EXPERIMENTAL AGRICULTURE

Editor

PROFESSOR J. P. HUDSON

Editorial Board

SIR E. J. RUSSELL (President)

PROFESSOR D. K. BRITTON DR E. E. CHEESMAN PROFESSOR SIR J. B. HUTCHINSON PROFESSOR J. D. IVINS PROFESSOR F. L. MILTHORPE SIR G. W. NYE DR G. WATTS PADWICK D. RHIND



CAMBRIDGE UNIVERSITY PRESS

Bentley House, 200 Euston Road, London, N.W. 1 American Branch: 32 East 57th Street, New York, N.Y. 10022

> Annual Subscription £3, 15s. net (U.S.A. \$13.50) Single part 25s. net (U.S.A. \$4.50)

https://doi.org/10.1017/S0014479700018627 Published online by Cambridge University Press

Expl Agric.

EDITORIAL ADVISORS

J. A. ANDERSON (Canada) M. A. A. ANSARI (Pakistan) R. G. BASKETT (Great Britain) G. E. BLACKMAN (Great Britain) S. DE BLANK (Great Britain) M. F. CHANDRARATNA (Ceylon) SIR DAVID CUTHBERTSON (Great Britain) H. P. DONALD (Great Britain) W. L. FIELDING (S. Rhodesia) W. M. HAMILTON (New Zealand) P. S. HUDSON (Great Britain) G. V. JACKS (Great Britain) J. LAMB (Trinidad) A. H. LEWIS (Great Britain) J. MELVILLE (Australia) B. P. PAL (India) S. J. DU PLESSIS (South Africa) E. W. RUSSELL (Great Britain) P. T. T. THOMAS (Great Britain) F. R. TUBBS (Great Britain) S. WATSON (Great Britain) F. YATES (Great Britain)

Experimental Agriculture publishes the results of experimental work in animal and crop husbandry, with an emphasis on research carried out in the warmer climates of the world. It also includes accounts of new experimental techniques, discussions of specific problems met in countries when agricultural production is developing rapidly, review articles on new developments in scientific agriculture, and occasional papers on technical, economic and sociological aspects of farming systems. The journal is the successor to *The Empire Journal of Experimental Agriculture*.

Each annual volume comprises four parts (published in January, April, July and October) plus an index.

Subscriptions may be sent to any bookseller or subscription agent or direct to the Cambridge University Press, Bentley House, 200 Euston Road, London, N.W. 1. Subscriptions in the U.S.A. and Canada should be sent to the American branch of the Press, 32 East 57th Street, New York, N.Y. 10022. The subscription price is 75s. net (including postage) for an annual volume (\$13.50 in the U.S.A.), payable in advance; separate parts cost 25s. net or \$4.50 each (plus postage).

Back Volumes. Inquiries for Vols. 1-32 of *The Empire Journal of Experimental Agriculture* should be addressed to Wm Dawson & Sons Ltd, 16 West Street, Farnham, Surrey. Previously published parts of *Experimental Agriculture* are available from the London or New York offices of the Cambridge University Press.

NOTES FOR CONTRIBUTORS

Contributions will be welcomed from scientists of all nationalities, particularly those working in tropical and sub-tropical countries where up-to-date techniques of agricultural experimentation are helping in the rapid development of more modern methods of farm production. Contributions, which must be written in English, should be sent to the Editor, Professor J. P. Hudson, University of Nottingham School of Agriculture, Sutton Bonington, Loughborough, England. **Conditions of acceptance.** Submission of a paper will be taken to imply that the material has not previously been published, and is not being considered for publication elsewhere. Papers published in *Experimental Agriculture* may not be reprinted or published in translation without permission from the Editor, given on behalf of the Editorial Board.

General lay-out. Before having their manuscripts typed contributors are asked to look carefully at the lay-out of

The Journal of

AGRICULTURAL SCIENCE

(Established 1905)

Edited by G. D. H. Bell, K. L. Blaxter, G. W. Cooke, R. E. Evans, Sir John Hammond, Prof. Sir J. B. Hutchinson, Sir Bernard Keen, H. L. Penman, Sir E. John Russell, E. W. Russell and F. Yates

Contents of Volume 64, Part 2, April 1965, 32s. 6d net

GORDON, J. G. The relationship between rumination and the amount of roughage eaten by sheep. HAMILTON, HERMAN, A. Influence of phosphorus and potassium on forage yields in relation to

fertilization and stage of harvest of an oat companion crop. HOLLIDAY, R., HARRIS, P. M. and BABA, M. R. Investigations into the mode of action of farmyard manure. I. The influence of soil moisture conditions on the response of maincrop potatoes to farmyard manure.

BLAIR, R. and ENGLISH, P. R. The effect of sex on growth and carcass quality in the bacon pig. CASTLE, M. E., REID, D. and HEDDLE, R. G. The effect of varying the date of application of fertilizer

nitrogen on the yield and seasonal productivity of grassland. REID, D. and CASTLE, M. E. The response of grass-clover and pure-grass leys to irrigation and fertilizer nitrogen treatment. I. Irrigation effects.

BROWN, N. J., FOUNTAINE, E. R. and HOLDEN, M. R. The oxygen requirement of crop roots and soils under near field conditions.

EKPETE, D. M. and CORNFIELD, A. H. Effect of varying static and changing moisture levels during incubation on the mineralization of carbon in soil.

JOHNSTON, MARGARET J. and WAITE, R. Studies in the lignification of grasses. I. Perennial ryegrass (S 24) and cocksfoot (S 37).

BLIGH, J. and LAMPKIN, G. H. A comparison of the deep-body temperature of Hereford and zebu cows recorded continuously by radio-telemetry under similar field conditions.

CUNNINGHAM, R. K. and KARIM, A. Cation-anion relationships in crop nutrition. IV. Maximum

Contents of cations and anions in Italian rye-grass. OKORIE, I. I., HILL, D. H. and MCILROY, R. J. The productivity and nutritive value of tropical grass/legume pastures rotationally grazed by N'Dama cattle at Ibadan, Nigeria.

PALSSON, H. and VERGES, JUAN, B. The effect of the plane of nutrition on the shape of the ribs in lambs.

AKKADA, A. R. ABOU and EL-SHAZLY, K. Effect of presence or absence of rumen ciliate protozoa on some blood components, nitrogen retention, and digestibility of food constituents in lambs.

INNES, N. L. Inheritance of resistance to bacterial blight of cotton. I. Allen (Gossypium hirsutum) derivatives

PATTERSON, D. S. P. The association between depot fat mobilization and the presence of xanthopyll in the plasma of normal sheep.

WALKER, D. M. and CAMPBELL, M. K. The development of the digestive system of the young animal. VII. The total and partial apparent digestibility of a pelleted diet by lambs and adult sheen.

Spedding, C. R. W., Large, R. V., Brown, T. H. and Wilson, I. A. N. The use of 'worm-free' sheep in grazing experiments.

> Issued at two-monthly intervals in parts of about 136 pages with plates and figures, three parts constituting a volume, 2 volumes yearly Subscription price 75s. per volume. Single parts 32s. 6d. net

CAMBRIDGE UNIVERSITY PRESS

Bentley House, 200 Euston Road, London, N.W.1

AGRONOMY JOURNAL

This official organ of the American Society of Agronomy is a bimonthly publication of up-to-date reports of general agronomic research. Workers in the field of forages and pastures, crop improvement, cultural practices, soil fertility, and allied areas of investigation will find articles of lasting interest in AGRONOMY JOURNAL. Publication is open to members of the American Society of Agronomy.

> \$14.00 per year in U.S. and Canada. \$15.00 per year elsewhere.

AMERICAN SOCIETY OF AGRONOMY

677 S. Segoe Road

Madison, Wisconsin, 53711

THE ANNALS OF APPLIED BIOLOGY

Conducted by the Association of Applied Biologists

Contents of Volume 55, Part 1, February 1965

- J. A. BULLOCK. The assessment of populations of *Thrips* nigropilosus Uzel. on pyrethrum
- F. G. W. JONES, V. H. MEATON, D. M. PARROTT, A. M. SHEPHERD and J. M. KING. Population studies on pea cyst-nematode *Heterodera goettingiana* Liebs.
- A. G. WHITEHEAD and J. R. HEMMING. A comparison of some quantitative methods of extracting small vermiform nematodes from soil.
- ROGER HULL and I. W. SELMAN. The incidence and spread of viruses in sweet peas (*Lathyrus odoratus* L.) in relation to variety and the use of systemic insecticides.
- M. J. DAFT. Some interactions of kinetin and temperature on tobacco leaves infected with tomato aucuba mosaic virus.
- L. BROADBENT. The epidemiology of tomato mosaic. VIII, Virus infection through tomato roots.
- L. BROADBENT. The epidemiology of tomato mosaic. IX. Transmission of TMV by birds.
- J. E. E. JENKINS, D. WIGGELL and J. T. FLETCHER. Tomato fruit bronzing.
- E. W. BUXTON, O. KHALIFA and V. WARD. Effect of soil amendment with chitin on pea wilt caused by *Fusarium oxysporum* f. pisi.

PRITAM SINGH, R. S. VASUDEVA and B. S. BAJAJ. Seed bacterization and biological activity of bulbiformin.

- A. G. CHANNON, ANNE E. FLINT and R. A. L. HINTON. Further studies on the effect of aldrin and three other chlorinated hydrocarbons on clubroot of summer cabbage.
- G. J. A. RYLE. Effects of daylength and temperature on ear size in S. 24 perennial ryegrass.
- A. J. HEARD. Eyespot in wheat after four-course rotations and 3½-year leys.
- I. D. FIRMAN and J. A. N. WALLIS. Low-volume spraying to control coffee leaf rust in Kenya.
- J. A. N. WALLIS and I. D. FIRMAN. Spraying arabica coffee for the control of coffee berry disease.
- P. G. BALAYANNIS, M. S. SMITH and R. L. WAIN. Studies on plant growth-regulating substances. XIX. Stability of 2,3,6-trichlorobenzoic acid in wheat plants and in the rabbit and mouse.
- A growth study of sugar beet treated with gibberellic acid and (2-chloroethyl) trimethylammonium chloride (CCC)
- Reviews

Subscription price to non-members is 75s. per volume of 3 parts (two volumes a year)

Cambridge University Press, 200 Euston Road, London, N.W.1

JOURNAL OF THE BRITISH GRASSLAND SOCIETY

This Journal is a medium for the publication of the results of research and practical experience in the realm of grassland husbandry.

EDITOR: A. G. G. HILL

Contents of Volume 20, No. 1, March 1965

THE PHYSIOLOGICAL BASIS OF GRAZING MANAGEMENT. By C. R. W. Spedding.

CARBOHYDRATE RESERVES IN THE REGROWTH OF COCKSFOOT (Dactylis glomerata L.). By J. L. Davidson and F. L. Milthorpe.

GRASS GROWTH IN MIDSUMMER. By R. C. Anslow.

SOME IMPLICATIONS OF DEATH AND DECAY IN PASTURE PRODUCTION. By L. A. Hunt.

- The effect of fertilizer nitrogen and frequency of defoliation on yield of grassland herbage. By R. Holliday and D. Wilman.
- The problems of relating greenhouse and controlled environmental work to sward conditions. By Th. Alberda.
- MECHANICAL TREATMENT FOR IMPROVING UPLAND GRAZING. By R. Hughes, J. M. M. Munro and I. B. Warboys.

THE EFFECT OF LENGTH OF SILAGE ON ITS VOLUNTARY INTAKE BY CATTLE. By J. C. Murdoch.

- THE EFFECT OF THE BIPYRIDYL HERBICIDES ON HILL COMMUNITIES AND THEIR ROLE IN THE IMPROVE-MENT OF HILL GRAZING. By G. Douglas, C. J. Lewis and H. C. McIlvenny.
- EFFECT OF THE LEGUME Stylosanthes gracilis ON BASTURE YIELDS AT SERERE, UGANDA. By C. R. Horrell and M. N. Court.

Published quarterly. The annual subscription is 60s. or \$8.40, post free. Back numbers are still available, at the following prices: Volume 1, 20s. or \$2.80; other volumes, 40s. or \$5.60 each.

Orders to: The Secretary, British Grassland Society, Grassland Research Institute, Hurley, Berkshire, England.

RHODESIAN JOURNAL OF AGRICULTURAL RESEARCH

The Journal of the Agriculture Research Council of Central Africa

Vol. 3, No. 1

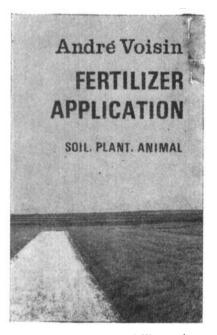
JANUARY, 1965

CONTENTS

Control of coppice growth in pastures Fertilizer placement and irrigation Growing of groundnuts in Malawi Evapotranspiration of cotton Rhodes grass for zebu cattle Late blight control on tomatoes Aphid control by dimethoate and menazon

Specimen copies are available free of charge to Libraries from:

The Assistant Editor Agricultural Research Council of Central Africa Pax House, Union Avenue, SALISBURY, Southern Rhodesia



128 pages, 32 tables and illustrations 18s. net

CROSBY LOCKWOOD

A link between agricultural research and practice

DR. ANDRÉ VOISIN who wrote Grass Productivity, the only practical book to show grassland farmers how grass can be as profitable as any other crop, was invited by Laval University, Canada, to give 25 lectures under the general title 'Soil, plant, animal.' This new book is based on three of those lectures and is mainly concerned with the proper use of fertilizers to combine maximum yields with the avoidance of damage to soil, plant and animal through misuse.

This is a highly important work for research workers and agricultural advisers because it deals with the correct treatment of the soil and sets out rules to show how and what elements can be assimilated by plants and how elements removed from the soil must be restored to it. Maximum results are useless if soil becomes depleted, plants deficient and animals unhealthy. Dr. Voisin shows how these disasters can be avoided by following his new scientific laws for fertilizer application.

26 Old Brompton Road, London SW7

TROPICAL AGRICULTURE

THE JOURNAL OF THE IMPERIAL COLLEGE OF TROPICAL AGRICULTURE

and

FACULTY OF AGRICULTURE UNIVERSITY COLLEGE OF THE WEST INDIES

General Editor: G. B. MASEFIELD, M.A., A.I.C.T.A. Department of Agriculture, University of Oxford

APRIL 1965

CONTENTS

Agricultural Problems and Potentialities		n Thailand Anthony and F. R. Moormann
Development of a Cassava Mill for Small	Processors	M. J. Percy and S. Redman
A Review of Leaf Rust and Coffee Berry	Disease Control in Ker	nya I. D. Firman
Certain Factors Affecting the Fat Percentages of Cow and Buffalo Milk K. A. Alim		
Notes on Bananas—I	D. L. Richardson, K. S. H	lamilton and D. J. Hutchison
Irrigation Investigations of the Giant Cavendish BananaI T. G. Arscott, M. S. Bhangoo and M. L. Karon		
Some Investigations into Factors limiti corea alata L.) under Trinidad Condi		ite Lisbon Yam (Dios- T. Chapman
Investigations on Out-of-season Tomato Production in Trinidad—I and II T. Chapman and J. D. Acland		
Milling Studies on Shade-dried Parboiled	Rice in Nigeria	J. A. F. M. Sluyters
Studies on the Bearing Behaviour of Some South Indian Varieties of Mango (Mangi- fera indica L.) under North Indian Conditions		
Zineb Contra-indicated as a Control for 1		Majumder and D. K. Sharma L. C. Knorr
Zineb Contra-Mulcaleu as a Control for h	Leprosis in citrus	L, U, KHOFF
Further Experiments with Herbicides on	Young Coconuts	D. H. Romney
Annual Subscription £3 10s. (\$10.00) post free		

Annual Subscription £3 10s. (\$10.00) post free Single issues 17s. 6d. post free

> A Quarterly Publication from BUTTERWORTHS 88 Kingsway, London, W.C.2

ANIMAL PRODUCTION

Journal of the British Society of Animal Production

Contents of Volume 7, Part 2, June 1965

CUNNINGHAM, E. P. The evaluation of sires from progeny test data.

JONES, J. G. W., DRAKE-BROCKMAN, R. M. and HOLMES, W. The feed intake of grazing cattle. 111. The influence of level of milk yield.

DUCKWORTH, J. E. The influence of pre-weaning nutrition on subsequent growth and development of bacon pigs.

JORDAN, R. M. and HANKE, H. E. Effects of hay pellets, pelleted ear corn or complete pelleted rations on the feedlot performance of lambs.

TROELSEN, J. E. Sustained release of chromic oxide in the rumen of sheep from a CR203-paper pellet.

TIMON, V. M. and BICHARD, M. Quantitative estimates of lamb carcass composition. 1, 2 and 3.

GRIFFITHS, T. W. A comparison of two methods for allocating concentrates to dairy cows according to yield.

RICKABY, C. D. Feeding of dairy cows: a survey of the concentrate usage of high yielding cows during the winter.

TAYLOR, ST. C. S. A relation between mature weight and time taken to mature in mammals.

HORROCKS, D., BURT, A. W. A., THOMAS, D. C. and LANCASTER, M. C. Effects of groundnut meal containing aflatoxin in cattle diets.

SMITH, C. Results of pig progeny testing in Great Britain.

BARBER, R. S., BRAUDE, R., HOSKING, ZENA D. and MITCHELL, K. G. The effects of different amounts of liquid skim-milk on pork pigs with particular reference to carcass quality.

HOLME, D. W. and ROBINSON, K. L. A study of water allowances for the bacon pig.

ROBERTSON, ALAN. The interpretation of genotypic ratios in domestic animal populations.

This Journal is published three times a year in February, June and October. The annual subscription rate is 65s. (U.S.A. \$11.00) single copy 25s. (U.S.A. \$4.00). Orders and subscriptions may be sent to any bookseller or direct to:

OLIVER & BOYD LTD.

Tweeddale Court, 14 High Street, Edinburgh 1

vi



Vapona will clear insects from any size glasshouse easily and safely

Vapona, Shell's latest insecticide, vaporises-whether you spray, fog or sprinkle it. The vapour spreads effectively up to 100 feet from its point of release, probing into cracks and crevices to search out and kill all types of insects (even resistant strains). Yet Vapona, which is DDVP based, breaks down rapidly into harmless substances on surfaces and in the presence of moisture. And the minute dosage required to destroy insects causes no harm or discomfort to humans or animals. Vapona is highly suitable for use in glasshouses (where it easily controls white flies and aphids) as well as in warehouses, restaurants, cinemas, abattoirs, food processing plants, and garbage dumps. Vapona is just one of Shell's comprehensive group of pesticides, which includes aldrin, dieldrin, endrin, Phosdrin, D-D and Nemagon.



For further information and details of Shell's technical services, please consult your Shell Company.