HELMINTHIC INFECTION OF LIVESTOCK AND THEIR ECO -FRIENDLY MANAGEMENT

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Helminthic parasites are considered to be one of the most economically important constraints in rearing livestock. Confined as well as pasture based animals are almost certain to be exposed to worms at some point of time in their life. Those animals which are raised on dry and arid areas are less likely to be infested with worms in comparison to those reared in humid climate. Most of the livestock owners are aware of problems of the worms which vary from the loss of productivity due to various reasons to death. Animals are routinely dewormed with commercial anthelmintics using different deworming schedule. Most of the dewormer has had some resistance to it by helminths.

In Himachal Pradesh livestock is not only a major source of livelihood to landless labourers and marginal farmers, especially in mountainous and sub mountainous areas but also contribute substantially to improve their nutritional status.

Parasitic diseases are important pathogens of livestock and poultry. They harm the animals by different ways which leads to reduced wait gain, retarded growth, infertility and low productivity and performance. There are three groups of parasites, out of which helminthic infections are common and important. Since their effects on animals are insidious, so they seldom attract attention they deserve. Therefore, they are continuous drain on the economy of animal owners.

Climate: Himachal Pradesh lies in the lap of Himalaya and its climate is largely conditioned by this factor. The Climatic conditions vary from hot and sub-humid sub tropical in southern low tract (450-900m), warm and temperate (900-1800m), cool and temperate (1900-2400m) and cold alpine and glacial (2400-4800m) in the northern and eastern high mountains.

Agro climatically, state is divided into four zones on the basis of topography , rainfall, and altitude (Figure -1).

Zone I	Sub mountainous low hills-sub tropical (up to 1000m)
Zone II	Mid hills sub humid (1,100 -<2000m)
Zone III	High hills temperate wet (2000-<3000m)
Zone IV	High hills temperate dry (>3,000m)

These conditions largely affect the occurrence of different parasitic species in the livestock. For survival and development of preparasitic stages moisture and temperature play important roles which are not same for all the zones.

The common helminthic diseases recorded in Himachal Pradesh are:

Sheep/Goat: Fascioliasis, Paramphistomiasis, Dicrocoeliasis, Monieziasis, Hydatidosis, Coenurosis, Cysticercosis, Gastrointestinal nematodiasis, Dictyocauliasis, Protostrongyliasis etc.

Cattle: Fascioliasis, Paramphistomiasis, Monieziasis, Ascariasis, Dictyocauliasis, Thelaziasis, Hydatidosis , strongylosis etc.

Equines: Parascariasis, Dictyocauliasis, Strongyliasis, Anoplocephaliasis, Habronemiasis, Oxyuriasis, etc.

Poultry: Ascardiasis , Heterakiasis .

Rabbit: Cysticercosis, strongyliasis.

Seasonal prevalence of Parasites: In a study EPG count, in cattle for fasciola, ranged from 70-350 and high load of worms was found during rainy and post-rainy season(July-Oct.). The eggs were found throughout the year. The strongyles were also found throughout the year but highest intensity was found from July-Sep. The EPG varied from 105-1950.

In sheep and goats Monthly EPG of strongyles ranged from 300-3200 in sheep and 370-5200 in goats with peak during June-August. In normal condition animals do possess a lower number of parasites without any clinical symptoms. But worm burden reaches to peak during monsoon and post-monsoon season. However parasitic induced mortality occurred mainly in spring and autumn seasons. This may be due to hypobiotic larval stages.

Management of helminthic infections:

I. Parasite: We should have information regarding different prevalent helminthic infections in different species of host in a particular place.

II. Life cycle of the parasite: knowledge of the lifecycle and characteristics of parasite is essential which help in understanding the parasite inside the host and outside in the environment, some parasites have direct life cycle while others may have indirect life cycle involving various kind of intermediate host. As we know that most of the nematodes have direct life cycle and flukes and tapeworms have indirect life cycles. If we are having the knowledge of life cycle then by breaking it at any stage we can chalk out preventive measures as per the feasibility and availability of the resources. It is difficult to control those having indirect life cycle in comparison to the parasites having direct life cycle.

III. Nutritional Status of the host: Nutrition plays a major role that is how well animals are able to over come to detrimental effect of parasites. Studies have showed that the animals kept on high nutritional plane were able to reduce their worm burden significantly.

It was found that if animal are fed by-pass proteins (fish meal, tannins; found in birds foot, trefoil and lespedeza) they lose less weight in comparison to others.

Other which may be useful are:

Vit.A, D, and B complex required for resistance in host system. Iron supplement (Mineral blocks).

IV. Pasture management:

1. Stocking rate: Increased stocking rate will increase the contamination of the pasture. If the mass of herbage is reduced by over stocking then infective larvae will also be more accessible. Usually 10 animals /ha. are recommended in extensive grazing.

2. Pasture resting:

Animals may be withhold from pasture for atleast 6 months under cool and moist condition and two months under hot and arid condition.

It helps in reduction of larvae to a acceptable level.

3. Alternate grazing with hosts of different species:

1. Alternate grazing in between ruminants and equines or cattle and sheep.
2. Graze the cattle after sheep to clear the pasture.
3. Cattle should be allowed to graze 3-5 cm from ground, which expose the parasites to Sun.

Cattle and sheep alternation is very common and effective (except for few species).

4. Alternate grazing with hosts of same species:

1. Young animals first which has not grazed by adults.
2. Young animals should graze in different paddocks which are rotated.
3. Grazing of calves on rotation basis. Cow and calves are rotated on different pastures.
4. Young cows should be sent with adult cows which serve as a source of infection.

5. Grazing height:

1. 80% parasites live in first 5 cm of vegetation.
2. Allow grazing by leaving 10 cm. from ground.

6. Grazing time

1. Drier the grass, most parasites stay at the base of plants.
2. Larvae migrate from the manure not more than 30 cm. from the manure pile.
3. Risk may be lowered by waiting until the dew has lifted or until grass has dried after rain before animals are let loosed for grazing.

7. Burning, ploughing and reseeding of pastures:

Markedly decrease the level of contamination.

8. Variation in timing of reproductive event:

The immunosuppressive effect of late pregnancy and lactation amplifies spring maturation of hypobiotic larvae.

Reproductive events should be timed in such a way that they should not overlap the spring maturation of larvae.

V. Manure Management

1. Parasitic stages killed in one hour at 50 ^{0}C and in 4 hours at 44^{0}C.
2. Outer layers should be turned towards middle of pile.
3. Adding urea (1 :125 parts) help in cleaning larvae and eggs of nematodes

VI. Improvement in drainage:

1. Wet pastures /sheds are ideal for larval growth.
2. Cattle watering areas should be located in well drained places.
3. Animals should be prevented to access swamps or streams.

VII. Use of anthelmintics: Only tactical dosing with anthelmintic is largely in practice. Most of the anthelmintics do not stop animals becoming reinfected when they ingest larvae on the pasture once the effect of the anthelmintic has finished. The use of dewormer alone is short term solution. The animals which are allowed to graze are always exposed to a variety of parasitic infections and constantly are re infected. The frequent use of dewormer, not to mention, delay the development of immunity in animals particularly in young ones. Moreover the frequent use of anthelmintics may produce the resistant strains.

Now in many developing countries a new threat is emerging in relation to exposure of parasites due to increasing demand of certain agricultural produce cultivated by organic farming to avoid health hazard. Our country is not legging behind. Such cultivated land where composed is used for cultivation of crops and subsequently the same land is used as pasture for the animals will pose a new threat for parasitic infections. Instead of frequent use of anthelmintics a good understanding of parasite and implementation of preventive measures will help to reduce the helminths to an acceptable level.

The ultimate object should be to develop an animal production system where parasites may be present in small number without any adverse effect on animal health and productivity. The dewormer should apply only in emergency situations.

Botanical Anthelmintics:

The use of plants as medicine has long being in existence and are widely documented in records kept in China, India and Egypt. Undoubtedly these ancient practices were discovered by series of "trial and error", which then could not be substantiated by proven scientific theories.

But from last few decades, there has been global resurgence of interest in indigenous knowledge of herbal drugs due to various reasons.

Medicinal plants may become good alternative for modern synthetic anthelmintics in developing countries particularly in small farms if their efficacy is proved scientifically under control studies.

A number of plant materials have been tested for their anthelmintics activity and found effective against many parasites. Some of the botanical plants which have been used as anthelmintics are given in Table-1.

Table 1. Some of the Botanical plants used as anthelmintics:

S. No	Botanical name	Family - Local name	Part of plant	Dose	Parasite/ disease (reduction in EPG*/worms**)	Animal	Ref.
1.	Cinnamomum tamala	Lauraceae-tejpat	Essential oil	-	Tapeworms	In-vitro	Girgune et al., 1978
2.	Punica granatum	Puniceae - anar	Fruit powder	3 gm/ Kg.BW.	GIT nematode (85.0%*)	Sheep	Akhatar & Riffat 1985
3.	*Butea monosperma*	Leguminosae -palas	palasonin	1mg/ml	A.lumbricoides	In-vitro	Lal et al., 1978
4.	*Carica papaya*	Carbicaeceae -Papaya	Seed ,aqueous extract	-	A.lumbricoides A.galli	Poultry,man	Neogi et al., 1964

5.	*Carica papaya*	Carbicaeceae -Papaya	Latex	2-8 gm /kg.BW	Ascaris suum (39.5-100%**)	Pigs	Satrija et al., 1994
6.	*Morinda citrifolia*	-Indian mulberry	Dried fruit	0.4-1g /kg.BW	H.contortus (73.6-88.8%**)	-	Satrija, 1999
7.	*Adhatoda vesica*	-	Crude aqueous extract of root	3 gm/ kg.BW.	Mixed GIT nematodes (37.4%*)	sheep	Lateef et al., 2003
8.	*Nigella sativa*	Ranunculaceae -Kalongi	Seed powder	2.5gm/ kg.BW.	*Moniezia* sp. (99±0.03%*)	Sheep	Akhatar & Javed, 1991
9.	*Nigella sativa*	Ranunculaceae -Kalongi	Seed powder	25 mg/ kg.BW.	Fascioliasis (88.2±0.4%*)	Buffalo	Kailani *et al .,* 1995
10.	*Fumaria parviflora*	Fumariaceae -Pit-papra	Powder of aerial part	60 mg/ kg.BW.	Fascioliasis (93.2±0.5%*)		
11.	*Caesalpinia crista*	Leguminosae - karanjwa	Seed powder	40 mg/ kg.BW.	Fascioliasis (89.7±1.7%*)		
12.	*Caesalpinia crista*	Leguminosae - karanjwa	Seed powder	4 g/kg. BW.	*T.vitulorum* (100±0%*)	calves	Akhtar et al.,1985
13.	*Nigella sativa*	Ranunculaceae -Kalongi	Glycosides	200mg/ kg.BW.	Anticestodal (94±5%*)	Goat	Akhtar & Aslam, 1997
			Saponins	200mg/ kg.BW.	Anticestodal (8±4%*)		
			Anthraquinones	200mg/ kg.BW.	Anticestodal (6±3%*)		

Apart from these anthelmintics *Vernonia anthelmintica* (local name - kali zeeri), *peganum harmala (*Harmal) , Embellia ribes (local name - babrung) , Mallotus phillippinensis (local name –red kamala), Calotropis procerca (local name – ak), Ananas salivus (local name – ananas) ,Cucurbita maxima (local name – Kaddu) ,Piper betle (local name – pan)Juglans regia (local name – akhrot) , Momordica charantia (local name – karela) Gingiber officinale (local name – adrak) were also reported to have anthelmintics activity.

It seems that although there is a large and diverse range of herbal dewormers available, the scientific validation of the reported anthelmintics effects of many of these plants is still lacking. This needs further verification.

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