Papageorgiou, G.C., Govindjee (ed.): **Chlorophyll *a* Fluorescence. A Signature of Photosynthesis**. – Springer, Dordrecht 2004. ISBN 1-4020-3217-x. 818 pp., € 270.00, GBP 187.00, USD 349.00 (hardcover).

The nineteenth volume of the well known series "Advances in Photosynthesis and Respiration" presents 31 chapters dealing with one of the most used groups of methods in recent studies of photosynthesis. The results of studying fluorescence of chlorophyll *a* are broadly interpreted and used for explanation of basic processes of photosynthesis as well as their limitation by biotic and abiotic factors.

The chapters were prepared by almost 60 excellent scientists all over the world (including two from the Czech Republic) who cite a fairly broad literature (42–333 references per chapter). Some of the references repeat often (but some of them are missing) and may be a common list of references for the whole book would be of better use for the reader.

All aspects of chlorophyll fluorescence are included, starting with basic facts and history of its study and ending with productivity of inland waters. Included are biophysical and methodical bases (photon capture, excitation energy migration, trapping, and transfer, charge separation, shape of fluorescence excitation and emission spectra, fluorescence induction and pulse-amplitude-modulation, fluorescence imagination, modes of fluorescence quenching, delayed emission and thermoluminescence), their relation to pigment-protein complexes and activities of photosystems 1 and 2, biochemical interpretations, models, xanthophyll cycle, protein mobility, physiological consequences, *etc*. Special chapters deal with various groups of organisms, such as photosynthetic bacteria, cyanobacteria, red and other algae, and higher plants, their wild types and mutants, as well as with fluorescence of plant organs (leaves, fruits) and whole plants and canopies, with land ecosystems and water reservoirs. The very important topics are relations of fluorescence with plant production monitored both in the laboratory by mostly mobile fluorometers and in nature by means of remote sensing.

In five chapters stresses induced by excess photosynthetically active radiation (photoinhibition) and UV-radiation are dealt with. Special chapters analyse other environmental effects such as water stress, heavy metal toxicity, *etc*. Not all stresses are included. I regret that there is not enough warning to carefully select leaves for comparative fluorescence studies: leaves develop during the whole vegetation season, not only in autumn, and these developmental changes are also reflected in fluorescence characteristics [for reviews see Šesták, Z., Šiffel, P., Photosynthetica **33**: 347-369, 1997; Šesták, Z., in: Argyroudi-Akoyunoglou, J.H., Senger, H. (ed.): The Chloroplast: From Molecular Biology to Biotechnology. Pp. 291-296. Kluwer, Dordrecht – Boston – London 1998]. I also miss information on fluorescence characteristics of transformants and genetically modified plants. It is interesting that the almost forgotten term "photosynthetic unit" is nowadays used again.

Unfortunately, the editors did not unify terms and abbreviations in different chapters as well as within text, figures, and tables of one chapter. Thus we find F_V, F_v, Fv, PSII, PS II, Chl a, Chl *a*, Cytb, Cyt b, Cyt *b*, and so on. This complicates reading. Also references are not fully edited (cf. Phytochem, Naturwiss). Supplemented are brief CV of both editors, photographs of all authors (pp. 5-8), colour plates, many equations, tables, graphs, and black-and-white photographs in the chapters, and a good subject index.

I doubt that somebody would read the full text, but the book is certainly a basic material for an advanced scientist in photosynthesis. It is a must for the bookshelf of every photosynthesis laboratory and for libraries of universities and research institutes in plant sciences.

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