

Tsetse Control by Game Destruction

By Walter N. Scott

A Review of Recent Knowledge on the Relationship between the Tsetse Fly and its Vertebrate Hosts, by P. E. Glover.
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DR GLOVER is a zoologist who has devoted the greater part of his scientific life to work on tsetse problems throughout Africa. He has been particularly concerned with the study and application of fly-control methods in Tanzania, Kenya and Uganda and his knowledge of the tsetse situation in these parts is probably unrivalled. This scholarly, well-balanced review, presented at the First International Congress of Parasitology held in Rome in 1964, and now published by the FPS for IUCN, is the work of a scientist of wide experience, and fairly presents all the known facts. It leads one to the inevitable conclusion that there is no valid justification for using game-destruction as a practical or lasting means of tsetse control.

Africa is about three times the size of Europe and one quarter of the African continent is denied to domestic stock by the presence of trypanosomiasis. The Sahara Desert stretches across Africa, from the West Coast to the Nile, to a depth of 1,000 miles astride the Tropic of Cancer. Desert conditions are unsuitable for the tsetse fly; south of the Sahara is fly country. Wild vertebrate animals provide the natural food of the tsetse fly, and at the same time they harbour in their blood disease-producing trypanosomes which in turn affect the tsetse fly and are then transmitted by the fly to man and his domestic animals or back to the wild host.

One hundred years ago written records for Africa between the Sahara and the Limpopo did not exist to any extent. All travel was on foot or by canoe. The indigenous populations were concentrated, tightly organised and in process of adapting themselves to the ecology of the areas which they occupied. Some recognised trypanosomiasis as a disease; the pastoral Bahima of Western Uganda called it "Amurasho"—a sickness of cattle associated with certain rivers and areas of thicket. The attitude of the people was conditioned not so much by the risk of sleeping sickness to themselves but more by the danger to their cattle; some could distinguish between innocuous flies and disease-transmitting flies. By the avoidance of fly-bush and a firm hierarchical tribal discipline of management, fly/cattle contacts were reduced to a minimum. Despite the presence of the tsetse flies, man

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and animals occupied wide areas of country. In 1861 Speke and Grant described the topography of parts of Uganda as a green sward, and the open nature of the grazing was maintained by fierce annual late burns organised under tribal discipline. The number of cattle and wild animals grazing the area also helped to prevent the regeneration of thicket. The disease-transmitting flies were confined to thickets along certain valleys and near rivers, unoccupied except for wild animals.

The Arrival of Rinderpest

At that time there was no word in the local language to describe rinderpest; this cattle plague was unknown. But in the 1890's a vast rinderpest epizootic swept through Africa southwards from Abyssinia, along the line of the Great Rift Valley, across the Zambesi to the Cape. It spread to the shores of the Great African Lakes and, judging by the death rate, was probably the greatest outbreak of disease in cattle and game ever to occur. The immediate effects were severe, but the after effects were even more profound and, at the time, quite incalculable. The heavy mortality in many of the wild ungulates, buffalo, kudu, eland and warthog, together with the decimation of the cattle herds, resulted in a shortage of grazing animals. The tribal pattern of the people was disrupted, late burning was abandoned and there was a tremendous regeneration of thicket in previously open country.

Nevertheless, one of the effects of the rinderpest epizootic was to reduce the numbers of important host animals available to the tsetse flies, and a contraction in the distribution of *Glossina morsitans* was noted over large tracts of country in Tanganyika, Northern Rhodesia, Nyasaland and Portuguese East Africa. Rinderpest did not, however, kill all the animals on which tsetse flies fed; enough game remained to support the fly in favourable places. The tsetse recovered and began to extend into areas which, although previously not infected, were now covered with regenerated bush suitable as fly habitat. Recurrent outbreaks of rinderpest have since taken place in various parts of Africa and there is some evidence to show that mortality in game does transiently have an effect on the distribution of the fly. Nevertheless, it became gradually apparent that the game/rinderpest/fly relationship was not a simple one, and that other factors were involved. Unfortunately, some of the earlier tsetse experts, including Sir David Bruce, Buxton and Hornby, either supported or condoned game destruction, and the method continued to attract supporters even in a more scientific age.

Game destruction was first introduced in Southern Rhodesia in 1919 as an experiment, and from 1922 onwards it was generally adopted as an effective method for dealing with tsetse advances. Between 1932 and 1948 ten thousand square miles of country were freed of fly by killing game, and it was claimed that by so doing 51,000 square miles of country were protected from tsetse invasion. Between 1950-1951, 28,489 head of wild animals, involving 23 species, were destroyed in tsetse control measures, and since 1951 many more thousands of

animals have been shot. In every area the fly numbers were apparently reduced to nil, or to a very low figure, and likewise trypanosomiasis in the local herds of cattle. Now, however, there are again build-ups of fly and a renewed incidence of trypanosomiasis in many of these cleared areas. As in the case of rinderpest, not all the wild animals were killed; enough remained to support the fly in favourable places.

In Uganda game-destruction as a means of tsetse control was started in 1945. Widespread operations were carried out in various parts of the country and a highly organised corps of hunters established. In one hunting area of 4,500 square miles a total of 30,000 animals was destroyed, giving a mean kill of six animals per square mile. Successful as these operations seemed at the time, reinvasion took place in some of the areas concerned. In his 1960/61 Report, A. G. Robertson, Director of the Tsetse Control in Uganda—now in Southern Rhodesia—justified his game-destruction policy as having halted the spread of tsetse fly in parts of the Ankole district in Western Uganda. The following year his successor, J. B. Bernacca, reported that although progress had been made “it had proved to be less easily accomplished than had been hoped and surprises had occurred”. In a later report Bernacca recorded the entire elimination of buffalo, waterbuck, eland, warthog and oribi from the same area, but questioned the need for shooting all these species. The fly problem is now being tackled with insecticides.

In 1914 Sir David Bruce is quoted as saying: “It is self-evident that wild animals should not be allowed to live in ‘fly country’ where they constitute a standing danger to the inhabitants and domestic animals. Not only should all game laws restricting their destruction in ‘fly country’ be removed, but active measures should be taken for their early and complete blotting out”. There is little doubt that Bruce’s arrogant attitude was largely responsible for much of the subsequent wanton destruction.

Against this bloody background Dr. Glover sums up the evidence both for and against game-destruction as a practical method of tsetse control.

Advantages

1. Game-destruction is a quick method of reducing tsetse populations, particularly *G. morsitans*, but only in the early stages, becoming more and more indecisive later on.
2. Compared with bush-clearing and the application of insecticides, it is easy to carry out. Nevertheless, extensive and highly organised shooting teams are required.
3. It is cheaper than any other known method, especially in the early stages. This would appear to be so according to the findings in Southern Rhodesia and Uganda, but Clarke, in Northern Rhodesia, said: “Game elimination, if it is to be successful, is a lengthy process extending over many years, and, apart from the repugnance which must be felt at the thought of the destruction of indigenous fauna, the costs are likely to be high, so that all efforts should be made to ensure that the most effective use is made of this method”.

4. Applied in conjunction with insecticides and bush-clearing, even quicker and more decisive results may be expected, but because of the very nature of such combined operations there is no means of assessing to what extent game-destruction has contributed to their success or otherwise.

5. The results of game-destruction may be particularly quick and effective in areas where the fly is near the limit of its range if the controlling factors are climatic, e.g. rainfall, latitude or altitude. These may have contributed to the initial spectacular successes in Southern Rhodesia and Uganda. But even so, no completely decisive results have so far been recorded from these countries or even the Sudan, where game-destruction was carried out in conjunction with the use of insecticides.

Disadvantages

1. Game-destruction has only been shewn to be effective against *G. morsitans* and *G. swynnertoni* in one scientifically conducted experiment. Since Potts and Jackson's work was done, no one else has attempted to exterminate *G. swynnertoni* by game destruction, and from the results of Weitz's serological tests it would seem unlikely to be successful again, particularly on a large scale. *G. morsitans* can adapt itself to feeding on cattle, other domestic stock and even man. Pilson and Harley found that 52 out of 98 engorged *G. morsitans* collected from the game eradication area in Ankole had fed on cattle, so that under conditions obtaining there, *G. morsitans* might be able to maintain itself on cattle alone.

2. Lovemore, in Southern Rhodesia, and Bernacca, in Uganda, have both shewn that it is impossible to exterminate many of the smaller ungulates, e.g. the Suidae (in S. Rhodesia), bushbuck, reedbuck and duiker, yet some of these animals, notably warthog and bushpig, are the favoured hosts of most tsetse flies, even *G. morsitans*.

3. After the initial spectacular reduction in fly which usually occurs with game-destruction, the rate of reclamation decreases in spite of more intensive shooting and some animals may even continue to flourish as Lovemore and Bernacca have shown.

4. Most game destruction operations are carried out over large tracts of country, therefore unless the areas concerned are flanked on all sides by open fly-free country or dense settlement, there is always a danger of re-infestation.

5. If it is the intention to follow up tsetse eradication with proper methods of land use, such as close settlement and intensive cultivation, what is the point in destroying the game by shooting, as both the game and the tsetse will be eradicated automatically by the settlement?

6. No effective method of assessing very low tsetse populations has yet been devised. It is therefore not safe to claim complete eradication in any particular area until no flies and no cases of trypanosomiasis have occurred for at least five years. The importance of this fact has been shewn clearly in Kenya where small numbers of *G. fuscipes* on the Kuja and Nyando rivers were suddenly found in areas which had been thought to be free of fly after the use of insecticides and where constant fly patrols had been carried out for nearly five years.

Apart from the six disadvantages listed above, there are other factors not purely materialistic to be taken into account:—

1. "The scientific case for the preservation of wildlife in Africa for the direct benefit of humanity is very strong; also the provision of meat, the conservation of vegetation and thereby the vital soil. If we add the aesthetic, recreational and educational value of wildlife and even its economic value as a tourist attraction, is not our case overwhelming? We ask for a reconsideration everywhere of the policy of slaughter so that wildlife, for its own sake and for the sake of humanity, may remain alive in the environment to which it is so beautifully adapted" (Pearsall, Oryx

1959). Surely the living beauty of nature itself is worthy of conservation as well as intelligent utilisation.

2. Professor Pearsall (1959), in discussing game protection as a form of land use, indicated that there are two facets to the problem. The first is that we are unlikely to find domestic breeds of animal which are so well attuned to their habitat as wild animals. Therefore, game is a valuable protein reservoir. The second is that herding, overgrazing and the constant use of fire by pastoralists (and primitive mixed farmers) degrade the vegetation from types selected naturally for high protein production to fire-resistant unpalatable species.

Professor Pearsall concludes by making a plea for the detailed study of the natural ecological systems "in their entirety before they have been wholly destroyed in favour of alleged improvements".

Unfortunately in Kenya in almost no instance where land has been reclaimed from tsetse, has there been a follow-up of proper land use because so far no agriculturist or administrator has been strong enough to enforce it or instil into the minds of primitive people the discipline of correct land usage after tsetse clearance.

3. As has been shewn, a great deal of information is now available about the use of insecticides, bush-control and other methods of tsetse reclamation which have been used at low cost in East, West and Central Africa.

It is clear therefore that the five apparent advantages in favour of game destruction are far outweighed by the six disadvantages and three other considerations.

This highly adaptive insect, the tsetse fly, has probably been more extensively studied than any other insect species. Vast sums of money have been spent in support of scientific research, and gifted scientists have recorded their findings and expressed their views. Yet in spite of the facts which have been so clearly established, large-scale tsetse operations started last year in Rhodesia, one of a combination of methods employed being "game destruction".

Dr. Glover expresses the hope that the interests of politics will not continue to influence the progress of science to the point of no return. In spite of the fact that a quarter of the African continent is denied to domestic stock by the presence of trypanosomiasis, man and his animals continue to multiply unchecked. Overpopulation, not tsetse flies, may be the greatest problem facing "emergent" Africa today.

Grasshoppers, Crickets and Cockroaches of the British Isles, by **David R. Ragge.** Warne. 42s.

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