

**BRITISH SOCIETY**

**OF**

**ANIMAL PRODUCTION**

  

**WINTER MEETING**

**13 - 15 March 1989**

**GRAND HOTEL**

**SCARBOROUGH**

**PROGRAMME AND SUMMARIES**

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## BRITISH SOCIETY OF ANIMAL PRODUCTION

WINTER MEETING 1989

## PROGRAMME

| DAY                   | TIME   | THEATRE SESSIONS                                      |  | POSTER SESSIONS   |  |
|-----------------------|--------|---|--|---|--|
| MONDAY<br>13 MARCH    |        | Ballroom  | South Lounge                                 | <u>Prediction and Measurement of Intake by Cattle</u><br>Sea View Lounge<br>Session opens 1410<br>Authors in attendance 1420-1550<br>Discussion 1610-1710<br><u>Pig and Poultry Production</u><br>Balcony<br>Session opens 1440<br>Authors in attendance 1610-1740    |  |
|                       | 1400   | The President   |  |   |  |
|                       | 1410   | Beef Production and Nutrition                         | Reproduction                                 |   |  |
|                       | 1550   | TEA   |  |   |  |
|                       | 1610   | Increasing the Productivity of Suckler Beef Systems   | Genetics                                     |   |  |
|                       | 1900   | SCARBOROUGH TOWN COUNCIL RECEPTION                    |  |   |  |
|                       | 1945   | ANNUAL DINNER   |  |   |  |
| TUESDAY<br>14 MARCH   | 0850   | Dairy Feeding and Milk Production                     | Pig Production                               | <u>Sheep</u><br>Sea View Lounge and Balcony<br>Session opens 0920<br>Authors in attendance 1050-1220<br><br><u>Goat Production</u><br>Balcony<br>Session opens 0920<br>Authors in attendance 1050-1220  |  |
|                       | 1030   | COFFEE  |  |   |  |
|                       | 1050   | High Forage Diets for Beef and Dairy Cattle           | Pig Growth and Nutrition                     |   |  |
|                       | 1230   | LUNCH   |  |   |  |
|                       | 1350   | Future Trends in Food Technology and Marketing        | Ruminant Nutrition                           |   |  |
|                       | 1530   | TEA   |  |   |  |
|                       | 1550   | PLENARY SESSION<br>1992 and the UK Livestock Industry |  |   |  |
|                       | 1800   | ANNUAL GENERAL MEETING                                |  |   |  |
| 1945                  | DINNER |   |  |   |  |
| WEDNESDAY<br>15 MARCH | 0900   | SIR JOHN HAMMOND MEMORIAL LECTURE                     |  | <u>Beef Production and Nutrition</u><br><u>Cattle Production and Nutrition</u><br>Sea View Lounge<br>Session opens 0900<br>Authors in attendance 1030-1200<br><u>Ruminant Feeds and Nutrition</u><br>Balcony<br>Session opens 0900<br>Authors in attendance 1030-1200 |  |
|                       | 1010   | COFFEE  |  |   |  |
|                       | 1030   | Growth Enhancers and their Use in Practice            | Production and Management of Small Ruminants |   |  |
|                       | 1220   | LUNCH   |  |   |  |
|                       | 1340   | Lamb Nutrition and Growth                             | Cattle Nutrition                             |   |  |
|                       | 1520   | CLOSE OF MEETING                                      |  |   |  |

**BEEF PRODUCTION AND NUTRITION**

CHAIRMAN - DR R M CRABTREE

- 1400            Opening remarks by the BSAP President, Prof. J H D Prescott
- 1410            1    Effects of pre-calving nutrition on the performance of twin  
                 bearing beef cows and their calves  
                 J H Topps , Md Nurul Islam, P J Broadbent and G F M Paterson
- 1430            2    Body composition changes in cattle during compensatory growth  
                 I A Wright    and A J F Russel
- 1450            3    Interrelations between beef carcass type, chilling rate and  
                 weight loss and meat quality  
                 A V Fisher, A J Gigiel, G R Nute and M V L Swain
- 1510            4    A comparison of wheat and barley as supplements to grass silage  
                 for beef cattle  
                 R W J Steen
- 1530            5    The effects of forage: concentrate ratio and protein  
                 supplementation for finishing beef heifers  
                 A E Robson    and R W J Steen
- 1550            T E A

**INCREASING THE PRODUCTIVITY OF  
SUCKLER BEEF SYSTEMS**

CHAIRMAN - MR G H BARNES

- 1610            6    Modern techniques for enhancing reproduction in suckler cattle  
                 systems  
                 I Gordon, University College, Dublin
- 1630            7    Efficient and effective cow feeding  
                 I A Wright and A J F Russel, MLURI, Edinburgh
- 1650            8    Once-bred heifer systems  
                 I Rigby, ADAS, High Mowthorpe EHF
- 1710            9    The potential for increasing slaughter weights of suckled calves  
                 A W Spedding, MLC, Milton Keynes
- 1730            Discussion
- 1800            Session ends
- 1900            SCARBOROUGH TOWN COUNCIL RECEPTION
- 1945            ANNUAL DINNER

## REPRODUCTION

CHAIRMAN - DR W HARESIGN

- 1410 10 Ovulation rate and embryo survival in Icelandic ewes  
J P Hanrahan , S Adalsteinsson, S Thorgeirsson, S S  
Thorsteinsson & E Eythorsdottir
- 1430 11 Direct intrauterine versus cervical insemination: effects on egg  
recovery and fertilization in superovulated ewes  
J J Robinson , J M Wallace & R P Aitken
- 1450 12 Intrauterine insemination in super- ovulated ewes: the effects  
of depositing semen in one versus two uterine horns at 48 or 60  
hours after progestagen withdrawal  
J M Wallace , J J Robinson and R P Aitken
- 1510 13 The influence of volume of food intake by gilts on blood flow in  
the portal vein and clearance of progesterone from plasma  
H W Symonds and G Prime
- 1530 14 In vitro culture of embryos produced by in vitro maturation and  
fertilization of bovine follicular oocytes  
V Vergos, A Gordon, M Gallagher and I Gordon
- 1550 T E A

## GENETICS

CHAIRMAN - DR J R WALTERS

- 1610 15 Genetic estimates for growth and carcass traits of pigs from  
closed herds on restricted feeding  
C S Haley , Y Gu and R Thompson
- 1630 16 Genetic relationships between carcass and meat/eating quality  
traits in pigs  
N D Cameron and P D Warriss
- 1650 17 Optimum selection indexes for production traits of  
Holstein/Friesian cattle in Britain  
J P Gibson
- (18 Transferred to Sheep poster session on Tuesday)
- 1710 19 Phenotypic and genetic variation for ovulation rate in Cambridge  
sheep  
J P Hanrahan
- 1730 The implications of changes of R & D funding for animal  
production  
J H D Prescott, P N Wilson, D W F Shannon, L K O'Connor, G  
Harrington and others
- 1830 Session ends
- 1900 SCARBOROUGH TOWN COUNCIL RECEPTION
- 1945 ANNUAL DINNER

DAIRY FEEDING AND MILK PRODUCTION

CHAIRMAN - PROF. J D LEAVER

- 0850 20 The effect of long-term daily administration of bovine somatotrophin on the performance of dairy cows over a second consecutive lactation  
R F Butterwick , T E C Weekes, P Rowlinson, D S Parker and D G Armstrong
- 0910 21 Evaluation of a slow release form of recombinantly derived bovine somatotropin (BST) in dairy cattle  
J Kim , R C Campling and M E Tarrant
- 0930 22 The effect of compound level and silage quality on the performance of October calving dairy cows  
O D Davies
- 0950 23 The interaction between level of protein and the response to specific nutrients in high silage diets  
C Thomas , A Crocker, W Fisher, C Walker and A Reeve
- 1010 24 The effect of crude protein content of the supplement on the response to level of supplementation for dairy cows with ad libitum access to grass silage  
C S Mayne
- 1030 C O F F E E

HIGH FORAGE DIETS FOR BEEF  
AND DAIRY CATTLE

CHAIRMAN - DR C THOMAS

- 1050 25 High forage diets for dairy cows  
C S Mayne, Hillsborough, N.I.
- 1115 26 High forage diets for beef cattle  
R W J Steen, Hillsborough, N.I.
- 1140 27 Financial aspects of high forage diets for beef and dairy cattle  
T Bradfield, Regional Farm Management Advisor, WOAD/ADAS,  
Trawsgoed
- 1205 Discussion
- 1230 L U N C H

PIG PRODUCTION

CHAIRMAN - DR D LISTER

- 0850 28 Developments in pig reproduction and production in the USA:  
Report of the 1988 Braude Scholarship study tour  
S A Edwards
- 0910 29 The effect of recombinant porcine somatotropin on the growth of  
pigs given different concentrations of protein in the diet  
V R Fowler , M Kay, H M Thikey, R M Livingstone, K Pennie  
and I C Hart
- 0930 30 The short term effects of abrupt diet composition changes in  
growing pigs  
I Kyriazakis , G C Emmans and C T Whittemore
- 0950 31 Energy metabolism studies in pigs fed diets containing sugar  
beet pulp  
W H Close , A C Longland and A G Low
- 1010 32 Intake and performance of growing pigs fed diets containing  
0,150,300 or 450 g/kg molassed or plain sugar beet pulp  
J C Bulman , A C Longland, A G Low, H D Keal and J I Harland
- 1030 C O F F E E

PIG GROWTH AND NUTRITION

CHAIRMAN - DR M F FULLER

- 1050 33 An empirical model for estimating feed allowances for breeding  
sows  
C T Whittemore
- 1110 34 The partition and utilisation of energy and nitrogen by sows  
during their first lactation  
B P Mullan and W H Close
- 1130 35 The phosphorous requirements of growing pigs  
V R Fowler , D Scott and R A Houseman
- 1150 36 The effect of body composition on diet selection of growing pigs  
I Kyriazakis , G C Emmans and C T Whittemore
- 1210 37 Influence of fodder beet on growth performance and carcass  
characteristics of growing/finishing pigs  
P A Boyd , D J A Cole, J Wiseman and P J Thorne
- 1230 L U N C H

Tuesday 14 March 1989

Theatre Session  
Ballroom

TRENDS IN FOOD TECHNOLOGY  
AND MARKETING

CHAIRMAN - PROF. P C THOMAS

- 1350 38 Future trends in food technology and marketing  
G Harrington, Director of Planning and Research, MLC,  
Milton Keynes
- 1415 39 New products from milk  
N S White, Director of Operations, MMB
- 1440 40 New products from meat  
R I Richardson, IFR, Bristol
- 1505 Discussion
- 1530 T E A

PLENARY SESSION

1992 AND THE UK LIVESTOCK INDUSTRY

CHAIRMAN - PROF. J H D PRESCOTT

- 1550 41 1992 and the UK livestock sector - an overview  
N A Young, Centre for European Agricultural Studies, Wye  
College
- 1610 42 1992 implications for the health and welfare of livestock in the  
UK  
T J L Alexander, University of Cambridge
- 1630 43 1992 implications for the UK dairy industry  
D Jones, Strategic Planner for Milk Marketing, MMB
- 1650 44 1992 implications for the UK pig industry  
R W Dean, Dean Agricultural Associates, London
- 1710 Discussion
- 1745 Session ends
- 1800 ANNUAL GENERAL MEETING
- 1945 onwards DINNER

RUMINANT NUTRITION

CHAIRMAN - DR B R COTTRILL

- 1350 45 Protection of proteins from degradation in the rumen by heating in the presence of sugars  
R J Wallace
- 1410 46 Effects of replacing rolled barley with either molassed sugar beet feed or lucerne meal in complete pelleted diets for young calves  
A I Frost , G M Innes and P E V Williams
- 1430 47 Contribution of palatability to differences in the intake of ground and pelleted roughages by sheep.  
F D D Hovell , D V Rayner, G H Clark, D J Kyle and S J Miller
- 1450 48 Herbage intake of cattle, sheep and goats grazed alone and in mixtures on ryegrass-white clover pasture  
H A Collins and A M Nicol
- 1510 49 A comparison of near infra-red reflectance spectroscopy with three in vitro digestibility methods to predict digestibility in vivo in cereal straws  
D I Givens, J M Everington and C K Baker
- 1530 T E A

1550-1745

Ballroom

P L E N A R Y S E S S I O N

See opposite page for details

1800 ANNUAL GENERAL MEETING

1945 DINNER  
onwards



**SIR JOHN HAMMOND MEMORIAL LECTURE**

CHAIRMAN - DR M BICHARD

0900            John Hammond - Science into Practice  
                 E J C Polge, Animal Biotechnology Cambridge

1010            C O F F E E

**GROWTH ENHANCERS AND THEIR USE  
IN PRACTICE**

CHAIRMAN - DR J P HANRAHAN

1030        50    Gut-active growth enhancers - probiotics and antibiotics  
                 D G Armstrong and D S Parker, University of Newcastle upon  
                 Tyne

1050        51    The use of growth hormone and Beta agonists to improve animal  
                 production  
                 J F Roche, University College, Dublin and W J Enright,  
                 TEAGASC

1110        52    The influence of Beta-adrenergic agonists and exogenous growth  
                 hormone on lean meat quality  
                 P D Warriss, IFR, Bristol

1130        53    Political considerations  
                 A Buckwell, Wye College

1150            Discussion

1220            L U N C H

Wednesday 15 March 1989

Theatre Session  
Ballroom

0900-1010 SIR JOHN HAMMOND MEMORIAL LECTURE

See opposite page for details

1010 C O F F E E

South Lounge

PRODUCTION AND MANAGEMENT OF SMALL  
RUMINANTS

CHAIRMAN - DR J M WILKINSON

- 1030 54 The endocrine control of fibre growth and shedding in cashmere  
goats  
P Lynch and A J F Russel
- 1050 55 Influence of clipping regime and silage quality on the  
performance of pregnant and lactating ewes  
H J Black and D M B Chestnutt
- 1110 56 Use of intraruminal soluble glass boluses containing two levels  
of melatonin for early lamb production  
D C Brown , E M Thomas, R A Jones and A L Poulton
- 1130 57 Stimulation of seasonally anovular Mule ewes by rams  
M F Ibraheem , M E King, J S M Hutchinson, G J Gunn,  
L Taylor and T Atkinson
- 1150 Session ends
- 1220 L U N C H

LAMB NUTRITION AND GROWTH

CHAIRMAN - DR J A MILNE

- 1340 58 Lamb performance on swedes supplemented with barley or soyabean meal  
W S Dingwall , J E Vipond, H E Brown and E A Hunter
- 1400 59 Evaluation of swede varieties with high, medium and low dry matter content in finishing systems for crossbred lambs from hill ewes  
J E Vipond , M E King and G Z Wetherill
- 1420 60 Efficiencies of use of the metabolisable energy from feeds based on barley or sugarbeet feed in immature sheep  
G C Emmans , M R Cropper, W S Dingwall, H Brown, J D Oldham and J I Harland
- 1440 61 The effect of the nature, level and frequency of feeding of supplement on the voluntary forage intake of wether sheep  
H F Eayres , D H Anderson and J D Oldham
- 1500 62 The influence of changes in tissue shape on muscle: bone ratio in growing sheep  
M J Young
- 1520 CLOSE OF MEETING

CATTLE NUTRITION

CHAIRMAN - DR M KAY

- 1340 63 An assessment of the potential of a lactobacilli inoculant as a silage additive  
P G Hooper , R Sharp, P Rowlinson and D G Armstrong
- 1400 64 Effects of replacing barley/soya with malt distillers grains (draff) in silage based complete diets for dairy cows  
J J Hyslop and D J Roberts
- 1420 65 A comparison of naked oats and barley in a silage-based diet for dairy cows  
P A Martin and D J Roberts
- 1440 66 The effect of two different protein sources in the diet upon the incidence and prevalence of lameness in dairy cattle  
D N Logue , A Lawson, D J Roberts and E A Hunter
- 1500 67 The energy metabolism of twin bearing cows  
P E V Williams , P J Broadbent, A Macdearmid and G S Mollison
- 1520 CLOSE OF MEETING

Monday 13 March 1989

Poster Session  
Sea View Lounge  
Authors in attendance 1420-1550  
Discussion on Monday 1610-1710  
CHAIRMAN - DR M GILL

Session opens 1410

PREDICTION AND MEASUREMENT OF INTAKE  
BY CATTLE

- 68 Prediction of voluntary intake of grass silage by growing cattle using ridge regression  
A J Rook, M Gill and M S Dhanoa
- 69 Prediction of size-scaling effects on forage intake and digestion using a model of digesta flow  
A W Illius and I J Gordon
- 70 Prediction of voluntary intake of conserved forages by cattle and sheep from degradability characteristics determined using synthetic fibre bags in sheep  
E L Miller and E O K Oddoye
- 71 The possibility of predicting the sheep voluntary dry matter intake of hays from their rumen degradation characteristics  
S Lopez, M D Carro, J S Gonzalez and F J Ovejero
- 72 Effect of soluble constituents of silage on oro-pharyngeal intake response of sheep  
J G Buchanan-Smith
- 73 The effects of rate of protein degradation in silage supplements on performance of beef cattle  
A Belete-Adinew and P C Garnsworthy
- 74 Simple simulation: prediction of intake by dairy cows using a spreadsheet model  
J M Forbes
- 75 Combined effects of intraruminal application of acetate, propionate and distension on silage intake by dairy cows  
J N Mbanya, M H Anil and J M Forbes
- 76 Depression in silage intake by infusion of propionate into the rumen of the dairy cow  
M H Anil, J N Mbanya and J M Forbes
- 77 Factors affecting silage intake of dairy cows fed low levels of compound  
O D Davies and V J Theobald
- 78 The effect of moving onto silage aftermath in mid-season on the intake and performance of young growing cattle  
S C Wilkinson and C K Mackie

## PIG AND POULTRY PRODUCTION

- 79 Studies on the firmness of backfat in bacon-weight pigs  
C H Briggs and J D Wood
- 80 Response of modern hybrid pigs to dietary energy concentration  
S A Chadd and D J A Cole
- 81 Preliminary observations on skatole production in pigs  
M Have, N Walker, M Porter and B W Moss
- 82 Ad libitum feeding of finishing pigs using single-space or  
multi-space feeders  
R M Kay, A W Armsby and A L Lightfoot
- 83 Effect of feeding level during rearing and pregnancy on gilt  
performance  
P H Simmins, S A Edwards, H H Spechter and J E Riley
- 84 Long-term performance and body composition of sows given differing  
levels of feed intake during pregnancy and lactation  
P A Lee, W H Close and J D Wood
- 85 Evaluation of fibrous by-product feeds for the pregnant sow using  
antibiotic suppression to measure degree of fermentation  
S A Edwards, B A Njotu and V R Fowler
- 86 The influence of free fatty acid content on the apparent  
metabolisable energy value of tallow fed to broiler chicks  
F Salvador and J Wiseman
- 87 Evaluation of the performance of British Landrace pigs under tropical  
conditions of Zimbabwe  
N Pathiraja, K T Mandisodza and L Nyabako
- 88 Degree of enclosure preferred by sows around farrowing  
K Hunt and A M Petchey
- 89 Farrowing site preference by sows  
D S Arey, A M Petchey and V R Fowler
- 90 Social activity and feeder use by 'dynamic' group of 40 sows using a  
sow-operated computerised feeder  
E J Hunter, S A Edwards and P H Simmins
- 91 Further quantification of pigs' need for food using operant  
conditioning  
A B Lawrence and A W Illius
- 92 Analysis of individual differences in behavioural responsiveness in  
pigs  
C Terlouw, A B Lawrence and A W Illius
- 93 A model relating litter size to ovulation rate and embryo survival in  
pigs  
J P Hanrahan
- 94 The effect of dietary intake and litter size on the productivity of  
first-litter sows  
B P Mullan and W H Close

## SHEEP

- 95 The response of silage-fed Scottish Blackface lambs to different levels of energy and protein supplementation with or without a store period  
G M Povey, G M Webster and T E C Weekes
- 96 The effect of pattern of food supply on intake, growth and body components in Beulah and Welsh Mountain lambs  
A R Mantecon, G R Iason, J A Milne, A D M Smith, I R White and D A Sim
- 97 Effects on lambs of ingestion of soil treated with sewage sludge  
J E Hall and B A Stark
- 98 Rumen microbial detoxification as a possible explanation for the tolerance of lambs to brassica derived glucosinolates  
A J Duncan and J A Milne
- 99 Factors affecting the utilised output from grass by British sheep flocks  
G E Pollott
- 100 Oats and naked oats: recent studies of composition, digestibility and energy value for ruminants  
J M Everington and D I Givens
- 101 Feeding maize silage to pregnant ewes  
D C Brown and E M Thomas
- 102 Ensiling grass and straw mixtures: effect of an enzyme additive and urea on chemical composition and nutritive value for sheep  
R C Jakhmola, J R Weddell and J F D Greenhalgh
- 103 Effects of intraruminal infusions of sodium salts on the selection of hay and concentrate diets by sheep  
E A Engku Azahan and J M Forbes
- 104 The effect of dietary sodium on the energetic efficiency of microbial yield from the rumen of sheep  
R J Dewhurst and A J F Webster
- 105 Effect of ammonia treatment and supplementation on barley straw intake by sheep  
M Fondevila, C Castrillo, J Gasa and J A Guada
- 106 Ewe and lamb performance on perennial ryegrass and perennial ryegrass plus white clover swards under controlled sward heights  
J E Vipond, G Swift, J FitzSimons, T H McClelland, J A Milne and E A Hunter
- 107 Long-term patterns of food selection in sheep growing towards maturity  
X Z Hou, D H Anderson, A W Illius, G C Emmans and J D Oldham
- 108 The integration of a ewe flock with the dairy herd  
E G O'Riordan
- 109 Plasma cortisol and B-endorphin concentrations in lambs after handling, transport and slaughter  
D P Fordham, G A Lincoln, E Ssewanyana and R G Rodway
- 110 The effect of repeated handling on the stress response of sheep to handling  
A L Hargreaves and G D Hutson
- 111 The efficacy of an anthelmintic (mebendazole) under different dosing strategies in controlling nematode parasite infection in sheep and pasture contamination  
T E Lawton and A W Speedy
- 112 The use of Fecundin with or without PMSG in late-lambing Mule ewes synchronized with progestagen sponges  
G H Sadeghi Namaghi and G M Webster
- 113 Successful pregnancies following transfer of ovine embryos recovered 24 to 29 days after parturition  
J M Wallace, J J Robinson and R P Aitken

Tuesday 14 March 1989

Session opens 0920

Poster Session

Sea View Lounge

Authors in attendance 1050-1220

### SHEEP (contd.)

- 114 Effect of restricted food intake before and/or after mating on FSH, LH and progesterone profiles in Greyface ewes  
S McMillen, S M Rhind, R G Gunn and W A C McKelvey
- 115 Effect of level of food intake on hypothalamo-pituitary sensitivity to ovarian steroid feedback in ewes  
S M Rhind, S McMillen and W A C McKelvey

Balcony

- 116 A system of store lamb finishing from roots involving the slimming of overfat lambs and ad libitum concentrate feeding of underfinished lambs  
A Waterhouse and L C Roger
- 117 Withdrawn
- 118 The effect of shearing on housed autumn store lambs  
J A Kirk and S E Alsop
- 119 Effects of diets differing in the proportion of sugar beet pulp and barley on growth, body composition and metabolism of entire male lambs  
H Galbraith, P Mandebvu, J K Thompson and M F Franklin
- 18 A selection index for hill sheep (Transferred from Theatre session)  
F M S Al-Nakib and G Simm

Tuesday 14 March 1989

Session opens 0920

Balcony

Authors in attendance 1050-1220

### GOAT PRODUCTION

- 120 A comparison of barley and molassed sugar beet feed for Saanen goats in early lactation  
J D Sutton and A Mowlem
- 121 Intake of straw, alkali-treated straw and hay by Saanen goats in mid lactation  
L M Sibanda, G Mkumbo, J D Sutton and E Owen
- 122 Reproductive and kid performance of a newly established feral goat herd being graded up for cashmere production  
L C Roger, A Waterhouse and G J Gunn
- 123 A comparison of consumer perceptions of goat and lamb meat  
J A Kirk, S Brunton, D R Owen and R A Cooper
- 124 Effects of castration on the performance and carcass composition of intensively-reared Saanen goats  
R A Cooper, J A Kirk, D Lerwill and R Draper
- 125 Effect of NaOH dip-treatment on intake, digestibility and selection of straw previously refused by goats  
A R Alimon, E Owen, B J Hosking and G Rios
- 126 Effect of rates of offer and treatment with sodium hydroxide or ammonia on intake, digestibility and selection of barley straw by goats  
A R Alimon, E Owen, B J Hosking and G Rios



**BEEF PRODUCTION AND NUTRITION**

- 127 Effect of grass variety type on the response in the performance of beef cattle to earlier cutting of ryegrass for silage  
R W J Steen
- 128 Effect of complete diets or separate feeding of long straw and concentrates on the performance of beef cattle  
K D Sinclair, S Thomas, A MacDearmid and G Nemie
- 129 The effect of a short finishing period for weaned once-bred heifers prior to slaughter on carcass weight and composition  
K D Sinclair, J Booth and B G Lowman
- 130 Molasses and fish meal for growing cattle  
S Thomas and A Mahmud
- 131 The response of intensively finished dairy bred bulls to three levels of protein, and the effect of supplementing the low protein ration with lasalocid sodium  
I Rigby and N Lodge
- 132 Ensiled distillers or brewers grains as the sole diet for beef cattle  
M Lewis and B G Lowman
- 133 The finishing of Zebu bulls on steam-hydrolysed sugar cane bagasse with different supplements  
H Osorio, T R Preston and A W Speedy
- 134 Effect of carcass manipulation on muscle collagen  
J M Dawson, P J Buttery, M Gill and D E Beaver
- 135 Animal performances, plasma hormones and metabolites in Holstein and Belgian Blue growing fattening bulls  
L Istasse, C Van Eenaeme, P Baldwin, G Maghuin-Rogister and J M Bienfait
- 136 Factors affecting reproductive efficiency in beef cows  
A J F Russel, I A Wright and E A Hunter

CATTLE PRODUCTION AND NUTRITION

- 137 Modelling seasonal effects in a new family of standard curves for the yields of milk, fat, protein and lactose in dairy cows  
A Gnanasakthy and S V Morant
- 138 The effect of parity, age and month of calving on milk, fat and protein yield, fat and protein percents for the five major dairy breeds  
H J Bellamy and G J T Swanson
- 139 Effect of an intramuscular injection of folic acid on concentrations of serum folates in gestating cow  
C J Girard, G F Tremblay and J J Matte
- 140 The use of a calcium soap to alleviate milk fat depression in dairy cows when turned out to grass  
P C Garnsworthy and S J Taylor
- 141 Protein supplementation of rapidly digested energy sources in dairy cows  
K Hecheimi, C J C Phillips, A Reeve and R Statham
- 142 Comparison of rapeseed meal, sunflower and soyabean meals as protein sources in concentrates for milking cattle  
I Vincent, R Hill and R C Campling
- 143 The response of Creole, Friesian and Friesian-cross cows to concentrate supplementation on village smallholdings in Mauritius  
A A Boodoo, R Ramjee, B Hulman, F Dolberg and J B Rowe
- 144 Protein sources for monogastric and ruminant livestock in the Cauca valley of Colombia  
M L Cruz and T R Preston and A W Speedy
- 145 Evaluation of a marking web device as an aid to detection of oestrus in cattle  
P J Broadbent, M M Alfuraiji, D C Macdonald and D F Dolman
- 146 Predicting the time of ovulation in dairy cows using milk progesterone kits  
B J McLeod, R F Weller, R H Phipps and J A Foulkes
- 147 Restriction fragment length polymorphisms in bovine milk protein genes  
B N Perry, D Savva, E Radley, C J Skidmore and R D Lovell
- 148 Efficacy of a controlled release intraruminal device containing albendazole against helminth infections in cattle  
S L Bell, P Rowlinson and K W Perry
- 149 Ovarian follicular populations, steroidogenic capacity and physiological status in post partum suckling beef cows in high and low body condition  
R Prado, S Rhind, I Wright, A Russel, S McMillen, A Smith and A McNeilly

## RUMINANT FEEDS AND NUTRITION

- 150 The influence of glucosinolate content on the nutritive value for pigs of diets containing rape seed meal  
M Davis, M Al Mammary, M Ellis and R Smithard
- 151 The rumen solubility of a calcium soap of palm fatty acids  
D I Givens, J M Everington and N Shepperson
- 152 An evaluation of by-products from wheat distillation as feeds for ruminant livestock  
L M Taylor and J J Parkins
- 153 Treatment of barley straw with ligninase enzyme or sodium hydroxide: effect on in vitro digestibility and chemical composition  
K A Khazaal, E Owen, J M Palmer, A P Dodson and P Harvey
- 154 The use of sodium hydroxide or gaseous ammonia as sources of alkali in the improvement of the nutritive value of straw by hydrogen peroxide treatment  
E A Adebowale, E R Orskov and W J Shand
- 155 The effect of a high rate of application of formic acid during ensilage of ryegrass on silage dry matter intake of sheep and cattle  
A R Henderson, D H Anderson, D Neilson, E A Hunter and P Phillips
- 156 Effect of ensilage method on storage dry matter loss and feeding value of malt distillers grains (draff)  
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- 157 Effect of forage type on the digestion of whole barley grain by ewes  
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- 159 Effect of *Aspergillus oryzae* fermentation extract (Amaferm) on fermentation in the rumen simulation technique (Rusitec)  
P P Frumholtz, C J Newbold and R J Wallace
- 160 Rumen probiosis: the effects of addition of yeast culture (viable yeast (*Saccharomyces cerevisiae*) plus growth medium) on patterns of rumen fermentation  
P E V Williams and G M Innes
- 161 Influence of dietary tetronasin on microbial nitrogen metabolism in rumen fluid from cattle  
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- 162 A system for analysing the buffer system in the developing rumen of the young calf  
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- 163 Nitrogen retention in growing lambs fed pelleted diets diluted with cereal straw  
C Castrillo, J Balcells, J A Guada and M Fondevila

Summaries for the following papers were not received in time for printing:-

25, 27, 29, 30, 35, 36, 40, 69, 99

There is no summary for paper no. 28.

Paper no. 117 has been withdrawn.