Topic
On
General control measures of parasitic infections

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General control measures of parasitic infections

Chemical control-

- Chemotherapy- Chemotherapy (Antiparasitic drugs) is still considered as the most important control measures against parasitic infections. e.g.
- Fenbendazole – usually against round and tapeworms
- Praziquantel - against tapeworms

- Buparvaquone (Butalex) - against theileriosis
- Quinapyramine sulphate and Quinapyramine chloride (Triquin)- *Trypanosoma evansi*
- Diminazene aceturate - Babesiosis
- Amitraz - against ticks and mites
- Ivermectin and Closantel act against both endoparasites and ectoparasites called endectocidal drugs.
- Ivermectin is an antibiotic extracted from fermentation of S*treptomyces avermitilis*.

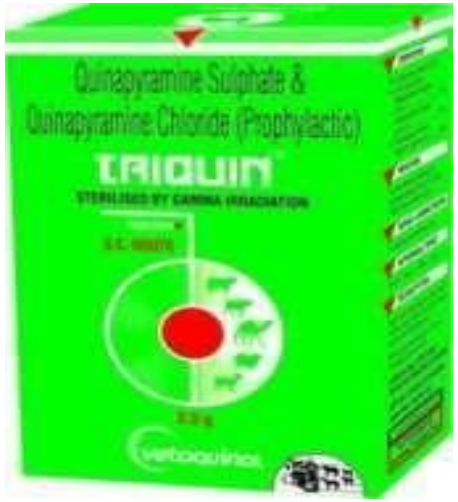

Table: List of Anthelmintics and Insecticides

Chemical groups	Examples	Mechanism of action
ANTHELMINTICS		
Benzimidazoles	Thiabendazole, Fenbendazole, Triclabendazole, Oxibendazole, Mebendazole Albendazole, Oxfendazole &	**Interfere with energy metabolism by inhibition of polymerization of microtubules leads to starvation of parasite. Wide margin of safety and frequently develop resistance against nematodes of sheep and horses.**
Imidazothiazoles	Tetramisole and Levamisole	**Cholinergic agonists result spastic paralysis**
Tetrahydropyrimidines	Morantel and Pyrantel	**Acetylcholine agonist and depolarizing neuromuscular blocking which result spastic paralysis.**
Organophosphates	Dichlorvos, Trichlorphon, Haloxon and	**Cholinesterase Inhibitor and causes spastic paralysis**
Piperazines	Piperazine salts	**Anticholinergic action - block neuromuscular transmission leads toflaccid paralysis.**
Macrocyclic (Macrolides) Lactones	Ivermectin, Doramectin, Moxidectinand Selamectin	**Potentiate GABA or bind to glutamated chlorine channels causingflaccid paralysis**
Salicylanilides or substituted phenols	Niclosamide, Oxyclozanide, Closantel and Rafoxanide	**Interfering ATP production in parasites by uncoupling oxidative phosphorylation.**
Isoquinolones	**Praziquantel and Epsiprantel**	**Paralysis and tegmental destruction of parasite**

LIST OF INSECTICIDES

Chemical Groups	Examples	Mechanism of Action
Organophosphates	Fenthion, diazinon, phosmet, Dichlorvos (used orally) , Haloxon and Trichlorphon	Irreversible acetylcholinesterase inhibitor
Chlorinaed hydrocarbons	DDT, Lindane(r-BHC), Aldrin, Dieldrin, Chlordane & Toxophene	
Carbamates	Carbaryl, Carbanolate & Propoxur	reversible cholinesterase Inhibitor
Synthetic pyrethroids	Pyrethrins, Cypermethrin, Deltamethrin, Fenvalerate & Permethrin	Block nicotinic receptors andincrease GABA release
Formamidines	Amitraz	Octopamine receptor agonist ininsects
Fly repellents	Dimethyl phthalate	Used for mosquitoes.
Growth regulators	Methopreme & triflumuron	Prevent insects from reaching maturity by arresting larvaldevelopment.

- Chemoprophylaxis- it is a type of prophylactic measure where the drugs are used in susceptible animals to prevent the infection. e.g. Quinapyramine chloride for *Tryapnosoma evansi.*
- Broad spectrum anthelmantic like Albendazole, Fenbendazole etc used for round worms infections as chemoprophylaxis.

Drugs use to expel the helminth parasites from the body of the host by either stunning or killing are called Anthelmintics e.g. Albendazole, Levamisole, Piperazine salts etc. They may also termed vermifuge (those that stun) or vermicide (those that kill).

- Chemoimmunoprophylaxis- it is a infection- treatment method and as result immunity develop in the host which prevents subsequent infection. e.g. Ground up tick's tissue suspension/sporozoites (GUTTS) are used as source of infection and then treated with Oxytetracyline.
- Immunological control- in this prophylactic measures, usually vaccines are used for the immunization or vaccination of susceptible

Commercially available parasitic vaccine

Intermediate host or Vector control-

Chemical control-

Intermediate host/vector	Chemical drugs
Snails	Copper Sulphate, Sodium pentachlorophinate
Flies, ticks , mites	Insecticides (Deltamethrin, Cypermethrin (Butox), Flumethrin, Malathion, Amitraz, Ivermectin etc)

- **Biological control-**
- Duck rearing for controlling snails.
- Rearing Gambusia fishes for mosquitoes.
- *Bacillus thuriengiensis* (bacteria) for mosquitoes.

Gambusia fish

- Mechanical control- snails and ticks are collected manually and killed by using a hard object.

Pasture management-

- Rotational grazing- Susceptible younger animals should be grazed ahead followed by the immune adults (Rotational grazing). It results pasture contamination is greatly reduced which leads to chance of pick up infection by the susceptible animals is low.
- Alternate grazing- the pasture is grazed by different species of animal like cattle, horse and sheep each with few months. A pasture grazed by cattle and/or horses is considered safe, since sheep/goats and cattle/ horses do not share the same parasites , so cross infection is inhibited.
- Pasture spelling- withdrawal of grazing animals from the infected pasture for at least one year to kill the parasites or its stages by starvation.
- Ploughing and burning of parasites to kill the adults or its larval stages.

Managemental control-

- Regular and proper disposal of manure
- Providing proper ventilation, adequate feed and clean water
- Regular deworming and vaccination
- Keep sick and healthy animals in separate house

Genetic control-

- To develop genetically parasite resistance animals.

Examples-

- N’ Dama cattle is resistance to Trypanosomosis,
- Red Massai sheep resistance to Hamonchosis
- Garole sheep is resistance to Fasciolosis
- Our Desi breed of cattle i.e. *Bos indicus* is resistance to tick infestation.

These resistant breed may be exploited further to develop genetically parasite resistance breed

- Integrated control management (ICM)- To avoid high cost of the treatment, drug resistance, drug/chemical residual effects and ecological imbalance, a concept of integrated control measures is coming up.

The main goal of ICM will be the manage of parasites and the environment in such a way that the costs, benefits, public health and environment will remain in balance.


THANK YOU...