

Hexachloroethane Treatment of Liver Fluke in Oregon Cattle

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INTRODUCTION

SINCE the reports of experiments by Alicata (1) and Olsen (2) there has been some agitation to treat cattle for the common liver fluke (*Fasciola hepatica*). In spite of the fact that a large percentage of Oregon cattle are infested with this parasite, it is rarely that one sees animals showing clinical symptoms. The cattlemen usually become concerned only when their animals are docked the customary \$2.50 per head for livers condemned for fluke lesions.

Sheep livers from treated animals continue to show scars throughout life but it was thought that possible successful treatment of cattle livers with hexachloroethane might not only destroy parasites but might permit livers enough resumption toward normal to enable them to pass inspection. It was with this in mind that the following experiment was carried out.

METHODS

So-called dairy steers, being the progeny of dairy cows and beef bulls, were obtained from a neighboring pasture where in 15 years time the renter, a local butcher, stated he had never seen an animal with a good liver. These steers in poor condition (see photograph) were ascertained by fecal examination, as described by Alicata (1), to have, or have had, flukes in the liver recently. After getting the steers started on feed they were weighed and two of nearly comparable weights were dosed with the hexachloroethane bentonite mixture recommended by Olsen (2). Each was given 10 gms. per 100 pounds of body weight. The steers were then kept in a corral with shelter and fed all the good grain hay they would clean up in addition to $4\frac{1}{2}$ to $8\frac{1}{2}$ pounds of ground barley each day. The steers became fairly gentle so that they could be put in stanchions during feeding. The two steers were dosed on April 20, 1944.

RESULTS

On April 21 both animals failed to eat and were scouring but on the next day were eating and manure appeared normal. The following shows the results of three fecal examinations on treated steers.

	5/5	6/8	7/13
Steer 1	+	—	—
Steer 2	—	+	+

All the steers began looking better, especially the largest one treated.

* *Acknowledgment*: All photographs used in this bulletin were made by Dr. O. H. Muth and Dr. D. R. Morrill, Department of Veterinary Medicine, Oregon Agricultural Experiment Station.

The following is a comparison of weights taken at the beginning of the experiment and on the day of slaughter.

Steer	Weight beginning of experiment <i>Pounds</i>	Weight day of slaughter <i>Pounds</i>	Rate of gain per day <i>Pounds</i>
Untreated	704	965	2.34
Untreated	774	975	1.94
Treated	746	1,010	2.35
Treated	809	1,070	2.53

The figures show an average of more than 2 pounds gain daily, which is a very good gain in these feeder cattle. The livers of two steers killed August 2, 1944 revealed some interesting facts. The liver of the treated steer weighed 15 pounds, that of the untreated, 16 pounds. Both livers appeared as typical fluke infested livers. Fifty mature flukes were recovered from the liver of the untreated steer but no flukes could be found in the liver from the treated steer, although a few fluke eggs were found in the gall bladder. In both instances, calcareous incrustations were extensive in the bile ducts but those in the liver of the untreated steer were more so than in the liver of the treated steer. By trimming away 2 pounds of main bile ducts, the rest of this liver appeared good enough to pass the meat inspection rules and regulations.

The livers of the other two steers killed August 11, weighed within $\frac{1}{2}$ pound of each other and both appeared typical of fluke infested livers. The treated steer had 24 flukes in its liver and the untreated steer had only 4. Calcareous incrustations were more extensive in the liver of the untreated steer and only 4 pounds could be salvaged as against 8 $\frac{1}{2}$ pounds in the treated steer.

DISCUSSION

It is realized that the number of steers used in this trial was not large enough to draw very definite conclusions, and for that reason this is considered a preliminary report. Further trials will be made, using a greater number of animals.

The treatment did not prove efficient judging from the number of parasites found on slaughter and the fluke eggs found in feces. The presence of fluke eggs in the gall bladder of the treated animal 4 months after treatment indicates the possibility of eggs being passed more or less constantly with the feces. The number of parasites found was not large but apparently the amount of pathology produced does not depend on the number of parasites present. The bovine liver seems to have remarkable power to perform its functions as long as the parenchyma (3) remains undamaged. This power, no doubt, accounts for the lack of symptoms shown by these animals, although fairly heavily infested.

Experimentally infested animals (3) with many more parasites in the liver also failed to develop symptoms under similar conditions. The carcasses of the steers were graded by a government grader and all were graded commercial. This could be accounted for by the breeding since all animals had dairy blood in them.

The gains made during the feeding period were considered excellent, especially for that type of steer and the quality of hay fed.

The possibility of salvage of liver tissue fit for human consumption seemed very apparent in this small trial. It would seem entirely practical in animals going on feed 3 or 4 months before slaughter, such as steers coming off fluke-

infested pastures, to feed lots where the possibility of reinfestation can be eliminated.

According to Edelmann, Mohler, and Eichhorn in their book, *Meat Hygiene*, "The judgment of distomatosis depends on the number of flukes and the probable changes in the liver. If the latter are absent, or restricted to the large bile ducts and the distomes are confined to these, they may be entirely removed by careful dissection of the bile ducts and the remaining tissue of the liver utilized. If, however, the flukes are also present in the smaller bile passages, or if severe indurative or suppurative processes are present, the whole organ is confiscated and destroyed.

"Such disposition could not be considered under prevailing conditions in the packing-house industry of the United States, and according to B.A.I. Order 211, Regulation 11, Section 18, Paragraph 5 if the liver shows an infestation with flukes it should be condemned."

Livers of treated animals might not come under this rule and with trimming, their livers could be salvaged. It would seem that this would be entirely up to the packers.

CONCLUSIONS

Treatment of cattle with hexachloroethane did not prove successful in destroying liver fluke in one of two steers treated.

Livers of treated animals were found in better condition for salvage than untreated livers.

Untreated infested animals made practically the same gains as treated infested animals.

Fluke eggs were present in gall bladder of treated animal as long as 4 months after treatment.

Efficacy of treatment could not be determined by egg counts.

Calcareous incrustations were not entirely absorbed in treated animals.

REFERENCES

1. Studies on Control of the Liver Fluke of Cattle in the Hawaiian Islands. Joseph E. Alicata. *American Journal of Veterinary Research* 2(3): 152-164. April, 1941.
2. Preliminary Observations on Hexachloroethane for Controlling the Common Liver Fluke *Fasciola hepatica* in Cattle. D. Wilford Olsen. *Journal of American Veterinary Medical Association* 102 (795): 433-436. June, 1943.
3. Studies of Pathology in Cattle Produced by Liver Fluke (*Fasciola hepatica*). Don R. Morrill and J. N. Shaw. *Oregon Agricultural Experiment Station Bulletin* 408. June, 1942.

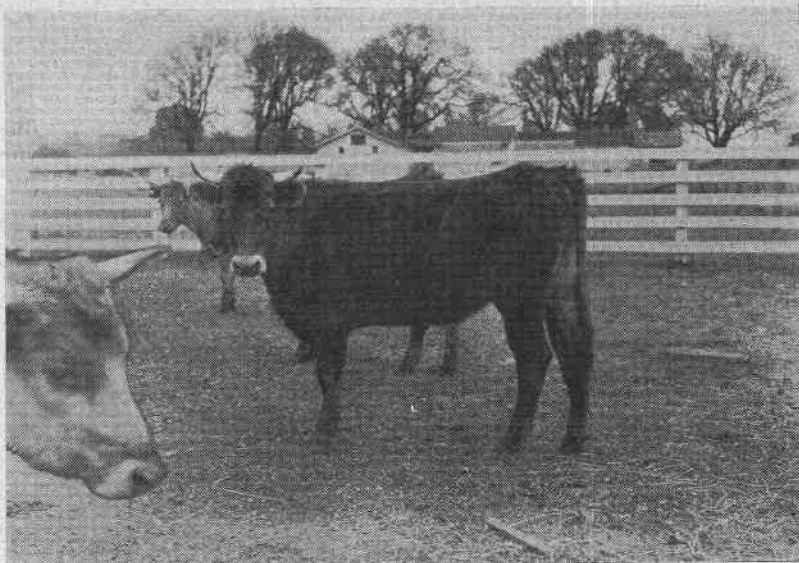


Figure 1. Treated steer. Weight 809 pounds at start of feeding period.

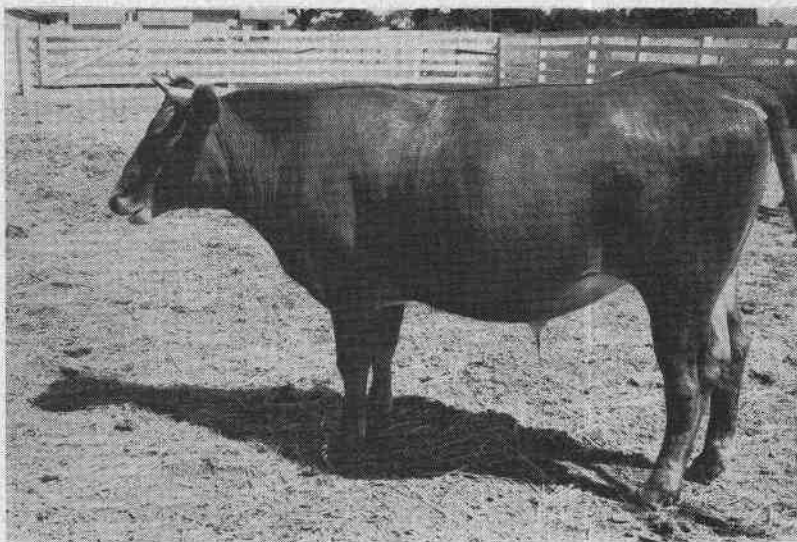


Figure 2. Treated steer. Weight 1,070 pounds the week before slaughter.



Figure 3. Untreated steer. Weight 774 pounds at start of feeding period.

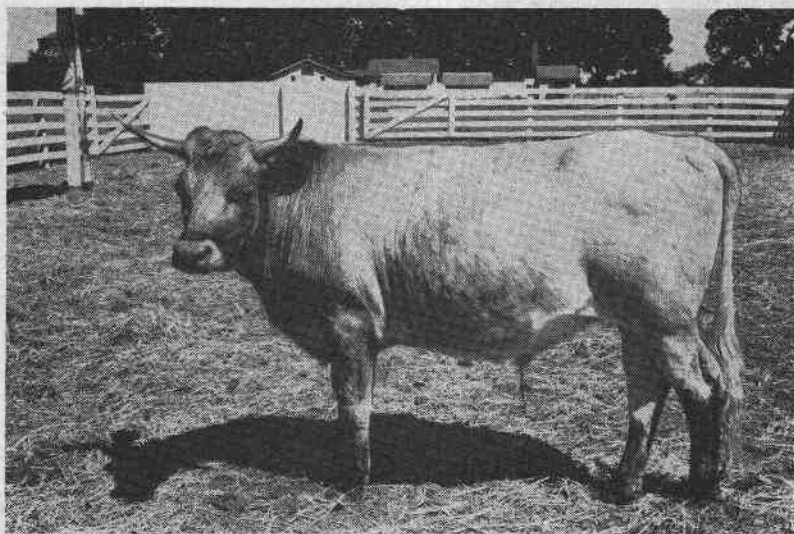


Figure 4. Untreated steer. Weight 975 pounds a week before slaughter.

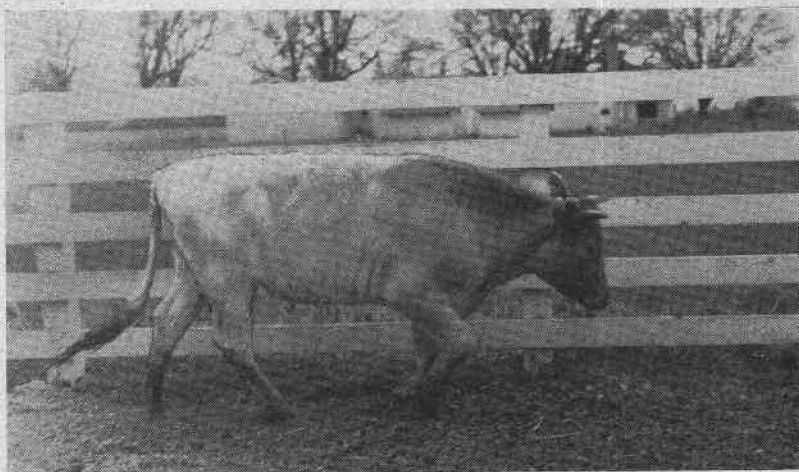


Figure 5. Treated steer. Weight 746 pounds at start of feeding period.

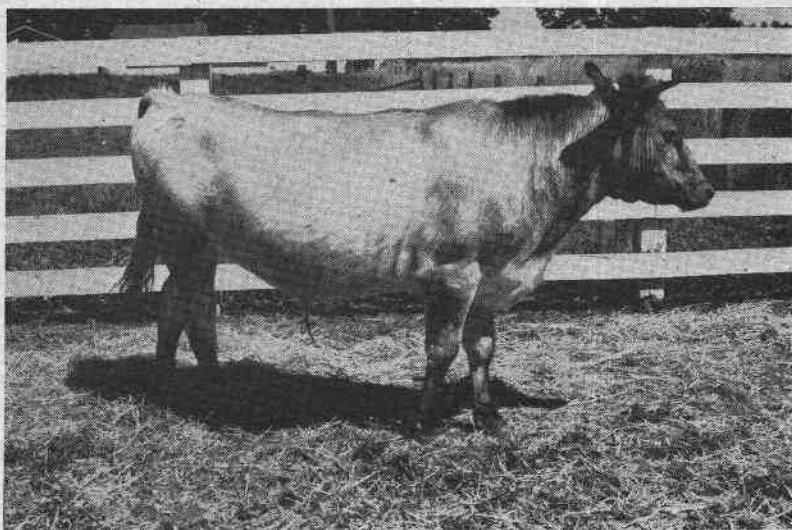


Figure 6. Treated steer. Taken two weeks before slaughter. Weight at slaughter 1,010 pounds.

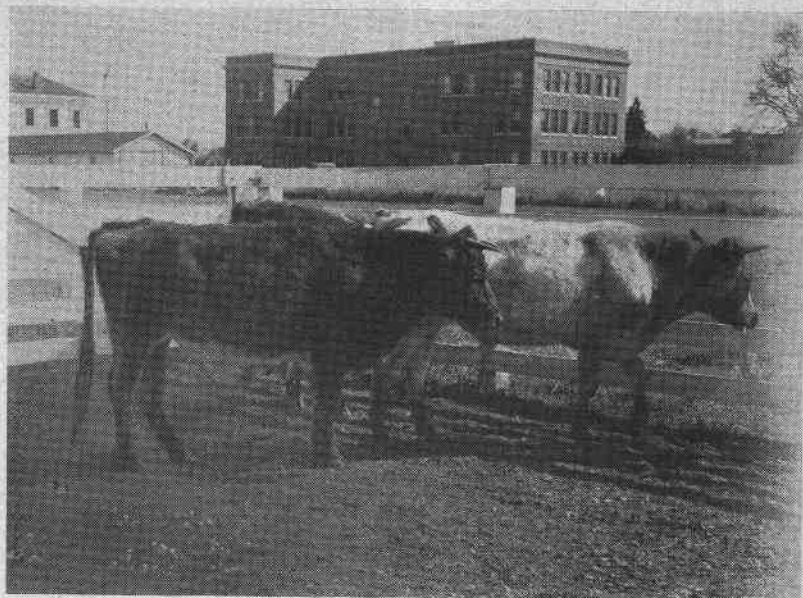


Figure 7. Untreated steer. Weight 704 pounds at start of feeding period.

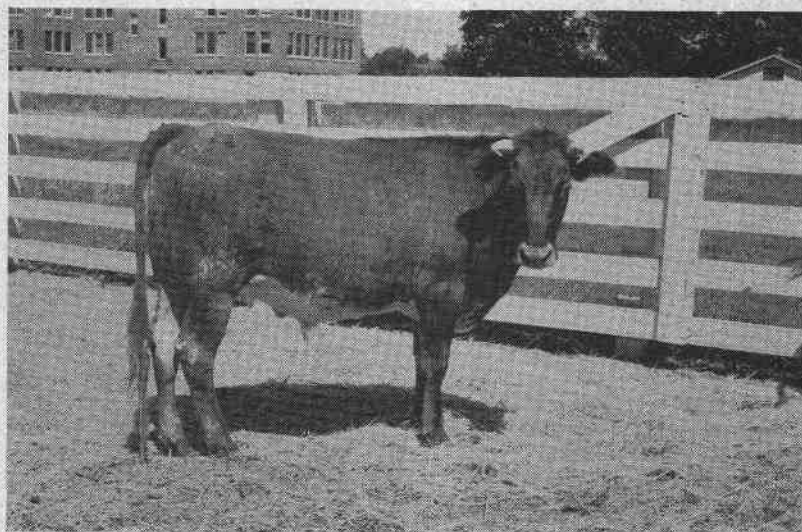


Figure 8. Untreated steer. Taken two weeks before slaughter. Weight at slaughter 965 pounds.

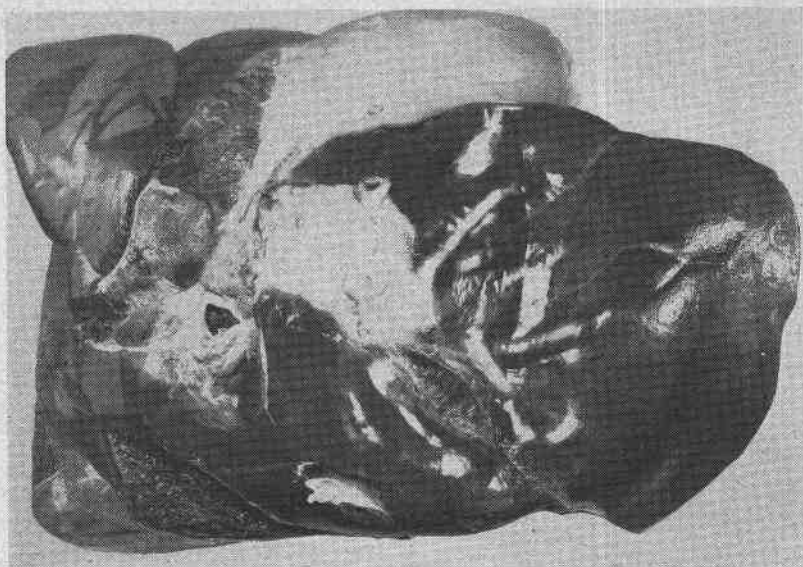


Figure 9. Liver from treated steer. No flukes, a few eggs in gall bladder. Calcareous incrustations easily removed with salvage of 13 pounds possible.

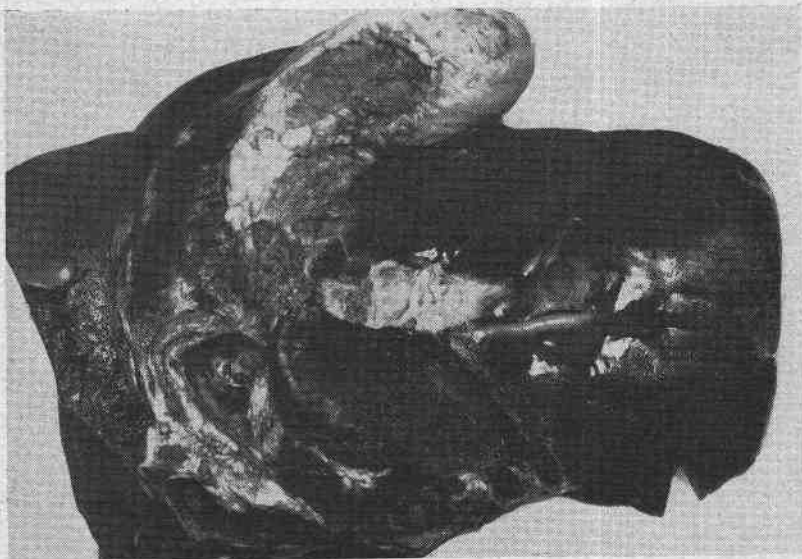


Figure 10. Liver from untreated steer. Fifty flukes. No salvage possible.



Figure 11. Liver from treated steer. Twenty-four flukes. Calcareous incrustation removed with salvage of $8\frac{1}{2}$ pounds possible.

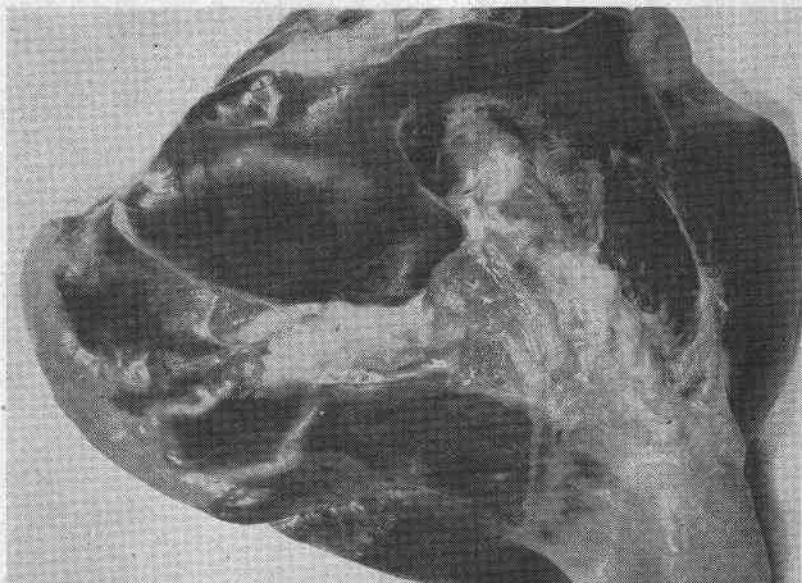


Figure 12. Liver from untreated steer. Four flukes. Calcareous incrustations removed with salvage of 4 pounds possible.