties were planted in 4-row strips, replicated 4 times, on 30 March, 25 April, 11 May, and 1 June. Twenty-foot long observation plots within each strip were used for daily flower counts and weekly sequential harvest of open bolls. An automated weather station collected weather data at the research site during the entire growing season.

## RESULTS AND DISCUSSION

Machine-picked yields for 1988 are summarized in Table 1. Yields were surprisingly good, in light of the growing season. A number of cold periods occurred in the early months, which retarded early stand development in the first, second, and fourth plantings (final stands for all plantings in 1988 were relatively uniform, however). In late July the site was hit by a severe hailstorm, which knocked off a number of fruiting forms, perforated leaves, and damaged some of the terminals. Yield projections at that point were not optimistic! Fortunately, unusually warm fall temperatures allowed many of the later-maturing bolls to open. That combination of events resulted in the highest yields for the short-season varieties (STV 506 and DPL 20) being obtained in the third planting (11 May). Deltapine 77, which requires a longer growing season, showed a more typical yield response to delay in planting date.

Table 1. Machine-picked lint yields for 3 varieties planted on 4 dates in Maricopa in 1988.

Date	Stoneville 506	Deltapine 20	Deltapine 77
3/30	1447	1612	1613
4/25	1443	1434	1393
5/11	1556	1659	1377
6/1	1180	1210	830

Lint yield vs planting date for 18 plantings of Stoneville 506 from 1985-1988 is summarized in Figure 1. Yield results for 14 plantings of Deltapine 20 during 1986-1988 followed a similar pattern (data not shown).

The data of Table 2 shows the variability (CV = coefficient of variation) in the number of days from planting and the number of heat units (HU) from planting needed to reach certain developmental stages in cotton: early bloom (cumulative 1 bloom/foot of row), early open boll (cumulative 1 open boll/foot of row), and first bale (cumulative 500 lb/ac of lint production). Stoneville 506 and Deltapine 20 had similar values in each case, whereas Deltapine 77 required more days/HU to reach each developmental stage. The low/high temperature thresholds for deriving the HU shown here were 55/86 F; that doesn't imply that that type of HU is necessarily the best one to use in all cases, but it is one that seems to be a good compromise. All studies to this point indicate that any of a wide range of HU types will do a better job of fitting developmental events compared across plantings than will time units.

Table 2. Days from planting and 55/86 F HU from planting associated with key stages of development for 3 upland cotton varieties. HU was derived by the triangulation method, using daily minimum/maximum field air temperatures.

Var.	Number of Plantings	Event	Days	HU
STV 506	18	Early bloom	61 (CV: 13.8%)	1481 (CV: 4.6%)
DPL 20	14	" "	64 (CV: 13.4%)	1507 (CV: 4.4%)
DPL 77	4	" "	72 (CV: 18.5%)	1631 (CV: 3.2%)
STV 506	18	Open boll	118 (CV: 7.4%)	2948 (CV: 4.5%)
DPL 20	14	" "	117 (CV: 6.6%)	2890 (CV: 3.3%)
DPL 77	4	" "	130 (CV: 8.5%)	3169 (CV: 1.2%)
STV 506	18	First bale	137 (CV: 8.1%)	3344 (CV: 4.8%)
DPL 20	14	" "	137 (CV: 8.0%)	3308 (CV: 4.5%)
DPL 77	4	" "	160 (CV: 4.0%)	3759 (CV: 1.5%)

Figure 2 graphically depicts the "scatter" in the days and HU associated with one of the events of Table 1 - the production of the first 500 pounds per acre of Stoneville 506 lint. When one considers the many factors besides temperature that could influence lint yield in 18 different plantings over a 4-year period, the agreement in HU totals is intriguing. The HU totals across plantings within a single year can be seen to be in even closer agreement, presumably due to a relative uniformity in seed lot, soil type, insect pressures, etc. The very low CVs seen in the HU totals for Deltapine 77 responses (in Table 2) are characteristic of such data for a single year.

FIGURE 1.

### Lint Yield vs Planting Date for Stoneville 506 at Maricopa Agricultural Center 1985-1988

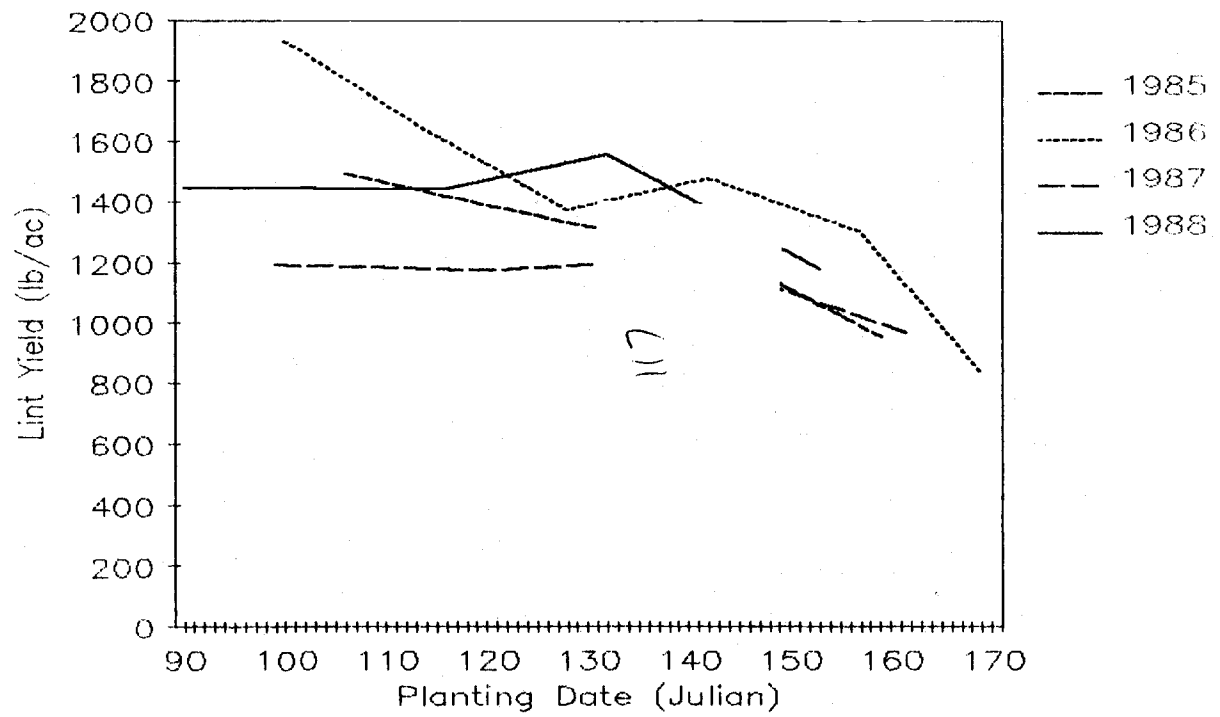
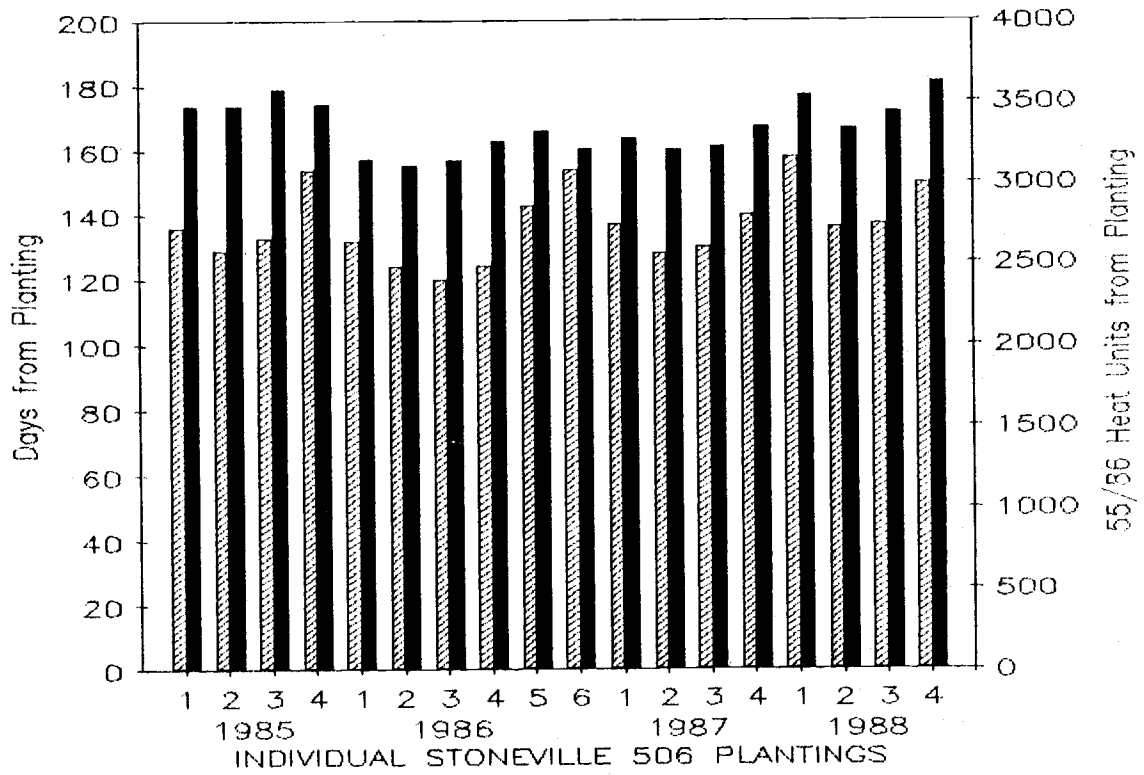
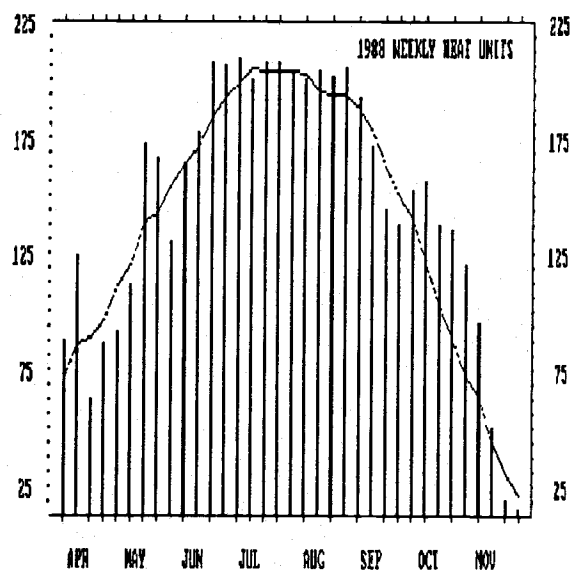
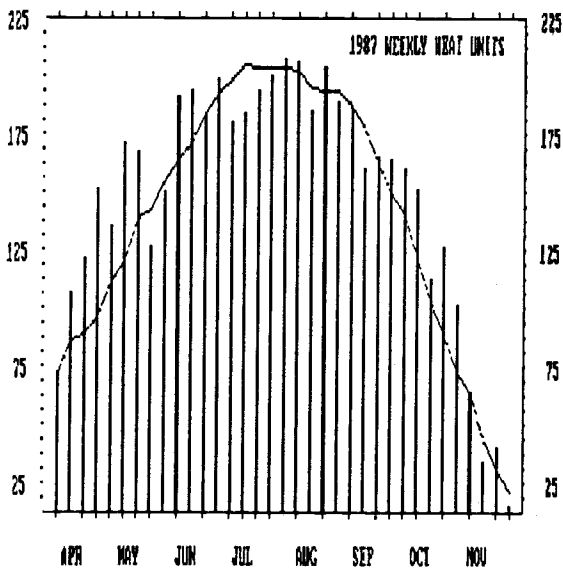
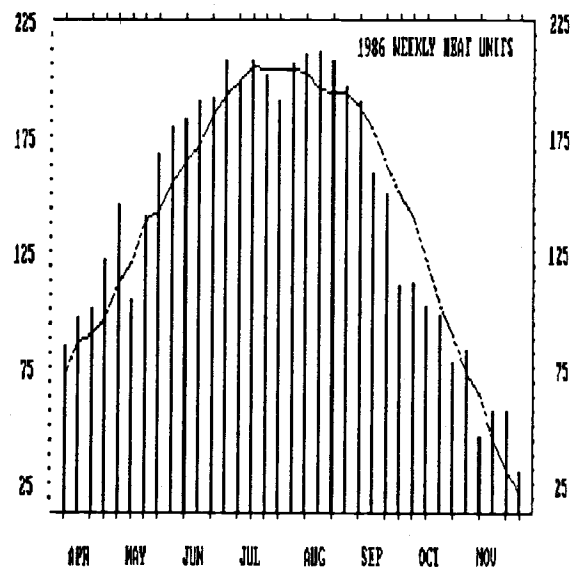
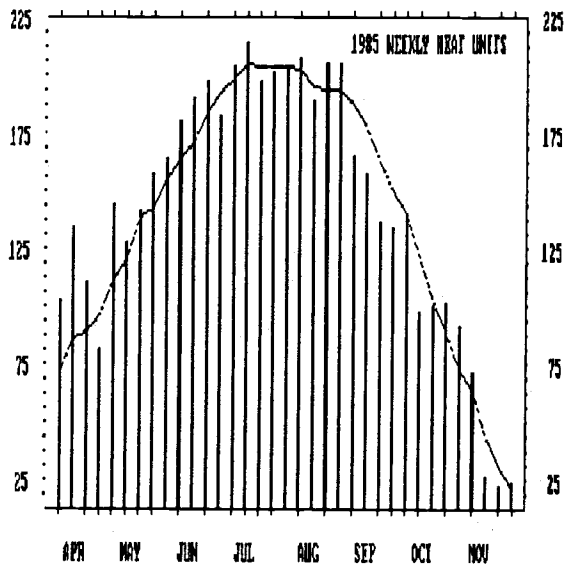


FIGURE 2. Days from planting and 55/86 F heat units associated with the time of the first 500 lb/ac of Stoneville 506 lint production. The dark bars are heat units, the striped bars days from planting.





The variability in weekly HU accumulation over a growing season in the Maricopa area can be readily seen in Figure 3. The weekly 55/86 F HU totals follow a completely different pattern in each of the 4 years of this test. Work is in progress to determine the effect of "swings" in the HU accumulation curve on the fit of HU to cotton developmental events. It may well be that the timing of HU accumulation, as well as the total HU attained, is important in their fit to cotton developmental events.