PROBLEM OF FASCIOLIASIS IN ANIMAL HUSBANDRY IN THAILAND

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Abstract. One of the most important parasitic diseases in adult cattle and buffalo in Thailand is fascioliasis, caused mainly by *Fasciola gigantica*. The economic loss from fascioliasis in cattle and buffalo throughout Thailand has been assessed at not less than 100 million Baht. Recent investigations have shown that the average prevalence of *F. gigantica* in cattle and buffalo in Thailand was 11.8%. However, the prevalence varies considerably between villages, ranging from 0 to 85 %. The prevalence is high in areas surrounding dams or large ponds in which *Lymnaea auricularia rubiginosa*, the intermediate host of *F. gigantica* is found. An epidemiological study revealed that the disease has a seasonal pattern from which the following conclusion for control of the disease can be drawn. Strategic liver fluke treatment of all cattle and buffalo which are older than 8 months should be carried out once a year in September. In addition, animals in poor condition should be treated in April to prevent severe losses, especially in high prevalence areas or where strategic treatment was missed.

Problems of liver fluke control include the lack of knowledge about the parasite on the part of the farmers and the lack of availability of drug supplies at the village level, both of which are important to allow strategic treatment of animals. To approach these problems, the government had developed "Farmer Self-Help Worm Control Program" in seven provinces in Northeast Thailand which is operated by village farmers trained as program "keymen". This program is very effective and will be extended throughout Thailand in the next Seventh Social and Economic Development Plan.

INTRODUCTION

One of the most important parasitic diseases in adult cattle and buffalo in Thailand is fascioliasis, which is caused mainly by *Fasciola gigantica* (Dissamarn, 1955, 1961). Most of the cases were chronic fascioliasis which decreased the productivity of draught and fattening animals. Feed conversion and fertility were low, and livers had to be condemned after slaughter (Dissamarn, 1955). Mortality rates were about 3–10% in replacement stock and 3% in adult animals (Dissamarn, 1961). The economic loss from fascioliasis in cattle and buffalo throughout Thailand has been assessed at not less than 100 million Baht (Chompoochantra *et al*, 1982). Due to the economic importance of this parasite, the epidemiology of *F. gigantica* and its intermediate host was studied and, as a result, a strategic deworming program was developed.

PREVALENCE

Buffalo and cattle can become infected with *F. gigantica* at 3–4 months of age. However, the egg output rate increased significantly only after the animals were more than 8 months old (Hoechner *et al*, in press).

Recent investigations have shown that the average prevalence of *F. gigantica* in cattle and buffalo in Thailand was 11.8% (Sukhapesna *et al*,1989). However, the prevalence varies considerably between villages, from 0 to 85% (Loehr *et al*, 1984; Hoechner *et al*, in press). The prevalence is high in lowland areas and areas surrounding water reservoirs, such as dams or large ponds in which *Lymnaea auricularia rubiginosa*, the snail intermediate host of *F. gigantica*, is found (Viboolyavatana, 1981).

CLINICAL SIGNS AND PATHOGENESIS

The pathological manifestations depend on the number of metacercaria ingested and the resistance of individual animals (Soulsby, 1982; Srikitjakarn, 1986a). Therefore, clinical signs of fascioliasis in cattle and buffalo are acute, subacute and chronic.

The chronic form of liver fluke infection is the most common that occurs in adult cattle and buffalo in Thailand. Animals show signs of appetite loss, weakness, loss of weight, anemia, submandibular edema, blackish and soft stool and indigestion. Animals either die of emaciation or are slaughtered for salvage.

Acute and subacute fascioliasis are also observed in young cattle and buffalo. Animals are anemic and jaundiced, and death occurs a few days to several days after the onset of clinical signs (Srikitjakarn, 1986a).

Pathogenesis of acute and subacute fascioliasis is essentially a traumatic hepatitis which is the result of a simultaneous migration of a large number of immature trematodes, with subsequent extensive destruction of liver parenchyma and marked hemorrhage (Hammond and Sewell, 1974).

Clinical signs of chronic fascioliasis is principally due to the presence of the adult flukes in bile ducts. The blood sucking activity of adult flukes causes biliary hemorrhage. This results in anemia, which is the main clinical symptoms of liver fluke infection along with hypoalbuminemia, and hypoproteinemia. In advanced cases, hyperplastic cholangitis, cirrhosis and calcification of bile ducts occurs (Soulsby 1982; Srikitjakarn, 1986a).

LIFE CYCLE

Fasciola gigantica occurs in the bile duct of buffalo and cattle. The eggs enter the duodenum with the bile and are excreted with the feces. The rate of development and hatching depends on temperature. At normal temperatures (25–30° C) fluke eggs hatch, releasing a miracidium between 8 and 14 days (Chompoochantra *et al*, 1982). At lower temperatures, the hatching period is delayed, while at higher temperatures, there is no development of miracidium (Dissamarn *et al*, 1973). The development of the parasite in *Lymnaea auricularia rubiginosa*, the aquatic snail intermediate host, requires 35–48 days. Cercaria are released and transform into metacercaria within 24 days; they subsequently encyst on water plants. The longevity of encysted metacercaria may be more than 4 months under normal environmental conditions. The metacercaria will be ingested by the final host with the plant on which they are encysted. The prepatent period is 114–116 days (Chompoochantra *et al*, 1982).

EPIDEMIOLOGY

During 1982–1984 the epidemiology of *F. gigantica* and its intermediate host in Northeast Thailand was studied by Hoechner *et al* (in press). The results of the study showed that the occurrence of the snail intermediate host fluctuated seasonally. The snail population notably increased between December and April each year under field conditions. From June to November there were few snails. The highest incidence of infected snails occurred between December and February, while between June to October infected snails were only occasionally seen. The liver fluke infection of animals in Northeast Thailand can be found throughout year, but a significant increase in the *F. gigantica* egg excretion rate was observed from August/September to November/December each year (Loehr *et al*, 1984). The epidemiological cycle of *F. gigantica* in Northeast Thailand is shown in Fig 1. It is likely that the relationship between annual distribution of lymnaeid snails, *Fasciola* cercaria harboring snails, and prevalence of *F. gigantica* in buffalo and cattle is due to contamination of the pasture or the aquatic environment in September with *Fasciola* eggs. The transmission of *Fasciola* infection from animals to snails is assumed to be 45 days (larval development period) before December. Treatment of infected animals at the beginning

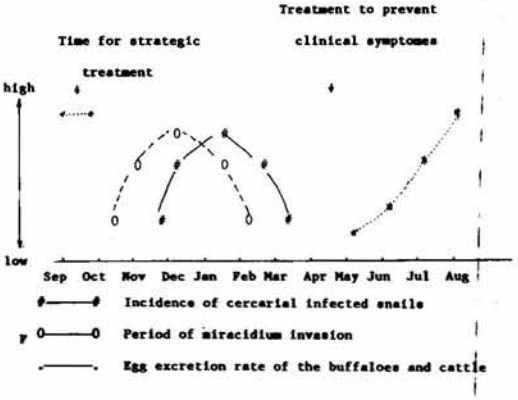

Fig 1 – Epidemiological cycle of *Fasciola gigantica* in Northeast Thailand.

of September would reduce contamination of the pasture and the aquatic environment; therefore, the infection of lymnaeid snails should be significantly reduced and the life cycle of *F. gigantica* would be interrupted (Hoechner *et al*, in press).

To test the efficacy of strategic treatment, Srikitjakarn (1986b) treated a herd of infected buffalo with anthelminthics in early October. After ten months the prevalence had decreased from 50% to 10% and the percentage of the cercarial-infected snails had decreased from 33% at the time of treatment to less than 1%. The results also indicate that the best time to treat animals and interrupt the life cycle of *F. gigantica* is September.

CONTROL OF FASCIOLIASIS

For successful control of fascioliasis in cattle and buffalo, all animals at risk over 8 months of age should be strategically treated once a year in September. After treatment all animals from other areas should be treated before being admitted to the area to prevent reinfection of treated animals. This economically justifiable strategic liver fluke control program, if carried out regularly once a year for several years, would result in a regular reduction of infection levels, comparable to that achieved in other countries with very different climatic conditions (Hoechner *et al*, in press).

In addition, animals in poor condition should be treated in April to prevent severe losses especially in high prevalence areas or were strategic treatment was missed. This method has been done successfully in villages around Nong Han, Sakon Nakhon Province. The infection of cattle and buffalo decreased from 40% and 45% to 1% and 6%, respectively, within 3 years.

Problems of liver fluke control include the lack of knowledge about the parasite on the part of the farmers and the lack of availability of drug supplies at the village level, both of which are important to allow strategic treatment of animals. To approach these problems, the government and Thai-German Animal Health Project has developed a "Farmer Self-Help Worm Control Program (BAHS)" in seven provinces in Northeast Thailand. In this program, the government will provide drugs constantly as cheaply as possible for sale to farmers in their villages. Farmers receive extensive services from trained fellow farmers, village "keymen", who teach farmers about the benefits from using these drugs, and supervise the treatment of animals. Thus, farmers can buy drugs at any time and the treatment of animals is served at a very low cost. This program is very effective and will be extended throughout Thailand in the Seventh Social and Economic Development Plan.

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