Journal of Reproduction & Fertility

Volume 54 (No. 1), September 1978

- N. C. Rawlings & W. R. Ward. Correlations of maternal and fetal endocrine events with uterine pressure changes around parturition in the ewe
- M. S. Stavy, J. Terkel & F. Kohen. Plasma progesterone levels during pregnancy and pseudopregnancy in the hare (*Lepus europaeus syriacus*)
- T. Krzymowski, J. Kotwica, S. Okrasa, T. Doboszynska & A. Ziecik. Luteal function in sows after unilateral infusion of PGF- 2α into the anterior uterine vein on different days of the oestrous cycle
- H. M. Radford, C. D. Nancarrow & P. E. Mattner. Ovarian function in suckling and non-suckling beef cows post partum
- E. M. Tucker, A. R. Dain & R. M. Moor. Sex chromosome chimaerism and the transmission of blood group genes by tetraparental rams
- J. P. Foster. Plasma LH concentrations after single or double injections of synthetic LH-RH in dairy cows
- S. G. Revell & P. D. P. Wood. A photographic method for the measurement of motility of bull spermatozoa
- D. Schams, S. Gombe, E. Schallenberger, V. Reinhardt & R. Claus. Relationships between short-term variations of LH, FSH, prolactin and testosterone in peripheral plasma of prepubertal bulls
- S. Niimura & K. Ishida. Histochemical demonstration of prostaglandin dehydrogenases in the uterine and chorionic epithelia of the pregnant pig
- F. A. Harrison & R. B. Heap. Progesterone secretion during pregnancy in sheep with an autotransplanted adrenal and an autotransplanted ovary
- D. N. Logue & M. J. A. Harvey. Meiosis and spermatogenesis in bulls heterozygous for a presumptive 1/29 Robertsonian translocation
- J. D. O'Shea, M. F. Hay & D. G. Cran. Ultrastructural changes in the theca interna during follicular atresia in sheep
- S. Acritopoulou, W. Haresign & G. E. Lamming. Time of ovulation in ewes after treatment with a prostaglandin $F-2\alpha$ analogue

The Journal of Reproduction and Fertility is published every 2 months at £14.00 (U.S. \$30.00 per issue; annual subscription £70.00 (U.S. \$150.00), by the

JOURNALS OF REPRODUCTION AND FERTILITY LTD

P.O. Box 32, Commerce Way, Colchester CO2 8HP, U.K.

Dairy Cattle Feeding and Nutrition

By W. J. MILLER

CHAPTER HEADINGS: Introduction and Utilization of Nutrients by Dairy Cattle. Energy Requirements of Dairy Cattle. Protein Requirements of Dairy Cattle. The Use of Non-Protein Nitrogen (NPN) for Dairy Cattle. Mineral and Trace Element Nutrition of Dairy Cattle. Vitamin Requirements of Dairy Cattle. Fat (Lipids) and Water Requirements and Utilization by Dairy Cattle.

Fiber Utilization and Requirements of Dairy Cattle. Forages and Roughages for Dairy Cattle. Concentrates, By-Products and Other Supplements for Dairy Cattle. Non-Nutritive Additives and Constituents. Evaluation of Feeds for Dairy Cattle.

1978, about 400 pp., in preparation ISBN: 0-12-497650-6

Swine Feeding and Nutrition

By TONY J. CUNHA

A Volume in the ANIMAL FEEDING AND NUTRITION Series

This book discusses in detail the feeding and nutrition of swine. The author presents a review of the swine industry, and treats the many factors that can effect nutrient requirements, emphasizing the reasons why nutrient requirement standards are only a guide to formulating diets. Much of the book is devoted to concise up-todate summaries on minerals, vitamins, proteins, amino acids, carbohydrates, fiber, fatty acids, fat, energy, water, enzymes, antibiotics, and other antimicrobial compounds. The author discusses the nutrient requirements of the pig and compares them to National Research Council (NRC) recommendations; he investigates and treats deficiency symptoms for all nutrients, and illustrates most nutritional deficiencies with photographs. In addition, the author discusses a well-balanced diet for pigs based upon nutrient requirements,

and examines and reports on the relative value of feeds used throughout the world. Much space is devoted to the infant and growing pig, to its special nutritional requirements, and to the relative merits of early weaning; the author discusses prestarter, starter, grower, finishing, gestation; and lactation diets. He presents sample diets from a number of universities that may be used as guides in formulating diets. This book will be of great value to swine producers, feed manufacturers and dealers, county agents, farm advisors, consultants, veterinarians, teachers and students in agriculture, pharmaceutical companies and other firms that produce nutrients and agricultural chemicals for the feed industry.

1977, 352 pp., \$20.50/£14.55 ISBN: 0-12-196550-3

The Evaluation of Feeds Through Digestibility Experiments

By BURCH H. SCHNEIDER and WILLIAM P. FLATT

In the field of animal nutrition, digestibility is a vital and heavily researched subject. The Evaluation of Feeds Through Digestibility Experiments provides an extensive critical survey of the research conducted during the past century on the digestibility of feeds for domestic livestock. Schneider and Flatt analyze critically and comprehensively the techniques and results of experiments performed in laboratories throughout the world. The study carefully outlines and illustrates desirable procedures and notes precautions neces-

sary to insure accurate results and correct evaluation. For students of animal science and for animal nutritionists, particularly in the developing areas, it is an important tool in evaluating feeds for which there are few or no data. The authors answer a broad range of questions on digestibility studies, making their work invaluable not only as a reference, but also as a guide for practical application.

1977, 424 pp., \$19.50/£13.85 ISBN: 0-12-627650-1

Send payment with order and save postage and handling charge.

Prices are subject to change without notice.

U.S. customers please note: On prepaid orders—payment will be refunded for titles on which shipment is not possible within 120 days.

ACADEMIC PRESS, INC.

A Subsidiary of Harcourt Brace Jovanovich, Publishers 111 FIFTH AVENUE, NEW YORK, N.Y. 10003 24-28 OVAL ROAD, LONDON NW1 7DX

Please send me the followMiller: Dairy Cattle Fee		NAME
Nutrition —Cunha: Swine Feeding and Nutrition —Schneider/Flatt: The Evaluation of		ADDRESS
		CITY/STATE/ZIP
Feeds through Digestit Check enclosed {	Bill me	New York residents please add sales tax. Direct all orders to G. Phillips, Media Dept.
		JAgrSci/12/78

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, C.B.E., PH.D., F.R.S. Plant Breeding Institute, 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
- G. W. COOKE, Ph.D., F.R.I.C., F.R.S., Agricultural Research Council, 160 Great Portland Street, London W1N 6DT
- 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
- 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
- H. H. ROGERS, B.SC., DIP.AG.SCI., Plant Breeding Institute, Cambridge
- L. E. A. ROWSON, O.B.E., M.R.C.V.S., F.R.S., Agricultural Research Council, Unit of Reproductive Physiology and Biochemistry, Animal Research Station, 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 91

CAMBRIDGE UNIVERSITY PRESS CAMBRIDGE · LONDON · NEW YORK 1978 iv Contents

	PAGE			
 BHALARU, S. S. and DHILLON, J. S. Estimates of phenotypic and genetic parameters of some measures of efficiency of milk production in buffaloes				
			RIGGS, T. J. and KIRBY, E. J. M. Developmental consequences of two-row and six-row ear type in spring barley. 1. Genetical analysis and comparison of mature plant characters KIRBY, E. J. M. and RIGGS, T. J. Developmental consequences of two-row and six-row ear type in spring barley. 2. Shoot apex, leaf and tiller development	
KHERADNAM, M. and BASSIRI, A. Variations among heads, plants, and ecotypes of wild safflower	223			
Armstrong, A. C. The effect of drainage treatments on cereal yields: results from experiments on clay lands	229			
Singh, Bijay and Sekhon, G. S. Leaching of potassium in illitic soil profiles as influenced by long-term application of inorganic fertilizers	237			
Collier, G. F., Wurr, D. C. E. and Huntington, Valerie C. The effect of calcium nutrition on the incidence of internal rust spot in the potato	241			
SHORT NOTES				
HAY, R. K. M. Seasonal changes in the position of the shoot apex of winter wheat and spring barley in relation to the soil surface	245			
Maloiy, G. M. O., Taylor, C. R. and Clemens, E. T. A comparison of gastrointestinal water content and osmolality in East African herbivores during hydration and dehydration .	249			
DE, MAINE, M. J. The relationship between yield and sprout length after storage in diploid and tetraploid potatoes.	253			
STICKLAND, N. C. and GOLDSPINK, G. Number of fibres in the skeletal muscle of miniature pigs	255			
Part 2 (October 1978)				
PATIL, B. B. and DE, RAJAT. Studies on the effect of nitrogen fertilizer, row spacing and use of antitranspirants on rapeseed (<i>Brassica campestris</i>) grown under dryland conditions .	257			
IFENKWE, O. P. and Allen, E. J. Effects of row width and planting density on growth and yield of two maincrop potato varieties. 1. Plant morphology and dry-matter accumulation				
IFENKWE, O. P. and Allen, E. J. Effects of row width and planting density on growth and yield of two maincrop potato varieties. 2. Number of tubers, total and graded yields and their relationships with above-ground stem densities	279			
ROBINSON, J. J., McDonald, I., McHattie, I. and Pennie, K. Studies on reproduction in prolific ewes. 4. Sequential changes in the maternal body during pregnancy	291			

 $oldsymbol{ iny}$ Contents

	PAGI
JOHNSON, A. O. and Bell, T. D. Comparative performance of calves from Bunaji (White Fulani) dams and Charolais, three-quarter Friesian and Bunaji sires	308
Malik, N. S., Langar, P. N. and Chopra, A. K. Uromol as a source of dietary nitrogen for ruminants: metabolic and rumen fermentation studies on buffalo calves	309
Onwueme, I. C. Sett weight effects on time of tuber formation and on tuber yield characteristics in water yam (<i>Dioscorea alata</i> L.)	317
Legg, B. J., Day, W., Brown, N. J. and Smith, G. J. Small plots and automatic rain shelters: a field appraisal	321
FULLER, M. F. and LIVINGSTONE, R. M. Effects of progressive feed restriction on the growth and carcass composition of pigs: comparative responses of gilts and castrates	337
Williams, Ingrid H. The pollination requirements of swede rape (Brassica napus L.) and of turnip rape (Brassica campestris L.)	343
ADELUSI, S. A. and LAWANSON, A. O. Heat-induced changes in dry weight, leaf size and number of chloroplasts per cell in maize and cowpea shoots	349
SHEHATA, M. N., HASSAN, ADEL, EL-SHAZLY, K. and YASSEN, A. M. Oestrogenic activity of fresh, wilted, dried and fermented berseem (<i>Trifolium alexandrinum</i>)	359
WILMAN, D. and WRIGHT, P. T. Dry-matter content, leaf water potential and digestibility of three grasses in the early stages of regrowth after defoliation with and without applied nitrogen	365
WILMAN, D. and WRIGHT, P. T. The proportions of cell content, nitrogen, nitrate-nitrogen and water soluble carbohydrate in three grasses in the early stages of regrowth after defoliation with and without applied nitrogen	381
KHAN, M. S., GHOSH, P. K. and SASIDHARAN, T. O. Effect of acute water restriction on plasma proteins and on blood and urinary electrolytes in Barmer goats of the Rajasthan desert	395
BROSTER, W. H., SMITH, T., SIVITER, J. W., SCHULLER, E. and BROSTER, VALERIE J. Experiments on the nutrition of the dairy heifer. XI. Further observations on the effect of energy intake on protein utilization	399
MORGAN, C. A. and CAMPLING, R. C. Chewing behaviour of hay-fed cows given supplements of whole barley and oat grains	415
GLEESON, A. C. and McGilchrist, C. A. Analysis of plant competition data from an incomplete mixture diallel experiment	419
TROUGHTON, A. The influence of reproductive development upon the root system of perennial ryegrass and some effects upon herbage production	427
WIENER, G., SUTTLE, N. F., FIELD, A. C., HERBERT, J. G. and WOOLLIAMS, J. A. Breed differences in copper metabolism in sheep	433
DYKE, G. V. and Slope, D. B. Effects of previous legume and oat crops on grain yield and take-all in spring barley	443
WILLIAMS, INGRID H. and FREE, J. B. The feeding and mating behaviour of pollen beetles (Meligethes aeneus Fab.) and seed weevils (Ceutorhynchus assimilis Payk.) on oil-seed rape (Brassica napus L.)	453
GREENWOOD, D. J. and BARNES, A. A theoretical model for the decline in the protein content in plants during growth	461

viii Contents

WURR, D. C. E. The effects of the date of defoliation of the seed potato crop and the storage temperature of the seed on subsequent growth. 2. Field growth	
Younis, A. A. and El-Gaboory, I. A. H. On the diurnal variation in lambing and time for placenta expulsion in Awassi ewes	757
Morgan, J. H. L. and Behrens, W. C. Live-weight responses by young Friesian steers to supplements of oats, linseed meal and biuret	761
BOLAND, M. P., LEMAINQUE, F. and GORDON, I. Comparison of lambing outcome in ewes after synchronization of oestrus by progestagen or prostaglandin treatment	765

Continuea from back page	DAGE
ONWUDIKE, O. C. and ADEGBOLA, A. A. Agronomic evaluation of Stylosanthes guyanensis and its use in the diet of laying hens	PAGE 661
Austin, R. B., Kingston, G., Longden, P. C. and Donovan, P. A. Gross energy yields and the support energy requirements for the production of sugar from beet and cane; a study of four production areas	667
More, T. and Sahni, K. L. Effect of giving water intermittently on excretion patterns of water and certain electrolytes in Chokla sheep during summer	677
WHITTEMORE, C. T., AUMAITRE, A. and WILLIAMS, I. H. Growth of body components in young weaned pigs	681
BOLTON, J. and PENNY, A. The longevity of sodium, potassium and magnesium fertilizer residual effects on the yield and composition of ryegrass grown on a sandy soil	693
BARRY, T. N., COOK, J. E. and WILKINS, R. J. The influence of formic acid and formaldehyde additives and type of harvesting machine on the utilization of nitrogen in lucerne silages. 1. The voluntary intake and nitrogen retention of young sheep consuming the silages with and without intraperitoneal supplements of DL-methionine	701
BARRY, T. N., MUNDEL, D. C., WILKINS, R. J. and BEEVER, D. E. The influence of formic acid and formaldehyde additives and type of harvesting machine on the utilization of nitrogen in lucerne silages. 2. Changes in amino-acid composition during ensiling and their influence on nutritive value	717
BOLAND, M. P., GORDON, I. and KELLEHER, D. L. The effect of treatment by prostaglandin analogue (ICI-80, 996) or progestagen (SC-9880) on ovulation and fertilization in cyclic ewes.	727
DATTA, K. S., KUMAR, SURINDER and NANDA, K. K. Effects of some phenolic compounds and gibberellic acid on flowering and yield characters of cheena millet (Panicum miliaceum L.)	731
WURR, D. C. E. The effects of the date of defoliation of the seed potato crop and the storage temperature of the seed on subsequent growth. 1. Sprout growth	737
WURR, D. C. E. The effects of the date of defoliation of the seed potato crop and the storage temperature of the seed on subsequent growth. 2. Field growth	747
SHORT NOTES	
Younis, A. A. and El-Gaboory, I. A. H. On the diurnal variation in lambing and time for placenta expulsion in Awassi ewes	757
Morgan, J. H. L. and Behrens, W. C. Live-weight responses by young Friesian steers to supplements of oats, linseed meal and biuret	761
BOLAND, M. P., LEMAINQUE, F. and GORDON, I. Comparison of lambing outcome in ewes after synchronization of oestrus by progestagen or prostaglandin treatment.	765

THE JOURNAL OF AGRICULTURAL SCIENCE

CONTENTS

Vol. 91 Part 3 December 1978

•	PAGE
KING, J. M., NYAMORA, M. R., STANLEY-PRICE, M. R. and HEATH, B. R. Game domestication for animal production in Kenya: prediction of water intake from tritiated water turnover	513
GRAY, D. and Morris, G. E. L. Seasonal effects on the growth and time to maturity of lettuce	523
SHARMA, N. K., LODHI, G. N. and ICHHPONANI, J. S. Comparative feeding value of expeller-processed undecorticated and decorticated cottonseed cakes for growing chicks	531
CILLY, V. K., LODHI, G. N. and ICHHPONANI, J. S. Nutritive value of mustard cake derived from seeds of different genetic make up for growing chicks	543
TULLBERG, J. N. and ANGUS, D. E. The effect of potassium carbonate solution on the drying of lucerne. 1. Laboratory studies	551
TULLBERG, J. N. and MINSON, D. J. The effect of potassium carbonate solution on the drying of lucerne. 2. Field studies	557
ELLIOTT, JENNIFER E. M. and WHITTINGTON, W. J. The effect of soil pH on the severity of Chocolate Spot infection on field bean varieties	563
COOPER, P. J. M. and the late LAW, R. Enhanced soil temperature during very early growth and its association with maize development and yield in the Highlands of Kenya	569
STARK, A. J., ROWLANDS, G. J., MANSTON, R. and McCLINTOCK, A. E. The blood composition of Friesian bulls; variations with age and relationships with results of progeny tests	579
TAYLOR, B. R. Studies on a barley-oats mixture	587
BALL, P. J. H., MORANT, S. V. and CANT, E. J. Measurement of milk temperature as an aid to oestrus detection in dairy cattle	593
DAY, W., LEGG, B. J., FRENCH, B. K., JOHNSON, A. E., LAWLOR, D. W. and JEFFERS, W. DE C. A drought experiment using mobile shelters: the effect of drought on barley yield, water use and nutrient uptake	599
PEARCE, S. C. and GILLIVER, B. The statistical analysis of data from intercropping experiments	625
REMISON, S. U. and AKINLEYE, DELE. Relationship between lodging, morphological characters	023
and yield of varieties of maize (Zea mays L.)	633
STARR, CAROL and SMITH, D. B. A semi-micro dry-block and automated analyser technique suitable for determining protein nitrogen in plant material	639
ADENEYE, J. A. and ADEBANJO, ADETOWUN, K. Lactational characteristics of imported British Friesian cattle in Western Nigeria	645
FINNEY, D. J. Statistics and statisticians in agricultural research	653

Continued on inside back cover

© Cambridge University Press 1978

SUBSCRIPTIONS. Two volumes of three parts are published annually. The subscription price of volumes 90 and 91, 1978, is £25.00 net (U.S.A. and Canada US \$55.00) per volume (post free); single parts are available at £10.00 net (U.S.A. and Canada US \$22.00) plus postage. Orders or enquiries may be sent to any bookseller or subscription agent, or to Cambridge University Press, P.O. Box 110, Cambridge CB2 3RL (U.S.A. and Canada, Cambridge University Press, 32 East 57th Street, New York, N.Y. 10022, U.S.A.).