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In dairy industries throughout the world there is a desire to optimize udder health. An improved udder health will lead to improved animal welfare, improved production efficiency and a reduction of the use of antibiotics. To improve udder health, first of all, technical knowledge on issues such as treatment, milking, infectious pressure and host resistance is important. However, over the years we learned that knowledge alone is not enough: knowledge has to be used. And for knowledge to be used, farmers have to be motivated. This requires knowledge about motivation and communication. In this book, recent knowledge on technical udder health issues is combined with knowledge on motivation and communication. A large number of descriptions of mastitis control programs that are being carried out worldwide is combined with more specific studies. These are aimed at effective advising, motivation and communication strategies, economics, and technical studies on mastitis control and prevention. Therefore, this book provides an applied source of information for all that are willing to improve udder health.

Broodstock management, the control of reproduction and genetic improvement are central parts of an aquaculture business that allow a hatchery to continually improve efficiency and productivity of the entire business. Control of reproduction, has been classified into critical points and management points. The chapter identifies and explains how critical points must be controlled to obtain successful spawning of good quality eggs and how management points can be controlled to maximize production. Genetic improvement gives the potential to shape an organism to meet human needs, improving productivity and product quality. The chapter explains the bases of setting up a genetic improvement program and identifies the associated benefits and risks of this long term investment.

Our lives and well being intimately depend on the exploitation of the plant genetic resources available to our breeding programs. Therefore, more extensive exploration and effective exploitation of plant genetic resources are essential prerequisites for the release of improved cultivars. Accordingly, the remarkable progress in genomics approaches and more recently in sequencing and bioinformatics offers unprecedented opportunities for mining germplasm collections, mapping and cloning loci of interest, identifying novel alleles and deploying them for breeding purposes. This book collects 48 highly interdisciplinary articles describing how genomics improves our capacity to characterize and harness natural and artificially induced variation in order to boost crop productivity and provide consumers with high-quality food. This book will be an invaluable reference for all those interested in managing, mining and harnessing the genetic richness of plant genetic resources.

Although many books currently available describe statistical models and methods for analyzing longitudinal data, they do not highlight connections between various research threads in the statistical literature. Responding to this void, Longitudinal Data Analysis provides a clear, comprehensive, and unified overview of state-of-the-art theory and applications. It also focuses on the assorted challenges that arise in analyzing longitudinal data. After discussing historical aspects, leading researchers explore four broad themes: parametric modeling, nonparametric and semiparametric methods, joint models, and incomplete data. Each of these sections begins with an introductory chapter that provides useful background material and a broad outline to set the stage for subsequent chapters. Rather than focus on a narrowly defined topic, chapters integrate important research discussions from the statistical literature. They seamlessly blend theory with applications and include examples and case studies from various disciplines. Destined to become a landmark publication in the field, this carefully edited collection emphasizes statistical models and methods likely to endure in the future. Whether involved in the development of statistical methodology or the analysis of longitudinal data, readers will gain new perspectives on the field.

Proceedings of the Sixteenth Conference Application of New Genetic Technologies to Animal Breeding, Noosa Lakes, Queensland Australia, 25th-28th September 2005
CSIRO PUBLISHING
Quantitative Genetics in the Wild
Oxford University Press

Animal Science Reviews 2012 provides scientists and students in animal science with timely analysis on key topics in current research. Originally published online in CAB Reviews, this volume makes available in printed form the reviews in animal science published during 2012.

This book fills the gap between textbooks of quantitative genetic theory, and software manuals that provide details on analytical methods but little context or perspective on which methods may be most appropriate for a particular application. Accordingly this book is composed of two sections. The first section (Chapters 1 to 8) covers topics of classical phenotypic data analysis for prediction of breeding values in animal and plant breeding programs. In the second section (Chapters 9 to 13) we provide the concept and overall review of available tools for using DNA markers for predictions of genetic merits in breeding populations. With advances in DNA sequencing technologies, genomic data, especially single nucleotide polymorphism (SNP) markers, have become available for animal and plant breeding programs in recent years. Analysis of DNA markers for prediction of genetic merit is a relatively new and active research area. The algorithms and software to implement these algorithms are changing rapidly. This section represents state-of-the-art knowledge on the tools and technologies available for genetic analysis of plants and animals. However, readers should be aware that the methods or statistical packages covered here may not be available or they might be out of date in a few years. Ultimately the book is intended for professional breeders interested in utilizing these tools and approaches in their breeding programs. Lastly, we anticipate the usage of this volume for advanced level graduate courses in agricultural and breeding courses.

The prediction of producing desirable traits in offspring such as increased growth rate, or superior meat, milk and wool production is a vital economic tool to the animal scientist. Summarising the latest developments in genomics relating to animal breeding values and design of breeding programmes, this new edition includes models of survival analysis, social interaction and sire and dam models, as well as advancements in the use of SNPs in the computation of genomic breeding values.

Geostatistics is essential for environmental scientists. Weather and climate vary from place to place, soil varies at every scale at which it is examined, and even man-made attributes – such as the distribution of pollution – vary. The techniques used in geostatistics are ideally suited to the needs of environmental scientists, who use them to make the best of sparse data for prediction, and to plan future surveys when resources are limited. Geostatistical technology has advanced much in the last few years and many of these developments are being incorporated into the practitioner's repertoire. This second edition describes these techniques for environmental scientists. Topics such as stochastic simulation, sampling, data screening, spatial covariances, the variogram and its modeling, and spatial prediction by kriging are described in rich detail. At each stage the underlying theory is fully explained, and the rationale behind the choices given, allowing the reader to appreciate the assumptions and constraints involved.

Recognizing the significant advances made in the field of animal genetics in the ten years since the first edition of "The Genetics of the Dog", this new edition of the successful 2001 book provides a comprehensive update on the subject, along with new material on topics of current and growing interest. Existing chapters on essential topics such as immunogenetics, genetics of diseases, developmental genetics and the genetics of behaviour have been fully updated, while new authors report on the latest advances in areas such as genetic diversity of dog breeds, canine genomics, olfactor.

Climate change issues are attracting rapidly increasing interest from a wide range of biologists due to their unprecedented effects on global biodiversity including humans. This comprehensive and coherent volume provides an exhaustive and up-to-date synthesis of current level of knowledge as it relates to birds.

A comprehensive resource that covers all the aspects of sex control in aquaculture written by internationally-acclaimed scientists Comprehensive in scope, Sex Control in Aquaculture first explains the concepts and rationale for sex control in aquaculture, which serves different purposes. The most important are: to produce monosex stocks to rear only the fastest-growing sex in some species, to prevent precocious or uncontrolled reproduction in other species and to aid in broodstock management. The application of sex ratio manipulation for population control and invasive species management is also included. Next, this book provides detailed and updated information on the underlying genetic, epigenetic, endocrine and environmental mechanisms responsible for the establishment of the sexes, and explains chromosome set manipulation techniques, hybridization and the latest gene knockout approaches. Furthermore, the book offers detailed protocols and key summarizing information on how sex control is practiced worldwide in 35 major aquaculture species or groups, including fish and crustaceans, and puts the focus on its application in the aquaculture industry. With contributions from an international panel of leading scientists, Sex Control in Aquaculture will appeal to a large audience: aquaculture/fisheries professionals and students, scientists or biologists working with basic aspects of fish/shrimp biology, growth and reproductive endocrinology, genetics, molecular biology, evolutionary biology, and R&D managers and administrators. This text explores sex control technologies and monosex production of commercially-farmed fish and crustacean species that are highly in demand for aquaculture, to improve feed utilization efficiency, reduce energy consumption for reproduction and eliminate a series of problems caused by mixed sex rearing. Thus, this book: Contains contributions from an international panel of leading scientists and professionals in the field Provides comprehensive coverage of both established and new technologies to control sex ratios that are becoming more necessary to increase productivity in aquaculture Includes detailed coverage of the most effective sex control techniques used in the world's most important commercially-farmed species Sex Control in Aquaculture is the comprehensive resource for understanding the biological rationale, scientific principles and real-world practices in this exciting and expanding field.

This book is a printed edition of the Special Issue "Genetics and Genomics of Forest Trees" that was published in Forests

Ruminant Ophthalmology, An Issue of Veterinary Clinics of North America: Food Animal Practice, E-Book

The new Animal Genetics and Disease 2017 conference committee organized a Research Topic for the proceedings of this inaugural conference. The meeting brought together specialists working on the interface between genomics, genetic engineering, and infectious disease, with the aims of improving animal and human health and welfare. This conference was funded by Advanced Courses and Scientific Conference at the Wellcome Genome Campus, Hinxton, UK. The conference will highlight breakthroughs in genomic technologies that are rapidly increasing our understanding of the fundamental role that host and pathogen genetics play in infections and epidemics. This Research Topic focuses on how infections spread and how they further affect the productivity of livestock systems and food supply chains. Thanks to technological advances, we now have the tools for real-time surveillance of zoonoses affecting wildlife, farm animals and animal-to-human disease transmission.

This second edition presents the use of linear models, particularly Best Linear Unbiased Prediction (BLUP), for the genetic evaluation of domestic livestock. The 13 chapters discuss genetic evaluation with different sources of records, genetic covariance between relatives, BLUP of breeding value using univariate models with one random effect, BLUP of breeding value using models with random environmental effects, BLUP of breeding value using multivariate models, maternal trait models, analysis of longitudinal data, the use of genetic markers in predicting breeding values, non-additive animal models, analysis of ordered categorical traits, estimation of genetic parameters, the application of Gibbs sampling in variance component estimation and prediction of breeding value and solving linear equations. Appendices with additional information on introductory matrix algebra, fast algorithms for calculating inbreeding, methods for obtaining approximate reliability for genetic evaluations, procedure for computing de-regressed breeding values, calculating the phi matrix of legendre polynomials at different ages or time periods and computing the covariance matrix of additive genetic effect of marked quantitative trait loci (MQTL) are also included. This book will be of interest to advanced students and practitioners of animal breeding and genetics.

Mastitis is one of the main health issues in dairy production. The losses are not only economic, but also issues such as animal health and welfare, milk quality, antibiotic usage and the image of the dairy sector are important reasons to focus on mastitis control. Accordingly, mastitis is a topic that is well-studied worldwide. Although the scope of the studies may vary from the smallest unit, the gene, to the largest unit, a whole country, the final goal is to control mastitis more effectively. Effective mastitis control is based on knowledge from a wide range of fields, like infectious pressure, milking procedures, resistance, detection, diagnosis and treatment. However, science alone is not enough. To ensure effective mastitis control, research needs to be

inspired by, and implemented in, dairy farming practice. This demands cooperation and communication between scientists, veterinarians, extension specialists and dairy farmers worldwide. This book gives the state of the art of mastitis research internationally. The contributions reflect not only current knowledge of mastitis control, but also provide ideas for effective mastitis control in practice.

This book contains over 400 offered papers which were presented at the 63rd International Congress of Meat Science and Technology, held in Cork, Ireland, from 13-18 August, 2017. Under the theme of nurturing locally, growing globally, areas covered in the congress included meat sustainability and the role of the of meat science in a challenging global environment, genetics and genomics, the science of meat quality, technological demands in meat processing from an Asian perspective, international best practice in animal welfare, scientific advances underpinning meat safety, emerging technologies in meat processing, meat science and impact, consumer aspects, meat biochemistry, advancements in meat packaging and the congress ended with a session on meat and health, with focus on sustaining healthy protein sources. This year also included a session dedicated to addressing specific hot topics of importance to the industry and meat scientists. These proceedings reflect the truly global nature of meat research and provide an insight into current research issues for the industry.

Modern Biotechnology has potential for solving many problems associated with animal productivity and health and offers exciting opportunities for enhancing agricultural productivity. At present the focus is, however, on the issues and problems of significance for livestock producers in the developed world. In order to fully realize the benefits of this technology in developing countries, there is a need to identify, characterize and apply appropriate gene-based technologies for these regions. These proceedings present peer reviewed state-of-the-art papers describing the achievements in the areas of animal breeding and genetics, animal nutrition, animal health, and environment, ethics, safety, and regulatory aspects of gene-based technologies; achievements which could be realized using these modern scientific tools to maximise the benefits from the 'livestock revolution' that is taking place; and the constraints in the use of gene-based technologies and their specific research needs. This book will help in bridging the wide gap between developed and developing countries, in the development and use of gene-based technologies, and to elucidate the current and future roles of such technologies in the developing world. It is a good reference source for researchers, students and policy-makers alike.

John Nelder was one of the most influential statisticians of his generation, having made an impact on many parts of the discipline. This book contains reviews of some of those areas, written by top researchers. It is accessible to non-specialists, and is noteworthy for its breadth of coverage.

"Cotton, 2nd edition, edited by David D. Fang and Richard G. Percy, is a long awaited, much needed comprehensive update on the science of cotton. This book epitomizes the thorough coverage of an Agronomy Monograph. Readers will find essential coverage of the many scientific advancements in the field, from fiber handling to the transgenic cotton revolution. This amazing and versatile crop, cultivated for more than 7000 years, is one of the most powerful stories in agricultural science. More than 50 experts who contributed to this volume represent the leading edge of this exciting story."

Across these fields, there is increasing appreciation of the need to quantify the genetic - rather than just the phenotypic - basis and diversity of key traits, the genetic basis of the associations between traits, and the interaction between these genetic effects and the environment. This research activity has been fuelled by methodological advances in both molecular genetics and statistics, as well as by exciting results emerging from laboratory studies of evolutionary quantitative genetics, and the increasing availability of suitable long-term datasets collected in natural populations, especially in animals. Quantitative Genetics in the Wild is the first book to synthesize the current level of knowledge in this exciting and rapidly-expanding area.

Aquaculture is the fastest-growing food production sector in the world. With demand for seafood increasing at astonishing rates, the optimization of production methods is vital. One of the primary restrictions to continued growth is the supply of juveniles from hatcheries. Addressing these constraints, Advances in aquaculture hatchery technology provides a comprehensive, systematic guide to the use of current and emerging technologies in enhancing hatchery production. Part one reviews reproduction and larval rearing. Aquaculture hatchery water supply and treatment systems, principles of finfish broodstock management, genome preservation, and varied aspects of nutrition and feeding are discussed in addition to larval health management and microbial management for bacterial pathogen control. Closing the life-cycle and overcoming challenges in hatchery production for selected invertebrate species are the focus of part two, and advances in hatchery technology for spiny lobsters, shrimp, blue mussel, sea cucumbers and cephalopods are all discussed. Part three concentrates on challenges and successes in closing the life-cycle and hatchery production for selected fish species, including tuna, striped catfish, meagre, and yellowtail kingfish. Finally, part four explores aquaculture hatcheries for conservation and education. With its distinguished editors and international team of expert contributors, Advances in aquaculture hatchery technology is an authoritative review of the field for hatchery operators, scientists, marine conservators and educators. Provides a comprehensive guide to the use of technologies in enhancing hatchery production Examines reproduction and larval rearing, including genetic improvement and microdiets Discusses challenges in hatchery production of specific species

Fitness and adaptation are fundamental characteristics of plant and animal species, enabling them to survive in their environment and to adapt to the inevitable changes in this environment. This is true for both the genetic resources of natural ecosystems as well as those used in agricultural production. Extensive genetic variation exists between varieties/breeds in a species and amongst individuals within breeds. This variation has developed over very long periods of time. A major ongoing challenge is how to best utilize this variation to meet short-term demands whilst also conserving it for longer-term possible use. Many animal breeding programs have led to increased performance for production traits but this has often been accompanied by reduced fitness. In addition, the global use of genetic resources prompts the question whether introduced genotypes are adapted to local production systems. Understanding the genetic nature of fitness and adaptation will enable us to better manage genetic resources allowing us to make efficient and sustainable decisions for the improvement or breeding of these resources. This book had an ambitious goal in bringing together a sample of the world's leading scientists in animal breeding and evolutionary genetics to exchange knowledge to advance our understanding of these vital issues.

Identification of desirable genotypes with traits of interest is discernible for making genetic improvement of crop plants. In this direction, screening of a large number of germplasm for desirable traits and transfer of identified traits into agronomic backgrounds through recombination breeding is the common breeding approach. Although visual screening is easier for qualitative traits, its use is not much effective for quantitative traits and also for those, which are difficult to score visually. Therefore, it is imperative to phenotype the germplasm accessions and breeding materials precisely using high throughput phenomics tools for challenging and complex traits under natural, controlled and harsh environmental conditions. Realizing the importance of phenotyping data towards identification and utilization of a germplasm as donors, global scientific community has exerted increased focus on advancing phenomics in crop plants leading to development of a number of techniques and methodologies for screening of agronomic, physiological, and biochemical traits. These technologies have now become much advanced and entered the era of digital science. This book provides exhaustive information on various aspects related to phenotyping of crop plants and offers a most comprehensive reference on the developments made in traditional and high throughput phenotyping of agricultural crops.

Metabolomics has been a useful method for various study fields. However, its application in animal science does not seem to be sufficient. Metabolomics will be useful for various studies in animal science: Animal genetics and breeding, animal physiology, animal nutrition, animal products (milk, meat, eggs, and their by-products) and their processing, livestock environment, animal biotechnology, animal behavior, and animal welfare. More application examples and protocols for animal science will promote more motivation to use metabolomics effectively in the study field. Therefore, in this Special Issue, we introduced some research and review articles for "Metabolomic Applications in Animal Science". The main methods used were mass spectrometry or nuclear magnetic resonance spectroscopy. Not only a non-targeted, but also a targeted, analysis of metabolites is shown. The topics include dietary and pharmacological interventions and protocols for metabolomic experiments.

This book provides a fresh, updated perspective of the current status and perspectives in genetic improvement of a diverse array of tropical crops. The first part covers aspects which are relevant across crops, namely how to maximize the use of genetic information through modern bioinformatic approaches and how to use statistics as a tool to sustain increased genetic gains and breeding efficiency. The second part of the book provides an updated view of some seed-propagated crops, such as rice, maize and oil palm, as well as crops propagated through vegetative means such as sweet potato, cassava, banana and sugarcane. Each chapter addresses the main breeding objectives, markets served, current breeding approaches, biotechnology, genetic progress observed, and in addition a glimpse into the future for each of these selected and important tropical crops.

This book reviews the biological science and background to breeding meat poultry, specifically broiler, turkey and duck. These commercial birds have been changed by genetic selection to such an extent that they are substantially different from traditional breeds and laying hens. Covering science, management and husbandry systems, this book is an essential reference for researchers and students in animal science, as well as technical staff of breeding companies and poultry meat producers. Part of the Poultry Science Symposium Series.

The ontogeny of each individual contributes to the physical, physiological, cognitive, neurobiological, and behavioral capacity to manage the complex social relationships and diverse foraging tasks that characterize the primate order. For these reasons Building Babies explores the dynamic multigenerational processes of primate development. The book is organized thematically along the developmental trajectory:conception, pregnancy, lactation, the mother-infant dyad, broader social relationships, and transitions to independence. In this volume, the authors showcase the myriad approaches to understanding primate developmental trajectories from both proximate and ultimate perspectives. These collected chapters provide insights from experimental manipulations in captive settings to long-term observations of wild-living populations and consider levels of analysis from molecule to organism to social group to taxon.

Strepsirrhines, New World monkeys, Old World monkeys, apes, and humans are all well-represented. Contributions by anthropologists, microbiologists, psychologists, population geneticists, and other primate experts provide Building Babies a uniquely diverse voice. Building Babies features multi- and trans-disciplinary research approaches to primate developmental trajectories and is particularly useful for researchers and instructors in anthropology, animal behavior, psychology, and evolutionary biology. This book also serves as a supplement to upper-level undergraduate courses or graduate seminars on primate life history and development. In these contexts, the book provides exposure to a wide range of methodological and theoretical perspectives on developmental trajectories and models how researchers might productively integrate such approaches into their own work.

Throughout the last century, specialisation and intensification were buzz words for farmers in the Western world. However, this approach has not resulted in sustainable development as evidenced by the fact that scientists now need to create technologies to reduce negative impacts. In this book we demonstrate that an alternative exists. Case studies from Bangladesh, Thailand, and Vietnam show that integration and diversification increase both farm productivity and farmers' incomes. By adopting a participatory approach, farmers and scientists identified a range of technologies that strengthen the positive impacts of integrated aquaculture-agriculture systems for the environment. This book is a collection of refereed papers on a controversial subject in agricultural development. Arguing that sustainability of fish culture in ponds needs a new paradigm - feed the pond to grow fish - two chapters focus on nutrient cycling in such systems. Another chapter makes the case for breeding Nile tilapia for resource poor farmers and presents practical options to avoid the pitfalls that arise from natural tilapia mating in low-input ponds. The book contains chapters on livelihood and development aspects and ends with a general discussion completing the picture of the integrated aquaculture-agriculture systems. Overall it composes a review which addresses one of the key issues of the new century: how to sustainably produce food without compromising environmental integrity.

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