

SARATOV, RUSSIA
Saratov State University

Embryological peculiarities of tetraploid parthenogenetic maize forms
Kolesova AY; Tyrnov VS

Apomixis is manifested, as a rule, on polyploid level, and so we started the work on producing of analogues of the parthenogenetic lines. The tetraploid maize form, produced by pollination of tetraploid form KrP-1 by pollen of the diploid parthenogenetic line AT-1 was investigated. Line AT-1 is characterized by autonomous embryo- and endospermogenesis, and, as result, the plants of this line form with the high frequency polyembryos and haploids. Producing of tetraploid parthenogenetic line became possible owing to formation at line AT-1 of sporadic unreduced male gametes, that lead to development of tetraploid plants after fertilization of diploid eggs of tetraploids.

We carried out the analysis of 2800 embryo sacs (ES) at 18 plants. With that purpose, we fixed preliminary isolated ears in 10 days after occurrence of stigma. Formation of additional elements (nuclei and cells) in egg apparatus of ES and/or autonomous development of embryo was noted at 16 plants. The frequency of ES development with additional elements in egg apparatus varied from 0.5 to 5.9%. ES with 4-10 cells in egg apparatus and ESs with one, rarely with two embryos were discovered. Embryos were bicellular or globular, containing up to 92 cells. The eggs and/or synergids in 6 ES with three-cellular egg apparatus contained 1-4 additional nuclei.

ES with disturbed differentiation of egg apparatus were found in 13 plants. In the main, they are ES with synergid-like egg (to 13.2%), in which the nucleus occupies a basal position. ES with egg-like synergid (to 2.3%) and ES with undifferentiated egg apparatus were found. At 6 plants ES with 3.4 and 6 polar nuclei were observed. Autonomous development of endosperm was found at 4 plants (to 3.0%).

The growing of the cells of antipodal complex was noted in the ovules of all investigated plants. Big growing cells, reaching up to 2/3 ES size, always adjoined antipodes. The number of ES with growing cells was from 1.14 to 49.4%. Usually 1-2 cells were growing, rarely more (to 9). The large cells contain more often 1-2 nuclei, the cells with 3-12 and more high number of nuclei has been also observed (up to 66).

The analysis has shown, that produced tetraploid form is characterized by autonomous development of embryo and endosperm. Atypical ES are like in many respects the ES of initial diploid parthenogenetic line AT-1.