

# **FECUNDATION IN PLANTS**

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Fecundation in plants by David M. Mottier

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**DAVID M. MOTTIER**

**FECUNDATION  
IN PLANTS**



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Gen.

# FECUNDATION IN PLANTS

BY

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## PREFACE.

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This volume presents the subject of fecundation in the vegetable kingdom by the discussion of concrete cases, selecting from the great groups of plants certain typical representatives in which the sexual process seems to have been most thoroughly investigated. In the introductory chapter I have discussed typical processes of nuclear division and cell-formation, especially in spore mother-cells, together with a few topics dealing with certain phenomena of the cell and the significance of sexuality. This is considered necessary to a better understanding of sexual reproduction, for problems of sexuality, like problems of evolution, have in late years become reduced to problems of the cell, and, since the nucleus plays by far the most important part in fecundation, I am tempted to say to problems of the nucleus.

The processes leading to the development and differentiation of the gametes have been regarded as of prime importance, and they have therefore received emphasis. Whenever the subsequent history of the fecundated egg has been followed to any extent this has been done, as in the *Ascomycetes* and *Floridea*, to show the relation between the real sexual process and the vegetative fusion of nuclei which has been confused with the sexual act, and, as in the *Desmids*, for the sake of pointing out certain nuclear phenomena that take place during the germination of the zygote with similar phenomena just preceding the sexual act in the *Diatoms*. Processes which are purely morphological are assumed or dealt with very briefly.

In grouping the representative types into the several chapters I have had in mind no particular theory of the evolution of sexuality, but merely the idea of the evolution of the plant kingdom and the corresponding differentiation of the sexual organs and cells accompanying this evolution in the groups of plants themselves.

The chapters dealing with the lower plants in which the development of the gametes is not known from a modern cytological standpoint, and in which the behavior of the sexual nuclei in the fusion of the gametes has not been followed—have been made as brief as possible. For a similar reason the mosses and liverworts have been omitted entirely.

No attempt has been made to discuss the numerous theories bearing upon the subject. Whenever theoretical matters are touched upon the object has been chiefly to suggest probable lines of investigation. I have not hesitated, however, to express my own opinion in all cases in which my special field of study has given me a first-hand knowledge of the subject-matter.

To designate the sexual process which consists in the fusion of sexually differentiated cells, or gametes, and especially the fusion of their nuclei, the term *fecundation* has been used instead of *fertilization*—*fecundation* being the equivalent of the German *Befruchtung* and the French *fécondation*.

It has been necessary, of course, to copy numerous figures from the papers of other investigators, but in every case due credit is given.

In the citation of literature in the text the author is referred to by the year in which his work was published. No attempt has been made to give a complete bibliography, and no doubt many valuable references have been omitted.

The author is indebted to Professors W. Belajeff, H. O. Juel, F. Oltmanns, S. Ikeno, and to Dr. H. Klebahn, Dr. A. H. Trow, Dr. H. Wager, Dr. S. Hirase, and Dr. V. H. Blackman, for reprints of their papers, from many of which illustrations have been borrowed, and especially to Professor R. A. Harper for helpful suggestions.

DAVID M. MOTTIER.

INDIANA UNIVERSITY, *August, 1902.*



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