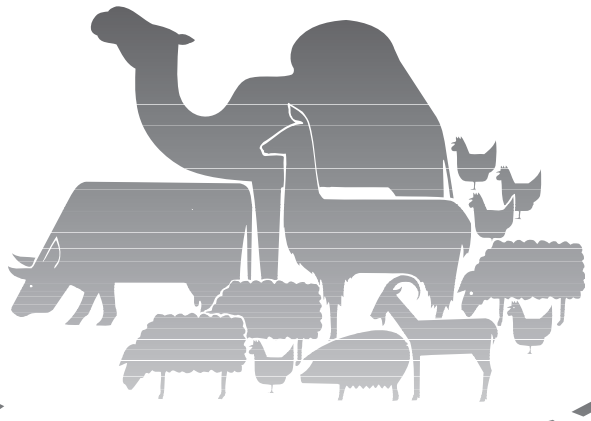
ANIMAL PRODUCTION AND HEALTH NEWSLETTER



Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture and FAO/IAEA Agriculture and Biotechnology Laboratory, Seibersdorf

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TO THE READER

Dear Colleagues,

Many of you will be aware that Martyn Jeggo, who was Head of the Animal Production and Health Section during the past six years, left the Agency in September 2002. This would no doubt have come as a surprise to you. To many of us here it was not totally unexpected, given the Agency's policy of staff rotation, particularly for posts in the technical and specialized fields. We are therefore very happy that Martyn was appointed as the Director of the Australian Animal Health Laboratory at Geelong, near Melbourne. This was indeed apt recognition of Martyn's extensive global experience in the animal health sector as well as his outstanding capabilities and leadership qualities. Whilst congratulating him on this appointment, we wish him the very best in this highly demanding and challenging job. We shall of course be keeping in close touch with him and will continue to use his expertise to advance our projects in the future.

As described in previous Newsletters by Martyn, the Animal Production and Health Sub-programme went through a rigorous review and planning exercise during 2001, in order to develop a medium-term strategy for the future. The result was a decision to re-direct our activities to focus on the use of biotechnology and gene-based technologies for improving livestock production and health in developing countries. I know that many of you have questioned the rationale of moving away from our tried, tested and proven technologies such as RIA and ELISA to areas that can be argued as being premature, especially for developing countries. I would like, therefore, to outline some of the considerations that convinced us that this new direction was indeed appropriate and timely.

Over the past twenty years the focus of our assistance to counterparts has been for the establishment and application of simple and robust nuclear and related technologies to obtain answers to crucial problems facing livestock producers. These have included the use of isotopic tracers and assays for feed quality and nutritional status to develop feeding strategies, RIA for progesterone measurement together with clinical methods and data management tools to improve breeding and reproduction, and the use of ELISA and PCR for diagnosing and controlling infectious diseases. These methods were adapted, standardized and proven through Co-ordinated Research Projects (CRPs) and subsequently transferred, established and applied on a wider scale through Technical Co-operation (TC) projects. Their relevance, utility and value are clearly evident from the results and reports of our counterparts, and will undoubtedly continue to have important applications in the future.

The consensus of opinion was that these technologies were now "mature" and that the trained personnel and resources available in our developing Member States should be capable of sustaining them. This would free up scarce resources available within the Sub-programme to be utilized for supporting studies on newly emerging areas that have the potential for future applications, perhaps seven to ten years from now. Therefore, during the past two years we have taken steps to assist our counterpart institutions to achieve the capability to use these "mature" technologies even after the conclusion of FAO and IAEA support. For example, some of the reagents for RIA and ELISA are now being produced in regional centres within the developing world. Many national laboratories are now capable of making other components such as standards and quality control samples. This capacity building is continuing, as described in several reports appearing in this Newsletter.

The question then was, where should we focus our limited resources? In reviewing the current trends in livestock research in the more advanced countries, it became clear that biotechnology was very much at the forefront. In fact, the Governments of many developing countries have included biotechnology as an important component in their agenda for improving the agricultural sector. In response, FAO has launched several initiatives to assist its Member States to critically assess the issues, advantages and risks involved and to make informed judgments. Looking specifically at the livestock sphere, it became clear that the advances being made in genomics and the ability to manipulate genes and their expression, whether it is in animals, fodder plants or microbes, will provide opportunities to improve livestock production. The next question was whether, and if so when, such technologies could be harnessed to benefit farmers in developing countries. The on-going debate in the scientific and popular press indicates that this is very likely, but also that the technology gap between the developed and developing world is growing wider. One obvious need then, is for the technologies being developed in advanced countries to be tested, selected and suitably

adapted to meet specific needs of developing countries. This is where international co-ordination and assistance will be indispensable. In hindsight, we see that this is exactly where we were, twenty years ago, with our now "mature" technologies!

We then asked two questions: what are the specific biotechnological methods that have the greatest potential for livestock production and health in developing countries, and which of these require nuclear and related techniques? The consultants' meeting that we held during 2001 (http://www.iaea.org/programmes/nafa/d3/public/gene-technologies.pdf) provided us with the answers. We have subsequently discussed these concepts further with FAO, ILRI and other partners, and have planned a series of activities over the next two years to facilitate the transition of our Sub-programme. The first is an FAO/IAEA International Symposium on "Applications of Gene Based Technologies for Improving Animal Production and Health in Developing Countries" which will be held here in Vienna from 6 to 10 October 2003. The official announcement is included in this Newsletter. This will be followed by three inter-regional training courses, to be held during 2004 and 2005, to train scientists in developing countries on the molecular techniques currently being used in the fields of animal nutrition, genetics and disease diagnosis. Subsequently, four new CRPs will be initiated during 2005–2006, dealing with (a) rumen molecular techniques for predicting and enhancing productivity; (b) manipulation of nutrition *in utero* to alter gene expression; (c) characterization of small ruminant genetic resources aimed at selection for parasite resistance; and (d) improvement of diagnostic tests for African Swine Fever to assist in molecular epidemiology. The announcements for the first two have already appeared in previous Newsletters and that for the third will be in the next issue.

Notwithstanding the above changes, I hasten to add that we will continue to support our "mature" technologies through the Agency's TC programme. The projects that have been approved for implementation during the next biennium (2003–2004) are listed in this Newsletter. I would like to remind you that proposals for new projects to be considered for the next biennium (2005–2006) need to reach the Agency, with the approval of your national Atomic Energy Commission or other competent authority, by December 2003. Further information on how to apply and the forms for proposals are available on the Home Page of the Department of Technical Co-operation (http://www-tc.iaea.org/tcweb). If you would like assistance in preparing a proposal please do not hesitate to contact us.

Coming back to staff changes, I am pleased to announce that we have been able to obtain the services of Dr. Roland Geiger to assist with the implementation of the CRPs and TC projects that Martyn was responsible for, until a new Head of Section is appointed. Many of you will know Roland from his previous assignments with us. The selection process for a new Head is now underway and we expect that the appointment will be made during the first quarter of 2003. Axel Colling, who was responsible for our External Quality Assurance (EQA) programme over the past five years, will leave us at the end of 2002. Axel has been an indispensable asset to our Sub-programme, consolidating the EQA activities and assisting our counterparts in disease diagnosis laboratories to institute quality management procedures and work towards accreditation. We wish Axel the very best in his future career and look forward to continued use of his expertise in our projects. The selection process for this vacancy is now underway and the new appointee will work in the area of molecular genetics of ruminants. Beatrica Rogovic, a very long-standing member of our team at the Seibersdorf Laboratory, retired at the end of September 2002. "Beata", as she was called, was a major contributor to the development of our solid-phase progesterone RIA technology during the 1980s and has been working more recently on assays for veterinary drug residues. We wish her a long and contented retired life with her family. We expect that this position will be filled soon.

Finally, I would like to ask you for feed-back on our Newsletter. Would you like to see any changes? For example, at present it is very much "one-way", from us to you. Should it include news from you, our partners and counterparts, and be a forum for exchange of information? Do let us know and we will see how we can meet your needs better.

In conclusion, I wish all of you every success in your work and your families a happy and safe year ahead.

Oswin Perera,
Acting Head, Animal Production and Health Section

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The Animal Production Unit, Seibersdorf, is a collaborating Center for ELISA and molecular technologies in animal disease diagnosis for both the OIE and WHO.

B. FORTHCOMING EVENTS

Technical Co-ordination Workshop on Diagnosis and Monitoring of Contagious Bovine Pleuropneumonia (RAF/5/053)

Scientific Secretary: Roland Geiger

The International Atomic Energy Agency (IAEA) and Food and Agriculture Organization (FAO) in co-operation with the Laboratoire Central Vétérinaire, Bamako, Mali will hold a Workshop on the diagnosis and monitoring of Contagious Bovine Pleuropneumonia (CBPP) from 10 to 14 February, 2003.

The main objective is to give the participants an understanding on the background and practical aspects of the confirmatory laboratory diagnosis of CBPP which will include also some presentations and discussions on the interpretation and presentation of laboratory results. The Workshop will cover all relevant aspects of the bacteriological and serological diagnosis of CBPP, the background and problems associated with the isolation and cultivation of mycoplasmas, and the identification of *Mycoplasma mycoides subsp. mycoides SC (MmmSC)* using bacteriological and biochemical techniques and dot blots. The main serological techniques such as the complement fixation test and the competitive ELISA for the detection of antibodies to MmmSC will be covered. An introduction and practical exercises for a pen side test for the detection of the MmmSC capsular polysaccharide-specific antigen by latex agglutination test will be included in the Workshop.

The Workshop is intended for technicians and veterinarians from the national veterinary laboratories responsible for the diagnosis of CBPP. They should have prior experience in the basic bacteriological techniques and should be familiar with the culturing and isolation of mycoplasma.

Final Research Co-ordination Meeting of the Co-ordinated Research Project on the Monitoring of Contagious Bovine Pleuropneumonia in Africa using enzyme immunoassays (D3.20.18)

Technical Officer: Roland Geiger

The final Research Co-ordination Meeting of the Co-ordinated Research Project on the Monitoring of Contagious Bovine Pleuropneumonia in Africa using Enzyme Immunoassys will be held from 17 to 21 February, 2003 at the Central Veterinary Laboratory, Bamako, Mali.

During the meeting the results of the CRP, which focused on the validation of a competitive ELISA for the detection of antibodies to *Mycoplasma mycoides subsp. mycoides SC (MmmSC*) and its comparison to the CFT, will be presented. Additional data on the performance of an indirect ELISA based on a recombinant antigen will also be presented during the meeting. The main objective of the meeting will be to make recommendations for the surveillance of CBPP in Africa and to advise PACE on a possible strategy to monitor the various national CBPP control programmes.

In the week before the meeting a Workshop on the diagnosis of CBPP will be held at the same venue (see above).

Task Force Meeting on Cost-benefit Analysis, Cost Recovery and Regional Production and Distribution of RIA Reagents (RAF/5/046)

Technical Officer: Oswin Perera

The meeting will be held in Dakar, Senegal, from 17 to 21 February 2003. It will be open to five selected national Project Co-ordinators from the AFRA Member States participating in the AFRA III-2 project on "Improving and increasing milk and meat production". The meeting will discuss the following topics: (a) methodologies for assessing costs and benefits of the milk progesterone RIA and non-

pregnancy diagnosis (N-PD) technologies at the level of the participating institutes and the farmers; (b) modalities, proposals and prospects for cost-recovery for services provided to farmers; and (c) procedures for ensuring continued supplies of materials and reagents for RIA, including the regional production and distribution of ^{125}I progesterone tracer. Recommendations will be made for the adoption of a unified approach to these activities in the AFRA Member States.

Regional Co-ordination Meeting for RAS/5/041

Technical Officer: John Crowther

This meeting will be held at the Australian Animal Health Laboratory (AAHL), Geelong, Australia from 24 to 28 February 2003 to discuss the sustainable production, distribution and use of kits to allow detection of foot-and-mouth disease virus, measure antibodies against whole virus and to allow differentiation of infected and vaccinated livestock.

Meeting/Workshop on the Implementation of Quality Systems in Veterinary Testing Laboratories (INT/5/148)

Technical Officer: John Crowther

This new interregional project INT/5/148 will facilitate the implementation of Quality Systems in 15 Veterinary Testing Laboratories worldwide. The first meeting is planned to be held at the Australian Animal Health Laboratory in Geelong, Victoria, Australia from 25 March to 1 April 2003.

Second Research Co-ordination Meeting of the Co-ordinated Research Project on Developing, Validating and Standardizing Methodologies for the use of PCR and PCR-ELISA in the Diagnosis and Monitoring of Control and Eradication Programmes for Trypanosomosis (D3.20.21)

Technical Officer: John Crowther

The RCM will be held from 7 to 11 April 2003 in Rio de Janeiro, Brazil. It will review progress and plan future activities.

Second Research Co-ordination Meeting of the Co-ordinated Research Project on the Integrated Approach for Improving Small Scale Market Oriented Dairy Systems (D3.10.23)

Technical Officer: Oswin Perera

This RCM will be held from 21 to 25 July 2003 in Asuncion, Paraguay. Holders of on-going Research Contracts, Technical Contracts and Research Agreements will be invited to attend.

Workshop and Training Courses on Strengthening Capacities for Implementing Codex Standards, Guidelines and the Recommended International Codes of Practice for Control of the Use of Veterinary Drugs

Technical Officer: Andrew Cannavan

Following the recommendations of a consultants meeting (report in this issue), it has been decided to hold a single Workshop for policy makers/decision makers, rather than holding the Workshop on three occasions, as originally planned. Up to 45 candidates will be included. The purpose of the Workshop is to strengthen the awareness of policy/decision makers in developing countries of the requirements, and the means of achieving them, for the control of veterinary drug residues. The format will include presentations

by consultants, open discussion sessions and opportunities for smaller discussion groups. This Workshop will be held in mid-2003. The venue has yet to be finalized. The Workshop will be complemented by a course to strengthen the awareness of scientists and technicians of the theoretical and technical aspects of screening and confirmatory methodologies for the detection and control of veterinary drug residues. This is a 2-week course, which will be held on three occasions at different locations. The first will be held at the Agency's Laboratories at Seibersdorf, near Vienna, from 16 to 27 June 2003. The course is aimed at laboratory scientists and middle management and will provide participants with background information and demonstrations of a range of analytical methodologies and instrumentation, but is not designed to provide comprehensive training. Approximately 15 candidates will be selected for the first presentation of this course, mainly from Europe and Latin America. The course will be repeated in September 2003 in South Africa and again in early 2004 in Asia. The training material produced for both the Workshop and the technical courses will also be published on paper and in CD format. Further information and application details will be circulated and will be published on the APHS Home Page. Application for places will be via relevant National Government Departments.

International Symposium on Application of Gene-Based Technologies for Improving Animal Production and Health in Developing Countries (CN-110)

Technical Officer: Harinder Makkar

This Symposium will be held from 6 to 10 October 2003 in Vienna, Austria. The announcement and the call for papers is provided at the end of this Newsletter.

C. PAST EVENTS

National Workshop on the Diagnosis and Surveillance of Transboundary Animal Diseases (YEM/5/004)

Technical Officer: John Crowther

This National Workshop took place at the Central Veterinary Laboratory (CVL), Directorate of Animal Health, Sanaa, Yemen, 11–22 May 2002. The highly successful Workshop was run with Yemen staff by Dr. H. Unger, Vienna Veterinary University, Dr. R. Geiger, Germany and the Technical Officer. The Workshop was attended by 45 field veterinarians. Participants were introduced to the areas of epidemiology, diagnosis and differential diagnosis, and the concepts for the control of the major transboundary diseases. Background on disease reporting systems, sample submission systems and the operation and control of such systems based on performance indicators were covered during the Workshop. Emphasis was given to basic epidemiological investigation techniques at the field level using rapid appraisal systems and interview techniques. Selected technical personnel were taught laboratory aspects of the diagnosis of transboundary diseases, testing strategies and interpretation of the laboratory results. The Workshop consisted of a series of formal presentations followed by discussions on the needs for the development of a national system for disease surveillance and to agree on the operation of such a system. Practical sessions in sample taking, preparation and submission to the laboratory for confirmation were included. There was a call to repeat this Workshop for veterinary assistants. We are grateful to Dr. Mansoor Al-Qadasi, Head of the CVL, Sanaa, for organizing this Workshop.

National Training Workshop on Livestock Disease Diagnosis and Epidemiology (MON/5/011)

Technical Officer: John Crowther

This National Training Course took place from 24 June to 5 July 2002 at the Veterinary University in Ulaanbaatar, Mongolia. The Course Director was Dr. Ch. Tungalag, Head Department of Microbiology and Infections Diseases, the Faculty of Veterinary Medicine, the Mongolian Agricultural University.

Experts from Australia and the UK lectured and demonstrated in serological, epidemiological and molecular biological areas. The Workshop was successful in increasing awareness of the potential of the methods.

Training Workshop on Management and Utilization of Field and Laboratory Data for Breeding Support Services to Livestock Farmers (RAS/5/035)

Technical Officer: Oswin Perera

This regional Workshop was organized under the framework of the RCA project on "Improving Animal Productivity and Reproductive Efficiency" in the Asia/Pacific region and was held from 7 to 11 July 2002 at the Bangladesh Agricultural University (BAU) in Mymensingh. It was attended by 10 participants from India, Indonesia, Malaysia, Myanmar, Pakistan, Sri Lanka, Thailand and Vietnam, as well as two local participants from the Department of Livestock Services in Bangladesh and several observers from BAU. The Course Director was Prof. Mohammed Shamsuddin and external resource persons were Dr. Mario Garcia of Peru and the Technical Officer.

The objective of the Workshop was to provide training on the Artificial Insemination Database Application (AIDA), which has recently been customized (AIDA Asia) for use as a data management and decision support tool by national AI services in RCA Member States. Training on a second computer application developed for use by Central Bull Stations, named "Semen Processing Records Management" (SPeRM), was also included. The target group was staff responsible for AI data management and training of other users of AI databases in the participating countries. The

Workshop was organized in the form of lectures, demonstrations, hands-on practical work using computers, discussions, individual work and presentations by participants. Field visits were made to the Central Cattle Breeding Station at Savar (near Dhaka) and a medium scale private livestock farm which utilizes a highly integrated system of management and waste recycling.

The following recommendations are based on the discussions which followed presentations made by the participants:

- The participants, together with the Project Co-ordinators (PCs) of RAS/5/035 in each country should continue with project work plans to facilitate wider use of the two database applications. This includes briefing higher management in Government Departments and other organizations involved in delivery of AI services to livestock farmers, and organizing and conducting training Workshops for other local staff.
- The PCs should ensure that computer facilities required for operating the database applications are available. This includes sensitizing relevant authorities on the importance of computerised data management in AI and exploring local and other sources for funds where necessary.
- The Agency should provide, on request and where justified, services of an expert to assist with the conduct of national Training Workshops.
- Extension of the RAS/5/035 project for a final two year period will permit the advances made so far to be consolidated, with wider application of the two databases developed under the project, ensuring future sustainability.
- Progress in the use of the database applications should be assessed at the next project review and planning meeting scheduled for November 2002 and a definitive schedule of national Workshops and requirements for expert services finalized.

We are grateful to Prof. Mohammed Shamsuddin and staff of Bangladesh Agricultural University for assistance in organizing this Workshop.

National Training Workshop on Feed Supplementation Strategies and Reproduction of Camels and Yak (MON/5/011)

Technical Officer: Harinder Makkar

This Training Workshop was held at Mongolian State Agricultural University, Ulaanbaatar from 15 to 26 July 2002 and was organized jointly by the University and the Research Institute for Animal Husbandry. Twenty-seven local participants comprising of extension workers from International Projects, progressive farmers, veterinarians, and research and development workers attended the Workshop. The main objective of the Workshop was to disseminate the supplementation strategies and technologies developed under the project. The first week was devoted to the cattle, sheep and goat production and the second week to camel and yak production. The Workshop was supported by IAEA experts from Sri Lanka (Dr. Noble Jayasuriya) and China (Dr. R. Long). The former acted as a resource person during the first week and the latter during the second week. The participants acquired useful basic and practical skills on supplementation strategies and relevant background knowledge. This will contribute to the introduction of new supplementation strategies to the field, which is likely to help reducing the huge losses of livestock occurring every winter and also to enhance livestock productivity.

First Research Co-ordination Meeting of the Co-ordinated Research Project on the Development of Strategies for the Effective Monitoring of Veterinary Drug Residues in Livestock and Livestock Products in Developing Countries

Technical Officer: Andrew Cannavan

The first RCM of this CRP was held at the Vienna International Centre from 2 to 6 September 2002. Twelve Research Contracts (RCs) and three Research Agreements (RAs) have been awarded under this CRP and all awardees, the Technical Officer and a guest speaker from the Austrian Agency for Health and Food Safety (AAHFS) participated in the RCM.

The objective of the RCM was to plan the first phase of the CRP, initiation of the development and validation of methods. Specific objectives were to:

- Agree upon a small number of veterinary drugs upon which to focus the research;
- Agree upon analytical methodologies to be employed;
- Formulate individual work plans for each Research Contract holder within the framework of the overall work plan.

Intense discussion was generated by an overview of the importance of measuring drug residues, presented by Dr. Chris Elliott (UK) and by the presentation on EU Commission Decision 2002/657/EC, which describes new performance criteria for analytical methods, by D.I. Thomas Kuhn, from the AAHFS laboratory at Mödling.

The participants visited the Austrian National Reference Laboratory for veterinary drug residues at Mödling and discussed the activities with Mr. Kuhn and laboratory staff.

A framework for phase I of the CRP, focusing upon the compounds and analytical techniques of major importance to the majority of participants, was formulated. Each RC holder discussed and revised their individual work plan with the RA holders and the TO. The overall framework was reviewed and the work plans summarized.

Conclusions

1. Each RC holder has formulated a work plan that both meets the requirements of his/her country and is in accordance with the framework of the CRP.
2. Three compounds, or compound groups, were identified to be of common interest to the majority of participants:
   - Chlorampenicol (CAP)
   - Nitrofurans (NF)
   - ß-agonists
3. All three compounds/groups are included as "group A" drugs in EU legislation and are banned for use in food producing animals. CAP and NF are also prohibited for extra-label use in food producing animals in the USA. These compounds are not, therefore, subject to EU or Codex MRLs. However, because of their efficacy and/or low cost, CAP and NF are still used in many parts of the world. Of the ß-agonists, ractopamine and zilpaterol have recently been licensed for use in food producing animals in the USA and South Africa, respectively. Other drugs in this group are widely abused as growth enhancing and repartitioning agents.
4. Since they are not subject to MRLs, the important criterion for analytical methods for each compound is the Minimum Required Performance Limit (MRPL).
5. The analytical methodologies of choice for screening are EIA, HPLC, RIA and CHARM II. The majority of participants were also interested in the application of biosensor technology in this field. The methods of choice for confirmation are HPLC and LC-MS-MS.
6. The compound of most interest to the majority of participants is CAP. ELISA is the screening method of choice. Commercial ELISA kits are available, but are prohibitively expensive. In some instances, reagent stability has also caused problems.
7. Methods are available for the measurement of NF. However, NFs are quickly metabolised into stable, tissue bound metabolites. HPLC methods are required to measure the metabolites. Methods

measuring the parent compounds are of limited value, but may be applied to the measurement of NF in feedstuffs.

8. RIA is the method of choice for screening in many laboratories of South America.

Recommendations

1. Where possible, analytical standard materials should be procured from EU Community Reference Laboratories and distributed by the TO.
2. Transport mechanisms must be identified for the supply of consumables and equipment, especially for thermolabile reagents. Care must be exercised in choosing the best means of delivery, e.g. supply via UNDP office.
3. Two Technical Contracts should be awarded for:
   - Production and distribution of immunogens and immunoassay reagents;
   - development and transfer of ^{125}I-labelled RIA methodology.
4. Guidelines should be produced for the validation of screening methods, since this subject is not well defined by existing EU legislation or Codex guidelines.
5. A report should be produced on the implications for developing countries of the newly adopted EU legislation regarding the performance of analytical methods (Commission Decision 2002/657/EC).
6. A Workshop should be planned on the application of the new criteria.
7. Analytical methods developed should be sufficiently sensitive to reach the MRPLs for the relevant compounds.
8. An evaluation of existing screening methods for CAP should be conducted.
9. Screening methods should be developed for:
   - CAP (ELISA and RIA)
   - NF metabolites (HPLC)
   - ß-agonists (multi-residue RIA)
10. A confirmatory method for CAP should be developed at the laboratory of the RC holder with LC-MS-MS capability. If successful, this institute should act as a confirmatory laboratory for the other participants.
11. Work on other compounds of specific interest to each participant should proceed in parallel with the major focus of this phase of the CRP.
12. All participants should remain in frequent contact with the TO and with each other.
13. The 2nd RCM should be held in September 2003 in South Africa, immediately preceding a FAO Workshop to be held at the same location.

Summary of Work Plan for 1st Phase

- The development of new ELISA and/or RIA methods for CAP will form the basis of the work plan for the first year for 9 participants. Participants from Sri Lanka (SRL), Indonesia (INS), Kenya (KEN) and Korea (ROK), in collaboration with the RA holder in UK, will develop EIAs for CAP. ROK will develop the EIA into a membrane-based format. The first working methods should be produced in the second half of the year. Participants from Thailand (THA), Malta (MAT), Barbados (BAR) and Cyprus (CYP) will evaluate currently available ELISA and/or CHARM II kits and, when the new methods are available, will verify and compare their performance.
- The participant from Turkey (TUR), in collaboration with the RA holder in Germany (GFR), will commence the development of a RIA for CAP.
- THA will commence method development for the confirmation of CAP by LC-MS-MS. If an instrument becomes available, THA will develop a biosensor screening method in collaboration with UK.
- Participants from South Africa (SAF) and Namibia (NAM) will collaborate in the development of a HPLC method for the NF metabolites. When established, the method will be verified by other partners.
- Brazil (BRA) will develop a multi-residue RIA for ß-agonists, in collaboration with the UK RA holder. When established, the method will be verified by TUR and GFR.

Workshop on Establishing Quality Systems in Veterinary Diagnostic Testing Laboratories (INT/0/060)

Technical Officer: Axel Colling

This Workshop which was the third under the project INT/0/060 was held at the Colombian Agriculture Institute, ICA, Bogota, Colombia, 9-13 September 2002.

The meeting was attended by more than 40 national and international veterinary diagnostic scientists and delegates. This included participants from the Philippines, Malaysia, Cote d'Ivoire, South Africa, Peru and Colombia, one expert from Australia and staff from the Ministry of Agriculture (e.g. General Manager of Protection and Regulations in Agriculture, the Chief of Veterinary Diagnostic Group and representative from the Superintendence for Industry and Trade - SIC), laboratories of ICA and University of Antiquia.

The objectives of the Workshop were:

a) based on individual progress agree on remaining activities in 2002 to achieve objectives e.g.
   – expert visits as audits
   – External Quality Assurance (EQA) rounds

b) review training material and documentation ready to be used

c) elaborate a TC project proposal for 2003/04
   – identification of labs in each region
   – pathway for establishing Quality Systems
   – national commitment

d) produce a meeting report

The Workshop was conducted in a very open, interactive and productive manner and all agenda topics were addressed.

Country reports from Peru, Cote d'Ivoire, South Africa, Malaysia, Philippines and Colombia showed very encouraging results regarding the status of implementation of Quality Systems (QS): Two labs will go for accreditation in the near future. The remaining four labs have almost established 100% of the requirements for a QS.

A presentation from Dr. Caicedo from the SIC provided a clear overview about the mandate and objectives of this organization, what mechanisms are in place to integrate new technical standards into this organization and a pathway to achieve accreditation through SIC.

The close co-operation between SIC and ICA should be maintained and strengthened to follow up ICAs endeavors to become an accredited lab.

A number of presentation from Colombian colleagues provided good evidence how ICA is seriously implementing a QS at different levels.

To further improve this positive development it was suggested that the forthcoming expert visit (from a Quality Manager) could assist the coordination in this complex area.

Due to security clearance problems and other issues three experts, Dr. Jacobson and Anne Wiegers from the U.S. and Dr. Ian Gumm from the U.K. could not attend the meeting but the heavy load of extra-work was professionally dealt with by an international expert in the area of QA/QC and lab accreditation, Dr. Doughty from the Australian Animal Health Laboratory in Geelong. Dr. Doughty covered central topics such as comparison of OIE and ISO standards, explanation and distribution of training material.

A thorough comparison of the "OIE standard for the management and technical requirements for laboratories conducting tests for infectious animal diseases" and ISO/IEC 17025-1999 "General requirements for the competence of testing and calibration laboratories" revealed only minor differences in these standards (e.g. the Estimation of Uncertainty). Nevertheless this issue is being dealt with in the OIE standard by referring to the validation of diagnostic assays. One session of this Workshop was dedicated to the introduction, discussion and distribution of training material related to the Estimation of Uncertainty in animal disease diagnosis. Further clarification on this issue is needed and an FAO/IAEA consultants meeting with experts from OIE, FAO, WHO and other leading scientific and governmental institutions held in Vienna 18–20 November, assisted in identifying constrains and needs in the crucial area of assay validation (see report of the meeting in this Newsletter).

It can be further noted that the OIE standard will be brought to the attention of the international and national accrediting community such as International Laboratory Accreditation Co-operation (ILAC) and South African National Accreditation Service (SANAS) in the near future to evaluate its compliance with existing international standards and application documents. Furthermore it will be available as an OIE publication.

Another important highlight of this project is that there has been a significant improvement regarding the commitment of the management towards implementing a QS. This is reflected e.g. by having appointed Quality Managers in all laboratories. Nevertheless when it comes to a crucial issue such as equipment maintenance and calibration a sustainable solution still needs to be found since this central activity can not depend on a TC project.

The participation in proficiency test rounds is a central precondition to fulfill the above mentioned standards. Since the FAO/IAEA EQA programme is being phased out, possibilities of delegating the organization of this important activity into centers of expertise, e.g. the brucellosis laboratory of ICA, were discussed and should be considered. The large success of this laboratory through FAO/IAEA research projects and IAEA TC projects should be highlighted in this context. A database which lists proficiency test round organizers on a global scale including a list of diseases and costs is being prepared and will be available on the APHS Home Page.

The "Guidelines for Establishing Quality Systems in Veterinary Testing Laboratories" were updated and the latest version is available on the APHS Home Page under http://www.iaea.org/programmes/nafa/d3/public/guidelines.pdf. A translation into Spanish and French was received and will be available later on.

We thank Dr. Marino from ICA for hosting this meeting.

Train the Trainers Workshop on Improved Breeding Data Management and Integration of Progesterone-Based Farmer Services in AI Systems (RAF/5/046)

Technical Officer: Oswin Perera

This Regional Workshop was organized under the framework of the AFRA III-2 project on "Increasing and Improving Milk and Meat Production" in the African region, and was hosted by the Direction de l'Elevage, Ministère de l'Agriculture du Développement Rural et des eaux et Forêts, Rabat. It was attended by 11 participants from Algeria, Burkina Faso, Ethiopia, Kenya, South Africa, Sudan, Tanzania, Tunisia, Uganda and Zambia, as well as five local participants. The Course Director was Dr. Samira Manar and external resource persons were Dr. Mario Garcia of Peru, Dr. Naceur Slimane of Tunisia (Project Scientific Consultant) and the Technical Officer. Local lecturers were Dr. Nadia Lotfi and Dr. Abdelmalek Sghiri.

The Workshop was aimed at training staff members of national institutes responsible for the recording, analysis and reporting of data relating to AI in the use of the Artificial Insemination Database Application (AIDA), which has recently been customized (AIDA Africa) to meet the requirements of national AI systems in AFRA Member States. Training also included procedures for the provision of early non-pregnancy diagnosis (N-PD) services to cattle farmers based on milk progesterone assay, and demonstrations on a second database application, named "Semen Processing Records Management" (SPeRM), which was developed for use by Central Bull Stations under a parallel RCA project in the Asia/Pacific Region (RAS/5/035).

The Workshop was organized in the form of lectures, demonstrations, hands-on practical work using computers, discussions, individual work and presentations by participants. A field visit was made to the Doukkala region, which included the Regional Office for Agricultural Improvement at El Jadida, small-holder dairy farms, the Circuit of an AI technician and a Co-operative milk collection centre. The Central AI Station at Ain Jemaa in Casablanca was also visited, the RIA laboratory established under the project was inspected and the work programme for providing diagnostic services to farmers was discussed. At the end of the Workshop each participant was provided with a CD-ROM containing the

following: AIDA Africa and SPeRM software; Workshop lectures and practical guides as MS-Word and Power Point files; digital photographs taken during the field visits; and a set of ICT-based training modules for AI technicians developed under a related project (RAF/0/013).

We are grateful to Dr. Samira Manar and staff of the Ministry of Agriculture for assistance in organizing this Workshop.

Training Workshop for Trainers on Development of ICT-based Materials for Refresher Courses for Cattle Artificial Insemination Technicians (RAF/0/013)

Technical Officer: Oswin Perera

The Workshop was organized under the framework of a multidisciplinary pilot project "ICT-Based Training to Strengthen LDC Capacity". It was held from 2 to 13 September 2002 at the Animal Breeding Centre in Entebbe, Uganda and was attended by six participants from Tanzania and Uganda. The Course Director was Dr. Daniel Semambo and the external resource person was Mr. Jouseph Aboulfaki of Ethiopia.

This Workshop was a follow-up to a previous Training Course held in November 2001 in Tanzania, which introduced trainers of artificial insemination (AI) technicians to the current concepts and methodologies in the development and use of ICT-based methods. It dealt with more specific and intensive hands-on training in the compilation and use of ICT based materials for refresher training of AI technicians. Before the Workshop, in accordance with the recommendations made at the previous Training Course, the participants collected draft materials (text and illustrations in the form of still and video images) for the training modules that were to be developed. During the Workshop they worked with the resource person to obtain hands-on experience in the compilation and development of ICT-based training modules using their own materials. The software applications used included Dreamweaver, Flash and Fireworks.

Two new training modules on "Semen Production" and "Correct Insemination Technique" were developed during he Workshop. These will be added to the six modules already developed for a draft CD-ROM on "Artificial Insemination of Cattle" (see page 30, AP&H Newsletter, July 2002) and an updated version will be prepared in early 2003 for distribution to those involved in the training of AI technicians.

National Training Workshop on Urea Molasses Multinutrient Blocks and Feed Supplementation Strategies (RAS/5/035)

Technical Officer: Harinder Makkar

This Training Workshop was held in Phisanulok, Thailand and was jointly organized by Naresuan University and Dairy Farming Promotion Organisation of Thailand. A total of 109 participants comprising 12 extension workers, 87 farmers and 10 research workers participated in the Workshop. The main objective of the Workshop was to disseminate the urea molasses multi-nutrient block technology. The training was a blend of theory and practical. The emphasis in the theory classes was on conceptual background, principles of the feeding and management strategies, and interpretation of the data. The participants acquired useful basic and practical skills on the preparation and use of urea molasses multi-nutrient blocks.

Consultants Meeting to Plan a Workshop for Policy Makers/Senior Officials under the Project "Strengthening Capacities for Implementation of Codex Standards, Guidelines and the Recommended International Codes of Practice for Control of the Use of Veterinary Drugs" (FAO Project PFL/INT/858/PFL)

Technical Officer: Andrew Cannavan

The consultants meeting was held from 21 to 24 October 2002, in Vienna. The meeting was attended by four consultants representing the approaches taken to the control of veterinary drug residues at different regulatory levels and in different regions, with expertise in aspects such as risk analysis, maximum residue levels, drug registration/marketing authorizations, control/surveillance of drug residues, the Codex Committee on Residues of Veterinary Drugs in Food (CCRVDF) and the Joint WHO/FAO Expert Committee on Food Additives (JECFA). The participants were Dr. Kornelia Grein (European Agency for the Evaluation of Medical Products, UK), Dr. Phil Reeves (National Registration Authority for Agricultural and Veterinary Chemicals, Australia), Mr. Alfredo Montes Niño (Microbioticos Analises Laboratoriais, Brazil) and Prof. Rainer Stephany (EU Community Reference Laboratory, Netherlands).

The specific objectives of the meeting were to:

- Define the critical elements to be presented;
- Further define areas of importance to policy makers in developing countries to provide a series of session titles and elucidate the format of the sessions;
- Identify possible consultants for the preparation and presentation of material;
- Review the approach taken to the organisation of the technical courses to complement the policy makers Workshop (objective (b) above).

A list of prospective consultants for participation in the Workshop was compiled and a programme was drafted.

Conclusions And Recommendations

1. The meeting supported the proposal to hold a Workshop to strengthen the awareness of policy makers and public health officials in developing countries of the requirements, and the means of achieving them, for the control of veterinary drug residues. The project will be complemented by technical Training Courses to make laboratory personnel familiar with principles of residues surveillance.
2. The meeting recommended that one Workshop would be held for policy/decision makers to which all countries participating in the project should be invited. For a Workshop for policy/decision makers, one milestone event was considered more appropriate than three Workshops within one year. This would also allow more consultants to be recruited to present the programme (8 instead of 4), and would facilitate their enlistment, since prospective consultants may face restrictions if having to participate at three meetings.
3. The duration of the Workshop would be one week. Australia, South Africa and the VIC in Vienna were discussed as possible venues/host countries. The possibility of holding such a meeting in Australia would be further explored.
4. The meeting recommended that three technical courses would be held, of which the first would be in Seibersdorf and the second probably in South Africa. The venue for the third course, for which Malaysia has been proposed, has yet to be confirmed. The duration of these courses would be 2 weeks each. The courses would target "middle management" persons in national laboratories.
5. The proposed technical courses will provide participants with demonstrations of a range of analytical methodologies and instrumentation. It is recognized that these courses will not provide comprehensive training. Therefore, the meeting suggested that it would be desirable to make course participants aware of the opportunities available to apply for fellowships to achieve comprehensive training.

6. The meeting recommended that questionnaires be circulated with the invitations to participating governments, in order to prepare the participants for the meeting, as well as to help the consultants to identify the issues relevant to their countries on which the lectures shall focus.

7. The questionnaire for the policy/decision makers shall address:
   - sectors of the agricultural industry in which their country is engaged;
   - pests/diseases important in their country;
   - veterinary drugs used in their country;
   - export markets.

8. The questionnaire regarding the technical Training Course shall address per country:
   - laboratory infrastructure;
   - currently available methodologies;
   - quality assurance.

Project Review, Co-ordination and Planning Meeting for the RCA Project: Improving animal productivity and reproductive efficiency (RAS/5/035)

Technical Officers: Oswin Perera and Harinder Makkar

The meeting was held from 11 to 15 November 2002 in Hangzhou, China. All 25 National Project Co-ordinators, who had been officially nominated by 12 RCA Member States participating in the project RAS/5/035, attended. Each participant presented a scientific paper based on the work undertaken and results obtained during the full period of the project, together with an assessment of costs and benefits of improvements and interventions introduced, a summary of the training activities conducted, and their impact at the level of the end-users. The meeting also developed work plans for a final two-year period (2003-2004). A full report will be included in the next Newsletter.

FAO/IAEA Consultants Meeting on "Guidelines for Validation and Certification of Diagnostic Assays for Animal Infectious Diseases"

Technical Officer: Adama Diallo

This consultants meeting was held in Vienna, Austria from 18 to 20 November 2002.

In the Manual of Standards for Diagnostic Tests and Vaccines, the OIE provides a list of diagnostic tests that are labelled as prescribed or alternative tests for the lists A and B diseases. Prescribed tests are those that are required by the International Animal Health Code for international trade purpose. The alternative tests are those that can be used for the import/export of animals provided there is an agreement between parties involved in the trade. In the chapter devoted to each disease described in the Manual, some other tests are indicated along with the prescribed and alternative tests. These last two categories are accepted as such by the OIE upon recommendations of its Standards Committee. This classification is made by the Commission for tests which it receives for analysis and eventual approval for animal disease diagnosis.

The AP&H Sub-programme and particularly the OIE Collaborating Centre for ELISA and Molecular Techniques receives a significant number of requests for clarification of how and of which data of the assay to submit to the OIE for approval as a prescribed or alternative test. Indeed, the Manual describes "The Principles of Validation of Diagnostic Assay for Infectious Diseases." They are in fact a summary of the development of an assay, the feasibility studies, the optimization and standardization of the reagents, the characterization of the assay performance (sensitivity and specificity) and the interpretation of the assay results. Because the Manual provides principles for assay validation but not standards to be referred to, the term "validated assay" elicits various interpretations. For example, many consider that validation of an assay is a time-limited process and not an on-going assessment of assay performance for as long as it is used, as is clearly stated in these principles. Beside this,

the list of prescribed and alternative diagnostic tests in the OIE Manual is limited to their application in international trade without considering any other situations. Test outcome or its predictive value is not only determined by the (variable!) sensitivity and specificity but also by the prevalence of the disease and a number of other factors (physiological status, husbandry and ecological conditions of the animal, factors associated with the disease agent, etc.). Consequently it is essential to relate the requirements for diagnostic testing not only to the diagnostic test itself but also to the purpose of the diagnostic testing ("fit for purpose"). The final objective is to come to a risk assessment which will guide the diagnostic testing. Many experts in assay development and in epidemiology have a feeling that many points need to be clarified for the "harmonisation" of assay validation and use. The main objective of this meeting was therefore to examine the possibilities for defining the requirements for testing based on "fitness for purpose". Another objective was to define a strategy/guideline for assay validation and its submission to the OIE for recognition. About 15 experts participated in the meeting. They identified 8 purposes for animal disease diagnosis and indicated the assay characteristics needed for each of these purposes. It became obvious that a single test might not be enough for a particular purpose and therefore a combination of tests would be necessary to obtain the objective of the purpose ("fitness for purpose").

The meeting also defined a guideline for assay validation, evaluation for its purpose, and submission to the OIE. It was recommended that this organisation would accept an assay only after an independent peer review of the validation and evaluation results. This will be an independent opinion on the purpose(s) for which the assay is deemed to be fit at the time of the OIE evaluation. Validation and evaluation will be carried out according to a template that will be written by a group of experts. The purpose of the template is to standardize validation methods, provide guidance through the validation process, promote quality in diagnostic assays, support the incremental process of validation, and aid in the establishment of a registration process. Its use will ensure that the appropriate process controls are in place to ensure reliability of test results. The necessity to set up serum/sample banks was also noted. The objective of those banks is to provide analytical references, evaluation panels, and proficiency panels.

The meeting recommended that another meeting should be held by June 2003, to which more stakeholders would be invited, including private companies. That meeting, probably for 5 days' duration, would cover the serum/sample banks required to deal with the problems.

D. STATUS OF EXISTING CO-ORDINATED RESEARCH PROJECTS

Use of Nuclear and Colorimetric Techniques for Measuring Microbial Protein Supply from Local Feed Resources in Ruminant Animals (D3.10.21)

Technical Officer: Harinder Makkar

This CRP has concluded. It aimed at developing a simple method, which can readily be used by extension workers or farmer advisors to identify major problems of nutrition that result in a grossly inefficient rumen digestion of feed and a low level of microbial supply to the host animal. The final RCM was held from 6 to 10 May 2002 in Vietnam. The conclusions and recommendations were included in the previous Newsletter. The full report, including a detailed technical assessment of the achievements in camels, cattle (*Bos taurus, Bos indicus and Bos sondaicus*), buffalo, sheep and goats, is available on the APHS Home Page under the following URL: http://www.iaea.org/programmes/nafa/d3/mtc/d31021-finalrcm.pdf.

Use of Nuclear and Related Techniques to Develop Simple Tannin Assays for Predicting and Improving the Safety and Efficiency of Feeding Ruminants on Tanniniferous Tree Foliage (D3.10.22)

Technical Officer: Harinder Makkar

This CRP was initiated in 1999. The Second Research Co-ordination Meeting (RCM) was held from 19 to 23 November 2001 at the Centro de Energia Nuclear na Agricultura (CENA), Universidade de Sao Paulo, Piracicaba, Brazil. The purpose of the meeting was to review the results obtained so far on development, refinement, standardization and validation of tannin assays to seek correlation with animal performance indicators; and to plan future studies. It was attended by 10 Research Contract and Agreement holders, the Technical Officer, and 10–15 staff members and students of the host institution. The conclusions and recommendations from the meeting can be obtained from the previous Newsletter. At present the CRP is in the second phase. Studies are in progress on development of detannification strategies, and on mechanisms of adaptation to tannins.

Integrated Approach for Improving Small-Scale Market Oriented Dairy Systems (D3.10.23)

Project Officer: Oswin Perera

This CRP now has a full complement of participants, comprising 10 Research Contracts, 1 Technical Contract and 4 Research Agreements. The first RCM was held from 8 to 12 April 2002 in Vienna, and resulted in the development of detailed work plans for the first phase of the project. At present the Contract Holders are undertaking a Participatory Rural Appraisal (PRA) and an Economic Opportunity Survey (EOS). Based on the results of these surveys they will initiate a longitudinal Diagnostic and Surveillance Study (DSS) to characterize the constraints identified and to formulate integrated interventions. The second RCM is scheduled for 21-25 July 2003 in Asuncion, Paraguay.

Standardized Methods for Using Polymerase Chain Reaction (PCR) and Related Molecular Technologies for Rapid and Improved Animal Disease Diagnosis (D3.20.17)

Technical Officer: John Crowther

This is the final year of the CRP and the setting up of routine PCR for the diagnosis and differentiation of vesicular viruses in the Research Contract holder's laboratories can be regarded as complete. Full reports of the work will be made as well as a set of working protocols based on the experience of the Contract holders. This will be published as a TECDOC in 2003. The main problem in most laboratories is the sustainability of the technology and the lack of field activity and sending of appropriate samples for examination. The final RCM will be held in the second half of 2003.

The Monitoring of Contagious Bovine Pleuropneumonia in Africa Using Enzyme Immunoassays (D3.20.18)

Technical Officer: Roland Geiger

The final RCM of this CRP will be held in Bamako, Mali from 17 to 21 February, 2003. More details are contained under "Forthcoming Events".

Assessment of the Effectiveness of Vaccination Strategies against Newcastle Disease and Gumboro Disease Using Immunoassay-based Technologies for Increasing Farmyard Poultry Production in Africa (D3.20.19)

Technical Officer: Roland Geiger

There are currently twelve Research Contracts and five Research Agreements. The Final RCM will take place in 2004.

The Use of Non-structural Protein of Foot-and-Mouth Disease Virus (FMDV) to Differentiate Between Vaccinated and Infected Animals (D3.20.20)

Technical Officer: John Crowther

The planned exercise to compare commercial kits has been delayed due to supply problems. The Bommeli Diagnostics (Intervet) kits have been supplied, but UBI kits required import licences to Austria, which have still to be obtained. However, Spain has been licensed to receive the kits and this opens the way for importation into all EU countries. This will allow kits to be redistributed through the Seibersdorf Laboratories for an exercise to be mounted early in 2003. A concept of concentrated validation testing at a single laboratory is now being planned, using scientists involved in the CRP. It is hoped that other initiatives taken by the USA in evaluating the kits can be co-ordinated. A meeting to discuss this took place in Vienna in November 2002. The development of antibodies in chicken eggs, against *baculo* expressed 3ABC has been successful and it is hoped that competitive assays can be tested soon. The Malaysian counterpart is involved in validation of some commercial pen side tests for use in monitoring quarantine livestock for import from Myanmar and Thailand. A detailed protocol has been devised and this should allow a definitive study to assess the usefulness of the products. Reference sera against serotypes SAT1, 2 and 3 were contracted 7 months ago, and there is a delay in implementing this. Several large volumes of sera are available as reference reagents in Thailand and Laos. Containers for sending the sera will be supplied before the end of 2002 to facilitate the safe entry of the sera for irradiation in Seibersdorf.

Developing, Validating and Standardizing Methodologies for the Use of PCR and PCR-ELISA in the Diagnosis and Monitoring of Control and Eradication Programmes for Trypanosomosis (D3.20.21)

Technical Officer: John Crowther

Most Research Contract holders have now renewed their contacts. Full reports will be made available after the 2nd RCM which will be held in Rio de Janeiro in April 2003. Various reagents and cash payments have been sent to Contract holders on request.

The Development of Strategies for the Effective Monitoring of Veterinary Drug Residues in Livestock and Livestock Products in Developing Countries (D3.20.22)

Technical Officer: Andrew Cannavan

The first RCM for this project was held in Vienna, 2 – 6 September 2002 and is reported elsewhere in this issue. The CRP now involves a full complement of 12 Research Contract holders and 3 Research Agreement holders. Following the recommendations of the 1st RCM, two technical contracts have now been awarded for the production and distribution of immunogens and immunoassay reagents (UK) and the synthesis and transfer of key reagents for an ^{125}I-chloramphenicol RIA (Germany). Perhaps unsurprisingly, the main classes of compounds

selected at the RCM for the initial phase of the CRP (chloramphenicol, nitrofurans and beta-agonists) are all "high profile" drugs, which are banned for use in food-producing animals under EU legislation and, with minor exceptions, in the other major trading blocks. Residues of each of these compounds have been the subject of many reports in the media and some have been the cause of recent trade disputes world-wide. Work has now commenced on several approaches to the detection of residues of these compounds at appropriate concentrations to permit their control for trade purposes.

The second RCM is planned for September 2003, in South Africa.

African Swine Fever Technical Contract 11294 (D3.00.00)

Technical Officer: John Crowther

The Indirect ELISA kits for the detection of antibodies against ASF have been developed by Mariame Diop, Institut Sénégalais de Recherches Agricoles ISRA, Laboratoire National de l'Elevage et de Recherches Vétérinaires (LNERV). The kits have now been sent to ten laboratories in Africa. Support for future manufacture of kits has been given to allow approximately 45 kits to be made, which can be also purchased from the Senegal laboratory by arrangement with M. Diop. This is an encouraging landmark in the sustainable supply of kits in Africa.

An EQA exercise is also planned.

E. NEW CO-ORDINATED RESEARCH PROJECTS

Development and Use of Rumen Molecular Techniques for Predicting and Enhancing Productivity

Technical Officer: Harinder Makkar

Details on the background, rationale, objectives, output, outcomes and impact are available in the June 2002 issue of the Newsletter. The information is also available at the APHS Home Page.

Research project proposals for the CRP are being entertained. The closing date for submission of proposals is 30 April 2003.

Scientists working in Africa, Asia, and Latin America, where novel feeding strategies are being evaluated for improving ruminant production, are requested to submit research proposals using the appropriate forms (Research Contract Proposal). A Training Workshop on molecular and nuclear techniques required for achieving the objectives of the project will be organized in 2004. The contents of the proposal submitted will form one of the criteria for selection of candidates for the Training Workshop. The project will become operational in January 2005.

Proposals should describe the expertise of the group in rumen microbiology and biochemistry, availability of laboratory equipment and capability in the areas of anaerobic microbiology and molecular techniques, experimental design (e.g. number of samples, number of animals, geographical area, parameters, sampling techniques, experimental animals, etc.) for evaluation of feeding systems and approaches to improve production and reduce methane. In addition, the expected output and benefits (for the laboratory, the farmers and the country) should be indicated.

For further information on Co-ordinated Research Projects, please see "General Information" on page 19.

Improvement of Animal Productivity in Developing Countries by Manipulation of Nutrition *in utero* to Alter Gene Expression

Technical Officers: Harinder Makkar and Oswin Perera

Details on the background, rationale, objectives, outputs, outcomes and impact are available in the June 2002 issue of the Newsletter. The information is also available at the APHS Home Page:

Research project proposals for this CRP are being entertained. The closing date for submission of proposals is 30 April 2003.

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Proposals should describe the expertise of the group in gene expression and gene-related techniques, radioimmuno assay, availability of laboratory equipment and capability in the areas of molecular techniques,; experimental design (e.g. geographical area, number of animals, parameters, sampling techniques, etc.). In addition, the expected output and benefits (for the laboratory, the farmers and the country) should be indicated.

For further information on Co-ordinated Research Project, please see "General Information" below.

General information applicable to all Co-ordinated Research Projects

Submission of Proposals

Research Contract proposal forms can be obtained from IAEA, National Atomic Energy Commissions, UNDP offices or by contacting the Technical Officer. The form can also be downloaded from the Website: http://www.iaea.org/programmes/ri/uc.html

Such proposals need to be countersigned by the Head of the Institutions and sent directly to the IAEA. They do not need to be routed through

other official channels unless local regulations require otherwise.

Complementary FAO/IAEA Support

IAEA has a programme of support through national Technical Co-operation (TC) Projects. Such support is available to IAEA Member States and can include additional support such as equipment, specialized training through IAEA training fellowships and the provision of technical assistance through visits by IAEA experts for periods of up to one month. Full details of the TC Programme and information on how to prepare a project proposal are available at the following Website:
http://www-tc.iaea.org/tcweb/default.asp

F. TECHNICAL CO-OPERATION PROJECTS

Operational Projects in 2003/2004

ANG5002, Upgrading Laboratory Services for Diagnosis of Animal Diseases, John Crowther and Roland Geiger

BEN5002, Diagnosis and Control of Animal Diseases, John Crowther

BGD5023, Development of Agroforestry-Based Livestock Production Systems, Gamini Keerthisinghe and Harinder Makkar

BKF5002, Development of a Veterinary Medicine to Combat the Fowl Pox Virus, Roland Geiger

BOL5014, Differential Diagnosis of Foot and Mouth Disease, John Crowther

CMR5011, Nuclear Techniques for Improving Local Ruminant Productivity, Harinder Makkar and Oswin Perera

CMR5012, Diagnosis and Surveillance of Major Animal Diseases Using Molecular Biology Techniques, John Crowther and Roland Geiger

COL5020, Use of Protein Banks for Improving Pork Production, Harinder Makkar

CPR5014, Increasing the Productivity of Crop/Livestock Production System, Harinder Makkar

CYP5019, Accreditation of Laboratory for Control of Foods of Animal Origin, Andrew Cannavan

ELS5009, Improving Cattle Production and QC for Monitoring of Animal Diseases, Oswin Perera

ETH5012, Integrating Sterile Insect Technique for Tsetse Eradication, Roland Geiger and Udo Feldmann

INS5029, Supplementary Feeding and Reproduction Management of Cattle, Oswin Perera and Harinder Makkar

INS5032, Improving Beef and Dairy Cattle Production in Yogyakarta, Oswin Perera and Harinder Makkar

INT5148, Establishing Quality Systems in Veterinary Testing Laboratories, John Crowther

MAG5012, Increasing Self-sufficiency in Domestic Meat and Milk Production, Harinder Makkar

MAL5025, Food Safety Monitoring Programme for Livestock Products, Andrew Cannavan

MAT5003, Surveillance Programmes for Contaminants in Foods of Animal Origin, Andrew Cannavan

MEX5026, Improving the Reproductive Performance of Pelibuey Sheep in Tropical Mexico Using Local Feed Resources, Harinder Makkar

MON5011, Integrated Approach for Field Management of Animal Production and Health, John Crowther and Harinder Makkar

MON5012, Monitoring of Residues in Livestock Products and Surveillance of Animal Diseases, Andrew Cannavan

MOR5027, Monitoring of Veterinary Drug Residues, Andrew Cannavan

MYA5011, Development of Supplementary Feeding Strategies Based on Local Feed Sources, Harinder Makkar

MYA5012, Diagnosis and Control of Swine Vesicular Disease and Swine Brucellosis, John Crowther

NAM5007, Control of Animal Diseases in Northern Namibia, Roland Geiger

NIR5032, Control and Eradication of African Swine Fever, John Crowther

PAK0007, Human Resource Development and Nuclear Technology Support, Oswin Perera

PAK5041, Setting Up Immunoassay and Molecular-Based Methods to Monitor and Survey Rinderpest Disease, John Crowther

RAF0013, ICT-Based Training to Strengthen LDC Capacity, John Crowther and Oswin Perera

RAF5046, Increasing and Improving Milk and Meat Production (AFRA III-2), Oswin Perera

RAF5053, Assistance to OAU/IBAR PACE Programme for the Control and Eradication of Major Diseases Affecting Livestock, Roland Geiger, Mamadou Lelenta

RAS5035, Improving Animal Productivity and Reproductive Efficiency (RCA), Oswin Perera and Harinder Makkar

RER5012, Regional Control of Brucellosis in Sheep and Goats, John Crowther

SAF5003, National Reference Laboratory for Veterinary Drug Residues, Andrew Cannavan

SAF7002, Development of Veterinary Vaccines and Strengthening Drug Residue Laboratory Capabilities, John Crowther

SIL5006, Improving the Productivity of N'dama Cattle, Oswin Perera and Harinder Makkar

SRL5035, Monitoring and Control of Residues in Livestock Products, Andrew Cannavan

SUD5027, Control of Ticks and Tick-Borne Diseases Using ELISA, Roland Geiger

TUN5021, Fodder Shrubs as Feed Resources to Improve Livestock Productivity, Harinder Makkar

URT5021, Livestock Development in Zanzibar After Tsetse Eradication, Oswin Perera, Harinder Makkar and Roland Geiger

YEM5004, Improving the Diagnosis of Animal Diseases, John Crowther

YEM5005, Monitoring of Veterinary Drug Residues, Andrew Cannavan

ZAI5013, Improving Animal Disease Diagnosis, Roland Geiger

ZAI5014, Upgrading Laboratory Services for Diagnosis of Animal Diseases, John Crowther

Validation and Comparison of ELISAs for the Surveillance of Antibodies to Rinderpest in Cattle and Wildlife (RAF/5/053)

On the initiative of GREP and the Animal Production and Health Section a comparative study and validation of six different ELISAs and the virus neutralisation test was carried out at the National Veterinary Research Institute (NVRI), Muguga, Kenya with the objective to advise GREP on a suitable testing strategy for the final confirmation of the global eradication of rinderpest and with the objective to provide data on the absolute diagnostic sensitivity and specificity of these tests. The Laboratoire National d'Elevage et Recherches Vétérinaires (LNERV), Dakar, Senegal which is now producing two of the ELISA kits was also involved in the planning process and contributed a major part of the reagents and sera for the study. Other contributors of reagents and sera were the World Reference Laboratory for Rinderpest, UK, CIRAD/EMVT, France, the Laboratoire Central Vétérinaire, Bingerville, Côte d'Ivoire, the Central Veterinary Laboratory, Windhoek, Namibia and PD-ADMAS, Bangalore, India.

The validation study was a joint undertaking between technicians and scientists from ISRA (M.Diop), NVRI (Wamwayi, Ndungu) and an expert contracted by the IAEA (R.Geiger).

More than 20 000 ELISA tests were carried out and three ELISAs emerged as suitable tests for the serological surveillance of rinderpest.

G. ACTIVITIES OF THE ANIMAL PRODUCTION UNIT (APU) AT THE FAO/IAEA AGRICULTURE AND BIOTECHNOLOGY LABORATORY

Foot-and-Mouth Disease (FMD) Kits

From 2 to 4 October 2002, the Head of the Animal Production Unit attended an Ad Hoc Group meeting in Paris organised by the OIE on the use of non structural protein (NSP) in the serodiagnosis of Foot and Mouth Disease (FMD). The use of such tests was approved by the OIE Standards Commission (SC) last year. Indeed they offer the possibility to discriminate infected animals from vaccinated animals. The SC believed that these tests are appropriate for use in determining FMD status in vaccinated animals on a herd basis. The meeting was held:

► to specify what validations have been done,

► to specify what reference reagents are available

► to define the proper use of the test (only herd basis use or not)

► to indicate whether or not further work is needed.

The Group noted the lack of reference standard sera at present for the calibration of test methods or for the production of national or working standards. It was agreed that these sera are essential and should be prepared for cattle, sheep and swine.

Diagnostic validation data are scattered throughout the literature. For the most part, this data is from cattle, but there will be some data on sheep and pigs. The Experts agreed to review all available data and assemble pooled estimates of diagnostic specificity (DSp) and sensitivity (DSn).

It was proposed that the NSP-based ELISAs be used as screening tests (sensitivity to be maximized for that purpose). In that case it would be expected that there would be a predictable false-positive rate. Confirmation of true positive status would then require re-testing using a test of higher DSp. At present, the only confirmatory test proposed is the enzyme-linked immuno-electrotransfer blot (EITB), a technique already described in the *OIE Manual*. The Experts felt that the ELISAs and the EITB have definite potential in the monitoring and recovery from FMD outbreaks in either vaccinated populations or naïve populations subsequently undergoing high potency vaccination. However, until the foregoing tests, reagents and panels are fully standardized and validated for cattle, sheep and pigs, it would not be possible to define or defend specific application, sampling and interpretation strategies, especially with respect to declaration of freedom.

Trypanosomosis

CRP on Developing, Validating and Standardizing Methodologies for the Use of PCR and PCR-ELISA in the Diagnosis and Monitoring of Control and Eradication Programmes for Trypanosomosis (D3.20.21)

Trypanosoma DNAs samples, received from different partners, are being sequenced to build up a sequence data bank. These DNA samples will serve as references for the development of PCR tests for the diagnosis of trypanosomosis.

A trainee, Miss K. Schiller, who is spending 5 months internship in APU is involved in this work.

Veterinary Drug Residues

Current activities in the field of veterinary drug residues in the APU involve the reorganization and preparation of the laboratory for the technical Training Course planned for June 2003 under the FAO funded project "Strengthening Capacities for Implementation of Codex Standards, Guidelines and the Recommended International Codes of Practice for Control of the Use of Veterinary Drugs". This course will utilize the training facilities of the FAO/IAEA Training and Reference Centre for Food and Pesticide Control in the Agriculture and Biotechnology Laboratory to provide participants with demonstrations and hands-on experience of a range of analytical methodologies and instrumentation. The APU will work in close co-operation with colleagues in the Agrochemicals Unit to provide back-up for this training. In October, the Animal Production and Agrochemicals Units and the training laboratory were visited by consultants participating in a

Consultants' Meeting to plan the training activities for the project mentioned above. The consultants were impressed by the facilities and approved the laboratory as a venue for the planned training.

The APU is currently being equipped with instrumentation for techniques such as HPLC to support both training and technical back-up activities for TCPs and the CRP on veterinary drug residues. There is currently a vacancy for a technician in the field of veterinary drug residues analysis. This post will be advertised in the near future and research work, based mainly on HPLC methodologies, will resume when the post is filled.

Quality Assurance Programme for Animal Disease Diagnosis.

Technical Officer: Axel Colling

The FAO/IAEA External Quality Assurance (EQA) programme consisted of (a) inter-laboratory proficiency testing, (b) analysis and charting methods of internal quality controls (IQC), and (c) analysis and evaluation of a questionnaire.

Fifteen EQA rounds were organized since 1995 for a number of FAO/IAEA ELISAs e.g. rinderpest, FMD, trypanosomosis and brucellosis. The overall results indicate that the FAO/IAEA EQA programme is a valuable tool in the assessment of both the results obtained from and the proper functioning of the FAO/IAEA indirect brucellosis ELISA. Furthermore, the EQAP can assist counterpart laboratories to establish and implement Quality Control/Quality Assurance (QC/QA) procedures for conducting the FAO/IAEA ELISA, and to advise on the implementation of similar QC/QA procedures in other laboratory activities e.g. the use of IQC charting methods to monitor ELISA performance.

During the last seven years results of the FAO/IAEA EQA programme were published in IAEA Symposium Proceedings and in IAEA TECDOC 1150. The results were also included in two FAO/IAEA consultants meeting reports (94 and 98) and were presented at several international congresses.

The objectives of the EQA were to:

a) develop reference data for the assessment of new FAO/IAEA diagnostic assay performance in the field,

b) determine the user's general QA status and specific assay proficiency,

c) enhance the user's QA awareness and culture,

d) provide reference data to help identify and solve systematic and random errors in FAO/IAEA diagnostic assay application, and

e) provide an organized and transparent mechanism to enhance the national and international credibility of the user's laboratory.

The overall aim was to enhance international trade by providing transparent diagnostic quality results of infectious animal diseases. Thirteen EQA interim reports were produced and forwarded to the respective counterparts in developing countries and copied to FAO and OIE. The EQA programme was presented and well received at international scientific meetings, workshops and congresses. In addition, the data developed through the FAO/IAEA EQA were used under a programmatic perspective as baseline data for the development of appropriate intervention strategies, for monitoring project implementation and evaluation of impact during and after the project's conclusion.

An overview of the FAO/IAEA EQA rounds including the number of FAO/IAEA "Recognized" and "Provisionally Recognized" labs from 1995-2002 is given below:

Type of ELISA	No. of Participants	Recognized Laboratories	Provisionally Recognized Laboratories
Ind. Brucellosis ELISA 99b	29	7	4
Ind. Brucellosis ELISA 99a	32	7	4
Ind. Brucellosis ELISA 98b	32	7	5
Ind. Brucellosis ELISA 98a	33	4	7
Ind. Brucellosis ELISA 97a	39	6	9
Ind. Brucellosis ELISA 96a	35	na	na
Ind. Brucellosis ELISA 95a	31	na	na
Comp. Rinderpest ELISA 98a	28	2	12
Comp. Rinderpest ELISA 97a	29	5	8
Comp. Rinderpest ELISA 96a	29	na	na
Comp. Rinderpest ELISA 95a	23	na	na
Trypanosomosis ELISA 96a	16	na	na
FMD ELISA	10	na	na
FMD ELISA	11	na	na

na = not applied

Laboratories, which wish to participate in inter-laboratory proficiency test rounds in future may wish to obtain information from the APHS Home Page, where a list of national and international inter-laboratory proficiency test round suppliers will be available.

In addition FAO/IAEA 'Recognized' laboratories are encouraged to evaluate their technical suitability and infrastructure, strategic location within the region and overall operational conditions (e.g. as OIE/FAO reference or collaborative centers) to become inter-laboratory proficiency testing providers and reference standard producers for infectious animal disease testing activities.

Based on a programmatic decision, the EQAP activities are being phased out. The TC programme together with regional international programmes such as PACE in Africa, OPAS/Panaftosa in Latin America and AAHL/ANQAP in Asia, are encouraged to support such external quality assurance activities.

H. GEOGRAPHICAL INFORMATION SYSTEMS

A report covering the work done during the past year has been prepared and is available from the APH Section. The report emphasizes GIS products and focuses on the objectives, input data involved, and the outputs (either as printouts or layouts in the computer system). Hotlinks are created within the report to access the database as 'ArcView Projects'.

The areas covered by the report are:

China: A stratified sampling frame based on ecological and husbandry conditions for the serological surveillance of rinderpest, which was based on randomized geographical coordinates. This was carried out in support of FAO/GREP.

Ethiopia & Sudan: Distribution of four main tsetse flies in Ethiopia and in the border of Sudan.

Mali MLI/05/017 The distribution and apparent density of the tsetse fly *G.P. Gambensis* in the peri-urban area of Bamako. Orthomap of peri-urban area of Bamako. Bamako peri-urban area: River pattern delineation Riparian system evaluation Current statute of field surveys (trapping). Overview of the tsetse flies presence (trapping). Generating sample points for genetic survey of tsetse flies. Land cover / land use survey (to be conducted by BEAGGES).

Somalia (Puntland): Development of a serological sampling frame for Rift Valley fever to determine the distribution of the disease based on randomized geographical coordinates which included the identification of suitable areas for the vector based on remote sensing data. This activity was undertaken in support of PACE.

Uganda and Kenya: Transects and sampling areas for *G. fuscipes fuscipes* tsetse fly population.

Yemen: Development of a serological sampling frame for Rift Valley fever to determine the distribution of the disease based on randomized geographical coordinates which included the identification of suitable areas for the vector based on remote sensing data. This was undertaken in support of the national veterinary service and the central veterinary laboratory.

I. PUBLICATIONS

Published:

Manual of procedures for the production of iodinated progesterone tracer for use in the self-coating radioimmunoassay (RIA) method for measurement of progesterone in milk and blood of domestic animals, Bench Protocol Version 1.1, September 2002.

In Press:

The Establishment of Quality Systems in Agriculture Laboratories in Developing Countries, IAEA Centered Issue for the Journal 'Accreditation and Quality Assurance - ACQUAL'

In Preparation:

A Joint FAO/IAEA TECDOC on 'Quantification of tannins in tree foliage'. The Working Manual is already available on the APHS Home Page.

http://www.iaea.org/programmes/nafa/d3/crp/pubd31022manual-tannin.pdf

A guidebook dealing with practical aspects of PCR technologies as applied in the veterinary sphere, is being prepared by Professor Gerrit Viljoen, DSc. Head: Applied Biotechnology Division, Onderstepoort Veterinary Institute, South Africa, and colleagues. The manuscript is now being edited and should be available by the end of 2002.

Publications in Scientific Journals and Conference Proceedings

A list of Articles from APHS and APU staff published in Scientific Journals and Conference Proceedings is available at our APHS Home Page http://www.iaea.org/programmes/nafa/d3/public/d3_pbl_6.html

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CD-ROMs

A CD ROM is available dealing with training material for the diagnosis of rinderpest and for the preparation for the OIE pathway. It was produced under an IAEA Technical Co-operation project RAF/0/013 "ICT based training to strengthen LDC capacity". Contact J. Crowther (J.Crowther@iaea.org) for further information.

Information on New FAO titles:

To be regularly informed on FAO new titles, subscribe to FAO-Bookinfo, the free electronic Newsletter from the FAO Sales and Marketing Group. All you have to do is to send an E-mail to mailserv@mailserv.fao.org, leave the subject blank and then put in the first line of the message the following: Subscribe FAO-Bookinfo-L.

J. WEBSITES

- The APHS Home Page is being updated on a regular basis. Please feel free to look at the Website and make comments.
  http://www.iaea.org/programmes/nafa/d3/index.html
- International Symposium on Application of Gene-Based Technologies for Improving Animal Production and Health in Developing Countries, 6–10 October 2003,Vienna, Austria.
  http://www.iaea.org/programmes/nafa/d3/index-symp2003.html
- Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture Homepage:
  http://www.iaea.org/programmes/nafa/
- FAO Homepage: http://www.fao.org/
- FAO/IAEA Guidelines for Establishing Quality Systems in Veterinary Diagnostic Testing Laboratories
  http://www.iaea.org/programmes/nafa/d3/public/guidelines.pdf
- Web-based interactive programme about ISO/IEC 17025
  http://www.aplactraining.asn.au.

IAEA-CN-110

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO)
INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA)

FAO/IAEA INTERNATIONAL SYMPOSIUM ON

APPLICATIONS OF GENE BASED TECHNOLOGIES FOR

IMPROVING ANIMAL PRODUCTION AND HEALTH

IN DEVELOPING COUNTRIES

6–10 October 2003
Vienna International Centre
Vienna, Austria

ANNOUNCEMENT

AND

CALL FOR PAPERS

1. INTRODUCTION

Genetic engineering is at the forefront of much biological research — basic, adaptive and applied or near market. Manipulation of genes to bring about the expression of a specific product, or to produce a characteristic or trait, offers exciting possibilities within both the plant and the animal kingdom. The opportunities, in terms of improving livestock productivity or reducing losses from disease, lie in a number of areas. Some examples are:

- The expression of gene products that can be used as vaccines or reagents in diagnostic assays. Recombinant vaccines and vector virus expressed diagnostic reagents are being increasingly used and offer a variety of advantages, including their purity, safety and cost.
- Molecular techniques used in epidemiology to make possible the characterization of pathogens (viruses, bacteria, parasites) through determination of their nucleotide sequence. This is particularly important for epidemic diseases, where the possibility of pinpointing the source of infection can significantly contribute to improved disease control.
- The production of therapeutic substances through the insertion of specific genes into a variety of living tissues, ranging from single cells to complete animals or plants. There are already successes in this area and the potential is considerable.
- The identification of genes (usually several genes) that control an advantageous genetic productivity trait. Analysis and identification of individuals or specific breeds that have this gene cluster is then possible, allowing breeding from these for subsequent improvement in production. A more long term goal in this area would be to insert such advantageous genes into particular breeds or species to perpetuate a trait through genetic modification.
- There are many initiatives to obtain the complete genome sequence for many organisms, including humans. Although all cells contain the complete genome of any given organism, not all genes are expressed within each cell type. Therefore, it is imperative to study the expression of the genes and post-translational modification of proteins coded by genes through transcriptome analysis and proteomics. In the context of developing countries, one approach could be control of the expression of genes that confer disease resistance or a specific productivity trait, through simple approaches such as nutrition or environmental triggers.
- Production of transgenic animals with defined traits and utilization of cloning procedures as a tool for identical multiplication of valuable animals.
- The majority of domestic animal breeds are in developing countries, and global surveys indicate that about 30% of all livestock breeds are at risk of extinction, with little investment in conservation efforts. The use of microsatellites in genetic distancing of breeds will help maintain breeds through the conservation of genomic DNA, along with other approaches.
- Plant biotechnologies to improve the nutritional quality of plant feedstuffs and by-products offer enormous potential benefits for the livestock industry. Tremendous strides have been made in the recent past. Genetically engineering rice to produce high levels of beta carotene and iron is close to realization, and this has vast implications in developing countries. The work has demonstrated that it is possible not only to transfer a single gene but also the entire genetic pathway for producing a nutritionally advantageous substance in a plant. There are examples where the composition of oils, proteins and carbohydrate in seeds of corn, soybean and other

crops has been modified using plant breeding and molecular technologies to produce grains with enhanced value. Improving feed quality through genetic manipulation holds great promise, e.g. through alteration of the leaf/stem ratio; introduction of 'stay green' traits; increasing the digestibility of nutrients, especially the fibre in tropical forages; decreasing the fibre content and increasing cell solubles; increasing soluble carbohydrate in roughages; increasing protein in tropical forages and decreasing the degradability of proteins in the rumen for temperate forages; increasing sulphur amino acids in leguminous forage; regulation of protein and carbohydrate contents and their degradation to achieve maximum microbial protein synthesis in the rumen, etc.

- There are good prospects for manipulating rumen microflora to enable better utilization of feeds in ruminant species through the degradation of fibre and lignin, increasing the efficiency of nitrogen utilization and allowing the breakdown of anti-nutritional and toxic factors. The establishment of genetically modified microorganisms or 'foreign microbes' in the rumen can be monitored using competitive PCR methods and 16S rRNA-targeted oligonucleotide probes, which do not require culturing of microbes. These probes can also be used to allow characterization of rumen ecology, and such information can be used to develop more appropriate feeding strategies and also to allow a reduction in the emission of environmentally polluting gases, in particular methane.

In almost all areas of this research, isotopic markers are extensively used and are in most cases essential for achieving the levels of sensitivity required for genetic characterization and manipulation. Genetic engineering has the potential to solve many problems relating to animal productivity and health. At present the focus is on the problems that face livestock producers in the developed world. If the full benefit of this technology is to be realized globally, the problems confronting livestock farmers in developing countries will have to be considered. The characterization and application of methods in these regions has to be managed and exploited. It is hoped that this Symposium will stimulate the international exchange of information and ideas that contribute to greater accessibility and enhanced use of gene based technologies in animal agriculture in developing countries.

2. OBJECTIVES

- To create an interactive environment to discuss the role and future potential of gene based technologies for improving animal production and health;
- To identify constraints in the use of gene based technologies in developing countries and to determine how to use these technologies in a simple, practical way;
- To identify and prioritize specific research needs;
- To explore the possibility of international co-ordination in the area of gene based technologies in animal agriculture;
- To examine ethical, technological, policy and environmental issues and the role of nuclear techniques in the further development and application of gene based technologies with respect to livestock; and
- To develop a plan to translate the Symposium recommendations into actions.

3. TARGET AUDIENCE

- Scientists from developing and developed countries
- Policy makers — governmental and international organizations

- Donor agencies — international/national organizations, international/national foundations and trusts

4. PROGRAMME STRUCTURE

- Plenary Lectures
- Theme Specific Sessions: keynote addresses, contributed papers and posters
- Panel Discussions/Discussion Forum

Plenary Lectures (on the first day)

- A vision of gene based technologies for the livestock industry in the third millennium
- Advances in, and impact and future of, gene based technologies in developed and developing countries: A comparative scenario and efforts required to bridge the gap.

These lectures will set the scene for the Symposium.

Theme Specific Sessions

The format will be: 3–4 keynote addresses by invited speakers (30 min presentation followed by 10 min discussion); 4–6 oral communications (10 min presentation followed by 5 min discussion); and posters, for each of the following four sessions:

1. **Gene based technologies applied to livestock**
   Chairperson: John Gibson, Kenya
2. **Gene based technologies applied to pathogens and host–pathogen interactions**
   Chairperson: Paul-Pierre Pastoret, United Kingdom
3. **Gene based technologies applied to plants, rumen microbes and systems biology**
   Chairperson: C.S. McSweeney, Australia
4. **Gene based technologies in relation to the environment, food safety and the livestock industry, and related ethical and intellectual property rights issues**
   Chairperson: John Hodges, Austria

Prominent experts will be invited to deliver keynote addresses to provide perspectives, give rationales and expound on the potential applications of and need for innovation in gene based technologies in the context of developing countries. There will be no parallel sessions. Ample time will be provided for questions and answers, with opportunities for personal interactions with the speakers.

Panel Discussions

The first two Panel Discussions will each be of two hours' duration. They will start with brief statements of 10 min each by 4–6 invited speakers, followed by questions from the floor, replies by the invited speakers, comments and discussion, and finally conclusions by the moderator. The moderator is expected to submit a report on the Conclusions and Recommendations for discussion during the third Panel Discussion.

Panel Discussion 1: Which gene based technologies are most likely to succeed in enhancing animal productivity in developing countries?

Panel Discussion 2: Role of international organizations and funding agencies in promoting gene based technologies in developing countries.

Panel Discussion 3: Where to go from here — How can the recommendations of this Symposium be translated into action?

The Symposium will conclude with this Panel Discussion, which will be held on Friday 10 October and will be of three hours' duration. Chairpersons of the Sessions and moderators of the previous two Panel Discussions will present Conclusions and Recommendations of their respective Sessions/Panel Discussions, followed by a discussion of 60–90 minutes' duration.

5. CONTRIBUTED PAPERS

Concise papers on issues falling within the topics outlined in Theme Specific Sessions (Section 4 above) may be submitted as contributions to the Symposium. All papers, apart from invited review papers, must present original work; they should not have been published elsewhere. All accepted papers will be published in the Symposium proceedings and will be considered by the Chairpersons in Panel Discussion 3.

In order to provide ample time for discussion, the number of papers that can be accepted for oral presentation is limited. If the number of relevant and high quality papers submitted for selection exceeds the acceptable number, poster sessions may be arranged. The authors may indicate if they would wish to present their contribution as an oral presentation or a poster. The sponsoring organizations reserve the right to refuse the presentation or publication of any paper that does not meet the expectations based on the information given in the extended synopsis.

(a) Submission of extended synopses

Persons who wish to present a paper or poster at the Symposium must submit an extended synopsis (in English) together with the completed Form for Submission of a Paper **(Form B)** and the Participation Form **(Form A)** to the competent national authority for official transmission to the IAEA in time for them to be received by the IAEA by **10 April 2003**. In addition, the synopsis should be sent electronically to the IAEA Scientific Secretary, Mr. H. Makkar, e-mail: H.Makkar@iaea.org. Authors are urged to make use of the Extended Synopsis Template in Word 2000 on the Symposium Website. The specifications and instructions for preparing the synopsis and using the synopsis template are given in the attached "Instructions on how to prepare the extended synopsis and how to submit it electronically". Attached to this announcement is a sample extended synopsis.

The synopsis will be considered by the Programme Committee only if the Participation Form A and Paper Submission Form B have been received by the IAEA through the official governmental channels.

(b) Acceptance of papers

Authors will be informed of whether their paper has been accepted by the Programme Committee on the basis of the extended synopsis submitted. At the same time, authors of accepted papers will be advised if the synopsis has been accepted for oral presentation or for presentation as a poster, and they will also be informed of the assigned paper number and session of presentation. The accepted synopses will be reproduced in unedited form in the Book of Extended Synopses.

6. PARTICIPATION

All persons wishing to participate in the Symposium are requested to complete a Participation Form (see attached Form A) and send it as soon as possible to the competent official authority (Ministry of Foreign Affairs, Ministry of Agriculture, national FAO committee, or national atomic energy authority) for subsequent transmission to the IAEA. A participant will be accepted only if the Participation Form is transmitted through the government of a Member State of the sponsoring organizations or by an organization invited to participate.

Participants whose official designations have been received by the IAEA will receive further information on the Symposium approximately two to three months before the meeting. This information will also be posted on the Website: http://www.iaea.org/worldatom/Meetings/ .

7. EXPENDITURES

No registration fee is charged to participants.

As a general rule, the IAEA does not pay the cost of attendance, i.e. travel and living expenses, of participants. However, limited funds are available to help meet the cost of attendance of selected specialists mainly 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 specific requests to the IAEA Secretariat to this effect. Governments should ensure that applications for grants:

(a) are submitted by **10 April 2003,** and

(b) are accompanied by a duly completed and signed Grant Application Form (see attached Form C).

Applications that do not comply with conditions (a) and (b) cannot be considered.

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

8. PROCEEDINGS

It is intended that the proceedings of the Symposium will be published as a book by an external publisher and that all participants will receive a free copy of the proceedings.

9. EXHIBITION

A limited amount of space will be available for commercial vendors' displays/exhibits during the Symposium. Interested parties should contact the Scientific Secretary.

10. WORKING LANGUAGE

The working language of the Symposium will be English. All communications, synopses and papers must be sent to the Symposium Secretariat in English.

11. DOCUMENTS AND WEBSITE

Information on the Symposium as it becomes available will be placed on two IAEA Websites:

http://www.iaea.org/worldatom/Meetings/
http://www.iaea.org/programmes/nafa/d3/index-symp2003.html

A preliminary programme of the Symposium will be sent to participants before the meeting. It will also be available on the above mentioned Websites.

The final programme and Book of Extended Synopses will be distributed at registration.

12. ACCOMMODATION

A wide range of accommodation will be available. Hotel room rates range from approximately US $40 to 250 per night (with breakfast), while room rates in apartments range from approximately US $30 to 65 per night. Detailed information on accommodation and other items will be sent directly to all designated participants well in advance of the meeting.

13. VISA

If you require a visa to enter Austria (the 'Schengen visa'), please submit the necessary applications to the nearest diplomatic or consular representative of Austria as early as possible (please note that this procedure may take up to three weeks).

14. SECRETARIAT

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The Scientific Secretary for the Symposium is Mr. Harinder Makkar (telephone extension 26057; e-mail address: h.makkar@iaea.org) of the Animal Production and Health Section, Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture. Communications related to technical aspects of the Symposium should be addressed to Mr. Makkar. Meeting organization is provided by Ms. Karen Morrison, Conference Service Section, Division of Conference and Document Services (telephone extensions 21317 and 21311, e-mail address: k.morrison@iaea.org).

15. CHANNELS OF COMMUNICATION

The Participation Form and the Form for Submission of a Paper, together with two copies of each synopsis, and, if applicable, the Grant Application Form, should 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 IAEA.

Subsequent correspondence on scientific matters should be sent to the Scientific Secretary (Mr. H. Makkar) and correspondence on administrative matters to the IAEA Conference Service Section (Ms. K. Morrison).

Animal Production and Health Newsletter

Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture
and FAO/IAEA Agriculture and Biotechnology Laboratory, Seibersdorf

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