Table 2. Composited yields of seed cotton from six varieties showing the relative efficiency of water use under different irrigation and fertility treatments. Yuma Branch Experiment Station. 1964.

Irrigation Treatment		Average Yield of Seed Cotton[1]		Average Yield of Seed Cotton Per Inch of Applied Water	
Interval Between Irrigations	Water Applied[2]	No Applied Nitrogen	200 Pounds Applied N	No Applied Nitrogen	200 Pounds Applied N
	Acre Inches	Lbs/A	Lbs/A	Lbs/A	Lbs/A
7 Days (19 Irrigations)	56.49	4369	4707	77	83
14 Days (10 Irrigations)	40.65	4894	5099	120	125
21 Days (7 Irrigations)	35.60	4584	5014	129	141
28 Days[3] (5 Irrigations)	25.52	4351	4465	170	175

[1] Each yield figure is an average of eight replications of six varieties (48 plots).

[2] "Water Applied" does not include the preplant irrigation, which was not measured.

[3] Cotton planted April 5, irrigated May 21, July 2, July 30, August 27 and September 21.

The soil in the experimental area is a silty clay loam underlain with fine sand at depths varying from 24 to 48 inches.

New Strains

(Werner Fisher and Lee Stith)

A major objective of the cotton breeding program of the University of Arizona for the past several years has been the development of a high quality, wilt tolerant variety of cotton. Hundreds of crosses have been made and many strains have been tested, including those developed in other areas. One such strain, Hopicala, (tested under strain No. 4447), developed at the New Mexico Experiment Station, appears to offer considerable promise for production in Arizona. Cooperative tests for the past three years at locations ranging from Shafter, California to Ysleta, Texas have shown Hopicala to be a consistently good producer. It appears to be best adapted to areas of higher elevation but has also produced good yields in such areas as Brawley and Yuma. The following tables show the yield of

Hopicala compared to other well known varieties at several locations. Hopicala has a good level of tolerance to Verticillium wilt but may be injured on severely wilt-infested soils. Fiber and spinning tests (see table) indicate that Hopicala has very excellent fiber quality, being fully equal to Acala 4-42 in this respect. Seed of this new variety is being increased this year and should be generally available for planting in 1966.

Some six or eight new strains in the Arizona program will be widely tested in 1965. 1964 results from preliminary tests indicate the U of A strains to be satisfactory in yield and to have very good tolerance to Verticillium wilt. More extensive yield tests and quality evaluation are needed before the value of these strains can be properly assessed.

Hopicala 4447 Yield Comparisons

ARIZONA TESTS

All yield figures are pounds lint per acre

Yuma-ave. 5 tests		CRC-ave. 3 tests		Marana-ave. 5 tests		Safford-ave. 3 tests	
DSL	1548	DSL	1447	4447	1072	4447	1402
4447	1356	4447	1156	4-42	1028	1517C	1330
4-42	1323	4-42	1001	DSL	934	1517D	1307

1962 REGIONAL TESTS

Shafter		Brawley		Tempe		Marana	
4447	1343	Deltapine 15	2210	4-42	1384	4447	1397
44-10	1343	4447	2000	44-10	1334	Deltapine 15	1291
4-42	1269	4-42	1904	Deltapine 15	1219	4-42	1278
Deltapine 15	807	44-10	1703	4447	1206	44-10	1040

Univ. Park, N. M.		Ysleta, Tex.		Logandale, Nev.		AVE. 7 Locations	
4447	1293	4447	790	4447	1396	4447	1346
4-42	1007	4-42	692	4-42	1317	4-42	1264
44-10	870	44-10	572	44-10	1161	44-10	1146
Deltapine 15	772	Deltapine 15	275	Deltapine 15	1131	Deltapine 15	1115

1963 REGIONAL TESTS

Shafter		Brawley		Yuma		Tempe	
4447	1275	DSL	1819	DSL	1512	DSL	1573
4-42	1257	4447	1642	4-42	1475	4447	1258
DSL*	928	4-42	1437	4447	1453	4-42	1056

Marana		Univ. Park, N.M.		Logandale, Nevada		AVE. 7 Locations	
4447	1247	4447	1585	4447	1462	4447	1417
4-42	1171	DSL	1455	4-42	1394	DSL	1395
DSL	1014	4-42	1294	DSL	960	4-42	1298

*DSL is used as an abbreviation for Deltapine Smooth Leaf

SPINNING TEST 1963

	Staple Length	Neps	Yarn Strength 22's	Yarn Strength 50's
4447	1 3/32	4	138	54
4-42	1 3/32	5	138	52
DSL	1 1/16	3	108	38

Isolation of Monosomes in Cotton - To Be Used as a Tool for Developing Better Cottons

(J. E. Endrizzi)

Genes determine the characters of a cotton plant, such as boll size, fiber length, disease resistance, and yield. The genes are carried in linear order on the chromosomes which are present in pairs in cells of the plant. In the formation of seed, the genes are reshuffled between the paired chromosomes. The plant breeder uses this reshuffling process in his attempts to bring together into one or more plants the most desirable combination of genes that will show a significant improvement in the agronomic characters. There are many factors that exert controlling influence on this process over which the breeder has little or no control.

In the past breeders have been very successful in developing improved varieties by conventional breeding methods. During the many years in the history of cotton breeding in which improved varieties were successively developed and released, the genetic variability of the kind useful for improving existing varieties has become progressively less. Our modern cotton varieties, therefore, constitute gene combinations that are made up of essentially the best combinations that exist among the most desirable breeding materials.

Even though present day cotton breeders are making significant accomplishments in improving present commercial cottons, the availability of agronomically desirable genes and gene combinations from which he can select has become progressively smaller. This explains the difficulty and the long and laborious process current breeders are experiencing in their attempts to systematically and periodically come up with a type that is superior to existing commercial varieties in one or more characters.

Because of the high state of development of modern cotton varieties, breeders must operate with a high degree of precision which is greatly determined by the availability of basic information in the genus.

Since the development of characters of a cotton plant are controlled by genes that are carried in a linear order on the chromosomes, it would be highly advantageous to have detailed information on the nature and interaction of these genes. The more information available on the linkage relationship and interaction of genes determining agronomic traits and the role each chromosome plays in controlling growth and development would put breeding on a more scientific basis and greatly facilitate the development of better cottons.

To obtain information of this kind, a project for isolating specific types of cytological stocks is underway. These stocks will consist of deficiencies for a whole chromosome for each of the twenty-six pairs of chromosomes in cotton. Plants