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Market day

To Our Readers

Dear Colleagues,

As part of our regular Coordinated Research Project (CRP) activities and our technical support given to ongoing national and regional Technical Cooperation projects (TCPs), we evaluated our activities as part of the Agency's 2004/2005 midterm performance evaluation. During this exercise we could identify areas where good performances were achieved as well as those where further improvements were needed – and which we then addressed. We also had time to reflect on our past performances in order to serve the best interests of our Member States. It became apparent that more proactive measures are needed towards the detection, control and management of emerging diseases, with particular emphasis on transboundary animal diseases and the offering of relevant support to Member States. A particular case in point is the current avian influenza situation.

As a reminder, I want to briefly dedicate this section of the Newsletter to rinderpest. This viral disease of cattle, buffalo, yak and numerous wildlife species has had devastating effects throughout history. In the 1890's, rinderpest destroyed nearly 90 percent of all cattle in sub-Saharan Africa and millions of wild animals. Major rinderpest outbreaks last approximately five years and result on average in 30 per cent mortalities within a population.

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This poses a massive risk to millions of small-scale farmers and pastoralists. Major outbreaks of rinderpest could destroy more than 70 million of the total 220 million cattle in Africa, or 14 million per year. With an estimated value per head of US $120, the cost of such an outbreak would be more than $1 billion per year and a total of $5 billion for the whole outbreak (figures are based on the rinderpest epidemic of 1979–1983 from FAO). Eliminating rinderpest could thus be viewed as producing a net annual economic benefit to the African region of at least $1 billion. Rinderpest has almost been totally eliminated globally with the exception of a small region in the Somali pastoral ecosystem that encompasses northeastern Kenya, southern Somalia and some areas of Ethiopia. The goal of global freedom from rinderpest is thus within our grasp, placing it as only the second example of a disease eradicated worldwide – after smallpox. The progress towards eradication through large scale vaccination and surveillance campaigns has been a remarkable triumph for veterinary science. This serves as a powerful example of what can be achieved when the international community, the veterinary services of individual countries, as well as farming communities cooperate to develop and implement results-based policies and strategies. The key coordinating institutions in the battle against rinderpest include the Pan African Rinderpest Eradication Campaign (PARC) and later the Pan African Programme for the Control of Epizootics (PACE), overseen by the African Union with the secretariat of the Global Rinderpest Eradication Programme (GREP) hosted at FAO, and the IAEA Technical Cooperation (TC) Programme. The latter transferred technologies for reducing the risk associated with transboundary livestock diseases and those affecting veterinary public health, in association with the Joint FAO/IAEA Division of the IAEA who provided technical expertise and assistance.

Both past and future activities are described in detail in this Newsletter and are also accessible on our website (http://www.iaea.org/programmes/nafa/d3/index.html); I thus need not mention them in this section. Please contact us if you have any further ideas, comments, concerns or questions. 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, to optimally serve our Member States.

Concerning news from the Subprogramme, we want to welcome T. Abdallah, a scientist from Mali, who joined the Animal Production Unit at Seibersdorf as of 7 November for six months. Traoré has been working in the Laboratoire Central Vétérinaire (LCV) in Bamako since 1986. He will be working on the development of new tests for PPR diagnosis. Sadly, we also said farewell to two members of our staff, H. Makkar (1999–2005) and J.F. Garcia (2003–2005). Harinder joined us in 1999 and has thus completed his 7 year term with the IAEA. He and Surinder returned to the University of Hohenheim (Germany) where Harinder has a professorship. Harinder was a great asset to the Subprogramme, responsible for technology transfer to Member States related to animal nutrition. His dedication and hard work is much appreciated and he will be greatly missed as a friend and colleague. Harinder can be reached by email at makkar@uni-hohenheim.de. Fernando joined the Subprogramme in September 2003 as expert animal genetic breeder and initiated our first CRP regarding the genetic characterization of farm animal breeds. He also returns to his alma mater, the Universidade Estadual Paulista (Brazil). His dedication and hard work is much appreciated and we will certainly miss his ethusiasm and amiabililty. Fernando can be contacted by email at jfgarcia@terra.com.br. We wish both, Harinder and Fernando, as well as their families, great success and happiness. We will remain in close contact and will continue to make use of their expertise.

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

Gerrit Viljoen,
Head, Animal Production and Health Section

Staff

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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

Consultants Meeting on International Harmonization of SOPs for FMD Diagnosis

Technical Officer: John Crowther

The meeting will be held from 6 to 8 December in Vienna and 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.

Experts Meeting on Selection Criteria for Breeding Heifers (RAS/5/044)

Technical Officer: Paul Boettcher

The meeting will be held in Dhaka, Bangladesh, from 6 to 10 February 2006. The meeting is associated with the reproduction component of TC Regional Project RAS5044. Participants in the meeting will include five experts who contribute to country projects and two regional experts, and Technical Officer. The purpose of the meeting will be to discuss current breeding practices in the Member States, traits of economic importance, and prospects for the future. The expected output of the meeting will be a set of guidelines, both general and country specific, for selection of cattle, with an emphasis on improving the genetic value of females owned by smallholder farmers.

Regional Workshop for the Planning of the Control of Fascioliasis and Good Agricultural Practices (GAPs) in the Latin American Region

Technical Officer: Gerrit Viljoen

This workshop will be held from 27 February to 3 March 2006 in Mendoza Argentina.

Regional Training Workshop on Selective Breeding and Gene Technologies (RAS/5/044)

Technical Officer: Paul Boettcher

This workshop, planned to be held in the Republic of Korea in April, is associated with the reproduction component of TC Regional Project RAS5044. The purpose of the meeting will be to transfer to the Member States the basic theoretical background and appropriate technologies for application of selective breeding of livestock populations. Key topics in both quantitative and molecular genetics will be addressed, including degree of resemblance among relatives, progeny testing and nucleus schemes, genetic evaluation, detection of economic trait loci, and marker assisted selection. In addition, participants will be instructed on the theories and techniques involved in genetic characterization of animal genetic resources for the establishment of conservation priorities.

First RCM on the Diagnosis and Surveillance of Contagious Bovine Pleuropneumonia (D3.20.24)

Technical Officer: Hermann Unger

It is planned to hold the first RCM of this new CRP in Namibia.

4th International Veterinary Vaccines and Diagnostics Conference (IVVDC)

Technical Officer: Gerrit Viljoen

The Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture is cooperating in the 4th International Veterinary Vaccines and Diagnostics Conference (IVVDC) which will be held from 25 to 29 June in Oslo, Norway. Further information can be found on http://www.veso.no/IVVDC%202006/?Start_page .

Consultants Meeting on Devices and Systems for Early and Rapid Detection of Animal Diseases, Early Response to Emerging Diseases

Technical Officer: Gerrit Viljoen

This consultants meeting is planned to be held in May 2006.

Consultants Meeting on Training and Capacity Building for Research Workers in Animal Production and Health in Developing Countries

Technical Officer: John Crowther

The meeting is planned to take place in June 2006.

Molecular Diagnostic PCR Fellowship Training Course

Technical Officer: Gerrit Viljoen

The fifth workshop of this kind is planned to be held from 7 August to 1 September 2006 in Pretoria, South Africa. This workshop will be held in cooperation with PCRbiotech, Microbiology Department, University of Pretoria.

The course coordinator is Prof. Luis Nel E-mail: louis.ne.@up.ac.za.

Preparation of the 2nd Inter-Regional Training Course on Molecular Methods in Livestock Genetics and Breeding

Technical Officer: Adama Diallo

The training course will take place at the FAO/IAEA Agriculture and Biotechnology Laboratory from 27 November to 9 December 2006. The major focus will be the use of molecular methods for livestock genetic resource conservation in developing countries and breeding programmes implementation using genomic information. Different approaches for DNA marker analysis will be employed on a hands-on basis. Theoretical and practical lectures will revise the strategies for proper use of technologies involving the analysis of DNA microsatellite and single nucleotide polymorphism (SNP) markers, as well DNA sequencing methodology mainly for developing country scenarios. The course prospectus and information will be circulated to Member States, the selection process will take place after the given deadline.

Expected qualification of the candidates are:1) to have basic knowledge of the major DNA analysis techniques (nucleic acid isolation, polymerase chain reaction — PCR, electrophoresis), 2) to be currently involved in a research project dealing with livestock genetics (classical or molecular) and 3) possibility to send in advance a set of DNA samples for markers analysis during the training course.

Announcements from Member States

Research- and Web-based MSc Programmes, PhD and Certificated Online Modules in Tropical Animal Health offered by the Department of Veterinary Tropical Diseases

A new primarily Web-based modular part-time MSc (Veterinary Tropical Diseases) as well as the Certificated Online Modules in Tropical Animal Health for Continuing Professional Development is presented by the Department of Veterinary Tropical Diseases, Faculty of Veterinary Science, University of Pretoria, in collaboration with the Department of Animal Health of the Institute of Tropical Medicine, Antwerp, Belgium, and with the support of the Department of Production Animal Studies (UP) and the Department of Infectious Diseases and Immunology, Faculty of Veterinary Medicine, Utrecht University, the Netherlands.

More information is available on the following websites:
Web-based MSc (Veterinary Tropical Diseases): http://www.up.ac.za/academic/veterinary/depts_vtd_mscweb/index.htm
Research-based MSc (Veterinary Science): http://www.up.ac.za/academic/veterinary/acadoff_mscres.htm
PhD: http://www.up.ac.za/academic/veterinary/acadoff_phd.htm
Certificated Online Modules in Tropical Animal Health: http://www.up.ac.za/academic/veterinary/depts_vtd_cpdweb/index.htm

Past 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 was held in Hanoi, Vietnam, from 20 to 24 June 2005. Presentations on the work made since the last RCM were made.

Results were assessed as to whether sufficient validation data were available for establishing protocols for the specific detection of trypanosomes, as well as for the use of methods to allow general screening for all trypanosomes. It was concluded that more work is needed to meet fitness for purpose guidelines as instigated by the OIE. The guidelines are relatively new and form the basis for test design based on specific use. The Contract holders agreed to look at the guidelines and assimilate available data to highlight deficiencies in validation, to allow work to be made to increase the effectiveness of the various assays so far studied.

The development of a gel-independent stick method for visualizing PCR products though a Technical Contract was reported. The method can be used where power is not available and was reported as having a higher analytical sensitivity of detection of products than gels, which might allow improvement in the diagnostic sensitivity of tests and provide a more consistent approach. A ring test for the Trypstick was devised that will be completed by the end of 2005. This has been procured and presently is being sent out to five participant laboratories.

Discussions on the development of specific trypstick applications resulted in agreement that a device to detect trypanosomes through universal primers sets such a the ITS primers was desirable, though funding equivalent to the Technical Contract of around $ 15 000 is needed. The remaining funds for the Contract holders have all been paid and workplans for the remaining eight months of the CRP were made (finishes February, 2006). The publication of a TECDOC was discussed as to how the manuscripts were to be written and a Word template demonstrated to speed up the publication process.

XX International Grassland Congress

Technical Officer: Harinder Makkar

The Animal Production & Health Section cooperated in this International Congress, which was held in Dublin from 26 June to 1 July 2005. The Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture co-sponsored this Congress. Financial help provided by the Joint Division enabled over 15 scientitsts from developing countries to participate in 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 was held from 12 to 16 September 2005 The purpose of the Research Coordination Meeting was to review the work done and plan the future work.

This CRP was initiated with nine Research Contract holders (RCHs). However, for the present meeting eight RCHs were invited. The meeting was also attended by four Research Agreement holders and one Consultant.

The main achievements for the period May 2004 to September 2005 are:

- All RCHs demonstrated proficiency in DNA extraction from rumen samples, purification of extracted DNA and efficient PCR amplification of DNA. Quantitative RT-PCR data from *in-vitro* experiments were produced by all RCHs except the one from Thailand, due to limitations on access to RT-PCR machine;
- All RCHs demonstrated a capacity to measure methane from *in-vitro* fermentations; and
- A reliable robust screening method for anti-methanogenic activity was set in the laboratories of the participating groups, and each RCH has identified 2–3 plants or natural inhibitors for *in vivo* evaluation

During the meeting, detailed work plans for the individual RCHs for the next phase until November 2006 have been developed. The project is making good progress and is moving forward towards the evaluation *in vivo* of novel approaches to decrease methane production, support for the project must continue.

The participants of the meeting also presented papers at the International Conference on 'Greenhouse Gases and Animal Agriculture' held at ETH just after the RCM.

Workshop on Methodologies for Measurement of Methane Emission from Ruminants

Technical Officer: Harinder Makkar

This training workshop was conducted for Research Contract holders (RCHs) of the CRP entitled 'Development and Use of Rumen Molecular Techniques for Predicting and Enhancing Productivity through a Reduction in Rumen Methane', D3.10.24 and was held after the first RCM, from 26 September to 7 October 2005 at ETH's experimental station, Emmau, approximately 40 km outside Zürich. The main objective of the CRP, under which this workshop was organized, is to reduce methane (a greenhouse gas) emission from livestock and divert the energy being lost in methane production to increasing livestock production, thus enhancing the efficiency of production and reducing environment pollutants. Since methods for measuring methane from animals are complex and the capacity to measure methane from whole animals did not exist in the countries of the RCHs, the holding of this training workshop was mandatory for successful completion of the CRP.

This training course was organized through Professor Michael Kreuzer, a FAO/IAEA Technical Contract holder under the CRP. All eight RCHs attended the training workshop. Three invited scientists (Dr. Kris Thompson, USA; Dr. Roger Hegarthy, Australia; Prof. Jamie Newbold, UK) and one local scientist (Dr. Michael Kreutzer) delivered the lectures and provided the practical training. The programme of the training workshop consisted of lectures and practical exercises on:

- SF6 tracer technique
- Respiration chambers
- Tunnel System for methane determination using an infrared detector and GC
- Chamber/box system for methane determination using a GC
- Indirect method for methane determination by infusion of labelled short chain fatty acids
- Direct method for methane emission by infusing labelled methane

Advantages and disadvantages of each method were discussed. A manual in hardcopy form covering the above methodologies was provided to the participants. Feedback on the training programme was taken from the participants through discussions and a questionnaire. All participants graded the training workshop as very good/excellent. All participants indicated that they acquired all the practical skills for conducting the methodologies and they were confident of introducing and using one of the techniques demonstarted in their

laboratories. This expertise, together with the use of molecular methods for quantifying rumen microbial population, would provide a better understanding of the roles and interactions of different groups of rumen microorganisms in methane production, fibre degradation and livestock productivity.

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

Technical Officer: Harinder Makkar

The Animal Production & Health Section cooperated in this seminar which was held from 8 to 10 September 2005 at the University of Catania, Italy. Dr. Makkar presented an invited paper on Nuclear and molecular techniques in animal production research.

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

Technical Officers: Paul Boettcher & Fernando Garcia

The first RCM was held from 19 to 23 September 2005 in Bogor, Jakarta, Indonesia. This CRP started in December 2004 with the overall objective to utilize gene-based technologies to characterize small ruminant genetic resources in Asia. The use of molecular tools to access small ruminant biodiversity in Asia is a key point for genetic conservation and optimized use of those genetic resources. The specific objectives of this project are to use firstly DNA microsatellite markers (followed by other relevant DNA markers) in order to better understand the genetic structure of sheep and goat breeds from Asia and to allow the National Agricultural Research Systems (NARS) to formulate policies and action plans to preserve and exploit indigenous breeds potential. Experiences collected by the participants during the first 10 months of activities were shared and plans for the next biennium traced. After finalizing the first co-ordinated task (DNA microsatellite analysis), expected for the first semester 2006, the laboratories will start to experience local optimization of PCR and production of PCR data, for centralized mitochondrial DNA sequencing. This DNA analysis will offer a clear and definitive picture of sheep and goat breed structure on the Asian continent, creating opportunities for conservation and better breeding of those species.

It was planned to start in 2006, the analysis of the single nucleotide polymorphism (SNP) markers, in order to direct the project towards marker assisted selection/introgression programmes in the future. The IAEA Seibersdorf Laboratory and Animal Genomics and Bioinformatics Collaborating Centre for IAEA will work on the development of SNP assays for the major mutations endemic in sheep and goat breeds (e.g. prolificacy, disease resistance, meat production).

First RCM on Veterinary and Human Surveillance of Rift Valley Fever

Technical Officer: Gerrit Viljoen

The first RCM took place from 3 to 7 October 2005 in Dakar, Senegal. The purpose of the meeting was to review the projects and to prepare work plans.

The meeting was attended by ten Research Contract holders (RCHs), three Research Agreement holders (RAHs), three consultants and seven observers. The meeting commenced with two presentations by the Technical Officer (TO) on the activities of the Animal Production and Health Section and the objectives of the CRP and the RCM. It was followed by presentations from the RCHs on the work to be conducted in the CRP. Each presentation was thoroughly discussed, background raw data and calculations examined, future activities harmonized and focused in context with the objectives of the CRP. The RAHs and the consultants set the scene for the future work with their state-of-the-art presentations. The TO, RAHs and consultants then assisted the individual RCHs in the development of their work plans. The RO, RAHs and consultants moderated and facilitated the discussion. The main conclusions and technical recommendations from the meeting are as follows.

- RVF is present and identified by all participants in their region of responsibility.
- The expanding human population and its demand on livestock resources place ever increasing pressure on the optimum production of livestock. In addition, other interventions – the building of more water reservoirs (Burkina Faso for example) and hydroelectric power plants (Guinea for example) and the ingression into forest areas with higher rainfall may also play a role in the epidemiological shift in the presence or absence of RVF and should therefore be noted.
- The cryptic cycle of the virus is still not fully understood.
- Unusually high precipitation has a correlation with outbreaks but does not explain them.
- Serological tests will predominantly be used to determine the distribution and prevalence of RVF. This data will be used to establish/broaden the epidemiological knowledge of the disease in participating countries. Both the National Institute for Communicable Diseases, Sandringham-Johannesburg, South Africa (NICD) IgG and IgM ELISA kits (distributed by BDSL), and the Onderstepoort Veterinary Institute, South Africa (OVI) IgG ELISA kit can be used.
- The NICD/BDSL and OVI serological IgG tests will be further validated to improve the serological platform (s).
- As a first step, only positive IgM samples should be submitted for PCR and PCR sequencing analysis to establish/broaden the knowledge on molecular diag-

nosis and molecular epidemiology. This should not exclude other interesting samples.
- A serological databank, established and maintained by FAO, Senegal, Mauritania and Mali, could serve as basis of a holistic serological databank/platform. Before permission and collaboration will be sought from all parties to include this databank in the envisaged databank to be established at Seibersdorf, its feasibility and usability should be established.
- A serum reference bank (located at Seibersdorf) should be established. Senegal, Yemen, Democratic Republic of Congo and others will contribute to this reference bank.
- A computer platform to enhance communication and disseminate information should be established. This should include lists of new and available reagents and other reagents to CRP counterparts.
- Individual counterpart's intellectual property (IP) rights will be respected.

Recommendations:
- The activities of the RVF CRP should support national diagnostic, monitoring and control programmes and increase the national capability.
- The safety of staff or other personnel involved in any aspects of RVF work is the responsibility of their respective local authorities.
- WHO, FAO, OIE and other relevant organizations should be kept informed on the progress of the CRP.
- Enhanced networking between different laboratories should be encouraged. This should include communication, exchange of data and other information, training and the transfer of technology.
- For RVF surveillance, the primary target should be cattle, camels, sheep and goat. Where applicable this should be extended to include the role of vectors and other possible intermediate hosts like rodents and amphibia.
- The basic principle of sentinel herds should be supported.
- The serological ELISA kits should be evaluated for their fitness for purpose.
- Molecular diagnostics should be introduced and used to facilitate early detection. This should contribute to a more timely containment and preventative response.
- Molecular characterization of RVF isolates will not only enhance the epidemiological understanding (i.e. movement, circulation of the strains) but also provide pathogenicity data of the virus.
- Development of safer vaccines should be supported.
- A recombinant expressed RVF antigen is desirable as antigen for diagnostic assays and therefore all efforts should be made to introduce this as soon as possible. This would also entail the possible production of the recombinant kits by Contract holders.
- A CRP open source databank and communication platform should be established and available.
- A serum and nucleic acid reference bank should be established at Seibersdorf.
- A user-friendly computer assisted interface should be supported and introduced to facilitate sample data handling.
- The publication of results emanating from this collaboration should be encouraged.

Consultants Meeting on Research Needs for Improvement of Livestock Productivity in Developing Countries Through Manipulation of Nutrition *in utero*, and to Identify Future Areas of Research in Animal Nutrition

Technical Officer: Harinder Makkar

A Consultants Meeting on The Identification of Research Needs for Improvement of Livestock Productivity in Developing Countries through Manipulation of Nutrition *In Utero*, and to Identify Future Areas of Research in Animal Nutrition was held at IAEA, Vienna, from 17 to 20 October 2005.

Five consultants (Dr. Stephen Ford, USA; Prof. Peter Gluckman, New Zealand; Dr. Paul Greenwood, Australia; Dr. Jean-Francois Hocquette, France; and Dr. Mette Olaf Nielsen, Denmark) with expertise in *in utero* nutrition and foetal programming and in the long term effects of pre-conception, pre-natal and post-natal nutrition; and two consultants (Dr. Mario Acquarone, Denmark; and Dr. Dennis Poppi, Australia) with expertise in modern nutritional concepts from National Agricultural Research Organizations and Universities, attended the meeting together with staff members of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture.

Dr. Gerrit Viljoen formally opened the meeting and presented an overview of the activities of the Section. Dr Harinder Makkar (TO) outlined various IAEA mechanisms of support to the Member States and presented the background and objectives of the meeting. In closing the meeting the TO expressed his enthusiasm for the proposed programmes and thanked participants for their contributions.

The consultants presented state-of-the-art reviews in their areas of expertise. The consultants were of the opinion that in view of the Joint FAO/IAEA Division's comparative advantage in operating (both technically and administratively) Coordinated Research Projects (CRPs), the proposal to initiate an FAO/IAEA CRP on Managing the Maternal Environment to Enhance Lifetime Health and Performance of Offspring and Improve Profitability of Livestock Production Systems' is appropriate. They identified a well focused area for the CRP. Other areas of future research in the field of animal nutrition were also identified.

A full report of the meeting and PowerPoint presentations of the consultants are available at our web site.

Conclusions and recommendations:

- It was recognized that it is timely to transfer the knowledge of developmental plasticity to livestock production in developing countries.
- The consultants felt that the IAEA could play an important role to bring experts together from the developed and developing world to identify methods with a nuclear association so as to foster development internationally in this new field of foetal programming or developmental plasticity.
- It was concluded that available data suggests that the output of foetal programming or developmental plasticity is specific to the environmental background and genotype of livestock especially within the developing world.
- It was concluded that this information on foetal programming or developmental plasticity with respect to livestock production could lead to cumulative benefits which result in larger system output changes.
- A CRP entitled 'Managing the Maternal Environment to Enhance Lifetime Health and Performance of Offspring and Improve Profitability of Livestock Production Systems' should be initiated.
- The CRP should be initiated and conducted according to the project document prepared during the meeting. The substantial comparative advantage of the Joint FAO/IAEA Programme in conducting integrated research and training programmes was noted by the consultants
- The research within this CRP needs to be integrated within the whole system approach and so there is a need to define the livestock system.
- It was concluded that this research is novel in that it focuses on foetal programming or developmental plasticity affecting livestock productivity in comparison to current work on long term health issues with humans.
- A training workshop in radioimmunoassays (RIA) and molecular methods to be used in the CRP should be instigated and integrated in the work plan of the CRP.
- A review of the literature should be commissioned in the area of developmental plasticity and the reviews presented in the form of a book.
- There is a requirement to carefully characterize the animals as it was recognized that environmental and genetic background of the animals will influence the output as a result of different maternal environment.
- It was recommended that a session on foetal programming or developmental plasticity be included in a future IAEA symposium in the field of animal production and that a RCM be organized close to other relevant international symposia. It was noted that a number of such symposia are planned for the next few years.
- The Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture should consider initiating new CRPs in other areas of research in animal nutrition identified during the meeting. Some of the projects need a collaborative approach. Collaboration with other disciplines such as plant breeding and soil and water management should be fostered. The Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture, having sections dealing with these subjects, is well placed to establish research and development projects with multidisciplinary focus.

Ongoing Activities

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

Technical Officer: John Crowther

The Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture in Vienna, Austria, has long experience in helping to develop and validate assays and has provided strong support in developing OIE norms. Scientific landmark OIE guidelines for validation of tests have been developed through cooperation with the Animal Production & Health Section. The guidelines concentrate on identifying the fitness for purpose of any test and demand justification of the criteria used to validate such tests. The guidelines can be seen on the OIE webpages http://www.oie.int/eng/en_index.htm.

Education to improve the Quality of Research in Developing Countries

Technical Officer: John Crowther

Identification of the need to improve research in developing countries is being addressed through the development of a web based education package. This modular based package will guide individuals to think and plan more clearly and contain all the aspects of science necessary to perform, analyse, report and promote high quality research. The platform chosen allows the course to be used as distance learning, with continuous remote supervision, assessment and guidance. A number of modules have already been completed and more are being written by experts. It is hoped that the web based system will be completed for peer review by the end of March 2006 and that a fully available programme will

be ready by the end of September 2006. See researcher-training.org for developments.

IAEA Collaborating Centre in Animal Genomics and Bioinformatics

Technical Officer: Fernando Garcia

The IAEA Collaborating Centre in Animal Genomics and Bioinformatics, is planned to be inaugurated officially in Piracicaba, Brazil, in January 2006. The Collaborating Centre is composed by four laboratories from three world-class research/teaching institutions in Brazil (Animal Biotechnology Laboratory - Escola Superior de Agricultura Luiz de Queiroz - University of São Paulo – Piracicaba, Laboratory of Molecular Morphophysiology and Development - University of São Paulo – Pirassununga, Laboratory of Molecular Biology of Trypanosomatids - Fiocruz - Rio de Janeiro and Animal Biochemistry and Molecular Biology Laboratory - São Paulo State University - UNESP - Araçatuba). These institutions will be collaborating in a three year work plan aiming at: a) development and application of genomic technology in the context of livestock production; b) provision of reference substances and other services; c) conduct of research in collaboration with the IAEA and its partners, including planning, monitoring and evaluation of the research and promotion of the application of the results; d) standardization of terminology and nomenclature of technology, standardization of procedures and protocols, and promotion of relevant quality control and quality assurance standards; e) training of fellowships, including research training; f) collection, collation and dissemination of information and g) coordination of activities carried out by several partner institutions on animal genomics and bioinformatics subjects.

Coordinated Research Projects

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

Technical Officer: Paul Boettcher

This CRP will be beginning its fifth and final 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. Contract holders are preparing manuscripts on their Participatory Rural Appraisals and Economic Opportunity Surveys, which are scheduled to appear in a special issue of Tropical Animal Production and Health in 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 RCM was held from 12 to 16 September 2005 followed by a training workshop on methodologies for measuring methane from ruminants, from 26 September to 7 October 2005. A full report of both meetings is in the past events section of this Newsletter.

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

During the recent 1st RCM in Bogor, Indonesia, held from 19 to 23 September 2005 (please see Past Events), it was possible to quantify the work performed by the group during 2005. Around 60 sheep and goat breeds were already sampled in the field and experimental stations (totalizing almost 2400 individuals). DNA was prepared and aliquots brought to ILRI – Nairobi for microsatellite DNA analysis. The molecular analysis was performed by one member of each group from October to December 2005 and the generated data will be analyzed along the first months of 2006. Another 30 breeds are expected to be sampled in the first semester of 2006, with more conjunct analysis planned for June 2006. Other biodiversity related markers (mitochondrial DNA and Y chromosome markers) were agreed to be included in this research, as well as functional markers (single nucleotide polymorphism – SNP).

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 help developing country scientists implement the technique.

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 CRP is now finished and is being written up as an IAEA-TECDOC and major review paper for an OIE publication. The CRP was funded by the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture from 1999 to 2004. The Research Contract and Agreement holders changed somewhat during the five years of the project. The idea was to try and examine test performance of the reagent sets available. Note that in 2000 there were no commercial kits available, although several initiatives had begun which have resulted in such kits. During the time of the CRP the various 'kits' have been altered and this has led to a fragmented set of date and no full validation exercises. However, the basic construction of kits with regard to antigen and systems in general does mean that we can compare data in time and arrive at some 'valid' statements. During the time of the CRP three Research Co-ordination meetings (RCM) took place where Research Contract holders presented findings and planned future work.

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 was held in Hanoi in June 2005 and a report on the meeting can be found under Past Events in this Newsletter. The results will be published as an IAEA-TECDOC.

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

Work is ongoing on the final phase of the project. A summary of the results of the CRP to date was presented as a poster at the 2nd International Symposium on Recent Advances in Food Analysis in Prague, Czech Republic, 2-4 November 2005. The final RCM is tentatively planned for November 2006, venue yet to be agreed.

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 Arabian 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 ELISA 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).

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 the IAEA, the 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 programmes using mass vaccination in the 1980s 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 Animal Diseases	Crowther Viljoen
PER/5/027	Use of Nuclear Techniques to Improve Alpacas Productive and Reproductive Methods	Boettcher
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

Marker PPR vaccine and Companion test Development

The animal production Unit, in collaboration with some other laboratories in Europe and Africa has started a project on the development of a peste des petits ruminants (PPR) the marker vaccine of and its companion test to enable differentiation between infected and vaccinated animals. The nucleocapsid proteins of paramyxoviruses, as PPR virus (PPRV), are highly immunogeneic and are ideal for the development of diagnostic test. At APU, work is being carried out to map the nucleopcapsid protein (Np) of the PPRV to identify the most immunogenic peptide and also the protein fragments involved in the protein–protein interactions (fragments not to be deleted for the marker vaccine development). Two regions involved in the formation of the nucleocapsid (Np-Np interactions) have been already been identified.

Gene mapping for gastro-intestinal resistance in sheep

Aiming the identification of DNA markers related with helminth resistance in sheep, the Animal Production Unit is participating in an international effort (with ILRI and USDA) to perform the mapping of a specific crossbred population of Dorper and Red Masaai sheep breeds (raised in ILRI – Kenya). DNA microsatellite markers covering the 26 sheep chromosomes have been used and QTL (quantitative trait loci) analysis performed. Preliminary results are indicating the existence of relevant QTL to be further investigated as potential markers for breeding and selection.

Participation on the Bovine Haplotype Mapping initiative

In cooperation with Swedish Agricultural University (SLU), ILRI and Ethiopian Agriculture Research Organization (EARO), the IAEA is involved with the international Bovine Genome Sequencing Technical Committee (BGSTC), in a specific project aiming the validation and characterization of 20 000 single nucleotide polymorphism (SNP) markers in several cattle breeds. The IAEA is sponsoring the Ethiopian breed Sheko which, in conjunction with the other breeds under analysis, will constitute the state of the art data bank for genetic diversity and breeding purposes. Animal Production Unit expects in the near future, to use the information on the way to be generated from this project, in order to select and validate specific markers for traits of interest in cattle from tropical, semi-arid and arid regions.

Development of single nucleotide polymorphism (SNP) panel for sheep and goat

In conjunction with the IAEA Collaborating Centre for Animal Genomics and Bioinformatics (Brazil), the Animal Production Unit is developing a panel of relevant and already characterized SNP markers for sheep and goat. The panel includes markers for prolificacy, disease resistance and production traits (meat and milk quality). The goal is to work in close coordination and to set up real-time PCR based assays to detect the polymorphisms and to use QTL related microsatellite markers, being able to offer this technology through group and individual training courses during 2006.

Training in the APU

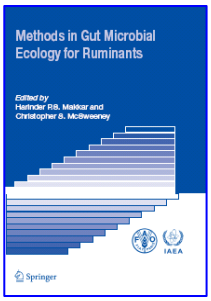
- A fellow, Mr Wijaya Kumara Hirimburegama, from Sri Lanka, started a two-months training in APU on ELISA technique: standardization of reagents on October 5
- Mr Traoré Abdallah, a scientist from Mali, joined the APU as of November 7 for six months. He will be trained in the use of molecular techniques for the for PPR diagnosis.

Publications

Recent Publications:

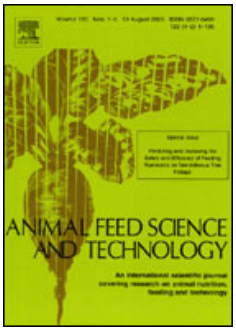
Methods in Gut Microbial Ecology for Ruminants

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 section 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.



Libraries of research institutions, including universities, in developing countries can request a free copy from aph-webcontact@iaea.org.

Predicting and Improving the Safety and Efficiency of Feeding Ruminants on Tanniniferous Tree Foliage.



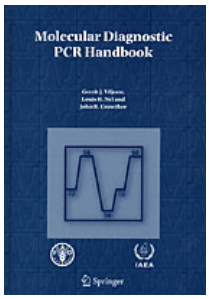
Special Issue Animal Feed Science Technology, Volume 122 Nos. 1-2, August 2005, ISSN 0377-8401.

This special issue contains the peer reviewed papers from participants in a FAO/IAEA CRP entitled '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'. This CRP was initiated in 1999 with the objective of validating tannin assays and using them to exploit the potential benefits of tanniniferous plants as animal feed supplements and as strategic feeds in situations of fluctuating nutrient supply. Some selected papers from those presented during the final review meeting are presented in this volume. These papers deal with refinement and standardization of nuclear, chemical and biological assays for measuring tannins, and development of strategies for enhancing utilization of tree leaves as livestock feed.

Workers from developing countries conducting research on tannin assays and utilization of tannin-containing feed resources can request for a free copy of the special issue of the journal from aph-webcontact@iaea.org.

Molecular Diagnostic PCR handbook

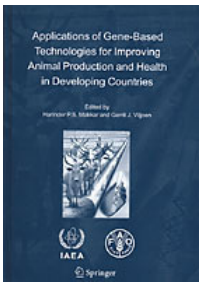
The uses of nucleic acid-directed methods have increased significantly in the past five years and have made important contributions to disease control country programmes for improving national and international trade. These developments include the more routine use of PCR as a diagnostic tool in veterinary diagnostic laboratories. However, there are many problems associated with the transfer and particularly, the application of this technology. These include lack of consideration of: the establishment of quality-assured procedures, the required set-up of the laboratory and the proper training of staff. This can lead to a situation where results are not assured.



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 setting-up of a PCR laboratory; Good Laboratory Practice and standardised 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.

Libraries of research institutions, including universities, in developing countries can request a free copy from aph-webcontact@iaea.org.

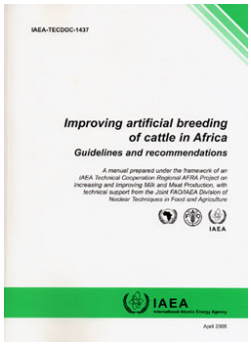
Applications of Gene-Based Technologies for Improving Animal Production and Health in Developing Countries



This book provides a compilation of peer-reviewed scientific contributions from authoritative researchers attending an international symposium convened by the Animal Production and Health Subprogramme of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture in cooperation with the Animal Production and Health Division of the FAO. These Proceedings contain invaluable information on the role and future potential of gene-based technologies for improving animal production and health, possible applications and constraints in the use of this technology in developing countries and their specific research needs.

Libraries of research institutions, including universities, in developing countries can request a free copy from aph-webcontact@iaea.org.

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 of Nuclear Techniques in Food and Agriculture. The manual is intended for livestock specialists involved in the provision of artificial insemination (AI) services to cattle farmers in Africa, 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.

In Preparation:

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 will be available as an FAO Animal Production and Health Paper in the second half of 2005.

Improving Animal Productivity through Meeting Nutrient Deficiencies with Multinutrient Blocks Controlling Internal Parasites and Enhancing Utilization Efficiency of Alternate Feed Resources

Livestock farming is important for provision of animal protein for human consumption, and as a source of income for many poor farmers in developing countries. With increase in human population and economic growth of many Asian countries, the demand for livestock products will increase considerably in the coming years. However, the main constraint to livestock development in these countries is the scarcity and fluctuation of the quality and quantity of the year-around animal feed supply. Increased population and industrialization are making the arable land scarce and in addition a large area of arable land is being degraded due to human activities. For sustainable development of the livestock sector it is essential to secure sufficient supply of balanced feeds from resources, which do not compete with human food. The conventional feeds such as soyabeen, groundnut, rapeseed meals, etc. are either not available or are available at very high cost. Therefore, there is an urgent need to efficiently utilize locally available feed resources such as tree and shrub leaves, agroindustrial by-products and other lesser-known and new plants adapted to harsh conditions and capable of growing in poor, marginal and degraded soils. Another important limiting factor for enhancing animal productivity in the tropical countries is heavy internal parasitic load in livestock. The publication presents results of the regional IAEA TC project entitled 'Improving Animal Productivity and Reproductive Efficiency' RAS/5/035.

Guidelines and Recommendations for Improving Artificial Breeding of Cattle in Asia

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 of Nuclear Techniques in Food and Agriculture. 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.

Manual on screening and confirmatory methodologies for veterinary drug residues.

Handbook on regulatory aspects of veterinary drugs and residue control.

Improving Family poultry production in Africa: Interventions and their economic assessment. Proceedings of the final Research Coordination Meeting of the FAO/IAEA Coordination Project on Assessment of the Effectiveness of Vaccination Strategies against Newcastle Disease and Gumoro Disease using Immunoassay-based Technologies for Increasing Farmyard Poultry Production in Africa.

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-naweb.iaea.org/nafa/aph/index.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 John 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-naweb.iaea.org/nafa/aph/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 send an email 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-naweb.iaea.org/nafa/aph/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-naweb.iaea.org/nafa/aph/public/d3_pbl_1_10.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 for users who have no access to internet connection.

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