Chapter 10

General control measures against parasitic diseases

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The effective control measures against parasitic infections depend on the life cycle pattern of different parasites, because life cycle differs in different parasites. It is seen that, some parasites have direct life cycle whereas, in some parasites have indirect life cycle that employ intermediate hosts to complete their life cycle. Therefore, the general control measures against parasitic diseases can be achieved through:-

1. Improving management
2. Destruction of intermediate host
3. Providing preventive medications
4. Study of epidemiological factors
5. Immunoprophylaxis
6. Biological control

1. Improving management

In parasites having direct life cycle, restoring hygienic methods of management provides effective control of parasitic infection. Following are some of the methods:-

a) The animal house should be kept dry and clean. Faeces or urine should be removed regularly from the shed and the floor should be cleaned with hot water, preferably with caustic soda. These methods prevent hatching of eggs and liberation of larvae and destroy them.

b) The bedding materials of animal should be cleaned regularly.

c) There should not be over-crowding of animals either in field or in pastures

d) The affected animals should be isolated from the healthy stock.

e) The health of the animal should be maintained by providing sufficient mineral mixtures enriched with copper, iron, cobalt, manganese, proteins etc. It is seen that, when animals

are healthy and free from deficiencies of trace minerals, there is increase resistance against the effects of helminth parasites.

f) The feed and water trough should be high enough to prevent contamination from faeces.

g) Animals should be restrained from grazing in contaminated field.

h) As the young animals are more susceptible to helminth infection, they should be housed and grazed separately from adults.

i) Animals should not be allowed to take grasses from known endemic areas of trematodiasis.

j) To limit the ingestion of the infective larvae by the animal, rotational grazing should be practiced. It is seen that, many parasite larvae die within a few days, however, others do not, and instead they survive for a long time. Therefore, even the heavily infected pasture may be kept clean for a period of time by keeping the pasture free from animals.

Silage and hay:

When the crop of hay is removed from field, the pasture may be considered safe for grazing, because during this period the larvae normally disappear from the pasture.

Pasture resting:

Grazing animals should not be allowed on pastures for at least fw months under cool, moist conditions and two months under hot arid conditions for larval concentration to be reduced to a low level.

Stocking rate

When the numbers of animals are increased, the stocking rate is also increased. If the mass of herbage is reduced y the increased stocking rate, then infective stages will be more accessible. However, the reduced herbage may reduce free living stages and nutritional status of the host.

Alternate grazing:

It is highly effective when different species of hosts are grazed alternately with exception of some parasites.

Ploughing and burning pasture:

Ploughing and burning of pasture can effectively reduce the load of contamination, particularly the nematode larvae and the tick population. Some fertilizers also have larvicidal effects.

2. Destruction of intermediate host

Intermediate hosts play a great role in parasite transmission. Removal of intermediate host from the parasite endemic areas breaks the life cycle of the parasites and therefore stops the transmission process. A number of measures for the destruction of snails and vectors have been tried in many countries, including our own, with fair degree of success. These measures can be different kinds in different intermediate hosts and vectors. Snails are important intermediate host of trematodes. Removal of snails from the endemic areas may reduce the contamination level of metercariae from field. Snails may be controlled by mechanical, chemical or biological means. The choice of methods depends on local conditions and resources available. In mechanical control of snails may be done through extermination of snail population, removing the vegetation from the aquatic habitat, draining of swampy and other places which are breeding grounds of snails. In chemical control of snails, the drugs which are used to kill the snails are known as molluscicide. Copper sulphate is a known molluscicide. Other chemical molluscicides are Baylucide, fresco, Sodium pentachlorophenate, copper pentachlorophenate etc. While using chemical molluscicides, it should always be remembered that, they should be targeted against the snails and not against oter biotic agents. Drinking water should not get contaminated with molluscicide. In biological control of snails, rearing of ducks and fishes may be adopted which use to eat the adult or developing stages of snails.

3. Providing preventive medications

Drugs commonly used in veterinary health care have been listed in Chapter 9. Students may refer to these drugs in relation to preventive medications. If the parasite endemic

areas are detected, animals or birds may be screened for the presence of helminth or other parasitic infections. At suitable intervals of the year, appropriate medications may be administered before the occurrence of the disease. One should remember that , the dose used to prevent the possible attack of the disease is known preventive dose, whereas the dose administered to treat the disease after clinical manifestation is known as therapeutic dose. Naturally, preventive dose is lesser than the therapeutic dose.

4. Study of epidemiological factors

Epidemiological studies related to pasture larval burden and the worm burden in the host animal may be carried out to prepare a bio-climatograph. Bio-climatograph may help in the early prediction of the disease to enable to adopt a suitable preventive measure before the actual onset of the disease occurs. Climatic factors play a dominant role in determining pasture larval contamination. Forecasting the incidence of parasitic diseases in lambs and calves is more complex owing to the variety of parasitic species involved in the disease. Bioclimatograph will aid in the development and timing of various strategic control measures.

5. Immunoprophylaxis

In this type of control measures, first helminth larvae are exposed to ionizing radiations. This helps to reduce the disease causing ability of the larvae and increases immunogeniticy. These larvae are then introduced into the host at measured amount which stimulates the acquired immunity. Such irradiated larval vaccines are under experimental stage for the species *Haemonchus contortus*, *Trichostrongylus* , specis, Oesophagostomum, species, *Bunostomum* species, *Gaigeria pachychelis*, amphistomes and schistosome species. In *Ancylostoma caninum* a double subcutaneous vaccination with X-irradiated larvae (40 kil rad) has been reported highly effective to stimulate a higher degree of resistance in 3-16 weeks. A successful cell culture vaccine against Theileriasis is available (Raksha Vac T).

6. Biological control

All animals may be detrimentally affected , in one way or another by other forms of life. In many instances living organisms act as control agents of the population of their hosts either as predators, parasites or pathogens. The use of these agents in controlling pestiferous

arthropods has been referred to as biological control. Biological control is the science that deals with the role that natural enemies play in the regulation of the numbers of their hosts, especially as it applies to animal or plant pests.

Some important biological control agents :

a. Fishes: *Gambusia affinis, Poecilia reticulata* against larvae of mosquitoes.

b. Birds: *Bubulcus ibis* etc., against ticks

c. Ants

d. Hymemopterous insects

e. *Toxorhyncites* species

f. Frogs and toads

g. Carnivorous plants

h. Nymphs of dragon flies

i. Bacteria : *Bacillus sphaericus*

j. Protozoa : *Lakesteria*, Herpetomonas

k. Algae : *Cladophora*

l. Nematophagus fungi : *Duddingtonia flagrans*

m. Flat worms : Plannarians feed on mosquito and chironomid larvae

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