

**British Society of
Animal Production**

Winter meeting

*The 100th meeting of the
British Society of Animal Production*

19 - 21 March 1990

Grand Hotel
Scarborough

Programme and summaries

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BRITISH SOCIETY OF ANIMAL PRODUCTION

WINTER MEETING 1990

PROGRAMME

DAY	TIME	THEATRE SESSIONS		POSTER SESSIONS	
MONDAY 19 MARCH 18.30		Ballroom	South Lounge	<u>Novel Forms of Animal Production</u> Sea View Lounge Session opens 1410 Authors in attendance 1420-1550 Discussion 1610-1740 <u>Pig Production</u> Balcony Session opens 1440 Authors in attendance 1610-1740	
	1400	The President			
	1410	Beef Production	Animal Breeding		
	1550	TEA			
	1610	Animal Welfare - Where Do We Go From Here?	Dairy Cow Nutrition		
	1900	SCARBOROUGH TOWN COUNCIL RECEPTION			
	1945	ANNUAL DINNER			
TUESDAY 20 MARCH	0850	Carcass and Meat Quality in Pigs	Rumen Metabolism	<u>Electronics in Animal Production</u> Sea View Lounge Session opens 0920 Authors in attendance 1050-1220 Discussion 1350-1520 <u>Ruminant Nutrition</u> Sea View Lounge Session opens 0920 Authors in attendance 1050-1220 <u>Dairy Production</u> Balcony Session opens 0920 Authors in attendance 1050-1220 <u>Silage Feeding</u> Balcony Session opens 0920 Authors in attendance 1050-1220	
	1030	COFFEE			
	1050	Impact of Food Processing Technology on Animal Production	Sheep Production		
	1230	LUNCH			
	1350	Use of Commercial Farms for Research	Nutrition & Management of Dairy Cows		
	1530	TEA			
	1550	PLENARY SESSION Livestock Wastes and the Environment			
	1800	ANNUAL GENERAL MEETING			
	1945	DINNER			
WEDNESDAY 21 MARCH	0900	SIR JOHN HAMMOND MEMORIAL LECTURE		<u>Raw Materials</u> Sea View Lounge Session opens 0900 Authors in attendance 1030-1200 Discussion 1340-1510 Authors in attendance 1030-1200 <u>Genetics and Reproduction</u> Balcony Session opens 0900 Authors in attendance 1030-1200	
	1010	COFFEE			
	1030	Appropriate Technology for Overseas	Pig Production		
	1220	LUNCH			
	1340	Hormonal and Behavioural Aspects of Production	Silage Additives and Animal Production		
	1520	CLOSE OF MEETING			

BEEF PRODUCTION

CHAIRMAN - DR M. KAY

- 1400 Opening remarks by the BSAP President, Dr M. Bichard
- 1410 1 Calving performance and calf survival in a twin calving
 beef herd
 M G Diskin, T G McEvoy and J M Sreenan
- 1430 2 The effect of different distributions of the same total
 dietary energy between late pregnancy and early lactation
 on the performance of twin-bearing suckler cows
 J H Topps, P J Broadbent, J N Methu and B B N Xaba
- 1450 3 An evaluation of the effects of twinning in dairy cows on
 animal production
 C S Mayne and W J McCaughey
- 1510 4 Beef cattle output from clover-based and nitrogen
 fertilised swards over six grazing seasons
 D Younie and S B Heath
- 1530 5 A comparison of the growth rate of single and twin born
 beef calves
 M G Diskin, T G McEvoy and J M Sreenan
- 1550 T E A

ANIMAL WELFARE -

WHERE DO WE GO FROM HERE?

CHAIRMAN - PROF. A. J. F. WEBSTER

- 1610 6 The science of animal welfare
 M C Appleby, University of Edinburgh
- 1635 7 An economic perspective on animal disease
 J P McInerney, University of Exeter
- 1700 8 Farm animal welfare legislation in Europe
 H E Carter, Enfield, Middlesex
- 1725 Discussion
- 1800 Session ends
- 1900 SCARBOROUGH TOWN COUNCIL RECEPTION
- 1945 ANNUAL DINNER

ANIMAL BREEDING

CHAIRMAN - DR M. K. CURRAN

- 1410 9 Selection for improved carcass composition in Suffolk sheep: interim results
G Simm, W S Dingwall, S V Murphy, J FitzSimons and W R Brown
- 1430 10 Effect of ignoring major genes when predicting responses to selection
S P Simpson
- 1450 11 Relationship between sires transmitting ability and daughter performance in a high yielding dairy herd
P Persaud, G Simm, H Parkinson and W G Hill
- 1510 12 Estimation of genetic and phenotypic trends for litter size in Canadian Yorkshire and Landrace swine
O I Southwood
- 1530 13 Growth of carcass joints and tissues in steers of three breed types fed two dietary energy levels
M G Keane, G J More O'Ferrall and J Connolly
- 1550 TEA

DAIRY COW NUTRITION

CHAIRMAN - DR B. R. COTTRILL

- 1610 14 Changes to the amounts of compounds for mid-lactation cows as a method of modifying milk output
D A Poole
- 1630 15 Factors affecting yields of milk constituents in dairy cows
A J Rook, J D Sutton and J France
- 1650 16 The effect of protein supply and level of supplementary concentrate on rumen metabolism of lactating dairy cows
R E Poots and E F Unsworth
- 1710 17 Lactational responses of dairy cows to changes in dietary protein fed at different stages of lactation
B L Wood, D J Roberts and E A Hunter
- 1730 18 Use of protected amino acids to increase duodenal amino acid supply in lactating dairy cows
D E Beever, D J Napper and B Sloan
- 1750 Session ends
- 1900 SCARBOROUGH TOWN COUNCIL RECEPTION
- 1945 ANNUAL DINNER

CARCASS AND MEAT QUALITY IN PIGS

CHAIRMAN - DR J. F. O'GRADY

- 0850 19 The effects of sire type and company source on litter productivity and pig growth performance
A J Kempster, A P Landon, D G Evans and D E Steane
- 0910 20 The effects of sire type, company source, feeding regimen and sex on eating quality of pig meat
C C Warkup, A W Dilworth, A J Kempster and J D Wood
- 0930 21 The effects of different factors on the levels of androstenone and skatole in pig fat
R L S Patterson, P K Elks, D B Lowe and A J Kempster
- 0950 22 The effect of diet on skatole concentrations in the intestine and adipose tissue of growing pigs
S M Hawe and N Walker
- 1010 23 Sex and feeding level effects on the eating quality of fresh pork
M Ellis, A J Webb, P J Avery, R Smithard and I Brown
- 1030 C O F F E E

**IMPACT OF FOOD PROCESSING
TECHNOLOGY ON ANIMAL PRODUCTION**

CHAIRMAN - DR J. D. WOOD

- 1050 24 Is there still a need for milk quality at point of production?
F Harding, MMB, Thames Ditton
- 1115 25 Meat
P D Jolley, IFR - Bristol
- 1140 26 Food
G C Evans, United Biscuits (UK) Ltd., High Wycombe
- 1205 Discussion

1230 L U N C H

RUMEN METABOLISM

CHAIRMAN - DR J. D. OLDHAM

- 0850 27 Effect of fishmeal supplementation on rumen function and silage intake
M Gill, D P Poppi, R T Evans and A Sargeant
- 0910 28 Effect of feed type on methane produced by sheep
A Moss and D I Givens
- 0930 29 Rumen proteolysis of constituent proteins of soyabean meal
J R Newbold and S R Rust
- 0950 30 The effect of short term intra-ruminal infusions of lactic acid on the voluntary intake of silage and hay by steers
M Cole and M Gill
- 1010 31 Effect of dietary monensin and tetronasin on rumen fermentation in sheep
C J Newbold and R J Wallace
- 1030 C O F F E E

SHEEP PRODUCTION

CHAIRMAN - DR J. J. ROBINSON

- 1050 32 Effect of selection for increased litter size on ovulation rate and embryo survival in sheep
J P Hanrahan
- 1110 33 Evaluation of the use of a small leaved clover as an alternative to fertiliser N on tetraploid and diploid perennial ryegrass swards grazed to controlled sward heights by ewes and lambs
J E Vipond, G Swift, J FitzSimons, T H McClelland, J A Milne and E A Hunter
- 1130 34 The effect of ruminal metabolites of brassica-derived glucosinolates and S-methyl cysteine sulphoxide (SMCO) on the voluntary intake and metabolism of sheep
A J Duncan and J A Milne
- 1150 35 Effect of a B agonist on the partition of protein between wool and other tissues in sheep
J E Nash, J F D Greenhalgh and M Birnie
- 1210 36 Relationships between lamb vigour and ewe behaviour on sucking success at parturition
C E O'Connor and A B Lawrence
- 1230 L U N C H

**USE OF COMMERCIAL FARMS
FOR RESEARCH**

CHAIRMAN - DR M. J. DUCKER

- 1350 37 **The usefulness of commercial pig farms for research studies**
P R English, V R Fowler and J A Roden, School of
Agriculture, Aberdeen
- 1415 38 **Reproducibility of performance results in dairy cow trials**
J D Oldham, ESCA and E A Hunter, SASS, Edinburgh
- 1440 39 **The use of field trials in reproduction research -
experiences with melatonin in sheep and milk progesterone
in dairy cattle**
W Haresign, University of Nottingham
- 1505 **Discussion**
- 1530 **T E A**

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

**LIVESTOCK WASTES
AND THE ENVIRONMENT**

CHAIRMAN - PROF. J. D. LEAVER

- 1550 40 **The problem, legislation and codes of practice**
V C Nielsen, ADAS Liaison Unit, Silsoe
- 1620 41 **Agronomical and environmental implications of soil
enrichment with P and K and heavy metals from slurries**
F A M de Haan, Wageningen Agricultural University, The
Netherlands
- 1650 42 **Fate of nitrogen applied to land in livestock slurries**
B F Pain, IGAP, Hurley
- 1720 **Discussion**
- 1745 **Session ends**
- 1800 **ANNUAL GENERAL MEETING**
- 1945 **DINNER**
onwards

**NUTRITION AND MANAGEMENT
OF DAIRY COWS**

CHAIRMAN - PROF. J. F. D. GREENHALGH

- 1350 43 The effect of protein content of the supplement on the response to level of supplementation with dairy cattle offered grass silage ad libitum
C S Mayne
- 1410 44 The use of bovine somatotrophin (BST) to increase summer milk production
D J Roberts, R J Wells, D N Logue and A G Buchanan
- 1430 45 Effect of level of concentrate feeding on the intakes and digestion of grass silages differing in cutting date
A B McAllan, J D Sutton, D E Beever and D J Napper
- 1450 46 Supplementation of grazing dairy cows with a brewers grains/treated straw mixture
J D Leaver and R C Campling
- 1510 47 Predicting food intake in dairy heifers from part-lactation records
G Simm, P Persaud, H Parkinson and B J McGuirk
- 1530 T E A

1800 ANNUAL GENERAL MEETING

1945 DINNER
onwards

Wednesday 21 March, 1990

Theatre Session
Ballroom

SIR JOHN HAMMOND MEMORIAL LECTURE

CHAIRMAN - DR M. BICHARD

0900 **Animal Production in the Federal Republic of Germany**
 K. Meyn, Bonn

1010 **COFFEE**

**APPROPRIATE TECHNOLOGY
FOR OVERSEAS**

CHAIRMAN - DR F. D. DeB HOVELL

1030 48 **Identification of constraints in livestock production in
developing countries**

 E R Ørskov, RRI, Aberdeen

1055 49 **The role of aid Organisations**

 R Sansoucy, FAO, Rome

1120 50 **Education in temperate countries**

 T R Morris, University of Reading

1145 **Discussion**

1220 **LUNCH**

0900-1010 **SIR JOHN HAMMOND MEMORIAL LECTURE**

See opposite page for details

1010 **COFFEE**

South Lounge

PIG PRODUCTION

CHAIRMAN - PROF. C. T. WHITTEMORE

- 1030 51 Current European advances in the measurement of stress in pigs
A B Lawrence
- 1050 52 Dietary factors affecting voluntary food intake in growing and finishing pigs
S A Chadd
- 1110 53 The metabolic effects of feeding diets containing sugar beet pulp to sows
W H Close , J E Pettigrew, C E Sharpe, H D Keal and J I Harland
- 1130 54 The effects of feeding diets containing high levels of fibrous by-products during late pregnancy on sow performance
S A Edwards and A G Taylor
- 1150 55 The chemical composition of fresh pork and bacon from pigs of different breed types, sexes and origins
D B Lowe, A J Kempster, M W Fogden and C F White
- 1210 Session ends
- 1220 LUNCH

**HORMONAL AND BEHAVIOURAL ASPECTS
OF PRODUCTION**

CHAIRMAN - DR M. A. VARLEY

- 1340 56 Effect of pre-mating nutritional status and post-mating progesterone supplementation on early pregnancy in Large White gilts
C J Ashworth
- 1400 57 Evaluation of the Chinese Meishan as a nurse sow for establishing ill-nourished 3 week old White breed pigs
P R English, O MacPherson, S A Edwards, V R Fowler, B P Gill, A G Taylor, M Birnie and C S Haley
- 1420 58 The hormonal manipulation of cashmere growth and shedding
P Lynch and A J F Russel
- 1440 59 The effect of age of purebred Large White and Landrace boars at time of service on herd performance
M J H Francis and J T Mercer
- 1500 60 The effect of supplementary light on the behaviour and environmental preference of calves
C J C Phillips and L Weiguo
- 1520 CLOSE OF MEETING

**SILAGE ADDITIVES AND
ANIMAL PRODUCTION**

CHAIRMAN - DR C. S. MAYNE

- 1340 61 Prediction of voluntary intake of grass silage by lactating cows
A J Rook, M Gill and R D Willink
- 1400 62 Effects of feeding silage and sugar-beet pulp, separately, mixed or in an ensiled blend, upon milk production in British Friesian dairy cows
C P Ferris and C S Mayne
- 1420 63 Effect of applying high levels of mixed aliphatic carboxylic acids to grass on silage composition, and energy value and nitrogen balance in sheep
D I Givens, A R Moss and D A Jackson
- 1440 64 The effect of a bacterial inoculant on the digestibility of grass silage and energy intake by young growing cattle
T W J Keady and R W J Steen
- 1500 65 An alternative approach to the use of silage inoculants
R J Merry, M K Theodorou, D E Beever, D K Leemans and C Thomas
- 1520 CLOSE OF MEETING

Monday 19 March 1990

Poster Session
Sea View Lounge
Authors in attendance 1420-1550
Discussion 1610-1740
CHAIRMAN - DR A. J. F. RUSSEL

Session opens 1410

NOVEL FORMS OF ANIMAL PRODUCTION

- 66 The developing market for farm-bred meat rabbits in Britain
N D Jones
- 67 Fibre production in Angora rabbits
J C McKay
- 68 Effect of dietary protein and energy on growth and fibre characteristics of British Angora goats
Md Shahjalal, H Galbraith and J H Topps
- 69 Relationships between fleece characteristics and body weight in male Angora goats
J S Broadbent and D Pullar
- 70 Effect of dietary yeast and protein supplementation on growth and fibre characteristics of British Angora goats
E R Deaville and H Galbraith
- 71 Production and composition of milk from suckled feral, dairy and crossbred goats
A J F Russel and J E Adkins
- 72 Sensory attributes of conventional and organic beef
D Younie, M Hamilton and I Nevison
- 73 Dutch free-range pig keeping
H A M van der Steen, A Dyson and B Dekker
- 74 Carcass and meat quality in iron age pigs
J D Wood and G R Nute
- 75 Livestock diversification. The potential for farming camelids in the United Kingdom
C Campbell
- 76 Effect of two growth rates and two forage diets over winter on the performance of red deer stag calves
M H Davies and E M Thomas
- 77 Silage and hay intakes of housed red deer calves
D J Kennedy

PIG PRODUCTION

- 78 Performance of group-housed growing pigs at and below lower critical temperature
P H Simmins, S A Edwards, A T Smith and A W Armsby
- 79 The roles of feeding regime, housing and individuals' characteristics in the development of stereotypic behaviour in pregnant gilts
E M C Terlouw, A B Lawrence and A W Illius
- 80 Space requirements of the boar and sow at mating
A M Petchey and K A Hunt
- 81 Hypothermia and its attempted control in newborn piglets
R J Pattison, P R English, O MacPherson, J A Roden and M Birnie
- 82 The effect of dietary concentration and blend of added fat on the performance of growing pigs at equal energy intake
D C Patterson
- 83 The influence of heavy slaughter weights on growth and carcass characteristics of pigs
M Ellis and P J Avery
- 84 Influence of the correlation between growth rate and backfat on selection response in pigs
P R Bampton and A J Webb
- 85 Consistency and accuracy of pig carcass lean prediction from P2 fat thickness and sample joint dissection
J Planella, G L Cook and C C Warkup
- 86 Associations between carcass lean and predictors of lean in the pig
J R Walters and S P Simpson
- 87 Estimation of carcass lean content in the revised EC pig grading scheme
G L Cook and A J Kempster
- 88 Evaluation of the performance of five exotic pig breeds under test station conditions in Zimbabwe
N Pathiraja and K T Mandizodza
- 89 Evaluation of different feeding strategies for the lactating sow
C J M Anderson, P R English, S A Edwards and O McPherson
- 90 Lifetime performance of pigs fed post-weaning diets of different levels of ideal protein
R M Kay, B V Miller, F J Bourne and J Gibson
- 91 The effect of high-fat diets on gastric inhibitory polypeptide (GIP) and insulin secretion in growing pigs
A A Ponter, D N Salter, L M Morgan and P R Flatt
- 92 Effect of feed intake on protein and energy retention of boars of high genetic potential for lean growth
S D Rao and K J McCracken
- 93 Effect of dietary linoleic acid on the fatty acid composition of pig muscle
M Enser, F M Whittington, J D Wood, D J A Cole and J Wiseman
- 94 Serum cholesterol as an indicator of performance and carcass quality in growing pigs
J Taylor, D Salter and D Lister
- 95 A study of factors which influence the job satisfaction of stockpeople on commercial pig farms
R C Segundo, P R English, G Burgess, S A Edwards, O Macpherson, J Roden, P A Russell, J W Shepherd and J Dunne
- 96 A critical evaluation of culling policy in a commercial herd of sows
J H Dunne, P R English, O MacPherson, J A Roden and R C Segundo
- 97 The influence of inclusion of a probiotic in the diet on the development of enzyme activity in the small intestine of the pig
G K Collington, D S Parker, D G Armstrong and M Ellis

Tuesday 20 March 1990

Poster Session
Sea View Lounge
Authors in attendance 1050-1220
Discussion 1350-1520
CHAIRMAN - PROF. J. M. FORBES

Session opens 0920

ELECTRONICS IN ANIMAL PRODUCTION

- 98 The economic assessment of technological and management changes on Welsh dairy farms by computerised spreadsheet analysis
R W M Willis, T H Thomas, C J C Phillips, G A Bright and R W Howarth
- 99 The application of electronics to the study of animal behaviour
A B Lawrence
- 100 An electronic system for studying the relationship between behaviour and body temperature in dairy cows
Y Mayet, T T McCarthy and P Rowlinson
- 101 Measurement of lamb carcass composition using the velocity of ultrasound
C A Miles, A V Fisher, G A J Fursey and S J Page
- 102 Electronic live animal and carcass identification systems
R W Slader and A M S Gregory
- 103 Survey of the state of the art of computerisation in British meat plants and an assessment of training requirements
S J Porter, A J Kempster and A G Sains
- 104 Automatic recording of individual voluntary feed intake in group housed pigs
A N R Brown and H A M van der Steen
- 105 The use of normalised NIR difference spectra to monitor the time course of rumen digestion of untreated and ammonia treated straws in sheep
D I Givens, C W Baker and B Zamine
- 106 Electronics in genetic improvement of pigs
A J Webb, P R Bampton, S Smith and S P Close
- 107 Electronics in Animal Breeding
G Simm and N R Wray

RUMINANT NUTRITION

- 108 The effect of inclusion of virginiamycin in feed on glucose and alanine transport by intestinal brush border membrane vesicles of sheep
D S Parker, H Tapper, H Mason and H Tuer
- 109 Basal urinary excretion of purine derivatives in sheep
J Balcells, J A Guada, C Castrillo and J I Bonafonte
- 110 The direct and residual effects of the plane of nutrition of calves in early life on physical performance and gains in chemical components
D C Patterson and R W J Steen
- 111 The effect of a fungal probiotic on intake and performance of early weaned calves
M K Theodorou, D E Beever, M J Haines and A Brooks
- 112 Feeding behaviour and digestive kinetics in sheep fed chopped or ground and pelleted low quality alfalfa hay
A de Vega, J Gasa, M Fondevila and A Lopez
- 113 Urea-treated whole crop wheat for dairy cattle
J Hill and J D Leaver
- 114 Dry matter intake and rumen fermentation in steers fed untreated grass hay or hay treated with urea, sodium hydroxide or a combination of both
A P Moloney and A V Flynn
- 115 The use of n-Alkanes as indigestible markers in studies on intestinal digestion in sheep
F Kafilzadeh and D S Parker
- 116 The effect of supplemental yeast culture (Yea-sacc) on patterns of rumen fermentation and growth performance of intensively fed bulls
I E Edwards, T Mutsvangwa, J H Topps and G F M Paterson
- 117 Effect of protein supplementation on the performance of intensively-fed weaned suckled bulls
D Jacklin and I Rigby
- 118 Effect of calcium oxide, sodium hydroxide and alkaline hydrogen peroxide treatments on the nutrient digestion of wheat straw (Norman) by sheep
A S Chaudhry and E L Miller
- 119 Effect of treating wheat straw with sodium hydroxide and calcium oxide alone or in combination with hydrogen peroxide on the in vitro dry matter digestibility
A S Chaudhry and E L Miller
- 120 Effects on animal performance of a fat concentrate in diets for growing/fattening bulls
L Istasse
- 121 Response of urinary purine derivatives to urea supplementation of sodium hydroxide treated straw
J A Guada J Balcells, J Gasa and A de Vega

DAIRY PRODUCTION

- 122 The effect of differing patterns of energy intake in mid and late pregnancy in maiden heifers
K D Sinclair and B G Lowman
- 123 Effects of including malt distillers grains (draff) either ensiled alone or with molassed sugar beet shreds as a concentrate feedstuff for dairy cows
J J Hyslop and D J Roberts
- 124 The effects of protein and energy content of compound feeds offered at low levels to October calving dairy cows
O D Davies and V J Theobald
- 125 A comparison of high nitrogen and clover based swards grazed by summer calving cows
J A Bax and D J Roberts
- 126 A farm based comparison of grass/white clover with nitrogen based system for dairy cattle
J A Bax, D J Roberts and C Thomas
- 127 Response by dairy cows to a change in concentrate energy supply with equal supply of concentrate crude protein
E J Smith, G C Emmans, N Friggens, J D Oldham, D A Whitaker, K Aitchison and J M Kelly
- 128 Evaluation of a high fibre compound diet as a grass silage replacer for dairy cows
T D A Brigstocke, W S Thickett, J S Blake and A B Harker
- 129 The effects of supplements containing different carbohydrate sources on milk production in cows receiving a hay-based diet
P A Martin, D G Chamberlain and S Robertson
- 130 The effect of cubicle housing, grazing and increasing age on the locomotion scores of dairy cows
R Wilkinson, T P Thomas, P E J Gwynn and M Jory
- 131 A parsimonious model of seasonal and regional variation in the parameters of lactation curves for milk yields of cows in the UK
A Gnanasakthy and S V Morant
- 132 Intake and digestibility of urea-treated whole-crop wheat by growing heifers
M Castejon and J D Leaver

SILAGE FEEDING

- 133 Beef production from silages produced from *Lolium multiflorum*, *Lolium perenne* and permanent grassland swards
T Keating and P O'Kiely
- 134 The effect of fishmeal supplementation on in-vitro subcutaneous adipose tissue metabolism in young cattle fed silage
A Walsh, M Gill and D E Beever
- 135 Restriction of the silage fermentation by the application of high levels of mixed aliphatic carboxylic acids on the productive performance of lactating dairy cattle
D A Jackson and S Furniss
- 136 Evaluation of a *Lactobacillus* inoculant as an additive for silage fed to heifers
P O' Kiely
- 137 Characterisation of nitrogen fractions during ensilage of fresh and additive treated ryegrass
A P Williams, J E Cockburn and J K S Tweed
- 138 The effect of a biological silage additive and type of supplement on the performance of beef cattle
R Laird, A Gill, J McAuslan, C Thomas and I D Wright
- 139 The effect of biological additives on the composition and nutritive value of silage
M Gonzalez-Yanez, R McGinn, D H Anderson, A R Henderson and P Phillips
- 140 Effect of stage of growth and conservation procedure on the ruminal N degradability of perennial ryegrass
R C Siddons, J M Wilkinson, J Paradine and V de Faria

RAW MATERIALS

- 141 The effects on feed intake in weaned calves of low glucosinolate rapeseed meal as the sole protein supplement
R Hill, I C Vincent and J Thompson
- 142 The voluntary feed intake and weight gain of lambs given concentrate feeds containing rapeseed meal with a range of glucosinolate contents
R Hill, I C Vincent and J Thompson
- 143 Determination of digestible energy, metabolisable energy and oil digestibility of triple-low rapeseed products for growing and finishing pigs
J A Agunbiade, J Wiseman and D J A Cole
- 144 The effect of inclusion rate of a 2:1 mixture of extruded whole rapeseed and peas in barley and wheat based diets for pigs from 17 to 30 kg liveweight
S M O'Dowd, V R Fowler, P R English, B P Gill, O MacPherson, J A Roden, F M Davidson and P W Kenyon
- 145 Effect of dietary inclusion level of low glucosinolate rapeseed meal on growing pig performance
M Davis, M Ellis and R R Smithard
- 146 Evaluation of solvent extracted meals from double-low and triple-low rapeseed as alternative dietary protein supplements to soya-bean meal for finishing pigs
B P Gill, J Q Zhu and A G Taylor
- 147 Rapeseed meal and maize gluten as supplements to straw in winter rations for spring calving suckler cows
D Pullar and I Rigby
- 148 Optimising crop residue utilization in Zimbabwe
B Manyuchi, S Ncube and T Smith
- 149 Performance and digestibility of non-starch polysaccharides in cereals or sugar beet pulp in pigs of 3-8 weeks
A G Low, J C Carruthers, A C Longland and J I Harland
- 150 Nutritive value of zero-tannin, white-flowered and tannin-containing, coloured-flowered field beans (*vicia faba* L.) for chicks
C N Wareham, J Wiseman and D J A Cole
- 151 Soyabean meal degradability in the sheep rumen
R C Siddons, J Paradine and D E Beever
- 152 Assessment of free fatty acid content on dietary energy values of soya bean oil fed to broilers
F Salvador and J Wiseman
- 153 A legume browse, *Sesbania sesban* as an alternative protein supplement to fishmeal for lactating cows in Bangladesh
M A S Khan, M A Jabbar, M A Akbar and J H Topps
- 154 The use of molassed sugar beet feed in growing pig diets and the effect of inclusion rates on subsequent performance
R M Kay, P H Simmins and J I Harland
- 155 A comparison of hay and strawmix as forages for preweaned calves
R Njei, C J C Phillips and L Weiguo

SHEEP PRODUCTION

- 156 The system efficiency in Mediterranean sown irrigated pastures consumed by lactating ewes
R Caballero, M Arauzo and P J Hernaiz
- 157 Influence of supplementation on the composition of Manchega ewes' milk grazing sown pastures in central Spain
R Caballero, E Fernandez, J Rioperez, L Amigo and J Fontecha
- 158 A survey of lowground sheep farmers' concerns and experience of sheep health and diseases in Scotland
A W Alexander, G Burgess, P R English, D C Macdonald and O MacPherson
- 159 Silvopastoral sheep and pine systems for small farmers in southern Chile
M P Herve, O A Balocchi and R Penaloza
- 160 Feeding sorghum stover to Ethiopian sheep: effect of stover variety and amount offered on growth, intake and selection
A A O Aboud, J D Reed, E Owen and A McAllan
- 161 The effect of dietary protein: energy ratio during food restriction on the size of the digestive tract and subsequent growth of lambs
A R Mantecon, G R Iason and A D M Smith
- 162 Comparative performance of spring and summer born lambs grazing two sward types
L M Mitchell, M E King and C M Mackie
- 163 An evaluation of methods for improving reproductive performance in summer lambing ewes
M E King, L M Mitchell, J S M Hutchinson, R Glatt and M F Ibraheem
- 164 Influence of shearing and level of concentrates offered on the performance of fattening lambs
H J Black and D M B Chestnutt
- 165 Effects upon the performance of Scottish Blackface ewes with different nutrition during the second oestrous cycle after ram joining
A Waterhouse and L C Roger
- 166 Teasing to induce ovarian activity in anoestrous mule ewes
M F Ibraheem, J S M Hutchinson, M E King, L M Mitchell and M Donald

GENETICS AND REPRODUCTION

- 167 The potential for improving sire selection in dairy cattle by molecular genetic analysis of bovine casein genes
S J Pinder, B N Perry, D Savva and C J Skidmore
- 168 A comparison of an indirect and direct method for converting sire evaluations from the USA to UK improved contemporary comparison (ICC83) equivalents - Holstein/Friesian
G J T Swanson and H J Bellamy
- 169 Yolk lipid changes during embryonic development of the alligator and chicken: association with temperature dependent sex determination
R C Noble, M W J Ferguson and D C Deeming
- 170 Withdrawn
- 171 Effect of altrenogest on litter size in primiparous sows
D J Baker, G Gettinby and A R Peters
- 172 Plasma B-endorphin and cortisol in sheep during adaptation to a new environment
D P Fordham, S J M Al-Gahtani, L A Durotoye and R G Rodway
- 173 Beef production from once calved heifers
M G Keane and F J Harte