

# The Effect of Diseases on Food Consumption and Weight Gain in Captive Common Buzzards (*Buteo buteo*)

Okoli C. P, Aiyedun J. O

**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 rehab facilities. Fifty common buzzards were studied in five batches of 10 birds at a time. The conditions the buzzards were diagnosed of at entry were divided into infectious and non-infectious diseases. The main trust of this investigation was to arithmetically compute the average daily food consumption and weight gain by common buzzards with non-infectious, infectious diseases and those with both non-infectious and infectious diseases over the study period, analyse and interpret the results statistically. The buzzards were kept singly in perforated paper boxes with their food weighed daily with an electronic scale. A control was set up daily in a box without any buzzard to determine and correct for weight loss through moisture by evaporation. The left-over was weighed the next day and subtracted from the quantity of meat served to get the relative quantity of meat consumed. The absolute quantity of meat was gotten after taking cognizance of moisture lost by the control. Birds with non-infectious, infectious and those with both non-infectious and infectious diseases on the average consumed 116.6g, 111.9g and 110.3g of food daily respectively. In the same order their weight gain was 12.2%, 18.8% and 17.6%. While there are obvious differences mathematically in the amount of food consumed and percentage weight gained by the 3 categories of birds as shown, Anova shows no significant difference in the values obtained since the P-value (0.38741) is greater than the level of significance of 0.05. This result could be attributed to the unbiased, equal and good care given to all the studied buzzards as the study lasted in tandem with world best standard practice and ethics. It also underscores the necessity and effectiveness of wildlife rehabilitation programmes.

**Keywords :** Diseases, Food Consumption, Weight Gain, Captive, Common Buzzards.

## I. 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. According to Oxford dictionary, disease is a disordered state of an organism or organ. Cooper (1985) defined infectious diseases as one caused by the actions of a living organism as opposed to physical injuries, endocrinological disorders or genetic abnormalities.

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\* Correspondence Author (s)

**Okoli C. P.**, Department of Veterinary Medicine and Surgery, Faculty of Veterinary Medicine, University of Abuja, Abuja, Nigeria.

**Aiyedun J. O.**, Department of Veterinary Public Health and Preventive Medicine, Faculty of Veterinary Medicine, University of Ilorin, Nigeria.

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Diseases are generally known to affect animals in various ways ranging from loss of appetite to loss of weight, reduced libido to infertility and inactivity to death. They also include disabilities, injuries, disorders, syndromes, deviant behaviour and atypical variation of structures. For the purpose of this work, diseases will be broadly divided into infectious and non-infectious diseases. Captivity no doubt is a stressful factor and Von Faber, H. (1964) listed some stressors which could lead to general adaptation syndrome in poultry as fatigue, excess cold or heat, starvation, crowding or restraint. Freeman B.M (1976) stated that stressed fowls release chemicals such as glucagon, adrenaline and non-adrenaline into their blood circulation. Cooper J.E also stated that some non-domesticated birds appear to suffer from stress on account of prolonged period of poor management, inter-current disease or chronic injury. Avoidance of extreme temperatures, adequate nutrition and prompt attention to diseases are practical ways of checking stress in animal populations. The diseases which the studied buzzards were diagnosed of included ectoparasitism, capillariasis, trichomoniasis, gas gangrene etc. The non-infectious conditions include laxation, dehydration, broken feather, bruised beak to mention some. Mumcuoglu and Muller (1974) recorded that serious infestation with feather mites predisposed a free living eagle to aspergillosis and pseudomonas which case ended in fatality Houde and Torio (1992), Clayton (1990) and Zuk et al (1993) suggested that male parasite toads can influence female mating preferences. Hamilton and Zuk (1982) suggested that bright plumages in birds indicate genetic resistance to parasites. Tranner et al (1968) and Cooper (1969) reported that *Capillaria Contorta* of the upper alimentary tract can cause disease of varying severity. Prey items can act as intermediate host as reported by Cerna and Louckova (1977). Generally speaking, 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. Cooper (1985) stated that only a few birds of prey will take food other than flesh. For example the African Harrier Hawk which eats oil palm nuts. The figures given by Brown and Amadon (1968) for food consumption by a select number of falconiform species (exclusive of common buzzards) show that the smaller the bird, the greater the percentage of body weight that it consumed daily.

Nutrition is such an important aspect of rehabilitation efforts for captive wild birds as inadequate food supply in terms of quantity or quality has deleterious effects. Inanition or exhaustion from lack of nutrient can kill free living birds while underfed birds have the pectoral muscles wasted through tissue catabolism. This research work was intended to find out the effect of infectious and non-infectious diseases as diagnosed on entry into the rehab facility on food consumption and weight gain in captive common buzzards. A third class of buzzards are those with both infectious and non-infectious diseases and the computation and comparison will be done arithmetically and statistically.

**II. MATERIALS AND METHOD**

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 rehab facility, common buzzards were fed with preslaughtered 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 taken and put in the bowl and their combined weight taken and recorded to determine the quantity of meat served. The weighed meat was then carefully lowered in to 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 in to 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 by one person, while the second person gathered the leftover meat for re-weighting. The underlay glossy paper was changed and the bird put back in the box. The leftover meat were painstakingly 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 and recording 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 26<sup>th</sup> 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.

**III. RESULTS**

**Table I**

**List of 50 common buzzards (B1-B50) studied, their clinical conditions, average quantity of food consumed daily, initial weight final weight and weight gained (g).**

BUZZARD	CLINICAL CONDITIONS	Average Daily food (g)	Initial wt.(g)	Final wt.(g)	%/wt gained/ lost
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, Capillarais Coccidiosis, 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	1.9	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
<b>AVERAGE</b>		<b>112.9</b>	<b>642</b>	<b>942.9</b>	<b>16.3</b>

Table II

Categorization of studied captive common buzzards into disease type, average qty. Of food consumed daily and average weight gain/loss in percent

BWNID	Av. Qty. of Food Consumed Daily (g)	Av. Weight Gain/Loss (%)
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
<b>BWID</b>		
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
<b>BWNAID</b>		
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

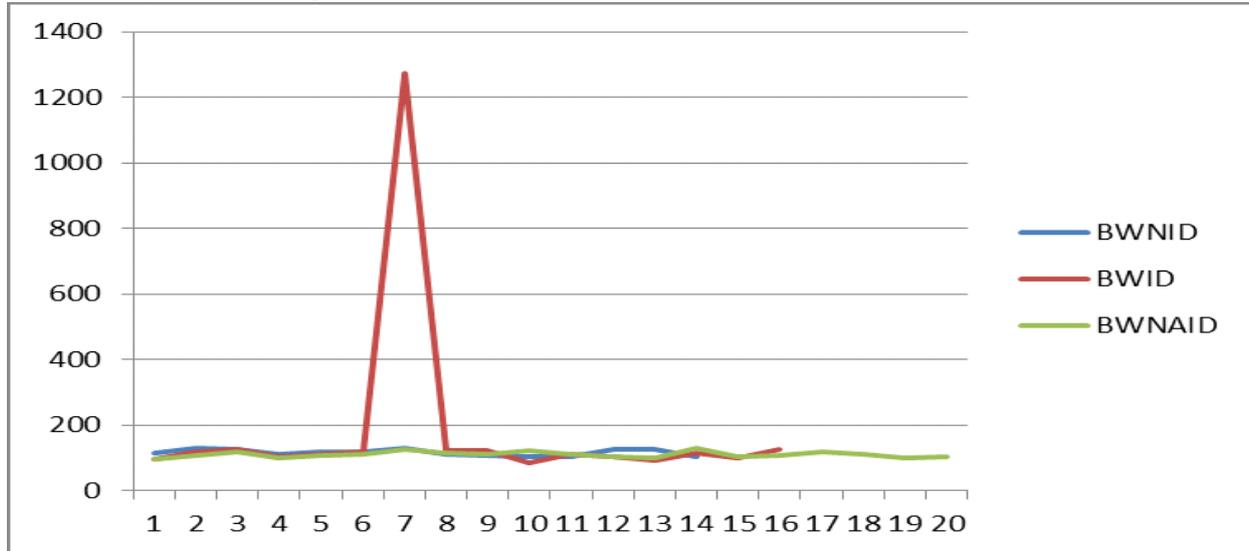
**Table III**

	Birds with non-infectious diseases	Birds with infectious diseases	Birds with both infectious and non-infectious diseases

No	14	16	20
Av. Daily food consumption	116.6g	111.9g	110.3g
Av. Weight gain	12.2%	18.8%	17.6%

**Analysis of Variance**

**DISEASE TYPE, AVERAGE QTY. OF FOOD CONSUMED DAILY**



**Figure1: Line Plot of average food consumed by different Birds with diff Disease Types**

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				

Result shows no significant diff. In AVERAGE QTY. OF FOOD CONSUMED DAILY for the birds with the three diseases type since P-value of 0.38741 which is greater than the level of sign. of 0.05.

**Av. Weight Gain/Loss**

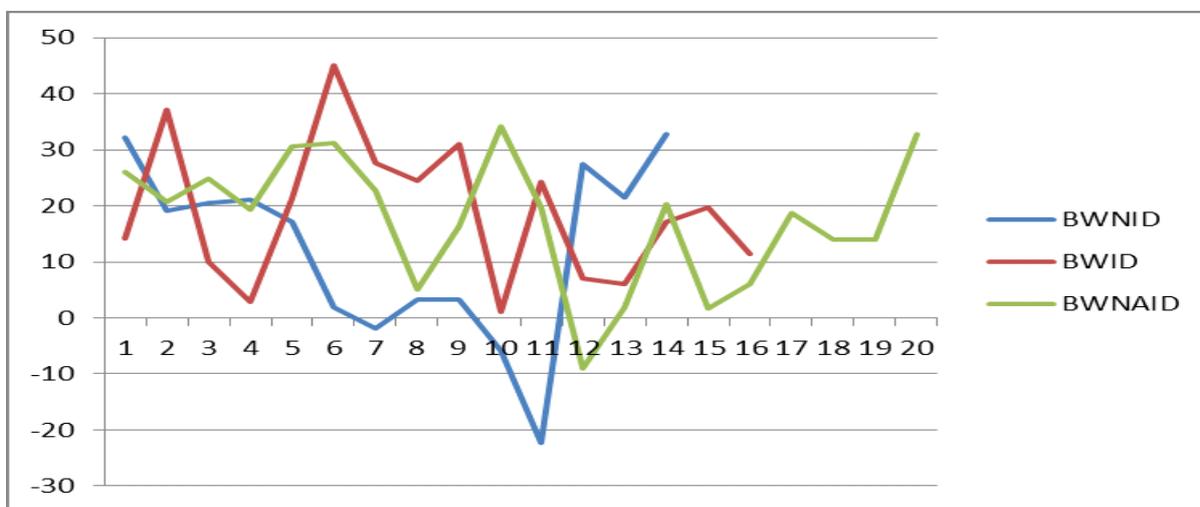


Figure 2: Line Plot of Av. Weight Gain/Loss by different Birds with diff Disease Types

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 is no reason to reject the null hypothesis of non-sig. Diff in the **Av. Weight Gain/Loss** by the various birds with different disease type  
 Result shows no significant diff. **Av. Weight Gain/Loss** for the birds with the three diseases

IV. DISCUSSION

Disease conditions affect the physiology and activity of common buzzards irrespective of whether they are infectious or non-infectious. The impact of diseases on these birds is further compounded by the stress captivity bordering on confinement, frequent handling, restraint and placement on different diet from that in the wild. A major trust of this investigation is to find out and interpret both arithmetically and statistically the effect of diseases of the studied buzzards as categorized on their average daily food consumption and weight gain/loss. Result obtained shows that buzzards with non-infectious diseases, infectious diseases and those with both non-infectious and 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 largest quantity of food (111.6g) while those

with infectious diseases gained weight most (18.8%). This implies that non-infectious disease conditions did not affect food consumption as much as the infectious diseases did. On the other hand, birds with infectious diseases gained most weight 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. Statistically, there is no significant difference in the average daily food consumption and weight gain of the 3 groups of birds as categorized. The Anova shows no significant difference in the average quantity of food consumed daily for the 3 categories of birds since P-value of 0.38741 is greater than the level of significance of 0.05. The statistical non-significant difference in the daily food consumption and weight gain by the 3 categories of buzzards as grouped should be attributed to the unbiased equal and good care given to all the birds as the study lasted in tandem with world best standard practice and ethics. It also underscores the necessity and effectiveness of wildlife rehabilitation programmes.



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