Therapeutic management of eimeriosis in a broiler chicken farm

Ionuț Răzvan DOBRE, Diana Mihaela ALEXANDRU, Maria CRIVINEANU
Faculty of Veterinary Medicine Bucharest, 105 Independentei Street, district 5
drrazvandobre@gmail.com

Abstract
The growth of poultry for meat has undergone a spectacular evolution over the last 20 years. Chicken broilers were obtained with outstanding performances, the breeding and feeding technology was perfected, progress was made in ensuring health, biosecurity and well-being. The aim of the present study is to analyze the incidence of the appearance of eimeriosis according to the therapeutic strategies approached in a farm, the efficiency of the coccidiostats and the contribution that the climatic conditions bring in their action. The study was conducted in an exploitation with several farms distributed in different counties, which, in order to cover the need to populate all farms, imports chickens from the Cobb 500 breed from Slovakia and Hungary. Depending on the therapeutic strategy addressed against eimeriosis, the feeds contain different coccidiostatic drugs, their homogenization being done in the combined feed factory after the decision previously made by the veterinarian of the farm. Depending on the location of the farm, the climatic conditions in the area and the pathological background, different treatment programs are established. The introduction of coccidiostats is made from the first day until day 37-38, after two programs: full and shutlle. In the last 4-5 days their use is stopped, according to the legislation, to respect the waiting time until slaughter. The full program involves the administration of a single coccidiostat throughout a series, without repeating it, two series in a row, while the shutlle program involves the combination of two coccidiostats, usually in the first 15 days, a synthetic one, followed by an ionophore. Based on the necropsies it was concluded that the eymeriosis was caused by 3 species of Eimeria which evolved on the farm, with the highest incidence being Eimeria tenella (up to 65% of the necropsied cases). According to the mortality rates, the efficiency of the shutlle program is clearly superior to the full program, thus recommending its use especially in cold periods.
Keywords: *eimeriosis, broiler chicken, therapeutic management*

Introduction

The growth of poultry for meat has undergone a spectacular evolution over the last 20 years. Chicken broilers were obtained with remarkable performances, the breeding and feeding technology was perfected, progress was made in ensuring health, biosecurity and well-being [7, 9].

Eimeriosis is one of the main enemies of chicks and farm veterinarians, so it is closely monitored from day one. The well-established prophylaxis measures and the correct interpretation of the intestinal lesions observed as a result of the necropsies cause the disease evolution to be stopped, thus preventing the loss of growth [5, 6].

The aim of this study is to analyze the incidence of the appearance of eimeriosis according to the therapeutic strategies approached in the exploitation, the efficiency of the coccidiostats and the contribution that the climatic conditions bring in their action.

Materials and methods

The study was conducted in an exploitation with several farms distributed in different counties. To cover the need to populate all farms, they import from Slovakia and Hungary chickens of the Cobb 500 breed, a meat breed with the same performance as the Ross 308 breed(Table 2).

Depending on the therapeutic strategy against eimeriosis, the feed contains different coccidiostatic drugs. Their homogenization is done in the combined feed factory after the decision is taken in advance by the veterinarian of the holding. Depending on the location of the farm, the

climatic conditions in the area and the pathological background, different treatment programs are established (Table 1) [4, 6].

The administration of coccidiostats is made from the first day until day 37-38, after two programs: full and shutlle. In the last 4-5 days their use is stopped, according to the legislation, to respect the waiting time until slaughter. The full program used on the farm involves the administration of a single coccidiostatic throughout a series, without its repetition, two series in a row [1, 8]. The shutlle program involves the combination of two coccidiostats, usually in the first 15 days, a synthetic one, followed by an ionophore.

Table 1. Coccidiostats used in the farms

Coccidiostat	Active substance	The quantity used for 1 ton of feed	Type of coccidiostat
Maxiban	Nicarbazin	500 g	Chemical
Sacox	Salinomycin	500 g	Ionophore
Avatec	Lasalocid	700 g	Ionophore
Monteban	Narasin	700 g	Ionophore
Coxiril	Diclazuril	500 g	Chemical
Coxidin	Monensin	600 g	Ionophore
Elancoban	Monensin	600 g	Ionophore
Cygro	Maduramicin	500 g	Ionophore

If the coccidiostats do not have 100% efficiency and the diagnosis of eimeriosis is established in the halls, a treatment with Cooccistop is instituted for 3 days. This product contains Sulfaquinoxaline, Vitamin K and Vitamin C, and it is introduced into drinking water in order to lower the rates of morbidity and mortality [2].

The regulation and monitoring of the climatic conditions in the halls is computerized. In the months when the temperatures differ much from those in the halls, maintaining optimum humidity is almost impossible due to the created condensation. This leads to the appearance and spread of eimeriosis, thus increasing the rates of morbidity and mortality. Increased feed and water consumption are the first warning signs of the disease. Good hall monitoring and timely temperature regulation can slow the spread of the disease [3, 5].

The diagnosis was established by correlating the clinical signs with the results of the anatomical-pathological examinations [2].

Results and discussions

Table 2. The halls studied in the first period

The hall	Start date of the technological process	Number of chicks	Coccidiostatic treatment
Hall 7 A	03.11.2017	17.250	Shutlle – Maxiban(15 days)+Elancoban
Hall 3 B	18.11.2017	19.500	Full - Maxiban

Hall 4 C	07.12.2017	18.200	Shutlle - Coxiril(15 days)+Avatec
Hall 2 D	20.01.2017	21.120	Full – Sacox

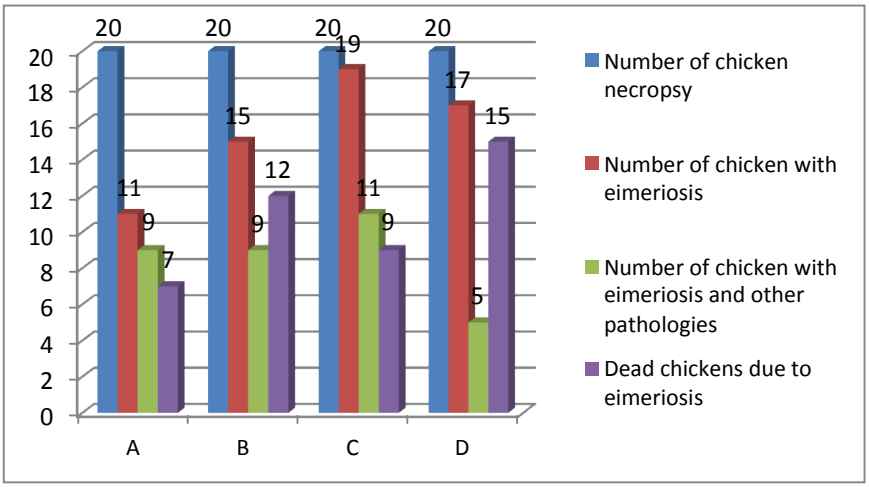

Fig. 1 Graphical representation of the results obtained after the necropsies

As it can be seen, the death of chickens due to eimeriosis was considerably higher in the halls from localities B and D, where the administration of coccidiostats in feed was done according to the full program (Fig 1).

Hall 7 from the locality A

After performing the necropsies of 20 birds it was observed that: 7 had intestinal lesions of score 3 and 4 due to eimeriosis; Eimeriosis was present in 4 of them, but this was not the cause of death, and the remaining 9 died from other causes (Fig 3). The treatment scheme used was shutlle - in the last 5 days Maxiban was given in feed - a synthetic coccidiostat, and in the rest of up to 38 days Elancoban – ionophore (Fig 2).

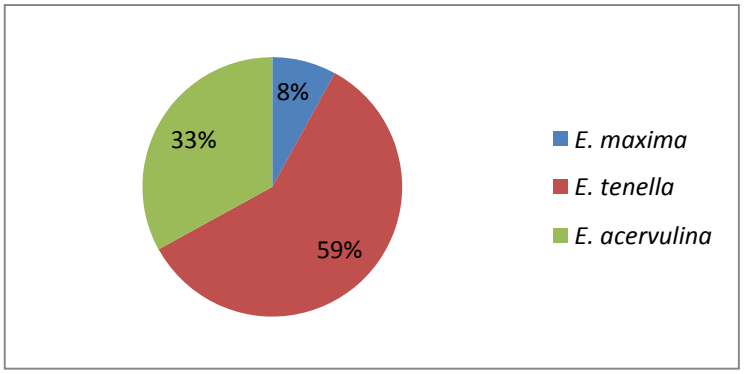

Fig. 2 Percentage representation of Eimeria species found in Hall 7 A

Hall 3 from the locality B

In this hall Sacox was administered throughout the chickens growth. The necropsy of 20 birds was performed and it was observed that: at 12 of them the intestinal lesions caused by eimeriosis were the cause of death, 3 had signs of eimeriosis but according to the lesion scores they did not represent the cause of death, and the remaining 5 had only other pathologies. Sacox, the ionophore coccidiostatic used, has the active substance salinomycin sodium and acts on *Eimeria* schizonts by limiting the damage to the intestine. It has been found to have a low efficiency in the full program, due to the fact that its action on the parasites interferes with the humidity in the hall and with the evolution of other diseases (Fig. 4).

Fig. 3 Hemorrhagic typhlitis –
lesion score 4 produced by *Eimeria tenella* (original)

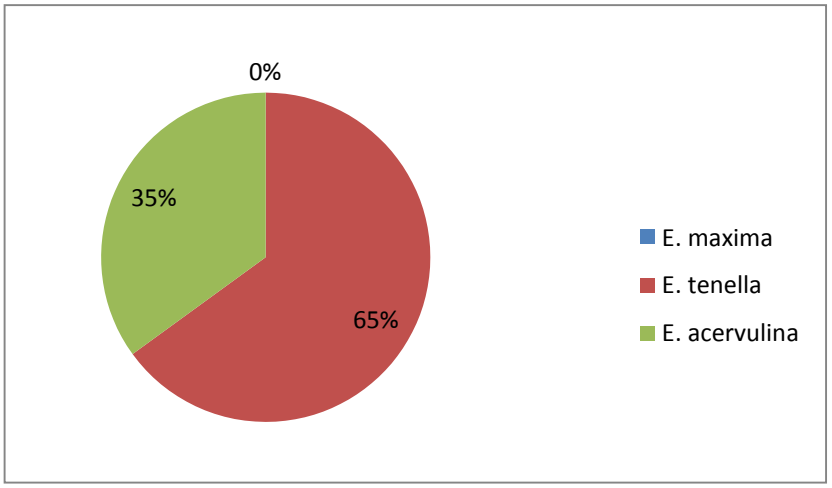

Fig. 4 Graphical representation of eimeriosis by species in Hall 3 B

Hall 4 from the locality C

Of the 20 cases with eimeriosis, only 9 had intestinal lesions of scores 3 and 4, which were also the cause of death and 11 chicks died from other causes. The coccidiostats administration

program was shutlle - Coxiril, a synthetic product, during the first 5 days, and Avatec, an ionophore, for the remaining 18 days.

Fig. 5 The upper third of small intestine - *Eimeria acervulina* (original)

Hall 2 from the locality D

After the necropsies of 20 birds it was observed that: 17 had eimeriosis and 15 of them died because of it; 2 birds had injuries caused by *Eimeria* but this was not the cause of death and 5 had other pathologies. During the rearing, the chicks were treated in full program with Sacox - an ionophore(Fig. 5,6 and 7).

Fig. 6 Hemorrhagic typhlitis produced by Eimeria tenella (original)

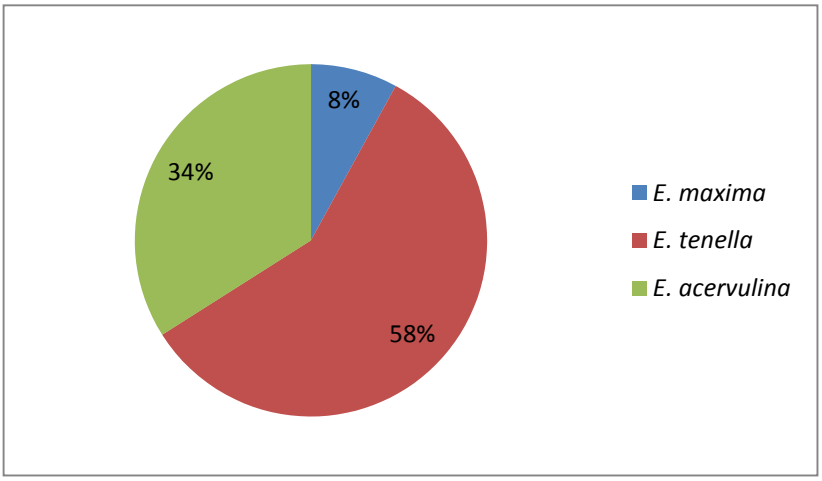

Fig. 7 Percentage representation of *Eimeria* species found in Hall 2 D

Table 3. *Eimeria* species found after the necropsy in the 4 halls

Hall	*Eimeria tenella*	*Eimeria acervulina*	*Eimeria maxima*
7 A (11)	7	4	1
3 B (15)	11	6	0
4 C (9)	3	6	0
2 D (17)	15	9	2

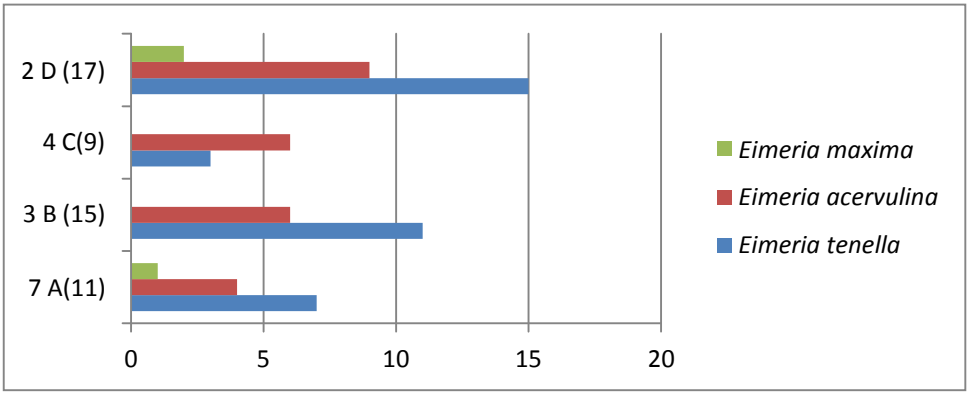

Fig. 8 Graphical representation of the incidence of the 3 species of *Eimeria* found in chickens in the first part of the study

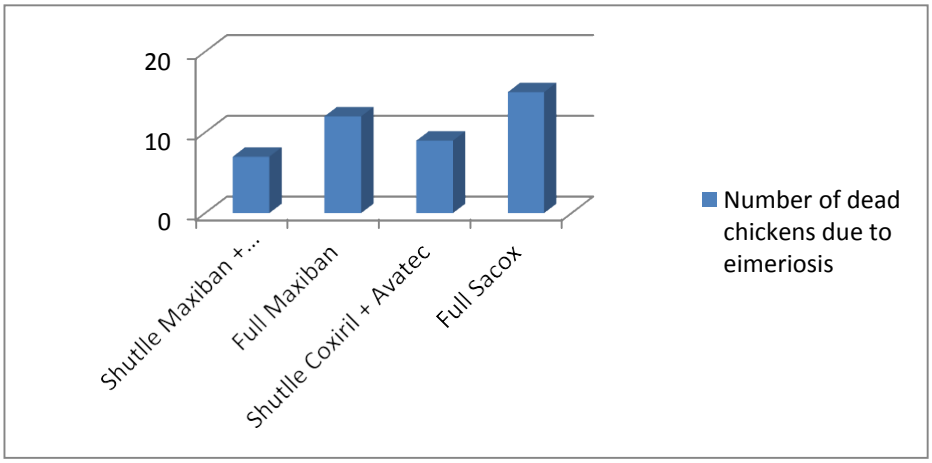

Fig. 9 Number of dead chickens due to eimeriosis depending on the used coccidiostat

As noted, the highest mortality rate is recorded following the administration of the Sacox coccidiostat in the full program. The most effective treatment method was the shutlle method with Maxiban and Elancoban, with the lowest mortality rate recorded(Table 3, Fig 8 and 9).

Table 4. Number of chickens and mortality rate

Hall	Number of chickens first day	Number of chickens last day	Mortality rate
Hall 7 A	17.250	16.601	3,76 %
Hall 3 B	19.500	18.486	5,22 %
Hall 4 C	18.200	17.581	3,40 %
Hall 2 D	21.120	20.107	4,81%

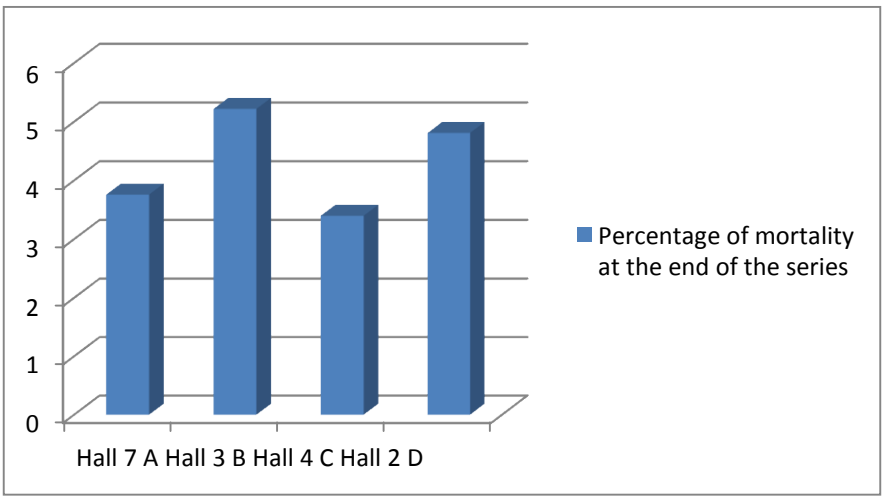

Fig 10. Graphical representation of the mortality rate in each hall at the end of the series

As you can see, the differences are significant between the halls. In the halls where coccidiostats were administered in the full program, the losses at the end of the series were noticeably higher than those treated according to the shutlle program. It was shown that in hall 7 of the locality A the mortality rate was higher than usual due to a technological error: the feed was not properly homogenized, so a number of chickens were deprived of the necessary dose of coccidiostat (Table 4 and Fig.10).

Conclusions

1. According to the necropsies performed, the eimeriosis found in the farms was caused by 3 species of *Eimeria*, with the highest incidence being *Eimeria tenella* (up to 65% of the necropsied cases).
2. According to the mortality rates, the efficiency of the shutlle program is clearly superior to the full program, thus recommending its use especially in cold periods.
3. Following the administration of the synthetic coccidiostats in the full program, lower mortality rates were observed compared to the mortality rates obtained after the administration of the ionophores in the full program, during the cold periods.
4. Ionophoric coccidiostats used in the full program during periods without critical temperatures have the same results as those of synthesis.

Bibliography

1. AHAD S, TANVEER S, MALIK TA,(2015) Seasonal impact on the prevalence of coccidian infection in broiler chicks across poultry farms in the Kashmir valley. J Parasit Dis.
2. BEATRIS CORINA ANCUCEANU, (2011) Contribuții la studiul etiologiei, patogenezei si prevenirii eimeriozeipuilor de găină crescuți in sistem intensive - Lucrare de doctorat, Universitatea de Științe Agronomice si Medicină Veterinară din București, Facultatea de Medicină Veterinară, specializarea: Medicină Veterinară, sesiunea iulie 2011, indrumător științific Prof. Univ. Dr. DIDĂ I.
3. CHAPMAN H.D.,(2014) Milestones in avian coccidiosis research; Poultry Science 93, pp. 501-511.
4. CRIVINEANU M., (2011) Farmacologie veterinara, Ed. Printech, Bucuresti
5. LANDMAN, H.W. and PEEK, (2011) Coccidiosis in poultry: anticoccidial products, vaccines and other prevention strategies. Veterinary Quarterly Vol. 31, No. 3, pp. 143 -161
6. MITREA I.L., (2011) Parazitologie si boli parazitare, Editura Ceres, București
7. VASCAN I., (2013) Creșterea păsărilor, www.scribd.com, 10 iunie 2013
8. WATSON B.C., MATTHEWS J.O., SOUTHERN L.L., SHELTON J.L., (2005) The interactive effects of Eimeria acervulina infection and phytase for broiler chicks, Poultry science, 84: 910-913
9. WILLIAMS R.B., (2006) Tracing the emergenece of drug resistance in coccidia of comercial broiler flocks medicated with decoquinate for the first time in the U.K., Veterinarian Parasitology.