

ANIMAL PRODUCTION AND HEALTH

NEWSLETTER



Joint FAO/IAEA Division of Nuclear
Techniques in Food and Agriculture
and FAO/IAEA Agriculture and
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International Atomic Energy Agency
Vienna



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TO THE READER

Dear Colleague,

Since the beginning of this year, Britain, along with other countries within Europe, has been grappling with the problem of the re-introduction of foot-and-mouth disease (FMD). For several years, Britain and then subsequently a number of other countries have had to deal with the problem of bovine spongiform encephalopathy (BSE). What are the implications of these disease outbreaks in terms of animal health management and control in developing countries, on international livestock trade and on the more general issue of food safety and quality?

In the wider sense, these two diseases could not be further apart. FMD has been with us since records began, its management and control has been the subject of numerous discussions over many years, considerable amounts have been invested in research, vaccines and diagnostic tools abound. On the other hand, BSE was unknown before the outbreaks in the UK, the mechanism and causative agent are still not well characterized, the diagnosis is in its infancy and no vaccines exist. Yet, the response and the devastation caused were similar – slaughter of infected animals and economic ruin for livestock farmers involved.

For those in developing countries, the implications are difficult to evaluate. For many, FMD is of little or no consequence, causing minimal disease in their livestock and having little impact on their trade, because the trading partners themselves live with FMD. Even if control and eradication were possible, other diseases would take priority, e.g. rinderpest, CBPP, trypanosomosis. In terms of BSE, there should be no significant implications. Scrapie has never been recorded and management practices in developing countries are completely opposite to those that are thought to have given rise to BSE.

Yes, there is little doubt that the repercussions of BSE and the recent outbreaks of FMD in Europe will have significant impact for the developing world. Looking first at negative aspects, the human-related cases of BSE and other recent livestock-linked health issues mean that food consumption patterns could change significantly on a global basis. The “livestock revolution”, described recently by IFPRI that predicted a major increase in the global consumption of livestock products as a signal for a healthy long-term future for livestock production, may now be untenable.

Even though changes in diets may not be markedly affected in many developing countries, where choice is limited, there is little doubt that many western countries will see changes in eating habits because of BSE. This will certainly have a negative affect on livestock trade and the opportunities that had been so clearly identified for livestock producers through the livestock revolution.

In terms of the trade itself, it is highly likely that international movement of livestock and livestock products will now be further curtailed by application of more stringent disease restriction measures. The absolute demonstration of freedom from a disease-causing agent, in the livestock, in the product for export, or in the exporting country may well further curtail south-north, south-south, and north-north trade. For many developing countries, it is apparent that the level of surveillance and testing required will be beyond their capabilities, and thus become a technical barrier in itself for international trade.

But what of the positive aspects? Both the BSE and the FMD epizootics have raised serious questions about animal production systems in the developed world. Many are now questioning the intensive farming practices within Europe and advocating a return to the more extensive systems. If this is tied to removal of European subsidies, it could offer a really competitive opportunity for livestock producers in the developing world who still adhere to the more traditional production methods often euphemistically termed as “organic farming”.

In terms of FMD, it is apparent that once things have been brought under control in Britain and Europe, the focus will turn to the origins of this recent outbreak and ways to ensure that this does not happen again. These origins are in the developing world and opportunities exist to ensure that the focus now turns to globally controlling and eliminating diseases like FMD. Research is likely to center around better and more rapid systems of diagnosis, improved control and eradication procedures and more effective vaccines. Such research will involve not only FMD, but other important epizootics such as CBPP, ASF and the like. All this should benefit the livestock producers in developing countries.

So how does this affect the Animal Production and Health Sub-programme and the support we provide to you? I would see that we must try to ensure that the negative impact in terms of trade can be reduced through strengthening of national diagnostic and surveillance systems. We need to ensure that, wherever possible, research is undertaken within the NARS and veterinary services of the countries that have the diseases in question. This will not only assist capacity building, but make certain that solutions are applicable and appropriate. Finally, as new tools and concepts emerge we need to be assisting in applying these in disease control and eradication programmes.

This then leads me to another crucial issue. Traditionally, our support through IAEA Technical Co-operation projects operates on a two-year cycle with a two-year lead in period. During the first year of this you are expected to prepare, submit to a central national authority, prioritize and then send to the IAEA, the programme of support you would like in the coming biennium. At present, IAEA is in general able to support five projects per country and thus prioritization is a major exercise at the national level. In part, to assist you with this, IAEA has developed a process called Country Programme Frameworks which enables, at the national level, the IAEA programme of support to be focused on the critical development issues for which IAEA is best able to provide support. Whilst in many countries these CPFs have yet to be formulated, in those that have such Frameworks, they can create an exclusive situation for those in Agriculture.

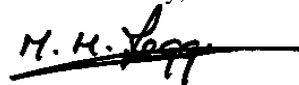
Firstly, I would urge you to strongly consider formulating a proposal for support under the IAEA Technical Co-operation programme, whether in the area of animal production, animal health or veterinary drug residue testing (the three main areas of activities of our support programme). In undertaking this, you will need to determine if indeed a CPF exists and whether your sector is involved. If this is the case, then you will be in a strong position for support. If not, then you will need to prepare a proposal and work with your national IAEA authority to agree on a prioritization that will ensure uptake and support by the Agency. If you have not already embarked on this and feel that support would be valuable, then the matter is now really urgent. Such proposals must reach the IAEA by the end of this year, and this time line is strictly adhered to! Please note that proposals forms can be obtained from the IAEA Homepage on the Web, from local

UNDP Offices or from us. Do NOT hesitate to contact us if you need these forms. Now is the time to tackle this issue.

Before closing, I would like to draw your attention to a couple of important staff changes. As you will be aware, Adama Diallo took over as Head of the Animal Production Unit late last year (the laboratory arm of the Sub-programme). You will find an article in this Newsletter from Adama giving some of his ideas on re-direction of our laboratory programme, and I think you will find this interesting reading. Many of you will be aware that I have been overseeing the veterinary drug residue programme for the past three years. I am therefore really pleased to let you know that we have now recruited a full-time technical officer to take over this important programme. Andrew Cannavan is from Ireland and has excellent experience in testing for a range of important residues that can be found in livestock products. He has a very wide experience of different testing methods, and I am sure will be able to provide you with the support needed to develop this programme further. We have now recruited Karim Tounkara from Mali, to provide support to the OAU/IBAR PACE programme in the general field of sero-epidemiology. Karim, who I know is familiar to all those working in laboratories in Africa, will be based in the PACE Programme Co-ordination Unit at the OAU/IBAR Headquarters in Nairobi. He has a six-month appointment and will be there to provide support to all PACE national veterinary laboratories in carrying out their PACE national programmes and ensuring that the inputs provided through the IAEA regional Technical Co-operation project in support of PACE provide maximum benefit. Unfortunately, we have the departure of Herbert Haas from the Animal Production Unit at Seibersdorf. For many years, Herbert has given excellent service to the Unit and the Sub-programme through overseeing the assembly and dispatch of kits to many of you. Clearly, Herbert will be missed, if for no other reason but his cheerful disposition. But with the move towards rationalization of kit production and distribution, we felt this was an appropriate realignment of staff resources.

Wishing you all the very best for the rest of 2001.

Yours sincerely,



Martyn Jeggo
Head, Animal Production and
Health Section

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

B. FORTHCOMING EVENTS

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

Technical Officer: Martyn Jeggo

The third RCM of this CRP will take place at the OAU/IBAR PACE Headquarters in Nairobi, Kenya from 18 to 22 June. The meeting will review the work undertaken during the past 12 months in validating the current cELISA and in conducting prevalence studies in the 12 participating countries. Work plans will then focus on extending these studies to all participating countries and using these for

developing control and intervention studies on CBPP.

A new pen side test for CBPP developed at the Moredun Institute, UK, will be demonstrated and distributed for evaluation in the field. The meeting will also provide an opportunity for those from PACE countries to become more acquainted with this important regional programme and the implications within their own national laboratories.

FAO/IAEA Interregional Consultants Meeting/Workshop on Developing Standardized Training Material to Assist FAO/IAEA Member States to Establish Quality Systems for Veterinary Diagnostic Laboratories

Technical Officer: Axel Colling

A follow-up Training Course/Workshop will be held in Onderstepoort, South Africa, from 16 to 20 July 2001.

The purpose of this meeting is to

- monitor the status of implementation of a quality system in the laboratories from six

participants;

- review the report entitled: "Guidelines for establishing Quality Systems in Veterinary Diagnostic Testing Laboratories" as a practical guide;
- develop/adapt individual work plans for the coming year.

Regional Training Course/Workshop on Quality Assurance (QA) and Quality Control (QC) for ELISA and ELISA Kit Production in South African Developing Countries (SADC), RAF/5/043

Technical Officers: Martyn Jeggo and Axel Colling

The Training Course/Workshop will be held from 15 to 19 October 2001 in Onderstepoort, South Africa.

The purpose of this Regional Training Course/Workshop is to make participants familiar with the principles of quality assurance and quality control for ELISA as a basis for quality assured production of ELISA kits.

During the course, the following topics will be addressed:

- The FAO/IAEA External Quality Assurance programme;
- The use of internal controls in ELISA;
- Storage and retrieval of data (e.g. EDI);
- Interpretation of results (Basic statistics) using EXCEL spreadsheets;
- Charting methods (Daily Data Charts and Summary Data Charts) using EXCEL spreadsheets;
- Patterns in assay behaviour and troubleshooting procedures.

Third RCM to Develop and Validate 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 RCM will be held in 22 to 25 October in Vienna, and will concentrate on preparing a set of full working protocols for the differential diagnosis of vesicular diseases of livestock. Eight Research Contract holders and four Agreement and Technical Contract holders will be invited to participate in the meeting.

The complete protocols for PCR to allow differential diagnosis of vesicular diseases will

be written by Research Contract holders and Agreement holders at that meeting to prepare a publication in French and English. This will be a complete guide to the setting-up of PCR laboratories (GLP), the methods to be used, sample taking and preparation, defined protocols and the primers examined, as well as showing typical results and dealing with problems.

Training Workshop on ICT-based Methods under RAF/0/013

Technical Officers: Oswin Perera and John Crowther

This interdisciplinary project, which is being implemented to introduce information communication technology (ICT) based methods to least developed countries (LDCs) in Africa, has two components which deal with livestock production and health: (a) improving the knowledge and skills of artificial insemination (AI) technicians who provide

services to small-holder dairy farmers (in Tanzania and Uganda); and (b) increasing the awareness and ability of extension workers and farmers to detect and report cases of rinderpest (in Ethiopia and Sudan). The first Training Workshop to “train the trainers” in these LDCs in the use of ICT-based methods for these two components will take place from 5 to 9 November 2001 in Arusha, Tanzania.

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

Technical Officer: Harinder Makkar

This RCM will be held from 19 to 23 November 2001 in São Paulo, Brazil. Six Research Contract holders and four Agreement

and Technical Contract holders will be invited to participate in the meeting. The objective of the meeting is to review the work conducted and plan studies for the second phase of the project.

Regional Training Workshop Update on Technologies for the Surveillance of Rinderpest Freedom supported under OAU/IBAR/PACE programme RAF/5/053

Technical Officers: Mamadou Lelenta and Martyn Jeggo

This Training Workshop will be held from 19 to 30 November 2001 in Dakar, Senegal, in co-operation with the Government of Senegal within the framework of regional Technical Co-operation project RAF/5/053 - Assistance to OAU/IBAR PACE Programme for the Control and Eradication of Major Diseases Affecting Livestock.

The main purpose of the Workshop is to update African laboratory scientists under the OAU/IBAR/PACE programme in diagnostic technologies and related procedures to support the activities required to demonstrate national freedom from rinderpest disease and infection, and the activities conducted by the national laboratories in support of the national PACE programme. The main focus of this Workshop will be on the diagnosis of rinderpest, the sero-

surveillance of rinderpest as part of demonstration of national rinderpest freedom and the regional production and distribution of rinderpest serology kits. As such, the preference on participation will be given to those working in the PACE national laboratories on rinderpest.

The Workshop will be attended by 20 participants from African diagnostic

laboratories including the laboratories involved in the development, production and distribution of rinderpest serology kits and the representative of FAO, PACE and IAEA. Invitations for nominations of suitable candidates have been sent out to the Member States.

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

Technical Officer: Martyn Jeggo

This symposium will be held from 6 to 10 October 2003 in Vienna.

Objectives of the symposium are to create an interactive environment to discuss the role and future potential of gene-based technologies for improving animal production and health, to identify constraints in the use of this technology in developing countries and how to use this technology in a simple practical way, especially for developing countries, to identify specific research needs and prioritize them, to explore the possibility of international co-ordination in the area of biotechnology in animal agriculture, and to examine ethical, technological, policy and environmental issues, and the role of nuclear techniques in the further development and application of genetic manipulation in respect of livestock.

Some important dates

March 2002: Release of second notice;

September 2002: Announcement letter inviting extended synopsis and grant applications;

End of January 2003: Receipt of extended synopsis and grant applications.

There will be no registration fee for attending the Symposium.

Those interested in attending the Symposium should fill in the registration.

The above information can also be submitted through the Web, from:

<http://www.iaea.org/programmes/nafa/d3/index-symp2003.html>

The basic structure of the Symposium will be:

- Plenary lectures
- Theme-specific sessions
- Round table discussion/discussion forum

Four theme-specific sessions and four round table discussions/discussion forums are being considered.

Theme-specific sessions

- Application of gene-based technologies in genetics and reproduction;
- Application of gene-based technologies in animal health;
- Application of gene-based technologies in animal nutrition;
- Application of gene-based technologies in environment, food safety and animal industry, and related ethical and intellectual property right issues.

Round Table Discussions/Discussion Forum:

- Can gene-based technologies enhance food security in developing countries?
- Role of gene-based technologies in enhancing animal production in Africa (focused on Africa).
- Role of international organizations and funding agencies in promoting gene-based technologies in developing countries.
- Where to from here? How to translate recommendations of this symposium into action.

Detailed information on the Symposium is available at the above Website.

Suggestions and comments on the Symposium should be sent to: H.MAKKAR@IAEA.ORG

Registration Form

(The registration can be submitted by mail, fax, e-mail to: H.Makkar@iaea.org or via the registration form on our homepage <http://www.iaea.org/programmes/nafa/d3/index-symp2003.html>)

Surname: _____ First name: _____ Title: _____

Institution: _____

Address: _____

E-mail: _____

Fax: _____

I intend to present a paper: Yes No Oral presentation Poster presentation

Tentative title of the presentation:

Name and address of a colleague to whom this notice should be sent:

Further information can be obtained from:

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C. PAST EVENTS

Final Review Meeting of the AFRA Project on Development and Field Evaluation of Animal Feed Supplementation Packages (RAF/5/041, AFRA II-17)

Technical Officer: Harinder Makkar

The meeting was held from 25 to 29 November 2000 in Cairo, Egypt.

The objectives of this meeting were to (a) review the achievements in formulating and field testing including the economic analysis of feed supplementation strategies; (b) evaluate papers presented during the meeting from the technical point of view for publication as an IAEA-TECDOC, and (c) identify future areas of importance in the field of animal production for the AFRA region and develop a proposal for consideration by the AFRA to be undertaken by the AFRA Member States (MSs) during the cycle 2003–2004.

The meeting was hosted by the Egyptian Atomic Energy Authority (EAEA), and was attended by 9 of the 10 nominated Project Co-ordinators (PCs) from 10 AFRA MSs (Cameroon, Egypt, Madagascar, Mauritius, Nigeria, Sudan, Tunisia, U.R. Tanzania and Zambia). It was supported by an IAEA expert (Dr. Noble Jayasuriya from Sri Lanka), the Project Scientific Consultant (PSC, Prof. Ibrahim Issa Ibrahim, also PC for Egypt) and the Technical Officer Dr. Harinder Makkar.

The full report on the meeting is available at our Website

<http://www.iaea.org/programmes/nafa/d3/mtc/cairo-nov2000.pdf>

Conclusions and Recommendations

Conclusions

Technical Aspects

1. All participating MSs have developed feed supplementation packages based on locally available feed resources and have completed on-station and on-farm studies.
2. Those MSs who extended the packages to the farmers have been able to determine the cost-effectiveness of the packages.
3. Six regional Training Workshops have been completed as programmed.
4. National Workshops have been completed by 90% of the participating MSs.

5. A training manual on “Guidelines for Development of Feed Supplementation Packages” was compiled and is available to AFRA MSs.
6. Some participating MSs have compiled a database on “Feed Resources and Reproductive Parameters of Livestock”.
7. Radioimmunoassay (RIA) facilities have been upgraded in all participating MSs and the solid state RIA technique has been established.
8. All participating MSs have successfully participated in the external quality assurance programme for RIA.
9. The project has led to the successful co-operation between scientists from AFRA MSs and the willingness to plan together for the future.

Administrative and Logistical Aspects

1. The support provided by participating MSs, which hosted project meetings and Workshops over the past three years, is greatly appreciated.
2. Inadequate financial and logistical support was provided by the National Governments for project activities.
3. Inadequate recognition as well as no financial and logistical support was given to the PSC by the IAEA and AFRA Field Management Committee, in spite of specific recommendations made at the first AFRA II-17 Project Co-ordinators meeting held in Tanzania in February 1997, and the second meeting held in Madagascar in February 1999.
4. Problems associated with shipment and customs clearance for project materials retarded progress in many participating MSs.
5. Problems in nominations by MSs as well as late notice given to selected participants of the Training Courses and Workshops led to the non-participation of some MSs at these events.

Recommendations

1. *To Project Co-ordinators*

1. All participating MS who have completed on-farm studies should ensure wider application and extension of the packages.
2. All Project Co-ordinators, who successfully developed and tested supplementation packages, should develop strategies for sustaining them by establishing suitable mechanisms such as a revolving fund-system or entrusting the manufacture of the package to a private industry.
3. Where applicable, Project Co-ordinators should incorporate the project activities into their national R&D programmes.

2. *To AFRA National Co-ordinators*

1. It is once again emphasized that in future programmes adequate administrative, logistical and financial support must be given to the PSC to carry out his/her functions effectively. This will further enhance the output of the programme.
2. Due to financial constraints of some participating MSs, AFRA should provide funds for local expenses within AFRA projects when justified.

3. *To AFRA Governments*

1. All AFRA Governments should be urged to fulfil their commitments towards the implementation of AFRA Project activities.
2. The co-operation amongst the AFRA MSs should continue and should be strengthened.
3. The project has come up with proven technologies. AFRA Governments should capitalize on this and support the extension

of these packages and sustain them for the development of the livestock industries.

4. *To IAEA*

1. The artificial insemination and reproductive management component, which was formulated as a sub-project of AFRA II-17 but subsequently approved by IAEA as a new AFRA Project (AFRA II-46), should be implemented in close collaboration with the Project Co-ordinators of AFRA II-17, utilizing the infrastructure and expertise, which has been already established.
2. The participants of this project recognized that this programme is now finished. However, in order that some of the activities continue until the initiation of a new programme at a later date, IAEA should continue to assist the MS e.g. through the supply of RIA reagents, chemicals, etc.
3. The papers presented at the meeting as well as those submitted to the IAEA but not presented at this meeting, should be published as an IAEA-TECDOC. The TECDOC should also be considered for placing on the AFRA Website.
4. The participating MSs wish to propose a new project which will involve the use of non-conventional, lesser utilized feed resources for livestock production. It is strongly recommended that IAEA support be made available towards the formulation of the new project through a pre-project planning meeting in 2001. The proposed project is entitled "Improvement of livestock productivity through the enlargement of feed resource base and its effective utilization, using nuclear and related techniques".

RCA Project Review and Planning Meeting on Improving Animal Productivity and Reproductive Efficiency (RAS/5/035)

Technical Officers: Oswin Perera and Harinder Makkar

The objectives of this meeting were to (a) review the results obtained so far in extending nutritional supplementation strategies and in evaluating AI services and reproductive

management; and (b) plan future strategies for the following:

- Establishing pilot farms and introducing integrated management practices;
- Evaluating and incorporating lesser known plants as livestock feeds;

- Furthering regional capability for RIA reagent production; and
- Improving AI services and introducing a customized database for routine use.

The meeting was hosted by the Philippine Nuclear Research Institute (PNRI) and the National Dairy Authority (NDA), and was held from 14 to 18 February 2001 at the PNRI in Quezon City, Metro Manila, Philippines. It was attended by all 21 nominated Project Co-ordinators (PCs) from 10 RCA Member States (MSs), namely P.R. China, India, Indonesia, Malaysia, Myanmar, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam. It was supported by two IAEA experts (Dr. Dennis Poppi for nutrition and Dr. David Galloway for reproduction, both from Australia) and two IAEA Technical Officers (Dr. Harinder Makkar for nutrition and Dr. Oswin Perera for reproduction). The Animal Production Service of FAO, Rome, provided the services of a Technical Officer (Dr. Manuel Sanchez) as a resource person in nutrition. The full report on the meeting is available at our Website.

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

Nutrition

Conclusions

- All participating MSs have developed UMB based on locally available feed resources, completed on-station and on-farm studies, and demonstrated the cost-effectiveness of the blocks. This technology has been found to increase animal performance leading to higher income of farmers, and has been disseminated to a large number of farmers through demonstrations, training, farmers' days and mass media.
- The participating MSs and experts endorsed the work plan for the Phase II (2001-2002) proposed by the lead country to (a) transfer and sustain the proven UMB technology through establishment of pilot farms; (b) use of the blocks as a carrier for anthelmintic agents and feed additives; and (c) evaluation of new, lesser-known and lesser-utilized plants adapted to the local

environmental conditions and poor and marginal soils as animal feed. These three areas are consistent with the national programmes of most of the participating countries, and are being given importance by their Governments for enhancing ruminant production.

- The two new areas (b and c) outlined above will require training and applied research in the years 2001–2002. Full impact of these measures is expected to be realized at the farmers' level in 2003–2004.

Recommendations

- In order to implement the work plan satisfactorily, all participating MS should be invited for the Training Workshop on “*In vitro* techniques for feed evaluation” planned from 16 to 27 April 2001. A Training Workshop must be conducted in July 2002 on the methodologies developed through the Joint FAO/IAEA CRP for urinary purine derivatives, to non-invasively measure microbial protein supply for production purposes in ruminant livestock. The venue proposed is Malaysia (jointly by MARDI and UPM, Kuala Lumpur).
- Since the MSs are initiating work on new areas, training of team members will be required on nuclear and related techniques for evaluation of unconventional feed resources. The financial support from the IAEA for equipment and training should therefore be increased.
- In order to fully realize the impact of new areas initiated during Phase II, the project should be extended until 2004.
- The participating MSs proposed a new CRP for initiation in 2003, the need for which has originated from extensive discussions during this meeting and keeping in view the opinion of scientists, mainly from developing countries, expressed in the World Conference on Science in Budapest, Hungary in 1999 (Nature 398, 744; 1999). The proposed project is entitled “Identification, characterization and evaluation of bioactive compounds of plant origin for enhancing animal productivity through nuclear and related techniques”.

This CRP will lay the foundation for utilization of vast plant resources and biodiversity available in developing countries for production and utilization of bioactive compounds (e.g. drugs, feed additives, enzymes, etc.), and will complement the work initiated in Phase II of RAS/5/035. It is strongly recommended that IAEA support be made available towards the formulation of this new CRP through a pre-project planning meeting in 2002.

Reproduction

Conclusions

- All participating MSs have achieved good progress in their work programmes and acquired the necessary capability to participate effectively in the next phase of the project activities. All participants confirmed that Sc-RIA could be successfully established in their laboratories. Training conducted has developed capability to produce ¹²⁵I tracer within the region.
- All MSs have successfully installed and used AIDA for recording and summarizing data. They confirmed the usefulness of this tool and expressed the need to simplify and adapt it for routine monitoring and decision making purposes in their countries.
- The need to develop a uniform approach to evaluation of breeding bulls and quality control of semen used in AI was highlighted by many MSs.

RECOMMENDATIONS

- The next project review meeting should be held in mid-November 2002 in China or India. PCs must submit progress reports bi-annually (June and December), and the final report six weeks prior to this review meeting.
- A regional Workshop should be held on “Evaluation of breeding bulls and semen quality control” and could be hosted by Pakistan or Sri Lanka during April 2002.
- Wider use of the customized AI management database, which will be developed through the Task Force Meeting in Sri Lanka (April 2001), should be accomplished by holding a Training Workshop on “Management and utilization of field and laboratory data for breeding support services to livestock farmers” in Bangladesh or Vietnam in June 2002.
- The development of capacity in the Asian region to meet the needs of RIA reagent production (tracer and antibody) must be expedited.
- The MSs proposed a new CRP on “Infectious causes of infertility in breeding cattle and buffaloes”. This will focus on validating and applying currently available diagnostic techniques (microbiological methods and immunoassays, including ELISA) to screen breeding animals for specific diseases such as Brucellosis, Tuberculosis, Campylobacteriosis, Trichomoniasis, Leptospirosis, IBR/IPV and Mucosal Disease. Support to develop this CRP should be provided through a project formulation meeting during 2002.

First RCM to Develop, Validate and Standardize Methodologies for the Use of PCR and PCR-ELISA in Diagnosis and Monitoring of Control and Eradication Programmes for Trypanosomosis (D3.20.21)

Technical Officer: John Crowther

The first Research Co-ordination Meeting (RCM) of the Co-ordinated Research Programme (CRP) on “Developing, validating and standardizing methodologies for the use of PCR and PCR-ELISA in the diagnosis and monitoring of control and eradication

programmes for trypanosomosis”, under D3.20.21, was held from 26 to 30 March 2001 in Antwerp, Belgium.

The participants were given an overview of the Joint FAO/IAEA Division in supporting research through Co-ordinated Research Programmes (CRP). The role of the Technical

Co-operation Department of the IAEA in supporting national programmes was also highlighted and methods of project submission discussed. The TO agreed to send TC application forms for both national projects and training to each Contract holder.

The participants were reminded of the background to the CRP and the previous aims were re-stated for examination and possible modification in the light of current experience. The areas for development in the CRP originally stated were discussed. These were:

1. To obtain agreement on standardized protocols for the PCR, parasitological and immunoassay techniques.
2. The evaluation and standardization of current techniques with regard to sensitivity, specificity and reproducibility.
3. The preparation of protocols with regard to sampling methods, primers to be used and technical aspects of the PCR method.
4. The adaptation of the test for distribution and the mechanics of distribution of a set of primers and methods.
5. The training of Research Contract holders in the techniques (parasitological, immunoassay and PCR) as demand requires.
6. The introduction of a standardized PCR protocol and the details of the technique.
7. The establishment of the criteria for creating a blood bank to be used as a reference collection for the PCR tests.
8. Development of a pan-pathogenic trypanosome primer.

The meeting discussed these topics in detail.

Role of PCR

This was discussed generally and also as a result of points made in the presentations by Research Contract and Agreement holders'. It was agreed that clear ideas as to the role of the PCR must be worked out before development of tests. This should establish whether the PCR is, in fact, the most useful and appropriate test to be used and tests should be fit for purpose. Elements of high relative cost, sample collection and storage, sensitivity, specificity,

need for training, establishment of good laboratory facilities and contamination, should all be considered in the context of what exactly is required in any study at the national level. These should be compared to what is already available in the country. It was generally agreed that the PCR should be a component of any testing and not aim to replace existing assays.

Methods and protocols

It was agreed that each established PCR protocol (based on methods and primers used), should be written and that a standard format should be used. A protocol from Dr. Peter-Henning Clausen was examined in detail and additions made. He agreed to produce a final version and send this to Dr. Diallo, to act as a template for all other protocols. The participants will then receive a copy of this protocol to act as a guide. Completed protocols will then be sent to Dr. Diallo for compilation and distribution. It was agreed that some basic background information should also be included with regard to reagent formulation, and that Dr. G. Viljoen would send the additions to Dr. Diallo for inclusion in the final protocol document.

DNA bank

It was agreed that a reference bank of DNA should be set up at the FAO/IAEA Laboratory, Seibersdorf. The DNA should be from trypanosomes, control DNA from various livestock and insect species, and DNA from relevant organisms likely to complicate the PCR diagnostic potential with regard to trypanosomosis. The strains selected would be well characterized and "reliable" in terms of their pedigree. It was agreed that certain participants would prepare one milligram of DNA. The extraction processes, sources of DNA, and details of sending and receiving any material, would be developed by Dr. Diallo, for distribution to participants. A list of candidate DNA along with details of the interested participants likely to need access to the bank was compiled. A typical "withdrawal" of approximately 200 ng was envisaged. Dr. Diallo agreed that the DNA sent would be characterized with respect to the PCR products produced using standardized protocols, and that the products would be sequenced to allow quality control.

Good laboratory practice (GLP)

It was agreed that the proper setting-up of a PCR laboratory was fundamental. It was agreed that each laboratory would examine closely its set-up and report on any deficiencies. A good laboratory practice (GLP) document for PCR will be provided by Dr. Viljoen to Dr. Diallo, and this will then be sent to all participants. Certain laboratories will need to address the situation before starting PCR work, and this was reflected in the work plans.

Primers

Extensive discussions on which primers could be used to obtain products for use in various aspects of the study of trypanosomosis were made. This was facilitated through the papers presented by the Research Contract holders and Agreement holders. The key components of the species primers of interest for specific and pan trypanosomosis detection were defined.

Comparative testing and sensitivity specificity

There was discussion on sensitivity and specificity of all tests including PCR. There appears to be some confusion as to what exactly is being measured and compared between tests and protocols. There is a need to define sensitivity in terms of both analytical and diagnostic potential of the PCR. There are drawbacks to estimating analytical sensitivity from "spiked" samples by dilution of material. There is also a difficulty where field samples are examined and the effect of the matrix on PCR analysis. This area should be addressed and some guidelines drawn up to standardize the approaches for comparison of results. The need for specificity at the expense of sensitivity and vice versa, should also be considered.

Antibody assays (ELISA)

The indirect ELISA developed at Seibersdorf was outlined. The TO explained that 10 kits were immediately available. This assay features the use of pre-coated plates with either *T. vivax* or *T. congolense*, the antigens being totally denatured. The use of other ELISA systems to detect *T. evansi* was also discussed. The effectiveness of the Seibersdorf kits in detecting antibodies against *T. evansi* might also be

considered. The need for quality control was emphasized.

Kit production and distribution

It was indicated that through technology transfer Ketri, (Kenya Trypanosomosis Research Institute) could be assisted to produce and distribute kits as developed at Seibersdorf on a cost-recovery basis. This includes training of Ketri staff at Seibersdorf through fellowship training and through TC programmes.

PCR-ELISA

The need to develop such methods was discussed following a paper by Dr. te Pas. It was concluded that there was no direct benefit from the approach in most laboratories and that the advantages of high throughput were not really required. There were discussions on the sensitivity aspects of the methods.

Review of other support

The TO asked participants to list other support to allow assessment of resources. This will enable a better utilization of efforts in future.

Work plans

Work plans for all the Research Contract holders were presented.

Report

A full report on the meeting, including work plans and tables of conclusions with regard to primers and DNA standards, will be prepared and distributed to all participants.

People attending

P. Buscher*	11411/RB	Belgium
J. L. Quiroga Civera	11408/RB	BoliviaA.
M. Rivera Dávila	11409/RB	Brazil
I. Sidibe..	11407/RB	BF
B. J.in Xu	11410/RB	China
P. -Henning Clausen	11412/RB	Germany
D. Masiga.	11414/RB	Kenya
G. Viljoen	11416/RB	SA
D. Tuntasuvan	11417/RB	Thailand
M. F.W. te Pas*	11415/RB	NL
J. C. Enyaru	11418/RB	Uganda
A. G. Luckins*	11419/RB	UK
My Le Ngoc	11420/RB	Vietnam
R. Dwinger	Expert	NL
J. R. Crowther	TO	IAEA
A. Diallo	HOL	IAEA

M. Radwanska PhD Belgium
 Neither Bocar Sane and Philippe Solano (Côte

d'Ivoire, 11413/RB) could attend.

* = Agreement holder .

RCA Task Force Meeting on Customization of the Artificial Insemination Database Application (AIDA) for Routine Use in AI Services (RAS/5/035)

Technical Officer: Oswin Perera

This Task Force Meeting was organized to address a specific activity of the regional RCA project RAS/5/035, and had the following objectives:

- Consider the current systems of recording, analysing and reporting AI data in national animal breeding programmes in six selected Asian Member States (MSs);
- Review the results and experiences obtained by them in the use of AIDA;
- Determine a suitable “Minimum Data Set” to be adopted for AI recording in the field; and
- Identify and document the modifications necessary for adapting AIDA for routine use.

The meeting was hosted by the Faculty of Veterinary Medicine and Animal Science of the University of Peradeniya, in collaboration with the Livestock Breeding Project of the Ministry of Livestock Development and Estate Infrastructure, and was held in Kandy, Sri

Lanka, from 2 to 6 April 2001. It was attended by National Consultants from four of the five invited RCA MSs (Bangladesh, Indonesia, Philippines and Thailand) and ten Sri Lankan participants from the University of Peradeniya, the Livestock Breeding Project, the Central AI Station and Provincial Directorates of Animal Production and Health. The participant from Myanmar was unable to attend due to a late substitution with an alternate by the national authorities. The meeting was supported by an IAEA expert (Dr. Mario Garcia of Peru) and the IAEA Technical Officer (Dr. Oswin Perera).

1. Conclusions

- 1.1. All participating MSs have a basically similar system of AI organization, which can be hierarchically described as comprising of four levels (I–IV) see Fig.1.

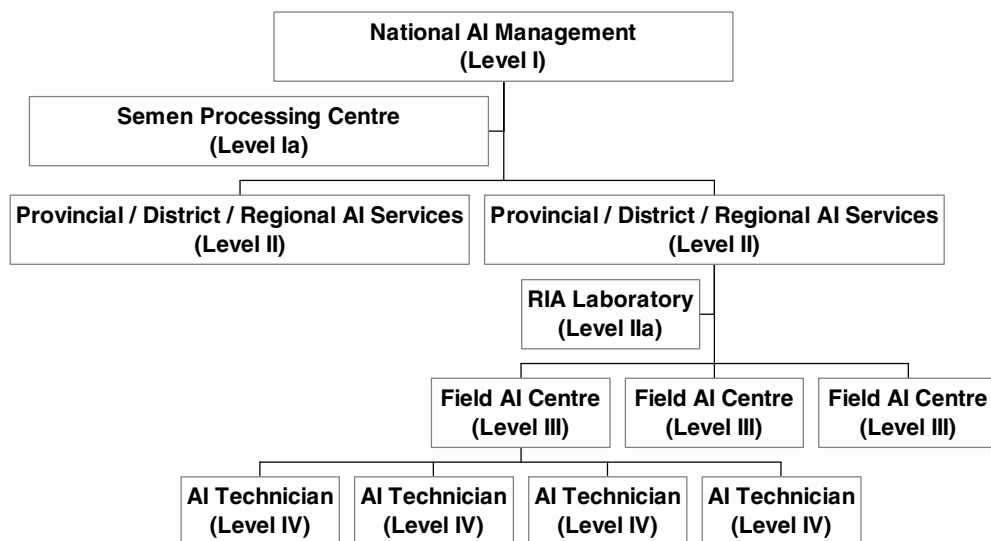


FIG. 1. AI organization

- 1.2. Strengths are: in each country the number of AI service providers is small and mostly limited to government or co-operative organizations; existing recording systems within the participating countries are basically similar; all countries feel the need for improvement of recording systems through the use of computers; and computer literacy is good in medium and upper management levels.
- 1.3. Weaknesses are: in the majority of situations the records are hand-written and manually calculated at Level III; accuracy of records is sometimes doubtful; some entry of summary data into computer applications is done at Levels I and II; most reports are focused on administrative aspects and not on technical aspects; data flow is mostly one way, upwards from the field to central administration; identification of animals on-farm and the methods for registration of animals and farms are inadequate; computer-based systems exist on a limited scale and are not capable of fully meeting the requirements; and most Semen Processing Centres use hand-written records on ledgers and registers, while a few use computer databases or spreadsheets of limited capability.
- 1.4. Needs for improvement in data management include: better identification of animals and farms; simplified data collection forms with minimum essential data that is easy to record on-farm by Artificial Insemination Technicians (AITs); awareness of field personnel on the importance of accuracy and completeness of records and the need to acquire computer skills; participation of farmers in collection of records and problem-solving based on feedback; awareness of decision-makers on the importance of improving the recording and reporting system; ability to regularly analyse records at Level III, which requires provision of computer facilities at this level; ease of transferring data from Level III through Level II to Level I; ability to combine data from several sources, analyse and report at Levels I and II; ability to evaluate performance and technical aspects at all levels; and ability to provide feedback that is technically important from Levels I and II to Levels III and IV, and from these to farmers. Furthermore, Semen Processing Centres require the ability to record information on bulls, semen collection and evaluation, and doses of semen processed, stored and despatched.
- 1.5. The above can best be achieved through a structured data management system that comprises improved paper-based recording at Level IV and computer-based recording, analysis and reporting at Levels III, II and I.
- 1.6. The characteristics of an optimum computer-based system would be: recording on paper forms (structured as required) by AI technicians on-farm (Level IV) followed by entry of data into a computer database and preliminary analysis at field AI Centre (Level III) and/or Provincial/District management (Level II), where applicable; transfer of data from Level III to Levels II and I as electronic files, on diskette or through e-mail; ability to merge, summarize, analyze and report at management Levels II and I; compatible database modules for recording and reporting information on (a) bulls and semen at Semen Processing Centres (Level Ia) and (b) progesterone measurement at RIA Laboratories (Level IIa); facilities for importing data already existing in other systems and ability to link with related databases on livestock development; appropriate user-friendly computer software that can run as a stand-alone application and can be locally customized and upgraded; appropriate measures to prevent errors in data entry and protected by passwords at two levels (“users” for routine operation and “administrator” for making necessary modifications); provision for periodical backing-up and archiving of data; provision for analyzing and reporting on targeted data and management factors as required; and possibility for translating

forms, menus, error messages, on-line help and reports into national languages.

- 1.7. The above can be achieved by (a) customizing AIDA to meet some of the needs; (b) new programming within AIDA to meet additional needs; and (c) developing a new stand-alone module for use by semen processing centres.

2. Recommendations

2.1. To the Agency

- 2.1.1. The modifications proposed for (a) customizing AIDA for routine use by AI service providers and (b) developing a compatible module for use by semen processing centres in RCA Member States (MSs) should be accomplished through the necessary software programming done under MS-Access and Visual Basic. The products should be stand-alone applications and freely available in the public domain to users in developing countries.
- 2.1.2. Test versions of these two software applications, designated as (a) Artificial Insemination Database Application for Asia (AIDA-Asia) and (b) Semen Processing Records Management (SPeRM), should be distributed to MSs participating at this meeting for trial use by August 2001.
- 2.1.3. It is recommended that consideration be given to providing each MS participating in the testing of AIDA-Asia and SPeRM with one desktop computer capable of running these applications, to be located in the main organization responsible for AI in the country.
- 2.1.4. The final version of AIDA-Asia and SPeRM should be compiled by December 2001 based on the feedback received from participating MSs.
- 2.1.5. A Training Workshop should be held on the use of the AIDA-Asia and SPeRM software in July 2002 to train the trainers in all RCA MSs. Bangladesh has agreed to host this Workshop.
- 2.1.6. Follow-up assistance should be provided to MSs which will use AIDA-Asia and

SPeRM on a routine basis through expert services where necessary.

- 2.1.7. Assistance should be provided to establish decentralized mini-assay laboratories for progesterone measurement where justified.
- 2.1.8. Future programmes should consider the development of a wider software package for general farm management, progeny testing and livestock improvement, which is applicable to farming systems in Asia and amenable to local customization.

2.2. To RCA Member States

- 2.2.1. Assistance should be provided to provincial and district level AI management as well as to field AI Centres to use computerized data management.
- 2.2.2. Provision should be made for training of personnel both locally and abroad as required, and supply of computer hardware.
- 2.2.3. The national AI management should participate fully in the testing of the AIDA-Asia and SPeRM software and, if proved applicable, should consider its adoption on a national scale.
- 2.2.4. Assistance should be given to establish decentralized mini-assay laboratories for progesterone measurement by facilitating licensing and related administrative procedures.

2.3. To Project Co-ordinators

- 2.3.1. Close collaboration should be established and maintained with the national AI management at all stages of implementation of this project.
- 2.3.2. The testing of AIDA-Asia should be completed by entering a minimum of 500 existing AI records by October 2001 and the data file sent back to IAEA, together with a list of specific improvements required.
- 2.3.3. The testing of SPeRM should be done by entering a minimum of 50 semen batches from existing records by October 2001 and the data file sent back to IAEA,

together with a list of specific improvements required.

2.3.4. Use of the final version of AIDA-Asia and SPeRM by AI organizations should be promoted through appropriate group activities for familiarization and training.

2.3.5. Staff members from the AI organizations, who will be responsible for training others in the use of AIDA-Asia and SPeRM, should be identified and nominated through the RCA Co-

ordinators for the Workshop scheduled for July 2002 in Bangladesh.

2.3.6. Locations for establishing decentralized mini-assay laboratories for progesterone measurement should be identified and assistance requested from the Agency for the equipment required.

2.3.7. The PCs must maintain close communication with the Agency during all stages of testing and improvement of the AIDA-Asia and SPeRM software.

RCA Training Workshop on *in vitro* Techniques for Feed Evaluation (RAS/5/035)

Technical Officer: Harinder Makkar

This Training Workshop was held from 16 to 27 April 2001 in Batan, Jakarta, Indonesia. It was attended by 15 participants from 11 countries (one each from 10 countries and five from the host country). The training was supported by three IAEA experts (Drs. Michael Bluemmel and U. Krishnamoorthy and Mr. Hermann Baumgartner), the Technical Officer, and a local lecturer, Dr. Hendrawan Soetanto.

The objective of the Workshop was to provide training on modern *in vitro* techniques, in particular the gas method, for evaluation of ruminant feeds. The summary and synthesis on the feed evaluation approaches using the gas method demonstrated during the Workshop, and a slide presentation on the methodologies demonstrated will be available on the home page of the Animal Production and Health Section.

National Training Workshop on Disease Surveillance, Reporting and Emergency Preparedness Systems

Technical Officer: John Crowther

The meeting took place from 23 to 28 April in Islamabad, Pakistan, and was attended by 51 participants, including officials from all provinces and agencies in Pakistan concerned with livestock diseases. Pakistan is a country with the last confirmed focus for rinderpest in the world. It is absolutely vital that the disease is eliminated from this area on behalf of the whole global effort to eradicate rinderpest by the year 2010. Under the Global Rinderpest Eradication Campaign (GREP) of the FAO in Rome, great efforts have been made to organize activities and resources in Pakistan to this end. Part of this is through the Technical Co-operation (TC) project PAK/5/041 as well as other TC projects from FAO and funds from the EU.

The key to the elimination of the virus from livestock is in the motivation and training of the veterinary workers at all levels. This starts with

the management levels and is disseminated to the key workers who have to investigate and search out the disease throughout Pakistan. Pakistan represents a difficult area since co-ordination is not easy and because there is a rather fragmented and variable effort to control diseases in different districts. Formulating and initiating a plan requires significant training in awareness of the disease and related diseases. Setting up of performance indicators, establishing epidemiological principles, setting up laboratory support, initiating proper disease reporting systems, contingency planning, animal movement control strategies, etc., were covered in the Workshop.

Any plan may be a victim of unknown factors and so may have to be adapted to local knowledge. The meeting brought all the major players together to allow specific needs to be addressed. This Workshop focussed on training the decision makers and implementers of plans,

based on the successful experiences in Africa, to allow a full awareness of the situation and principles to be used in the eradication of rinderpest from the whole of Pakistan. Without such a meeting, the resources available may be badly used. There is a distinct danger that co-operation and co-ordination will not be considered as a whole and that misunderstandings will happen with regard to the purpose of the plans. The danger then is that rinderpest will not be eliminated.

The need for the Workshop was emphasized. It was stressed that the success of any campaign for the control/eradication of an infectious disease mainly depends upon obtaining information, in quantitative terms, on a population. Recently, FAO launched a TC project in Pakistan for epidemiological analysis of rinderpest and development of an eradication strategy. Various international and national experts have reviewed the state of preparedness, need for surveillance, disease reporting system and diagnostic facilities in the country. These experts have emphasized that strengthening of these key elements is required to develop a reliable disease control/eradication strategy in the country. It was further stated that the matter should be discussed with veterinary authorities at national level. Currently uniform reporting systems for animal diseases do not exist in the country. There is a great need to harmonize the disease reporting system among various provinces/areas. Thus, the Workshop on the disease surveillance, reporting and emergency preparedness system was essential.

The current animal disease surveillance systems in Pakistan were reviewed through presentations by Director Generals/Directors, from Punjab, Sind, Baluchistan, NWFP, AJ&K; Remount Veterinary and Farm Corps; Deputy Director (Animal Husbandry) Northern

Areas, Assistant Director (Federal Capital Area), Animal Husbandry Commissioner, MINFAL, and those in charge of all Veterinary Training Hospitals.

Presentations were given by the rinderpest officers responsible for the various provinces on their FAO-supported activities. These dealt with setting up of active surveillance for rinderpest through dissemination of flash reporting forms, training material, the running of Training Workshops and the supply of kits to allow local confirmation of clinical diagnosis (Agar Gel Immuno Diffusion- AGID and dipstick technologies). These presentations were complete and indicated a good level of activity. It was concluded that the officers were doing a good job and that expansion of this area was essential.

The seniority of the staff present at the Workshop was testament to the will to improve matters concerning surveillance in Pakistan and the rapid need to eradicate rinderpest. There was a general agreement that improvements had already been seen through the efforts of FAO and that these should receive full support at the provincial level. It was agreed that the present reporting systems are totally inadequate and that the field services needed support both from increased resources and better, more flexible, administration with regard to establishing duties. The meeting proved essential in promotion of the activities and served to give support to the staff in Pakistan from various administrative divisions, who are now charged with improving the reporting and surveillance for rinderpest in Pakistan. Thanks should be given to the local organizers for their excellent administration of the meeting and all the participants and experts for giving up their valuable time and for their very active participation.

AFRA Task Force Meeting to Harmonize Procedures for Selection and Management of AI Bulls and Use of Semen Technology in African Countries (RAF/5/046, AFRA III-2)

Technical Officer: Oswin Perera

This meeting was held from 7 to 11 May 2001 in Arusha, Tanzania. Project counterparts from six AFRA Member States with expertise in

technical aspects of managing AI bulls and semen processing participated, together with an IAEA expert (Dr. David Galloway of Australia) and the Technical Officer.

Presentations were made on the following topics:

1. System of selection of bulls for AI: genetics: progeny testing; performance, production and reproduction; suitability for the environment and production system.
2. Management of bulls: training, feeding, handling and housing.
3. Health and disease control: statutory requirements for disease testing and quarantine.
4. Veterinary examination of bulls: aim; history; general, clinical and physical examination of reproductive organs; serving behaviour; semen collection and examination; tests for infectious and inherited diseases; diagnosis; prognosis; management of cases.
5. Collection, processing and handling of semen for AI: comparison of local technologies and practices; development of standards.
6. Transport and handling of semen in the field and insemination technique: comparison of local practices and development of standards.
7. Heat detection, communication of request for AI, transport and basis for remuneration of technician: methods employed and possibilities for improvement.
8. Diagnosis of pregnancy/non-pregnancy and feed-back of information to farmer: comparison of local practices and development of standards.
9. Results of AI from present recording systems and RIA of progesterone (AIDA): comparison of results, their utilization and identification of constraints.
10. Alternative semen technologies and sustainability of AI systems in African countries: review of current status and future potential.
11. Marketing of semen and advice to AI technicians and farmers on appropriate breeds and bulls.

These were then discussed in relation to best practicable procedures under African conditions, recommendations were made for future application of selected methods, and the framework for a manual of guidelines to be written by the expert was drafted. A full report will be given in the next Newsletter.

FAO/IAEA Consultants Meeting on Preliminary Establishment of GREP Guidelines for the Global Sero-surveillance for Rinderpest Disease in 2003

Technical Officer: Martyn Jeggo

This meeting was held at the Vienna International Centre from 15 to 18 May 2001. It was attended by Peter Roeder, GREP Secretariat, Pascal Hendrix, CIRAD IEMVT, Roger Morris, Massey University, New Zealand, and staff of the Animal Production and Health Sub-programme. The objectives were to delineate concepts for the sampling frame for this global survey, to outline implementation of the survey at the national and regional level, to consider laboratory testing

protocols and to formulate initial and subsequent reporting procedures and actions to be taken. An appendix will contain the inputs needed to complete this survey. The overall survey will be based on agro-ecological systems and homologous groups of cattle and will be strongly linked to a GIS-based data management protocol. It is anticipated that all sera collected will be geo-referenced for ease of data management and interpretation of the results.

D. STATUS OF EXISTING CO-ORDINATED RESEARCH PROJECTS

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

Technical Officer: Harinder Makkar

This CRP is now in its second Phase. It has a total of nine Research Contracts and six Research

Agreement holders. It is aimed at developing a simple method, which can readily be used by extension workers or farmer advisors to identify major problems of nutrition that result in a grossly

inefficient rumen digestion of feed and a low level of microbial supply to the host animal. The final RCM will be held in Vietnam in 2002.

A meeting was held with Agreement holders, Prof. P. Susmel and his group, and Dr. X.B. Chen, from 2 to 4 May 2001 in Vienna to discuss the use of external quality control by Research Contract holders to ensure quality of the data generated. A protocol for development, production and use of the external quality control standards was developed. The external quality control standards

will be provided to all Research Contract holders by the end of this year. The document on internal quality control approach, already in use by the Research Contract holders, was discussed and extended to achieve better applicability. The meeting also addressed the need to develop biosensors for purine derivatives and creatine. Approaches for development of simple biosensors for use in developing countries were discussed and finalized. Prof. Susmel and his group will conduct work on these approaches.

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

Technical Officer: Harinder Makkar

This CRP has six Research Contracts, one Technical Contract and three Research Agreements. It is presently in its first Phase. The main objective of this Phase of the CRP is to identify a tannin assay or a battery of tannin assays which could predict the biological effects of tannin-containing tree or shrub leaves on

ruminants.

The second RCM will take place in São Paulo, Brazil, in November 2001, to evaluate the progress of the work conducted and to formulate work plans for the second Phase of the CRP. Three to four new Research Contracts could be awarded in the second Phase of the CRP. Interested groups are suggested to contact the Technical Officer.

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

Technical Officer: John Crowther

The CRP has now five Research Contract holders from Mali, Côte d'Ivoire, Ethiopia, Kenya and Korea.

The next RCM will be held in November 2001 in Vienna. The complete protocols for PCR to allow differential diagnosis of vesicular diseases will be written up by Research Contract holders and Agreement holders at that meeting to prepare a publication in French and English. This will be a complete guide to the setting up of PCR laboratories (GLP), the methods to be used, sample taking and preparation, defined protocols

and the primers examined, as well as showing typical results and dealing with problems.

Activity in the CRP is being maintained mainly in Côte d'Ivoire, Kenya, Mali, Cameroon and Ethiopia. A new Research Contract entitled "Use of PCR for the diagnosis and determination of prevalence of stomatitis-enteritis diseases in Tanzania" proposed by Joram Buza, Tanzania, has been approved. If any other scientists involved in the rinderpest campaign are in a position to perform PCR now (PCR facilities are set up), then please write to Dr. J. R. Crowther for details on a Research Contract. It is envisaged that the past work in this CRP will add to laboratories involved in rinderpest differential diagnosis.

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

Technical Officer: Martyn Jeggo

This CRP has eleven Research Contracts and three Research Agreements. The main objective of the CRP is to validate, standardize and utilize the competitive ELISA for the detection of antibodies

to contagious bovine pleuropneumonia (CBPP) through field studies in different African countries.

The second RCM of this CRP took place in Lusaka, Zambia, early last year. The next RCM will take place in Kenya in June 2001.

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: Martyn Jeggo

The Second Research Co-ordination Meeting took place at the Sokoine University at Morogoro, United Republic of Tanzania, from 4 to 8

September 2000, and the results will be published. There are currently twelve Research Contract and five Agreement holders. The next RCM will take place in 2002 in Mauritius.

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 recent crisis in Europe has emphasized the need for fully validated, robust and referenced tests to differentiate foot-and-mouth disease vaccinated and infected livestock. The CRP has provided data using several sources of tests and shown variation in both analytical and diagnostic sensitivity and specificity with regard to various livestock and diseases status. Problems identified include the changing nature of the kits provided, the lack of reference sera provided or being selected, the limited work on sheep and goat sera, the relatively high variation in control positive serum values as assessed by charting methods for the indirect ELISAs examined, the poor performance of indirect ELISAs for the detection of antibodies from certain species of livestock, e.g. Caraboa in the Phillipines.

It is hoped that the kit available from S. America (PANAFTOSA), which is being used routinely in

the control programmes, can be included in the next comparison phase in some Contract holder laboratories. Development is needed of competitive/inhibition methods for measurement of antibodies based on non-structural proteins. This will allow a single test to be able to examine all species of antisera. This should be coupled with the setting up of reference panels of sera from sheep, goats, cattle, buffalo and other wild life sera, which can be made through the CRP. Through Technical Contracts, it is envisaged that a new competitive test will be developed so that it can be compared to existing assays and validated in full by the rest of the CRP Research Contract holders. The new test will be based on a non-mammalian system.

The next RCM will be arranged for January /February 2002.

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

Ten Research Contract holders and five Agreement Contract holders are now in the CRP. The first RCM was held in Antwerp and is reported under

Past Events. This report details names of all participants and focuses on the aims of the CRP after the discussions in the RCM.

E. NEW CO-ORDINATED RESEARCH PROJECTS

Integrated Approach for Improving Small Scale Market Oriented Dairy Systems

Technical Officer: Oswin Perera

The background and objectives of this new CRP were described in the December 1999 Newsletter, and the report on a Consultants Meeting conducted to finalize the project was presented in the December 2000 Newsletter.

Proposals for Research Contracts and Agreements are now being entertained. Those who made requests for information have been sent the Project Document and the appropriate forms for preparing a proposal. Award of Contracts and Agreements will be done during the second half of 2001, and

the project will become operational with the holding of the first Research Co-ordination

Meeting in January 2002.

The Development of Strategies for the Effective Monitoring of Veterinary Drug Residues in Livestock and Livestock Products in Developing Countries

Technical Officer: Martyn Jeggo

The commencement of this CRP was postponed until the appointment of a new staff member who will be responsible for technically supporting the projects in veterinary drug residue monitoring. Dr.

Andrew Cannavan has been appointed and will arrive in August. A re-evaluation of all Research Contract proposals will take place prior to the commencement of this CRP, hopefully before the end of the year.

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 and UNDP offices. Such proposals need to be countersigned by the Head of the Institution 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 IAEA Technical Co-operation Projects (TCP). These

are concerned with aspects of animal production and diagnosis of animal diseases. Through such projects, additional support may be provided for the activities planned under the individual Research Contracts. This would provide further equipment, specialized training through IAEA training fellowships and the provision of technical backstopping through visits by IAEA experts for periods of up to 1 month. Such support is available to IAEA Member States.

F. TECHNICAL CO-OPERATION PROJECTS

Operational Projects in 2001/2002

(Number, Title, Technical Officer)

ARG/5/010, IMPROVING TUBERCULOSIS DIAGNOSIS IN RUMINANTS USING PCR, John Crowther

BGD/5/023, DEVELOPMENT OF AGROFORESTRY-BASED LIVESTOCK PRODUCTION SYSTEMS, Harinder Makkar

BKF/5/002, DEVELOPMENT OF A VETERINARY MEDICINE TO COMBAT THE FOWL POX IN POULTRY FARMING, Martyn Jeggo

BOL/5/014, DIFFERENTIAL DIAGNOSIS OF FOOT-AND-MOUTH DISEASE, John Crowther

CMR/5/009, NUCLEAR TECHNIQUES FOR IMPROVING LOCAL RUMINANT PRODUCTIVITY, Harinder Makkar

COL/5/020, USE OF PROTEIN BANKS FOR IMPROVING PORK PRODUCTION, Harinder Makkar

CPR/5/014, INCREASING PRODUCTIVITY OF CROP-LIVESTOCK PRODUCTION SYSTEMS, Harinder Makkar (Associate Staff)

CYP/5/019, ACCREDITATION OF LABORATORY FOR CONTROL OF FOODS OF ANIMAL ORIGIN, Martyn Jeggo

ETH/5/012, INTEGRATING SIT FOR TSETSE ERADICATION, Martyn Jeggo

ELS/5/009, IMPROVING CATTLE PRODUCTION AND QC FOR MONITORING OF ANIMAL DISEASES, Oswin Perera, Axel Colling

INS/5/029, SUPPLEMENTARY FEEDING AND REPRODUCTIVE MANAGEMENT OF CATTLE, Oswin Perera, Harinder Makkar

INS/5/032, IMPROVING BEEF AND DAIRY CATTLE PRODUCTON IN YOGYAKARTA, Oswin Perera

MAL/5/025, FOOD SAFETY MONITORING PROGRAMME FOR LIVESTOCK PRODUCTS, Martyn Jeggo

MAT/5/003, SURVEILLANCE OF PROGRAMMES FOR CONTAMINANTS IN FOODS OF ANIMAL ORIGIN, Martyn Jeggo

MEX/5/036, IMPROVING THE REPRODUCTIVE PERFORMANCE OF PELIBUEY SHEEP IN TROPICAL MEXICO USING LOCAL FEED RESOURCES, Harinder Makkar

MON/5/011, INTEGRATED APPROACH FOR FIELD MANAGEMENT OF ANIMAL PRODUCTION AND HEALTH, John Crowther, Harinder Makkar

MOR/5/027, MONITORING OF VETERINARY DRUG RESIDUES, Martyn Jeggo

MYA/5/011, DEVELOPMENT OF SUPPLEMENTARY FEEDING STRATEGIES BASED ON LOCAL FEED SOURCES, Harinder Makkar

MYA/5/012, DIAGNOSIS AND CONTROL OF SWINE VESICULAR DISEASE AND SWINE BRUCELLOSIS, John Crowther

NAM/5/006, MONITORING OF VETERINARY DRUG RESIDUES IN LIVESTOCK, Martyn Jeggo

PAK/5/041, SETTING UP IMMUNOASSAY AND MOLECULAR-BASED METHODS TO MONITOR AND SURVEY RINDERPEST DISEASE, John Crowther

POL/5/010, INCREASING PIG PRODUCTIVITY THROUGH RADIOIMMUNOASSAY TO DETERMINE METHODS FOR ADVANCING PUBERTY IN GILTS, Oswin Perera

RAF/5/046, INCREASING AND IMPROVING MILK AND MEAT PRODUCTION, Oswin Perera

RAF/5/053, ASSISTANCE TO OAU/IBAR PACE PROGRAMME FOR THE CONTROL AND ERADICATION OF MAJOR DISEASES AFFECTING LIVESTOCK, Martyn Jeggo, Mamadou Lelenta

RAS/5/035, BETTER MANAGEMENT OF FEEDING & REPRODUCTION OF CATTLE (RCA), Oswin Perera, Harinder Makkar

RLA/5/046, SUSTAINABLE ANIMAL PRODUCTION ON LANDSCAPES OF VENEZUELAN-COLOMBIAN ORINOQUIA, Harinder Makkar

SUD/5/025, IMPROVING PRODUCTIVITY OF GOATS IN SUDAN, Oswin Perera

SRL/5/035, MONITORING AND CONTROL OF RESIDUES IN LIVESTOCK PRODUCTS, Martyn Jeggo

URT/5/021, LIVESTOCK DEVELOPMENT IN ZANZIBAR AFTER TSETSE ERADICATION, Oswin Perera, Harinder Makkar

URU/5/023, IMPROVEMENT OF ARTIFICIAL INSEMINATION SERVICES USING RIA, Oswin Perera

VEN/5/021, SUSTAINABLE ANIMAL PRODUCTION, Harinder Makkar

YEM/5/004, IMPROVING THE DIAGNOSIS OF ANIMAL DISEASES, John Crowther

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

In the past, providing counterparts with diagnostic kits was an important activity in APU. This will dramatically decrease in the near future since the

policy of FAO/IAEA Programme is to promote the transfer of the kit production closer to the end

users, i.e. to support kit production in different regions.

In APU, activities are now being re-organized in view of the need to strengthen its capability in gene-based technology for the support of FAO/IAEA Programme to improve animal health and animal production in developing countries. Two examples to illustrate this trend are:

- In a seamless link with the Technical Officer responsible for the CRP on the use of PCR for trypanosomosis, APU will be playing an important role in the standardization of the different tests to be developed. To this end, it will establish at Seibersdorf a trypanosoma DNA bank to be used by counterparts as controls in their tests. All PCR target fragments

of those DNA will be sequenced for further identification if needed. Samples of those DNA, with their fingerprints (nucleic acid sequences) will be provided on request.

- In collaboration with other laboratories, and the frame of PACE programme in Africa, APU will be developing new tests for specific diagnosis of rinderpest and peste-des-petits ruminants.

Another new activity is being set up in the APU, within the context of the FAO/IAEA Training and Reference Centre for Food and Pesticide Control. This will focus on training and the validation of tests for the detection of veterinary drug residues in animal products. We hope that this is a start of a future programme on animal product quality control.

H. QUALITY ASSURANCE PROGRAMMES

QUALITY ASSURANCE PROGRAMMES FOR THE DETERMINATION OF PROGESTERONE IN SKIM MILK AND PLASMA BY RADIOIMMUNOASSAY

The following is a summary of EQA rounds with the RIA for the determination of progesterone in milk and serum /plasma samples.

The 23rd External Quality Control (EQC) exercise for progesterone RIA, which is a component of the FAO/IAEA External Quality Assurance Programme (EQAP), has recently been concluded. EQC samples for milk progesterone determinations were distributed to 37 laboratories, and for plasma/serum determinations to 8 laboratories.

A report has been prepared from the results returned by 23 laboratories that processed milk EQC samples (62.2% response rate) and 6 laboratories that processed the serum/plasma EQC

samples (75% response rate). In the present exercise, the results for milk progesterone values for laboratories using Self-coating RIA (Sc-RIA) kits have also been analyzed, and provide an opportunity for participants to compare these with values obtained using DPC kits.

The response rate for this round of EQC was higher than that for previous rounds.

The 24th EQC exercise for milk and plasma was sent in November 2000, and we are still waiting to receive all the results. In order to complete the analysis of the 24th EQC exercise, we would appreciate receiving the remaining results as soon as possible.

The 25th EQC exercise for milk and plasma is scheduled for July 2001, and will include both DPC and Self-coating RIA kits.

I. COMPUTER SOFTWARE PROGRAMS

LABInfo

From previous reporting, some definition work has been carried out so far – notably in a ‘Concept paper’ (Abela, Dec 1998) and the ‘Stage 1 report’ (Bruegger et al, Jan 2001). These, however, stopped short of preparation of a functional requirement for a prototype.

The next steps in the development of Labinfo sees the departure from the concept of open source.

LABinfo will be integrated within TADinfo system architecture, using compatible tools, able to operate without TAD or fully integrated with TAD (in terms of data exchange).

The next phase should be built on a set of key assumptions, such as:

- The system will be limited to application within veterinary laboratories and not address the human health angle (despite the fact that many of the laboratory sample tracking and management issues are common to human and animal health, as stated in the Stage 1 Report)
- A limited set of diseases should/will be targeted (six have been identified – notably Rinderpest, FMD, CBPP, ASF, Brucellosis and Trypanosomosis).

The software aims specifically to support veterinary laboratories in developing countries, which are seeking to improve internal laboratory working practices and/or are working towards international standards accreditation.

LABinfo will be first targeted to the laboratory manager and staff within a given developing country central veterinary laboratory. The system

is not yet planned to be extended to operate at regional laboratories or in the field.

Once users have reviewed the requirement through a variety of participating activities, a system prototype will be built. First demonstration of a working prototype will take place at the IAEA Regional Training Workshop in Senegal in November 2001.

Two test cases will then be piloted from November 2001 onwards selected from (1) a country currently attempting an eradication programme, and hence handling large numbers of laboratory samples, and (2) a country with scope to become medium-sized livestock/animal products exporter.

LABinfo project roles will be as follows:

Project manager for phase 1 (Robson)
Programme managers for AGE/AGAH components (Jeggo, Rweyemamu)
Design/build team (Morteo + programmers)
AGAH TAD functional expert (Paskin)
AGE, LABinfo functional expert (Lelenta).

J. GEOGRAPHICAL INFORMATION SYSTEMS

For the GIS model to identify priority areas for tsetse control in Ethiopia a visit to Ethiopia was made in April 2001 to carry out a ground-truth survey in South-western Ethiopia. Seventy six ground-truth points were collected, focusing on cultivation rates, suitability classes, farming systems, vegetation types & vegetation cover (%), slope classes and ecological zoning. Validation of these points will take place soon.

A 10-day visit was made to the Ethiopian TC-project "Integrating Sterile Insect Technique for Tsetse Eradication" (ETH/5/012) to assist in GIS activities (mapping and reporting) of the veterinary and entomology survey data. All geo-referenced data collected during the surveys (entomological- 4 cycles and parasitological- two seasons) have been mapped in ArcView and as a result, 35 shape-file layers of e.g. fly-species, fly-sexes, parasite-species, number of animals anaemic have been created (in UTM-37n). In two ArcView-modules comparisons have been made of different parameters in relation to altitude (DEM) and land-use (LANDSAT). To support reporting 40 maps, 10 posters, 3 presentations and a GIS database set-up have been created. A geo-referenced socio-economic survey will take place in the near future.

An extensive land use planning exercise will start soon to protect the natural resources of the project area.

The West African desk study, co-ordinated jointly by AGAH, Rome and the Joint FAO/IAEA Division, Vienna, "*to develop a data driven area bound strategy decision model for tsetse eradication*" is coming to the end of its first phase. From 21 to 24 May 2001, a FAO/IAEA Workshop was held (start of phase 2: Capacity building) in Ouagadougou, Burkina Faso, on "Strategic planning of area-wide tsetse and Trypanosomosis control in West Africa". The objective of the Workshop is to further the strategy development of a programme for tsetse and trypanosomosis control and eradication in West Africa, through adoption of a rational, data-driven approach towards area-wide intervention schemes.

A visit to AGAH, FAO, Rome, has been made to explore data availability and to discuss the GIS approach to support the GREP pathway to globally eradicate Rinderpest by 2010 in close co-operation with AGAH, Rome, and PACE, Nairobi, using GIS analysing methodologies. As a result, a draft map of 45 groups of "homogenous groups of animals" have been identified. An expert meeting

took place from 15 to 17 May in Vienna to work out this concept in more detail.

A visit to the Venezuelan TC-project "Sustainable Animal Production" (VEN/5/021) will be made in June to assist in creating a spatial database for farm classification, data dissemination & mapping, and to give a training on modelling with ArcView.

New soft- and hardware have been received to support the GIS Unit at the Joint FAO/IAEA Division. New software packages include the

ArcViews' Model builder, 3D Analyst, Image Analyst, Tracking Analyst and ArcPress. IDRISI has been updated to IDRISI32 and most of the old imagery and IDRISI vector layers have been converted to the new format. New hardware received include a large format colour scanner (ScanPlus III, model 810c) and a large format colour printer (HP DesignJet 5000, model 42). As a result, a number of posters for the section have been created.

K. PUBLICATIONS

Published:

"Guidelines for establishing Quality Systems in Veterinary Diagnostic Testing Laboratories", Report from a Training Course/Workshop entitled "Developing Standardized Training Material to Assist FAO/IAEA Member States to Establish Quality Systems for Veterinary Diagnosis Laboratories" held in Vienna, 4-8 September 2000.

The External Quality Assurance Programme for the FAO/IAEA/P4-23 Exercise, for the determination of progesterone in skim milk and plasma of farm livestock, Report (EQAP/August 2000) M. Khadra, and O. Perera .

The External Quality Assurance Programme for the FAO/IAEA/P4-22 Exercise, for the determination of progesterone in skim milk and plasma of farm livestock, Report (EQAP/May. 1999) M. Khadra, and O. Perera.

Khadra, M., Richards, J.I., Robinson, M.M., Development and evaluation of a micropipette tip washing system, *J. Immunol. Meth.*, 242 (2000) 1–8.

In Press:

Proceedings of the Final RCM of the Co-ordinated Research Project on "Use of RIA and Related

Techniques to Identify Ways of Improving Artificial Insemination Programmes for Cattle Reared under Tropical and Sub-tropical Conditions", held in Uppsala, Sweden, 10–14 May 1999 (IAEA-TECDOC-1220).

In Preparation:

Performance indicators for rinderpest surveillance.

The FAO/IAEA Guidelines to Establish a Quality System in Veterinary Testing Laboratories in Developing Countries.

Proceedings of the third RCM of the Co-ordinated Research Project on "The Rinderpest Sero-monitoring and Surveillance in Africa Using Immunoassay Technologies" held from 16 to 20 October 2000 in Vienna, Austria.

Proceedings of the second RCM of the Co-ordinated Research Project on "The Assessment of the Effectiveness of Vaccination Strategies against Newcastle Disease and Gumboro Disease Using Immunoassay-based Technologies for Increasing Farmyard Poultry Production in Africa" held from 4 to 8 September 2000 in Morogoro, Tanzania.

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