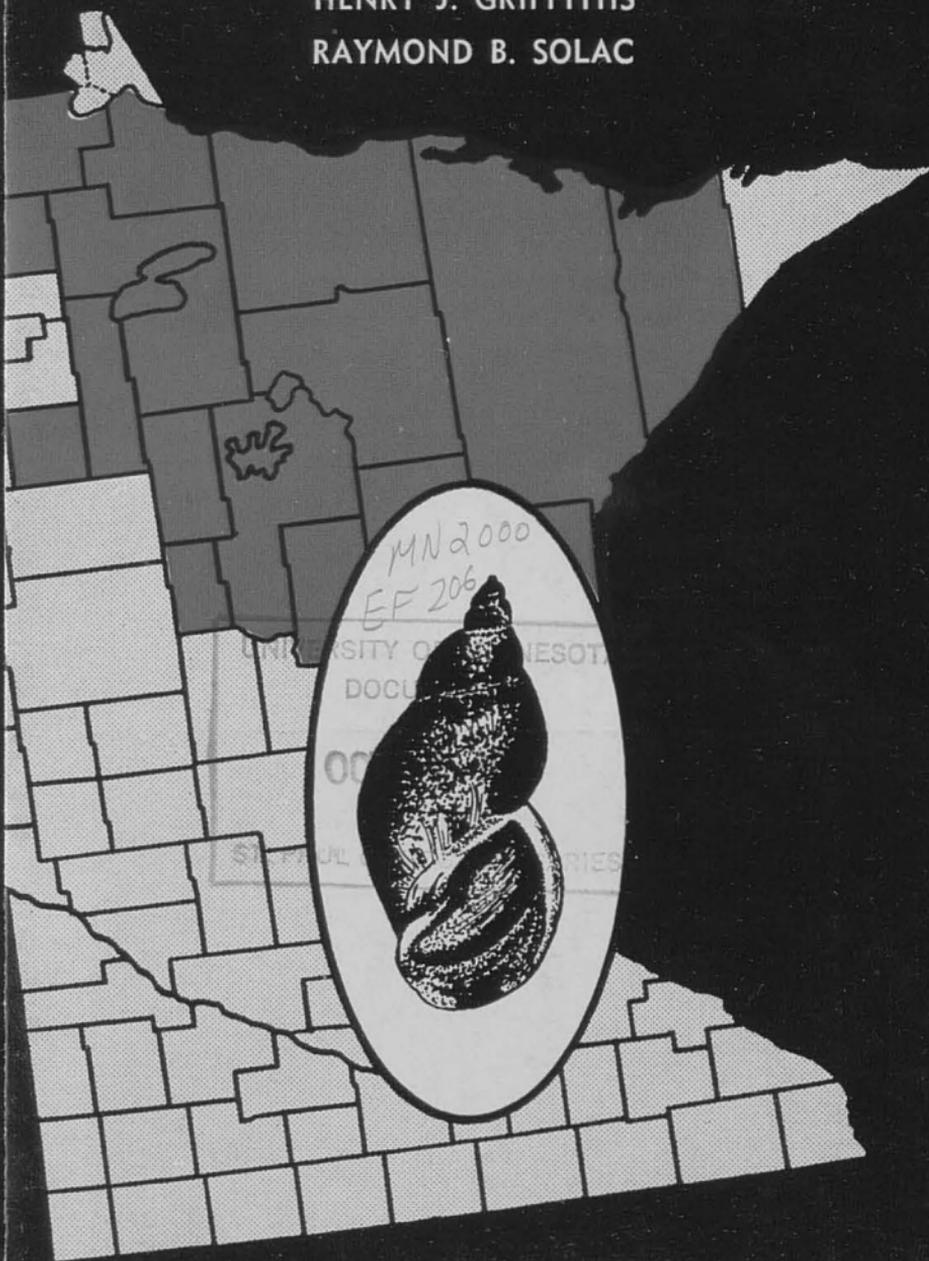


LIVER FLUKE

IN MINNESOTA

HENRY J. GRIFFITHS

RAYMOND B. SOLAC



Throughout northern Minnesota, fluke disease in cattle, sheep, and deer is caused by the large American liver fluke.¹ The common liver fluke² is not native to this state but is prevalent in the Gulf Coast, Rocky Mountain, and Pacific Coast areas of the United States.

Insofar as is known, the large American liver fluke seldom causes death in cattle and deer in Minnesota. However, severe death loss may occur among sheep. Considerable loss of bovine livers is seen in native cattle due to liver condemnation at time of slaughter. It is thought by many that cattle infected with the large American liver fluke do not finish as well or produce as good quality meat as fluke-free stock.

THE LIVER FLUKE

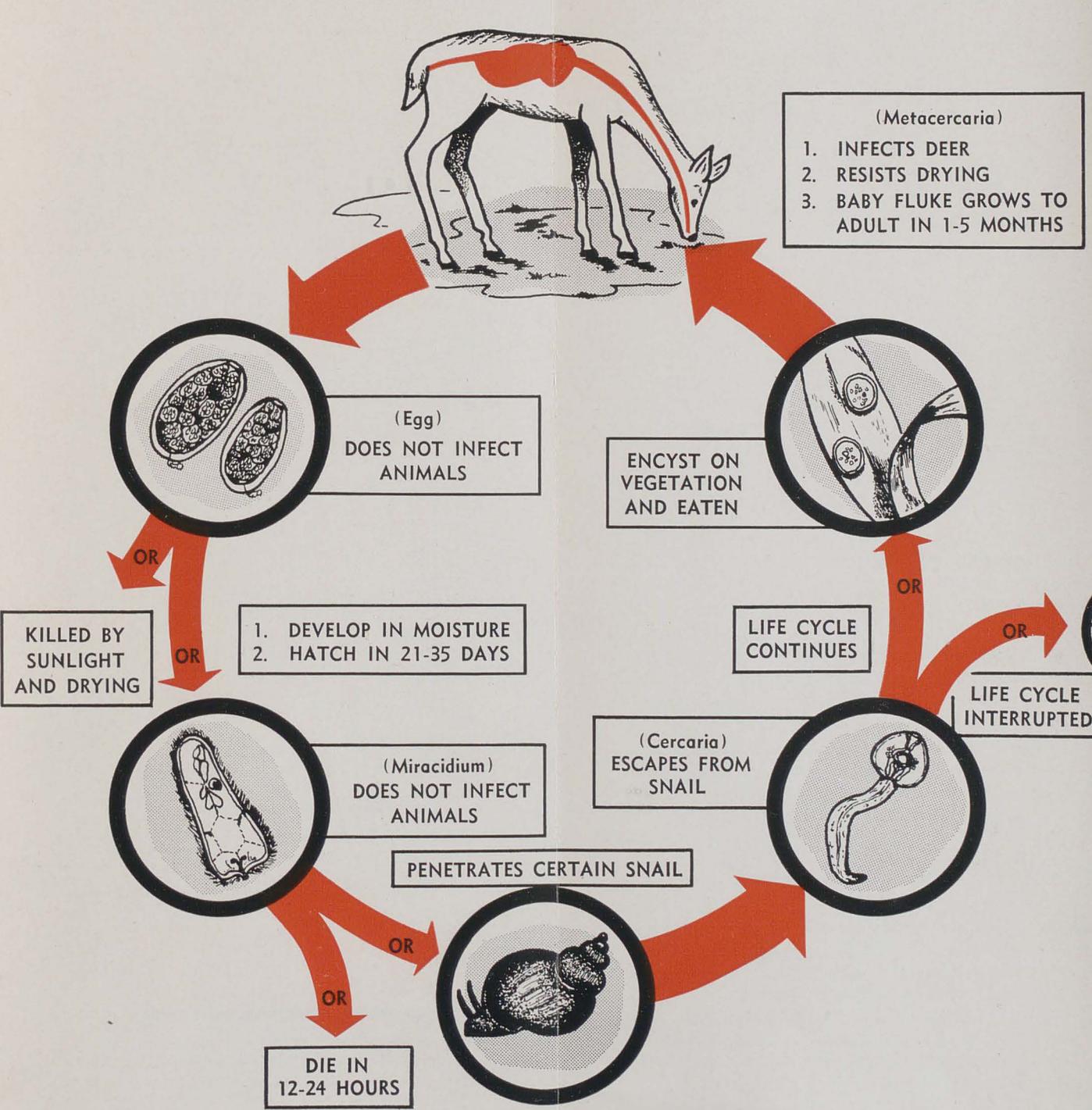
The large American liver fluke is found in the actual liver tissue. The adult parasite has also been seen in the lung tissue of cattle. The common liver fluke, however, lives in the bile ducts. Hunters often see these parasites¹ in deer and refer to them as "blood suckers" or "liver leeches." The adult worms are large, thick, leaf-like, and vary from a flesh color to the color of the liver itself. They range from 1 to 3 inches in length by 1 to 1½ inches in width. They lay large numbers of eggs which are microscopic in size and golden brown in color.

¹ *Fascioloides magna*.

² *Fasciola hepatica*.

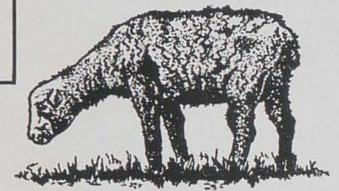


Fig. 1. Large American liver fluke.



LIFE CYCLE OF A LIVER FLUKE

- (Metacercaria)
1. INFECTS ANIMALS
 2. RESISTS DRYING
 3. MATURES IN LIVER IN 3 MONTHS
 4. FEW IF ANY EGGS PASSED



LIFE CYCLE OF THE FLUKE

After fluke eggs are laid, they are passed from the liver of the natural host through the bile ducts to the intestines and then passed out with the droppings. Those eggs which reach water or damp ground will complete their development. Under suitable moisture conditions, the eggs will develop and hatch in a month or longer.

A small form hatches and looks for a specific kind of aquatic snail.³ The fluke enters the snail and continues to develop further. The snail is the secondary host for the fluke. These snails inhabit stagnant bodies of water which contain large amounts of living and dead plants. These bodies of water may or may not be permanent and they are

³ There are two known snail carriers commonly found in northern Minnesota, *Stagnicola palustris* and *Stagnicola caperata*.

common throughout the woodland pastures of northern Minnesota.

Growth and multiplication in the snails takes at least 7 or 8 weeks depending on temperature and other factors. Finally, after development in the snail has been completed, small forms leave the snail. These free-swimming forms attach themselves to vegetation and debris. Here they become cysts. These are infective forms and are resistant to a variety of climatic conditions. A host animal, either deer, cow, or sheep, becomes infected by taking in these cysts with food or water. When swallowed, the cyst wall is dissolved by digestive juices and a baby fluke emerges. After considerable migration, taking from 1-6 months, the fluke reaches maturity in the liver.

SIGNS OF THE DISEASE

When animals become infected, the larval flukes penetrate the intestinal wall and wander throughout the body cavity. This may cause severe illness when a large number of larval flukes cause the infection. More often, the infection is picked up over a period of time and no signs of acute ill health or marked loss of conditions are seen.

The amount of damage done by the fluke depends on how well the host has adapted itself to the fluke. They seem to cause little harm to deer, the natural host for the large American liver fluke. The liver tissue of the deer reacts to the presence of the parasites in varying degree. The parasite usually becomes trapped in a cyst-like pocket which connects to the bile ducts. This permits fluke eggs to find their way out with the droppings.



Fig. 2. Pasture suitable for snail carriers.

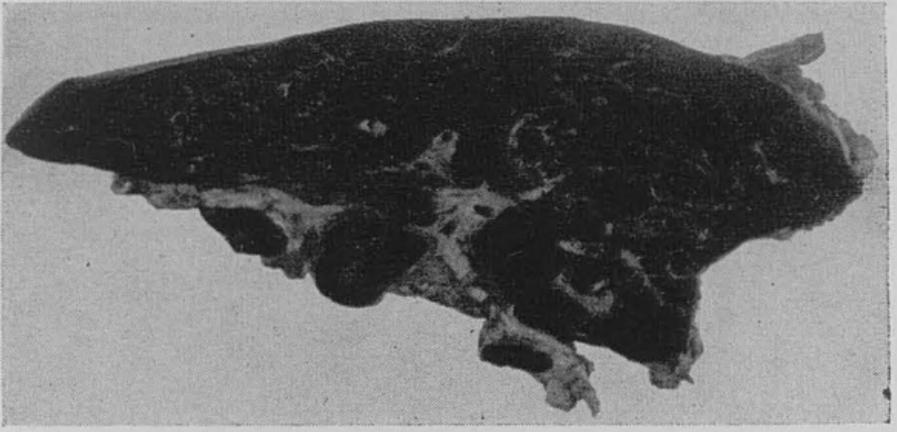


Fig. 3. Cow liver damaged by large American liver fluke.

In the case of cattle, the parasite provokes a violent tissue reaction. It is usually completely walled off so it has no outlet. Infected sheep do not appear to have any ability to combat and isolate the parasite. As a result, the fluke destroys much liver tissue and ultimately causes death.

DIAGNOSIS OF THE DISEASE

The most satisfactory method of diagnosis is the actual finding of flukes in the liver upon post mortem examination. The liver may be cut into $\frac{1}{2}$ -inch slices which allow one to see the flukes or the fluke cysts if they are present. On butchering, a black color may be noted in the intestinal fat, lymph glands, and throughout the liver tissue. This shows up as a black marbling or streaking effect which may be considered as evidence that the large American fluke is or has been present.

It is seldom possible to find fluke eggs in the droppings of sheep and cattle. In the deer, eggs may be seen by examining the manure.

PREVENTION AND CONTROL

To prevent infection, destroy the snail intermediate hosts or keep livestock away from infected pasture or hay. Control of liver fluke infection is accomplished by eliminating the places where water snails live. Drain wet places and eliminate potholes or, where drainage is not practical, fill in or fence off low areas. Hay cut from infected areas should be fed to nonsusceptible animals or fed only after thorough drying.

Control of the large American liver fluke in domestic animals is difficult. Since two hosts are involved in the life cycle, control is based on re-

moving the adult parasite from infected animals or by destroying the snails.

CHEMICAL CONTROL

Water snails can be destroyed by using copper sulfate (bluestone, blue vitriol). The concentration and the method of application depend on the area to be treated, the habitat of the snail, and the amount of vegetation. Sprays containing 0.5 percent of copper sulfate applied at the rate of about 140 gallons to the acre will destroy snails on pasture. A more common method of application is the use of 1 part of powdered copper sulfate to 4 parts of sand or dry earth. This mixture is broadcast by hand over wet areas at the rate of 20 pounds of the chemical per acre. Stock should be kept off treated land until after a rain has removed some of the bluestone.

TREATMENT

When considering treatment for an animal, remember that the large American liver fluke lives in the actual tissue of the liver; it is not found in the bile ducts. Getting an effective drug or chemical to the right place at the right time is the problem. At present, no drug has been effective in destroying the adult large American liver fluke in the liver.

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UNIVERSITY OF MINNESOTA, INSTITUTE OF
AGRICULTURE, ST. PAUL 1, MINNESOTA

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