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The contribution of avian scavengers to sanitation in Azerbaijan territory

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Abstract

The study investigates the sanitary roles of scavengers in ecosystems. Twenty pet and 42 wild animal corpses were found in the 22.88 ha Turyanchay State Natural Reserve and its surrounding areas during two months of study (from June to July in 2013). Ten diseases were observed and associated with various causes in 38 of these undecomposed corpses. Out of 38 corpses, 13 were infected with echinococcosis, 9 with rabies, 4 with tuberculosis, 4 with toxoplasmosis, 2 with brucellosis, 2 with adentis eguorum, 1 with distemper, 1 with pasteurellosis, 1 with anthrax and 1 with tularemia. It was determined that scavenger birds prevent the corpses, died from various diseases, from becoming an infection source by eating them (excluding bones) within 1-3 days.

Keywords: Corpse, Diseases, Necrophage birds, Sanitary

1. Introduction

According to a report by International Epizooties Bureau of Europe stopping death of animals that are disease reservoirs and utilization of their corpses are very complicated task. It also notes that since the preventive methods are in early stages requiring sophistication and demands costly technologies and considerable human labor. It is impossible to reveal those animals and prevent their corpses from becoming sources of diseases in the nature [1-5]

Necrophage birds (*Gyps fulvus*, *Aegypius monachus*, *Gypaetus barbatus*, *Neophron percnopterus*) play a vital role in rejection of emergence of disease sources from animal corpses left in inaccessible areas away from the control of veterinary and sanitary services nature [6, 7].

Considering the above-mentioned informations we intended to study the roles of scavengers in limiting the sources of diseases in the nature by eating animal corpses.

2. Materials and Methods

2.1 Study area

The research was conducted in the territory of Turyanchay State National Reserve and neighboring areas encompassing an area of 22,488 ha in the territory of 6 districts (Agdash, Gabala, Goychay, Yevlakh, Oghuz and Shaki) of Azerbaijan during June-July of 2013 (Fig. 1).



Fig 1: A- Map of the area of study in the Azerbaijan Republic; B- Turyanchay State Natural Reserve and neighboring areas where corpses were found.

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Conducting the research in this area is related to following reasons. These areas are considered the main territories of settlement and food for scavengers like Griffon Vulture (*Gyps fulvus*), Black Vulture (*Aegypius monachus*), Egyptian Vulture (*Neophron percnopterus*) and Lammergeier (*Gypaetus barbatus*) in Azerbaijan nature [9]. Concentration of 24 species of wild mammals in Turyanchay Reserve as well as hundred thousands of pet animals in the surrounding zone continuously maintains a high level of animal death. Another factor forcing animal losses is related to sophisticated landscape of the area. Turyanchay, Goychay, Garachay Rivers, canyon Type Mountains with the height of 400-650 m above sea level, and deep ravines have created complicated reliefs in the reserve and neighboring areas nature [6].

2.2 Discovering of Animal Corpses

Hard reliefs led to fallings of animals pasturing on sloppy hills and river valleys from rocks, killings in river floods and on migration roads during summer and autumn.

In order to quickly discover animal corpses and to analyze the material before decomposition of corpses we held organizational works in advance, together with veterinary and sanitary staff, and also determined the routes. Purpose of research was explained to the Reserve functionaries, shepherds, village residents and hunters. They informed us about locations of corpses with mobile phones. Several observations were made in a car in the morning and evening on the Agdash-Gabala road passing the Reserve area. In the daytime, when the probability of animal death was very high, observations were carried out around Turyanchay, Goychay and Garachay rivers as well as in pastures. Within 2 months, 375 km of distance was covered by car, 42 km on horse and 17 km by walking.

Following devices were used during the monitoring process: Yukon 10x50 binoculars, Kova TSN-601 telescope, Sony DSC No10 digital still camera as well as Alsten x2 portable dictaphone.

2.3 Anatomic pathology examination of corpses and picking materials for analysis

Sixtytwo corpses of pet and wild animals were obtained during the monitoring period. Thirty eight of them were not decomposed. Anatomic pathology examination of 38 corpses showed that echinococcosis and pasteurellosis were found in internal organs of 17 of them.

Because 21 of the animals were presumably suggested as victims of infection thus, sample materials (skin, heart, liver, spleen, bone marrow) were collected from them for analysis. Due to hot weather the materials were conserved in liquid solution of clean glycerin (30%) and sterile vaseline oil. Each separate material was provided With a document containing information that included data, such as name of animal species, name of organ, clinical signs and anatomic pathology changes, assumed diagnosis and date of shipment and were sent to veterinary laboratory in Agdash town (7 km from the Reserve).

2.4 Laboratory Analysis

Rabies- Antigen was revealed by immunofluorescent analysis method [8].

Toxoplasmosis-Sistosoids were found in the smear prepared from head brain [9].

Canine distemper- It was revealed by bacteriological analysis method in the material taken from bone brain and pathology anatomical opening [8, 10].

Echinococcosis- It was defined by revealing echinococ cysts in the internal organs of body [11].

Anthrax- Anthrax antigen was found in the extract made from corpse skin [8].

Pasteurellosis- It was determined according to pathological changes (lung fibrosis, effusion; kidney, liver necrosis) in the corpse's internal organs [8].

Adentis eguorum- It was determined by taking and identification of *Bacteria abortis* culture from *parenchymatous* organ of the fetus [8].

Tularemia- It was revealed by a method of taking *Francisella tularensis holartica* in the material taken from animal's heart [8].

Brucellosis- *Brucella suis* (rabbit) ve *Brucella melitensis* (cow) brucella were revealed by bacteriological method with a microscope (MBC-1) in the structure of colony from the material taken out of bone marrow [8].

Tuberculosis - By a microscope, tuberculosis bacilli were found in the smear of emulsion prepared from feces [8].

2.5 Ethics

Since the Turyanchay Natural Reserve's territory and its animals are in state ownership a permission was obtained from Ministry of Ecology and Natural Resources of Azerbaijan Republic for implementing the research (*N 208/BMQD*).

Our work was conducted according to scientific and research plan of Azerbaijan Zoology Institute. This research was financed by the Zoology Institute.

3. Results

During June-July of 2013 we discovered 62 animal corpses in the Turyanchay National Reserve and the neighboring zones. Forty two of them were wild while 20 were pet animal corpses. These corpses belonged to 7 species of wild animal and 6 species of pets. Most corpses were found in over 10 village pastures, surrounding dumps, river valleys located close to Turyanchay, Goychay and Garachay as well as on the Gabala-Agdash highway.

The causes of deaths were as follows: killed by other animals (fox, badger, rabbit) on Gabala-Agdash highway of intensive traffic, disposing the corpses of animals (cow, buffalo, sheep, wolf, jackal, fox, badger, raccoon), stuck in poisonous traps, ill, aged or shot ones to dumps and hidden places, slaughtering of ill and aged horse and donkeys left alone on pastures by wolves, and falling of animals from sloppy mountain hills from rocks (Fig. 2).

Thirty-eight (61.29%) out of 62 revealed corpses had various causes of diseases. Twenty-two corpses (57.89%) out of 38 belonged to seven wild species. Those animals that carried diseases: fox (*Vulpus vulpes*), jackal (*Canis aureus*), boar (*Sus scrofa*), wolf (*Canis lupus*) rabbit (*Lepus europaeus*), badger (*Meles melis*) and raccoon (*Procyon lotor*). Various diseases were found in pet animals such as cow, buffalo, donkey, horse, sheep and dog corpses. The below table describes reasons for deaths, number of disease carriers and diseases discovered on the corpses (Table 1).

Of these 34.22% were infected with echinococcosis, 23.68% with rabies,



Fig 2: Undecomposed corpses of 1-buffalo sunk in the river and 2-cow fallen from rocks; 3- Bones of horse killed by wolves; 4-remainders of birds disposed by their owners in covert place and eaten by scavengers.

10.52% with tuberculosis, 10.52% with toxoplasmosis and 5.26% with brucellosis. One of two dead buffalos had anthrax, 1 of 5 raccoons was carrier of canine distemper and one was infected with pasteurellosis.

Echinococcosis was found in 13 animal corpses. The main carriers of this parasite were fox (n=5), wolf (n=3), homeless dogs (n=3) and jackals (n=2).

Table 1. Animal losses registered in the Turyanchay State Reserve and neighboring areas within 2 months (individual)

Animal	Death Individual	Possible reason of death	Revealed disease	Carrier of Disease
Cow	1	Illness	brucellosis	1
Buffalo	2	illness, sunkin river	anthrax	1
Donkey	1	Killed by wolf	adenitis eguorum	1
Horse	1	age, illness	adenitis eguorum	1
Boar	1	Illness	pasteurellosis	1
Sheep	7	Infected by wolf, illness	tuberculosis,	4
			rabies,	1
Wolf	9	By food trap, shot	rabies,	1
			echinococcosis	3
Jackal	6	Shooting and food trap	rabies,	2
			echinococcosis	2
Fox	14	Traffic and shooting	rabies,	2
			echinococcosis	5
Homeless dog	7	illness, hunger	rabies,	3
			toxoplasmosis	1
			echinococcosis	3
Rabbit	2	Hit by traffic	brüselyoz	1
Badgeer	6	Hit by traffic, illness	tularemia,	1
			toxoplasmosis	3
Raccoon	5	Shooting and food trap	caninedistemper	1
Total	62		10	38

4. Discussion

It should be mentioned that morphological (i.e. body structure, hairs), physiological (i.e. high acidity of body, neutralization of toxic elements, function of bacteria in digestion system) and ethological (i.e. sun bathing for cleaning ectoparasites, bathing in river) characteristics enable the scavengers to play a role of nature’s orderlies nature [6, 7, 12].

Constant animal deaths in this region may be closely related to provision of nestling opportunities and an area with rich of

food sources for necrophage birds such as Griffon Vultures (8 nests), Black Vulture (9 nests), Egyptian Vultures (15 nests). Lammergeyers arrive to this territory from Major Caucasus. During June-July of higher demand for food and intensive feeding of nestlings [6, 7] there can be seen about 3 up to 110 scavengers around a corpse depending on its size. Presence of animal corpses in open areas enables the birds to locate them easily. Scavengers discover corpses in two ways: by collective searching and by following wolves and hooded crows (*Corvus*

corone cornix). That is, landing of one of the griffons that fly and follow each-other alerts the rest of the birds for the presence of corpses. Scavenger birds chasing wolves (about 100 individuals in the reserve and surrounding areas) that go for hunting during day times eat the leftovers of animals killed by them. Noisy gatherings of hooded crows also a sign of the presence of corpses. Eating of animals spotted by the hooded crows and killed by wolves by necrophage birds are of higher importance. Because, after eating a part of corpses, wolves usually leave the rest part or hide them. As a result, the remaining parts become a source of diseases.

The number and masses of animal corpses located by the griffons influenced the number of birds gathering around them. That is, maximum 100-110 scavengers gathered around a cow, horse, donkey, buffalo (n=5) weighing 100-150 kg. The softer parts of corpses were eaten within 2-3 h and the leftovers in the next day by 5-10 birds. During the monitoring we noted that softer parts (excluding bones) of a one big animal corpse was consumed by local scavengers within 2 days at most. Relatively smaller corpse was eaten within 1-2 h.

It should be noted that corpses with heavier mass attracted mostly Griffon Vultures and Black Vultures. Skins and muscle parts of the corpses were consumed by Black Vultures, internals by Griffon Vultures while leftovers were eaten by Egyptian Vultures. Although lammergeyers do not nest in the reserve's territory they flew to the area during intensive feeding of nestlings. Generally, from 2 to 3 lammergeyers around newly died animal corpses can be seen.

Egyptian Vultures that do not abstain from humans compared to Griffon Vultures and Black Vultures mainly gather around the corpses of lesser weight killed by traffic and disposed to dumps. This is related to fact that 12 out of 15 Egyptian Vulture nests were located near the Agdash-Gabala highway (500-2000 m away) and constant presence of dead animals on that road. We registered 21 fox, badger, rabbit corpses (corpses of tortoise, hedgehog, snake and frogs were attached on the road, hence not eaten) killed by traffic on the Agdash-Gabala highway. Three to 5 Egyptian vultures fully ate one animal corpse within 1-2 h.

Forty two out of 62 corpses (67.74%) found in the reserve and surroundings belonged to wild animals. The reason was increasing numbers of animals during June-July at the end of breeding. In this period, death facts were mostly found among inexperienced individuals with incomplete adaptation reactions as well as weak and sick ones.

This creates conditions for spreading of echinococcosis among pets and people. Causers of rabies were found mostly in fox, wolf, homeless dog, jackals and sheep corpses. Due to wide diffusion of rabies about 250 thousand dogs were vaccinated in Azerbaijan in the year 2014. The infection of 22.3% of pet dogs with echinococcosis in this region in the year 2010 nature [6].

In most areas it is not possible to isolate settlements of wild animals that are reservoirs of diseases, to vaccinate them eliminating infection of pet animals (chiefly on pastures, migration roads) and to timely treat diseased pets. Toxins may emerge in rotten corpses. These corpses turn out to be hazardous food sources for some animals.

The analysis of the collected materials prove that Black Vulture, Griffon Vulture, Egyptian Vulture and Lammergeyers positively influence the sanitary and hygienic conditions in the natural and anthropogenic ecosystems by eating 38 animal corpses which were carriers of echinococcosis and transmissible diseases in a territory of about 50 km².

Veterinary organizations can use scavengers as indicators for

easily revealing animal corpses and utilizing their remainders (left out from vet control, remaining in covert places, disposed by their owners in hidden areas and etc). Flying of tens or even hundreds of birds over the place where corpse is located usually points to availability of animal there. In the territories where their colonies are located and nourish (there are 12 in Azerbaijan territory) the scavengers can be used as indicators.

5. Conclusion

Veterinary organizations can use scavengers as indicators for easily revealing animal corpses and utilizing their remainders (left out from vet control, remaining in covert places, disposed by their owners in hidden areas and etc). Flying of tens or even hundreds of birds over the place where corpse is located usually points to availability of animal there.

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7. References

1. Frolich K. A review of mutual transmission of important infectious diseases between livestock and wildlife in Europe. *Annals the New York Academy of Sciences*. 2002; 969(1):4-13.
2. Cross ML, Buddle BM, Aldwell FE. The potential of oral vaccines for disease control in wildlife species. *Vet J*. 2007; 174:472-480.
3. Wobeser GA. *Disease in Wild Animals. Investigation and Management*. Second ed., Berlin-Heidelberg: Springer-Verlag. 2007, 393.
4. Vallat B. Improving wildlife surveillance for its protection while protecting us from the diseases it transmits. In, *Bulletin of the World Organization for Animal Health (OIE)*, Accessed: 15 March, 2008. [<http://www.oie.int/en/for-the-media/editorials/detail/article/improving-wildlife-surveillance-for-its-protection-while-protecting-us-from-the-diseases-it-transmit/>]
5. Artois M, Ben Jebara K, Warns-Petit E, Leighton FA. National wildlife disease surveillance systems. In, Karesh W, Machalaba C (Eds): *OIE Global Conference on Wildlife, OIE (World Organization for Animal Health): Paris, France, 2011, 23-25*.
6. Karimov TA. About the roles of scavengers as nature's orderlies. *Materials of the conference on veterinary medicine and food security, problems and perspectives. Materials of international conference. Nakhchivan*. 2011; 23-24:58-61.
7. Donázar JA, Cortes-Avizanda A, Carrete M. Dietary shifts in two vultures after the demise of supplementary feeding stations: consequences of the EU sanitary legislation. *Eur J Wildl Res*. 2010; 56:613-618.
8. *Infectious diseases of animals (Editor: Sydoruk A.A.)*. Moscow, Russia, Kolos, 2007, 671.
9. Borisov BA, Moroz BV. *Clinic, diagnosis and toxoplasmosis*. Moscow, Russia, Kolos, 2003, 398.
10. Zharov AV, Ivanov IV, Strelnikov AP. *Autopsy and pathological diagnosis of animal diseases*. Moscow, Russia, 2000, 400.
11. Karimov AM. *Diagnosis of liver echinococcosis. Synopsis of thesis*. Dushanbe, Tadjikistan, 2001, 26.
12. Karimov TA. *Main limiting factors affecting biological parameters of necrophage birds*. *The Journal of V.N. Karazin Kharkiv National University*. 2015; 1153:68-72.