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INHERITANCE OF BIOLOGICAL TRAITS IN SOME REPRESENTATIVES OF POLYMORPHIC COTTON SPECIES.

Annotatsion: The character management of wild, ruderal and cultivated tropical diverse plants found in nature is particularly dependent on genetic information. The variability that occurs during the growing season of a plant depends on external environmental factors. Therefore, it is assumed that artificial selection by humans has led to progress in the evolutionary process. The consumption of cotton fiber is one of the main valuable economic characteristics of the plant.

Key words: cotton, cocoon, seed, fiber index, shape, fiber yield, variability, heredity, crossing, generation, column, hybrid, heterosis, recombinant.

Аннотация: Управление характером диких, рудеральных и культурных тропических разнообразных растений, распространенных в природе, особенно зависит от генетической информации. Изменчивость, возникающая в течение вегетационного периода растения, зависит от внешних факторов окружающей среды. Следовательно, предполагается, что искусственный отбор человеком привел к прогрессу в эволюционном процессе. Расход хлопкового волокна - одна из основных ценных экономических характеристик завода.

Ключевые слова: хлопок, кокон, семя, индекс волокна, форма, выход волокна,изменчивость, наследственность, скрещивание, поколение, колонка, гибрид, гетерозис, рекомбинантный.

Introduction. It is known that the fiber color of the cotton can be white, tan, light tan, reddish brown, golden, green, light pink, bluish-green, dark brown. Several scientists have conducted research on this character [8; 11; 12]. While one group of scientists reported that the fiber color marker is inherited monogenically, others noted that it is inherited polygenically.

Literature review. In ontogenesis, differentiation of germ and outer epidermal tissue has been studied as a fiber-forming layer [1]. Using the terminology adopted in our study, we took a detailed approach to the formation of cotton cell populations, changes in their ratios, and the stabilization of the ontogenesis of the germ and seed. [11] There are three types of cell populations: statistical, growing, and regenerating cell populations. Changes in population size over time can be seen as the most common manifestation of cell population kinetics.

Due to the differentiation of the outer epidermal cells, it is of great importance to determine the number of hairs in the germ and seed, the moving of hair cells in the germ, their topography, i.e. the direction of location and the degree of regionalization. The study of these issues is important in solving problems in developmental biology, such as cytological, genetic, physiological and biochemical mechanisms of differentiation, growth, life cycles of cell populations, and more.

In practice, this work is necessary to determine the parameters that indicate the amount of fiber for the seed and to determine the amount of fiber and the possibility of increasing its yield.

Determination of the number of differentiated cell populations of the germ epidermis, i.e., the number of hair cells and hair-forming cell populations; the change in the number of these populations in the ontogenesis of the seed are noteworthy. To address these issues, it is first necessary to determine the presence of changes of germ forming cell populations and their ratios in the ontogenesis of seed of cotton species and varietal diversity.

A few data have been given in the literature on the number of hairs in one seed. B.A.Krakhmalev, M. B. Sultanova [5] noted in their work that *G.hirsutum* L. species varieties have hairs in the seeds between 7,8 and 14,7 thous.

According to D. V. Ter-Avanesyan [8], in the seeds of *G.hirsutum* L. there are 7.8-18.0 thous. fibers, while in the varieties of *G.barbadense* L. 11,0-17,0 thous.fibers.

Research methodology. N. A. Vlasova [3] studied changes in cytoadnuclear relations of mitotic active and differentiated cells of the germ epidermis and identified that total number of epidermal cell of hairs close to regenerating population was 21,2% in “108-F” variety of cotton during the flowering stage . In the following days, the percentage of fibers decreased by 17.5%, because these days due to the increase in mitotic activity of cells, their total number increased by a large proportion relative to the number of fibers. 3-4 days after flowering, the epidermal cells do not break down into fibers, so they are almost of the same length in each part of the germ. By the 5th day, 0.25% hairs appear of the total number of epidermal cells. On days 6–7–8, the proportion of hairs is 1.5%, 2.8%, and 4.0%, respectively.

Anaysis and results. The decrease in the number of hairs occurs due to the division and rapid growth of epidermal cells. Then, as a result of differentiation of epidermal cells and their gradual dehydration and pigmentation, the number of hairs per 1 mm^2 may increase slightly, for example, it can be observed in the 50-day period of cotton variety "Kelajak". Epidermal cells are often disproportionate, curved, and elongated, with 6–7 elongated cells per hair follicle.

In the wild subspecies *mexicanum* belonging to the genus *G. hirsutum* L., the number of hairs per 1 mm^2 is twice less, which is explained by the smaller size of their seeds, and there are only 3144 hairs per seed. The total number of hairs per seed in the cultivar "Kelajak" was 8638, respectively, and the share of hairs in the total number of epidermal cells was 7.8%. Wild *G. darwinii Watt* species has the lowest number of hairs per 1 mm^2, with only 2760 hairs per seed (Table 3).

In the age dynamics, the number of epidermal cells of a growing population of seeds increases until cell division stops by metastasis, the volume of epidermal cells belonging to the statistical population increases rapidly due to cell growth by elongation and decreases in 1 mm^2 as seed continues to grow rapidly. Therefore, as the age of the seed increases, the number of hairs in the epidermal cells decreases by one when intensive cell growth is observed with elongation. There is a law that the smaller the proportion of hairs from the total number of epidermal cells, the greater the number of epidermal cells in the hair.

We hypothesized that the number of epidermal cells corresponding to a single fiber account would determine the degree of seed hairiness. However, this is not true because the number of cells in a single fiber is determined by the intensity of division of epidermal cells in the early stages of seed development and the elongated growth after division. The epidermal cells on the surface of the seed are elongated, with a minimum cell diameter of 7–31 µm and a maximum of 19.9–61.05 µm in *G. hirsutum* L.intraspecific varieties of cotton. In particular, the smallest diameter of epidermal cells in the cultivar Kelajak was 7.0 µm, while the largest share was recorded in subspecies *mexicanum var.nervosum* (Yucatan) of *G. hirsutum* L. with 61.05 µm indication. In *G. barbadense* L. intraspecific varieties, the minimum cell diameter is 7.0–29.7 µm and the maximum is in the range of 18.9–75.9 µm. In Surkhan-9 cultivar, the smallest diameter of epidermal cells was found to be 7.0 µm and the largest share in the form semi-wild subspecies *ruderale ƒ.parnat* (tan fiber) in the range of 75.9 µm. In the wild *G. darwinii* Watt species, the smallest unit of epidermal cell diameter was found to be 23.1 µm, while the largest unit was found to be 59.4 mm.

Thus, the analysis of the results obtained revealed differences in the quantitative indicators specific to each sample, the proportion of hairs on the seed surface depends not only on seed size, number and size of epidermal cells, but also on the number of cells surrounding each fiber.

Based on the above, it can be concluded that further research is needed, involving many samples and varieties specimens. The nature and degree of hairiness of immature seeds were studied, epidermal cells and fibers (hairs) of and their parameters (length, middle part and base diameter) of *G. hirsutum* L.

and *G. barbadense* L. intraspecific varieties and *G. darwinii* Watt species were determined.

A comparative comparison of the data showed some differences that belonged to each subtype. Thus, the smallest number of hairs in the large-celled epidermis and in 1 mm^2, as well as on the entire surface of the seed was observed in the ancient wild forms *paniculatum* and *punctatum* subspecies. The fibers of this representative are much shorter and thicker, which is especially noticeable in the diameter of the base. There are many cells on the epidermal surface, the hairs are surrounded by only 7-8 cells, while in the *paniculatum* and *punctatum* subspecies the figure was -11.9 and 12.4, respectively. The seeds of subspecies *paniculatum* have smaller cells, thinner and longer fibers than other specimens, and there are largest number of hairs per mm^2 and the entire seed surface.

It should be noted that the wild forms of subspecies *punctatum* and *paniculatum* were found to be close to each other in all respects relative to cultivated varieties. *Punctatum* and *paniculatum* subspecies were found to have twice the number of fibers per 1mm^2 compared to the studied varieties, due to small size of seeds, and only 6402.3 and 5967.5 hairs per seed, respectively.

In terms of the number of hairs per 1 mm^2 in the semi-wild form *ruderale f.parnat* (tan colored fiber), the lowest indication is 18.9, and 2540.6 hairs per seed. In the studied Surkhan-9 variety of *G. barbadense* L., the number of hairs per 1 mm2 was 45.1, and the number of hairs on the seed surface was 7422.9. The proportion of fiber cells in the total number of epidermal cells was lower than in *G. hirsutum* L. species varieties, with 97.2% in Surkhan-9 variety.

The data obtained revealed quantitative differences in the traits being analyzed in the studied representatives. Basically, the fiber index and yield are determined by the amount of fiber on the seed surface, and according to our data, the epidermis has a positive relationship with the number and size of cells. Also, these parameters, along with the hardness of the seed coat, the parameters of the hairs - length, middle part and diameter of the base - can be important in determining the causes of fiber deterioration (contamination) during seed cleaning (ginning).

Conclusion. Consequently, the results obtained showed that the differences in the quantitative indicators of the traits belonging to each representative under analysis, the proportion of hairs on the seed surface depends not only on seed size, amount and size of epidermal cells, but also on the number of cells surrounding each fiber.

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