

ANIMAL PRODUCTION AND HEALTH



NEWSLETTER

Joint FAO/IAEA Division of Nuclear
Techniques in Food and Agriculture
and FAO/IAEA Agriculture and
Biotechnology Laboratory, Seibersdorf
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<http://www.iaea.org/programmes/nafa/>
<http://www.fao.org>

TO THE READER

Dear Colleagues,

The first half of this year has been a busy time for the Sub-programme. As you will see from this Newsletter, we are operating eight Co-ordinated Research Projects (CRPs) and providing support to the implementation of over 40 Technical Co-operation (TC) projects. Related to these activities, we organized and ran nine meetings, workshops and group training events. We were involved in a mid-term review of our activities under the IAEA's Programme of Work and Budget (PWB) for the 2002–2003 biennium, and in the planning of future activities under the FAO's PWB for the 2004–2005 biennium. These discussions and deliberations have resulted in a clear view of the way ahead for our Sub-programme, which is undergoing a series of changes as outlined in the previous Newsletter of December 2002.

Our future activities in relation to FAO's programme will focus on the theme 'Sustainable Intensification of Livestock Production Systems through Technologies and Capacity-building', and will be implemented under two distinct disciplines. The first is termed 'Biotechnology and strengthened capacities for characterizing farm animal genetic resources and improving natural resource management within production systems' and will deal with issues related to feeding, reproductive management and breeding of livestock. The second, related to issues in livestock health and food safety, is termed 'Biotechnology and enhanced capacities for assessing and managing the risks from transboundary animal diseases, diseases of veterinary public health importance and veterinary drugs through international standards to improve diagnosis, surveillance and control'.

During the past two months we have also been involved, together with colleagues at FAO, in a compilation of information to be used for FAO's annual publication on 'Status of Food and Agriculture' (SOFA), which this year will focus on biotechnology. Those of you interested in following the current trends and future priorities of international donor agencies and national agricultural research systems (NARS) on this 'hot' topic will find a wealth of information on the FAO biotechnology Website, which has a section dealing specifically with livestock at the URL <http://www.fao.org/biotech/sector3.asp>. The proceedings of a recent conference convened by the Consultative Group on International Agricultural Research (GCIAR) and US National

Academy of Sciences entitled 'Agricultural Biotechnology and the Poor' is available at the URL <http://www.cgiar.org/biotech/rep0100/contents.htm> and has links to individual papers, including one on 'Genomics Research: Prospects for Improving Livestock Productivity'.

Coming back to our projects, I wish to draw your attention to a new CRP 'Gene-based Technologies in Livestock Breeding: Phase 1 - Characterization of Small Ruminant Genetic Resources in Asia' that is advertised in this Newsletter. This resulted from a consultants meeting that we held some time ago and subsequent discussions with colleagues in FAO and ILRI. Please go through the background information and, if the expertise required is available in your Institute, consider making a proposal. Alternatively, kindly pass on the information to other colleagues in your country who might be interested. The deadline for submission of proposals is December 2003. I would also like to remind you that proposals for new TC projects to be considered for the next biennium (2005–2006) need to reach the Agency, with the approval of your national Atomic Energy Commission or other competent authority, by December 2003. Further information on how to apply and the forms for proposals are available at the Website of the Department of Technical Co-operation (<http://www-tc.iaea.org/tcweb>). If you would like assistance in preparing a proposal please do not hesitate to contact us.

With regard to staff changes, I am pleased to inform you that, unlike during the previous six month period, we have not 'lost' any staff. The recruitment process for the two vacant professional posts, that of Section Head at Headquarters and of Molecular Geneticist at Seibersdorf, is now well underway. Interviews of short-listed candidates for both posts have been completed and we expect higher management to make decisions regarding these by the time this Newsletter is published. In the meantime, Dr. Roland Geiger continues to assist us with the implementation of CRPs and TC projects that Dr. Martyn Jeggo was responsible for. Ms. Alla Kist has joined the APU as a temporary technician to assist in the area of veterinary drug residues testing. We are pleased to welcome Mr. Victor Mlambo of Zimbabwe, who joined the staff as a Junior Professional Officer. He will be based at Seibersdorf and will work for one year in the area of ruminant nutrition.

I would like to thank those of you who sent feedback to my request for comments on the format of our Newsletter and suggestions for improvement. The response was not 'overwhelming' (which makes me wonder how many really read this message), but those who did respond said they were happy with the current format, so we will keep the status quo!

In conclusion, I wish all of you every success in your work and your families a happy and safe second half of 2003.

A handwritten signature in black ink, appearing to read 'Oswin Perera', with a long horizontal flourish extending to the right.

Oswin Perera,
Acting Head, Animal Production and
Health Section

A. STAFF

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

B. FORTHCOMING EVENTS

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

Technical Officer: John Crowther

This new interregional project INT/5/148 will facilitate the implementation of Quality Systems in 15 Veterinary Testing Laboratories

worldwide. The first meeting will take place from 2 to 6 June 2003 at the Australian Animal Health Laboratory, Geelong, Australia.

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

Technical Officer: Andrew Cannavan

The Training Course will take place from 16 to 27 June 2003 at the Agency's Laboratories, Seibersdorf, Austria. 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. Eighteen candidates have been selected for the first presentation of this course, from Eastern Europe, West Asia and Latin America and the Caribbean.

This course will be repeated in Onderstepoort, South Africa, 10–21 November 2003, for participants selected mainly from Africa and again in Australia in early 2004 for participants from East Asia and the Pacific. Notification and application information for the course in South Africa will be circulated and will be available on the AP&H Section Website.

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

Technical Officer: Oswin Perera

This RCM will be held from 21 to 25 July 2003 in Asuncion, Paraguay. Holders of on-going Research Contracts, Technical Contracts and Research Agreements will be invited to attend. The meeting will review results obtained by Contract holders on a participatory rural appraisal (PRA) and economic opportunity survey (EOS). Guidelines will be

provided on follow-up action to the EOS, conduct of cost-benefit analyses using partial budgets and use of the computer database Livestock Information Management Application (LIMA). Work plans for the next two years, including protocols for a diagnostic and surveillance study (DSS) and interventions for improving productivity, will be developed.

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

Technical Officer: Harinder Makkar

This Symposium will be held from 6 to 10 October 2003 in Vienna, Austria. The tentative

programme is provided at the end of this Newsletter.

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

The purpose of this Workshop for policy and decision makers, which will be held from 20 to 24 October 2003 in Vienna, Austria, is to strengthen the awareness in developing countries of the requirements and the procedures involved in the control of veterinary drug residues. The programme will include topics such as the importance of veterinary drugs and their residues, the need for surveillance programmes, the appropriate

use of veterinary drugs, maximum residue levels, marketing authorizations and the management of control/surveillance programmes. The format will include presentations by consultants, open discussion sessions and opportunities for smaller discussion groups. Notification of the course and nomination information was circulated in May 2003 and is available on the AP&H Section Website.

Second Research Co-ordination Meeting of the Co-ordinated Research Project on the Development of Strategies for the Effective Monitoring of Veterinary Drug Residues in Livestock and Livestock Products in Developing Countries (D3.20.22)

Technical Officer: Andrew Cannavan

The second RCM for this CRP is planned for 3-7 November 2003 at the Onderstepoort Veterinary Institute, South Africa. Holders of on-going Research Contracts, Technical Contracts and Research Agreements will be invited to attend.

The meeting will review the results of the research and method development performed under the first phase of the CRP and update work plans to include further development work, the elaboration of sampling protocols and the transfer, validation and integration into routine testing schemes of the methods developed.

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

Technical Officer: Harinder Makkar

The Training Workshop will be held from 1 to 13 December 2003 at the Nuclear Institute for Agriculture and Biology (NIAB), in Faisalabad, Pakistan.

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 in the 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 tannins in these feeds and proper management, they could become an invaluable source of protein for strategic supplementation.

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

The Training Course is open to 12 participants from RCA Member States. Nominations should be submitted on the standard IAEA Training course application form. Completed forms should be endorsed by, and returned through, established official channels (the Ministry of Foreign Affairs, the National Atomic Energy Authority, or the Office of the United Nations Development Programme).

They must be received by the Agency no later than 31 August 2003. Nominations received after this date or applications which have not

been routed through one of the above-mentioned channels will not be considered.

FAO/IAEA National Workshop on the Diagnosis and Surveillance of Transboundary Animal Diseases in Mongolia – Towards the Final OIE Declaration of Freedom from Rinderpest Infection

Technical Officer: Roland Geiger

This Workshop, which was initially planned for May 2003 to be held at the State Central Veterinary Laboratory of the Ministry of Agriculture in Ulaanbaatar, Mongolia had to be postponed. The new dates will be confirmed as soon as possible. The provincial veterinary officers and main diagnosticians from all provinces of Mongolia are invited to attend. Main objectives are to introduce the

participants to the background of disease reporting systems, sample submission systems, the operation and control of such systems based on performance indicators, the epidemiology of rinderpest and the principles of the OIE pathway. A national strategy and framework for a disease reporting system will be discussed and elaborated.

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: Roland Geiger

The final Research Co-ordination Meeting of this FAO/IAEA Co-ordinated Research Project (CRP) will be held from 16 to 20 February 2004 in Accra, Ghana. The main objective of the meeting is to review and summarize the results of this CRP and to focus in particular

on the economic impact of different intervention strategies (vaccination, parasite control, improved housing and supplementary feeding) to increase farmyard poultry production in Africa.

C. PAST EVENTS

Project Review, Co-ordination and Planning Meeting for the RCA Project: Improving Animal Productivity and Reproductive Efficiency (RAS/5/035)

Technical Officers: Oswin Perera and Harinder Makkar

The meeting was hosted by the Institute of Nuclear Agricultural Sciences, Zhejiang University, Hangzhou, People's Republic of China and was held from 11 to 15 November 2002. It was attended by all 25 nominated Project Co-ordinators (PCs) from 12 RCA Member States (Bangladesh, P.R. China, India, Indonesia, Malaysia, Mongolia, Myanmar, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam). The meeting was supported by two IAEA experts (Dr. Malcolm Knox of Australia for nutrition and Dr. Peter Ball of the United Kingdom for reproduction) and the Co-Technical Officers from IAEA.

The full meeting report, including detailed conclusions and recommendations, is available on the AP&H Section Website under 'Meetings and Training Courses' at <http://www.iaea.org/programmes/nafa/d3/index.html>.

A summary of the main conclusions and recommendations is given below:

Nutrition:

Conclusion

- Nutrition activities of the project integrate well with the national priorities. A considerable amount of work has been completed on medicated. Almost 100% efficacy of blocks medicated with fenbendazole has been confirmed by five participating Member States (MSs), and a number of potential herbal anthelmintics (pineapple leaf, neem leaf, momordica, commercial mixtures) have been identified and efficacy of the order of 75–95% when used as a single dose has been demonstrated in six participating MSs.
- All participating MSs have introduced integrated management approaches in pilot farms in one form or another, and have established strong linkages with local extension agencies. A total of approximately 2000 farmers have been trained through the pilot farms on new technologies introduced in the last phase; approximately 50% of the trained farmers

are using the new technologies. A total of approximately 10 000 man-days of training were organized for farmers and extension workers.

- UMMB technology once again has been found to have attractive cost-benefit ratios of 1:1.25 to 4.5, and benefit was higher for dairy farming than for meat production systems.
- Forty new and lesser known feed resources which do not compete with human food have been tentatively selected for further investigation and introduction in the pilot farms and wider dissemination.
- The following two group training activities were identified as needs to meet the objectives of the project and also to contribute effectively to related national and international activities: (a) tannin assay methodologies; (b) other antinutritional factor methodologies.

Recommendations to PCs and Collaborating Institutes

- The focus of the future programme should be on development and use of medicated blocks, new feed resources, proper recording systems in pilot farms, making UMMB technology sustainable and strengthening of linkages with local extension agencies.
- The groups should continue to gather information on helminth parasites and their impact on production to enable economic assessment and determine strategies for application if treatment is necessary. Impact of medicated block use on production should be completed in 2003 and its use promoted in local livestock production systems in 2004.
- Strategies for making UMMB technology sustainable must be put in place and linkages with local extension agencies (both governmental and NGOs) and work on introduction of appropriate recording systems at the pilot farms should be further strengthened. Economic analysis for the new technologies introduced in the pilot

farms should be conducted by all participating groups.

Reproduction:

Conclusions

- The project activities are fully complementary to national livestock breeding and improvement programmes in participating MSs. The surveys on AI services to identify constraints have been conducted on over 3200 farms and have involved around 5000 breeding animals in the participating countries. Most MSs have undertaken improvements and interventions at the level of AI services as well as farmers.
- All MSs have functioning RIA laboratories and the majority of MSs are routinely using the Self-coating RIA (Sc-RIA) for assay of progesterone. Thailand is now producing good quality ¹²⁵I-labelled progesterone tracer for use in the assay.
- All MSs have installed the customized AIDA Asia software for data management. A limitation in some MSs is the need to translate the program into local languages, but several are in the process of introducing it at the national level. Most MSs have installed and used the SPeRM software and it is proving valuable in those national AI Stations that previously had no other computer program for the purpose.
- Education, training and extension activities conducted to improve the knowledge and skills of field veterinarians, AI technicians, extension staff and farmers have amounted to more than 6000 man-days and benefited around 4000 participants.
- The following regional group activities were identified as necessary to ensure success and sustainability of activities after completion of the project: (a) Workshop for trainers on cattle fertility management for optimum economic returns; (b) Workshop on RIA reagent production and assay technology.

Recommendations to PCs and Collaborating Institutes

- Activities aimed at improvement of AI service quality should continue, using the information generated previously, as well as in new areas. Greater emphasis should

be given to improvement of reproductive management and herd health by farmers, including basic record keeping, heat detection and udder health.

- Specific studies on infertility diagnosis and interventions should be conducted in collaboration with specialists in relevant disciplines. All studies involving introduction of improved technologies and interventions should include cost-benefit analyses.
- All PCs should aim for AIDA Asia and SPeRM usage at the national level unless better alternative computer programs are already in use for these purposes.
- The following MSs should submit requests for consideration as Regional Resource Centres in accordance with RCA guidelines: (a) production of progesterone ¹²⁵I tracer – Thailand, Indonesia and China; (b) production of monoclonal antibody to progesterone – China, Bangladesh and Indonesia.

General recommendations to IAEA and RCA administration

- Funds should be provided for the following regional group activities that were identified as being of high priority: (a) Nutrition: tannin assay methodologies (2003, Pakistan); other antinutritional factor methodologies (2004, Thailand or India); (b) Reproduction: Workshop for trainers on cattle fertility management for optimum economic returns (2003, India); Workshop on RIA reagent production and assay technology (2004, Thailand).
- It is recommended that P.R. China should continue as the Lead Country, and Sri Lanka and Pakistan as the Assistant Lead Countries. They should take the initiative in consultation with other MSs to finalize a new project proposal dealing with the priority areas identified by the participants, to be considered for support during the next biennium (2005–2006).
- Support should be provided to Thailand to continue production of progesterone tracer for RIA and to distribute it to users in other MSs. At least one further regional centre should be established for production of tracer. Capability should also be developed to produce a suitable monoclonal antibody for RIA in the

- region.
- The final project review meeting should be

held in November 2004. Thailand and Pakistan have offered to host this meeting.

FAO/IAEA Workshop on the Diagnosis and Monitoring of Rinderpest and the OIE Pathway (PAK/5/041)

Technical Officer: Roland Geiger

This Workshop was held from 12 to 30 January 2003 at the National Agriculture Research Centre, Islamabad, Pakistan.

This Workshop was jointly organized between FAO and IAEA. Support was provided through IAEA TCP PAK/5/041 (two lecturers) and through an EU trust fund FAO TCP GCP/PAK/088EC (equipment, field activities and technical backstopping). The main objective of the Workshop was to provide training for the laboratory confirmation of rinderpest, which will support the national certification process aiming at a final OIE declaration of freedom from rinderpest infection. The Workshop was attended by participants from the Veterinary Research Institutes of all four provinces of Pakistan.

During the first week of the Workshop, the Technical Officer gave formal presentations on all aspects of the diagnosis of rinderpest, general aspects of disease surveillance, rinderpest surveillance, different ELISAs and other laboratory tests for serological diagnosis and detection of antigens. Dr. Dad Amir, who was recruited through PAK/5/041, directed the remaining two weeks. They focused on practical aspects of the diagnosis of rinderpest. From other presentations given during the present Workshop it was evident that as a result of the first Workshop in November 2000 the initially embryonic disease reporting system had improved greatly and that the first Workshop had also contributed to the control of other transboundary animal diseases such as haemorrhagic septicaemia and peste des petits ruminants. Outbreaks are now followed up and investigated and it is now essential that a system for laboratory confirmation be put in place.

Conclusions and recommendations

- The support provided by FAO and IAEA was instrumental to the eradication of rinderpest from Pakistan.
- The collaboration between the two organizations was excellent and the support provided by each of the organizations was catalytic to the success of the inputs from the other organization.
- The Workshop was successful in training participants from all provinces in the laboratory diagnosis of rinderpest. To ensure that the ELISA for the diagnosis of rinderpest is fully established in all VRIs, it will be important that these inputs are followed up.
- The technical backstopping and troubleshooting of the assays in the four VRIs will be provided through several expert missions under FAO GCP/PAK/088EC.
- The quality control of the results from the confirmatory diagnosis of transboundary diseases should be an integral component of any laboratory system. After the ELISA has been introduced into the VRIs it will be important to follow up these activities through a national Workshop which will involve all four VRIs. This Workshop should include the introduction of quality systems and be held under the guidance of the National Veterinary Laboratories, Islamabad.

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

Technical Officer: Roland Geiger

This Workshop was held from 10 to 14 February 2003 at the Central Veterinary

Laboratory, Bamako, Mali, and was jointly organized and funded by FAO and IAEA (FAO:TCP/RAF/0172 and IAEA:TCP RAF/5/053). It was attended by participants from 15 African countries. The objectives of the Workshop were to cover the background of the laboratory diagnosis of CBPP in technical presentations and in practicals. These were sample taking, isolation and identification of *Mycoplasma mycoides* subspecies *mycoides* SC (MmmSC), the complement fixation test (CFT), the latex agglutination test (LAT) for antigen and antibody detection, the dot blot test, the cELISA and its quality control.

The diagnosis of CBPP, which is regarded as the most important transboundary animal disease restricting livestock development and in particular livestock trade in the continent, is still an important constraint in many countries of the Pan African Programme for the Control of Epizootics (PACE) and in the establishment of adequate control programmes. Further support through a Workshop focusing on the francophone countries is one of the priorities of IAEA TCP RAF/5/053. Details of the Workshop will be announced on the AP&H Section Website in the near future.

Final Research Co-ordination Meeting of the Co-ordinated Research Project on the Monitoring of Contagious Bovine Pleuropneumonia in Africa Using Enzyme Immunoassays (D3.20.18)

Technical Officer: Roland Geiger

The final Research Co-ordination Meeting of this Co-ordinated Research Project was held from 17 to 21 February 2003 at the Central Veterinary Laboratory, Bamako, Mali.

The main objectives of this CRP were to develop, introduce and compare/validate a number of serological tests for the diagnosis of CBPP. The programme, which started in 1998, included 11 Research Contract holders from 11 countries of West, East and Southern Africa and 3 Research Agreement holders. The latex agglutination tests (LAT) were developed in cooperation with the Moredun Research Institute, UK and the competitive ELISA (cELISA) in co-operation with CIRAD/EMVT, France. They were compared and validated together with the complement fixation test (CFT).

Inadequate diagnostic tools and insufficient knowledge on the distribution and prevalence of the disease are one of the main constraints

in the implementation of efficient CBPP control programmes. The main achievements of the CRP are the validation of such diagnostic tools (the cELISA, the CFT and the LAT) and the development of testing strategies to overcome these constraints. In this respect the programme was highly successful and it is anticipated that it will have a major impact on the establishment of national disease surveillance programmes aiming at the control of CBPP.

The cELISA was identified as a suitable and useful test and should be submitted to the OIE Standards Commission to be considered along with the CFT as a prescribed test. During the CRP the test was introduced in all participatory institutes and is now operational in all of them. Full details are available in the conclusions and recommendations of the meeting which can be downloaded from URL

<http://www.iaea.org/programmes/nafa/d3/crp/d32018-conclusions.pdf>.

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

Technical Officer: Oswin Perera

The meeting was held from 17 to 21 February 2003 and was hosted by the Inter States School of Sciences and Veterinary Medicine in Dakar, Senegal. It was attended by all eight participants who were invited from eight AFRA MSs on the basis of their annual progress report (2002) and was supported by

an IAEA expert (Mr. Parmessur Toolsee of Mauritius), a representative of the regional laboratory that is now producing ¹²⁵I progesterone tracer (Ms. Judith Wagener of South Africa) and a local expert on cost-benefit analysis (Prof. Cheikh Ly of Senegal). The Technical Officer was unable to attend and was represented by the Project Scientific

Consultant (PSC), Prof. Naceur Slimane of Tunisia.

The meeting was opened by the Minister of Scientific Research and Technology of Senegal and the opening ceremony was addressed by him, the Director of the Veterinary School (Prof. François Abiola) and Prof. Slimane. Plenary sessions commenced with a paper, prepared by the Technical Officer and presented by Prof. Slimane, on an overview of the project RAF/5/046 and the specific objectives, activities and expected outputs for the meeting. This was followed by presentations from each participant on (a) main outcomes from project activities, (b) benefit assessment of the RIA and non-pregnancy diagnosis (N-PD) technologies, (c) cost-benefits analysis, and (d) modalities, proposals and prospects for cost-recovery for services provided to farmers.

Ms. Wagener presented a paper on 'Production and distribution of ¹²⁵I progesterone tracer – overview of methodology and proposal procedures'. Future tracer production, distribution, inputs required during 2003 and subsequent cost recovery mechanisms were discussed in detail and conclusions and recommendations were drafted. Prof. Ly made a presentation on 'Assessment of impact from introduction of improved technologies in smallholder rural farms' and Mr. Toolsee made a presentation on 'Economic evaluation of non-pregnancy diagnosis in dairy cattle by milk progesterone determination'. The meeting then discussed the approach, methodologies and work plans for data collection and analysis. An Excel spreadsheet was developed to assist each country in calculating the cost of assaying one milk sample for progesterone by RIA, based on the costs of the different components.

The full meeting report, including detailed conclusions and recommendations, is available with the Animal Production and Health Section and the AFRA Projects Co-ordinator's Office. A summary of the main conclusions and recommendations is given below:

Conclusions

1. Ensuring future availability of tracer and other materials: A comparison has been done on the costs of the tracer from different sources, and the meeting has

accepted that South Africa can supply the tracer. Attempts should be made to further reduce the costs to end-users.

2. Project results, outputs and outcomes: The project has achieved its objectives in terms of identifying reproductive problems, the efficiency of the AI technicians and problems at the farm level. It has helped member countries to identify action points to bring about improvement in reproduction of cattle. RIA laboratories in the member countries have developed the assay technique to different levels of success. There is a need for all laboratories to improve their efficiency to the highest level.
3. Cost-benefit analysis and impact assessment: Methods, approach and data requirements for a cost-benefit analysis at the farmer level were presented. The data collected for AIDA can and should be connected to other data from the market and the farm, to work out further the costs of inputs and the returns from the outputs. Then partial budgeting analysis at the farm level, individual groups and cooperatives should be worked out.
4. Sustainability of N-PD services: The reliability of the service at the RIA laboratory is of greatest importance for sustainability. There is a need to sensitize the whole range of stakeholders including policy makers on the usefulness of N-PD service. Quick analysis and timely feedback of results to the farmer will greatly increase confidence.
5. Mechanism for cost recovery: The process of cost-recovery in the provision of N-PD services should be gradual (i.e. starting with Government, cooperatives and farmers contributing to the cost). The time period for the cost-recovery will differ from one country to another. Procedures need to be adopted to minimize cost and maximize benefit of the service.

Recommendations

1. The laboratory in South Africa is requested to send the tracer produced by it to some countries in the region to test for the quality of the tracer.
2. The RIA as a service should be integrated in AI programmes of the member countries and the price of the service should be kept as low as possible.

3. Suitable laboratories should be identified to carry out RIA quality control procedures in the region.
4. It is important that each country carries out a full and detailed cost-benefit analysis.
5. Economic and technical data should be collected to be used for cost-benefit analysis and the results for each country presented in a workshop to take place in South Africa or Burkina Faso in November 2003.
6. Governments, cooperatives and other NGOs should commit themselves to support the activities of N-PD as gradual commercialization takes root. RIA laboratories should diversify in the use of their equipment to carry out more activities (e.g. in small ruminants, companion animals, etc.).
7. Continued training of veterinarians, animal scientists and AI technicians should be undertaken as a major activity.

Project Formulation and Strategic Planning Meeting for the RCA Project Sustainable FMD Kit Production in South East Asia (RAS/5/041)

Technical Officer: John Crowther

A Project Formulation and Strategic Planning Meeting for the RCA project RAS/5/041 took place from 24 to 28 February 2003 at the Australian Animal Health Laboratory (AAHL) in Geelong, Australia.

The aim of this project is to produce kits for the detection of foot-and-mouth disease (FMD) virus in clinical samples and also kits to measure antibodies against FMD, both for total antibodies following vaccination as well as after infection to distinguish vaccinated and infected animals.

The meeting was attended by all counterparts except those from Pakistan and one from Indonesia. The RCA Regional Co-ordinator from China did not attend. Full country reports as to the state of FMD control in each country were presented. Lectures on the economics of the disease were given by Dr. B. Perry. Dr. J. Edwards, Regional Co-ordinator, Regional Co-ordination Unit, South East Asia Foot-and-Mouth Disease Campaign discussed the initiatives in S.E. Asia, in particular the Myanmar, Thailand and Malaysia initiative. A report on USA FMD activities was given by Dr. T. McKenna. A report on EMPRES was given by Dr. J. Lubroth. A new work schedule was agreed in the light that AAHL Geelong can handle non-infectious purified viruses so that guinea pig and rabbit sera can be prepared for kit formulation. Discussions took place on the strains to be used, the formulation of the kits, the time course for kit validation and full kit distribution as well as the roles of the counterparts in training schemes, experts and developmental needs at the Pakchong laboratory, Thailand, where reagents will be

assembled for kit production. The details of the work at AAHL Geelong will be finalized and contracts directed as soon as possible. A training course was planned for later in the year to allow kits to be handed out for validation. The role of a regional reference laboratory was discussed. Inputs from India and Korea were positive, in that reagents are already available for harmonization of tests in the region including chromatographic strips for measuring antibodies against non-structural proteins. Conclusions and recommendations were made. A full report will be made available to counterparts. Australia was elected as the new regional co-ordinating country.

Conclusions and recommendations

1. An antigen capture ELISA kit to allow FMD diagnosis should be produced for the RCA member countries, as soon as possible in Phase 1. Phase 2 should involve kits for antibody detection (e.g. LPB ELISA and NSP).
2. Counterpart laboratories in Thailand and Australia will take a lead role in the production and distribution of the kits (2a and 2b) to all counterparts (2c) for initial validation studies and then for routine use.
 - 2a) Role of AAHL Geelong
 - (i) To produce antibodies against types O, two type A, Asia 1 and C viruses in both rabbits and guinea pigs using commercially available pre-formulation 146s (inactivated) antigens. The exact strains will be agreed.
 - (ii) To adsorb the antisera and remove anti-bovine activity.

- (iii) To titrate the antibodies against the homologous viruses, to allow an estimate for their use as capture antibody (rabbit) and detector antibody (guinea pig) in the antigen capture ELISA.
- (iv) To prepare 12S from the purified viruses and estimate the concentrations to be used as control antigens in the antigen capture ELISA.
- (v) To send the sera to the Pakchong laboratory in sufficient quantity, estimated from initial titrations, to allow the production of kits for use in preparing capture ELISA kits.
- (vi) To provide scientific support to the Pakchong laboratory in the preparation of fully validated capture ELISA kits.
- (vii) To prepare a report and submit to IAEA, JICA and counterparts.

2b) Role of Pakchong laboratories

- (i) To receive the sera and data from AAHL Geelong and store reagents under agreed conditions.
- (ii) To receive expert practical help and guidance in the preparatory phases below.
- (iii) To take aliquots of the sera and examine activities in negative pressure facilities, to develop working dilutions, controls and conjugate conditions for fully formulated kits.
- (iv) To titrate the reagents for use in the ELISA using tissue culture derived viruses from all serotypes.
- (v) To prepare 12S control antigens and standardize the controls for rabbit and guinea pig activities.
- (vi) To innocuity test such controls using an agreed standard operating procedure (SOP).
- (vii) To agree on a plate format for the ELISA.
- (viii) To receive plates, tips, reagents sufficient for preparing kits.
- (ix) To prepare mini kits for sending to counterparts as part of an initial validation exercise and a training course.
- (x) To monitor IQC data from counterparts and address problems.
- (xi) To review progress of validation and decide to prepare full kits for 400 samples.

- (xii) To run a two week training course covering all aspects of kits in FMD diagnosis including IQC with emphasis on the new kit being produced, along with experts from inside and outside the region.
- (xiii) To supply kits to all counterparts and solve problems of distribution and tracking.
- (xiv) To receive feed back on kits and assembly of data on a continuous basis as to the performance.
- (xv) To increase staff component involved in routine kit supply (issues related to packaging and legalities of transport and acceptance).

2c) Role of counterparts

- (i) To receive mini kits and evaluate their performance using existing and collected samples.
- (ii) To report on kits performance to Pakchong including IQC data (charting methods).
- (iii) To receive fully formulated kits and use these routinely in FMD control programmes (EQA).

2d) Role of Technical Officer in Vienna

- (i) To work out accurate time bound details on kit production with counterparts from AAHL Geelong and Pakchong laboratory.
- (ii) To co-ordinate activities between AAHL Geelong, Pakchong laboratory and counterparts.
- (iii) To supply procurement needs for the project.
- (iv) To organize expert visits and a training course.
- (v) To update information with lead country co-ordinator on progress and solve problems.
- (vi) To present initiatives to international organizations.
- (vii) To maintain developments of LPBE and NSP tests for phase 2 in RCA project.

2e) Role of other organizations

- (i) To co-ordinate training aspects with JICA.
- (ii) To provide expert and counterpart participation particularly for Cambodia and Laos.

- (iii) To provide training to develop regional expertise.
- (iv) To aid in training course design and fulfilment.
- (v) To co-ordinate activities with IAEA.

3. New regional co-ordinator

It was agreed that the Lead project co-

ordinator and the Regional Resource Unit should be AAHL Australia.

A full report of the meeting will be prepared and put on the AP&H Section Website.

International Symposium on Foot-and-Mouth Disease organized by the European Directorate for Quality of Medicines (EDQM)

Technical Officer: John Crowther

The International Symposium on Foot-and-Mouth Disease organized by the European Directorate for Quality of Medicines (EDQM) took place from 17 to 18 March 2003 in Strasbourg, France.

The symposium was organized to examine the current and regulatory aspects of vaccines for foot-and-mouth disease (FMD) and discuss the allied areas of diagnostics. Representatives attended from regulatory bodies, the EUFMD commission, the EU commission, OIE and commercial concerns (vaccine producers) as well as scientists involved in FMD research. A main aim was to review the Pharmacopoeia documentation with regard to vaccines. Developments using the non-structural protein (NSP) of FMD in ELISA for differentiation of infected and vaccinated livestock were

examined in the context of a vaccination to live policy. The TO gave a paper entitled Measuring foot-and-mouth disease (FMD) status of livestock-problems and solutions which highlighted the developments in the FAO/IAEA CRP examining NSP tests. This will be placed on the AP&H Section Website. The major discussions on the diagnostics centred on the relative diagnostic sensitivity and specificity of different commercial kits, the need to standardize and validate methods, the great need for standard sera and effective strategies for surveying animals using the tests. The EDQM agreed to consider acting as a standards Agency for FMD sera. It is clear that there is little real impetus to fund efficient exercises in producing standard sera, although there is an EU initiative within European laboratories to begin this process for Types O, A, C and Asia 1 FMD viruses.

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

Technical Officer: John Crowther

The RCM was held from 7 to 11 April 2003 in Rio de Janeiro, Brazil.

Recommendations and conclusions

1. Work plans were prepared and ratified. The outstanding contract funds were discussed. It was agreed that there had been significant improvement in some laboratories' ability to perform PCR through additional training and laboratory organization. This was most relevant to Vietnam and Kenya.
2. It was agreed that the Pan-tryp. primers have been examined in various laboratories with some success. Further

work to better define the conditions for their use is needed to see whether their spectrum of detection can be improved. This will be examined by Dr. Davila with cooperation from various counterparts.

3. Kits were discussed and it was believed that there was no need to supply these for any purposes at this time, although the stocking of reagents from various sources to supply a single package of reagents was advised and this could be a role for the Seibersdorf laboratory.
4. It was agreed that communication should be better. It was agreed that the protocols for PCR and the report of the first meeting would be circulated.

5. It was agreed that the details of work done on the DNA bank samples in Seibersdorf should be sent as soon as possible.
 6. It was agreed that more DNA samples should be submitted to Seibersdorf and that a protocol for this would be sent to all counterparts indicating how they were to be sent and how samples should be obtained as standards.
 7. The ELISA for *T. congolense* proved useful in some laboratories, but there are problems with the *T. vivax* system. The transfer of the ELISAs is being discussed with OVI, Onderstepoort, South Africa.
 8. It was agreed that taking of samples directly into solutions to prevent nuclease activity was useful in maintaining the maximum analytical sensitivity of the PCR. This will be examined in some laboratories, in particular the use of guanidine isothiocyanate for blood samples.
 9. It was agreed that the PCR manual being produced by OVI, S. Africa and the IAEA could be put on the AP&H Section Website as a pre-publication item.
 10. It was agreed that there should be an inter-laboratory exercise (Ring Test) arranged through Seibersdorf laboratories. This will be discussed between Dr. Diallo and Dr. Viljoen.
 11. Dr Te Pas put forward a proposal for increased co-operation and an application to the EU for funding. This will be discussed further.
 12. It was agreed that the next meeting would be held in Vietnam.
- A full report of the meeting will be prepared and put on the AP&H Section Website.

Regional Co-ordination Meeting on Regional Control of Brucellosis in Sheep and Goats (RER/5/012)

Technical Officer: John Crowther

The Regional Co-ordination Meeting which was held from 14 to 18 April 2003 in Skopje-Ohrid, Macedonia, brought together 10 countries of the region.

Recommendations and conclusions

These were considered in the light of the limited budget for the programme.

1. A document should be prepared in English and Russian to allow the situation regarding brucellosis to be considered by any country and region from all aspects, to educate authorities to design the best possible strategies for brucellosis control. This should include epidemiological as well as test criteria and clearly define the needs in terms of control or eradication criteria. This should help improve regional cooperation and serve as a template for disease awareness and where vaccination strategies are required as against identification of animals and culling. A model document is available from the EU and this can be used as a starting point for the Regional initiative.
2. An inter-laboratory exercise should be made using a panel of sera that is available from the Central Veterinary Laboratory, Weybridge, UK. This will involve the blind testing of samples by any test and results being co-ordinated. In this way it is hoped to help build up a regional network approach as well as to identify major problems in testing in individual labs. The laboratories will be coded. The TO will liaise with Dr. McMillan to assess costs and timing of this exercise.
3. A Training Course will be held in early 2004 in Skopje for 2–3 weeks on diagnosis of brucellosis in sheep and goats.
4. An expert visit should be arranged as soon as possible to Azerbaijan.
5. The Indirect ELISA for testing bulk milk samples should be modified for use in a tube ELISA to increase the sensitivity of detection due to increased sample volume and increased capacity of the ELISA antigen coating. This offers the better possibility of using a test at the farm on all batches of milk.
6. The Indirect ELISA for detecting antibodies against brucellosis in sheep and goats should be ratified under the OIE guidelines. Data from all sources should be correlated and a dossier presented.

D. 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 Second Research Co-ordination Meeting (RCM) was held from 19 to 23 November 2001 at the Centro de Energia Nuclear na Agricultura (CENA), Universidade de Sao Paulo, Piracicaba, Brazil. The purpose of the meeting was to review the results obtained so far on development, refinement, standardization and validation of tannin assays to seek correlation with animal

performance indicators; and to plan future studies. The conclusions and recommendations from the meeting can be obtained from the previous Newsletter. At present the CRP is in the second phase. Studies are in progress on development of detannification strategies, and on mechanisms of adaptation to tannins. This CRP will conclude in 2004.

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

Technical Officer: Oswin Perera

This CRP now has a full complement of participants, comprising 10 Research Contracts, 1 Technical Contract and 4 Research Agreements.

The second RCM will be held from 21 to 25 July 2003 in Asunción, Paraguay (see Forthcoming Events).

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

Technical Officer: John Crowther

This is the final year of the CRP and the setting up of routine PCR for the diagnosis and differentiation of vesicular viruses in the research contract holder's laboratories can be regarded as complete. Full reports of the work will be made as well as a set of working protocols based on the

experience of the contract holders. This will be published as a TECDOC in 2004. The main problem in most laboratories is the sustainability of the technology due to the lack of field activity and sending of appropriate samples for examination.

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 (see Past

Events). 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.

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 kits from United Biomedical Inc. (UBI) are now available and will be distributed. The concept of concentrated validation testing at a single

laboratory is still being planned, using scientists involved in the CRP. Containers to allow transport of serum to act as standards are now available and will be sent out to various laboratories to allow large volumes to be sent to Seibersdorf laboratories for setting up a serum bank. The sera prepared against FMD SAT 1 2 and 3 in S. Africa are almost ready, a single serotype remains to be prepared. This will be sent

to Seibersdorf. Monoclonal antibodies are being produced against baculo expressed 3AB and 3ABC at Seibersdorf for exploitation in a competitive ELISA. Studies in Geelong, Australia, using chicken antibodies against *E.coli* expressed 3ABC in a competition assay involving baculo expressed 3ABC as antigen show great promise. The use of dipstick technologies will be examined in co-operation with Korean scientists.

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 second RCM was held in Rio de Janeiro, Brazil, in April 2003 (see Past Events).

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

Technical Officer: Andrew Cannavan

The first RCM for this project was held in Vienna, 2–6 September 2002 and a report of the meeting can be found in the previous issue of the newsletter. The CRP involves a full complement of 12 Research Contract holders (RCH), three Research Agreement holders (RAH) and two Technical Contract holders (TCH). All RCHs have renewed their contracts for the second year of the CRP. Work on the first phase, the development and validation of screening methods, has been commenced by the RCHs using immunogens and immunoassay reagents produced and distributed by the TCHs and protocols developed in collaboration with the RAHs. Methods under development include ELISA and RIA for chloramphenicol, HPLC for nitrofurantol metabolites and RIA for beta-agonists. Each of

these compounds is banned for use in food-producing animals under EU legislation and, with minor exceptions, in the other major trading blocks. Residues of each of these compounds have been the subject of many reports in the media and some have been the cause of recent trade disputes world-wide. The objective of this phase of the CRP is to produce screening methods for the detection of residues of these compounds at appropriate concentrations to permit their control for trade purposes.

The second RCM is planned for 3–7 November 2003 at the Onderstepoort Veterinary Institute, South Africa. This meeting will review the results of the research and update work plans to include the elaboration of sampling protocols and the transfer, validation and integration into routine testing schemes of the methods developed.

African Swine Fever Technical Contract 11294 (D3.00.00)

Technical Officer: John Crowther

Following the successful distribution of kits developed by Ms. Mariame Diop, Institut Sénégalais de Recherches Agricoles ISRA, Laboratoire National de l'Élevage et de Recherches Vétérinaires (LNERV), 50 Indirect ELISA kits for the detection of antibodies against ASF are now available for sale. 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). An EQA exercise is still being planned and a technical contract being applied for.

E. 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

1. Rationale and background

Many studies have now shown that considerable genetic biodiversity exists in small ruminants in developing countries, much of which controls advantageous traits influencing adaptability to harsh environments, productivity or disease resistance. However, these indigenous genetic resources are underutilized in conventional breeding programmes due to a failure to identify animals carrying the most advantageous traits. Mapping of quantitative trait loci and genes controlling such traits, and subsequent use of this information in selection and breeding programmes, could provide considerable gains in productivity.

At present, there is a need to build capacity within national agricultural research systems (NARS) of most developing countries in Asia to conduct research in livestock genetics and breeding using modern molecular methods. Such methods are likely to become increasingly important in the future for developing appropriate breeding strategies to optimally utilize indigenous genetic resources.

This Co-ordinated Research Project (CRP) is therefore planned for implementation in two phases. The first phase aims to provide an opportunity to scientists in NARS to acquire research capacity to define the genetic characteristics of their small ruminants. The second phase will focus more specifically on genetic resistance of small ruminants to helminth parasites. This trait, which is known to exist in many indigenous breeds, is likely to be an important resource for ensuring future sustainability of many production systems. Molecular genetic methods involving nuclear and related techniques have a clear application in this field.

This CRP fits well within the current research priorities in livestock production and health of many Asian countries. It also complements programmes of the Food and Agriculture Organization (FAO) and the International Livestock Research Institute (ILRI) in the area of Animal Genetic Resources (AnGR) and will generate information that will be directly relevant

to their on-going efforts to compile a global AnGR database.

2. Overall objectives

This project intends to build capacity in developing countries in Asia to use modern molecular methods and bioinformatics to characterize and use the available genetic advantages in indigenous livestock, enabling optimum management of this natural resource. It will develop methodologies, generate information and formulate decision support systems for defining phenotypic and molecular genetic diversity, using micro-satellite and related technologies, and enable the development and implementation of national and regional strategies for optimum use and conservation of small ruminants in Asia.

3. Specific research objectives

- Complete the databases of characteristics and status for a representative set of breeds of sheep and goats of Asia, which will complement existing FAO and ILRI data for Africa and Europe;
- Develop capacity within the Asian region to use radio-isotopic micro-satellite methods and related technologies for genotype characterization of ruminants;
- Complete the analysis of regional and global genetic diversity of each species based on molecular data;
- Assess new technologies for diversity assay; and
- Make recommendations on their future application for improving ruminant productivity.

4. Expected outputs

- Increased capacity of NARS in Asia to integrate modern molecular techniques for livestock genetic characterization into research and breeding programmes;
- Improved knowledge on the genetic characteristics of small ruminants in Asia;

- Publication and dissemination of research results;
- Establishment of regional and international collaborative linkages;
- Recommendations for future research and development through use of genetic characterization to improve productivity of small ruminants.

5. Proposals

Scientists working in developing countries in Asia are requested to submit proposals for Research Contracts using the appropriate forms, which are available with national Atomic Energy Commissions and UNDP offices. The form can also be downloaded from the Website www.iaea.org/programmes/ri/uc.html or can be obtained by contacting the Technical Officer (O.Perera@iaea.org). The closing date for submission of proposals is 31 December 2003. A Training Workshop on molecular and nuclear techniques relevant to the project will be organized in 2004. The proposals submitted will form one of the criteria for selection of candidates for the Training Workshop. The CRP will commence with awards of Research Contracts being made in early 2005.

Proposals should describe the expertise and current research of the Chief Scientific Investigator (CSI) and his/her institute, with particular reference to national programmes on genetics and breeding of livestock. Information should be provided on: availability of laboratory equipment and other facilities for molecular techniques; the target small ruminant species and breeds; experimental design (e.g. geographical area, sampling techniques); proposed laboratory procedures; and existing or proposed collaborative links. Those submitting acceptable proposals will be provided with further information on minimum sampling sizes and sampling methods that will be required in order to contribute meaningful data to the global AnGR analyses.

6. 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\$ 10 000 per year and 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 technical staff at FAO in Rome and ILRI in Nairobi, who are involved in the global analyses on AnGR. Previous experience in the use of micro-satellites to define genetic diversity has shown that combining data obtained in different laboratories is very difficult. Therefore, funds allocated for the early stages of the project will include support to send an appropriate member from each research team, together with a limited number of relevant samples, to undertake training and to perform core micro-satellite analyses at ILRI. The data from all participating countries will then be combined with existing data to complete the global AnGR database. Subsequently, each research team will be assisted to establish the techniques in their own laboratories and to undertake more detailed analyses on their small ruminant genetic resources.

A Research Co-ordination 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 co-ordinated approach to the studies that will be undertaken during the first two years. 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.

For further information on Co-ordinated Research Projects, please see ‘General Information’ below.

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

Technical Officer: Harinder Makkar

Details on the background, rationale, objectives, outputs, outcomes and impact are available in the June 2002 issue of the Newsletter. The information is also available at the AP&H Section Website.

Research project proposals for the CRP are being entertained. The closing date for submission of proposals has been extended to 31 December 2003.

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>

F. 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

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

Development of standards to be used as internal controls in nucleic acid amplification assays for animal disease diagnosis

The Animal Production and Health Subprogramme has operated, for many years, an External Quality Assurance Programme (EQAP) for Animal Disease Diagnosis with the objective of assisting veterinary diagnostic and analytical laboratories in developing countries to:

- Improve their diagnostic proficiency for diseases of national importance,
- Monitor the performance of the assays used,
- Provide a framework to help laboratories establish or improve their international credibility for trade purposes by implementing a quality system based on OIE standards with the final aim to facilitate certification or accreditation.

This EQAP depended mainly on the use of the FAO/IAEA ELISA/RIA kits for which proficiency testing was organized. A continuation of this process will involve mainly facilitation of the establishment of Quality Systems in Veterinary Testing Laboratories, based on the OIE standard. The input of APU in this quality system will be in the development and storage of reference materials to be used by FAO/IAEA Member State laboratories for:

- Monitoring the performance of assays,
- Development and validation of assays,
- Implementation of proficiency testing rounds

Assays involving the polymerase chain reaction (PCR) are becoming more routine in aiding animal disease diagnosis. After having organized a Training Course in molecular techniques in 1995, the FAO/IAEA Joint Division, through different Co-ordinated Research Projects (CRPs) run by the Animal Production and Health Subprogramme, is fostering the transfer of this technology to developing countries. The first diseases targeted in those CRPs were: rinderpest (RP), Peste Des Petits Ruminants (PPR), contagious bovine pleuropneumonia (CBPP) and trypanosomosis.

For obtaining accurate and reliable results, many precautions have to be taken to ensure proper functioning of this nucleic acid amplification, in particular in avoiding carry-over contamination between test samples and the control positive sample (or between test samples themselves). Results of the PCR can also be affected by the presence of enzyme inhibitors in the test sample that need be removed during the nucleic acid purification step. Their presence might be the origin of false negative results and external standard controls are not adequate to identify all such effects. In order to identify such PCR-inhibitors in samples, heterologous or homologous nucleic acid fragments have been used as internal controls in molecular assays. Such internal controls have been shown to be effective for the discrimination of true from false negative PCR results. Standards that are thought to exhibit most accurate internal controls are designed to be co-amplified with the target specific nucleic acid in competitive PCR, within the same reaction vessel and with the same set of primers. For the gel electrophoretic analysis, the size of the PCR product from this internal control should be different from that of the test sample. Beside the fact that this kind of standard will be the true control of the PCR conditions, their use will avoid the possible contamination of the test sample by the relevant positive control.

In the APU, one of the planned activities is the development of standards to be used by the partners in the implementation of their molecular assays for some animal diseases such as RP, PPR and trypanosomosis. The causal agents of RP and PPR are RNA viruses. For the application of the PCR technique in the identification of these pathogens, the RNA has to be first transcribed into single-stranded DNA. This step is then followed by the normal PCR. In the current reverse transcriptase (RT-PCR) assays published for RP and PPR diagnosis, only external positive controls are used and they are homologous for PPR or RP or heterologous (Canine distemper virus) RNA. Two targets in the Np gene of PPRV have been amplified by RT-PCR. The PCR products have been cloned into plasmids. A clone was selected from each sample and their inserts deleted by about 40 nucleotides. The new targets can be distinguished from the originals by

electrophoresis on agarose gels. The deleted DNA (NPPR del SP and NPPR del Nad) will be transcribed in-vitro into RNAs that will be used as standards in PPR PCR test at the beginning step of the assay, during the nucleic acid purification.

As for PPR virus, a standard was prepared to be used as internal control in the PCR assay of trypanosomes with the primers Kin1 and Kin2. It is planned to develop standards for other sets of primers for trypanosomosis diagnosis by PCR.

Constitution of Trypanosome DNA and Sequence Data Banks

At the first RCM of the CRP D3.20.21 (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) held in Antwerp, Belgium, 2001, it was agreed to set up a DNA reference bank at the Animal Production Unit (APU), FAO/IAEA Agriculture and Biotechnology Laboratory, Seibersdorf.

A total of 27 DNA samples from 4 counterpart laboratories have so far been sent to the APU. Fourteen of them, plus three samples from the APU's stock, were submitted to PCR with some sets of primers. The amplified products were cloned and sequenced. The primers that were used were from:

- Mr. Dávila (Brazil) for primers AF/BR, CF/BR, and
- Mr Desquenes (Cirdes, Burkina Faso) for primers Kin1/Kin2.

All these primers allow the amplification of the internal transcribed spacers (ITS) of ribosomal DNA. One of the advantages of this target is that its size varies from one taxon to another but is conserved in size in a given taxon. The primers that were used can amplify the DNA from all trypanosomes but can make a differentiation between taxons based on the differences in size of the PCR products.

The amplification products achieved from the different DNA samples and primer combinations (AF/BR, CF/BR, KIN1/KIN2) were cloned and sequenced. The following table summarises the size of the different PCR products according to the sequence data. All the plasmids and the sequence data are available on demand.

Identification	AF/BR	CF/BR	Kin1/Kin2
T.evansi		475	
T.spp	827		
T.congolense savannahs.			533
T.congolense savannah	1030	685	533
T.congolense	1059	712	
T.congolense			749
T.brucei brucei	829	475	
T.brucei rhodensiense	826	474	
T.brucei.gambiense	827	475	532
T.brucei.gambiense	827	477	
T.brucei	827		533
T.simiae	728	388	
ID 10/T.vivax	586	249	
ID 31/T.vivax	597	259	

Veterinary Drug Residues

Recent activities in the field of veterinary drug residues in the APU have involved the reorganization and preparation of the laboratory for the Introductory Training Course on Screening and Confirmatory Methodologies for Veterinary Drug Residues (16–27 June 2003). A new HPLC system has been installed in the APU and staff are involved in becoming proficient in the software and setting up methods using this instrument.

The HPLC will be used for research and method development and to support both training and technical back-up activities for TC Projects and the CRP on veterinary drug residues. A technician has been recruited, currently on a temporary basis, to provide support for the veterinary drug residues activities within the unit.

Training of Fellows in APU

Mr Charles Bodjo (Côte d'Ivoire) spent 13 months (February 2002–February 2003) in the APU to work on the production of PPR virus recombinant nucleoprotein in the baculovirus vector for the development of a specific PPR ELISA test.

Mrs Kimberley Schiller (Sweden) spent five months (September 2002–January 2003) in the

APU and participated in the development of the trypanosome DNA sequence data bank.

Mrs Maria Helena Lino Bento (Portugal) spent four months in the APU for training on the study of 'interaction of various purified tannins with ¹⁵N labelled rumen microbes and efficiency of various tannin activating agents'.

H. PUBLICATIONS

In Press:

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

In Preparation:

A Joint FAO/IAEA TECDOC on 'Quantification of tannins in tree foliage'. The Working Manual is already available on the AP&H Section Website at the URL

<http://www.iaea.org/programmes/nafa/d3/crp/pub/d31022manual-tannin.pdf>

A guidebook dealing with practical aspects of PCR technologies as applied in the veterinary sphere, is being prepared by Professor Gerrit Viljoen, DSc. Head: Applied Biotechnology Division, Onderstepoort Veterinary Institute, South Africa, and colleagues. The manuscript is now being edited and should be available as a publication by the end of 2003. It will be placed on the AP&H Section Website before publication.

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.

Information on New FAO titles:

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I. 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 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/IAEA International Symposium on
Applications of Gene-based Technologies for Improving Animal Production and
Health in Developing Countries
6 – 10 October 2003**

Tentative Programme

Venue: IAEA, Vienna

Monday, 6 October 2003

- Opening addresses** W. Burkart, Deputy Director General, NA, IAEA, Vienna, Austria
S. Jutzi, Director, AGA, FAO, Rome, Italy
- Plenary Lectures** Chairperson: S. Jutzi, Italy
- A vision of the gene based technologies for the livestock industries in the third millennium – *E.P. Cunnigham, Ireland*
- The livestock revolution: opportunities and challenges for developing countries through gene-based technologies.– *J.D. Dargie, Austria*
- Theme-specific Session I** **Gene-based technologies applied to livestock genetics and breeding**
Chairperson: J. Gibson, Kenya
- Keynote 1.** Molecular genetics and livestock selection: approaches, opportunities and risks – *J. Williams, UK*
- Keynote 2.** Combining gene-based methods and reproductive technologies to enhance genetic improvement of livestock in developing countries – *J. van der Werf, Australia*
- Keynote 3.** Status of world's animal genetic resources: views on biotechnologies as expressed in country reports. – *R. Cardellino and I. Hoffmann, Italy*
- Contributory oral presentations

Tuesday, 7 October 2003

- Keynote 4.** The Development of Germline Manipulation Technologies in Livestock – *J. Clark, UK*
- Contributory oral presentations
- Poster session and discussions related to Theme I
- Panel Discussion 1** **Which gene-based technologies are most likely to succeed in enhancing animal productivity in developing countries?**
Moderator: J. Donelson, USA
- Speakers**
- Solving productivity constraints with rumen/nutrition biotechnology in developing countries – *R. Mackie, USA*
- Gene-based vaccine development – *J. Egerton, Australia*
- Animal breeding in developing countries based on gene-based selections – *J. Gibson, Kenya*

**Theme-specific
Session II**

Gene-based technologies applied to pathogens and host-pathogen interactions

Chairperson: P.P. Pastoret, U.K.

Keynote 1. Reverse genetics with animal viruses – *T. Mebatsion, The Netherlands*

Keynote 2. Immune evasion by viruses – *A. Vanderplasschen, Belgium*

Wednesday, 8 October 2003

Keynote 3. Future of gene base diagnostic approaches – *G. Viljoen, South Africa*

Keynote 4. Molecular Basis of Infectious Diseases in Livestock of Developing Countries – *J. Donelson, USA*

Contributory oral presentations

Poster session and discussions related to Theme II

**Theme-specific
Session III**

Gene-based technologies applied to plants, rumen microbes, and systems biology

Chairperson: C.S. McSweeney, Australia

Keynote 1. The application of microbial genomics to improve rumen function – *M. Morrison, USA*

Keynote 2. Transgenic forages and marker selection in breeding for improved forage quality of plants – *G. Spangenberg, Australia*

Poster session and discussions related to Theme III

Contributory oral presentations

Thursday, 9 October 2003

Keynote 3. Nutrition-gene interaction (post genomics): changes in gene expression through nutritional manipulations – *G. Harper, Australia*

Keynote 4. Options For Development of Transgenic Pigs With Enhanced Performance Traits – *C. W. Forsberg, Canada*

Contributory oral paper

**Theme-specific
Session IV**

Gene-based technologies in environment, food safety and animal industry and related ethical and intellectual property right issues

Chairman: J. Hodges, Austria

Keynote 1. Ethical, social, environmental and economic issues in animal agriculture – *P.C. Kesavan, India*

Keynote 2. Risks of gene transfer from GMOs (plants and microbes) to livestock and its consequences for health and nutrition – *R. Phipps, R. Einspanier, Germany; D. Beveer, UK*

Keynote 3. Regulatory and biosafety issues in relation to transgenic animals in food and agriculture, feeds containing GMO, and veterinary biologicals – *H. Kochhar, Canada*

Contributory oral papers

Keynote 4. IPR Issues with relevance to the application of gene-based technologies to animal production and health in developing countries – *G. Dutfield, UK*

Panel Discussion 2 **Role of international organizations and funding agencies in promoting gene-based technologies in developing countries**
Moderator: T. Viegas, Brussels

Friday, 10 October 2003

Panel Discussion 3 **Where to from here – How to translate recommendations of this symposium into action?**
Moderator: M.H. Jeggo, Australia

Speakers

Chairpersons of the Sessions and Moderators of the Panel Discussions:
Presentations of Recommendations

Closing ceremony/remarks

Optional visit to FAO/IAEA Agricultural Biotechnology Laboratory
Seibersdorf

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