IAEA

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

Animal Production & Health Newsletter

No. 42 July 2005

http://www.iaea.org/programmes/nafa
http://www.fao.org

ISSN 1011-2529

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Yak production in Alpine Region of Qinghai-Tibetan Plateau

TO OUR READERS

Dear Colleagues,

The first six months of this year have been a busy time for all personnel in the Subprogramme. Apart from our regular Coordinated Research Project (CRP) activities and our technical support given to ongoing national and regional Technical Cooperation projects (TC), we were also involved in the initiation (together with TC Country Officers) of the 2005/6 biennial TC project cycle. In addition to this, when carrying out our 2004/5 midterm performance evaluations, we could identify the areas where good performance was achieved as well as areas where further improvements are needed. It is hoped that our inputs will serve the best interests of our Member States.

1. The characterization of locally available feed and animal genetic resources and the identification and alleviation of constraints in the management of feeding, breeding and reproduction so as to improve the efficiency of livestock production while conserving the environment. This is done through the transfer of the following technologies:
   - *Radioimmunoassays (RIA) for measuring hormones:* for identifying and mitigating constraints to efficient livestock production and improving the delivery of national artificial insemination services and providing diagnostic services to farmers.

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- *Radiolabelled and stable isotope-based feed evaluation systems:* for developing effective feed supplementation strategies using locally available feed resources, particularly those that do not compete with human food.
- *Radiolabelled hybridization, polymerase chain reaction (PCR), gene expression and other molecular methods:* for characterizing rumen microbial ecology to develop and use strategies to decrease environmental pollution from gases and excretions from livestock and for characterizing small ruminant genetic resources; also for identifying quantitative trait loci, microsatellites and genes for disease resistance and productive traits.

2. The assessment and reduction of risk to livestock by effective diagnosis and monitoring of transboundary animal diseases and zoonoses and their use in national and international control and eradication programmes, through:
   - *Immunoassays (such as ELISAs), molecular and PCR diagnostics and other molecular techniques:* for the development, standardization and validation of veterinary diagnostic test procedures to improve national and international trade and the control of livestock diseases to improve the livelihood of the informal or small-scale farming community.
   - *Establishment of quality systems related to nuclear and non-nuclear disease diagnosis and monitoring methods*: for the development, standardization and validation of reagents and kits, the development of standard operating procedures and guidelines for their use, to establish quality assured disease control measures and to transfer technology and knowledge for use in veterinary diagnostic laboratories.
3. The assessment and reduction of risks to livestock products by effective screening and quantification of veterinary drug residues in animal products and promoting safety of foods, through:
   - *RIAs for measuring veterinary drug residues: to* promote safety of food of animal origin and to meet international requirements for their trade.
   - *Establishment of quality systems related to nuclear and non-nuclear methodologies:* to determine veterinary drug residues in veterinary drug laboratories.

The above activities are complemented by tools developed for computerized data management in disease diagnosis and animal production; use of geographic information systems in management of farm resources and diseases; and distance learning through information communication technologies in the related areas.

Both past and future activities are described in further detail in this Newsletter and are also accessible at our AP&H Section website (http://www.iaea.org/programmes/nafa/d3/index.html). Recently, we have introduced a FEEDBACK section on the left column of the first web-page. Please contact us if you have any further ideas, comments, concerns or questions. We thank all those who have responded to our request to update their contact and mailing address details and urge those who haven't to please do so by replying to R.Schellander@iaea.org, to ensure that the next copy of our Newsletter will be received. We will also be able to widen our network if the addresses of unsubscribed colleagues are sent to us. As discussed in previous Newsletters, the Animal Production and Health Subprogramme will continue to move progressively forward and in pace with developments within the livestock field so as to optimally serve our Member States. We will therefore continue to encourage project teams to keep abreast of current technological developments and to promote their implementation where feasible. This would allow a better positioning of our Member States with respect to international trade and other livestock-related issues. In turn, this would promote improved quality assurance of animal husbandry and health practices, and also lead to a greater autonomy for Member States.

In our news from the Subprogramme, we want to welcome two new members of staff who joined us in March 2005. Hermann Unger did his veterinary degree at the Veterinary University of Vienna in the early 1980's and his tropical disease management post-graduate studies at the University of Berlin, Germany. He has extensive experience with veterinary health projects in Africa and Asia which includes the development and evaluation of diagnostic tests (Trypanosomiasis, Rinderpest, FMD, CBPP), the use of tissue culture-based diagnostic tests and to establish animal models to study immunological aspects following influenza and Rift Valley fever infections. The focus of all these projects was on host/pathogen interactions and possible immune mechanisms. Paul Boettcher grew up on a small dairy farm in Wisconsin, USA and obtained his respective university degrees (in animal science and genetics) from the Universities of Wisconsin, Minnesota and Iowa State. After completing his PhD study on the effects of cytoplasmic inheritance on production traits in dairy cattle, he moved to the University of Guelph in Canada as Adjunct Professor and Senior Research Associate. In 2000, he moved to the Institute of Biology and Biotechnology in Agriculture at the Italian National Research Council where he was involved in the development and application of statistical approaches to the analysis of genetic traits in both livestock and humans, with an emphasis on traits related to health. We want to wish both members a pleasant time in the Subprogramme.

We also welcome Ericka A. Pestana and Charles Bodjo who have joined the Animal Production Unit at the at the FAO/IAEA Agriculture and Biotechnology Laboratory You will find a description on background and current work on page 19 of the current Newsletter.

Finally, as most of you already know, Jim Dargie retires in July as Director of the Joint FAO/IAEA Division. For us at the Subprogramme this will be a particularly big loss as Jim was firstly a Technical Officer and later the Head of the Animal Production and Health Section before taking the position as Director of the Division more than 10 years ago. Under his guidance and leadership the Subprogramme has made significant progress forward to address the needs of Member States. We want to wish him and Marina only the very best for the future. The newly appointed Director, Mr. Liang Qu is from the People's Republic of China and holds an advanced degree in Agronomy from the Chinese Academy of Agricultural Sciences. His former positions include Deputy Director General of the Institute for Application of Atomic Energy, Beijing; Director-General of the Department of International Cooperation and Industrial Development of the Chinese Academy of Agricultural Sciences; Permanent Representative of China to FAO and, his most recent position, Director-General, Dept. of International Cooperation in the Chinese Academy of Agricultural Sciences. We want to wish him luck with his new position and we look forward to work with him, as a team, to promote the cause of our Member States.

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 the OIE.

FORTHCOMING EVENTS

Third RCM to Develop, Validate and Standardize 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 final RCM will be held in Hanoi, Vietnam, from 20 to 24 June 2005. Fifteen Research Contract and Agreement holders will attend. The meeting will discuss the developments of the past five years and focus on producing a document for publication.

XX International Grassland Congress

Technical Officer: Harinder Makkar

The Animal Production & Health Section cooperates in this International Congress, which will be held in Dublin from 26 June to 1 July 2005. The Joint FAO/IAEA Division is a co-sponsor of this Congress.

First RCM on Development and Use of Rumen Molecular Techniques for Predicting and Enhancing Productivity through a Reduction in Rumen Methane D3.10.24

Technical Officer: Harinder Makkar

The first RCM will be held from 12 to 16 September 2005 and a Training Workshop from 26 September to 7 October 2005 at the Institute of Animal Science and Nutrition, ETH-Zentrum Zürich.

The purpose of the Research Coordination Meeting is to review the work done and plan the future research and the purpose of the training workshop is to train participants in methane measurement methodologies *in vivo*.

Seminar of the FAO-CIHEAM Sub-Network on Sheep and Goat Nutrition

Technical Officer: Harinder Makkar

The Animal Production & Health Section cooperates in this seminar which will be held from 8 to 10 September 2005 at the University of Catania.

First RCM on Veterinary and Human Surveillance of Rift Valley Fever

Technical Officer: Gerrit Viljoen

The first RCM is scheduled from 3 to 7 October 2005 in Dakar, Senegal. The purpose of the Research Coordination Meeting is to review the projects and to prepare work plans.

First RCM one 'Gene-based Technologies in Livestock Breeding: Characterization of Small Ruminant Genetic Resources in Asia D3.10.25

Technical Offier: Paul Boettcher & Fernando Garcia

The first RCM will be held from 19 to 23 September, Bogor, Jakarta. The purpose of the Research Coordination Meeting is to review the projects and to prepare work plans.

Consultants meeting on Improvement of Animal Productivity in Developing Countries by Manipulation of Nutrition *in Utero* and to identify future areas of research in Animal Nutrition

Technical Officer: Harinder Makar

This meeting will be held in October 2005. The objectives of this meeting are to: i) evaluate the overall scope of a new Coordinated Research Project (CRP) in the field foetal programming, and ii) suggest specific areas of research of importance to developing countries and develop a work plan for a CRP within that scope. This new CRP is likely to be initiated in 2006. Another objective of this meeting is to evaluate the applicability of nuclear and isotope based techniques in researches related to other areas of research in Animal Nutrition and based on the information, identify and suggest areas of future research.

Consultants Meeting on International Harmonization of SOPs for FMD Diagnosis

Technical Officer: John Crowther

The meeting will consider the present protocols for the use of PCR for the detection of FMD and focus on finding universally accepted methods. Agreed protocols and SOPs will be published in line with the fitness for purpose criteria required for test validation by OIE. The meeting is planned in November at the VIC, Vienna. Contacts with scientists from Australia, UK, USA and South America have been made. Further information for exoerts who wish to attend at their own expense can be obtained from the Technical Officer.

PAST EVENTS

Consultants Meeting on Early Warning Devices and Tools for the Early and Rapid Detection of Animal Diseases

Technical Officer: Gerrit Viljoen

The meeting was held at the Vienna International Center, Vienna, Austria from 29 November to 3 December 2004.

The purpose of the meeting was to determine current and future technologies useful for early warning of the occurrence of pathogens and toxic agents affecting animal's health, potentially endangering public health and food security.

Global effort is needed to ensure the early detection and rapid response to outbreaks of priority livestock diseases. This will include cooperative research to develop affordable and effective solutions, educational resources, communication and validated diagnostic tools for the farmer, as well as through the logical hierarchy of veterinary services (local, central, national, regional, reference laboratories) and to the appropriate veterinary authority (action agency).

The wide range of diagnostic tools are clearly dependent on the intended purpose, devices available and the target to be identified (pathogen, toxin or other biological marker(s)). Current technologies range from penside or dipstick technologies to multiple biomarker detection systems like microarrays. The selection of diagnostic tools should be based on the most effective, appropriate, affordable, and maintainable platforms available for the desired purpose. The tools should reflect the diagnostic urgency to promote timely and informed decision making.

The use of multiple platforms (in sequence or in parallel) should increase confidence in the diagnostic results, aide in risk-assessment, and to ensure that appropriate response is taken. Penside or dipstick technologies exist and are beneficial, but development and validation of new tests require biological reagent development and commercial partnership for sustainable production and quality assurance. The real-time PCR is currently the genetic amplification device of choice, however, it is only one of several methods available and not appropriate in all environments or situations. Other amplification technologies should be evaluated because the cost of current amplification technologies hinders the sustainability of this technology. Biosensors, multi-bead flow-through, and other emerging technologies are coming available and efforts should be made to encourage the development of this technology for agricultural purposes. Remote sensing devices that would allow the early forecasting or detection of disease should be investigated. This would include satellite monitoring of environmental factors associated with potential disease outbreak conditions, information search tools to monitor open source internet-based material, and the capability to track and monitor the health of an individual or sentinel or animals from a remote location. Integration of currently available databases that can filter collected data sets in an electronic matter (not requiring human resource capital) is needed. It is recognized that understanding baseline data and its relevant analysis for disease forecasting is required. An important aspect to remember is that sample treatment (collection procedure, preparation, quality, etc) prior to being submitted for analysis is critical.

Conclusions and recommendations

The Joint Division should aid the coordination of global efforts to develop the appropriate diagnostic technology that can be validated according to international guidelines. These efforts will result in increased capabilities for the early detection of animal and human pathogens or toxic agents that threaten the safety of the world's food supply and public health at large.

The application of the appropriate devises and tools is critical to the success of an early warning alert and disease system.

Real-time PCR (leading from PCR and PCR sequencing) is currently the genetic amplification device of choice and should be supported.

Direct detection methods are becoming more available and should be the method of choice in the medium to long term (i.e. 5–10 year projection).

Proficiency reference standards should be developed, characterized and cataloged. They are critical to the validation and implementation of early detection tools and the harmonization of their use.

The proper application of these tools will require the availability of education and communication tools.

A follow-up consultant meeting will be scheduled for 2006.

Work Planning Meeting and Training Course on "Gene-based Technologies in Livestock Breeding: Characterization of Small Ruminant Genetic Resources in Asia"

Technical Officer: Fernando Garcia

The meeting was held at the International Livestock Research Institute ILRI, Nairobi, Kenya, from 13 to 24 December 2004.

The Joint FAO/IAEA Division has undertaken new initiatives in the field of nuclear and related techniques applied to livestock genetics and breeding in the past 2 years. Following the organization of an International Training Course in livestock molecular genetics in June/2004 in Seibersdorf, activities on the CRP entitled "Gene-based Technologies in Livestock Breeding: Characterization of Small Ruminant Genetic Resources in Asia" (D3.10.25) started in December 2004 with the FAO/IAEA Training Course and Planning Meeting on "Molecular Genetics of Small Ruminants in Asia". The course was funded by the Joint FAO/IAEA Division and outsourced to ILRI – Kenya. During this meeting in Nairobi, work schedule and follow-up mechanisms for field and laboratory work were defined. Activities related to the work planning meeting and training course occurred simultaneously, proving to be highly successful and productive. Theoretical explanations, discussions, as well as 'hands-on' activities were performed. The programme also included technical visits to farms and research stations in Nairobi and surrounding areas. In addition to the nine Research Contract holders (Pakistan, Indonesia, Sri Lanka, Bangladesh, Iran, Vietnam and China - 2), ILRI staff members and the former coordinator of the ECONOGENE EU project attended the meetings. The ECONOGENE project aims at the sustainable conservation of animal genetic resources in marginal rural areas, by integrating molecular genetics, socio-economics and geo-statistical approaches, and it complements the FAO/IAEA CRP objectives.

Third RCM to Develop Methodologies for Demonstrating Increases in the Productivity of Peri-urban Dairy Cattle Using an Integrated Approach to Nutrition, Reproductive Management and Disease Control (D3.10.23)

Technical Officer: Paul Boettcher

This RCM was held in Pretoria, South Africa, from 14 to 18 March 2005. The objective of the meeting was to present and discuss results of completed field surveys, laboratory investigations and partial budget analyses; to review on-going interventions; to assess the applicability of the Livestock Information Management Application (LIMA) and make recommendations for any changes necessary; and to finalize an integrated strategy for implementation during the final phase of the project. The primary achievement of the meeting was the writing of comprehensive workplans for the remainder for the project for each of the contract holders. The local organizer was Dr. Leon Prozesky, a contract holder from the Section of Pathology, Department of Paraveterinary Sciences, Faculty of Veterinary Science, University of Pretoria.

A detailed report is available on the AP&H Section website.

Project Coordination Meeting for the RCA Project: Integrated Approach for Improving Livestock Production Utilizing Indigenous Resources and Conserving the Environment (RAS/5/044)

Technical Officers: Harinder Makkar and Paul Boettcher

The meeting was held in Beijing, China from 4 to 8 April to plan activities of this new project. The objectives of this project are to improve animal productivity and decrease emission of greenhouse gases, (methane and carbon dioxide) and discharge of nutrients (nitrogen and phosphorus) into the environment; and to identify and adopt better breeding strategies that will improve animal productivity through the use of better selection criteria for offspring from cross-breeding programmes, optimum utilization of appropriate indigenous cows, and improving procedures for management, nutrition and healthcare programmes in dairy farms. The meeting was hosted by the Institute of Agricultural Environment and Sustainable Development of the Chinese Academy of Agricultural Sciences (CAAS), Beijing, China. It was attended by 23 nominated Project Coordinators from 12 RCA MS (Bangladesh, P.R. China, India, Indonesia, Malaysia, Myanmar, Pakistan, Philippines, Korea, Sri Lanka, Thailand and Vietnam) and was supported by two IAEA experts (Dr. Graeme Blair of Australia for nutrition and Dr. Peter Ball of the United Kingdom for reproduction) for the entire duration of the meeting. Dr. Graeme McCrabb of Australia (based in Thailand) provided expert services for only first three days to the nutrition group. The meeting was organized in the form of joint plenary sessions and parallel scientific and discussion sessions for the two groups of counterparts in nutrition and reproduction. The work plans for the participating groups were formulated and training and expert services needs for achieving the objectives of the project were identified. A detailed report is available on the AP&H Section website.

Third RCM to Develop 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 third RCM for the CRP on the development of strategies for the effective monitoring of veterinary drug residues in livestock and livestock products in developing countries was held in Natal, Brazil, from 11 to15 April 2005. The meeting was attended by ten Research Contract holders, a second representative of the research group of the host country, two Research Agreement holders, two Technical Contract holders and the Scientific Secretary.

The meeting was opened by Dr. Alfredo Montes Niño on behalf of the host country. An overview of the objectives and progress of the project was presented by the Scientific Secretary, Dr. Andrew Cannavan. Background and review papers were presented on modified gene expression profiles in bovine liver after animal treatment with anabolic steroids (Prof. Heinrich Meyer, Germany), future issues in veterinary drug residue analysis (Dr. Chris Elliott, UK), studies on the antibody response of *Lama glama* – evaluation of the binding capacity of different IgG subtypes in ELISAs for clenbuterol and BSA (Dr. Iris Lange, Germany) and the preparation of reagents for use in monitoring of veterinary drug residues in livestock (Mr. Terry Fodey, UK). The Scientific Secretary also presented an overview of the INFOCRIS database and the e-learning modules and courses available and under development by the Joint FAO/IAEA Division.

The progress of each research group was presented and the results were discussed and used to formulate individual work plans for the final phase of the CRP. The main focus of the project to date has been on method development or adaptation and evaluation. Progress has again been made in this phase of the project on the development of immunoassay methods for chloramphenicol. Many of the problems encountered in the first phase of the CRP with reagent production have been overcome and good quality antibodies and conjugates are now being produced in several laboratories. Some stability problems have been addressed, for example by a change of format from direct to indirect ELISA. Antibody production and maturation has been studied in various species. The overall objectives for the final phase of the project for those groups working on ELISA (Indonesia, Kenya, Korea, Sri Lanka, Barbados, Malta, Cyprus) are to develop test protocols using the reagents produced, validate the methods and compare results with test kits and confirmatory methods. This will require further investigation into methods to stabilize reagents, including lyophilization and the use of ammonium sulphate or glycerol, further antibody purification and characterization, optimization and validation of test protocols, and transfer of methods for comparison in partner laboratories and against commercially available kits.

The scope of the RIA method employed in Brazil has been successfully broadened to include a second beta-agonist, mabuterol. A full validation, including parameters specified in European Community Decision 2002/657/EC, was presented at the RCM. Future work aims to extend the scope further to include a range of beta-agonistic compounds, through further cross-reactivity tests and development of suitable multi-residue sample preparation protocols.

Confirmatory LC-MSMS methods, including extraction procedures, for both the nitrofuran metabolites and chloramphenicol in meat have been developed by the research group in Argentina. Confirmatory methods are, therefore, now available in laboratories in South America and in Asia (Thailand). The work plan for the final phase includes optimization of extraction procedures for different matrices and full validation of the methods according to criteria specified in Decision 2002/657/EC.

A full set of reagents and protocols for their optimization in a novel ^{125}I-radioimmunoassay (RIA) for chloramphenicol was developed in the first phase of the project by the technical contract holders. No progress has been made on the further elaboration of this promising method and it has been decided to transfer this work to the research group in Brazil.

Progress was also reported on the development of HPLC methods for nitrofuran metabolites. Nitro-phenyl derivatives of the metabolites of the four main nitrofuran drugs have been produced in Namibia and applied in an HPLC-UV method. Various fluorescence reagents have been evaluated and a suitable fluorescent derivative of AOZ (furazolidone metabolite) has been selected by the researchers in South Africa. Further work for both groups will include elaboration of sample extraction and clean up protocols and validation of the methods.

A number of investigations into the possible natural occurrence of chloramphenicol in poultry litter have been carried out by the researchers in Thailand. The results presented were interesting and further experiments are planned to complete this work.

The objectives of the CRP also include the elaboration of Quality Assurance and Quality Control procedures and the sharing of practical advice on the implementa-

tion of sampling plans. To help address these objectives, a detailed presentation on the preparation of a "QA Handbook for the Implementation of the German National Residue Control Plan in Bavaria" was presented by Dr. Lange. The practical steps outlined in this presentation can be adapted and used by the CRP participants in their respective countries. Dr. Elliott also presented a lecture on method validation for immunoassays and it was agreed to use the protocol provided by Dr. Elliott, with necessary adaptations to suit local conditions, as the standard for all research groups. The applicability of the immunoassay validation protocol will be discussed at the final RCM in 2006. Dr. Montes Niño presented a lecture on Conformity Assessment, which outlined the history and development of various standards and explained the role of certification and accreditation bodies.

The Scientific Secretary wishes to express his gratitude to Dr. Alfredo Montes Niño, Dr. Rodrigo Granja and the local organizing team from Microbioticos for their assistance in organizing the meeting.

Conclusions and Recommendations

The work in the second phase of this CRP has built upon the progress reported from the first phase, resulting in good quality immunoassay reagents, confirmatory methods and a number of validated methods. It is recommended that all contracts (with one exception), including technical contracts, be renewed to facilitate the completion of the work plans agreed at the meeting.

A protocol for the validation of immunoassays will be provided by a Research Agreement holder. The protocol has already been successfully applied for validation of an RIA method in Brazil. It is recommended that this protocol be adopted by all participants in the project to harmonize the validation of immunoassay methods developed.

Work on the development of the ^{125}I-radioimmunoassay for chloramphenicol has not been satisfactory. It is recommended that this work is transferred to the research group in Brazil.

The meeting agreed that the FAO/IAEA Joint Division's INFOCRIS database and associated e-learning modules are a very useful resource for developing country scientists. It is recommended to proceed with the expansion of the database as planned. In addition, it was suggested that a database and bibliography of original literature on, for example, pharmacokinetic and metabolism studies on veterinary drugs and hormonal growth promoters should be included. Much of this data was published many years ago and is very difficult to access, but is of importance in the design and development of methods.

Some of the results generated by CRP participants should be presented at the 2nd International Symposium on Recent Advances in Food Analysis, Prague, Czech Republic, 2–4 November 2005.

The final RCM will be held in approximately 18 months. The venue has yet to be selected.

Regional Seminar on the Status of the Diagnostic Control of Human and Animal Fasciolosis (PAN/5/014)

Technical Officer: Gerrit Viljoen

The seminar was held at the University of Panama, Panama City, Panama, 4–8 April 2005. It was attended by 10 regional and international fasciolosis scientists from Panama, Cuba, Bolivia, Mexico, Peru and Spain and was hosted by the University of Panama in support of their TC project "Diagnosis of bovine diseases using PCR-ELISA techniques to support productive and reproductive activities".

The seminar identified 7 Latin American countries (Venezuenela, Panama, Peru, Mexico, Argentina, Bolivia and Cuba), Egypt and Iran as countries with similar human and animal fascioliasis problems and a consensus was reached about the importance of the disease in public health and food security, mainly concerning children and females in contact with infected animals. Exchange of information showed that this is a transboundary health problem that should be faced by means of concerted international cooperation efforts. Discussions proved that there is a pronounced heterogeneity of scientific knowledge, information and data available about the characteristics of the disease in the different countries, including several in which studies had to be performed starting even from zero baseline and with appropriate tools to ascertain the present unknown situation. Information analysed suggest that there is an urgent need to implement international and national intervention activities to establish the appropriate control and prediction measures. The participation, in this meeting, of experts from different countries able to furnish complementary and high technology tools offers, for the first time, the possibility to study the disease in its entirety. Results indicate that such an international cooperation in Latin America could prove to be helpful for a global strategy against this disease.

Conclusions reached about this zoonosis clearly indicate that the complexity of the disease requests the multidisciplinary cooperation between national responsibles in public health, food and agriculture, science and technology experts, and the education sector.

Meeting of the Consortium for Gastro-intestinal Nematode Resistance Gene Mapping in Sheep

Technical Officer: Fernando Garcia

The meeting of this research consortium was held at the International Atomic Energy Agency - Vienna, Austria, from 4 to 6 May 2005. Drs. Tad Sonstegard and Curt Van Tassel from the United States Department of Agriculture (USDA) and Dr. Fuad Iraqi from the International Livestock Research Institute (ILRI) were present. The objectives of the meeting were to perform the compilation and correction of marker genotypes generated by the Bovine Functional Genomics Laboratory (USDA), International Livestock Research Institute (ILRI) and Animal Production Unit at Seibersdorf Laboratories, during the previous 12 months and to test available software for QTL identification. Molecular data was normalized between laboratories and further analyses, as well as the extension of laboratory activities, were planned for the next months. Besides the research activities, Drs. Sonstegard and Van Tassel (USDA) presented a seminar regarding to the state-of-the art of the Bovine Genome Project (more information on this initiative can be found at: http://www.csrees.usda.gov/nea/animals/pdfs/bovine/agendaforweb.pdf).

Molecular Diagnostic PCR Fellowship Training Course

Technical Officer: Gerrit Viljoen

The molecular diagnostic PCR workshop was held this year for the fourth consecutive year in a row in cooperation with PCRbiotech, Microbiology Department, University of Pretoria, South Africa from 16 May to 15 June 2005. Judging from the number of applicants, more and more researchers from developing countries are interested in the advantages that molecular diagnostic tools could bring to their laboratories to expand their repertoire of diagnostic services. In short; the training workshop is structured to ensure that participants can perform a quality assured molecular diagnostic procedure with confidence in their own laboratories. The training curriculum include both theoretical principles and methodology and "hands-on" laboratory and practical bench experiments. This should equip participants with scientific and theoretical knowledge and expose them to routine laboratory procedures associated with diagnostic PCR tests.

They were exposed to and involved in all aspects of routine PCR test procedures (classical and real-time formats), i.e. the implementation, execution, analysis, evaluation (including IQC), interpretation and result reporting. In addition, PCR laboratory set-up received some attention together with accreditation quality assurance and quality control. Other topics such as "PCR troubleshooting" were tailored towards the participant's interests and needs.

The training period was divided into three stages

Stage One: Devoted to the principles and theory of PCR. This section included a thorough review of basic molecular and cell biology principles which are relevant to the process of PCR and the application thereof. The course then progressed into the fundamentals of PCR *per se* and included the basic reaction, performance indicators and controls, contamination, etc), including the use of isotopic and non-isotopic procedures to increase test sensitivity and to confirm test specificity, with hands-on practical sessions to demonstrate the theory under discussion (PCR optimization, controls, evaluation and result interpretation). Included are new generation developments like on-line real-time PCR and automated systems and their applications and advantages,

Stage Two: Devoted to Laboratory set-up and outlay, equipment needed, quality assurance and quality control (IQC & EQC). Much time was devoted to laboratory accreditation criteria and standards required for national and international trade. Internal audit and laboratory performance indicators were discussed in detail. Each participant's "home PCR laboratory" was discussed and suggestions made.

Stage Three: Designed towards a "hands-on" practical and training period concerning the molecular and/or differential diagnosis of veterinary pathogens, for example, CBPP/CCPP/mycoplasma differential PCR, Brucella differential PCR, foot-and-mouth typing, Newcastle disease pathotyping, Rift Valley fever PCR and others. Laboratory preparedness in the early, and quality assured, detection of important animal disease pathogens received much attention.

The course coordinator was Prof Louis Nel. The course presenters were Prof Louis Nel (louis.nel@up.ac.za) and Prof Gerrit Viljoen (G.J.Viljoen@iaea.org).

ONGOING ACTIVITIES

Development of OIE guidelines for submission of tests for approval and registration

Technical Officer: John Crowther

During the 71st General Session of the OIE in May 2003, the International Committee adopted Resolution No. XXIX. This Resolution endorses the principle of validation and certification of diagnostic assays (test methods) for infectious animal diseases by the OIE and gives a mandate to the Director General of the OIE to set up the specific standard procedures to be used before the final decision for the validation and certification of the diagnostic assay is taken by the OIE International Committee.

The Resolution establishes that 'fitness for purpose' should be used as a criterion for validation.

To this end, with the aid of an outside expert (Dr. X. B. Chen) templates (two forms) have been developed to guide applicants in the process of application. A web-based management system for application was also developed and offered to the OIE to allow on-line application and management of documents. In the short term, the OIE is announcing a registration system on their web pages that will involve submission of hard copies. In the longer term the web-based management system will be introduced. Direct information from OIE about this initiative can be obtained from Francois Diaz (f.diaz@oie.int).

Education to Improve the Quality of Research from Developing Countries

Technical Officer: John Crowther

A site has been set up on researcher-training.org to develop a large web based training and education package on research. This activity is in response to the observed weaknesses at all levels in research. The platform used for this very flexible package is Moodle which offers a wide range of activities for allowing monitoring, supervision, testing and interactions between supervisors o and students. The package is intended to educate at fundamental as well as higher levels. The package will be useable by anyone and made available under a licence ensuring quality issues are maintained. The themes contained in the modules are shown below.

Theme 2 (the research mind) is thought to be of highest importance. Skills are taken care of in Theme 3 and there will be a large and expandable tools and technologies section in Theme 4. Some modules are already developed and it is hoped to have a fully working package by the end of November 2005.

Theme 1: Setting the Scene
- Module A01: What is Research?
- Module A02. Where are You as a Researcher?

Theme 2: Developing the Research Mind
- Module B01. How to Plan Research
- Module B02. Understanding the Importance of Experimental Design
- Module B03. Being a Responsible Scientist

Theme 3: Building Your Skills
- Module C01. Searching the Scientific Literature
- Module C02. Getting Advice from other Scientists
- Module C03. Processing Data and Interpreting Results
- Module C04. Writing a Scientific Paper for Publication
- Module C05. Giving Presentations in Science Meetings
- Module C06. Using Your Time More Effectively
- Module C07. Getting to Grips with Internet
- Module C08. Adopting Good Laboratory Practices
- Module C09. Managing and Supervising Research
- Module C10. Applying for Research Funding
- Module C11. Understanding Intellectual Property Issues

Theme 4: Tools and Technologies to Help You
- Examples
- How to use MS Word to write papers for an IAEA-TECDOC
- Enzyme Linked Immunosorbent Assay (ELISA)
- Polymerase Chain Reaction (PCR)

IAEA Collaborating Centre in Animal Genomics and Bioinformatics

Technical Officer: Fernando Garcia

In a pioneer initiative, the Department of Nuclear Sciences and Applications of the IAEA has designated research laboratories from leading institutions in different continents, specialized in distinct areas of nuclear knowledge, as **IAEA Collaborating Centres**.

Related to the AP&H Subprogramme, an IAEA Collaborating Centre in Animal Genomics and Bioinformatics (AGB) was approved in late 2004. This Centre is formed by four laboratories from three different world-class research/teaching institutions from Brazil, located in the São Paulo - Rio de Janeiro geographical area. The laboratories have facilities for preparation and delivery of reference standards and research and training, and are designated together as one IAEA Collabo-

rating Centre, with the Animal Biotechnology Laboratory (ABL) - Escola Superior de Agricultura Luiz de Queiroz - University of São Paulo – Piracicaba, acting for them in relations with the Agency. The other three component laboratories are Laboratory of Molecular Morphophysiology and Development (LMMD) - University of São Paulo – Pirassununga, Laboratory of Molecular Biology of Trypanosomatids (LMBT) - Fiocruz (Oswaldo Cruz Foundation) - Rio de Janeiro and Animal Biochemistry and Molecular Biology Laboratory (LBBMA) - São Paulo State University - UNESP - Araçatuba.

These institutions have the capacity to fulfil functions relevant to the Agency's programme, and hold high scientific and technical standing, attested by international recognition. This Centre will carry out work at no cost to the Agency, except in cases where the Agency may agree to fund necessary supplies and materials for work plan implementation. A three-year work plan is being finalized and the AGB Collaborating Centre is expected to work in research and development projects related to the AP&H Subprogramme. The proposed actions for the AGB Collaborating Centre are:

A) ***Information collection and dissemination of nuclear and molecular technologies related to animal genetics***. Using information available in the scientific literature and genetic databases, the AGB Collaborating Centre will maintain a monthly updated web tool containing information on molecular markers relevant to the major livestock species. On request, the AGB Collaborating Centre will prepare, test and deliver PCR primers and related reagents to Member States, to be used under supervision of the IAEA, in international, regional and national genetic studies and breeding schemes. The Agency will send relevant information to the AGB Collaborating Centre to be disseminated to research institutes through media such as website, e-mail alert, and printouts. This information will include the Newsletters, TECDOCs and other IAEA publications on this specific topic.

B) ***Development, application and evaluation of new technologies.***

1) *Bioinformatics:* Development of bioinformatics tools for databasing and comparative genomic analysis in livestock and its major pathogens, aiming at markers discovery and their future exploitation in diagnostic kit development and breeding strategies. The database design will be flexible enough to be able to host different genome data/projects, including specific analyses tools and approaches/framework to be used to identify candidate genes for diagnostic purposes, disease resistance, production traits and environment adaptation phenotypes.

2) *Population resources:* Development and characterization of livestock resource population (primarily cattle, sheep and goat breeds from the tropics), which will constitute reference families for molecular genetic studies. Emphasis will be placed on characteristics such as: parasite resistance, harsh environment adaptation, reproductive traits, milk production and meat quality. In contact with national and international institutions, DNA banks and phenotypic data banks will be generated in order to facilitate the validation of markers for future livestock breeding strategies using molecular genetic information.

3) *Molecular tools resources:* Development and characterization of nuclear and molecular tools for livestock genetic analysis (primarily in ruminants - cattle, sheep and goat). The following data should be generated: i) information on microsatellite allele size, number and frequency, ii) cDNA and EST libraries, iii) SNP information and allele frequency, iv) primers design for SNP analysis and gene expression studies and v) generation of membrane/slides arrays for gene expression studies.

4) *Technology application:* Application of suitable molecular tools to be used on the improvement of animal production in the tropics, such as disease diagnostic tools and molecular markers for marker assisted breeding and selection. After validation steps, kits will be developed to be applied in different Member States' breeding programmes.

C) ***Assistance for Agency's training programme***. The AGB Collaborating Centre will host individual fellowships and co-organize regional training courses supported by the Agency's programmes. Currently, it is possible to host up to four individual fellows per year (one per laboratory) and co-organize one regional training course each year on the subjects related to those listed above.

COORDINATED 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

This CRP has concluded with the final RCM held in Kars, Turkey in June 2004. The work conducted through this CRP will appear in a special issue of the Animal Feed Science and Technology journal during the second half of 2005. Further information can be obtained from: h.makkar@iaea.org.

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

Technical Officer: Paul Boettcher

This CRP is now in its fourth year and has a full complement of participants, comprising ten Research Contracts, one Technical Contract and four Research Agreements. The third RCM was held from 14 to 18 March 2005 in Pretoria, South Africa and the final RCM is tentatively scheduled for Sri Lanka during early December of 2006.

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

Technical Officer: Harinder Makkar

There are currently nine Research Contract holders and five Agreement holders. The next RCM will be held from 12 to 16 September 2005. The purpose of this RCM would be to review the work done and plan future work. It will be followed by a training workshop on methodologies for measuring methane from ruminants and will be held from 26 September to 7 October 2005. Both the RCM and training workshop will be held at the Institute of Animal Sciences / Animal Nutrition ETH Zurich, Switzerland.

Gene-based Technologies in Livestock Breeding: Phase 1 Characterization of Small Ruminant Genetic Resources in Asia (D3.10.25)

Technical Officers: Paul Boettcher and Fernando Garcia

As the first activity of this CRP, a planning meeting and training workshop was held from 13 to 24 December 2004 at the International Livestock Research Institute (ILRI) in Nairobi, Kenya. Eight Research Contract holders, in addition to ILRI staff members and invited resource persons, took part of the training course which covered essential aspects of theory and practical work for field and laboratory procedures in molecular genetics characterization, as well as the standardization of methods and reagents. Despite the fact that first RCM will take place only in September 2005, the group has decided to start the activities immediately after the work-planning meeting in Nairobi, which brought benefits and agility to the project. By the end of 2005, first molecular data is planned to be ready for computational analysis. Major decisions taken at the work-planning meeting referred to: 1) sampling and DNA analysis (40 individuals from each of 150 sheep and goat breeds should be taken, totalling over 6000 individual samples), 2) definition of molecular markers (microsatellite DNA markers will be the major marker in the first year's coordinated activity) and 3) definition of reference samples. The first RCM is planned for September in Indonesia and by then we expect to have a large part of the samples collected and DNA analysis in progress.

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 CRP has been concluded. It is planned to hold a consultants meeting to review the data and prepare a manuscript reviewing all experiences in transferring the technology of PCR to developing countries in association with a PCR manual written to aid developing country scientists implement the technique, by the end of 2005.

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 research made under this CRP entitled 'The use of non-structural protein of foot-and-mouth disease virus (FMDV) to differentiate between vaccinated and infected animals' is being written up as a large paper to be included in the publication of the OIE. Sera are being collected by the Research Contract holders to be sent for irradiation at Seibersdorf laboratories for reference purposes.

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 final RCM will be held in Hanoi in June 2005.

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 third RCM for this project was held in Natal, Brazil, from 11 to 15 April 2005. A summary report of the RCM is published under "past events" in this issue of the Newsletter.

Veterinary Surveillance of Rift Valley Fever (D3.20.23)

Technical Officer: Gerrit Viljoen

Rift valley fever (RVF) is a mosquito borne viral disease affecting both livestock and people. In animals it mainly causes abortions while humans show influenza like symptoms leading in a small percentage to death. The disease is endemic to Africa with sporadic major outbreaks following extreme humid conditions. In 2000, imported RVF infected cattle from Somalia caused an epidemic on the Arabic Peninsula resulting in the death of nearly 300 people and several thousand abortions in ruminants. This expansion in the epidemic area to the Arabian Peninsula raises the possibility of RVF spread to other parts of Asia and Europe, especially since RVF virus (RVFV) can be spread by a wide range of mosquito vectors.

This Coordinated Research Project (CRP) has been developed in collaboration with the Food and Agriculture Organization (FAO) and the World Health Organization (WHO). The need for this CRP arises both from the fact that existing methods to monitor the disease and to detect the disease at an early stage have not been sufficiently well validated and that the new generation of molecular techniques need to be introduced. In order to develop and install a rapid, sensitive and specific detection procedure for RVFV, in support of an early warning system for RVF, the diagnostic capability/capacity of the laboratories should be improved, sensitive (using isotopes), specific and statistically viable monitoring procedures introduced, and research personnel trained. The system should be evaluated in practice and guidelines prepared that could be used as a model for other diseases.

Research objective of the CRP

- Evaluation, validation and implementation of RT-PCR and PCR sequencing procedures for early and sensitive detection of the RVFV and its use in molecular epidemiology using isotopic techniques to improve diagnostic sensitivity (via isotope incorporation into PCR amplicons) and to confirm diagnostic specificity (via hybridization of amplicons with isotope labeled probes). In laboratories equipped with real-time PCR capabilities, the manual PCR procedures will be adapted to include their use as part of the Standard Operating Procedures (SOPs). Manual isotope based slab PCR-sequencing procedures will be implemented (in laboratories equipped with automated sequencing equipment, these procedures will be adapted for use).
- Evaluation, validation and use of iELISA formats to detect virus-specific antibodies.
- Evaluation of recombinant antigens for use in indirect and competition ELISA's.
- Harmonization of Standard Operating Procedures (SOPs) and introduction of quality assurance procedures for RVF-ELISA and RVFV RT-PCR.
- Setting up of a serological and molecular epidemiological database (based on antibody prevalence and virus isolate genetic variation).

Research Contract holders (C) and Agreement holders (A) are from research institutions in Burkina Faso (C), Eritrea (C), Guinea (C), Mali (C), Mauritania (C), Senegal (C), Kenya (C), Uganda (C), Yemen (C), South Africa (A), Germany (A) and France (A). The first Research Coordination Meeting will be held in Dakar, Senegal in October 2005 to prepare the research work plans.

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'Elevage 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).

NEW COORDINATED RESEARCH PROJECTS

General information applicable to all Coordinated 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 Cooperation (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.as

For further information contact Roswitha Schellander (r.schellander@iaea.org)

The Control of Contagious Bovine Pleuro Pneumonia in Sub-Saharan Africa

Technical Officer: Hermann Unger

Rationale and background:

Contagious bovine pleuro pneumonia (CBPP) is a highly infectious cattle disease endemic in many African countries. The Office International des Epizooties (OIE) lists CBPP in the disease category A (high socio-economic impact) and FAO regards it as one of the transboundary animal diseases (TAD) being the most serious constraints to the development of the livestock sector in sub-Saharan Africa. Control programs using mass vaccination in the 1980's reduced the prevalence enormously but in the past few years the disease has spread. The hardest hit countries are from the Southern African Development Community (SADC). Namibia and Botswana are the only countries in Africa with an active livestock trade to the EU, being free of foot and mouth disease (FMD) and CBPP. CBPP outbreaks in Angola and Northern Namibia now threatened this situation.

CBPP control and eradication depend on proper diagnosis, surveillance of cattle in diseased areas and intervention by vaccination and movement restrictions and in the worst-case scenario, culling.

Disease confirmation currently relies on time consuming bacterial culture methods. Problems with sample transport and contamination make identification cumbersome. The Polymerase Chain Reaction (PCR) is a quick and reliable alternative molecular tool providing high sensitivity but is not yet a frequently used method in most African laboratories. CBPP epidemiology is based on serology where the prescribed complement fixation test (CFT) has a limited sensitivity and a competitive enzyme linked immunosorbent assay (C-ELISA) is not yet fully validated reducing its diagnostic value. None of the tests can differentiate vaccinated from infected animals.

Addressing these issues will as well support the efforts of the Pan African Programme for the Control of Epizootics (PACE) in curbing CBPP.

Overall objectives

The target of this CRP is to support SADC countries to: gain the capacity for quick and reliable CBPP diagnosis by improving and validating diagnostic tools; perform applied research on new molecular methods in diagnosis and epidemiology; and support the installation of a disease monitoring system to better identify and control CBPP and ultimately demonstrate freedom of disease according to the OIE pathway.

Specific research objectives

- Monitoring CBPP infection by use of PCR and agglutination technique
- Validation of competition and indirect tests (C-ELISA and I-ELISA) for disease diagnosis

– Determination of CBPP isolates applying PCR sequencing
– Evaluation of the immune response to LppQ in infected and carrier animals (skin test)
– Standard Operation Procedures (SOPs) produced for sample collection and quality assurance (QA)

Expected Research Outputs

– Diagnostic and operational capability is established in the cooperating laboratories to perform CBPP surveillance and early disease diagnosis
– SOPs and quality assurance for CBPP diagnosis
– Sequence data from CBPP field isolates
– A skin test to detect latent carriers

Proposals

A call for submission of proposals will be made in January 2006. Selection of proposals for award of contracts is expected to be by May 2006.

Implementation procedure

Proposals selected for award of Research Contracts will be provided with funds, on a cost-sharing basis, to cover part of the local costs during the first year of the project. Subsequently, annual renewals will be available, based on satisfactory progress, up to a total of five years. The maximum award available under a Research Contract is US$ 11 000 for the first year and US$ 6000 for the subsequent years. It is mandatory that Contract holders have support from their institutes for part of the local costs of the project. In addition to the award of Research Contracts, scientists with international expertise in the fields covered by this project will be considered for award of Research Agreements, which do not carry cash awards. They will function as resource persons in this project to provide assistance to Contract holders.

The CRP will be implemented in collaboration with OAU-IBAR and in consultation with the Research Agreement holders.

A Research Coordination Meeting (RCM) will be held at the commencement of the project, to which all Contract and Agreement holders will be invited. This meeting will discuss the proposed work plans of each research team and elaborate a unified and coordinated approach to the studies that will be undertaken during the first two years. At the same time a training course in PCR technology will be given. A second RCM will be held after 18–24 months to present results from each research team, review progress and define further work plans for the remainder of the project period. A final RCM will be held at the conclusion of the project to present the final results and to prepare the papers presented by participants for publication by FAO/IAEA.

TECHNICAL COOPERATION PROJECTS

Operational Projects and Technical Officers responsible for implementation

ANG/5/002	Upgrading Laboratory Services for Diagnosis of Animal Diseases	Crowther Viljoen
ANG/5/003	Veterinary Drug Residues Monitoring Programme	Cannavan Byron
ANG/5/004	Monitoring and Control of Transboundary Animal Diseases	Crowther
BEN/5/002	Diagnosis and Control of Animal Diseases	Crowther Viljoen
BEN/5/003	Veterinary Drug Residue Monitoring Programme	Cannavan Byron
BKF/5/002	Development of a Veterinary Medicine to Combat the Fowl Pox Virus	Viljoen
BOL/5/016	Diagnosis and Molecular Characterization of the Foot-and-Mouth Disease Virus	Crowther
BYE/9/006	Rehabilitation of the Chernobyl-Affected Territories	Crowther
CHI/5/046	Certification of Exported Animal Products Using Nuclear and Other Analytical Techniques	Cannavan Byron
CMR/5/011	Nuclear Techniques for Improving Local Ruminant Productivity	Boettcher
CMR/5/012	Diagnosis and Surveillance of Major Animal Diseases Using Molecular Biology Techniques	Crowther
COL/5/020	Use of Protein Banks for Improving Pork Production	Makkar
CPR/5/014	Increasing the Productivity of Crop/Livestock Production System	Makkar
CYP/5/018	Improving Artificial Insemination Efficiency and Cattle Fertility	Boettcher
ELS/5/010	Improving Nutrition Practices and Reproductive Efficiency in Cattle	Makkar
ERI/5/003	Monitoring and Control of Transboundary Animal Diseases	Viljoen
ETH/5/012	Integrating Sterile Insect Techniques for Tsetse Eradication	Feldmann Viljoen
ETH/5/013	Veterinary Drug Residues Monitoring Programme	Cannavan
HON/5/002	Improvement in the Nutritional and Sanitary Conditions of Cattle to Enhance their Productivity through Nuclear Methods	Makkar
INS/5/029	Supplementary Feeding and Reproduction Management of Cattle	Makkar Boettcher
INS/5/032	Improving Beef and Dairy Cattle Production in Yogyakarta	Makkar Boettcher
INT/5/148	Establishing Quality Systems in Veterinary Testing Laboratories	Viljoen Crowther
IRA/5/012	Preparation of ELISA Kits for Diagnosis of Foot and Mouth Disease	Crowther
IVC/5/028	Surveillance and control of African Swine Fever	Diallo Unger
KEN/5/025	Development of Diagnostic Tests and Vaccines for Livestock Diseases	Unger
MAG/05/12	Increasing Self-sufficiency in Domestic Meat and Milk Production	Makkar
MAL/5/025	Food Safety Monitoring Programme for Livestock Products	Cannavan
MLI/5/019	Improving Pneumopathies Diagnosis in Ruminants Using PCR	Viljoen
MON/5/012	Monitoring of Residues in Livestock Products and Surveillance of Animal Diseases	Cannavan Crowther
MON/5/013	Diagnosis and Surveillance of Transboundary Animal Diseases and Production of Diagnostic Reagents	Crowther Viljoen
MYA/0/006	Human Resource Development and Nuclear Technology Support	Crowther

MYA/5/011	Development of Supplementary Feeding Strategies Based on Local Feed Sources	Makkar
MYA/5/012	Diagnosis and Control of Swine Vesicular Disease and Swine Brucellosis	Crowther
MYA/5/013	Integrated Approach for Enhancing Cattle Productivity	Makkar
NAM/5/007	Control of Animal diseases in Northern Namibia	Viljoen
NER/5/011	Upgrading Laboratory Services for Diagnosis of Animal Diseases	Diallo Unger
NIC/5/007	Determining Drug Residues in Bovine Meat Exports	Cannavan Byron
NIR/5/032	Control and Eradication of African Swine Fever	Crowther
PAN/5/014	Improving Cattle Production and Quality Control for Monitoring of Anmal Diseases	Crowther Viljoen
PER/5/027	Use of Nuclear Techniques to Improve Alpacas Productive and Reproductive Methods	Garcia
RAF/0/013	ICT-Based Training to Strengthen LDC Capacity	Crowther Boettcher
RAF/5/046	Increasing and Improving Milk and Meat Production (AFRA III-2)	Boettcher
RAF/5/053	Assistance to OAU/IBAR PACE Programme for the Control and Eradication of Major Diseases Affecting Livestock	Viljoen Lelenta
RAF/5/054	Improvement of Livestock Productivity through an Integrated Application of Technologies (AFRA III-4)	Boettcher
RAF/5/055	Support to African Union's Regional Programmes for Control and Eradication of Major Epizootics	Viljoen
RAS/5/035	Improving Animal Productivity and Reproductive Efficiency (RCA)	Makkar Boettcher
RAS/5/041	Production of Foot-and-Mouth Disease Antigen and Antibody ELISA Reagent Kit (RCA)	Crowther
RAS/5/044	Integrated Approach for Improving Livestock Production Utilizing Indigenous Resources and Conserving the Environment (RCA)	Garcia Boettcher
RER/5/012	Regional Control of Brucellosis in Sheep and Goats (core 2003–2007)	Crowther
SAF/7/002	Development of Veterinary Vaccines and Strengthening Drug Residue Laboratory Capabilities	Crowther Viljoen
SIL/5/006	Improving the Productivity of N'dama Cattle	Boettcher Makkar
SRL/5/039	Monitoring of Chemical Residues and Food-borne Pathogens	Cannavan
SUD/5/027	Control of Ticks and Tick-Borne Diseases Using ELISA	Unger
SUD/5/028	Epidemiology and Control of Snail-borne Diseases in Irrigated Areas	Crowther
SUD/5/029	The Characterization and Quality Assured Production of an Attenuated Theileria Annulata vaccine	Crowther
TUN/5/021	Fodder Shrubs as Feed Resources to Improve Livestock Productivity	Makkar
UGA/5/026	Monitoring and Control of Foot and Mouth Disease	Crowther
URT/5021	Livestock Development in Zanzibar After Tsetse Eradication	Boettcher Makkar Viljoen
UZB/5/003	National Livestock Feed Quality database	Makkar
YEM/5/004	Improving the Diagnosis of Animal Diseases	Crowther
YEM/5/005	Monitoring of Veterinary Drug Residues	Cannavan
YEM/5/006	Quality Management for Upgrading Animal Disease Control	Crowther Viljoen
ZAI/5/014	Upgrading Laboratory Services for Diagnosis of Animal Diseases	Crowther
ZIM/5/010	Improvement of Veterinary Diagnostic Laboratory Services	Unger

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

Import of some animal pathological samples for diagnosis by the IAEA at the Austrian high security laboratory

Last December, the IAEA signed a Memorandum Of Understanding (MOU) with the Austrian Agency for Health and Food security (AGES) for the use of the high-security laboratory this agency is operating in Vienna. With this agreement, it is now possible for the Animal Production Unit to import samples from abroad for the diagnosis of peste des petits ruminants, rinderpest, capripox and foot and mouth disease (only sera in the case of FMD).

Reference sera for PPR diagnosis

With the financial support of the Joint FAO/IAEA Joint Division, the Laboratoire de Pathologie Bovine de Bingerville, has produced reference peste des petits ruminants (PPR) anti-sera. Using a representative of each of the four PPRV lineages, these sera were produced in sheep, goats and cattle. They were sent to the IAEA in April and immediately irradiated. They will constitute a part of the serum bank the AP&H subprogramme is building up.

New Staff Members at APU

Ms. Ericka A. Pestana was born in Lima-Peru and obtained her BSc. in Biology at the Cayetano Heredia University in Lima-Peru. She worked at the International Potato Centre, conducting research on potato genetic improvement for two years. Ms. Pestana completed her MSc in Medical Molecular Genetics at the University of Aberdeen-Scotland, where she was involved in the study of molecular markers of candidate genes thought to be related to depression and manic depression. She began her PhD in Biotechnology and Plant Genetics, working at the Austrian Research Center - Seibersdorf. The work involved the development of a multiple allele co-dominant marker detection system for linkage mapping in hexaploid sweet potato, based on expressed genes. She is now engaged in the APU activities related to livestock molecular genetics.

Dr Charles Bodjo, virologist at the Laboratoire de Pathologie Animale de Bingerville, Côte d'Ivoire, has rejoined APU to work on the development of a PPR specific ELISA test, a project supported by the European Union through the African Union (AU/IBAR) PACE programme.

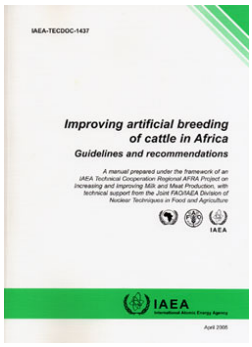
Scientific Visit in APU

From 11 to 15 of April, Mr Leopold Kazadi Mulumba Mfumu from the Democratic Republic of the Congo visted the APU. During his stay, Mr Mulumba Mfumu discussed with staff members of AP&H Subprogramme on the technical support that the Agency could provide his institute for the application of modern techniques to the diagnosis of animal diseases.

PUBLICATIONS

Recent Publications:

Guidelines and Recommendations for Improving Artificial Breeding of Cattle in Africa



IAEA-TECDOC-1437

ISBN 92-0-100705

Date of publication: April 2005

This manual of protocols, procedures, guidelines and recommendations was produced under an IAEA Technical Cooperation Project entitled "Improving Animal Productivity and Reproductive Efficiency", that was implemented within the framework of the RCA programme, with technical support of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture. It is the result of interactive collaboration between the national Project Coordinators of the project, several experts in AI in the participating Member States, IAEA experts who assisted with the project and the Technical Officer from the Joint FAO/IAEA Division. The manual is intended for livestock specialists involved in the provision of artificial insemination (AI) services to cattle farmers in Asia, including those in Ministries of Agriculture/Livestock, Departments of Livestock and Veterinary Services, AI centres, semen distribution centres and field level AI Service points. It is also a useful resource for teachers and students in Faculties of Veterinary and Animal Sciences, and those involved in the training of AI technicians.

Applications of Gene-Based Technologies for Improving Animal Production and Health in Developing Countries

ISBN: 1-4020-3311-7
Date of publication: July 2005

Published by: Springer

Modern Biotechnology has potential for solving many problems associated with animal productivity and health and offers exciting opportunities for enhancing agricultural productivity. At present the focus is, however, on the issues and problems of significance for livestock producers in the developed world. In order to fully realize the benefits of this technology in developing countries, there is a need to identify, characterize and apply appropriate gene-based technologies for these regions. These proceedings present peer reviewed state-of-the-art papers describing the achievements in the areas of animal breeding and genetics, animal nutrition, animal health, and environment, ethics, safety, and regulatory aspects of gene-based technologies; achievements which could be realized using these modern scientific tools to maximize the benefits from the 'livestock revolution' that is taking place; and the constraints in the use of gene-based technologies and their specific research needs. This book will help in bridging the wide gap between developed and developing countries, in the development and use of gene-based technologies, and to elucidate the current and future roles of such technologies in the developing world. It is a good reference source for researchers, students and policy-makers alike.

Molecular Diagnostic PCR Handbook

ISBN: 1-4020-3403-2
Date of publication: June 2005
Published by: Springer

The uses of nucleic acid-directed methods have increased significantly in the past five years and have made important contributions to disease control country programmes for improving national and international trade. These developments include the more routine use of PCR as a diagnostic tool in veterinary diagnostic laboratories. There are, however, many problems associated with the transfer and particularly the application of this technology. These include a lack of consideration for the implementation and establishment of quality-assured procedures, the required set-up of the laboratory and the proper training of staff.

This book gives a comprehensive account of the practical aspects of PCR and strong consideration is given to ensure its optimal use in a laboratory environment. This includes the theoretical aspects related to PCR, setting-up of a PCR laboratory and Good Laboratory Practice and standardized PCR protocols to detect animal disease pathogens. Examples of Standard Operating Procedures as used in individual specialist laboratories and an outline of training materials necessary for PCR technology transfer are presented. The difficulties, advantages and disadvantages in PCR applications are explained and placed in context with other test systems. Emphasis is placed on the use of PCR for detection of pathogens with a particular focus on diagnosticians and scientists from the developing world. It is hoped that this book will enable readers from various disciplines and levels of

expertise to better judge the merits of PCR and to increase their skills and knowledge in order to assist in a more logical, efficient and assured use of this technology

In Press:

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

The work conducted through this CRP will appear in a special issue of the Animal Feed Science and Technology journal during the second half of 2005. Further information can be obtained from: h.makkar@iaea.org.

Urea-Molasses Multinutrient Blocks – Simple and effective feed supplement technology for ruminant agriculture.

This publication provides a comprehensive overview of the practical aspects of development and use of urea-molasses multinutrient blocks in different parts of the world. Experiences are also presented from some countries on the production of blocks with local alternative materials, and with therapeutic additives. The impact of using these blocks by farmers in terms of enhanced income and improved cost-benefit ratio are discussed. The book also considers future research and development areas. It is hoped that this publication will be of great practical value to extension workers, students and researchers, and to those thinking of using such feed supplementation technology or of starting commercial production. This book as an FAO Animal Production And Health Paper will be available in second half of 2005.

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

The work conducted through this CRP will appear in a special issue of the Animal Feed Science and Technology journal during the second half of 2005. Further information can be obtained from: h.makkar@iaea.org.

In Preparation:

Manual on screening and confirmatory methodologies for veterinary drug residues.

Handbook on regulatory aspects of veterinary drugs and residue control.

Methods in Gut Microbial Ecology for Ruminants

This book presents a comprehensive up-to-date account of the methodologies and protocols for conventional and modern molecular techniques that are currently in use for studying the gut microbial ecology of ruminants. Each chapter has been contributed by experts in the field and methods have been presented in a recipe-like format designed for direct practical use in the laboratory and also to provide insight into the most appropriate techniques, their applications and the type of information that could be expected. The techniques and procedures described are also relevant and adaptable to other gastrointestinal ecosystems and the microbiology of anaerobic environments in general. This manual will be available in August/September 2005.

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 Cooperation project RAF/0/013 'ICT based training to strengthen LDC capacity'. Contact J. Crowther at 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:

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.

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

- 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 STRENGHTEN 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/

- FAO Biotechnology website http://www.fao.org/biotech/index.asp

IAEA
International Atomic Energy Agency

Animal Production and Health Newsletter
No. 42

July 2005

The APH Newsletter is prepared twice a year by the Animal Production and Health Section, Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture and FAO/IAEA Agriculture and Biotechnology Laboratory, Seibersdorf.

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Wagramer Strasse 5, P.O. Box 100,
A-1400 Wien, Austria

Printed by the IAEA in Austria,
June 2005

05-20991