# The Ecology of Tropical Food Crops M. J. T. NORMAN, C. J. PEARSON and P. G. E. SEARLE

The ecology and environmental requirements of the major tropical food crops, their individual responses to variations in climate and soil, and their place in cropping systems are comprehensively discussed in this advanced textbook, which will prove a must for those concerned with research and teaching in relation to the agriculture of developing countries. Species discussed include rice, maize, groundnut, cassava and banana.

## Contents

Preface Abbreviations I General II Cereals III Legumes IV Non-cereal Energy Crops

> Hard covers £32.50 net Paperback £12.95 net

# Agricultural Insect Pests of the Tropics and Their Control

Second Edition D. S. HILL

This is both a textbook on insect and mite pests of tropical crops and a handbook for practising entomologists. It is also a source of further information about most of the major pests and crops concerned. Major features of the book are the clear line drawings accompanying the textual descriptions of the insect pests, and maps showing their distribution throughout the world.

In this second edition the number of insect pests treated in the pest description chapters has been increased by the addition of about 70 species of agricultural and horticultural pests from tropical and sub-tropical Asia, and some from the tropical parts of the New World. **£39.50 net** 

# CAMBRIDGE UNIVERSITY PRESS



bring yourself up-to-date with

# The Cambridge Guide to the Material World

Rodney Cotterill's *The Cambridge Guide to the Material World* provides a unique single-volume introduction to the materials found on this planet, both organic and inorganic.

The opening sections are devoted to such fundamental topics as the nature of the atom, the structure of molecules and the common states of matter. There then follow chapters on specific classes of material, notably ceramics, glasses, metals, conductors and insulators, liquid crystals, and



natural and synthetic polymers. Minerals, water and the living cell are considered in detail and the book concludes with a characteristically lucid discussion of the molecular structure of plant and animal life. Each chapter is packed with fascinating examples and analogies, and closes with a useful summary of what has gone before.

- ★ Numerous full colour photographs and illustrations
- ★ Text and illustrations carefully integrated to ensure maximum clarity and readability
- Topics requiring special attention prominently highlighted in display panels

297 x 210 mm 352 pp. 190 illustrations including 90 in full colour and 30 in two colours 0 521 24640 7 £17.50 net

#### CAMBRIDGE UNIVERSITY PRESS The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU, England

# EXPERIMENTAL AGRICULTURE

VOLUME 21 1985

Editor

DR F. G. H. LUPTON

Editorial Assistant MRS SUSAN CARR

Book Review Editor PROFESSOR N. W. SIMMONDS

Editorial Board DR M. H. ARNOLD (Chairman)

K. R. M. ANTHONY PROFESSOR A. H. BUNTING DR M. K. V. CARR DR I. D. CARRUTHERS DR R. K. CUNNINGHAM PROFESSOR J. P. HUDSON DR N. W. HUSSEY PROFESSOR J. L. MONTEITH PROFESSOR E. W. RUSSELL DR R. D. STERN DR R. J. SUMMERFIELD DR C. C. WEBSTER



#### CAMBRIDGE UNIVERSITY PRESS

CAMBRIDGE LONDON NEW YORK NEW ROCHELLE MELBOURNE SYDNEY

#### PUBLISHED BY

#### THE PRESS SYNDICATE OF THE UNIVERSITY OF CAMBRIDGE

The Pitt Building, Trumpington Street, Cambridge CB2 1RP

32 East 57th Street, New York, N.Y. 10022, USA

10 Stamford Road, Oakleigh, Melbourne 3166, Australia

© Cambridge University Press 1985

Printed in Great Britain by Adlard & Son Ltd, Bartholomew Press, Dorking

.

#### CONTENTS

•

### Part 1 (January 1985)

J. Smartt: Evolution of Grain Legumes. II. Old and New World Pulses of Lesser Economic Importance	1
M. A. B. Fakorede: Response of Maize to Planting Dates in a Tropical Rainforest Location	19
M. A. B. Fakorede and B. O. Opeke: Weather Factors Affecting the Response of Maize to Planting Dates in a Tropical Rainforest Location	31
D. H. Putnam, S. J. Herbert and A. Vargas: Intercropped Corn-Soyabean Density Studies. I. Yield Complementarity	41
J. B. Oyedokun: Genotype Environment Interactions and the Identifica- tion of Adaptable Cultivars of Upland Rice (Oryza sativa) in South- Western Nigeria	53
R. S. Malik, B. S. Jhorar and I. S. Dahiya: Influence of Seedbed Tilth on Emergence and Root and Shoot Growth of Seedlings of Some Crops	59
M. J. S. Magambo and Kimani Waithaka: The Effect of Pruning at Dif- ferent Heights on Yields, Dry Matter Production and Partitioning in Clonal Tea ( <i>Camellia sinensis</i> ) in Kenya	67
S. C. O. Nwinyi and W. O. Enwezor: Evaluation of Fertilizer Placement Methods for White Yam (Dioscorea rotundata)	73
Book Reviews	79

## Part 2 (April 1985)

J. Smartt: Evolution of Grain Legumes. III. Pulses in the Genus Vigna	87
E. Sibbesen, C. E. Andersen, S. Andersen and M. Flensted-Jensen: Soil Movement in Long-term Field Experiments as a Result of Cultivations. I. A Model for Approximating Soil Movement in One Horizontal Dimen-	
sion by Repeated Tillage	101
E. Sibbesen and C. E. Andersen: Soil Movement in Long-term Field Experiments as a Result of Cultivations. II. How to Estimate the Two- dimensional Movement of Substances Accumulating in the Soil	109
R. W. Willey: Evaluation and Presentation of Intercropping Advantages	119
F. O. Olasantan: Effects of Intercropping, Mulching and Staking on Growth and Yield of Tomatoes	135

J. A. Ayuk-Takem and H. R. Chhedda: Grain Yield Potential of Some Diverse Maize (Zea mays L.) Morphotypes Intercropped with Cocoyam	
(Xanthosoma sagittifolium)	145
P. J. Salter, Jayne M. Akehurst and G. E. L. Morris: An Agronomic and Economic Study of Intercropping Brussels Sprouts and Summer Cabbage	153
C. O. Othieno, C. J. Stigter and A. R. Mwampaja: On the Use of Stigter's Ratio in Expressing the Thermal Efficiency of Grass Mulches	169
S. P. Wani, S. Chandrapalaiah and P. J. Dart: Response of Pearl Millet Cultivars to Inoculation with Nitrogen-fixing Bacteria	175
M. T. Dahniya, S. K. Hahn and C. O. Oputa: Effect of Shoot Removal on Shoot and Root Yields of Sweet Potato	183
Book Reviews	187

# Part 3 (July 1985)

J. Smartt: Evolution of Grain Legumes. IV. Pulses in the Genus Phaseolus	193
J. D. H. Keatinge, P. J. H. Neate and K. D. Shepherd: The Role of Ferti- lizer Management in the Development and Expression of Crop Drought Stress in Cereals under Mediterranean Environmental Conditions	209
E. A. Roberts: The Importance of Lay-out in Determining Error Variance in Field Experiments	223
B. Gilliver, M. J. Vasudeva Rao and P. Venkateswarlu: A Design and Methods of Analysis to Monitor Crop Growth Conditions Illustrated with Sorghum Screening Trials for Resistance to Striga	233
V. R. Sashidhar, T. G. Prasad, S. J. Patil, M. Udaya Kumar and K. S. Krishna Sastry: The Balance between Leaf Area and Photosynthetic Activity in Determining Productivity of Fox-tail Millet (Setaria italica) under Rain-fed Conditions	241
Luis Fanjul, R. Arreola-Rodriguez and M. P. Mendez-Castrejon: Stomatal Responses to Environmental Variables in Shade and Sun Grown Coffee Plants in Mexico	249
N. T. M. H. de Silva and C. A. Tisdell: Density Related Yield Functions for Coconut (Cocos nucifera): an Empirical Estimation Procedure	259
M. S. Reddy and R. W. Willey: Evaluations of Alternate Cropping Systems for Alfisols of the Indian Semi-arid Tropics	271
T. A. T. Wahua: Effects of Melon (Colocynthis vulgaris) Population Den- sity on Intercropped Maize (Zea mays) and Melon	281
G. O. Kayode and A. Odulaja: Response of Cowpea (Vigna unguiculata) to Spacing in the Savanna and Rainforest Zones of Nigeria	291
Book Reviews	297

## Part 4 (October 1985)

J. Smartt: Evolution of Grain Legumes. V. The Oilseeds	305
<b>R. S. Verma, R. S. Chauhan and R. N. Singh:</b> Studies on Row Arrangement and Population Densities of Potato Cultivars in a Sugarcane and Potato Intercropping System in North Central India	321
K. N. Tiwari and Anil Kumar: Effect of Iron Pyrites, Organic Materials and Micronutrients on Yield of Rice and Wheat and on Amelioration of Sodic Soil	329
P. Soman and J. M. Peacock: A Laboratory Technique to Screen Seedling Emergence of Sorghum and Pearl Millet at High Soil Temperature	335
H. J. Ougham and J. L. Stoddart: Development of a Laboratory Screening Technique, Based on Embryo Protein Synthesis, for the Assessment of High-temperature Susceptibility During Germination of Sorghum bicolor	343
R. W. Palmer-Jones: Harvesting Policies for Tea in Malawi	357
J. Riley: Examination of the Staple and Effective Land Equivalent Ratios	369
M. McGowan and E. Tzimas: Water Relations of Winter Wheat: the Root System, Petiolar Resistance and Development of a Root Abstraction Equation	377
G. O. Kayode: Effects of NPK Fertilizer on Tuber Yield, Starch Content and Dry Matter Accumulation of White Guinea Yam ( <i>Dioscorea rotun-</i> <i>data</i> ) in a Forest Alfisol of South Western Nigeria	389
S. S. Narwal and D. S. Malik: Influence of Intercropping on the Yield and Food Value of Rainfed Sunflower and Companion Legumes	395
H. M. Ishag, Osman A. Fadl, H. S. Adam and A. K. Osman: Growth and Water Relations of Groundnuts (Arachis hypogaea) in Two Contrasting	
Years in the Irrigated Gezira	403
Book Reviews	409
Notes for Contributors	413
Index	417



#### Volume 21, Number 4 October 1985

#### CONTENTS

J. Smartt: Evolution of Grain Legumes. V. The Oilseeds	305	
R. S. Verma, R. S. Chauhan and R. N. Singh: Studies on Row		
Arrangement and Population Densities of Potato Cultivars in a		
Sugarcane and Potato Intercropping System in North Central India	321	
K. N. Tiwari and Anil Kumar: Effect of Iron Pyrites, Organic		
Materials and Micronutrients on Yield of Rice and Wheat and on	200	
Amelioration of Sodic Soil	329	
P. Soman and J. M. Peacock: A Laboratory Technique to Screen Seedling Emergence of Sorghum and Pearl Millet at High Soil		
Temperature	335	
H. J. Ougham and J. L. Stoddart: Development of a Laboratory		
Screening Technique, Based on Embryo Protein Synthesis, For the		
Assessment of High-Temperature Susceptibility During Germination		
of Sorghum bicolor	343	
R. W. Palmer-Jones: Harvesting Policies For Tea in Malawi	357	
J. Riley: Examination of the Staple and Effective Land Equivalent		
Ratios	369	
M. McGowan and E. Tzimas: Water Relations of Winter Wheat: the		
Root System, Petiolar Resistance and Development of a Root Abstrac-		
tion Equation	377	
G. O. Kayode: Effects of NPK Fertilizer on Tuber Yield, Starch		
(Dicaccare retundate) in a Forest Alfred of South Western Nigeria	200	
(Datastated rotandada) in a Porest Amisor of South Western Migeria	309	
Vield and Food Value of Rainfeed Supflower and Companies		
Legumes	395	
H M Ishag Osman A Fadl H S Adam and A K Osman:	000	
Growth and Water Relations of Groundnuts (Arachis hyporgea) in Two		
Contrasting Years in the Irrigated Gezira	403	
Book Reviews	409	
Notes for Contributors	413	
Index	417	
CAMBRIDGE UNIVERSITY PRESS		

The Pitt Building, Trumpington Street, Cambridge CB2 1RP 32 East 57th Street, New York, NY 10022, USA 10 Stamford Road, Oakleigh, Melbourne 3166, Australia

Printed in Great Britain by Adlard & Son Ltd, Bartholomew Press, Dorking