



## Supplementary Material

# Causes of Morbidity and Mortality in Wild Animals and Birds at Captive Breeding Facilities of Punjab, Pakistan

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Supplementary Table S1. Diseases and pathological conditions in animals.

Sr. No.	Disease/ Condition/ Clinical symptom	Type	Baha-walpur zoo	Bansra Gali Murree wildlife park	Pirowal wildlife park	Changa Manga wildlife park	Gatwala wildlife park	Jallo wildlife park	Lahore zoo-logical garden	Lahore zoo safari	Lal Su-hanara national park	Vehari wild-life park
			1	2	3	4	5	6	7	8	9	10
1	Abnormal behavior	Condition		1								
2	Acidosis	Condition				1						
3	Allergy	Condition							2			
4	Alopecia	Condition	1	1		2						
5	Anemia	Condition							2	2		
6	Anorexia	Condition		1			1		2			1
7	Ascites	Condition							6		1	
8	Anthrax	Disease				1						
9	Atresia ani	Condition								1		
10	Bacterial infection	Disease			1							1
11	Birth complication	Condition										
12	Bronchopneumonia	Disease				1		1		1		
13	Bronchitis	Disease										1
14	Bradycardia	Condition				1						
15	Breathing difficulty	Condition									1	
16	Bloody Diarrhea	Condition								1		
17	Captivity stress	Condition										
18	Cardiac arrest	Condition				3			2	2		1
19	Cardiovascular failure	Condition								1		
20	Hepatic failure	Condition							1			
21	Chronic wasting disease	Disease				1						

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Sr. No.	Disease/ Condition/ Clinical symptom	Type	Baha-walpur zoo	Bansra Gali Murree wildlife park	Pirowal wildlife park	Changa Manga wildlife park	Gatwala wildlife park	Jallo wildlife park	Lahore zoo-logical garden	Lahore zoo safari	Lal Su-hanara national park	Vehari wild-life park
22	Coccidiosis	Disease							1			
23	Choking	Condition									1	
24	Coryza	Disease									2	
25	Cough	Condition							1			
26	Dehydration	Condition							3			
27	Dermatitis	Condition					1					
28	Diarrhea	Condition			3	1	1	3	16	3	1	1
29	Dull and Depressed	Condition	2	1	1	1			2	1	2	2
30	Dystocia	Condition	1		1		1	1	2		5	1
31	<i>E. coli</i> infection	Disease							1			
32	Ectoparasites and endoparasites	Disease							4			
33	Enteritis	Condition			1				6	2	11	
34	Typhoid	Disease	1									
35	Epistaxis	Condition								1		
36	Emaciation	Condition		1		1						
37	Eye infection	Condition										1
38	Feline panleukopenia	Disease							3			
39	Foot rot	Disease		1								
40	Gastroenteritis	Condition							4	1		
41	Gastrointestinal Disorder	Condition	1	1			1					1
42	Gastrointestinal tract compaction	Condition							1			
43	Heart Failure	Condition	3	2	1		1	2		1	9	4
44	Heat stress	Condition					3				1	
45	Heat stroke	Condition									3	
46	Hydatid Cyst	Condition			2							
47	Hemorrhagic gastro-enteritis	Disease							5	2		
48	Hepatitis	Condition							1			
49	Hygroma	Condition	1									
50	Hyper excitation	Condition							1			
51	Hyperkeratosis	Condition								1		
52	Hypothermia	Condition	1	1					1	1	1	1
53	Hyperthermia	Condition	1						4		1	
54	Hypovolemic shock	Condition				1		1				
55	Indigestion	Condition	2				1					
56	Infectious myositis	Disease							1			
57	Intestinal strangulation	Condition	1									
58	Lactic Acidosis	Disease					1					
59	Lameness	Condition	1	1		1	1		9	1	1	
60	Lethargic	Condition								2		

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61	Liver fluke infestation	Disease						1				
62	Lymphadenitis	Disease							2			
63	Malaria	Disease							1			
64	Myasis	Disease								2	7	
65	Nasal discharge	Condition		1					1		1	
66	Nervous disorder	Condition				2						
67	Neoplasia	Disease								1		
68	Necrosis	Condition							1			
69	Paralysis	Condition	1									
70	Peritonitis	Condition				1	1		1	1		
71	Pneumonia	Disease	3		2	4		2	10	6	20	3
72	Pulmonary congestion	Condition				1			3	1		
73	Pulmonary edema	Condition								1		
74	Protozoal Infection	Disease				1		1	2			
75	Rectal prolapse	Condition							1			
76	Ruminal impaction	Condition								1		
77	Respiratory distress	Condition	1						4	1		
78	Respiratory failure	Condition					1		3	5	3	1
79	Respiratory infection	Condition							1			
80	Restlessness	Condition							1			
81	Round worm infestation	Disease							1			
82	Salmonella infection	Disease							1			
83	Shivering	Condition									1	
84	Septic shock	Condition							1			
85	Septicemia	Condition					3		3	4	1	
86	Spinal cord compression	Condition							1			
87	Skin infection	Condition								1		
88	Skin Allergy	Condition							5			
89	Skin Cancer	Disease									1	
90	Swelling	Condition	1						2			
91	Tetanus	Disease				1						
92	Tympanites	Condition								1		
93	Toxemia	Condition			2				1	1		
94	Trypanosomiasis	Disease						1	1			
95	Tuberculosis	Disease	1						3	4	1	1
96	Tumor	Disease								1		1
97	Gastroenteritis	Condition							1			
98	Off feed	Condition		2								
99	Urine retention	Condition				1						
100	Vomiting	Condition							1	1		
101	Weakness	Condition	3	3	5	1			7	1		3
102	Worm infestation	Disease					3		2			1

**Supplementary Table S2. Disease and pathological conditions in birds.**

Sr. No.	Disease/ condition/ Clinical symptom	Type	Baha-walpur zoo	Bansra Gali murree wildlife Park	Pirowal wildlife park	Changa Manga wildlife park	Gatwala wildlife park	Jallo wildlife park	Lahore zoo-logical garden	Lahore zoo safari	Lal Su-hanara national park	Vehari wildlife park
1	Anemia	Condition	5						2			
2	Allergy	Condition							1			
3	Abnormal breathing	Condition	2									
4	Anorexia	Condition		1		2	1			2		1
5	Anthracosis	Disease							1			
6	Ascites	Condition		1					4			1
7	Avitaminosis	Disease							1			
8	Avian influenza	Disease							3	12		
9	Avian tuberculosis	Disease									1	
10	Bacterial infection	Disease							1	4		
11	Histomoniasis	Disease										
12	Bronchopneumonia	Disease						2	10			
13	Bronchitis	Disease	2									
14	Bursal disease	Disease		1								
15	Caseous necrosis	Condition	1									
16	Chronic respiratory disorder	Disease		4	8		3		1	1		2
17	Coccidiosis	Disease	3				2	1	5	1	3	
18	Colibacillosis	Disease				1	1	1	13	13		
19	Congestion	Condition						2				
20	Coughing	Condition				2						
21	Congested lungs	Condition		1					3			
22	Coryza	Disease	1	4	1	4	4	4	9	2	4	1
23	Crippled toe	Condition							1			
24	Cyst	Condition						1				
25	Dull and depressed	Condition	13			5	12	3	31	2		9
26	Dehydration	Condition							1			
27	Diarrhea	Condition	1		1	6	1		1			1
28	<i>E. coli</i> infection	Disease					2			12		
29	Egg bound	Condition	4	2	1		2	2				1
30	Egg drop syndrome	Disease		1								
31	Endoparasites	Disease							1	1		
32	Enteritis	Condition	8	4	1	2	7	5	25	11	3	6
33	Eye opacity	Condition					1	1				
34	Food poisoning	Disease		1				1	4			
35	Fever	Condition										1
36	Gastroenteritis	Condition								1	3	1
37	Fowl typhoid	Disease	5			1					17	

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Sr. No.	Disease/ condition/ Clinical symptom	Type	Baha-walpur zoo	Bansra Gali murree wildlife Park	Pirowal wildlife park	Changa Manga wildlife park	Gatwala wildlife park	Jallo wildlife park	Lahore zoo-logical garden	Lahore zoo safari	Lal Su-hanara national park	Vehari wildlife park
38	Gasping	Condition				2		1				
39	Heart failure	Condition	7	1				4				
40	Hypovolemic shock	Condition				1						
41	Heart attack	Condition										1
42	Heat stroke	Condition	12			1	2			2		
43	Heat stress	Condition						1	11	1		
44	Hepatitis	Condition							2	1		1
45	Intestinal hemorrhage	Condition							3			
46	Isolated	Condition	4									
47	Hemorrhagic enteritis	Condition				1	1		2			
48	Hyperthermia	Condition				4						
49	Lameness	Condition			2	1			23	1		
50	Leucosis	Disease										1
51	Lethargy	Condition	9				1		1			
52	Liver failure	Condition							1	1		
53	Low immunity	Condition							3			
54	Liver intoxication	Condition							5			
56	Limping	Condition						1				
57	Liver enlargement and damage	Condition		1								
58	Lung congestion	Condition							4			
59	Mycoplasma infection	Disease	1						1			
60	Mycotoxicosis	Disease						2		2		
61	Nasal discharge	Condition					1	1				
62	Nephritis	Condition						2	15			
63	Newcastle disease	Disease		1	23				2	1		
64	Necrotic enteritis	Disease	3						2	6		
65	Nervous disorder	Condition				1						
66	Off feed	Condition				1			2			
67	Omphalitis	Disease							4			
68	Ornithobacterosis	Disease					2					
69	Paresis	Condition						1				
70	Perihepatitis	Condition								3		
71	Pasteurellosis	Disease							1			
72	Peritonitis	Condition				1				2		
73	Pneumonia	Disease						1	6	4		3
74	Recumbency	Condition					1					

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Sr. No.	Disease/ condition/ Clinical symptom	Type	Baha-walpur zoo	Bansra Gali murree wildlife Park	Pirowal wildlife park	Changa Manga wildlife park	Gatwala wildlife park	Jallo wildlife park	Lahore zoo-logical garden	Lahore zoo safari	Lal Su-hanara national park	Vehari wildlife park
75	Pulmonary congestion	Condition								1		
76	Pulmonary edema	Condition								1		
77	Renal failure	Condition							7	1		
78	Respiratory failure	Condition								4		
79	Respiratory tract infection	Condition			5							
80	Respiratory distress	Condition			1	2	7		16	10		1
81	Respiratory issue	Condition							4			1
82	Ruffled feather	Condition					1					
83	Salmonellosis	Disease	10		1	3	2		1	11	5	1
84	Sneezing	Condition		3								
85	Stress	Condition						1				
86	Septic yolk	Condition						1	2			
87	Septicemia	Condition					3		4	4		
88	Sinusitis	Condition			2	1		3		1		
89	Spraddle leg	Condition					1					
90	Swelling	Condition		3				2			1	
91	Travelling stress	Condition					2					
92	Traumatic gizzard	Condition								2		
93	Toxic material ingestion	Condition										1
94	Ulcerative enteritis	Disease			1				13			
95	Upper respiratory swelling	Condition						3				
96	Ulcers	Condition			1	1						
97	Uterine impaction	Condition		1								
98	Weakness	Condition	3	1	1			2	2	1		3
99	Worm infestation	Disease							1			