Секция «Ботаника»

Study of embryo sac development in sexual and apomictic species of Boechera (Brassicaceae)

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Apomixis is a unique phenomenon in plant reproduction that promotes clonal reproduction of plants through seeds, while the embryo is genetically identical to the maternal genotype. The introduction of apomictic technology into agriculture will be revolutionary, as the consolidation of important traits over many generations will reduce costs and breeding time [1].

Various authors have pointed a polyploidy as an indispensable thing in the regulation of apomixis, which makes the genus *Boechera* an ideal model system for study, since it is characterized by diploid sexual and apomictic forms [1, 2].

During the cytoembryological study of the development of *B. stricta* and *B. divaricarpa* (accession ES517) embryo sacs, we used the method of cleared specimen with chloral hydrate by visualization using differential interference contrast (DIC) microscopy, as well as the method of histological staining sectioned ovaries with Hemaetoxylin Erlisch's solution [3].

It was established that *B. stricta* is characterized by megasporogenesis with the formation of tetrads of megaspores and the development of an embryo sac from a chalazal megaspore according to the *Polygonum*-type. The formed embryo sac is bipolar 7-cell, 8-nuclear, consists of an egg and two synergids at the micropylar pole, a 3-cell antipods at the chalazal pole, and a central cell with 2 polar nuclei.

For *B. divaricarpa (*ES517) it was shown an arrest of megasporogenesis at the stage of dyads of megaspores, which are equal in size. At the same time, the surrounding tissues of the ovules at the dyad stage in *B. divaricarpa* reach the same degree of development as the surrounding tissues of ovules at the tetrad stage in the sexual *B. stricta.*

Thus, the megasporogenesis was established in accordance with the diplospory by Taraxacum type, in which disturbances in meiosis lead to the formation of dyad with an unreduced set of chromosomes [4]. The embryo sac develops from the chalazal cell of the dyad, undergoes three mitotic divisions, and is similar in structural organization to the *Polygonum*-type embryo sac (as in *B. stricta*).

References

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