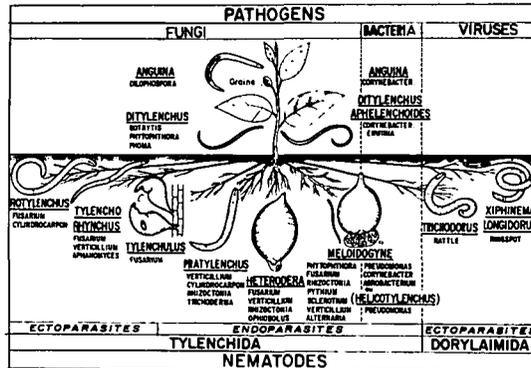


J. Palti

Cultural Practices and Infectious Crop Diseases

1981. 43 figures. XVI, 244 pages
(Advanced Series in Agricultural Sciences, Volume 9)
Cloth DM 98,-; approx. US \$ 45.70
ISBN 3-540-11047-X



The prevention of plant disease is generally not a major consideration in crop planning, so wing, fertilization and harvesting. Although these and other agricultural practices have long been recognized as a major component in integrated disease control, far more research has been invested in resistance breeding and the application of chemical agents, leaving growers to rely on experience and tradition rather than on sound scientific principles in the conduct of successful antipathogenic agriculture.

This book is the first monograph to deal comprehensively with the effects of agricultural practices on plant health. Following the effects of background factors (climate, soil, stress, and crop age), the author describes the impact of the major farming operations on the development of crop diseases, among them crop planning and alternation, multiple cropping, tillage, fertilization, moisture management, sowing, harvesting, and sanitation. The author concludes with a consideration of integrated disease control combining agricultural practices, resistance breeding and the use of chemical agents.

This volume will prove an invaluable aid to agricultural advisors, growers, researchers, students and teachers in appreciating the importance of appropriate practices management in the prevention of crop disease.



Springer-Verlag
Berlin Heidelberg New York

6 114/4/2h

THE JOURNAL OF AGRICULTURAL SCIENCE

EDITED BY

PROF. J. W. L. BEAMENT, SC.D., F.R.S., Department of Applied Biology, Cambridge

G. D. H. BELL, PH.D., C.B.E., SC.D.(*h.c.*), D.SC.(*h.c.*), F.R.S., 6 Worts Causeway, Cambridge

SIR K. L. BLAXTER, PH.D., N.D.A. (HONS.), D.SC., F.R.S.E., F.R.S.,
Rowett Research Institute, Bucksburn, Aberdeen

PROF. A. D. CARE, D.SC., M.R.C.V.S., Department of Animal Physiology and
Nutrition, Leeds

G. W. COOKE, C.B.E., PH.D., F.R.S.C., F.R.S., Rothamsted Experimental Station,
Harpenden

J. A. CURRIE, PH.D., Rothamsted Experimental Station, Harpenden

S. K. ELTRINGHAM, PH.D., Department of Applied Biology, Cambridge

PROF. SIR J. B. HUTCHINSON, C.M.G., SC.D., F.R.S., Emeritus Professor of
Agriculture, Department of Applied Biology, Cambridge

PROF. J. L. JINKS, F.R.S., Department of Genetics, Birmingham

D. B. LINDSAY, B.SC., M.A., D.PHIL., Agricultural Research Council, Institute of Animal
Physiology, Babraham, Cambridge

PROF. J. B. OWEN, B.SC., PH.D., M.A., The Department of Agriculture, Bangor

W. J. RIDGMAN, M.A., Department of Applied Biology, Cambridge

PROF. E. W. RUSSELL, C.M.G., D.SC., F.INST.P., Department of Soil Science,
University of Reading

F. YATES, C.B.E., SC.D., F.R.S., Rothamsted Experimental Station, Harpenden

VOLUME 98

CAMBRIDGE UNIVERSITY PRESS

CAMBRIDGE

LONDON NEW YORK NEW ROCHELLE

MELBOURNE SYDNEY

1982

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

© Cambridge University Press 1982

Printed in Great Britain at the University Press, Cambridge

Contents

PART 1 (FEBRUARY 1982)

	PAGE
EL-SEBAE, A. H., ABD EL AAL, M., MAREI, A. S. M. and TANTAWY, G. Photolysis and degradation of Thanite in cotton plants and artificial rumen	1
BARNARD, A. J. and HORNBY, D. The effects of dazomet and nitrogen fertilizer on successive crops of maize (<i>Zea mays</i> L.) grown for either grain or forage	7
OSMAN, A. E. and OSMAN, A. M. Performance of mixtures of cereal and legume forages under irrigation in the Sudan	17
GARTNER, R. J. W., MURPHY, G. M. and HOEY, W. A. Effects of induced, subclinical phosphorus deficiency on feed intake and growth of beef heifers	23
HOEY, W. A., MURPHY, G. M. and GARTNER, R. J. W. Whole body composition of heifers in relation to phosphorus status with particular reference to the skeleton	31
PARR, R. A., CUMMING, I. A. and CLARKE, I. J. Effects of maternal nutrition and plasma progesterone concentrations on survival and growth of the sheep embryo in early gestation	39
DAVIES, I. Developmental characteristics of grass varieties in relation to their herbage production. 6. Spring and summer growth of Sabrina hybrid ryegrass and RvP Italian ryegrass as influenced by the date of the initial cut in spring and the length of the succeeding growth period	47
TAYO, T. O. Growth, development and yield of pigeon pea (<i>Cajanus cajan</i> (L.) Millsp.) in the lowland tropics. 1. Effect of plant population density	65
TAYO, T. O. Growth, development and yield of pigeon pea (<i>Cajanus cajan</i> (L.) Millsp.) in the lowland tropics. 2. Effect of reduced assimilatory capacity	71
TAYO, T. O. Growth, development and yield of pigeon pea (<i>Cajanus cajan</i> (L.) Millsp.) in the lowland tropics. 3. Effect of early loss of apical dominance	79
BEN-GHEDALIA, D., TAGARI, H. and GEVA, A. Absorption by sheep of calcium, phosphorus and magnesium from a poultry litter supplemented diet	85
WISEMAN, J., COLE, D. J. A. and LEWIS, D. Energy values in pig nutrition. 3. The digestible and metabolizable energy content of barley, wheat, maize, oats and rye	89
SANT, F. I. and WILSON, D. Use of a cellulolytic digestion technique to distinguish bloat-causing from non-bloat-causing legumes and to select for speed of mesophyll cell-wall disintegration in red clover (<i>Trifolium pratense</i> L.)	99
RAGHAVULU, P. and SINGH, S. P. Effect of mulches and transpiration suppressants on yield, water use efficiency and uptake of nitrogen and phosphorus by sorghum under dryland conditions of north-western India	103
ANDREWS, A. H. The relationship of bovine mandibular cheek tooth development to age determined by post-mortem radiographic examination of cattle aged between 12 and 24 months	109
DYKE, G. V., SMITH, GINA L. and YEOMAN, D. P. Fourier series and response curves	119
PATTERSON, D. C. and WALKER, N. Some factors affecting the voluntary intake by pigs of diets containing effluent from the ensilage of grass	123

	PAGE
BENJAMIN, L. R. A model to predict the effects of complex row spacings on the yields of root crops	131
ASHWORTH, J., WIDDOWSON, F. V., PENNY, A., GIBBS, A. J., HODGKINSON, R. A. and HEWITT, M. V. Results from an experiment on permanent grass evaluating the cumulative effects of aqueous urea, injected alone or with a nitrification inhibitor, with those of 'Nitro-Chalk'	141
SMITH, M. W. and JAMES, P. S. Sodium transport by lamb proximal colon measured during early postnatal development	155
SMITH, M. W. and JAMES, P. S. Absorption of glucose by lamb proximal colon measured during early postnatal development	161
NANDI, A. S., SENGUPTA, B. and SEN, S. P. Utility of <i>Rhizobium</i> in the phyllosphere of crop plants in nitrogen-free sand culture	167
NANDI, A. S., SENGUPTA, B. and SEN, S. P. Utility of <i>Rhizobium</i> in the phyllosphere of crop plants under field conditions	173
NANDI, A. S. and SEN, S. P. Utility of <i>Rhizobium</i> in the phyllosphere of crop plants: two-way exchange of metabolites between <i>Rhizobium</i> and the host plant	179
THOMSON, E. F., BICKEL, H. and SCHÜRCH, A. Growth performance and metabolic changes in lambs and steers after mild nutritional restriction	183
WATHES, C. M., SPECHTER, H. H. and BRAY, T. S. The effects of light illuminance and wavelength on the growth of broiler chickens	195
SINGH, S. P. Control of Zn, Cu and Mn activities in alkaline and calcareous soils equilibrated with EDTA	203
SEN, H. S., SURIYA RAO, A. V., MAHATA, K. R. and DAS, P. C. Water diffusivity of germinating soya-bean, cow-pea and blackgram seeds and both large and small times	209
GUIRGIS, R. A., ASHMAWY, G. and ABU EL-EZZ, S. S. Postnatal changes in some skin and wool characteristics associated with vitamin A blood concentration	215
SHORT NOTES	
ANTONIEWICZ, ANNA M. and PISULEWSKI, P. M. Measurement of endogenous allantoin excretion in sheep urine	221
MOHANTY, C. R. and GANGOPADHYAY, S. Variation of leaf angle and incidence of rice blast disease	225
ALAKU, O. and STEINBACH, J. A note on kidney weight in Large White pigs reared in the humid tropics of southern Nigeria	229
MORE, T. Effect of water deprivation on urinary concentrations of creatinine and nitrogen in sheep	233
FUJIHARA, T. and NAKAO, T. Eating and rumination behaviour in sheep given silage made from the fibrous residue of broad bean (<i>Vicia faba</i> L.)	237

PART 2 (APRIL 1982)

SEARLE, T. W., GRAHAM, N. McC. and DONNELLY, J. B. The effect of plane of nutrition on the body composition of two breeds of weaner sheep fed a high protein diet	241
---	-----

	PAGE
COOP, R. L., SYKES, A. R. and ANGUS, K. W. The effect of three levels of intake of <i>Ostertagia circumcincta</i> larvae on growth rate, food intake and body composition of growing lambs	247
WHINGWIRI, E. E. and STERN, W. R. Floret survival in wheat: significance of the time of floret initiation relative to terminal spikelet formation	257
IGWILO, N. Nodulation and nitrogen accumulation in field beans (<i>Vicia faba</i> L.)	269
ADENEYE, J. A. Comparative weights of dairy calves at 4, 8, 12 and 16 weeks of age at Moor Plantation, Ibadan, Nigeria	289
STONE, D. A. The effects of subsoil loosening and deep incorporation of nutrients on yield of broad beans, cabbage, leek, potatoes and red beet	297
COWARD, B. JANE and BUTTERY, P. J. Metabolism of perfused ruminant muscle	307
ABDALLAH, O. Y., SHAHIN, KARIMA A. and LATIF, M. G. A. Growth and development of water buffalo and Friesian cross-bred cattle, with special reference to growth and distribution of carcass muscle and bone	317
LEA, J. W., GIBBS, D. A. and LAWRENCE, N. G. Morphological changes in a brown earth soil in response to applications of pig slurry	325
SURULIVELU, T. and MENON, M. VIJAYARAGHAVA. Contact toxicity of synthetic pyrethroids, organophosphorus and carbamate insecticides to adults of the parasite <i>Chelonus blackburni</i> Cameron	331
ADAMS, T. McM. The effects of agronomy on C and N distribution in soil organo-mineral fractions	335
UMUNNA, N. N. Utilization of poor quality roughages: response of sheep fed native hay supplemented with urea by different methods	343
DANIELS, R. W., ALCOCK, M. B. and SCARISBRICK, D. H. A reappraisal of stem reserve contribution to grain yield in spring barley (<i>Hordeum vulgare</i> L.)	347
KAISER, A. G., OSBOURN, D. F. and ENGLAND, P. Intake and digestion of formaldehyde-treated red clover silages offered to calves either alone or with a urea supplement	357
MATTHEWS, D. J. and HAYES, P. Effect of root zone temperature on early growth, nodulation and nitrogen fixation in soya beans	371
SOLIMAN, H. S., ØRSKOV, E. R., DAVIES, N. T. and McDONALD, I. Utilization of proteins from milk and raw or acid-treated <i>Toprina</i> yeast by newly born ruminant lambs and growing rats	377
BOLAND, M. P., CROSBY, T. F. and GORDON, I. Induction of lambing: comparison of the effects of prostaglandin, oestradiol benzoate and dexamethasone	391
TUDOR, G. D. and MINSON, D. J. The utilization of the dietary energy of pangola and setaria by young growing beef cattle	395
BLAXTER, K. L., FOWLER, V. R. and GILL, J. C. A study of the growth of sheep to maturity	405
SHARMA, A. K., GANGWAR, P. C., SRIVASTAVA, R. K. and DHINGRA, D. P. Artificial cooling of buffaloes (<i>Bubalus bubalis</i>) in a hot environment, and plasma oxytocin concentration	421
BECKETT, J. L. Variety × environment interactions in sugar beet variety trials	425

	PAGE
TOWNER, G. D. Towards more efficient soil-water modelling: moisture profiles for constant application or removal of water at the surface	437
AUSTIN, R. B. Crop characteristics and the potential yield of wheat	447
SCOTT, S. W. The effects of white clover mosaic virus infection on the yield of red clover (<i>Trifolium pratense</i> L.) in mixtures and in pure stands	455
TANEJA, V. K., BASU, S. B. and BHATNAGAR, D. S. Genetic and phenotypic parameters of some measures of lifetime production and their relationship with milk yield in the first three lactations in Tharparkar cows	461
SHORT NOTES	
PALMER, B. and JESSOP, R. S. The relative value of water-soluble and ammonium-citrate-soluble phosphorus for wheat production	467
HAYCOCK, R. and OLLERENSHAW, J. H. Winter survival and spring growth of white clover cultivars at an upland site in northern England	471
PART 3 (JUNE 1982)	
BAJWA, M. S. A study on the salt and sodium tolerance of rice	475
PICHAICHARNARONG, A., LOYPETJRA, P., CHAIYABUTR, N., USANAKORNKUL, S. and DJUR-DJEVIC, D. J. Thyroid activities of non-pregnant, pregnant, post-partum and newborn swamp buffaloes	483
RAI, R., PRASAD, V., PRASAD, T. N., KUMAR, S. B. and SRIVASTAVA, B. S. Symbiotic nitrogen fixation efficiency of mutant strains of lentil (<i>Lens esculenta</i>) <i>Rhizobium</i> growing from pH 4.5 to 7.5	487
MORAN, J. B. and WOOD, J. T. The growth and development of the alimentary tract in Asiatic swamp buffalo and zebu cattle	493
MALTZ, E., SILANIKOVE, N. and SHKOLNIK, A. Energy cost and water requirement of black Bedouin goats at different levels of production	499
CHOWDHURY, A. R. and HODGSON, D. R. Growth and yield in pure and mixed crops of potato cultivars	505
WILLIAMS, A. H. and CUMMING, I. A. Inverse relationship between concentration of progesterone and nutrition in ewes	517
WALLACE, R. J. and WEST, AILEEN A. Adenosine 5'-triphosphate and adenylate energy charge in sheep digesta	523
WOOLFORD, M. K., BOLSEN, K. K. and PEART, LESLEY A. Studies on the aerobic deterioration of whole-crop cereal silages	529
BENJAMIN, L. R. Some effects of differing times of seedling emergence, population density and seed size on root-size variation in carrot populations	537
RAI, R., SINHA, R. B. and PRASAD, V. Phorate-resistant mutant strains of chick pea (<i>Cicer arietinum</i> L.) <i>Rhizobium</i> sp. growth and their compatibility in symbiotic nitrogen fixation	547
RYDER, M. L. Seasonal fleece changes in two selection lines of Scottish Blackface sheep during their lifetime on the hill	553

	PAGE
SMITH, R. W. and WALSH, ANN. Effects of pregnancy and lactation on the activities in sheep liver of some enzymes of glucose metabolism	563
REINHARDT, V. Reproductive performance in a semi-wild cattle herd (<i>Bos indicus</i>)	567
ABDALLAH, O. Y., SHAHIN, KARIMA A. and LATIF, M. G. A. The partition of fat between depots and its distribution in the carcasses of water buffalo and Dutch Friesian cross-bred cattle	571
DRAYCOTT, A. P. and BUGG, SUSAN M. Response by sugar beet to various amounts and times of application of sodium chloride fertilizer in relation to soil type	579
DE, R., GIRI, G., SARAN, G., SINGH, R. K. and CHATURVEDI, G. S. Modification of water balance of dryland wheat through the use of chlormequat chloride	593
KEMPTON, R. A. Adjustment for competition between varieties in plant breeding trials	599
KOONER, B. S. and DEOL, G. S. Comparative rate of development of <i>Orosius albicinctus</i> Distant (Cicadellidae: Homoptera) on different host plants	613
AYUK-TAKEM, J. A. Response of S_1 maize varieties and varietal hybrids to altitude and environments in Cameroon	615
NORRIS, I. B. and THOMAS, H. Recovery of ryegrass species from drought	623
SWATLAND, H. J. Histology of allometric growth in hindlimb muscles of pigs	629
MATHERS, J. C. and WALTERS, D. E. Variation in methane production by sheep fed every two hours	633
BRYANT, D. T. W. and SMITH, R. W. Protein synthesis in muscle of mature sheep	639
EL-KHOLY, E., HAFEZ, H. and NAEEM, F. Effect of some growth regulators on yield and quality of sweetmelon and muskmelon	645
FRANCIS, P. E. and PIDGEON, J. D. A model for estimating soil moisture deficits under cereal crops in Britain. 1. Development	651
FRANCIS, P. E. and PIDGEON, J. D. A model for estimating soil moisture deficits under cereal crops in Britain. 2. Performance	663
LAUGHLIN, J. C. and MUNRO, D. The effect of fungal colonization on the morphine production of poppy (<i>Papaver somniferum</i> L.) capsules	679
SHORT NOTES	
LALL, D., LOHAN, O. P., MAKKAR, H. P. S. and NEGI, S. S. <i>In vitro</i> hydrolysis of urea-formaldehyde complexes made with or without molasses in the presence of phosphoric acid	687
LINDBERG, J. E. Ruminant flow rate of soya-bean meal, rapeseed meal and cottonseed meal in cows fed at maintenance and at three times maintenance	689
ADENEYE, J. A. Embryonic mortality, calf production, calving interval and life span of imported Friesian cattle in western Nigeria	693

	PAGE
KOONER, B. S. and DEOL, G. S. Comparative rate of development of <i>Orosius albicinctus</i> Distant (Cicadellidae: Homoptera) on different host plants	613
AYUK-TAKEM, J. A. Response of S_1 maize varieties and varietal hybrids to altitude and environments in Cameroon	615
NORRIS, I. B. and THOMAS, H. Recovery of ryegrass species from drought	623
SWATLAND, H. J. Histology of allometric growth in hindlimb muscles of pigs	629
MATHERS, J. C. and WALTERS, D. E. Variation in methane production by sheep fed every two hours	633
BRYANT, D. T. W. and SMITH, R. W. Protein synthesis in muscle of mature sheep	639
EL-KHOLY, E., HAFEZ, H. and NAEEM, F. Effect of some growth regulators on yield and quality of sweetmelon and muskmelon	645
FRANCIS, P. E. and PIDGEON, J. D. A model for estimating soil moisture deficits under cereal crops in Britain. 1. Development	651
FRANCIS, P. E. and PIDGEON, J. D. A model for estimating soil moisture deficits under cereal crops in Britain. 2. Performance	663
LAUGHLIN, J. C. and MUNRO, D. The effect of fungal colonization on the morphine production of poppy (<i>Papaver somniferum</i> L.) capsules	679
 SHORT NOTES	
LALL, D., LOHAN, O. P., MAKKAR, H. P. S. and NEGI, S. S. <i>In vitro</i> hydrolysis of urea-formaldehyde complexes made with or without molasses in the presence of phosphoric acid	687
LINDBERG, J. E. Ruminal flow rate of soya-bean meal, rapeseed meal and cottonseed meal in cows fed at maintenance and at three times maintenance	689
ADENEYE, J. A. Embryonic mortality, calf production, calving interval and life span of imported Friesian cattle in western Nigeria	693

THE JOURNAL OF AGRICULTURAL SCIENCE

CONTENTS

Vol. 98 Part 3 June 1982

	PAGE
BAJWA, M. S. A study on the salt and sodium tolerance of rice	475
PICHAICHARNARONG, A., LOYPETJRA, P., CHAIYABUTR, N., USANAKORNKUL, S. and DJURDJEVIC, D. J. Thyroid activities of non-pregnant, pregnant, post-partum and newborn swamp buffaloes	483
RAI, R., PRASAD, V., PRASAD, T. N., KUMAR, S. B. and SRIVASTAVA, B. S. Symbiotic nitrogen fixation efficiency of mutant strains of lentil (<i>Lens esculenta</i>) <i>Rhizobium</i> growing from pH 4.5 to 7.5	487
MORAN, J. B. and WOOD, J. T. The growth and development of the alimentary tract in Asiatic swamp buffalo and zebu cattle	493
MALTZ, E., SILANIKOVE, N. and SHKOLNIK, A. Energy cost and water requirement of black Bedouin goats at different levels of production	499
CHOWDHURY, A. R. and HODGSON, D. R. Growth and yield in pure and mixed crops of potato cultivars	505
WILLIAMS, A. H. and CUMMING, I. A. Inverse relationship between concentration of progesterone and nutrition in ewes	517
WALLACE, R. J. and WEST, AILEEN A. Adenosine 5'-triphosphate and adenylate energy charge in sheep digesta	523
WOOLFORD, M. K., BOLSEN, K. K. and PEART, LESLEY A. Studies on the aerobic deterioration of whole-crop cereal silages	529
BENJAMIN, L. R. Some effects of differing times of seedling emergence, population density and seed size on root-size variation in carrot populations	537
RAI, R., SINHA, R. B. and PRASAD, V. Phorate-resistant mutant strains of chick pea (<i>Cicer arietinum</i> L.) <i>Rhizobium</i> sp. growth and their compatibility in symbiotic nitrogen fixation	547
RYDER, M. L. Seasonal fleece changes in two selection lines of Scottish Blackface sheep during their lifetime on the hill	553
SMITH, R. W. and WALSH, ANN. Effects of pregnancy and lactation on the activities in sheep liver of some enzymes of glucose metabolism	563
REINHARDT, V. Reproductive performance in a semi-wild cattle herd (<i>Bos indicus</i>)	567
ABDALLAH, O. Y., SHAHIN, KARIMA A. and LATIF, M. G. A. The partition of fat between depots and its distribution in the carcasses of water buffalo and Dutch Friesian cross-bred cattle	571
DRAYCOTT, A. P. and BUGG, SUSAN M. Response by sugar beet to various amounts and times of application of sodium chloride fertilizer in relation to soil type	579
DE, R., GIRI, G., SARAN, G., SINGH, R. K. and CHATURVEDI, G. S. Modification of water balance of dryland wheat through the use of chlormequat chloride	593
KEMPTON, R. A. Adjustment for competition between varieties in plant breeding trials	599

Continued on inside back cover

© Cambridge University Press 1982

SUBSCRIPTIONS. Two volumes of three parts are published annually. All orders must be accompanied by payment. The subscription price of volumes 98 and 99, 1982, is £44.00 net (U.S.A. and Canada US \$121.00) per volume (post free); single parts are available at £17.00 net (U.S.A. and Canada US \$47.50) plus postage. Orders or enquiries may be sent to any bookseller or subscription agent, or Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU (U.S.A. and Canada, Cambridge University Press, 32 East 57th Street, New York, N.Y. 10022, U.S.A.). Second class postage paid at New York, N.Y., and at additional mailing offices.

Printed in Great Britain at the University Press, Cambridge