

## EMBRYO SAC DEVELOPMENT IN *EUPHORBIA MYRSINITES* AND *E. KOMAROVIANA* (EUPHORBIACEAE)

G. E. Titova<sup>a,#</sup> and M. A. Nyukalova<sup>a</sup>

<sup>a</sup> Komarov Botanical Institute RAS Prof. Popov Str., 2, St. Petersburg, 197376, Russia

<sup>#</sup>e-mail: galina\_titova@mail.ru

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Megasporogenesis and embryo sac development in *Euphorbia komaroviana* and *E. myrsinites* from the sections *Holophyllum* and *Myrsiniteae* of *Euphorbia* subgen. *Esula* have been investigated. These sections represent two large advanced clades separated in the subgenus *Esula* on the base of molecular-phylogenetic analysis – clade I (section *Holophyllum*) and clade II (section *Myrsiniteae*), and are situated near the base of its tree (Riina et al., 2013). In present study it was established that both species (not previously studied in this respect) have multiple archesporium, many-celled sporogenous complex and Polygonum-type of embryo sac development, manifesting a great similarity in the patterns of realization of this process: transformation of the sporogenous cells majority into the megasporocytes, their entering into the meiosis and its completion with the formation of multiple linear or T-shaped tetrads or triads of megaspores; subsequent development of a single embryo sac (as a rule) from the chalazal megaspore of one of tetrads; common organization of its egg apparatus (typical polarization of egg cell and synergids, presence of filiform apparatus in synergids, etc.), central cell (contact of polar nuclei near egg apparatus); long preserving of antipodals (till the zygote stage). The differences mainly concern the antipodals behaviour (divisions of their cells and nuclei during the maturation of embryo sac in *E. myrsinites* and the absence of this process in *E. komaroviana*), and also the ability of *E. komaroviana* ovule to sporadical formation of several embryo sacs on the base of many-celled sporogenous complex.

As a result of the comparison of received data with literature the conclusion about the absence of the relationship between the number of archesporium cells and the type of embryo sac development in the species of *Euphorbia* (Vinogradova, 2017) is supported (contrary to the point of view of some early authors – Modilewski, 1909, 1911; D'Amato, 1939). Also, the correction was made into the assumed by some authors (Vinogradova, 2017) relationship between the antipodals behaviour and the type of embryo sac development in *Euphorbia* species: different longevity of antipodals functioning may be more related with a different activity of the chalazal endospermal haustorium and the massiveness of the seed chalazal part structures, revealed earlier in the species of some species of *Euphorbia* subgen. *Esula* (Titova et al., 2018a, 2019).

As a result of the analysis of distribution of the character “type of embryo sac development” within the *Euphorbia* subgen. *Esula* (characterized by significant diversity of this character – Vinogradova, 2017), the predominance of monosporic Polygonum-type of development among its species was supported, including the species of basal clade *Lathyris* and the species of sections lying near this clade (*Holophyllum* – clade I, *Myrsiniteae* and *Pithyusa* – clade II). The preliminary conclusion about the primacy of this type of female gametophyte in the subgenus *Esula* was made. The assumed trends towards the confinement of the tetrasporic types in general to the clade I (Penaea-, Fritillaria- and other types – section *Helioscopia*), and bisporic ones – to the clade II (Allium-type – sections *Patellares*, *Aphyllis*) have not yet been confirmed, but, to present time, an insufficient number of species have been studied.

**Keywords:** *Euphorbia*, subgenus *Esula*, *Euphorbia komaroviana*, *Euphorbia myrsinites*, molecular phylogeny, ovule, archesporium, embryo sac, antipodals

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