

Josef Johann Gross *Editor*

Production Diseases in Farm Animals

Pathophysiology, Prophylaxis and
Health Management



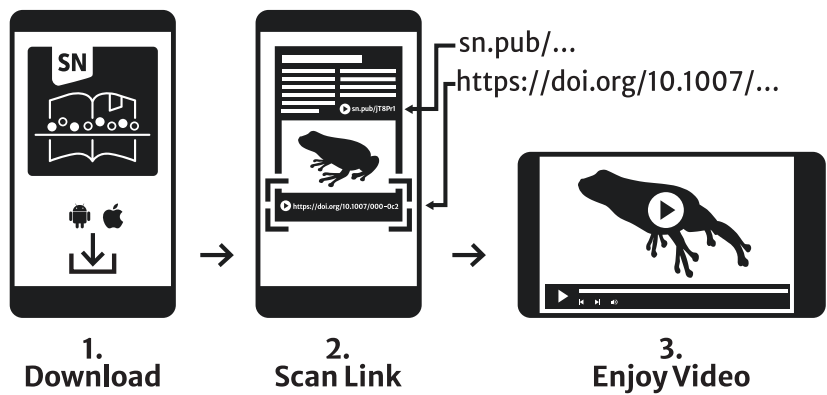
MOREMEDIA



Springer

Production Diseases in Farm Animals

Springer Nature More Media App



Support: customerservice@springernature.com

Josef Johann Gross
Editor

Production Diseases in Farm Animals

Pathophysiology, Prophylaxis
and Health Management

Editor

Josef Johann Gross
Veterinary Physiology, Vetsuisse Faculty
University of Bern
Bern, Switzerland

This work contains media enhancements, which are displayed with a “play” icon. Material in the print book can be viewed on a mobile device by downloading the Springer Nature “More Media” app available in the major app stores. The media enhancements in the online version of the work can be accessed directly by authorized users.

ISBN 978-3-031-51787-7 ISBN 978-3-031-51788-4 (eBook)
<https://doi.org/10.1007/978-3-031-51788-4>

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Switzerland AG 2024

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

If disposing of this product, please recycle the paper.

Preface

The growing demand of an increasing global population for animal-derived food and products requires intensive livestock farming. During the past few decades, performance across all livestock species worldwide increased continuously. However, breeding and husbandry of farm animals are often accompanied by conflicts of interest between biological requirements of the animal and economic needs of the producer. This conflict is increasingly gaining attention not only by producers, animal scientists, and veterinarians but also by the public. An inadequate breeding strategy or animal housing and feeding may lead to production diseases, coming along impaired animal welfare, but also reduced income for the producer and reduced product quality for the consumer. Furthermore, large-scale livestock farming creates an increasing number of environmental problems which must be considered a limiting factor for animal production.

Production diseases were originally defined as “a number of metabolic disorders of increasing importance in agriculture.” Over the years, this definition has expanded and covers diverse aspects of diseases and their association with performance level and management. Farm animals are permanently challenged by a variety of factors: improper nutrition, inadequate housing systems, infections, stress, etc., which affect the incidence, course, and outcome of production diseases. Despite changes and improvements in livestock farming, analytics, and veterinary care, further research is warranted in terms of gathering new information on the prevention, diagnosis, and treatment of production diseases.

This book focuses mainly on production diseases and their prevention in ruminants, swine, and poultry. Experts in different fields of animal science and veterinary medicine contribute to this book. The main topics are veterinary public health and metabolic, gastrointestinal, and respiratory health disorders. Furthermore, mammary gland health and locomotion disorders are addressed, likewise the impact of environment, behavior, genetics, and animal welfare. The major focus of the individual contributions is on an interdisciplinary view on pathophysiology, prophylaxis, and health management.

Of course, the chapters presented in this volume reflect only a small segment of current research related to production diseases in farm animals and make no claim to completeness.

Bern, Switzerland

Josef J. Gross

Contents

Part I Veterinary Public Health Aspects of Production Diseases

Epidemiology of Production Diseases 3

Gertraud Schüpbach-Regula

Societal Attitudes Towards Animal Welfare and Livestock

Production Diseases 11

Beth Clark, Albert Boaitey, and Carmen Hubbard

Antimicrobial Resistance in Bacterial Pathogens

from Farm Animals. 25

Ulf Magnusson, Heike Kaspar, Oskar Nilsson, and Stefan Schwarz

Part II Metabolic Health Disorders

Metabolism and Inflammation in Dairy Cows. 49

M. Mezzetti, G. Carpenter, B. Bradford, and E. Trevisi

Etiology of Oxidative Stress in Dairy Cow 99

Loredana Basiricò, Tiziana Vetturini, and Umberto Bernabucci

Ketosis in Dairy Cows. 115

Josef J. Gross

Part III Gastrointestinal Disorders

Displacement of the Abomasum 137

Andrew J. Niehaus

The Gut Microbiome in Pigs and Its Impact on Animal Health. . . . 157

Jürgen Zentek, Wilfried Vahjen, Łukasz Grześkowiak, Beatriz
Martínez-Valleśpín, Johannes Schulze Holthausen, and Eva-Maria
Saliu

Physiology of Gut Water Balance and Pathomechanics

of Diarrhea. 179

Ted H. Elsasser and Shollie Faulkenberg

Diarrhea in Calves 211

Ingrid Lorenz and Florian M. Trefz

Infectious Enteric Diseases in Pigs	223
Mirjam Arnold, Thomas Echtermann, and Heiko Nathues	
Part IV Respiratory Diseases	
Bovine Respiratory Disease	273
Martin Kaske, Petra Reinhold, Bart Pardon, and Jade Bokma	
Respiratory Diseases in Pigs	305
Maria Pieters and Albert Canturri	
Part V Mammary Gland Health and Lactation	
Postpartum Dysgalactia Syndrome in Sows: A Review	319
Dominiek Maes and Chantal Farmer	
Mastitis in Dairy Cows	339
Pamela L. Ruegg and Pamela R. F. Adkins	
Disturbed Milk Ejection at Machine Milking and the Issues Related to Exogenous Oxytocin in Dairy Cows	367
Rupert M. Bruckmaier	
Part VI Locomotion Disorders	
Lameness in Cattle	377
Nick J. Bell, Sara I. L. Pedersen, Laura V. Randall, John G. Remnant, and James P. Wilson	
Lameness in Pigs	405
Mari Heinonen, Liesbet Pluym, Dominiek Maes, Kristin Olstad, and Mate Zoric	
Part VII Environment, Behavior, Genetics, and Animal Welfare	
Associations of Behavior and Production Disease in Dairy Cattle . . .	453
Meagan T. M. King and Trevor J. DeVries	
Heat Stress in Lactating and Non-lactating Dairy Cows	469
Jimena Laporta and Amy L. Skibiel	
Feather Pecking Behavior in Laying Hens: Challenges in Management and Breeding	493
Nicole Kemper and Jens Tetens	
Tail Biting in Pigs	517
Sven König and Kathrin Halli	
Breeding for Metabolic Robustness and Longevity in Dairy Cows	531
Sven König and Hermann H. Swalve	

Part VIII Strategies and Management Tools for Disease Control

**Milk as Diagnostic Medium for Detection of Health Disorders
in Dairy Animals** 557
A. Costa, S. Magro, S. Sterup Moore, G. Visentin, M. Penasa, and
M. De Marchi

**Consequences of Lactation Length Management for Health and
Fertility in Dairy Cows** 571
Ariette T. M. van Kneegsel and Akke Kok

**Surveillance and Decision-Making in Swine Health
Management** 587
Robert Friendship

Index 599