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Chromatin diminution during endosperm development in *Allium atroviolaceum* Boiss. (Alliaceae)

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Abstract

The chromatin diminution phenomenon during endosperm formation in Allium atroviolaceum was confirmed by cytophotometric method. Triploid endosperm nuclei, originated by the triple fusion, lose heavily condensed chromosome set beginning with the 8-nucleate stage. This chromosome set is arisen by pycnotic chalazal polar nucleus participating in the triple fusion. As a result, endosperm nuclei at a cellular stage possess only diploid genome. In spite of this fact, the endosperm of the investigated plant species is functioning normally.

Key words: embryology, endosperm, chromatin, *Allium.*

Endosperm in *Allium* species is originated by triple fusion, a typical second unit of the double fertilization occurring in angiosperms. During this process, two polar nuclei of the central cell of a female gametophyte fuse with sperm nucleus and, as a result, a triploid endosperm is formed (Gvaladze, 1976). In contrast with the other species of a genus *Allium*, micropylar and chalazal polar nuclei of a central cell of the female gametophyte of *Allium atroviolaceum* and *A. rotundum* reveal difference in structural organizations. In spite of the fact that both of them are haploid and contain similar sets of chromosomes, chalazal polar nucleus is smaller than the micropylar and possesses Feulgen-positive chromatin determining its pycnotic nature (Gvaladze, 1962, 1966). The similar phenomenon is described in *A. porrum* (Sokolov, 1968).

This structural difference of the polar nuclei in these species plays definite role during endosperm development, when beginning with the 8-nucleate stage, the diminution of the heterochromatinised DNA of the chalazal nucleus occurs. Chromatin diminution was observed visually on cytological preparations, when condensed Feulgen-positive DNA exits from endosperm nuclei via the nuclear envelope and eliminates in the hyaloplasm (Gvaladze, 1962, 1966). It was supposed (Gvaladze, 1962, 1976) that this process caused completely or partially elimination of chromosome set of the chalazal polar nucleus from the entire triploid genome of the endosperm nuclei. The similar observation was done in *Erythronium japonicum,* where the elimination of a complete genome of the chalazal polar nucleus proceeds after the first division of the primary endosperm nucleus (Oikawa, 1953). In general, DNA diminution is a rare phenomenon in the plant kingdom and is qualified as intraspecific unorthodox genome size variation, i.e. “plastic genome” (Greilhuber, 1998).

Current data on elimination of the heterochromatinised DNA of the chalazal polar nucleus in *A. atroviolaceum* and *A. rotundum* are based only on visual observations on cytological preparations and no experimental confirmation of the fact, does DNA content really diminish in endosperm nuclei as a result of elimination of the chalazal polar nucleus genome or not, is provided.

The objective of this investigation concerns the experimental confirmation of elimination of the chalazal polar nucleus genome from the endosperm nuclei in *A. atroviolaceum.* For this