Breeding and Feeding of Indian Peafowl in Bangladesh National Zoo

A

DISSERTATION

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSHOPY IN ZOOLOGY (WILDLIFE MANAGEMENT AND CONSERVATION BIOLOGY)

JAHANGIRNAGAR UNIVERSITY

BY

OMAR FARUK MIAZI

EXAMINATION ROLL NO.: 16238

REGISTRATION NO.: 2754

SESSION: 2015-2016

DEPARTMENT OF ZOOLOGY, JAHANGIRNAGAR UNIVERSITY

SAVAR, DHAKA, BANGLADESH

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Authorization

I declare that I did the work presented here and that it followed the style and contents of the PhD dissertation in Zoology (Wildlife Management and Conservation Biology), Jahangirnagar University. No part of this work has ever presented to anywhere else for any degree whatsoever. I hereby declare that I am the sole author of the thesis.

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Session 2015-2016

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Supervisor's Recommendation

The undersigned certifies that the author himself did the work presented here and that based on the style and contents, the dissertation is suitable for submission in partial fulfillment of the requirements for the degree of the Doctor of Philosophy in Zoology (Wildlife Management and Conservation Biology), Jahangirnagar University.

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Dedicated to

My beloved Parents and Family members

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The Author
December, 2020

LIST OF ABBREVIATION

Abbreviation	**Elaboration**
AA	Amino Acid
AI	Avian Influenza
ACP	Anticoccidial Products
AD	Anno Domini
BC	Before Common Era
BNZ	Bangladesh National Zoo
C	Celsius
CDIL	Central Disease Investigation Laboratory
CI	Confidence Interval
cm	Centimeter
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CRD	Chronic Respiratory Disease
CVASU	Chattogram Veterinary and Animal Sciences University
df	Degree of Freedom
E	East, *Eimeria*
F	Fahrenheit
FAO	Food and Agricultural Organization
FC	Fowl Cholera
FDA	Food and Drug Adminitration
FP	Fowl Pox

gm	Gram
https	Hypertext Transfer Protocol Secure
l	Litre
lb	Pound
ICBP	International Council for Bird Preservation
I/M	Intra Mascular
in	Inch
IUCN	International Union for Conservation of Nature
kcal	Kilo Calorie
kg	Kilogram
KNP	Keoladeo National Park
m	Meter
ml	Milliliter
M	*Mycoplasma*
Max	Maximum
MG	*Mycoplasma gallisepticum*
mg	Milligram
MI	*Mycoplasma iowae*
Min	Minimum
mm	Millimeter
MM	*Mycoplasma meleagridis*
MS	*Mycoplasma synoviae*
N	North
NASA	National Audubon Society of America

ND	Newcastle Disease
NDV	Newcastle Disease Virus
No./no.	Number
P	*Pavo*
RIR	Rhode Island Red
®	Trade Name
S	*Salmonella, Serratia*
SD	Standard Deviation
SL	Serial
SPSS	Statistical Package for the Social Sciences
SSC	Species Survival Commission
STATA	Syllabic abbreviation of the words statistics and data
TB	Tuberculosis
tsp	Teaspoon
UPA	United Peafowl Association
WWF	World Wide Fund for Nature
WWW	World Wide Web

CONTENTS

SUMMARY

Indian peafowl (*Pavo cristatus*) is one of the most beautiful birds in the world. Because of its attractive appearance, the bird has long been famous outside its native range, and consequently kept in captivities and bred across the world. Indian peafowl is an attraction for people and the wild birds are being used as flagship species for conservation and an indicator species for environmental changes. Few other bird species have had such an impact and long history, holding an unmistakable place in the way of life, craftsmanship and religion of eastern and western societies. The wild populations of Indian peafowl are declining and currently it is declared a threatened species according to IUCN Red List. The wild birds used to be found in all the Sal (*Shorea robusta*) forests of Bangladesh until the 1980s. Today, there is no Indian peafowl in the wild in Bangladesh, but a good number is available in captivity. There are more than 200 Indian peafowls in Bangladesh National Zoo (BNZ) alone, but there was no scientific study on the breeding and feeding as well as others related parameters in captivity in the Bangladesh context. Therefore, the main focus of this study was to fulfill that data gap and get new information on the breeding and feeding of the Indian peafowl in captivity. The data were collected from April 2015 to December 2018 by directly observing and measuring various parameters as well as by questionnaire survey.

Based on the data on weight-gain and other phenotypic characteristics of the Indian peafowl in BNZ it was found that the average live weight of a day old chick and 6 month old chick were 65.7±3.00 gm and 1982.05±38.58 gm, respectively. There was statically increasing trend in the weight in different ascending age groups. The body weight of a day old peachick ranged from 58 to 71 gm, which continue to gain weight with the age and at age 180 days the weight ranged from 1,935 to 2,079 gm. Significant, variation was found in the individual weight gain with the age. The males gain more weight in all stages of development

compared to the females from 210 days up to 365 days. On average, the one year old males gained 3,266.2 gm weight whereas females gained 2,830.4 gm weight. The growth rates varied significantly in males and females of all age groups (*P<0.001*). The weight gain was found satisfactory because of the supply of proper and balanced feed, good housing, and good management in BNZ. The average weight of mature Indian peafowl was found 5.35 kg for male and 3.14 kg for female. Most of quantitative parameters of male and female were significantly different (*P<0.001*).

The mature male appearance in breeding season was colourful plumage with glossy blue neck and the mature female was shiny brown with smooth plumage. In the breeding season every single male maintained a territory that consisted of three or four females. Males became sexually mature at the age of 2.79±0.20 years whereas females became sexually mature at 1.77±0.19 years of age. Breeding season was from February to August (n=105). The incubation period was 29.45±0.69 days and the first laying age was 675.45±65.74 days. Egg weight, egg length, egg width and clutch number found in this study were 107.84±6.27 gm, 7.53±0.50 cm, 5.43±0.24 cm and 11.25±1.02, respectively. The overall fertility was 45.61% (n=592), but the overall hatchability was 40.20% based on total eggs (n=592) and 88.15% based on fertile eggs (n=270).

The feeds supplied for adult Indian peafowl during the study included layer feed, spinach, cabbage, fruits, eggs and peanuts. Mango and watermelon were supplied seasonally, but papaya was supplied most of the time. Bulk of feeds (comprised of layer feeds, spinach and fruits) were provided totally 250 gm daily; on the other hand, 25 gm of supporting feed eggs and peanuts were given per peafowl. Clean water was given every day. No significant difference in feed intake was found across the seasons. The peachicks were fully free from feed and water on the 1st day and small amount of crumble feeds were supplied to the peachicks from the 2nd day. After the 3rd month, pellet form of layer starter feed was

supplied. Spinach, fruits, eggs and peanuts were given as feed constituents after 2 weeks, 1.5 months, 2 weeks and 4 months respectively. The habitats of the Indian peafowl in BNZ are fully enclosed, and comprises with resting and egg laying areas. Space requirement for each Indian peafowl was more than 100 square feet in both habitats.

Livability of the Indian peafowl chicks was very high for all study years. The overall livability was 95.82% (n=263) up to fledgling age. The fledgling age was considered three months when they grow full feathers. Livability (97.5%; n=39) was the highest in 2018, whereas the lowest (93.75%; n=15) was in 2016. Mortality, on the other hand, was found low in all study years, the total average was found only (4.18%; n=263). The main causes of peachick mortality were found colibacillosis and salmonellosis. Most of the deaths orrurred in early age between 1-15 days, which was 82% (n=9), later in 16-90 days age only 18% (n=2) deaths occurred.

Out of the total recorded death cases due to diseases during the study, 62.5% (n=5) was due to colibacillosis and 37.5% (n=3) was due to salmonellosis. The common diseases were salmonellosis and colibasillosis in early stage, and coccidiosis and parasitic infestation in adult stage. Moreover, omphalytis was found in day-old peachicks and Newcastle disease, fowl pox, avian cholera, rickets and enteritis were reported in past time, but not during this study. The common visible abnormalities were curled toes, bumble feet, wing injury and lameness. The highest recorded (54.1%; n=33) was curled toes and the lowest recoded (6.6%; n=4) was wing injury. Other rarely observed abnormalities included gout in hock joint, heat stress, cool stress, visitor stress and nervous disorder. The diagnosis of diseases and abnormalities were done by the official veterinary physicians, based on clinical signs and postmortem analysis, which was followed by treatment as prescribed by the physicians. Vaccine against Newcastle disease, fowl pox and avian influenza were used to combat the diseases. Moreover, medication against parasitic infestation was started from four month of

age and later continued regularly in six months interval. Some vitamins, minerals and nutrients were used regularly for preventing several abnormalities and diseases.

The findings of this study will be useful in improving the management and propagation of the Indian peafowl in captivity, particularly in zoos, safari parks and farms. Since it is a large ornamental bird, its breeding has the commercial prospect to sale as pet bird or for meat. Moreover, initiatives can be taken to breed the species in captivity, systematically train them to survive in the wild, and release in safe wild habitats where the species once existed in the wild.