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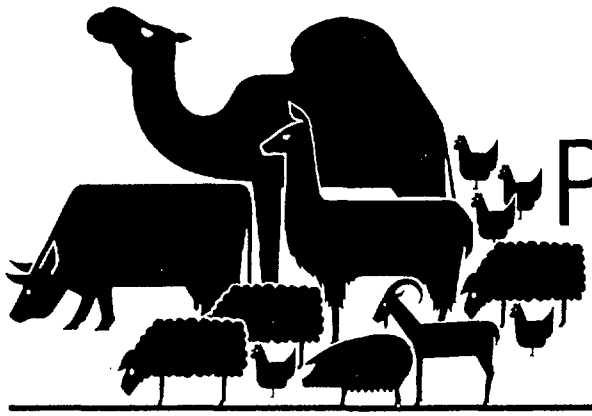

Animal Production and Health Newsletter

JOINT FAO/IAEA DIVISION OF ISOTOPE AND RADIATION APPLICATIONS
OF ATOMIC ENERGY FOR FOOD AND AGRICULTURAL DEVELOPMENT
INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA

No.3 January 1986

CONTENTS

The RIA laboratory also has a stock of antisera for the assay of LH, oestradiol 17-beta, oestrone and testosterone which can be supplied on demand.

The nutrition laboratory is evaluating fibrous feeds of potential value for feeding ruminants. So far 30 samples have been sent to us from Research Contractors and Technical Cooperation counterparts and 18 have already been analysed for fermentation characteristics in Rusitec. The data are now being compiled and will be made available soon to the donor scientists. This information will be of value in identifying potential feed sources or feed treatment procedures and hence in developing suitable feeding strategies. We invite the Section's collaborators to send us any new feeding material which they think may have potential as a ruminant feed for initial screening in the Rusitec.

(ii) Training of Scientists through Training Courses and Fellowships

Another important aspect of the Animal Science Unit's work is training. As judged by the large interest in the Training Course on "The Use of Isotope-aided Techniques in Ruminant Nutrition", it is clear that the demand for training is greater than time allows the available staff to devote to such an essential activity. Two fellows in Animal Nutrition (Mr. A. Photiou from Cyprus and Mr. S. Puspowardoyo from Indonesia) have each received 4 months' training in laboratory techniques for measuring rumen fermentation, characteristics of fibrous feeds, etc. Also, one fellow (Dr. A.-L.Vasquez from Mexico) is being trained on a coated-tube technique for assaying progesterone.

(c) Provision of Bibliographic Support

Many research workers in developing countries do not have access to good library facilities. The Section has therefore implemented a bibliographic search service based on the AGRIS computer system which uses keywords to search the literature on agriculture (over 1-? million documents written over the last 11 years) and its related fields (including fisheries, forestry, food and veterinary science). Whilst not exhaustive in its search of all published materials in agriculture, an AGRIS search yields excellent material for a review of the research topic in question. Research Contractors and Technical Cooperation project counterparts of the 'Latin American Regional Network in Reproduction' have already received the results of their first literature searches; similar searches will be conducted for the counterparts of the Section's other programmes in the course of the next few months and those attending the Symposium will have the opportunity of making their own search while in Vienna.

Animal Production and Health Newsletter

Joint FAO/IAEA Division of Isotope and Radiation Applications
of Atomic Energy for Food and Agricultural Development
International Atomic Energy Agency
P.O.Box 100, A-1400 Vienna, Austria

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85-06499

Dear Colleague,

Over the past 6 months much effort has gone into planning the scope and direction of future events and programmes, although as usual we were also kept occupied with the implementation of on-going Research Contract programmes and Technical Cooperation projects. Probably the single biggest event on next year's calendar is our Symposium in March which will have around 40 invited lectures and over 50 poster presentations. The fact that this Symposium has attracted such a high quality scientific "field" is of course in itself very gratifying and will certainly ensure a "state-of the-art" meeting, not to mention a quality publication towards the end of 1986. Just as gratifying, however, and vital for the success of such an operation is financial support, and in this respect a note of thanks is due not only to such organisations as ACIAR, the British Council, SAREC, SIDA and USAID, but also to the many institutes and universities throughout the world who have so generously provided funds to ensure the attendance of scientists from developed and developing countries alike.

Another major activity in 1986 will be the initiation of a new Regional Programme of Technical Cooperation for Africa. This programme, which will be carried out in collaboration with the Africa Section of the IAEA's Department of Technical Cooperation is being structured in a similar manner to that already established in Latin America, and will initially involve 18 projects within 14 countries. The aim is to strengthen the capabilities of veterinary institutes and university departments for conducting problem-oriented research in animal nutrition, reproduction and disease diagnostics. In addition to providing training within Africa through courses and individual fellowships, as well as equipment and expert services, the programme will be technically supported by the supply of standardised kits and reagents from the FAO/IAEA laboratory at Seibersdorf and other institutes; a regional expert will be appointed; and coordination meetings will be held at regular intervals to which the counterparts of each project will be invited. These meetings will help ensure proper coordination and adherence to the aims and scope of individual projects. The programme is planned to last for 5 years and hopefully will expand to cover more countries as it progresses.

As far as our Coordinated Research Programmes (CRPs) are concerned, we now have over 130 Research Contracts and Agreements within 7 operational programmes. In 1986, a new programme on disease diagnostics using ELISA techniques will become fully operational and we hope to be able to award around 20 Contracts/Agreements in this area of activity. The movement into disease diagnostics and ELISA methodology will, like all other activities, be closely integrated into FAO's programme and will attempt as much as possible to address priority diseases such as rinderpest, foot-and-mouth, babesiosis and some bacterial infections. A training manual is now in the process of preparation and we also hope to produce a video on how to conduct ELISA's for particular diseases. There will also be technical support to Contractors from the FAO/IAEA laboratory at Seibersdorf and from Austrian and other national virological and bacteriological institutes.

The CRP on animal nutrition will terminate in March 1986 when a publication will be prepared on the results obtained. Also that time, a meeting will be held in Vienna to advise on the possibilities for establishing a follow-up programme, so there could be openings for Research Contracts within the framework of a new CRP on nutrition before the end of 1986. This would be important for those who participated in our recent (and by all accounts highly successful) training course on animal nutrition at Seibersdorf, not to mention those who have been writing to the Section in recent months requesting support in this area.

For those of you with a background in reproduction and wish to obtain a Research Contract/Agreement, there is unfortunately little hope at present, since all programmes currently in operation are full. We are however constantly trying to obtain support for new programmes and should these efforts prove successful, we will certainly let you know at the first opportunity.

On the staff side, we are pleased to announce that Dr. Ray Nachreiner has joined the Section for 1 year on a sabbatical leave from the Animal Health Diagnostic Laboratory of the Michigan State University, USA. Ray has a great deal of experience in the quality control aspects of immunoassay techniques and in addition to establishing a quality control back-up to the progesterone RIA kit developed at Seibersdorf, he is serving as a field expert on Technical Cooperation projects. Developments within the Animal Science Unit of the FAO/IAEA laboratory at Seibersdorf are described later but we would like at this point to acknowledge the excellent support we receive from the Veterinary School of the University of Vienna, and particularly from Professors J. Leibetseder and E.Bamberg. Also with the movement of the Section into the field of disease diagnostics, links have recently been established with Prof. W. Schuller of the same institute and this will no doubt prove to be equally beneficial in the years to come.

Finally, we wish you all the best for 1986 and look forward to your continued support of our programmes.

With best wishes,

James D. Dargie
Lars-Eric Edqvist
Noble Jayasuriya
Stefan Oschmann
Wyn Richards
Ray Nachreiner

(A) PAST EVENTS

(1) FAO/IAEA Training Course on Ruminant Nutrition - Animal Science Unit, Seibersdorf, Austria, 26 August - 20 September 1985.

This interregional training course attracted 100 applications from 48 countries but unfortunately only 16 could be selected because of limitations in laboratory space and other facilities.

The Course consisted of lectures, tutorials, practical exercises and research presentation seminars. Lectures and tutorials included: characteristics of isotopes and radiation; sample preparation and measurement of radioactivity; safe handling of isotopes; radioactive and stable isotopic techniques in animal nutrition; feed resources for ruminants in developing countries; physiology, biochemistry and microbiology of the rumen and hind gut; digestion and metabolism of nitrogen and carbohydrates, especially in the rumen. Practical exercises were based on the rumen simulation technique (Rusitec) to measure various parameters such as feed digestibility, production of volatile fatty acids, fermentation gases and microbial biomass. The programme also included the use of ^{14}C acetate to measure the rate of production of volatile fatty acids, ^{14}C glucose for microbial compartmentation, dacron bag technique to estimate rate of feed digestion in the rumen of sheep, calculations, interpretation and presentation of results. All candidates who participated in and completed the Training Course were awarded a certificate.

We are very grateful to Dr. J.W. Czerkawski of the Hannah Research Institute, Ayr, (U.K.) for acting as course co-director and to Dr. K. Buchtela (Austria), Drs. P. Buttery, E. Owen and R. Orskov (U.K.), Dr. B.A.Young (Canada) and for undertaking the tasks of lecturing and assisting with the laboratory work during the course. We are also very grateful to Professors Leibetseder and Baumgartner of the Veterinary School in Vienna for their valued collaboration with our Training Course, particularly for the provision of fistulated sheep and for arranging an excellent weekend visit to different types of farms in Austria.

(2) Preparation of a Training Manual on "Enzyme immunoassay techniques in animal disease diagnosis and epidemiology (Vienna, 11-15 November 1985).

In the coming years, the main thrust of the Section's programme on animal disease will be oriented towards assisting Member States in improving their capabilities for disease diagnosis, and specifically toward the introduction of improved serological methods involving ELISA technology. Since the success of these efforts will depend heavily on appropriate training, it was felt that a training manual should be prepared which covered both the principles involved and methods for specific viral, bacterial and parasitic infections. This manual, which should be published in 1986 was drafted by:

Dr. J. Crowther (U.K.); Dr. K. Frankena (Netherlands);
Dr. R. Möllby (Sweden); Dr. D. Rothauer (Italy);
Dr. H. Smith (U.K.); Dr. R. van de Wiel (Netherlands) and
Dr. K. J. Wojciechowski (FAO, Italy).

We would like to thank all these scientists for their enthusiasm with which they tackled this task.

In addition to drafting the manual, the consultants recommended the preparation of a video on ELISA techniques, and this is something now under active consideration.

(B) STATUS OF COORDINATED RESEARCH PROGRAMMES

(1) Isotope-aided Studies on Non-Protein Nitrogen and Agro-Industrial By-Products Utilization in Ruminant Nutrition with Particular Reference to Developing Countries.

This programme will be terminated in March 1986 when it is intended to hold the final research coordination meeting in conjunction with the FAO/IAEA Symposium (see later for details).

(2) Use of Nuclear Techniques in the Study and Control of Parasitic Diseases.

This programme has a full complement of Contract and Agreement holders and therefore no further awards can be considered. We are planning to hold the final RCM during the first half of 1987 and subsequently to publish the results.

(3) Application of Radioimmunoassay to Improving the Reproductive Efficiency and Productivity of Large Ruminants.

This programme is also full and therefore no further awards can be considered. Arrangements are being made to hold the 2nd RCM in Vienna at the time of the Symposium.

(4) Improving the Productivity of Sheep and Goats with the Aid of Nuclear Techniques.

No further awards can be considered for this programme which is also full. The 2nd RCM should be held in 1987.

(5) Optimizing Grazing Animal Productivity in the Mediterranean and North African Regions with the Aid of Nuclear Techniques.

This programme is also full; we intend to hold the final RCM in 1987 and to publish the results thereafter.

(6) Regional Network for Improving the Reproductive Management of Meat and Milk-producing Livestock in Latin America with the Aid of Radioimmunoassay Techniques.

This programme currently has 19 Contractors and 5 Agreement holders, and therefore we are not seeking further proposals. The 2nd RCM will be held either at the end of 1986 or early in 1987.

(7) Use of Nuclear Techniques to Improve Domestic Buffalo Production in Asia - Phase II

In this programme 16 Contracts and 6 Agreements have been awarded and we are not seeking any further proposals. The first RCM will be held in Bogor, Indonesia from 28 January - 1 February 1986.

(8) Application of Immunoassay Techniques for Improved Diagnosis and Control of Diseases of Livestock.

We have already received over 35 applications and intend to initiate the programme at the end of March with the award of around 15 Contracts and 4 Research Agreements. There is therefore still time to prepare a proposal, which should reach the Agency not later than 10 March 1986. In view of the

large number of new readers, a description of the scope and goals of this programme is given below:

(a) Scientific Background:

Livestock diseases adversely affect food production in all parts of the world. The enormous wastage resulting from disease can be gauged from the fact that more than 50 million cattle and buffaloes and 100 million sheep and goats die each year, the productivity and reproductive efficiency of many millions more are seriously reduced, and vast quantities of animal products are condemned at slaughter. In addition, some diseases have a pronounced effect on the establishment and development of viable animal industries, inhibit international trade in animals and animal products, and have severe effects upon crop production in those areas where livestock provide draught power (especially at the small-farm level).

The major diseases of food-producing animals are caused by viruses (e.g. foot-and-mouth, rinderpest, African swine fever); bacteria (e.g. brucellosis, leptospirosis) and by protozoal parasites (e.g. babesiosis and trypanosomiasis); also, a number of helminth infections (e,g. hydatids and trichinella) have considerable public health importance. Although some of these conditions continue to pose serious potential threats to all countries, it is in the developing countries of Asia, Latin America and Africa that their most devastating effects are felt. Disease control is therefore a high priority requirement for the veterinary services of these countries.

Paramount to the control of animal diseases is rapid and accurate diagnosis. Not only does this enable identification and treatment of cases and carriers and/or removal of reservoirs of infection, it also increases the effectiveness of vaccination strategies. In many instances, diagnosis is based solely on clinical observations, but since the clinical signs of some diseases vary or cannot be differentiated from others, such observations should be supported by isolation and identification of the organism concerned. However, some organisms cannot be easily isolated or grown in culture, the procedures are often time-consuming, and the results are obtained too late to institute effective therapy or other control measures. Serological immunoassay tests are therefore also widely employed as tools for diagnosis. These assays are based on the fact that infectious agents can be identified by a specific antigen-antibody reaction, and the tests themselves either involve the detection of organism-specific antigens or detection of an altered antibody status.

Until recently, diagnostic immunoassays have involved tests such as classical neutralisation, complement fixation, immunofluorescence or gel diffusion. Although producing a result within one to a few days, these tests are often cumbersome and inferior in terms of sensitivity, precision and through-put to the more modern radio- and enzyme immunoassays (RIA and EIA) which now cover about 90% of the routinely reported tests in the research and diagnostic fields. Although there are a number of RIA and EIA systems available, the form which has attained most widespread usage for diagnosis is the solid-phase assay in which antigens or antibodies are passively adsorbed onto microtitre polystyrene or polyvinylchloride plates or tubes and reacted with the test material. Subsequently, a radio- or enzyme-labelled antibody is added, followed in the case of EIA by an enzyme substrate which changes colour on degradation. The amount of radioactivity or colour measured is a function of the amount of antigen or antibody in the test material and the end result can be assessed objectively in simple manual counters or colorimeters. For large-scale testing, multi-well manual gamma-counters or microtitre plate colorimeters may be employed.

In June 1983, the Joint FAO/IAEA Division convened a Consultants Meeting in Vienna to review the applications of nuclear and related techniques in the study, diagnosis and control of livestock diseases in developing countries. The consultants recognised the expertise and experience of the Animal Production and Health Section of this Division in promoting the widespread development and application of RIA and related techniques to the study and improvement of reproductive efficiency of animals kept at the small-farm level. They further noted the similar technical basis of RIA and non-isotopic assays such as EIA, and recommended that the Division should embark on supporting programmes of research and development involving the use of both techniques.

(b) Scientific Scope and Proposed Programme Goals:

The programme will be directed towards:

(i) improving the diagnosis of infectious and parasitic diseases of ruminant livestock and pigs using radioimmunoassay and/or enzyme immunoassay techniques;

and

(ii) employing these tests to obtain a better understanding of the factors affecting the epidemiology of such infections and their impact on productivity.

The following topics are recommended as priorities for attention:

- Assessment of the suitability of EIA and/or RIA techniques for the diagnosis of important viral, bacterial or parasitic diseases in tropical and subtropical countries. This would require comparative studies between these modern immunoassays and the longer-established techniques in order to determine the most suitable approach to specific disease problems.

- Evaluation of the use of EIA and/or RIA in epidemiological surveys of viral, bacterial or parasitic disease.

- Evaluation of the use of EIA and/or RIA for assessing the success of vaccination or other disease control campaigns.

- Application of EIA and/or RIA techniques to determine the role of infectious or parasitic disease on reproductive efficiency and/or growth rate.

- Examination of the relationship between such factors as nutrition and genotype on the resistance of livestock to viral or bacterial infections.

(C) PUBLICATIONS

(1) FAO/IAEA Laboratory Training Manual on "Use of Nuclear Techniques in Animal Nutrition".

This is now available and can be obtained from the Division of Publications, IAEA; price: Austrian Shillings 680,-- or equivalent paid in your local currency or UNESCO coupons. The contents of this manual include descriptions of the potential of isotopic techniques in animal nutrition; properties of radionuclides and radiation; and radiation detection and protection. These are followed by descriptions and exercises on the measurement of radioactivity and tracer methodology; the preparation of animals with fistulae in the digestive tract; determination of ^{15}N; measurement of flows and volumes in the alimentary tract of ruminants and non-ruminants; and measurement of such parameters as microbial protein synthesis, VFA production, glucose turnover, urea synthesis, Ca absorption and endogenous excretion, body composition, etc. There are some 60 exercises in the Manual dealing with various aspects of animal nutrition.

(2) "Improving the Productivity of Indigenous Animals in Harsh Environments with the Aid of Nuclear Techniques", Ankara, Turkey.

The publication arising from an Advisory Group Meeting on this topic in June 1985 has now been edited and should be available within the next few months. Further details will be given in the next Newsletter, but in addition to the recommendations from the meeting, it will contain the following articles:

Present trends in livestock development in Africa and the Middle East.	A.W. Qureshi (FAO)
Effects of the thermal environment on animal production in the tropics.	D. Robertshaw (USA)
Genetic improvements to the productivity of cattle in tropical Africa.	J.E. Frisch and J.E. Vercoe (Australia)
Environment by reproductive interaction in cattle.	W.W. Thatcher et al. (USA)
Sensitivity of reproductive potential to environmental factors in sheep and goats.	P. Chemineau and M. Terqui (France)
Effect of cloprostenol on progesterone profile and fertility in suboestrus cattle.	F.S. Chauhan et al. (Tanzania)
The use of radioimmunoassay for quantitative determination of progesterone in milk samples of dairy cows in Zimbabwe.	P.J. Freymark and C.T. McCabe (Zimbabwe)
Adaptation of indigenous sheep, goats and camelids to harsh grazing conditions.	W. von Engelhardt (FRG)
Agro-industrial by-products as ruminant feeds.	M.C.N.Jayasuriya (FAO/IAEA)
Nitrogen metabolism in the tissues of the ruminant.	P.J. Buttery (U.K.)

Mineral supplementation for grazing ruminants.	L.R. McDowell et al. (USA)
Ruminant mineral deficiencies and radioisotopic and other techniques of detection.	L.R. McDowell et al. (USA)
Evaluation of dose response effects related to nutritional diseases (mineral deficiencies) in ruminants.	K. Göksoy et al. (Turkey)
The use of irradiation to produce vaccines and of radioisotopes to study the pathophysiology and immunology of host-parasite relationships.	P.H. Holmes et al. (U.K.)
Enzyme immunoassays in disease studies.	J.R. Crowther (U.K.)

(D) FORTHCOMING EVENTS

(1) First Research Coordination Meeting on "The Use of Nuclear Techniques to Improve Domestic Buffalo Production in Asia - Phase II, Bogor, Indonesia, 28 January - 1 February 1986.

(2) Final Research Coordination Meeting on "Isotope-aided Studies on Non-Protein Nitrogen and Agro-Industrial By-Products Utilization in Ruminant Nutrition with Particular Reference to Developing Countries, Vienna International Centre, Vienna, Austria, 17-26 March 1986 (in conjunction with Symposium, see later).

(3) Second Research Coordination Meeting on "Application of Radioimmunoassay to Improving the Reproductive Efficiency and Productivity of Large Ruminants", Vienna International Centre, Vienna, Austria, 17-26 March 1986 (in conjunction with Symposium, see later).

(4) FAO/IAEA International Symposium on the Use of Nuclear Techniques in Studies of Animal Production and Health in Different Environments", V.I.C., Vienna, 17-21 March 1986.

The arrangements for this Symposium are now in an advanced stage and some 40 papers and 50 posters have been selected for presentation, so it should be a busy and interesting time. For those who may be interested in attending, below is the provisional programme. The papers presented at the Symposium along with summaries of the work illustrated by the posters will be published by the Agency towards the end of 1986; further details concerning this publication will be given in the next edition of the Newsletter.

FAO/IAEA International Symposium on the Use of Nuclear Techniques in Studies of Animal Production and Health in Different Environments

17-21 March 1986, Vienna, Austria

Provisional Programme

MONDAY, 17 MARCH 1986

09.30 Opening of the Symposium

09.50 Keynote Address by Dr. H.A. Jasiorowski
(Director, Division of Animal Production and Health, FAO, Rome)
Constraints and prospects for livestock production in developing countries.

No. of paper IAEA-SM-292	Name	Designation Member State/Organization	Title of paper

11.15 Session I: Adaptation of Animals to the Environment

Chairman: Dr. H.A. Jasiorowski (FAO, Rome)

5	J.V. Wilkins	United Kingdom	The productive and reproductive performance of cattle in the tropics.
1	W.Thatcher D.K. Collier C.J.Beede C.J. Wilux M. Drost	United States of America	Applications of hormone radioimmunoassays on studies of environment/ reproduction interactions in large ruminants.

14.00 Session II: Adaptation of Animals to the Environment

Chairman: Dr. J. Wilkins (United Kingdom)

8	J.E. Vercoe J.E. Frisch	Australia	Utilising genotype x environment inter-actions for improving the production of cattle in the tropics.
15	D. Robertshaw	United Kingdom	Use of isotopes in the assessment of animal responses to the environment.
3	S. Benlamlih	Morocco	Fluid balance and urea recycling during pregnancy and lactation in small ruminants.
6	I. Choshniak A. Shkolnik	Israel	Coping with shortage of adequate food by livestock tended by the Bedouin in the extreme desert.

	12	P. Susmel	Italy	Effect of genotype on the protein and energy requirements of livestock.

TUESDAY, 18 MARCH 1986

Chairman: Dr. C. S. Galina (Mexico)

09.00 Session III: Animal Reproduction

32	S.A. Khanum M. Ali S.H.M. Naqvi	Pakistan	Effect of feeding salt tolerant grasses on reproductive efficiency of dwarf goats.
17	J. Thimonier M. Terqui P. Chemineau	France	La conduite de reproduction des petits ruminants dans les différentes parties du monde.
2	A.Lahlou-Kassi	Morocco	Use of hormone determinations in studies on the reproductive efficiency of small ruminants.
16	J. Sumar	Peru	Studies on the reproductive behaviour of Latin American cameloids.
19	B.M.A.O.Perera	Sri Lanka	Use of radioimmunoassay methods in studies of swamp buffalo reproduction.
29	H.S. Tan H. Kassim T.K. Mak	Malaysia	Reproductive performance of indigenous cattle in Malaysia.

14.00 Session IV: Animal Reproduction

Chairman: Dr. H. Karg (Federal Republic of Germany)

30	S. Gombe H.B. O'Hara	Kenya	Strictures in reproductive performance in small to large-scale dairy farming in Kenya.
18	C.S. Galina A.Duchateau	Mexico	Assessment of reproductive efficiency of Bos indicus cattle in Mexico.
28	G.J. King	Canada	Intelligent use and potential abuse of hormone assays in animal production research.
7	D.F.M.van de Wiel J.Vorstermans J.A.H.van Lieshout	Netherlands	Enzyme and radioimmunoassay techniques for hormone determinations in livestock.

31	H.H.D. Meyer	Federal Republic of Germany	Possibilities to improve EIA techniques and their application in animal production.
33	H. Kindahl C.Fredriksson L.-E. Edqvist	Sweden	Some aspects on the possible roles of diseases in altering reproductive performance of livestock.

WEDNESDAY, 19 MARCH 1986

09.00 Session V: Animal Health

Chairman: Dr. I.G. Wright (Australia)

37	Y. Ozawa	Food and Agriculture Organization	The impact of animal diseases in developing countries.
10	M. Jeggo	United Kingdom	The diagnosis of viral diseases using ELISA techniques: Current status and future prospects.
24	R.H. Jacobson	United States of America	Recent developments in the diagnosis of infectious and parasitic diseases of farm animals.
40	J.Moreno-Lopez	Sweden	Recombinant DNA technology in the diagnosis of infections in animals.
38	H.J. Rziha V. Ohlinger T.C.Mettenleiter G. Wittmann	Federal Republic of Germany	Studies on Aujezky's disease using recombinant DNA technology.

14.00 Poster Session: See pages 15-20 for details.

THURSDAY, 20 March 1986

09.00 Session VI: Animal Health

Chairman: Y. Ozawa (FAO, Rome)

14	I.G. Wright C.A.Schunter B.V.Goodger G.Leatch	Australia	The application of nuclear and related techniques in the diagnosis and control of tick-borne diseases of livestock.

23	P.H. Holmes	United Kingdom	Use of radioisotopic methods in studies on the pathogenesis of gastrointestinal helminths in sheep.
4	A. Dakkak	Morocco	The mechanisms causing reduced productivity in sheep infected with abomasal parasites.
34	A.G. Luckins C. Llewelyn C.D. Munro M. Murray	United Kingdom	Effects of pathogenic trypanosomes on the mammalian reproductive system.
13	D.P. Poppi	New Zealand	The use of isotopic methods in studies on parasite x nutrition interactions.

14.00 Session VII: Animal Nutrition

Chairman: Dr. S. Economides (Cyprus)

36	P. Auriol	Food and Agriculture Organization	Animal feed resources in developing countries: their extent and current constraints on their utilisation.
11	R. Orskov	United Kingdom	The effect of undernutrition on rumen and post-absorptive N metabolism.
20	J.V. Nolan R.M. Dixon	Australia	Protein nutrition and dynamics of N metabolism in ruminants.
21	L.D. Satter J. Lopez-Guisa W.F. Nelson	United States of America	Use of markers for measurements of feed digestibility in ruminants.
9	P.J. Buttery	United Kingdom	The influence of diet and and hormones on muscle protein metabolism - a review.
41	J.W.Czerkawski	United Kingdom	A simple model to describe the flows of large and small particles in the rumen.

FRIDAY, 21 March 1986

09.00 Session VIII: Animal Nutrition

Chairman: Dr. I. Choshniak (Israel)

27	J.T. Munthali	Malawi	Effect of carbohydrate and nitrogen source on the utilisation of sugarcane diets.
22	S.S.S.Jalaludin F. Francis Y.W. Ho K.J. Cheng	Malaysia	Utilisation of agro-industrial by-products as animal feeds in the Asian Region.
25	L.R. McDowell J.H. Conrad J.K. Loosli	United States of America	Mineral imbalances and their diagnosis in ruminants.
39	F.A. Kallfelz C. Crosetti I. Tukenmez	United States of America	Urinary tract obstruction in calves induced by dietary magnesium: incidence and pathogenesis.
26	S. Economides	Cyprus	Mineral requirements of dairy sheep.
-	J.D. Dargie	FAO/IAEA	Summary of Symposium achievements and implications for direction of animal production and health research in developing countries.

Closing of Symposium

POSTER SESSION

14.00 WEDNESDAY, 19 MARCH 1985

No. of Poster IAEA-SM-292	Name	Designating Member State/Organisation	Title of Poster
1	J.A.S. Chipepa M.A. Omer B. Sakala R.C. Changa	Zambia	Short term calf removal to increase conception rates in Angoni cows.
2	J. Eldon T. Olafsson	Iceland	The post-partum reproductive status of dairy cows in two areas of Iceland.

3	Y. Intraraksa K. Nitichri	Thailand	Milk progesterone profiles during the post-partum period in dairy cow at Thai-Danish farm.
4	S. Wahab	Malaysia	
5	J. Robalo Silva	Portugal	Post-partum anoestrus in beef cows: A comparison between two groups of animals calving at different times of the year by plasma progesterone profiles.
6	L. Mahaputra S. Hardjopranjoto M.R. Indra M. Soerjoatmodjo	Indonesia	Defatted milk progesterone radioimmunoassay as a tool to confirm oestrus, early pregnancy and early embryonic death in dairy cattle.
7	L.M. Kezimbira	Uganda	Studies on reproductive efficiency of Ankole cattle under rural management conditions.
9	D. Choung J.K. Kim D.C. Kim	Republic of Korea	The use of radioimmunoassay to monitor reproductive status of Cheju native cattle, and the effect of supplementary feeding on reproduction.
10	A.R. Mohamed R. Sivakanesan R. Rajamahendran	Sri Lanka	A study of clinical and biochemical changes in the post-partum cow in relation to oestrus detection and fertility as monitored by a radioimmunoassay method.
12	T.B. Post	Australia	Immunization against LHRH as an aid for managing reproduction in grazing female beef cattle.
13	E. Bamberg H.S. Choi J. Hois	Austria	Comparison of estrogen concentrations in faeces and blood plasma of cycling and pregnant sows.
14	S.M. Gennari M.C.R.V. Bressan	Brazil	Development of Ascaridia galli after infection with irradiated eggs.

15.	G. Dazhi L. Xianyi C. Faju D. Yongle S. Xuehua	People's Republic of China	Early pregnancy diagnosis in dairy cattle based on milk and hair progesterone levels.
16	J.H. Jarrin P.F. Villalba J. Pastrano	Ecuador	Un estudio de la actividad ovarica post-parto en un grupo de vacas lecheras del Valle de Machachi, Ecuador.
17.	T.H. Kamal	Egypt	The TOH-heat tolerance index as growth predictor for hot climate in goats drinking river and sea water.
18	M. Rahman R.N. Baruah N.N. Barthakur	India	Effect of feeding three levels of protein on growth, feed conversion, reproductive performance of certain blood constituents of Jersey heifers.
19	C. Hendratno Z. Abidin S. Suharyono M. Winugroho R. Bahaudin	Indonesia	Use of leucaena and cassava tops in combination with molasses and tapioca waste as supplement for buffaloes fed road side grass.
20	S. Sastradipradja I.G. Manik	Indonesia	Glucose, protein and energy metabolism of lactating goats fed a grass diet and steam-cooked cassava urea supplement.
21	O. Adeyemo	Nigeria	Serum progesterone levels in monitoring ovarian activity in White Fulani (Zebu) dairy cattle after parturition.
22	W.T. Binnerts P. Polak J. Geradts R. van der Vlist L. Lindner	The Netherlands	Healthy animals in a sound environment: perspectives of study with copper istotopes.
23	J. van den Hoek J. van Bruchen R.J. Kirchmann	The Netherlands	The use of animal feed labelled with ^{3}H and ^{14}C in animal nutrition studies.

24	R. Krzeminski G. Kulasek W. Barej	Poland	The mediation of pancreatic and thyroid hormones in the utilization of nutrients in dairy cows.
25	P. Ostaszewski S. Nissen A. Trenkle	Poland	Estimation of the kinetic parameters of insulin, glucagon and growth hormone in sheep fed supplemented energy.
26	A.M. Homeida	Sudan	Evidence that oxytocin is of luteal origin during the caprine oestrous cycle.
27	N. Chaiyabutr L. Buranakarl V. Huangcharoen P. Loypetjra A. Pichaicharnarong	Thailand	Changes in the rate of liquid flow from the rumen and turnover of body water of the acute heat stressed buffalo.
28	M. Kamonpatana	Thailand	Hormone determination as a tool to improve reproductive efficiency in swamp buffalo.
29	S. Sophon K. Srisakwattana H. Kamonpatana	Thailand	Post-partum ovarian cyclicity of cross-bred cows during tropical adaptation.
30	M. Alabay H. Cerci F. Aykol	Turkey	Response of lambs vaccinated with irradiated Trichostrongylus colubriformis larvae to impulse and sequential challenge with normal larvae.
31	S. Ozsar H. Izgur Z. Emre	Turkey	Some managerial factors affecting reproductive performance of dairy cows in Turkey.
32	K. Göksoy T. Morcol A.I. Gucus S. Karakaya	Turkey	Response of small ruminants to daily and weekly mineral supplementation.
33	R. Kovacevic L. Krsmanovic D. Maric S. Veselinovic R. Perkucin	Yugoslavia	Investigation of progesterone profiles in post-partum dairy cows.
34	D. Djurdjevic P. Nikolic V. Stojic	Yugoslavia	The possibility of early pregnancy diagnosis in sows by RIA of serum progesterone.

35	C.E. Suarez A.M. Vigliocco G. Pacheco	Argentina	Serodiagnosis of ovine brucellosis by a radio-immunoprecipitation test.
36	A.R. Sheikh-Omar A.L. Ibrahim	Malaysia	The pathogenicity of infectious bovine rhinotracheitis virus isolated from water buffalo.
37	H. Höller	Federal Republic of Germany	
38	R.H. Smith M.P. Grantley-Smith R.J. Merry J.D. Mcallan	United Kingdom	Supply of N-compounds to the rumens of growing cattle and their subsequent metabolism and nutritional value.
39	H.A.El-Fouly R.A. Leng	Egypt	Manipulation of rumen fermentation to enhance microbial protein synthesis from NPN supplements.
40	Chang-Won Kim	Korea	
41	V. Talavera	Peru	Utilizacion de sub-productos agro-industriales y residuos de cosecha en el Peru.
42	L.P. Milligan P.M. Kennedy A. Lirette K. Chai	Canada	Forage particle breakdown and movement in the reticulo-rumen of cattle.
43	T. Hvelplund	Denmark	Estimation of nitrogen digestibility in undergraded dietary protein by *in sacco* procedure.
44	E. Seren	Italy	Measurement of reproductive hormones by ELISA.
45	M.M. Tareque S.A. Choudhury	Bangladesh	Utilization of sugar cane bagasse as basal roughage for growing local bull calves.
46	P. Vuister	IAEA	Power conditioning of electronic equipment.

47	Animal Production & Health Section	FAO/IAEA	Activities of Animal Science Laboratory, Seibersdorf.
48	AGRIS	FAO	Information Retrieval Service.
49	E. Sinski H. Wedrychowkz I.B. Helal B. Bezubik	Poland	Effects of acute nutritional deprivation on local immune responses to gastrointestinal helminths in rabbits and sheep.
50	N. Baishya G.S. Pope	India	Progesterone determination as a tool to improve reproductive efficiency in dairy cattle.
51	T.C. Mettenleiter H.J. Rziha N. Lukacs H.J. Thiel C. Schreurs R. Simon	Federal Republic of Germany	Studies on the involvement of pseudorabies virus (Aujeszky's disease virus) envelope proteins in virulence and protection using recombinant DNA technology.
52	O.F. Limia R.F.Y.L. García	Cuba	Valores de progesterona durante el ciclo estral postparto en vacas Holstein en seca y lluvia.

(E) DEVELOPMENTS AT THE SECTION'S LABORATORY, SEIBERSDORF

Considerable impetus has been given to the development of the Animal Science Unit since the last Newsletter largely as a result of an increase in staffing and laboratory space: a viable laboratory for RIA of reproductive hormones and two for animal nutrition have recently been complemented by an ELISA laboratory for disease diagnosis. The Unit's work has been directed towards supporting the activities of the Section's research contractors and technical assistance counterparts in developing countries. This support takes three forms:

(a) Provision of Standardised Kits, Reagents and Analytical Data

(i) Solid-phase RIA kits for milk and plasma progesterone will be available to Research Contract (RC) holders and Technical Assistance (TA) counterparts in early 1986. The prototype kits have already been produced and validated for different animal species and await the definition of inter-laboratory variability by 12 renowned RIA laboratories in different parts of the world prior to being made available generally. The price will be US$ 25 per 100 tube kit, a considerable financial saving on commercially available kits. Included are two quality control samples, and recipients will be expected to participate in regular external quality control checks directed from Vienna.

The RIA laboratory also has a stock of antisera for the assay of LH, oestradiol 17-beta, oestrone and testosterone which can be supplied on demand.

The nutrition laboratory is evaluating fibrous feeds of potential value for feeding ruminants. So far 30 samples have been sent to us from Research Contractors and Technical Cooperation counterparts and 18 have already been analysed for fermentation characteristics in Rusitec. The data are now being compiled and will be made available soon to the donor scientists. This information will be of value in identifying potential feed sources or feed treatment procedures and hence in developing suitable feeding strategies. We invite the Section's collaborators to send us any new feeding material which they think may have potential as a ruminant feed for initial screening in the Rusitec.

(ii) Training of Scientists through Training Courses and Fellowships

Another important aspect of the Animal Science Unit's work is training. As judged by the large interest in the Training Course on "The Use of Isotope-aided Techniques in Ruminant Nutrition", it is clear that the demand for training is greater than time allows the available staff to devote to such an essential activity. Two fellows in Animal Nutrition (Mr. A. Photiou from Cyprus and Mr. S. Puspowardoyo from Indonesia) have each received 4 months' training in laboratory techniques for measuring rumen fermentation, characteristics of fibrous feeds, etc. Also, one fellow (Dr. A.-L.Vasquez from Mexico) is being trained on a coated-tube technique for assaying progesterone.

(c) Provision of Bibliographic Support

Many research workers in developing countries do not have access to good library facilities. The Section has therefore implemented a bibliographic search service based on the AGRIS computer system which uses keywords to search the literature on agriculture (over 1-? million documents written over the last 11 years) and its related fields (including fisheries, forestry, food and veterinary science). Whilst not exhaustive in its search of all published materials in agriculture, an AGRIS search yields excellent material for a review of the research topic in question. Research Contractors and Technical Cooperation project counterparts of the 'Latin American Regional Network in Reproduction' have already received the results of their first literature searches; similar searches will be conducted for the counterparts of the Section's other programmes in the course of the next few months and those attending the Symposium will have the opportunity of making their own search while in Vienna.

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