

In serene memory

of Elena Gerassimova-Navashina, Vera Poddubnaya-Arnoldi, Veronika Vasilevskaya, Katherine Esau and Barbara Haccius – women-scientists, who made a great input to the development of complicated problems of plant morphogenesis and reproduction

Preface

The third volume of *Embryology of Flowering Plants* is a concluding volume of the edition. This encyclopaedic dictionary has no analogies in the world. It is an original attempt to combine the principles of constructing a terminological dictionary with monographic description of structures and processes.

The publication consists of three volumes. Volume 1 (2002), *Generative Organs of Flower*, is divided into three parts: **Flower, Anther, Ovule**. Volume 2 (2005), *Seed*, comprises the following: **Double Fertilization, Endosperm, Perisperm, Embryo, Seed, Seed Dormancy and Germination**. The third volume, *Reproductive Systems*, includes seven principal parts: **Plant Reproduction, Pollination and Breeding, Seed Propagation, Vegetative Propagation, Molecular-Genetic Aspects of Reproduction, Population and Ecological Aspects of Reproduction and Embryological Bases of Reproductive Strategies**.

Specialists in different disciplines of botany, such as embryology, morphology, genetics, geobotany and ecology, give their interpretation of such many-sided notions as "systems of reproduction" or "living strategies". In this connection some key notions are considered, including reproduction, renewal, propagation, amphimixis, apomixis, reproductive effort, reproductive success, potential seed productivity and real seed productivity. For the first time, all these aspects are covered in this, the third volume of *Embryology of Flowering Plants*.

When preparing the book we used such well-known monographs, as F. Netolitzky, *Anatomie der Angiospermen-Samen* (1926); K. Schnarf, *Embryologie der Angiospermen. Archegoniaten* (1929) and *Vergleichende Embryologie der Angiospermen* (1931); R. Souèges, *Les Lois du Développement* (1937) and *Embryogénie et Classification* (1939); P. Maheshwari, "An Introduction to the Embryology of Angiosperms" (1950); D. A. Johansen, *Plant Embryology* (1950); P. A. Baranov, *The History of Plant Embryology* (1955); A. L. Takhtajan, *Foundations of Evolutionary Morphology of Angiosperms* (1964), *Outline of the Classification of Flowering Plants* (1980) and *System Magnoliophyta* (1987); V. A. Poddubnaya-Arnoldi, *General Embryology of Angiosperms* (1964b) and *Cytoembryology of the Angiosperms: Principles and Perspectives* (1976); G. Davis, *Systematic Embryology of Angiosperms* (1966); T. B. Batygina, *Wheat Embryology* (1974), *The Grain of Cereals (Atlas)* (1987); E. S. Teryokhin, *Parasitic flowering plants. The Evolution of Ontogenesis and the Mode of Life* (1977); E. Corner, *The Seeds of Dicotyledons* (1976); K. Esau, *Anatomy of Seed Plants* (1977); B. M. Johri (ed.), *Embryology of Angiosperms* (1984); T. B. Batygina and M. S. Yakovlev (eds.), *Comparative Embryology of Flowering Plants* (1981, 1983, 1985, 1987, 1990); V. Raghavan, *Experimental Embryogenesis in Vascular Plants* (1976), *Embryogenesis in Angiosperms: A Developmental and Experimental Study* (1986), *Developmental biology of fern gametophytes* (1989) and *Molecular embryology of flowering plants* (1997); M. F. Willson, *Plant Reproductive Ecology* (1983); B. M. Johri, K. Ambegaokar, P. S. Srivastava, *Comparative Embryology of*

Angiosperms (1992); B. Rodkiewicz, *Embryology of flowering plants* (1973) and *Embryology of gymnosperms* (1984); Hu-Han and Yang Honjyuan, *Haploids of higher plants in vitro* (1986); M. Cresti, P. Gori and E. Pacini, *Sexual Reproduction in Higher Plants* (1988); P. R. Bell, *Green plants. Their origin and diversity* (1992); K. G. Mukerji, *Seed Biology* (1992); E. Ottaviano, D. L. Mulcahy, M. Sari-Gorla and G. B. Mulcahy, *Angiosperm pollen and ovules* (1992); R. B. Primack, *Essentials of Conservation Biology* (1993) and others.

For more precise definition of terms the following dictionaries were used: M. C. Cooke, *A Manual of Botanic Terms* [1873?]; B. D. Jackson, *A Glossary of Botanic Terms* (1916); N. N. Zabinkova and M. E. Kirpichnikov, *Latin-Russian Dictionary for Botanists* (1957); M. E. Kirpichnikov and N. N. Zabinkova, *Latin-Russian Dictionary for Botanists* (1977), *Biological Encyclopedical Dictionary* (1986, 1989); *The Oxford English Dictionary* (1989) and others.

While preparing the publication of the 3-volume edition on Russian, English and Farsi some new data has become available on the various aspects of the developmental biology. The editorial board has made a principal decision not to include the data into the new issued volumes, because it will take a tremendous effort and will cause delay in issuing of these unique books. However, we considered it possible to mention at least some publications of recent years, in which some problems, considered in the 3-volume edition, were solved: E. S. Teryokhin, *Seed and seed reproduction* (1996); E. S. Teryokhin, *Weed broomrapes systematics, ontogenesis, biology, evolution* (1997); T. B. Batygina and V. E. Vasilyeva, *Plant propagation (Textbook)* (2002); N. N. Kruglova, T. B. Batygina, V. Yu Gorbunova, G. E. Titova and O. A. Seldimirova, *Embryological bases of wheat androcliny: Atlas* (2005); T. B. Batygina, E. A. Bragina, A. V. Ereskovsky and A. N. Ostrovsky, *Viviparity in plants and animals: invertebrates and lower chordates* (2006); T. I. Serebryakova, N. S. Voronin, A. G. Elenevskiy, T. B. Batygina, N. I. Shorina and N. P. Savinych, *Botany with basics of phytocoenology: Anatomy and morphology of plants (Textbook for higher school)* (2006); T. B. Batygina, G. Yu. Vinogradova, *Phenomenon of Polyembryony. Genetic Heterogeneity of Seeds* (2007); I. I. Shamrov, *Ovule of flowering plants: structure, functions, origin* (2008).

In this encyclopedic edition the principles of constructing the dictionary with monographic description of embryonic structures and processes are combined. However, unlike traditional dictionary structure, the terminological articles in every part of the book are placed not in alphabetical order, but according to the theme to create the integrated picture of each main seed structure. A subject index is given at the end of the book.

Terminological articles comprise the main part of the text and include: the definition and semantics of the terms, their history, and major data about the origin, development, functions and classification of the structure described. In a number of cases, questions concerning evolutionary transformations and the character of distribution of embryological features among flowering plants are discussed.

The second group of articles combines conceptional, and hence the most complex articles presenting the discussion of questions of modern angiosperm embryology. Some cases of difference between the author's terms and terms accepted in this edition are footnoted.

Most of terminological and conceptional articles are complemented with illustrations such as drawings, microphotographs, schemes and diagrams.

Complete bibliographical data are given in the References at the end of the volume.