

SPINNING TEST 1963

	Staple Length	Neps	Yarn Strength	
			22's	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

that are missing a chromosome are called monosomes, which means that only one (mono) body (some) of a pair of bodies or chromosomes is present in each cell. A normal plant contains twenty-six paired chromosomes, whereas a monosomic plant contains twenty-five paired chromosomes plus one chromosome lacking a mate.

Such stocks will enable the identification of the chromosomes and parts of chromosomes which carry the genes that regulate the development of a specific character. Following the studies which pin-point a specific gene or a group of genes of agronomic importance on a particular chromosome, the cytological stocks can be used to systematically and deliberately "reshuffle" and combine superior gene combinations from different sources of breeding material.

An understanding of the way each chromosome and the genes it carries contribute to the overall development of the plant will enable the breeder to use far greater precision in selecting breeding material and recombine it in the formation of a superior line.