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PARASITIC CHALLENGES IN SHEEP PRODUCTION

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Abstract: Infections caused by parasites are among the most dangerous health problems which affects sheep around the world. Parasitic infections can cause many problems including damaging the oesophagus, stomach, small intestine and large intestine, reduction feed efficiency, and leading to anaemia, weight loss, and, in severe cases, death. In addition to Internal parasites a range of external parasites such as blowflies, ticks, and mites, can attack sheep. External infections though less fatal can cause skin damage, irritation, and secondary infections. The combination these parasites add up to unintended expenses on farmers. In the recent decades scientific work enabled to understand parasite biology, life cycles, and epidemiology, which certainly had a positive impact on identifying key risk periods, host factors. While these affords also discovered new phenomenon called anthelmintic resistance, showing overreliance on traditional treatments are no longer effective. This report describes the major parasitic challenges sheep production in facing and evaluates how research has informed treatment protocols and regulatory guidelines.

Keywords: Sheep parasites; gastrointestinal nematodes; parasite control; anthelmintic resistance; sheep health; external parasites; research- based treatment; parasite epidemiology

Introduction and Background

Parasitic infections are one of the biggest constraints on sheep farming and one of the most important health challenges in grazing sheep farms. Among them infections caused by gastrointestinal nematodes (GIN) are most difficult to handle (Sutherland & Scott, 2010). Field investigations have revealed big difference in infection levels between lambs that was born in different type, gender, and breed, which shows complexity of host–parasite interactions (Idris et al., 2012). Research on life cycles of gastrointestinal nematodes and the favourable conditions support their transmission gives the valuable insights for timing of the treatments and grazing management (Sutherland & Scott, 2010). In the past, farmers have relied on anthelmintic treatments, but recent evidence shows resistance to the very methods is emerging, proving that this approach is unsustainable. Luckily alternative ways to eliminate GIN are on the horizons.



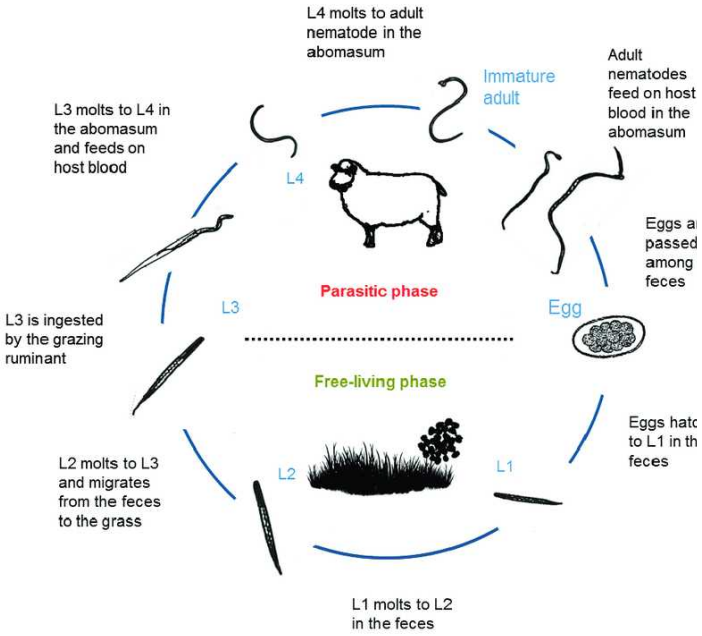
Picture 1. gastrointestinal nematodes Retrieved from: https://share.google/qjqBDhv3WfS9iHZPe

Literature Review

Major Internal Parasitic Challenges in Sheep

An article on GIN in sheep and cattle by Sutherland & Scott comprehensively describes how these parasites harm the gastrointestinal tract, damage feed efficiency, and cause diarrhoea, as a result weight loss, which in turn leads to economic losses for farmers (Sutherland & Scott, 2010). Studies on Epidemiology of the subject matter have provided clear understanding of GIN infections' distribution patterns within sheep farms. In Germany, Idris et al. (2012) measured faecal egg counts in lambs. He used different breeds and control groups, and found noticeable variation in natural GIN infections according to birth type, gender, and breed. According to this study female sheep in German Whiteheaded Mutton breed found to be the most susceptible to GIN. Idris et al. (2012) also mentions that proportion of infected sheep are higher in grazing lambs.

Another literature highlights that gastrointestinal parasites are posing risks to endangered breeds. A study of an autochthonous Portuguese sheep breed which is at risk of extinction indicates that helminth and protozoan infections can be the culprit to its reductions on numbers. This particular study reveals that parasitic disease treatment is also linked to genetics of sheep (Taylor, 2012). Overall, these articles reveal that internal parasites are both ubiquitous and significant in economic sense. Additionally, effective management must take into account the host's breed, gender, parasite's genome, and environmental factors.



Picture 2. Life cycle of gastrointestinal nematode (*Haemonchus contortus)*
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Anthelmintic Resistance and Sustainable Control Strategies

Anthelmintic resistance is the growing problem and this incidence has been documented in many pasture-based ruminant farms. Burke and Miller (2020) stated that it is becoming increasingly difficult to cure GIN in ruminants because of the growing prevalence of anthelmintic resistance. They argue that replacement of traditional control programs into more sustainable approaches should be done to prevent superparasite outbreak. According to Burke and Miller

(2020), abandoning drug use entirely does not solve the problem instead farmers should consider combining anthelmintics with alternative tools.

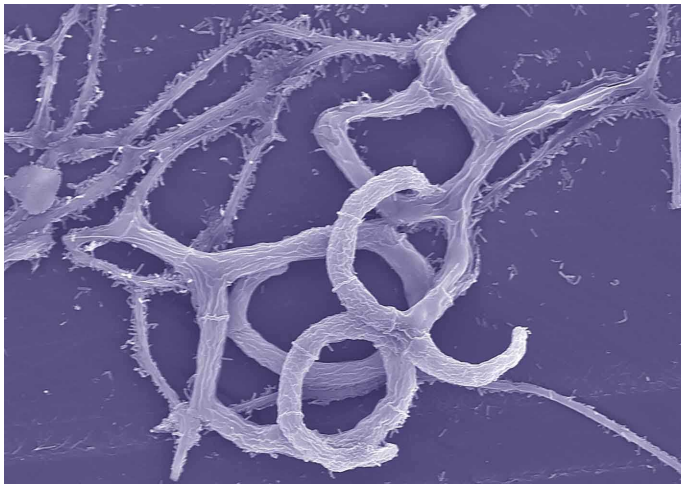
There are several alternative tools that will be discussed in this report. These alternative tools include copper oxide wire particles and condensed-tannin-rich forages, which can help to eliminate parasites such as *Haemonchus contortus* in sheep (Burke & Miller, 2020). Another alternative bio-control method is Nematophagous fungi. It reduces the number of larvae on pasture (Larsen, 2006).

At the same time, policy-maker's responses emerged. Working Group on Parasite Resistance is deployed by The Food and Agriculture Organization (FAO) in 1997 to give data driven advice on integrated parasite control in ruminants (FAO, 2004). The publication of FAO guidelines on resistance management and integrated parasite control in ruminants in 2004, is the result of this group's affords which provides compelling evidence on resistance and supports integrated control methods (FAO, 2004). Later other FAO documents mentions a surge in scientific articles about antiparasitic drug resistance in worms and ticks after 2004, which shows a growing awareness about drug resistance in sheep parasites (FAO, 2013).

Biological Control Approaches

Biological control agents worth mentioning in detail because they have been proposed as a very effective addition to integrated parasite management. Larsen (2006) reviews the potential of the nematode-destroying microfungus called *Duddingtonia flagrans* as a biological control method against GIN in sheep. If we look at the mechanism of this fungus, it forms sticky traps that inhibit developing larval stages of parasitic nematodes in the faecal environment (pastures) (Larsen, 2006).

Studies conducted in temperate climate fields in Denmark, for example, have shown that giving approximately half a million fungal spores per kilogram of live body weight per day to sheep may reduce pasture infestation by parasites and untimely lead to increased lamb production (Larsen, 2006). Importantly, another finding proves that *D. flagrans* has been found in fresh faeces of sheep appears to be a fungi that consistently capable of reducing infective trichostrongyle larvae in faeces, though the effect is relatively minimal (Larsen, 2006).



Picture 3. *Duddingtonia flagrans*
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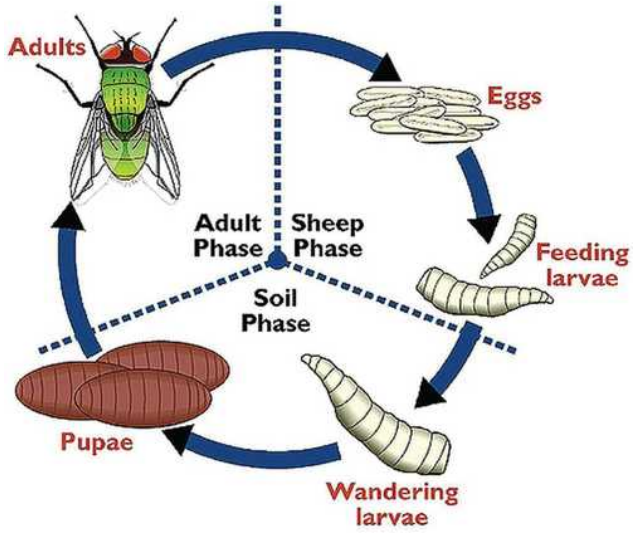
Major External Parasites and Their Impacts

External parasites, although less detrimental, also contribute to health problems in sheep. The book by Bates (2012) mentions that ectoparasites including lice have strong relationships with skin environment of host; for instance, bacteria on the surface of the skin play an essential role in the diet of the sheep- chewing louse *Bovicola ovis*. These findings suggest that differences in bacterial flora in sheep's skin can affect success of colonisation of host's skin (Bates, 2012). The review by Taylor (2012) further studies ectoparasites and concludes that if climatic conditions and husbandry practices change, risk and distribution of ectoparasitic diseases will be altered.

Blowfly Strike and Research- Informed Control

Blowfly strike or scientifically known as ovine cutaneous myiasis is a particularly significant ectoparasitic disease in small ruminants such as sheep. Lihou and Wall (2019) identifies blowfly strike as a widespread problem in sheep production, fly is abundant almost ubiquities which makes combating complex (Lihou & Wall, 2019). Their work describes the wide range of approaches adapted by many farmers weak. Lihou and Wall's (2019) research provides an effective framework for prophylactic actions by calculating the cost of control and the risk of strike. One of the methods Broughan and Wall (2006) suggested and evaluated is the use of fly traps. They reported that traps negatively effects fly populations in the area and therefor reduces the risk of strike in sheep (Broughan & Wall, 2006).

Regarding Plant and Lewis's (2011) review on treatment of ectoparasites in sheep. It discusses both chemical and non- chemical methods. Historically, over nearly a century, wool producers in England have relied on chemicals to eliminate the risk of blowflies, lice, and other ectoparasites, but that control proven to be ineffective due to the resistance developed in parasites to these compounds (Plant & Lewis, 2011).



Picture 4. Lifecycle of Blowfly *(ovine cutaneous myiasis)*
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Integrated Parasite Control and Regulatory Guidance

Together, the articles and books on internal and external parasites in sheep highlights three key subjects: the undeniable impact of parasitism on productivity and welfare; the antiparasitic resistance; and integrated, control and prevention strategies. Meanwhile, research on alternative treatment tools and FAO's resistance- management guidelines have helped farmers to navigate integrated parasite control methods in ruminants especially sheep and goat, (Burke & Miller, 2020;

FAO, 2004; Larsen, 2006). As for external parasites, many scientists worked on blowfly strike and other ectoparasite management with economic modelling, knowledge of climate–parasite relationships, and evaluation of specific interventions like fly traps these papers may be helpful for some farmers who are dealing with parasitic infections on their farms to make more rational and cost- effective decisions (Broughan & Wall, 2006; Lihou & Wall, 2019; Plant & Lewis, 2011).



Picture 5. Ranch Fly Traps
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Conclusion

Studies describe biology and epidemiology of GIN and show how it reduces profits of the farm and how infection patterns differ in different hosts. The need for integrated curing actions with diagnostics, selective treatment, alternative control is driven by the prevalence of anthelmintic resistance. International bodies including FAO, similarly, suggest integrated parasite combating techniques due to their long- term benefits. Research on biological control, gives compelling evidence that adapting sustainable alternatives will be possible with more research. Modern curing protocols and guidelines are research-based, and they play a crucial role in adapting sustainable parasite treatment methods in sheep farms.

Reference List

1. Bates, P. G. (2012). *External parasites of small ruminants: A practical guide to their prevention and control*. CABI.
2. Broughan, J. M., & Wall, R. (2006). Control of sheep blowfly strike using fly-traps. *Veterinary Parasitology*, *135*(1), 57–63.
3. Burke, J. M., & Miller, J. E. (2020). Sustainable approaches to parasite control in ruminant livestock. *Veterinary Clinics of North America: Food Animal Practice*, *36*(1), 89–107.
4. Food and Agriculture Organization of the United Nations. (2004). *Guidelines: Resistance management and integrated parasite control in ruminants*.

5. Idris, A., Moors, E., Sohnrey, B., & Gauly, M. (2012). Gastrointestinal nematode infections in German sheep. *Parasitology Research*, *110*(4), 1453–1459. https://doi.org/10.1007/s00436-011-2648-1
6. Larsen, M. (2006). Biological control of nematode parasites in sheep. *Journal of Animal Science*, *84*(Suppl. 13), E133–E139.
7. Lihou, K., & Wall, R. (2019). Sheep blowfly strike: The cost of control in relation to risk. *Animal*, *13*(10), 2373–2378.
8. Plant, J. W., & Lewis, C. J. (2011). Treatment and control of ectoparasites in sheep. *Veterinary Clinics: Food Animal Practice*, *27*(1), 203–212. https://doi.org/10.1016/j.cvfa.2010.10.012
9. Starkey, L. A., & Pugh, D. G. (2020). Internal parasites of sheep, goats and cervids. In D. G. Pugh, A. N. Baird, M. A. Edmonson, & T. Passler (Eds.), *Sheep, goat, and cervid medicine* (3rd ed., pp. 97–117). Elsevier.
10. Sutherland, I., & Scott, I. (2010). *Gastrointestinal nematodes of sheep and cattle: Biology and control*. Wiley-Blackwell.
11. Taylor, M. A. (2012). Emerging parasitic diseases of sheep. *Veterinary Parasitology*, *189*(1), 2–7.