An anthelmintic resistance level is easily calculated by using "RESO" software.

Interpretation

- Anthelmintic resistance is present if the percentage reduction in egg count is less than 95 per cent and the 95 per cent confidence level is less than 90 per cent.
- Anthelmintic resistance is suspected if only one of the above two criteria is met.

Current and Future Strategies for combating anthelmintic resistance

The challenge to veterinarians and producers is to utilize known and emerging technologies to control anthelmintic resistance of gastrointestinal nematodes of livestock especially small ruminants such as sheep and goats.

Current Strategies

- Reduce the frequency of deworming
- Administer right dose of anthelmintics
- Buy drugs from reputed companies
- Monitoring of gastrointestinal nematode infection through regular faecal egg counts
- Provide safe pasture for grazing of animals
- Avoid using the same class of anthelmintic year after year
- Introduce annual rotation of anthelmintics
- Avoid wrong choice of anthelmintics and discontinue ineffective drugs
- Check the drenching gun is delivering the correct volume/dose of drug and administer all drops of drugs over the back of the tongue
- Undertake a post drench efficacy check of anthelmintics by examining faeces for presence of eggs
- Maximise the persistence of anthelmintics

by incorporating in sustained release device
- Maintain the animals on dry fodder or fasting prior to dosing
- Minimize the stocking rate of animals in farm/pasture land

Future Strategies

- Use of targeted selective treatments (TST) i.e. deworm only the worm infected animals and not healthy animals
- Follow the FAMACHA method for dosing anthelmintics in animals
- Looking for alternative methods such as vaccines, nematophagous fungi, condensed tannins, ethnoveterinary plant products and genetic selection of worm resistant animals for controlling the gastrointestinal nematodes
- Use of computer modeling of epidemiology of gastrointestinal nematodes, anthelmintic treatment and pasture management for effective control of gastrointestinal nematodes in livestock.

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Anthrax Resistance - an emerging global risk?

The term "Anthelmintic resistance" denotes the heritable ability of some nematode parasites to survive treatment with anthelmintic drugs at the recommended therapeutic dose levels. The genes responsible for resistance are present in many of the important pathogenic round worms of ruminants, horses and pigs. These genes are highly inheritable unless controlled or checked. The first report of anthelmintic resistance has been described in 1957 against phenothiazine in the USA. Anthelmintic resistance has become a worldwide problem especially in sheep and has been documented to all classes of anthelmintics. It should be also noted that Haemonchus contortus, being the most prevalent, was invariably the first nematode to develop resistance against different anthelmintics. The parasite once developed resistance to one anthelmintic, will also become resistant to other drugs from the same class (Single resistance). Some parasites develop resistance against different classes of anthelmintics at the same time (Cross resistance). Reports on anthelmintic resistance to all classes of drugs such as Benzimidazoles, Nicotinic agonists, Macrocyclic lactones etc. are fast emerging all over India including Tamilnadu.

Diagnosis

Suspect anthelmintic resistance when farmers report failure of anthelmintic treatment. Always anthelmintic resistance is best judged by faecal egg count rather than by suppression of clinical signs. A number of in vitro or in vivo tests can be used for detecting the anthelmintic resistance in nematodes of livestock. However, in vivo technique, Faecal egg count reduction test (FECRT) is the most practical method of determining resistance to anthelmintics by nematodes in sheep or other ruminants.

Faecal egg count reduction test (FECRT)

It is a simple and field friendly test that does not require highly trained personnel, extensive resources, sophisticated equipment or facilities. It can be applied to detect the development of resistance to all classes of anthelmintics and in all species of animals. The susceptibility or resistance of worms to anthelmintics is determined by comparing the faecal egg output (epg) in animals prior to and after 15 days after anthelmintic medication. When there is reduction of epg by more than 95 percent after fifteen days of treatment, the drug is susceptible. A reduction of epg less than 90 percent is indicative of resistance.

Test Protocol

Selection of animals

- Select 30 young animals of three to six months of age infected (egg count of 200 epg) with nematodes
- Divide them randomly into control and treatment groups of 15 animals each
- Animals should not have been dewormed in the previous 8 to 12 weeks

Fecal egg count

- Egg per gram (epg) of faeces should be counted as per modified McMaster method

Calculation

- Faecal egg count reduction% = 100(1-Xt/Xc)
  - Xt = arithmetic mean egg count of treated group at 15 days
  - Xc = arithmetic mean egg count of control group at 15 days

Treatment of animals

- Dose of drug is based on the weight of the heaviest animal in the group and according to the manufacturers recommended dose.

Collection of samples

- Five gram of faeces (10 to 15 pellets) should be collected from each animal directly from the rectum on (0 day) and 15 days after drenching from both control and treatment group.
- Place the faecal samples in air tight containers separately and transport to laboratory for counting the eggs in each sample.