



Animal Production and Health Newsletter



JOINT FAO/IAEA DIVISION OF NUCLEAR TECHNIQUES IN FOOD AND AGRICULTURE
INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA

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Dear Colleague,

1989 is sure to be a busy year for the Animal Production and Health Section of the Joint Division, as we prepare for no less than 7 Research Coordination Meetings in such widely dispersed countries as Australia, Zimbabwe and Austria, an Advisory Group Meeting on ruminant nutrition and a Regional Seminar for Africa scheduled over the coming 12 months. In addition, around 45 Technical Cooperation projects in 39 Member States (each with its individual requirements for equipment, expert services and training fellowships) will require back-stopping, a number of small consultants' group meetings have to be organised, and the results reported at four final Research Coordination Meetings prepared for publication. We also move into 1989 in the knowledge that although two more Coordinated Research Programmes will reach completion and over 40 Research Contracts and Agreements terminated, the Section's ability to support research in developing countries is stronger than ever. In fact, during the latter part of this year we will probably be operating over 150 Contracts and Agreements as several new programmes come on stream.

From the above statistics there's little doubt that when considered in numerical terms, the Joint Division's programme in animal production and health seems to be going from strength to strength. However, from our standpoint, more important than "numbers" is the "quality" of projects and programmes we are trying to operate, i.e. their relevance to the country or region concerned, the way we as a Section attempt to help the individual researcher/institute achieve their goals, the costs involved, etc. In attempting to establish a strong and relevant programme in animal production and health, qualitative factors such as those mentioned above have always been uppermost in our mind, and as we move into 1989 the question of quality will remain our primary concern. This will mean some small changes in emphasis within some programmes, areas of activity or techniques, as well as some quite major changes within others.

An example of our determination to maintain and where possible improve the relevance and impact of our programmes is our activities in animal reproduction. As mentioned in our last Newsletter, the Joint FAO/IAEA Division started supporting work in this area approximately 5 years ago, and since then has initiated several Coordinated Research Programmes and Training Courses and many Technical Cooperation projects. In September of last year we asked a group of distinguished scientists to comment on our activities in this area and to point us in the right direction for the future. A summary of the findings from this Consultants' Group is given later in this Newsletter. Basically, however, it can be safely said that the Group reported very favourably on what we had been doing in the past, pointing out that our activities directly or indirectly had done much to establish and strengthen expertise in developing countries in animal reproduction and in techniques associated with this discipline, e.g. RIA, laparoscopy, rectal palpation, etc. More important however were the views of the Group on the future, and essentially three major recommendations emerged:- (a) that future programmes should be directed at the study of animal production systems as opposed to reproductive physiology or solely the reproductive efficiency aspect of production systems; (b) that more attention should be given to the examination and solution of nutritional constraints on reproductive efficiency/productivity; and (c) that the emphasis should be on programmes of a regional nature, such as the recently completed programme in Latin America. These recommendations will be borne in mind as we formulate future strategies for programme direction and implementation, and while we recognise that for a variety of reasons the inter-disciplinary approach will be more difficult to pursue, we also know it is the right way forward to solve the problems

encountered. In this context, it is worth mentioning that our nutrition programme is coming up for a similar review in March, and it will be interesting to hear from this Group how the "marrying" of nutrition and reproduction research to optimise productivity can best be accomplished within the context of developing country livestock production systems. We will of course report on this meeting in the next edition of the Newsletter and seriously pursue the recommendations which emerge.

There have been a few staff changes in the Section since the last Newsletter. In the first place, Dr. Emyr Owen has now joined us on sabbatical leave for 1 year from the Department of Agriculture and Horticulture of Reading University and has settled in nicely helping our programmes in animal nutrition. In addition to Emyr, we have now been joined by Mark Eisler, a veterinary graduate from Cambridge University, who subsequently studied at the Centre of Tropical Veterinary Medicine, UK. Mark, whose services have generously been provided by the British Overseas Development Administration, will be assisting our programmes in disease diagnosis through work at our Laboratory Unit at Seibersdorf and travel to counterpart institutes. It goes without saying that we are extremely grateful to the British Government for its expression of support for our programmes.

With best wishes for 1989,

James Dargie, Francesco Castrignanò, Mark Eisler, Noble Jayasuriya,
Martyn Jeggo, Camille Ooijen, Emyr Owen, Oswin Perera,
Kees Plaizier, Wyn Richards, Hermann Unger

(A) PAST EVENTS

- (i) FAO/IAEA First Research Coordinating Meeting on "Improving the Diagnosis and Control of Trypanosomiasis and other Vector-borne Diseases of African Livestock using Immunoassay Methods", ILRAD, Nairobi, Kenya, 18-23 July 1988.

The first Research Coordination Meeting of this programme was held at the International Laboratory for Research on Animal Diseases (ILRAD). 13 scientists from 10 African and 2 European countries together with FAO/IAEA staff attended the meeting during which work plans for the forthcoming 12 months were drawn up. In addition, a considerable amount of time was allocated to EIA training. During the practicals, the Research Contract holders were made familiar with the specific EIA methods to be employed in the programme as well as with the buffy coat phase contrast technique for trypanosome detection which will also be used. A detailed description of the programme with the individual work plans for the forthcoming 12 months has been compiled into a bound report, copies of which have been forwarded to the participating scientists and other interested parties. A limited number of copies are still available and may be obtained by writing to the Section.

Both the RCM and the training workshop at ILRAD were considered highly successful and the next Research Coordination Meeting is planned for Harare in Zimbabwe next September.

- (ii) FAO/IAEA Final Research Coordination Meeting on "The Application of Radioimmunoassay for Improving the Reproductive Efficiency and Productivity of Large Ruminants", Vienna, Austria, 5-9 September 1988.

This meeting was attended by 10 Research Contractors, 3 Agreement Holders and an FAO staff member from Rome. As is the case in all final RCM's, the main purpose of the meeting was the presentation of results representing the culmination of work undertaken by the contributing research institutions over the 6 year lifetime of the CRP. Only those research papers which were considered to be of sufficient calibre by the Agreement Holders and FAO/IAEA staff to be included in an IAEA publication have been technically/scientifically/linguistically edited by Agency staff. Those of you who have seen these publications will be aware of their high quality and we are obliged to maintain these high standards. The manuscripts have now been edited and it is envisaged that the proceedings will appear in 1989.

This programme, initiated in late 1982, was designed to develop practical management systems, based on locally available resources or the introduction of appropriate technology, for improving the reproductive efficiency of large ruminants in small holder systems. Like the other CRP's in animal reproduction, a three tiered research approach was applied: (i) definition of the production system, environment, infrastructure and production/reproduction parameters of livestock on typical farms; (ii) determination of the major causes of reproductive inefficiency; and (iii) the introduction of simple cost-effective changes to management to ameliorate the causes of low reproductive performance. Whereas all the research contractors defined (i) and most had identified the major causes of low reproductive performance (ii), only a few had time to investigate (iii) in depth. The relatively low implementation of part (iii) was not a reflection of a lack of commitment by the research contractors but rather of the protracted period necessary to establish the basic information on production and requirement parameters.

The achievements of the programme include the following:

- (a) The assay of progesterone in milk and/or blood by RIA was established by all contract holders in the programme.
- (b) Progesterone and other measurements were used successfully to identify specific causes of low reproductive efficiency such as delayed puberty, extended postpartum anoestrus, mistiming of insemination, and to investigate the interactions between environment, management, nutrition and reproductive performance.
- (c) The major causes of lowered reproductive efficiency in the studies reported in this programme were poor or inadequate nutrition (especially during the dry season) and mismanagement (e.g. incorrect timing of service). The influences of the environment (e.g. heat stress), appropriate genetics and disease were secondary to and exacerbated by, nutrition and management.

It was recommended that future programmes in animal reproduction should concentrate on indigenous breeds and especially on the development of practical effort to resolve reproductive and productive efficiency. An integrated approach involving nutrition-reproduction interactions would probably be most effective.

(iii) FAO/IAEA Consultants Meeting on Animal Reproduction, 7-9 September 1988.

This meeting was held in conjunction with the large ruminant RCM described above; its purpose was to review our activities in animal reproduction and make recommendations for the future. Below is a summary of the outcome of the meeting which was attended by the following:

Prof. E. Bamberg (Austria); Dr. D. Blackmore (U.K.);
Dr. Y Folman (Israel); Prof. J.M. Forbes (U.K.);
Prof. H. Kindahl (Sweden); Prof. G. King (Canada);
Prof. H. Meyer (Federal Republic of Germany); Dr. H. Wagner (FAO);

1. General Recommendations

The FAO/IAEA should encourage and promote the following:

- (a) Research aimed at improving the productivity of traditional livestock systems commonly practiced in rural areas.
- (b) Integrated interdisciplinary research involving studies on the management system as a whole and on interactions between genotype and environmental factors such as climate, nutrition, husbandry and disease, and their effects on overall reproductive performance
- (c) Studies aimed at achieving sustainable development (i.e. moderate improvements in productive efficiency through introduction of simple, practical, cost-effective and acceptable changes in existing systems, without causing environmental degradation).
- (d) Collaborative research between groups of workers in different disciplines.

- (e) Interchange of information between scientists, extension workers and farmers.

2. Specific Recommendations

Research workers should adopt a "three tiered" approach, which consists of:

- (a) Determining the reproductive performance of the common types and breeds of livestock kept by local farmers under prevailing systems of management (eg. field surveys, case studies, etc., aimed at establishing baseline data).
- (b) Defining the problem(s) and identifying the most important causes of reproductive inefficiency.
- (c) Studying possible methods of overcoming these problems through simple modifications to existing practices.

3. Management of Research Studies

In conducting these studies, the researchers should pay particular attention to documenting the following:

- (a) The environment - Location of the study (latitude and longitude, altitude), climatic variables (minimum and maximum temperatures, relative humidity, rainfall pattern, day length), fluctuations in fodder availability, measures of climatic stress on the animal.

Climatic stress can be assessed from several physiological measures (recording of rectal temperature and respiratory rate at specific times of the day and night, measuring water turnover rate using isotopes, etc.) and behavioural observations.

- (b) The animal and its use - Genotype, mature weight and size, expected normal performance and productivity.
- (c) Husbandry - The production system, including management and breeding system.
- (d) Nutrition - Feed quality and availability (including seasonal fluctuations, quantitative and qualitative deficiencies), nutritional status of the animal (body weight changes, condition score, production parameters) and related factors.

In field studies where facilities for weighing animals do not exist, the use of a weigh-band is recommended. Ideally, such weigh-bands should be validated at an experimental station or institutional farm for the species and breed of animal used in the study. Alternatively, the relationship between heart girth and body weight should be established using a representative sample of animals.

Changes in body weight and condition score are excellent indices of nutritional status. Other indicators of feed

quality are voluntary food intake and, in dairy animals, milk production. Under specific conditions, measurement of levels of nutrients or their metabolites in blood may be used (eg. blood urea nitrogen). With regard to minerals, the possibility of deficiencies and toxicities should be considered.

- (e) Reproduction - The methods used for establishing baseline data for reproductive performance and fertility indices should include : a) analysis of records on reproductive events (calvings, occurrence of oestrus, matings and related phenomena); b) regular physiological and clinical observations (including rectal palpation of internal genitalia); and c) measurement of progesterone concentration in sequential samples of blood or milk collected at regular intervals.

It is reiterated that the measurement of hormones should only be used to complement other observations such as records, physiological and clinical data, in order to define more clearly the reproductive patterns and ovarian activity. In the majority of studies on females, progesterone will be the only hormone measured.

The technique to be used for progesterone measurement should be either the radioimmunoassay (RIA) or the enzymeimmunoassay (EIA), as appropriate for the particular conditions of the investigator's laboratory. If RIA is selected, the use of the solid-phase coated tube system employing ¹²⁵I as tracer (as supplied in kit form by the FAO/IAEA laboratory) is strongly recommended. The assay should be done on either blood plasma or skim milk. Measurement of Luteinizing Hormone (LH) in blood may also be undertaken in specific studies where indications warrant it. In studies on the male, testosterone measurement may be undertaken where indicated. With both LH and testosterone measurement, the high frequency of sampling required for meaningful results should be considered.

- (f) Health - Information on the health status of the animals and the disease situation in the area of study (incidence of infectious and non-infectious diseases, epizootics, chronic or sub-clinical conditions, especially parasitism).

Routine monitoring of the following should be done at regular intervals: packed cell volume(PCV), counts of red blood cells (RBC) and white blood cells (WBC), plasma protein concentration, examination of stained blood smears for parasites, faecal egg counts, examination for external parasites, and procedures such as tick counts where appropriate. In special situations additional investigations such as bacterial cultures or serological tests should be undertaken.

In planning and conducting these studies, researchers should consider at the very outset the methods of statistical analysis to be employed. It is realised that traditional statistical requirements may be difficult to achieve in certain situations, given the difficult conditions and limitations under which research is often conducted in developing countries. Nevertheless, appropriate modern statistical methods should be considered in all studies.

5. Recommendations to the FAO/IAEA

- (a) Attempts should be made to promote projects which have an integrated approach to problem solving, involving studies on interactions between reproduction, nutrition, disease and climate. It is acknowledged, however, that such projects are demanding in manpower and finances.
- (b) The approach taken to support research in developing countries through Technical Cooperation (TC) projects and Research Contracts (RC) under Coordinated Research Programmes (CRP's) have been largely successful.
- (c) The possibility of combining TC projects and RC's should be considered, so as to overcome some of their current limitations. This would have the beneficial effect of:
 - bringing together a critical mass of scientists to approach a common problem from several angles and disciplines.
 - providing more financial support than is currently possible through a RC (which is limited to \$ 5,000, thus precluding most types of interdisciplinary research).
 - providing regular interaction and discussion as well as accountability through attendance at Research Coordination Meetings (which is currently restricted to RC holders only).
 - permitting the technical officers of the Animal Production and Health Section to maintain close contact with counterpart research workers in developing countries, and to assist them in the planning and execution of their projects.
- (d) The attempts being made to "regionalise" programmes and projects should be continued.
- (e) The species on which research is supported should be largely restricted to herbivores (large and small ruminants, and camelids).
- (f) The training functions being undertaken by the FAO/IAEA laboratory at Seibersdorf have proven to be valuable for developing countries, and should be continued. The possibility of providing a broader based training (eg. inclusion of equipment maintenance, simple trouble-shooting and some exposure to appropriate bio-statistical methods) should be explored.
- (g) The laboratory support being provided for research on reproduction through the regular supply of RIA kits for measurement of progesterone in blood and milk is invaluable for the majority of research workers undertaking TC and RC projects, and should be continued. Further development work on refining this and other immunoassay techniques (such as the EIA) should continue. Development of assays for other reproductive or metabolic hormones should be considered if and when required for support of studies in developing countries.
- (h) Supply of kits and reagents at cost for counterparts in programmes of other internationally or bilaterally supported programmes should be considered.
- (i) The use of progesterone measurement for monitoring artificial insemination programmes should be supported, especially where this

would have an useful educational or extension function. Advanced technologies such as embryo transfer and immuno-manipulation have limited practical application at present in developing countries. They should only be supported in selected and appropriate cases, where they are part of an integrated livestock development programme, and as a supportive measure for training and research in reproductive physiology.

- (j) Basic studies on reproductive physiology should only be supported in cases where a clear justification exists (eg. use of LH and other assays for studying ovulation in camelids).

We would like to express our sincere appreciation for the efforts of the consultants who drew up these recommendations.

- (iv) FAO/IAEA Final Research Coordination Meeting and Training Workshop on "Regional Network for Improving the Reproductive Management of Meat and Milk-Producing Livestock in Latin America with the Aid of Radioimmunoassay Techniques", Bogota, Colombia, 19-23 September 1988.

The meeting was held at the Instituto de Asuntos Nucleares, Bogota; the IAEA would like to record its appreciation for the excellent arrangements made by the Institute administration and in particular to Dra. Mercedes de Garcia and her team.

The meeting was attended by 16 Research Contractors, 3 Agreement Holders, 3 Consultants (two of whom, Drs. E. Mather and B. Murphy, were previously Regional Experts for the ARCAL III project), 4 TC project counterparts and numerous local participants. The papers were presented in Spanish or English and the quality of the research work reported and the verbal and visual presentations were generally of a high calibre. The 1988 ARCAL III prize for the best presentation and achievements was awarded to Dra. Bessie Urquieta, University of Chile, Santiago, for her outstanding research effort on the reproduction of the Vicuña in the Lauca National Park. Subsequent to the presentations, considerable effort was expended by all concerned in improving the quality of the manuscripts; special thanks should be given to the advisers and agreement holders (Drs. Thatcher, Galina, Murphy, Mather and Jane Galina) for their efforts in this regard and for their positive and enthusiastic contribution to the meeting. All the manuscripts have now been submitted and, with the help of Jane Galina, we are presently editing them scientifically/linguistically prior to publication. It is envisaged that the final publication will appear in late 1989; it will be divided into production systems - dairy, beef (Bos taurus and Bos indicus), dual-purpose, sheep, goats, camelids and buffaloes - with an introductory paper on the present status of research in each system in Latin America. Complementary papers on sampling and statistical procedures will also be included.

Among the major achievements of the five year programme, the following may be highlighted:

- (a) The assay of milk/blood progesterone by RIA has been established in all project counterpart laboratories.
- (b) Progesterone measurements were used successfully to complement other reproductive measures to identify age of puberty, duration of post-partum anoestrus, timing of insemination and to examine the

influence of environment, management and nutrition on reproductive performance.

- (c) The major causes of low reproductive efficiency in the livestock investigated in this research programme were poor or inadequate nutrition and mismanagement. The influences of the environment (e.g. heat stress and daylight) and disease were exacerbated by, but secondary to the effects of nutrition and management.
- (d) As the vast majority of research projects were conducted on farms, the programme was instrumental in increasing the awareness of farmers to the critical importance of management and nutrition. In a number of instances, livestock management schemes have been established to provide farmers with a rapid reproduction diagnostic service; this development is as a direct result of this CRP.

It was recommended that this programme should continue for a further one year period with reduced numbers of participants and that a second phase 5 year programme should be initiated in late 1989/early 1990. In the second phase programme, preference would be given to applications concerned with nutrition - reproduction interactions and the development of feeding strategies to improve the reproductive performance of farm livestock in Latin America. More details on this new programme appear in Section C of this Newsletter.

- (v) FAO/IAEA Regional Training Course on "Use of Immunoassay Techniques in the Sero-monitoring of Rinderpest in Connection with the Pan Africa Rinderpest Campaign (PARC)", Debre Zeit, Ethiopia, 25 September - 15 October 1988.

The Joint FAO/IAEA Division and the Animal Production and Health Division of FAO are assisting with the sero-monitoring of rinderpest as part of the activities of PARC. This assistance consists of providing standardised immunoassay kits (ELISA), adequate training and some of the equipment required. Research contracts have been awarded to individuals in each PARC country who have been charged with the task of undertaking this laboratory testing. Paramount to the success of this programme of sero-monitoring is suitable and adequate training of the scientists involved. To help meet this need, an FAO/IAEA Training Course was organised to provide training (i) in the use of ELISA for sero-monitoring of rinderpest; (ii) in the use of radio-labelled DNA probes for the detection of the virus; (iii) in sampling procedures to be adopted in carrying out annual sero-monitoring of rinderpest vaccination.

The course was held at the National Veterinary Institute, Debre Zeit, with the Deputy Director and Head of Virology of this institute, Dr. Mebratu, acting as Course Director. Of the 21 originally selected participants, 18 from 17 different African countries were able to attend and the course itself was conducted in both English and French. Most of the lectures and practicals were given by scientists from the Pirbright Laboratories, UK. (Drs. J. Anderson and S. Pedley), and the Institut d'Élevage et de Médecine Vétérinaire des Pays Tropicaux, France (Drs. P. Lefevre, G. Libeau and A. Diallo). Additional lectures were provided by FAO staff members at PARC headquarters, Nairobi, (Drs. L. Tyler, A.S. Joris and M. Kadohira); the PARC Regional Co-ordinator (Dr. Y. Solomon) and by an FAO/IAEA staff member (Dr. M. Jeggo). Individual participants also gave presentations on the rinderpest situation in their own countries and details of the results obtained to-date on sero-monitoring using the FAO/IAEA rinderpest ELISA kit.

In the first week the course concentrated on formal lectures dealing with the PARC campaign, serum sampling approaches based on a booklet produced by the Joint FAO/IAEA Division entitled "Guidelines for Sero-monitoring of Rinderpest conducted under PARC", and the theory of ELISA and DNA probes. During the following two weeks, practicals giving a great deal of "hands on" experience with the ELISA were held in the institute's laboratories. Some time was also spent during these practical sessions with radio-labelled DNA probes. During the course, discussions were held with each participant regarding his national laboratory and the various inputs required to enable sero-monitoring to be conducted effectively. In particular, equipment and kit requirements were detailed and discussions held as to how these might be provided. At the end of the course, it was felt that the participants had all achieved the required level of understanding of and expertise in the ELISA, and upon return to their own laboratories should be able to establish this system for the sero-monitoring of rinderpest.

We would like to thank all those who took part in this activity for their enthusiasm, patience and good humour, and trust that they all enjoyed their short stay in Ethiopia.

(vi) FAO/IAEA/SIDA First Research Coordination Meeting on "Regional Network for Latin America on Animal Disease Diagnosis Using Immunoassay and Labelled DNA Probe Techniques", Buenos Aires, Argentina, 7-11 November 1988.

This meeting was held at the Comision Nacional de Energia Atomica, Buenos Aires, Argentina and attended by 10 Contract holders and 3 Agreement holders. Also at the meeting were 4 scientists supported by the International Foundation for Science (IFS) and a small review team from SIDA.

During the first three days of the meeting, scientific papers were presented on work carried out under this programme during the last 18 months; four further scientific papers were given by scientists supported through IFS. All the papers were concerned with the use of ELISA and DNA probes in animal disease diagnosis. The diseases covered included brucellosis, bovine leucosis, tuberculosis, babesiosis, Aujeszky's disease and enzootic abortion. During the second half of the week, workshops were held at which detailed workplans for the coming 18 months were formulated. Finally, each participant delivered a short presentation of his/her workplan.

In overall terms the programme was deemed to be highly successful and the work carried out to-date by individual participants of a very high quality. The major problems encountered involved individual components of the ELISA kits and comparison of these kits with existing tests. In the case of the kits for brucellosis and babesiosis there were some marked differences in kit performance between individual contract holders with some reporting excellent results and others experiencing difficulties.

In the conclusions and recommendation of the meeting small changes to the composition of the kits were recommended, as was the supply of kits to IFS contract holders. It was further agreed that these IFS contract holders should be invited to the final RCM.

- (vii) FAO/IAEA Regional Training Course for Latin America on the "Use of Immunoassay and DNA Probe Methods for Diagnosis of Animal Diseases", INTA, Argentina, 14 November - 3 December 1988.

This Course was held at the Instituto Nacional Tecnologia Agropecuaria (INTA) near Buenos Aires and attended by 26 participants from 14 countries in Central and South America. After 1 week of basic theory on immunoassays and DNA probes, the students were divided into 3 groups and for the following 2 weeks were given in-depth exposure to the use of these methodologies in: foot-and-mouth disease typing, antibody detection and virus characterisation; measurement of antibodies to B. bovis, B. bigemina and A. marginale; detection of parasite DNA; and measurement of antibodies to B. abortus. There is no doubt that this Course, which was the first of its kind in Latin America providing hands-on experience of some of the new biotechnologies for animal disease diagnosis/surveillance (e.g. labelled probes and monoclonal antibodies) was highly appreciated and should be repeated in the Region and elsewhere in the future. There is also no doubt that much of the success of the Course was due to the excellent local support provided by INTA and the Argentinian Atomic Energy Commission, and in particular Drs. Alejandro Schudel and Ana Vigliocco of these organisations. In addition, we were fortunate to have the assistance of staff from the Pan American Foot-and-Mouth Disease Centre, Rio de Janeiro (Drs. Albino Alonso Fernandez, Maria da Penha D. Gomes and Dr. Rossana Allende; the World Reference Laboratory for FMD at Pirbright, UK (Dr. John Crowther); Agriculture Canada (Dr. Peter Wright); CSIRO's Indooroopilly Laboratory (Dr. Ian Wright) and Dr. Gillian Bushell of Griffith University, Australia. To all of these scientists and institutions, very many thanks for making this Course as successful as it was!

Course Participants

A. Bernardelli (Argentina); S.M. Toriono de Echaide (Argentina);
G. Fernandez (Argentina); R. Echeveria (Argentina); E. Osorio Salvo (Brazil);
J.A. Pires Prado (Brazil); H.J. Montassier (Brazil); P. Abalos Pineda (Chile);
O. Alonso Fernandez (Chile); O.C. Marino (Colombia);
O. Garcia Alzugarate (Colombia); F.G. Calderon Chacon (Costa Rica);
J. Noda Gomez (Cuba); C. Fernandez Molina (Cuba);
F. Andujar (Dominican Republic); E.R. Zurita Mantilla (Ecuador);
Z. Garcia Vazquez (Mexico); J.A. Perez Martinez (Mexico);
M.J. Jaen Torrijos (Panama); S. Gonzales Patino (Paraguay);
M. Silva Paravis (Uruguay); V. Lena Crescente (Uruguay);
M.A. Solari Damonte (Uruguay); A.T. Guillen Torres (Venezuela);
J.M. Rodriguez de Dominguez (Venezuela).

(B) STATUS OF EXISTING COORDINATED RESEARCH PROGRAMMES

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

This programme, which has 12 Research Contractors and 5 Agreement holders, will terminate following the final RCM which will be held in Perth, Australia, from 20-24 February, 1989. During this meeting the results of the 5-year programme will be presented and discussed prior to publication. It is hoped to have the results published under the IAEA's Panel Proceedings Series during the first half of 1990.

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

This programme, which has 14 Research Contract and 5 Agreement holders, will terminate at the final RCM which will be held in Rockhampton, Australia, from 20-24 February 1989 in conjunction with a meeting on buffaloes being sponsored by the Australian Council for International Agricultural Research (ACIAR).

(iii) Regional Network for Serosurveillance of Rinderpest in Africa.

This programme now has 19 Research Contract holders, all of whom are attached to institutes in Africa responsible for the sero-monitoring of rinderpest under the Pan Africa Rinderpest Campaign (PARC). The second RCM of this Network will probably be held in Nairobi, Kenya, in June 1989. We are not seeking further proposals for Contracts under this SIDA-funded programme.

(iv) Regional Network for Latin America on the Use of Immunoassay and Labelled DNA Probe Methods for the Diagnosis of Livestock Diseases.

This SIDA-funded programme currently has 12 Research Contract and 3 Research Agreement holders and we are not seeking further participants. We hope to be able to hold the next RCM under the programme in Costa Rica during the early part of 1990.

(v) Improving the Productivity of Indigenous African Livestock Using Radioimmunoassay and Related Techniques.

This programme is funded by the Ministry of Foreign Affairs of the Government of the Netherlands and has 17 Contracts and 2 Agreements; we are not seeking further proposals. We are making arrangements to hold the 2nd RCM of the programme in Harare, Zimbabwe, from 4-9 September, in conjunction with an FAO/IAEA Regional Seminar for Africa on the Use of Nuclear and Related Techniques in Animal Production and Health (for details, see later).

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

This programme is also funded by the Government of the Netherlands and has 13 Research Contracts and 2 Research Agreements; we are not seeking any further proposals. The 2nd RCM of the programme will also be held in Harare, Zimbabwe, from 4-8 September in conjunction with the FAO/IAEA Regional Seminar for Africa described later.

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

The first RCM of this programme which has 15 Research Contracts and 4 Research Agreements will be held at IAEA Headquarters, Vienna, from 13-17 March 1989 in conjunction with an Advisory Group Meeting on ruminant nutrition; no further contract awards can be considered under this programme.

(viii) Strengthening Animal Reproduction Research and Disease Diagnosis in Asia through the Application of Immunoassay Techniques.

We have now awarded 16 contracts and 3 agreements under this CRP, and hope to award another 4 contracts and 2 agreements by early 1989 thus bringing the programme up to its full complement. In view of the two distinct

specialities which are represented in this programme (reproduction and diseases), it has now been decided that there should be two parallel but complementary programmes. Thus, contracts involving studies on reproduction will be under a CRP entitled "Strengthening Animal Reproduction Research in Asia through the Application of Immunoassay Techniques". Similarly, those dealing with studies on diseases will be under a CRP entitled "Strengthening Animal Disease Diagnosis in Asia through the Application of Immunoassay Techniques". We feel that this splitting of the original "embryo" will allow more flexibility for development and maturation of each "twin", whilst retaining the ability to interact with and benefit from one another.

The First Research Coordination Meetings (RCM's) of these two programmes will be held jointly, and will be followed by a training workshop. The dates will probably be 22 - 31 May 1989, and the venue is likely to be Malaysia. Participants will be informed as soon as official confirmation has been obtained. The training workshop will consist of parallel practical sessions for the two CRP's, with emphasis on RIA for the reproduction group and on ELISA for the diseases group. Some special lectures on experimental design, statistical considerations, sample collection and storage, and data analysis will also be included.

- (a) CRP on "Strengthening Animal Reproduction Research in Asia through the Application of Immunoassay Techniques".

Contract Holders

Title of Research Project

- | | | |
|----|--|---|
| 1. | Dr. (Ms) Apichartsrunskoon, T.
Dept. of Animal Husbandry
Faculty of Agriculture
Chiangmai University,
Chiangmai 50002
THAILAND | Progesterone measurement by RIA as a criterion to determine the onset of puberty and the <u>post-partum</u> status of cross-bred Holstein-Friesian in Chiangmai province. |
| 2. | Dr. Abeygunawardena, H.
Dept. of Veterinary Clinical Studies
Faculty of Vet. Med. & Animal Science
University of Peradeniya,
Peradeniya
SRI LANKA | Assessing the reproductive efficiency and management systems in the Zebu cattle farming systems in Sri Lanka using nuclear techniques. |
| 3. | Dr. Choi, Han Sun
Dept. of Veterinary Medicine
College of Agriculture
Chonnam National University
Yongbong-dong 300, 505 Kwang-ju
REPUBLIC OF KOREA | Progesterone measurement using RIA as a parameter for fertility control in cattle. |
| 4. | Mr. Chen, Bei-Xeng
Dept. of Veterinary Medicine (Vet. Obstetrics Section)
Gansu Agricultural University
Wuwei, Gansu 733006
PEOPLE'S REPUBLIC OF CHINA | Studies on the reproduction of the Yak using RIA for progesterone measurement. |

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| 5. | Dr. Wang, Guangya
Dept. of Veterinary Science
Northwestern Agricultural
University
Yangling, Shaanxi
PEOPLE'S REPUBLIC OF CHINA | Monitoring the cyclic ovarian activity postpartum of Anhui cattle by RIA of progesterone in blood plasma. |
| 6. | Dr. Alam, M.G.S.
Dept. of Surgery & Obstetrics
Faculty of Veterinary Science
Bangladesh Agricultural Univ.,
Mymensingh 2202
BANGLADESH | A baseline study of reproductive patterns of indigenous cows with reference to fertility as monitored by a radioimmunoassay technique. |
| 7. | Dr. Chantaraprateep, P.
Dept. of Obstetrics, Gynaecology
& Reproduction
Faculty of Veterinary Science
Chulalongkorn University,
Henri Dunant Rd, Bangkok 10500
THAILAND | Control of reproductive disorders and monitoring of herd health programme using RIA for improving dairy production in Thailand. |
| 8. | Mr. Haryana, I.G.N.R.
Department of Animal Production
Faculty of Animal Husbandry
Udayana University
Jl. Jenderal Sudirman, 80232
Denpasar, Bali,
INDONESIA | Assessment of fertility in Bali cattle with progesterone radio-immunoassay. |
| 9. | Mr. Obsioma, A.R.
Institute of Animal Science
College of Agriculture
University of the Philippines
at Los Banos
College, Laguna
PHILIPPINES 4031 | Studies on ovarian function and nutrition/reproduction interactions in Philippine carabao using clinical and radioimmunoassay techniques. |
| 10. | Dr. Le Xuan Cuong
Institute of Agricultural
Technology
No. 212 Nguyen Binh Khiem Str.
District 1,
Ho Chi Minh City
VIETNAM | Studies on reproduction of different genotypes of buffaloes and cattle in Vietnam using RIA techniques. |

Agreement Holders

- | | | |
|----|--|--|
| 1. | Dr. D'Occhio, M.J.
CSIRO, Division of Tropical
Animal Production
Tropical Cattle Research Centre
P.O.Box 5545
Rockhampton Mail Centre
Queensland 4702
AUSTRALIA | Improving reproductive efficiency in tropical cattle through GnRH therapy and ovarian steroid immunization, and monitoring the response using RIA. |
|----|--|--|

2. Dr. Wahab, S. Fertility investigation in small-holder dairy cattle in Malaysia using radioimmunoassay techniques.
 Dept. of Veterinary Clinical Studies
 Faculty of Vet. Med. & Animal Science
 Universiti Pertanian Malaysia
 43400 Serdang, Selangor
 MALAYSIA
3. Dr. Entwistle, K.W. Nutritional and managerial techniques for controlling post-partum anoestrus in tropical beef cattle.
 Graduate School of Tropical Veterinary Science
 James Cook University
 Townsville, Queensland 4811
 AUSTRALIA

(b) CRP on "Strengthening Animal Disease Diagnosis in Asia through the Application of Immunoassay Techniques"

Contract Holders

1. Dr. Bahaman, A.R. Use of ELISA technique for diagnosis and sero-epidemiological studies on bovine brucellosis.
 Dept. of Vet. Pathology & Microbiology
 Faculty of Vet. Med. & Animal Science
 Universiti Pertanian Malaysia
 43400 Serdang, Selangor
 MALAYSIA
2. Dr. Horadagoda, N.U. Application and evaluation of ELISA in diagnosis of haemorrhagic septicaemia in cattle and buffaloes caused by Pasteurella multocida.
 Dept. of Veterinary Paraclinical Studies
 Faculty of Vet. med. & Animal Science
 University of Peradeniya,
 Peradeniya
 SRI LANKA
3. Mr. Cai, Xuelin Studies on diagnosis of pseudorabies in swine using radiolabelled DNA probe and monoclonal antibody techniques.
 Isotope Research Laboratory
 Sichuan Agricultural University
 Yaan, Sichuan
 PEOPLE'S REPUBLIC OF CHINA
4. Dr.(Ms) Wongwatcharadumrong, R. Diagnosis of Aujeszky's disease in swine: comparison of specific DNA probe and ELISA methods.
 Department of Veterinary Pathology
 Faculty of Veterinary Science
 Chulalongkorn University,
 Henri Dunant Rd, Bangkok 10500
 THAILAND
5. Dr. (Ms) Sendow, I. An epidemiological study of arbovirus infection in Indonesia using ELISA.
 Virology Department
 Research Institute for Animal Diseases (BALITVET)
 Jalan Martadinata 32
 P.O.Box 52, Bogor 16114
 INDONESIA

- | | | |
|----|---|--|
| 6. | Dr. (Ms) Le Ngoc, My
Parasitology Department
National Institute for
Veterinary Research
Nga Tu Vong, Dong Da
Hanoi
VIETNAM | Application of EIA and related
methods for diagnosis and sero-
epidemiological surveys of parasitic
infections. |
| 7. | Dr. Debnath, N.C.
Animal Health Research Division
Bangladesh Livestock Research
Institute
P.O.Savar, Dhaka
BANGLADESH | Study of immune status of riderpest
in cattle of Bangladesh using an
ELISA technique. |
| 8. | Dr.(Ms.) Molina H.
National Institute of Biotechno-
logy and Applied Microbiology
University of the Philippines
at Los Banos College
Laguna 4031,
PHILIPPINES | Development of an ELISA technique
for detection of Haemorrhagic
Septicaemia in the field and
monitoring vaccination response. |

Agreement Holders

To be finalised.

(C) NEW COORDINATED RESEARCH PROGRAMME

In view of the success of the Regional Network for Latin America on Animal Reproduction (ARCAL III) which was established in 1984, a second phase of this programme will be initiated in late 1989/early 1990. Research Contract and Agreement proposals to participate in this programme are now invited and should reach Ms. T. Benson, Head of the Contracts Administration Section of the IAEA, before 31 July 1989.

Title of Programme:

"Development of Feed Supplementation Strategies for Improving Ruminant Productivity on Small-holder Farms in Latin America through the Use of Immunoassay Techniques".

(i) Scientific and Technical Basis of Programme

(a) The human population of the Latin American Region is reportedly a little over 400 million and increasing at the rate of 2.5% per year (1985 FAO Handbook). Despite rapid urbanization and industrialization over the last 20 years, one-third of the population are rural dwellers dependent on agriculture for food and income; a high proportion of this population lives in extreme poverty and suffers the consequences of malnutrition and disease. Livestock products are the major components of the food consumed by Latin Americans; they also account for a significant proportion of the regions' exports. However, as a result of the increasing domestic consumption related to the increased population over the last 15 years there has been a reduction in net exports and if this trend continues the region could become a net importer of livestock products in the very near future.

Latin America is a region with vast and varied animal resources which consist not only of the more conventional domesticated species (e.g., cattle, sheep and goats), but also of such indigenous species like the llama, alpaca and vicuña. The production of meat, milk, wool and/or hides from these animals is important to all countries of the region, providing nutrition and clothing for the human population, valuable export earnings, and perhaps most important of all - employment and income for a high proportion of the poorer people living in the rural and highland areas.

The types of ecosystems under which domesticated animals are reared in Latin America also vary greatly - from tropical and temperate grasslands through to semi-arid and desert scrubland, and often interspersed by areas of high fertility farming dependent upon irrigation water from mountain rivers. In most instances, however, animals are reared in areas where the climate is harsh and consequently they are subjected to a combination of stresses, e.g., extremes of heat, cold and high humidity; pastures of low nutritive value; and insufficient water supplies. Consequently, it is hardly surprising that the efficiency of livestock production in the region is invariably low. An analysis of livestock production and productivity in the region shows that there is a wide gap between actual and potential achievements; thus, of total world livestock numbers, the percentage of beef cattle, dairy cattle and sheep in the Latin American region are 27%, 16% and 10% respectively; however, the production of meat, milk and mutton from these animals only represents 17.4%, 7.4% and 4.8% respectively (FAO Regional Report 1985). One may conclude from these figures that there is the potential for at least a doubling of productivity.

Nutritional limitations in livestock production, especially in the case of ruminant production in the Latin American region, are the most important factors preventing indigenous stock from achieving their potential. Pasture is the basic resource which sustains the Latin American region's ruminant population. Consequently development depends largely on the possibility of increasing its quality, quantity and year-long availability through modifications to existing pasture management and/or the provision of supplements to the animals in an attempt to balance the inadequacies of the pasture.

Improvement of grazing management and the utilisation of better-adapted grasses and legumes as well as conservation of fodder have not been successfully adopted by small farmers within the region. This has been partly due to the technical limitations of the message but mainly because economic factors have worked against the farmer's propensity to assume the investment risks involved in introducing technical change. It should be remembered that most technological advances in animal nutrition and feeding originate from developed countries and their adoption tends to be governed by a very different relative set of labour, land, input and capital goods costs than those prevailing in the Latin American region. Thus, the use of biotechnology at basic and adaptive research levels to improve forage crop performance has been rather poor; however, this technology may be a way to improve productivity at the animal level.

Mineral deficiencies or imbalances in soils and forages (and ultimately in animals) have long been held responsible for low production and for reproductive problems among grazing animals in the tropics. In the Latin American region, grazing cattle commonly suffer deficiencies of phosphorus, cobalt, copper and iodine and a toxicity of selenium; indeed, in severe cases, livestock production is even more limited by these elements than by either energy or protein. Research from tropical regions has shown that mineral supplementation can increase calving percentages by 20% and growth rates by up

to 25% and can reduce mortality significantly. However, much work needs to be done to better define the problem areas in Latin America to assess the influence of deficiency/toxicity on production and on the economics of livestock enterprises and to develop practical and economic prophylactic measures.

Crop residues and by-products and animal waste contribute important yet underutilised sources of animal feed. One way to correct the seasonal deficiency of animal fodder would be to incorporate these residues in the diet and thereby improve the digestibility, intake and protein content of the ration as a whole. For instance, an improvement in the digestive efficiency of crop residues and high fibre diets can be effected by manipulating the rumen micro-flora and micro-fauna through feeding urea-molasses blocks as a source of ammonia and extra energy (and minerals). This technique has worked well under grazing conditions in the dry season in the tropical zone of the Latin American region although the productive, reproductive and economic responses of such supplementation have not been evaluated.

(ii) Scientific Scope and Proposed Programme Goals

The primary aim of the programme is to improve the productivity of indigenous ruminant livestock species maintained on typical small holder farms in Latin America through the identification of nutritional and management constraints which affect their reproductive and productive efficiency, and subsequently to devise and test suitable corrective measures which are within the practical and economic capabilities of the farmer.

This will be achieved by the provision of technical support and back-stopping to research institutions already conducting problem orientated investigational work in livestock production in the region. Monitoring the effect of nutrition on reproductive efficiency will be conducted through measurement of the blood or milk levels of metabolic, gonadotrophic and steroid hormones using radioimmunoassay (RIA) and enzymeimmunoassay (EIA) procedures. These will complement conventional chemical, clinical, behavioural, productive and economic values.

In order to achieve the above-mentioned general objectives, the programme will attempt to identify those nutritional and management constraints in indigenous livestock enterprises which the small-scale farmer is in a situation to rectify without undue demand on technical expertise and financial investment. Consequently, the attention will be given to:

- assessing the importance of mineral deficiencies/toxicities as determinants of existing levels of production through diagnostic procedures and through production responses to feed supplements;
- manipulation of the diet so as to provide livestock with an optimum diet for production during the wet-season as well as generating sufficient body reserves (internal fat stores) for meeting production requirements during times of nutritional inadequacy (dry-season);
- in concert with the above, the provision of locally available alternative feed resources such as urea/molasses/mineral blocks/poultry manure/fish meal and other protein sources to complement poor quality roughage during the dry season.

The effectiveness of supplementary feeding strategies will be monitored through already established reproductive monitoring techniques utilising radioimmunoassay and related procedures in concert with conventional reproductive measures (behavioural and calving/lambing indices) and production parameters (milk production, live-weight gain, wool production).

Subsequent to characterising the reproductive parameters of the livestock enterprises (e.g. post-partum intervals, open-periods, age of onset of sexual maturity, calving interval), the influence of nutrient supplementation and management changes (e.g. partial calf-removal) on these parameters will be assessed.

Also addressed will be nutrient supplementation needs for alleviating sub-clinical and clinical disease problems arising from such conditions as:

iodine related goitrogenic conditions
phosphorus related infertility problems
cobalt related growth retardation

(iii) Programme Management

On the basis of technically-sound proposals from institutions within the existing Regional Network and others, each collaborating national institute will be awarded a Research Contract for an initial period of 1 year. This Contract will be renewable for a total period of 5 years subject to satisfactory progress being made during each contract period. Research Contracts provide modest financial support (up to US\$ 5,000/year) to follow an agreed work plan, and are awarded on a cost-sharing basis, i.e. the institutes concerned also provide support to achieve the project's objectives. In addition to Research Contracts (which are only awarded to developing country institutes), Research Agreements will be awarded to research institutes with special expertise in nutrition/reproduction relationships and the employment of RIA/EIA assays for metabolic/reproductive hormones. Research Agreements do not provide financial support but holders participate in exchange of information and will be invited to attend Research Coordination Meetings to assist Contract holders in preparing work plans, solving methodological problems, analysing data, etc.

This Project will provide about 20 institutes with Research Contracts and 4 institutes with Research Agreements. The selection of all participants will be made by staff of the Joint FAO/IAEA Division's Animal Production and Health Section upon receipt of completed Contract and Agreement proposal forms. It is anticipated that Research Agreements will be awarded to two institutes within the region and two outside.

Research Coordination Meetings will be held at the beginning of the programme and thereafter at intervals of approximately 15-18 months. Such meetings have the effect of encouraging close contact and information exchange between the scientists and institutes involved, as well as a uniform approach both to the development and the practical utilisation of RIA/EIA techniques for the measurement of metabolic and reproductive hormones.

To support the programme, standardised reagents and tests and a quality control service involving reagent testing and distribution will be operated by the Animal Production and Health Unit at the IAEA Agricultural Laboratory, Seibersdorf, Austria.

(D) DEVELOPMENT AT THE SECTION'S LABORATORY UNIT, SEIBERSDORF

Nutrition

The nutrition laboratory continued with its feed evaluation and formulation testing programme using the Rumen Simulation Technique. Data from fermentation studies of untreated and urea-ammonia treated wheat straw and two sources of concentrate supplements from Tunisia have been transmitted to the scientist concerned for use in field studies. At least two further feed evaluations and formulation testing are envisaged during the first half of 1989.

Over the past three years the nutrition unit has been characterizing fibrous agricultural residues from developing member states. Data covering over 25 residues have now been compiled and statistically analyzed. This information will be available as a TECDOC publication from the Section in the near future. In addition, two scientific publications "The Fermentation of Straw-based Diets containing Azolla (A. caroliniana Willd.) using the Rumen Simulation Technique (Rusitec)" and "The Fermentation Characteristics of Botanical Fractions of Rice Straw in an Artificial Rumen" appeared in Biological Wastes (1988) Volumes 24, pp. 213-226 and 25, pp. 303-307 respectively.

A major problem in running the Tilley and Terry in vitro techniques in many developing countries is the large variation which occurs in the quality of the diet fed to fistulated animals used to supply rumen liquor. This often leads to poor repeatability of digestibility determinations. One of our major activities during the past six months has been to evaluate the Rusitec as a source of rumen liquor for Tilley and Terry digestion studies. Preliminary results are highly encouraging. It appears that with a few modifications the effluent from the Rusitec could serve as a source of inoculum for the Tilley and Terry method.

As far as training is concerned, Mr. Clarence Lakpini from NAPRI, Nigeria completed a 6-month training period in feed evaluation techniques; presently, Mr. Manuel Tiagno from the Philippines and Mr. M. Sithole from Zimbabwe are undergoing training in feed characterization at the Seibersdorf laboratory.

Reproduction

In 1988, over 4,000 FAO/IAEA RIA progesterone kits were supplied to FAO/IAEA Technical Cooperation projects and Research Contract holders. An External Quality Control Service for the users of this kit started in September 1988. Three External Quality Control (EQC) samples were provided to these users and they were asked to report on assay characteristics and progesterone concentrations observed in the EQC samples. A large number of RIA kit recipients have already provided us with the requested information and this information has shown that the kit performs extremely well under the sometimes difficult conditions which are found in recipient laboratories.

Considerable progress has been made in the development and validation of an RIA kit based on a self-coating system. It is hoped that this system which is based on a monoclonal antibody will form the basis of a "bulk reagent supply" for some of our collaborators.

The validation of an enzyme immunoassay (EIA) kit for the measurement of progesterone in milk has now been completed and a field validation of this kit is about to start, involving 10 selected laboratories in developed and

developing countries. The validation of an EIA kit for progesterone measurement in plasma is still in progress but will be completed shortly; this will be followed by a similar field validation.

One of our Agreement holders has informed us that he could supply limited quantities of an antibody to ovine LH. This can be used in RIA for measuring LH in cattle, buffaloes and goats. Those contract holders who wish to make use of this offer should write to us with the following details:

- objectives of the study
- experimental protocol and sampling schedule
- the envisaged sources of other reagents to be used in the assay, e.g. purified LH for radioiodination, LH standards, second antibody etc.

Regarding training fellowships in RIA, the reproduction laboratory will host 4 trainees and 1 scientific visitor during the next 6 months.

Disease Diagnosis

Our activities have concentrated on the production and distribution of ELISA kits. Following the FAO/IAEA training course in Ethiopia, our Rinderpest ELISA kit has now been finalised and its composition agreed upon. It continues to be distributed as two components: one from the laboratory at Seibersdorf and the other from the Pirbright Laboratories, UK. However, any problems regarding the kit can be dealt with by us here in Vienna; please do not hesitate to contact us if you do encounter difficulties with this or indeed any of our other kits.

Following the RCM and Regional Training Course on disease diagnosis in Argentina, we have decided to change the substrate in the Brucella kit to ABTS. This modified kit and a new protocol will be distributed in early 1989 to all those working on this disease. We are confident that the use of this substrate will reduce the high background experienced by some working with the original FAO/IAEA kit. Please note that the other kits produced by the Section will continue to be based on OPD since this substrate has proved to be ideal. We will, however, be issuing an antiovine kit containing both substrates for use with other antigens. The remaining kits, i.e. for IBR, babesiosis, Aujeszky's disease and trypanosomiasis continue to be supplied as before but are being continually monitored for areas where improvements can be made.

We are now up-grading the quality of the booklets containing the protocols for FAO/IAEA diagnostic kits. In future, these will be provided separate from the kits themselves and in a hardbacked ring binder. This has been done primarily so that changes to protocols can be sent as individual sheets for inclusion. Everyone working with our various kits will be sent these new protocols around the end of January.

Work has continued on the development of DNA probes as an adjunct to the ELISA system for disease diagnosis although to some extent it has become clear that the use of this methodology will be restricted to a few very well defined activities. In particular, they are available for Aujeszky's disease for detecting carrier animals, for rinderpest for detecting the possibility of carriers and in babesiosis for detecting low grade infections. We have still to determine an ideal kit format for DNA probes but will continue to monitor activities in this direction.

We have also continued to develop our capability to work with monoclonal antibodies and now have a new laboratory specially for this purpose. Francisco Castrignano is now responsible for maintaining the various hybridomas acquired by us for use in diagnostic kits. We have also established a small animal house for producing polyclonals and now have a supply of rabbit anti-camel immunoglobulin.

Once again we would like to thank all those who have provided information on how the FAO/IAEA kits are performing in the field; we would urge that anyone using our kits writes to us with comments, (good or bad!), on kit performance. This in the long run will help us to help you.

(E) PUBLICATIONS

(i) "Guidelines for Sero-Monitoring of Cattle Conducted by PARC".

This booklet was prepared by the Animal Production and Health Section of the Joint FAO/IAEA Division in Vienna in co-operation with the Animal Production and Health Division of FAO, Rome, together with the EEC and PARC Co-ordinators from Nairobi, Kenya. It is designed to give advice to those involved in sero-monitoring of rinderpest vaccination carried out under PARC. In particular, when and where to sample, what data to collect with the samples, how to process the results, and what equipment is needed. This advice, although based on sound epidemiological principles, is designed to take into account the different conditions which exist in the countries involved. It is available free-of-charge by writing to the Section to anyone taking part in the Pan African Rinderpest and other interested parties.

(ii) Use of Nuclear Techniques in the Study and Control of Parasitic Diseases of Farm Animals.

This book was published this month and contains the results of a 5-year Coordinated Research Programme of the same name. The publication is available from the Division of Publications, IAEA, price Austrian shillings: 530.-- or equivalent paid in convertible currency or UNESCO coupons. In addition to a general description of the achievements of the programme and recommendations for future research, the book contains the following articles:

<u>Title of Paper</u>	<u>CONTENT</u>	<u>Authors</u>
Use of ionising radiation in the development of vaccines against <u>Fasciola gigantica</u> and <u>Schistosoma bovis</u> in Sudanese cattle, sheep and goats.		E.M. Haroun, A.I. Yagi, S.A. Younis, A.A. El Sanhoury, H.A. Gadir, A.A. Gameel, H.O. Bushara, M.G. Taylor (Sudan)
Studies on the epidemiology, diagnosis and control of <u>E. granulosus</u> infections.		R. Lalic, M. Petrovic, M. Movsesijan, B. Jovanovic, S. Radulovic (Yugoslavia)
Genetic control of acquired resistance against gastro-intestinal nematode parasites in sheep.		R.G. Windon, B.M. Wagland, J.K. Dineen (Australia)
<u>Dictyocaulus filaria</u> in Ethiopia: studies on vaccination and pathogenesis.		G. Tilahun (Ethiopia)

- Epidemiology and control of dictyocauliasis and the epidemiology of parasitic gastroenteritis in ruminants. C.S. Eddi, R.P. Dughetti, C.M. Carcagno, J. Dorsi, J. Pereira (Argentina)
- Some factors influencing the immunisation of sheep with irradiated Haemonchus contortus larvae. S. Sivanathan, J.L. Duncan, G.M. Urquhart, W.D. Smith (United Kingdom)
- An epidemiological study on the gastrointestinal parasites of beef cattle in Uruguay. J. Berdie, J. Genovese, C. Zunini, C. Molinari, A. Charlone, E. Castro, J.L. Duncan (Uruguay)
- Effect of host nutrition on immunity and local immune responses of rabbits to O. cuniculi. E. Sinski, B. Bezubik, H. Wedrychowicz, J. Szklarczyk, N. Doligalska (Poland)
- Ovine haemonchosis: digestive pathology and vaccination trials. A. Dakkak (Morocco)
- Further observations on the pathogenesis of anaemia in fascioliasis and on immunoglobulin metabolism. A.F. Ogunrinade, M.O. Makinde (Nigeria)
- Mineral transactions along the digestive tract of lambs exposed to mixed nematode infection (Trichostrongylus colubriformis and Ostertagia circumcincta). M.D. Bown, D.P. Poppi, A.R. Sykes (New Zealand)
- Use of nuclear techniques in the study of some tick-borne haemoparasitic diseases. I.G. Wright, B.V. Goodger, C.A. Schunter, D.J. Waltisbuhl, A. Düzgün (Australia)
- Irradiated vaccines against bovine babesiosis. D.J. Weilgama, H.M.C. Weerasinghe, P.S.G. Perera, J.M.R. Perera (Sri Lanka)
- Anaplasma marginale attenuated by irradiation: kinetics of immunity and protection. L.A. Gil, B.O. Higuera, J. Castro, M. Chavez, O. Ruiz (Colombia)
- East coast fever immunisation: effect of chronic trypanosomiasis on the development of immunity. E.L.N. Taracha, A.D. Irvin, S.P. Morzaria, S.K. Molloo, J.M. Katende, J.N. Kiarie (Kenya)

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

The results of this Coordinated Research Programme are now being edited and we hope to have them published during 1989.

(iv) Improving the Reproductive Management of Livestock in Latin America with the Aid of Radioimmunoassay Techniques.

The results of this CRP are also now in the process of being edited technically within the Section and by Jane Galina; we hope to have the book published during 1989.

(F) FORTHCOMING EVENTS

- (i) FAO/IAEA Final Research Coordination Meeting on "Improving the Productivity of Sheep and Goats with the Aid of Nuclear Techniques", Perth, Australia, 20-24 February 1989.
- (ii) FAO/IAEA Final Research Coordination Meeting on "Use of Nuclear Techniques to Improve Domestic Buffalo Production in Asia - Phase II," Rockhampton, Australia, 20-24 February 1989.
- (iii) FAO/IAEA First 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", Vienna, Austria, 13-17 March 1989.
- (iv) FAO/IAEA Advisory Group Meeting on "Feeding Strategies for Improving Productivity of Ruminant Livestock", Vienna, Austria, 13-17 March, 1989.

This meeting will be held in conjunction with the First Research Coordination Meeting of the Coordinated Research Programme on the "Development of Feeding Strategies for Improving Ruminant Productivity in Areas of Fluctuating Nutrient Supply through the use of Nuclear and Related Techniques" at the Vienna International Centre, Vienna, Austria. The purposes of the meeting are: (a) to review recent developments in the use of nuclear and related techniques for feeding ruminant livestock in both developed and developing countries; (b) to identify developments and techniques that could be of use in ruminant nutrition and production in developing Member States; and (c) to review the activities of the Joint FAO/IAEA Division in relation to promoting research in animal nutrition and feeding strategies in developing countries, and define the future role of the Nutrition Unit of the Seibersdorf laboratory in supporting programmes of the Section.

In addition to the Research Contract and Agreement holders in the CRP, invitations have been sent to 7 specialists in nutrition, digestive physiology and nutrition/reproduction interactions. They will contribute papers in their area of speciality and assist in the formulation of conclusions and recommendations which would constitute the basis of the Section's activities in ruminant nutrition over the next 3-5 years. It is intended to publish the proceedings of this meeting as a Panel Proceedings Series of the IAEA, but a summary of the conclusions and recommendations will be published in the next issue of the Newsletter.

- (v) FAO/IAEA First Research Coordination Meeting on "Strengthening Animal Reproduction Research and Disease Diagnosis in Asia through the Application of Immunoassay Techniques", Kuala Lumpur, Malaysia, 22-31 May 1989.
- (vi) FAO/IAEA/SIDA Third Research Coordination Meeting of "Regional Network for Serosurveillance of Rinderpest in Africa", Nairobi, Kenya, June, 1989.
- (vii) FAO/IAEA Second Research Coordination Meeting on "Improving the Productivity of Indigenous African Livestock Using RIA and Related Techniques", Harare, Zimbabwe, 4-8 September 1989.
- (viii) FAO/IAEA Second Research Coordination Meeting on "Improving the Diagnosis and Control of Trypanosomiasis and other Vector-borne Diseases of African Livestock using Immunoassay Methods", Harare, Zimbabwe, 4-8 September 1989.

(G) REGIONAL SEMINAR FOR AFRICA ON "IMPROVING HEALTH AND REPRODUCTIVE EFFICIENCY OF LIVESTOCK THROUGH RADIOIMMUNOASSAY AND RELATED TECHNIQUES", Zimbabwe, 4-8 September 1989.

1. Introduction

Africa has undergone rapid population growth in the last two decades, and as a consequence the demand for high quality food and fibre of animal origin has increased substantially. Reflecting this demand have been increases in the production of animal products but these have been achieved largely through increased livestock numbers rather than through improved animal productivity. Indeed, in some countries in the region animal productivity has actually decreased with the result that per caput consumption of meat and milk is currently the same as or less than it was 20 years ago, and this despite the fact that many countries now also import substantial quantities of animal feeds and products.

The reasons for low livestock productivity in Africa are variable and complex, and therefore efforts to improve productivity in the continent must involve the implementation of a variety of strategies taking account of the diversity of traditional patterns of farming and social practices. Where possible these strategies should be based on local animal and feed resources, and the appropriate introduction of low-cost modifications to the animal and/or its environment. All this may seem obvious but the goal of improving livestock productivity in Africa is made all the more difficult by the paucity of basic and applied research conducted within the continent on animal feeding, reproduction and disease-control strategies, and on interactions between these. The Seminar provides a forum whereby scientists from various disciplines will review and report on various ways by which nuclear and related techniques, employed in association with standard methods, can help veterinary and animal scientists assess parameters such as the nutritional value of feeds and the reproductive and disease status of livestock. This approach not only enables the identification of constraints, but also the investigation of methods to minimise their impact.

2. Programme

Participants are requested to present papers on the use of nuclear and related techniques, as a complement to standard methods, for studying the productivity and health of indigenous African livestock. The topics of the Seminar include:

- (a) Livestock production systems in Africa
- (b) The effect of environment, nutrition and management on the productivity of African indigenous and cross-bred livestock.
- (c) Reproductive performance of cattle, sheep, goats and camels.
- (d) The interaction between seasonal feed supply and fertility, and the influence of strategic supplementation or conservation strategies.
- (e) Diagnosis and control of viral, bacterial and parasitic infections.
- (f) Improving the diagnosis and control of trypanosomiasis and other vector-borne diseases of African livestock.
- (g) Immunoassay techniques in animal reproduction studies and disease diagnosis.

3. Participation

The Seminar is mainly of interest to the following:

- animal scientists/veterinarians with specialist research/development experience in improving livestock productivity at the small-holder level.
- physiologists/biochemists with active research experience in RIA and EIA systems for quantification of reproductive and metabolic hormones.
- livestock disease control and diagnostic specialists with experience of ELISA systems for detecting haematoprotzoal diseases.
- ruminant nutritionists involved in developing feed supplementation strategies aimed at improving reproduction and productive efficiency.
- government/regional administrators responsible for improvement of livestock productivity/disease control.

People wishing to participate in the Seminar are requested to complete the attached Participation Form and send it as soon as possible to the competent official authority (i.e. Ministry of Foreign Affairs, Ministry of Agriculture, National FAO Committee or the National Atomic Energy Authority) for onward transmission to the Secretariat. The designation of a participant will be accepted only when transmitted by the government of a Member State of the sponsoring organizations or by an organization invited to participate.

Prospective participants whose official designations have been received by the Secretariat will be notified directly two or three months before the meeting.

4. Papers

Designated participants are urged to submit reports on their activities to the Seminar. They are requested to send two copies an abstract of between 250 and 350 words to the competent official authority for transmission to the Secretariat in time to reach it before 6 April 1989, together with the completed Participation Form.

Authors will be informed about details concerning the written and oral presentation at the Seminar in due course. Presentation of a paper is not to be regarded as a condition of participation.

Please note that the Secretariat does not prepare preprints. Authors are encouraged to arrange themselves for the printing and provision of 50 copies of their papers for general distribution to the participants during the meeting. The printing and transportation costs to the place of the meeting are at the author's expense.

5. Expenditures

As a general rule, the sponsoring Organizations do not pay the cost of attendance, i.e., travel and living expenses of participants. However, some funds are available to help meet the cost of attendance of selected specialists from developing countries with low economic resources. Generally, not more than one grant will be awarded to any one country.

If governments wish to apply for a grant on behalf of one of their specialists, they should address a specific request to this effect to the Director General of the International Atomic Energy Agency. To be able to take advantage of these funds governments should ensure that applications for grants:

- a) be submitted by 6 April 1989.
- b) be accompanied by a duly completed and signed Grant Application Form (as attached).

Applications which do not comply with the conditions mentioned under a) and b) cannot be considered.

The grants awarded will be in the form of lump sums usually covering part of the cost of attendance.

No registration fee is charged to participants.

6. Visas

Designated participants who require a visa to enter Zimbabwe should submit the necessary applications to the nearest diplomatic or consular representative of Zimbabwe as soon as possible.

7. Working Languages

The working languages of the Seminar will be English and French.

8. Distribution of Documents

A preliminary programme of the Seminar will be sent to the participants before the meeting.

The final programme, the Book of Abstracts in the original language and preprints, to the extent available, will be distributed upon registration.

9. Accommodation

Detailed information on accommodation and other items will be sent directly to all designated participants well in advance of the meeting.

10. Secretariat

The Scientific Secretary of the Seminar is Mr. J.I. Richards, Joint FAO/IAEA Division, International Atomic Energy Agency, (telephone extension 6063). Conference organization for the Seminar is provided by Ms. T. Niedermayr, Conference Service Section, Division of External Relations, International Atomic Energy Agency, (telephone extension 1312 or 1311).

The address of the Secretariat of the Seminar is:

International Atomic Energy Agency
IAEA-SR-158
Vienna International Centre
PO Box 100
A-1400 Vienna
Austria

Telephone No.: (222) 2360 plus extension
Telex No.: 1-12645
Cable address: INATOM VIENNA
Telefax No.: 43 222 234564

11. Channels of Communication

The Participation Form and the Grant Application Form, if applicable, should be sent, together with two copies an abstract to the competent official authority (i.e. Ministry of Foreign Affairs, Ministry of Agriculture, National FAO Committee or the national atomic energy authority), for transmission to the Secretariat.

Subsequent correspondance on scientific matters should be sent to the Scientific Secretary and correspondence on administrative matters to the Conference Service Section of the IAEA.

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
INTERNATIONAL ATOMIC ENERGY AGENCY

Seminar on Improving Health and Reproductive Efficiency of
Livestock through Radioimmunoassay and Related Techniques
for Developing Countries in Africa

Harare, Zimbabwe
4 - 8 September 1989

To be sent to the competent official authority (Ministry of Foreign Affairs, Ministry of Agriculture, National FAO Committee or national atomic energy authority) for transmission to the Joint Secretariat of the Symposium, c/o International Atomic Energy Agency, P.O.Box 100, Vienna International Centre, A-1400 Vienna, Austria.

GRANT APPLICATION FORM*

Name: (Mr/Ms)

Mailing Address:

Telex No.:

Telefax No.:

Cable address:

Telephone:

Date of Birth (Year/Month/Day):

Nationality:

1. EDUCATION (Post-Secondary)

Name and place of institution	Field of study	Diploma or degree	Years attended	
			from	to

2. RECENT EMPLOYMENT RECORD (Starting with your present post)

Name and place of employer/organization	Title of your position	Type of work	Years of service	
			from	to

3. DESCRIPTION OF WORK (Performed over the last three years)

4. INSTITUTE'S/MEMBER STATE'S PROGRAMME IN FIELD OF MEETING

.....
Date

.....
Signature of Applicant

.....
Date

.....
Name and title (printed) and signature of
responsible Government official

* To be completed only by participants from developing countries on whose behalf a grant is requested.

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