

# EXPERIMENTAL AGRICULTURE

VOLUME 14 1978

*Editor*

PROFESSOR J. P. HUDSON

*Book Review Editor*

PROFESSOR N. W. SIMMONDS

*Editorial Board*

PROFESSOR E. W. RUSSELL (*Chairman*)

PROFESSOR D. K. BRITTON	PROFESSOR J. D. IVINS
PROFESSOR A. H. BUNTING	A. R. MELVILLE
DR R. K. CUNNINGHAM	DR R. D. STERN
DR G. WATTS PADWICK	

CAMBRIDGE UNIVERSITY PRESS  
CAMBRIDGE · LONDON · NEW YORK

PUBLISHED BY

THE SYNDICS OF THE CAMBRIDGE UNIVERSITY PRESS

The Pitt Building, Trumpington Street, Cambridge CB2 1RP

Bentley House, P.O. Box 92, 200 Euston Road, London, NW1 2DB

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

© Cambridge University Press 1978

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

## CONTENTS

### PART I (JANUARY 1978)

<b>J. L. Monteith:</b> Reassessment of Maximum Growth Rates for C <sub>3</sub> and C <sub>4</sub> Crops	1
<b>G. R. Squire:</b> A Simple Temperature-controlled Glasshouse for Field Experimentation in the Tropics	7
<b>Idris M. Nur and Ali A. E. Gasim:</b> Effect of Sowing Date on Groundnuts in Sudan Gezira	13
<b>J. M. Hardaker and R. C. Hardwick:</b> A Note on Rhizobium Inoculation of Beans ( <i>Phaseolus vulgaris</i> ) using the Fluid Drill Technique	17
<b>W. Erskine and T. N. Khan:</b> Inheritance of Cowpea Yields under Different Soil Conditions in Papua New Guinea	23
<b>M. S. Hassan and A. T. Ayoub:</b> Effects of N, P and K on Yield of Onion in the Sudan Gezira	29
<b>O. A. A. Ageeb and Y. H. Yousif:</b> P and K Nutrition of Rice ( <i>Oryza sativa</i> ) in the Sudan Kenana	33
<b>A. E. Kambal and M. A. Mahmoud:</b> Genotype × Environment Interactions in Sorghum Variety Tests in the Sudan Central Rainlands	41
<b>P. A. Huxley and Z. Maingu:</b> Use of a Systematic Spacing Design as an Aid to the Study of Inter-cropping: Some General Considerations	49
<b>A. A. Al-Noaim, G. M. Davies and J. Farnworth:</b> A Study of Hasawi Alfalfa under Three Irrigation and Three Cutting Regimes in Saudi Arabia	57
<b>H. A. Abou-El-Fittouh:</b> Relative Efficiency of the Split-Plot Design	65
<b>V. Arunachalam and R. K. Katiyar:</b> Genetic Diversity and Breeding Potential from Disruptive Selection in <i>Brassica campestris</i> cv Brown Sarson	73
<b>A. Hadjichristodoulou:</b> Genotype, Environment and Rainfall Effects on Common Vetch Varieties in a Semi-Arid Region	81
<b>O. O. Okoli:</b> Stimulating Axillary Buds in Yam ( <i>Dioscorea</i> spp.)	89
<b>V. A. Savangikar and R. N. Joshi:</b> Edible Protein from <i>Parthenium hysterophorus</i>	93
<b>Book Reviews</b>	95

### PART 2 (APRIL 1978)

<b>E. A. Kueneman, G. Hernandez-Bravo and D. H. Wallace:</b> Effects of Growth Habits and Competition on Yields of Dry Beans ( <i>Phaseolus vulgaris</i> ) in the Tropics	97
---	----

<b>W. Y. Chew, K. T. Joseph and K. Ramli:</b> Influence of Soil-applied Micronutrients on Cassava ( <i>Manihot esculenta</i> ) in Malaysian Tropical Oligotrophic Peat	105
<b>R. Lal, P. R. Maurya and S. Osei-Yeboah:</b> Effects of No-tillage and Ploughing on Efficiency of Water Use in Maize and Cowpea	113
<b>W. Godfrey-Sam-Aggrey and Alex S. Ndoleh:</b> Effects of Alar on Growth, Flowering and Yield of Okra	121
<b>T. F. Demian:</b> The Pull and Lift Required to Remove Cotton Stalks in the Sudan	129
<b>A. M. Hamdoun and A. G. T. Babiker:</b> Effects of Some Herbicides on Cotton Weeds in the Sudan Gezira	137
<b>F. I. O. Nwoke and S. N. C. Okonkwo:</b> Effects of Periodic Removal of Mother Tubers on Yield of <i>Dioscorea rotundata</i>	145
<b>Hassan Suliman Ibrahim:</b> Effects of Irrigating Sugarcane at Different Soil Moisture Deficits in the Sudan	151
<b>W. Y. Chew and M. A. Abdul Malek:</b> Influence of BOH (Beta-hydroxyethylhydrazine) on Pineapple cv Mauritius Grown in Malaysian Peat	157
<b>A. R. Pillay and J. R. Mamet:</b> Intercropping Sugarcane with Maize	161
<b>S. H. Mantell and S. Q. Haque:</b> Incidence of Internal Brown Spot Disease in White Lisbon Yams ( <i>Dioscorea alata</i> ) During Storage	167
<b>Zahar Samsuddin and Ivan Impens:</b> Water Vapour and Carbon Dioxide Diffusion Resistances of Four <i>Hevea brasiliensis</i> Clonal Seedlings	173
 <b>Book Reviews</b>	
Vegetation and the Atmosphere: J. L. Monteith	178
Tropical Soils and Soil Survey: A. Young	178
Tea: T. Eden (3rd ed)	179
Food Crops of the Lowland Tropics: Ed. C. L. A. Leakey and J. B. Wills	179
A Manual of Ghana Grasses: R. R. Innes	179

### PART 3 (JULY 1978)

<b>T. E. Yassin:</b> Phenotypic Variation in Local Sorghums in the Sudan Nuba Mountains	181
<b>J. Nothmann, Irena Rylski and M. Spigelman:</b> Effects of Air and Soil Temperatures on Colour of Eggplant Fruits ( <i>Solanum melongena</i> L.)	189

<b>J. O. Akinola and J. H. Davies:</b> Effects of Sowing Date on Forage and Seed Production of 14 Varieties of Cowpea ( <i>Vigna unguiculata</i> )	197
<b>S. U. Remison:</b> Neighbour Effects Between Maize and Cowpea at Various Levels of N and P	205
<b>Ashwani K. Srivastava:</b> Effects of Fertilizers on the Composition and Emergence of Sunflower Seeds	213
<b>E. Tafazoli and B. Shaybany:</b> Effects of Short-day Treatments on Second Crop Summer-fruited Strawberries	217
<b>T. W. Tanton:</b> Effects of Fuels and Varieties on Aroma of Malawi Dark-fired Tobacco	223
<b>C. O. Othieno:</b> Supplementary Irrigation of Young Clonal Tea in Kenya. I. Survival, Growth and Yield	229
<b>W. Godfrey-Sam-Aggrey:</b> Effects of Plant Population on Sole-crop Cassava in Sierra Leone	239
<b>W. Godfrey-Sam-Aggrey:</b> Effects of Delayed Hand Weeding on Sole-crop Cassava in Sierra Leone	245
<b>H. N. Verma, S. S. Prihar, Ranjodh Singh and Nathu Singh:</b> Yields of Sub-humid Rainfed Crops in Relation to Soil Water Retention and Cropping Sequence	253
<b>G. M. Milbourn, G. E. D. Tiley and M. K. V. Carr:</b> Planting Density for Grain Maize in South-east England	261
<b>J. F. M. Fennell:</b> Use of Durometer to Assess Onion Bulb Hardness	269
<b>Hassan Suliman Ibrahim:</b> Effects of Soil Properties on Sugarcane Yield in Sudan	273
<b>H. D. Catling, Shamsul Alam and S. A. Miah:</b> Assessing Losses in Rice Due to Insects and Diseases in Bangladesh	277
<b>Book Reviews</b>	289

#### PART 4 (OCTOBER 1978)

<b>E. F. I. Baker:</b> Mixed Cropping in Northern Nigeria. I. Cereals and Groundnuts	293
<b>C. N. Williams:</b> Fertilizer Responses of Cucumbers on Peat in Brunei	299
<b>C. N. Williams:</b> Effects of Drainage, Spacing and Fertilizer on Soyabeans in Paddy Soils in Brunei	303
<b>C. O. Othieno:</b> Supplementary Irrigation of Young Clonal Tea in Kenya. II. Internal Water Status	309

<b>G. C. Bate, M. E. R. Meakin and D. M. Oosterhuis:</b> Effects of Environment on Nitrate Reductase Assays in Field-grown Cotton Leaves	317
<b>H. van Arkel:</b> Effects of Population, N and Age on Sunflower Grown for Silage	325
<b>Zahar Samsuddin and Ivan Impens:</b> Comparative Net Photosynthesis of Four <i>Hevea brasiliensis</i> Clonal Seedlings	337
<b>Osman A. A. Fadl:</b> Evapotranspiration Measured by a Neutron Probe on Sudan Gezira Vertisols	341
<b>G. O. Obigbesan and A. A. Agboola:</b> Uptake and Distribution of Nutrients by Yams ( <i>Dioscorea</i> spp.) in Western Nigeria	349
<b>E. A. Ogunremi:</b> Effects of Nitrogen on Melon ( <i>Citrillus lanatus</i> ) at Ibadan, Nigeria	357
<b>R. D. Cooke, A. K. Howland and S. K. Hahn:</b> Screening Cassava for Low Cyanide Using an Enzymatic Assay	367
<b>T. A. T. Wahua and D. A. Miller:</b> Leaf Water Potentials and Light Transmission of Intercropped Sorghum and Soyabeans	373
<b>H. A. Abou-El-Fittouh and E. O. Taha:</b> Handling Missing Observations in the Two-way Analysis of Variance with Interaction	381
<b>K. Anand Reddy, B. Bhasker Reddy, K. Balaswamy and A. Venkatachari:</b> Effects of Soil Moisture and Organic Mulches on Corn Planted in Different Patterns	389
<b>C. M. Singh, B. E. Sood and S. C. Modgal:</b> Response of Rainfed Pop Corn ( <i>Zea mays</i> Everta) to Nitrogen and Plant Population	395
<b>Book Reviews</b>	399
<b>Index</b>	403

**Headings.** The following details should be given at the head of the first sheet: the full title of the paper; a short title for running headlines, not exceeding 48 characters, counting each letter and space as one character; the name(s) of the author(s); the address at which the work was carried out; the present address(es) of author(s), if different from the previous item; and the address(es) to which proofs should be sent (see under 'Proofs' below).

**Summary.** A short but accurate and informative summary must be included, *not longer than ten lines of typescript*. The preparation of the summary, which requires much care, is not an Editorial responsibility.

**Experimentation.** This journal specialises in the presentation of data based on up-to-date methods of field experimentation. It is therefore important, where appropriate, that papers should include: an adequate account of experimental lay-outs; a description of treatments and general management; and assessments of experimental variability (e.g. coefficient of variation) and of the statistical significance of the results, specifying the methods used for the analysis (but without showing any details of the calculations). Papers can rarely be accepted if the work was carried out in containers, and/or under glasshouse conditions, unless it forms part of an investigation on field problems. The journal does not normally publish accounts of straightforward trials of pesticides, herbicides or varieties, since such papers are usually of local interest only.

**Plates.** Illustrations are welcome if they contribute to an understanding of the paper, but will only be accepted if of high quality. Photographs should be provided as unmounted glossy black-and-white prints (colour prints, but not colour transparencies, are acceptable for reproduction in black-and-white; they can only be reproduced in colour if a financial subsidy is provided). If lettering is to be inserted on a print, this should be shown on a spare copy or an overlay, and an unmarked print should be provided for marking by the printer.

**Diagrams.** Diagrams, including lettering, should be drawn in Indian ink on white drawing paper. Each illustration should bear the name of the author(s) and the figure number, written clearly in the margin or on the back. *On no account should diagrams be submitted on sheets larger than foolscap size.*

**Legends.** The legends for all illustrations should be given on a separate sheet of paper, clearly marked with the number of each plate or diagram. The ideal position for each diagram should be marked in the text, although it may not be possible to put the illustration exactly in that place. Plates will normally be bound immediately after the end of the paper.

**Dating the work.** Dates should be given for the beginning event of each experiment. *The journal is reluctant to accept papers submitted more than three years after the end of the relevant experimental work.*

**Tables.** Each table should be typed on a separate sheet of paper, and its preferred position indicated on the typescript. Each table should be numbered and bear an appropriate title, along the lines normally used for tables in this publication. Contributors are specially asked to avoid presenting tables that are too large to print across the page, hence the limit of 80 typewriter characters referred to earlier.

**Use of metric units.** All data must be presented in metric units, preferably SI units. Comparable data in local units (e.g. acres, ounces, etc.) may be given in parentheses at the first mention, if authors wish, or factors for converting metric into local units may be given as footnotes. The use of SI units will probably become mandatory at some time in the future.

**References.** The Harvard system of citation is used throughout as follows: name and initial(s) of author(s); year of publication in parentheses, further distinguished by the addition of small letters a, b, c, etc., where there are citations to more than one paper published by the same author(s) in one year; contracted title of periodicals as given in the World List of Scientific Periodicals; volume number in arabic figures; number of the first page of the paper. In the text, references should be denoted by giving the name of the author(s) with the date of publication in parentheses, e.g. Brown (1937) . . . (Brown, 1937), (Brown, 1927a; Jones and Smith, 1942a, b; Smith *et al.*, 1950). In the list of references all authors' names should be given. **Not more than fifteen papers should normally be cited.**

**Referees.** All manuscripts are critically reviewed by expert referees, on whose advice the Editor accepts or rejects contributions, or returns them to authors for reconsideration.

**Proofs.** Two sets of single-sided page proofs will be sent to each author, but it is the responsibility of the senior author to collate the views of his co-author(s) and submit a consolidated set of corrections to the Editor, by returning to him the printer's marked proof (identified by the words 'marked copy') with all required corrections. No further corrected proof will be sent to the author(s), unless this is specially requested. Excessive alterations, other than corrections of printer's errors, may be disallowed or charged to the author.

**Offprints.** Fifty offprints will be sent free of charge to the author. Where there are two or more authors, all fifty offprints will be sent to the senior author, unless the printer is asked to divide them. Additional offprints may be ordered on the form sent out with the proofs (to the senior author only if there is more than one) provided this is returned to the printer within seven days of its receipt by the author.

**Return of manuscript.** Where a submission is not accepted for publication the top copy will be returned; manuscripts on thin (air-mail) paper will usually be sent by air but bulky manuscripts from overseas may be returned by surface mail.

# EXPERIMENTAL AGRICULTURE

VOLUME 14, NUMBER 4, OCTOBER 1978

## CONTENTS

<b>E. F. I. Baker:</b> Mixed Cropping in Northern Nigeria. I. Cereals and Groundnuts	293
<b>C. N. Williams:</b> Fertilizer Responses of Cucumbers on Peat in Brunei	299
<b>C. N. Williams:</b> Effects of Drainage, Spacing and Fertilizer on Soyabeans in Paddy Soils in Brunei	303
<b>C. O. Othieno:</b> Supplementary Irrigation of Young Clonal Tea in Kenya. II. Internal Water Status	309
<b>G. C. Bate, M. E. R. Meakin and D. M. Oosterhuis:</b> Effects of Environment on Nitrate Reductase Assays in Field-grown Cotton Leaves	317
<b>H. Van Arkel:</b> Effects of Population, N and Age on Sunflower Grown for Silage	325
<b>Zahar Samsuddin and Ivan Impens:</b> Comparative Net Photosynthesis of Four <i>Hevea brasiliensis</i> Clonal Seedlings	337
<b>Osman A. A. Fadl:</b> Evapotranspiration Measured by a Neutron Probe on Sudan Gezira Vertisols	341
<b>G. O. Obigbesan and A. A. Agboola:</b> Uptake and Distribution of Nutrients by Yams ( <i>Dioscorea</i> spp.) in Western Nigeria	349
<b>E. A. Ogunremi:</b> Effects of Nitrogen on Melon ( <i>Citrillus lanatus</i> ) at Ibadan, Nigeria	357
<b>R. D. Cooke, A. K. Howland and S. K. Hahn:</b> Screening Cassava for Low Cyanide Using an Enzymatic Assay	367
<b>T. A. T. Wahua and D. A. Miller:</b> Leaf Water Potentials and Light Transmission of Intercropped Sorghum and Soyabeans	373
<b>H. A. Abou-El-Fittouh and E. O. Taha:</b> Handling Missing Observations in the Two-way Analysis of Variance with Interaction	381
<b>K. Anand Reddy, B. Bhasker Reddy, K. Balaswamy and A. Venkatachari:</b> Effects of Soil Moisture and Organic Mulches on Corn Planted in Different Patterns	389
<b>C. M. Singh, B. R. Sood and S. C. Modgal:</b> Response of Rainfed Pop Corn ( <i>Zea mays</i> Everta) to Nitrogen and Plant Population	395
<b>Book Reviews</b>	399
<b>Index</b>	403