


**British Society of
Animal Production**



Winter meeting

15 - 17 March 1993

SPA Complex
Scarborough

Programme and summaries

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**BSAP WINTER MEETING 1993
PROGRAMME**

DAY	TIME	THEATRE SESSIONS		POSTER SESSIONS
Monday 15 March		SPA THEATRE	REGENCY ROOM	Assessing Animal Welfare Vita Dome Session opens 1410 Authors in attendance 1420-1500 Discussion 1610-1700
	1400	The President		
	1410	Ruminant Protein Metabolism	Pigs I	Reproduction Grand Hall Session opens 1410 Authors in attendance 1420-1500
	1550	TEA		
	1610	Application of Protein Rationing Systems for Ruminants	Pigs II	Dairy Production Grand Hall Session opens 1410 Authors in attendance 1420-1500
	1900	SCARBOROUGH TOWN COUNCIL RECEPTION		
	1930	ANNUAL DINNER 1993		
Tuesday 16 March	0900	Intake and Milk Production	Sheep	Small Ruminant Production Vita Dome Session opens 0900 Authors in attendance 1100-1145 Discussion 1145-1230
	1040	COFFEE		
	1100	Biotechnology - Plenary Session Molecular Biology Poster Discussion		Pigs Grand Hall Session opens 0900 Authors in attendance 0940-1040
	1230	LUNCH		
	1340	Gut Microbiology	Milk Production	Silage and Feeding Behaviour Grand Hall Session opens 0900 Authors in attendance 1100-1145
	1520	TEA		
	1540	Genetics	Dutch Animal Science	The application of Molecular Biology to Animal Science Grand Hall Session opens 0900 Authors in attendance 0940-1040
	1730	AGM		
	1900	DINNER		Nutrition & Metabolism Grand Hall Session opens 0900 Authors in attendance 0940-1040
	2015	Use of Animals in the Educational Context		Ruminant Metabolism Grand Hall Session opens 1340 Authors in attendance 1420-1520
Wednesday 17 March	0900	Hammond Memorial Lecture		Diet Selection Vita Dome Session opens 0900 Authors in attendance 1030-1115 Discussion 1135-1230
	1010	COFFEE		
	1030	Ruminant Metabolism	Non-Ruminant Nutrition	Tropical Forages Grand Hall Session opens 0900 Authors in attendance 1030-1115
	1115	Diet Selection (VITA DOME)		
	1230	LUNCH		Beef Grand Hall Session opens 0900 Authors in attendance 1030-1115
	1340	Ruminant Reproduction	Alternative Production Systems	Alternative Production Systems Vita Dome Session opens 0900 Authors in attendance 0930-1030 Discussion 1430-1510
	1520		Metabolic Disorders	
	1620	BSAP Meeting Closes		
	1700	WPSA Gordon Lecture	1800 WPSA Reception	Metabolic Disorders Regency Room Session opens 1510 Authors in attendance 1600-1620 viewing and discussion
	2000	WPSA BRANCH DINNER		
Thursday 18 March		WPSA Spring Meeting - Mini Symposium and Poster Session		

RUMINANT PROTEIN METABOLISM

Chairman - Dr C Thomas

1400 Opening Remarks by BSAP President - Prof J M Forbes

- 1410 1 Milk protein precursors in the goat during late lactation
B J Bequette, F R C Backwell, A G Calder, D Wray-Cahen,
J A Metcalf, G E Lobley & J C MacRae
- 1430 2 Peptide utilisation by the mammary gland of lactating goats
F R C Backwell, B J Bequette, A G Calder, D Wray-Cahen,
J A Metcalf, G E Lobley & J C MacRae
- 1450 3 The efficiency of amino acid utilisation by the mammary gland of Holstein-Friesian cows fed
three levels of dietary crude protein
J A Metcalf, D Wray-Cahen, B J Bequette, F R C Backwell, D J Humphries,
D E Beever & J D Sutton
- 1510 4 The effect of fermentable energy supply on the excretion of purine derivatives in milk and urine
of dairy cows
J M Moorby & R J Dewhurst
- 1530 5 Purine derivatives in spot urine samples and plasma of sheep: A possible index of microbial
protein supply
X B Chen, A T Mejia, D J Kyle & E R Orskov

1550 TEA

APPLICATION OF PROTEIN RATIONING SYSTEMS FOR RUMINANTS

Chairman - Prof D G Armstrong

- 1610 6 Comparison and evaluation of protein evaluation systems currently in use in Europe
W M Van Straalen & S Salaun, CLO-Institute for Animal Nutrition 'De Schothorst',
Lelystad, The Netherlands
- 1640 7 The UK metabolisable protein system
B R Cottrill, ADAS, Starcross, Exeter
- 1710 8 Evaluation of the UK metabolisable protein system
J D Oldham, GABS, SAC, Edinburgh
- 1800 Session Ends

1900 **SCARBOROUGH TOWN COUNCIL RECEPTION**

1930 **ANNUAL DINNER**

PIGS I

Chairman - Prof C T Whittemore

- 1400 See opposite page
- 1410 9 Effect of group size on the feeding behaviour of pigs using a computerised single-space feeding system
B L Nielsen, A B Lawrence & C T Whittemore
- 1430 10 Protein deposition rate of hybrid boars and its measurement
T A Van Lunen & D J A Cole
- 1450 11 Effect of long-chain dietary polyunsaturated fatty acid content on pig meat
C O Leskanich, R C Noble & C A Morgan
- 1510 12 The effect of dietary fibre on the meat eating and fat quality of finishing pigs fed ad libitum
B P Gill, B Hardy, J G Perrott, J D Wood & M Hamilton
- 1530 13 Effects of final cooking temperature on the eating quality of pork loin steaks
J D Wood, G R Nute, G A J Fursey & A Cuthbertson

1550 TEA

PIGS II

Chairman - Mr C C Warkup

- 1610 14 The influence of early life environment on personality development and reproduction in multiparous sows
M A Varley & R C Stedman
- 1630 15 An assessment of the effect of feeding system on the production and social organisation of group housed gilts
A H Stewart, S A Edwards, F Brouns & P R English
- 1650 16 Long-term influence of feeding regime and housing on development of stereotypies in sows
A B Lawrence, E M C Terlouw, B L Neilsen
- 1710 17 Differences in heart rate response at feeding between stall housed and group housed sows
J N Marchant & A R Rudd
- 1730 18 Production comparisons between farrowing crates and community farrowing systems
A R Rudd, P H Simmins, M T Mendl & S Malkin
- 1750 Sessions Ends
- 1900 *SCARBOROUGH TOWN COUNCIL RECEPTION*
- 1930 *ANNUAL DINNER*

INTAKE AND MILK PRODUCTION

Chairman - Dr P Garnsworthy

- 0900 19 Rapid assessment of silage fermentation characteristics by electrometric titration
N W Offer, J A Rooke, R J Dewhurst & C Thomas
- 0920 20 The effects of ensiling on the intake of herbage and milk production by lactating dairy cows
T W J Keady & J J Murphy
- 0940 21 The effect of mixed forage diets on feed intake and milk production of dairy cows
R H Phipps, J D Sutton, B A Jones, D Allen & W J Fisher
- 1000 22 The effects of dietary protein levels on the performance of lactating dairy cows given high levels of molasses
T Yan & D J Roberts
- 1020 23 The effect of fine grinding or sodium hydroxide treatment of wheat, offered as part of a concentrate supplement, on the performance of lactating dairy cows
C S Mayne
- 1040 COFFEE

BIOTECHNOLOGY - Plenary Session

Chairman - Prof J M Forbes

- 1100 24 Biotechnology - The Possibilities
J J Robinson, Rowett Research Institute, Aberdeen
- 1130 25 Biotechnology - The Ethics
T B Mepham, University of Nottingham
- 1200 DISCUSSION (to include discussion of poster session:
The Application of Molecular Biology to Animal Science)
- 1230 Session Ends

SHEEP

Chairman - Dr W Haresign

- 0900 26 Growth potential and feed intake capacity of Spanish sheep breeds from weaning to maturity
M R Cropper, G Flores & J Zea
- 0920 27 Consumer panel assessment of eating quality of lamb from the progeny of Suffolk sires with high
or low indices for leanness
R M Lewis, G Simm, S V Murphy, H E Brown & C C Warkup
- 0940 28 Comparison of four ultrasonic techniques for in vivo estimation of sheep carcass composition
J P Chadwick, C M Yates & M G Owen
- 1000 29 The role of cut surface muscle area in the prediction of carcass composition of beef, lamb and pork
C M Yates, A Cuthbertson & M G Owen

1040 COFFEE

SEE PAGE OPPOSITE

1230-1340 LUNCH

GUT MICROBIOLOGY

Chairman - Dr D S Parker

- 1340 30 Exploitation of the biodiversity within the rumen microbial ecosystem
G Hazelwood, IAPGR, Brabraham, Cambridge
- 1405 31 Interactions between bacteria and the surface of the small intestine
D Kelly, R Begbie, A J Flanagan, R G Mattison & T P King, Rowett Research Institute,
Aberdeen
- 1430 32 Aspects of immunology of the gut and rotavirus infection
G Oldham, Institute of Animal Health, Compton
- 1455 DISCUSSION

1520 TEA

GENETICS

Chairman - Dr N D Cameron

- 1540 33 A method for reducing inbreeding with best linear unbiased prediction
B Grundy & W G Hill
- 1600 34 A comparison of the rate genetic gain and inbreeding in open nucleus and closed flock breeding
systems for sheep
J A Roden
- 1620 35 A comparison of 'Bonus' and 'Quota' systems utilising the SRY gene in beef cattle breeding
S C Bishop & J A Woolliams
- 1640 36 Environmental and genetic influences on hill lamb performance
J Conington, G Simm, S C Bishop & A Waterhouse
- 1700 37 Crossbreeding and selection for fibre traits in cashmere goats
S C Bishop & A J F Russel
- 1720 Session Ends
- 1730 **AGM**
- 1900 **DINNER**
- 2015 See opposite page

MILK PRODUCTION

Chairman - Dr P Rowlinson

- 1340 38 Changes in the sites of milk storage over the lactation cycle of primiparous and multiparous dairy cows
R J Dewhurst & C H Knight
- 1400 39 Milk nitrogen fractions in Holstein-Friesian cows as affected by amount and protein concentration of the concentrates
J D Sutton, D E Beever, K Aston & S R Daley
- 1420 40 Effect of silage type and supplementation with sucrose or lactic acid on rumen fermentation in dairy cows
J G Doherty & C S Mayne
- 1440 41 The effect of sodium fertilisation of pasture on herbage production and the performance of lactating dairy cows
A Cushnahan & F J Gordon
- 1500 42 The effect of the energy and protein content of a strawmix supplement on the milk production and bloat incidence of cows grazing a high clover pasture
C J C Phillips & N L James
- 1520 TEA

DUTCH ANIMAL SCIENCE

Chairman - Prof E W Brascamp

- 1540 43 Animal science research in the Netherlands
E W Brascamp, University of Wageningen, The Netherlands
- 1550 44 Studies to determine energy and protein requirements of the gastro intestinal tract of pigs
M W Bosch & P van Leeuwen, University of Wageningen, The Netherlands
- 1610 45 Effects of gastrointestinal nematode infection on growth and performance in dairy replacement stock and possible effects on subsequent milk production
H W Ploeger, University of Wageningen, The Netherlands
- 1630 46 The relevance of milk protein polymorphisms for dairy cattle breeding
H Bovenhuis, University of Wageningen, The Netherlands
- 1650 Discussion
1700 Session Ends

1730 **AGM**

1900 **DINNER USE OF ANIMALS IN THE EDUCATIONAL CONTEXT**

Chairman - Dr J Harland

- 2015 47 Current pupil attitudes and perceptions and a framework for the future
M Reiss, Department of Education, University of Cambridge
- 2045 48 'Food - a fact of life' - food and nutrition education in practice
G Fine, Education Director, British Nutrition Foundation, London
- Poster Presentation** The knowledge and perception of GCSE students to biotechnology applied to agriculture - C M Miles, AFRC, Polaris House, Swindon

SIR JOHN HAMMOND MEMORIAL LECTURE

Chairman Prof J M Forbes

- 0900 49 The relative importance of Public and Industry Funding of Fundamental Research
Prof T Blundell, AFRC, Swindon

1010 COFFEE

RUMINANT METABOLISM

Chairman - Prof D E Beever

- 1030 50 Factors influencing the robustness and accuracy of near-infrared reflectance spectroscopy (NIRS) calibrations for predicting the digestibility of grass silages
C W Baker & D I Givens
- 1050 51 Rumens fermentation and degradability in steers offered grass silage and untreated or sodium hydroxide-treated sugar-beet pulp or rolled or sodium hydroxide-treated barley or wheat
A P Moloney
- 1110 52 Effect of supplement type and grass silage: concentrate ratio on methane production by sheep
A R Moss & D I Givens
- 1130 53 The influence of diet and hence ammonia on energy and nitrogen metabolism across splanchnic tissues in growing cattle
S A Maltby, D E Beever, M A Lomax, L A Crompton & C J Pippard
- 1150 54 Net mesenteric and portal absorption and rumen metabolism of volatile fatty acids in forage-fed steers receiving intraruminal propionic acid
C J Seal & D S Parker
- 1210 55 The effect of ad lib feeding on the efficiency of energy utilisation in growing and lactating cattle
B J Tolkamp & J J M H Ketelaars, University of Wageningen, The Netherlands

1230-1340 LUNCH

RUMINANT REPRODUCTION

Chairman - Dr J J Robinson

- 1340 56 Relationships between observable oestrous behaviour and the number of heifers in oestrus
D Pullar & C A Collins
- 1400 57 The effect of feeding level during a 12 day progesterone-priming period on the viability of embryos collected from superovulated ewes
T G McEvoy, J J Robinson, R P Aitken, C E Kyle & I S Robertson
- 1420 58 Post-ovulation nutritional status in ewes does not influence early conceptus development in vivo or luteotrophic protein secretion in vitro
J M Wallace, R P Aitken & M A Cheyne
- 1440 59 Superovulation in the ewe: The effects of source of gonadotrophin, season, breed and age
K Fernie, W S Dingwall, W A C McKelvey & J Fitzsimons
- 1500 60 The use of a hyper-osmotic diluent for freezing ram semen
Y J Ahangari, R E F Axford & I Ap Dewi
- 1520 Session Ends

POSTERS

Monday 15 March 1993

Poster Session

Vita Dome

Authors in attendance 1420-1500

Discussion 1610-1700

Co-Chairmen Dr R Rodway

Prof I Duncan

Session Opens 1410

ASSESSING ANIMAL WELFARE

- 71 Welfare effects of a new head restraint for slaughter cattle
M H Anil, S Warttig & J L McKinstry
- 72 The effects of handling on stress parameters before religious slaughter in sheep and cattle
M H Anil, T Yesildere, U Coteliloglu & B Nazli
- 73 Noise and stress responses in sheep and pigs
M H Anil, O Ozgen, P D Warriss, T G Knowles, S N Brown, J L McKinstry, J E Edwards,
S J M Adams & R G Rodway
- 74 The effect of slaughter handling system on levels of stress indicators in pig serum
C M Weeding, H J Guise, E J Hunter & R H C Penny
- 75 Teeth clipping in piglets
J B Brookes & I J Lean
- 76 Assessment of immune responses as indicators of welfare in calves
A M Mackenzie, T G Rowan, S D Carter, J B Dixon & J Tebble
- 77 Effect of transportation and husbandry on humoral immune responses in suckler calves
A M Mackenzie, M Drennan, T G Rowan, S D Carter, J B Dixon & J Tebble
- 78 Quantifying nesting motivation in domestic hens
J J Cooper & M C Appleby
- 79 The initial and long term preference of broilers for red, blue or green light after being reared in red, blue, green or white light
D S Prayitno, C J C Phillips & H M Omed
- 80 The effect of supplementary light on the productivity and behaviour of dairy cows during the Spring
C A Lornas, T Arab, C J C Phillips, R F E Axford & R Rodway
- 81 The effect of cubicle mats on the behaviour, health and productivity of dairy cows
P J H Ball, E E A McEwan & J E Offer
- 82 The use of time-budgets in the assessment of animal welfare in the horse; "Are changes in time-budgeting indicative of changes in welfare"
M D Marsden
- 83 Characterisation of behavioural types in pigs: The relationship between feeding behaviour and social rank
H A M Spoolder, J A Burbidge, A B Lawrence, P H Simmins, S A Edwards & E M C Terlouw
- 84 Patterns of response of some physiological indices of stress in pigs negotiating loading ramps
S N Brown, T G Knowles, J L McKinstry, J E Edwards, M H Anil & P D Warriss
- 85 The effects of food level and a foraging device on the behaviour of sows
R J Young & A B Lawrence
- 86 A long term study of the effects of housing conditions on the welfare of domestic pigs
M Mendl, D M Broom & A J Zanella
- 87 Are aggressiveness and social status of group housed sows predictable from observations of earlier behaviour
M Mendl

Monday 15 March 1993

Poster Session

Grand Hall

Authors in attendance 1420-1500

Session Opens 1410

REPRODUCTION

- 88 Litter size in the Matebele goat and its effects on productivity
L Majele-Sibanda, M J Bryant & L R Ndlovu
- 89 Effect of bovine somatotropin (growth hormone) treatment on gonadotropin profiles and ovarian follicle populations during the postpartum period in beef cows in low body condition
L Pinto de Andrade, S M Rhind, I A Wright, S R McMillen & T K Whyte
- 90 A comparison of the frequency of lambing on the reproductive performance of Finn Dorset ewes
C M Minter
- 91 An evaluation of artificial insemination on breeding performance in a commercial pedigree flock of Lleyn ewes
C M Minter
- 92 Effect of body condition and breeding history on the reproductive performance of twenty month old female breeding sheep - L M Mitchell & M E King
- 93 Plasma B-Endorphin and LH during prolonged hypoglycaemia in ewes - A M X Eloy & R G Rodway

Poster Session

Grand Hall

Authors in attendance 1420-1500

Session Opens 1410

DAIRY PRODUCTION

- 94 Influence of urea treatment of straw and of type of protein supplement on the milk production of cows fed maize silage and straw - T Sylvester & J D Leaver
- 95 The effects of feeding a polymer gel to dairy cows in early lactation - P C Garnsworthy
- 96 Whole-crop barley as a supplementary feed for dairy cows grazing at two sward heights
A Hargreaves & J D Leaver
- 97 Sward characteristics and animal performance in a leader/follower grazing system with cows and sheep
G E J Fisher, A Gill & A Dowdeswell
- 98 The intake, digestibility and rate of passage of whole crop wheat and grass silage by growing heifers
J Hill & J D Leaver
- 99 Production responses by cows to grass-clover swards maintained at different heights with or without concentrate supplementation - C A Huckle, A J Rook & R J Wilkins
- 100 Urea treated straw as an ingredient in dairy cow diets - M Iqbal & J D Leaver
- 101 Calibration of a polyurethane foam casting technique for estimating the weight of bovine udders
R J Dewhurst, A M Mitton & C H Knight

Poster Session

Grand Hall

Authors in Attendance 1420-1500

Session Opens 1410

GENETICS

- 102 Superovulatory responses of hill ewes - W Haresign, B Merrell & R W Richards
- 103 An evaluation of MOET in Suffolk sheep - W S Dingwall, W A C McKelvey, J Mylne & G Simm
- 104 Genetic parameters of lamb carcass composition at three endpoints; age, weight and fat cover
G E Pollott, D R Guy & D Croston
- 105 Using BLUP to estimate responses in a sheep flock selected for litter size - G E Pollott
- 106 Genetic evaluation of pedigree beef cattle in Great Britain
R E Crump, J G E Bryan, D Nicholson, R Thompson & G Simm

Tuesday 16 March 1993

Session Opens 0900

Poster Session

Vita Dome

Authors in Attendance 1100-1145

Discussion 1145-1230

Chairman - Mr D Croston

SMALL RUMINANT PRODUCTION

- 107 Use of near infrared reflectance spectroscopy to predict the composition of carcass samples
R Sanderson, S J Lister & M S Dhanoe
- 108 An assessment of growth potential in small sized British sheep breeds
N C Friggens, T H McClelland, I Kyriazakis & M Shanks
- 109 Effects of the utilization of mountain resources on body condition scoring in Latxa ewes and its consequences on reproductive performance
L M Oregui, M V Bravo & D Gabina
- 110 Effect of intraruminal infusions of volatile fatty acids on the intake of a low digestibility straw by sheep
S Lopez & F D deB Hovell
- 111 Effects of synchronising dietary nitrogen and energy supply in diets with a similar carbohydrate composition on rumen fermentation and microbial protein synthesis in sheep
L A Sinclair, P C Garnsworthy, J R Newbold & P J Buttery
- 112 Carcass composition in lambs of Greek dairy breeds of sheep at different degrees of maturity
D Zygoiannis, C Stamataris & N Katsaounis
- 113 Comparison of sodium hydroxide and alkaline hydrogen peroxide in improving chemical composition and utilisation of wheat straw by sheep
A S Chaudhry & E L Miller
- 114 Rate of growth and timing of growth and moulting of secondary fibre in Siberian and Icelandic x Feral goats fed high and low levels of dietary protein
S M Rhind & S R McMillen
- 115 Ewe performance, colostrum yield and serum progesterone concentration of single, twin and triplet bearing ewes fed silage
T F Crosby & J V O'Doherty
- 116 A comparison of the Suffolk and Vendeen breeds when used as terminal sires for crossbred lamb production
B G Merrell
- 117 Factors affecting vitamin A concentration in lamb's liver
T A Hughes & T F Crosby
- 118 Improvements in growth and wool production of winter-grazed Merino weaners when offered a protein-rich supplement
J V Nolan, J A Thomas & M K Hill
- 119 The effects of urea treatment, urea supplementation and coarse milling on the nutrient intake of sheep fed barley straw
A Termanini, A Goodchild, T Treacher, S Rihawi & E Owen
- 120 Cut-and-carry feeding of indigenous grasses in Indonesian smallholder sheep production: effect of amount offered on intake and growth, and on output of compost made from refusals and excreta
J C Tanner, E Owen, M Winugroho & M Gill
- 121 Evaluation of malt distillers wet grains for pregnant ewes
J E Vipond & M Lewis

Continued

SMALL RUMINANT PRODUCTION

- 122 Prediction of digestibility and intake of sheep fed different quality hays from the kinetics of gas production or dry matter degradation
M T Dentinho, K Khazaal, J M Ribeiro & E R Orskov
- 123 The effect of level of milk intake and protein content in the post-weaning diet on internal fat distribution of lambs
T Manso, A R Mantecon, M A Chaso, P Lavin & T Castro
- 124 The effect of the reproductive state and concentrate supplementation on ruminal outflow rates of digesta in ewes
J F Perez, J Gasa, C Castrillo, C Rubio & J A Guada

Tuesday 16 March 1993

Session Opens 0900

Poster Session

Grand Hall

Authors in attendance 0940-1040

PIGS

- 125 Absorption of nutrients by pigs fed diets containing 9% non-starch polysaccharides from sugar-beet pulp or wheatstraw
A C Longland, A G Low, S P Bray & D B Quelch
- 126 The adaptation to and digestion of diets containing sugar beet pulp of Solka Floc by growing pigs
A C Longland, A G Low, S P Bray and D B Quelch
- 127 Digestibility of soya bean meal and raw peas for growing pigs
H E Greer, J McEvoy & K J McCracken
- 128 Effect of the degree of saturation on the digestible energy value of fats fed to growing/finishing pigs
J Powles, J Wiseman, D J A Cole & B Hardy
- 129 Effect of free fatty acid content on the digestible energy value of soyabean oil and tallow fed to growing finishing
J Powles, J Wiseman, D J A Cole & B Hardy
- 130 An assessment of source of supplemental dietary fat during early gestation on foetal survival and foetal measurements in swine
M D Lindemann, A P Rigau, E T Kornegay & A F Harper
- 131 The effect of feed intake on the reproductive performance of first parity sows
C M Carroll, P B Lynch, M P Boland, F H Austin & J F Roche
- 132 Sources of inefficiency at mating in pigs - an appraisal
C V Rikard-Bell, P R English, J H Dunne, O MacPherson, J A Roden, F M Davidson & R Bamlett
- 133 Synchronisation of oestrus in once bred gilts using gonadotrophins (PG600)
A H Stewart, S A Edwards & V R Fowler
- 134 Withdrawn
- 135 Comparison of seven ultrasonic techniques for in vivo estimation of pig carcass composition
C M Yates & M G Owen

SILAGE AND FEEDING BEHAVIOUR

- 136 The selection of winter wheat varieties for whole-crop cereal conservation
R F Weller, A Cooper & R H Phipps
- 137 The composition and energy value of big bale grass silages
D I Givens, A R Moss & E R Deaville
- 138 The effect of feeding grass diets based on silage or wheat to pregnant housed ewes on ewe and lamb performance
P N Johnson
- 139 The effect of complementary supplements on grass silage intake
G Moseley
- 140 Effect of drying temperature and method of analysis on the measurement of cell wall content in forages
E R Deaville & D I Givens
- 141 The fermentable metabolisable energy in grass silage
A T Chamberlain, K Seyoum, D Chapman & C Piotrowski
- 142 The effect of species complexity and sodium fertilizer application on the grazing behaviour of calves
M Youssef, P C Chiy, C J C Phillips & M Metwally
- 143 Grazing of barley stubble by sheep in Syria: effect of stocking rate on selective intake of stubble fractions
S Rihawi, E Owen, A V Goodchild, A Termanini & T T Treacher
- 144 Encouraging store lambs to eat barley straw at housing: Influence upon intake of pen to pen visibility and number of lambs per pen
F N A Odoi & E Owen
- 145 Vertical 'reach' capacity of sheep and goats fed through barriers
V R M Muhikambele, E Owen & J E Owen
- 146 Ingestive behaviour of cows grazing grass-clover swards maintained at different heights with or without concentrate supplementation
A J Rook, C A Huckle, P D Penning & R J Wilkins
- 147 The effects of feeding silage and sugar beetpulp, separately or ensiled to twin bearing pregnant ewes, on ewe and lamb performance
J V O'Doherty, T F Crosby & P J Quinn
- 148 A comparison of grass silage and whole crop fodder beet silage when fed to ewes in late pregnancy
J V O'Doherty, P J Quinn & T F Crosby
- 149 The effect of varying cattle trough height on their reach and food wastage
A M Petchey & T Hailu
- 150 Relationships between social dominance and feeding behaviour in lactating heifers during periods of heavy competition
A D Kenwright & J M Forbes

Tuesday 16 March 1993

Session Opens 0900

Poster Session

Grand Hall

Authors in attendance 0940-1040

THE APPLICATION OF MOLECULAR BIOLOGY TO ANIMAL SCIENCE

- 151 Ontogenic study of expression of IGF-1 and G H-receptor (GHR) mRNA in pig liver and skeletal muscle
J M Brameld, P A Weller, R S Gilmour & P J Buttery
- 152 The molecular biology of trophoblast α_{H} interferons
A P F Flint, G E Lamming & H Stewart
- 153 The generation of non-ruminant transgenic animals with cellulolytic capacity
J Hall, S Ali, M Azim Surani, G P Hazlewood, A J Clark, J P Simons, B H Hirst & H J Gilbert
- 154 Studies on the structure and function cellulases and hemicellulases
H J Gilbert & G P Hazelwood
- 155 The use of genetically Lactobacillus plantarum in the ensilage process
H J Gilbert, J E Rixon, R S Sharp, A G O'Donnell & G P Hazelwood
- 156 Studies on sorted X and Y enriched populations of bull spermatozoa
N G A Miller, E A Howes, D G Cran & L A Johnson
- 157 Prospects for mapping bovine genes affecting disease and production
S P Simpson & J L Williams
- 158 Acute and Chronic effects of β -agonist treatment on calpastatin gene expression and muscle growth in sheep
P A Speck, K M Collingwood, R G Bardsley, R S Gilmour, G A Tucker & P J Buttery
- 159 Autocrine control of milk secretion by a milk protein
C J Wilde, C V P Addey, F M Campbell, S A Connor, M A Kerr & C H Knight

Tuesday 16 March 1993

Session Opens 0900

Poster Session

Grand Hall

Authors in attendance 0940-1040

NUTRITION AND METABOLISM

- 160 Effects of *Yucca schidigera* extract on *Bacillus pasteurii* urease activity
D R Headon & G Killeen
- 161 Adhesion of lactobacilli to small intestinal cells
A Phillips & D S Parker
- 162 Jerry Hughes Memorial Scholarship
A Phillips
- 163 Changes in the trace element concentrations of developing chick embryo brain tissue
A MacPherson, J Dixon, R C Noble, B Speake & M Cocchi
- 164 Lipid blends and antioxidant supplements in broiler chicken diets: Effects on performance, meat properties and storage quality
J R Scaife, P Iji, W Michie & M Davis
- 165 Full-fat rapeseed and field beans in broiler diets
S A A Mutalab & R R Smithard

RUMINANT METABOLISM

- 166 WITHDRAWN
- 167 The use of a novel in vitro technique for the assessment of the ruminal degradation of soya bean meal
A T Chamberlain
- 168 The effect of drying method on the degradation characteristics of grass silage
A T Chamberlain & F Endalew
- 169 The use of the Gas Pressure Transducer Technique for the assessment of the ruminal degradation of the dry matter of protein supplements
A T Chamberlain
- 170 The effect of previous microbial experience on the gas production profiles in the Gas Pressure Transducer system
A T Chamberlain
- 171 The effect of gossypol on the rumen microbial degradation of grass hay under consecutive batch culture (CBC)
Ismartoyo, T Acamovic & C S Stewart
- 172 Use of the rumen simulation technique (RUSITEC) to provide micro-organisms for assessing the rate of fermentation, in vitro, of forages
J H T Barbi, E Owen & M K Theodorou
- 173 The effect of increased absorption of ammonia and arginine on splanchnic metabolism of beef steers
S A Maltby, C K Reynolds, M A Lomax and D E Beaver
- 174 Comparative study of rumen activity in Churra and Merino sheep
M D Carro, F J Giraldez, M J Ranilla, J S Gonzalez & A R Mantecon
- 175 The effect of yeast culture on rumen fermentation: Growth of the yeast in the rumen and the requirement for viable yeast cells
S M El Hassan, C J Newbold & R J Wallace
- 176 Salivary losses of purine derivatives in sheep
J Surra, J A Guada, J Balcells & C Castrillo
- 177 Diurnal variation in urinary purine derivative excretion of dairy cows on different feeding patterns
J M Moorby & R J Dewhurst
- 178 Supplementation of barley straw with starch in sheep: Effect on microbial protein supply estimated from urinary purine derivative excretion
M J Gomes, X B Chen, F D Deb Hovell, D Fikremariam & E M Nengomasha
- 179 Effect of diets differing in the ratio of molassed sugar beet feed to barley and yeast culture on growth and rumen metabolism of sheep
Y Rouzbehan, J A Rooke, H Galbraith & J G Perrott
- 180 Effect of sward height on rumen degradation in Merino grazing sheep
A R Mantecon, M D Carro, F J Giraldez, M J Ranilla, P R Revesado & J S Gonzalez
- 181 The effect of reduced protein supply on energy and nitrogen metabolism in early lactation cows
F Sutter & D E Beaver

Continued

RUMINANT METABOLISM

- 182 The effects of low molecular weight phenolics in the ruminant gut metabolism
R Parrinder, P J Buttery, J M Dawson, C D Wood & M Gill
- 183 The effect of level of available carbohydrate, offered as a supplement to a forage based diet, on intake, milk yield and milk composition
R Mansbridge
- 184 The intake and digestion of high and low digestibility ryegrass hays by South American camelids and sheep
J A Riley, D H Baker & G M Moseley
- 185 Effect of basal diet on sheep rumen degradability of different feedstuffs
M A Chaso, T Manso, F J Giraldez & A R Mantecon
- 186 Purine derivatives excretion in sheep urine in relation to metabolizable energy and rumen degradable protein intake
F J Giraldez, R Pelaez, E Zorita & C Valdes
- 187 Effects of sustained release boluses providing selenium and vitamin E on blood glutathione levels of cows and their calves
R G Hemingway, J J Parkins, D C Lawson & C L Allan
- 188 Overestimation of solubility by dacron bag methodology
J E Cockburn, M S Dhanoa, J France & S Lopez
- 189 Plasma iodine status in steers treated with iodine
P A M Rogers, J A Larkin & A P Moloney
- 190 The effect of supplementation with starch on the voluntary intake of straw and the flux of water from the rumen of sheep
E M Nengomasha, D Fikremariam, F D Deb Hovell & S Lopez
- 191 Development of an in vitro technique to investigate growth and metabolism of mohair follicles of the Angora goat
M Ibraheem, H Galbraith, J R Scaife & S Ewen
- 192 Nutritional and hormonal regulation of hepatic IGF-1 production in sheep and rats
Q J Luo & J C MacRae
- 193 Solubilization of macro-mineral elements in vivo from fresh herbage and their availabilities to, and uptake by steers
P C Chiy & C J C Phillips

Wednesday 17 March 1993

Session Opens 0900

Poster Session

Vita Dome

Authors in Attendance 1030-1115

Discussion 1135-1230

(Theatre paper at 1115)

Chairman - Dr I Kyriazakis

JOINT WPSA/BSAP SESSION

DIET SELECTION

- 194 The selection by young pigs of dietary cereal and protein fractions supplemented with amino acids to idealise protein contents
W J Healy, B P Gill, P R English & F M Davidson
- 195 Selection of dietary lysine and threonine concentration of growing pigs
R A C Fairley, S P Rose & M F Fuller
- 196 The diet selection of lambs offered food choices of different nutrient density
S D B Cooper & I Kyriazakis
- 197 The effect of physiological state (late pregnancy) on the diet selection of ewes
S D B Cooper, I Kyriazakis, D H Anderson & J D Oldham
- 198 Diet selection of cockerels and the feeding value of wheat
S P Rose, G Abbas

TROPICAL FORAGES

- 199 Effect of field storage on quantity and quality of sorghum (*Sorghum bicolor* Moech), stover and lablab (*Lablab purpureus* (L) Sweet), haulm
A J Kitalyi, E Owen, L A Mtenga
- 200 Feeding chopped sorghum stover to Ethiopian sheep: Effects of sorghum variety and amount offered on intake, digestibility and live-weight change
E L K Osafo, E Owen, A N Said, M Gill, A B McAllan & J Sherington
- 201 The nutritive value of some Greek browsing species as affected by maturity and antinutritive compounds
X Markantonatos, K Khazaal & E R Orskov
- 202 The particle size distribution in Colombian rice polishings and its effect on gas production by rumen microorganisms *in vitro*
D Cardenas Garcia, H Galbraith, C J Newbold & J A Rooke
- 203 The nutritive value of some tropical forage legumes from Zimbabwe
T Acamovic, J Hare & J H Topps
- 204 Effect of feeding groundnut hay as a supplement to a basal diet of sorghum stover on intake and growth rate of Zebu cattle
A Kibon & S M Yahaya
- 205 Effects of accession and cutting frequency on the rumen degradability of nitrogen in the foliage of *Sesbania sesban varnubica*
K Otieno, M J Bryant & J F M Onim
- 206 Comparison of the *in vitro* rumen fermentation of forage legumes *Sesbania rostrata* and *Sesbania aculeata*
M A Akbar, J R Scaife, T Acamovic & C S Stewart
- 207 Milk production and rumen measurements in crossbred cattle fed Napier grass *ad libitum* supplemented with two levels of leucaena and maize bran
R W Muinga, J A Rooke, W Thorpe L Reynolds & J H Topps

BEEF

- 208 A three-year comparison of profitability of organic and conventional beef production systems
D Younie, G W Carr & D S Yackiminie
- 209 Effect of offering concentrate rations with different energy densities on calf performance
R J Fallon & J R Twigge
- 210 Predicting chronological age at slaughter from the dentition of young bulls
D J Gair, K D Sinclair & C C Warkup
- 211 The performance, carcass characteristics and meat quality of two breeds of cattle taken to slaughter at three different levels of backfat thickness
S Thomas & K Demeke
- 212 Effect of extended daylength on appetite, liveweight performance, and attainment of slaughter weight in weaned deer stag calves
M H Davies & A P Wade
- 213 Effects of feeding level, season of calving and body weight on performance and carcass traits of Friesian x native calves
S T M Fahmy, H A Hassan, F M R el-Feel & N H A Morsy
- 214 Effects on performance and meat characteristics of a diet supplemented with fat during the finishing period of growing fattening bulls
V Hollo, C Marche, I Dufrasne, C Van Eenaeme & L Istasse
- 215 Comparison of 2 growth patterns during the growing period in fattening bulls 1. Animal Performances
J L Hornick, C Van Eenaeme, A Clinquart, N Korsak & L Istasse
- 216 Comparison of 2 growth patterns during the growing period in fattening bulls 2. Plasma Metabolites and Hormones
C Van Eenaeme, A Clinquart, J L Hornick, P Mayombo & L Istasse
- 217 Comparison of 2 growth patterns during the growing period in fattening bulls 3. Slaughter characteristics, carcass composition and meat quality
A Clinquart, C Van Eenaeme, T Van Vooren, J Van Hoof & L Istasse

Wednesday 17 March 1993

Session Opens 0900

Poster Session

Vita Dome

Authors in Attendance 0930-1030

**(2 Theatre papers at 1340 & 1400
in the Regency Room)**

Discussion 1430-1510

Chairman - Ms S Tucker

JOINT WPSA/BSAP SESSIONS

ALTERNATIVE PRODUCTION SYSTEMS

- 218 Design of modified cages for laying hens: effects on behaviour and welfare
M C Appleby
- 219 Evaluation of the usefulness of the provision of shredded paper as bedding in a slatted floored farrowing pen
K Stamatopoulos, P R English, O MacPherson, J A Roden, F M Davidson & J Williams
- 220 Nest site choice by farrowing sows offered cubicles or parallel walls
A M Petchey
- 221 The effects of dry sow housing conditions on responses to farrowing
J N Marchant & D M Broom
- 222 The effect of environment on plasma cortisol in parturient sows
A B Lawrence, J C Petherick, K A McLean, L A Deans, J Chirnside & A Vaughan
- 223 Behaviour and performance of lactating sows and piglets housed individually or in a multisuckling system
A Sinclair, S A Edwards, A Cruickshank & P R English
- 224 Summer-Winter behavioural comparisons of allowing the farrowing and lactating sow greater freedom
A R Rudd, M T Mendl, P H Simmins & D M Broom
- 225 Comparison of methods to measure hierarchies in group-housed sows and the interaction with feeding regime
F M R Brouns, S A Edwards & P R English
- 226 A Comparison of a straw-based and slatted floor housing system for the weaned pig
M Britton, J A Roden, O MacPherson, G Willox & P R English
- 227 Effect of environmental enrichment on behaviour, growth and meat quality in the domestic pig
V E Beattie, I A Sneddon & N Walker
- 228 The litter and wire system of housing for laying hens
D M Alvey & S A Tucker
- 229 Behaviour of sows in a free-access farrowing section
H W J Houwers, R G Bure & P Koomans

Session Opens 1510

Poster Session

Regency Room

Authors in Attendance 1600-1620

(2 Theatre papers at 1520 & 1540)

Chairman - Dr S E Solomon

METABOLIC DISORDERS

- 230 Effect of Ascorbic acid and $1,25(\text{OH})_2\text{D}_3$ on bone cell metabolism in relation to the development of tibial dyschondroplasia
C Farquharson, J S Rennie, N Loveridge & C C Whitehead
- 231 Assessment of the welfare of food restricted broiler breeder males with musculo-skeletal lesions
P M Hocking