



Animal Production and Health Newsletter

JOINT FAO/IAEA DIVISION OF NUCLEAR TECHNIQUES IN FOOD AND AGRICULTURE
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Dear Colleague,

In the previous edition of the Newsletter, some focus was given to the philosophy of the Joint FAO/IAEA Division with respect to technology transfer and know-how, and in particular to training through fellowships/training courses, visits by FAO/IAEA experts, provision of equipment and organisation of meetings. I think it's important to continue on this theme here by saying something about the people behind the development and evolution of our programme philosophy, as well as those that implement it. The most important point to make in this respect is that while the staff of the Section is of course intimately involved in all aspects of programme development and delivery, the need for constant consultation and collaboration with scientists and institutes in the world at large is essential to achieve a properly focused, balanced and realistic programme. This is why, before we ever think of starting a new Coordinated Research Programme for example, we seek the advice, comments and criticisms of people outside the Organisation who have an international reputation in the field in question. Then, when implementing the programmes itself, we invite scientists and institutes with recognised expertise to help us as Agreement holders to ensure that it follows the "right direction". Likewise, with our Technical Cooperation projects, we rely heavily on outside expertise to help in implementing them, and we also rely on our "experts" to help identify others not yet known to our staff, who can also assist. Another good example of the assistance we receive from outside sources is in the developments related to the FAO/IAEA diagnostic kits which are now provided through our various projects to counterparts in developing countries. We did not develop these tests ourselves - they were (and are still) developed by specialised institutes and scientists who want to assist our programmes. Our task was (and will remain) to work with these people and institutes to make sure the product does the job it is meant to do in a tropical or subtropical environment, and at the same time to make the necessary arrangements to ensure that counterpart institutes and staff are appropriately equipped and trained to use the kits properly.

The point I would like to make then, is that behind all aspects of our programmes - whether they be Coordinated Research Programmes, Technical Cooperation Projects, Training Courses or anything else, there are large numbers of people and institutes advising and assisting us. In the development and implementation of FAO/IAEA activities in animal production and health, the staff of the Section are of course in the "shop window", but in the "backroom" are many others dedicated to ensuring that our activities are relevant and are being implemented in the most professional way possible. To them, I would like to offer our sincere thanks.

On the programmatic front itself, you will see that the next 6 months (in particular the month of September) will be fairly hectic, with 4 Research Coordination Meetings and 2 Regional Training Courses planned. Since two of these meetings will be the last under the programmes concerned (i.e. the animal production and the trypanosomiasis programmes in Africa), there will be the additional job of ensuring that all the results from

these programmes are written up for subsequent publication. Although we are not yet in a position to announce replacement CRPs for Africa in these fields of activity, it is hoped that this can be done in the next edition of the Newsletter. As far as the two CRPs in Asia are concerned, these will terminate with the final RCMS scheduled for Bangkok in February 1993. We do not intend a follow-up CRP on animal production specifically for the Asian Region since we recently included 6 Asian institutes in the new CRP on milk-producing animals. However, should funds become available, a new programme - probably on pig and poultry diseases - will be initiated. With respect of Latin America, I do not see any further scope for new CRPs over the next 3-4 years since this Region is already being very well supported through existing activities.

On the staff front, Trevor Wilson left us to become the Manager of an FAO Project based in The Gambia on trypanotolerant livestock. Although we were sorry to lose Trevor, we realised that his heart was in Africa and that should the right opportunity to work there again come along, he would take it. He remains, however, with FAO and we therefore hope that contact will be maintained. In the next edition of the Newsletter, we should be in a position to announce Trevor's successor. The other recent staff changes are the replacement of Beata Rogovic by Cynthia Hoffmann in our Laboratory Unit, and the resignation of one of our Secretaries, Dagmar Just, to take up a position in Tokyo with the Austrian Trade Commission. We thank Dagmar for the work she did in the Section during her short period with us, and wish her all the best in Japan.

With best wishes,

James D. Dargie
Head, Animal Production
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(B) **PAST EVENTS**

- (1) **FAO/IAEA Consultants Meeting on "ELISA Data Expression and Evaluation", V.I.C., Vienna, 27-31 January 1992**

The enzyme-linked immunosorbent assay (ELISA) has become widely employed for both antigen and antibody detection in annual disease diagnosis, and is now being used within the framework of many programmes being run by the FAO/IAEA and other organisations in developing countries. ELISA tests are also now becoming increasingly recognised by the OIE as alternatives or additions to conventional serological tests for diagnosis. However, at present there is little standardisation of data expression or evaluation, and relatively few internationally accepted reference reagents or protocols exist. This is of concern to international and national organisations because of its negative impact on international control of animal diseases and inter-country trade

in livestock. The Joint FAO/IAEA Division therefore felt that it was now appropriate to bring together a group of experts to draw up guidelines on the expression and evaluation of serology-based ELISA results, with the ultimate aim of getting these ratified by the OIE Standards Commission and subsequently by the OIE General Assembly. Four areas are considered in the report prepared by these Consultants: expression of results from the samples tested; the use of international reference standards; the incorporation of internal quality control procedures; and the determination of the test threshold. Also included are brief descriptions of commonly used procedures plus conclusions and recommendations on appropriate methodologies. Once this document has been discussed by OIE and possibly amended in the light of such discussions, it will be made available to all the FAO/IAEA counterparts working the area of animal diseases, and to anyone else who requests it in writing to the Section.

Finally, we would like to express our appreciation of the services provided by Dr. Richard J. Jacobson (USA); Dr. Terry Spencer (Australia); Dr. Steven Edwards (United Kingdom) and Dr. Hiko Tamashiro (WHO, Switzerland) in preparing this report.

(2) FAO/IAEA Training Course on "The Analysis of Animal Production Data Using Personal Computers", International Livestock Centre for Africa, Ethiopia, 9-20 March 1992

This course was attended by 15 participants from different African countries and 6 invited lecturers.

During the first week of the course, lectures were given on scientific writing and statistical analyses of animal production data. Practicals were given on the use of personal computers, MS DOS, and software programmes for statistical analysis, i.e. INSTAT from the University of Reading, UK, and DBstat from the University of Wageningen, The Netherlands. The course participants were also able to practice with these computer programmes independently.

In the second week of the course lectures were given on "Nutritional constraints to livestock production", "Increasing livestock productivity in African livestock production systems", and "Management of cattle reproduction in the tropics". Presentations were also given on the 3-Way computer programme for recording and processing of animal production data, developed for FAO/IAEA by the University of Wageningen, and the Livestock Information Management System (LIMS) developed by ILCA. Case studies on the analysis of animal production data were also presented.

The main part of the second week consisted of workshop groups, during which the course participants were assisted in the analysis of their research data and the preparation of a scientific publication. A field trip to the ILCA field station in Debre Zeit, was organised on the last day of the course.

(3) Final FAO/IAEA Research Coordination Meeting on "Development of Feeding Strategies for Improving Ruminant Productivity in Areas of Fluctuating Nutrient Supply through the Use of Nuclear and Related Techniques", V.I.C., Vienna, 30 March - 3 April 1992

This meeting was attended by the 12 Research Contract and 5 Research Agreement holders in the programme. Since this was the final meeting under the programme, most of the time was spent on editing manuscripts and drawing up conclusions and recommendations for an FAO/IAEA publication on the programme. Dr. M. Bryant (UK), who recently completed a 1-year sabbatical with the Section and who was responsible for the programme during that time, kindly agreed to attend the meeting and to stay on afterwards for 1 week to complete the editing of the manuscripts. We would like to thank Mike for his efforts in this regard and also the participants themselves for contributing so positively to the programme over the past 5 years. We hope to have the papers presented at the meeting published by the IAEA before the end of 1992.

This Coordinated Research Programme was concerned primarily with finding ways of better utilising locally-available feed resources to improve the productivity of ruminant animals in areas where the nature, supply and quality of these resources varies seasonally. It is recognised that the nature and magnitude of the response to nutritional manipulation will depend on the genotype (species/breed) and on environmental factors such as temperature and humidity, and the occurrence of parasitic and other diseases. Nutrition can, however, be improved by treating straws and other roughages and by identifying varieties with superior digestibility; by strategic supplementation with other protein and carbohydrate-containing feedstuffs or feed additives (minerals/vitamins) which influence digestion; and by manipulating the animal's metabolism so that accumulated tissue reserves are used during times of shortage or high nutritional demand.

Within the framework of this programme one or a combination of these approaches was attempted in different animal species, but at the outset it was recognised that the nutritive values of the basal roughages and other feedstuffs available were often inadequately known. Participants were therefore encouraged to identify conventional and non-conventional feed resources that could potentially overcome nutritional constraints to the target systems in question using both *in vitro* analytical methods and animal responses, prior to embarking on studies designed to examine how these resources or modifications to them could benefit these systems.

The major conclusions which emerged from the programme were as follows:

(a) Use of Straws and Forages

Work in Sri Lanka demonstrated that leguminous forages e.g. Glyricidia stimulated the intake of rice straw by cattle more effectively than did urea, probably as a result of supplying rumen-degradable N as well as easily digestible fibre. These

studies, which were conducted on animals grazing natural herbage under coconut trees, also demonstrated the additional benefits of supplementation with a "by-pass" protein source (rice polishings) and a vitamin-mineral mix - not only in terms of growth, but more particularly on reproductive performance.

The studies reported from Tunisia demonstrated that the quality of different types of straw varies considerably, although it was not possible to identify consistent differences between varieties in terms of nutritive value (e.g. intake or animal performance). Treatment of straw with anhydrous ammonia and of baled straw using urea/ammonia resulted in heterogenous results but efficiency was increased by the addition of water. A further finding from these studies was that ad libitum feeding of ammonia treated straw supplemented with low levels of concentrate improved the performance of pregnant and lactating ewes traditionally fed on grazing systems.

Similar work from Portugal showed also that large variability in the nutritive value of straws exist between cultivars and because of the environment, and that because of the cultivar - environment interaction, the ranking of a cultivar in terms of nutritional value at more than one location or year is unpredictable. The increase in dry matter digestibility of straws resulting from ammonia treatment was negatively correlated with the buffering capacity of rumen contents, suggesting that a prior measurement of buffering capacity could help to predict more precisely the ammonia required to achieve a given nutritive response. Work under this project also demonstrated that when harvested at the mature stage of growth, triticale could be effectively preserved through treatment with urea (6% level) and that this product had a substantially higher nutritive value than untreated triticale. Various studies on supplementation of basal diets of triticale and meadow hay (using corn gluten, citrus pulp or lucerne meal) demonstrated lower intakes of triticale and of hay when levels of supplementation exceeded around 30% of dry matter.

(b) Evaluation of Protein Sources

The major feedstuffs used for ruminant feeding in Cyprus, both treated and untreated, were evaluated in terms of potential and in vivo degradability in order to provide tabular information for use by the extension services. As a result of this work a large body of information was generated about the feeds available in this country for feeding dairy animals (cattle and sheep).

Similar kinds of evaluation were conducted in Venezuela, and the findings verified in a series of feeding trials using different protein sources. In general, all proteins with a degree of escape potential, benefitted production. One interesting relationship that emerged from these studies was that protein supplements produced animal production responses by stimulating feed intake, whereas energy concentrates tended to produce "substitution", with the degree of response per unit of protein decreasing as level of production increased.

In Thailand, a novel protein source for buffalo production was identified in the form of cassava leaf. This abundant

protein source grows prolifically in areas of poor fertility. The leaves can be harvested at 6 months with minimal effects on eventual tuber production, and a second crop of leaves is obtained when the tubers are harvested. The leaves contain prussic acid, a potential toxin, but the simple technology of sun-drying virtually removes the potential toxicity, enabling the leaves to be used at up to 30% of the total ration, and possibly higher with large economic benefit to production. This protein source is much less expensive than traditional protein sources used during the seasonal dry period, and supplies are virtually unlimited at the present time. This discovery could be of enormous benefit to ruminant production in Thailand.

In Nigeria, work has commenced on providing additional N for rumen microorganisms and sources of escape protein for the host. To provide nutrients for the rumen microbes, the strategy of urea-molasses block feeding was chosen. Block formulation methods have been successfully developed to provide blocks of suitable composition and consistency using local ingredients. These blocks have been used in feeding trials, and appear to have stimulated intake of low digestibility forage (stova), and liveweight gain. The use of protein-rich concentrate mixtures appear also to have been beneficial, especially with increasing levels of ingredients such as cotton seed cake.

To meet the nutritional demands of higher producing cows from locally available feedstuffs in Korea, methods to improve post-ruminal supply of protein were investigated, e.g. extrusion of soya bean meal at controlled temperature and mixing of soya bean meal with blood prior to extrusion. Initial studies showed that extrusion at 15°C and addition of 60 ml blood/100 g of soya bean meal were likely to be effective treatments as judged by in vitro estimates of degradability. Measurements in cannulated sheep showed that isonitrogenous inclusion of extruded blood/soya mixture yielded a substantial increase (12%) in post-ruminal crude protein supply over that from untreated soya, but had no effect on rumen microbial protein production. Incorporation of blood from abattoirs, in association with soya and extrusion treatment, showed promise as a source of post ruminal protein and will now be evaluated in production trials where protein supply limits performance.

However, results from Turkey indicated that feeding of high quality protein supplement (e.g. soyabean meal, sunflower meal and cottonseed meal) to stimulate and increase mohair production and mohair quality in Angora goats was unlikely to be economic. Results using poultry manure gave results similar to protein supplements and indicated that on the whole, provided microbial need for degradable N was met, there was not likely to be additional benefit in terms of increased mohair production and quality and also in reproduction by providing additional undegraded protein.

(c) Other Studies

Work from Brazil demonstrated that P availability in a range of forages varied substantially, and provided a good basis for planning of effective supplementation. The work has confirmed the high F content of some supplements, e.g. superphosphate and

Patos rock phosphate. The health hazard associated with feeding these sources will only become apparent after a further few years of feeding. However, given the very high F levels recorded and the lack of clinical symptoms, the work points to the need for more vigorous evaluation of the levels of F associated with the development of clinical symptoms in young and lactating animals.

Socio-economic problems limit the potential improvement of small ruminant system productivity in Bangladesh. The work under this CRP demonstrated that major improvements will result from control of internal parasites. This could be rapidly taken up by farmers with readily demonstrable returns. These studies also provided information on the feeding value of a range of crop by-products available as supplements and demonstrated weight gain improvements from feeding some of these; however, this will not readily provide economic returns. There is a need to target, in collaboration with farmers, particular animals for superior nutrition to see whether economic gain can be enhanced by nutrition.

Finally, work in Morocco monitored the energy balances of local sheep exposed to different patterns of nutrient supply during three successive reproductive cycles. It demonstrated that feeding strategies adopted for other prolific breeds in other systems will be appropriate for recommendation for use with local Moroccan breeds.

During the meeting the following recommendations also were drawn up:

(a) Roughage Feed Evaluation Systems

The work of several contract holders showed clearly the difficulty in predicting animal performance largely due to the inability to predict roughage intake with any precision. There is now a great interest in developing such systems based on degradation characteristics and promising results have been repeated. There are, however, likely to be exceptions particularly if the feeds contains antinutritive factors or the feeds are consumed by animals that are selective such as sheep and goats, which for instance prefer leaf of rice straw although these are less digestible than stems.

(b) Determination of Protein Supply in Ruminants

The use of purine excretion into urine seems to show great promise after some work involving elucidation of endogenous excretion has been carried out. There is a possibility that the supply of microbial proteins in field situations may be determined with sufficient accuracy from purine concentrations in the blood. There is a need to support work on validation of the promising approach and to develop simple and robust techniques for determining urine and blood purines under field situations.

(c) Determination of Protein Status

For animals exposed to fluctuating exogenous nutrients, there is a great need to assess the protein status. Animals

receiving less than energy maintenance of feed are likely to lose tissue protein due to insufficient supply of microbial proteins. The extent to which animals are in protein deficit needs to be assessed from blood and urine markers since N balance work is unsuitable. The FAO/IAEA should support work on the development of suitable markers, and subsequently robust kits, which can be used in the field for extension services to provide producers with better advice as far as expected responses to protein supplementation for growth and lactation are concerned.

(d) Determination of Fat Status

The reaction of most ruminants to fluctuating supply of exogenous nutrients is to store surplus food as endogenous fat in different parts of the body e.g. humps, tails, subcutaneous etc. There are no good methods of determining this source of energy, although condition scoring developed for different breeds and types of animals is a useful indicator. There is a need to examine whether there are blood and/or urine metabolic markers which can indicate the quantity of fat stored or which together with liveweight can enable a reasonably accurate assessment. It is only possible to develop livestock policies for dry season feeding and the necessity for supplementation when this feed store can be assessed with an improved accuracy. The extent to which endogenous fat stores can be used to fuel growth and lactation during periods of exogenous feed deficiency also needs to be better understood and quantified.

(e) Science of Feed Supplementation

The work carried out by several participants demonstrated not only appropriate methods for studying supplementation, but also the complexity. More information is urgently needed to quantify relationships between basal feeds and the most common supplements such as cereal brans, oil seed cakes and leaves. The extent to which these supplements at different levels can increase digestion rate, alleviate basal diet deficiencies, stimulate microbial protein synthesis and supply undergraded proteins, and generally increase feed intake needs to be quantified. Relatively simple tools are now available for elucidation of some of these effects. Knowledge in this field can be of great assistance in the strategic use of scarce high quality supplements in different seasons and for different animal production systems.

(f) Inter-disciplinary Research

Most farmers in developing countries are subsistence-based and will remain so for a long time. It is important that this is recognized, since an intervention in one part of a farm system (e.g. livestock) will influence other parts of the system (e.g. crops, labour use, etc). Consequently, future programmes should attempt to be more interdisciplinary in approach. Interactions between animal nutritionists and scientists in other disciplines should be encouraged, both in the conduct of research and in the development of practical systems. For example, the interface between nutrition and reproduction, such as embodied in the work reported from Sri Lanka on the reproduction of cattle under coconut, should be given more attention in the future.

Also, whereas strategic supplementation with protein, carbohydrate and mineral/vitamins, etc., needs to be given more emphasis in the future, supplements should be designed in relation to season and physiological state of the animal within different production systems. Research should aim to identify strategic points in the production chain in relation to climate/season and to develop appropriate supplementation strategies. This may be especially important where more than one animal species is involved in the production system and where each species has a different biological strategy.

(4) FAO/IAEA Consultants Meeting on "Preparation of a Manual on Measuring Greenhouse Gases from Agriculture", V.I.C., Vienna, 7-10 April 1992

During the past 5 years, a tremendous amount of data has been collected and published on "greenhouse gases", and with international and national meetings taking place at an ever-increasing frequency, few aspects of the global warming phenomenon have been omitted from discussion - including the role of agriculture. However, one aspect which has received relatively little attention is the methodology for measuring the emissions of these gases (primarily CH₄ and N₂O) from different agricultural practices (particularly rice production and rearing large ruminants). FAO therefore decided to produce a manual on appropriate methods for measuring CH₄ and N₂O emissions, and requested the Joint FAO/IAEA Division to organise its preparation. The result is a manual containing details of how to make these measurements (including requirements for equipment, sampling procedures, standards and quality control), and of how to conduct tracer studies using stable and radioisotopes to measure pools and the dynamics of gas production. It is hoped that the availability of this manual will not only encourage the generation of much-needed data on greenhouse gas emissions from agricultural sources in developing countries, but will lead in the longer term to the development of environmentally more friendly and sustainable practises. It is also hoped that the manual will encourage the use of uniform, standardised and internationally-accepted methodologies which in turn will promote more reliable inter-country data comparisons.

For the preparation of the manual, we would like to thank the following for their expert inputs and tireless work:

Dr. D. Beever (Switzerland); Dr. J.W. Czerkawski (United Kingdom); Dr. O. Van Cleemput (Belgium); Dr. M. Gibbs (USA); Dr. K. Johnson (USA); Dr. R. Leng (Australia); Dr. A. Mosier (USA); Dr. William H. Patrick, Jr. (USA); Dr. J. Rowe (Australia); Dr. K. Smith (United Kingdom); Dr. J. Wallace (United Kingdom); Dr. R. Wassmann (Germany).

(C) STATUS OF EXISTING COORDINATED RESEARCH PROGRAMMES

(1) Improving the Productivity of Indigenous African Livestock

This programme is funded by the Ministry of Foreign Affairs of the Government of the Netherlands. The final RCM of the programme will be held from 21-25 September 1992 in Accra, Ghana.

(2) **Improving the Diagnosis and Control of Trypanosomiasis and other Vector-borne Diseases of African Livestock using Immunoassay Methods**

This programme, also funded by the Government of the Netherlands, has 11 Research Contract and 2 Research Agreement holders. The final RCM of the programme will be held at the International Laboratory for Research on Animal Diseases (ILRAD), from 21-25 September 1992 in Nairobi, Kenya.

(3) **Strengthening Animal Reproduction Research in Asia through the Application of Immunoassay Techniques**

This programme also has a full complement of 9 Contract and 3 Agreement holders. The final RCM will be held from 16-20 November 1992 in Bangkok, Thailand.

(4) **Strengthening Animal Disease Diagnosis in Asia through the Application of Immunoassay Techniques**

This programme has 9 Contract and 3 Agreement holders and the final RCM will also be held from 16-20 November 1992 in Bangkok, Thailand.

(5) **Development of Feed Supplementation Strategies for Improving Ruminant Productivity on Small-holder Farms in Latin America through the Use of Radioimmunoassay Techniques**

This programme has 18 Research Contract and 5 Agreement holders and no further awards can be considered. The third RCM will be held in Brazil in September 1993.

(6) **Inter-Regional Research Network for Improving the Productivity of Camelids through Studies on Reproduction and Reproduction x Nutrition Interactions**

This programme has 11 Contract and 6 Agreement holders and we are not seeking further proposals. It was expected that the 2nd RCM of the programme would be held early in 1993, but due to budgetary constraints, this meeting will probably have to be delayed, perhaps to 1994.

(7) **Immunoassay Methods for Sero-Monitoring of Rinderpest in Africa - Phase II**

This programme is a follow-up of our earlier efforts to support the Pan African Rinderpest Campaign (PARC) and is again made possible through the generous support of the Swedish International Development Authority (SIDA). There are 21 participants in this programme (17 Contract and 4 Agreement holders). The 2nd RCM will be held from 21-25 September 1992 in Kampala, Uganda.

(8) **Immunoassay Methods for the Diagnosis and Epidemiology of Animal Diseases in Latin America**

This programme is also a follow-up to an earlier one with a similar title, and is again being funded by SIDA. There are 22 Contract and 5 Agreement holders in the programme which covers

foot-and-mouth disease, babesiosis and brucellosis. The 2nd RCM will be held from 30 November - 4 December 1992 in Bogota, Colombia.

(9) Development of Supplementation Strategies for Milk-producing Animals in Tropical and Sub-tropical Environments through the Use of Nuclear and Related Techniques

Our intention to initiate this programme was announced about a year ago, and due to the availability of funds at the end of 1992 we were able to award Research Contracts to 13 institutes in Asia and Latin America. In addition, Research Agreements have been drawn up with 2 institutes and we hope to enter into 2 more Agreements shortly. No further proposals can be considered for this programme and we hope to hold the 1st RCM in Vienna during 19-23 April 1993.

Research Contract Holders

Title of Project

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Improving dairy cattle
production at farm level
in Southern Luzon,
Philippines.

Dr. Somchai Chanpongsang
Department of Animal Husbandry
Fac. of Veterinary Science
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Feed supplementation
strategies for milk-producing
animals in tropical and sub-
tropical environments through
the use of nuclear and related
techniques.

Dr. C. Hendratno
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Jakarta 12240,
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Studies on interaction of
nutrition and reproduction in
dairy cattle using nuclear
techniques.

Dr. M.A. Samad Khan
Department of Dairy Science
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Effect of urea-molasses block
without or with by-pass
protein source in straw based
diets on the performance of
indigenous cows and heifers
under the village condition
of Bangladesh.

Dr. H. Ozan
Lalahan Nuclear Research
Institute of Animal Health
Turkish Atomic Energy Authority
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The correlation of changes in
productivity with certain
metabolites in blood of dairy
cows fed crop residues.

Dr. H. Peiris
Veterinary Research Institute
Gannoruwa,
Peradeniya,
SRI LANKA

Potential for use of fortified
(by-pass protein) molasses-
urea block and rice straw as
as a supplementary feed for
dairy cattle.

Dr. Luu Van Tan
Cattle and Buffalo Research Dept.
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Study on improving feeding
systems and interaction
between nutrition and re-
production in dairy cattle in
Vietnam.

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Metabolic profiles, body
conditions and ovarian
activity in post-partum of
dairy cows raised in
Piracicaba, Sp.

Dr. Ivette Rubio
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The effect of different
nutritional managements on the
onset of post-partum ovarian
activity in dual cattle in the
tropics.

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Strategic supplementation for
dairy cattle grazing low
quality pastures in the high-
lands of Peru.

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Effects of interactions among
feed supplementation
strategies, environmental
conditions and management
factors on dairy cattle
reproduction in Uruguay.

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Strategic supplementation of
dual-purpose herds kept under
natural grazing conditions.

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Feed supplementation
strategies for improving
the reproductive performance
of dairy herds in Chile (VIII
Region) using nuclear
techniques.

Research Agreement holders

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Urea en leche como indicador
del balance de energia/
proteinas en vacas.

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UNITED KINGDOM

Supplementation strategies for
lactating ruminants.

(D) DEVELOPMENTS AT THE ANIMAL PRODUCTION UNIT, SEIBERSDORF

(1) Disease Diagnosis

The Animal Production and Health Section has submitted a proposal to both the FAO and IAEA to have the Seibersdorf Laboratory recognized as the "FAO/IAEA Centre for ELISA and Molecular Techniques in the Diagnosis of Animal Diseases". Working in close co-operation with existing international and national organizations, this Centre would participate in the international standardization and transfer of ELISA and molecular techniques, reagents, protocols and quality assurance for infectious disease diagnosis. Hopefully by the time the next Newsletter is published, the Centre will have official FAO/IAEA status.

At their 60th General Session (June 1992), OIE Member States approved a resolution to have the Seibersdorf Laboratory officially designated as an 'OIE Collaborating Centre' for immunoenzymatic and molecular diagnostic methods. We are currently collaborating with the OIE and its Reference Centres on the international standardization of ELISA techniques for the diagnosis of Foot and Mouth Disease, Bluetongue, Rinderpest, Infectious Bovine Rhinotracheitis and Brucellosis. The group is also continuing its collaboration with the WHO/FAO/IAEA Working Group on enzyme immunoassays for Brucellosis diagnosis and research.

(2) Animal Production

Field evaluation of five nutritional metabolite kits (total protein, albumin, β -hydroxy butyrate, urea and phosphorus) is now complete and the qualitative and quantitative data are being analyzed. Seven laboratories collaborated in this study (see names below) for which we are very pleased to acknowledge our gratitude. All the kits performed within acceptable limits even when some had been held up in hot customs sheds for several weeks. The comments made by the collaborating laboratories (mainly on volumes of materials supplied and clarifications to the analytical procedures) will be incorporated into the kits and protocols, and it is envisaged that the validated FAO/IAEA kits

for the forementioned metabolites will be available for project counterparts in September 1992. Another five metabolite kits (major and trace minerals) will also be subject to field testing over the next 3 months and we hope that they will be available for project counterparts by the end of the year.

Laboratories collaborating in field evaluation of metabolite kits

- a. Dairy Herd Health and Productivity Service
Royal (Dick) School of Veterinary Science
The University of Edinburgh
Midlothian EH25 9RG,
Scotland
- b. Department of Large Animal Medicine and Nutrition
Faculty of Veterinary Medicine
Utrecht University
Yalelaan 16,
Utrecht,
The Netherlands
- c. Instituto de Ciencias Clínicas Veterinarias
Universidad Austral de Chile
Casilla 567
Valdivia,
Chile
- d. Benalla Agriculture and Veterinary Centre
Regional Veterinary Laboratory
P.O. Box 388, Sidney Road
Benalla 3672, Victoria
Australia
- e. Animal Science Section
CENA - Universidade de Sao Paulo
Campus de Piracicaba
Avenida Centenario 303
Sao Paulo,
Brazil
- f. Faculty of Veterinary Science
University of Zimbabwe
P.O. Box MP 167
Mount Pleasant,
Harare,
Zimbabwe
- g. Department of Animal Science
Agricultural University of Norway
P.O. Box 25
N-1432 Ås-NLH,
Norway

Regarding developments previously mentioned on a self-coating RIA for progesterone, the Seibersdorf Laboratory is collaborating with the Agriculture Biotechnology Centre in Gödöllő, Hungary in the production of a specific polyclonal antibody to progesterone. Good progress has been made and we are hopeful that by the time the next Newsletter is written we will

be in a position to report that field evaluation of a new progesterone kit is underway.

The external quality assurance service for progesterone is being 'beefed up'. We have now been providing this service for 3½ years and, based on the experience gained, we wish to give more direct guidance to those laboratories which sometimes report values outside acceptable limits (so called 'outliers'). On average, 10-15% of the data derived from the 25-30 responding laboratories are outlier. From the details provided, our staff can generally interpret where the analyst is making errors viz. pipetting, poor binding, use of ¹²⁵I-progesterone beyond its half-life, computational errors, graphical errors, etc. Laboratories reporting outlier values will now be contacted directly by our staff and suggestions made as to the source of errors; complete confidentiality will, as always, be maintained. We are also concerned that on average only half of the laboratories provided with EQC samples respond within the given time limit. As the purpose of the service is to give confidence to end-users in the use of the progesterone kits and therefore the quality of the data, it is surprising that not more laboratories respond. It has been suggested that in future, progesterone kits should only be supplied to those laboratories who collaborate in these EQC exercises and which demonstrate that this RIA technology is being successfully transferred.

3. Fellowship Training

Six fellows have just completed 3 months of training at the Seibersdorf Laboratory. Trained in the ELISA Unit were M. Mpokwa (Tanzania), M. Barrie (Sierra Leone), L. Mwambazi (Zambia) and X. Zeng (China). Trained in the Reproduction and Nutrition Unit were E.M. Al-Kurdi (Jordan) and L.V. Tan (Vietnam). This completes our Seibersdorf Fellowship training for 1992.

(E) PUBLICATIONS

(1) Immunoassay and DNA Probe Techniques for the Diagnosis of Animal Diseases in Developing Countries

This publication contains the results of the recently completed FAO/IAEA/SIDA Coordinated Research Programme on Disease Diagnosis in Latin America, as well as the results obtained by Research Contract holders in Asia funded by SIDA through the Joint FAO/IAEA Division programme. The publication comes under the IAEA-TECDOC Series and is therefore free-of-charge. It is now available from the IAEA's Division of Publications.

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How well do serodiagnostic tests predict the infection or disease status of animals? by R. H. Jacobson.

Examination of chromogenic and fluorogenic substrates in solid-phase enzyme linked immunosorbent assays (ELISA) by J. Crowther.

Comparison between results of virus neutralisation test and those of two ELISA's when screening for antibodies to pseudorabies virus in Thailand by R. Wongwatcharadumrong and J. Moreno-Lopez.

Detection of cells infected by Thailand strains of pseudorabies virus using a specific DNA probe by R. Wongwatcharamdurong, V. Boonsang and T. Linne.

Development of an indirect and a dot ELISA to detect antibodies to porcine pseudorabies virus in Argentina by E.O. Nosetto, M.G. Echeverria, E.J. Gimeno, M.R. Pecoraro and M.E. Etcheverrigaray.

A serological survey and the diagnosis of pseudorabies virus among pigs in Argentina by M.G. Echeverria, E.O. Nosetto, M.E. Etcheverrigaray, C.M. Galosi, R.D. Fonrouge, N.E. Pereyra, K. Belak and E.J. Gimeno.

Aujeszky's disease: ELISA test as part of a herd control scheme in pigs in the state of Rio Grande do Sol (Brazil) by R. M. Martins, E.O. Salvo, L. G. Oliveira, A. C. Da Cunha, I. M. Trevisol, I.I. Guizaardi and R. de Souza.

An ultra micro ELISA for detection of bovine leukemia virus (BLV) antibodies in cattle by J. Noda, M. Perez, M. Barreras and M. A. Abeledo.

The use of ELISA and nucleic acid hybridization tests in research and diagnosis of bovine leukosis virus by J.N. Gomez, M. Perez, M. Marreras and M.A. Abeledo.

Serological studies on bovine leukemia virus (BLV) infection in Costa Rica by ELISA, immunodiffusion and western blot tests by E. Moreno, G. Dolz, J. Bonilla, C. Jimenez, L. Rodriguez, I. Salazar, M. Ramirez, E. Bolanos, M. Mara and S. Silva.

Epidemiological studies on orbiviruses in Indonesian livestock by I. Sendow, P.W. Daniels and P. Ronohardjo.

Specific quantification of whole virions of foot-and-mouth-disease virus in a sandwich ELISA using a monoclonal antibody by J. Crowther.

Comparison of five serological tests to detect Brucella abortus antibodies and a report of prevalence of the disease in livestock in the state of Yucatan, Mexico by A. Dajer, E. Gutierrez, N. Honhold, D. Zapata and S. Villegas.

The use of ELISA to detect antibodies to Brucella abortus in naturally infected cattle by O.C. Marino, E. Rueda de C., L.S. de Deleon and C. Ramirez.

Comparison of an indirect enzyme immunoassay and conventional serological techniques for the detection of bovine antibody to Brucella abortus by M.A. Saravi, R.J. Gregoret, P. F. Wright and D.E.J. Gall.

Assessment of an indirect ELISA for the diagnosis of bovine tuberculosis by V. Ritacco, B. Lopez, L. Barrera, A. Nader, E. Fliess and I. N. de Kantor.

Prevalence of Chlamydia psittaci infections in domestic ruminants in Mexico, determined by an indirect ELISA and isolation of Chlamydiae by J.A. Perez-Martinez, C. Escalante-Ochoa, G. Angulo-Blanco, J. Villa-Sandoval, R.E. Miranda-Morales, J. Romero-Martinez, A. Ducoing-Watty.

A serological survey using ELISA for Babesia bovis infection of cattle in Turkey by A. Duzgun, M. Alabay, H. Cerci, Z. Emre and A. Cakmak.

The use of ELISA for the diagnosis of Babesia bovis in cattle in Mexico by Z. Garcia-Vazquez, R. Rosario-Cruz, N. Solorzano-Salgado and A. Espin.

Evaluation of an indirect ELISA for the diagnosis of Babesia bovis in Uruguay by H. Cardozo, M. Solari and J. Etchebarne.

(2) FAO/IAEA Manual on Measurement of Methane and Nitrous Oxide Emissions from Agriculture

This manual has now been edited and will be published by the end of 1992. Full details will be given in the next APH Newsletter.

(3) Feeding Strategies for Improving Ruminant Productivity in Areas of Fluctuating Nutrient Supply through the Use of Nuclear and Related Techniques

This publication is essentially the proceedings of the final RCM of the Coordinated Research Programme with the same title and held in Vienna in April. The manuscripts have now been edited and we expect the publication to be available by the end of 1992. Full details will be given in the next edition of Newsletter.

F. FORTHCOMING EVENTS

(1) FAO/IAEA Regional Training Course for Europe and Middle East on "Isotope Techniques in Animal Nutrition and Reproduction Research", Nicosia, Cyprus, 21 September - 16 October 1992.

(2) FAO/IAEA Research Coordination Meeting on "Improving the Productivity of Indigenous African Livestock", Accra, Ghana, 21-25 September 1992.

(3) FAO/IAEA Research Coordination Meeting on "Improving the Diagnosis and Control of Trypanosomiasis and other Vector-borne Diseases of African Livestock using Immunoassay Methods", Nairobi, Kenya, 21-25 September 1992.

(4) FAO/IAEA Research Coordination Meeting on "Sero-monitoring of Rinderpest in Africa - Phase II", Kampala, Uganda, 21-25 September 1992.

(5) FAO/IAEA Regional Training Course on "Immunoassays, Epidemiology and Data Analysis for the Diagnosis of Animal Diseases, Bogota, Colombia, 23-28 November 1992.

- (6) FAO/IAEA Research Coordination Meeting on "Immunoassay Methods for the Diagnosis and Epidemiology of Animal Diseases in Latin America", Bogota, Colombia, 30 November - 4 December 1992.

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