### CORRIGENDUM

# The effects of grazing intensity on herbage consumption and animal production

III. Dairy cows grazed at two intensities on clean or contaminated pasture

By J. F. D. GREENHALGH AND G. W. REID

J. agric. Sci. 72, p. 223. Reference at top of page should read:

J. agric. Sci., Camb. (1969), 72, 223-228.

# THE JOURNAL OF AGRICULTURAL SCIENCE

### **EDITED BY**

- G. D. H. BELL, C.B.E., PH.D., F.R.S. Plant Breeding Institute, Cambridge
- K. L. BLAXTER, Ph.D., N.D.A. (HONS.), D.SC., F.R.S.E., F.R.S., Rowett Research Institute, Bucksburn, Aberdeen
- G. W. COOKE, Ph.D., F.R.I.C., F.R.S., Rothamsted Experimental Station, Harpenden
- JOHN HAMMOND, Jr., M.A., School of Agriculture, Cambridge
- Prof. Sir J. B. HUTCHINSON, C.M.G., SC.D., F.R.S., School of Agriculture, Cambridge
- H. L. PENMAN, O.B.E., PH.D., F.R.S., Rothamsted Experimental Station, Harpenden
- W. J. RIDGMAN, M.A., School of Agriculture, Cambridge
- H. H. ROGERS, B.SC., DIP.AG.SCI., Plant Breeding Institute, Cambridge
- Prof. E. W. RUSSELL, C.M.G., PH.D., 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 LXXII 1969** 

CAMBRIDGE
AT THE UNIVERSITY PRESS
1969

### PUBLISHED BY

### THE SYNDICS OF THE CAMBRIDGE UNIVERSITY PRESS

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

Printed in Great Britain at the University Printing House, Cambridge

## **Contents**

PART 1 (JANUARY 1909)	DACE
SCHRÖDER, H. H. E. and GILCHRIST, F. M. C. Adaptation of the ovine ruminal flora to biuret. (With Seven Text-figures)	PAGE l
BROSTER, W. H., Tuck, Valerie J., Smith, T. and Johnson, V. W. Experiments on the nutrition of the dairy heifer. VII. Observations of the effect of the energy intake on the utilization of protein in growth and in lactation. (With Three Text-figures)	13
McManus, W. R., Prichard, R. K., Baker, Carolyn and Petruchenia, M. V. Estimation of water content by tritium dilution of animals subjected to rapid live-weight changes. (With Four Text-figures)	31
INNES, N. L. Inheritance of resistance to bacterial blight of cotton. IV. Tanzania selections.  (With Two Text-figures)	41
Russel, A. J. F. and Doney, J. M. Observations on the use of plasma free fatty acid concentrations in the determination of maintenance requirements of sheep. (With One Text-figure)	59
GHARAYBEH, H. R., McManus, W. R., Arnold, G. W. and Dudzinski, M. L. Body composition of young sheep. I. Body composition in merino and Border Leicester × Merino hoggets in relation to and at common empty body weight	65
ARNOLD, G. W., GHARAYBEH, H. R., DUDZINSKI, M. L., McManus, W. R. and Axelsen, A. Body composition of young sheep. II. Effect of stocking rate on body composition of Dorset Horn cross lambs	77
JENKINS, G. Heterosis and combining ability in hybrids of Avena sativa L. and A. byzantina C. Koch.	85
WIENER, GERALD, FIELD, A. C. and WOOD, JEAN. The concentration of minerals in the blood of genetically diverse groups of sheep. I. Copper concentration at different seasons in Blackface, Cheviot, Welsh Mountain and crossbred sheep at pasture. (With Two Text-figures).	93
ROBINSON, J. J., FOSTER, W. H. and FORBES, T. J. The estimation of the milk yield of a ewe from body weight data on the suckling lamb. (With Two Text-figures)	103
Hull, R. and Scott, R. K. A comparison of methods of growing sugar-beet seed	109
FORBES, J. M. The effect of pregnancy and fatness on the volume of rumen contents in the ewe. (With One Text-figure)	119
Wenham, G., McDonald, I. and Elsley, F. W. H. A radiographic study of the development of the skeleton of the foetal pig. (With Two Plates and Five Text-figures)	123
Kambal, A. E. Flower drop and fruit set in field beans, Vicia faba L. (With One Plate) .	131
KEENAN, D. M., McManus, W. R. and Freer, M. Changes in the body composition and efficiency of mature sheep during loss and regain of live weight. (With One Text-figure)	139
CHANDRA, G. and BHARADWAJ, M. B. Epidermal pigment distribution in buffaloes (Bos bubalis). (With Three Text-figures)	149
Downes, A. M. and Hutchinson, J. C. D. Effect of low skin surface temperature on wool growth (With Three Text-figures)	155

iv Contents

D 0 (Apper 1000)	
Part 2 (April 1969)	PAGE
Jackson, J. E. Cotton crop environment, growth and yield in the Sudan Gezira. I. The Gezira observation plots: experimental design, cultural methods and yield analysis. (With Three Text-figures)	159
Jackson, J. E. Cotton crop environment, growth and yield in the Sudan Gezira. II. The causes of variation in yield from year to year. (With Seven Text-figures)	169
Eddowes, Maurice. Physiological studies of competition in Zea mays L. I. Vegetative growth and ear development in maize. (With Four Text-figures)	185
Eddowes, Maurice. Physiological studies of competition in Zea mays L. II. Effect of competition among maize plants. (With Three Text-figures).	195
Eddowes, Maurice. Physiological studies of competition in Zea mays L. III. Competition in maize and its practical implications for forage maize production. (With Five Text-figures)	203
DAVIS, R. H. and LEWIS, D. The digestibility of fats differing in glyceride structure and their effects on growth performance and carcass composition of bacon pigs	217
GREENHALGH, J. F. D. and Reid, G. W. The effects of grazing intensity on herbage consumption and animal production. III. Dairy cows grazed at two intensities on clean or contaminated pasture	223
BROSTER, W. H., BROSTER, VALERIE, J. and SMITH, T. Experiments on the nutrition of the dairy heifer. VIII. Effect on milk production of level of feeding at two stages of the lactation. (With Three Text-figures)	229
Shimizu, Hirokazu and Takeuchi, Saburo. Effect of early weaning at about 30 days after farrowing on the reproductive characteristics in gilts and sows	247
COOMBE, J. B. and PRESTON, G. K. The effect of urea on the utilization of ground, pelleted roughage by penned sheep. I. Food intake, live-weight change and wool growth. (With One Text-figure)	251
COOMBE, J. B. and Christian, K. R. The effect of urea on the utilization of ground, pelleted roughage by penned sheep. II. Utilization of organic matter, nitrogen and minerals .	261
EAGLES, C. F. and WILLIAMS, D. H. Effect of environment on competitive ability of two natural populations of <i>Dactylis glomerata</i> L	271
BREMNER, P. M. Effects of time and rate of nitrogen application on tillering, 'sharp eyespot' ( <i>Rhizoctonia solani</i> ) and yield in winter wheat. (With Three Text-figures)	273
BREMNER, P. M. Growth and yield of three varieties of wheat, with particular reference to the influence of unproductive tillers. (With Four Text-figures)	281
Garrigus, R. R., Johnson, H. R., Thomas, N. W., Firth, N. L., Harrington, R. B. and Judge, M. D. Dietary effects on beef composition. I. Quantitative and qualitative carcass traits. (With Two Text-figures)	289
Johnson, H. R., Garrigus, R. R., Howard, R. D., Firth, N. L., Harrington, R. B. and Judge, M. D. Dietary effects on beef composition. II. Quantity and distribution of fat. (With One Text-figure)	297

JUDGE, M. D., FIRTH, N. L., JOHNSON, H. R., KESSLER, W. V., HARRINGTON, R. B. and GARRIGUS, R. R. Dietary effects on beef composition. III. Weight, composition and

303

potassium-40 content of fat-free muscles. (With One Text-figure).

Contents

	PAGE
Jenkins, G. Grain quality in hybrids of Avena sativa L. and A. byzantina C. Koch. (With One Text-figure)	311
DRAYCOTT, A. P. and DURRANT, M. J. The effects of magnesium fertilizers on yield and chemical composition of sugar beet. (With Two Text-figures)	319
DEWAR, W. A. A method for pelleting small amounts of purified diets	325
DROR, Y. and BONDI, A. Utilization of surplus protein by sheep. (With Two Text-figures) .	327
CAWSE, P. A. and WHITE, T. Accumulation of nitrate in fresh soils after gamma irradiation	331
Part 3 (June 1969)	
Browman, M. G., Chesters, G. and Pionke, H. B. Evaluation of tests for predicting the availability of soil manganese to plants	335
BEAN, E. W. Environmental and genetic effects upon reproductive growth in tall fescue (Festuca arundinacea Schreb.). (With Two Text-figures)	341
OWEN, J. B., MILLER, E. L. and BRIDGE, P. S. Complete diets given ad libitum to dairy cows—the effect of the level of inclusion of milled straw. (With One Text-figure)	351
Kambal, A. E. Components of yield in field beans, Vicia faba L. (With One Text-figure) .	359
EPSTEIN, H. and Kadmon, S. Physiological and economic feasibility of hormonally induced ovulation in lactating Large White sows	365
GUNN, R. G. The effects of calcium and phosphorus supplementation on the performance of Scottish Blackface hill ewes, with particular reference to the premature loss of permanent incisor teeth. (With Two Text-figures)	371
BLAIR, R., DENT, J. B., ENGLISH, P. R. and RAEBURN, J. R. Protein, lysine and feed intake level effects on pig growth. I. Main effects	379
Addiscott, T. M. Relationships of yields of maize and cotton, and their response to phosphate fertilizer, with soil phosphate potentials in Tanzania	401
CANNELL, R. Q. The tillering pattern in barley varieties. I. Production, survival and contribution to yield by component tillers. (With Eight Text-figures)	405
CANNELL, R. Q. The tillering pattern in barley varieties. II. The effect of temperature, light intensity and daylength on the frequency of occurrence of the coleoptile node and second tillers in barley. (With Six Text-figures)	423
D'Aoust, M. J. and Tayler, R. S. The interaction between nitrogen and water in the growth of grass swards. II. Leaf area index and net assimilation. (With Two Text-figures) .	437
GOOT, H. and SCHINDLER, H. The use of vaginal sponges in spring breeding of Mutton Merino and cross-bred ewes. (With Two Text-figures)	445
Russel, A. J. F., Doney, J. M. and Gunn, R. G. Subjective assessment of body fat in live sheep. (With Two Text-figures)	451
Sansom, B. F. Calcium metabolism of cows at parturition and during milk production	455
HUGHES, A. D. The non-protein nitrogen composition of grass silages. I. The estimation of the basic amino acids and non-volatile amines by chromatography on a weak cation exchange resin. (With Five Text-figures)	459

vi Contents

Kirby, E. J. M. The growth and development of some barley varieties in response to irrigation and nitrogen fertilizer. (With Seven Text-figures)	467
Anderson, D. M. and Elsley, F. W. H. A note on the use of indwelling catheters in conscious adult pigs	478
Shannon, D. W. F. and Brown, W. O. Calorimetric studies on the effect of dietary energy source and environmental temperature on the metabolic efficiency of energy utilization	
by Light Sussex cockerels. (With Three Text-figures)	479

### THE JOURNAL OF AGRICULTURAL SCIENCE

### CONTENTS

### Vol. 72 Part 3 June 1969

	PAGE
Browman, M. G., Chesters, G. and Pionke, H. B. Evaluation of tests for predicting the availability of soil manganese to plants	335
Bean, E. W. Environmental and genetic effects upon reproductive growth in tall fescue (Festuca arundinacea Schreb.). (With Two Text-figures)	341
OWEN, J. B., MILLER, E. L. and BRIDGE, P. S. Complete diets given ad libitum to dairy cows—the effect of the level of inclusion of milled straw. (With One Text-figure)	351
KAMBAL, A. E. Components of yield in field beans, Vicia faba L. (With One Text-figure) .	359
EPSTEIN, H. and KADMON, S. Physiological and economic feasibility of hormonally induced ovulation in lactating Large White sows	365
Gunn, R. G. The effects of calcium and phosphorus supplementation on the performance of Scottish Blackface hill ewes, with particular reference to the premature loss of permanent incisor teeth. (With Two Text-figures)	371
BLAIR, R., DENT, J. B., ENGLISH, P. R. and RAEBURN, J. R. Protein, lysine and feed intake level effects on pig growth. I. Main effects	379
Addiscorr, T. M. Relationships of yields of maize and cotton, and their response to phosphate fertilizer, with soil phosphate potentials in Tanzania	401
CANNELL, R. Q. The tillering pattern in barley varieties. I. Production, survival and contribution to yield by component tillers. (With Eight Text-figures)	405
CANNELL, R. Q. The tillering pattern in barley varieties. II. The effect of temperature, light intensity and daylength on the frequency of occurrence of the coleoptile node and second tillers in barley. (With Six Text-figures)	423
D'Aoust, M. J. and Tayler, R. S. The interaction between nitrogen and water in the growth of grass swards. II. Leaf area index and net assimilation. (With Two Text-figures)	437
Goot, H. and Schindler, H. The use of vaginal sponges in spring breeding of Mutton Merino and cross-bred ewes. (With Two Text-figures)	445
RUSSEL, A. J. F., DONEY, J. M. and GUNN, R. G. Subjective assessment of body fat in live sheep. (With Two Text-figures)	451
Sansom, B. F. Calcium metabolism of cows at parturition and during milk production	455
HUGHES, A. D. The non-protein nitrogen composition of grass silages. I. The estimation of the basic amino acids and non-volatile amines by chromatography on a weak cation exchange resin. (With Five Text-figures)	459
KIRBY, E. J. M. The growth and development of some barley varieties in response to irrigation and nitrogen fertilizer. (With Seven Text-figures)	467
Anderson, D. M. and Elsley, F. W. H. A note on the use of indwelling catheters in conscious adult pigs	475
Shannon, D. W. F. and Brown, W. O. Calorimetric studies on the effect of dietary energy source and environmental temperature on the metabolic efficiency of energy utilization by mature Light Sussex cockerels. (With Three Text-figures)	479

SUBSCRIPTIONS. Two volumes of three parts are published annually. The subscription price is £4 10s. net (U.S.A. \$14.50) per volume (post free); single parts are available at 40s. net (U.S.A. \$6.00) plus postage. Orders or enquiries may be sent to any bookseller or subscription agent, or to Cambridge University Press, P.O. Box 92, London, N.W. 1. (U.S.A. and Canada, Cambridge University Press American Branch, 32 East 57th Street, New York, N.Y. 10022, U.S.A.)