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TSETSE AND TRYPANOSOMIASIS INFORMATION

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TSETSE AND TRYPANOSOMIASIS INFORMATION

This is the first issue of the new half-yearly Tsetse and Trypanosomiasis Information periodical (TTI) which replaces the former Tsetse and Trypanosomiasis Information Quarterly (TTIQ).

The Tsetse and Trypanosomiasis Information periodical has been established to disseminate current information on all aspects of tsetse and trypanosomiasis research and control to institutions and individuals involved in the problems of African trypanosomiasis. This service forms an integral part of the Programme Against African Trypanosomiasis (PAAT) and is jointly sponsored by the Food and Agriculture Organization of the United Nations (FAO), 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 trypanosomiasis 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 organisers and field workers themselves, readers are requested to submit news items and copies of scientific papers and reports to the Editor: Dr John N. Pollock, 25 Palmeira Mansions, Church Road, Hove, East Sussex, BN3 2FA, United Kingdom (tel. (+44) 1273 326211; e-mail johnnpollock@hotmail.com).

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

Distribution dates and copy deadlines

	Copy deadline for news items	Distribution (English and French editions)
Part 1	15 April	July/August
Part 2	15 October	January/February

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

ABBREVIATIONS USED IN *TTI*

a.i.	active ingredient
ACTH	adrenocorticotrophic hormone
ALAT	alanine aminotransaminase
ASAT	aspartic acid aminotransaminase
b.w.	body weight
BIIT	blood incubation infectivity test
CATT	card agglutination test for trypanosomiasis
CD_{50}	median curative dose
CNS	central nervous system
CSF	cerebrospinal fluid
DNA	deoxyribonucleic acid
ELISA	enzyme linked immunosorbent assay
HAT	human African trypanosomiasis
HCT	haematocrit centrifugation technique
GIS	geographic information system(s)
GPS	global positioning system(s)
i.m.	intramuscular(ly)
i.p.	intraperitoneal(ly)
i.v.	intravenous(ly)
IFAT	indirect fluorescent antibody test
KIVI	kit for *in vitro* isolation of trypanosomes
LC_{50}	median lethal concentration
LD_{50}	median lethal dose
M	molar
mAEC	miniature anion-exchange centrifugation technique
McAb	monoclonal antibody
MW	molecular weight
NARS	National Agricultural Research Services/Systems
p.i.	post-infection
PCR	polymerase chain reaction
PCV	packed cell volume
ppb	parts per billion (10^9)
ppm	parts per million
r.h.	relative humidity
RNA	ribonucleic acid
SIT	sterile insect technique
sp(p).	species (plural)
ssp(p).	subspecies (plural)
UV	ultra-violet
VAT	variable antigen type
VSG	variant surface glycoprotein
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)
DSE	German Foundation for International Development
EC/EU	European Community/European Union
EDF	European Development Fund
FAO	Food and Agriculture Organization of the United Nations
FITCA	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
IFAH	International Federation for Animal Health
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'Elevage 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 Trypanosomiasis
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

PAG MEETING REPORT

Ninth PAAT Advisory Group (PAG) Coordinators' meeting Pretoria, South Africa, 24-25 September, 2003

The ninth PAAT Advisory Group (PAG) Coordinators' meeting was held at the George Bou Conference Centre, Pretoria, South Africa, 24–25 September, 2003. The meeting was organized by FAO Rome with assistance from the Directorate, Animal Health, Department of Agriculture, Government of South Africa.

Prof. Albert Ilemobade was in the Chair. Prof. Raffaele Mattioli, welcomed the participants on behalf of the Director of Animal Production and Health Division of FAO. The Representative of the Government of South Africa, Dr Johan Van Wyk, welcomed members of the PAG to Pretoria. He commended the work of PAAT and the Pan African Tsetse and Trypanosomiasis Eradication Campaign (PATTEC). After remarks underlining South Africa's intense interest in tsetse and trypanosomiasis control, Dr Van Wyk wished delegates a successful meeting and officially declared the meeting open.

Conclusions and Recommendations

The Conclusions and Recommendations of the 9th PAAT Advisory Group (PAG) Co-ordinators Meeting are given below.

1. Conclusion: A key role of PAAT is to develop standardized normative procedures, protocols and survey methodologies, including standardized data collection and analysis.
   Recommendation: Attempts to further develop a standardized method to quantify and map the economic benefits of tsetse and trypanosomiasis (T&T) intervention should be pursued.
2. Conclusion: The PAG recognizes the major achievements over the past year of PAAT international agency members, and is grateful for their contribution to PAAT activities.
   Recommendations: Regular updating and dissemination of PAAT and PAG achievements and agreed recommendations are required, for example through the PAAT website.
3. Conclusion: Ethiopian colleagues are congratulated for their formulation of the Concept Note and its progress towards submission. The Concept Note proposal is fully endorsed by the PAG.
   Recommendation: The two PAAT-PATTEC priority areas, i.e. Southern Rift Valley of Ethiopia and the "cotton belt" transboundary zone of Burkina Faso-Mali are not exclusive. Countries are encouraged to propose further areas for T&T intervention to be evaluated against the agreed PAAT-PATTEC criteria. In particular, more attention should be paid to T&T issues in Central Africa.

4. Conclusion: PAAT will continue to assist and advise PATTEC on T&T and related matters.
   Recommendation: (i) Efforts to persuade countries to include T&T in their PRSP (Poverty Reduction Strategy Paper) should continue. PATTEC should monitor the inclusion of T&T control into national priorities and keep PAAT informed; (ii) PAAT should assist PATTEC and governments with evidence and advocacy material as they relate to the T&T problem and agricultural development.
5. Conclusion: The dual burden of poverty and disease should be emphasized to donors.
   Recommendation: T&T control activities should be conducted in the context of SARD (Sustainable Agricultural and Rural Development), considering a modular strategy, for spreading investment and benefits, which includes the agricultural, economic and social dimensions as exemplified in some FITCA (Farming in Tsetse Control Areas of Eastern Africa) activities.
6. Conclusion: The T&T problem is often of a transboundary nature.
   Recommendation**:** T&T activities should be conducted in a regional context, especially where barriers are to be maintained. Regional collaboration and coordination should be encouraged.
7. Conclusion: PAG continues to endorse the Integrated Control of Pathogenic Trypanosomes and their Vectors (ICPTV) activities and appreciates the participation of the WHO/TDR representative.
   Recommendation**:** (i) PAAT and ICPTV should explore novel ways of disseminating clear T&T research-related information to all stakeholders; (ii) collaboration between PAAT and ICPTV should be enhanced, as well as linkages with existing projects and areas of T&T activity; and (iii) PAAT should collaborate with WHO/TDR and will advise on generating proposals for research as appropriate.
8. Conclusion: Some areas are considered to be freed of tsetse and trypanosomiasis, but no standards are available to declare the disease and tsetse free status.
   Recommendation**:** PAAT should assist partners in identifying a set of internationally agreed criteria to declare disease and tsetse fly free status, similar to the OIE (Office International des Epizooties) pathway.
9. Conclusion: PAG appreciates the reported achievements of FITCA in Kenya.
   Recommendation**:** PAAT should establish ways of evaluating new T&T intervention tools and of promoting their wider adoption where appropriate.
10. Conclusion: Sustainability of T&T interventions is a crucial issue.
    Recommendation**:** Factors affecting T&T intervention sustainability should be urgently identified and assessed.
11. Conclusion: In certain areas both sleeping sickness and animal trypanosomiasis constrain agricultural development and human welfare, and Southern Chad is recognized as an area where the elimination of both human and animal diseases is possible.
    Recommendation**:** Concerted actions driven by international agencies and institutions to combat both human and animal diseases, including case management and vector control, in collaboration with public and private sectors should be promoted.

Brief and discussion on the last PAG meeting report – A.A. Ilemobade

After some adjustments to the text mainly for clarification purposes, the report of the previous meeting held in Nairobi in September 2002 was accepted. In addition, the meeting agreed that conclusions and recommendations should not be time bound or tied to a particular meeting. The meeting emphasized the need of standardization of data and data collection methodologies, and a more active involvement of FAO Liaison Officers.

Report of the PAAT Secretariat and FAO/PAAT activities – R.C. Mattioli

The audience was briefed on the outcome of the PAAT Programme Committee (PAAT-PC) meeting, held in WHO Headquarters, Geneva, November 2002. The main conclusions and recommendations of the PAAT PC were:

(i) The T&T problem needs to be included in the national Poverty Reduction Strategy Papers;
(ii) The T&T problem is complex and there is a need to formulate integrated intervention packages tailored to local situations and cost-benefit scenarios;
(iii) T&T affected countries need to objectively assess the impact of T&T and prioritize areas for national and regional intervention;
(iv) High priority should be given to human resource development and rural services.

The strategic role that trypanocidal treatments play in the control of the disease was recognised. The presence of poor quality trypanocides is a matter of concern. The steps taken by FAO with IFAH in this regard were appreciated by PAG.

The participants were informed about FAO and PAAT activities as they relate to tsetse and trypanosomiasis since the 2002 PAG meeting. Two PAAT Technical and Scientific Series papers were published: a first paper focuses on the integration of the Sterile Insect Technique (SIT) in area-wide T&T intervention, while the other one deals with socio-economic and cultural factors in the research and control of the disease. Four additional papers are in press or in preparation. These papers deal with: economic principles for strategic planning of tsetse control/eradication in West Africa; the role of trypanotolerant animals in T&T intervention programmes; options for long-term T&T management in West Africa; and the mapping of benefits of disease removal as a decision tool for T&T interventions.

A number of workshops were convened on different themes. A further workshop was convened in July 2003 at FAO HQs; this focused on the development of field programme proposals in the Southern Rift Valley (SRV) of Ethiopia. Following the workshop, a concept note was prepared. A similar workshop for the transboundary Burkina Faso-Mali "cotton-belt" zone was planned for end 2003 – beginning 2004.

Future FAO/PAAT activities will concentrate on the development of field programme proposals in the two PAAT-PATTEC agreed priority areas (Burkina Faso-Mali and the SRV of Ethiopia) and the advancement of PAAT-PATTEC harmonization process. The restructuring of the PAAT website (http://www.fao.org/ag/paat.html) was announced. Following discussion, the meeting agreed to maintain the current definition of priority areas and other countries, besides Burkina Faso, Ethiopia and Mali, are encouraged to use the PAAT-PATTEC established criteria for screening further areas

which may deserve international attention. Results of the screening process will be submitted to PAAT for eventual endorsement. Countries have complete freedom to approach donors for support; PAAT endorsement is intended as a facilitating mechanism to help fundraising. Again, it was stressed the necessity to include T&T in the PRSPs and to thoroughly evaluate the impact of T&T on poverty and SARD.

Report of AU/IBAR activities – J. Musiime

Details for funding proposals under the current EU EDF9 framework were presented. Proposals should be presented through "Regional Economic Communities" (RECs), such as the Common Market for Eastern and Southern Africa (COMESA), East African Community and the Economic Community of West African States (ECOWAS). AU could provide advice upon request and it was agreed that policy making activities should be delegated to existing organizations rather than setting up new bodies.

Five countries surrounding the Okavango region are being lobbied at ministerial level by AU to coordinate T&T activities, and a meeting had been convened in August 2003 to further discuss the issue.

FITCA: report on regional progress and future work – H.M. Solomon

An overview of FITCA activities was presented, with particular reference to national priorities, surveys, specific field intervention actions and research activities. In some countries, like Sudan and Burundi, FITCA could not operate due to civil insecurity.

FITCA has provided assistance to some countries in the formulation of T&T projects, and held coordination meetings at ministerial level to discuss priorities. FITCA activities concerned the training of private veterinary practices and financial monitoring of trainees' activities at regional level; community based tsetse control activities (training of 1 500 farmers on the use of targets and tsetse monitoring); construction of 300 community-managed crush pens, which act as focal points for a range of agricultural interventions, including cattle spraying; training of over 10 000 farmers in a range of agricultural practices other than tsetse related ones; implementation of zero grazing cattle pens with insecticide (pyrethroids) impregnated nets.

A point of discussion concerned the sustainability of the increased milk production resulting from T&T control and the use of improved animals. It was argued that the high demand would render milk production a remunerable and, thus, sustainable, activity. It was noted that in large parts of West Africa where transhumance is a common livestock management practice, such movement may constitute an obstacle for the introduction and adoption of "zero grazing pens – impregnated nets".

Although significant resources have been allocated to sleeping sickness in north-eastern Uganda, the necessity for an improved coordination and integration of actions dealing with animal trypanosomiasis and sleeping sickness within the FITCA project area was stressed.

Report from IAEA – U. Feldmann

The work of the Agency concentrated on research, method development, technical cooperation field projects and normative issues. With regards to research and method development, work on the mating compatibility and competitiveness of mass-reared tsetse strains with wild target strains of the same tsetse species was pursued by laboratory mating studies and field cage behavioural tests. The trials confirmed the suitability of sterile males of several available mass-rearing adapted strains for use against wild target strains.

In collaboration with FAO and Environmental Research Group Oxford (ERGO) and with the contribution of colleagues in T&T affected countries, improved tsetse presence/absence risk prediction maps were developed for different areas. DNA libraries of the most important tsetse species were acquired and, partially under a Coordinated Research Project on tsetse genetics, techniques were developed for field application of tsetse population genetic studies. Combined with the risk prediction maps (to be further improved), these genetic studies are expected to generate a better data base for strategic planning of field intervention projects.

Regarding technical cooperation projects, one regional IAEA-TC project and, on specific requests from Member States, eight national TC projects (Botswana, Burkina Faso, Ethiopia, Kenya, Mali, South Africa, Tanzania and Uganda) were implemented. The regional project provided support to PATTEC, contributed to awareness and commitment generation towards intervention against the T&T problem, fostered sub-regional cooperation on transboundary measures on T&T and funded regional training courses. The national projects are at different stages of planning and implementation of area wide integrated T&T intervention operations. Remarkable progress on or relevant to project activities was achieved over the past year. This included a draft of a design for a tsetse mass-rearing facility in Burkina Faso; close and useful interaction of project staff and communities in joint efforts against T&T; and good progress towards the construction of tsetse mass-rearing facility at Kaliti, Ethiopia. Also, notable was the collation of essential field data in Mali for eventual delineation of intervention area along watersheds as assumed (temporary) barriers that separate river basins.

With regard to normative issues and assistance to PATTEC and Member States in generating awareness and fund raising, several steps were taken. First, there was the collaborative work by FAO and PAAT mentioned above. Second, collaborative work by AU-IBAR, FAO and WHO along lines of the PAAT-PATTEC harmonization process for joint international action, led to support for T&T intervention campaigns in areas with high potential for sustainable and rural development. Furthermore, two issues of the Insect Pest Control Newsletter (IPCN) are published every year. The IPCN announces the upcoming events (training courses, seminars, etc.) and contains relevant summary information of the work carried out under the FAO/IAEA Programme in the field of pest insect control. Notable also is a consultation meeting held in Vienna in late August 2003 on the development of internationally agreed procedures for declaring zones free of the tsetse and trypanosomiasis problem.

In consultation with AU-IBAR, FAO, PATTEC and WHO, IAEA submitted a proposal to the United Nations Fund for International Partnership (UNFIP) entitled "Coordinated, Phased Programme for the Creation of Tsetse Free Zones in Africa: A

Prerequisite to Enhance Agricultural Development and to Control Human African Trypanosomiasis". The proposal was positively received by the UNFIP and it is envisaged that the sum of US$300 000 will be made available to IAEA. The project is intended to generate additional technical information for strategic planning of integrated area-wide T&T intervention operations and, in close collaboration with Member States and other partners (especially FAO, WHO, PAAT and PATTEC), to increase awareness of the T&T problem among potential donors for agreed priority intervention areas (e.g. the Southern Rift Valley of Ethiopia). Additional information is available on the IPCN and on the IAEA website.

Report from WHO – J. Jannin

Human African trypanosomiasis (HAT) can be seen as one of the neglected diseases affecting marginalised populations. Political decisions are required to apply intervention strategies in countries where endemic foci are present. A minimum level of capacity is required in affected countries for the application of new and more efficient tools. Particularly important is a bottom-up integrated approach, where the implementation of improved HAT screening and treatment activities can contribute to a general health care system, until countries can perform such functions independently.

WHO is actively supporting the concept of inter-country teams aiming to a complete assessment of the epidemiological situation and the initiation of activities targeting disease elimination. WHO also gives support to national programmes for raising their efficiency. In this regard, three strategies are adopted: increased control and surveillance for a rapid implementation of a disease elimination programme; sustained control and surveillance activities as a follow up to epidemiological assessment; and the building of regional teams to enable the launching of a disease elimination process.

These strategies are of high significance in countries where HAT problem is widespread, i.e. Angola, Democratic Republic of Congo and Sudan. In Sudan, in particular, WHO assists the national authorities at ministerial level, in the coordination of NGOs, and in the establishment of national structures to combat HAT.

Drugs for treatment of HAT are now free of charge for all Africa. WHO works to ensure the provision of an effective drug delivery programme that would promote the chance of treatment of affected populations, but major problems here are access to refugees, and lack of security due to civil disturbances.

WHO involvement in HAT research is increasing, mainly through its "Treatment and Drug Resistance Network", hosting research projects for clinical trials or validation of diagnosis tests. DNDi (Drug for Neglected Disease initiative) participates in this activity. An initiative for the development of new diagnostic tools had seen the light and the first achievement has been the creation of a TDR/WHO Product Development Team in charge of developing new tools.

A large number of HAT cases remain undetected, and there must be a large number of undetected deaths. This shows that the negative impact of HAT is grossly underestimated. A working group has been created by WHO to refine the calculation of this impact. An important output would be the development of a knowledge base on the dual burden of poverty and disease which would lead to the inclusion of sleeping sickness in information papers (Poverty Reduction Strategy Papers).

A WHO-ICIPE concerted action, with the participation of FAO, is being developed in Chad to eliminate both human and animal disease, using screening, treatment, vector control and increasing agricultural production.

The 56th World Health Assembly (WHA), May 2003, adopted a resolution to support PATTEC. Member States urged WHO to prepare a new resolution for the 57th WHA to emphasize their role for the elimination of sleeping sickness, using mainly systematic screening and treatment.

Tsetse and trypanosomiasis in the Ethiopian Southern Rift Valley – A concept note for field programme – A. Temesgen

The T&T situation in the Southern Rift Valley (SRV) of Ethiopia was outlined. In this area, the presence of tsetse fly denies access to lower fertile valleys which causes over-stocking and overuse of highlands and heavy population pressure. Long term efforts had been deployed to reduce T&T pressure through the use of prophylactic drug treatments with partial success. Government has therefore selected to support a pilot project aiming at the elimination of the vector and the disease. A ten year programme was set up in 1997 with the objective of reducing human population pressure on highlands, promoting agriculture in the lowlands with a view to reduce poverty and increase rural livelihoods. The Government has committed US$3 million to this programme.

Following a workshop, held in July 2003 in FAO HQs, a draft concept note was developed and a refined version presented during the PAG meeting. Some 10 500 km^2 of an overall 25 000 km^2 area were selected. The area is isolated from adjacent infested areas, contains only one fly species (i.e. *G. pallidipes*) and has high agricultural potential. In addition, the Government, partly supported by IAEA, has engaged in the construction of a tsetse rearing facility (in progress). Baseline data collection, fly suppression activities and baseline monitoring are now under way. However, additional work needs to be carried out to achieve the ultimate goal, i.e. increased agricultural production. A total amount of approximately US$12.5 million has been estimated. This amount will allow, in general terms, to: complement existing data, particularly socio-economic and environmental data; develop the necessary human resources; reduce disease pressure; ensure appropriate use of natural resources and the planning of land use and land tenure, and promote crop and livestock farming.

Factors improving the chances of success of this intervention are: present commitment of government and local communities to the current T&T activities in the area; the heavy human pressure in the surrounding highlands that could take up suitable land in the valley for agricultural and livestock production provided that T&T threat is removed; the fact that only one species of tsetse is present; the fact that the area is confined in terms of tsetse population isolation, thus substantially reducing the risk of re-invasion after intervention; and the huge potential for livestock and crop production and consequent poverty reduction in the selected area.

This pilot intervention will serve as a model for future projects. The Concept Note will be presented by the Ethiopian Government to donors during the 8th PAAT Programme Committee meeting, foreseen in March-April 2004 in FAO HQs.

The PAG endorsed the concept note and noted the need to revise the budget which appears modest in relation to the size of the area and the various activities that need to be conducted.

Tsetse and trypanosomiasis in the "cotton belt" zone of Burkina Faso and Mali: an outline – S. Maiga, I. Tamboura

Burkina Faso and Mali have engaged in a transboundary T&T intervention project, with administrative and technical arrangements put in place. In Mali, with an active participation of rural communities, insecticide impregnated targets have greatly reduced the tsetse populations in operation areas. An artificial barrier system has been put in place to avoid re-invasion.

Concern was expressed about the use, maintenance, and consequently efficiency or sustainability of artificial barriers. The present massive use of insecticide to protect cotton cultivation in the area might already be having an effect in reducing tsetse populations. The foreseen expansion and intensification of livestock-agricultural production could also assist active tsetse control, and render initial barriers only a temporary necessity.

A proposal for harmonization of sampling tsetse populations – U. Feldmann, W. Wint, G. Chizyuka

Draft tsetse distribution maps at 1 km resolution have so far been produced for the major fly species in six regions or countries: West Africa, Southern Africa, Ethiopia, Kenya, Western Somalia, Tanzania and Uganda. These maps will be refined later. The ground validation exercise would be standardized, using sample transects for all regions to be studied with heterogeneous fly distributions.

In addition, there is a need to establish criteria for defining fly and disease free status. Monitoring should be carried out in all phases, but most intensively for two years in the final post intervention phase. Fly monitoring methods would be standardized for season, trap type and attractant, trap density and placement, and duration of the exercise, based on statistical protocols. Necessary funds are being identified for the implementation of the fly transect/grid exercise. Collaborators need to be selected to conduct validation sampling. FAO, through its Liaison Officers Network for T&T, could be an ideal partner.

It was suggested that PAAT should set up a committee to set criteria for the declaration of tsetse and trypanosomiasis free zone.

Mapping the benefits: first steps in developing a new decision tool for tsetse and trypanosomiasis intervention – W. Wint, A. Shaw, G. Hendrickx

A study has been initiated to investigate the feasibility of linking quantitative economic variables to a Geographic Information System (GIS) spatial framework in order to provide new insights and reinforce the decision-making process for T&T interventions. The first phase of the work tackled Benin, Ghana and Togo. Initial data have been collected for parts of Burkina Faso and Mali and will be analysed in the second phase. A

range of standardized livestock production and price data have been collated at national, province and district level from each country, together with the most recent livestock, cropping and disease information. These have been amalgamated with corresponding data layers from the PAAT Information System, and a new distribution map of trypanotolerant and susceptible cattle breeds has been produced for the study area. Existing information on the disease impact on cattle production parameters has been incorporated in herd models, leading to estimates of the potential benefits of T&T interventions. Results can be applied to the respective breed density maps produced to provide a map of estimated benefits per square km, 20 years after disease removal. Even in the presence of the disease, cattle populations in the study area are thought to be increasing, which will affect the downstream livestock distribution. However, these growth rates increase in the absence of trypanosomiasis, so that populations at the end of the period are larger. The elements of cattle population growth have therefore been mapped separately and have then been combined in several sequential stages: firstly, livestock growth maps provide an estimate of the cattle population after 20 years, assuming no T&T intervention; secondly, where densities in population foci significantly exceed likely carrying capacities, these are reduced by "exporting" animals from the high concentration areas to surrounding less heavily stocked regions; thirdly, to the redistributed populations are added the additional calculated increase in cattle due to fly removal; fourthly these are once again redistributed to surrounding areas if the growth leads to exceeding the nominal carrying capacity. Lastly, an incremental benefit can be derived from the number of animals imported to new areas, their value per head and the time of transfer. A final benefit map is then produced by adding the two components.

A number of refinements are being considered to improve this analytical method. The most important will be producing maps for additional breed/productions system combinations. Data for Burkina Faso and Mali have already been collected; these will be analysed and mapped using the methodology described above. At the same time another breed/production system will be defined, based on crossbred cattle and very high use of work oxen, for application to the Burkina Faso and Mali area. As the outputs are provided for each map pixel, the benefit values could be readily summed for any selected areas of interest, and if compared with potential costs, could produce cost-benefit ratio for any defined area. If successful, it may even be feasible to test this approach for other livestock diseases which are endemic over large geographical areas. It was suggested that the technical approach might be improved if the environmental costs of the expanding populations were to be incorporated.

The new phase of ICPTV – M. Eisler, P. Van den Bossche

A brief overview of ICPTV Phase I was provided. Proposals for the second phase plus two further ICPTV-linked proposals, submitted to the EC for funding under EU FP6 INCO-DEV (International Cooperation with Developing Countries) programme, were presented. The proposals constitute a "thematic network". They consist of two STREPs (Strategic Targeted Research Programmes) and one Coordinated Action (CA). The first STREP focuses on livestock trypanosomiasis. It aims at establishing the effect of a changing environment on the epidemiology of the disease and its impact on disease control. This will be achieved by collecting historical information, assessing

environmental determinants and studying the trypanosomiasis epidemiology. The project has a socio-economic component and will establish the impact and adoption of different type of control interventions under different epidemiological circumstances. The project will be coordinated by the Centre for Tropical Veterinary Medicine (CTVM), Edinburgh. The second STREP focuses on tsetse. Its main objective is to establish the effect of habitat fragmentation on the survival of tsetse populations and tsetse population isolation. Through parameters such as fly size, age distribution and genetic diversity, the tsetse population's vulnerability and level of isolation will be determined and priority areas for control will be identified. The outcomes of the two STREPs are likely to contribute greatly to important questions with respect to strategic decisions that will have to be made in the control of tsetse-transmitted trypanosomiasis. All these activities of the two STREPs are very much complementary to PAAT strategy for T&T interventions. The second phase of ICPTV will be coordinated by the Veterinary Department of the Institute of Tropical Medicine (ITM), Antwerp. This phase will be similar in scope as the first phase. It will concentrate on dissemination of information obtained through research, to be achieved through workshops, a website, leaflets and scientific exchanges. Special attention will be paid to the changing environment and how those changes may affect tsetse and trypanosomiasis control strategies. During the four years of the second phase, workshops will be organized on environmental changes and their effect on trypanosomiasis control, and on scientific progress and its potential impact on trypanosomiasis control. The discussion stressed the necessity to enhance coordination among EU funded programmes and with other national African T&T initiatives. The meeting supported the second phase of ICPTV and the continued collaboration with PAAT.

Report on the progress in the implementation of PATTEC initiative – J. Kabayo

The PATTEC's history since 2000 was outlined. The eradication of tsetse fly using appropriate methods was emphasized. This will be achieved through a phased approach with discrete packages and specific aims. The plan of action of PATTEC was presented as follows: identification of areas with isolated tsetse populations; tackling each area one at a time; applying integrated control methods; producing clear plans and deadlines; focussing on regional operations; and having a long-term goal but aiming at short-term successes.

PATTEC's role is to catalyse actions, to coordinate and mediate actions between countries, and to synergise interventions and support training and capacity building. Since the last PAG meeting, the PATTEC coordinator attended meetings with ECOWAS to discuss transboundary operations. Agreements were made with the African Development Bank (ADB), the Ethiopian Science and Technology Commission (ESTC) and COMESA. Extensive cooperation agreement exist with 22 countries, in all four sub-Saharan regions. Each country needs to define activities, mobilize funds by preparing bankable projects, ensure appropriate exploitation of newly tsetse cleared land, promote surveillance, disseminate information to politicians, and persuade countries to include T&T in annual budgets and PRSPs. A GIS training course was organized and a newsletter and website (part of the AU website) were launched.

The PATTEC Coordinator highlighted the normative and advisory role provided by PAAT on all aspects of the implementation of the PATTEC initiative and, *inter alia*, on the identification of research needs and in the preparation of projects. The recognition of PAAT as an advisory body for PATTEC was appreciated by the meeting.

Reports on research programme from CIRDES, ICIPE, ITC, KETRI, and TDR/WHO – I. Sidibe, J. Ndung'u, R. Saini, O. Akinbamijo, D. Kioy

CIRDES – I. Sidibe

CIRDES has a regional mandate covering Burkina Faso, Benin, Côte d'Ivoire, Ghana, Mali and Togo. Research programmes focus on improved diagnosis, epidemiology, tsetse rearing, chemoresistance and socio-economics. Most of the research activities are supported by EU through the PROCORDEL (Programme de Recherche et Développement) programme. An overview of the trypanosomiasis and control situation in Burkina Faso, Côte d'Ivoire and Mali was presented.

Future activities will aim at evaluating the farmers' perspectives and perceptions with respect to trypanosomiasis control, developing simple field diagnostic tools, method promoting rational drug use, evaluating the development of drug resistance, assessing the property of trypanocidal activities of certain plants, integrating tsetse and tick control, and improving the transfer of technology.

ICIPE – R. Saini

ICIPE's perspective on a series of researchable issues for practical research to improve T&T interventions were presented. Three main areas can be distinguished: the development of improved intervention tools; the design of integrated disease and vector management schemes; and capacity building.

Proposed projects include research into attractants and repellents, improved baits for riverine and savannah species of tsetse, multispecies suppression studies, barrier systems, improved live bait systems and their impact on some tick-borne diseases, and genetically modified refractory vectors to replace competent vectors.

Another research area will focus on strategic use of drugs and insecticides, standardization of methodological approaches, and improving information on fly population dynamics and dispersal so to improve bait technologies. Finally, there is a need to refine and adapt new strategies for incorporation into extension packages for different farming systems.

ITC – O. Akinbamijo

ITC has a regional mandate, covering The Gambia, Guinea, Guinea Bissau, Liberia, Senegal and Sierra Leone, with research collaborations inside and outside its mandate region. ITC recognizes that T&T continues to constitute a major problem. There is no prospect for a vaccine and drug resistance is on the increase. Considering these issues, trypanotolerance has major potential.

The Centre has four major impact areas: the production of tsetse distribution maps; the assessment of trypanocidal drug efficiency; the breeding schemes of trypanotolerant livestock, and the genetic characterization of small ruminants.

Four pillars are identified to ensure the ITC's action: improvement of local resources; introduction of innovative actions (crossbreeding); collaboration and networking, and training.

KETRI – J. Ndung'u

A list of factors that may hinder the implementation of currently available trypanosomiasis control methods was presented. A major factor is the absence or inadequacy of policies. In addition, poor national capacity, poor transferability of technologies, science-driven technology, poor understanding of the concept of community participation, long duration of the intervention and poor coordination are contributing factors.

The following solutions were proposed: development of national policies; improving linkages between donors and Governments, institutions, extension services, private sector and communities; priority-setting using decision-support tools and adequate information; sufficient resource allocation; a balance between basic and applied research; increased involvement of stakeholders; and appropriate research at all stages.

There was a need for projects that are incorporated into the poverty reduction plans. For sustainability, the right stakeholders should be involved in project implementation and activities. It was suggested that the next PAG meeting should consider sustainability of intervention in more detail.

WHO/TDR – D. Kioy

TDR's priorities in support of research on African trypanosomiasis were presented. The TDR strategy 2000–2005 puts emphasis on poverty alleviation and inequity, fostering economic development and increasing research self-reliance. Because of numerous problems currently encountered in drug use, the strategic plan for the control of HAT focuses on the development of new tools rather than implementation. Furthermore, capacity building continues to be an area of particular interest. Unfortunately, declining financial resources impedes the implementation of several of the TDR's training objectives.

Trypanosomiasis, together with nine further diseases, is listed among the so-called neglected diseases. Four activity areas are addressed by TDR. These are basic research, product research and development, implementation research and research capability strengthening. A strategic direction has been developed for each of the neglected diseases. Depending on several priority-setting criteria (e.g. disease burden, persistence of disease burden, ongoing research and development), three categories are defined. Trypanosomiasis is ranked as a category 1 disease or an "emerging and uncontrolled disease".

A list of research projects was presented. It included bioinformatics and applied genomics, socio-economic impact of HAT, the effects of policy changes on health care delivery, and factors influencing community participation. Other research areas comprise

the development of new drugs, the improvement of diagnostic tools, and trials using different intervention methods for vector and disease control.

JOINT FAO/IAEA DIVISION

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

The Joint Division has become increasingly aware of the importance of knowing when it is safe to regard an area as "pest-free" after a control programme has been taken place, and the need to develop scientific methods to support such decisions. A consultants' meeting has focused on this topic. A procedure to this end has been developed: it involves a probability model to deal with null trapping results and a growth model to help verify that pest specimens were not present when control operations stopped. Models assist in calculating the probability of negative trapping results after control operations, in the case in which insects were in fact present (but at such low densities as to escape detection). Such models depend on knowledge of the efficiency of the traps, and of the area of attractiveness of the traps. The critical question is whether a target pest population at very low densities could resurge to levels at which they are detectable again, and to beyond that level. The rate at which an insect population could recover from one or two insects is considered. For insects that are disease vectors, it is proposed that the disease should be monitored, and the results incorporated into a disease transmission model.

Knowledge of tsetse genetics has made impressive advances over the last six years in three main areas: (a) the development of genetic tools for studying tsetse flies; (b) the development of tsetse as a model system for studies on insect immunity, and (c) the finding that tsetse populations show an unexpectedly high degree of genetic differentiation. Such advances are seen as highly relevant to the successful application of the sterile insect technique (SIT).

A Co-ordinated Research Project (CRP) on "Improved and Harmonized Quality Control for Expanded Tsetse Production, Sterilization and Field Application" has had a successful start. At a meeting in Montpellier, France, participants agreed to focus research in the next six years of this CRP on three major areas of quality control relating to (a) tsetse diet, (b) tsetse rearing, and (c) tsetse behaviour.

Past events

There was a meeting on technical and management issues of the TC tsetse project MLI/5/017 "Integrated Control of Animal Trypanosomosis through the Creation of a Tsetse Fly Free Zone" with the participation of Mali, Burkina Faso, PATTEC and FAO/IAEA, 12–16 May 2003, Vienna, Austria.

There was a Consultants' meeting on "Development of guidelines for verification of tsetse fly free areas and the Trypanosomosis Problem" August 2003, Vienna, Austria (see below).

An FAO Workshop was held on "Moving from criteria for selection of priority areas to formulation of tsetse and trypanosomiasis field programme proposals: Ethiopia Southern Rift Valley – Case Study" Rome, Italy, 2–4 July 2003.

Technical Co-operation Projects

The following Technical Co-operation Projects have a tsetse interest:

BOT/5/002 Support of Tsetse Eradication from Ngamiland
BKF/5/003 Applying Sterile Insect Technique to Create Tsetse Fly Free Zones
ETH/5/012 Integrating SIT for Tsetse Eradication
INT/5/010 Insect Pest Control Using the Sterile Insect Technique
KEN/5/022 Integrated Area-Wide Tsetse and Trypanosomosis Management in Lambwe Valley
MLI/5/017 Integrated Control of Animal Trypanosomosis through Creation of a Tsetse Fly Free Zone
RAF/5/051 SIT for Tsetse and Trypanosomosis Management in Africa
SAF/5/005 Situation Analysis of the Feasibility and Desirability of Tsetse Fly Eradication
UGA/5/025 Integrated Area-Wide Tsetse Eradication Programme in the Lake Victoria Basin

Developments at the Entomology Unit, Seibersdorf: Tsetse Research and Development

(a) *Survival of Glossina pallidipes irradiated and exposed to low temperature*. A series of experiments has confirmed that a release strategy of irradiated male *Glossina pallidipes* can be developed which includes the chilling of males for up to six hours.
(b) *Salivary gland hypertrophy virus*. Following the purification of virus from the salivary glands of infected *G. pallidipes* flies, cloning and sequencing of the salivary gland hypertrophy virus (SGHV) was performed by Prof. M. Bergoin at the Laboratoire de Pathologie Comparée, Université de Montpellier II, France. Efforts are being made to use the very sensitive detection method to detect SGHV in infected flies in a non-invasive manner. Efforts are underway to see if a virus-free colony of flies could be developed.
(c) *Pupal sexing*. After early problems, some good progress as been made in the automatic sexing of tsetse pupae. Collaborative arrangements have been made with Dr F. Dowell, USDA-ARS, through Dr W. Wirtz, Atlanta. The ultimate objective is to provide a system to sex the pupae at least five days prior to emergence, to allow separate handling of the males and the females, and to optimize the sex ratio of production cages.
(d) *DNA microsatellites*. A company has been contracted to construct microsatellite enriched DNA libraries, for four tsetse species. These will greatly assist genetic analysis of field populations of tsetse.
(e) *Prototype tsetse rearing container*. Prototype shipping containers in which to hold tsetse are under test.
(f) *Tsetse Production Unit 3-2 drawings available*. Design details for the latest tsetse production unit are available on http://www.iaea.org.programmes/d4/index.html.

(g) *A new tsetse rearing laboratory*. A new tsetse rearing facility has been opened at the Institute of Zoology, Slovak Academy of Science, Bratislava. A colony of *G. pallidipes* is being set up there with assistance from Seibersdorf.

Consultants' Meeting on "Development of Guidelines for Verification of Tsetse Fly Free Areas and the Trypanosomosis Problem", August 2003, Vienna, Austria.

Since it is difficult or impossible to prove the absence of tsetse flies or the disease they transmit in any given situation (due to sampling and other constraints), the question arises as to when and on what criteria should one be able express confidence that a given area is free of tsetse flies. Relevant variables could include information on the known reproductive rate of tsetse flies under different climatic conditions, the relative effectiveness of different traps for different tsetse species, trapping intensity and duration, information on disease incidence and related epidemiological factors. The meeting considered how to standardize a decision process that would eventually permit declaring areas free of tsetse and the disease transmitted by these flies. The findings were outlined at the 9th meeting of the PAAT Advisory Group (PAG) in Pretoria, South Africa, 24-25 September 2003.

TRAINING MATERIAL

Video on the Eradication of Tsetse from Zanzibar available on the Web

It has been announced that a video, "Biting the Fly", on the success achieved in eradication of the tsetse from the island of Zanzibar is now available at the following: http://adminonline.iaea.org/videoclips/clipgallery.html.

PAAT TECHNICAL AND SCIENTIFIC SERIES NO. 4

Socio-economic and Cultural Factors in the Research and Control of Trypanosomiasis, by Dr. Mulumba Kamuanga

FAO Rome (2003) has published No.4 in its PAAT Technical and Scientific Series: *Socio-economic and Cultural Factors in the Research and Control of Trypanosomiasis*, (pp. 67) by Dr. Mulumba Kamuanga, International Livestock Research Institute, Nairobi, Kenya, in partnership with the Centre International de Recherche-Développement sur l'Elevage en Zone Subhumide, Bobo-Dioulasso, Burkina Faso and the International Trypanotolerance Centre, Banjul, The Gambia.

The booklet sets out to review the role and importance of socio-economic factors and the necessity to incorporate cultural aspects in the design and implementation of policy with regard to the research into and control of tsetse and trypanosomiasis (T&T). The Programme against African Trypanosomiasis (PAAT) commissioned the review in 1998 with the purpose of amalgamating several draft papers on socio-economic and

cultural impacts of T&T control into one broad-ranging paper. First, the paper shows that an armoury of control techniques is available for combating the disease and that nowadays one admits that an integrated approach using a combination of techniques, supported by the use of trypanocidal drugs, is likely to be the most effective strategy for T&T control. Second, the review emphasizes the role of economic analysis as one of improving the ability of planners to make better decisions regarding the implementation and sustainability of T&T control programmes. Thus there is a need to distinguish between "macro-planning", which takes a broad view of the entire life of the programme to derive quantitative measures of its social profitability, and "micro-planning", which deals with day-to-day operations and functioning of the programme as modelled by local institutions, social rules and norms. Third, the paper indicates that, at present, there are no models for community-managed T&T control. Indeed, several lessons on the need and importance of socio-economic and cultural factors ought to be learned from the disillusionment with both large-scale, government-managed schemes and the questionable sustainability of most small-scale, community-based programmes, which will help to determine when and how it might be appropriate to involve a village, group of villages and individual livestock owners in T&T control. Of particular importance are the notions of distribution of benefits amongst stakeholders, free-riding by non-members, empowerment of local communities, management and organizational capability, as well as gender and equity issues to be addressed prior to the implementation of T&T control programmes.

After the *Introduction*, there are chapters on: *Economic Issues in the Research and Control of Tsetse and Trypanosomiasis*; *Sociocultural Factors and the Research and Control of Tsetse and Trypanosomiasis*; *Data Needs*; *Lessons of the Past to inform the Future*; *Issues to Anticipate*. These are followed by *Concluding Remarks*, and *References* (97 entries).