Eighth International Meeting on Trypanosoma evansi: Report of the Working Group

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Summary: More precise information concerning the epidemiological situation in certain African and Asian countries has been obtained recently, particularly by using new diagnostic tests (CATT test, immuno-enzymatic chemoluminescence), verifiable by comparison with immunolysis. The role of cattle and small ruminants as reservoirs of the parasite has been clarified. Attempts to develop new trypanocidal drugs are continuing, by fundamental study of the metabolism and biochemistry of the trypanosome in connection with the application of antimitotic substances, and also by screening new compounds. A new organic arsenical compound has given promising results in dromedaries infected experimentally with T. evansi.


PROGRESS REPORT OF THE SECRETARY GENERAL

Two meetings of the group have taken place since May 1986, one in South-East Asia at Kuala Lumpur (Malaysia) on the occasion of the 5th International Conference of Institutions of Tropical Veterinary Medicine (18-22 August 1986).

The other meeting was held in West Africa at Lome (Togo) on the occasion of the 19th Meeting of the International Scientific Council for Trypanosomiasis Research and Control (ISCTRC), of OAU/IBAR (30 March-4 April 1987).

Reports and communications were presented on the following subjects:
- origin, objectives and accomplishments of the Working Group (12);
- role of T. evansi in abortion of buffaloes in Thailand (5);
- assay of trypanocides in the blood (7);
- treatment of the infection by combinations of trypanocides (10);

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In Somalia, Prof. Dr F. Hörchner had conducted a serological survey of over 2,000 animals (dromedaries, cattle, sheep and goats) living in a tsetse fly free zone. The percentages of infection varied from 45 to 65% according to species, indicating that cattle, sheep and goats could serve as reservoirs of *T. evansi* for dromedaries.

In Kenya, Dr D. Schillinger had investigated the asymptomatic course of *T. evansi* infection among sheep and goats in the Wamba/Samburu district by microscopic examination of 280 blood smears, none of which was positive. However, experimental infection of goats proved that this species could develop a chronic form of the disease without showing any clinical signs.

In Sudan, Prof. R. Hamers presented a report at the Lome conference on the role of *T. brucei* infection in the dromedary. According to Prof. T. Baltz, it is not possible to identify *T. evansi* by performing in the laboratory the immunological serological tests currently available.

In Thailand, Dr M. Clair reported that Dr J.M. Humbert, seconded from IEMVT, had confirmed the presence of *T. evansi* in the blood of numerous imported dairy cows. Prof. Hamers confirmed that he had obtained similar results among the bovines of this country, noting that some losses occurred among zebu of the Brahman breed. Trypanosomiasis occurred coincidentally with bovine brucellosis. The most serious problem seemed to be the infection of sows with *T. evansi*, leading to frequent abortions.

In Mali, Dr M. Touré considered that many of the 200,000 dromedaries in the country were infected with *T. evansi*, as demonstrated by systematic blood sampling carried out by Dr O. Diall of the National Veterinary Laboratory, in collaboration with the Free University of Brussels (Prof. Hamers).

In Mauritania, Dr Ph. Christy, seconded by IEMVT to the National Centre for Animal Husbandry and Veterinary Research, provided data based on increasing numbers of positive diagnoses made at the laboratory since 1981, and above all since July 1986, revealing the presence of *T. evansi* among dromedaries (which currently number about 800,000). The clinical disease is only seen between July and November, but in March 1987 the presence of *T. evansi* was detected in numerous blood smears taken south of the 18th parallel (at Tarza, Brakna and Gorgol). There was no evidence of trypanosomes in blood smears from a hundred bovines in the southern region. Camel owners prefer to use Berenil for treating the disease, despite its high toxicity for camels in Kenya (confirmed by Prof. Hörchner), because the alternative of isometamidium chloride (Trypamidium) involves a painful local injection.
Concerning transmission of the parasite, Dr Schillinger did not believe that the finding by J.L. Jacquemin of epimastigote forms in larvae of Cephalopsis titillator (in the nasal cavity of slaughtered dromedaries) was important. It remains to be proved that these forms can reach a trypomastigote stage before this insect can be incriminated as a vector of T. evansi. Further research is indicated.

The economic impact of the infection, apart from mortality, can be measured by the considerable fall in milk yield. Affected camels should be treated with an efficacious trypanocide which does not produce toxic residues in the milk. An evaluation programme described by Dr A.R. Njogu of the Kenya Trypanosomiasis Research Institute (KETRI) is investigating the period of elimination of residues of the commonly used trypanocides (diminazene diaceturate, isometamidium, quinapyramine and suramin), in order to establish the period during which milk should not be used for human consumption (withdrawal period).

RESEARCH

Fundamental and applied research

Prof. Hamers and his team from the Free University of Brussels are working on two projects: the nature of the immunosuppression produced by T. evansi, and genetic characteristics which distinguish this trypanosome from other species. They are collaborating with Dr W. Gibson of Bristol in a study of the repertoires of the brucei group trypanosomes. They are also working with members of the GTZ seconded to Thailand and field workers in Thailand to discover the effect of T. evansi as it occurs in South-East Asia on the initiation of outbreaks of haemorrhagic septicaemia among buffaloes, and on the susceptibility of cattle and buffaloes to brucellosis.

Prof. Hörchner stressed the differences in immunosuppression mechanisms between species of trypanosomes. According to Prof. Hamers, this mechanism is located in macrophages, and it should be compared with the process which occurs during brucellosis.

Dr W.N. Masiga asked if this phenomenon could interfere with vaccination against brucellosis, as has been suggested by Prof. Shien at Taiwan.

Prof. Hörchner outlined the projects for fundamental research being conducted at his Institute, particularly the study of variants against specific antigens, by using clones of T. evansi and separating the antigens.

In applied research, Dr Schillinger had organised trials for the control of vectors of camel trypanosomiasis in Kenya, using pour-on formulations of pyrethrins, according to the suggestions of the Working Group in 1984 (Rev. sci. tech. Off. int. Epiz., 3 (4), 933-939).

Developing techniques for immunological diagnosis

Prof. T. Baltz recalled the difficulty of identifying individual members of the T..brucei group. Attention is drawn to publications from the Chinese People’s Republic on the introduction of a reliable immunological diagnostic technique.
Prof. Hamers and Dr E. Bajyana Songa were working on a card agglutination test (CATT) for detecting *T. evansi* (1), tested in the field in Thailand (2) in collaboration with German veterinarians belonging to GTZ and Thailand veterinarians. The authors stated that this test was useful for identifying *T. evansi* infections in cattle and pigs, as well as (after appropriate modifications) in buffaloes.

Prof. F. Hörchner described briefly the method which he has used with S. Steuber (11) and J.Y. Caille (3) for an epidemiological survey in Somalia. This is a chemoluminescent immuno-enzyme assay in which the positive results are identified on polaroid film.

Prof. N. van Meirvenne believed that all serological diagnostic tests should be compared with the immunolysis test.

Professors Hamers, Hörchner, van Meirvenne and Dr Bajyana Songa agreed that it was necessary for an immunological diagnostic test to be available in kit form for field use. Attempts are being made to do this, and the results may be available at the next meeting of the Working Group.

**Trials of new trypanocides**

Dr A.R. Njogu reported the results obtained at the Kenya Trypanosomiasis Research Institute with established drugs (suramin, difluoromethyl ornithine or DFMO, and nitroimidazole) in a scheme based on that formulated by WHO (10) for controlling sleeping sickness.

The Soviet Delegation to the OIE General Session had presented a communication by Dr S.Kh. Khamiev concerning research on bactrian camels (*Camelus bactrianus*) in Kazakhstan (4). This confirms the results obtained in the USSR by V.V. Petrovsky and in Kenya by D. Röttcher *et al.* (9) concerning the sensitivity of suramin-resistant strains to isometamidium.

S.Kh. Khamiev infected 400 camels with suramin-resistant strains of *T. evansi* (resistant to suramin at 50 and even 70 mg/kg body weight – dosages toxic for camels), and injected a 2% solution of isometamidium (Trypamidium) intramuscularly at 1 mg/kg body weight. At tests conducted 1 and 6 months after treatment, 398 camels were negative while the 88 untreated controls remained positive.

S.Kh. Khamiev proposed the use of Trypamidium in areas where suramin (Naganin) had been used for a long time. The general tolerance of camels to Trypamidium was good and local tolerance was acceptable, apart from a lump which persisted at the injection site (in the shoulder) for about 35 days.

In Somalia, Dr A. Yussuf reported that quinapyramine was highly toxic for dromedaries, and that isometamidium (Samorin) could not be injected intramuscularly because of poor local tolerance. The same drug injected intravenously led to blindness, a finding which surprised Dr Schillinger, who had never encountered this alarming complication after the recommended dose of 0.5 mg/kg body weight had been injected. In Somalia, only suramin and quinapyramine were used.

From Ethiopia, Dr Zelleke Dagnatchew communicated early results obtained with a new melarsoprol derivative in dromedaries infected experimentally with *T. evansi*, and kept housed for 90 days in order to protect them from reinfection. Doses
decreasing from 1.2 to 0.3 mg/kg body weight produced recovery without relapse (verified by inoculating blood samples into mice and examining blood smears).

Dr Schillinger formerly tested in Kenya the potassium salt of melarsoprol ("Mel W") in infected dromedaries, but a considerable swelling developed at the site of injection. Nevertheless, the experimental animals recovered after being given a rather high dosage (3.6 mg/kg).

In France, Prof. J. Périé outlined research undertaken by a biological organic chemistry group at Toulouse University on two principal projects:

- Synthesis and study of the mode of action of antimitotic substances on the trypanosome, based on the fact that this parasite undergoes very rapid division. A number of DNA-gyrase inhibitors and other antimitotic radicals, grafted onto chains of the pentamidine (Lomidine) type, were synthesized and tested on *T. equiperdum* in collaboration with Prof. T. Baltz (Bordeaux University II).

- Inhibition of the atypical glycolysis of the trypanosome has led to research on specific inhibitors by synthesizing some thirty glycerol phosphate analogues.

All these new compounds are equally capable of acting, by their trypanocidal and antimitotic properties, as regulators of male fertility, and they may also be tested as inhibitors of spermatozoal glycolysis.

This research is being carried out in coordination with the WHO and the International Organization for Chemistry in Development (IOCD), a body which supports research in chemistry in both industrialised and developing countries, particularly as part of its parasitic diseases programme.

Other research projects were also mentioned, including the assay of melarsoprol in the serum and cerebrospinal fluid of patients with sleeping sickness by Professors Hamers (7) and Baltz.

**OTHER TOPICS**

- A review of the protozoal diseases of Camelidae was presented at the 55th General Session of the OIE (8) as part of Item I of the Agenda.

- Mention was made of a paper (in Spanish) submitted by Dr C.A. Luciani of Argentina entitled "Trypanosoma species of cattle in Chaco and Formosa" (6), in advance of its publication in *Revista Argentina de Medicina Veterinaria*, Buenos Aires, which reports the detection of trypanosomes in the blood of asymptomatic carriers.

- For future meetings of the Group, Dr A. Yussuf requested that each participant should submit a typewritten text in accordance with the agenda items.

- Taking into account the importance of *T. evansi* infections throughout the world, Dr W.N. Masiga stated that the next ISCTRC/OAU/IBAR conference in 1989 would include a satellite meeting on *T. evansi* to receive information originating from the infected countries of Africa, Asia and South America, as well as from laboratories working on this trypanosome.
Annex 1

FIFTH INTERNATIONAL CONFERENCE
OF INSTITUTIONS OF TROPICAL VETERINARY MEDICINE

Kuala Lumpur, Malaysia, 18-22 August 1986

General recommendations

1.3. *Trypanosoma evansi*

(i) Among the non tse-tse transmitted trypanosomiasis, *Trypanosoma evansi* infections are important and must be considered for their economic impact in Africa and Asia.

(ii) The International Working Group on *T. evansi* infections — constituted under the sponsorship of the OIE, FAO, OAU/IBAR and in relationship with the Institutions of Tropical Veterinary Medicine — is coordinating information to assess the actual involvement of these protozoan infections in animal losses and to develop diagnostic and control methods.

Annex 2

19th MEETING OF THE INTERNATIONAL SCIENTIFIC COUNCIL FOR TRYPANOSOMIASIS RESEARCH AND CONTROL (ISCTRC)

Lome, Togo, 30 March-4 April 1986

Recommendations (concerning *T. evansi* infections)

After consultation with Dr W. Gibson it was recommended that:

1. There be exchange of strains between laboratories to be sent for identification to Dr Gibson (Bristol) and Prof. Hamers (Brussels) (the exchanged trypanosomes must first be passaged through rodents to avoid transmission of other disease agents).

2. Baseline data on camels and on *T. evansi* strains be obtained to increase our understanding of the disease.

3. CATT test be evaluated and if successful be included in the OIE Animal Health Code.

4. Reference *T. evansi* resistant strains be obtained for comparison of drug resistance between laboratories.

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REFERENCES


