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Animal Production and Health Newsletter

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

In the 6 months since the previous edition of this Newsletter was sent to you, the Section has organised 5 Research Coordination Meetings (two in Asia and 3 in Africa), covering a wide variety of topics relating to the productivity of livestock in the tropics and subtropics. Altogether, around 80 scientists working in the fields of animal nutrition, reproduction and the diagnosis and surveillance of diseases were able to attend these meetings and benefit from interactions within and across disciplines. In addition, from 15-19 April we held an International Symposium on Nuclear and Related Techniques in Animal Production and Health at the IAEA's headquarters here in Vienna - an event which attracted over 140 participants from 41 Member States of FAO and IAEA. Apart from the large number of participants, we were particularly pleased about the high scientific quality of the papers and posters which were presented, and the obvious care which the vast majority of authors took in preparing their manuscripts for the Symposium Proceedings. In fact, these manuscripts were in such good shape that already many of them have been typeset and we can now confidently predict that the Proceedings will be available around October. So, to all those who contributed to the Symposium - many thanks for making it such an easy event for us to run!

As we move into the second half of the year, it can be seen from this Newsletter that while we will still be running Research Coordination Meetings (3 are scheduled for Latin America and 1 for Africa), a great deal of our time will be spent organising training events of one type or another. In some cases (e.g. the new programmes starting up in Africa and Latin America on disease diagnosis/surveillance), Training Workshops are being organised in association with Research Coordination Meetings so that the participants of the relevant Coordinated Research Programmes can receive training on how to handle and use the standardised reagents which the Section provides under these programmes to conduct the diagnostic tests for the diseases being covered. In addition, we will be providing training on how to analyse and interpret the results of these tests and on the use of computerised databases. With this approach, we hope that the quality of the work which we are trying to promote through our CRP's will be enhanced.

In other cases, training is being provided through specific Courses which normally run for 4-6 weeks. We will be running two such Courses between now and the end of the year - one in Austria (for scientists from any geographical region covered by FAO and IAEA), and the other in Mexico which is restricted to around 20 participants from the Latin American region. Both of these Courses are concerned with animal production, and through lectures, demonstrations and practicals we hope to impart some of the basic principles behind the feeding and reproductive management of livestock in developing countries, as well as teach appropriate techniques for studying and improving productivity. Unlike the Workshops which are designed for more established scientists who are contributing to our CRP's, these Training Courses are mainly designed for "up and coming" and younger researchers who, we hope will contribute to national or international programmes within their home countries. In addition to these two approaches to training, it should not be forgotten that throughout the year the IAEA awards Training Fellowships and Scientific Visits to animal scientists from developing countries to that they can spend time abroad learning new techniques, and/or simply visiting more established institutes to see what is going on and what approaches are being taken to solve problems of mutual interest. While the majority of these Fellowships and Scientific Visits

are awarded to staff of institutes which are receiving support from the IAEA's Technical Cooperation programme, it is nevertheless possible for staff of other institutes to benefit from such training activities provided a good justification is given.

Finally, on the staff front there have fortunately been very few changes, and these have been restricted to our secretarial assistance. Ms. Margaret Heymann from Ghana, who was with the Section for nearly 4 years, left Vienna in March to take a course in business management in Canada and New York. Everyone was very sorry to see "Maggie" go since she was such a popular staff member, but at the same time we knew that her decision to move on was in her own best interests for the future, and we wish her well. Maggie has been replaced by Ms. Rosario Leon Kuong from Peru and everyone hopes that Rosario, who works equally well in Spanish and English, will enjoy her time in the Section. We have also recently been joined by Ms. Dagmar Just (Austria) who is presently filling in for Chakkappan Thottakara who was transferred temporarily to our Director's Office due to a staffing shortage.

With best wishes for now,

James D. Dargie
Head, Animal Production and
Health Section

(A) STAFF

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Marina Nagj, Laboratory Technician
Lal Peiris, Laboratory Technician
Beate Rogovic, Laboratory Technician

(B) PAST EVENTS

- (i) FAO/IAEA Second Research Coordination Meetings on "Strengthening Animal Reproduction Research in Asia through the Application of Immunoassay Techniques" and "Strengthening Animal Disease Diagnosis in Asia through the Application of Immunoassay Techniques", Manila, Philippines 4-8 February 1991

The second RCM's of these two programmes were held jointly at the Philippine Centre for Economic Development, on the campus of the University of the Philippines in Diliman. They were attended by all 18 research contract holders and 4 of the 6 research agreement holders, representing 10 countries in the Asian-Australasian region. In addition, a representative of the Food and Agriculture Organisation in Rome, an Australian scientist involved in a related ACIAR project, and several observers from the Philippines participated.

The meetings were co-hosted by the Philippine Nuclear Research Institute (PNRI), the Bureau of Animal Industry (BAI) and the Institute of Animal Science of the University of the Philippines at Los Banos (UPLB). We wish to express our gratitude to the host institutes for the excellent arrangements made to hold these meetings.

Some of the conclusions and recommendations arising from these meetings are given below:

A. Reproduction Group:

1. The RIA technique for progesterone measurement has been established in all participating laboratories and is being routinely applied for the on-going studies.
2. A study in Bangladesh showed that dietary supplementation with Urea-Molasses Blocks (UMB) in prepubertal indigenous zebu calves increased growth rate but did not cause a significant increase in the percentage of animals reaching puberty by 2.5 years of age. Indigenous cows fed UMB from the time of calving resumed ovarian activity between 30 - 60 days postpartum, whereas control animals resumed activity between 100 - 160 days.

3. In Sri Lanka, reproductive performance of indigenous zebu cows was found to be good in one region where restricted suckling was practiced by the farmers. The mean interval from calving to the first elevation of progesterone was 40 days and the calving to conception interval was 70 days. In calves, however, puberty was not observed up to 2 years of age.
4. The reproductive patterns of native Korean cattle were documented under institutional farm conditions. In heifer calves, the first elevation of progesterone occurred at around 11 months of age and oestrous cycles commenced around 14 months of age. In cows, postpartum cyclicity commenced between 20 to 60 days after calving. At 60 days postpartum 93 % had shown elevated progesterone, whereas only 56 % had been observed in oestrus.
5. In Vietnam, studies on reproductive performance of different grades of crosses between Holstein Friesian (HF) and indigenous cattle (F1, F2, F3) in institutional and small holder farms revealed differences attributable to genotype, season and management. In general, fertility was better during the rainy than dry season, and in those with lower percentage of HF inheritance.
6. A large scale field survey of purebred and crossbred HF dairy cattle in Thailand showed differences in fertility attributable to genotype, climate and management. Purebred HF cows had higher incidence of reproductive disorders than crossbreds. Calvings preceding the hottest season resulted in the longest calving to conception intervals. Establishment of a routine herd fertility programme resulted in improved fertility.
7. Postpartum ovarian activity was monitored in five Bali (Bibos banteng) cows in Denpasar. First elevation of progesterone occurred between 80 - 140 days postpartum.
8. A slaughter house study on Philippine carabaos (Bubalus bubalis) showed that 15 % of the females were pregnant. The overall incidence of genital tract abnormalities was 23 %. Information was also obtained on the accuracy of rectal palpation in diagnosing ovarian and uterine structures.
9. In China, studies on two populations of Yaks (Poephagus grunniens) with contrasting calving rates indicated that the difference could be due to frequency of milking and feed supplementation during the winter. The progesterone profile during pregnancy was characterised and the mean gestation period was found to be 255 days.
10. Where sufficient information has not been obtained to clearly document the reproductive performance of animals under the production system being studied, further investigations should be continued to allow reliable conclusions to be drawn.
11. Where there is clear evidence of a significant effect of genotype and/or environment on fertility, studies should be focused on determining appropriate methods for improving production within the system.

12. Contract holders should guard against experimental bias and pay particular attention to study design. Where inappropriate methods of statistical analysis have been used, the data should be reanalysed.
- B. Disease Diagnosis Group:
1. Most contract holders have made progress with their work on using ELISA methods for disease diagnosis, monitoring animal responses to vaccination and/or for epidemiological studies. However, the rate of progress has been variable.
 2. Two projects (in Sri Lanka and the Philippines) are using an ELISA test developed through ACIAR support for testing the quality of locally produced vaccines against haemorrhagic septicaemia (caused by *Pasteurella multocida*), and for following the immune response of buffaloes to such vaccines. In both countries, the test has been established and it is clear that in one case, the quality of vaccine produced was poor.
 3. Three projects (in Indonesia, Malaysia and the Philippines) deal with the use of ELISA tests developed by the FAO/IAEA and ACIAR for examining the prevalence of brucellosis (*B. abortus*) among cattle, using blood or milk samples. While in all cases the tests themselves seemed to perform satisfactorily, in one case the correlation between ELISA results and tests for antibody based on other methods (e.g. CFT and RBT) was poor, indicating the need for further testing using all methods.
 4. Work on Aujeszky's disease in pigs (in China and Thailand) has demonstrated the value of the ELISA test developed by FAO/IAEA for detecting antibodies. In both countries the ELISA was validated against other methods and needs now to be extended to cover differentiation between vaccinated and naturally infected animals.
 5. In Indonesia, comparisons were conducted between the ELISA test and agar gel immunodiffusion (AGID) for monitoring antibodies to bluetongue. The competitive ELISA detected maternal antibody longer than AGID as well as seroconversion earlier after infection, suggesting that the ELISA is a useful screening test for bluetongue infections.
 6. From Vietnam, results were reported of a parasitological and serological survey of trypanosome (*T. evansi*) infections in buffaloes. No ELISA results were reported since at the time of the RCM a staff member of the institute was receiving IAEA Fellowship Training in UK; it is expected that information on the potential use of the ELISA test will be forthcoming in the near future.
 8. Despite the progress described above, a general criticism was that in very few cases have Contract holders reached the stage of analysing the field significance of their work - all too often they have not maintained sufficient contact with the field. It was emphasised that without good clinical data to support their studies, the value of any serological data was questionable. All contract holders were therefore urged to ensure (a) that the quality control aspects of their tests were strengthened, and (b) that clinical as well as serological data were available for the final RCM.

(ii) FAO/IAEA International Symposium on "Nuclear and Related Techniques in Animal Production and Health", Vienna, Austria, 15-19 April 1991

It seems from all reports that the Symposium was highly successful not only from the scientific standpoint but also from the standpoint of the interactions which took place between people from so many different scientific and cultural backgrounds. About 140 scientists from over 40 countries attended the Symposium, and there were 63 presentations of which 27 were posters. The first 3 sessions of the Symposium were given over to nutrition where the general theme was optimising the use of poor quality forage feeds for ruminant production, e.g. through feeding urea-molasses blocks, and providing sources of rumen non-degradable protein and/or minerals. There then followed 2 sessions dealing with animal reproduction and with interactions between nutrition and reproduction, and where a variety of animal production systems were discussed. Finally, there were 2 sessions dealing with animal health, and in particular with the use of ELISA and DNA probe methods for disease diagnosis/epidemiology and the development of recombinant antigen-based vaccines.

Many of the participants were from developing countries and the majority of the presentations described work conducted within developing countries, often with assistance from the Joint FAO/IAEA Division. Fortunately, we received generous support from many national institutes worldwide as well as from a number of bilateral funding organisations, e.g. the British Council, CSIRO (Australia), the Swedish International Development Authority (SIDA), the Italian Department of Cooperation for Development, and the Technical Assistance Department of the Dutch Ministry of Foreign Affairs. It is with pleasure that FAO and IAEA acknowledge this support which enabled so many people to attend. We would also like to thank the participants for making the Symposium such a technical and social success, and in particular for the effort they put into preparing their manuscripts for publication in the Symposium Proceedings. As a result of these efforts, and the work of the Editor, Mr. Steve Flitton, we should achieve our target publication date of October 1991.

(iii) FAO/IAEA Research Coordination Meeting on "Improving the Productivity of Indigenous African Livestock using Radioimmunoassay and Related Techniques", Bingerville, Côte d'Ivoire, 20-25 May 1991

The third meeting of this programme took place at the Centre des Métiers de l'Electricité in Bingerville, Côte d'Ivoire. The meeting was attended by the principal investigators, or their representatives, of 13 out of the 15 research contracts, 2 research agreement holders, 2 FAO/IAEA staff members, 1 consultant, and 3 participants of the FAO programme on "The Promotion of Trypanotolerant Livestock in West and Central Africa".

During the meeting the participants presented their results and formulated new work plans. It became clear that in all the projects the progesterone measurement is now used as a tool to monitor reproductive performance and the improvement of reproductive performance after interventions in livestock production systems. The collection of baseline data on productivity and reproductive performance has been completed in nearly all the projects. Undernutrition and poor management have been identified as the major constraints responsible for low livestock

productivity. Work under these projects now focuses on improving livestock productivity by improving nutrition and management. In nearly all the projects research is conducted on-farm as well as on-station.

- (iv) FAO/IAEA Research Coordination Meeting on "Improving the Diagnosis and Control of Trypanosomiasis and other Vector-borne Diseases of African Livestock using Immunoassay Methods", Bingerville, Côte d'Ivoire, 20-25 May 1991

The third Research Coordination Meeting of this Netherlands Government funded programme was held at the Centre des Métiers d'Electricité, Bingerville, Côte d'Ivoire. The meeting was organized in conjunction with the third RCM of the Coordinated Research Programme on "Improving the Productivity of Indigenous African Livestock Using Radioimmunoassay and Related Techniques". The RCM was attended by 11 of the 12 Research Contract holders, the 2 Research Agreement holders, FAO's Regional Animal Health Officer and a programme consultant from The Netherlands.

The Research Contract and Agreement holders presented papers during this RCM with details on the validation and use of the antigen detection ELISA kits, which FAO/IAEA, in collaboration with ILRAD in Nairobi and the CTVM in Edinburgh, had developed for the diagnosis of bovine and camel trypanosomiasis respectively. One of the conclusions at the meeting was that the two antigen-ELISA systems which can detect species-specific invariant trypanosome antigen, have been successfully introduced and established at 10 of the 11 participating institutes involved with the diagnosis of trypanosomiasis. The results reported of the Ag-ELISA validation demonstrated the considerably greater sensitivity (4-5 times) of these systems for the detection of active trypanosome infections as compared with the buffy coat technique (BCT), the more commonly used diagnostic method.

It was further concluded that the results obtained with the antigen-ELISA systems clearly demonstrated the potential of these tests in the development of strategies for the monitoring and control of animal trypanosomiasis.

The meeting was also used for the formulation of workplans for the period 1991-92. The majority of these workplans are now focussed on the use of the antigen-ELISA systems in epidemiological studies to determine the prevalence of trypanosomiasis prior to and after the implementation of a tsetse and/or trypanosomiasis control programmes, in studies to select trypanotolerant breeding cattle, and for studies to assess observed trypanocidal drug resistance.

The Animal Production and Health Section wishes to express its gratitude to the local organisers, i.e. the staff of the Laboratoire Central de Nutrition Animale (LACENA) in Abidjan, for their assistance in organizing the meetings on livestock production and trypanosomiasis.

- (v) FAO/IAEA Research Coordination Meeting on "Inter-Regional Network for Improving the Productivity of Camelids", Rabat, Morocco, 17-21 June 1991

The first Research Coordination Meeting of this Programme was held in Morocco from 17-21 June 1991. The meeting was attended by 10 research contract and 5 agreement holders from 13 countries; each of the

Contract holder's countries has important camelid populations. All the climatic zones inhabited by camels, from cold Asian desert, through hot Middle Eastern and African deserts to the Alpine highlands of South America, and all six of the world's species of camel, were the subject of discussion at the meeting. All Contract holders attended except those from the People's Republic of China and Somalia.

The RCM also benefitted from the presence of an observer who is responsible for coordinating the Camel Applied Research and Development Network (sponsored by the International Fund for Agricultural Development and hosted by the Arab Center for the Study of Arid Areas and Dry Lands in Damascus, Syria). One FAO/IAEA staff member was in attendance as Scientific Secretary. The official opening was performed by the Secretary-General of the Ministry of Agriculture and Agrarian Reform, supported by the Director of Livestock Production: the Elected Representative of the Southern Region of the country to the Moroccan Parliament also assisted at the opening. The FAO Resident Representative in Morocco was also present.

The meeting was held at the Institut Agronomique et Vétérinaire Hassan II in Rabat. The people immediately responsible for local organization were a Contract holder in the Department of Animal Physiology and his colleague who participates in the contract. The warmth of the reception given by the Institute, the facilities provided, and the arrangements made to ensure the success of the meeting were exemplary.

The first two days were occupied by Agreement and Contract holders in making presentations on current research directions and results of previous work. A field trip was made to the Marrakesh area on the Wednesday to allow participants to obtain an impression of Moroccan agriculture and livestock husbandry and to see one-humped camels in their natural environment.

All of the fourth and much of the fifth days of the meeting were occupied by Contract and Agreement holders in formulating Research Protocols for future work: it was encouraging to note the collaboration between these two groups, both formal during designated work sessions and informal in what otherwise might have been leisure time. Final sessions were concerned with presentation of protocols to the group as a whole and with formulating conclusions and recommendations.

The Scientific Secretary had the opportunity during the week to discuss individually with Contract holders their requirements for equipment, laboratory consumables and other forms of support. It was recommended by the participants that the Second RCM be held in Chile in March or April of 1993 to coincide with the Eighth International Symposium on South American Camelids.

A full report of the meeting, with texts of presentations, research protocols, programme and list of participants is in the course of preparation.

(C) STATUS OF EXISTING COORDINATED RESEARCH PROGRAMMES

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

This programme which has 14 Research Contracts and 5 Research Agreements is now entering its final stages and will be terminated following a final RCM which will be held in Vienna around May 1992.

(ii) Improving the Productivity of Indigenous African Livestock

This programme is funded by the Ministry of Foreign Affairs of the Government of the Netherlands, and following the RCM in Côte d'Ivoire, it was decided to reduce the number of Research Contracts from 15 to 12. No further participants can be accepted. The third RCM of the programme will be held early in 1993.

(iii) 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; we are not seeking further proposals. The final RCM of the programme will also be held in early part of 1993.

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

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

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

This programme has 9 contracts and 3 agreements and we are not seeking any further proposals. The final RCM will be held in Bangkok, Thailand, from 16-20 November 1992.

(vi) Development of Feed Supplementation Strategies for Improving Ruminant Productivity on Smallholder Farms in Latin America through the Use of Radioimmunoassay Techniques

This programme has 18 Research Contracts and 5 Agreements and no further awards can be considered. The 2nd RCM of the programme will be held in Mexico from 4-8 November 1991.

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

This programme has 11 Research Contracts and 6 Research Agreements and we are not seeking further proposals. It is expected that the 2nd RCM of the programme will be held early in 1993.

(viii) Immunoassay Methods for Sero-Monitoring of Rinderpest in Africa

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). The first RCM of this programme will be held in Cameroon from 16-27 September 1991 in conjunction with a Training Workshop and the following Research Contract and Research Agreement holders are expected to attend:

Contract holders

Title of Project

E. Couacy-Hymann

Laboratoire de Pathologie Animale
B.P. 206
Bingerville,
COTE D'IVOIRE

The use of nuclear and related techniques (enzyme-linked immunosorbent assay-ELISA) in the serosurveillance of rinderpest.

I. Diallo

Laboratoire Central de l'Elevage
B.P. 485
Niamey,
NIGER

Use of nuclear and related techniques in the serosurveillance of rinderpest in Niger as part of the PARC.

K. Loretu

Animal Disease Research Institute
P.O.Box 9254
Dar es Salaam,
UNITED REPUBLIC OF TANZANIA

The use of nuclear and related techniques (enzyme-linked immunosorbent assay) in the sero-monitoring of rinderpest.

K. A. Majiyagbe

Virology Division
National Veterinary Institute
Vom, Jos Plateau State,
NIGERIA

Towards rinderpest eradication in Nigeria; continuous evaluation and monitoring of vaccination effectiveness (sero-monitoring) using nuclear and related techniques (ELISA).

M. Elamin

Central Veterinary Research
Laboratories
P.O.Box 8067
Almarat,
SUDAN

Use of nuclear and related techniques (enzyme-linked immunosorbent assay-ELISA) in surveying rinderpest in Sudan.

G. Opoku-Pare

Ministry of Agriculture
Dept. of Veterinary Services
P.O.Box M. 161
Accra,
GHANA

Sero-monitoring and epidemiology of rinderpest and other diseases in Ghana using nuclear and related techniques (ELISA).

T. U. Obi

University of Ibadan
Dept. of Veterinary Medicine
P.O.Box 155
Ibadan,
NIGERIA

The application of enzyme-linked immunosorbent assay in epidemiological survey of rinderpest and rinderpest-like virus infections in southern Nigeria.

- G. D. Ezeokoli
Dept. of Animal Production and Health
Anambra State University of
Technology (ASUTECH)
Abakaliki
Anambra State,
NIGERIA
- Studies into the role of mild virus in infections and of immune complexes in the epidemiology of rinderpest in Nigeria using nuclear and related techniques.
- M. Sidibie
Laboratoire de Diagnostics
Vétérinaires
B.P. 7026
Ouagadougou,
BURKINA FASO
- Sero-surveillance of rinderpest and related diseases using nuclear and related techniques (enzyme-linked immunosorbent assay (ELISA)).
- K. Tounkara
Laboratoire Central Veterinaire
B.P. 2295
Bamako,
MALI
- Sero-monitoring of antibodies against rinderpest virus in cattle in Mali using nuclear and related techniques (ELISA).
- J. Sarr
LENEV
B.P. 2057
Dakar,
SENEGAL
- Rinderpest in Senegal. Sero-surveillance using nuclear and related techniques (ELISA).
- E. Touray
Central Veterinary Laboratories
P.O.Box 553
Banjul,
GAMBIA
- Sero-surveillance of rinderpest and other diseases in Africa using nuclear and related techniques (ELISA).
- Boubaccu Diallo
C.N.E.R.V.
B.P. 167
Nouakchott (R.I.M.),
MAURITANIA
- Programme of support for rinderpest sero-monitoring in Mauritania.
- E. K. Twinamasiko
Animal Health Research Centre
P.O.Box 24
Entebbe,
UGANDA
- Use of nuclear and related techniques (ELISA) in the sero-monitoring of animal diseases in Uganda.
- H. Wamwayi
Kenya Agricultural Research Institute
Muguga
Nairobi,
KENYA
- Routine sero-monitoring and epidemiological studies of rinderpest in Kenya using the enzyme-linked immunosorbent assay (ELISA).
- C. Diguimbaye
Laboratoire de Recherche
Vétérinaires et Zootechniques
de FARCHA
B.P. 433
Ndjamena,
TCHAD
- Sero-surveillance de la peste bovine au Tchad.

Y. Mebratu
National Veterinary Institute
Debre Zeit,
ETHIOPIA

Use of nuclear and related techniques (enzyme-linked immunosorbent assay-ELISA) for the evaluation of rinderpest antibodies.

Agreement holders

Dr. J. Anderson
Institute for Animal Health
Virus Diagnosis Dept.
Pirbright, Woking, Surrey,
UNITED KINGDOM

Application of immunoassay techniques for improved diagnosis and control of infectious diseases of livestock.

Dr. R. Lancelot
Laboratoire de Farcha
Service d'Epidemiologie
B.P. 433
N'Djamena,
TCHAD

Assistance to the conducting of rinderpest sero-surveillance in Africa.

Dr. G. Libeau
Institute d'Elevage et des Medicines
Vétérinaire des Pays Tropicaux
10 Rue Pierre Curie
94704 Maisons Alfort CEDEX
FRANCE

A competitive ELISA using anti-N antibodies for specific detection of rinderpest antibodies in cattle and small ruminants in epidemiological surveys.

Dr. L. Tyler
Pan Livestock Services Ltd.
Department of Agriculture
Berkshire,
UNITED KINGDOM

Sero-monitoring of rinderpest in Africa.

(ix) 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. The first RCM of the programme will be held along with a Training Workshop in Rio de Janeiro, Brazil, from 4-14 November 1991 when the following Research Contract and Research Agreement holders are expected to attend:

Contract holders

Title of Project

Dra. Eliana Smitsaart
Centro de Investigacion en Ciencias
Veterinarias - Instituto Nacional
de Tecnologia Agropecuaria
C.C. No. 77 (1708)
Moron, (Provincia Buenos Aires)
ARGENTINA

Field assessment of the enzyme immunoassay for Foot-and-Mouth disease virus diagnosis.

Dr. Francisco A. Uzal
Instituto Nacional de Tecnologia
Agropecuaria, URISA
E.E.A. Bariloche - C.C. 277
8400 Bariloche,
ARGENTINA

A survey of bovine brucellosis by enzyme-linked immunosorbent assay (ELISA) technique in Patagonia region, Argentina, and a comparison of ELISA with conventional diagnostic techniques.

Dra. Susana Torioni de Echaide
INTA
CC 22
2300 Rafaela (Santa Fe)
ARGENTINA

Evaluation of the enzyme-linked immunosorbent assay (ELISA) for the diagnosis of Babesia bovis and its use for epizootiological studies.

Dr. Jose Antonio Prado
Instituto de Pesquisas Veterinarias
"Desiderio Finamor"
Caixa Postal 2076
90.001 Porto Alegre, RS
BRAZIL

Enzyme-linked immunosorbent assay (ELISA) to evaluate immunity levels in cattle used in Foot-and-Mouth disease vaccine potency kits.

Dr. Fernando Padilla Poester
Instituto de Pesquisas Veterinarias
"Desiderio Finamor"
Caixa Postal 2076
90.001 Porto Alegre, RS
BRAZIL

Brucellosis: application of enzyme-linked immunosorbent assay (ELISA) for improved diagnosis.

Dr. Joao R. de Souza Martins
Instituto de Pesquisas Veterinarias
"Desiderio Finamor"
Caixa Postal 2076
90.001 Porto Alegre, RS
BRAZIL

Evaluation of enzyme-linked immunosorbent assay (ELISA) tests in the diagnosis of Babesiosis and Anaplasmosis.

Dr. Pedro Atalos
Facultad de Ciencias Veterinarias
y Pecuarias
Universidad de Chile
Casilla 2 Correo 15 La Granja
Santiago,
CHILE

Epidemiological study on bovine Brucellosis.

Dra. Ximena Rojas
Instituto de Microbiologia
Universidad Austral de Chile
Casilla 567
Valdivia,
CHILE

Enzyme-linked immunosorbent assay test for discriminating Brucella bovis vaccinated and natural infected animals.

Dra. Iris Sanchez-Gonzales
Instituto de Medicina Veterinaria
Calle 12E/15 y 17 Vedado Plaza
Ciudad de la Habana,
CUBA

Use of enzyme-linked immunosorbent assay (ELISA) for the control and eradication of Brucellosis in Cuba.

Dra. Teresita Blandino
National Animal and Plant Health
Center
Ap. 10 San Jose de las Lajas
Havana,
CUBA

Establishment of enzyme-linked immunosorbent assay (ELISA) and dot ELISA tests for the detection of Babesia bovis antibodies.

Dr. Alfredo Dajer
Facultad de Medicina Veterinaria
Universidad de Yucatan
Apdo. Postal 4-116
Merida, Yucatan, MEXICO

Use of enzyme-linked immunosorbent assay (ELISA) for the diagnosis of Brucellosis in cattle in Yucatan.

Dr. Genny Ramirez
F.M.V.Z. - U.A.D.Y.
Apartado Postal 4-116
Yucatan,
MEXICO

Kinetic behaviour of immuno globulin M (IgM) against Babesia bovis and Babesia bigemina in beef cattle from birth to 15-18 months of age, in the Yucatan State, Mexico.

Dr. Tomas Martinez Aguilar
Servicio Nacional de Salud Animal
Casilla de Correo 1110
Km. 10,5 Ruta Mcal. Estigarribia
San Lorenzo,
PARAGUAY

Incorporation of enzyme-linked immunosorbent assay technique to study antibody levels against Foot-and-Mouth disease and Brucellosis.

Dra. Ana Maria Espinoza
National Institute of Health
Foot-and-Mouth Disease Lab.
Capac Yupanqui 1400
Lima 11,
PERU

Detection and titration of Foot-and-Mouth disease antigens and antibodies in Peruvian livestock using enzyme-linked immunosorbent assay (ELISA).

Dra. Mariela Silva
Centro de Investigaciones
Veterinarias "M.C. Rubino"
Casilla de Correo 6577
Montevideo,
URUGUAY

Evaluation of enzyme-linked immunosorbent assay (ELISA) for the diagnosis of bovine Brucellosis in Uruguay.

Dr. Herculano Cardozo
Centro de Investigaciones
Veterinarias "M.C. Rubino"
Ministerio de Ganaderia, Agricultura
y Pesca
Ruta 8 km. 17,5
Montevideo,
URUGUAY

The use of enzyme-linked immunosorbent assay (ELISA) for sero-epidmiological survey for Babesiosis in Uruguay.

Dr. Nelda R. de Guanipa
Ministerio de Agricultura y Cria
Laboratorio Regional de Diagnostico
Km. 6,5 Via a Perija
Maracaibo, Zulia,
VENEZUELA

The use of enzyme-linked immunosorbent assay (ELISA) for studies on the prevalence of foot-and-mouth disease in the State of Zulia.

Dr. Edgar Leon
Instituto Investigaciones Veterinarias
Avds. Principal Las Delicias
Apda. Correo 70, Maracay
Cod. Postal 2101
Estado Aragua,
VENEZUELA

Enzyme-linked immunosorbent assay (ELISA) and dot-ELISA for the diagnosis of Babesia bovis infections.

Agreement holders

Dr. Richard P. Kitching
(Dr. John R. Crowther)
Institute for Animal Health
Compton, nr. Newbury,
Berks.RG16 0NN,
UNITED KINGDOM

Standardization and supply of reagents for foot-and-mouth-disease ELISA kits.

Dr. Albino Alonso
Pan American Foot-and-Mouth
Disease Center
P.O. Box 589
20 001 Rio de Janeiro,
BRAZIL

Identification and quantification
of foot-and-mouth antibodies by
ELISA.

Dr. I. Wright
CSIRO, Division of Tropical
Animal Production
Private Bag No. 3 PO
Indooroopilly, Qld. 4068
AUSTRALIA

Diagnosis and control of tick-borne
diseases using rDNA techniques.

Dr. Richard Jacobsen
130 Diagnostic Laboratory
N.Y.S. College of Veterinary
Medicine
Cornell University
Ithaca, N.Y. 14853
USA

Requirements for validation and
application of ELISAs in developing
countries.

Dr. K. Nielsen
Agriculture Canada
A.D.R.I.
P.O. Box 11300 Station H,
Nepean, Ontario, K2H 8P9
CANADA

Diagnosis and control of brucellosis
using ELISA.

(D) NEW COORDINATED RESEARCH PROGRAMME

Because of the amount of data to be collected, the need for an inter-disciplinary approach involving nutritionists, reproduction specialists and parasitologists, and the requirement of access to sufficient numbers of animals kept on farms, the award of Contracts under this programme will be limited to a maximum of 10 institutes. Only institutes which can meet the above criteria and adhere to the stated guidelines for the conduct of the research should apply. Applications should be sent to the IAEA's Research Contract Administration Section before 1 October 1991.

Title: Development of supplementation strategies for milk-producing animals in tropical and subtropical environments

(1) General Introduction

The productivity of many herds of milk-producing animals in developing countries is low because of low individual yield and poor fertility, the latter often reducing the proportion of the herd in milk at any one time to less than 50 percent of the mature cows. The reasons for the low productivity are complex but, in order of priority, appear to be (a) the imbalanced nature of the nutrients that arise from the digestion of the forage resources, (b) the incidence of disease/parasitism, and (c) the often harsh climatic circumstances. The resistance to disease and climatic stress exhibited by particular breeds

's an important overall consideration but only when the major constraints to productivity have been overcome does the genetic potential for milk production become important.

Recent nutritional research has demonstrated the possibility of substantial increases in the productivity of milk-producing animals fed poor-quality roughages through small alterations to the feed base. In some countries these improvements have been demonstrated at the farm level: milk yield has increased; the body condition of the animals has improved; and the age at puberty and the interval between calvings have been reduced. These advances have been brought about by the addition of critical catalytic nutrients to the diet. The nutrients provided varied according to the rate-limiting factors of the basal diet. Commonly however, the supplements provided nitrogen or phosphorus for the rumen organisms or by-pass protein or all of these.

To allow effective supplementation in practice there is a need to identify the nutrient or combination of nutrients that are the rate-limiting factors to optimum fermentative digestion of the basal diet or the efficiency of utilisation of the major products of digestion. In many of the dairying systems operating in developing countries this is far from easy, mainly because of the difficulties encountered in effectively measuring intake and selection and the efficiency with which the nutrients absorbed are used for productive purposes. In order to circumvent these difficulties it may be possible to measure biochemical indicators in the cows themselves that provide an assessment of nutrient status.

This Coordinated Research Programme will investigate the concept of "the catalytic nutrient" as a means of increasing the utilisation of the basal diet for both milk production and reproduction, and the possibility of using biochemical indices as a tool in the diagnosis of nutrient deficiencies.

(ii) Scientific Background

There is a growing interest, particularly in tropical countries, in describing the nutritional status of ruminants in terms of the nutrients available in the diet in relation to those required for optimal production. This stems from the findings of numerous feeding trials where cattle consuming poor-quality forages have been given supplements formulated to optimise the protein (microbial and dietary) digested and absorbed relative to the supply of VFA (the major source of energy or oxidisable substrate). Such supplementation resulted in marked improvements in liveweight gain, sometimes associated with increased intakes, but always because of an enhanced efficiency of feed utilisation.

This improvement in efficiency through supplementation is not readily rationalised by present-day methods of feed evaluation and the application of feeding standards. The measurement of the efficiency of microbial protein synthesis is notoriously difficult but there are sufficient estimates from animals given a variety of foodstuffs for it to be clear that the flow of microbial protein to the duodenum of the host animal is very variable and that a major contributing factor to this variation is the nature of the diet. As most of the ruminant's protein supply comes directly from the microbes, the animal is very dependent upon the growth of the rumen flora. The consequence of a slow growth rate is a poor supply of amino acids relative to VFA at the tissues, and this may represent a major constraint to animal productivity. The correction of the energy-to-protein ratio, either by the provision of a

nitrogen source available in the rumen to encourage a more efficient microbial growth rate (with a greater yield of microbial cells) and/or by the provision of by-pass protein, may allow more productive use of the basal diet.

As with all production systems based upon locally available feed resources the need is to be able to predict the likelihood of a response occurring to a change in the nutrition of the animal. This is particularly important where the dietary change needs to influence a distant physiological event such as a successful conception or the birth of a viable offspring. Since animals need to use nutrients which are transported to the sites of metabolism in blood, one possibility is that changes in blood levels of nutrients which are affected by nutrition (as well as disease/parasitism/climate) may provide indicators of dynamic changes in nutritional status (i.e. improved or depressed efficiency of feed utilization). Biochemical indices are being used as an aid in nutritional management of high-yielding dairy cows fed high-quality feeds. Interpretation of these metabolic profiles is often fraught with difficulty and requires considerable knowledge of the management system and the environment. Under tropical and subtropical conditions, where fluctuations in dietary quality and availability are much more severe, changes in metabolite levels may, however, prove more reliable. It is therefore proposed that some of the projects within the coordinated research Programme should examine the levels of selected metabolites in blood with the intention of establishing whether such measurements correlate with the benefits brought about by supplementation.

(iii) Objectives

The Coordinated Research Programme has a number of objectives:

(a) At the farm level the results of the research are intended to lead to practices that will increase productivity through improved nutrition. It is anticipated that the increased milk output will be partly the result of enhanced individual yield and partly because improved fertility will result in a greater proportion of the herd in milk.

(b) The research will test the hypothesis that the provision of appropriate supplements to supply the nutrients required for optimum production from the available forage resource will result in the output of animal products from poor-quality forages that is in excess of what would be predicted by conventional feeding standards.

(c) The research will establish whether differences in productivity correlate with selected metabolic indicators in blood and whether any of the measurements recommended (see below) may prove useful as predictors of nutritional constraints.

(iv) Scope of the Programme and Guidelines for Experimental Design

(a) General

Participants in the programme will research one or more of the above objectives. In order to meet objectives, participating institutes must be prepared to work to a fixed protocol, to use hormone and metabolite kits supplied by FAO/IAEA, and to participate in a quality control programme. It is not envisaged that any project will be exclusively directed towards the nutrition or reproduction components of the programme and therefore applications will only be considered from

institutes which are prepared to undertake inter-disciplinary investigations. Before submitting proposals for funding, institutes interested in this programme should ensure that they have the manpower required for such studies and that they can adhere to the guidelines drawn up for the work plan which are described below.

It is envisaged that the programme will last 5 years, the first year of which will be concerned with the development of the methodology, training of the professional and technical staff, liaison with suitable farmers and collection and subsequent statistical analysis of the data.

The animals will not be treated with anthelmintics and trace element supplements in the first year, but may be in subsequent years. In subsequent years the dairy cows will also receive dietary supplements and changes in productivity and metabolic indices will be monitored. The nature of the supplementation in future years may be changed in the light of experience.

(b) Production Systems and Animals

(i) Projects will only be considered which aim to work within the systems of management commonly encountered within particular regions and practiced by resource-poor farmers. Although there is great diversity in the systems of management used in animal enterprises, general systems can be identified. These are the predominant grazing systems of Central and South America and Africa, including the doble proposito system in which some agricultural by-products are fed; the "cut-and-carry" system of Indonesia, New Guinea and Thailand; and the crop residue systems of Asia. In some of these systems the calves are with their mothers during the day and separated at night, while in others they are with the mothers only at milking time. It is proposed that farms representative of these systems will be chosen.

(ii) The target animals involved will be large ruminants kept primarily (but not necessarily exclusively) for milk production. Thus buffaloes are acceptable as well as cows and multi-purpose cows will be considered as well as dairy cows. Consideration will also be given to proposals to investigate the nutrition and reproduction of replacements i.e. dairy heifers.

(iii) It is envisaged that most of the projects in the programme will be carried out on farms rather than within institutions. These farms should contain sufficient animals of similar breed type to carry out experiments. A minimum of 4 herds with at least 20 cows in each is envisaged. Cows should calve throughout the year if possible to separate effects of season from physiological state. There should also be a low disease incidence in the herd. There should be good communications between the institutes and the farms and the farmers should be cooperative.

(c) Feed Resources and Supplementation Strategies

The basal feed resources which will be considered are crop residues, pastures and cut-and-carry herbage.

Crop residues include straws and stovas, sugar cane tops and bagasse, and other industrial by-products such as pulps. Most of these materials are of low digestibility, are low in nitrogen and almost always

deficient in many minerals. Animals subsisting on these feeds have been observed to respond to supplements that improve the growth efficiency of the rumen microbes and the efficiency of utilisation of nutrients in the animal. For example, recent work from Mauritius has demonstrated a strategy for utilising cane tops that appears to have enormous potential and requires research in other countries. The use of fresh and ensiled cane tops given in sufficient quantities to allow the animal to exercise selection and supplemented to ensure a balanced nutrition should be investigated. Research into the utilisation of crop residues could consider supplementation with molasses-urea blocks in concert with varying levels of input of by-pass protein of local origin on milk production and subsequent reproduction. This might include preliminary work to develop the by-pass protein source.

Grazing systems in the tropics are often made complex, not only because of the environment/plant/animal relationships, but also because of the multiple objectives of such systems in many localities. Milk and meat production may have the same priorities and both of these objectives may be subservient to draught power and/or the socio-economic benefits accruing from livestock ownership. However, these multi-purpose systems are important enterprises that have received relatively little research and as such are sensitive to increased research effort. Grazing animals are more difficult to research because of the largely unknown and constantly changing quality of the feed base, particularly in arid and semi-arid countries where extensive grazing is practiced. The need for supplements may not be so universally constant under these circumstances. However, the same basic approach as for crop residues should be followed, with the proviso that research should aim to identify the deficient nutrients, thus removing the necessity for "shot gun" approaches to the provision of minerals and allowing more economic supplements.

Research in Indonesia has demonstrated a doubling of milk production in potentially high-yielding dairy cows when a molasses urea feed block is provided along with the cut pasture. The system is different from grazing as the animal has difficulty in selecting from the limited amount of forage made available, but the intensive feeding system allows input-output relationships to be readily established and the eventual definition of the critical inputs should allow these to be researched in considerable detail.

Projects must investigate forms of supplements that are appropriate to the socio-economic conditions of the region. The supplements must be readily available within the region and likely to be cost-effective when included in a diet.

(d) Guidelines for Experimental Design

(i) General Information

The following information on the animals should be collected: age, breed type, date of present and previous calving, parity, calf at foot and health record including vaccination.

The system of animal management must be described giving details of the feeding regime, milking and other management procedures.

Details on the variations in ambient temperature and rainfall from the nearest meteorological station should be collected monthly.

At the beginning of the study, animals should be screened for general health, nutrition and physiological state. Animal health will be assessed from total and differential white blood cells and from the concentration of gamma GT, an indicator of liver damage.

The trace element status of the animals will not be monitored on a routine basis, but tests will be provided to measure the copper, cobalt, selenium, zinc and iodine status at the beginning and possibly at the end of the first year.

Since one measure of improved animal productivity is a reduction in calving interval, the reproductive status of the animals must be determined at the beginning of the study. The situation should be avoided where a large proportion of the experimental animals are barren. Rectal examination and progesterone measurement in milk or blood will be used to monitor reproduction, diagnose pregnancy, etc.

(ii) Measurements of animal productivity

Productivity will be monitored from measurements of milk production, changes in live weight/condition score and from various reproductive indices e.g. age at first parturition, intervals between parturition and start of sexual cycles/conception, conception rate, numbers of offspring born/weaned etc. It is envisaged that within the context of the work on reproduction, use will be made of progesterone measurements to examine e.g. onset of ovarian activity post partum, pregnancy, embryonic mortality, etc.

(iii) Nutrient intake

The nutrient intake is determined by the quantity and quality of the feeds. Measurement of intake will only be possible in the "cut-and-carry" system, where the quantity can be weighed and sampled for moisture and chemical composition (e.g. CP and ash) during the period spent at the farm by the research scientist or technician.

The ability to conduct and interpret in sacco degradability studies is desirable. Not only do these provide measurements of the rumen degradability of the nitrogen in protein sources but they may also provide a prediction of the intake of roughages.

(iv) Biochemical indices

Biochemical indices have been used as aids to feeding management mainly in Europe. Their value is potentially greater in areas where a severe dietary deficiency of one or more major nutrients is a likely occurrence. The following indices have been chosen on European experience, but with the realisation that some may be of limited use in the agricultural systems under investigation:-

For energy: beta hydroxybutyric acid

For protein: urea, albumin and total protein in blood

For minerals: P, Mg and some trace elements as described earlier

Haematology: Haemoglobin

Milk Composition: Fat

(e) Collection and analysis of data

The animals on the chosen farms will be ear tagged for identification. The farms must be visited once monthly on 5 consecutive days. A special visit should be made to collect a blood sample 7-10 days after calving.

(i) Weights

The cows, calves and milk yields will be weighed once daily and the weights averaged over the 5-day period. Animal weighing will take place before morning milking.

(ii) Sampling

Each milking will be sampled and the aliquots pooled over the five day period. The samples will be preserved using sodium azide or Lactab (potassium dichromate), a commercially available preservative.

Samples of blood will be taken from the tail vein on the last day of the observation period into a vacutainer (10 ml) using lithium heparin as the anticoagulant. If the central laboratory and farm are in close proximity, whole blood can be transported to the laboratory and centrifuged on arrival, after taking a small sample for haemoglobin estimation. If the distance is large, the blood sample should be processed at the farm. The blood should be kept on ice during transport. Each sample of plasma should be split into three aliquots and stored at -20°C until required for analysis.

Faecal samples for the determination of nitrogen concentration and parasitic worm egg counts will be taken directly from the rectum on the last day immediately after milking. Rectal temperatures using a sample digital thermometer should be taken at the same time.

Heart girth measurements and condition scoring will be done once during the observation period.

(iii) Biochemical methodology

Details of the experimental methods will be provided to all Contract holders. The methods are colorimetric, end point rather than kinetic. A special spectrophotometer will be supplied for the measurement of colour. All chemical analyses should be done successively on each sample on the same day. Any repeat analyses should be carried out on a fresh sample from the deep freeze.

Errors in chemical analysis can arise from two sources: during transport, storage and subsequent thawing of the samples, and in the chemical analysis itself. The probability is that the former may be the more important. Control plasma, both normal and abnormal, should be used to monitor changes before and during analysis.

(iv) Records and statistical analysis

Data sheets will be provided for the collection of information; in this way there should be no omissions. After collection the information should be entered immediately into the computer; a special computer programme will be provided for this purpose.

(E) DEVELOPMENTS AT THE ANIMAL PRODUCTION UNIT, SEIBERSDORF

(i) General

The Animal Production Unit will be undergoing laboratory renovations in the near future. For those of you that have had the opportunity to visit Seibersdorf in the past, you had no doubt noticed that laboratory space is at a premium. In a 'swap' with another resident group at the Laboratories, we have been able to consolidate our Unit into a more defined area. The staff of the rather cramped ELISA group will be breathing a sigh of relief when they move into a new lab of double the current size which will be designed to allow up to 6 people to work simultaneously on ELISA techniques. The Nutrition group will take up residence in the former ELISA lab while the Reproduction group will remain in their present RIA lab. We are also trying to acquire more office space so that we may establish a computer area for database and statistical analyses.

(ii) Disease Diagnosis

A sub-group meeting of the WHO/FAO/IAEA Working Group on EIA for Brucellosis Diagnosis and Research sponsored by the Animal Production and Health Section was held in Vienna, May 23/24, 1991. In attendance were Drs. Fujikura (WHO, Geneva), MacMillan (CVL, Weybridge), Dubray (INRA, Nouzilly), Wilke (TiHo, Hannover) and Jeggo and Wright (FAO/IAEA, Vienna). At this meeting, final details on the reagents and protocol for the FAO/IAEA bovine brucellosis ELISA kit were established. The kit containing SLPS (hot water/phenol extracted) and both a polyclonal and a monoclonal anti-bovine conjugate will be ready for field validation by collaborating institutes by September. Although the FAO/IAEA already has a brucellosis kit in use at present, it will be replaced by the internationally standardized kit and protocol in 1992. In actual fact there will be very little difference between the old and the new kit, other than that it will be recognised as the international standard. We are now in the process of banking sera for use in an external quality assurance programme for the bovine brucellosis kit.

Subsequent to a consultants meeting sponsored by the Section last October on the standardization and supply of reagents for detection of antibodies to Bluetongue a collaborative study was initiated under the auspices of OIE (Dr. Ozawa, Paris) and the FAO/IAEA. Data has since been received from Drs. Afshar (ADRI, Canada) and Pearson (NVSL, Ames, USA) and analyzed with respect to the performance of the competitive ELISA (C-ELISA). Monoclonal reagents from Drs. Anderson (IAH, Pirbright, UK) and Eaton (AAHL, Geelong, Australia) were used in combination with a tissue culture VP7 antigen and a yeast expressed VP7 antigen (AAHL, Geelong) in a modification of Dr. Afshar's C-ELISA protocol. A high degree of correlation was observed in all combinations of monoclonal and

antigen reagents. These data were recently presented by Dr. Jeggo at the 2nd International Symposium on Bluetongue, African Horse Sickness and Other Related Orbiviruses at the OIE in Paris, June 17-24, 1991. The FAO/IAEA C-ELISA protocol and the reagents were unanimously accepted as the international reference standards for the detection of group-specific antibodies by ELISA.

Collaborative work is ongoing with Dr. Anderson (IAH, Pirbright) with respect to the standardization of a new C-ELISA for Rinderpest which will replace the indirect ELISA in current use in PARC. As well, collaborative work is on-going with Dr. Kitching (IAH, Pirbright) with respect to the establishment of an Foot-and-Mouth Disease antigen detection ELISA kit. Both kits will be introduced in the latter part of this year.

With respect to Bovine Leukosis and Porcine Pseudorabies ELISA kits, an agreement has been made with the Swedish National Veterinary Institute for the supply of complete kits. The kit reagents are currently being lyophilized and assessed for heat stability by Dr. Linde (SVA, Uppsala).

The ELISA kit which has been developed in collaboration with Dr. Jacobson (Cornell University, Ithaca, USA) has recently been validated with sera supplied by Drs. van Oirschot (CDI, Lelystad, The Netherlands), Straub (BVT, Tübingen, Germany) and Castrucci (IMI, Perugia, Italy). The kit and protocol are now in the final stages of production.

The Trypanosomiasis ELISA kits which were developed in collaboration with Drs. Nantulya (ILRAD, Nairobi, Kenya) and Luckins (CTVM, Edinburgh, UK) have now been validated at 10 research institutes in Africa. Based on the validation results, it would appear that the ELISA is at least 5 times more sensitive than conventional diagnostic tests.

Work is on-going with respect to reagent supply, standardization and/or protocols for Babesiosis (Dr. Wright, CSIRO, Indooroopilly, Australia), Newcastle Disease (Dr. Della Porta, AAHL, Geelong), Rift Valley Fever (Dr. Ksiazek, USAMRIID, Fort Dietrich) and Haemorrhagic Septicaemia (Dr. Johnson, RVL, Benalla, Australia).

New computer software in support of the antibody detection ELISA's is in the process of being written in collaboration with Walter Kelly (ADRI, Nepean). This software system will include provisions for quality assurance monitoring, as well as an export feature for database analysis. This software should be available by September.

(iii) Animal Production

Research and development work continued in support of programmes involving an integrated (nutrition-reproduction) approach to animal production. In particular, the Unit has developed and standardized more kits and protocols for the measurement of nutritional metabolites. Thus in addition to those metabolic kits mentioned in the previous Newsletter (Jan '91), colorimetric kits have now been validated for the measurement of magnesium, iron and glucose. In addition, protocols are being developed for body condition scoring, weigh-banding and faecal egg counting. A pilot study is presently being conducted on milking and dry cows in two herds in Austria in which all the forementioned metabolic kits are being used routinely, in addition to the measurement of production parameters (live weight changes and milk production), faecal

egg counts and reproductive indices (breeding records and progesterone concentrations). Important procedural, as well as scientific information will be derived from this study. Plans are being developed to further field test these kits in Brazil, Zimbabwe, Australia and the UK over the next 6 months. The conclusions of the foregoing studies will be reported in the next Newsletter. The Unit gratefully acknowledges the collaboration of Dr. Wensing (University of Utrecht) and Dr. Bamberg (Veterinary University of Vienna) in the development and testing of our metabolic kits.

The Unit has also been collaborating with Drs. Solti and Barna-Vetro (ABC, Godollo, Hungary) in the development of a 'self-coating' RIA system for the measurement of progesterone in the blood and milk of farm livestock. A polyclonal antibody, provided by the ABC, has proven to be effective in a simple coating procedure using polystyrene 'star' tubes. In this RIA technique, the competition between progesterone ¹²⁵I labelled hormone and spiked or unknown samples for binding to this homologous antibody has been shown to be consistent and reliable. The validation of this self-coating kit is now underway and it is hoped that a field trial will be initiated later on in the year. This kit will obviate the dependence of many of our counterparts presently using the FAO/IAEA kits and enable them to continue their research in livestock reproduction after the Agency's support for their TC or RC projects has terminated. However, it is still envisaged that there will be a continuing need for the supply of the FAO/IAEA kits, particularly to those counterparts who have newly started their projects.

The response to the external quality assurance programme (EQUAS) for the progesterone RIA is still somewhat disappointing in that, on average, only about 60% of counterparts normally reply. Although the results of the vast majority of the responders are well within acceptable international limits, we are concerned about the non-responders. Should you fall into this latter category, please realize that the considerable amount of effort the Unit puts into EQUAS is for your benefit alone!

(F) PUBLICATIONS

(i) Isotope-aided Studies on Goat and Sheep Production in the Tropics

This publication represents the results of a 5-year Coordinated Research Programme which was completed in 1989. It is available from the IAEA's Division of Publications (price: Austrian Schillings 500,-- paid in convertible currency or UNESCO coupons).

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Title of Paper

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Endocrine basis of prolificacy in the Booroola Merino.

B.M. Bindon, L.R. Piper,
M.A. Hillard, T. O'Shea,
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The effect of amount of dietary energy on growth and body composition of Sabi lambs.

N.T. Kusina, D.H. Hale,
J.M. Chesworth, C. Mutisi
(Zimbabwe)

- Evaluation of radiolabelled microspheres as digesta markers.
- Improving the utilization of beech sawdust by sheep.
- Strategies for ruminant nutrition during a harsh and extended dry season.
- Effect of feeding salt tolerant plants on growth and reproduction of goats.
- Chemical composition and utilisation of rice straw by goats in Malaysia.
- The use of enzymeimmunoassay (EIA) to measure progesterone and oestrone sulphate in milk and/or plasma for monitoring of fertility in goats.
- Control of oestrus and ovulation rates in Yankasa ewes.
- Ovarian function and growth performance of indigenous goats in Malaysia.
- Techniques for the improvement of fertility and prolificacy of anoestrous ewes in Spain.
- Reproductive performance of the Saanen goat in China.
- Milk progesterone profiles and the effect of the buck during the anoestrous period in goats.
- Milk and hair progesterone contents during the oestrous cycle and gestation in goats.
- Fertility of the small east African goats following pre-pubertal infection with Trypanosoma congolense.
- B.A. Young, B.V. Turner, A.E. Dixon, M. Winugroho, Z. Abidin, D.M. Exley, S.B. Young (Canada)
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- Dazhi Guo, Xianyin Zeng, Xianyi Liu, Faju Chen, Xuehua Song (China)
- H.B. O'Hara, S. Gombe (Kenya)

- (ii) Proceedings of the Final Research Co-ordination Meeting of the FAO/IAEA/SIDA/PARC Co-ordinated Research Programme entitled "The Sero-monitoring of Rinderpest throughout Africa (Phase I)", Bingerville, Côte d'Ivoire, 19-23 November 1990

This publication contains the result of the FAO/IAEA/SIDA Coordinated Research Programme on rinderpest sero-monitoring which operated between 1986 and 1990. The publication comes under the IAEA-TECDOC Series and is therefore free-of-charge. It is available from the IAEA's Division of Publications.

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The use of monoclonal antibodies in competitive ELISA for the detection of antibodies to rinderpest and peste des petits ruminants viruses.	J. Anderson, J.A. McKay, R.N. Butcher (United Kingdom)
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Rapport préliminaire d'activités de la sero-surveillance au Cameroun.	A. Ngangnou (Cameroon)
Sero-surveillance de la peste bovine au Tchad: Utilisation du test ELISA indirect.	C. Diguimbaye (Chad)
Evaluation de l'immunité post-vaccinale antibovipestique après la campagne de vaccination 1989 en Côte d'Ivoire.	E. Couacy-Hymann, A. Kodjo, S. Diawara, J. Domeneck (Côte d'Ivoire)
Detection of rinderpest antibodies in Egypt by indirect ELISA.	Ikram A. Karim, H.M. El-Sawah, N.A. El-Danaf, A.A. Moussa (Egypt)

- The ELISA technique for the detection and evaluation of rinderpest antibodies. G.Y. Mebratu (Ethiopia)
- A plan for PARC rinderpest serological surveillance in the Gambia. G.M. Touray (Gambia)
- Use of enzyme immunoassay (ELISA) for monitoring effectiveness of rinderpest vaccination and comparative evaluation with agar-gel immunodiffusion test. G.A. Opoku-Pare (Ghana)
- The use of an enzyme-linked immunosorbent assay for rinderpest sero-monitoring in Kenya. H.M. Wamwayi, J.S. Wafula, P.B. Rossiter (Kenya)
- Report on the sero-monitoring programme in Mali. K. Tounkara, B.O. Diallo, K.O. Sangare, B. Seck, A. Traore (Mali)
- Enquete serologique dans un pays sahelien, le Niger. Problems d'echantillonage et resultats de la sero-surveillance de la peste bovine. I. Diallo, N. Bloch (Niger)
- Sero-monitoring the Nigerian national herd for rinderpest. C.D. Ezeokoli, T.U. Obi, K.A. Majiyagbe (Nigeria)
- Sero-surveillance de la peste bovine au Rwanda. J. Muberuka (Rwanda)
- Natural and aquired immunity against rinderpest in Senegalese cattle and a comparative study of virus neutralisation with ELISA. J. Sarr, M. Diop, S. Cissoko (Senegal)
- Sero-monitoring of rinderpest in the Sudan. M.A.G. Elamin, A.W. Abdalla, N. Babikar (Sudan)
- Rinderpest sero-survey in Uganda (Part 1 - the pilot survey) E.K. Twinamasiko (Uganda)

(iii) Two other publications are in the process of being edited/typeset. The first of these "Nuclear and Related Techniques in Animal Production and Health" is the Proceedings of the FAO/IAEA International Symposium held in April 1991 and should be available in October 1991. The second contains the results of the 5-year (1986-1990) FAO/IAEA/SIDA Coordinated Research Programme on animal disease diagnosis in Latin America. This should be available during the early part of 1992. Further details of both publications will be given in the next edition of the Newsletter.

G. FORTHCOMING EVENTS

- (i) FAO/IAEA Interregional Training Course on Immunoassay and Related Techniques in the Study of Livestock Production in the Tropics, Vienna, (Laboratory Seibersdorf), Austria, 2 September - 4 October 1991
- (ii) FAO/IAEA Research Coordination Meeting on "Sero-monitoring of Rinderpest in Africa: Phase II", followed by the Training Workshop on "The Establishment and Use of a Monoclonal-antibody based Competition ELISA System for Rinderpest Sero-monitoring", Garoua, Cameroon, 16-27 September 1991
- (iii) FAO/IAEA Research Coordination Meeting on "Immunoassay Methods for the Diagnosis and Epidemiology of Animal Diseases in Latin America", Rio de Janeiro, Brazil, 4-14 November 1991
- (iv) FAO/IAEA Regional Training Course on Immunoassay and Related Techniques in Livestock Reproduction and Nutrition Research in Latin America, Mexico, 11-29 November 1991

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