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Initial Data on Albania Regarding the Urgency of Implementing one Wildlife one Food Safety

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Abstract

Albania, located in the western part of the Balkans, is home to a rich terrestrial and aquatic fauna, with one of the largest numbers of wild animal species per surface area. However, since the country opened up its economy after the 1990s, the population, mainly rural, has increased their consumption of protein, largely from wild animals and aquatic fauna. This growing demand has led to some pathologies in humans that originated from wild animals.Public hospitals have reported cases of salmonellosis in humans caused by the consumption of meat and eggs from wild birds, as well as cases of Campylobacteriosis in some hunters, according to data from public hospitals and the Federation of Hunters of Albania. Children have also been infected with rotavirus from mussels. The identification of cases with the presence of Escherichia coli from the meat is provided by wild pigs. These examples illustrate the importance of reconceptualizing food safety according to the One Health principle, which is currently accepted and implemented throughout the European Union and in other developed countries around the world. The cases identified in this presentation highlight the urgent need for Albania to develop a Wildlife and One Health system. Any delay or neglect in doing so could harm public health by causing outbreaks of zoonotic pathogens originating from the wild. The construction of this system will not only mean more food security but also safer public health.

Keywords: wildlife, one health, food safety, pathogen, Albania eyword.

1. Introduction

This study aims to report on a one-year monitoring of the fauna in the hilly-mountainous region of Çarçovë, Përmet district. This region is covered with bushes and high trees, providing an ideal environment for the development of wild animals. The climatic and environmental conditions have created opportunities for the growth of many wild species, with priority given to pigs and wild fowl such as pigeons, turtledoves, and mountain grouse. These species are highly valued not only for the ecosystem but also as an object of hunting, as their meat is considered an elite, nutritious, and preferred bio-product [1].

However, animals and fowl raised in these limited areas, natural wildlife sanctuaries, are exposed to a multitude of infections, including infective, parasitic, or organic diseases. These diseases, acting alone or in combination, can cause significant damage to the wildlife population.

Periodical signals from the region's inhabitants and hunters reported finding damaged fowl or animals in their nests or holes. As a result, a continuous monitoring plan was established in cooperation with the human service, which identified 7 cases of people affected by *Escherichia coli* and *salmonella.* The contamination source was traced back to the consumption of meat obtained from hunting wild pigs, pigeons, and grouse.

Overall, this study highlights the importance of monitoring the wildlife population in natural reserves and implementing safety measures to prevent the

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spread of infections and ensure the safety of wild game meat for human consumption.

2. Material and Methods

The study was conducted on samples collected from various wild animals, including 65 pigeon heads, 10 turtledove heads, 24 grouse heads, 10 samples of wild pig meat from hunting, 15 pigeon fledglings, 10 grouse fledglings, 10 pigeon eggs, 5 grouse eggs, and 20 samples of feces from pigeon and grouse nests and 10 samples of feces from wild pig sites. The selection of the samples was based on qualitative, quantitative, representative, and all-inclusive criteria.

Samples were taken using scientific techniques to ensure consistency in manipulation, transport, and sampling throughout the year. The identification and classification of strains were based on biochemical characteristics tied to the formation of metabolic products and fermentation of organic sugars.

Evaluation of the risk was based on norms and standards set by institutions of scientific research in the country and the European Union for food safety and public health. The presence of E. coli in food products from wild animals is an indicator of fecal pollution, and the numeric evaluation indicates possible pathogen presence in these foods. In recent years, E. coli verotoxigenic has been identified as a potential cause of foodborne illness in humans.

2.1. Method

For fresh crude meat, the ratio of a load of coliform bacteria and *E. coli* is evaluated against the standards of scientific research institutions in the country, FSVI, and the Institution of Public Human Health [2]. The limit of coliform bacteria and *E. coli* in eggs is set at ≤120 coliforms/gram in 4 samples and ≤110 coliforms/gram in the fifth sample [3]. The method of colony plate counting is used to identify the number of bacterial colonies present in the sample. *Salmonella spp*. is a pathogen that can affect both humans and animals and is therefore of public health concern. For fresh crude meat and eggs, the norm of bacterial load, referred to the standard of the scientific research institutions of the country, FSVI, and the Institution of the Human Public Health, as well as the Rule nr.854/2004 of CE, is that salmonella must not be present in 25 grams of the product. The conventional method fixed on EN/ISO 6579 is used to determine the presence of salmonella in food, including wild animal meat [3].Interpretation of the results is based on the given limits for every tested sample unit. For *E.coli* forms, if the microbial values fall within the given limits for every tested sample unit, it is assumed to be due to accidental environmental fecal contamination or during the manipulation of the sample. For salmonellas, the result is satisfactory if there is no presence of the bacteria in any of the tested samples, acceptable if only one of the five tested samples shows the presence of the bacteria, and not satisfactory if the presence of the bacteria is discovered in every tested sample

3. Results and Discussion

Tables 1 and 2 present the laboratory results of 183 samples, with elevations taken in spring (49), summer (47), autumn (51), and winter (36).

The samples were collected from pigeons and their fledglings for up to 3 months (45), grouses and their fledglings for up to 3 months (32), turtledoves (13), and wild pigs (25). The coefficient of check for the wild fowls (pigeons, grouses, and turtledoves) was approximately 8-10%, whereas, for pigs, it was about 3.5%, in proportion to the fauna of the wildlife sanctuary.

The samples were taken using techniques for manipulation, transport, and storage, and relevant data regarding the history of the suspected pathology, the animal's condition, and their products, were sent to the lab. The results showed that the incidence of salmonella and Escherichia coli infection spread symmetrically in proportion to the seasons, ages, and products under control. The infection of Escherichia coli was found in about 90% of the samples, with salmonella infection occurring in approximately 16.5% of fowls and 20% for wild pigs in spring, rising to about 21.34% for fowls and 25% for pigs in summer, and decreasing gradually to about 14.2% for fowls and 13.9% for pigs in winter. The development of the E. coli infection was approximately constant in spring and autumn, at about in winter, to around 10.3.

The frequency of salmonella infection was highest in spring and summer, attributed to favoring factors such as the increase in the activation of many living things, including the tortoise and other reptiles, that helped to transmit the infection. The development of the *E. coli* infection was higher in winter, owing to factors such as increased humidity and lower temperatures, favoring

the growth of the infection, especially in young animals that stay in groups.

The results of tests on 50 samples of feces, 18 samples of eggs taken from nests, and 20 samples of meat from fowls and wild pigs resulted in high positivity. Although resistance to salmonella and *E. coli* infection differed according to age, with younger animals at higher risk, immunization protection mechanisms in pigs have not been proved. The characteristic form of the infection caused by Salmonella's gender is usually asymptomatic in animals and people, with common clinical signs such as sterility and disorders in accouchement, paralysis of neck muscles, torticollis, and diarrhea. Dead birds and female birds without any clinical signs were found in nests.

Autopsy results from 26 fowls and five pigs showed hypertrophic and discolored liver, spleen, kidneys, and pancreas, with necrotic seats and changes in the color of the liver, such as redness due to septicemia, side lips with reflexes of brass color, green and strong, inflammation of the tests, ovaries, and intestines. The heart was surrounded by the deposition of fibrin. The study followed a clinical framework of seven individuals who were hospitalized due to Salmonella and *E. coli* infections. Three of these individuals were contaminated by pork meat, while the other four were contaminated by wild pigeon and grouse meat. Salmonella is considered a cosmopolitan infection and is ranked as an important zoonotic illness in veterinary public health. In the cases described above, it was observed that the primary source of the alimentary toxic infection was contaminated meat with Salmonella, where toxins were released. When combined with the bacillary infection of *E. coli*, the complications became more serious. The identified seropositivity responsible for the infection of the seven affected individuals were *Salmonella Typhimurium* and Salmonella Choleraesuis, which were found in the damaged fowls and animal.

Table 1. The positivity of the samples according to the species, of the wildlife sanctuary of Çarçovë, in the district of Përmet.

Nr	Months	Spring			Summer			Autumn			Winter			Annual		
	Checked samples	Nr. samples	*E. coli*	*Salmonella*	Nr. samples	*E. coli*	*Salmonellae*	Nr. samples	*E. coli*	*Salmonella*	Nr. samples	*E. Coli*	*Salmonell*	Nr. samples	*E. coli*	*Salmonella*
1	Pigeons	5	-	1	5	1	-	10	1	1	10	2	1	30	4	3
	Fledgling-3 damaged	2	-	-	5	1	1	5	1	-	3	1	-	15	3	1
	Eggs in brooding period	4	1	1	-	-	-	3	-	1	3	-	-	10	1	2
	Faeces	5	-	1	5	-	1	5	-	-	5	1	-	20	1	2
Contaminated samples		**16**	**1**	**3**	**15**	**2**	**2**	**23**	**2**	**2**	**21**	**4**	**1**	**75**	**9**	**8**
2	Grouses	5	1	-	7	1	1	6	1	1	6	1	-	24	4	2
	Fledgling-3 damaged	-	-	-	5	1	1	-	-	-	3	-	1	8	1	2
	Eggs in brooding period	5	-	1	-	-	-	-	-	-	-	-	-	5	-	1
	Faeces	5	-	1	-	-	-	5	1	1	-	-	-	10	1	2
Contaminated samples		**15**	**1**	**2**	**12**	**2**	**2**	**11**	**2**	**2**	**9**	**1**	**1**	**47**	**6**	**7**
3	Turtledoves	6	-	1	-	-	-	4	1	-	-	-	-	10	1	1
	Fledgling-3 damaged	-	-	-	3	-	1	-	-	-	-	-	-	3	-	1
	Eggs in brooding period	3	1	1	-	-	-	-	-	-	-	-	-	3	1	1
	Faeces	-	-	-	5	-	1	-	-	-	5	1	-	10	1	1

Contaminated samples		**9**	**1**	**2**	**8**	**-**	**2**	**4**	**1**	**-**	**5**	**1**	**-**	**26**	**3**	**4**
4	Damaged pigs	-	-	-	2	-	1	2	-	1	1	-	-	5	-	2
	Pork meat	5	1	1	7	-	2	8	-	2	-	-	-	20	1	5
	Faeces	4	1	1	3	-	1	3	-	1	-	-	-	10	1	3
Contaminated samples		**9**	**2**	**2**	**12**	**-**	**4**	**13**	**-**	**4**	**1**	**-**	**-**	**35**	**2**	**10**

Table 2 .Summary data of the epidemiologic situation of the *E.coli* and *Salmonellas* in the wildlife sanctuary of Çarçovë in the district of Përmet

Nr	Months	Spring			Summer			Autumn			Winter			Annual		
	Checked samples	Nr. sam p	*E. coli*	*Salmonella*	Nr. sam p	*E. coli*	*Salmonella*	Nr. sam p	*E. coli*	*Salmonella*	Nr. sam p	*E. Coli*	Sal mon ella	Nr. sam p	*E. coli*	*Salmonella*
1	Fowls in total	16	1	2	12	2	1	20	3	2	16	3	1	64	9	6
2	Fledling-3 m damaged	2	-	-	13	2	3	5	1	-	6	1	1	26	4	4
3	Eggs in brooding period	12	2	3	-	-	-	3	-	1	3	-	-	18	2	4
4	Faeces	14	1	3	13	-	3	13	1	2	10	2	-	50	4	8
5	Damaged pigs	-	-	-	2	-	1	2	-	1	1	-	-	5	-	2
6	Pork meat	5	1	1	7	-	2	8	-	2	-	-	-	20	1	5
Contaminated samples		**49**	**5**	**9**	**47**	**4**	**10**	**51**	**5**	**8**	**36**	**6**	**2**	**183**	**20**	**29**

Table 3. Summary data on the incidence of *E.coli* and *Salmonellas*, in the wildlife sanctuary of Çarçovë in the district of Përmet

Nr	**Months**	**Spring**			**Summer**			**Autumn**			**Winter**			**Annual**		
	Samples	Nr. sam ple	*E. coli*	*Salmonella*	Nr. sam ple	*E. coli*	*Salmonella*	Nr. sam ple	*E. coli*	*Salmonella*	Nr. sam ple	*E. coli*	*Salmonella*	Nr. sam ple	*E. coli*	*Salmonella*
			%	%		%	%		%	%		%	%		%	%
1	Fowls	16	6.25	12.5	12	16.66	8.3	20	15	10	16	18.75	6.2	64	14	9.37

Nr	Months	Spring			Summer			Autumn			Winter			Annual		
	Samples	Nr. sample	*E. coli*	*Salmonella*	Nr. sample	*E. coli*	*Salmonella*	Nr. sample	*E. coli*	*Salmonella*	Nr. sample	*E. coli*	*Salmonella*	Nr. sample	*E. coli*	*Salmonella*
			%	%		%	%		%	%		%	%		%	%
2	Damaged fledling-3m	2	-	-	13	15.38	23.07	5	20.0	-	6	16.66	16.66	26	15.38	15.38
3	Eggs in brooding period	12	16.66	25.0	-	-	-	3	-	3.33	3	-	-	18	11.11	22.22
4	Faeces	14	7.14	21.42	13	-	23.07	13	7.69	15.38	10	20.0	-	50	8.0	16.0
5	Damaged pigs	-	-	-	2	-	50.0	2	-	50.0	1	-	-	5	-	40.0
6	Pork meat	5	20.0	20.0	7	-	28.57	8	-	25.0	-	-	-	20	5.0	25.0
Contaminated samples		**49**	**10.20**	**18.36**	**47**	**8.51**	**21.27**	**51**	**9.80**	**15.68**	**36**	**16.66**	**3.33**	**183**	**10.92**	**15.84**

4. Conclusions

Our research aims to determine the correlation between the presence of *E.coli* bacteria and salmonella infections in wildfowl, and the danger they pose to people who consume them. We found that 7 cases had microbial loads in our analyzed samples. Our analysis shows a symmetrical spread of the infection in proportion to seasons, ages, and products under control.

The infections of salmonella and *E.coli* are related but independent, creating the potential for the growth of complications in animals, which can cause danger to humans if the products are not evaluated by sanitary and veterinary control, according to EU standards [4], [5], [6].

The presence of salmonella and *E. coli* infections in every season is a signal of alarm to implement EU standards in the control and evaluation of wildlife products, not only for food safety but also as an element of security and protection against global bioterrorism.

The hunters' community is the most endangered community as they are the providers of these products [7].

Our study found that out of the 7 people hospitalized due to salmonella and *E. coli* infections, 4 of them consumed these products in restaurants. Our study also found that most poisonings from these products occurred in rural regions, which coincides with the habitats of wild fauna and rural communities. Therefore, we suggest spreading food control in these areas.

Application of standard methods of evaluating salmonella and E. coli in products originating from the wild world should be carried out in regional labs as they are simple and not costly, and this will serve better in preventing poisonings in people [8], [9]. Food safety of products originating from the wild fauna is a challenge for food safety not only in Albania but also in the region. European integration obligates veterinary services to apply standards similar to those of the European Community in this sector, by cooperating with national and regional experts in this field.

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