

OBSERVATIONS IN A COLIBACILLOSIS OUTBREAK IN PIGEONS

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Abstract

The research was conducted during 2014-2016 in a racing pigeon loft, which were divided into 3 categories: flying batch, breeding batch and young. The symptoms that occurred were consisting in digestive manifestations such greenish profuse diarrhea, with foul-smelling and dehydration. In order to establish the diagnosis, a physical, a laboratory and a pathological examination has been conducted. An infection with Escherichia coli was confirmed, thereafter, an appropriate treatment was applied according to the antibiotic sensitivity result. The affected pigeons were divided into two batches, while for the each batch was applied a particular treatment plan. Following the specific treatment, for the batch no. 1, the recovery percentage was 65.38 %, while for the batch no. 2 the recovery percentage 46.15%. For the treatment of the batch no.1, the 4 in 1 Mix product was used, which contains a specially designed combination for pigeons which consists in 6 active substances (flumequine, trimethoprim, colistin sulphate, furaltadone, sulfadiazine, ronidazole).

Key words: pigeons, Escherichia coli, 4 in 1 Mix

Introduction

Pigeon sport is a fierce passion which converts into an art as time passes, while others consider it a veritable science. During the recent years, the pigeon sport experienced a continuous development both worldwide but especially at national level.

The fact that the pigeon's pathology presents some particularities, certain conditions may go unnoticed with serious repercussions for hatchery. Even though the adults show mild disease, sometimes asymptomatic, they can be carriers, affecting youth, other species or even the humans (Duchatel et al., 2011).

An accurate and fast diagnosis of diseases that might occur, with the prompt establishment of control and the correct treatment, can save the work done by a pigeon fancier during the years, from the selection and up to the continuity of obtained results.

Colibacillosis is an infectious disease common to several species of birds characterized by symptoms of the various systems, mainly the reproductive and respiratory, with exudative inflammation of serous membranes (Perianu et al., 2011). It is caused by a gram-negative bacillus, which lives in the digestive tract of pigeons. They are saprophytes bacteria as part of the microbial flora of the gut, without causing them disorders.

Generally, the clinical cases are seen in young pigeons from the nest and less frequently in the adult birds. When the pathogen coli bacillus spreads from the intestine to cloaca, the eggs are infected, leading to a high percentage of dead embryos (Severeanu et al., 1997).

The disease is occurring differently depending on the organs affected by coli bacillus. When they invaded the airways, especially the air sacs, there may be observed yellowish nasal discharge (rhinitis), respiratory disorders and claptap breathing, due to pneumonia and airsacculitis; moreover, a conjunctivitis with ocular discharge may be seen.

This study was conducted in order to recognize timely the symptoms showed by the pigeons, the disease correct diagnosis and to establish a rapid and effective treatment to prevent the disease spreading and to lower the mortality rates in the pigeon loft.

Material and methods

The investigations were conducted on a group of 257 pigeons divided in 3 batches: one batch of flyers, a batch of breeding and young pigeons. The young pigeon's batch is composed

of 117 birds, the flayer's batch composed of 80 birds, while the breeding batch is composed of 60 birds (table 1).

Table 1.

Total no. of pigeons	The pigeon's batches					
	Young pigeons		Flayers		Breeding	
	No.	%	No.	%	No.	%
257	117	45.52	80	31.12	60	23.34

The pigeon loft is located in Solca, Suceava County, submitted to the Suceava Fanciers Association, affiliated to FNCPR (Federația Națională a Columbofililor Profesioniști din Romania) assigned with the code SV803. As structure, the pigeons loft is composed of five compartments of different sizes with 6 individual boxes used for quarantine.

During 2014-2016 different disease outbreaks occurred. Thus, in 2014, at the competition beginning, the young pigeons showed a decreasing sporting condition. The decreasing sporting condition occurred in the same time with the introduction of a new pigeons in the loft that arrived from the training phase #10 - Vișeu (80 km). This pigeon showed digestive symptoms such as profuse yellowish diarrhea, with repulsive smell.

The data provided by the clinical signs together with the gross pathology suggested the utility of the laboratory examination.

The gross pathology led to the identification of some lesions. The collected samples represented by cord and bones were submitted for bacterioscopy and bacteriological examination, as well for antibiotic sensitivity. The samples were subjected to laboratory investigations according to the general protocol for bacteriological diagnosis. There were used usual culture media (nutrient agar) and differential and selective media (Levine medium).

The pigeons were treated according to the result of the antibiotic sensitivity. There were applied two different treatment plans on two different pigeon batches, together with the proper control measures.

The control measures were applied as follows: the training was stopped and during the treatment the birds were kept in the shelter; the access in the loft was restricted in the rainy days in order to prevent the moistening of the air inside the loft; the weekly bath was stopped to prevent the disease spreading; a disinfection was performed with bleach and it was checked the integrity of the ventilation system inside the loft for a better air circulation; it was performed a daily mechanical cleaning; a feeding restriction was established (Tanase and Daraban, 2015).

Results and discussions

The investigations performed during 2014-2016 in a pigeon batch from the pigeon loft code SV803 revealed epidemiological, clinical, and pathological and laboratory results.

The results of the epidemiological investigation of a number of 257 pigeons are given in the table 2.

Table 2.

Age category	Flock	Morbidity		Mortality	
		No.	%	No.	%
Young	117	97	82.9	37	38.14
Adults	140	13	9.28	2	15.38
Total	257	110	42.8	39	35.45

According to the table 2, the morbidity was higher in the young pigeons where out of 117 pigeons, 97 were affected, which represents 82.9%, while 37 died, which represents 38.14%. In adults, a lower percent of morbidity was seen, around 9%, while the mortality was 15.38%. Overall, out of 257 pigeons, the morbidity and the mortality were high as 42.8% and 35.45% respectively.

Following the physical examination, in young pigeons were seen: an affected general condition (figure 1), profuse yellowish diarrhea, with repulsive smell, bloody faeces, a swollen goiter full with gas, apathy, pronounced weakening, respiratory disorders, gradual decrease of appetite and polydipsia (Harrison et al., 2006).



Fig. 1. Young pigeon with general bad condition



Fig. 2. Diarrheic feces with blood

In contrast to young pigeons, in adults the clinical signs were faded showing: clusters in corners (figure 3), apathy and respiratory signs. The nasal discharge was missing, instead a respiration with the beak open was noted. The respiration was noisy and snorting.

At the entrance in the loft, there were noticed the perches dirty with diarrheic feces and pigeons with general bad condition.



Fig. 3. Overcrowding

For the pathological diagnosis, 25 young pigeons were sacrificed. The gross pathology revealed congestion of the liver, spleen and kidneys (figure 4), catarrhal enteritis, hemorrhage on the abdominal and thoracic serous membranes and on pericardium.



Fig. 4. Congestion of internal organs



Fig. 5. Catarrhal enteritis

After performing the bacteriological examination of the collected samples (heart, bones) on nutrient agar and Levine media, cultural characters of the bacteria that grown were analyzed. On nutrient agar the colonies showed the following characters: round, whitish and abundant colonies, with clearly defined edges. On Levine medium the colonies were black with greenish metallic sheen (figure 6).

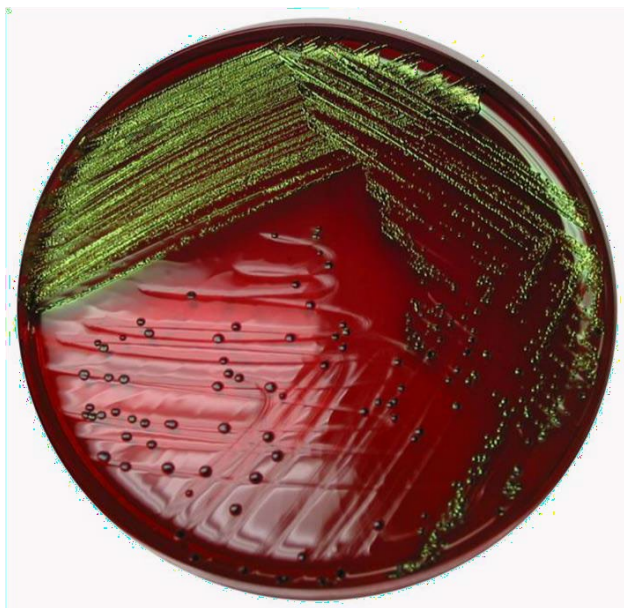


Fig. 6. Levine medium - black with greenish metallic sheen colonies

There were tested and highlighted the biochemical characteristics of the grown bacteria. Thereby, on MIU medium, it was observed the formation of indole and the urease was negative. On TSI medium it was observed the fermentation of glucose, lactose, sucrose, and gas production with no H₂S production.

From the bacterial colonies a smear was prepared and microscopically examined, resulting in the identification of *Escherichia coli*.

Escherichia coli is a Gram negative convex bacillus, mobile, non sporulating, enveloped with distinct edges and smooth surface.

Coli bacillus may become pathogen, if in the same time are involved predisposing causes such as the lack of cleanliness in the loft, the cumulative stress during transport in the transportation boxes, a polluted and moist air, the existence of dust in the loft, as well as the irritating gases produced by the manure fermentation which sensitizes the airways, accumulated fatigue after heavy races, the parasitism or other persistent diseases and incorrectly applied treatments that might lead to the body resistance decreasing, ie reducing its means of defense, with disturbances of the intestinal flora. All those aforementioned promotes the bacteria excessive multiplication and the invasion of various organs as they are considered as facultative pathogen. The sensitivity test revealed that the *E. coli* strain was sensitive to enrofloxacin and colistin.

The control measures were supplemented with the antibiotic treatment taking into account the germ sensitivity as recommended by the laboratory.

In the pigeon loft the next treatment plans were applied:

Plan 1. For the first batch of 26 pigeons, according to the results of the sensitivity test, a treatment that was based on a combination of antibiotics with good results in colibacillosis was applied (table 3). Administration may be done both in food and in the drinking water.

Table 3.

Treatment plan #1		
Product	Administration route	Doses
4-1 Mix	Drinking water	2.5 g /L water / 40 pigeons
Belgasol	Drinking water	10 ml / Lwater
Kefir	Food	1 tsp/kg food mix

The product 4 in 1 Mix Power is produced by Belgica de Weerd containing: flumequine 40 mg, trimetoprim 12 mg, colistine sulphate 0.00008 mg, furaltadone HCL 80 mg, sulfadiazine 80 mg, ronidazole 60 mg. The dose administrated was 2.4 g/L water /day for 40 pigeons during 7 days. Considering the pronounced thirst, the amount of water actually administered was calculated in order to maintain the correct dose of the drug.

In order to support the organism, there was administered Belgasol, produced by Rohnfried. This is a combination of amino acids, vitamins and micronutrients, having a beneficial contribution in organism recovery from an illness. The dose administrated is 10 ml per liter of water. As probiotic it was used kefir that was administered in food. The dose was one table spoon for one kg of food mix.

Plan 2. The pigeons from batch #2 received and individual treatment based on *Enrocol* tablets (table 4).

Enrocol produced by Romvac Company, contains on each tablet enrofloxacin 5mg, colistine sulphate 5mg and 5 mg vitamin C. The dose for a bird was a ½ tablet for 5 days. As a supportive treatment, it was administrated Vitamin *AD₃E* in dose of 0.3 ml IM repeated after 7 days and Duphalyte 0.5ml SC for 3 days consecutively. Simultaneously, a table spoon of kefir was given in the food mix.

Table 4.

Treatment plan #2		
Product	Administration route	Doses
Enrocol cpr.	Oral	½ tbl / pigeon/ day
Vitamina AD ₃ E	IM	0.3 ml / day
Duphalyte	SC	0.5 ml / day
Kefir	Food	1 tsp / kg food mix

The results obtained after treatment are presented in table 5.

Table 5.

Healing percentage depending on the treatment plan					
Batch	Pigeon number	Healed pigeons	% Healed pigeons	Dead pigeons	% Dead pigeons
Batch no.1	26	17	65.38	9	34.62
Batch no.2	26	11	46.15	14	53.85

According to table 5, there may be noticed that in case of the batch no.1 the healing percentage was 65.38%, by approximately 9 percent higher than the one seen in the case of batch no.2, where the healing percentage was 46.15% because the product used in the treatment plan no.1 is more complex.

Conclusions

Following the results obtained from the analysis of the epidemiological, clinical and pathology investigations and from the prevention and control measures applied in the pigeon loft during September 2014-May 2016, several conclusions are given:

1. The morbidity and the mortality determined by colibacillosis in young pigeons were 80%, 40% respectively.
2. The main clinical signs that occurred in young pigeons affected by colibacillosis were profuse yellowish diarrhea, with repulsive smell, a pronounced thirst, general bad condition and a pronounced weakening.
3. The gross pathology consisted in organs congestion, catarrhal enteritis, and hemorrhages of abdominal and thoracic serous membranes and on the pericarium.
4. The bacteriological exam leaded to the development of abundant, round and whitish colonies, with clearly defined edges on nutrient agar and black with greenish metallic sheen colonies on Levine medium, typical for *Escherichia coli*.
5. The results of the sensitivity test showed that the only efficient antibiotics against the isolated *Escherichia coli* strain were enrofloxacin and colistin.
6. In order to control the colibacillosis, two different treatment plans were applied, the first using a combination of 6 antibiotics and one antiparasitic given in the drinking water (4 in 1 Mix) and the second plan using two antibiotics given per os (Enrocol) as tablets. A higher percentage of healing was noticed for treatment plan 1 (65.38) when comparing to the results of the treatment plan 2 (45.15%).

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