VOL. 5, NO. 3

**JULY 1969** 

# EXPERIMENTAL AGRICULTURE

Editor PROFESSOR J. P. HUDSON

Editorial Board

PROFESSOR SIR J. B. HUTCHINSON (CHAIRMAN)

PROFESSOR D. K. BRITTON DR. E. E. CHEESMAN PROFESSOR J. D. IVINS SIR G. W. NYE D. RHIND PROFESSOR E. W. RUSSELL DR. G. WATTS PADWICK DR. C. C. WEBSTER



#### 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 £5 net (U.S.A. \$16.50) Single parts 35s. net (U.S.A. \$5.00)

> > Expl Agric.

#### OVERSEAS ADVISORS

DR. J. A. ANDERSON (Canada) DR. M. A. A. ANSARI (Pakistan) DR. M. F. CHANDRARATNE (Ceylon) DR. K. B. LAL (F.A.O.) DR. J. MELVILLE (Australia) DR. A. H. MOSEMAN (United States) PROFESSOR M. A. NOUR (Sudan) DR. B. P. PAL (India)

DR. S. J. DU PLESSIS (South Africa)

**Experimental Agriculture** publishes the results of research on crop production and animal husbandry, with the main emphasis on field experiments carried out in the warmer climates of the world. It also includes accounts of new experimental techniques, discussions of specific problems met in countries where 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*.

Experimental Agriculture is published quarterly. Four parts form a volume.

**Subscriptions** may be sent to any bookseller or subscription agent or direct to Cambridge University Press, P.O. Box 92, 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  $\pounds 5$  net (including postage) for an annual volume (\$16.50 in the U.S.A.), payable in advance; separate parts cost 355. net or \$5.00 each (plus postage).

Second class postage paid at New York, N.Y.

**Back Volumes.** Inquiries for Vols. 1-32 of *The Empire Journal of Experimental Agriculture* should be addressed to Wm Dawson & Sons Ltd, Cannon House, Folkestone, Kent. Previously published parts of *Experimental Agriculture* are available from the London or New York offices of 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, Orchard House, Long Ashton, Bristol.

**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 other papers published in this journal, to ensure that their own papers, as submitted, conform as closely as possible to the accepted pattern. This very much facilitates the work of the Editor and may often result in a paper being published earlier than if it requires a great deal of detailed editorial attention. Numerical data, which should only be included if they are essential to the argument, can be presented either in the form of tables or diagrams, but should never be shown in both ways. It is not the normal custom of the Journal to publish notes shorter than about 2000 words (4 pages) or longer than about 6000 words (12 pages including illustrations).

**Typescripts.** A top copy and one carbon copy of the script should be submitted, typed with double spacing, on one side of the paper only and with margins of about 1<sup>1</sup>/<sub>2</sub> inches at the left-hand side and head of each sheet. Quarto size is preferred to foolscap.

Title. The development of automatic bibliographic methods, based on single-word indexing of the significant words in the title, makes it essential that the title of each paper should contain the maximum of relevant informa-

# Azodrin

# does its job inside out-outside in

... and that means double trouble for cotton pests, because Shell's powerful new organo-phosphorus insecticide Azodrin works *two* ways.

By contact, immediately destroying insects on the plant surface. And systemically, by penetrating foliage rapidly where it kills sucking and chewing pests as they try to eat.

This sophisticated dual action makes Azodrin by far the most wide-ranging insecticide yet devised giving *continuing* control over *more* pests *more* effectively.

Azodrin has already been employed with outstanding success in the United States and Central America, and is now proving worldwide to be one of the cotton grower's most powerful allies.

Suddenly pests that took a bite out of profits are losing their appetite.

For further information or supplies of Azodrin contact your Shell company or Shell chemicals distributor. Shell works today for your more profitable tomorrow.





https://doi.org/10.1017/S0014479700004403 Published online by Cambridge University Press

## The Journal of Agricultural Science

#### Volume 72, Part 2. April 1969

- J. E. JACKSON Cotton crop environment, growth and yield in the Sudan Gezira. I. The Gezira observation plots: experimental design, cultural methods and yield analysis.
- J. E. JACKSON Cotton crop environment, growth and yield in the Sudan Gezira. II. The causes of variation in yield from year to year.
- MAURICE EDDOWES Physiological studies of competition in Zea mays L. I. Vegetative growth and ear development in maize.
- MAURICE EDDOWES Physiological studies of competition in Zea mays L. II. Effect of competition among maize plants.
- MAURICE EDDOWES Physiological studies of competition in Zea mays L. III. Competition in maize and its practical implications for forage maize production.
- R. H. DAVIS AND D. LEWIS The digestibility of fats differing in glyceride structure and their effects on growth performance and carcass composition of bacon pigs.
- J. F. D. GREENHALGH AND G. W. REID The effects of grazing intensity on herbage consumption and animal production. III. Dairy cows grazed at two intensities on clean or contaminated pasture.
- W. H. BROSTER, VALERIE J. BROSTER AND T. SMITH Experiments on the nutrition of the dairy heifer. VIII. Effect on milk production of level of feeding at two stages of the lactation.
- HIROKAZU SHIMIZU AND SABURO TAKEUCHI Effect of early weaning at about 30 days after farrowing on the reproductive characteristics in gilts and sows.
- J. B. COOMBE AND G. K. PRESTON The effect of urea on the utilization of ground, pelleted roughage by penned sheep. I. Food intake, live-weight change and wool growth.
- J. B. COOMBE AND K. R. CHRISTIAN The effect of urea on the utilization of ground, pelleted roughage by penned sheep. II. Utilization of organic matter, nitrogen and minerals.
- C. F. EAGLES AND D. H. WILLIAMS Effect of environment on competitive ability of two natural populations of *Dactylis glomerata* L.
- P. M. BREMNER Effects of time and rate of nitrogen application on tillering, 'sharp eyespot' (*Rhizoctonia solani*) and yield in winter wheat.
- P. M. BREMNER Growth and yield of three varieties of wheat, with particular reference to the influence of unproductive tillers.
- R. R. GARRIGUS, H. R. JOHNSON, N. W. THOMAS, N. L. FIRTH, R. B. HARRINGTON AND M. D. JUDGE. Dietary effects on beef composition. I. Quantitative and qualitative carcass traits.
- H. R. JOHNSON, R. R. GARRIGUS, R. D. HOWARD, N. L. FIRTH, R. B. HARRINGTON AND M. D. JUDGE Dietary effects on beef composition. II. Quantity and distribution of fat.<sup>7</sup>
- M. D. JUDGE, N. L. FIRTH, H. R. JOHNSON, W. V. KESSLER, R. B. HARRINGTON AND R. R. GARRIGUS Dietary effects on beef composition. III. Weight, composition and potassium-40 content of fat-free muscles.
- G. JENKINS Grain quality in hybrids of Avena sativa L. and A. byzantina C. Koch.
- A. P. DRAYCOTT AND M. J. DURRANT The effects of magnesium fertilizers on yield and chemical composition of sugar beet.
- W. A. DEWAR A method for pelleting small amounts of purified diets.
- Y. DROR AND A. BONDI Utilization of surplus protein by sheep.
- P. A. CAWSE AND T. WHITE Accumulation of nitrate in fresh soils after gamma irradiation.

£2 net (\$6.00)

Annual subscription £9 net (\$29.00) for six issues

## CAMBRIDGE UNIVERSITY PRESS

#### **CROP SCIENCE**

Crop breeders, plant geneticists and physiologists, and workers in related areas will find *Crop Science* a source of valuable articles in their branches of science. This bimonthly journal carries reports of research in the genetics, physiology, ecology, breeding and management of field crops, turfgrasses, pastures and ranges, and in seed technology. It is published by the Crop Science Society of America.

\$16.00 per year in U.S. and Canada. \$17.00 per year elsewhere.

Crop Science Society of America 677 S. Segoe Rd, Madison, Wisconsin, U.S.A., 53711 Symposium of the African Studies Association of the United Kingdom

# The Soil Resources of Tropical Africa

#### Edited by R. P. MOSS

The production of world food supplies is largely dependent on the efficient management and rational use of the soil system. In Africa traditional methods of soil management are being superseded by new, more technologically based ones. This is in response to the increasing demands of an expanding population for food and materials, and to the growth of internal trade.

This book considers soil as a resource. It discusses its characteristics, potential and problems in relation to new technologies, land use and the planning of agricultural development. 40s. net

### CAMBRIDGE UNIVERSITY PRESS

## TO KEEP UP-TO-DATE

with world agricultural research on annual field crops, the simplest and best method is to consult:

## FIELD CROP ABSTRACTS

If you would like to receive a free specimen copy of this quarterly journal, please write to :

COMMONWEALTH BUREAU OF PASTURES AND FIELD CROPS, HURLEY, MAIDENHEAD, BERKS., ENGLAND

## The Annals of Applied Biology

#### Volume 63, Number 2. April 1969

- F. G. W. JONES and D. M. PARROTT Population fluctuations of *Heterodera* rostochiensis Woll. when susceptible potato varieties are grown continuously
- R. I. BAXTER and C. D. BLAKE Some effects of suction on the hatching eggs of *Meloidogyne javanica*
- R. I. BAXTER and C. D. BLAKE Oxygen and the hatch of eggs and migration of larvae of *Meloidogyne javanica*
- C. S. JAMES and R. L. WAIN Studies on plant growth-regulating substances. XXVIII. Halogen-substituted benzoic acids
- B. E. A. KNIGHT, H. F. TAYLOR and R. L. WAIN Studies on plant-growth regulating substances. XXIX. The plant growth-retarding properties of certain ammonium, phosphonium and sulphonium halides
- B. M. SAVORY Evidence that toxins are not the causal factors of the specific apple replant disease
- AVELINA Q. PAULSEN and R. W. FULTON Purification, serological relationships and some characteristics of plum line-pattern virus
- GILLIAN N. THORNE, P. J. WELBANK and G. C. BLACKWOOD Growth and yield of six short varieties of spring wheat derived from Norin 10 and of two European varieties
- W. CLIVE JAMES A survey of foliar diseases of spring barley in England and Wales in 1967
- G. M. FARRELL, T. F. PREECE and M. J. WREN Effects of infection by *Phytophthora* infestans (Mont.) de Bary on the stomata of potato leaves
- J. A. C. HARRISON and IVOR ISAAC Survival of the causal agents of 'early-dying disease' (*Verticillium* wilt) of potatoes
- D. NETZER and R. G. KENNETH Persistance and transmission of Alternaria dauci (Kühn) Groves and Skolko in the semi-arid conditions of Israel
- J. P. BLAKEMAN and A. K. FRASER The significance of temperature during sporulation on the biology of pycnidiospores of *Mycosphaerella ligulicola*
- O. A. AKINREFON Biochemical studies on plant tissues infected by *Phytophthora* palmivora (Butl.) Butl.
- PROCEEDINGS OF THE ASSOCIATION OF APPLIED BIOLOGISTS Factors affecting the colonization of plants by aphids

REVIEWS

45s. net (\$7.00)

Annual subscription £10 net (\$33.00) for six issues

### CAMBRIDGE UNIVERSITY PRESS

## 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 24, No. 1, March 1969

PRESIDENTIAL ADDRESS. I. V. Hunt.

THE USE OF CATTLE WITH OESOPHAGEAL FISTULAE IN GRASSLAND EXPERIMENTS. F. E. Alder.

HARVESTING \$352 TIMOTHY FOR SEED. H. M. Roberts.

Losses in the nutritive value of heavily-wilted herbage ensiled in evacuated and non-evacuated polythene containers. N. Jackson.

THE EFFECT OF FERTILIZER NITROGEN ON SILAGE FERMENTATION. J. B. Fox and S. M. Brown.

- A comparison of seven additives used in ensiling high-moisture grass/clover pastures. R. B. McCarrick.
- UPLAND GRASS PRODUCTION IN NORTH-EAST SCOTLAND IN RELATION TO SOIL AND SITE CONDITIONS. F. Beavington

A HISTORY OF THE INTRODUCTION OF TIMOTHY AND COCKSFOOT INTO ALTERNATE HUSBANDRY IN BRITAIN. 2. THE IMPACT OF TIMOTHY OF LEY FARMING. A. R. Beddows

INFLUENCE OF NITROGENOUS AND PHOSPHATIC FERTILIZERS ON SETARIA SPHACELATA IN SOUTH AFRICA. C. E. Malherbe

FERTILE TILLER PRODUCTION AND SEED YIELD IN MEADOW FESCUE FESTUCA PRATENSIS L. 3. DATE OF SPRING DEFOLIATION AND NITROGEN APPLICATION. J. Lewis.

RESPONSE OF CREEPING RED FESCUE SEED FIELDS TO AFTERMATH GRAZING BY BEEF CATTLE. W. L. Pringle, C. R. Elliott and J. L. Dobb

THE PATTERN OF GRAZING IN 'CONTINUOUSLY' GRAZED SWARDS. R. M. Morris.

PRODUCTIVITY OF TROPICAL PASTURES. 1. PANGOLA GRASS. J. Blydenstein, S. Louis, J. Toledo and A. Camargo.

THE INTRODUCTION OF PANGOLA GRASS INTO THE CARIBBEAN ISLANDS. D. F. Osbourn.

BEEF PRODUCTION FROM PASTURE LEYS IN UGANDA. T. H. Stobbs.

BOOK REVIEWS.

CONVERSION TABLES FOR BRITISH AND METRIC WEIGHTS AND MEASURES

Published quarterly. Annual subscription £4, post free. Back numbers are still available, at the following prices; Volume 1, £1; volumes 2–17, £2 each; volumes 18–22, £3; volume 23, £4.

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

## ANIMAL PRODUCTION

Journal of the British Society of Animal Production

#### Contents of Volume 11, Part 2, May 1969 include the following:

LODGE. The effects of pattern of feed distribution during the reproductive cycle on the performance of sows. McCULLOUGH. A study of factors affecting the voluntary intake of food by cattle.

BROADBENT, BALL and DODSWORTH. The effect of plane of nutrition during calfhood on the subsequent performance of Hereford × Ayrshire steers.

LEAVER, CAMPLING and HOLMES. The influence of flexible and rigid grazing management and of supplementary feed on output per hectare and per cow.

ANDREWS, KAY and ØRSKOV. The effect of different dietary energy concentrations of the voluntary intake and growth of intensively-fed lambs.

ØRSKOV, ANDREWS and GILL. Effect of replacing rolled harley with swedes or potatoes on the intake and rumen volatile fatty acid composition of lambs.

PRESCOTT, EL-SHOBOKSHY and ARMSTRONG. Ammonium salts of fatty acids for milk production.

HUTTON, PRESCOTT, SEELEY and ARMSTRONG. Ammonium salts of fatty acids for milk production.

HULET, FOOTE and PRICE. Factors affecting growth of ovine foetuses during early gestation.

ELSLEY and others. The effect of level of feed intake in pregnancy and lactation upon the productivity of sows. MACDOUGALL, CUTHBERTSON and SMITH. The assessment of pig meat paleness by reflectance photometry. AGAR, RAWAT and ROY. Haemoglobin variants in Indian sheep.

LAND, DICKINSON and READ. The influence of seasonal variation on fertility and early body growth in sheep.

#### OLIVER & BOYD LTD.

#### Tweeddale Court, 14 High Street, Edinburgh 1

Have you given up in despair the task of trying to read the dozens of scientific journals on your subject? If so, you should consult:

## HERBAGE ABSTRACTS

Compiled from the world's grassland literature

A free specimen copy of this quarterly journal will be sent to you on request.

Commonwealth Bureau of Pastures and Field Crops, Hurley, Nr. Maidenhead, Berks., England

## TROPICAL AGRICULTURE

THE JOURNAL OF THE IMPERIAL COLLEGE OF TROPICAL AGRICULTURE and FACULTY OF AGRICULTURE UNIVERSITY COLLEGE OF THE WEST INDIES General Editor: H. K. ASHBY, M.A., DIP.AGRIC., A.I.C.T.A. 7, Linton Road, Oxford

Established in 1925, this illustrated journal of the Imperial College of Tropical Agriculture, Trinidad, is essential to agricultural research workers, and to all concerned with the science of agriculture in the tropics. Published quarterly during January, April, July and October, it serves ninety countries and holds the unique position of being the only journal, printed in English, which is devoted solely to agriculture within the tropical zone. In bringing it to your attention, we are introducing a method of ensuring that you are kept well informed and up-to-date on the latest developments and advances in agricultural research and its application in the tropics.

> Annual Subscription £4 10s. (\$10.00) post free Single issues 22s. 6d. post free

# A Quarterly Publication from **BUTTERWORTHS**

88 Kingsway, London, WC2

# Dieldrin V The Desert Locust

viii

## Check-mate before the first move

Dieldrin is widely recognised as the best insecticide for preventing desert locusts ever leaving their breeding ground.

Small amounts of dieldrin solution safeguard vast food supplies. One litre sprayed over 2 hectares can control 500,000 hopper locusts. These would consume as much food in one day as 250 people, if allowed to reach the swarm stage. Shell companies are situated in key areas to ensure that supplies are immediately available where they are needed.

Locust control is just one of dieldrin's many uses. It is being used all over the world to protect many different crops against a wide range of pests. It is also much used in industry and public health schemes. Dieldrin is available in a range of formulations, and when used as directed is harmless to both applicators and consumers of crops.

For full details of approved uses and advice on application, please consult your Shell company or Shell Chemicals distributor.





https://doi.org/10.1017/S0014479700004403 Published online by Cambridge University Press