

BOOK REVIEW

**LE LAPIN. DE LA BIOLOGIE À L'ÉLEVAGE (*THE RABBIT. FROM BIOLOGY TO FARMING*). GIDENNE T. (COORD.)
ÉDITIONS QUÆ, VERSAILLES, FRANCE, (2015). 270 PP. PAPERBACK.**

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Rabbit farming reaches its maximum development in the western Mediterranean countries. In this region, France is one of the most relevant countries in rabbit production and consumption, producing more than 52000 t per year. Moreover, it is one of the countries that has contributed most to research and development of rabbit science and technology. In this context, a collective book has recently been released: “Le lapin. De la biologie à l'élevage” (The rabbit. From biology to farming), written by 27 authors with broad expertise in the field, belonging to several French universities, research centres, enterprises and veterinary clinics. The project was coordinated by Thierry Gidenne, Research Director at the Institut National de la Recherche Agronomique (INRA) and General Secretary of the World Rabbit Science Association (WRSA). Dr. Gidenne has developed his professional and research career in the field of rabbit production systems, actively engaging in the spread of the knowledge accumulated over the years.

The book provides useful and valuable information organised in 7 chapters:

The first, “Anatomie, taxonomie, origine, evolution et domestication” (*Anatomy, taxonomy, origin, evolution and domestication*), describes the anatomy of this lagomorph, focusing mainly on examples and values for medium-sized rabbits whose prototype is the New Zealand breed. After describing the general morphology, skeleton and muscular system, special attention is paid to the reproductive and digestive anatomy underlying the reproductive performance and feeding behaviour of this herbivorous monogastric species. After framing the rabbit from the taxonomic point of view, the origin of the species and its history and domestication are also narrated. Regarding breeds and lines, the genetics of coat colour and structure are revised, four breed types are defined (primitive, obtained by artificial selection, synthetics and Mendelian breeds), and a classification of breeds according to their size (heavy, medium, light and dwarf breeds) is established.

Chapter 2, “Physiologie” (*Physiology*), reviews the functioning of the rabbit organism in detail, starting from the general physiology that explains respiration, thermoregulatory mechanisms, the immune system, sense organs and sensory perceptions, urinary excretion, circulatory physiology and blood parameters. The second part of the chapter deals with digestive physiology, explaining enzymatic digestion, digestive microbiota, caecal microbial activity and digestive transmission, as well as caecotrophy and faecal excretion. Moreover, reproductive physiology is reviewed in depth, starting from the onset of puberty. Gametogenesis in males and females is also described. Doe physiology receives special attention with descriptions of the oestrus cycle, mating, ovulation and fecundation, with reference to pseudogestation and its implications in doe handling. Embryonic development, gestation, parturition and lactation are also studied. Practical implications for farm handling are derived from these biological bases.

Chapter 3, “Reproduction” (*Reproduction*), describes reproductive management, artificial insemination and biotechnology applied to reproduction. To this end, nubility age, preparation of does for reproduction and reproductive rhythms are addressed in the first part of the chapter. Procedures for semen collection, evaluation of semen quality, dose preparation and conservation and insemination of does are also described. A review of factors influencing artificial insemination success is also included. Main methods to induce sexual receptivity of does are addressed. The state of the art in novel biotechnologies: semen freezing, embryo transfer, sperm sexing, production of in vitro embryos, gene transfer and cloning is reviewed.

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Chapter 4, "Habitat et comportement" (*Habitat and behaviour*), addresses the main habitat-related aspects in the wild and housing in farming, as well as behaviour patterns of this species, except for reproduction and feeding (aspects studied in chapters 3 and 5). Housing conditions for rabbits are discussed for professional farming under European production models, reviewing issues such as cage floor types, available space and its organisation, as well as environmental enrichment. Moreover, attention is paid to alternative housing modalities to the conventional cage. The chapter also analyses social behaviour in the wild and under farming regimes, particularly maternal behaviour, kit behaviour and doe-offspring interaction.

Nutrition and feeding is analysed in Chapter 5, "Nutrition et alimentation", the longest of all. The state of the art in rabbit feeding, focused primarily on animals housed in cages under controlled environmental conditions and *ad libitum* supply of a single pelleted balanced feed. Feeding behaviour and feed intake at different ages are studied. A review of nutritional needs for growing rabbits, does and bucks is undertaken, with special attention to digestive health and the role of fibre. Vitamin and mineral needs, as well as feedstuffs and water quality are also studied. Feeding management strategies according to the productive status of the animals and feeding restriction as a tool to limit digestive disorders are reviewed. The chapter ends with the study of wild rabbit feeding behaviour and feeding for rabbits other than the meat-oriented type (feeding with forage, as well as feeding for laboratory, companion, fur and hair rabbits).

Chapter 6, "Santé et prévention des maladies" (*Health and disease prevention*), is structured in sections that address digestive, pyogenic and parasitic diseases, as well as rabbit haemorrhagic disease and ailments of the respiratory system. Moreover, attention is paid to non-pharmacological prevention measures based on biosecurity, cleaning and disinfection, and water quality. The chapter is well updated with the latest developments in the emerging diseases, such as epizootic enteropathy and the new variant of rabbit haemorrhagic disease, described for the first time in France in 2010.

The last chapter, "Génétique et sélection" (*Genetics and selection*), explains animal breeding applied to rabbit farming, focusing on inbreeding and crossbreeding management and maternal and growth characters in meat-oriented rabbits, as well as on improvement of fur (Rex) and hair (Angora) breeds. Improving disease resistance is also studied. In addition, this chapter provides an overview of the structure for the dissemination of genetic progress and commercial lines used in rabbit farming, with most attention to INRA and French commercial lines. The role of molecular tools and their applications in rabbit breeding are also addressed.

The book includes a glossary that defines and explains 57 terms used in the text, which help readers understand concepts specific to some disciplines. Each chapter is also accompanied by bibliographic references. It is well illustrated, with 76 figures (37 of them in colour), 23 tables and 40 pieces of framed text, and represents an updated, comprehensive and applied review of rabbit biology and its farming management which is useful for a wide audience of farmers, researchers, professors, university students, advisors and professionals interested in rabbit production. It is destined to become a reference work for French-speaking readers.

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