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Programme
Against
African
Trypanosomosis



TSETSE AND TRYPANOSOMOSIS INFORMATION

**DFID**

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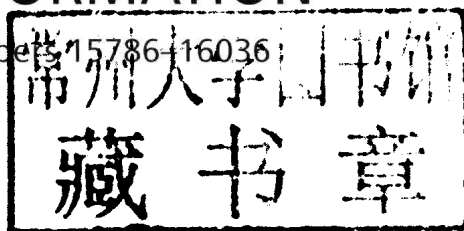
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TSETSE AND TRYPANOSOMOSIS INFORMATION

The Tsetse and Trypanosomosis Information periodical has been established to disseminate current information on all aspects of tsetse and trypanosomosis research and control to institutions and individuals involved in the problems of African trypanosomosis. This service forms an integral part of the Programme Against African Trypanosomosis (PAAT) and is jointly sponsored by the Food and Agriculture Organization (FAO) of the United Nations, the International Atomic Energy Agency (IAEA), the Inter-African Bureau for Animal Resources of the African Union (AU-IBAR), the World Health Organization (WHO), the Research Department for Livestock Production and Veterinary Medicine of the Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD-EMVT) and the British Government's Department for International Development (DFID).

The half-yearly periodical is prepared for publication, in both English and French editions, by the Food and Agriculture Organization of the United Nations. Each annual volume consists of two parts and an index. Subscription is free for all recipients engaged in trypanosomosis research and control, and requests for enrolment may be sent to: Ms Maria Grazia Solari, AGAH, FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy (fax +39 06 5705 5749; e-mail MariaGrazia.Solari@fao.org).

Since the value of this information service depends to a great extent on the receipt of relevant material from research workers, campaign planners and organizers and field workers themselves, readers are requested to submit news items and copies of scientific papers and reports to the Editor: Dr James Dargie, Brunnstubengasse 43, 2102 Bisamberg, Austria (tel. +43 2262 61735; e-mail j.dargie@aon.at).

We regret that we are unable to supply photocopies of the papers quoted in the periodical.

Distribution dates and copy deadlines

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The Index will be distributed as soon as possible after the completion of each volume.

ABBREVIATIONS USED IN TTI

a.i.	active ingredient	LC ₅₀	median lethal concentration
ACTH	adrenocorticotrophic hormone	LD ₅₀	median lethal dose
ALAT	alanine aminotransaminase	M	molar
ASAT	aspartic acid aminotransaminase	mAEC	miniature anion-exchange centrifugation technique
b.w.	body weight	McAb	monoclonal antibody
BIIT	blood incubation infectivity test	MW	molecular weight
CATT	card agglutination test for trypanosomiasis	NARS	National Agricultural Research Services/Systems
CD ₅₀	median curative dose	p.i.	post-infection
CNS	central nervous system	PCR	polymerase chain reaction
CSF	cerebrospinal fluid	PCV	packed cell volume
DNA	deoxyribonucleic acid	ppb	parts per billion (10 ⁹)
ELISA	enzyme linked immunosorbent assay	ppm	parts per million
HAT	human African trypanosomiasis	r.h.	relative humidity
HCT	haematocrit centrifugation technique	RNA	ribonucleic acid
GIS	geographic information system(s)	SIT	sterile insect technique
GPS	global positioning system(s)	sp(p).	species (plural)
i.m.	intramuscular(ly)	ssp(p).	subspecies (plural)
i.p.	intraperitoneal(ly)	UV	ultra-violet
i.v.	intravenous(ly)	VAT	variable antigen type
IFAT	indirect fluorescent antibody test	VSG	variant surface glycoprotein
KIVI	kit for <i>in vitro</i> isolation of trypanosomes	WBC	white blood cell

Organizations

ANDE	Agence Nationale de Développement de l'Elevage
AU	African Union
AU/STRC	African Union/Scientific, Technical and Research Commission
BICOT	Biological Control of Tsetse by the Sterile Insect Technique
CEBV	Communauté Economique du Bétail et de la Viande
CEMV	Centre Universitaire de Formation en Entomologie Médicale et Vétérinaire
CGIAR	Consultative Group on International Agricultural Research
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement
CIRAD-EMVT	Département d'Elevage et de Médecine Vétérinaire des Pays Tropicaux du CIRAD
CIRDES	Centre International de Recherche-Développement sur l'Elevage en Zone Subhumide
CNERV	Centre National d'Elevage et de Recherches Vétérinaires
CNRS	Centre National de Recherche Scientifique
CREAT	Centre de Recherche et d'Elevage, Avétonou, Togo
CRSSA	Centre de Recherches du Service de Santé des Armées Emile Pardé
CTVM	Centre for Tropical Veterinary Medicine
DFID	Department for International Development (UK)
DNDi	Drugs for Neglected Diseases Initiative
DSE	German Foundation for International Development
EC/EU	European Community/European Union

Tsetse and Trypanosomosis Information

EDF	European Development Fund
FAO	Food and Agriculture Organization of the United Nations
HTCA	Farming in Tsetse Control Areas of Eastern Africa
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
IAEA	International Atomic Energy Agency
IBAR	Interafrican Bureau for Animal Resources
ICIPE	International Centre of Insect Physiology and Ecology
ICPTV	Integrated Control of Pathogenic Trypanosomes and their Vectors
IFAD	International Fund for Agricultural Development
ILRI	International Livestock Research Institute
INRA	Institut National de Recherche Agronomique
IPR	Institut Pierre Richet
IRD	Institut de Recherche et de Développement (formerly ORSTOM)
ISCTRC	International Scientific Council for Trypanosomiasis Research and Control
ISRA	Institut Sénégalais de Recherches Agricoles
ITC	International Trypanotolerance Centre
KARI	Kenya Agricultural Research Institute
KETRI	Kenya Trypanosomiasis Research Institute
LCV	Laboratoire Central Vétérinaire
LNERV	Laboratoire National de l'Élevage et de Recherches Vétérinaires
LSHTM	London School of Hygiene and Tropical Medicine
MRC	Medical Research Council
MRU	Mano River Union
NITR	Nigerian Institute for Trypanosomiasis Research
NRI	Natural Resources Institute
OCCGE	Organisation de Coopération et de Coordination pour la Lutte contre les Grande Endémies
OCEAC	Organisation de Coordination pour la Lutte contre les Endémies en Afrique Centrale
OGAPROV	Office Gabonais pour l'Amélioration de la Production de la Viande
OIE	Office International des Epizooties
OMVG	Organisation pour la Mise en Valeur du Fleuve Gambie
PAAT	Programme against African Trypanosomosis
PATTEC	Pan-African Tsetse and Trypanosomiasis Eradication Campaign
PRCT	Projet de Recherches Cliniques sur la Trypanosomiase
RDI	Rural Development International
RUCA	Rijksuniversitair Centrum Antwerpen
SADC	Southern African Development Community
SIDA	Swedish International Development Authority
SODEPRA	Société pour le Développement des Productions Animales
TDR	UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases
TDRC	Tropical Diseases Research Centre
TPRI	Tropical Pesticides Research Institute
TTRI	Tsetse and Trypanosomiasis Research Institute
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
UTRO	Uganda Trypanosomiasis Research Organisation
WHO	World Health Organization

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SECTION A – NEWS

31ST INTERNATIONAL SCIENTIFIC COUNCIL FOR TRYPANOSOMIASIS RESEARCH AND CONTROL (ISCTRC) GENERAL CONFERENCE, BAMAKO, MALI, 12-16 SEPTEMBER, 2011

This Conference, the first of which was convened in 1949, was held at the Centre International de Conference de Bamako in Bamako, Mali. The ISCTRC Conference is organized on a two-year basis, with this year's theme being **"Refocusing Research and Control of Tsetse and Trypanosomiasis: A Development Agenda"**.

The Conference was opened by the Prime Minister, Her Excellency Mme Cisse Mariam Kaidama Sidibe. The ceremony was also attended by the Malian Minister of Livestock and Fisheries, Hon Dr. Bokary Treta, the Minister of Health, Ms Diallo Madeleine Ba, the Commissioner for Rural Economy and Agriculture of the African Union Commission and the Director of AU-IBAR, Prof. Ahmed El-Sawalhy, among other prominent dignitaries. In her speech, the Prime Minister urged scientists to bring research to the doorstep of the rural poor who bear the scourge of tsetse and trypanosomiasis. The Director of the Inter-African Bureau of Animal Resources, Dr Ahmed El-Sawalhy, complemented the call of the Prime Minister by reiterating the commitment of AU-IBAR to contribute to removing the tsetse and trypanosomiasis burden from the African Continent.

The AU Commissioner for Rural Economy and Agriculture observed that 60 million rural people and 50 million cattle in 37 sub-Saharan countries live within or at the margins of tsetse infested areas and are at risk of African trypanosomiasis. About 300 000 to 500 000 new cases of human African trypanosomiasis (HAT) are reported every year with an annual mortality of approximately 50 000 people. The Commissioner moreover observed that the economic loss due to animal African trypanosomiasis is estimated at US\$ 5 billion a year. She urged institutions working on tsetse and trypanosomiasis, including the ISCTRC, the Pan African Tsetse and Trypanosomiasis Eradication Campaign (PATTEC), the Programme against African Trypanosomiasis (PAAT), the World Health Organization (WHO), the Food and Agriculture Organisation (FAO) and the International Atomic Energy Agency (IAEA) as well as national institutions, universities, international NGOs and research institutions to redouble their effort to contribute to the control, elimination and eventual eradication of tsetse and trypanosomiasis. She further observed that controlling, eliminating and eventually eradicating tsetse and trypanosomiasis calls for regional approaches as it is impossible for any single country to achieve tsetse free status without collaborating with neighbouring countries, given the transboundary nature of the fly and the attendant threat of re-invasion. She further emphasised the important role public and private partnerships can play in the management of tsetse and trypanosomiasis.

A total of 314 participants attended the meeting, drawn from 26 African Member States, the African Union Commission, universities and research institutions from all over the world, FAO, WHO, the IAEA, PAAT, the International Centre for Insect Physiology and Ecology (ICIPE), the Centre International de Recherche-Développement sur l'Élevage en zone Sub-humide (CIRDES), the Foundation for Innovative New Diagnostics (FIND), the Drugs for

Neglected Diseases (DNDi) and the Global Alliance for Livestock Veterinary Medicine (GALVmed).

The Conference observed that significant progress had been made in the area of tsetse and trypanosomiasis field interventions and that there was a general trend and desire by countries to operate within the framework of PATTEC. A major issue of concern was how to use research methods and tools for the collection of good quality baseline data for the planning of control and eradication programmes. The Conference also noted that even though progress has been made in the implementation of PATTEC projects there was not sufficient quantification of the benefits derived in transforming livelihoods.

The Conference also observed the growing interest and enhanced collaboration between institutions in all areas of tsetse and trypanosomiasis research and control as evidenced by the number of networks, consortia and other specialized groups that have evolved over time.

Several papers were presented on the diagnosis and treatment of HAT. Of significance was the growing interest in non-invasive methods for the detection of the second stage of HAT. Research has also advanced in post-treatment follow-up periods and also in the use of appropriate combination of drugs for the treatment of HAT. It was also concluded that communities should be made familiar with the strategic use of trypanocides and that they should also have access to quality animal health products.

The meeting noted with appreciation the contribution of countries towards the elimination of HAT as evidenced by the downward trend in the numbers of reported cases. Countries were, however, urged not to relent on the surveillance and treatment of HAT.

The Conference acknowledged that a wide variety of tsetse suppression technologies, such as the sequential aerosol technique (SAT) have been developed and tested and that these have proven highly efficient under different ecological conditions. There was consensus that the sterile insect technique (SIT) as a mop-up technology is still very relevant and efforts should be geared towards removing the bottlenecks that hinder tsetse mass rearing. Challenges faced in tsetse fly mass rearing were discussed and it was heartening to note that a lot of work is currently being undertaken by national and international organizations to address high mortality in tsetse colonies attributable to viral infections (some of this work is described later under the work of the Joint FAO/IAEA Division and IAEA Technical Cooperation Programmes).

The SAT was also noted to have succeeded under certain ecological conditions. It was, however, acknowledged that flexible guidelines were required to enable the adaptation of this technology to varying conditions in different countries.

The Conference was informed of the significant progress made in the development of bait technology for tsetse suppression such as the use of insecticide-impregnated netting in domestic and peri-domestic livestock production systems. The cost-effectiveness and sustainability of this group of methods needs to be evaluated, and the participation of the private sector was identified as crucial in this endeavour. The Conference observed that as a result of current gains made in tsetse suppression/eradication, the issue of non-tsetse transmitted trypanosomiasis should be revisited.

Presentations made on the use of geographic information systems (GIS) for tsetse and trypanosomiasis mapping were enlightening and there was consensus that they should be adopted by countries as a decision-support tool for the planning of tsetse and trypanosomiasis control/eradication programmes.

Tsetse and Trypanosomosis Information

Given the low number of interventions under the sub-theme Land Use, Environment and Socio-Economics, the Conference encouraged scientists to develop proposals to address socio-economic issues with emphasis on impact assessment. This could be addressed by the integration of socio-economic studies in tsetse and trypanosomiasis control/eradication programmes.

The importance of capacity building in all areas of tsetse and trypanosomiasis research and control was also emphasized.

In view of the theme of the Conference, it was acknowledged that research should be adaptive and in the short to long-term lead to development. This requires research themes to be formulated to respond to real development needs in the affected countries.

NEW PATTEC COORDINATOR

During a handover ceremony on 2 August 2011 in the African Union Office of the Director of Rural Economy and Agriculture (DREA), the PATTEC “instruments of power” were given to Dr. Hassane Mahamat by Dr. John Kabayo. The instruments consisted of a report, the tsetse gun (PATTEC flag) and a PATTEC cap. The ceremony took place in the presence of staff from the Commission and particularly from the DREA. Speaking during the handover ceremony, Dr. Abebe Haile Gabriel, Director, DREA hailed the occasion as a sign of maturity for power transfer. He commended Dr. Kabayo’s efforts and commitment in serving Africa through the fight against tsetse flies and trypanosomiasis and pledged to support the new Coordinator. Meanwhile, PATTEC celebrated its tenth anniversary during the 17th Ordinary Session of the Assembly of the African Heads of State and Government that took place in Malabo, Equatorial Guinea, 30 June-1 July, 2011. H. E. Teodoro Obiang Nguema Mbasogo, the President of Equatorial Guinea and Chairperson of the African Union is the PATTEC Patron for the ECCAS Region, while H. E. Prof. Bingu wa Mutharika, the President of the Republic of Malawi and former Chairperson of the African Union, is the Patron of PATTEC in the SADC Region.

BRIEF ON THE WORK OF THE PAAT SECRETARIAT (2010 – 2011)

Since October 2010, the PAAT Secretariat which is composed of FAO, IAEA, AU-IBAR and WHO staff organized one visit and three meetings.

1. Visit to AU Headquarters in Addis Ababa, 3-8 October 2010

Two members of PAAT Secretariat, (Raffaele Mattioli and Udo Feldmann) from FAO and IAEA respectively, visited AU Headquarters in Addis Ababa to hold talks with the AU Commissioner in charge of Rural Economy and Agriculture (REA) and with the PATTEC Coordinator on the issue of PAAT/PATTEC collaboration. During this visit, both parties recognized the need for reinforced collaboration and synergy between PAAT and PATTEC. During the talks, a request was made for PAAT to assist in revising the PATTEC Plan of Action.

2. Ad hoc meeting of the PAAT Secretariat at FAO Headquarters, 3-4 November 2010

This meeting deliberated on the issues raised during the meeting held between the PAAT Secretariat mission and PATTEC coordination in Addis 3-8 October 2010 and which was dedicated to collaboration between PAAT and PATTEC and collaboration between the PAAT Secretariat agencies.

On the PAAT-PATTEC collaboration, it was recommended that high level contacts be established between FAO and the AU Commissioner for REA. Improving that collaboration might require the inclusion of PATTEC in the Secretariat and any future MOU between FAO and AU should reflect the role of PAAT. It was also suggested that the PATTEC Plan of Action be revised in a participatory manner.

On the inter-agency collaboration, the meeting suggested that steps be taken to formalize AU-IBAR's membership of PAAT.

In the course of this meeting members present also discussed the importance of capacity building in T & T. On this issue, it was suggested that investment in such programmes should be situated within the universities of the respective sub-Saharan African regions for the purposes of improving sustainability.

3. PAAT Secretariat meeting in Addis Ababa, 26-27 January 2011

The agenda of this meeting centred on the PAAT external review report, a summary of which was presented by the PAAT Secretariat focal point. Observations and comments were made by participants, but the main conclusion was that PAAT should have its own strategic framework which should clearly show its objectives, strategy, priority actions and the role of each of its PAAT Secretariat members. The meeting further emphasized that PAAT activities should not be confused with those of FAO, a member of the Secretariat.

4. PAAT Secretariat meeting in Bamako, 8-9 September 2011

The meeting's objective was for participants to examine the draft PAAT Strategic Framework prepared by the Secretariat. The submitted document was read chapter by chapter and comments and corrections taken by the focal point who prepared a clean document for approval at the next PAAT secretariat meeting which has yet to be convened.

WORKSHOP TO REVIEW THE PATTEC PLAN OF ACTION, ADDIS ABABA, 24-25 NOVEMBER 2011

The African Union Commission (AUC) invited 25 participants from tsetse and trypanosomosis (T&T) affected countries and international and regional organisations and institutions to this workshop to review the PATTEC Plan of Action, which had been developed some ten years ago and was approved by the African Heads of States and Government at the AU Summit in Lusaka, Zambia, 2001. The participants discussed lessons learned from implementing activities under the PATTEC Plan of Action during the past ten years and initiated the development of a new

PATTEC Strategic Framework document by establishing four working groups to elaborate on the following topics: a) vector control/eradication; b) human trypanosomosis; c) animal trypanosomosis; and d) land use development. The PATTEC Coordination Office at the AUC intends to submit the new PATTEC Strategic Framework document for consideration to the African Heads of States and Government at their Summit in mid-2012.

WORK SUPPORTED BY THE JOINT FAO/IAEA AND IAEA TECHNICAL CO-OPERATION PROGRAMMES

Most activities in relation to addressing the tsetse and trypanosomosis (T&T) problem are planned and carried out through the Insect and Pest Control (IPC) sub-Programme of the Joint FAO/IAEA Division and the IAEA Technical Cooperation Programme. Activities include (i) coordinating and supporting R&D for the most part through Coordinated Research Projects and by staff working at the FAO/IAEA Insect Pest Control Laboratory which is housed within the IAEA Laboratories at Seibersdorf near Vienna, (ii) providing technical and advisory services to Governments and their institutions (including through consultants and staff as well as training courses and fellowships) on planning, feasibility assessment and implementing area-wide integrated tsetse and trypanosomosis control efforts at national and regional levels, and (iii) collecting, analysing and disseminating accurate and balanced scientific, technical and policy-relevant information to a wide variety of stakeholders in close collaboration with AU, FAO and WHO, and making use of the PAAT forum. Each six months the IPC sub-Programme publishes a Newsletter, the most recent being available at <http://www-pub.iaea.org/MTCD/publications/PDF/Newsletters/IPC-NL-78.pdf>.

Below is a description of some of the main activities conducted during the past 12 months, but full details - particularly concerning the extensive work carried out within the FAO/IAEA Insect Pest Control Laboratory which cannot be described here due to space limitations - are available by consulting the Newsletters themselves.

1. Implementing the Pre-Operational Phase to Create a Zone Free of *Glossina palpalis gambiensi* using the Sterile Insect Technique (SIT)

A delegation from the Mubargui company visited the project in Senegal to discuss the development of a chill fly aerial release system for tsetse. This team is developing a chill fly aerial release system suitable for tsetse together with navigation equipment, recording and management software as a donation to the project. The system is based on the system used for fruit fly releases in Central America, but has been extensively modified to fit the much lower release rates and much higher cost of tsetse flies compared to fruit flies. Together with the project counterparts, the company Domain de Kalahari which is proposed to do the aerial releases was visited. This company has a number of two seat (tandem) gyrocopters that are used for sightseeing trips for tourists. It is proposed that these gyrocopters would be suitable for tsetse fly release. The Mubargui team examined the gyrocopters with a view to fitting the chill release machine into the rear passenger compartment with the necessary associated power supplies and navigation equipment. They informed us that the new system would be ready in September 2011.

The Mubarqui team also demonstrated the MacX web-based management system for recording and monitoring all aspects of the fruit fly release programmes in Central America. The system records rearing, release and monitoring data and presents these in various formats, including via Google Earth allowing an immediate visual impression of the area covered and the accuracy of the on-going releases. Any errors in track or altitude are immediately visible and a “virtual” flight can be followed to see the release path. Ruben Leal has offered to modify the MacX system, which is based on MySQL, and make it available for the tsetse project’s use. The current project database is in the process of being converted to ySQL and Rene demonstrated how easily and quickly the data could be loaded into the MacX system. It is recommended that the MacX system is adopted for the project with suitable modifications appropriate to tsetse biology. An initial contract for test releases will cover about 60 hours total flying time in the Kayar area, including a mobilization component to cover obtaining permits, preparing the gyrocopter for the releases, identifying and preparing emergency landing areas in the release zone, etc. As part of this test, shipments of pupae will be sent from Seibersdorf or Bratislava for comparison with the quality of the pupae shipped from CIRDES in Burkina Faso. The first shipment will be made to arrive in Dakar for release in Kayar simultaneously with the release of the CIRDES flies so that a direct comparison can be made. Depending on the outcome of this shipment a second shipment will be sent four weeks later and possibly further shipments.

2. Creating a Tsetse-Free Zone in the Southern Rift Valley

FAO/IAEA continued to provide technical assistance to the Southern Tsetse Eradication Project (STEP). This large and complex project aims at controlling and eventually eliminating the tsetse and trypanosomosis problem in the Ethiopian Southern Rift Valley by developing and applying an area-wide integrated pest management (AWIPM) approach, involving a sterile insect technique (SIT) component. The project has passed the phases of baseline data collection and feasibility assessment and is currently in the pre-operational and capacity building phase. In order for STEP to enter and receive support for the operational phase, some ten identified shortcomings, relevant to project management and a few of a technical nature, need to be addressed before completing the preoperational phase in mid-2012. By May 2011 “good” and “some progress” could already be reported on three and six of these shortcomings, respectively. Worth mentioning in this context are: a) a revised project management set-up and the appointment of a new, effectively working project management team; b) a substantial increase of the number of mass-reared tsetse colony females needed to supply sterile male flies for aerial release in SIT operations: the *Glossina fuscipes fuscipes* colony has meanwhile exceeded 600 000 colony female flies; c) progress in the initiation of intensive and area-wide pre-SIT tsetse population suppression in the entire 10 500 km² STEP “block-1” field area, using insecticides on targets and on livestock, as well as in the near future, involving the sequential aerosol technique (SAT). Preparations are under way to initiate pilot operational aerial releases of sterile *G. f. fuscipes* male flies in April 2012 in the Deme valley.

3. Assessing the Feasibility of Establishing a Tsetse Free Zone in Lake Victoria Basin

Collaborators in Uganda have made progress with standardised collection and processing of field data relevant to the tsetse and trypanosomosis problem. Tsetse suppression activities are under way in large parts of the *Glossina fuscipes fuscipes* belt in the country. A Government request to the IAEA for technical assistance against this key vector of animal and human African trypanosomosis in the country beyond 2011 was the basis for a meeting held in Vienna between tsetse control specialists from Uganda and Ethiopia. In the past years Uganda has repeatedly faced difficulties with creating a mass-reared colony of *G. f. fuscipes*. This prevented the development of a tsetse SIT component as part of AW-IPM measures in the country. As the STEP mass-rearing facility in Ethiopia meanwhile appears to be in a position to produce substantially more sterile male flies of this species than required for the SIT operations in the STEP project area, Ethiopia and Uganda entered negotiations and elaborated detailed plans for the procurement of sterile males for an SIT feasibility demonstration in a pilot area in Lake Victoria in Uganda, which is proposed to be implemented during the 2012-2013 biennium.

4. Collaboration between SlovakAid and Kenya on the Tsetse and Trypanosomosis Problem

For the past ten years the Institute of Zoology, Slovak Academy of Sciences (IZ SAS) in Bratislava, Slovakia, has collaborated with the FAO/IAEA in research and methods development for addressing the tsetse and trypanosomosis problem in Africa and in maintaining back-up or "seed" colonies of three important tsetse fly species in support of on-going and planned tsetse sterile insect technique (SIT) programmes in Africa. The IZSAS also assists FAO and IAEA and their Member States in providing training on tsetse mass rearing and aspects relevant to developing and applying SIT for scientists and technicians from collaborating African institutions. This fruitful collaboration between IAEA, FAO and the IZ SAS was instrumental in engaging the SlovakAid to provide bilateral technical assistance amounting to € 174 000 to the Trypanosomosis Research Centre of the Kenya Agriculture Research Institute (KARI-TRC) in Muguga, Nairobi, Kenya.

The SlovakAid support was used to refurbish, equip and upgrade KARI-TRC's tsetse rearing facility and to assist in tsetse research and control activities. Support was also provided to the KARI-TRC molecular genetics laboratory, which is among the leading institutions in Africa for research on tsetse population genetics. The KARI-TRC insectaries were equipped with the newly developed tsetse production unit (TPU-4), which now enables the Centre to increase its tsetse rearing capacity to about 100 000 colony female flies. Two KARI-TRC staff obtained SlovakAid sponsored fellowship training at the IZ SAS. The official commissioning of the newly equipped facilities at the KARI-TRC took place in December 2010 in the presence of Kenyan officials, the Ambassador of Slovakia Republic and representatives of the IZ-SAS. Activities under the bilateral cooperative effort currently focus on increasing the *Glossina pallidipes* colony at KARI-TRC with a view to initiating pilot SIT releases in the Lambwe Valley, Kenya.

5. Supporting the Creation of a Tsetse Free Zone in Southern Mozambique and North-East South Africa

The third regional coordination meeting of TC project RAF5059 was held in Pretoria, South Africa in November 2011, hosted by the Onderstepoort Veterinary Institute (OVI). Scientists from the OVI, the Department of Veterinary Services, KwaZulu Natal (KZN), the Ministry of Agriculture, Mozambique and the Eduardo Mondlane University (EMU), Maputo, Mozambique attended the meeting. Dr Hassane Mahamat, the new Coordinator of the Pan African Tsetse and Trypanosomosis Eradication Campaign (PATTEC) was also present. The tsetse and trypanosomosis situation in KZN has not changed, i.e. it is clear that both *G. brevipalpis* and *G. austeni* are omni-present in KZN and the trypanosomosis prevalence averages around 19 percent. The disease is mainly managed through the curative administration of trypanocidal drugs, very often only after clinical diagnosis. The dip tanks in KZN only use Amitraz, which is an acaricide ineffective against tsetse.

New research data on vector competence seem to indicate that *G. austeni* is a better vector of trypanosomosis than *G. brevipalpis*. Population genetics data using mitochondrial DNA as a marker indicate that the flies in Swaziland belong to a separate population, but the flies from Southern Mozambique and KZN constitute one population. However, these findings need to be confirmed with other markers such as microsatellites. In Mozambique, the entomological and veterinary baseline data surveys were further implemented. Entomological surveys were carried out in 30 of the 54 grids where a total of 171 traps were deployed that trapped 609 tsetse flies, i.e. 515 *G. brevipalpis* and 94 *G. austeni*. Trap deployment needs to be done more effectively and there is therefore an urgent need to develop land cover maps to better guide these surveys. More than 2 000 cattle were screened in the target area using the buffy coat technique, giving an average trypanosomosis prevalence of 15 percent. *T. congolense* was the predominant species.

A formal document has been signed by representatives of the Department of Agriculture, Environmental Affairs and Rural Development and the KZN Ezemvelo Wildlife, in which both parties endorsed a programme to eradicate tsetse from KZN. This document should clear the way to go ahead with the implementation of a tsetse eradication programme in KZN.

6. Third Research Coordination Meeting of the Coordinated Research Programme on Applying Population Genetics and GIS for Managing Livestock Insect Pests

This meeting was held from 10-14 October 2011 at CIRDES, Bobo Dioulasso, Burkina Faso and was attended by 17 research contract and agreement holders from 12 countries as well as by observers from CIRDES and PATTEC-Burkina Faso and by FAO and IAEA staff. Participants benefited from practical tutorials and working sessions on the use of free open source software (FOSS) for GIS aided field work. Based on the progress reports by the participants, the meeting generated specific technical recommendations regarding individual work plans and identified the following "tsetse specific targets" to be addressed by the final RCM in early 2013:

- Further development of specific techniques (population genetics and geometric morphometrics) and gathering of geo-referenced information for assessing differences between *Glossina pallidipes* populations;
- Confirming: a) the updated northern limit for *G. p. gambiensis* and *G. tachinoides* in Burkina Faso by gathering additional entomological data; and b) the absence of tsetse in the area of the “Togo gap” (the two species are no longer trapped in this area of Burkina Faso), and assess the degree of “isolation” (population genetics and geometric morphometrics);
- Strengthening FAO's support to CRP partners involved in tsetse and trypanosomosis research;
- Developing a standardised spatial platform to be linked with FOSS GIS software for use by the CRP participants and providing technical support in the use of these applications.

7. Consultants Meeting on Enhancing Vector Refractoriness to Trypanosome Infection, 10-14 October 2011, Vienna, Austria

Four consultants discussed the current state of knowledge on controlling the susceptibility of the vectors of trypanosomes to their pathogens, current research on methods to change the susceptibility, and the need for future research and development in this area. The success of the FAO/ IAEA supported project to eradicate *Glossina austeni* from the island of Unguja, Zanzibar, integrating the SIT created considerable interest in utilizing this approach in other locations, and led to the African Union initiative on PATTEC. To date, FAO/IAEA supported SIT projects have been in areas without human sleeping sickness, and disease transmission has in the past been minimized by adding trypanocidal drugs to the blood meal when feeding sterile males before release. Nevertheless, for future projects, which could include areas of actual or potential human disease transmission, it would be desirable to develop strains refractory to the transmission of trypanosomes as a much simpler and more effective method of ensuring that released sterile flies do not transmit any disease. Several approaches are currently being investigated in this respect, including drug treatment, manipulation through *Wolbachia* infection and modification of the symbiont *Sodalis glossinidius* to express anti-trypanosome peptides. The meeting concluded that more work on these approaches is needed to better understand the mechanism involved, to determine the level of refractoriness achievable and to develop the necessary tools to produce refractory strains. The meeting drafted a proposal for a follow-up CRP to the current CRP on Improving SIT for Tsetse Flies through Research on the Symbionts and Pathogens.

8. Call for Submission of Research Proposals for a new FAO/IAEA Coordinated Research Project on Enhancing Vector Refractoriness to Trypanosome Infection

The SIT relies on the release of sterilized male insects to mate with virgin wild female insects. In the case of disease vectors such as tsetse, the sterilising dose that the insects receive does not reduce their vectorial capacity. It is therefore critical when large numbers of sterile male vectors are released, that the risk of transmission of the disease is minimized or eliminated. In the case of tsetse flies, disease transmission has in the past been minimized by holding sterile males after

emergence and adding trypanocidal drugs to the blood meal when feeding them before release. The development of strains that would be refractory to the transmission of trypanosomes would however be a much simpler and hopefully more effective method of ensuring that released sterile flies do not transmit the disease. In that way, the SIT for tsetse and other trypanosome vectors could be significantly improved. Tsetse flies (Diptera: Glossinidae) are the only cyclical vectors of African trypanosomes, protozoan parasites that cause sleeping sickness in humans (HAT) and animal African trypanosomosis (AAT). HAT is endemic to 36 countries in sub-Saharan Africa with about 70 million inhabitants at risk. In 2009, the number of new cases of HAT reported to WHO dropped below the symbolic number of 10 000. However, given that the disease affects hard to reach rural populations, and that active surveillance in war-torn areas is non-existent, the disease prevalence numbers are undoubtedly a gross underestimation. The related disease AAT, causes estimated losses to African agriculture of at least US \$4.5 billion per year and has a profound effect on the development of the continent. Most economically important African trypanosomes are transmitted during the bite of the tsetse fly. Humans are only infected by *Trypanosoma brucei rhodesiense* and *T. b. gambiense*. The “nagana” - causing related trypanosomatids *T. vivax*, *T. congolense* and *T. brucei brucei* are major pathogens of livestock. The natural transmission of the major medically and veterinary important trypanosome species (*T. brucei* spp., *T. congolense* and *T. vivax*) relies on the specific biological relationship between the parasites and the blood feeding insect vector, the tsetse fly. Indeed, depending on the trypanosome species, the parasite has to go through an obligatory developmental cycle that varies from a short cycle in the mouthparts of the fly (*T. vivax*) to a longer, more complex life cycle in the tsetse fly midgut and mouthparts (*T. congolense*) or the midgut, mouthparts and salivary glands for the *T. brucei* subspecies. For both *T. congolense* and *T. brucei*, the molecular interplay at different stages of development will determine the success of parasite development in the fly to the final infective stage. A better understanding of the vector-trypanosomes-symbiont tripartite association is essential to develop methodologies that could result in the enhancement of refractoriness of the vectors to trypanosome infection.

Tsetse flies also harbour three maternally transmitted bacterial endosymbionts that presumably assume different roles with respect to their host's biology. *Wigglesworthia*, an obligate mutualist, is found in all tsetse flies examined to date. Tsetse's second symbiont, *Sodalis*, is a commensal bacterium found in all lab-colonized tsetse lines and some natural populations. Finally, some tsetse populations are colonized with *Wolbachia*. This bacterium is restricted to tsetse's germ line, and exhibits a parasitic phenotype in its host. All three of these symbionts are potentially exploitable for the purpose of reducing trypanosome transmission through tsetse. Interestingly, while only these three bacteria are found in laboratory colonies of tsetse, field caught flies house a taxonomically diverse bacterial population that further manipulates their host's biology. The elucidation of these interactions is essential to understand the determinants of tsetse vector competence for a given trypanosome population and how they can be affected. This knowledge will help to develop tools to enhance refractoriness to trypanosome infection. In this context a new CRP will be initiated focusing on various aspects of this tripartite association. It will offer a unique opportunity to bring together different research groups working on tsetse and other vectors of trypanosomes from different regions in the world that are active in this scientific field stimulating inter-disciplinary discussions and collaborative work. Four main research questions will be addressed by the CRP: