Acta Botanica Neerlandica **12** (1963) 354–360

BOOK REVIEWS

OF PUBLICATIONS RELATED TO BOTANICAL WORK IN THE NETHERLANDS

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This Bibliography is an index to the literature of agriculture and the allied sciences, received in the National Agricultural Library, Washington. It is published monthly. The December issue is devoted wholly to a subject index and the author index to the preceding eleven issues.

The Bibliography is a classified arrangement of references under the following subjects: Plant Science, Soils and Fertilizers, Forestry, Animal Industry, Entomology, Agricultural Engineering, Agricultural Products, Agricultural Economics and Rural Sociology, Food and Human Nutrition, Miscellaneous. The titles of articles in serial publications are given in English only. The language of the text is shown in abbreviated form at the end of the title.

To give an idea of the scope of this work: vol 26, no. 11 (November 1962) consisted of 289 + IV pages and contained items 86282–94968.

F. P. J.

KONRAD MENGEL, Ernährung und Stoffwechsel der Pflanze. Mit 89 Abbildungen, 75 Tabellen und 18 Tafeln. VEB Gustav Fischer Verlag, Jena, 1961. Preis gebunden DM 34.—

Dr. Mengel of the Justus-Liebig university, Gieszen (Germany) has written a valuable book on nutrition and metabolism of plants. The book consists of two parts: Part I deals with the general and physiological bases of plant nutrition: the soil as a medium for root growth, uptake and translocation of nutrients, photosynthesis, respiration, protein synthesis, lipid metabolism, growth substances, and the relations between nutrition, yield, and quality of agricultural crops. Part II is devoted to more special topics, such as the occurrence of various nutrients in the soil, their use as fertilizers, their function in the plant, and deficiency symptoms. In his introduction the author points out that the first part is intended for use by students in agricultural sciences, while the second part is intended to be of use also for agricultural chemists and plant physiologists.

As it is only to be expected in a book of this type, the various topics are not all dealt with in detail. It is remarkable, however, to find about ten pages of text devoted to photosynthesis and only one to water translocation and transpiration. In view of their importance to a good understanding of ion translocation and distribution, one would expect to find a more detailed discussion of these subjects. Another shortcoming in the reviewer's opinion is that the theories on membrane permeability received only brief mention. In addition, various inaccuracies occur in the physiological sections. Cohesion forces of the xylem capillaries, instead of cohesion forces between the water molecules, are stated to be responsible for a

ocntinuous transport of water in the plant. The occurrence of sugars in xylem sap (p. 59) is unusual in herbaceous plants. The statement that the nitrogen translocated in an upward direction is mainly organic nitrogen (p. 59) is perhaps valid for many trees and climbers under more or less usual conditions, but is certainly not true for most agricultural crops. Some illustrations seem superfluously or unnecessary elementary (e.g. fig. 5), while the three formulas of flavine, FMN and FAD could perhaps be combined (p. 73–75). As it is still doubtful whether asparagin is synthesized in the way shown on p. 143, the mechanism of the biosynthesis of amides could better be illustrated with that of glutamin.

There are only a few typographical errors, as Lundagardh (p. 42), Lungegardh (p. 44), Kohlenhydratstoffwechse (p.87). In the bibliography the name of Penningsfeld is erroneously spelled.

In general most omissions and errors seem minor in comparison with the vast quantity of valuable information presented in this book. Particularly most sections of the second part are informative and well-balanced. A remarkably extensive bibliography of some 620 references is appended. This alone would be sufficient to make the book a valuable mine of information in this field.

The book is well produced and indexed. It has much to commend it to students and may also provide much useful information to chemists and plant physiologists who are concerned in agricultural research.

J. VAN DIE

HANS WILLUTZKI, Zur Waldgeschichte und Vermoorung sowie über Rekurrenzflächen im Oberharz. Nova Acta Leopoldina N.F., nr. 160, Bd. 25, 52 S., 7 Abb., 6 Taf. Johann Ambrosius Barth, Leipzig, 1962. DM 5.60.

Deze publikatie behandelt de postglaciale bos- en hoogveengeschiedenis van de Oberharz, aan de hand van palynologisch onderzoek in 29 profielen, verdeeld over een tweetal levende hoogvenen en een sparrenbos op veen, alle tussen de 755 en 865 m. Van het sparrenbos op veen dat zich over 4 km lengte en $\pm$ 1 km breedte over een bergkam uitstrekt, is bovendien de geomorfologie (dikte van de veenlaag) in een lengtetransect en in talrijke dwarstransecten nauwkeurig onderzocht. Van de vijf reeds over dit gebied verschenen studies onderscheidt de publikatie van Willutzki zich 1° door talrijke absolute tijddateringen met de C^{14}-methode, 2° door het feit dat de profielen terug reiken tot in het praeboreaal (8400 v. Chr.), terwijl de meeste andere onderzoekingen uit de Harz pas beginnen halverwege het subboreaal (1600 v. Chr.) Uit de verkregen gegevens werden tevens de hoogten van de boomgrens en van de diverse bosgordels in de verschillende postglaciale perioden berekend. De aanwezigheid in een bergland van verschillende bosgordels op korte afstand van elkaar kan aanleiding geven tot complicaties. Zo neemt de auteur bijv. aan dat het hoge percentage *Pinus*-pollen in de jonge toendratijd te wijten is aan aanvoer met wind uit het aangrenzende heuvelland.

De resultaten inzake de bosgeschiedenis kunnen als volgt worden samengevat:

A. Praeboreaal.
   1. Jonge toendratijd. 8800–8300 v. Chr. Opvallend veel struikvormige wilgen. *Betula*-pollen 30–40 %. Geen *Pinus*(?) Bosgrens 800–900 m lager dan nu. Eeuwige sneeuwgrens op $\pm$ 1200 m.
   2. Berken (-dennen) tijd. 8300–6800 v. Chr. Weinig *Salix*, *Betula* neemt sterk

toe, maar wordt aan het einde der periode overvleugeld door *Pinus*. Eerste optreden van *Corylus* en *Ulmus*, daarna ook *Quercus*. Bosgrens op 900 m (nu op 1050 m).

B. Boreaal = hazelaartijd. 6800–5000 v. Chr. Dominantie van *Corylus*, die toen 300–500 m hoger reikte dan tegenwoordig (vondsten van hazelnoten). Eerste optreden van *Tilia*. *Ulmus* en *Quercus* breiden zich sterk uit. Er zijn twee perioden te onderscheiden. In de eerste tijd overheerst *Pinus*, in de tweede gaat *Pinus* sterk achteruit, bereikt *Corylus* zijn maximum en treedt *Alnus* op.

C. Atlanticum.
   1. Quercetum mixtum-periode. 5000–4000 v. Chr. Sterke uitbreiding van *Ulmus*, daarna *Quercus*. Eerste optreden *Fraxinus*. Het "Quercetum mixtum" reikte tot 900–1000 m, d.i. 300–400 m hoger dan de tegenwoordige eikenbossen.
   2. Quercetum mixtum-Picea-periode. 4000–3000 v. Chr. Optreden en sterke uitbreiding van de spar. *Alnus* blijft zeer talrijk; de kruiden worden door *Picea* (schaduw!) teruggedrongen. Optreden van *Fagus*.

D. Subboreaal. Afname van *Ulmus* en eerste optreden van *Plantago lanceolata*.
   1. Quercetum mixtum-Picea-tijd = Neolithicum. 3000–1600 v. Chr. *Quercus*, *Tilia* en *Fraxinus* abundant. Opvallend veel *Hedera helix*. Optreden van *Viscum album*, *Carpinus* en van graanpollen, o.a. *Triticum*.
   2. (Picea-Quercetum mixtum-) Fagustijd = Bronstijd. 1600–700 v. Chr. Achteruitgang van *Tilia*, *Corylus*, *Viscum* en *Hedera*, *Picea*, *Pinus* en later ook *Alnus*. Sterke toename van *Fagus*. Meer graanpollen. Eikenbosgrens nog 300–400 m hoger dan nu.

E. Subatlanticum.
   1. Beukentijd. 700 v. Chr.–800 n. Chr. *Fagus* absoluut overheersend. Vrij veel *Alnus* en *Acer*. a) IJzertijd. 700 v. Chr.–0. *Carpinus* neemt toe, akkeronkruiden nog talrijk. Naast gerst veel tarwe. b) Oudste historische tijd. 0–800 n. Chr. *Carpinus*-maximum. Optreden van rogge. Maar in het algemeen sterke afname van graanpollen en van cultuurbegeleidende planten: de Oberharz werd in deze periode door de bevolking verlaten tengevolge van een klimaatverslechtering.
   2. Cultuurtijd. 800 n. Chr.–heden. Afname van *Carpinus*, toename van cultuurplanten.
      a. Beuken (-sparren)tijd.
         α) Meer beuk dan spar: 800–1200
         β) Meer spar dan beuk: 1200–1350
         γ) Meer beuk dan spar: 1350–1500
         Eerste verschijnen van *Juglans*: 1400.
      b. Sparrentijd. 1500–heden.
         Eerste optreden van boekweit: 1600.

De uitbreiding van de spar ten koste van de beuk is enerzijds een gevolg van de klimaatverandering sinds 1550 (koudere en vochtigere zomers), waardoor de boomgrens 100–200 m verlaagd werd, anderzijds en met name in de Harz een gevolg van het selectief uitkappen van beuken door de mens (ertssmelterijen!): houtskool van beuk heeft de dubbele verbrandingswaarde van sparrenhoutskool. Historische archiefgegevens.

Inzake de veenontwikkeling komt de schrijver tot het vaststellen van vijf perioden van veenvorming, gescheiden door recurrentieniveau's (verdroging van het veen, waardoor vertraging of stilstand van de groei). De twee eerste veenvormingsperioden zijn alleen in het sparrenbos op veen aangetroffen en wel locaal. In de jonge Dryas-tijd trad boven 750 m nog solifluctie op, waardoor veenvorming op die hoogte onmogelijk was. Het begin der 5 veenvormingsperioden werd gedateerd op 8400 v. Chr., 5000 v. Chr., 1600 v. Chr., 700 v. Chr. en 1500 n. Chr. De belangrijkste hiervan was de derde; toen ontstonden de meeste hoogvenen in de Harz. Zij ontstonden over grote oppervlakten tegelijk en niet uitgaande van één punt. De uitbreiding tezelfdertijd van de atlantisch-montane beuk hangt hier ten nauwste mee samen. Ook de vijfde periode was belangrijk. Beide worden toegeschreven zowel aan toeneming van de neerslag als aan daling van de temperatuur. De stilstand in de veengroei van 900–1450 n. Chr. valt samen met een tijdperk van warme, droge zomers en zeer zachte winters in de Middeleeuwen. De veenvorming in de bossen is sinds de Middeleeuwen nog bevorderd door de mens die de fijnspar begunstigde ten koste van de beuk. In fijnsparrenbossen treedt nl. veenvorming bijzonder gemakkelijk op doordat *Picea* zeer vlak wortelt en veel ruwe humus produceert. Door drainage wordt dit proces in recente tijd tegengegaan en ontstaan nu zelfs sparrenbossen op eertijds boomloos hoogveen.

De studie van Willutzki heeft echter de veel verbreide mening kunnen weerleggen dat alle veenvorming in sparrenbossen van jonge datum zou zijn: Het grootste veensparrenbos van de Harz was reeds hoogveen lang voordat de spar in dit gebied zijn intrede deed. Wel is de "Vermoorung" van deze bossen door klimatologische oorzaken sterk toegenomen in de derde en vooral in de vijfde veenvormingsperiode, in de laatste periode mede door toedoen van de mens.

J. J. BARKMAN

Effects of ionizing radiations on seeds, Proceedings of a Symposium, Karlsruhe, 8–12 August 1960, International Atomic Energy Agency, Kaerntnerring, Vienna I, Austria, August 1961, 655 pp. Sold in the Netherlands by "N.V. Martinus Nijhoff's Boekhandel en Uitgevers Mij", The Hague. Price *f* 27,95.

In this symposium organized by the International Atomic Energy Agency and the Food and Agricultural Organization of the United Nations and attended by a hundred experts in the field of ionizing radiations on seeds from 17 countries and 5 international organizations, 51 papers were presented.

The symposium was organized to collect the knowledge about this subject spread all over the world. The intention was to get better foundations for further scientific research on one hand and furtheron to receive a better understanding of the possibilities to improve crops by artificially induced mutation by irradiation of plants by ionizing radiations on the other.

After a short general survey there are two parts of about equal length, one on special aspects of radiobiology of seeds and the other on radiation and chemically-induced chromosome breakage and reunion. The last and largest part is on principles and ways of crop improvement.

Out of the four official languages only English (90 %) and French (10%) are used, the Russian and Spanish language are used only in the summaries which are given in all four languages. The number of participants from the East Europian countries was very small.

The papers themselves, preceded by the summaries in the four languages, are generally followed by a large amount of references. The discussions are also very interesting. The mean length of each paper is 12 pages, the mean number of authors per paper is a little over two.

The series of papers are followed by two general closing discussions: one dealing with advances in the fundamental aspects of plant and seed radiobiology, the other with practical aspects of the work and data discussed at the Symposium.

The Netherlands were presented by 7 attendants from which only two gave a paper: S. J. Wellensiek spoke about early-flowering neutronic mutants in peas, found in the Horticultural Laboratory of the Agricultural University at Wageningen; J. Bekendam presented his results with x-ray-induced mutations in rice, work done in Suriname.

In most papers a study of the first, i.e. the irradiated, generation is presented and only a relatively small number deals also with the second or later generations.

As external factors influencing the results of the radiation are mentioned: drying the seeds after irradiation with or without oxygen, time elapsing between treatment and germination, temperature shock before irradiation, water content of the treated seed, addition of seed extract of one genus to another; as internal factors: age of the seeds, ploïdy, hybrids versus varieties, chromosome number and size, nuclear volume, DNA content, growth speed.

Effects of radiation are given on: germination speed, seedling, height or growth rate, percentage of survival and fertility, chimeras, morphological and cytological aberrations, mutation frequency.

Worth mentioning specially are:

a) Low doses of ionizing radiations stimulate the growth of the treated generation.
b) Diplontic selection may show a difference in heritage between seeds of different parts of the M_1-plant, concluded from the segregations in the M_2 lines.
c) Inter specific incompatibility was sometimes removed by radiation.
d) Radiation may also uncover chimeras in fruit crops.
e) 4 of the 51 papers deal with the very important rice crop.

This symposium is very valuable for those who want to study the different aspects of theoretical as well as practical research in the field of ionizing radiations in plants.

K. VERKERK

PLANT EMBRYOLOGY, A Symposium, Held under the auspices of the Biological Research Committee, CSIR: November 11–14 at the Department of Botany, University of Delhi. Council of Scientific & Industrial Research. New Delhi 1962, pp. 273; Price: Rs. 20.– or Sh. 40/–

Since Schnarf "Plant embryology" has become a rather vague term. This symposium report is a collection of 29 loose papers on the different aspects of various processes and microscopic structures in the sexual sphere. They were delivered at an all-India meeting in November 1960.

No special line or theme is to be discovered in the book. Masheswari gave a general introduction; but this is not reproduced. Prologue, epilogue and register are lacking, just as the discussions.

Something in the nature of a general review is to be found in the contribution of Johri on the *Santalales*, but it is mainly an extension of another, larger review published before in 1960.

Most articles are of the "life-history" type of which hundreds have appeared in Indian journals, often extensions of former studies. They might perhaps just as well have been published there. The publication in book-form in 1962 has even the disadvantage that sometimes an author has to refer in notes to more detailed papers appeared since 1960. It seems strange that Johri could give in 1960 a review of papers from 1961 and 1962.

The aim of the book seems to be of a more or less representative character, also to stimulate further collaboration for the tremendous enterprise of an exhaustive handbook. Practically all the participants are Indian.

Some papers treat embryology s. str. or embryogeny. Other ones reflect the trend toward in-vitro culture (for which Delhi University also has become a centre) without offering so far inspiring new results or ways of thought.

We relate some of the various topics treated in the book: origin of ruminate endosperm, apogamy in *Pennisetum*, intra-ovarial pollination, funicular origin of seed wings and their role in dispersal, form of ovules, taxonomic classification on embryological grounds (a.o. a fine paper by Murgai on *Paeonia*), the causation of embryoless seeds by attack of a "chalcid fly", interspecific crossings and the overcoming of incompatibility barriers by prior grafting of the parents (by Iyer), etc.

Excepting a new approach to the morphology of the Monocotyledonous embryo (by Swamy) the authors pay little attention to some more fundamental, morphological questions arising out of their microscopical work—as the nature and structure of the carpels dissected. The term aril is used uncritically, even for *Paeonia* and its sarcotesta, though the drawings permit critical discussion of this point for *Celastraceae* and *Zingiberaceae*. One by Panchaksharappa (Fig. 44) provides an interesting argument to prove aril and arillode as separate organs. All in all the book provides interesting data and access to Indian botanical literature since Maheswari's book —when one takes the painstaking trouble to scrutinise it line by line.

The line-drawings are clear, the photographs poor.

L. VAN DER PIJL

PANKOW, H. 1962. Histogenetische Studien an den Blüten einiger Phanerogamen. Botanische Studien 13. Mit 187 Abbildungen im Text, 106 Seiten. Veb Gustav Fischer Verlag Jena. Brosschiert DM 15,15.

The author attempted to give histogenetic evidence for the phylogenetic theory on stachyosporous and phyllosporous conditions in Angiosperms proposed by Lam.

Four relevant facts were presented.

1) In some species the ovules originate as a continuation of the floral axis.
2) On the floral growing points in some species the ovules appear earlier than the carpels. In these cases the existence of a cross zone (Eckardt) was doubted, since a cross zone should appear later than the abaxial carpellary parts.
3) There are species in which the initial divisions leading to the development of

the ovules *and of the axillary axes* occur in the third cell layer of the growing points, whereas all other organs of the same plants are initiated in the second cell layer.

4) In phyllosporous plants the initial divisions for all floral organs, including the ovules, start in the second cell layer.

Consequently Pankow considered the ovules to be axis-borne in some species of the families *Piperaceae, Juglandaceae, Myricaceae, Moraceae, Cannabinaceae, Urticaceae, Chenopodiaceae, Amaranthaceae, Nyctaginaceae, Cactaceae, Basellaceae, Caryophyllaceae, Polygonaceae, Plumbaginaceae, Primulaceae, Myrsinaceae, Euphorbiaceae, Solanaceae, Labiatae, Juncaceae, Cyperaceae, Gramineae.* Possibly *Casuarinaceae, Salicaceae, Phytolaccaceae, Portulacaceae, Plantaginaceae, Scrophulariaceae* and *Alismataceae* are stachyosporous as well.

Since Pankow started from the idea of two organ categories in the Angiosperms, namely the shoot and the leaf, and then found phyllosporous and stachyosporous ovules, he preferred to consider the ovules organs "sui generis". He tried to corroborate his opinion by stressing the fact that the development of axis-borne ovules and axillary axes is identical initially, but divergent later on.

Finally, the possibility was discussed that phyllosporous conditions are due to congenital concrescence of axillary ovules and carpels.

In my opinion it would be expedient to test these results by means of a comparative study, covering many representatives of a family, to determine the histogenetic features which accompany reduction. The initial separation of the carpellary margins from the central column and its ovular rudiments, followed by postgenital fusion, as found by Moeliono in *Stellaria*, has been underrated by Pankow. Two initially independent parts should be recognized, namely one abaxial and sterile, another adaxial and fertile. If the adaxial part were foliar, a kind of diplophyllous classical carpel had to be imagined. Both Lam and Melville hold the adaxial part to be an axillary system. As Pankow favours this view, he might have been expected to change over to the telome theory.

W. A. VAN HEEL