

# Avian (Poultry) Production

## A Text Book

This book has been compiled covering the revised syllabi of Poultry/Avian production i.e., LPM 211 and LPM 221 suiting to the undergraduate teaching in Indian Veterinary Colleges. As the language has been made easy, it will certainly be of immense use to both student, and teachers.

Altogether 30 authors have contributed on different topics. Almost all of them are highly experienced. At the end of each topic a question bank is given containing the object questions with answer key so as to self-test by the students. The topics are well-covered with appropriate illustration, wherever necessary.

2014, 286pages, figures, tables, index, 25cm

**D Sapkota** : MVSc, PhD, FUWAI, FIPSA: Professor, Department of Poultry Science, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati.

**D Narahari** : MVSc, PhD, FFAO (USA), FNAVS.: Retired Professor, Department of Poultry Science, Madras Veterinary Colleges, Tamil Nadu Veterinary and Animal Science University.

**J D Mahanta** : MVSc, PhD.: Professor and In-Charge, Poultry Farm, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati.



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101, Vikas Surya Plaza, CU Block, L.S.C. Market  
Pitam Pura, New Delhi-110 034, India  
Tel. : +91(11) 27341717, Fax : +91(11) 27341616  
E-mail : info@nipabooks.com  
Web : www.nipabooks.com

**Readership:** Purely a text book for BVSc & AH students. Also works as a guide book for Poultry Production & Business Management (PPBM), B. Tech. Poultry Science/ B.Sc. Poultry Science degree and diploma students. Will cater to the needs of those related to poultry science, meat science and technology, livestock production and management, livestock production and technology, avian studies and aspirants for ARS, NET, JRF, SRF and Post-graduate examinations.

### CONTENTS

- Indian Poultry Industry
- Classification and Common Breeds of Poultry
- Indigenous Fowls of India
- Reproduction in Fowl
- Formation and Structure of Egg
- Economic Traits in Poultry
- Backyard, Scavenging and Semi Intensive Systems of Management
- Coloured Feathered Birds Developed for Rural Poultry
- Mixed Farming
- Brooding and Rearing of Poultry
- Economic Production of Poultry
- Marketing of Poultry Products
- Setting Up of Farms for Different Classes of Poultry
- Organic and Hill Farming
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- Vices in Poultry and Their Remedial Measures
- Water Quality in Poultry Rearing
- Biosecurity
- Poultry Behavior and Welfare
- Feeding of Poultry
- Health Care
- Designer Egg and Chicken Meat
- Breeder Flock Management
- Artificial Insemination in Poultry
- Hatchery Practices



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Avian (Poultry) Production  
Editors : D Sapkota • D Narahari

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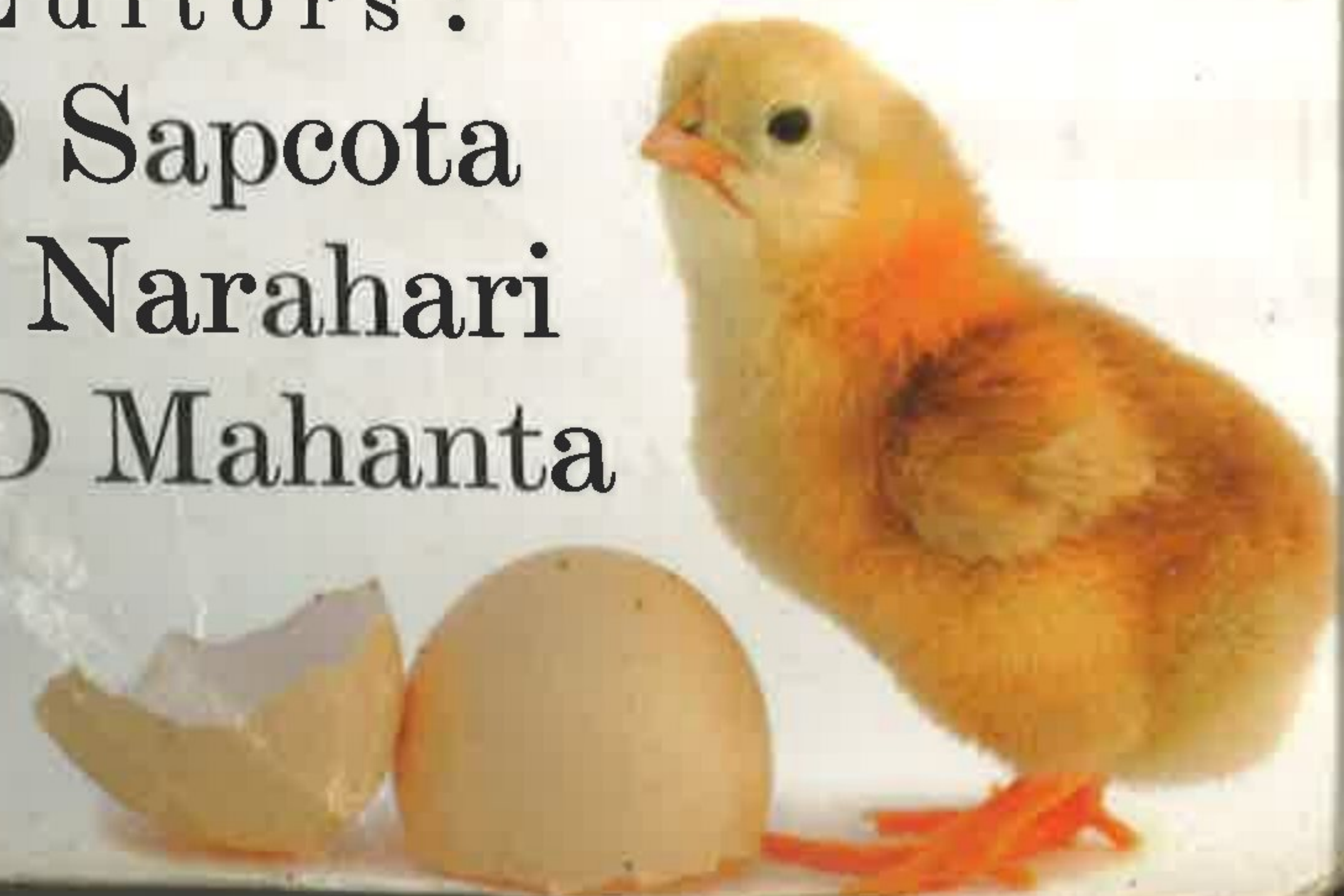
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# Avian (Poultry) Production

## A Text Book

Editors :  
D Sapkota  
D Narahari  
J D Mahanta





About the Editors :



Prof. D Sapkota completed BVSc & AH from AAU in 1984 and MVSc in Poultry Science with an ICAR Jr fellowship from APAU, Hyderabad in 1986. After a stint in the service of Assam Govt. as Veterinary Assistant Surgeon he joined AAU as Assistant professor (Farm Manager) in the year

1987. Subsequently, he completed Doctoral in Poultry Science in 1997 from IVRI, Bareilly with CSIR Sr Research Fellowship specializing on amino acid nutrition. He is presently working as Professor, Department of Poultry Science, CVSc, AAU, Khanapara. He has published about 320 research papers/abstracts/popular scientific articles, two hand books, 3 book-chapters, four practical manuals and one teaching learning material on poultry production for K.K. Handique Open University, Guwahati. As Principal Investigator he has completed 2 research projects under the aegis of ICAR and World Bank and one being executed funded by the DBT. He is associated with the Experiential Learning for hands on training programme and participated in several national and international conferences presenting research papers in India and abroad. He is in the editorial board of half-a-dozen journals of repute and guided 17 students for MVSc/Ph D programmes. He writes scientific articles in English, Assamese, Nepali and Hindi. He has been a life member of more than ten professional/scientific bodies and is the executive member of Indian Poultry Science Association and Councilor of Worlds' Poultry Science Association (IB). He is the recipient of the Fellow of the IPSA. He can be contacted at debensapkota@yahoo.com.



Prof. D. Narahari did Master's and Doctoral in Poultry Science from APAU, Hyderabad and TNAU, Coimbatore in the year 1974 and 1981, respectively. In the year 1999, he did Post-Doctoral research in Poultry nutrition, from the University of Missouri, Columbia, U.S.A. Before

joining the university service in the year 1978, he served the State AH Department and the TNPDC, for a decade. He retired from the university service in the year 2006 as Professor and Head,

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### *Editors*

**D Sapkota, MVSc, PhD. FUWAI, FIPSA**

Professor  
Department of Poultry Science  
College of Veterinary Science  
Assam Agricultural University  
Khanapara, Guwahati, Assam

**D Narahari, MVSc, PhD., FFAO (USA), FNAVS**

Retired Professor  
Department of Poultry Science  
Madras Veterinary College  
Tamil Nadu Veterinary and Animal Science University  
Chennai, Tamil Nadu

**J D Mahanta, MVSc, PhD.**

Professor  
Department of Poultry Science  
College of Veterinary Science  
Assam Agricultural University  
Khanapara, Guwahati, Assam



**NEW INDIA PUBLISHING AGENCY**

New Delhi – 110 034



About the Editor



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Email: info@nipabooks.com  
Web: www.nipabooks.com

Feedback at feedbacks@nipabooks.com

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Composed, Designed and Printed in India

## Contents

Foreword.....	ix
Preface.....	xi
Terminologies.....	xiii
Contributors.....	xvii
Stimulating Memory Tips.....	xxi
<b>1. Indian Poultry Industry .....</b>	<b>1</b>
<i>D. Narahari</i>	
<b>2. Classification and Common Breeds of Poultry .....</b>	<b>15</b>
<i>D. Sapkota</i>	
<b>3. Indigenous Fowls of India .....</b>	<b>29</b>
<i>Islam Uddin Sheikh</i>	
<b>4. Reproduction in Fowl .....</b>	<b>43</b>
<i>S. George Paradis</i>	
<b>5. Formation and Structure of Egg .....</b>	<b>49</b>
<i>S.C. Edwin</i>	
<b>6. Economic Traits in Poultry .....</b>	<b>61</b>
<i>A. Jalaluddin</i>	
<b>7. Backyard, Scavenging and Semi Intensive Systems of Management .....</b>	<b>73</b>
<i>A. Bhattacharyya</i>	
<b>8. Coloured Feathered Birds Developed for Rural Poultry .....</b>	<b>79</b>
<i>S.T. Viroji Rao</i>	



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vi Contents

9. Mixed Farming .....	85
<i>M.V. Dhumal</i>	
10. Brooding and Rearing of Poultry .....	91
<i>D. Sapkota</i>	
11. Economic Production of Poultry .....	99
<i>M.T. Bandy</i>	
12. Marketing of Poultry Products .....	113
<i>Ashok Kumar and Jyoti Palod</i>	
13. Setting-Up of Farms for Different Classes of Poultry .....	123
<i>J.D. Mahanta</i>	
14. Organic and Hill Farmings .....	135
<i>Ranjana Goswami and M Sarma</i>	
15. Conservation of Indigenous Germplasm .....	145
<i>P.K. Shukla and Sujit Nayak</i>	
16. Project Preparation for Rural People .....	155
<i>J.D. Mahanta</i>	
17. Poultry Housing .....	167
<i>S.S. Nagra</i>	
18. Brooding (Chick) Management .....	185
<i>D. Sapkota</i>	
19. Care and Management of Commercial Growers, Layers and Broilers .....	193
<i>D. Sapkota</i>	
20. Poultry Judging .....	205
<i>D. Sapkota</i>	
21. Poultry Litter Management .....	217
<i>M.M. Kadam and P.L. Shirde</i>	
22. Special Management of Poultry .....	225
<i>N. Panda and S.C. Mishra</i>	
23. Vices in Poultry and Their Remedial Measures .....	233
<i>J.D. Mahanta</i>	
24. Water Quality in Poultry Rearing .....	239
<i>R. Prabhakaran</i>	
25. Biosecurity .....	243
<i>V. Ravinder Reddy and T. Srilatha</i>	
26. Poultry Behaviour and Welfare .....	253
<i>Asma Khan</i>	

Contents . vii

27. Feeding of Poultry .....	261
<i>D. Sapkota</i>	
28. Health Care .....	283
<i>B. Mohan</i>	
29. Designer Egg and Chicken Meat .....	299
<i>J.D. Mahanta and Rahul M. Warhadpandy</i>	
30. Breeder Flock Management .....	307
<i>H.N. Narasimha Murthy</i>	
31. Artificial Insemination in Poultry .....	325
<i>J.D. Mahanta</i>	
32. Hatchery Practices .....	333
<i>S.J. Manwar</i>	
Index .....	355



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## ASSAM AGRICULTURAL UNIVERSITY

DR. K M BUJARBARUAH, ARS, PhD, FNAAS, DSc (Hc)  
VICE-CHANCELLOR

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### FOREWORD

I am pleased to write foreword for the book, "Avian (Poultry) Production". The book deals with the subject Poultry/Avian Science containing updated information as per revised VCI curriculum for under-graduate teaching in Veterinary Colleges. Altogether 30 authors from different Agricultural/Veterinary Universities of India have contributed on different topics.

The massive expansion taking place in Indian poultry industry under commercial sector has been well reflected in the chapter: *Indian Poultry Industry*. However, emphasis has also been given on unorganized poultry sector which is a backbone of rural people for nutritional security, women empowerment and solution to unemployment problem; the book has well covered this area under the topic: *Backyard poultry under scavenging system*. Of late, it has been observed that consumers are becoming more health-conscious emphasizing on organic products; the book has covered this subject under: *Organic and Hill farming*. Yet another topic: *Designer egg and meat production* is well suited to the present-day need of food quality savy consumers. While poultry has taken slow stride from backyard to industry there appeared necessity to conserve indigenous germplasm; a chapter on this topic, "*Conservation of indigenous germplasm*" a quite appropriate. While dealing with conventional poultry species – chicken, an emphasis has been made in this book to other avian species like duck, quail, geese, turkey, guinea fowl, pigeon, emu etc.

The topics of the book are well planned, explained using simple language with coloured photographs, sketches, illustrations and tables, wherever necessary. For the benefit of students the book also contains certain guidance/tips for

Phone: (91)-376-2340013(O), 2340350 (R), Fax: +91-376-2340001  
Email: kmbujarbaruah@rediffmail.com, vc@aau.ac.in



About the Editors :



1987. Subsequently  
Poultry Science in  
CSIR Sr Research  
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x Foreword

improving memory, increasing performance, excelling in examinations or relieving stresses. After each chapter a Question bank is given with answer key so as to benefit students for self-evaluation and preparation of examination. All the three editors are well experienced with long years of teaching stint. I am sure; this book will be well accepted by the student community not only for their academic pursuance but also for the preparation of competitive examinations both in public and private sectors. I appreciate the editors for their effort to write this book.

Place: Khanapara

K.M. Bujarbaruah

## Preface

Poultry husbandry has been transformed from backyard venture to a business enterprise with annual increase of 10% and 15% in egg and broiler production, respectively. India has reached to the 3<sup>rd</sup> and 5<sup>th</sup> rank in egg and broiler chicken production in the world. This progress has become possible due to the constant support of poultry science education either to the farmers, entrepreneurs or to the veterinarians. This book has been prepared to meet the academic requirement under VCI system in undergraduate teaching in Veterinary colleges of India. The entire poultry science education has been covered under the 2 courses; Avian Production Management (LPM 211) and Commercial Poultry Production & Hatchery Management (LPM 221) with 2 credit hours, each. Poultry Science is emerging along with poultry industry dealing primarily chicken. However, emphasis has been made to other avian species like duck, quail, geese, turkey, guinea fowl, pigeon, emu etc. Therefore, to deal eight poultry species with only 2 credit hours is really a stupendous task! Since this is a multi authored book it is but natural that there are repetition of certain data and information. The size of the chapters varied since made according to syllabus only basic information are given because of limitation of space and credit hours. For the benefit of students the book also contains certain guidance/tips for improving memory, increasing performance, excelling in examinations or relieving stresses. After each chapter a Question bank is given with answer key so as to benefit students for self-evaluation and preparation of examination.

Altogether 30 eminent authors spreading in the length and breadth of this country have contributed to this book. To get further information the readers can make direct contact with authors through the emails of contributors which are given in chapter: **Contributors**. Efforts have been made to make this book simple



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with proper explanations and illustrations, wherever necessary. The editors of this book acknowledge the help received from the course materials prepared by the TNVASU, Chennai and APAU, Hyderabad for UG teachings. Since the various topics have been prepared by different authors it is expected that all of them must have taken proper care in obtaining permission from the source of information, if any, incorporated in their articles and acknowledged. Preparation of this book has been made possible by wise counsel and help of various teachers, colleges especially from the department of Poultry Science and friends. Advice of Dr. K M Bujarbaruah, Hon'ble Vice Chancellor, Assam Agricultural University to write a book appropriate to Veterinary students stimulated immensely to compile this book. We deeply appreciate the facilities extended by the Assam Agricultural University to complete this book in time.

Despite all our efforts to make this book error-free, there is every possibility of printing mistake due to oversight. We look forward to overcoming all the shortfalls, if any, in the book. Therefore, we request and expect from all our valuable readers to inform us/bring the shortfalls to our notice, which will help us to make the next edition of this book better and error-free. We also expect valuable suggestions to make the next edition of this book far better.

#### Editors

## Terminologies

**Addled egg:** A fertile egg containing a dead embryo, which has died during the early period of incubation.

**Air sacs:** Expandable membranes communicating with the lungs and the hollow bones. Help in respiration of birds and also gives lightness to birds.

**Avian:** Relating to birds.

**Bantam:** Dwarf variety of domestic fowl.

**Blood ring:** Observed in some hatching eggs, when the embryo has died during first few days of incubation.

**Blood spot:** A small blood clot attached to the membranes surrounding the yolk, or to the chalaza, or noticed in the albumen as a result of haemorrhage during ovulation. It can be detected by candling.

**Bloom:** A layer of protective coating on the external surface of egg; also called cuticle.

**Breed:** It is a group of birds that have usually the same general body shape; they are true to the type, carriage and characteristics of the name of the breed they carry. Eg. Leghorn, Rhode Island Red, Australorp, Aseel etc.

**Brood:** A group of chicks hatched out from the same batch of eggs.

**Broodiness:** Desire in a hen to sit on eggs, characteristic of desi hens.

**Broiler or Fryer:** Broilers are the young birds of either sex, upto 5 to 6 weeks of age and weighing 1.5 to 2.5 Kg body weight with soft pliable skin, tender meat and well developed breast bone cartilage.

**BCC:** Broiler Co-ordination Committee.

**Candling:** Visual examination to test eggs for freshness by holding them between the eye and a source of light.

**Cannibalism:** Vice that may occur in chickens of all ages. It includes feather picking, toe picking, vent picking, egg eating etc.

**Capon:** Castrated male chicken. Chickens are usually caponized between 3 and 4 weeks of age.





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**CARI:** Central Avian Research Institute.

**Chick:** Young one of chicken, quail or pheasant from day old to 8 weeks of age.

**Chicken:** It is a term used to designate domestic fowl- *Gallus*.

**Clutch:** Term expressing the sequence of egg laying or number of eggs laid on consecutive days.

**Cock or Roaster:** These are adult male chicken above 1 year of age.

**Cockerel:** These are male chicken above 18 weeks but below 1 year of age.

**Cygnets:** Young one of swan.

**Dead-in-shell:** Embryo that has died at any stage of incubation.

**Down:** Initial hairy covering of baby chicks, duckling etc. Also the fluffy part of the feather below the web.

**Drake:** Adult male duck.

**Droppings:** The faecal excretion of birds.

**Dubbing:** The process of trimming or removing the comb of breeder males to improve their virility and vigour. Preferably done at day-old age.

**Duck:** Adult female duck.

**Duckling:** Young one of duck.

**Forced moult:** Deliberate moulting of birds, by drastic changes in food and environment. Done after the first laying cycle is completed to help increase egg production in the second cycle.

**Fowl:** It has three meanings- 1. Live poultry, 2. A mature chick, 3. Any large bird OR Any bird, but more commonly referred to larger ones.

**FSSAI:** Food Safety and Security Act of India.

**Gander:** Mature male goose.

**Giblets:** The edible viscera of the bird, comprising its gizzard, heart and liver.

**Goose:** Mature female goose.

**Gosling:** Young one of goose.

**Grower:** Chicks of either sex between 9 to 18 weeks of age.

**Hen:** These are female chicken above 1 year of age.

**Inbred line:** A bird resulting from four or more generation of inbreeding.

**Keel bone:** Breastbone of birds; the sternum.

**Keets:** Young one of guinea fowl.

**Layers:** These are chickens which lay eggs. Generally chickens lay eggs at the age of 5.0 to 5.5 months (20-22 weeks).

**Management:** It is the art and science of combining ideas, facilities, processes, material and labour to produce or market a worthwhile product or service.

**Morbidity:** Sick rate

**Mortality:** Death rate

**NAFED:** National Agricultural Co-operative Marketing Federation of India.

**NECC:** National Egg Co-ordination Committee.

**Oviposition:** Act of laying of egg.

**Poult:** Young one of turkey.

**Poultry:** The term 'Poultry' indicates all domesticated species of birds reared for economic purpose. It includes chicken, duck, turkey, Japanese quails, guinea fowl, geese, pigeon, ostrich, emu etc.

**Poultry management:** It is the art and science of organization and operation of farms so as to obtain maximum amount of continuous net income.

**Pullet:** These are female chicken above 18 weeks but below 1 year of age.

**Roaster:** These are the young chicken (usually 3 to 5 months of age) of either sex that is tender meat with soft, pliable, smooth textured skin and breast bone cartilage that may be somewhat less flexible than that of a broiler.

**Squab:** Young one of pigeon.

**Starter:** Chicks of either sex between 0 to 8 weeks of age.

**Strain:** Strains are closely related inbred flocks with definite economic characters. A strain is the name given by a breeder who has done breeding on the birds and introduced certain economic characters in the birds. A breed or a variety may have several strains and may be phenotypically alike but often differ on their production performance depending on breeding history. Eg. Babcock, Hyline, BV-300, BV-380, Bovans, Hisex, Cobb, Hubbard, Ross, Hybro etc.

**Straightrun:** Means chickens irrespective of male and female.

**Table bird:** Means 'meat birds' which are specially bred for this purpose. Eg. Broilers, turkeys, capon etc.

**Tom:** Adult male turkey.

**Vaccine:** A product which contains living disease producing organisms which have been weakened or attenuated so as to lose much of their virulence and power and injected into the body of a healthy bird to produce a mild attack of the disease and induce production of anti-bodies.

**Variety:** A variety is a sub-division of a breed distinguished either by plumage colour, plumage pattern or comb type. Eg. White Leghorn, Single Comb White Leghorn, Barred Plymouth Rock, Black Minorca etc.



#### About the Editors



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## Contributors

### A. Jalaudeen

Professor and Special Officer  
Faculty of Poultry Science of KVASU  
Pookode, Kerala  
*Email id: jalalabdulrazak@gmail.com;*  
*pfsso@kvasu.ac.in.*

### Amitav Bhattacharyya

Assistant Professor  
Department of Poultry Science  
Dairy Farm Campus, DUVASU  
Mathura - 281 001, UP  
*Email id: amitav16@rediffmail.com*

### Ashok Kumar

Director  
Students' Welfare, BAU  
Sabour, Bhagalpur, Bihar  
*Email id: drashoklpm@gmail.com*

### Asma Khan

Associate Professor and Head  
Division of Livestock Production  
Management. SKUAST, Jammu, J&K  
*Email id: asmakhan\_70@yahoo.co.in*

### B. Mohan

Professor and Head  
Poultry Disease Diagnosis and Surveillance  
Laboratory  
Veterinary College and Research Institute  
Campus  
Tamil Nadu Veterinary and Animal Sciences  
University, Namakkal - 627 002  
*Email id: mohan.balusamy@gmail.com*

### D. Narahari

Former Professor and Head  
Poultry Science Department, 31/15, 3rd Floor  
First Main Road East, Shenoy Nagar  
Chennai - 600 030, Tamil Nadu  
*Email id: narahari.devareddy@gmail.com,*  
*dnarahari@scientist.com*

### D. Sapkota

Professor  
Department of Poultry Science  
CVSc, AAU, Khanapara - 781 022, Assam  
*Email id: debensapkota@yahoo.com*

### H.N. Narasimha Murthy

Dean  
Hassan Veterinary College of KVAFSU  
(B) 1320, First Floor, 24th Main, 9th Block  
Jayanagar, Bangalore - 560 069, Karnataka  
*Email id: hnnm2007@gmail.com*

### I.U. Sheikh

Associate Professor  
Division of LPM, F.V.Sc & A.H.  
SKUAST-K, Shuhama  
Srinagar - 190 006, J&K.  
*Email id: iusheikh@rediffmail.com;*  
*sheikhiu@gmail.com*

### J.D. Mahanta

Professor  
Department of Poultry Science  
CVSc, AAU, Khanapara - 781 022  
Assam  
*Email id: mahantajd@gmail.com*





1987. Subsequent Poultry Science CSIR Sr Researcher, amino acid nutrition, Professor, Department of Poultry Science, AAU, Khanapuri, Guwahati. He has published several research papers, two have been practical manuals, material on poultry Open University. Investigator he has been under the aegis of being executed associated with hands on training several national presenting research. He is in the journals of research M.V.Sc/Ph.D. articles in English. He has been professional/scientist member of Indian Council of Veterinary (IB). He is the He can be contacted



joining the university served the State for a decade. He in the year

**Jyoti Palod**

Professor, College of Veterinary and Animal Sciences  
G.B. Pant University of Agriculture and Technology,  
Pantnagar- 263 145, Uttarakhand  
*Email id: palod\_jyoti17@rediffmail.com*

**M. V. Dhumal**

Professor, Department of Poultry Science  
MAFSU, Parbhani - 431 402  
Maharashtra  
*Email id: dhumalmv@gmail.com*

**M. Tufail Banday**

Professor and Head  
Division Livestock Production Management  
Faculty of Veterinary Sciences & Animal Husbandry, Srinagar, Shuhama, J&K.  
*Email id: drtufailbanday@yahoo.co.in, mtbanday@gmail.com*

**Mihir Sarma**

Jr. Scientist  
Livestock Research Station, Mondira  
AAU, Kamrup Dist. Assam  
*Email id: mihirsarma21@gmail.com*

**Mukund M Kadam**

Assistant Professor  
Department of Poultry Science  
Nagpur Veterinary College  
MAFSU, Nagpur, Maharashtra  
*Email id: mukundkadam@gmail.com*

**N. Panda**

Associate Professor  
College of Veterinary Science and Animal Husbandry, OUAT  
Bhubaneswar-751003  
*Email id: npandaouat@gmail.com*

**P.K. Shukla**

Professor and Head  
Dean PG Studies and Scientific and Technical Advisor to the Vice Chancellor  
DUVASU, Mathura-281001, UP  
*Email id: hukla\_pankaj2004@rediffmail.com, pksmathura@yahoo.co.in*

**Prashant Shinde**

Technology Application Manager at Cargill  
Feed & Nutrition  
Maharashtra  
*Email id: prashant\_shinde@cargill.com*

**R. Prabhakaran**

Vice-Chancellor  
TNVASU, Chennai, Tamilnadu  
*Email id: rpakaran@mail.com, karanmgk@gmail.com*

**Rahul M. Warhadpande**

I/C Assistant Commissioner of Animal Husbandry  
Taluka Veterinary Mini-Polyclinic  
Deori and Livestock Development Officer  
TMVPC, Deori Dist. Gondia, Maharashtra  
*Email id: dr.rahulwarhadpande@gmail.com*

**Ranjana Goswami**

Assistant Professor  
College of Veterinary Sciences and Animal Husbandry  
C.A.U. Selesih, Aizawl, Mizoram  
*Email id: sksthakur2007@rediffmail.com*

**S.C. Edwin**

Professor and Head  
Department of Poultry Science  
Veterinary College and Research Institute  
Namakkal - 627 002, Tamilnadu  
*Email id: drscedwin@yahoo.com, drscedwin@rediffmail.com*

**S.J. Manwar**

Associate Professor and Head  
Department of Poultry Science  
Post Graduate Institute of Veterinary and Animal Sciences, Akola, MAFSU  
Maharashtra.  
*Email id: satishmanwar@rediffmail.com, vetsatish@yahoo.com*

**S.C. Mishra**

Former Dean Extension Education and Prof. & Head  
Department of Poultry Science, College of Veterinary Science and Animal Husbandry  
OUAT, Bhubaneswar-751003  
*Email id: scmishraouat@gmail.com*

**S. George Paradis**

Associate Professor  
PJN. College of Agriculture and Research Institute  
Karaikal, Puducherry  
*Email id: georgeparadis2000@yahoo.com*

**S.T. Viroji Rao**

Principal Scientist and Head  
AICRP on Poultry Breeding, S.V.V.U.  
Hyderabad - 500 030, Telengana  
*Email id: virojiraosindhe@yahoo.co.in*

**Sarbjit Singh Nagra**

Director, Instructions  
Central Agricultural University  
Imphal, Manipur  
*Email id: snagra52@rediffmail.com*

**Sujit Nayak**

Assistant Commissioner  
Department of Animal Husbandry Dairying & Fisheries  
Ministry of Agriculture, Government of India  
39-C, Krishi Bhawan, New Delhi - 110 001  
*Email id: sujit.nayak@nic.in*

**T. Srilatha**

Assistant Professor  
Department of Poultry Science  
College of Veterinary Science  
Korutla, S.V.V.U., Telengana.  
*Email id: srilatha.mangalam@gmail.com*

**V. Ravinder Reddy**

Professor and Head  
Department of Poultry Science  
College of Veterinary Science  
Rajendranagar, S.V.V.U.  
Hyderabad - 500 030, Telengana  
*Email id: vangooravinder@yahoo.co.in*



#### About the Editor



1987. Subsequent  
Poultry Science  
CSIR Sr Res  
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## Stimulating Memory Tips

### Brain gym – Simple Exercises for a Better Mind and Body

- Brain Gym is a programme of physical activities that enhances the development of neural pathways in the brain through movements.
- It comprises of easy body movements, designed to coax the two hemispheres of the brain to work in synchronisation.
- It could help your brain function better, making you sharper, smarter – and far more confident.
- It can do everything from speeding up your reading to boosting self-esteem and creativity. It improves communication skills, helping you make better decision maker.
- It is observed that very simple body movements could help to improve brain function. The Brain Gym can help everyone, even those who think they have perfectly normal brain function will help perform even better.
- For details one can search Google.

### Drink Water to Drive-Out Stress

- More of the brain is comprised of water (about 85%). Drinking water during class can help *'grease the wheel'*.
- Brain function depends on having abundant access to water.
- Water gives the brain the electrical energy for all brain functions, including thought and memory processes.
- Drinking water is very important before any stressful situation tests as we tend to perspire under stress, and dehydration can affect our concentration negatively.





1987. Subsequent Poultry Science CSIR Sr Researcher, amino acid nutrition Professor, Department of Nutrition, AAU, Khanapara. research papers, articles, two handbooks, practical manual, material on poultry. Open University Investigator he has been under the aegis of being executed associated with hands on training several national presenting research. He is in the editor of journals of reputation. MVSc/Ph D projects, articles in English. He has been a professional/scientist member of Indian Council of Workers (ICWU) (IB). He is the research. He can be contacted



joining the university served the State Government for a decade. He retired in the year 20

### Relieve Stresses, Improve Performance

1. Sit relaxed.
2. Close your eyes.
3. With the fingertips of each hand gently touch the point above each eye halfway between the hairline and eyebrow.
4. Take slow and deep breaths.
5. Your memory blocks will be released, stresses will be relieved, thinking will be cleared, speaking abilities will be improved!

### Memory Improvement Tips

- **Give attention:** Concentrate on the information you are trying to learn. Grow interest. This is especially true if you are trying to learn a new skill or subject. Give it your undivided attention.
- **Play games:** Use your brain just like every other muscle of your body; the more you exercise it the better it will function.
- **Be active:** If your attention is diverted take a moment and get up and move around the room. Try some deep knee bends or body stretching.
- **Eat brain Foods:** Our *brain* accounts for only 2 percent of your body weight but *consumes* roughly 20 percent of our *calorie intake*. As it operates at its peak it needs to have the proper nutrients. Eating food rich in omega -3 fatty acid will help as will increasing the amount of antioxidants that you consume.
- **Use as Many Senses as Possible:** When trying to remember information the more senses you can incorporate the better. For example, if you read louder so that you hear as well as see the information.
- **Drink water:** When your body gets dehydrated you actually lessen your ability to focus. Stay away from coffee and sugar filled drinks. Water is the best way to hydrate your body.
- **Use Acronyms, initialism or pseudo-blend:** You can use acronyms, initialism or pseudo-blend to remember words or facts. The first letter of other words or phrases come together to create *acronyms*. e.g., SARS = severe acute respiratory syndrome. **initialism** is an abbreviation pronounced wholly or partly using the names of its constituent letters, e.g., CD =compact disc, pronounced *cee dee*. **Pseudo-blend** is an abbreviation who's extra or omitted letters mean that it cannot stand as a true acronym or initialism, e.g., UNIFEM – *United Nations Development Fund for Women*.

- **Re-read and Review:** Underline or highlight the information into point form and read and re-read over a number of days. This will help to create long term memories.
- **Take more oxygen:** If you are working for long periods of time the brain cells may become fatigue. Take a break and practice few deep breathing. This will help you to relax get more oxygen to your brain.
- **Room System:** To use the technique, imagine a room that you know, such as your sitting room, bedroom or classroom. Within the room are objects. Associate images representing the information you want to remember with the objects in the room. To recall information, simply take a tour around the room in your mind, visualizing the known objects and their associated images. The idea is to associate the new items with stable old memories.



- j. How does a chick embryo develop?
- k. How long fertile hatching eggs can be stored before they must be incubated?
- l. How soon after hatching should the chicks be removed from the incubator?
- m. Should the dirty hatching eggs be washed before incubation?
- n. What are the best methods to follow for sanitizing eggs and incubators to reduce bacterial infections?
- o. Why the chicks may die in the egg after they pip or break the shell?
- p. Describe a typical modern hatchery.

## Index

### A

Abdominal capacity 206  
 Aflatoxins 279, 280  
 Age at first egg 33, 102  
 Age at maturity 102  
 Agrocortex India Limited (ACIL) 115  
 AI equipments 329  
 Air cell 52, 55, 56, 58, 334-336, 339, 346, 348, 351  
 Albumen 44, 46, 49-52, 54, 55, 57-59, 65, 302, 339, 341  
 Albumenous sac 59  
 American class 18  
 Androgen 50, 51, 58  
 Ankleshwar 29, 38  
 Anti-nutritional factors 278  
 Antioxidant 229, 300, 303  
 Artificial insemination 5, 310, 325, 337  
 Aseel 16, 17, 30, 38, 39, 40, 41, 80, 81, 148, 151  
 Asiatic class 22  
 Australorp 17, 19, 21, 27, 148  
 Aylesbury 23

### B

Backyard poultry 1, 29, 70, 71, 73, 74, 76, 77, 79-82, 136

Backyard poultry farming 29, 73, 74, 76, 77  
 Bad/poor layer 213  
 Battery cage 200  
 Beltsville White 25, 26, 27  
 Biliverdin 53, 57  
 Biosecurity 101, 123, 140, 240, 243-246, 248-250, 292, 296, 349, 353  
 Blastodisc 55  
 Blood spot 59  
 Body conformation 66, 67, 206, 215  
 Brahma 16, 17, 22, 27  
 Break even analysis 346  
 Breed 9, 16, 23, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38, 39, 40, 53, 56, 57, 64, 68, 69, 79, 81, 126, 127, 139, 142, 148, 149, 150, 151, 181, 205, 208, 209, 211, 213, 214, 237, 311, 312, 321, 328, 336, 337, 342  
 Breeder feed 7, 314, 315, 323  
 Breeds of Quail 24  
 Broad Breasted Bronze 25, 26, 27  
 Broiler 1, 2, 4-6, 9, 12, 18-20, 27, 66-71, 80, 81, 83, 86, 99, 100, 102, 104, 106-108, 110-113, 117, 118, 120, 122, 124-126, 128, 133, 145, 151, 163, 164, 173, 174, 180, 188, 193, 198-200, 203, 205, 206, 209, 210, 215, 218, 219, 221, 222, 225, 228, 230, 243, 245, 266, 269, 273, 274,



- 277, 278, 281, 282, 290, 298, 307, 309, 313, 315-317, 322, 323, 325, 337
- Broiler Breeder 4, 6, 274, 307-309, 313, 315, 316, 323
- Broiler Coordination Committee 118
- Broiler farm economy index 108, 112
- Broiler feed price ratio 107
- Broiler house 124, 126, 133, 173, 174, 180, 245
- Broiler performance efficiency factor 106
- Broiler performance efficiency index 107, 112
- Broiler production 2, 4, 5, 12, 66, 86, 120, 124, 218
- Brooder 91-94, 96-98, 127, 128, 132, 133, 160, 173, 174, 183, 185-193, 198, 200, 202, 219, 233, 284, 297, 319
- Brooder house 96, 127, 132, 173, 174, 183, 186, 188, 191, 200, 202, 233
- Brooder Quail cage 132
- Brooding 7, 9, 63, 79, 86, 91-98, 104, 129, 130, 132, 140, 143, 158, 162, 163, 168, 173, 182, 183, 185-189, 191, 193, 198, 220, 226, 230, 235, 308-310, 312, 313, 322
- Brooding management 193, 198
- Busra 30, 38, 148
- C**
- Cage system 177, 179, 184, 194, 198, 200, 201, 202, 309, 310, 315
- Cages 2-8, 11, 24, 104, 124, 128, 132, 160, 173, 175, 177, 178, 190, 195-198, 200, 201, 203, 205, 234, 255-259, 287, 308, 315, 325, 326
- Calcium carbonate 52
- Calcium chloride 240
- Cannibalism 7, 178, 179, 190, 201, 233, 234, 235, 236, 237, 254, 257, 313, 323
- Carbonic anhydrase 53
- Care and management 193, 194, 198, 353
- Carotenoid pigments 50, 58, 68, 207, 303
- Chalazae 51, 52, 55, 59
- Chara 9, 13, 37, 39, 40, 149, 152, 158
- Chemballi 13, 37, 39, 40, 149, 152, 158
- Chick 2, 5, 6, 8, 10, 11, 13, 26, 35, 65, 66, 76, 77, 87, 91-98, 102-104, 107, 108, 110, 117, 125, 127, 131-133, 139-141, 155-157, 160, 161, 163, 169, 170-173, 181, 183, 185-193, 198, 200, 203, 218-220, 226, 233, 236-238, 244, 248, 253, 254, 266, 273, 280, 285-289, 291, 302, 308-311, 314-317, 320, 322-324, 326, 330, 333, 334, 336, 338-340, 342-346, 348, 350-354
- Chick comfort 94
- Chick guards 92, 94, 98, 187
- Chick room 171, 172
- Chicken 1-9, 11, 12, 15, 16, 25-29, 31, 34, 36, 38, 50, 51, 53, 55-59, 61, 62, 64, 66, 67, 73, 74, 79-81, 83, 86-88, 91, 95-97, 106-108, 110, 114, 117, 118, 120, 124, 126, 130, 131, 133, 136, 137, 141-145, 147, 148, 153-155, 157, 158, 163, 165, 181, 197, 203, 209, 248, 249, 254, 257, 261-263, 265-267, 270, 280, 281, 285-287, 292, 297-299, 301-304, 310, 311, 312, 325-327, 329-331, 335, 336, 341, 350, 351
- Chicken meat 5, 114, 118, 142, 265, 299, 304
- Chittagong (Malay) 30
- Cholesterol 99, 263, 300, 304
- Cholesterol content 99
- Class 15, 16, 18, 19, 20, 22, 25, 64, 206
- Classification 15-17, 19, 85, 264, 276
- Cleaning of the farm 246
- Cleanliness and sanitation 189
- Clipping 308, 323
- Cloaca 43-45, 234, 235, 262, 308, 326, 329
- Cochin 16, 22
- Coliform count 123, 240
- Colour sexing 308
- Commercial broilers 67, 68, 70, 180, 198, 290, 317
- Commercial growers 193, 194, 201
- Commercial layers 63, 64, 70, 194, 203, 258, 259, 290
- Communication 254
- Composting 244, 248, 250
- Conservation 145, 146, 149-154, 330
- Construction coefficient 106, 110
- Contract farming 120
- Copulatory organ 43, 46
- Cornish 16, 17, 19, 28, 68, 69, 80, 81, 148
- Cost of egg production 321
- Cost of production 108
- Crop 85, 88, 136, 188, 208, 262, 263, 280
- Cryopreservation 330, 331
- Cryptoxanthin 50
- Culling 3, 6, 101, 178, 196, 201, 212, 213, 321
- Cuticle 46, 53, 56, 338, 351

- D**
- Daonhaigir 31, 38, 40, 148
- Debeaking 95, 97, 190, 230, 237, 238, 257, 308, 323
- Decontamination of the poultry house 246
- Deep litter system 6, 7, 92, 94, 95, 97, 124, 175, 177, 178, 179, 180, 181, 188, 193, 194, 200, 201, 202, 217, 276, 288, 309, 321
- Denki 31, 38
- Dense or thick albumen 51, 55
- Descriptive score card for egg laying contests 209
- Desi birds 64
- Designer egg 299-302, 304
- Designer meat 303
- Diet composition 301
- Dietary manipulation 303
- Digestion 181, 221, 261-263, 265, 269, 276-278, 281, 285
- Disease resistance 1, 8, 139, 146, 268, 275
- Diseases 32, 61, 65, 67, 73, 74, 80, 81, 86, 96, 101, 105, 140, 143, 146, 177, 179, 180, 188, 189, 212, 214, 219, 225, 239, 243, 245, 246, 250, 274-277, 283, 284, 287, 288, 291, 297, 299, 307, 311, 317-321, 341, 349, 353
- Disinfection 124, 131, 169, 185, 189, 240, 247, 248, 249, 292, 295-298, 340, 350
- Disposal of poultry waste 247
- Disposal pit 248, 250
- Domestication of fowls 147
- Double ovulation 51, 59
- Drinker space 95, 129, 132, 236
- Drugs 141, 219, 229, 292
- Dubbing 308, 323, 324
- Duck 1, 3, 6, 8, 9, 12, 13, 16, 22-28, 32, 36, 37, 39-41, 54, 73, 86-88, 95, 97, 114, 117, 121, 129, 130, 133, 149, 152, 158, 159, 165, 325, 326, 328, 335
- Duck farm 158
- Duck farming 8, 87
- Dumasil 31, 38, 40
- E**
- Economic traits 61, 70, 102
- Economics 16, 61, 87, 104, 163, 256, 271, 343, 344
- Economization of Poultry feeding 273
- Egg 2-13, 17-25, 27-37, 40, 44-46, 49-59, 61-66, 69-71, 73, 75, 76, 79-81, 83, 86, 87, 91, 99-105, 108-117, 120-122, 126, 129, 131, 137, 139-142, 144, 146, 147, 149, 156-159, 161, 162, 167-169, 171, 172, 175-182, 184, 189, 192, 194-197, 200-203, 205, 207, 209, 211, 219, 229, 231, 233-237, 239, 241, 243, 245, 248, 255, 265, 267-269, 271-275, 277, 278, 284-287, 299-302, 304, 305, 307-315, 318-323, 327, 329, 333-341, 343-354
- Egg formation 50, 52, 53
- Egg marketing 115, 121
- Egg production 3, 4, 8, 10, 12, 13, 18, 21, 30-37, 40, 51, 57, 61, 62, 64, 66, 69, 70, 73, 80, 81, 100, 102, 108-111, 113, 117, 126, 157, 161, 176, 178, 181, 182, 195-197, 202, 219, 231, 234, 241, 267, 269, 274, 275, 278, 284-287, 311, 314, 319, 352
- Egg room 171, 172, 184
- Egg type 36, 61, 65, 83, 129, 131, 211, 273, 308-311, 321, 323, 343
- Eggshell 52, 53, 56-59, 312
- Elevated or high raised 200, 203
- Elevation 124
- Emergence of breeds 147
- Emu farming 7-9, 12
- Environmentally controlled housing 181
- Enzymes 263, 276, 277, 285, 286
- Epididymis 43
- Esophagus 261, 262
- Essentials of broiler housing 124
- Estimating the performance of broiler 106
- Estrogen 50, 58, 279
- Evolutionary and domestication history 147
- Ex situ* preservation 149
- Extensive or Free Range System 175
- F**
- Factors influencing price of eggs 101
- Fat 67, 99, 113, 194, 206, 208, 209, 210, 213, 215, 228, 231, 263, 268, 275, 277, 281, 286, 287, 299, 301, 303, 304, 316
- Fat and fatty acid 301, 304
- Feed Additives 101, 274-276
- Feed consumption 103, 109, 110, 160, 189, 194, 199, 200, 228, 286
- Feed conversion ratio 5, 106
- Feed efficiency/kg egg mass 108
- Feed formulation 265, 270, 271, 313
- Feed ingredients 75, 77, 101, 139, 264, 265,



- 268-272, 278, 282  
 Feeder space 95-98, 129, 132, 193, 194, 198, 201, 236, 310, 311, 323  
 Feeding 7, 9, 10, 11, 29, 80, 81, 88, 95, 100, 105, 129, 137, 140, 142, 143, 155, 157-159, 161, 163, 182, 189, 194, 198, 199, 202, 228, 231, 237, 261, 272, 273, 274, 275, 277, 282, 303, 313, 314, 315, 320, 322, 326, 337  
 Fertility 6, 43, 47, 65, 68, 70, 103, 136, 181, 274, 308-310, 312, 321, 325-327, 329, 330, 336-338, 346  
 Floor plan 171, 184  
 Floor space 8, 75, 95, 96, 97, 98, 100, 104, 125, 126, 127, 129, 130, 131, 132, 133, 137, 172, 176, 179, 180, 188, 193, 196, 198, 201, 203, 236, 256, 257, 258, 310, 313, 323  
 Floor space requirement 95, 97, 125, 201, 310  
 Folding unit system 75, 77  
 Follicles 44, 49, 50, 58, 312  
 Follicle-stimulating hormone (FSH) 50  
 Food security 29, 146  
 Free range or extensive system 74  
 Frizzle fowl 35, 38, 41  
 Fumigation 172, 297, 339, 340, 347, 348, 352  
 Fumigation room 172  
*Fusarium* mycotoxins 280
- G**  
 Geese farming 9  
 Germinal disc 50, 55, 57, 346  
 Ghagus 32, 38, 40, 41, 148  
 Gizzard 263  
 Gonadal hormones 50, 58  
 Good layer 23, 63, 64, 71, 110, 206-208, 213-215  
 Grading 55, 111, 115, 117, 172, 182, 220, 342, 352  
 Gross margin per unit floor area 106  
 Gross output 100, 101, 102, 105  
 Gross output in egg production unit 100  
 Gross profit 157, 158, 164  
 Grower house 127, 160, 173, 174, 189  
 Grower Quail cage 132  
 Growers 6, 102, 130, 193, 194, 201-203, 312, 317, 322, 323  
 Guinea fowl 10, 26, 28, 96, 131, 133, 161, 162, 165, 325, 328, 335  
 Guinea fowl farm 161
- Gujuri 32, 38, 41
- H**  
 Harringhata Black 32, 148  
 Hatch failure 343, 344, 345  
 Hatch weight 102, 103  
 Hatchability 6, 7, 8, 30, 63, 65, 66, 68, 70, 103, 143, 144, 284, 285, 286, 287, 307, 315, 320, 325, 334, 337, 338, 339, 343, 346, 349, 351, 353  
 Hatcher room 171, 172  
 Hatchery 4, 7, 9, 12, 14, 17, 171, 172, 183, 184, 187, 191, 248, 249, 264, 290, 333, 339, 340, 341, 343, 344, 346, 349, 350, 352, 353, 354  
 Hatchery biosecurity 248, 353  
 Health and immunity 95  
 Health and Vigour 206, 210  
 Heat stress 174, 226, 228, 229, 230, 231  
 Hen day production-103  
 Hen housed production 103  
 Hill farming 135, 142, 143  
 Housing 3, 5, 6, 29, 86, 104, 105, 124-126, 131, 133, 136, 137, 139, 140-142, 158, 163, 167, 169, 181, 183, 184, 226, 256, 258, 309, 321  
 Humidity 124, 137, 169, 180, 181, 183, 187, 188, 191, 219, 220, 222, 227, 280, 334, 335, 338, 340, 345, 347, 348  
 Hygiene 219, 341, 349
- I**  
 Importance of environment for brooding 143  
 Improved birds 148  
*In situ* conservation 149, 152  
 Incinerators 248, 250, 341  
 Incubation 8, 24, 27, 49, 333, 334, 335, 336, 337, 338, 339, 344, 345, 347, 348, 350, 351, 352, 353, 354  
 Indian poultry industry 1, 11, 12  
 Indian Runner 23, 27, 28  
 Indigenous duck 8, 9, 13, 36, 39, 149, 152  
 Indigenous germplasm 145  
 Infra red 92, 185, 191, 192, 198  
 Infundibulum 44-46, 51, 54, 57, 58, 330, 331  
 Insemination 5, 51, 310, 325, 327, 328, 329, 330, 331, 337  
 Integration 4, 5, 12, 87, 120, 122, 150  
 Intensive system 74, 100, 121, 129, 131, 175, 177, 184, 243

- Internal layers 51, 59  
 Iodophores 241, 242  
 Isthmus 44, 45, 52, 54, 58
- J**  
 Japanese quail 1, 3, 7, 11, 12, 24, 28, 54, 58, 96, 117, 131, 132, 133, 159, 160, 161  
 Judging broilers 209  
 Judging for breed characteristics 211  
 Judging of layer 206  
 Jungle fowl 15, 28, 145, 147, 151
- K**  
 Kadaknath 32, 33, 38, 39, 40, 41, 80, 83, 148, 151  
 Kalahandi 33, 38, 40  
 Kalasthi 33, 38, 39, 41, 148  
 Kashmir Faverolla 33, 40, 41, 148, 151  
 Khaki Campbell 1, 8, 9, 23, 28, 158
- L**  
 Large intestine 262, 329  
 Latebra 55  
 Layer 1-7, 23, 32, 45, 50-53, 55, 56, 63-66, 68-71, 79, 97, 100, 101, 102, 105, 108, 110-112, 115, 126-129, 133, 137, 139, 142, 145, 151, 156-158, 173, 174, 175, 177, 178, 179, 180, 181, 184, 189-191, 193-198, 201-203, 205-208, 212-215, 221, 222, 225, 228, 229, 231, 237, 243, 257, 258, 259, 261, 266, 271, 273, 278, 281, 286, 290, 307-309, 312, 313, 315, 317, 322, 323, 337  
 Layer farm efficiency 108  
 Laying hen house 173  
 Layout of operations 168  
 Leghorn 1, 16, 17, 18, 20, 27, 28, 63, 64, 69, 81, 213, 257, 310, 311, 312, 323  
 Level of inclusion 264, 270  
 Lighting 104, 129, 138, 189, 193, 195, 200-203, 312, 313  
 Lighting management 193, 195, 200, 312  
 Litter 5, 6, 7, 8, 9, 86, 92, 94, 95, 96, 97, 104, 124, 125, 127, 132, 137, 138, 140, 142, 143, 156, 157, 169, 174, 175, 177, 178, 179, 180, 181, 184, 185, 186, 187, 188, 191, 193, 194, 195, 198, 199, 200, 201, 202, 203, 217, 218, 219, 220, 221, 222, 223, 229, 230, 231, 239, 244, 246, 250, 255, 256, 257, 259, 276, 277, 287, 288, 309, 310, 314, 321  
 Litter management 199, 217, 219, 220  
 Low input technology poultry farming 74  
 Luteinizing hormone (LH) 50
- M**  
 Machine sexing 324  
 Magnum 44, 45, 46, 51, 52, 54, 57, 58, 331  
 Management 4, 7, 11, 29, 30, 61, 67, 73, 76, 77, 79, 80, 85, 86, 88, 94, 97, 100, 101, 104, 105, 108, 129, 131, 135, 139, 140, 143, 146, 149, 150, 155, 158, 163, 168, 169, 179, 185, 188, 193-196, 198-200, 217-220, 222, 225, 226, 228-230, 234, 235, 247, 249, 257, 289, 307, 308, 312, 313, 330, 337, 345, 349, 350, 353  
 Management practices 79, 80, 86, 139, 219, 235, 257, 345  
 Marketing 4, 5, 7, 11, 66, 87, 100, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 160, 300  
 Marketing channels 114, 116, 117, 119, 122  
 Meat type 33, 34, 40, 61, 66, 81, 129, 131, 211, 308, 323  
 Medication 95, 101, 105, 159, 161, 190, 229, 240, 241, 244, 292  
 Mediterranean class 64  
 Mineral 44, 114, 220, 228, 229, 239, 241, 265, 267-269, 275, 278, 285, 302, 303, 315, 316, 319, 320, 337  
 Minorca 16, 17, 21, 63, 312  
 Miri 33, 34, 38, 40, 148, 151  
 Mixed farming 85, 86, 87, 88, 89  
 Modern-day chicken 145, 148, 154  
 Modified egg 304  
 Moulting and plumage 206, 207  
 Mouth 195, 261, 263, 286  
 Muscovy 24, 27, 149, 152, 326, 335
- N**  
 n-6 fatty acid 299, 304  
 Nageswari 36, 39, 40, 41, 149, 152  
 Naked Neck 17, 36, 38, 40, 81  
 Naragansette 26  
 National Egg Co-ordination Committee (NECC) 115, 122  
 Net feed efficiency index- 109, 112  
 Net profit 158, 159, 161, 162, 164



- New Hampshire 18, 27, 64, 68, 69, 80, 312  
 Nicobari 34, 38, 40, 41, 80, 148, 151  
 Nitrate 123, 240  
 Non-nutrient 274-276  
 Nutrient composition 221, 264, 270  
 Nutrient requirement 162, 264, 265, 266, 270, 317  
 Nutrition 61, 100, 146, 219, 261, 313, 315, 345

**O**

- Ochratoxins 280  
 Omega-3-fatty acids 299, 304  
 Oophorphyrin 56, 58  
 Organic egg 137, 139, 144, 302  
 Organic farming 135, 138  
 Organic meat 138, 139, 141  
 Organic poultry production 136, 139, 141, 175, 176, 184  
 Orientation of houses 167  
 Orpington 16, 20  
 Ovary 44, 46, 49, 50, 51  
 Oviduct 43, 44, 46, 47, 49, 50, 51, 52, 54, 57, 58, 329, 330, 341  
 Oviposition 51, 52, 53, 54, 59, 351

**P**

- Pancreas 262, 263  
 Pecking 233, 234, 235, 236, 238, 254, 255, 257, 313  
 Pekin 23, 27  
 Pellet feeding 272  
 Performance efficiency index 109, 112  
 Pesticides 136  
 Photoperiod 138, 187, 191, 200, 203, 312, 313, 322, 323  
 Photostimulation 50, 57  
 Phulbani 34, 38  
 Pigeon production 10  
 Pigmentation 53, 206, 207, 208, 209  
 Pipping 56, 59, 346  
 Planning of a poultry farm 167, 184  
 Plumage 16, 18, 19, 21, 23, 26, 30-37, 40, 66, 68, 70, 80, 81, 147, 154, 206-208, 211, 213, 214, 254, 312, 342  
 Plymouth Rock 16, 17, 19, 64, 68, 69, 80, 148, 342  
 Point spread 107, 112  
 Porphyrin 53, 58

- Poultry 1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15, 16, 21, 25, 26, 29, 30, 49, 61, 63, 68, 70, 71, 73, 74, 75, 76, 77, 79, 80, 81, 82, 83, 86, 87, 88, 91, 98, 99, 100, 101, 104, 110, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 133, 135, 136, 139, 140, 141, 143, 144, 145, 146, 148, 149, 150, 151, 153, 155, 157, 164, 167, 168, 169, 170, 173, 174, 175, 176, 181, 183, 184, 188, 195, 205, 206, 211, 214, 215, 217, 219, 220, 221, 222, 223

Poultry farm facilities 170, 173

Poultry feed production 10

Poultry housing 3, 167, 184, 256, 258

Poultry Judging 205, 214

Poultry meat marketing 118, 121

Poultry shows 205, 214

Preparation of poultry for show 211

Pre-warming room 172, 184

Price of culls 105

Price of eggs 12, 101, 105

Progesterone 50

Project report 158, 159, 161, 162, 165

Protein 33, 50, 52, 56, 58, 67, 73, 77, 79, 96, 97, 99, 113, 138, 162, 189, 192, 221, 229, 231, 236, 263, 264, 265, 266, 267, 270, 271, 272, 274, 276, 280, 281, 286, 293, 314, 315, 316, 353

Punjab Brown 34, 39, 40, 148

**Q**

Quail 1, 3, 6-9, 11-13, 24, 26-28, 54, 58, 96-98, 117, 131-133, 159-161, 335, 337, 351

Quail farm 159

Quaternary ammonium 241, 294

**R**

Rearing systems 175, 177, 310

Reproductive system 43, 44, 45, 49, 341

Restricted feeding 194, 282, 313, 322, 337

Rhode Island Red 1, 18, 27, 342

Roof 125-127, 133, 160, 169, 170, 182, 184, 226, 227, 230, 231, 256, 258

Rouen 23, 24, 28

**S**

Sanitation 105, 127, 141, 189, 247, 249, 297, 340

Sanitation practices 141, 247

Sanitizers 241, 242, 289, 296

Scavenger feed base 75, 76, 77

Scavenging system 75, 142

Score card 205, 206, 209, 210, 211, 214

Selection 63-67, 70, 71, 102, 123, 133, 139, 140, 146, 147, 150, 153, 154, 167, 168, 184, 205, 211, 214, 308, 309, 311, 321, 325, 336-338

Semen 43, 44, 47, 49, 149, 152, 244, 309, 315, 321, 325, 326, 327, 328, 329, 330, 331, 337

Semi intensive system 73, 75, 77

Separate male feeding 274, 315

Setter room 171, 172, 183

Setting-up of farm 123

Sexing 26, 172, 308, 309, 322, 323, 234, 342, 343, 353

Shell colour 30, 31, 32, 35, 56, 64

Shell membrane 44, 49, 52, 54, 55, 58, 335

Slat and litter system 180

Slat floor system 177, 180

Small intestine 262

Sodium 229, 232, 236, 240, 241, 269, 275, 276, 277, 294, 315, 316

Sperm storage tubules 51

Spermatozoa 43, 45, 51, 321, 325, 327, 328, 330, 341

Step up lighting 195, 203, 313

Stigma 44, 46, 50, 59

Stocking density 96, 98, 106, 136, 138, 178, 181, 201, 202, 230, 258

Strain 16, 27, 81, 100, 105, 125, 288, 314, 318, 323, 336, 337, 346

Sulphate 240, 276, 277, 280

Supplementary feeding 80, 81, 155, 161

Sussex 16, 20, 68

Synthetic variety 81, 83

**T**

Table egg production 3, 12, 13

Testosterone 50, 51, 58

The Standard Score Card 211

Total bacterial count 123, 240

Toxins 276, 277, 278, 284, 296

Turkey 6, 9, 12, 16, 25-28, 54, 86, 95-97, 117, 130, 131, 133, 162-165, 325, 328, 335, 351

Turkey farm 162

Turkey production 9, 133

Turkey hybrid 26

**U**

Uterus or shell gland 52

Utility 16, 17, 171, 206, 221, 223

**V**

Vaccination 76, 77, 95, 96, 105, 125, 140, 141, 144, 159, 161, 172, 187, 189, 191, 230, 240, 244, 288, 289, 290, 291, 297, 298, 308, 317, 318, 320, 323, 344

Vaccination schedule for duck 95

Vagina 44, 45, 51, 53, 54, 57, 58, 329

Variety 9, 16, 17, 19, 23, 25, 26, 31, 35, 37, 81-83, 86, 146, 165, 208, 209, 221, 254

Vectors 244

Vent sexing 308, 323

Vent 51, 54, 206-209, 213, 214, 234, 235, 237, 245, 262, 308, 323, 324, 342

Ventilation 93, 94, 96, 98, 104, 106, 124-127, 138, 143, 169, 174, 178, 182, 184, 186-188, 196, 219, 226-228, 230, 237, 240, 244, 257, 334, 345, 347, 348, 349

Vegetation 35, 39

Vitelline membrane 44, 46, 51

**W**

Washroom 173, 340

Water 10, 44, 52, 53, 61, 74, 75, 86, 87, 92, 94, 95, 96, 123, 124, 125, 127, 129, 130, 131, 132, 139, 140, 143, 161, 168, 170, 186, 189, 190, 191, 193, 194, 197, 198, 199, 200, 202, 203, 212, 217, 218, 219, 220, 227, 228, 229, 230, 235, 236, 237, 239, 240, 241, 242, 244, 245, 247, 249, 250, 251, 262, 265, 268, 270, 275, 279, 289, 290, 291, 292, 294, 295, 307, 310, 311, 314, 318, 339, 348, 353

Water contaminants 239

Welfare code 256, 259

Welfare issues 257

Welfare of bird 256

White Holland 25, 26, 27

**X**

Xanthophylls 50





Continued from 1<sup>st</sup> flap

Department of Poultry Science, Madras Veterinary College. Presently, he is offering Poultry consultation services to the industry. He has published more than 200 research papers, 170 popular papers, 20 books/manuals, 14 bulletins, 24 book-chapters. He has participated in more than 100 international and national conferences and presented research and lead papers in 26 countries. Formerly he worked as a technical advisor to the "National Meat & Poultry Processing Board", Govt. of India, "Chennai Zoological Park", "Farmer's Advisory Cell", Director of Animal Husbandry for drawing Various Poultry Schemes, UNISEF / SCERT- Resource person, "Agmark" for fixing standards for grading of Table Eggs, At present, he is the Senior Vice-President of the WPSA (IB), Speakers' Bureau, WPSA & Vice-President, IPSA. He is the International Editorial Board Member of the World's Poultry Science Journal & Editorial Board Member of another 10 poultry journals. He has received several awards and recognitions at national and international levels, including "lifetime achievement award" from the Indian Poultry Science Association. He can be contacted at [narahari.devareddy@gmail.com](mailto:narahari.devareddy@gmail.com).



**Prof. J. D. Mahanta** completed BVSc & AH from AAU with distinction and Gold Medal in 1985 and MVSc. in Poultry Science with an ICAR Jr fellowship from CSAUAT, Mathura in 1987. Then he joined AAU as Assistant professor in 1989. Subsequently, he completed Doctoral in

Poultry Science in 1997 from KAU, Mannuthy with CSIR Sr Research Fellowship specializing on duck production and management. He is presently working as Professor and i/c, Instructional Poultry Farm, Department of Poultry Science, CVSc, AAU, Khanapara. He has published about 47 research papers in national and international journals besides 20 popular articles, one book on Duck husbandry in Assamese, five hand books, two information bulletins, four practical manuals and one teaching learning material on duck production and management for K.K. Handique Open University, Guwahati. He is associated with one DBT research project as Co-PI and executing Experiential Learning for hands on training programme. He has guided 16 Post graduate students as Major Advisor/ member of Advisory Committee. He can be contacted at [mahantajd@gmail.com](mailto:mahantajd@gmail.com).