

**THE PROGRAMME AGAINST AFRICAN TRYPANOSOMIASIS**

# REPORT OF THE THIRD PAAT ADVISORY GROUP CO-ORDINATORS MEETING

**MAPUTO, MOZAMBIQUE**

**28 SEPTEMBER - 3 OCTOBER 1997**

Food and Agriculture Organization of the United Nations
Inter-African Bureau for Animal Resources of the African Union
International Atomic Energy Agency
World Health Organization of the United Nations

## FOREWORD

The second meeting of the Advisory Group Coordinators to the Programme Against African Trypanosomosis (PAAT) was convened in Maputo, Mozambique, from 28 September to 3 October 1997, under the auspices of the joint FAO/OAU-IBAR/IAEA/WHO secretariat. This meeting was arranged to coincide with the International Scientific Council for Trypanosomosis Research and Control (ISCTRC) in order to ensure the maximum interaction of the expertise represented in the two meetings and to bring the activities of PAAT to the attention of a wider scientific and international audience.

The format for the meeting consisted of a one day discussion devoted specifically to matters relating directly to the role of PAAT advisory group coordinators, followed by full participation of the coordinators in the ISCTRC, within which time was allocated for the presentation and discussion of position papers on key topics as identified by the PAAT Committee. This report records the proceedings of the PAAT elements of the combined meetings and the conclusions reached. A separate report on the 24th. ISCTRC will be issued by OAU/IBAR.

The overall goal of PAAT is, through coordination and facilitation, to solve the problem of tsetse and Trypanosomosis, both human and animal, in the broader context of food security, health, rural development and sustainable agriculture. In pursuance of this objective, the role of the advisory group coordinators is to identify co-workers in specific technical and scientific fields and to encourage and facilitate their interaction. The objective being that the information and advice emanating from this level be then directed through the PAAT secretariat to the Programme Committee and so facilitate decision making at the policy and funding level.

The meeting was opened by Dr. W. Masiga, Director, OAU/IBAR, who welcomed participants on behalf of the joint secretariat and emphasised the important role of PAAT in providing the direction and re-orientation required to combat the increasing and uniquely African problem of tsetse transmitted Trypanosomosis. The meeting was chaired by Professor P.H. Holmes, with Messrs. B. Hursey, J. Slingenbergh acting as Raporteurs. The list of participants is attached as Annex 1.

The meeting was held with the financial and technical support of the joint secretariat with contributions from DFID, UK, to facilitate the attendance of the Chairman and some invited speakers.

## Introduction

The occurrence of human Trypanosomosis is on the increase in many historic disease foci throughout sub-saharan Africa and in several locations has reached epidemic proportions for example, in Southern Sudan, Northern Uganda and Angola. There are also reports of significant tsetse recolonisation of previously freed areas which have considerable negative impact on the development of sustainable mixed farming in potentially fertile regions of the sub-humid ecozone across the sub-continent. Food security and the advancement of agricultural production in Africa is largely dependent of the availability of healthy livestock for cultivation and to a lesser extent as a source of manure. Despite this need the total cattle population of the entire region remains unevenly distributed and at less than 180 million animals, largely due to the threat of Trypanosomosis. Efforts to combat the disease in the past have, although successful, had only transitory results and it is now recognised that gainful inroads to sustainable disease control are dependent on the coordination of inputs from implementors, planners and financiers alike, and that the resources available be focused on identified priority areas which offer the greatest social and economic rewards.

The formation of the Programme Against African Trypanosomosis (PAAT) presents the opportunity to provide a new direction to control efforts through focusing the limited human and financial resources on identified priorities within the broader context of human welfare and sustainable agricultural development.

Whilst still in its formative stages the PAAT, operated under the joint FAO/OAU-IBAR/IAEA/WHO secretariat, offers the potential to coordinate activities in disease and vector research and control and thus facilitate the pooling of the required multi-disciplinary developmental actions, from the level of the small-scale farmer to the national and international scales.

The Coordination of the present meeting with that of the FAO Liaison Officers for Southern and Eastern Africa and with the OAU/IBAR "International Scientific Council for Trypanosomosis Research and Control" (ISCTRC) presented the unique opportunity for the proceedings and recommendations emanating from the two former meetings to be discussed and endorsed in the plenary session of the ISCTRC. This arrangement was considered to be highly desirable in so far as subsequent reports produced and presented to the PAAT Committee for further consideration may be considered to have the approval of the highest international scientific and technical body in this specialised field.

The main objectives of the meeting were to provide advice and recommendations to the PAAT Committee on priority areas for further research, to make recommendations on key policy and technical issues presented in the form of position papers and to deliberate on ways to more effectively coordinate the multidisciplinary activities required to deliver disease control in the broader context of human welfare and agricultural production.

**Matters arising from minutes of last meeting**

**Recommendations**

1. Communications : It was noted that although some progress has been made in establishing e-mail links between Advisory Group Coordinators this was mainly due to individual efforts and the situation remained unsatisfactory, particularly in West Africa. The secretariat was aware of the need to pursue this issue during the next year and was urged by the meeting to actively seek the assistance of donors.

2. PAAT Planning Workshop Report: The outcome of the planning workshop held in CIRAD-EMVT, Montpellier, April 7-10 1997, was accepted without comment.

3. Assistance for Coordinators to attend meetings: The issue remained largely unresolved although the RTTCP re-iterated its willingness to assist within the limits of the southern Africa region. It was concluded that the matter be raised again within the PAAT Committee.

4. Data management: The meeting was advised of the DFID support of $330 000 for the development of a PAAT information system comprising of a resource inventory, a knowledge base and a GIS component. The system will be based in FAO, Rome. The meeting noted with concern the need to ensure that the various information systems and data bases being developed be compatible and standardised. In this regard it was mentioned that FAO activities in Southern Africa, through SADISCON were not in harmony with those of the RTTCP.

5. Sleeping sickness surveillance: WHO, in collaboration with national focal point officers, was undertaking the mapping of disease foci down to the village level. A CD ROM information system was also being developed, which could be updated, for distribution to medical workers in Africa.

6. Pesticide Resistance Reference Centre: The termination of GTZ support has forced the closure of this facility in Berlin. It was suggested that GTZ may consider re-newing this support if there was a proposal to transfer the facility to Africa. CIRDES have undertaken some monitoring in West Africa and will strengthen this facility and maintain reference strains, however, they are unable to provide test kits. IAEA are active in the field of drug residues but do not include acaricides. The meeting expressed considerable concern over this issue and urged the PAAT secretariat to raise it again at the next Committee meeting.

7. Privatisation of services: The principle of moving towards privatisation of vector control services was supported, however, full discussion was deferred pending the presentation of the position paper on this subject.

8. Resource inventory: The compilation of a comprehensive inventory was appreciated as being a formidable task. However, it was recognised as an essential information source and

the secretariat were urged to continue their efforts. Concerning SADC country fact sheets the RTTCP offered to assist in the completion of these providing they were given the standard format for the information required.

**Secretariat progress report**

**IAEA**
During the past year the Programme memorandum was published in English and French, financial assistance had been given for various participants to PAAT meetings, 16 participants had received support to attend the ISCTRC in Maputo and the focal officer had been fully involved in the routine affairs of the secretariat, including participation in the Montpellier planning workshop.

**IBAR**
OAU/IBAR hosted the last meeting of Advisory Group Coordinators in Nairobi, facilitated the work of PAAT within the ISCTRC, actively participated in the Montpellier Management workshop and nominated a staff member as the focal officer responsible for the routine duties of the joint secretariat.

**WHO**
WHO participated, as a member of the secretariat in all PAAT meetings and was preparing to host the November Committee meeting. A notable achievement was made, in May 1997, when the World Health Assembly passed a resolution in support of the PAAT principle and urged the Director-General of WHO to pursue the establishment of the coordinating structures required at the level of the international secretariat.

**FAO**
The reports of the various meetings have been published and distributed. Financial support has been given to ensure the attendance of all required participants. The compilation of a resource inventory has been initiated through letters to focal points in all tsetse infested countries, over 60% have replied. Negotiations with DFID, UK, have secured funds for the development of the PAAT Information system. The publication of TTIQ has been maintained. Recommendations emanating from the committee have been actioned within the limits of available resources. The FAO Liaison Officers' network has been re-aligned to give greater support to PAAT objectives. Position papers have been commissioned for presentation to the ISCTRC and research priorities have been more accurately identified to meet the needs of control workers. The profile of PAAT has been raised within FAO to the extent that the Programme will be presented to the Governing Bodies in November 1997 to seek higher statutory recognition.

## Reports from advisory group coordinators

### Bait techniques implementation: Southern and Eastern Africa
Mr.R. Allsopp

The report was based on a summary of a position paper on the use of bait techniques for tsetse control which will be published in full and presented to the Committee at the November meeting. Based on the limited replies from a questionnaire to co-workers in the region the author concludes that these techniques have only been applied on a limited basis and therefore, have made little impact on tsetse control overall. In East and Southern Africa some 110 000 targets are deployed over some 30 000 sq.km. or approximately 1% of the area infested. The suggestion was made that past techniques, which were abandoned because of the emotional issue of the insecticides involved, needed to be considered if progress was to be improved. This would, however, raise the issue as to how they would be funded as unlike the bait technology it would be difficult to privatise large scale ground or aerial spraying.

In the ensuing discussion there was general agreement on the need to review the practical approach to vector control generally and in this regard the point was made that perhaps tsetse control could learn from the experience of the Southern Cone initiative to control Chagas Disease in South America. Here the incidence of disease was reduced by some 95% as the exercise was coordinated and funded by the countries involved and they agreed on a single unified approach to the problem. In tsetse control this is not the case as advising scientists are unable to agree on the tools to be used nor on the objectives to be reached. The debate was left inconclusive with the recommendation that it be further discussed on presentation of the full working paper to the ISCTRC.

### Bait techniques, research and development: West and Central Africa
Dr. B. Bauer

A position paper on Integrated Disease Management (IDM) has been prepared for presentation to the ISCTRC. The regional research station, CIRDES, is in the process of gathering information on the technical potential and the economics of various insecticide products for use with bait attractants. The persistency of Deltamethrin on various fabrics has also been evaluated. Preliminary investigations have indicated that if the trend is towards privatisation, cost recovery or community involvement in control schemes then farmers more readily accept and pay for the application of insecticide to livestock.

### Strategies and planning for Trypanosomosis control in East and Southern Africa
Dr. R. Connor

In all SADC countries involved in the activities of the RTTCP the development of strategic plans for tsetse control, at both the national and regional levels, has continued. However, in many of these countries various external factors such as the formulation of Agricultural Sector Investment Programmes, adverse climatic conditions and the HIV/AIDS epidemic all exert undue influence on national priorities and the capacity to deliver. In this regard institutional strengthening through training is a major factor throughout the region. The future of the Regional Programme beyond 1998 will depend on the approval of SADC to the revised policy of the programme, the ability of governments to complete the strategic planning process and to fund a larger proportion of the costs.

**Host management through trypanotolerance utilisation**
Prof. L. Dempfle

The preference of farmers for trypanotolerant livestock varies throughout West Africa, based not only on their ability to resist Trypanosomosis but also other diseases such as dermatophilosis. This is illustrated by comparison of tsetse free areas in the Gambia and Northern Nigeria. In the former where the challenge of other diseases is high the N'Dama are retained whereas in the latter they are replaced by larger, non-tolerant, breeds. Studies, undertaken by the ITC in Gambia, are ongoing to compare the productivity of N'Dama with Zebu and Zebu/N'Dama crosses. Results indicate very little difference in productivity apart from milk production, however, further clarification of the economic impact of Trypanosomosis on N'Dama cattle is essential for decisions on their exploitation in tsetse areas as an alternative to tsetse control.

**Bait techniques implementation: West and Central Africa:**
Dr.A. Douati

Communications between countries in this region make information exchange very difficult. Large scale tsetse control using trapping devices has been on-going in northern Cote d'Ivoire since 1984. The operation now covers 50 000 sq. km. with finance provided through the national exchequer ($400 000 per annum) and by GTZ ($800 000 per annum). The exercise has suppressed the disease to economically tolerable levels but eradication has not been achieved. The system is dependent on donor support and therefore, not sustainable. There is a need to study the socio-economic aspects in order to demonstrate the tangible benefits, to fully involve the beneficiaries and to privatise the delivery of veterinary services.

**Parasite management for Animal Trypanosomosis**
Prof. S. Geerts

A position paper on parasite management and drug resistance has been prepared for presentation to the ISCTRC. This paper raises two main issues, after 30 years of developing resistance the impact is still not quantified and no standard tests have been developed. Guidelines are needed to

help postpone the development of resistance and to retain drug efficiency. It is important to try to reduce the frequency of drug treatment and in this regard attention should be given to combining control and curative techniques.

**Strategies and planning for human Trypanosomosis in West and Central Africa**
Dr. C. Laveissiere

In Côte d'Ivoire experience has shown that an integrated, cost effective and efficient, approach to Sleeping sickness control can be obtained through a combination of medical surveillance using the micro-CATT and vector control by trapping. This is particularly suited to the forest zones but may not be so effective in other areas such as mangrove swamps where vector control is more difficult. Problems are experienced when trying to integrate these operations with the control of animal Trypanosomosis as the major vectors are not always the same species of tsetse and there are behavioral differences that inhibit the attainment of optimal results in this dual objective.

**Vector management: techniques other than bait attractants**
Prof. I. Maudlin

Since the last report there has been no change in the work programme of the co-workers affiliated to this group. Under this heading there are three main approaches to be considered; the use of the Sterile Insect Technique (SIT); biological control with agents such as fungi and genetic control.

SIT is currently under trial on Zanzibar where the results of both fly and disease surveys now indicate that eradication may be achieved. However, the logistical demands are high and the progress towards eradication demands that operations be sustained for a considerable time. Costs are estimated at $ 8.5 million for treatment of some 1 600 km. sq.

With regard to biological control ICIPE is currently investigating the potential of fungi.

Genetical research : The aim is to produce transgenic tsetse which will be (a) refractory to infection with the transformation stable over time and, (b) able to spread naturally through wild populations. Because of the technical difficulties involved in tsetse genetics we have to follow progress in related fields of research and in particular mosquitoes. Transgenic insects - An exciting breakthrough has recently taken place in mosquito research in which a transposable element (Hermes) from the housefly has been inserted into Aedes embryos. This is a major step towards the production of a mosquito which will not vector malaria.

Drive mechanisms - To spread desirable genes through a population a 'drive mechanism' is essential or the gene will simply be eliminated by natural selection. An inherited cytoplasmic incompatibility factor (Wolbachia) which reduces egg hatch when infected males mate with uninfected females is such a candidate 'drive' factor for insect control. The most interesting research is based on a Drosophila simulans population in California. A Wolbachia infection has

been shown to be spreading at a rate of more than 100 km per year; populations in which the infection was rare have become almost completely infected within three years. It has been shown that Wolbachia can be transferred between insect species suggesting that it may be possible to introduce this agent experimentally into arthropod species of medical and agricultural importance in order to manipulate natural populations genetically . Taken together these results from other insect offer the most exciting prospect for tsetse research as we already have good information on the causes of refractoriness to trypanosome infection in tsetse and tsetse have a cytoplasmic incompatibility factor . This field is now in a most promising position for the development of a low-cost, sustainable method of tsetse control which will require few inputs after the development stages.

**Bait techniques: research and development; East and Southern Africa**
Dr. S. Mihok

In pursuance of compiling a resource inventory a questionnaire was sent to 27 co-workers, results were disappointing with insufficient replies being received to form the basis for a realistic analysis. This may be largely due to a lack of modern communications and also that some researchers may be suspicious of the intentions and fear competition. The meeting proposed that a renewed effort be made through the FAO Liaison Officers network and the WHO Regional Office based in Brazzaville.

**Vector management: Tsetse behaviour and ecology**
Mr. W. Shereni

In support of improvements to control techniques most activities within this group have been concentrated on the various behavioral responses of tsetse to traps and targets. Considerable progress has been made on how these responses are influenced by vegetation and the siting of the devices. Other areas of activity include, the factors affecting the survival of tsetse, their spatial and temporal distribution, and improvements to odours and the use of artificial refuges particularly with reference to their effectiveness for a greater range of species.

**Disease impact, in socio-economic terms, on rural development**
Dr. B. Swallow

Very little progress has been made in the compilation of a resource inventory and the identification of priority areas for research. Contacts now established with co-workers in CIRDES and RTTCP may help to improve this situation. Two position papers will be presented to the ISCTRC one on the impact of the disease on farming and the other on the socio-economic and cultural impact. In the former attempts have been made to review the impact on agriculture at different levels and to link them. The degree of the effect depends on the size of the livestock population. It is significant to note that a 10% increase in livestock yields a 2% increase in

production. This indicates that the most profitable rewards from Trypanosomosis control are in the subsequent availability of draft animal power to contribute to mixed farming.

**Diagnosis and epidemiology of sleeping sickness**
Dr. N. Van Miervenne

A review of the current diagnostics available was presented with particular reference made to the need for a test for dry blood samples supported by a regional reference laboratory in Africa. With regard to research activities it was recommended that urine strips be investigated for their potential to indicate Trypanosomosis through albumins. An alternative being the possibility of diagnosis through a dry film of CSF on a filter paper.

**Diagnosis and epidemiology of animal Trypanosomosis**
Dr. R. Dwinger

In order to ascertain the research priorities 27 scientists were asked to rank a number of research areas in order of priority. Ten responded and an analysis of these replies gave the following results:

**i)** survey for new diagnostic techniques;

**ii)** standardisation and quality assurance;

**iii)** validation of existing techniques;

**iv)** development of epidemiological tools for monitoring control programmes;

**v)** design, data management and analysis of epidemiological surveys;

**vi)** interface of diagnostic and epidemiological data with GIS;

**vii)** suitable methods to verify tsetse eradication;

**viii)** ass
essment of importance of mechanical transmission.

**Defining research and development priorities**

Based on the list of priorities for research and development identified by the Advisory Group Coordinators meeting, Nairobi, October, 1996, the participants to the meeting of FAO Liaison Officers for East and Southern Africa were requested to individually record their own list of priorities. These replies were then analysed and a final list compiled for presentation to the current meeting. The list is as follows:

- **i)** Improve existing diagnostics particularly at field level for both animal Trypanosomosis and sleeping sickness
- **ii)** Improve bait technology particularly for additional tsetse species of economic importance
- **iii)** Develop and strengthen integrated vector/parasite control
- **iv)** Develop guidelines on the organisation of control at the village and extension levels and clarify the social and cultural issues and the perceptions of the disease by local people
- **v)** Improve database development and incorporate agricultural impact
- **vi)** Develop guidelines for privatisation of control
- **vii)** Explore alternative drug formulation for both animal and human Trypanosomosis
- **viii)** Develop and improve epidemiological methods

The comments of the meeting on the above list are recorded as follows.

Overall comments:

these are useful proposals which bear some weight, however, they should also be considered by the Liaison Officers of West and Central Africa when they meet in November. Although the list will be presented to the Programme Committee in its original form it should be realised that there is a need to describe what each one means in more detail and to define who does what in order to prevent duplication. The justification for the actions proposed is vested in the PAAT logical framework produced at Montpellier.

Specific comment on each priority:

- **i)** accepted
- **ii)** accepted
- **iii)** Should be re-worded as "integrated strategies"
- **iv)** It would be difficult to identify the research activities required to achieve this. The item should be deleted as social and cultural issues of impact are primary requirements and the Montpellier meeting gave such guidelines as an OVI.
- **v)** This is a developmental activity and should be retained as there is a need to define areas and scenarios where the application of control will be most rewarding and where not. It leads to a better definition of priorities and may provide the justification.
- **vi)** Accepted but perhaps needs to be re-worded when it is considered that the systems have to be in place in order to be evaluated and it is putting them in place that requires the supporting research.
- **vii)** This is a large undertaking and to be realistic should be re-worded as "explore alternative treatments".

**viii)** This is rather vague and could be more specifically described as "tools for monitoring control and eradication".

**Future of research facilities in Africa**

Concern is expressed over the decline of field based research facilities in Africa which is in part due to the inability of Governments to provide the necessary recurrent funding. After some discussion the meeting concluded that the best opportunity was to adopt a regional approach, as has been successful in the RTTCP. At the national level the critical mass was often not available whilst regional sharing would allow for a mutual exchange and pooling of resources. For economic survival it was also considered that such stations should diversify beyond the field of Trypanosomosis in order to attract sponsors and donors and also ensure that their outputs related, and directly contributed, to the developmental requirements. Private sector involvement in Galana and Makwaja are good examples. When considering the future of these institutions it is important to recognise their key role in training, particulary at this critical period when experienced and trained staff are at a premium. The mechanisms for the strengthening of the institutes were not identified although it was suggested that the experience gained by the RTTCP be drawn upon before considering any further action.

**Presentation of position papers to the ISCTRC plenary session**

**Impact of Trypanosomosis on African Agriculture**
Dr. B. Swallow

Abstract:
The direct effects of Trypanosomosis on susceptible cattle are documented as i) reduced calving rates by 11-20% ii) a 10-20% increased calf mortality, iii) a 10-26% reduced milk offtake from trypanotolerant animals, and iv) a 4-38% reduction in reproduction in sheep and goats. At the herd level, it is estimated that the incidence of Trypanosomosis reduces cattle offtake by 5-30%, milk offtake by 10-40%, and the work performance of oxen by 33%. The risk of Trypanosomosis also shapes farmers choices about livestock purchases, sales and overall herd size. The evidence from a small number of field studies suggests that farmers in areas of high risk keep 25-60% as many cattle as nearby farmers in areas of low risk. Impacts on other livestock species vary greatly depending on the management system and level of susceptibility. Overall it has been estimated that Trypanosomosis reduces the density of cattle by 37% in the sub-humid zone and by 70% in the humid zone.

The indirect effects of Trypanosomosis risk on land use and agricultural production can be inferred from focused field studies and aggregate-level studies that have examined the relationship between livestock and crop production more generally. In mixed farming systems where Trypanosomosis is so severe that it constrains the number of oxen that farmers own, it can reduce the average area planted per household by as much as 50%. By generally constraining farmers from the overall benefits of livestock to farming - less efficient nutrient recycling, less access to farm traction, lower

income from milk and meat sales, less access to liquid capital - Trypanosomosis reduces both yields and areas cultivated. It is estimated that the elasticity of livestock stock with respect to total agricultural production is about 0.20: a 50% reduction in livestock population would reduce the total production of agricultural output by 10%.

Summary of discussion:

Studies undertaken by the RTTCP indicate similar levels of impact, however, there is need to also consider the longer term implications through grazing pressures and herd offtake as well as the impact on human health and the nutritional effects. These considerations indicate that there may be very considerable gains to be made from integrated crop/livestock production and that it is here that the greatest rewards will result from tsetse control. Tsetse is a land use issue and priority should be directed to the areas with the best potential for success. In recognition of this the meeting recommended that tsetse infested areas meeting these criteria should be identified and selected as priority for disease intervention within on-going and proposed regional programmes funded by the EC (see also section 9).

**The implementation of odour bait techniques for the control of tsetse flies in Eastern and Southern Africa**

Mr. R. Allsopp

Abstract:
Of the various techniques available for tsetse control, cattle dipping is probably the least expensive. Although figures are not readily available, SIT is probably the most expensive but is environmentally benign. Depending on local situations and strategic objectives (i.e. control or eradication) there is probably little difference in the costs of the three most widely used chemical control methods viz. discriminate ground spraying, aerial spraying and odour bait techniques. Similarly, barring malpractice, all three have no long term, irreversible effects.

Results of a survey conducted in East and Southern Africa suggest that tsetse control efforts are diminishing and this coincides with the proliferation of odour bait techniques. If this trend continues there is a danger that tsetse populations will recover more quickly than they are cleared. The question is thus raised as to whether it is realistic to simply do more of the same and increase the reliance on odour bait techniques.

Odour bait techniques may prove to be less environmentally benign and less economically advantageous than has been assumed. They may be slow to achieve results and may not be able to eradicate some populations but if managed properly they do have a significant effect on tsetse. They are also well suited to community projects. However, they do not appear to have made significant progress in the battle against tsetse flies in recent years thus are unlikely to do so in the future if left to work in isolation. Other well tried methods are available and should be used to complement the targets, to take up some of the slack and to inject a degree of urgency into this persistent and escalating problem. It is time to review our objectives, assess our performance, reconsider our options, mobilise the available resources and, perhaps, revise our strategies.

Discussion:
The paper is controversial, it presents only one conclusion, there are others. It does, however, raise an important point particularly concerning Sleeping Sickness epidemics where bait techniques are not appropriate and other more rapid methods such as aerial spraying should be considered. The paper suggests that the stance taken by the donors in their move away from former methods based on arguments of environmental pollution may not be supported by science. This raises a serious conflict that needs to be resolved. PAAT should undertake the gathering of the data required to present the facts and facilitate the decision processes. Perhaps a specific working group should be formed to investigate and report more fully on this issue as the indications from the paper are that we are not making progress and that in fact tsetse control may actually be losing ground.

**Drug management and parasite resistance in African animal Trypanosomosis**
Profs. S. Geerts & P.Holmes

Abstract:
Trypanocidal drugs remain the principal method of control in most African Countries. However, there is growing concern that their future effectiveness may be severely curtailed by widespread drug resistance. Although the number of case reports on drug resistance is increasing, there is lack of reliable data at the regional and national level, on the true prevalence and impact of this resistance. In order to compare data on a temporal and spatial basis across Africa there is an urgent need for better standardisation of tests for the detection of drug resistance. The advantages and disadvantages of currently available assays are briefly reviewed and measures suggested to improve the situation. Guidelines are proposed to delay the development of drug resistance as well as measures which may be adopted to control resistance when it occurs. These measures include the avoidance of under-dosing; reducing the number of treatments and withdrawing the use of Quinapyramine for use with cattle.

Discussion:
The meeting agreed on the need for a more systematic approach to drug usage but emphasised that this was jeopardised by the lack of supervision and advice by governments in both their acquisition and administration.It was acknowledged that PAAT may provide the means to address the situation through the issuance of guidelines and through the direct contact of the international organisations in the secretariat with national veterinary services.

**Concluding discussion of the session:**

Open discussion of the above three papers in the PAAT Session of the ISCTRC resulted in the following conclusions:
The meeting noted the need to consider the overall effects of Trypanosomosis in the context of socio-economic impact at the rural development level and in terms of the evolution of sustainable mixed farming. It is indicated that very substantial gains could be expected from tsetse and Trypanosomosis control in mixed crop/livestock systems and that these areas should constitute the priority focus for control.

It was, therefore, concluded that PAAT should identify areas of agricultural potential, with high levels of rural population activity, that may form the focus for the programmes activities and which offered the greatest opportunities for success. These studies should also cover the benefits to be gained from improved human health and nutrition (see section 9).

In considering the use of artificial odour-bait techniques for tsetse control in East and Southern Africa the meeting noted with some concern that the total extent of such operations covered an area of only some 30 00 km. sq.

The achievements obtained from these activities varied from a 50% to a 99% reduction in tsetse populations.

In conclusion the meeting agreed that although the artificial bait techniques have a role to play they may not be appropriate to all situations. There was, therefore, a need to re-consider an integrated approach that may include previous proven techniques such as aerial and ground spraying.

Trypanocidal drugs remain the principle method of control in most African Countries. However, there is growing concern that their effectiveness may be severely curtailed by widespread drug resistance. There is a lack of reliable data on the prevalence and impact of drug resistance and the need for guidelines to help manage the problem were strongly recommended. These guidelines should take into account the measures needed to avoid underdosing, promote a reduction in the number of treatments administered and to advocate that quinapyramine be withdrawn from use in the treatment of cattle.

The meeting acknowledged the important and pivotal role of trypanocides in combating the disease across Africa and agreed that if efficiency was the primary objective then the practices of the past must be revised accordingly.

## The social, economic and cultural implication of Trypanosomosis and it's control

### Incorporating socio-cultural factors into tsetse control and assessment of its impact.

Dr. J. Ssennyonga

Abstract:
The paper reviews achievements and failures in four major areas. The first, capacity building is examined in terms of knowledge of tsetse biology and ecology, problems of tsetse and methods of solving them, the impact of control, community mobilisation, organisation and management. Evidence shows that not enough investment has been put into capacity building, especially organisation and management. The second issue, methodology, is examined in terms of choice of level and unit of analysis, participation parameters (PP), factors influencing participation (FIP) and the relationship between PP and FIP.

Evidence from literature shows that there is no consensus on PP and FIP, as a result evaluation of achievement is very difficult. Use of the group as the unit of analysis makes it impossible to explain

participation at the individual level. The third issue, impact of tsetse control on common property resource use is examined in the context of the widespread conflicts over resource control and use in Africa. To the extent that tsetse control increases the value of resources in tsetse endemic areas, it also heightens the conflict over the control and use of those resources. The paper cites evidence of the occurrence of this phenomenon. the fourth issue, gender, is used to illustrate the three issues discussed. Findings, based on a case study, reveal there are both opportunities for and constraints against women participation.

**The socio-economic and cultural impacts of Trypanosomosis and its control**
Ms. D. Mwangi

Abstract:
The socio-economic importance of Trypanosomosis is difficult to assess, as the data available are fragmented and frequently only approximate. An investigation of the impacts of past outbreaks to a rural community in Kenya distinguished between direct and indirect impacts. A combination of qualitative methods and a formal household survey were used to collect data. The results indicated that residents in the areas where disease was prevalent attached greater social and economic importance to the disease. Direct effects of Trypanosomosis included: i) mortalities in both humans and livestock and a reduction in livestock production and ii) behavioral changes due to the fear of contracting sleeping sickness which affected normal social activities like visiting relatives, collecting firewood and fetching water. The consequences led to indirect effects including a reduction in family labour and household incomes. An important cultural impact was a shortage of animals for payment of dowry.

Summary Discussion:
A comprehensive position paper on social implications needs to be prepared as this is a neglected area. The sociological aspects need to be considered separate from the economic ones in the PAAT. In these studies there is a need to attempt to predict the longer term effects particularly in view of the continuous changes to lifestyle and social development. Sustainability of tsetse control is a key issue and raises concerns over the dependability of communal participation, this needs to be addressed although it is appreciated that it may be affected by the system of this control.

**Integrated Disease Management in Trypanosomosis control**
Dr. B. Bauer

Abstract:
The live bait technique, as applied in Burkina Faso, is not intended to strongly suppress tick infestations but is primarily directed against tsetse. However, in certain circumstances there should be an association of insecticide treated artificial baits for more effective control of tsetse. However, the question then arises as to who should pay for these increased inputs. Sustainability and cost recovery schemes are largely dependent on the technique chosen, the insecticidal treatment of livestock being generally considered as the method of choice by the beneficiaries. Individual rationality, i.e. the live bait technique is likely to prevail over collective rationality (or public good) i.e. insecticide treated targets or traps.

Cost-recovery for the live bait technique is largely dependent on the simultaneous efficacy of a given product against ticks. Many pour-on formulations have sub-optimal dispersal and do not control ticks satisfactorily. Sustainability is dependent on a regular and affordable supply of the acaricides and/or insecticides sufficiently close to the demand. The use of GIS in conjunction with sound socio-economic analyses is a pre-requisite for the justification of priority actions in certain areas, tsetse control will remain as a patchwork for the foreseeable future in view of its extent and the lack of effective participation by the beneficiaries.

Discussion:
In order to assess the individual techniques more needs to be done in terms of producing a cost: benefit analysis. Integrating bait technologies generally gives 90%, or more, in terms of Trypanosomosis reduction. This approach may also have application in Sleeping sickness epidemics where livestock are becoming increasingly more important reservoirs. Concern was expressed over disrupting the enzootic stability of livestock to Tick borne disease, as has already been observed in Zimbabwe where 10 years of livestock treatment with deltamethrin has significantly lowered the prevalence of Babesia antibodies in cattle. It was generally agreed that where cattle are available in adequate numbers and distribution then the animal treatment seemed the most convenient and cost effective, however, there is need for more research to further define this potential.

**A novel approach to chemotherapy for human African Trypanosomosis**

The current treatments available for human African Trypanosomosis are far from satisfactory, particularly in the later stages. The drugs available for penetrating the blood/brain barrier are Melarsoprol, Eflornithine and Nifurtinox. Of these it is generally the former which is administered as the drug of choice. Treatment with Melarsoprol entails from 9 to 12 intravenous injections and introduces concerns over perivascular damage and reactive encephalopathy. Laboratory tests on mice have now demonstrated that Melarsoprol is absorbed through the skin and can cure Trypanosomosis in the central nervous system. These tests indicate the potential for drug treatment through a "Transdermal Delivery System" or patch. The advantages of this technology are, better drug management, it is safer than existing formulations, the release rate can be controlled, no hospitalisation is required, it can be used with other formulations and treatment costs are lower than those for conventional treatment.

**A proposed action plan for PAAT: from research to implementation**

The following proposal was identified by a small informal working group during the ISCTRC, based on the concerns indicated during the course of preceding presentations. Particularly the information provided by Allsopp on the current state of tsetse control progress in East and Southern Africa (sections 4.1 and 7.2). The concept was introduced to the main ISCTRC Plenary session which after brief discussion gave agreement that it be presented to the Programme Committee for further consideration and decision.

**The Vision**

African animal Trypanosomosis reduces the milk and meat productivity of the 60 million cattle and 100 million small ruminants that smallholders raise in the tsetse affected areas of Africa. More importantly, AAT constrains the numbers and types of livestock that farmers may keep and thus the multiple contributions made by livestock in mixed crop-livestock systems (e.g. traction, nutrient cycling, cash flow). The medium rainfall areas of Africa, which are heavily infested with tsetse, offer the continent's greatest opportunities for agricultural growth.

The incidence of Human African Trypanosomosis has risen sharply in the 1990's due largely to the civil strife that has beset many central African countries. The symptoms of civil strife-abandonment of farms, mass migration to sparsely populated areas, deterioration of medical services, have created conditions conducive to the spread of tsetse, increased incidence of disease, and reduced surveillance.

Human and financial resources for investment in AAT and HAT control are scarce and must be directed to problems of highest priority. Priority areas for AAT and HAT control will generally differ, as will goals of control, optimal approaches to control, and the criteria used to measure progress toward these goals. Demonstration of good returns to investments will strongly enhance the prospects for future investments.

**The Plan**

The PAAT can enhance returns to investments in Trypanosomosis control by linking research and development to the planning, implementation and evaluation of control strategies for AAT. A five point action plan is proposed:

- **i)** Agree on criteria for prioritising areas for public investment in control that relate to the goals of food security, poverty alleviation and environmental conservation through improved productivity of mixed crop/livestock production systems.
- **ii)** Identify up to 100 000 Km. sq. of the mixed farming areas of East and West Africa as highest priority for public investments in the control of AAT. This could help to clarify and sharpen the focus of the two regional programmes for improving farming in tsetse affected areas.
- **iii)** Develop guidelines for appropriate control strategies in terms of: a) integration of parasite and vector control; b) roles of governments, private firms and farmers groups; c) contributions from intended beneficiaries; d) phasing of activities; and e) accompanying development activities and policy changes.
- **iv)** Agree on criteria for evaluating public investments in control activities and how those activities contribute to agriculture development.
- **v)** Develop indicators for those criteria and means of verification that can be easily incorporated into systems of monitoring and evaluation.

**Any other business**

A brief general discussion on PAAT and its' general principles was opened for debate and clarification in the ISCTRC Plenary session. From the comments received it became clear that

although PAAT was, in general, strongly supported there is a need to overcome some confusion as to its' structures and how the programme may relate to various other regional organisations and national activities. Some concern was expressed that role of the field workers, at the level of practical implementation, may not be adequately represented. It was agreed that although there was a weakness in this area it was to be rectified through the closer collaboration of the FAO Liaison Officer's Network. The discussion also highlighted the need to more clearly define the role of existing structures within the Programme, specifically the ISCTRC.

In considering the current list of Coordinators to the Advisory Groups there were requests from the floor that the Committee give consideration to increasing the involvement of women and to delegate more responsibility to those directly facing the problem in Africa.

**Conclusions and recommendations**

Matters arising from the minutes of the last meeting of Advisory Group Coordinators:

**a) Matters arising:**

1. The PAAT logical framework Produced by the Montpellier workshop was endorsed.

2. There is a need for further efforts to improve and strengthen communications within the Programme. The secretariat should pursue this with the Committee in order to procure the necessary funds.

3. Financial resources should be sought to facilitate the travel of Coordinators in the execution of their responsibilities, this is particularly evident from attempts to develop certain position papers.

4. Poor responses had been received by some Coordinators in their attempts to compile specific resource inventories (in part due to poor communications). These efforts should be continued and strengthened. In this regards there is a need to ensure that all data bases and management/information systems are at least compatible and preferably standardised.

5. The secretariat should improve the collection and flow of information from the field level.

6. There is a need to establish a Pesticide Resistance Reference Centre to serve Africa. The PAAT secretariat should pursue this and consider i) a request to GTZ for assistance, ii) to enable an existing regional laboratory to undertake the service, e.g. CIRDES, or iii) to investigate the possibilities for coordinating into current WHO activities through WHOPES.

7. The FAO Liaison Officers' Network should be included, as a group, within the Policy, Planning and Implementation module of Advisory Groups.

**b) New topics:**

1. The potential contribution in trypanotolerant breeds of resistance to other diseases should be further evaluated.

2. On the future of field research stations in Africa;

   **a)** the meeting recommended that priority should be given to a focusing and pooling of resources at the regional level and;
   **b)** that although research should focus on the priorities identified by the Liaison Officers, as endorsed by the coordinators meeting, further debate should be facilitated by PAAT to ascertain national and regional reservations and so define the path to make further progress. In this regard the RTTCP will provide observations on their regional experiences;
   **c)** when considering means to sustain research facilities the possibility for privatisation and/or the potential to wholly or partially commercialise should be taken into account. The pivotal role of research institutes in the training of national cadres cannot be over-stressed.

3. There is a need for greater emphasis on increasing understanding of the socio-economic and cultural implications of Trypanosomosis and its control. A comprehensive position paper should be produced to address these issues and should take into account the need to predict the longer term implications within the dynamics of population growth and rural development.

4. Standard tests are needed for detection of drug resistant parasites.

5. Studies should investigate ways to integrate efforts to control human and animal Trypanosomosis, at the implementation level, in common endemic areas as are found in Cote d'Ivoire and Uganda.

6. The PAAT secretariat should pursue the identification and listing of capable experts in the various specialisations that contribute to its, objectives.

7. The potential of urine strips to indicate Trypanosomosis through albumin levels should be further assessed.

**C) Outcomes and recommendations of the combined PAAT/ISCTRC sessions:**

1. The PAAT was introduced and explained to the ISCTRC. Considerable details of PAAT's overall goal, purpose, secretariat and programme structures were given. Essentially PAAT is an inter-organisational alliance of FAO/OAU/WHO/IAEA formed to facilitate

and coordinate activities and which seeks to harmonise donor support and Trypanosomosis control and research actions". This may be summarised as; "The distillation of International Expertise and experience leading to Policy Statements and plans for action".

2. The position papers presented to the meeting should be circulated to a wider range of experts in order that they may represent the broader international opinion and so gain recognition as authoritative lead publications in their specialised subjects.
3. In recognising the limited resources available for the control of tsetse and Trypanosomosis across the broad expanse of Africa. The meeting recommended that the PAAT secretariat initiate studies to identify priority areas for intervention where the benefits would best enhance the productivity and sustainability of integrated animal/crop agriculture.
4. The delivery of effective tsetse control through the application of artificial odour-baited attractive devices has achieved varying degrees of success. However, it is recommended that their potential be fully assessed in terms of biological efficacy and socio-economic impact and, where appropriate, consideration be given to an integrated approach to disease management which may also involve proven techniques such as aerial and ground spraying. This assessment should take into account the need to preserve enzootic stability of livestock to other diseases and should also include a Cost: Benefit analysis of the component techniques proposed for such integration.
5. In recognising the important and pivotal role of typanocidal drugs in controlling the disease and the increasing problems posed by the development of drug resistant parasites, the meeting recommends that the PAAT secretariat commission the drafting of guidelines for their use that would help to manage the problem.
6. The potential of the "Transdermal Delivery System" for the treatment of Human African Trypanosomosis should be more fully evaluated
7. When reviewing the list of Advisory group coordinators, consideration should be given to increasing the involvement of representatives in Africa and to decreasing the current bias by gender.