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SIGNIFICANCE OF ENDOSPERM DEVELOPMENT TRAITS FOR COMPARATIVE ANALYSIS OF ENDOSPERMOGENESIS AND EMBRYOGENESIS IN ANGIOSPERMS

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Most classifications distinguish two main types of endosperm development: Cellular and Nuclear. The Helobial endosperm is usually considered a type possessing features of both the above-mentioned types. Some authors add the number of types, or they describe the beginning of endosperm development as following one type, and the continuation of its development as following another type. We proposed a new classification of endosperm development modes. It consists of three hierarchial levels, amely types, subtypes and variations, each of them having its own criteria. The classification distinguishes only two types on the basis of morphogenetic potentialities of the primary micropylar and chalazal cells: Cellular (karyokinesis is completed with cytokinesis in both cells) and Helobial (only karyokinesis takes place in both cells and sometimes the chalazal cell remains uninucleate); a number of subtypes according to the degree of participation of micropylar and chalazal cells in construction of endosperm: within the Cellular type – Micropylar with chalazal haustorium, Micropylar with terminal haustoria, Micropylar-chalazal with terminal haustoria, Micropylar-chalazal without haustoria, Chalazal with micropylar haustorium, Chalazal without haustoria subtypes; within the Helobial type – Micropylar with chalazal haustorium, Micropylar without haustorium (= Nuclear) subtypes. Within the Cellular endosperm type, there is a number of variations according to the position of the walls during the second division – Nymphaea-variation in Micropylar with chalazal haustorium subtype, Pedicularis- and Pentaphragma-variations in Chalazal with micropylar haustorium subtype, Prunella- and Callitriche-variations in Micropylar with terminal haustoria subtype, Phyteuma- and Scutellaria-variations in Micropylar-chalazal with terminal haustoria subtype, Annona-variation in Micropylar-chalazal without haustoria subtype. Variations within the Helobial type are distinguished according to the number of nuclei in the chalazal cell of the two-celled endosperm – Limnocharis- and Dianella-variations in Micropylar with chalazal haustorium subtype, and no variations in Nuclear subtype.

In a comparative analysis of flowering plants, the types of embryogenesis are most often used among the characteristics of the embryo development. As for the endosperm, the types of its development correspond to a different status, instead of the "types" of embryogenesis. The types of embryogenesis can be compared with subtypes (6) and even variations (8) of the Cellular type of endosperm, and both traits (the contribution of derivatives of micropylar and chalazal cells to the formation of endosperm; the division patterns of these cells and the form of the tetrad) should be taken into account simultaneously. Apparently, one can also take into account the possibilities of the Helobial endosperm – the presence of 2 subtypes and 2 variations.

Keywords: endosperm, embryo, development, structure, typization

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