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EPIDEMIOLOGY AND CONTROL OF *FASCIOLA HEPATICA* IN SHEEP IN MOROCCO

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L'infestation par Fasciola hepatica est à l'origine de pertes économiques majeures dans les élevages ovins au Maroc. Dans le but de déterminer les périodes à haut risque d'infestation et de définir une stratégie de lutte appropriée, une étude épidémiologique basée sur l'utilisation des moutons traceurs a été conduite sur une période de trois ans dans la zone pastorale du Moyen Atlas au Maroc. Au niveau du foie, la charge en douve était élevée en automne et en hiver, témoignant d'une infestation à la fin du printemps, ce qui était en étroite corrélation avec l'activité des limnées dans la région.
L'évaluation des gains inhérents aux traitements anthelminthiques a montré que les agneaux traités avec un douvicide avaient un gain de poids de 13,07 kg en 7 mois, tandis que chez le groupe témoin, ce dernier n'était que de 6,67 kg au cours de la même période. Aucune mortalité n'a été enregistrée dans le groupe traité, alors que le taux de mortalité était de 20% dans le groupe témoin. Le taux d'agnelage était de 92% dans le groupe traité et de 76% seulement dans le groupe témoin. A la naissance, le poids moyen des agneaux était de 3,5 kg chez le groupe de brebis traitées et de 2,8 kg dans le groupe témoin. Cette étude a permis de déterminer les gains apportés par un traitement anthelminthique chez les brebis et leur agneaux dans une région endémique de fasciolose. En somme, l'élimination de la douve a permis d'améliorer notablement la production ovine, de faire diminuer le taux de mortalité et de prévenir l'infestation.

EPIDEMIOLOGY OF FASCIOLIASIS IN THE MIDDLE-ATLAS

In the rangeland of the Middle-Atlas the sheep population is estimated to comprise over 22% of the total of the national herd. Although, sheep breeding is the major source of income for rural communities, it remains inadequate because of sheep malnutrition, traditional management and serious losses in productivity caused by fascioliasis in the animals.

A three-year study conducted in the Middle-Atlas (Noth-central Morocco) demonstrated that the primary periods of fluke transmission occur in spring and fall (Khallayoune et al, 1991). Previous studies on the epidemiology of bovine fascioliasis in the Gharb (North-western Morocco) had indicated a similar infection pattern (Ouragh, 1973). However, in the Haouz area (Southern Morocco), the majority of livers condemned at meat inspection were seen in the fall and winter, suggesting high infection rates of sheep during the spring and summer, which coincided with the increased density of *L. truncatula* (Khallaayoune & El Hari, 1991). These results had limited significance, because they were based on an abattoir survey and conducted over only a one-year period.

In grazing sheep, high incidence of fascioliasis occur during fall and winter with a marked peak in November. During this period, fluke burden in infected sheep can reach up to 345 which is sufficiently heavy to cause a clinical form of the disease. Variations in fluke burdens among infected sheep reflect an irregular distribution of metacercariae on the pasture (Armour, 1975). Moreover, only a very few infected snails are found (2%) and the infection rate does not correlate with the timing and the level of infection, probably because the cercariae may have already been released and encysted on the herbage by the time the snail samples are obtained. However, even low infection rates in snails have been known to be adequate for the induction of infections in grazing sheep (Boray, 1969).

On the basis of seasonal patterns in the transmission of *F. hepatica* observed in the Middle-Atlas, it is suggested that at least two anthelmintic treatments with a flukicide be administered to minimize economic losses in sheep; one in late spring and the other in late fall. Additional treatment may eventually be advisable in mid or late winter to remove flukes that were not affected by the flukicide, and thus reduce pasture contamination with fluke eggs, consequently reducing potential infection of the spring snail population.

CONTROL OF FASCIOLIASIS

Khallaayoune and Stromberg (1992) conducted a field trial to compare the production advantages afforded by treatment with an anthelmintic that would remove both lungworms and gastro-intestinal (GI) helminths, or an anthelmintic that would remove liver flukes as well as lungworms and GI helminths, against an untreated control group. In grazing sheep, liver fluke infection was found to result in significant mortality rate in both lambs and ewes. However, a major consideration had to be that the mortality rate may have varied from one year to another, depending on weather conditions that subsequently resulted in poor feeding conditions and increased parasitism. The average level of infection recorded in the sentinel sheep maintained on the same pasture was found to vary from 3 to 174 flukes (Khallaayoune et al, 1991). This level of infection was assumed to be similar to the study flock exposure during this period.

Furthermore, in addition to the high susceptibility of pregnant ewes to fluke infection (Sinclair, 1972), poor nutrition in mid and late pregnancy period may also contribute to a high rate of still births and abortions in control sheep. In a fenbendazole treated group, Khallaayoune and Stromberg (1992) found that lambs gained less weight than those treated with albendazole, probably because of the high level of fluke infection that developed in these animals over this time period. At the beginning of the trial, lambs weighed an average of 11.5kg, when they were 3-4 months of age. At this age, lambs were still very susceptible to helminth infections and may not have been able to resist subsequent infections with *F. hepatica* and other worms. This demonstrated the effects of fluke infection on sheep production because, although sheep were treated against gastrointestinal helminths and lung worms with fenbendazole, they did not attain the same level of productivity as was observed in those treated with albendazole.

CONCLUSION

The study using sentinel sheep in the Middle-Atlas over a three year period in correlation with the seasonal variation in snail activity suggested that transmission of *F. hepatica* occurs twice a year, in spring and fall. The production trial demonstrated that treatment with a flukicide at the end of these two transmission periods, late spring and late fall would significantly improve the weight gains, reproductive efficiency and condition when compared to an untreated control group. Similarly, treated lambs grew better than their untreated counterparts. It is suggested that similar studies be conducted in other parts of Morocco in order to develop an integrated control strategy that would reduce the economic impact of the infection. Demonstration of the cost-benefits of strategic anthelmintic treatment for the fluke infection in different areas may convince the local producers of its value.

REFERENCES

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