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MEIOTIC MUTANTS TOMATOES WITH DISTURBANCE OF CHROMATIN CONDENSATION

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Reduction by half of the chromosomes number that occurs during sexual reproduction through meiotic division requires coordination of all processes that occurs during meiosis. To date, important for synapsis and equal distribution of homologous chromosomes and sister chromatids provide regular chromatin condensation and cohesion of sister chromatids.

In mitosis and meiosis, condensin and cohesin complexes play essential role in maintaining of the structure of chromosomes and sister chromatids cohesion. Cohesion of sister chromatids occurs in S-phase and stored in the area of the centromere to anaphase during mitosis and to anaphase II during meiosis. Cohesion sister chromatids arms in meiosis disappear in anaphase I that facilitate the separation of homologs in places chiasmata, but in the area of the centromere, where cohesins protected by protein - shugoshin, remains to anaphase II. In establishing the genetic mechanisms of chromatin condensation during meiotic prophase provide a significant contribution to the study of meiotic mutations that control the condensation of chromosomes during meiosis.

In the laboratory of genetics and breeding of Biology Faculty Lesia Ukrainka EENU created a collection of meiotic mutants of tomato, which consists of two meiotic mutants with impaired chromatin condensation. Both mutants are spontaneous and have different origins: *as4* mutant was isolated by sterility in a variety of San Marzano S. Soost (Soost, 1951), *sti* mutant was isolated moldavian scientists (Lisovska et al., 1994).

Mutations are very similar cytological expression during male meiosis. In homozygous for the mutation *as4* and *sti* plants, beginning of prophase I of meiosis is no apparent abnormalities. Thus, in late leptotene can see specific clusters of chromosomes in the nuclei meiocyte as a "bouquet". In pachytene observed irregularly thickened homologous chromosomes. Starting with dyplotene stage, chromosomes are characterized by indistinct contours, irregular condensation of chromosomes, weave chromatin between bivalents, non-homologous chromosomes and univalents that are difficult to separate. In metaphase I observed chromosomes locations outside the equatorial plane. In anaphase I found numerous strands of chromatin between homologous and non-homologous chromosomes, which went to the poles and fragmentation of chromosomes. Due to the numerous violations during the first meiotic division to second division becomes a small part of the cells. Meiosis II also occurs with disorders such binding chromatin bridges and fragmentation of chromosomes.

As a result of these violations during meiosis, the sporades stage formed mainly dyads, dyads and triads with micronuclei. Mutant plants exhibit significant pollen sterility (1-3% fertile pollen) and a sharp decline in the number of seeds in the fruit. Thus, mutations are an expression both in microsporogenesis and in megasporogenesis.Mutations *as4* and *sti* are recessive monogenic inheritance. According to the results test for alelizm these mutations is nonallelic.

Our data obtained on a similar phenotypic expression of *as4* and *sti* nonallelic tomato mutations to predict the presence of at least two paralogs cohesin with a similar function. Further studies of tomato mutants will detail the mechanisms of structural maintenance of chromosomes in plant meiosis.

Soost R. K., Genetics. 1951, 36:410-434.
Lisovska T. P. et al., Conf. I Nationale. Chisineu. 1994, 37–38.