EXPERIMENTAL AGRICULTURE

VOLUME 30 1994

Editor

DR F. G. H. LUPTON

Managing Editor
DR SUSAN CARR

Book Review Editor

PROFESSOR J. M. HIRST

Editorial Board

PROFESSOR R. J. SUMMERFIELD (Chairman)

DR M. G. R. CANNELL

PROFESSOR M. K. V. CARR

DR R. H. V. CORLEY

PROFESSOR D. J. GREENLAND

PROFESSOR P. J. GREGORY

DR J. G. W. JONES

MR R. KEMP

DR W. REED

MISS J. RILEY

PROFESSOR N. W. SIMMONDS

DR G. SQUIRE

MR R. W. SMITH

Overseas Correspondents

DR M. P. COLLINSON, CGIAR

DR P. J. M. COOPER, ICRAF

DR W. ERSKINE, ICARDA

DR G. KIRK, IRRI

DR T. G. KELLEY, ICRISAT



PUBLISHED BY

THE PRESS SYNDICATE OF THE UNIVERSITY OF CAMBRIDGE

The Pitt Building, Trumpington Street, Cambridge CB2 1RP
40 West 20th Street, New York, N.Y. 10011-4211, USA
10 Stamford Road, Oakleigh, Melbourne 3166, Australia

© Cambridge University Press 1994

Printed in Great Britain at the University Press, Cambridge

CONTENTS

Part 1 (January 1994)

B. Gail Smith, Paul J. Burgess and M. K. V. Carr: Effects of Clone and Irrigation on the Stomatal Conductance and Photosynthetic Rate of Tea (Camellia	
sinensis)	1
R. H. Ellis, R. J. Lawn, R. J. Summerfield, A. Qi, E. H. Roberts, P. M. Chay, J. B. Brouwer, J. L. Rose and S. J. Yeates: Towards the Reliable Prediction of Time to Flowering in Six Annual Crops. III. Cowpea (Vigna unguiculata)	17
R. H. Ellis, R. J. Lawn, R. J. Summerfield, A. Qi, E. H. Roberts, P. M. Chay, J. B. Brouwer, J. L. Rose, S. J. Yeates and S. Sandover; Towards the Reliable Prediction of Time to Flowering in Six Annual Crops. IV. Cultivated and Wild Mung Bean	31
Dermot McHugh: Evaluation of Stored Maize Losses in Cameroon	45
H. Vogel: The Effect of Tillage on Topsoil Temperature and Strength in Coarse-grained Sands with Special Reference to a Tied Ridging System	57
M. Grum, M. Halafihi, O. Stölen and M. Sørensen: Yield Performance of Yam Bean in Tonga, South Pacific	67
M. C. Klaij, C. Renard and K. C. Reddy: Low Input Technology Options for Millet-based Cropping Systems in the Sahel	77
K. C. Reddy, P. L. Visser, M. C. Klaij and C. Renard: The Effects of Sole and Traditional Intercropping of Millet and Cowpea on Soil and Crop Productivity	83
J. M. Njoroge and J. K. Kimemia: Influence of Tree Training and Plant Density on Yields of an Improved Cultivar of Coffee arabica	89
J. D. L. C. Siopongco, K. T. Ingram, P. B. Pablico and K. Moody: Crop and Soil Responses to Post-emergence Tillage and Weed Control in Lowland Rice	95
Book Reviews	105
Notes for Contributors	111
Part 2 (April 1994)	
Paul S. Teng: Integrated Pest Management in Rice	115
G. N. Zanakis, R. H. Ellis and R. J. Summerfield: Seed Quality in Relation to Seed Development and Maturation in Three Genotypes of Soyabean (Glycine max)	139

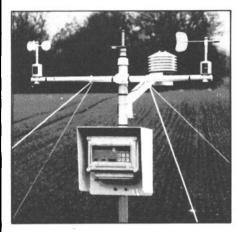
G. N. Zanakis, R. H. Ellis and R. J. Summerfield: A Comparison of Changes in Vigour among Three Genotypes of Soyabean (<i>Glycine max</i>) during Seed Development and Maturation in Three Temperature Regimes	157			
A. Wahbi, A. Mazid and M. H. Jones: An Example of the Farming Systems Approach: The Fertilization of Barley in Farmer and Researcher Managed Trials in Northern Syria				
S. Ceccarelli, W. Erskine, J. Hamblin and S. Grando: Genotype by Environment Interaction and International Breeding Programmes	177			
William Stephens and M. K. V. Carr: Responses of Tea (Camellia sinensis) to Irrigation and Fertilizer. IV. Shoot Population Density, Size and Mass	189			
A. Böhringer, M. Tamò and H. M. Dreyer: Growth and Productivity of Pigeonpea (Cajanus cajan) Genotypes for Use in Alley Cropping and their Interactions with the Environment	207			
J. M. Njoroge, J. K. Kimemia and A. M. Karanja: Evaluation of Methods of Replacing Established Uncapped Arabica Coffee with a New Improved Cultivar	217			
D. Friend and R. H. V. Corley: Measuring Coconut Palm Dry Matter Production	223			
P. S. Cocks: Effect of Tillage System on the Spontaneous Regeneration of Two Annual Medics (<i>Medicago</i> spp.) after Wheat in Northern Syria	237			
Dafalla A. Dawoud and J. Sauerborn: Impact of Drought Stress and Temperature on the Parasitic Weeds <i>Striga hermonthica</i> and <i>Alectra vogelii</i> in their Early Growth Stages	249			
Book Reviews	259			
Reviews of Electronic Databases	269			
Part 3 (July 1994)				
Ture Gury 1001/				
R. H. Ellis, R. J. Lawn, R.J. Summerfield, A. Qi, E. H. Roberts, P. M. Chay, J. B. Brouwer, J. L. Rose, S. J. Yeates and S. Sandover: Towards the Reliable Prediction of Flowering in Six Annual Crops. V. Chickpea (<i>Cicer arietinum</i>)	27			
Carlos Iglesias, Clair Hershey, Fernando Calle and Ana Bolaños: Propagating Cassava (Manihot esculenta) by Sexual Seed	283			
Abate Tedla, J. Sherington and M. A. Mohamed-Saleem: Integration of Forage and Food Crops Grown Sequentially on Vertisols under Rainfed Conditions in the Mid-altitude Ethiopian Highlands	291			

C. Okali, J. E. Sumberg and K. C. Reddy: Unpacking a Technical Package: Flexible Messages for Dynamic Situations	299
P. Pineda, J. A. Kipe-Nolt and E. Rojas: Rhizobium Inoculation Increases of Bean and Maize Yields in Intercrops on Farms in the Peruvian Sierra	311
M. A. Jabbar, A. Larbi and L. Reynolds: Profitability of Alley Farming with and without Fallow in Southwest Nigeria	319
M. V. K. Sivakumar and S. A. Salaam: A Wet Excavation Method for Root/ Shoot Studies of Pearl Millet on the Sandy Soils of the Sahel	329
A. O. Aweto and M. A. Ishola: The Impact of Cashew (Anacardium occidentale) on Forest Soil	337
Ashok Kumar, Lalita Batra and R. Chhabra: Forage Yield of Sorghum and Winter Clovers as Affected by Biological and Chemical Reclamation of a Highly Alkaline Soil	343
R. J. Carsky, L. Singh and R. Ndikawa: Suppression of Striga hermonthica on Sorghum Using a Cowpea Intercrop	349
Didier Pellet and Mabrouk A. El-Sharkawy: Sink-Source Relations in Cassava: Effects of Reciprocal Grafting on Yield and Photosynthesis	359
Book Reviews	369
Part 4 (October 1994)	
M. H. Arnold: EXPERIMENTAL AGRICULTURE and the Malthusian Challenge	375
D. J. Finney and J. L. Harper: Editorial Code for Presentation of Statistical Analysis	377
Janet Riley: Aspects of Statistical Technique and Presentation	381
M. P. Collinson and E. Tollens: The Impact of the International Agricultural Centres: Measurement, Quantification and Interpretation	395
J. M. Njoroge: Weeds and Weed Control in Coffee	421
P. I. Orphanos and C. Metochis: The Water Relations of Barley Grown Continually or After Fallow Under Semi-Arid Conditions	431
T. Mbabaliye and P. A. Wojtkowski: Problems and Perspectives on the Use of a Crop Simulation Model in an African Research Station	441
A. E. S. Ibrahim: Influence of Nitrogen Application and Stage of Harvesting on the Dry Matter Production of Sorghum sudanense-Lablab purpureus Mixtures in	

N. Moreira, H. Trindade, J. Coutinho and J. F. Almeida: Effects of Liming and Cultivation on the Establishment and Persistence of Rainfed Mediterranean	
Pastures	453
J. V. Waterworth: Intercropping Cotton and Groundnut in Low and High Rainfall Areas in Eastern Zambia	461
C. J. Breure: Development of Leaves in Oil Palm (Elaeis guineensis) and Determination of Leaf Opening Rate	467
Chit R. K. Prashar, Govind C. Sharma and Mohamadou Gandah: Evapotranspiration of Onion in Sahelian Niger	473
A. Hadjicristodoulou: Selection of Dry Pea (Pisum sativum) Varieties and their Performance by Comparison with Barley and Wheat in Mediterranean Environ-	
ments	477
Book Reviews	483
Reviews of Electronic Databases	491
Index	493

DELTA-T WEATHER STATION

A complete system of instrumentation for automatically measuring and recording the weather at remote sites.



Standard sensors measure:

- air temperature
- rainfall
- relative humidity
- soil temperature
- solar radiation
- wind direction
- wind speed
- barometric pressure
- * User-defined recording
- * Typically 12 months battery life
- * Solar power option
- * On-site checks using LCD on control panel
- * Remote interrogation via RS232 link

Description All sensors are mounted on a 2m mast, except for the soil temperature probe and the raingauge. An environmental data logger (the Delta-T logger) initiates readings, controls the sensors and stores data. The Logger memory is expandable from 16K to 128K readings.

Data collection Stored readings can be collected with a portable computer or printer without interrupting logging. Programmable The user has independent control over each sensor to define: sampling interval, valid reading range, engineering units (eg mm of rainfall), and data compression. These are specified using a personal computer.

Special requirements We are able to supply part-systems and non-standard combinations of sensors, (the Logger is expandable up to 60 analogue/counter inputs). Further information, advice or a quotation will be provided on request.



DELTA-T DEVICES LTD.

128 Low Road, Burwell, Cambridge CB5 0EJ Telephone: 0638 742922 Fax: 0638 743155 Telex: 817670 ASABSE G "ATTN DELTA-T" New Graphing Continued from inside front cover

Back volumes. Previously published parts of *Experimental Agriculture* are available from Cambridge or the American Branch of Cambridge University Press. Inquiries for Vols. 1–32 of *The Empire Journal of Experimental Agriculture* should be addressed to Wm Dawson & Sons Ltd, Cannon House, Folkestone, Kent.

Preparation and submission of manuscripts. Detailed instructions on the preparation of manuscripts are printed at the back of the first number of each volume of this journal.

Potential contributors are asked to give careful attention to these instructions. This will greatly assist the editors and thus speed the processing of their contributions.

Copying. This journal is registered with the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923. Organizations in the USA who are also registered with C.C.C. may therefore copy material (beyond the limits permitted by sections 107 and 108 of US copyright law) subject to payment to C.C.C. of the per copy fee of \$5.00. This consent does not extend to multiple copying for promotional or commercial purposes. Code 0014-4797/94 \$5.00+3.00.

ISI Tear Sheet Service, 3501 Market Street, Philadelphia, Pennsylvania 19104, USA, is authorized to supply single copies of separate articles for private use only.

Organizations authorized by the Copyright Licensing Agency may also copy material subject to the usual conditions.

For all other use, permission should be sought from Cambridge or the American Branch of Cambridge University Press.

CAMBRIDGE UNIVERSITY PRESS

The Pitt Building, Trumpington Street, Cambridge CB2 1RP 40 West 20th Street, New York, NY 10011–4211, USA 10 Stamford Road, Oakleigh, Melbourne 3166, Australia

Printed in Great Britain at the University Press, Cambridge

Experimental Agriculture

 commence of the second	All a	

CONTENTS	
M. H. Arnold: Experimental Agriculture and the Malthusian Challenge	375
D. J. Finney and J. L. Harper: Editorial Code for Presentation of Statistical Analysis	377
Janet Riley: Aspects of Statistical Technique and Presentation	381
M. P. Collinson and E. Tollens: The Impact of the International Agricultural Centres: Measurement, Quantification and Interpretation	395
J. M. Njoroge: Weeds and Weed Control in Coffee	421
P. I. Orphanos and C. Metochis: The Water Relations of Barley Grown Continually or After Fallow Under Semi-Arid Conditions	431
T. Mbabaliye and P. A. Wojtkowski: Problems and Perspectives on the Use of a Crop Simulation Model in an African Research Station	411
A. E. S. Ibrahim: Influence of Nitrogen Application and Stage of Harvesting on the Dry Matter Production of Sorghum sudanense-Lablah purpurens Mixtures in Central Sudan	447
N. Moreira, H. Trindade, J. Coutinho and J. F. Almeida: Effects of Liming and Cultivation on the Establishment and Persistence of Rainfed Mediterranean Pastures	453
J. V. Waterworth: Intercropping Cotton and Groundnut in Low and High Rainfall Areas in Eastern Zambia	461
C. J. Breure: Development of Leaves in Oil Palm (Elaeis guineensis) and Determination of Leaf Opening Rate	467
Chit R. K. Prashar, Govind C. Sharma and Mohamadou Gandah: Evapotranspiration of Onion in Sahelian Niger	473
A. Hadjicristodoulou: Selection of Dry Pea (<i>Pisum sativum</i>) Varieties and their Performance by Comparison with Barley and Wheat in Mediterranean	
Environments	477
Book Reviews	483
Reviews of Electronic Databases	491
Index	102

CAMBRIDGE UNIVERSITY PRESS

