

REVIEW ON IMPORTANT HELMINTHIC DISEASES IN ANIMAL IN INDONESIA

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ABSTRACT

Helminthic diseases are widely spread throughout the world. In Indonesia, the cases in animals are primarily associated with the condition of the field, although the intensity of the infestations are also affected by various factors inside the body of the host.

In general, the tropical and humid conditions in Indonesia, optimally support the development and spreading of the parasites, so that the prevalence of the infestations are usually high except in the very dry areas.

In Indonesia, important helminthic diseases found in livestock are mostly caused by nematodes and trematodes, and there is a lack of information regarding cestode infestations, except infestation by immature stages of the worm such as cysticercosis in ruminants and swine. On the other hand, dogs and cats are usually infested by cestodes and nematodes.

Here, the negative influence of helminthic infestation on live stock is mostly shown by failure of growth, decrease of body weight and body resistance, damage of organs infested by the parasites, but it is not rare that the disease cause death of the infested animals such as haemonchiasis in sheep, ascariasis in young swine and calves, etc.

The integrated system of farming combined with periodic anthelmintic treatments were favourable in the effort of controlling the disease.

INTRODUCTION

The situation of helminthic diseases in animals varies from one area to the other, depending on the geographical situation, and various factors inside the body of the animal; but the tropical and humid conditions of the country, however dominantly affect the disease.

THE SITUATION OF SOME IMPORTANT HELMINTHIC DISEASES IN ANIMAL IN INDONESIA

Helminthic infections are widely spread all over the islands of Indonesia. In general, high prevalences of helminthic diseases are found in livestock, especially in areas with adequate water such as the areas of ricefields and areas near the lakes.

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Some important helminthic diseases found in animals in Indonesia are :

1. Haemonchiasis

This disease in ruminants is caused by a nematode *Haemonchus spp.* They are very harmful bloodsucking parasites in the abomasum of sheep and goats (*H. contortus*) and in cattle (*H. placei*).

Lubis and Hamid³ reported that 45% of 120 female sheep from the district of Aceh Besar were infested by *H. contortus*. They also reported that the highest prevalence was found in sheep of 1-0 year of age.

Also in Sumatra (Lampung), Chotiah⁴ reported that 100% of goats of more than one year old and 86.20% of sheep were infested by *H. contortus*.

Cases in Java were reported by some research workers. In East Java, Sasmita, et al.⁵ reported that 76.67% of goats slaughtered at the slaughter-house of the city of Surabaya were infested by *H. contortus*. One year after this report, Darmono⁶ showed that a higher percentage (82.21%) of sheep from the same abattoir were infested by *H. contortus*.

In Yogyakarta, Sumartono⁷ reported that 92% of the sheep slaughtered in the city were infested by *H. contortus*.

Report from Bogor by Kusumamihardja⁸ showed that the intensity of *Haemonchus* infestation in sheep during the rainy season was significantly higher than during the dry season.

In Bali, Suweta, et al. (1986, unpublished data) found that 69.80% of goats slaughtered in the city of Denpasar were infested by *H. contortus*.

2. Bunostomiasis

This disease in ruminants is caused by a nematode *Bunostomum spp.* They are harm-

ful blood sucking parasites in the small intestine of sheep and goats (*B. trigonocephalum*) and in cattle (*B. phlebotomum*).

Although this parasite seems to be an important one, so far there is little information about the situation of this parasite in animals in Indonesia.

In East Java, Sasmita, et al.⁵ reported that 33.33% of goats slaughtered in the city of Surabaya were infested by *B. trigonocephalum*.

Kusumamihardja's report from Bogor showed that *B. trigonocephalum* was one of the seven nematode species infesting sheep.

3. Oesophagostomiasis

This disease in ruminants and swine is caused by a nematode *Oesophagostomum spp.* It is a harmful bloodsucking parasite in the colon of cattle (*Oe. radiatum*), and in the large intestine of swine (*Oe. dentatum*).

Although this parasite seems to be widespread, there is little information regarding the situation of this parasite in animals in Indonesia.

In Bali, Suweta et al.⁹ reported that 90% of swines from the village of Sanur, Denpasar were infested by nematodes, including *Oe. dentatum*. Also in Bali, Sweatman¹⁰ found *Oe. dentatum* among other helminth parasites in faecal samples of swine.

4. Trichostrongyliasis

This disease is a helminthic disease in ruminants and other animals such as swine, horse, donkey and also man, caused by a nematode *Trichostrongylus spp.* *T. colubriformis* was found in the small intestine and abomasum of sheep, goat, cattle, and *T. axei* in the abomasum of sheep, goat, cattle and in the stomach of swine, horse, donkey and man.

In Indonesia, trichostrongyliasis was first reported by Lie Kian Joe¹¹.

Sasmita, et al.⁵ showed that 63.33% of goats slaughtered in the city of Surabaya were infested by *Trichostrongylus* spp.

In Bogor, Kusumamihardja⁸ found *T. colubriformis* and *T. axei* among other nematodes infecting sheep.

5. Metastrongyliasis

This disease in ruminants, swine and horses is caused by a nematode *Metastrongylus* spp. *M. capillaris* was found as a parasite in the lungs of sheep and goats; *M. elongatus* in the bronchioles of swine, sheep, deer, and other ruminants, and accidentally also in man, and *M. pudendotectus* in the lungs of pigs.

Although this parasite seems to be widespread, there is little information regarding the situation of the disease in animals in Indonesia.

In Bali, the observation by the team of the Visiting Assignment in Management of Pig Diseases of IDP Australia and Udayana University (1986, unpublished data) showed that most of the lungs of the observed young swine were infested by *Metastrongylus* sp. Also in Bali, Dharma, et al.¹² from their observation at the slaughter-house of Denpasar found that 21.19% of the lungs of swine of 8 - 12 months of age were infested by *M. apri* and no other species of this parasite was found.

6. Ascariasis

This disease in animal and man is caused by a nematode *Ascaris* spp. *A. vitulorum* was found in the small intestines of cattle, and *A. suum* in the small intestines of swine. *A. galli* was found in the small intestines of chicken, duck, turkey, goose and various wild birds.

In Indonesia, this disease is very widely spread, especially in young animals.

In East Java, Sasmita¹³ reported that only 0.8% of local cattle and 1.5% of diary cattle were infested by *A. vitulorum*. On the other hand, Sweatman¹⁰ reported that 70%, 59%, 40%, 33%, 17%, 8%, and 5% of the young calves of 0-1 month, 1-2 months, 2-3 months, 3-4 months, 4-5 months, 5-6 months and 6-7 months of age were infested by *A. vitulorum*.

In South Kalimantan, Kalianda and Djagra¹⁵ reported that 41%, 48%, 31%, 29%, and 26% of young calves of 0-1 month, 1-2 months, 2-3 months, 3-4 months, 4-5 months, 5-6 months, and 6-7 months of age were infested by *A. vitulorum*.

Report from North Sumatra by Partoutomo, et al., cited by Berijaya and Sutejo¹⁶ showed that 16.44% of the swine were infested by *A. suum*.

In Bali, Suweta, et al.⁹ found that 96% of the swine from the village of Sanur, Denpasar were infested by nematodes and 90% were *A. suum*. On the other hand, Dennig⁴ reported that the prevalence of *A. suum* infestation in swine was only 9%; and Sweatman¹⁰ found only 1.2% *A. suum* from 81 swine examined. But Kusumaningsih, et al.⁷ reported that 30.8% of young swine of 0-6 months of age, and 10.8% of swine of more than 6 months of age were infested by *A. suum*.

In South Sulawesi, Beridjaya and Soetedjo¹⁸ reported that 73.23% of swine were infested by *A. suum*.

About ascariasis in poultry, Sasmita¹⁹ reported that 54.41% of broiler chicken slaughtered in Surabaya were infested by *A. galli*.

7. Filariasis

This disease in animal and man is caused by a nematode *Filaria* spp.

In some places such as North Sulawesi, Central Sulawesi, West Kalimantan, West Sumatra, and Lampung there were reports of this disease caused by *Stephanofilaria dedoesi*, mostly in adult cattle. In North Sulawesi, Central Sulawesi, West Kalimantan and West Sumatra²⁰ respectively 90%, 74%, 80%, and 90% of the cattle were infested by this parasite.

In other animals such as monkey, dog, and cat, filariasis was more commonly found.

In South Kalimantan, *Brugia spp.* infested 29.7% of 64 *Presbytis cristata* monkeys. In Sumatra, 86.9% of *Presbytis cristata* monkeys and 45.6% of *Macacus fascicularis* monkeys were infested by *Filaria spp.* And 39.7% of *Feliscattus* were infested by *B. pahangi*.

In Bali, microfilariae of *D. immitis* were often found in the blood of local dogs (unpublished data).

8. Trichinelliasis

This disease in swine and man is caused by a nematode *Trichinella sp.* In Indonesia, this disease is only found in North Sumatra around Lake Toba area.

Fisser and Manap, cited by Nazir²² found that 7.75% of local swine were infested by *T. spiralis*, but none of the china swine were infested. Holz, cited by Nazir²² also reported about *T. spiralis* infestation in swine in North Sumatra, but none were reported from swine in Java. Nazir²² found that 11.11% of the swine in North Sumatra were infested by *T. spiralis*, and 2 sera from 578 human sample showed a slight positive reaction.

9. Fascioliasis

This disease in ruminants and some other nonruminant animals, and also in man

is caused by a trematode *Fasciola spp.* In Indonesia, this disease is widely spread in all parts of the Indonesian archipelago. Fascioliasis in local animals is caused by *F. gigantica*, but in imported animals *F. hepatica* could be found.

The prevalence of the infestation in livestock varied from 10- 80%. In cattle in Java, the prevalence was 50 - 80%²³. In Malang, Soesetya²⁴ reported that 63.2% of cattle from East Java were infested by *F. gigantica*. In Bandung, Rukmana²⁵ reported that 79% of cattle from West Java were infested by *F. gigantica*. In Yogyakarta, Mukogham, et al.²⁶ reported that 65% of cattle from Central Java were infested by *F. gigantica*. On the other hand, report from Bali by Suweta²⁷ showed that the prevalence of *F. gigantica* in Bali cattle from the whole typology of Bali areas varied from 15.83% to 58.33%.

10. Paramphistomiasis

This disease in ruminants is caused by a trematode *Paramphistoma spp.* In Indonesia, the situation of this disease is almost the same as that of fascioliasis. Adiwinata, cited by Darmono, et al.²⁸ found that *P. cervi* and *Gastrotylax crumenifer* infested the rumen and reticulum, while *Gigantocoryl explanatum* infested the bile and urinary ducts of ruminants in Indonesia.

Berijajaya, et al.¹⁶ reported the situation of paramphistomiasis in ruminants in several parts of Indonesia.

In Aceh the infestation was 94.80% in cattle, 94.50% in buffaloes, 39.02% infested goats, and 60.00% infested sheep. In West Sumatra it was reported that 99.50% of cattle and 82.25% of buffaloes were infested. In Lampung 69.84% of cattle and 20% of goats were infested. In Java, the prevalence of the disease in cattle was 41.60%, in goats 5.00%

and 5.00% in sheep. In Bali 100% of the cattle and 20.00% of the sheep were reported infested. In South Sulawesi, 53.23% of the cattle and 39.60% of the buffaloes were reported infested. In South Kalimantan 56.00% of cattle, 100% of buffaloes, 80.00% of goats and 5.00% of sheep were infested. In West Nusa Tenggara there were 80.00% infested cattle, 80.00% infested buffaloes, 72.00% infested goats, and 60.00% infested sheep reported; and in East Nusa Tenggara there were 32.27% infested cattle, 60.48% infested buffaloes and 3.39% infested goats reported.

Other research workers²⁸ reported that the prevalence of *Paramphistomum* infestation in cattle in Bali was 88.89%. On the other hand, Suaryana, et al.²⁹ reported that 50.19% of Bali cattle were infested by *Paramphistomum spp.*

11. Schistosomiasis

This disease is a helminthic disease in blood vessels of man and animals caused by a trematode *Schistosoma spp.*, spread widely in the tropical and subtropical areas.

In Indonesia, this disease is found only in Sulawesi around Lindu Lake.

Schistosomiasis in man caused by *S. japonicum* was first found by Muller (1937) at autopsy in Palu, Sulawesi. In the same year Brug and Tesch (1937) found 8% of the people around Lindu Lake infested. Three years later, Bonne and Sandground (1940) found 53% of the people around the lake infested with *S. japonicum*.

Further investigation³⁰ showed that the prevalence of *Schistosoma* infestation in man around the above mentioned lake was 53%. Survey of animals around the same area showed that cattle, dogs, rats, wild swine, and deer were infested. The prevalence of the infestation in rats was 25%³⁰. The vector of

schistosomiasis japonica in Central Sulawesi has been identified as *Oncomelania hupensis lindoensis*. In some other areas such as Jakarta, Central Kalimantan and East Java, cases of schistosomiasis were also reported³⁰. Animal schistosomes have been described in animals in Indonesia such as *S. spindale* in cattle and *Trichobilharzia brevis* in ducks. Sumardi³¹ found that most of *Lymnaea rubiginosa* snails examined around Rawa Pening area, Central Java were positive with furcocercous cercariae. In Bali Suweta et al.³² also found that 17.5% of *L. rubiginosa* snails were infested by furcocercous cercariae.

12. Echinostomatosis

This disease of the digestive tract of animals and man is caused by a trematode *Echinostoma spp.* Five species have been reported from man in Indonesia namely : *E. ilocanum*, *E. recurvatum*, *E. malayanum*, *E. revolutum*, and *E. lindoensis*. These parasites are often found in rats and other animals.

The larval stages (metacercariae) have been found in *Bellamya* and *Pila* snails in the rice fields near Jakarta.

Report from Yogyakarta by Darmono and Sumartono³³ showed that 58% of 50 ducks examined were positive with *Echinostoma spp.* They were identified as *E. revolutum* and *Echinoparyphium paraulum*.

13. Cysticercosis

This disease is an infestation of the immature stages of tape worms (*Taenia spp.*) in the muscle and other organs of animals and man. *Cysticercus cellulosae*, the immature stage of *Taenia solium* is found in the striated muscle of swine; *Cysticercus bovis*, the immature stage of *T. saginata* is found in the

muscle of cattle while *Cysticercus tenuicollis*, the immature stage of *T. hydatigene* is found in the abdominal cavity of sheep and goat.

T. saginata and *T. solium* are found in the intestine of man, and *T. hydatigene* is a parasite in the intestine of dogs.

In Indonesia, cysticercosis cellulosa was first found by Le Coutre in 1920 from the swine in Bali (Anon., 1980)³⁴. He also reported that in Bali 1.80% - 3.20%, Ujung Pandang 1.20%, and Surabaya 0.50% - 0.60% of the swine were infested by *C. cellulosa*.

On an other occasion, Suweta, et al.³⁵ found that only 0.15% of swine in Bali were infested by *C. cellulosa*. Report from the Veterinary Service also showed that 0.16% of the swine in Bali were infested by *C. cellulosa*.³⁴

Cases of cysticercosis bovis in cattle in Bali were also reported by the Veterinary Services, and the prevalence was also low, but cysticercosis tenuicollis cases were more often found. In this cases, Rihi, et al. (unpublished data) found that 11.00% of the swine examined at the slaughter-house of Denpasar were infested by *C. tenuicollis*.

Cases of taeniasis in animal in Bali and other places were also reported, but the prevalence is usually low³⁶.

14. Raillietiniasis and hymenolepiasis

These diseases are helminthic diseases in the digestive tract of fowl caused by cestodes *Raillietina spp.* and *Hymenolepis spp.* In Indonesia, there was little information regarding these diseases in poultry.

In Surabaya, Sasmita¹⁹ reported that 85.64% of chicken slaughtered were infested by *Raillietina spp.*

In Yogyakarta, Darjono and Mukodham, cited by Darmono and Sumartono³³ reported that *Hymenolepis megalops* were isolated

from the cloaca of ducks. They also found *Hymenolepis spp.*, not only in the cloaca but also in the small intestine of the ducks observed. *H. nana* and *H. diminuta* are often found in rats and occasionally in man.

THE ECONOMIC LOSS DUE TO HELMINTHIC DISEASES IN ANIMAL

In Indonesia, as illustrated above, the situation of helminthic diseases in animals varied from one area to the other, but in general the prevalences of infestation were high, especially in the lowland areas with adequate irrigation.

In animals, the mixed infestation of the parasites were often found; single species infestation was rarely found. These mixed infestations are very harmful to the infested animal. Michel³⁷ in his study concluded that a group of young calves kept on a pasture infested with mixed nematodes for 6 months continuously showed a lower body weight of 45.5 kg than the other group which was kept on the same pasture for 3 months and then moved to an uninfested pasture without anthelmintic treatment. But the body weight of the first group of calves were 72.73 kg lower than those of the group of calves kept on the same pasture for three months only and moved to another uninfested pasture and treated with anthelmintic. Based on the above illustrations of helminthic diseases and their influence to the infested animal, it could be estimated that the economic loss due to nematodes on livestock in Indonesia is very high.

The Directorate of Animal Health⁸ estimated that the economic loss due to *Haemonchus sp.* infestation only on sheep is 4.366 million rupiah annually.

In Indonesia, the situation of trematode infestations in animals is the same as that of the nematodes. Mixed infestation was mostly found, although single species infestation could also be found. Fascioliasis is one of the very important helminthic disease caused by a trematode in ruminants. Suweta²⁷ concluded that the carcass weight of *Fasciola sp.* infested Bali cattle was 10.87 kg lower than those of the carcass weight of uninfested Bali cattle. And if converted into rupiahs, in which the value of 1 kg of carcass is approximately 2.500 rupiah, the economic loss due to fascioliasis would be 27.000 rupiah per cattle. Ronohardjo, et al.⁵⁸ estimated that the economic loss due to fascioliasis in livestock in Indonesia is about 32 million US \$ (about 40.000 million rupiah) annually. Losses due to the other trematode infestation such as paramphistomiasis and schistosomiasis in livestock did not differ much from that of the losses caused by fascioliasis, but losses due to cestodes were not well recorded.

THE STRATEGY OF CONTROLLING HELMINTHIC DISEASES IN ANIMAL

Anthelmintic treatments of infested animal in infested and suspected areas were conducted by the Veterinary Services, but so far there are no satisfactory results yet. This is due to the field conditions which are always favourable for the development and transmission of the parasites all year round, so that continuous reinfestations always occur.

As a matter of fact, trials of anthelmintic treatment of infested animals, showed effective results. In this case, Suweta, et al., (unpublished data) showed effective results of Levamisol, Pyrantel Pamoate, and Piperazine against ascariasis of swine.

Because of continuous reinfection, the effort of controlling the disease has to be planned as an integrated programme among all related sectors, and has to be directed to all stages of the parasites.

The development of the parasites to adult stage in the body of the host usually takes 2-3 months. And because of the occurrence of reinfestations, the programme of anthelmintic treatments has to be conducted as mass treatments repeated every 3 months. In this case, Suweta³⁹ showed effective results of mass fasciolicide treatment conducted every three months continuously on traditionally reared Bali cattle.

The application of the treatments should be combined with the effort of cutting the life cycle of the parasites outside the body of the host. In this case, the integrated system of rice farming and the traditional way of duck rearing in rice-fields are recommended. Also the application of pesticides in the rice fields and the use of urea as fertilizer are favourable to the effort of controlling the population of the parasites outside the body of the host. To avoid resistance to anthelmintic drugs, it is recommended to apply not only one kind of drug continuously, but changing it regularly.

CONCLUSION

From the above review of helminthic diseases in animals in Indonesia, the following statements could be concluded :

1. Complete data concerning the epidemiological situations of helminthic diseases in animal in Indonesia are not available yet.
2. The high prevalence of helminthic diseases in livestock in Indonesia was mostly

found in lowland areas with adequate irrigation, and most of the diseases were caused by nematodes and trematodes; diseases caused by cestodes were not well recorded except those caused by immature stages of the parasites.

3. Helminthic diseases of economic importance reported were haemonchiasis, ascariasis, metastrongylosis, fascioliasis, and paramphistomiasis.
4. The economic loss due to helminthic diseases in livestock in Indonesia was mostly caused by mixed infestation of the parasites, and mostly manifested by failure of growth and decrease of body weight of the infested animals.
5. The integrated system of rice farming (two crops per year) and the traditional way of duck rearing in rice fields, combined with those of the continuous anthelmintic treatment were favourable in the effort of controlling the helminthic diseases of animals in Indonesia.
6. In the effort of increasing the productivity of rice, the application of urea fertilizers and pesticides was also beneficial in controlling the larval stages of the parasite.

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QUESTIONS AND ANSWERS :

1. Question: - Can you list three of the major parasites of animals in relations to morbidity, mortality and economical impact ?
- Problems related to diagnosis and treatment
- Future research plan

Answer : - 1. Haemonchiosis
2. Ascariasis
3. Fascioliasis
- Problems related to diagnosis
Antemortem ---> detect eggs of the parasite
---> sensitivity not 100%
---> serology ---> cross reaction
- Future research plan ---> How to obtain satisfactory results of control programme in Indonesia.

2. Question: The prevalence of fascioliasis in cattle is high, 50% - 80% in Java. What control measures have been done ?
What are the clinical signs ?

Answer : Control measures: - observation of slaughtered animals
- control by fasciolicide such as dovencin, fascal-super etc.
Clinical signs : in cattle : chronic disease
decrease of body weight
sheep : sudden death