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THE NATURE OF INHERITANCE OF THE COLORED COTTON FIBER TRAIT

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ABSTRACT:
The article provides information on the biology of diploid and tetraploid cotton species, character and patterns of inheritance of fiber color. The fabric obtained from naturally colored cotton fibers has the properties of greater hygiene and hypoallergenic. Clothing made from such a fabric does not cause irritation on the skin, as the fabric perfectly passes air.

KEYWORDS: cotton plant, gossypol, down, fiber, dyed fibers, cellulose, fiber strength

INTRODUCTION:

Botanical genus-Cotton is part of the Malvaceae family, there are fifty species in the world, among which there are woody, herbaceous forms. The height of the plant reaches 1-3 meters, the root reaches from 30 cm to 3 meters, the leaves on the stem are alternately arranged with long petioles. The flowers are solitary with three to five wide fused petals. The fruit is a box with dark brown seeds inside, which are covered on the surface with soft sinuous hairs-cotton. Cotton hairs can be long or short, fleecy, which are called lint. There are two foci of the appearance of cotton India and America.

According to the results of genetic studies, the genus cotton consists of two groups of plants that differ in the number of chromosomes in a cell. Most species are diploid, that is, they have a double set of chromosomes, but tetraploid plants are found and triploid and hexaploid forms have been obtained experimentally.

Diploid forms include herbaceous cotton (Gossypium herbaceum) is a perennial plant, but is grown as an annual. Seedlings grow after sowing in 5-15 days, the growth rate of the plant depends on the ambient temperature. Coarse short fibers consist of cellulose used for the manufacture of fabrics in production.

Tree-like cotton (Gossypium arboreum It is found in tropical and subtropical regions of Asia and Africa. The height of the plant reaches from 1 to 2 meters. The flowers are purple or yellow in color. The fruit is an egg-shaped or oblong box of 1.5-2.5 centimeters, not covered with waxes. The weight of 1000 seeds is 46-91 grams.

Tetraploid species include Barbados cotton (Gossypium barbadense) grows up to 3 meters, has yellow flowers the length of the ovoid fruit is 2-6 centimeters, the seeds are pear-shaped with a length of 3.5-5 mm. fibers 35-44 mm, the plant can withstand the temperature is 15-38 °C. The composition contains gossypol, which increases the plant's resistance to fungal infections.

The species G. barbadense includes four subspecies: wild subspecies darwinii; subspecies ruderale, represented by primitive cultural and ruderal forms. The vitifolium

subspecies includes highly cultivated tropical cotton plants that gave rise to Egyptian varieties. The subspecies eubarbadense includes cultivated, sympodial, precocious varieties of fine-fiber cotton.

In various types of cotton, there are individual dwarf plants, with sharply shortened internodes of the main stem and side branches. In G. hirsutum L. there are different types of dwarfs, differing in the nature of inheritance. At present, the dwarf forms of all crops attract much attention in connection with the creation of intensive varieties, and in cotton also in connection with the idea of thickened crops. Therefore, the genetics of dwarfism is of practical interest. Today, more than 60 percent of genetically modified cotton is produced in the world's cotton-growing countries, and a foreign insecticide gene is introduced into biological cells. As you know, the advantages of a particular variety depend on many technological factors, ranging from the process of harvesting seeds, cleaning them, sowing to compliance with all agrotechnical requirements for growing. in terms of length, strength, microneur, and color, they meet the requirements of the global market and tend to improve. Thus, the consumer properties of cotton fiber in terms of length, strength, microneur, color should tend to improve.

Common cotton (Gossýpium hirsútum) Homeland Central America. The height of the stem is 1-1. 5 meters. the leaves are arranged alternately, long-stemmed, 3-5-lobed, with triangular-ovate pointed lobes. The flowers are single, five-petaled, cream-colored, with a reddish-purple hue. Blooms in July-September. The fruit is a box of seeds with long hairs. It is grown in the countries of Central Asia and Transcaucasia. All parts of the plant contain biologically active substances: roots-gossypol, tannins, ascorbic acid, vitamin K, trimethylamine, essential oil; seeds-gossypol, gossypin, gosipupurin, vegetable oils, proteins, flowers contain flavonoids (5%), limmon(5-7%) and malic (3-4%) acids, carotenoids and catechins are found in all parts of the plant.

The nature of inheritance of specific traits is specific for each type. The same characteristics in different cultures and even different types of the same crop are not inherited in the same way and may have different genetic natures. Differences can be observed in different types of the same crop. For example, the absence of down on cotton seeds (gymnosperm) is a dominant trait in the cultivars of the species G. hirsutun L. and recessive in the species G. barbadense L.In the species G. hirsutum L., a weak photoperiodic reaction dominates; in the species G. barbadense L, the opposite is true.Each culture has specific characteristics that are not peculiar to other cultures. In cotton, these characteristics include the type of branching, the mass of raw cotton in one box, the yield, length, strength, and tone of the fiber, resistance to specific diseases (wilt, gommosis), and others.

Cotton is the raw material for the production of cotton fabrics. The fiber of medium-fiber Mexican cotton, in addition to white, can have a naturally colored fiber and the variety in this feature is quite large. However, the study of the patterns of inheritance of fiber color remains an urgent problem. one of the methods is remote hybridization with wild cotton species that have predominantly colored fiber. Knowing the patterns of trait inheritance greatly facilitates this work. It is known that colored fiber dominates over white, although the fiber color of first-generation hybrids is less intense. In the second generation (hybrids), when crossing varieties with white and brown (brown) fiber, plants with brown, light brown and white fiber are formed. For white-fiber plants lines obtained from crossing brown-fiber and white-fiber varieties, separate plants with colored

fiber are formed for a long time. This phenomenon is observed, for example, in varieties and lines whose origin involved the wild form of G. hirsutum ssp. mexicanum with a brown fiber color. When crossing varieties with white fiber with the wild subspecies mexicanum, hybrids of the first generation acquire an intermediate fiber color. In the second generation, splitting occurs in the ratio of 9 parts with colored fiber, 7 parts with white fiber. This is typical for complementary interactions. If we distinguish phenotypes with different intensity of fiber color, then the ratio is 3:24:9:28. When crossing varieties with white and green fiber, in the first generation, the fiber turns out to be light green, and in F2 complex splitting occurs, and along with hybrids that have white and various shades of green fiber, hybrids with a brown tint also appear. This cleavage pattern suggests that the green color gene in the dominant state inhibits the action of complementary brown color genes. There are various shades of green and brown down on the seeds. When crossing forms that have white underparts with forms that have colored underparts, hybrids have F_1 the underside is colored, and in the second generation there is a complex splitting. Sometimes a green underbrush appears when crossing homozygous forms with a white underbrush. Cases are described when plants with green undergrowth are formed in the forest$_2$ when crossing forms with a brown undercoat. In such cases, it can be said that the green color gene is epistatic to the brown color gene. In interspecific crosses of varieties of the species G. hirsutum L. with light undergrowth with gymnosperm varieties G. barbadense L. seeds F_1 they may have a green downline inherited from the gymnosperm parent. Such facts show that, although in gymnosperm forms, the genes that determine the development of the down are not active (mutated or blocked), but other genes that control the color of the down are able to function normally.

The color attribute of cotton fiber is related to its chemical composition, which determines its physical and chemical properties. Green colored fibers contain up to 17% fat-soluble substances, but the proportion of cellulose is low. Therefore, the fiber is of low strength. In white fiber, the amount of fat-soluble substances is about 0.7-0.8 %, the strength is higher. Fabric made from naturally colored cotton fibers it has the properties of greater hygiene and hypoallergenic properties. Clothing made from such a fabric does not cause irritation on the skin, as the fabric perfectly passes air.

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