

Animal Production

Journal of the British Society of Animal Production

Edited by

J. A. F. ROOK
P. J. AVERY
D. A. BALCH
R. C. CAMPLING
M. F. FULLER
J. P. HANRAHAN
W. HARESIGN
R. B. LAND
T. L. J. LAWRENCE
J. M. MANSON
J. H. B. ROY
J. C. TAYLER
A. J. F. WEBSTER

Volume 36
1983

DURRANT

COPYRIGHT © 1983 BRITISH SOCIETY OF ANIMAL PRODUCTION
PRINTED IN GREAT BRITAIN BY
D. & J. CROAL LIMITED, HADDINGTON, EAST LOTHIAN

CONTENTS OF VOLUME 36
(LISTED ALPHABETICALLY BY AUTHOR)

PAGE

AHMED, M.-K. A., <i>see</i> HILL, W. G.	
ALLISTON, J. C., <i>see</i> NEILSON, D. R.	
AMOAH, E. A. and BRYANT, M. J. Gestation period, litter size and birth weight in the goat	105
ANGELAKOS, E. T., <i>see</i> KUSHNER, H.	
ARMSTRONG, D. G., <i>see</i> ELLIS, M.	
BAINES, D. M. and LAKE, P. A preliminary study of the effects of the anthelmintic thiophanate ('Nemafax') on the breeding performance of sows naturally infected with <i>Oesophagostomum</i> spp.	217
BASU, S. B., <i>see</i> CHEEMA, J. S.	
BATCHELDER, D. G., <i>see</i> STREETER, C. L.	
BHATNAGAR, D. S., <i>see</i> SHARMA, K. N. S.	
BLUM, J. W., KUNZ, P., LEUENBERGER, H., GAUTSCHI, K. and KELLER, M. Thyroid hormones, blood plasma metabolites and haematological parameters in relationship to milk yield in dairy cows	93
BOLTON, G. R., <i>see</i> RUSSEL, A. J. F.	
BOOTH, J. M., <i>see</i> WOOD, P. D. P.	
BOOTH, W. D., <i>see</i> KIRKWOOD, R. N.	
BRIGGS, P. A., <i>see</i> ELLIS, M.	
BRIGSTOCKE, T. D. A., <i>see</i> THICKETT, W. N.	
BRYANT, A. M., <i>see</i> GRAINGER, C.	
BRYANT, M. J., PALMER, G., PETHERICK, D. J. and ROWLINSON, P. Lactational oestrus in the sow. 4. Variation in the incidence and timing of lactational oestrus in groups of sows	453
BRYANT, M. J., ROWLINSON, P. and VAN DER STEEN, H. A. M. A comparison of the nursing and suckling behaviour of group- and individually-housed sows and their litters	445
BRYANT, M. J., <i>see also</i> AMOAH, E. A., <i>also</i> BUTCHER, CATHERINE	
BUTCHER, CATHERINE, BRYANT, M. J., OWEN, E., LEACH, I. and MACHIN, D. H. The effect of dietary metabolizable energy concentration upon the pre- and post-weaning performance of growing rabbits	229
BUTTERFIELD, R. M., GRIFFITHS, D. A., THOMPSON, J. M., ZAMORA, J. and JAMES, A. M. Changes in body composition relative to weight and maturity in large and small strains of Australian Merino rams. 1. Muscle, bone and fat	29
BUTTERFIELD, R. M., ZAMORA, J., JAMES, A. M., THOMPSON, J. M. and WILLIAMS, JEAN. Changes in body composition relative to weight and maturity in large and small strains of Australian Merino rams. 2. Individual muscles and muscle groups	165
BUTTERFIELD, R. M., ZAMORA, J., JAMES, A. M., THOMPSON, J. M. and REDDACLIFF, K. J. Changes in body composition relative to weight and maturity of large and small strains of Australian Merino rams. 3. Body organs	461
CAMPBELL, R. G. and DUNKIN, A. C. The influence of dietary protein and energy intake on the performance, body composition and energy utilization of pigs growing from 7 to 19 kg	185

CAMPBELL, R. G. and DUNKIN, A. C. The influence of nutrition in early life on growth and development of the pig. 1. Effects of protein nutrition prior and subsequent to 6.5 kg on growth and development to 45 kg	415
CAMPBELL, R. G. and DUNKIN, A. C. The influence of nutrition in early life on growth and development of the pig. 2. Effects of rearing method and feeding level on growth and development to 75 kg	425
CAMPBELL, R. G. and DUNKIN, A. C. The influence of nutrition in early life on growth and development of the pig. 3. Effects on energy intake prior and subsequent to 10 kg on growth and development to 30 kg live weight	435
CAMPBELL, R. G., TAVERNER, M. R. and CURIC, D. M. The influence of feeding level from 20 to 45 kg live weight on the performance and body composition of female and entire male pigs	193
CASTLE, M. E., <i>see</i> GILL, M. S.	
CHAMBERLAIN, D. G. and THOMAS, P. C. A note on the use of chromium sesquioxide as a marker in nutritional experiments with dairy cows	155
CHARLESTON, W. A. G., <i>see</i> STEWART, M.	
CHEEMA, J. S. and BASU, S. B. Usefulness of some components of the lactation curve for selection in Murrah buffaloes	277
CONNELL, ALEXMARY, <i>see</i> LOBLEY, G. E.	
COOK, G. L., JONES, D. W. and KEMPSTER, A. J. A note on a simple criterion for choosing among sample joints for use in double sampling	493
COUCHMAN, R. C. and MCGREGOR, B. A. A note on the assessment of down production in Australian 'cashmere' goats	317
CROSTON, D., READ, J. L., JONES, D. W., STEANE, D. E. and SMITH, C. Selection on ram 18-month weight to improve lamb growth rate	159
CURIC, D. M., <i>see</i> CAMPBELL, R. G.	
CURRIE, D. C., <i>see</i> RUSSEL, A. J. F.	
CUTHBERT, N. H., <i>see</i> THICKETT, W. N.	
DAVIES, M., <i>see</i> ELLIS, M.	
DOYLE, C. J. Evaluating feeding strategies for dairy cows: a modelling approach	47
DUCKER, M. J., <i>see</i> KENDALL, P. T.	
DUNKIN, A. C., <i>see</i> CAMPBELL, R. G., <i>also</i> KUAN, K. K.	
EDWARDS, M. R., <i>see</i> HILL, W. G.	
ELLIS, M., DAVIES, M., BRIGGS, P. A. and ARMSTRONG, D. G. A note on the influence of Avoparcin on apparent digestibility and nitrogen retention in growing pigs	151
ELLIS, M., SMITH, W. C., HENDERSON, RUTH, WHITTEMORE, C. T. and LAIRD, R. Comparative performance and body composition of control and selection line Large White pigs. 2. Feeding to appetite for a fixed time	407
ELLIS, M., <i>see also</i> HENDERSON, RUTH, <i>also</i> WOOD, J. D.	
ELWIN, R. L., <i>see</i> LYNCH, J. J.	
ENGLAND, P. and GILL, M. The effect of wilting and short-chopping of grass on the subsequent voluntary intake of silage, and live-weight gain of calves	73
ENGLAND, P., <i>see also</i> KAISER, A. G.	
FABRY, J. Thyroid hormones and daily gain in cattle. Relationships between plasma total thyroxine, free thyroxine, triiodothyronine and average daily gain during the first year of life in Belgian Blue and Friesian cattle	355

FLINT, A. P. F., <i>see</i> SAMSON, DEBORAH E.	
FURSEY, G. A. J., <i>see</i> MILES, C. A.	
GALBRAITH, H., <i>see</i> LOBLEY, G. E.	
GANDERTON, P., <i>see</i> ROY, J. H. B.	
GAUTSCHI, K., <i>see</i> BLUM, J. W.	
GILL, M., <i>see</i> ENGLAND, P.	
GILL, M. S. and CASTLE, M. E. The effects of the frequency of feeding concentrates on milk production and eating behaviour in Ayrshire dairy cows	79
GILLIES, CATHERINE M., <i>see</i> ROY, J. H. B.	
GOODALL, E. A. An analysis of seasonality of milk production	69
GOODE, JANE A., <i>see</i> SAMSON, DEBORAH E.	
GRAINGER, C., HOLMES, C. W., BRYANT, A. M. and MOORE, Y. A note on the concentration of energy in the milk of Friesian and Jersey cows	307
GREEN, G. C., <i>see</i> LYNCH, J. J.	
GRIFFITHS, D. A., <i>see</i> BUTTERFIELD, R. M.	
HARRIS, C., <i>see</i> MOORE, A.	
HART, I. C., <i>see</i> ROY, J. H. B.	
HEMINGWAY, R. G., <i>see</i> KENDALL, P. T.	
HENDERSON, RUTH, WHITEMORE, C. T., ELLIS, M., SMITH, W. C., LAIRD, R. and PHILLIPS, P. Comparative performance and body composition of control and selection line Large White pigs. 1. On a generous fixed feeding scale for a fixed time	399
HENDERSON, RUTH, <i>see also</i> ELLIS, M.	
HILL, W. G., EDWARDS, M. R., AHMED, M.-K. A. and THOMPSON, R. Heritability of milk yield and composition at different levels and variability of production	59
HINKS, C. E., <i>see</i> THOMAS, DELANA B.	
HOCKING, P. M. Live weights at fixed ages of Dairy Shorthorn, Red Friesian, Red Holstein, Meuse-Rhine-Yssel, Simmental and other sire breed progeny of Dairy Shorthorn, Red Friesian and crossbred dams, and estimates of heterosis and apparent heritability	285
HOCKING, P. M. A note on the carcass quality of Dairy Shorthorn, Red Friesian, Red Holstein, Danish Red, Meuse-Rhine-Yssel, Simmental and North Devon progeny of Dairy Shorthorn dams	295
HODGSON-JONES, L. S., <i>see</i> NEILSON, D. R.	
HOLMES, C. W., <i>see</i> GRAINGER, C., <i>also</i> STEWART, M.	
HOOPER, A. C. B. and HURLEY, M. P. The effect of selection for altered body weight on the ultrastructural components of skeletal muscle fibres	223
HORN, G. W., <i>see</i> STREETER, C. L.	
HUGHES, P. E., <i>see</i> KIRKWOOD, R. N.	
HUNTER, E. A., <i>see</i> MIRA, J. J. F.	
HURLEY, M. P., <i>see</i> HOOPER, A. C. B.	
INNES, G. M., <i>see</i> WILLIAMS, P. E. V.	
JACKSON, CAROLINE A., <i>see</i> ORR, R. J.	
JAIN, D. K., <i>see</i> SHARMA, K. N. S.	
JAMES, A. M., <i>see</i> BUTTERFIELD, R. M.	
JONES, D. W., <i>see</i> COOK, G. L., <i>also</i> CROSTON, D.	
KAISER, A. G., OSBOURN, D. F. and ENGLAND, P. The influence of formaldehyde application at ensiling and of supplementation with urea or maize starch on the utilization by calves of ryegrass and red clover silages	371

KAY, M., <i>see</i> MIRA, J. J. F.	
KELLER, M., <i>see</i> BLUM, J. W.	
KEMPSTER, A. J., <i>see</i> COOK, G. L.	
KENDALL, P. T., DUCKER, M. J. and HEMINGWAY, R. G. Individual intake variation in ewes given feedblocks or trough supplements indoors or at winter grazing	7
KEOGH, R. G., <i>see</i> LYNCH, J. J.	
KING, K. R., <i>see</i> STOCKDALE, C. R.	
KIRKWOOD, R. N., HUGHES, P. E. and BOOTH, W. D. The influence of boar-related odours on puberty attainment in gilts	131
KUAN, K. K., STANOGLIAS, G. and DUNKIN, A. C. The effect of proportion of cell-wall material from lucerne leaf meal on apparent digestibility, rate of passage and gut characteristics in pigs	201
KUNZ, P., <i>see</i> BLUM, J. W.	
KUSHNER, H. and ANGELAKOS, E. T. A note on a population model for breeding colonies	489
LAIRD, R., <i>see</i> ELLIS, M., <i>also</i> HENDERSON, RUTH, <i>also</i> WOOD, J. D.	
LAKE, P., <i>see</i> BAINES, D. M.	
LALL, D., MAKKAR, H. P. S. and NEGI, S. S. A note on <i>in vivo</i> comparison of a urea-formaldehyde-molasses complex and urea molasses mixes as sole nitrogen supplements to a wheat chaff ration for steers	309
LEACH, I., <i>see</i> BUTCHER, CATHERINE	
LEUENBERGER, H., <i>see</i> BLUM, J. W.	
LEWIS, M., <i>see</i> NEILSON, D. R.	
LINDEMAN, M. A., <i>see</i> THICKETT, W. N.	
LOBLEY, G. E., WALKER, A., CONNELL, ALEXMARY and GALBRAITH, H. The effect of trenbolone acetate on growth rate and carcass composition of young female rabbits	111
LYNCH, J. J., KEOGH, R. G., ELWIN, R. L., GREEN, G. C. and MOTTERSHEAD, B. E. Effects of early experience on the post-weaning acceptance of whole grain wheat by fine-wool Merino lambs	175
MACDEARMID, A., <i>see</i> WILLIAMS, P. E. V.	
MCGREGOR, B. A., <i>see</i> COUCHMAN, R. C.	
MACHIN, D. H., <i>see</i> BUTCHER, CATHERINE	
MAKKAR, H. P. S., <i>see</i> LALL, D.	
MAXWELL, T. J., <i>see</i> RUSSEL, A. J. F.	
MILES, C. A., FURSEY, G. A. J. and POMEROY, R. W. Ultrasonic evaluation of cattle	363
MILLS, J., <i>see</i> NEILSON, D. R.	
MIRA, J. J. F., KAY, M. and HUNTER, E. A. A comparison of long and shredded cereal straw for beef cattle	87
MIRA, J. J. F., KAY, M. and HUNTER, E. A. Treatment of barley straw with urea or anhydrous ammonia for growing cattle	271
MOORE, A. and HARRIS, C. A note on the storage of sodium hydroxide-treated whole-crop barley beneath grass and lucerne silage	143
MOORE, A. J., <i>see</i> TAYLOR, ST C. S.	
MOORE, Y., <i>see</i> GRAINGER, C.	
MOTTERSHEAD, B. E., <i>see</i> LYNCH, J. J.	
NEILSON, D. R., WHITTEMORE, C. T., LEWIS, M., ALLISTON, J. C., ROBERTS, D. J., HODGSON-JONES, L. S., MILLS, J., PARKINSON, H. and PRESCOTT, J. H. D. Production characteristics of high-yielding dairy cows	321

NEGI, S. S., <i>see</i> LALL, D.	
NEWTON, J. E., <i>see</i> ORR, R. J.	
NICHOLAS, F. W. and SMITH, C. Increased rates of genetic change in dairy cattle by embryo transfer and splitting	341
ORR, R. J., NEWTON, J. E. and JACKSON, CAROLINE A. The intake and performance of ewes offered concentrates and grass silage in late pregnancy	21
OSBOURN, D. F., <i>see</i> KAISER, A. G.	
OWEN, E., <i>see</i> BUTCHER, CATHERINE	
PALMER, G., <i>see</i> BRYANT, M. J.	
PARKINSON, H., <i>see</i> NEILSON, D. R.	
PARKS, J. R., <i>see</i> THOMPSON, J. M.	
PERFITT, M. W., <i>see</i> ROY, J. H. B.	
PETHERICK, D. J., <i>see</i> BRYANT, M. J.	
PETHERICK, J. CAROL. A note on allometric relationships in Large White \times Landrace pigs	497
PHILLIPS, P., <i>see</i> HENDERSON, RUTH	
POMEROY, R. W., <i>see</i> MILES, C. A.	
PRESCOTT, J. H. D., <i>see</i> NEILSON, D. R.	
READ, J. L., <i>see</i> CROSTON, D.	
REDDACLIFF, K. J., <i>see</i> BUTTERFIELD, R. M.	
ROBERTS, D. J., <i>see</i> NEILSON, D. R.	
ROWLINSON, P., <i>see</i> BRYANT, M. J.	
ROY, J. H. B., HART, I. C., GILLIES, CATHERINE M., STOBO, I. J. F., GANDERTON, P. and PERFITT, M. W. A comparison of preruminant bull calves of the Hereford \times Friesian, Aberdeen Angus \times Friesian and Friesian breeds. Plasma metabolic hormones in relation to age, and the relationship of metabolic hormone concentration with dry-matter intake and heart rate	237
RUSSEL, A. J. F., MAXWELL, T. J., BOLTON, G. R., CURRIE, D. C. and WHITE, I. R. A note on the possible use of goats in hill sheep grazing systems	313
RUSSELL, W. S., <i>see</i> WEBB, A. J.	
SALES, D. I., <i>see</i> WEBB, A. J.	
SAMSON, DEBORAH E., SLEE, J., THOMPSON, G. E., GOODE, JANE A. and FLINT, A. P. F. Prolongation of gestation and changes in maternal hormone concentrations during cold exposure of sheep in late pregnancy	1
SHARMA, K. N. S., JAIN, D. K., BHATNAGAR, D. S. and SHARMA, R. C. Estimation of milk fat, solids-not-fat and total solids production in zebu and their Brown Swiss crosses	383
SHARMA, R. C., <i>see</i> SHARMA, K. N. S.	
SLEE, J., <i>see</i> SAMSON, DEBORAH E.	
SMITH, C., <i>see</i> CROSTON, D., <i>also</i> NICHOLAS, F. W.	
SMITH, W. C., <i>see</i> ELLIS, M., <i>also</i> HENDERSON, RUTH, <i>also</i> STEWART, M., <i>also</i> WOOD, J. D.	
STANOGLAS, G., <i>see</i> KUAN, K. K.	
STEANE, D. E., <i>see</i> CROSTON, D.	
STEWART, M., HOLMES, C. W., SMITH, W. C. and CHARLESTON, W. A. G. The energy and nitrogen metabolism and performance of pigs infected with <i>Oesophagostomum dentatum</i>	137
STOBO, I. J. F., <i>see</i> ROY, J. H. B.	

	PAGE
STOCKDALE, C. R., and KING, K. R. A note on some of the factors that affect the water consumption of lactating dairy cows at pasture	303
STREETER, C. L., HORN, G. W. and BATCHELDER, D. G. Feeding values of high moisture ammoniated wheat straw for lambs	481
TAVERNER, M. R., <i>see</i> CAMPBELL, R. G.	
TAYLOR, ST C. S. and MOORE, A. J. Growth of twin cattle fed in proportion to body weight	253
THICKETT, W. N., CUTHBERT, N. H., BRIGSTOCKE, T. D. A., LINDEMAN, M. A. and WILSON, P. N. A note on the performance and management of calves reared on cold acidified milk replacer fed <i>ad libitum</i>	147
THOMAS, DELANA B. and HINKS, C. E. A note on the optimum level of roughage inclusion in the diet of the early-weaned calf	299
THOMAS, P. C., <i>see</i> CHAMBERLAIN, D. G.	
THOMPSON, G. E., <i>see</i> SAMSON, DEBORAH E.	
THOMPSON, J. M. and PARKS, J. R. Food intake, growth and mature size in Merino and Dorset Horn sheep	471
THOMPSON, J. M., <i>see also</i> BUTTERFIELD, R. M.	
THOMPSON, R., <i>see</i> HILL, W. G.	
VAN DER STEEN, H. A. M., <i>see</i> BRYANT, M. J.	
VARLEY, M. A. The regulation of oestrous cycles in groups of post-pubertal female pigs using allyl-trenbolone	211
WALKER, A., <i>see</i> LOBLEY, G. E.	
WEBB, A. J., RUSSELL, W. S. and SALES, D. I. Genetics of leg weakness in performance-tested boars	117
WHELEHAN, O. P., <i>see</i> WOOD, J. D.	
WHITE, I. R., <i>see</i> RUSSEL, A. J. F.	
WHITTEMORE, C. T., <i>see</i> ELLIS, M., <i>also</i> HENDERSON, RUTH, <i>also</i> NEILSON, D. R.	
WILLIAMS, JEAN, <i>see</i> BUTTERFIELD, R. M.	
WILLIAMS, P. E. V., MACDEARMID, A. and INNES, G. M. Anhydrous ammonia-treated whole-crop barley for beef steers	39
WILSON, P. N., <i>see</i> THICKETT, W. N.	
WOOD, J. D., WHELEHAN, O. P., ELLIS, M., SMITH, W. C. and LAIRD, R. Effects of selection for low backfat thickness in pigs on the sites of tissue deposition in the body	389
WOOD, P. D. P. and BOOTH, J. M. Variation in milk cell counts during lactation of British Friesian cattle	335
ZAMORA, J., <i>see</i> BUTTERFIELD, R. M.	
TITLES AND ABSTRACTS OF PAPERS FOR PRESENTATION AT THE 80TH MEETING OF THE BRITISH SOCIETY OF ANIMAL PRODUCTION, Scarborough, 21 to 23 March 1983	
	501

ERRATUM

ANIMAL PRODUCTION, Volume 35, Part 2, pp. 237-243

FATTENING PERFORMANCE OF HALFBRED AND THREE-BREED CROSSBRED RAM LAMBS IN AN INTENSIVE-FEEDING SYSTEM

H. GOOT, E. EYAL, Y. FOLMAN AND W. C. FOOTE

On page 241, the equations should read:

	Food intake	Food conversion
d.f.	36	36
r	0.8864	0.8857
\bar{Y}	$0.6255 + 0.0238X$	$1.1139 + 0.069X$

Hammond's Farm Animals

Fifth Edition

**J. Hammond Jr., J.C. Bowman and
T.J. Robinson**

No other book provides such a treatise on the physiological principles involved in animal production and their practical application. This new edition is updated by three authors with considerable experience in teaching and research. Technological advances in animal production are brought to the fore.

£9.95 paper 320 pages illustrated

Publication April



Edward Arnold

41 Bedford Square
London WC1B 3DQ

Illustrations. The same material should not normally be presented in tables and figures. Legends should be typed on a separate sheet.

- (a) Diagrams should be drawn in Indian ink, about twice the size of the finished block, on Bristol board, stout tracing paper or plastic film. Photographed diagrams are also accepted. Lettering inside the framework of the diagram should be avoided as far as possible but if unavoidable it should be included on a fly-leaf. Marginal lettering should be inserted lightly in pencil on the original diagram or on a fly-leaf.
- (b) Photographs intended for half-tone reproduction should be on glossy paper. They will be accepted only if found necessary by the Editors.
- (c) Colour plates are unlikely to be accepted unless authors bear the cost.

Tables should be as simple and as few as possible. Each table should be typed on a separate sheet.

Abstract. Every article should have a short abstract (not more than 250 words) complete in itself and understandable without reference to the paper. *The abstract will be printed at the beginning of the paper.*

References. Only papers closely related to the author's work should be referred to; exhaustive lists should be avoided. The arrangement of references should be as in recent papers in *Animal Production*; details are given in the notes for guidance.

Proofs are supplied once and must be returned corrected to the Editors *within 3 days*. Only essential corrections should be made.

Reprints. Twenty-five reprints of each paper will be supplied free to authors on request. Further copies may be purchased if the order is sent at the proof-stage.

Animal Production is published six times a year in two volumes. Annual subscription is £56·00 (or \$120·00 in the USA and Canada) and the price for a single part is £10·00 (or \$22·00) net.

Proceedings of the British Society of Animal Production (New Series) ceased publication in 1975 and the material is now published as a separate section in the June issue of *Animal Production*.

Correspondence regarding subscriptions and sales (current and back numbers of the Journal and the Proceedings), should be addressed to: Scottish Academic Press Ltd, 33 Montgomery Street, Edinburgh, Scotland EH7 5JX.

Other enquiries, including those concerning copyright, should be addressed to Durrant Periodicals, Winton Lea, Pencaitland, East Lothian, Scotland EH34 5AY.

Senior Editor

J. A. F. Rook, Agricultural Research Council

Editors

P. J. Avery, University of Reading
D. A. Balch, University of Reading
R. C. Campling, Wye College, University of London
M. F. Fuller, Rowett Research Institute
J. P. Hanrahan, Agricultural Institute
W. Haresign, University of Nottingham
R. B. Land, Animal Breeding Research Organisation
T. L. J. Lawrence, University of Liverpool
J. M. Manson, East of Scotland College of Agriculture
J. H. B. Roy, National Institute for Research in Dairying
J. C. Tayler, Agricultural Research Council
A. J. F. Webster, University of Bristol

Technical Editors

Marie C. Pitkethly
Jill M. Read

CONTENTS

PAGE

NEILSON, D. R., WHITTEMORE, C. T., LEWIS, M., ALLISTON, J. C., ROBERTS, D. J., HODGSON-JONES, L. S., MILLS, J., PARKINSON, H. and PRESCOTT, J. H. D. Production characteristics of high-yielding dairy cows	321
WOOD, P. D. P. and BOOTH, J. M. Variation in milk cell counts during lactation of British Friesian cattle	335
NICHOLAS, F. W. and SMITH, C. Increased rates of genetic change in dairy cattle by embryo transfer and splitting	341
FABRY, J. Thyroid hormones and daily gain in cattle. Relationships between plasma total thyroxine, free thyroxine, triiodothyronine and average daily gain during the first year of life in Belgian Blue and Friesian cattle	355
MILES, C. A., FURSEY, G. A. J. and POMEROY, R. W. Ultrasonic evaluation of cattle	363
KAISER, A. G., OSBOURN, D. F. and ENGLAND, P. The influence of formaldehyde application at ensiling and of supplementation with urea or maize starch on the utilization by calves of ryegrass and red clover silages	371
SHARMA, K. N. S., JAIN, D. K., BHATNAGAR, D. S. and SHARMA, R. C. Estimation of milk fat, solids-not-fat and total solids production in zebu and their Brown Swiss crosses	383
WOOD, J. D., WHELEHAN, O. P., ELLIS, M., SMITH, W. C. and LAIRD, R. Effects of selection for low backfat thickness in pigs on the sites of tissue deposition in the body	389
HENDERSON, RUTH, WHITTEMORE, C. T., ELLIS, M., SMITH, W. C., LAIRD, R. and PHILLIPS, P. Comparative performance and body composition of control and selection line Large White pigs. 1. On a generous fixed feeding scale for a fixed time	399
ELLIS, M., SMITH, W. C., HENDERSON, RUTH, WHITTEMORE, C. T. and LAIRD, R. Comparative performance and body composition of control and selection line Large White pigs. 2. Feeding to appetite for a fixed time	407
CAMPBELL, R. G. and DUNKIN, A. C. The influence of nutrition in early life on growth and development of the pig. 1. Effects of protein nutrition prior and subsequent to 6.5 kg on growth and development to 45 kg.	415
CAMPBELL, R. G. and DUNKIN, A. C. The influence of nutrition in early life on growth and development of the pig. 2. Effects of rearing method and feeding level on growth and development to 75 kg.	425
CAMPBELL, R. G. and DUNKIN, A. C. The influence of nutrition in early life on growth and development of the pig. 3. Effects on energy intake prior and subsequent to 10 kg on growth and development to 30 kg live weight	435
BRYANT, M. J., ROWLINSON, P. and VAN DER STEEN, H. A. M. A COMPARISON OF THE nursing and suckling behaviour of group- and individually-housed sows and their litters	445
BRYANT, M. J., PALMER, G., PETHERICK, D. J. and ROWLINSON, P. Lactational oestrus in the sow. 4. Variation in the incidence and timing of lactational oestrus in groups of sows	453
BUTTERFIELD, R. M., ZAMORA, J., JAMES, A. M., THOMPSON, J. M. and Reddacliff, K. J. Changes in body composition relative to weight and maturity of large and small trains of Australian Merino rams. 3. Body organs	461
THOMPSON, J. M. and PARKS, J. R. Food intake, growth and mature size in Merino and Dorset Horn sheep	471
STREETER, C. L., HORN, G. W. and BATCHELDER, D. G. Feeding value of high moisture ammonia-treated wheat straw for lambs	481
KUSHNER, H. and ANGELAKOS, E. T. A note on a population model for breeding colonies	489
COOK, G. L., JONES, D. W. and KEMPSTER, A. J. A note on a simple criterion for choosing among sample joints for use in double sampling	493
PETHERICK, J. CAROL. A note on allometric relationships in Large White × Landrace pigs	497
TITLES AND ABSTRACTS OF PAPERS FOR PRESENTATION AT THE 80TH MEETING OF THE BRITISH SOCIETY OF ANIMAL PRODUCTION, Scarborough, 21 to 23 March 1983	501
ERRATUM	follows Abstracts