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BOOK REVIEWS

WAGNER, J. C. (ed.): *BIOLOGICAL EFFECTS OF MINERAL FIBRES*; 1, 2. — International Agency for Research on Cancer, Lyon 1980, Vol. 30. 494 pp. + 496–1007 pp., clothbound Sw. fr. 60.— + 60.—; US \$ 35.00 + 35.00.

In spite of the known mutagenic and carcinogenic hazards associated with the use of mineral fibres, especially asbestos, its commercial value has ensured its continuing use. The 30th volume of the Scientific Publications of the International Agency for Research on Cancer comprises the Proceedings of a meeting held under the sponsorship of the National Institute of Health and Medical Research, France, and of the IARC in Lyon 1979. The aim of the meeting was to review the current knowledge in the whole field of the biological effects of mineral fibres and to stress the need of establishing or improving regulations, which could reduce the possible risks to a minimum. The mineral fibres discussed can be divided into 4 groups: asbestos, other asbestiform fibres, other naturally occurring fibrous minerals, and the man-made mineral fibres. The introductory sections of the Proceedings present contributions on the physics and chemistry of asbestos dust. This is followed by sections on the pathology and cytogenetic effects of asbestos fibres, including papers on the relation of the dimension of the fibres to their biological activity, and on the syncarcinogenicity of various substances such as benz(a)pyrene, N-nitrosodiethylamine, cigarette smoke and radiation with asbestos. Results of cytogenetic studies suggest that chromosomal damage is not caused by a direct interaction between fibres and DNA, but that probably these fibres act as disturbing elements, perhaps during DNA replication. The concluding chapters deal with fibres other than asbestos, shown to have biological activity, *e.g.* amosite, chrysolite, tremolite, crocidolite, anthophyllite *etc.* Each section of the book is preceded by a review that summarizes the contributed papers.

T. GICHNER (*Praha*)

JAUHAR, P. P.: *CYTOGENETICS AND BREEDING OF PEARL MILLET AND RELATED SPECIES*. — Alan R. Liss, Inc., New York 1981. 310 pp. £ 32.80, DM 144.00.

Pearl millet is a dual-purpose crop. It provides grain for human consumption and fodder for cattle. It is the sixth most important grain and forage crop which is mainly cultivated in Asia and Africa and has a remarkable potential of growing under some of the driest agricultural conditions. In the sub-Saharan Africa, harvests of pearl millet were obtained with as little as 250 mm of annual rainfall. The need for the genetic improvement of this important economic crop as well as its potential as a research tool has been fully realized recently. The purpose of this book was to summarize and integrate the available information on the genetics and cytogenetics not only of pearl millet but also of other *Pennisetum* species, particularly of those of greater importance to man. The introductory chapters deal with the taxonomy and karyology of the genus *Pennisetum*. These are followed by chapters on meiosis, abnormal meiosis and its genetics, haploidy, aneuploidy, structural changes in chromosomes, B chromosomes, hybridization and chromosome relationship and apomixis. Further sections of the book cover the physiology, genetics of qualitative and quantitative characters, induced mutations and floral biology. The concluding chapter reviews the early breeding work and the current breeding strategy. The most important task of breeding pearl millet today is the production of dwarf hybrids and the improving of the nutritive quality of grain with particular reference to protein content and amino acid balance. According to the author, "with further research, pearl millet will, hopefully, emerge as one of the leading economically viable crop".

Readership: plant breeders, plant geneticists and cytogeneticists.

T. GICHNER (*Praha*)

BOOK REVIEWS

HSIE, A. W., O'NEIL, J. P., McELHENY, V. K. (ed.): *MAMMALIAN CELL MUTAGENESIS: THE MATURATION OF TEST SYSTEMS*. Banbury Report 2. — Cold Spring Harbor Laboratory 1979. 504 pp., cloth \$ 45.— (outside US \$ 54.—).

The publication is the second volume of a successfully introduced series of promptly published reviews of topical scientific problems, in this case of mutagenesis in mammalian cell cultures. It is valuable not only as a source of information about the present state of the problem but especially because it presents a comprehensive discussion concerning individual subjects. It is due to the publishing of the discussion that the specific atmosphere of the site of conference — Banbury Center — is conveyed to the readers.

The Conference attended by 32 participants was divided into 7 sessions.

The first dealt with gene mutations. T. T. Puck discussed the historical perspective of mutation studies of somatic mammalian cells, L. Siminovitch the studies of mutation in CHO cells, C. T. Caskey the evaluation of HGPRT mutants in Chinese hamster V79 cells. The panel discussion was focused on the definition of criteria to define a genetic event.

The second session involved the quantitative mutagenesis with rodent cells, namely the experimental procedures in the system CHO/HGPRT (J. P. O'Neil) and L5178Y/TK⁺ (M. M. Moore-Brown), and the use of Chinese hamster V79 cell cultures for the detection of mutagens and promoters or antipromoters of carcinogenesis (C. Chang).

The determination of criteria for mutagen screening systems was the subject of the third session. D. A. Casciano, J. A. Bradlaw, B. E. Butterworth, L. D. Kier, M. D. Waters and D. F. Krahn discussed the selection of tests and the possibility of utilizing the mammalian cell cultures in screening for potential mutagens and carcinogens. E. Zeiger explained the approach of NIEHS to the use of mammalian cell systems expected to replace in the future bacterial systems; the positive results should further be verified in experiments with mammals to determine active dose levels and organ distribution that might signalize the organs most sensitive to tumor genesis.

In the fourth session attention was paid to the genetic, biochemical and molecular analyses of mutations. According to P.O.P. Ts'o this study should involve a systematic approach comprising the cloning and analysis of normal or mutated genes, the transfer of the normal or mutated genes from one cell to another, their function in cell cultures after transfer, and the structural arrangement of the transferred gene in the recipient host. Further contributions dealt with the investigation of temperature-sensitive mutants (L. T. Thompson), the titration of the lacking gene product (L. A. Chasin), the analysis of mutation at the ATP-locus (M. W. Taylor), the mechanism of resistance to thymidine analogs (R. E. Kaufman), and the use of ouabain-resistant mutants (R. M. Baker).

The fifth session discussed the possibilities of a practical utilization of individual mutagen screening systems. Attention was paid especially to the use of the CHO/HGPRT system along with metabolic activation (D. F. Krahn, J. D. Irr, D. B. Couch). J. P. O'Neil and A. W. Hsie suggested the adaptation of the CHO/HGPRT mutation assay for mutagen screening.

The sixth session, dealing with the possibilities of quantitative study of mutagenesis in human cell cultures, on employing diploid human lymphoblasts (W. G. Thilly), and diploid human fibroblasts with different capacities for DNA repair (V. M. Maher), and with direct mutagenicity testing with peripheral blood lymphocytes (R. J. Albertini), was of particular interest. I consider the practical utilization of this knowledge to be the most valuable contribution of studies with mammalian cell cultures for monitoring the genetic damage to human populations.

The final seventh session was focussed on the mutations, cancer, and progress in mutagen testing. P.O.P. Ts'o emphasized basic mechanisms and advantages of the study of neoplastic cell transformation, A. W. Hsie referred to the use of the CHO/HGPRT system, D. Clive to the use of the L5178Y/TK⁺ system, M. C. Hollstein informed on the comparison of the results obtained in short-term tests, and M. D. Waters on the so-called Gene-Tox programme.

The survey of the present state of the study of mutagenesis on mammalian cell cultures and of the application of the systems discussed to mutagen testing in the practice, as presented in the book reviewed, is a highly topical work that gives a lucid information on the systems which should be employed to a greater extent also in our country. Therefore the Banbury Report 2 is welcome also as a publication stimulating modern trends of research in our laboratories.

R. J. ŠRÁM (*Praha*)

BOOK REVIEWS

SCHLECHTER, R.: DIE ORCHIDEEN. 3. Auflage. BRIEGER, F. G., MAATSCH, R., SENGHAS, K. (ed.). — Paul Parey Verlag, Berlin—Hamburg. Bd. I., Lieferung 11—12 (pp. 633—752). Bd. II. Lieferung 4, 5, 6, 7, 8 (pp. 193—512); 1980—1981.

The irregular publication of individual issues of such a large and expensive monograph as is the 3rd edition of the famous Schlechter's handbook "Die Orchideen" brings about many difficulties not only to the authors and editors but also to the reviewer. The monograph has been revised and edited 50 years after the second edition, and enlarged into two volumes. The taxonomical revision of the family *Orchidaceae* has not yet been completed and the publication of the whole work, which began in 1971, will hardly be finished before 1982.

The last part of Volume I. (11th and 12th issues), including morphology, cytology, genetics, phytogeography and taxonomy, deals with the subtribus *Dendrobiinae*, treated by Brieger, Butzin and Senghas. Many generic taxa are involved, most of which have been newly separated from the old known larger genera: *Dendrobium* and *Eria*. — The new issues of the Volume II (Nos. 4, 5, 6, 7, 8) include the chapter on orchid cultivation: Generic multiplication by means of seeds inoculated with symbiotic fungi, and asymbiotic culture in artificial nutrient media, followed by a short chapter on pests and pathology. — The next extensive and well elaborated chapter by Maatsch and Wichmann brings ample systematic information on the most famous results of the world-wide orchid-growers; the main commercial cultivars and their hybrids are described: *Laelia*, *Cattleya*, *Miltonia*, *Odontoglossum*, *Paphiopedillum*, *Coelogyne*, *Lycaste*, *Dendrobium*, *Cymbidium*, *Epidendrum*, *Phalaenopsis*, *Oncidium*, *Vanda*, and others. This is followed by the part on flower harvesting, packing and expedition. Much information is given in the chapter on orchid cultivation at home by orchid-friends, written by Mergner. Treated is the culture at the window, in plastic greenhouses, with many technical details on all necessary equipment needed for successfully growing orchids in conditioned environments: heating, ventilation, shading, irrigation, fertilization, substrate preparation, etc. Description of the species, cultivars and hybrids recommended for home growing, arranged in alphabetical order closes this chapter.

The re-edition of Schlechter's handbook represents a greatly meritorious effort sincerely welcomed not only by the German-reading orchid growers, friends and botanists, but by the whole world public interested.

DAGMAR DYKYJOVÁ (Třeboň)

MOVABLE GENETIC ELEMENTS. Cold Spring Harbor Symposia on Quantitative Biology, Vol. 45. 1980. — Cold Spring Harbor Laboratory, 1981. 439 + 574 pp., US \$ 156.—.

B. McClintock discovered movable elements in maize in the 1940s and proceeded to demonstrate a remarkable array of properties associated with them, such as controlled chromosome breakage, effects on gene expression, localized mutagenicity, etc. In the late 1960s, Shapiro and Starlinger found that certain highly pleiotropic mutations in *E. coli* were the result of the insertion of discrete DNA segments that had the capacity to jump from one chromosomal site to another. In May 1976, a symposium of DNA insertion elements ((IS) took place at Cold Spring Harbor. With this meeting, IS elements and transposons moved to the center of attention of the genetic world. The 45th Volume of the Cold Spring Harbor Symposia on Quantitative Biology covers the Proceedings of the meeting in a 2 book-set. The Symposium was attended by more than 300 participants, presenting 117 reports on movable genetic elements. The introductory lecture, delivered by A. Cambell, presents the history of research on movable genetic elements and comments the various theories of the molecular mechanisms of insertion and transposition, and the roles of specific recombination systems in evolution and development. The introduction is followed by contributions on the inversion and transposable elements in bacteria, on their general properties, structure and function, on the mechanisms and factors affecting transposition and on the biochemistry of recombination. The second part of the book is introduced by papers dealing with genetic instability in plant systems, including works on controlling elements in maize, *Antirrhinum majus*, *Impatiens balsamina* and *Ascobolus immersus* and on molecular genetics of symbiotic nitrogen-fixation. Further papers cover the transposable elements in *Drosophila* and yeast, dispersed movable sequences, retroviruses as insertion elements, organization of genes, rearrangements in antibody genes and antigenic variation in *Trypanosoma* and mating-type switch in yeast. The Symposium is concluded by a Summary presented by M. B. Yarmolinsky.

Readership: all those interested in molecular biology and genetics.

T. GICHNER (Praha)