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Book reviews

Nationale Raad voor Landbouwkundig Onderzoek (ed.): Plant Breeders' Rights and Patent Rights in Relation to Plant Genetics Engineering. Studierapport 14 d. 38 pp. Nationale Raad vor Landbouwkundig Onderzoek, P.B. 297, 2501 BD's Gravenhage. Hfl 10.–.

The National Agricultural Council of the Netherlands is an organisation of cooperation between the Ministry of Agriculture and Fisheries, the Agricultural High School, The Faculty of Veterinary Sciences, and several other official organizations. It has the goal of planning and organizing research programs. The fast development in the field of genetic engineering focussed this organization on the problems of patent rights in relation to the new and sophisticated techniques commonly indicated as plant genetic engineering. The study, based on the Dutch legislative texts, memoranda and jurisprudence in the field, tries to answer the question of whether the results of genetic engineering can be protected either by plant breeders' rights or by patent rights, or even by both of them at the same time.

Because the Dutch national legislation follows the International Convention for the Protection of New Varieties of Plants (usually quoted as the UPOV-convention), it may be interesting to see how these problems are tackled.

The content of the study can easily be presented by reprinting part of the summary of the report by the National study committee.

Plant growers and plant breeders conceive a plant variety as the assemblage of all plants and parts of plant from which the variety with its characteristic features can be reproduced, including cell- and meristem-cultures.

In the Netherlands a Patent Right may be obtained as a national or as a European patent. Both are in line with the general principles established in the international treaties ratified by the members of the World Intellectual Property Organization (WIPO).

Stated in summary patent rights can be granted for an invention which is susceptible for industrial application, including agriculture, which is new and which involves an inventive step.

No patents rights are granted for plant or animal varieties or essentially biological processes for the production of plants or animals, with the exception of micro-biological processes or the products thereof.

The invention, be it a product or a process, should be described in such a way that it can be applied by other experts. In case a micro-organism is involved that is not generally available this should be deposited to an internationally recognized authority.

Explanatory notes in relation to patent rights treaties indicate that, for the purpose of these treaties, cultured cells of higher plants may be considered as micro-organisms.

Patent protection gives the patent holder the exclusive right to produce, use or sell the patented product or to apply a patented process or the product that is obtained immediately from applying that process, in the pursuit of his business.

If a patent can only be exploited by making use of an existing patent the national Patent Office will grant a compulsory licence for the use of the existing patent to the holder of the dependent patent.

Premature disclosure of experimental results or even disclosure of intentions in view of project planning, subsidy requests or permissions will destroy the novelty of inventions. This aspect needs attention from both the researchworkers and the authorities asking the information.

Assuming that a patent is granted for a process to modify the genetic structure of pollen or plant cells, two questions arise. What is to be understood by the immediate product of that process: chromosomes, cells, calli, meristems, tissues, plants, clones? Should the first plant be considered as a representative of a new variety and is this plant, therefore, expected from patentability?

Biomechanical technology is now opening the possibility to synthesize, recombine and reproduce polynucleotides that form new parts of plant chromosomes carrying genetic information. Such a polynucleotide, described and characterized by the fact that it contains an exactly defined sequence of nucleotides, may be considered to be:

- new if it cannot be proven that it is described earlier or already exists in nature,
- an inventive step if it is non-obvious and unexpected for an expert,
- reproducible if it can be obtained by execution of a described biochemical process or by multiplication in an available organism.

Furthermore the substance is not described as a plant or a variety. Herewith all basic conditions for patentability are satisfied.

Once patent rights are granted for a man-made polynucleotide the patent holders' permission would be needed for the commercial cultivation of cells, tissues or plants carrying that polynucleotide since from the patent rights viewpoint with each cell division a new molecule of the polynucleotide is "produced".

The patent protection would go further than the plant breeders' rights protection for it would also monopolize the use of plants or varieties with that polynucleotide for the production of the marketed end-products and their use as parents for the breeding of new varieties.

Since plant varieties are not eligible for patent rights, varieties carrying that specific polynucleotide cannot be subject to grants of dependent rights and compulsory licencess by the national Patent Office.

Such a patent on one gene would, therefore, create an absolute barrier for the use of certain varieties by breeders and growers. The committee assumes that the legislators of neither of the two protection systems aimed at such an unrestricted monopoly.

It is not all certain whether decisions of the national Patent Office or the court can remedy this situation. A change of law might be preferable.

Here the committee sees in principle two possibilities:

A) to restrict the exclusively patent rights on products in case plant varieties are affected, or
b) to introduce the rule that compulsory licences are granted if this is necessary for the breeding and exploitation of plant varieties.

Later on a report on international problems will be published.

H. F. Linskens, Nijmegen

Brettschneider, W. (in cooperation with Beyer, E.): Obstbäume in Töpfen. Ulmer Taschenbuch Nr. 11. Stuttgart: Ulmer 1984. 126 pp., 65 figs. in color, 43 drawings. Soft bound DM 14,80.

The cultivation of fruit trees in buckets and pots is an old, but nearly forgotten, method. But whoever wants to start fruit culture in miniature will find excellent advice on all sorts of topics in this pocket book written by an eighty year old expert: details on potting, special spring and summer treatment, pruning and cutting. In general fruit trees in pots have a reduced longivity, thus the choice of stock tree is of critical importance: for apple, EM 9 and 27 are advised; for pears the Maquince; for pitted fruit, the french selection "Pixy" and "INRA St. Julian GF 655/2". In any case, the productivity will be reduced in comparison with the same species in full soil. Pot fruit trees are more intended for the hobbists and amateurs, for decoration of roof gardens, flat-roofs, and balconies and for gardening in limited areas, which is so common in modern city housing. Strangely enough there are no special varieties or breeds for pot culture, at least not up till now.

H. F. Linskens, Nijmegen

Tindall, H. D.: Vegetables in the Tropics. London: MacMillan 1983. xi + 533 pp., drawings and photographs, 37 tabs. Soft bound £ 15.–.

For some years now, several nutrition and agricultural experts have been publishing books in order to disseminate one or more ideas of nutrition improvement, mainly to the third World. Still famine, caused by drought, pests and diseases of plants, or lack of modern methods of massive food production, has continued to afflict the greater number of people in this area.

H. D. Tindall's "Vegetable in the Tropics", is one more attempt aimed at improving the knowledge and materials for waging this war against malnutrition and hunger in the Tropics.

'Vegetables in the Tropics', could best be described as an agricultural handbook made easy for those trained farmers and horticulturists who wish to diversify their production of vegetables, seeds and processed food items.

The botanical descriptions of the plants mentioned in the book are very useful for identification; however, only farmers with some basic knowledge of botany can understand and apply them in selecting their crops. But the book would have been incomplete without such description of the plants mentioned.

'Vegetables in the Tropics', should be recommended as a teaching book for agricultural teachers in postprimary schools in the Tropics.

Though the drawings of the plants described are more revealing than those photographed with cameras, the author succeeded in putting together information which others in this same field had only partially done, by describing in one book many plants and the problems of their cultivation.

R. C. Agoha, Owerri, Nigeria

Kleinig, H.; Sitte, P.: Zellbiologie – Ein Lehrbuch. xii + 488 pp., 482 figs., 87 tabs. Hard bound DM 86,–.

Cell biology emphasizes the cell as a fundamental unit in biology. The striking progress made in the understanding of cell functions at the molecular level makes this branch of biology indispensable for studying the structure and function of living organisms.

Microscopic research forms the framework of "Zellbiologie" in which the authors successfully present an integrated treatment of cell structure and biochemistry related to cell function. This book consists of four parts: Cells and Organelles, Special Cell Types, Multiplication, Differentiation and Evolution of Cells, and an Appendix. The first part of the book deals with the Cell – an Introduction, the Biomembrane, Plasmamembrane, Cytoplasm, Ribosomes and Protein Synthesis, Intracellular Membranes, the Nucleus, Mitochondria and Respiration, Plastids and Photosynthesis, and the Cell Wall. The second part describes Muscle, Tumor and Nerve cells, Bar cells and Photoreceptors, and Blood, Blood Cells and Immune System. The third part contains chapters on Cell Growth and Differentiation, Cell Evolution and Symbiosis. The Appendix describes such general methods as microscopy, isotope labelling and centrifugation. Furthermore, the text is abundantly elaborated with "Boxes" containing information about methods such as immunofluorescence, nucleic acid analysis and radioimmunoassay (RIA) as well as specific information on ionophores, detergents and lectins for example.

The main objection which can be raised against this book is that a lot of information is presented without adequate reference to experiments. For a good textbook it is in my opinion essential to learn about how and why rather than to accumulate a lot of facts. Moreover, the book is written in German, a language most students outside Germany can not cope with and this limits the number of potential readers of this book. An English edition of this textbook is not warranted because from a didactical point of view better books are already available. Nevertheless, the diagrams, drawings, photographs and electron micrographs are reproduced excellently and throughout the book, there is a high standard of presentation both in terms of literary style and lay out.

M. M. A. van Herpen, Nijmegen

Thornber, J. P.; Staehelin, L. A.; Hallick, R. B. (eds.): Biosynthesis of the Photosynthetic Apparatus, Molecular Biology, Development and Regulation. Proceedings of a UCLA Symposium, held in Keystone, Colorado UCLA. Symposia on Molecular and Cellular Biology, New Series, Vol. 14. New York: Alan R. Liss 1984. 405 pp., many figs.

The University of California at Los Angeles has a fine tradition of organising frequent and outstanding symposia on various biological subjects. The present symposium was primarily aimed at bringing together researchers working in biochemistry and biophysics of photosynthesis with those whose interests are focused on molecular biological and structural aspects of photosynthesis. A second aim was to promote an exchange between researchers in industrial and academic laboratories. Such unifying efforts are a necessity in a rapidly radiating field of research, and the results may be very rewarding – though tiring – for participants in the first place, for readers afterwards.

The present volume is not a collection of a few key-note speeches followed by a host of short papers covering as many posters, as is often the case with symposium proceedings, but consists of 29 substantial papers by 113 authors. Quite a few of these have the character of authorative mini-reviews and all of them report novel experimental data up to the date of the symposium (April '83). They are generally very readable for those who want to keep up with what-is-going-on in neighbouring but not entirely familiar areas of photosynthesis research. Exemplary, among others, are papers by Bogorad (and 12 co-authors) on the organization of the maize plastid genome; by Staehelin and de Wit on the structure and function of chloroplast membranes; by Melis on light regulation of photosynthetic membrane structure, organisation and

function. Biochemistry sensu stricto is relatively little covered and essentially restricted to an exposé by Stumpf on chloroplast fatty acid synthesis. A major topic is the maturing field of thylakoid organisation and the flexibility of response of the developing thylakoid Biophysical, analytical and molecular biological techniques have made impressive achievements in clarifying the complex membrane architecture and in opening up several black boxes between sites of stimulus perception, e.g. the phytochrome, and the expression of relevant genes and insertion of multiple membrane peptides. The regulation, e.g., of the PS I/PS II ratio, and correlating stroma/grana thylakoid ratio shows remarkable similarities in shade plants and in herbicide habituated plants. The study of the relevant mechanisms is vigorously pursued by industrial and academic laboratories and by a variety of techniques and the present book is a testimony to impressive results. Photoheterotrophic bacteria offer unique possibilities for studying the regulation of the development of photosynthetic membranes. Photoautotrophic cyanobacteria, more closely related to chloroplasts, are important not only because of their unique system of accessory pigments but also because their genetic system offers new possibilities for studying genes related to photosynthesis, among which the gene for the herbicide target, 32 kD protein of PS II is now under close study. Together 8 papers relate to photosynthetic bacteria. The pervading influence of the symbiotic paradigma for chloroplast origin is also visible in the informative paper by Keegstra et al. on the possible homology of the chloroplast envelope with the double membranes of mitochondria and Gram-negative bacteria. Understandably, the rapid progress in knowledge on the organisation and functioning of the chloroplast genome receives a strong accent in several contributions.

Readers of TAG whose interest is mainly in plant genetics may find this book very useful as a source of inspiration and information, especially with regard to the plant cell as a unique model of integration of eukaryotic and prokaryotic genetic systems.

There are points of criticism, though. Oversights such as the consistent use of μm where nm is meant (pp 156–158) may not be attributed only to the editors. The main themes, as outlined in the sub-titles, are not clearly reflected in the six chapters. Some chapter titles are very broad and cover quite diverse subject matters. To compound this difficulty half of the papers have already appeared in several volumes of the Journal of Cellular Biochemistry, and these are placed in the sequence of appearance in that journal in the first 224 pages. Hence, most chapters are widely dispersed throughout the book. It is not clear why the editors should copy the bedeviling habits of genomic libraries, which are notorious for their unpredictable ways of hiding their vital information from outside intrusion. After all, the editor's job is to make information as accessible as possible. Economic considerations may have led to this semi-double publication technique, and necessitated the attending scramble. However, the very high price of over $ 100 is then difficult to understand. Subscribers to JCB will hesitate even more than others when they know they will receive only half a new book – notwithstanding its scientific quality.

J. F. G. M. Wintermans, Nijmegen

Janick, J. (ed.): Plant Breeding Reviews, Vol. 2. Westport, Conn.: AVI 1984. 327 pp., 24 figs., 38 tabs. $ 45.–.

This new review series, sponsored by four American professional societies in the field, is earning a solid place in the literature. The latest volume is dedicated to George F. Sprague, the intellectual leader of corn breeders in the USA. The homage of W. A. Russell includes a list of Sprague's publications. Quite a large number of the contributions are devoted to the breeding of tropical crops: cassava (D. Byre), bananas and plantains (P. Rowe), coffee (H. P. Medina-Filho et al.), as well as strawberries (D. H. Scott et al.), hybrid wheat (J. A. Wilson) and the application of tissue culture to legumes (L. A. Mroginski and K. K. Kartha).

The reviews on tissue culture techniques for virus elimination and germ plasm perservation (K. K. Kartha) and plant genetic engineering via organelle transfer (R. G. McDaniel) deserve special mention. The potential effective use of mutagens in seed-propagated crops (C. F. Konzak et al.) and its viable additional option to plant breeders for creating useful genetic variability is made evident. The very well-looked after edition and the fine printing guarantee this new series a place on the shelves of plant breeders.

H. F. Linskens, Nijmegen