Fourth International Meeting on *Trypanosoma evansi*: Report of the Working Group*

Paris, 22 May 1985

Summary: A meeting of the Working Group was held in May 1985, under the auspices of the OIE, to take stock of current knowledge and research on infection caused by Trypanosoma evansi. Having examined the conclusions of the 2nd Meeting (Paris, May 1984) and the 3rd Meeting (Harare, Zimbabwe, March 1985), the participants analysed the evolution of the epidemiologic situation in infected countries and presented the principal research work carried out in specialised laboratories on chemotherapy and chemoprophylaxis. The participants stressed the need to maintain efforts for the creation of trypanosome banks and for the development of exchange of strains in the different regions as well as the setting up of a practical method of immunological diagnosis for rapid identification of these infections in the field.

KEYWORDS: Africa - Asia - Buffalo - Cattle - Data banks - Diagnostic techniques - Disease control - Dromedary - Drug resistance - Epidemiology - Immunoenzyme techniques - Research institutes - Trypanosoma evansi - Trypanocidal drugs - Trypanosomiasis.

The report of the Working Group, established at the OIE Secretariat was circulated to each participant of the 53rd General Session of the OIE, in English, on 23 May 1985. The Director General of the OIE, Dr L. Blajan, subsequently sent the translation, in French and Spanish, to each permanent Delegate of the OIE.

The participants at the meeting were Drs. N. van Meirvenne, P. Kageruka (Belgium), Zelleke Dagnatchew (Ethiopia), E. Zweygarth (GFR), Prof. T. Baltz, Drs. M. Clair, D. Cuisance, J. Itard (France), Drs. Purnomo Ronohardjo (Indonesia), A. Mustaffa Babjee (Malaysia), Prof. D. Zwart (Netherlands), Drs. M. Abu El Azaim Medani (Sudan), Y. Ozawa (FAO), Prof. A. O. Williams (OAU/STRC), Drs. W. N. Masiga (OAU/IBAR) and L. Touratier (Secretary).

Following consultation with the participants, Dr Purnomo Ronohardjo agreed to chair the meeting.

* Original report written by the Secretary of the Working Group, Dr. L. Touratier, 228, boulevard du Président-Wilson, 33000 Bordeaux, France.
REMARKS ON THE REPORTS OF THE 2nd MEETING  
(Harare, Zimbabwe, March 1985)

The Secretary summarised several points as follows:

1. Minutes of the meeting held on 23 May 1984 were circulated to each participant in June and October 1984. A final text was prepared incorporating the amendments received and was sent to members of the group (2).

2. In agreement with the Conclusions of the 1st meeting of this group (1), contact was made with the Organising Committee of the 18th Meeting of the OAU/STRC to be held in Harare, Zimbabwe (4-9 March 1985) and this resulted in a meeting of the *T. evansi* group in Harare on 4 March 1985.

3. Minutes of the Harare meeting were circulated to each participant on 28 March 1985. A copy of these minutes is available on request.

In view of the impact of the disease, within and outside the tsetse belts, on livestock susceptible to *T. evansi*, recommendations were made to carry out research work in order to up-date knowledge on the vectors and to develop new means of chemotherapy (Appendix 1).

4. Correspondence with those responsible for the Trypanosomiasis Research Project of the German Agency for Technical Cooperation (GTZ-Chemo-Tryp), Kabete, Kenya.
   
a) Trials have been conducted with potassium melarsoprol (Mel W) in camels infected experimentally with *T. evansi*. Preliminary results are soon to be published. The compound seems to be better tolerated than melarsoprol base but to be less effective.

b) Publications by Chemo-Tryp: Two articles were mentioned (6, 7) both containing discussions concerning results obtained with suramin, quinapyramine and isometamidium in camels infected with strains resistant and non resistant to suramin and quinapyramine.

5. Work conducted at RIAD, Bogor, Indonesia.

Following the work on *T. evansi* already presented by Dr Purnomo Ronohardjo during the Second Meeting of the Working Group (2), new trials are being conducted on ‘Trypanosomiasis in Indonesia with particular reference to chemotherapy’. Dr P. Stevenson, who participated in the Harare meeting, announced that an article was being prepared by the Indonesian/Australian cooperative team.

6. *T. evansi* infection in Taiwan-ROC.

Several reprints of original articles have been received from Prof. Y.S. Shien of the National Taiwan University, Taipei concerning:
— Clinico-pathological studies on canine surra.
— Studies on immunosuppression in goats which had been experimentally infected with the surra agent.

a) Serological response to vaccination for *Brucella abortus* before and after administration of Naganol®.

b) Activity of lymphoid tissues and lymphocytes.
A study on the method of diagnosis of chronic surra in ruminants using the passive haemagglutination test.

The indirect fluorescent antibody technique for detecting *T. evansi* carriers in cattle.

7. Participation to be considered in the 5th International Conference of Institutions of Tropical Veterinary Medicine, which will take place in Serdang, Selangor, at the University of Pertanian Malaysia on 18-22 August 1986.

**EVOLUTION OF THE EPIDEMIOLOGICAL SITUATION IN INFECTED COUNTRIES**

Dr M.A. El Azaim Medani briefly described the situation in the Sudan where there are about 3 million camels. These animals are very useful in view of the current severe drought situation, especially in the South. The area where *T. evansi* infection is prevalent is clearly distinct from the tsetse belt. Suramin (Naganol®, Antrypol®) is used for the control of the disease. Quinapyramine is kept for treating chemoresistant cases.

Dr Zelleke Dagnatchew gave some information on Ethiopia: there are about 1 million camels, mainly in the lowlands, 8% of which are infected and treated with suramin (Naganol®). Suramin (Naganol®) resistant strains were checked in 1982 in mice and the strains were found to be susceptible to higher doses of the drug. *T. evansi* has been reported in areas without tsetse flies. The problem of interspecific infections in Ethiopia has arisen. Camel to camel transmission has not been investigated.

Dr W.N. Masiga and Dr E. Zweygarth reported a similar situation in Kenya where *T. evansi* infections gave rise to non-acute forms with mild symptoms: asthenia, emaciation with a reduced PCV.

Dr Y. Ozawa stated that the economic impact of *T. evansi* infections is not easy to assess because the causative agent is not always known. It would be useful, therefore, to develop an easy and practical diagnostic method with a view to better assessing the consequences of such infections. In the absence of more accurate information, the FAO cannot give priority treatment to the control of the disease in camels and buffaloes.

Prof. D. Zwart, who had recently visited Vietnam, reported that buffaloes were frequently infected with *T. evansi* in this country. However, the situation was not clear since several causes (poor nutrition, Fasciola spp. and *T. evansi* infections) could weaken infected buffaloes thus making them more susceptible to further infections.

A recent article by Löhr et al. (5) gives a summing-up of the *T. evansi* situation in buffaloes in the North-east of Thailand.

Dr Purnomo Ronohardjo then recalled the main features of the disease situation in Indonesia, which was already described in the detailed report presented at the 2nd meeting of this working group in Paris in May 1984 (2). A progress report describes the work carried out at the Research Institute for Animal Disease (RIAD) in Bogor since 1984 and updates previous data.

Buffaloes and cattle are being tested in Java for *T. evansi* antibodies thanks to the ELISA technique. In some areas, 70% of the animals were found to be infected by *T. evansi*.
Prof. D. Zwart learned from the Centre for Tropical Veterinary Medicine (CTVM), Edinburgh, that some strains received from Indonesia had similarities with *T. vivax*. However, this point still has to be clarified and was mentioned in the paper circulated by Dr Purnomo quoted above.

In Indonesia, *T. evansi* infections in buffaloes are also more frequently reported during the work periods in the rice fields.

In response to a question from Dr Zelleke Dagnatchew concerning the control of surra in camels by mass treatment, Dr Ozawa commented on the difficulty with regard to this issue and recommended the development of an accurate diagnostic method. Dr Purnomo said that suramin is mainly used in Indonesia but, in some areas, isometamidium is also still used.

**RESEARCH WORK CARRIED OUT IN SPECIALISED LABORATORIES**

Some results have already been quoted in this report — e.g. the German team in Kenya, research work in Bogor, Indonesia, and in Taipei at the National Taiwan University.

The activities of the Working Group in the USSR are considered highly. In his letter of 15 May, 1985, Prof. G. Koromyslov, Director General of the Federal Veterinary Experimental Institute (VIEV), Kuzminki, Moscow, wrote:

"*We welcome the recommendations made by the working group on the exchange of information among scientists and laboratories which are dealing with *T. evansi*. In the recommendations on fundamental studies, the problem of mechanisms of agent resistance to chemopreparations might be considered. We think that the agenda of the International Meeting to be held on 22 May 1985 in Paris is very interesting. At present, we are developing methods for field diagnosis of trypanosomiasis as well as chemopreparations including preparations of a prolonged action."

**Basic work and setting-up of a reliable diagnostic method to be used in the field**

Dr El Azaim Medani reported that, in the Sudan, diagnosis is usually made by examination of thick blood films or blood smears after staining.

In Kenya, the work carried out by the GTZ (Chemo-Tryp) was summarised by Dr Zweygarth:

In the Chemotherapy of Trypanosomiasis Research Project at the Veterinary Research Laboratory, Kabete, Kenya, the complement-fixation test was superseded by the ELISA test in order to detect *Trypanosoma* sero-positive camels. In recent experiments, the anti-camel conjugate was compared to a protein A conjugate. The results obtained indicate that the optical densities produced by both types of conjugate correlate linearly. Protein A binds to camel IgG and can therefore be used instead of the anti-camel conjugate. The isolation of camel IgG, the rise of anti-camel IgG and the labelling process are unnecessary if a commercially available protein A is used. A quick and reliable method of detecting *Trypanosoma* sero-positive camels has been published by members of our Project (8). This test can easily be applied in the field.
Profs. van Meirvenne and Baltz would like to investigate more antigens and request exchange of strains with other laboratories.

Dr Mustaffa Babjee reported that, in Malaysia, the causative organism is rarely evidenced in routine blood examinations and a practical diagnostic method should be developed.

Prof. Zwart stressed the value of the immunofluorescence test.

Prof. Williams considered that every technique is valid if it proves an excess of antigen, as in the detection of sleeping sickness.

Prof. van Meirvenne suggested that common tests such as the IFA and ELISA techniques could be applied in conjunction with the Woo technique. He proposed to develop a serological method for use in the field.

Dr Kageruka drew attention to the transmission of *T. evansi* infections not only through *Tabanus* and *Stomoxes* spp. but also through mosquitoes. He underlined the need for an immuno-diagnosis method to evidence inapparent infections (4).

Chemotherapy and chemoprophylaxis

In the USSR, research work is carried out on the resistance of *T. evansi* strains to suramin (Nagamin®) and their greater sensitivity to diminazene (Azidin®) and isometamidium (Trypamidium®).

In their paper presented at the Federal Seminar held in Samarkand in 1983 on ‘Experiences in the field of animal husbandry, feeding, nutrition and prophylaxis of animal diseases in Central Asia, Caucasus and Kazakhstan’, V.V. Petrovsky and S.N. Malichev described the morphological properties of suramin *T. evansi* (*ninakolyakimovae*) resistant strains as follows:

Comparative studies were carried out in laboratory animals, horses, cattle, sheep and dogs with three *T. evansi* strains:
• Su-auru strain resistant to suramin (isolated from camels in the USSR in 1973);
• Su-auru strain susceptible to suramin (isolated from camels in the USSR in 1967);
• Surra strain (Rouveix strain isolated from unknown origin, received from France in 1973) susceptible to suramin.

Particular findings regarding *T. evansi* strains resistant to suramin (Nagamin®) are:
— more reduced medium sizes (14.2 ± 0.4 µm × 2.4 ± 0.6 µm);
— lower pathogenicity for animal species;
— greater sensitivity to isometamidium and diminazene;
— stability of these characteristics after 113 passages and 6 years in frozen state.

Dr Purnomo Ronohardjo said that, in Indonesia, it is not yet confirmed whether isometamidium can be used in suramin resistant strains.

In France, Prof. T. Baltz (3) is developing axenic cultures of trypanosomes, which could be useful in the screening of new trypanocides.

With regard to prophylactic treatment in a given herd of animals, Prof. van Meirvenne recommends mass treatment of the entire herd rather than treating individual cases.
ESTABLISHMENT OF CENTRES FOR TRYPANOSOME BANKS
AND EXCHANGES OF STRAINS

Dr Masiga recommended the use of the trypanosome bank in Kenya (KETRI) for Africa.

Dr Purnomo Ronohardjo described the collection of the RIAD in Bogor, Indonesia (38 stabilates which could be used as a reference bank for South-east Asia).

Dr Kageruka mentioned that there was some interference between the *T. b. brucei* and *T. evansi* strains in Kenya with resulting difficulties in establishing an accurate diagnosis.

In a recent letter, Dr E.N. Miller, Molteno Institute, University of Cambridge, announced the establishment of a central data bank containing information on all available stocks and lines of African trypanosomes (special WHO programme).

It was noted with interest that some exchanges of strains had been made between specialised laboratories, namely Belgium and France, France and the USSR, Indonesia and the United Kingdom.

OTHER BUSINESS

Dr P. Kageruka gave a short account of his experimental work on *T. evansi* infections in dogs.

The announcement of the 5th International Conference of Institutions of Tropical Veterinary Medicine, which will take place in Malaysia in August, 1986, had been received by some participants. (Further information can be obtained from: The Secretary, 5th International Conference of AITVM, Faculty of Veterinary Medicine and Animal Science, University of Pertanian Malaysia, Serdang, Selangor, Malaysia —For the attention of Ms. Lai Chooi May).

Prof. Zwart gave some details about the running of such conferences. It was proposed than an item of the 5th Conference would be devoted to: The study of *T. evansi* infections in South-east Asia, with particular reference to immunodepression and its possible interference with vaccination campaigns against infectious diseases. Dr Babjee invited the participants to visit his country on this occasion.

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Appendix 1

RESOLUTIONS ON TRYPANOSOMIASIS ADOPTED
AT THE 18th MEETING OF THE OAU/STRC, HARARE, ZIMBABWE,
4-9 March, 1985

1. CONSIDERING the variability in the drug sensitivity of stocks of *T. evansi* from different geographical areas of the world, IT IS RECOMMENDED THAT:
   — basic studies on the biochemistry of *T. evansi* be undertaken to provide greater understanding of the mode of action of existing trypanocidal drugs;
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— investigation be carried out on the variability of drug sensitivity of different stocks of *T. evansi* under standardized laboratory conditions and techniques.

2. CONSIDERING the importance of *T. evansi* in camels, IT IS RECOMMENDED THAT:

— the FAO give support to epidemiological studies, the control of mechanical vectors and chemotherapeutical control measures against trypanosomiasis;

— the FAO convene a meeting in collaboration with concerned institutes and international organizations, to assess the state of knowledge regarding camels, their economic importance in arid and semi-arid areas and the factors affecting their production;

— encouragement be given for the exchange of information and materials amongst scientists and laboratories involved in research on *T. evansi*;

— a list of laboratories which keep stocks of *T. evansi*, and the stocks kept, be compiled and published in an appropriate journal such as *Tsetse and Trypanosomiasis Information Quarterly* (TTIQ).

3. Research aimed at identifying the active principle in traditional medicinal plants used by pastoralists should be encouraged in view of the limited number of trypanocidal drugs now available.

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REFERENCES


