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THE EVALUATION OF ANTIHELMINTHIC EFFICIENCY OF TRICLABENDAZOL AND NITROXINIL WITH THE TEST OF EGGS REDUCTION IN SHEEP

Përmbledhje: Delet në Shkodër konsiderohen si kafshët më të rëndësishme për prodhimet e tyre blegtorale. Delet në qarkun e Shkodrës janë burimi kryesor i të ardhurave nga bujqësia. Dominojnë racat e vendit dhe kryqëzimet me racat e importuara, të tilla si: Merinos, kokëbardha gjermane, cigaja, malorja e Dagestanit, merinosi i Kaukazit, Suffolk dhe racat për lesh, të tilla si karakul etj. Prodhimtaria e deleve dëmtohet prej helmintëve (trematodëve etj). Ne kemi aplikuar dy dehelmintizime: i pari në pranverë dhe i dyti në vjeshtë, por një problem i vazhdueshëm mbetet ende efikasiteti dhe rezistenca antihelmintike. Përdorimi efikas i protokolleve me substanca antitrematode në dele është me interes të madh jo vetëm për shëndetësimin e tufave, duke mbajtur nën kontroll infestimin nga fascioloza, por gjithashtu në rritjen e prodhimit të kafshëve. Studimi tregoi efikasitetin e antitrematodëve triclabendazol dhe nitroxinil, duke kaluar nëpër testin e reduktimit të vezëve. Delet u ndanë në dy grupe. Grupi A (n = 30) u trajtua me medikamentin Tri-ABZ-s 8.75 (Triclabendazol 5% + Albendazol 3.75%). Ky bar u përdor në dozën 1 ml /5 kg peshë të gjallë, nga goja (8 ml /për kokë). Grupi B (n = 30) u trajtua me barin Topnitroxi (Nitroxinil). Ky bar u përdor në dozën 1 ml/25 kg peshë të gjallë, nën lëkurë në shpatull (8 ml /për kokë). U morën mostra feçesh nga të dy grupet për evidentimin koproskopik, para trajtimit dhe 21 ditë pas trajtimit. Pas kryerjes së provave koproskopike kemi konstatuar efikasitet më të lartë të nitroxinilit ndaj fasciolozës. Kjo u provua nga ndryshimi në numrin e vezëve që janë reduktuar deri në 50% në grupin e dytë. Efektshmëria e barit nitroxinil në lidhje me triclabendazol i dedikohet rrugës parenterale të aplikimit si dhe përdorimit të tij për herë të parë. Pra nitroxinili ka një efektshmëri më të lartë kundër trematodëve.

Fjalë kyçe: *dele, triclabendazol, nitroxinil, efikasitetit, trematod.*

Abstract: Sheep in Shkodra are the most important animals considering their livestock productions. Sheep in Shkodra district are the main source of income from farming. The breed of the country and metise with the imported races such as merino, the German white-

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head, cigaja, Dagestanian mountainous, Caucasus merino, suffolk and the breeds for fur such as karakul etc. The production of sheep is damaged from helminths (trematods etc.). Sometimes we apply two dehelmentizations, first in spring and second in autumn, but a continuous problem still remains efficiency and antihelminthic resistance. The efficient use of protocols with antitremaadote substances in sheep is of a great interest not only for the health of the herd, keeping under control the fascioliasis infestation, but also in the growth of animal production. The study evaluated the efficiency of antitremaadote triclabendazol and nitroxinil by undergoing the test of egg reduction. The sheep were divided in two groups. Group A (n=30), was treated with the medicament Tri-ABZ-s 8.75 (Triclabendazol 5% + Albendazol 3.75 %). The medicament was used in a dosage of 1 ml/5 kg live weight from the mouth (8 ml/head). Group B (n=30) was treated with the medicament Topnitroxi (Nitroxinil). The medicament was used in a dosage of 1 ml/25 kg live weight s/c in scapula (2 ml/head). Faeces were taken as samples from the two groups which submitted coproscopic evidence before treatment and 21 days after treatment. After performing the coproscopic evidence we noticed the highest efficiency of nitroxinil against fascioliasis. This was proved by the difference in the number of eggs which were reduced sometimes until 50 % in the second group. The efficiency of nitroxinil in relation with triclabendazol belongs to the parenteral way of application as well as the use for the first time in this herd, and the Nitroxinil which is used rarely has a higher efficiency against trematodes.

Key words: *sheep, triclabendazol, nitroxinil, efficiency, trematode.*

INTRODUCTION

Shkodra is a district in north of Albania where sheep are bred. The sheep are bred among the breed of the country and the improved breeds. They live under half ½ intensive regime. Usually the farmers apply 2 dehelmentisations per year one in spring and the other in autumn. In practice they do not apply the routine rotation between antihelminths in this district. It must be pointed out that the year 2010 makes up a unique case study for the conditions of the area. The rains and humidity of this year, the once and again floods of the area around Shkodra will definitely reflect an increase in the infestation of parasites. The reason is related to the creation of almost ideal conditions for the realization of the biological cycle of parasites. Conditions like in 2010 strongly stimulate the biology of the intermediate hosts. The aim of the study were trematodes and especially the eggs (prevalence and parasitic load) of *Fasciola hepatica* (Fasciolidae family Railliet, 1895 of the type Platyhelminthes) a trematode of the liver to which we attribute the most severe damages of productivity in sheep. We exploited the routine dehelminthisation of spring 2010 and the sheep were divided in three parts around Shkodra Lake and in each economy (in 3 sheep farms) we created three groups of 10 head. The groups included sheep of different ages from the herd (WHO, 1995). In advance we defined the number of eggs in faeces per individual. Afterwards in the first group (in 3 farms) we used Triclabendazol in the dosage 1 ml/5 kg weight from the mouth. In the second group (in 3 farms) we used the medicament Topnitroxil in the dosage 1 ml/25 kg live weight s/c (Biba, 2007). The third group (in 3 farms) consisting of 10 head was not treated with antitremaadote and served as the control group. Individually for each animal by preserv-

ing the individual criterion we sampled and examined faeces before treatment and 21 days after treatment. We calculated the parasitic load with the technique of sedimentation (quantitative). The evaluation of efficiency among medicaments was done based on the comparison of results among groups and evaluation of egg reduction of the individuals of one group, before and after treatment.

MATERIALS AND METHODS

We sampled faeces from 180 sheep (90 samples in the moment where aplicated the study and 90 samples 21 days after dehelmentisation) individually and directly to rectum. Samples were examined in one day with the technique of quantitative sedimentation and the prastic load per head was evaluated. The animals that formed the groups were selected randomly where each group represented the herd, but in it we included only the sheep that resulted copropositive. The sheep of the first group were treated with Tri-ABZ-s 8.75 (Triclabendazol 5% + Albendazol 3.75 %) in the dosage 1 ml/5 kg weight from the mouth. The sheep of the second group were treated with Topnitroxil (Nitroxinil) in the dosage 1 ml/25 kg live weight s/c. The third group was not treated with antitremaodotes. 3 weeks after treatment we sampled the faeces of sheep again according to the groups and we calculated the parasitic load individually again. We did the individual compariosons and evaluations among individuals and among animal groups. In both methods of evaluation the parenteral use of nitoxinil resulted more efficient in the level of the group, in the parasitic load among the groups of work, in the test of egg reduction between groups of work and the control group and with the reduction in the number of eggs between the control groups.

RESULTS AND DISCUSSIONS

In the following tables we present for every farm the results of the coproscopic examination in the control group and in both groups of work before dehelmintisation.

Farm 1. The coprological results at the first moment of the study.

Group A

Nr.	1	2	3	4	5	6	7	8	9	10
Eggs	36	72	94	60	36	24	72	48	60	132

Group B

Nr.	1	2	3	4	5	6	7	8	9	10
Eggs	48	24	60	84	96	72	60	60	144	12

Group C

Nr.	1	2	3	4	5	6	7	8	9	10
Eggs	48	60	84	74	12	14	120	36	72	24

In the following tables we present the results of the coproscopic examination 21 days after dehelmintisation.

Group A

Nr.	1	2	3	4	5	6	7	8	9	10
Eggs	12	24	–	12	–	–	36	12	–	24

Group B

Nr.	1	2	3	4	5	6	7	8	9	10
Eggs	–	–	6	–	12	–	–	–	6	–

Group C

Nr.	1	2	3	4	5	6	7	8	9	10
Eggs	60	60	96	72	24	36	120	48	72	36

Farm 2. The results of coproscopical examinations at the moment of the study.

Group A

Nr.	1	2	3	4	5	6	7	8	9	10
Eggs	60	84	96	120	60	84	60	38	160	120

Group B

Nr.	1	2	3	4	5	6	7	8	9	10
Eggs	60	120	72	96	120	180	160	84	168	240

Group C

Nr.	1	2	3	4	5	6	7	8	9	10
Eggs	88	60	104	54	36	160	80	48	84	60

In the following tables we present the results of the coproscope examination 21 days after dehelmintisation.

Group A

Nr.	1	2	3	4	5	6	7	8	9	10
Eggs	12	24	–	36	–	12	12	–	–	24

Group B

Nr.	1	2	3	4	5	6	7	8	9	10
Eggs	–	–	6	–	12	–	–	–	6	–

Group C

Nr.	1	2	3	4	5	6	7	8	9	10
Eggs	96	60	120	60	36	144	92	60	90	72

Farm 3. The coprological results at the first moment of the study.

Group A

Nr.	1	2	3	4	5	6	7	8	9	10
Eggs	36	72	94	60	36	24	72	48	60	132

Group B

Nr.	1	2	3	4	5	6	7	8	9	10
Eggs	48	24	60	84	96	72	60	60	144	12

Group C

Nr.	1	2	3	4	5	6	7	8	9	10
Eggs	48	60	84	74	12	12	120	36	72	24

In the following tables we present the results of the coproscopie examination 21 days after dehelmitisation.

Group A

Nr.	1	2	3	4	5	6	7	8	9	10
Eggs	12	24	–	12	–	–	36	12	–	24

Group B

Nr.	1	2	3	4	5	6	7	8	9	10
Eggs	–	–	6	–	12	–	–	–	6	–

Group C

Nr.	1	2	3	4	5	6	7	8	9	10
Eggs	60	60	96	60	24	36	120	48	72	36

In the control groups where animals were not treated with antitremadotes we noticed a stationary state with a tendency of parasitic load increase only in separate individuals. An increase in the number of eggs of *Fasciola hepatica* was noticed for a small number of individuals. In the second group which was treated with triclabendazol we noticed a considerable reduction in the parasitic load. However the efficiency was up to 50 % in half of the head of the group. Despite reduction the individuals continued to result copropositive in the second examination. We must also put the emphasis on the risk that the use of triclabendazol presents during the period of milk/lactation which coincides to the dehelmitisation of spring, and the risk of abortion during insemination which coincides to the period of autumn in the practical routine of the two dehelmitisations programmed in sheep (Moll *et al.*, 2000). In the third group which was treated with nitroxinil we noticed a higher reduction in the number of eggs compared to the results of the second group. Despite the high-

er reduction in the number of eggs even the efficiency was higher. An efficiency of 80% is acceptable considering the pharmacological data of the proprietary and the time during which it was prepared. This is for a wider spectrum, the parenteral way of application (proved even with the eggs of other trematodes such as *Dicrocoelium dentriticum*) (Plumb, 1999). We think that one of the main reasons is minimization of chemoresistance. This is for the reason of frequent use sometimes even more than twice a year, without evaluating the parasitic load of albendazol in advance (Lacey, 1990). We think that another reason is the higher efficiency of nitroxinil to the adult egg production forms of *F. hepatica*, because in the study we didn't consider the migratory phase which has to be seen in autumn when these larvae will be adults and will start to produce eggs again. The advantage of nitroxinil application is also related to the fact that it is used in the period of impregnation and is eliminated little with milk which happens in spring dehelmetation. Nitroxinil has antitrematode protocols with a lower cost, because it is sufficient with only two dehelmintisations per year (spring, autumn) and for the cases with a high scale of infestation. We think that because it is used really rarely it minimizes the possibility of the appearance of chemoresistance (Wolstenholme *et al.*, 2004). Nitroxinil is active against the adult forms and the immature forms of fascioles (such as *F. hepatica* and *F. gigantica*) and at the same time it acts properly upon the new forms 4–6 weeks of fascioliasis that in our country it coincides with spring re-infestation. It has really good effects of fascioliasis because of the separation of oxidation fosforilations (Coles, 2006). It is eliminated really slowly up to 40 days and it continues the fascioliasis action in optimal limits. The therapeutic dosages might be used in sheep even during lactation and pregnancy, except for the fact that they could be accompanied together with tiabendazol against infestations from trematodes and nematodes (Goodman & Gilman, 1996). The data submitted a statistical processing. According to this the processing with probability 95 % or $\alpha = 0.05$ we confirm the data among the groups of work and the control group ($t_{Stat} = 5.696129$). The statistic changes are in this case really significant ($\chi^2 = 118.57$). The statistic changes between the two groups of work for the coproscopic examinations statistically have no changes ($P = 0.95$, $t = 0.048729344$) although the changes are evident in numeric values.

CONCLUSIONS

In a year like 2010 we would recommend treatment with nitroxinil because the changes in the flooded area of Shkodra and sub Shkodra will be accompanied by an increase of parasitic infestation due to favouring of the biology of the intermediate hosts and as a result severe damages of the efficiency in sheep which will strongly be reflected in the coming autumn and winter.

The comparative experimentation of the antifascioliasis efficiency between the two antitrematodes of triclabendazol and nitroxinil proved that the antitrematode of nitroksinil has farmacological efficiency up to 80 % in proportion with triclabendazol up to 45–50 %. This efficiency was proved by means of the eggs reduction test in faeces.

The use of nitroxinil has a lower cost; it is used only twice a year and can be used during pregnancy and lactation. Its rare use (almost no use at all) excludes the possibility of chemioresistance.

The use of nitroxinil also presented a wider spectrum of action which was also proved by the elimination of other trematodes.

However we would strongly recommend the rotations every ½ a year of the antitrematodes and their use as rarely as possible only when it is indispensable, but always after the evaluation of the parasitic load.

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