LEAF GROWTH, LEAF AGING AND LEAF PHOTOSYNTHETIC RATES IN COTTON

H. Muramoto, Associate Plant Breeder
J. D. Hesketh, Assistant Plant Breeder
C. C. Elmore, Graduate Assistant in Research

This study--limited to parameters of photosynthesis, and the leaf--was initiated to help us understand some of the functions regarding factors which contribute to the complex correlation between the growing plant and its ultimate yield.

A special field technique was developed to measure photosynthesis with an infra-red CO_2 analyzer and special leaf chambers.

Table 1 shows the results of the data collected in our photosynthetic rates study.

Significant differences were found in photosynthetic rates between different varieties and races of cotton. There also were differences in leaf growth. This is very important when one considers that growth is logarithmic.

Other interesting data gathered in this study show the effects of aging on photosynthetic rates. Young, fully expanded cotton leaves had the highest photosynthetic rates and there is a gradual decrease in photosynthetic rates until the leaf quits its function as a photosynthetic organ after 35 days. This should be an important point to consider in future studies on defoliation and fiber-quality studies.

Table 1. Photosynthetic rates among varieties, races and species of G. hirsutum and G. barbadense cotton.

ENTRIES	Photosynthetic rates ($mg\ CO_2\ dm^{-2}\ hr^{-1}$)	
1. F_1 Pima S-2 x Delta Pine Smooth leaf	48*	a
2. G. hirsutum race Marie galante (Texas III)	45	a b
3. " " " richmondi (Texas 18)	44	a b
4. " " " latifolium (Texas 34)	41	b c
5. " " var. Delta Pine Smooth leaf	41	b c
6. " " " M-8	40	c
7. " " race Punctatum (Texas 25)	40	c
8. G. barbadense var. Pima S-2	39	c d
9. G. hirsutum race Morrilli (Texas 192)	39	c d
10. " " " Yucatanense	39	c d
11. " " var. Super-Okra leaf	35	d
12. " " race palmeri (Texas 1)	35	d

* Duncan's multiple range test, Values having a common letter do not differ significantly at the 5 percent level.

* * * * *

HEXAPLOID COTTON

H. Muramoto, Associate Plant Breeder
W. E. Bryan, Plant Breeder

Several hexaploid plants derived from hybridization between the Australian wild cotton G. sturtianum and American cultivated cotton G. hirsutum have been established. The hexaploid plants were established from colchicine treated plants as follows: