



# ANTHELMINTIC RESISTANCE FACTSHEET SERIES

## RISK FACTORS FOR ANTHELMINTIC RESISTANCE IN SHEEP

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Anthelmintic Resistance (AR) occurs when gastrointestinal nematodes on a farm are only partially controlled by dewormers, so that resistant parasites remain in sheep after treatment. AR in sheep has been reported worldwide, and recently also in Ontario flocks. It is therefore important to identify those management practices that contribute to the emergence of AR, and to prevent its further development and spread in Ontario.

We conducted a systematic review of the international scientific literature on risk factors for AR, published during the last 35 years, when AR was first identified. We summarize here the findings from our review.

Frequent deworming has been associated with a four-fold increased risk of AR developing on a farm, compared to less frequent deworming. So, to slow the development of AR, you should only deworm those sheep that need treatment, when they need it - i.e. Targeted Selective Treatment. You can identify the more heavily parasitized sheep by regularly monitoring Fecal Egg Counts (FECs); using the FAMACHA<sup>®</sup> score to measure anemia levels; and by signs of diarrhea and loss in body condition.

There is evidence that use of long-acting dewormers (e.g. moxidectin) may increase risk of AR. As the dewormer drops to a sub-therapeutic level, moderately and highly resistant parasites will survive to contaminate pastures with resistant eggs. Long-acting dewormers should therefore only be used when the chance of animals getting re-infected with susceptible parasites is very high, e.g. when the pasture is highly contaminated.

There is also some evidence that AR develops more quickly when animals are dewormed and then moved

immediately to clean pastures (i.e. "drench-and-shift"). Resistant parasites that survive the deworming are the only parasites left to contaminate the clean pasture. To lower this risk, producers should either: (i) move their animals to clean pasture first, and then deworm them after a couple of days, or (ii) deworm their animals and leave them on the same pasture for a couple of days before moving them to a clean pasture. In both cases, animals will get slightly re-infected with susceptible parasites (but not enough to compromise animal health and productivity), and these parasites can then compete with any resistant parasites that survive deworming.

Grazing sheep with cattle (either together or rotationally) is no longer strongly recommended as the cattle may remove the dewormer-susceptible parasites on pasture. As a consequence, any resistant parasites present in the sheep will have no competition from the susceptible parasites, allowing them to re-establish within the sheep and rapidly increase in number.

Other management practices, such as the use of combination anthelmintic formulations and annual rotation of anthelmintic drug classes, have not yet been studied sufficiently. More information is needed before they can be recommended for regular use.

If you have any questions regarding this information, you may contact the authors or refer to the Handbook for the Control of Internal Parasites of Sheep and Goats at: [http://www.uoguelph.ca/~pmenzies/Handbook\\_Home.html](http://www.uoguelph.ca/~pmenzies/Handbook_Home.html)

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