



Joint FAO/IAEA Division of Nuclear
Techniques in Food and Agriculture
and FAO/IAEA Agriculture and Bio-
technology Laboratory, Seibersdorf

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A. TO THE READER

Dear Colleagues, Research aimed at improving animal production and health in the developed world has been revolutionized by recent developments in the biotechnological field, particularly those related to gene-based technologies. These developments have enabled new and innovative approaches towards finding unique solutions to both old and emerging problems. However, the developing world needs to be prepared to receive and fully exploit these technologies, which also need to be adapted to meet the specific needs, and to be integrated with conventional approaches to the extent that it is possible to address issues of relevance.

These sophisticated and costly platforms and cross-cutting technologies, are powerful tools with which one can elucidate so many problems and address many requirements. Nevertheless, there is still the question about their relative importance when so many other pressing issues require urgent attention – basic food requirements, housing and human health needs? Could we not jump the biotechnology revolution and join in at the nanotechnology end of things and reap-up the benefits? A case in point is the speed with which a transition in communication in the developed world occurred from widespread reliance on hand-written letters to electronic mail or mobile phones within a comparatively rapid period of time. Is it really necessary for developing countries to re-invent the wheel? If a problem exists with such a wheel – will we be able to fix it or will we forever be reliant on the developed world to come and fix it for us!

The biodiversity of the world is largely retained in the developing countries of the tropics, including many infectious and parasitic agents whose impact on both human and animal health is significant. The genetics of these pathogens will not be studied unless scientists in the developing world undertake the research themselves for which

they should be empowered. It will, however, mean that the governments of the day should support basic scientific and applied research in order to sustain short-term interventions (i.e. training, technology transfer, capacity building, implementation, etc.) launched by organizations like the Joint FAO/IAEA Division and other international funding organizations. It is time that we think about our partnerships so as to make us all collectively stronger.

As discussed in previous newsletters, the Animal Production and Health Sub-programme will continue to move forward in pace with developments in the livestock field, in order to optimally serve and support our Member States and colleagues. This means that we will encourage and promote projects to keep abreast of current developments in technology. Their implementation will hopefully help to ensure a better positioning of our Member States with respect to international trade and other livestock issues. This will no doubt also lead to improved quality assured animal husbandry and health practices which should in turn lead to a greater degree of autonomy.

Looking back at the activities of the past six months, we have had several workshops, training courses, research co-ordination meetings (RCM), meetings with consultants and an international symposium on the applications of gene-based technologies. Much of this period was consumed by our directional analysis regarding new generation technologies, so as to prepare us for the imminent livestock revolution and the increased demand for quality animal products and food security (as referred to in my opening paragraph). Questions that we still need to face are those related to essential technologies and those that are only desirable. Which are the biotechnological procedures that will have the greatest potential impact on livestock production and health in developing countries, and which of these require nuclear techniques or indeed radioisotopes? The recent symposium on gene-based technology underlined the potential of these molecular techniques and their impacts. It was clear from these discussions that the technologies in question are generic (i.e. the cloning and sequencing of genes and gene products, the analyses of the generated data and its bio-informatical evaluation) but that their implementation profiles are different depending on the discipline involved. The ready-to-use products with an immediate impact are molecular vaccines and diagnostics. The second wave of impact will be due to technologies promoting production, breeding and genetics as well as improvements in nutrient supply and enhanced nutrient utilization by the target animal. In addition, participants from developing countries expressed their need for biotechnological training and technical support.

Activities scheduled for the next half-year include further meetings with consultants, RCMs, a task force meeting, training courses and regional workshops. They are discussed in some detail in this newsletter. Please let us know if you have any ideas, comments, problems or indeed any questions. We would appreciate feedback, and are trying to improve our channels of communication to facilitate this. We are also in the process of updating our mailing list – so ensure that we have your correct address (send a reply to R.Schellander@iaea.org) if you wish to continue receiving our newsletters.

I will continue to use the last paragraph to inform you about the staff changes within the Sub-programme. In September, Jose Fernando Garcia from Brazil joined the Animal Production Unit. He will be working on livestock genetics and breeding, implementing molecular techniques in order to develop strategies for marker assisted selection (MAS) and marker assisted conservation (MAC) programmes. One of our secretaries, Rosario Leon de Muellner, decided that after 12 years with the AP&HS it was time to move on to new tasks. We will still profit from her knowledge and her familiarity with our programme, since she only moved offices within the Joint Division. A very capable Svetlana Mardari took over Rosario's responsibilities and activities in September. Roland Geiger left us in December and I would like this opportunity to wish him and his family great success for the future. His dedication and hard work is much appreciated and he will be missed. We will still be in close contact and will continue to make use of his expertise in the future. I would also like to thank Oswin Perera for his excellent leadership during the last year until I joined the Section in October.

Finally, I wish you all and your families a happy, healthy and safe New Year.



Gerrit Viljoen,
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.

C. FORTHCOMING EVENTS

Consultants Meeting on OIE Validation and Certification of Diagnostic Assays for Infectious Animal Diseases

Technical Officer: Adama Diallo

This consultants meeting will be held at IAEA Headquarters in Vienna, Austria from 9 to 12 December 2003. The consultants meeting will provide an acceptable system for prescribing

assays that should be used for diagnostic or surveillance purposes for infectious animal diseases within the context of international trade in livestock or livestock products.

Final Research Co-ordination Meeting of the Co-ordinated Research Project on 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: Gerrit Viljoen

The final Research Co-ordination Meeting of the FAO/IAEA Co-ordinated Research Project (CRP) on "Assessment of the effectiveness of vaccination strategies against Newcastle Disease and Gumboro Disease using immunoassay-based technologies for increasing farmyard poultry production in Africa" will be held from 1 to 5 March 2004 in

Accra, Ghana. This CRP looked at the impact of different interventions such as vaccination, improved housing, feed supplements and antiparasitic treatment on the economics of poultry production in Africa. It is anticipated that the results of this CRP will help poultry producers at the village level to increase the productivity of backyard poultry flocks.

Task force meeting to "Review results from cost benefit analyses and regional supply of progesterone tracer, and finalize cost-recovery strategy" (RAF/5/046)

Technical Officer: Oswin Perera.

This meeting will be held from 1 to 5 March 2004 in Pretoria, South Africa. It will be open to five Project Co-ordinators from the participating AFRA Member States. The objectives of the meeting are to:

- Review results from cost-benefit analyses done by each country and finalize the strategy for future cost-recovery;

- Review results obtained from RIA conducted using regionally produced tracer, discuss any problems encountered in technical or logistical aspects and recommend solutions;
- Determine future needs for a regional project to further advance cattle production and draft a project framework.

Training Course on Screening and Confirmatory Methodologies for Veterinary Drug Residues

Technical Officer: Andrew Cannavan

This training course will take place from 15 to 26 March 2004 at the Australian Government Analytical Laboratories, Pymble, Sydney, NSW Australia. The aim is 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.

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 this course, mainly from East Asia and the Pacific.

Regional Workshop for Trainers on Cattle Fertility Management for Optimum Economic Returns, (RAS/5/035)

Technical Officer: Oswin Perera

This Workshop will be held from 26 to 30 April 2004 in Ludhiana, India. It will be open to 15 trainees from the RCA Member States participating in the project. The objective of the workshop is to improve the knowledge and skills of national specialists who are involved in the training of field veterinarians, AI technicians, extension workers and livestock farmers. It will include the following topics:

- Management of breeding bulls, semen technology and delivery of AI services;
- Clinical and hormonal investigations, therapy and preventive measures;
- Recording, management and reporting of farm and AI data;

- Continuing education programmes for technicians, extension workers and farmers.

Nominations may be submitted on the standard IAEA application form for training courses. Completed forms should be endorsed by and returned through the official channels established (the Ministry of Foreign Affairs, the National Atomic Energy Authority or the Office of the United Nations Development Programme). The forms can be obtained from these official channels, IAEA in Vienna, or can be down loaded from <http://www.iaea.org>. They must be received by the International Atomic Energy Agency, P.O. Box 100, 1400 Vienna, Austria, not later than 6 February 2004.

FAO/AEA Inter-regional Training Workshop on Real Time PCR (RT-PCR) and *in situ* Hybridization for Detection and Quantification of Rumen Microbes

Scientific Secretary: Harinder Makkar

This training workshop is open to the participants of the CRP entitled Development and use of rumen molecular techniques for predicting and enhancing livestock productivity. It will be held from 19 to 23 April 2004 in Australia. The training will be a blend of theoretical and practical aspects of

anaerobic culturing of rumen microbes and Real Time PCR and *in situ* hybridization for detection and quantification of methanogens, fibre degrading bacteria, fungi and protozoa. At the same time a work plan for the CRP will be developed.

Final RCM to Develop and Validate Standardised 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 RCM will be held in Vienna in April 2004 and will bring together all the research and developmental work made under the CRP. Full reports of the work carried out under this project 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 2004. It is hoped that a manual for PCR can be finalized at the meeting to act as a working guide for setting up and using PCR in developing countries.

Training Course on FDM Serology (RAS/5/041)

Technical Officer: John Crowther

A training course on the serological diagnosis of FMD will be held in Pakchong, China. It is

scheduled to be held in the second quarter of 2004.

Further details including a prospectus and information on the procedure for nominations

will be circulated to RAS Member States

FAO/AEA Inter-regional Training Course on Molecular Methods in Animal Genetics and Breeding

Technical Officers: Oswin Perera and Fernando Garcia

This training course will be held from 14 to 25 June 2004 at the FAO/IAEA Agriculture and Biotechnology Laboratory in Seibersdorf, Austria. It will be open to 15 participants from Member States of FAO and IAEA. The objective of the course is to enhance knowledge and practical training on current molecular marker techniques and experimental design in livestock genetic resources characterization in order to obtain information that can be used to develop breeding strategies aimed at maximizing the utilization of indigenous breeds in developing countries.

The course will include lectures, practical exercises and discussions on the following topics: molecular biology theory, sampling

procedures, DNA extraction and purification, polymerase chain reaction (PCR), DNA microsatellite analysis using different electrophoresis systems, DNA sequencing and applications of DNA markers (marker-assisted selection – MAS, marker assisted conservation – MAC, functional genomics, parentage testing, linkage analysis, genetic mapping principles and related computer software utilization) to improve the use of these techniques in developing countries.

Further details including a prospectus and information on the procedure for nominations will be circulated to Member States in December 2004, and will also be posted on the Section's Website. The closing date for nominations is 29 February 2004.

Final RCM on Use of Nuclear Techniques to Develop Simple Tannin Assays for Predicting and Improving the Safety and Efficiency of Tanniferous Forage (D3.10.22)

Technical Officer: Harinder Makkar

This meeting will be held from 7 to 11 June 2004 in Kars, Turkey.

Six Research Contract holders and four Agreement holders are expected to participate in the meeting. The objective is to evaluate the work conducted in the second phase of the project in which the main aim was to develop

detanninification approaches for tree and shrub leaves and to use the promising ones to enhance the nutrient availability from these feed resources. A compilation of results obtained by the groups in this network programme is also expected to be produced in the meeting.

Third RCM on 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

This meeting will be held in the Philippines from 5 to 9 July 2004. Final reports on comparative work under the CRP will be given and conclusions about the use of kits from

various commercial sources will be made. A TECDOC will be published by the end of 2004.

D. PAST EVENTS

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

Technical Officer: John Crowther

The interregional project INT/5/148 will facilitate the implementation of Quality Systems in 15 Veterinary Testing Laboratories worldwide. The first meeting took place from 2 to 6 June 2003 at the Australian Animal Health Laboratory, Geelong, Australia.

The objectives were to:

- a) Evaluate the status and needs of a quality system (QS) in participant's laboratories;
- b) Produce work plans for implementing a QS in 2003–2004 in terms of experts, equipment and training;
- c) Review training material and provide training in the use of documentation;
- d) Produce a meeting report.

The project involves 15 countries (five each from Africa, Latin America and Asia) and nine participants attended from Argentina, Botswana, Brazil, Cameroon, Indonesia, Thailand, South Africa (expert), Vietnam, Zambia. Participants from Cuba, El Salvador, Uruguay, Pakistan and Ethiopia were unable to attend. Participants from China and Sudan have still not been identified. The meeting provoked a very open, interactive and productive week and all Agenda topics were addressed. IAEA support mechanisms and the history and objectives of the project were explained. Participants presented the status and needs of quality systems in their respective laboratories. The presentations and subsequent

discussions revealed that the participants had considerably different scopes, backgrounds and levels for implementing a QS, e.g. some laboratories were already accredited (South Africa, Indonesia, Argentina, Botswana) whilst others have just started to implement QC/QA procedures (Thailand, Brazil, Cameroon, Zambia, Vietnam). Some participants were more involved in the technical laboratory work whereas others were involved more in the management of one or more laboratory sites, including those other than infectious disease diagnosis, e.g. food quality and safety, vaccine production. Australian representatives from the National Accreditation Body, NATA, the National External Quality Assurance Program, ANQAP, Victorian Institute of Animal Science, VIAS and the Onderstepoort Veterinary Institute (OVI) South Africa, organized a number of practical sessions to promote understanding of the essentials and differences between the OIE and ISO 17025; the production of quality documents and beginning the implementation of a QS under an international standard. Individual work plans for 2003 and 2004 were produced for the participating laboratories: these included identification of tasks for expert services; QA/QC relevant equipment, e.g. analytical balances, ELISA calibration plates, calibrated weights and thermometers; proficiency test rounds and a pathway to assist participants in implementing critical quality documents such as QM, SOPs and WI. A full report of the meeting is now available.

Introductory Training Course on Screening and Confirmatory Methodologies for Veterinary Drug Residues

Technical Officer: Andrew Cannavan

This training course took place from 16 to 27 June 2003 at the Agency's Laboratories, Seibersdorf, Austria, as part of the FAO Project "Strengthening Capacities for Implementation of Codex Standards, Guidelines and the Recommended International Codes of Practice for Control of

the Use of Veterinary Drugs" (PFL/INT/858/PFL).

The objectives of the course were:

- to provide an overview of the methodologies employed in veterinary drug residues analysis,

- to give practical demonstrations and hands-on experience of the most commonly used techniques,
- to provide information on aspects such as method validation and troubleshooting,
- to provide instruction on the application of the most recent guidelines and legislation regarding residues analysis,
- to discuss and address specific issues and problems of importance to the participants,
- to provide information on mechanisms such as IAEA Technical Co-operation Projects (TCP) and Co-ordinated Research Projects through which Member States may obtain further assistance in the field of veterinary drug residues.

The course was not intended to provide comprehensive training in all aspects of residues analysis, nor would it be possible to achieve this within the scope of this project.

The course programme comprised a blend of lectures, laboratory practical sessions and demonstrations, computer-based practical exercises and discussion sessions. Although lectures were provided on advanced instrumental techniques, such as mass spectrometry, more emphasis was placed on the screening and quantitative methods more likely to be applicable in developing countries. The course was presented by the technical officer and a team of consultants with specific expertise in the subjects and techniques covered.

Seventeen participants were selected from more than forty nominations received from countries in Latin America/Caribbean, Europe and West Asia. The number of participants was limited mainly by the laboratory facilities and supervisory personnel available for practical work. The trainees were divided into groups for practical sessions and all group members were encouraged to participate and gain "hands-on" experience in the various activities. Handouts and supplementary material were provided for each lecture and each participant received a CD-ROM containing all MS Powerpoint presentations and other materials used during the course.

The performance of the participants was assessed continuously through close interpersonal interaction between the

Technical Officer, course presenters and participants, appraisal of the results of practical work and by oral examination. Feedback was invited during and after the course.

The course was evaluated by the mechanisms above and by mandatory completion of a questionnaire by the participants. Various aspects of the course were assessed on a numerical scale of 1–5 (1=very poor, 3=satisfactory, 5=excellent). Comments were also invited for areas such as aspects not covered, those covered in too much detail and how the course could be improved. The overall average score for the training was 4.6.

In general the course was felt to be well balanced and covered most of the important topics. Some participants from more advanced laboratories would have preferred to have more time dedicated to techniques such as LC-MS-MS, while others, who were trying to establish residues laboratories or were from less well developed facilities, felt that the presentations on advanced techniques such as mass spectrometry were less useful. It was considered that some of the most useful aspects of the course were those dealing with practical applications and troubleshooting.

Suggestions for improving the course included increased emphasis on measurement uncertainty and traceability, sample extraction and clean-up in various matrices, design of sampling regimes and the inclusion of LC-MS practical work and HPLC and LC-MS troubleshooting. It was suggested that participants should be prompted to collect information on procedures, problems, veterinary drugs used, etc., in their own country before attending the course, since a surprising lack of knowledge in some cases hampered discussion sessions. It was also suggested that it might be beneficial if participants received the training material before the course to permit them to acquire the necessary background knowledge before the lectures.

Though it would be impossible to incorporate all of the suggestions received, they will be taken into consideration and used where possible to improve the effectiveness of future courses.

Conclusions and recommendations

All participants thought that the course was worthwhile and the knowledge gained would be of use in their own countries.

Overall, it was felt that the balance of topics was appropriate.

It was agreed that the course presenters were effective. However, because the course was presented in English, which is not the first language of most of the participants and some of the presenters, the presenters must endeavour to keep their delivery of the lecture material slow and clear.

The course is suitable, with minor amendments, for presentation in the Africa and

East Asia/Pacific regions. The discussion sessions included in the programme should permit specific regional or national issues to be addressed.

There is a need for courses such as this to act not only as an introduction to the techniques but to update the knowledge of scientists in developing countries with regard to methodologies and associated legislation and guidelines. Other funding mechanisms should be investigated to enable such courses or workshops to be held after the current FAO funded project is completed.

A full report is available from the Animal Production and Health Section and the Animal Production Unit at Seibersdorf.

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 was held at the Ministry of Agriculture and Livestock, Asuncion, Paraguay, from 21 to 25 July 2003. It was attended by eight of the ten Research Contract (RC) holders, representatives of the other two RC holders, all four Research Agreement (RA) holders and the Technical Contract (TC) holder. The local organizer was Ms. Nidia Ferreira, the RC holder from Paraguay.

The specific objectives of the meeting were to:

- Review results from work conducted during the first phase of the project, including a Participatory Rural Appraisal (PRA) and an Economic Opportunity Survey (EOS);
- Provide guidelines on interpretation of results from these surveys and on undertaking cost-benefit analyses using partial budgets;
- Demonstrate the computer database Livestock Information Management Application (LIMA); and
- Discuss on-going studies and develop future work plans for the next phase, including specific investigations and intervention strategies.

A summary of the conclusions and recommendations is given below. A full report on the meeting report is available on the

AP&H Sections Website at:

<http://www.iaea.org/programmes/nafa/d3/crp/d31023-2ndrcm.pdf>

Conclusions:

- The participants reiterated the relevance of the objectives of an integrated approach in addressing the problems of small-scale market oriented dairy systems in their countries. They agreed that the activities and expected outputs, described in the project document, are in the process of being achieved.
- The PRA and EOS were found to be very useful tools to ensure the participation of farmers. The constraints and perceptions identified ensured their contribution to the activities envisaged under the work plans.
- The RCM was able to achieve the development of detailed work plans for the subsequent two year period in accordance with previous findings and requirements for each project.
- All teams have identified appropriate investigations, which will address specific issues of importance to the CRP, for potential funding by other donors.
- The schedule of activities has been retuned for the needs of individual countries.

Recommendations:

- The progress demonstrated at the RCM confirmed that the CRP must be conducted for the full five year period to achieve its objectives.
- Those who have not completed the initial PRA and EOS should do so by December 2003.
- Where investigations based on findings from the PRA and EOS have not commenced, they should be initiated as soon as possible.
- Where technologies exist to address constraints, interventions should be discussed with RA and TC holders as well as the IAEA Project Officer (PO). These could be undertaken in parallel with ongoing investigations.
- All participants should continue to maintain regular contact with the IAEA PO and with each other during implementation of the project.
- LIMA and partial budget analyses should be used as tools during the second phase and the results will be reviewed at the third RCM.
- Most investigations will have been completed and interventions initiated by January 2005. By this time a comprehensive report must be submitted to the RA and TC holders and IAEA.
- The third RCM should be held in March 2005 in Africa. South Africa and Cameroon have indicated interest to host it.
- The final RCM should be held in Asia in the last quarter of 2006. The findings from the five years of the CRP will be presented and prepared for publication at this RCM.

IAEA Workshop on the Diagnosis and Monitoring of Contagious Bovine Pleuropneumonia in Angola, Lubango, Angola (ANG/5/002)

Technical Officer: Roland Geiger

This national workshop was held from 1 to 26 September 2003 at the Regional Laboratory, Lubango, Angola, and was attended by 10 veterinarians and technicians from other veterinary laboratories in Benguela, Cabinda, Luanda and Lubango.

The workshop was supported through IAEA TCP ANG/5/002 and experts from the

European Reference Laboratory in Lisbon, Portugal, provided important inputs to this workshop which covered the clinical, bacteriological and serological diagnosis of CBPP. This workshop was an important contribution of the IAEA to strengthen the control of CBPP in Southern Africa, where the present focus of the disease which was initially in Angola is now expanding into Zambia and into the eastern parts of Namibia.

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

Scientific Secretary: Harinder Makkar

This symposium was held from 6 to 10 October 2003 in Vienna. One hundred and thirty participants from 60 Member States participated in the Symposium. A plenary session and four sessions, each covering animal breeding and genetics, animal health, animal nutrition, and environment, ethics, safety, and regulatory aspects of gene-based technologies and three thought-provoking panel discussions were held. A total of 44 oral and 33 poster presentations were made.

In the opening session, the symposium was addressed by three distinguished speakers (Werner Burkart, DDG and Head of the Department of Nuclear Sciences and Applications, IAEA; Samuel Jutzi, Director, Animal Health and Production Division of the FAO; and James Dargie, Director, FAO/IAEA Division of Nuclear Applications in Food and Agriculture). Mr. Burkart stressed the importance of the close relationships between FAO and IAEA for enabling the deployment of the considerable potential of nuclear technologies in food and agriculture. Mr. Jutzi

stressed the challenges and opportunities faced by the world's animal agriculture and emphasized the importance and nature of specific and general development policy measures for the enhancement of the impact of gene-based technologies to animal agriculture in developing countries, and Mr. Dargie emphasized the need for capacity building in

developing countries for enabling the application of gene-based technologies in key areas of the livestock sector.

The Programme and PowerPoint presentations, the extended book of synopses and the conclusions and recommendations can be downloaded from the AP&H Section Website: <http://www.iaea.org/programmes/nafa/d3/mtc/>

Joint FAO – IAEA National Workshop On The Diagnosis And Surveillance Of Transboundary Animal Diseases (MON/5/012)

Technical Officer: Roland Geiger

This workshop, which was held from 13 to 17 October, 2003 at the State Central Veterinary Laboratory, Ulaanbaatar, Mongolia, was jointly organized by FAO's GREP/EMPRES secretariat and IAEA through its TCP MON/5/012 to assist Mongolia to achieve an international recognition of freedom from rinderpest disease. The five-day workshop was opened by the Minister of Agriculture and was attended by 52 veterinarians representing Government institutions and the 22 aimags (provinces). It was highly successful in promoting international WTO-SPS requirements for disease surveillance and

disease reporting focusing on the OIE pathway for the national certification of freedom of rinderpest as part of the Global Rinderpest Eradication Campaign (GREP).

After almost 50 years of absence of rinderpest from Mongolia two isolated outbreaks occurred in 1991 but were quickly eradicated. Assistance was also provided for the preparation of an OIE dossier for international recognition of freedom from rinderpest disease which should be submitted to the OIE in November 2003 and which will hopefully be endorsed by the OIE General assembly in May 2004.

Workshop 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

This workshop for policy and decision makers was held from 20 to 24 October 2003 in Vienna, Austria. The objective of the workshop was to increase the awareness of individuals with influence on policy decisions in developing countries of the procedures involved in the registration and control of the use of veterinary drugs and the design and implementation of post-licensing surveillance programmes for veterinary drug residues in foods. This should assist the participants in implementing or augmenting programmes in their own countries to minimize the occurrence of veterinary drug residues in food, thereby protecting consumers from potential health risks and enhancing the potential for international trade in animal-derived food commodities.

The workshop was attended by representatives of 34 less developed countries. Presentations on procedures in place in different regions of

the developed and developing world and on FAO/IAEA mechanisms of support were given by the Technical Officer and consultants from both developed and developing countries. Discussion sessions were held to address particular issues raised by the participants. Interest was expressed by many participants in both the IAEA technical co-operation programme, with a view to obtaining assistance to implement the procedures discussed in the workshop, and the current FAO/IAEA CRP on veterinary drug residues.

A set of recommendations was agreed upon by the participants in the final session of the workshop:

Recommendations to policy makers in developing countries:

- Create awareness and promote action at the level of Ministers interacting in the international forum with regard to the

importance of residues of veterinary drugs in foods;

- Recognize that access to nutritious and safe food is a basic right of national consumers and is not only important for export markets;
- Recognize that safe food of good quality for your own population is the best argument for the sustainable growth of a successful food export industry;
- Anticipate that a safe domestic food supply will be an increasingly important criterion in the selection of destinations for tourists, taking into account the increasing average age of the tourist;
- Critically evaluate the impact of double standards of food quality control (domestic food vs food for the export market);
- Apply equivalent standards and levels of control for locally produced food for export and for imported foods;
- Establish a legal framework for the registration of veterinary products and control of their use, involving all stakeholders in the process;
- Inform the public of newly registered drugs;
- Establish a system for the control of residues of veterinary drugs in foods;
- Promote and initiate regional meetings and activities.

Recommendations to control authorities / analytical laboratories:

- Follow closely and understand what is happening at all relevant points with regard to the possible occurrence of residues, for example gather information using questionnaires in the market place, at the farm, in the pharmacy and from veterinarians;
- In the development of surveillance programmes, first consider local conditions and priorities and employ simple but reliable methods that can be locally supported;
- Collaborate closely with other government departments and agencies involved in food

safety and veterinary public health;

- Involve other stakeholders and organizations (e.g. farmers, veterinarians, consumers);
- Promote and commit to regional collaboration and sharing of resources in method development and analytical work;
- Develop and implement training programmes for stakeholders such as public health officers, laboratory personnel, field workers, farmers and veterinarians emphasising increased compliance with the basic issues of the prudent use of veterinary drugs (e.g. withholding periods)
- Establish a communication policy to regularly inform the public on the national residue monitoring programme and its outcomes.

Recommendations to international organizations and developed countries:

- International work in capacity building needs to be better co-ordinated (between FAO, IAEA, OIE, WHO, others);
- Assure a level playing field for requirements for analytical methods and laboratories, considering the limited resources available in many developing countries;
- Ensure that veterinary drugs exported or donated to developing countries are fit for use (e.g. sufficient shelf-life, appropriate quality);
- Support the establishment of regional reference laboratories and/or laboratory networks as part of capacity building;
- Create a network/platform and a mentorship approach to share experience, knowledge and data between experts and officials from developed and developing countries;
- Increase support for training of officials and professionals in key positions (a “train the trainers” approach)

A full workshop report is available in the Animal Production and Health Section.

Second Research Co-ordination Meeting of the Co-ordinated Research Project 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 second RCM under this CRP was held in Pretoria, South Africa, from 3 to 7 November 2003. Eleven of the twelve Research Contract holders, three Research Agreement holders and one Technical Contract holder attended the RCM. The meeting was opened by Dr. Fred Potgieter, Director of Onderstepoort Veterinary Institute. The three Research Agreement holders gave presentations on relevant aspects of veterinary drug residues analysis. The increasingly important role of bioassay techniques such as reporter gene assays for the direct screening of the effects of hormonal and other residues in animal cells and the future role of such assays to complement existing instrumental techniques was highlighted by Prof. Meyer (GFR). The Technical Contract holder and Research Contract holders reviewed the results of the research and method development performed under the first phase of the CRP. Considerable progress has been made in many aspects of the overall work plan.

Several commercial immunoassay methods have been critically evaluated. The main problems identified with these kits were the instability of reagents, notably the enzyme conjugates, resulting in poor performance, and the need for better sample preparation protocols applicable to a wider range of matrices. Work plans have been agreed with several laboratories to attempt to address these problems.

Good progress has been made in several laboratories working on the development of in-house ELISA methods for chloramphenicol residues. The laboratories involved have produced and characterized antisera in various species and these will be used with reagents produced by Technical Contract holders to elaborate assay protocols. Further investigation into aspects such as reagent stability, antibody maturation and assay development using various assay formats is planned.

A full set of reagents and protocols for their optimization in a ¹²⁵I radioimmunoassay (RIA) for chloramphenicol have been developed by

the Technical Contract holders and transferred to a Research Contract holder for further method development. However, this researcher was unable to attend the RCM and a full report on the progress made on this method has not yet been provided.

A confirmatory method for chloramphenicol by LC-MSMS has been developed and fully validated.

Work on the extension of the applicability of an existing RIA method for the beta-agonist, clenbuterol, to a range of beta-agonistic drugs is ongoing. Antibodies provided by a Technical Contract holder have been characterized and will be incorporated into the method. Further work on sample extraction/preparation for the multiresidue method is also planned.

Work on HPLC methods for metabolites of the nitrofurans is also ongoing, with some very promising results produced to date. Elaboration of sample preparation protocols is the next priority for the two contract holders working in this area.

The Agreement holder in Sweden will collaborate closely with the research contact holder in the Republic of Korea (and others) to commence the implementation of laboratory quality assurance procedures.

The Technical Officer wishes to express his gratitude to Ms. Azel Swemmer for her assistance in organizing the meeting.

Conclusions and recommendations

- Progress in the first phase of this CRP has been satisfactory. Various technical problems have been identified during the first phase and work plans have been designed to attempt to overcome these problems.
- It was recognized that sample preparation is a critical process in the analysis of trace amounts of residues of veterinary drugs in complex biological matrices. In many cases, the principles behind the extraction and clean up of drug residues are poorly understood. It was recommended that the

Agency should provide funding for training on this vital aspect of residues analysis. The best format for the training was felt to be a one-week training course.

- Interest has been shown in participation in the CRP as an Agreement holder by a researcher in Latin America with expertise in proficiency testing schemes. It was agreed that this would be a very useful component of the CRP, since participation in proficiency testing is a requirement for accreditation under the ISO 17025 quality assurance standard and such schemes are currently not available to many participants.

- It was agreed that the inclusion of another Research Contract holder in Latin America, who has proposed the provision of LC-MSMS confirmation of the results of the current HPLC method development for chloramphenicol residues, would be very beneficial to the CRP.
- The results of the Contract holder currently working on the ¹²⁵I RIA for chloramphenicol should be obtained as soon as possible and critically evaluated.

The third RCM should be held in early 2005. Three possible venues have been suggested and will be evaluated.

Introductory Training Course on Screening and Confirmatory Methodologies for Veterinary Drug Residues

Technical Officer: Andrew Cannavan

This training course took place from 10 to 21 November 2003 at Onderstepoort Veterinary Institute (OVI), South Africa. This was the second presentation of this course, the first being held at Seibersdorf, Austria, in June 2003. The course design and objectives were as described for the initial course in this issue. Eighteen candidates were selected for this training course, mainly from Africa. All trainees showed a keen interest in the subject matter and participated in the programme. Several participants requested information on the application process for IAEA Technical

Co-operation Projects. The Technical Officer gave a presentation on Agency support mechanisms and held discussions on specific project proposals.

Thanks to Ms. Azel Swemmer and the staff of the Residues Laboratory at OVI for their help with the organization and presentation of the training course.

A full report of this course will be available from the Animal Production and Health Section and will be included in the next issue of the Newsletter.

Consultants Meeting to define technical guidelines and standing operating procedures for the surveillance and testing of rinderpest as part of the Global Rinderpest Eradication Programme (GREP)

Technical Officer: Roland Geiger

This meeting was held at IAEA Headquarters, Vienna, Austria from 26 to 28 November 2003. The purpose of the meeting was to discuss and agree on technical guidelines and standing operating procedures covering all

aspects of activities for the surveillance and testing for rinderpest in connection with the OIE pathway and to develop a document covering these aspects.

RCA Regional Training Workshop on Nuclear and Related Methodologies for Quantification of Tannins in Shrub and Tree Leaves, Agro-industrial By-products and Other New Feed Resources(RAS/5/035)

Technical Officer: Harinder Makkar

The training workshop was held from 1 to 12 December 2003 at the Nuclear Institute for

Agriculture and Biology (NIAB), Faisalabad, Pakistan. Ten foreign and four local

participants from RCA Member States attended the training course.

Animal husbandry is one of the key sectors in many RCA Member States. It is essential for the sustainable development of the livestock sector to secure sufficient supply of balanced feeds against scarcity and year-round fluctuation of feeds in quantity and quality. During the implementation of the ongoing project RAS/5/035, much experience has been achieved in developing seed-bearing or fodder-producing plants as new sources of feeds and formulation of new feeds. These technologies are applicable in RCA countries due to their low cost, easy availability and satisfactory

nutritional value. Some of the locally available feeds are rich in antinutritional factors (ANFs, factors which decrease nutrient utilization). Amongst these, tannins are the most widely occurring ANFs. With a better understanding of the levels, nature and properties of ANFs and proper management, these feeds could become an invaluable source of protein for strategic supplementation.

This workshop was a blend of theoretical and 'hands-on' training on methodologies for the analysis of tannins using radiolabelled-, chemical-, protein precipitation/binding- and bio-assays.

E. STATUS OF EXISTING CO-ORDINATED RESEARCH PROJECTS

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

The CRP is in the second stage. The groups participating in this project are developing strategies to remove or inactivate tannins from tree and shrub leaves, the evaluation of which is being conducted using *in vitro* approaches based on chemical, bioassay and radiolabelled tannin determination methodologies. The promising

approaches are being evaluated *in vivo* for the animal responses. Studies are also in progress on understanding mechanisms of adaptation to tannins. This CRP will conclude with the final RCM scheduled to be held in Kars, Turkey in June 2004.

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

Technical Officer: Oswin Perera

This CRP is now in its third year and has a full complement of participants, comprising 10 Research Contracts, 1 Technical Contract and 4 Research Agreements. The second RCM was held from 21 to 25 July 2003 in Asunción, Paraguay

(see Past Events). The third RCM is scheduled for March 2005 in Africa and the final RCM will be held towards the end of 2006 in Asia.

Development and Use of Rumen Molecular Techniques for Predicting and Enhancing Productivity (D3.10.24)

Technical Officers: Harinder Makkar

Eight Research Contracts (Nadide Hulya Ozemir, Turkey; Devki Nandan Kamra, India; Jian Xin Liu, China; Adibe Luiz Abdalla, Brazil; Elizabeth Wina, Indonesia; Denia Caridad Delgado Fernandez, Cuba; Rolando Barahona Rosales, Colombia; Long Ruijun, China), five Research Agreements (Joblin Keith, New Zealand; Mackie Roderick, USA; Makoto Mitsumori, Japan; Charles James Newbold, UK; Michael Kreuzer, Switzerland), and one Technical Contract (Chris

McSweeney, Australia) have been awarded. This CRP will become operational in January 2004. Under this CRP, a training workshop on real time PCR and *in situ* hybridization techniques for characterization and quantification of rumen microbes will be held in April in Australia. Only the Research Contract holders are entitled to participate in this training workshop. A meeting to develop future work plans will be incorporated in the training workshop.

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

The final RCM will provide the data to produce a TECDOC as well as to finalize a manual for PCR development and use in developing countries

based on the experiences over the past five years by the counterparts.

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

Technical Officer: Roland Geiger

The final RCM of this CRP was held in Bamako, Mali from 17 to 21 February 2003. The

proceedings will be published as a TECDOC in 2004.

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 (see under forthcoming events).

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

New kits from CEDI diagnostics have been distributed for comparison to other tests. The standard sera against FMD types SAT 1, 2 and 3 are now made and will be characterized before and after irradiation. A competitive ELISA based on work in the Geelong laboratory under a

Technical Contact, using chicken antisera raised against FMD NSP 3ABC, is now available for testing. This will be distributed in the final phase of the CRP. Most contracts have been renewed. Most Research Contracts have been renewed.

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

Technical Officer: John Crowther

Good progress has been made in analyzing the universal primers. A full report of the 2nd RCM is

available. Most Research Contract holders have renewed their contracts.

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 second RCM for this project was held in Pretoria South Africa 3-7 November 2003 and a report can be found under past events in this Newsletter.

The CRP involves a full complement of 12 Research Contract holders, three Research Agreement holders and two Technical Contract holders.

African Swine Fever Technical Contract 11294 (D3.00.00)

Technical Officer: John Crowther

Indirect ELISA kits are still available from the Institut Sénégalais de Recherches Agricoles ISRA, Laboratoire National de l'Élevage et de Recherches Vétérinaires (LNERV), for the detection of antibodies against ASF. Each kit

includes plates, tips and reagents for testing 2800 samples and costs US\$ 2000. Applications for kits should be made to the Senegal laboratory directly (Dr. Joseph Sarr; Josarr@refer.sn).

F. NEW CO-ORDINATED RESEARCH PROJECTS

Gene-based Technologies in Livestock Breeding: Phase 1 - Characterization of Small Ruminant Genetic Resources in Asia

Technical Officer: Oswin Perera

The announcement and call for proposals for this CRP was published in the June 2003 issue of the Newsletter. This information is also available at the AP&H Section Website and includes details

on the rationale, background, objectives, expected outputs, and implementation procedure. The closing date for submission of proposals has been extended to 31 March 2004.

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

Technical Officers: Harinder Makkar and Oswin Perera

This CRP was advertised in our previous Newsletter. However, it is being kept in abeyance.

The proposals for this CRP will not be entertained.

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 URL

<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 URL <http://www-tc.iaea.org/tcweb/default.asp>

G. TECHNICAL CO-OPERATION PROJECTS

Operational Projects in 2003/2004 and Technical Officers responsible for implementation

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

IRA/5/012, Preparation of ELISA Kits for Diagnosis of Foot and Mouth Disease, 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

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

POL5010, Increasing Pig Productivity Through Radioimmunoassay to Determine Methods for Advancing Puberty in Gilts, Oswin Perera

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

RAS5041, Production of Foot and Mouth Disease Antigen and Antibody ELISA Reagent Kit (RCA, John Crowther

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

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

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

Study of the effects and interactions of tannins and non-starch polysaccharides (NSP) on rumen microbial fermentation and microbial attachment

The presence of tannins in feedingstuffs exerts both beneficial and detrimental effects on nutrient digestibility in ruminants. The major biological characteristics of tannins are (1) their ability to complex protein, carbohydrates and minerals and (2) ability to affect the activity of the rumen bacterial population and enzymes responsible for digestion. To study the effect of tannins on rumen microbial fermentation and thereby on the nutrient digestibility by ruminants, a fellow, Ms LINO BENTO Maria Helena, has spent four months, 02/02/03 to 02/06/03 in APU. Her training programme focused on the:

Use of ^{15}N labelled technique, an accurate and rapid technique, for the evaluation of the nutritive value and safety of foods. The effect of tannin on rumen microbial fermentation was investigated by measuring the gas produced. Its effect on microbial protein synthesis was also studied by measuring ^{15}N enrichment in the digested bacterial pellet obtained after fermentation of ^{15}N labelled maize shoots.

A study of additives to overcome the adverse effects of tannins on the gastrointestinal tract of ruminants was also carried out. In that study, pectin and polyethylene glycol were used as additives.

Conclusions of those studies are:

1) Pectin as a readily fermentable non-starch polysaccharide (NSP) increased gas production, when added to cellulose, from the first hours of fermentation. Cellulose by itself had little gas produced at the first stages of fermentation indicating that little degradation occurred. Therefore, a negative effect of tannin on gas

production from the fermentation of cellulose was only expected at later stages of fermentation (24h). Pectin improved gas production when added to cellulose+tannin but to a lesser extent than polyethylene glycol. Part of the increment in gas production when pectin is added to cellulose+tannin is due to pectin degradation. The extent of the adherence of microbes to the substrate affects the degradability of cellulose and thus gas production is a result of microbial attachment occurring during microbial fermentation. Polyethylene glycol (PEG) remains the only additive that completely removes the adverse effect of tannins on ruminal degradation. Pectin used in this study partially removed the detrimental effects of tannin on ruminal degradation.

2) A high positive correlation ($R^2=0.9$; $P<0.001$) was observed between gas production and ^{15}N enrichment (%), ^{15}N enrichment being an index of microbial protein synthesis, and indirectly an index of the utilization/degradation of the substrate by rumen microbes. The treatment of tannin containing diets with additives that have the ability to fully inactivate the action of tannins, such as PEG, improves rumen microbial fermentation.

This positive action of the PEG is due to its ability to bind to tannin. This feature is being used to develop an inexpensive method to screen foods suitable for ruminants nutrition. This work is being carried out by Mr Victor MLAMBO, a scientist from Zimbabwe who has a one year Junior Professional Officer (JPO) position in APU as of 1 May 2003.

Development of a test based on the non-structural protein of Foot-and-Mouth Disease Virus (FMDV) to differentiate between vaccinated and infected animals (D3.20.20)

Foot and Mouth Disease (FMD), due to its important economic impact on livestock production, is one of the most feared animal diseases. The stamping out policy which has been the main measure for the eradication of this disease in many developed countries is less and less accepted by public. This is why in May 2002 the OIE proposed changes in *the Code* Chapter on FMD to take into consideration vaccine purity and

new diagnostic tests that enable serological differentiation between vaccinated and infected animals. Those tests are based on the use of non-structural proteins (NSP) as antigen. Vaccines currently in use are killed viruses and if highly purified, they are devoid of NSP and do not induce anti NSP antibodies in vaccinated animals. Many NSP-based tests exist but their sensitivity may have to be improved to detect very low levels

of antibodies that must be present if a vaccinated animal comes into contact with field virus and supports moderate virus replication. Some tests are under development. The IAEA is also addressing this issue through the CRP D3.20.20: In the Animal Production Unit at the FAO/IAEA Biotechnology Laboratory, a cELISA test is being developed for the differentiation between

vaccinated and naturally infected animals. For that, specific monoclonal antibodies and recombinant FMD NSP were produced. Three of those monoclonal antibodies are being tested for their suitability for use in a c-ELISA test based on FMDV NSP produced with the baculovirus vector system as antigen.

Veterinary drug residues

A training course on screening and confirmatory methodologies for veterinary drug residues was held at the laboratory from 16 to 27 June 2003. A report on this meeting can be found in the “Past

Events” section of this issue. A full report is available in the Animal Production and Health Section, VIC or the Animal Production Unit at Seibersdorf.

Training of fellows in APU

Ms. Maria Helena LINO BENTO (POR/02003R), February – May 2003.

Study of the interactions of tannins and non-starch polysaccharides and their effects on rumen microbial fermentation and microbial attachment using *in vitro* fermentation techniques coupled with isotopic techniques.

Ms Nadine SCHUERER, a cost-free intern, has spent one month, July 2003, in APU to be trained on the PCR test for the diagnosis of trypanosomosis.

I. PUBLICATIONS

Published:

Laboratory Manual "Quantification of Tannins in Tree and shrub Foilage" by Harinder P.S. Makkar, Kluwer-Plenum Press, 2003, ISBN 1-4020-1632-8.

Extended Book of Synopses, FAO/IAEA international symposium on applications of gene-based technologies for improving animal production and health in developing countries, 6-10 October 2003, Vienna, Austria (hardcopy and CD ROM available. Contact Harinder Makkar, h.makkar@iaea.org)

Guidelines and Recommendations for Improving Artificial Breeding of Cattle in Africa (2003) A Working Document of the AFRA Project III-2 (RAF/5/046) on "Increasing and Improving Milk and Meat Production", with technical support from the Animal Production and Health Section of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture, International Atomic Energy Agency Vienna, Austria.

Technical parameters for assessment of scavengeable feed resource for poultry

This manual was produced as part of the FAO/IAEA Co-ordinated Research Project (CRP) on "Assessment of the effectiveness of vaccination strategies against Newcastle Disease and Gumboro Disease using immunoassay-based technologies for increasing farmyard poultry production in Africa" with the aim to provide the participating scientists with guidelines to estimate the scavengeable feed resources of poultry kept under extensive conditions in backyard poultry. It helps to estimate the carrying capacity of the range and to estimate the necessary feed supplementation. The Manual is now available through the APHS.

In Press:

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

Proceedings of the FAO/IAEA Co-ordinated Research Project on the "Monitoring of Contagious Bovine Pleuropneumonia in Africa Using Enzyme Immunoassays", IAEA TECDOC. The proceedings of this FAO/IAEA CRP are now available as an IAEA TECDOC through the APHS. The document summarizes the results of the validation and field use of a competitive ELISA for the detection of antibodies to MmSC and its comparison to the CFT. It contains also results on the use of the latex agglutination tests (LAT) which was developed in co-operation with the Moredun Research Institute, UK. The objective of the document is to present results on the surveillance of CBPP which can help national veterinary authorities to plan their surveillance and control programmes.

The cELISA was identified as a suitable and useful test and was now accepted by the OIE Standards Commission along with the CFT as a prescribed test.

In Preparation:

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 as a publication by the end of 2003. It will also be placed on the AP&H Section Website.

Estimation of microbial protein supply in ruminants using urinary excretion of purine derivatives.

Technical Manual on Development of Parameters for Scavengeable Feed Resources (SFR) for farmyard Poultry

Proceedings of the FAO/IAEA International Symposium on Applications of gene-based technologies for improving animal production and health in developing countries

Laboratory Manual on methods in gut microbial ecology for ruminants

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 on our AP&H Section Website at the URL

http://www.iaea.org/programmes/nafa/d3/public/d3_pbl_6.html

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.

A CD-ROM containing a training package on estimation of microbial protein supply in ruminants from the determination of urinary purine derivatives. Contact Harinder Makkar (h.makkar@iaea.org)

A new batch of CDs with a training package to help artificial insemination (AI) technicians to improve the performance of AI and field services provided to farmers was produced for users with a slow Internet connection and is now available through the APHS. It is also accessible from the AP&H Section Website:

<http://www.iaea.org/programmes/nafa/d3/index.html>

Information on New FAO titles:

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AGRIPPA – an FAO's electronic journal

AGRIPPA is a new initiative by FAO for the electronic publishing of agricultural literature: reviews, scientific papers, short communications and extension materials.

Electronic publishing is rapidly becoming the major alternative for information dissemination throughout the world, via the World-Wide-Web and CD-ROM. It avoids the costs of printing, binding and heavy postage, and makes information available anywhere, at any time. It has particular advantages for people in developing countries who previously had no access to books and libraries.

AGRIPPA is divided into Sections, currently covering Livestock and Animal Feed, and Farming Systems, and later to be extended to other areas of agriculture. These Sections have Editors and Reviewers in the AGRIPPA Network. Editors are responsible for managing the separate 'journals' in their subject areas. Authors are invited to write reviews, scientific articles, short communications (poster papers) and extension materials and submit them to the editors. The editors draw on the network of peer reviewers to assess the quality and accuracy of submitted works, in the same way as a conventional journal, but using electronic interchange to speed the process.

Peer reviewed and edited documents are published in the AGRIPPA system and immediately available to subscribers.

The URL is: <http://www.fao.org/agrippa/>

The papers may be sent to: Andrew Speedy (Andrew.Speedy@fao.org)

FAO's initiative on biosecurity

Introduction to Biosecurity: Biosecurity is a strategic and integrated approach that encompasses the policy and regulatory frameworks (including instruments and activities) that analyse and manage risks in the sectors of food safety, animal life and health, and plant life and health, including associated environmental risk. Biosecurity covers the introduction of plant pests, animal pests and diseases, and zoonoses, the introduction and release of genetically modified organisms (GMOs) and their products, and the introduction and management of invasive alien species and genotypes. Biosecurity is a holistic concept of direct relevance to the sustainability of agriculture, food safety, and the protection of the environment, including biodiversity.

Biosecurity in Food and Agriculture, Committee on Agriculture, Rome, 2001

<http://www.fao.org/docrep/meeting/003/x9181e.htm>

Biosecurity in Food and Agriculture, Committee on Agriculture 17th Session, Rome, April 2003

<http://www.fao.org/docrep/meeting/006/y8453e.htm>

Capacity Building in Biosecurity: An FAO technical consultation on Biosecurity held in Bangkok in January 2003 identified the critical need for capacity-building for developing countries and countries with economies in transition. This will require the development of capacity evaluation tools, and the co-ordination of sectoral initiatives. Work is carried out under the Umbrella Programme for Training on the

Uruguay Round, and the Standards and Trade Development Facility (STDF).

http://www.fao.org/es/ESN/food/meetings_biosecurity_en.stm

http://www.fao.org/es/ESN/food/capacity_workshop_umbrella_en.stm

<http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:20069625~menuPK:34467~pagePK:34370~piPK:34424~theSitePK:4607,0.html>

The International Portal on Food Safety, Animal and Plant Health (IPFSAPH): One tool to assist in providing information to countries to achieve Biosecurity is the International Portal on Food Safety, Animal and Plant Health (IPFSAPH). IPFSAPH, which is currently in development, will provide a single access point for the latest version of international and national standards, regulations, and other official materials relating to Sanitary and Phytosanitary (SPS) measures in food and agriculture (including fisheries and forestry). It also brings together information from the different disciplines grouped by cross-cutting issues. The information is of use in consumer and environmental protection, and can help facilitate international trade by providing trading partners with necessary information on SPS-related standards. Less developed countries can view existing legislation and regulations from other countries when drafting their own.

Concept Paper, "IPFSAPH" (INF/6, 26th Session of CAC, July, 2003)

<http://www.fao.org/docrep/meeting/006/y9489e.htm>

Material transfer agreements: MTAs are important for exchange of biological material between laboratories and countries. FAO has dealt with MTAs in various fora as shown below.

CGRFA-9/02/REPORT

Report of the Ninth Regular Session of the Commission on Genetic Resources for Food and Agriculture

<ftp://ext-ftp.fao.org/ag/cgrfa/cgrfa9/r9repe.pdf>

CGRFA-9/02/20

Renewal of the agreements between the International Agricultural Research Centres of the CGIAR and FAO and draft revised Material Transfer Agreement

<ftp://ext-ftp.fao.org/ag/cgrfa/cgrfa9/r9w20e.pdf>

FAO-BioDeC database on biotechnology

FAO-BioDeC is a database meant to gather, store, organize and disseminate, updated baseline information on the state-of-the-art of crop biotechnology products and techniques, which are in use, or in the pipeline in developing countries. The data base includes about 2000 entries from 70 developing countries, including countries with economies in transition.

http://www.fao.org/biotech/inventory_admin/dep/default.asp

J. WEBSITES

- The AP&H Section Website is being updated on a regular basis. Please feel free to look at it 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>
- A training package to help artificial insemination (AI) technicians to improve the performance of AI and field services provided to farmers is now accessible from the AP&H Section Website (<http://www.iaea.org/programmes/nafa/d3/index.html>). It was produced under an IAEA Technical Cooperation Project – RAF/0/013 – ‘ICT-BASED TRAINING TO STRENGTHEN LDC CAPACITY’ with the collaboration of the Animal Production & Health Section of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture. This package is also available as a CD ROM from the for users who have no access to internet connection.
- 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>.
- Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture Website:
<http://www.iaea.org/programmes/nafa/>
- FAO Website: <http://www.fao.org/>

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