

THE EFFECT OF DISEASES ON FOOD CONSUMPTION AND WEIGHT GAIN IN CAPTIVE COMMON BUZZARDS (*Buteo buteo*)

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ABSTRACT

Disease conditions invariably affect the activities and physiology of common buzzards irrespective of whether they are non-infectious or infectious. The impact of these diseases is further compounded by the stress of captivity in rehabilitation facilities. The aim of the study is to relate weight gain and food consumption to disease conditions in common buzzard. Fifty common buzzards were studied in five batches of 10 birds at a time. The absolute quantity of meat consumed was recorded after taking cognizance of the moisture lost by evaporation. Birds with infectious, non-infectious and those with both non-infectious and infectious diseases on the average consumed 111.9g, 116.6g and 110.3g of food daily, while their weight gain was 18.8%, 12.2% and 17.6% respectively. There were only slight differences in the amount of food consumed and percentage weight gained by the 3 categories of birds.

Key words: Captive Common Buzzards, Diseases, Food Consumption, Weight Gain.

INTRODUCTION

Diseases are specific abnormal pathological conditions that affect part or all of an organism which may include a disorder of structure or function culminating in signs and death if not properly treated. Diseases can be infectious, non-infectious, genetic or auto-immune. Diseases are generally known to affect animals in various ways ranging from loss of appetite, loss of weight, reduced libido, infertility, inactivity and eventually death.

Captivity is stressful and some of the factors that could lead to stress include excess cold or heat, starvation overcrowding and restraint (Von Faber, 1964). Stress leads to the release of glucagon, adrenaline and non adrenaline in the circulatory system (Freeman, 1976). None domesticated birds suffer from stress as a result of prolonged period of poor management and disease (Cooper, 1985b). Avoidance of extreme temperature, adequate nutrition and prompt attention to diseases are practical ways of controlling stress in animal population. The infectious diseases which the studied buzzards were diagnosed of included ectoparasitism, capillariasis, trichomoniasis and gas gangrene while the non-infectious conditions include laxation, dehydration, broken feather and, bruised beak.

Infestation with feather mites predisposed a free living eagle to aspergillosis and pseudomonas which ended in fatality (Mumcuoglu *et al.*, 1974). Male parasite toads can influence female mating preference (Houde and Torio, 1992, Hamilton and Zuk, 1982). Bright plumages in birds indicate genetic resistance to parasites (Hamilton and Zuk, 1982). Also *Capillaria Contorta* of the upper alimentary tract can cause disease of varying severity (Trainer *et al.*, 1968, Cooper, 1985b).

Prey items can act as intermediate hosts. Parasitism is quite high in captive birds of prey, but it can be minimised by good hygiene, avoidance of infested or contaminated food items, routine fecal examination, blood screening, regular and prompt treatment of newly admitted and carrier birds (Cerna and Louckeva, 1977).

Only a few birds of prey will take food other than flesh such as the African Harrier Hawk that eats oil palm nuts (Cooper, 1985a, Brown and Amadon, 1988).

Nutrition can play a number of roles in mediating potential for a disease state in both the genesis and the management of several common diseases. Metabolic diseases problems may be associated with either deficient or excessive nutrients intake (Elghandour *et al.*, 2013).

Nutrition is such an important aspect of rehabilitation efforts for captive wild birds as inadequate food

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supply in terms of quantity or quality has deleterious effects. Inanition or exhaustion from lack of nutrient can kill free living birds while under-fed birds have the pectoral muscles wasted through tissue catabolism.

MATERIALS AND METHODS

After clinical examination, diagnosis and recording, 50 common buzzards were randomly picked for the investigation. The birds were weighed with electronic weighting scales and put individually in perforated paper boxes measuring 90cm x 75cm x 75cm. The paper boxes were all kept in one large room on top of raised wooden pallets. In the rehabilitation facility, common buzzards were fed with pre-slaughtered frozen bony chicken. The chicken was brought ahead of time, chopped into smaller pieces and allowed to thaw slowly. Clean flat round bottom ceramic bowls 2cm deep with a diameter of 12cm were used in serving the chicken. The ceramic bowls were weighed and recorded. Thereafter a handful of the thawed chicken was put into the bowl and their combined weight recorded to determine the quantity of meat served. The weighed meat was thereafter lowered into the boxes containing individual common buzzards labeled B1-B50.

Each bird was kept in one box throughout the study period and the boxes were destroyed at the end of the study as the birds were transferred into bigger rooms. The birds were closely monitored for 24hours till the next morning when the buzzards were carefully picked up wrapped with clean dry cloth, while the leftover meat was gathered and the weight recorded.

The underlay glossy paper was changed and the bird put back in the box.

The leftover meat were gathered and put in the ceramic bowl and weighed. The weight of the ceramic bowl which has been predetermined was subtracted from the combined weight to determine the quantity of the meat left over. After the measurement of the leftover meat for each bird, the birds were returned and another meat for the day weighed and served. The buzzards were studied in batches of 10 for a period ranging from 30 to 36 days each. The quantity of meat consumed by buzzards for each day was determined by subtracting the quantity of leftover meat from the quantity of meat served the bird the previous day. The birds were served once a day and the records were compiled and kept throughout the study period for an overall average daily consumption to be computed. In the course of the study, the weight of the birds were taken at fairly equal intervals about 5 times each and recorded. The average of the five weights $W_1 - W_5$ was used as the average weight of the studied common buzzards.

In order to take cognizance of moisture lost by the served meat meals to the atmosphere through evaporation, controls were set up each day of the study. The same quantity of meat served the buzzards each day was put in ceramic bowls of the same capacity and dimension and lowered into the 26th paper box in the same room without any buzzard. The meat in the control bowl was reweighed the next day and recorded. The difference in weight represented the amount of moisture lost to the atmosphere by the meat through evaporation.

RESULTS

Table 1: Clinical conditions, average quantity of food consumed daily, initial weight, final weight and weight gain of buzzard (g).

BUZZARD	CLINICAL CONDITIONS	Average Daily food (g)	Initial wt.(g)	Final wt.(g)	%/wtgained; w.gain/ initial weight
B1	Ascariasis, Emaciation	97.9	628.4	791.7	26
B2	Capillariasis	96	596	683	14.6
B3	Emaciation, Fracture	113.4	622	822.2	32.2
B4	Capillariasis, Coccidiosis Fracture	106.4	579	698.8	20.7
B5	Capillariasis, Bruised beak, weakness	118.4	569.3	711	24.9
B6	Capillariasis, Coccidiosis, wound ankylosis	101.5	796	950.1	19.4
B7	Capillariasis, Gastroenteritis, Luxation	107.8	695	908.4	30.7

B8	Capillariasis	120.5	623.5	855.4	37.2
B9	Ascariasis, CapillariasisCoccidiosis, Dehydration	110.6	559	733.3	31.3
B10	Emaciation, wound	125	669	821.1	22.7
B11	Weakness, nervousness	130.2	551	656.8	19.2
B12	Gastroenteritis	125.1	601.4	661.4	10
B13	Occulitis, emaciation	114.2	661.4	695.4	5.1
B14	Abdominal tumor	104.2	564	579.7	2.8
B15	Weakness	127.7	689	831	20.6
B16	Bruised beak, Gastronteritis	111.7	633.9	737.2	16.3
B17	Occulitis, Dehydration	122.3	603.5	809	34.1
B18	Dehydration	111.7	591.3	716	21.1
B19	Fracture	118.3	683.9	801.5	17.2
B20	Coccidiosis	110.1	753.5	913.2	21.2
B21	Broken feathers, Ectoparasitism	113.1	629	753.5	19.8
B22	Trichomoniasis	119.9	557.4	808	45
B23	Ectoparasitism	127.5	499	637.1	27.7
B24	Ectoparasitism	121.6	565	703	24.4
B25	Ectoparasitism	123.3	654.2	857	31
B26	Emaciation wound	103.3	911	829	-9
B27	Gas Gangrene	87	845	853.5	1
B28	Ascariasis, weakness	101	614.	625.3	1.8
B29	Fracture	119.8	563	578.8	1.9
B30	Capillariasis, Coccidiosis, Gastroenteritis	111.7	567.4	705.3	24.3
B31	Sinusitis	104.1	498.4	533.8	7.1
B32	Ascariasis, Nervousness	131.4	619	745.3	20.4
B33	Nervousness, oil taint, poisoning	131.9	713	726.8	1.9
B34	Capillariasis,Ectoparasitism wound, luxation	104.3	565	574	1.6
B35	Emaciation, weakness	112.1	831	857.6	3.2
B36	Coccidiosis, Gastroenteritis. wound, Dehydration	105.8	568.8	603.5	6.1
B37	Dehydration	106	673.2	694.7	3.2
B38	Rhinitis sinusitis	94	601.5	638.2	6.1
B39	Ascariasis, Coccidiosis	115.7	550	644.6	17.2
B40	Trichomoniasis, wound	102	669	801.5	19.8
B41	Emaciation	103.3	731.8	688.6	-5.9
B42	Ectoparasitism, Electrocutation	105.5	767.5	597	22.2
B43	Weakness, Luxation	124.7	694	884.6	27.5
B44	Coccidiosis, Emaciation	117.6	790.4	939	18.8

B45	Ascariasis. wound, amputation	109.7	568	647	13.9
B46	Weakness, blindness	124.5	695.8	865.6	21.5
B47	Wound, Weakness	100.6	568	647	13.9
B48	Dehydration	118.1	695.8	865.6	24.4
B49	Ascariasis	128	598.5	666.7	11.4
B50	Capillariasis, weakness	102.8	620	823.4	32.8
AVERAGE		112.9	642	942.9	16.3

Table 2: Categorization of Captive Common Buzzards into Disease Type, Average Food Consumed Daily and Average Weight Gain.

BWNID	Av. Qty. of Food Consumed Daily (g)	Average Weight Gain (%)
B3	113.4	32.2
B11	130.2	19.2
B15	127.6	20.6
B18	111.7	21.1
B19	118.3	17.2
B29	119.8	1.9
B33	131.9	-1.9
B35	112.1	3.2
B37	106	3.2
B41	103.3	-5.9
B42	105.5	22.2
B43	124.7	27.5
B46	124.5	21.5
B48	102.8	32.8
MEAN	116.6	12.2
BWID		
B2	96	14.2
B8	120.5	37.2
B12	125.1	10
B14	104.2	2.8
B20	110.1	21.2
B22	119.1	45
B23	1273.5	27.7
B24	121.6	24.4
B25	123.3	31
B27	87	1
B30	111.7	24.3
B31	104.1	7.1
B38	94	6.1
B39	115.7	17.2
B40	102	19.8
B49	128	11.4
MEAN	111.9	18.8
BWNAID		
B1	97.9	26
B4	106.4	20.7
B5	118.4	24.9
B6	101.5	19.4
B7	107.8	30.7
B9	110.6	31.3
B10	125	22.7

B13	114.2	5.1
B16	111.7	16.3
B17	122.3	34.1
B21	113.1	19.8
B26	103.3	-9
B28	101	1.8
B32	131.4	20.4
B34	104.8	1.6
B36	105.8	6.1
B44	117.6	18.8
B45	109.7	13.9
B47	100.6	13.9
B50	102.8	32.8
MEAN	110.3	17.6

KEY:

BWNID = Buzzards with non-infectious diseases

BWID = Buzzards with infectious diseases

BWNAID = Buzzards with non-infectious diseases and infectious diseases

Table 3: Disease Type, Average Quantity of Food Consumed Daily

	Birds with non-infectious diseases	Birds with infectious diseases	Birds with both infectious and non-infectious diseases
No	14	16	20
Average daily food consumption	116.6g	111.9g	110.3g
Average weight gain	12.2%	18.8%	17.6%

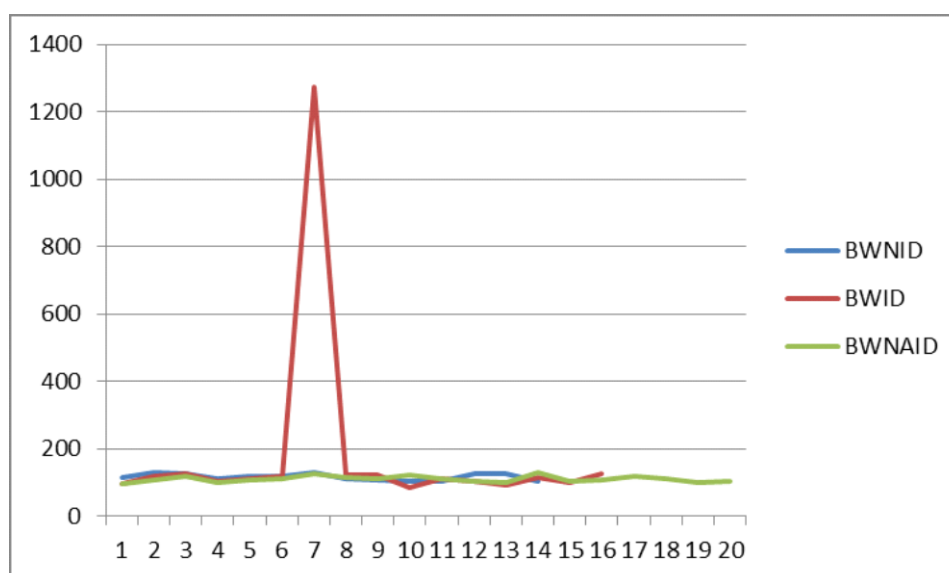


Figure 1: Line plot of average food consumed by different birds with different diseases.

ANOVA: Single Factor

Summary

Groups	Count	Sum	Average	Variance
BWNID	14	1631.8	116.5571	102.9673
BWID	16	2935.9	183.4938	84634.42
BWNAID	19	2103.1	110.6895	82.19544

ANOVA

Source of Variation	SS	Df	MS	F	P-value	F crit
Between Groups	53553.73	2	26776.87	0.968091	0.38741	3.199582
Within Groups	1272334	46	27659.44			
Total	1325888	48				

$P = 0.38741 > 0.05$.

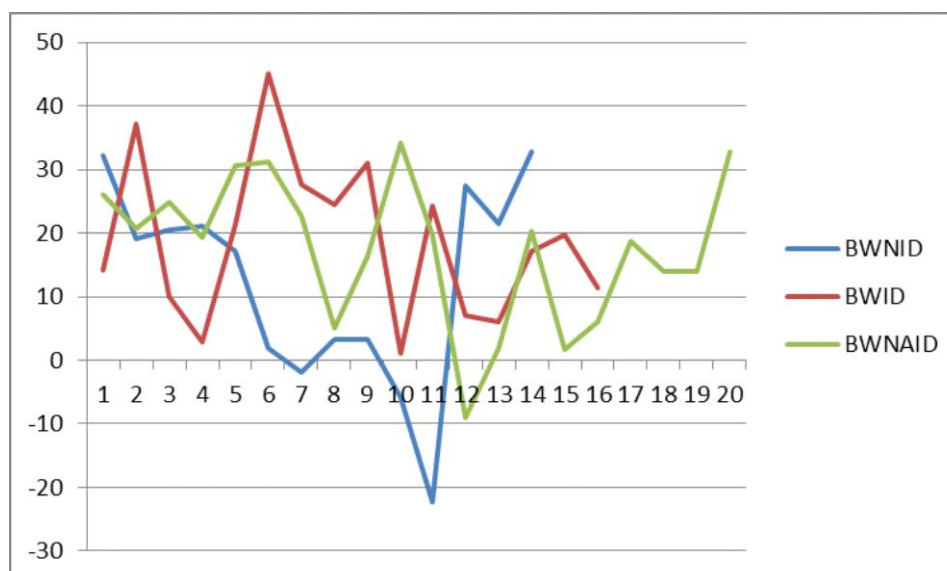


Figure 2: Line Plot of Average Weight Gain by different Birds with different Diseases

ANOVA: Single Factor

Summary

Groups	Count	Sum	Average	Variance
BWNID	14	170.4	12.17143	257.4284
BWID	16	300.4	18.775	156.5567
BWNAID	20	351.3	17.565	135.2719

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	367.6377	2	183.8189	1.045299	0.359616	3.195056
Within Groups	8265.084	47	175.8529			
Total	8632.722	49				

There were no significant differences in average weight gain for the birds with the three categories of diseases.

DISCUSSION

Results revealed that buzzards with non-infectious diseases, infectious diseases and those with both infectious and non - infectious diseases, on the average consumed 116.6g, 111.9g and 110.3g of food daily respectively. The group with non-infectious, infectious and those with both non-infectious and infectious diseases had 12.2%, 18.8% and 17.6% weight gain respectively.

Buzzards with non-infectious diseases consumed the most quantity of food (111.6g) while those with infectious diseases had the highest weight gain (18.8%). This implies that non-infectious disease conditions did not affect food consumption as much as the infectious diseases. On the other hand, birds with infectious diseases gained weight the most because the birds were treated as the research progressed and recovered birds are likely to have improved appetite and food conversion efficiency. It also means that food consumption does not have a direct correlation with food conversion efficiency and weight gain (Cuthbert *et al.*, 2006).

There was no significant difference in the average daily food consumption among the 3 groups of birds studied.

Despite the different disease conditions, most of the buzzards (98%) gained weight which might have been limited by the presence of these conditions.

The duration of disease, severity of disease, management of disease conditions, environmental factors and specie and experimental animal type could be possible reasons for the observed results.

CONCLUSION

Documented relationships exist between disease, food consumption and weight gain. This study showed no significant difference between food consumption in disease conditions and weight gain in disease conditions in common buzzards. Further studies could be done to investigate and compare the effect of other factors like experimental animal type and weather.

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