

استجابة الماشية للأدوية المستعملة في علاج الديدان الكبدية العظيمة

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ملخص

أستخدم عقار الهكساكلورفين والأوكسى سلوزانيد في علاج ماشية مصابة بالديدان الكبدية العظيمة حيث وجد للعقار تأثير فعال عند استعماله مرتين في العام وقد زاد وزن الحيوانات التي تخلصت من الديدان وفي مجموعة أخرى من الحيوانات عولجت بهذين العقارين وعقار آخر هو النيترو كلورفين ثلاث مرات سنويا زاد الوزن عن التجربة الأولى زيادة ملحوظة . وعند ذبح الحيوانات المعالجة لم يلاحظ أى نوع من التليف الكبدى .

THE RESPONSE TO CHEMOTHERAPY OF CATTLE (*BOS INDICUS*) NATURALLY INFECTED WITH *FASCIOLA GIGANTICA*

(With 3 figures and 3 tables)

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SUMMARY

The work reported in this paper is the result of a field study on the response to chemotherapy of cattle naturally infected with *Fasciola gigantica* in Uganda. The selected cattle regained more weight 30 weeks after treatment. On slaughter their livers were found to be free of fibrosis and flukes, and therefore were passed as fit for human consumption.

It was established that if cattle suffering from fascioliasis were treated once a year, they gained more weight but the weight gained was not statistically significant. It was shown that if cattle were treated twice a year their weight gain was statistically significant over the untreated control, and they gained even more weight if treated three times a year. In the once a year treatment groups, Hexachlorophene treated group produced the highest weight gains and Oxyclozanide treated group showed the least gain. In twice a year treatment groups, Oxyclozanide treated group was the best while Rafoxanide treated group had the least gain. In three times a year treatment groups, Nitroxylnil treated group was the best followed closely by Hexachlorophene treated group. On the whole however, all the drug groups produced highest weight gains when used three times a year.

Fluke burden in the cattle used for the drug trial was slight and infection chronic. There were no obvious pathological lesions on the carcasses of infected animals which could be attributed to fascioliasis alone. By visual inspection and with scoring system it was shown that treated cattle had better carcasses than the untreated infected cattle.

INTRODUCTION

The clinical effects of fascioliasis in cattle such as unthriftiness, weight loss, anaemia and hypoproteinaemia are usually observed on the affected animal when parasitism is very severe (SEWELL, 1966 ; ROSS, 1966 ; BORAY, 1967 ; BITAKARAMIRE and BWANGAMOI, 1969). The more obvious finding

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is the hepatic fibrosis with or without calcification which are usually seen at meat inspection. The economic significance of this disease in our meat industry has largely been attributed to the affected liver condemnation in abattoirs, thus rendering the organ unsuitable for human consumption. Fascioliasis is widespread in Uganda as indicated by the results of an abattoir survey conducted by OGAMBO-ONGOMA, (1927) who estimated cattle liver condemnation because of fascioliasis to be 53.74%.

At present practical means of control of fascioliasis in Uganda is by the use of chemotherapy. The use of molluscicides to kill the snail intermediate host of *Fasciola gigantica* is considered impracticable in view of extensive swamps which adjoin endemic farms and big stream and rivers from which animals obtain their drinking water (COYLE, 1959). Drugs in current use against fascioliasis in Uganda are administered to cattle anytime the farmer becomes suspicious of his animals having "Fluke". He does not put into consideration the biological life cycle of the parasite, climatic factors of the farm or whether in fact the animals are suffering from fascioliasis or some other disease.

The purpose of this paper therefore is to report on findings of the work carried out to determine the necessary frequency of treating cattle against fascioliasis under field conditions in Uganda using Hexachlorophene, (Fascol, Cooper), Oxytocyanide (Zanil, I.C.I.), Rafoanide (Flukanide M.S.D.) and Nitroynil ("Trodux", M and B).

MATERIALS AND METHODS

The anthelmintic trial as conducted on a ranch situated close to a swampy area in the Kafu River basin of Uganda as shown in figure I, a + b. The vegetation was characterised by broadleaf deciduous trees scattered in tall grass-high bush thickets. The area has a mean annual rainfall average of 1400 mm. The temperatures are generally high, 25°C — 30°C. The ranch is approximately 33.330 hectares and has a cattle population of 9,000 head. A total of 276 boran steers, 8, 12 months old, naturally infected with *Fasciola* species, were randomly selected from their herds on the ranch and numbered with ear-tags. The steers were then divided into four groups of 69 head to be treated with one of the four drugs in current use in the country as shown in table 1. Each group was later subdivided into 23 animals and each subgroup treated with the selected fasciolicide either once, twice or three times a year. All the animals in the drug trial were weighed and faecal sampled every three

months throughout the drug trial commencing three months before the start of the trial. Faecal samples were examined for the presence of *Fasciola* eggs and gastro-intestinal nematodes. At weighing time each steer was treated with Nilverm (I.C.I) at the dose rate of 7.5 mg per Kg. body weight of the animal to eliminate gastro-intestinal nematodes and lungworms which might have an influence on the animals' weight gain after treatment with the fasciolicide. A groupe of 23 male boran steers infected with *Fasciola* species were also selected from the ranch cattle and regularly treated with Nilverm to eliminate gastro-intestinal nematodes but not treated with a fasciolicide. These animals acted as the control group for the weight gain by those treated against *Fasciola*. Another group of 60 male boran steers also naturally infected with *Fasciola* was selected from the ranch, regularly treated with Nilverm and used as controls for *Fasciola* reinfections of the steers remaining exposed after treatment with the fasciolicide at different frequencies. These were divided into three groups of 20 animals for each of the treatment frequency regimes.

DRUGS

The drugs used at the standard doses (BERGER, J. 1971) were : Levomisole hydrochloride⁺ — Nilverm['] (I.C.I) subcutaneously at 7.5 mg/kg of body weight for controlling gastro-intestinal nematodes and lungworms ; Oxyclozamide⁺ — 'Zanil' (I.C.I.) orally 10 mg per kg of body weight ; Rafoxanide⁺⁺ — Flukanide['] (Merck, Sharp & Dohme Ltd.) orally at 7.5 mg perkg of body weight ; Hexachorophene⁺⁺⁺ — 'Fascol' (Cooper, McDougall & Robertson Ltd.) orally at 15 mg per kg of body weight ; and Nitroxynil⁺⁺⁺ — 'Trodax' (May & Baker Ltd.) subcutaneously at 10 mg per kg of body weight.

- + = 1 — 2,3,5,6-tetrahydro-6-phenyl-imidazo (2,1-6) thiazole (This is a laevo-isomer of tetramisole)
- + = 3,3' — 55' -6-pentachloro-Z, 2' dihydroxy-benzanilide
- ++ = 3,5' — diiodo- 3'-chlore-4' (P-chlorophenoxy)-salicylanilide
- +++ = (bis (2-hydéoxy-3,5,6-Trichlorophenyl) methane)
- ++ = (4-cyano-2-iodo-6-nitrophenol)

At the end of the trial all the animals were slaughtered and the carcasses examined for general development. The formation of adipose tissue over the muscles was taken to indicate the quality of the carcass (Hankins, Gaddis

and Sulzbacher, 1963). The body of the carcass covered by a thick layer of fat (including gluteal region, back part, neck etc.) was scored under very good.

A good layer of fat over gluteal region and body except the neck was scored under good. The moderate layer of fat over the body was scored under fair. Any carcass poorly developed with generally scanty and poor fat layer was scored under poor. All the control animals and 192 carcasses of the treated animal were examined and assessed as described above. Visual examinations for pathological lesions in organs and number of *Fasciola* present in the livers were made.

RESULTS

The results of the study show that treated cattle gained more liveweight than the untreated control cattle. Although the gains varied with frequency of treatment, they were not immediate on treatment. As shown in Figure 2 (OKAO, 1974), during the first 12 weeks, all the cattle lost weight. The weight losses ranged from 10 kg. to 162 kg. There was only one group (Hexachlorophene Group for 3x year treatment) which gained 130 kg. over the 12 weeks. In the animals treated 1 × year and 2 × year, their weight gains were not substantially different from those of the control cattle for the first 30 weeks (Figure 2 B and C); whereas the cattle in the groups treated 3 × year (Figure 2A) gained more than the control cattle as early as about 15 weeks following initial-treatments. The subsequent weight gains including the dramatic one between weeks 12 and 20 (Figure 2) occurred, because, apart from being growing cattle, they were treated against parasites, i.e. gastrointestinal nematodes and *Fasciola*.

DISCUSSION

Fasciolicides at standard doses as tried by other workers do kill *F. gigantica* parasites (mature ones lying within the bile ducts) only. They, as such, do not increase weight of cattle; but it is probable that the animal once freed of its parasite burden gained weight more than those not so treated. What actually is happening within the body system of the animals to produce the weight gain apparently is not clearly known. It may be that once the parasites are removed, the food conversion efficiency of the livers improved resulting in weight gain. CAWDERY and CONWAY, (1971) showed that the food conversion efficiency plays a part in the live weight gain of *Fasciola hepatica* infected cattle.

The amount of the live weight gain may depend on many factors e.g. the breed, sex and the nutritional status of the animal. However, among the factors influencing the amount of live weight gain is probably the efficiency of removal of parasites from the liver and how efficiently re-infection with fresh parasites has been controlled or as pointed out by BORAY, (1967 b) the effectiveness of the resistant status of the host. The last factor would be significant in field challenge infections. I may follow that if breed, sex, nutrition and age are harmonized (as was done in this work) amount of weight gain must depend to a very large degree on the efficiency of the chemotherapeutic agent. In this work three times a year treatment gave the highest gains. It is probably more efficient to treat 3 times a year in the condition of Kiryana Ranch, Uganda.

No critical tests for the anthelmintics have been attempted. This was not possible as the experiment was based on natural infection. The dosage of metacercariae of *F. gigantica* which infected the animals was not known. However, examining the weight gains of cattle in various treatment groups, assessment of performance of individual drug group was made. In the once a year treatment groups, Hexachlorophene treated group produced the highest weight gains and Oxyclozanide treated group showed the least gain. In twice a year treatment groups Oxyclozanide treated group was the best while Rafoxanide treated group had the least gain. In three times a year treatment groups, Nitroxynil treated group was the best followed closely by Hexachlorophene treated group. On the whole however, all the drug groups produced highest weight gains when used three times a year (Figure 2).

The carcass weights of treated cattle were more than those of the untreated infected control cattle. The mean dressed carcass weights at the end of 45 weeks are shown in Table 3. GONCHAR, (1959) compared the meat output from 200 cattle infected with *Fasciola* and 60 healthy cattle. He expressed results as the percentage of meat to live weight. He found that these percentages were smaller by 3.6% in case of infected cattle. He noted that the difference varied with the degree of fatness. The animals in the present experiment were immature and the degree of fatness was low; but the little fat that was there was used of help scoring of the quality.

Hence treated cattle were 66.2% "very good" in appearance; whereas the untreated infected control carcasses were only 42.8%. The treatment of infected cattle must have contributed to producing carcasses of better quality.

In this study, the hyperplasia of the bile ducts took place between the age of 18 months and adulthood. Treatment given when the infected animals are between 12 to 18 months will save bile ducts from serious hyperplasia as will be shown in the next series of publications.

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- (3) May and Baker Ltd.
- (4) Cooper, McDougall & Robertson Ltd.

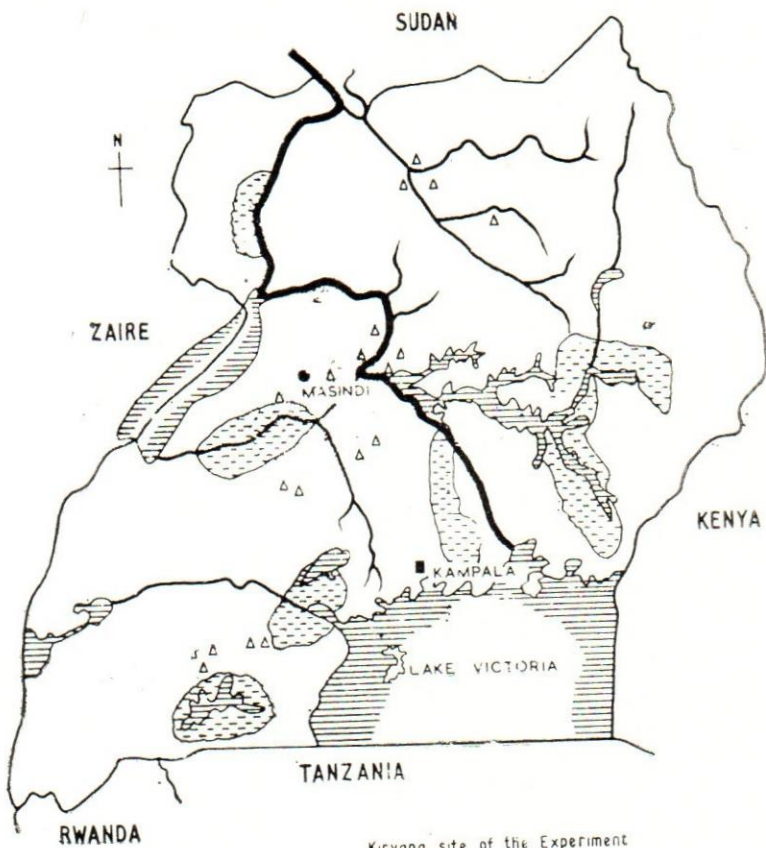
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- Kinyara site of the Experiment
- Δ Ranch Establishments
- ▨ Swampy Shores

Fig. 1. (a)

KIRYANA RANCH

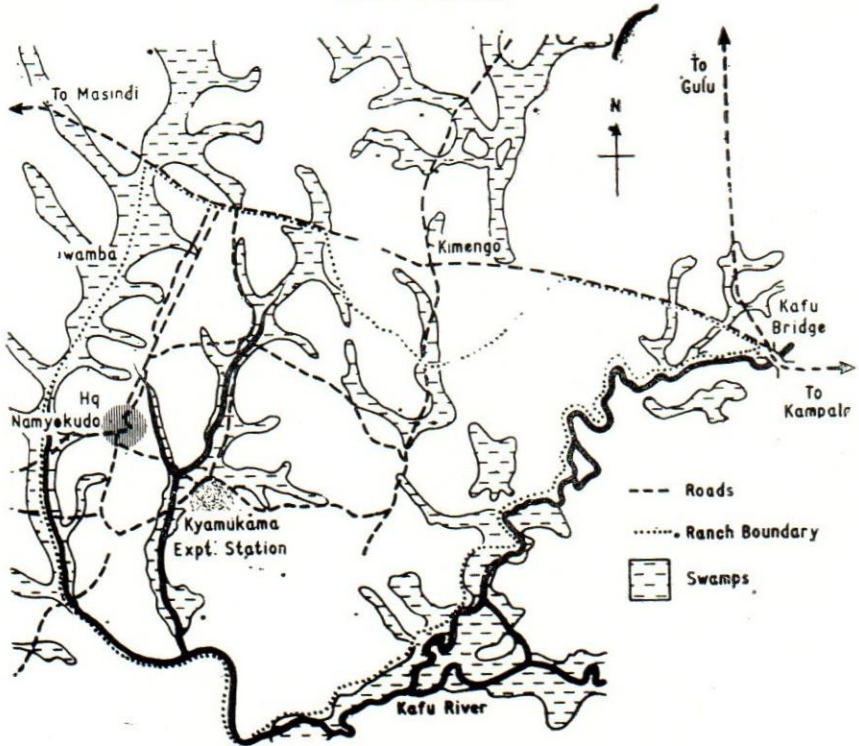


Fig. 1. (b)