

## 28925 - Production of monogastric animals

### Syllabus Information

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**Academic Year:** 2019/20

**Subject:** 28925 - Production of monogastric animals

**Faculty / School:** 201 - Escuela Politécnica Superior

**Degree:** 437 - Degree in Rural and Agri-Food Engineering  
583 - Degree in Rural and Agri-Food Engineering

**ECTS:** 6.0

**Year:** 3

**Semester:** Second semester

**Subject Type:** Optional

**Module:** ---

## 1.General information

### 1.1.Aims of the course

**The subject and its expected results correspond to the following approaches and objectives:**

This subject is oriented to the learning of the systems of production of monogástricos. That will allow the student to know and approach the management of this type of livestock.

### 1.2.Context and importance of this course in the degree

It is part of the common compulsory training for all students of the Specialty degree: "Animal Farming", for this reason it offers an overview of the differences, both in the systems of exploitation of the different species of interest cattle, and the Latest techniques for each group. As we have already said, the interest of this group of animals is maximum within the cattle ranch.

### 1.3.Recommendations to take this course

For the better follow up of the subject it is advisable to have passed the subjects: Mathematics II, Animal Science I, Statistics, Ecology and management of agroindustrial byproducts. It is also convenient:

- Have basic knowledge of Spanish/English for the understanding of scientific-technical texts.

## 2.Learning goals

### 2.1.Competences

**Upon passing the subject, the student will be more competent to ...**

Generic:

In general terms, the student must possess and understand knowledge in a study area related to production; Know how to apply the knowledge to their work in order to solve problems within their area of study; Acquire the ability to collect and interpret relevant data to make judgments; To be able to transmit information, ideas, problems and solutions and, to be able to undertake later studies with a high degree of autonomy. In the following table we show an assessment of the objectives:  
No.

INCIDENCE  
INSTRUMENTS

1

Capacity for analysis and synthesis  
high

2

Ability to organize and plan  
Moderate

3

Oral and written communication  
Moderate

4

Foreign Language Knowledge  
Weak

5

Computer knowledge

Weak

6

Ability to manage information

Moderate

7

Problem resolution

high

Referring to Fig.

Decision making

Moderate

News

9

Teamwork

Moderate

10

Working in an international context

Weak

eleven

Skills in interpersonal relationships

Weak

12

Recognition of diversity and multiculturalism

Weak

13

Critical thinking

Moderate

14

Ethical Commitment

high

SYSTEMS

fifteen

Autonomous Learning

high

16

Adapting to new situations

Weak

17

Creativity

Moderate

18

Leadership

Weak

19

Knowledge of other cultures and customs

Weak

twenty

Initiative and entrepreneurship

Moderate

twenty-one

Motivation for quality

high

22

Sensitivity for environmental issues

Moderate

OTHER COMP. TRANSVERSALES

2. 3

Ability to apply knowledge in practice

Moderate

24

Basic knowledge of the profession

high

25

Ability to communicate with non-experts

Moderate

Specific:

- EC.22. Ability to know, understand and use the principles of animal production technologies: animal anatomy; Animal physiology; Animal production, protection and exploitation systems; Animal production techniques; Genetics and animal breeding and feed formulation

- Acquisition of basic knowledge on the Pork, Poultry and Cunicultural Sector: market situation, farming systems, breeding and feeding technologies, genetic improvement, growth and development, egg production, facilities and equipment.

- Application of basic knowledge to phenomena and processes related to livestock production.

- Contrast theory and current production.

- Learning the skills needed for work in farms

## 2.2.Learning goals

**The student, to overcome this subject, must demonstrate the following results ...**

To be able to establish the criteria of reproduction, lactation, growth, feeding and genetics that allow to optimize from a technical-economic point of view the production of monogastric farms.

Be familiar with the facilities and management of the most current monogastric production systems under adequate hygienic

sanitary conditions with a commitment to the conservation of the environment and the sustainable use of its resources. Be able to analyze the productive parameters and identify the critical points of the processes to establish practices of continuous improvement.  
Be able to analyze the most important monogastric production systems to understand the role of monogastric production at both national and global levels.  
Be familiar with the most important legal regulations.  
Be able to show a critical and responsible attitude for quality, environmental and animal welfare issues.  
Know how to access sources and access routes to cutting-edge research.  
Be able to work in a team, including open communication, mutual respect, and ethical values.

### 2.3.Importance of learning goals

The competences that are achieved contribute to the understanding of the operation of the systems of monogastric cattle exploitation without forgetting the rural socioeconomic environment where it is possible its development.  
The student will have developed reasoning and critical thinking skills.

## 3.Assessment (1st and 2nd call)

### 3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that he / she has attained the expected learning outcomes through the following assessment activities

The students must pass a global test, similar in the two official examinations of the academic year, following the official calendar of exams of the EPS. The evaluation, which will be 0 to 10 points, will consist of three elements:

- 1.-Theoretical examination, P1, (60% of the final grade)
- 2.-Group work, P2: Delivery of a notebook of visits to a cattle operation, exhibition and public defense of the same (10% of the final note)
- 3.- Individual work of prospecting and / or bibliographic review, P3, (30% of the final grade).

Evaluation Criteria (clearly specify for evaluation activity)

The weighting of each test or work to obtain the final grade will be as follows:

P1) The written test (60% of the grade) will include questions on content theory and practice and will consist of two parts, a) consisting of questions requiring short answers (limited response tests) and b) option test questions multiple. The first type of test will evaluate the ability to organize and structure information, as well as ability to synthesise, analyze and clarify responses, while the second will measure the ability to relate, interpret, evaluate, extrapolate, etc.

P2) Test 2 (group work) may be evaluated during the academic year based on the following criteria and requirements:

Elaboration of a report (10% of the final grade), its exposure and public defense of the practical work entrusted on the description, analysis and operation of a livestock operation that the students, in a group of no more than 5.

Attendance to at least 80% of the compulsory practices in the group of practices assigned, not being able to change groups without justification.

The work will be presented and defended by each group of students at the end of the semester in seminar-type sessions, in which the authors should intervene to explain and argue some of the points contained in the report, discuss them and discuss them with the rest of participants The seminars (teachers and students). The time available for the presentation and defense of the theme during the seminar sessions will be 15 to 20 minutes. In addition, students will submit a self-assessment form filling out their work on the team. At the end of the exhibition, the rest of the students will also complete another evaluation form of the work of the classmates.

The qualification will be realized taking into consideration: a) content of the memory: 50%; B) formal aspects of the same: 20%; C) exposure and defense (30%).

Those students who have not been evaluated in the test 2 during the academic year must deliver an individual work on the date of the official call, whose content must have been previously accepted by the teacher of the subject. The evaluation criteria will be similar to those specified for students who have been tested for this test 2 during the course.

P3) Test 3, prospecting and / or bibliographic review (30% of the final grade), will consist of a review of a scientific article and a legal regulation of the EC.

Test 3 (individual survey work and / or bibliographic review) may be evaluated during the academic year, by delivery at the end of the quarter.

Those students who have not been evaluated in test 3 during the academic year must submit the individual work of prospecting and / or bibliographic review on the date of the official announcement.

The qualification will be made taking into account 50% the level of understanding of each of the works.

Final note

In order for the student to pass the subject within the 2 official examinations, it is necessary to:

1. Obtain a grade higher than 0 in each of the parts of the final exam (test 1) (theory questions, short practice questions) and obtain at least a 4.5 in the final mark of test 1.

2. Obtain at least a 4 in the work of prospecting and / or bibliographic review, test 3, (if the grade is less than 4, students will be suspended for the next course).

The final grade of the subject (CF) will be determined by the following equation:

$$CF = 0.6 \text{ Note P1} + 0.1 \text{ Note P2} + 0.3 \text{ Note P3}$$

In order to pass (CF  $\geq$  5) it is essential that:

$$NP1 \geq 4.5 \text{ (with a score greater than 0 on each of the parts)}$$

$$NP3 \geq 4.0$$

In the event that the requirements of the previous section are not met, the final grade will be obtained as follows:

If CF  $\geq$  4, the final grade will be Suspended (4.0)

If CF <4, the final grade will be Suspended (CF)

The tests surpassed in the first call will be saved for the second call of the same academic year.

## 4.Methodology, learning tasks, syllabus and resources

## 4.1. Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. The subject has a specific character orientation so that the activities proposed a focus on the various factors that involve, involved and influence farming systems and production processes of monogastric farms.

It is imposing an overview of the theory and practice, supported by laboratory practices and visits to farmers, conducting individual tutoring work and another group where the student must demonstrate their ability to work in teams and to expose and defend the report on issues related to the subject. This report should be prepared following the guidelines and format similar to the specification of a PFR presentation and be in <http://jescos.unizar.es>. To better track, the learning process will encourage students to use the tutorials through various systems and methods: conventional tutorials and more specific tutorials related to practical work. Professor facilitates your schedule as much as possible with the availability of the student.

## 4.2. Learning tasks

The course includes the following learning tasks:

Lectures. Study and individual/group work. ECTS credits: 4

Teaching methodology:

- Lecture dialogue.
- Problem-based learning.
- Cooperative learning
- Agreement learning.

Practical classes of problems. ECTS credits: 1

Teaching methodology:

- Theoretical Troubleshooting.
- Problem-based learning.

Study and individual /group work. ECTS credits: 1

Teaching methodology:

- Contact with the working reality.
- Individual study and work/group.

## 4.3. Syllabus

The proposed program includes 24 Topics that will be taught in 40 theoretical sessions and 20 Practice sessions. The theoretical program will be presented to the students during the first session and will be structured in three Sections for letting them have a more global view of the theoretical part of the subject.

The course will address the following topics:

Section I - Pig production (19 hours)

- Topic 1.- Situation and problems of the pig sector (1 hour) - 1. General ideas. 2. Importance of productions - census, productivity and economic value in the world, Europe and Spain. 3. Pig production systems in Spain - intensive farming (characteristics, classification, organization of production), extensive and semi-extensive farming. 4. Future perspectives in the EU environment.
- Topic 2.- Reproductive management in pig livestock (3 hours) - 1 Short physiological review of pig reproduction. 2. Reproductive objectives. 3. Factors that influence breeding failing. 4. Strategies of reproductive intensification. 5. Labour induction and labor management. 6. Handling the sow during the post-partum and newborn care. 7. Handling the sow and the piglets while breastfeeding. 8. Mortality of suckling piglets. 9. Weaning and transition. 10. Handling the boar - factors that influence the reproductive efficiency of the male, reproductive and general handling. 11. Reproductive rates and reproductive efficiency.
- Topic 3.- Genetic improvement in pig livestock (1 hour) - 1. Main breeds and crossbreeds used in pig production. 2. Aspects to take into account for genetic improvement and heritability. 3. Selection - objectives. 4. Cross-breeding - objectives, and schemes of cross-breeding (two, three and four ways). 5. Possibilities of supply of hybrid females by the farmer. 6. Hybridization and selection in Spain.
- Topic 4.- Management of feeding in reproductive pig livestock (3 hours) - 1. Importance, objective and short review of bases. 2 Foods and feeding systems. 3. Management of piglet feeding. 4. Sow feeding in reposition. 5. Management of sow feeding during the different stages of reproductive cycle (lactation, mating, gestation, post-partum) - capacity of ingestion, needs and recommendations. 6. Example of rationing. 7. Boar feeding. 8. Determination of physical condition.
- Topic 5.- Intensive production of pig meat (2 hours) - 1. Introduction and objectives. 2. Analysis of the factors that influence intensive fattening. 3. Phases of fattening and formation of lots. 4. Feeding during transportation and fattening - quantitative and qualitative criteria. 5. General rules for managing and for the environment in the phase of transition and fattening. 6. Peculiarities of growing-finishing of breeders.
- Topic 6.- Extensive and semi-extensive pig production. (1 hour) - 1. Generalities. 2. Fundamentals and objectives of the extensive systems in the Mediterranean area. 3. Iberian pig - feeding, reproductive management and genetic improvement. 4. Campsite type farms. 5. Analysis of the interest of extensive pig production.
- Topic 7.- Quality of carcass and pig meat (1 hour) - 1. Definition of the carcass. 2. Classification of carcasses and carcass return. 3. Characteristics of pig meat. 4. Factors that influence the quality of carcasses and pig meat.
- Topic 8.- Premises and equipment for pig livestock (4 hours) - 1. Introduction - general criteria of premises for pig

livestock. 2. Characteristics of premises for pig livestock - environmental requirements, water consumption, behavior, and regulations. 3. Premises in intensive pig farms - housing for breeders. Housing for dry or pregnant sows - in a group or in a fixed place. Intensive housing for lactating sows - general criteria, dimensions of a farm-based on management by lots, and productive level. Labor cell - general characteristics, cages, ground and heat sources for piglets. Housing for boars. Installations in premises for growing-finishing and fattening. 4. Installations in premises in extensive systems. 5. Installations for wastewater and livestock excrement. 6. Hygiene and health management in pig farms - main infectious and parasitic processes and their control. Hygiene and farming wastes.

- Topic 9.- Organization and control of pig farms (3 hours) - 1. Planning and organization of pig farm - conditioning factors. 2. Optimization of productive factors. 3. Aspects of the integration system in pig production. 4. Introduction of technical and economic pig management. 5. Control of results through technical and economic indexes. Study of a particular case - collection, register, and processing of data. Analysis, interpreting, and diagnosis. Decision making. 6. IT and management. 7. Ethnology. 8. Wastes. 9. I+D+i.

## Section II - Poultry keeping (15 hours)

- Topic 10.- Poultry farms (1 hour) - 1. The poultry industry and its evolution. 2. General characteristics of domestic poultry - physiological particularities. 3. Production types and systems. Censuses and productions in Spain - their distribution. 4. Economic importance of poultry keeping and future perspectives.
- Topic 11.- Reproductive management and genetic improvement of hens (2 hours) - 1. Short physiological review of poultry reproduction. 2. Broodiness and molt. 3. The cycle of laying and its graphical representation. 4. Genetic improvement of hens - achievements. 5. Qualitative characters - its Practice interest. 6. Quantitative characters in the improvement of eggs and meat. 7. Selection - current approaches. 8. Cross-breeding in poultry keeping - commercial hybrids. Interesting strains in Spain - return comparison and election criteria.
- Topic 12.- Artificial incubation (2 hours) - 1. Initial embryonic development. 2. Handling the egg before incubation - collection, classification, treatments and storage. 3. Handling in the incubation room. Incubation - environmental conditions and general handling. Hatchability - variation factors. 4. Transfer to hatchers. 5. Handling after the chicken is born. 6. Selection and transport. 7. Hygiene during the incubation process.
- Topic 13.- Breeding and growing-finishing of pullets (1 hour) - 1. Zootechnical characteristics. 2. Housing systems - advantages and disadvantages; environment and necessary equipments. 3. General management. 4. Lighting programs for the growing-finishing process. 5. Practice feeding rules. Food restriction - interest and necessary conditions. 6. Breeding of future breeders - differentiating features.
- Topic 14.- Exploitation of breeder hens (2 hours) - 1. General characteristics. 2. Housing, environmental conditions, installations and equipment. 3. General management. 4. Productive returns. 5. Feeding rules. Feeding management in heavy breeders. Dual feeding. 6. Hygiene during the collection of hatching eggs.
- Topic 15.- Exploitation of commercial laying hens (2 hours) - 1. Battery farming - housing, environmental conditions, installations and equipment, regulations. 2. General management. 3. Productive returns. 4. Feeding rules. 5. Alternative systems to battery farming.
- Topic 16.- Production of poultry meat (2 hours) - 1. Broiler chicken - productive characteristics. 2. Factors that influence productivity in fattening. 3. Rules for housing, environmental conditions, installations and equipment. 4. General management. 5. Feeding. 6. Systems for obtaining label chickens.
- Topic 17.- Quality of eggs, carcass and poultry meat (1 hour) - 1. The importance of quality. 2. Parameters of external and internal quality of eggs, variation factors and possibilities for improvement. 3. Parameters of external quality of the carcass and modifying factors. 4. Return, conformation and composition of the carcass. 5. Quality of meat and its variation factors.
- Topic 18.- Development of a farm (2 hours) - 1. Technical and economic factors - valuation and combination. 2. Objectives - quality of the carcass. 3. Register and control of the refunds. 4. Quality control of poultry products. 5. Regulations. 6. Management. 7. Production costs. 8. Ethnology. 9. Wastes. 10. I+D+i.

## Section III - Rabbit keeping (6 hours)

- Topic 19.- The species (? hour) - 1. Original species. 2. Biology and behavior. 3. Reproductive potential. 4. Mortality - pathologies, vaccines. 5. Domestication. 6. Comparison with other species in the market. 7. Environmental needs.
- Topic 20.- Production of the sector (? hour) - 1. Global production. 2. Consumption in Spain and other countries. 3. Market prices. 4. Market evolution. 5. Exploitation by Spanish regions. 6. Rabbits by Spanish regions. 7. Zootechnical classification. 8. La Lonja Ibérica. 9. SANDACH.
- Topic 21.- Rabbit farms (1 hour) - 1. Fundamentals and environmental needs. 2. Premises: area and material. 3. Housing or rabbit hutch - types, mother cages, nests, broiler cage, cages for males, materials, drinking troughs. 4. Cleaning equipments - detections. 5. Ecological farms - objectives, El majano.
- Topic 22.- Reproduction (1 hour) - 1. Reproduction - sexual organs. 2. The male. 3. Male/female. 4. The female - pseudo-gestation, acceptance and mating, mating and elimination, the female and its environment. 5. Reproductive control - induction of receptivity. 6. Genetic improvement - simple cross-breeding (2, 3 and 4 ways), backcrossing,

objectives of selection in rabbit keeping, selected lines in Spain. 7. Artificial insemination. 8. Gestation and labor - diagnosis, nests, birth.

- Topic 23.- Feeding and management (1,5 hours) - 1. Lactation - milk, lactation and weaning. 2. The digestive system of rabbits. 3. Cecotrophia. 4. Farm management. 5. Fattening. 6. Reposition. 7. Production. 8. Farm management - traditional, extensive, semi-extensive and intensive systems. 9. Female rabbits, cages and young rabbits. 10. Management in bands. 11. Diseases - eliminations, diseases by categories, digestive pathologies. 12. Formulation - fibre, quantity, energy, production peculiarities, feedstuff.
- Topic 24.- How to create a rabbit farm (1,5 hours) - 1. Ethnology - race, strain and line, races by-product, commercial hybrids. 2. Creating a farm - production costs. Basic and objective considerations, behavior, global objective. 3. Controlling the farm - files of males and females, productive indexes, for example. 4. Wastes - organic and inorganic wastes, uses, hoy to act, manure/agricultural land, composition and comparison with other species. The estimate of the produced quantity. 5. Regulations: RAMINP, procedure. 6. I+D+i - comparison with other species, productive indexes, France vs. Spain.

### **Content of Practice sessions**

#### **PRACTICE SESSIONS (20 hours)**

- Practice session 1.- Visit and discussion intensive pig farm (4 hours),
- Practice session 2.- Visit and discussion broiler hen farm (3 hours),
- Practice session 3.- Visit and discussion chicken farm (3 hours),
- Practice session 4.- Genealogic analysis - calculation of inbreeding coefficient (1 hour)
- Practice session 5.- Determination of the quality of the eggs for consumption and incubation (2 hours)
- Practice session 6.- Determination of the quality of meat (2 hours)
- Practice session 7.- Technical and economic management of livestock. The search for information and functioning of
- Software for livestock management (1 hour)
- Practice session 8.- In-class sessions about the control systems of critical points. Calculation of indexes for quality control and farm management (2 hours)
- Group tutorials(2 hours)
- Practice session 10.- Visit and discussion farm selected by students (not taken into account for final mark/grade)

## **4.4.Course planning and calendar**

### **Schedule sessions and presentation of works**

Weeks	Lectures	Lab practices	Seminars outputs field	Individual work	Evaluation
1	2			5	
2	2		4	15	
3	2		3	12,5	
4	2		3	12.5	
5	4			10	
6	4			10	
7	4			10	
8	4			10	
9	4			10	
10	2	1		7,5	
11	2	2		10	
12	2	2		10	
13	2	1		7,5	

14	2	2		10	
15	2	2		10	
16					5
Total	40	10	10	150	5

The programmed activities correspond to lectures (30 hours), classroom practices (5 hours), laboratory practices (13 hours) and visits to facilities (12 hours).

Each student will take an examination after the end of the teaching period (examination period), on the date established by the center.

#### 4.5. Bibliography and recommended resources

- BB** Acuicultura marina : fundamentos biológicos y tecnología de la producción / coord., F. Castelló Orvay .  
Barcelona : Universitat de Barcelona, D.L.1993
- BB** Buxadé Carbó, Carlos. El pollo de carne : sistemas de explotación y técnicas de producción / Carlos Buxadé Carbó ; con la colaboración de Ismael Ovejero Rubio ; prólogo de E. Pérez Adsuar . [2a. ed. rev.] Madrid : Mundi-Prensa, 1988
- BB** Buxadé Carbó, Carlos. La gallina ponedora : sistemas de explotación y técnicas de producción / Carlos Buxadé Carbó . 2ª ed., act. y amp. Madrid [etc.] : Mundi-Prensa, 2000
- BB** Control de la reproducción en el conejo / obra colectiva dirigida y coordinada por Mario R. Alvariño . [1ª ed.] Madrid : Ministerio de Agricultura, Pesca y Alimentación, IRYDA : Mundi-Prensa, 1993
- BB** Ganado porcino : diseño de alojamientos e instalaciones / Fernando Forcada... [et al.] . Zaragoza : Servet, D.L. 2009
- BC** Alimentos y racionamiento / coordinador y director Carlos Buxadé Carbó ; con la participación de 29 autores . Madrid [etc.] : Mundi-Prensa, 1995
- BC** Avicultura clásica y complementaria / coordinador y director, Carlos Buxadé Carbó ; con la participación de 18 autores . Madrid [etc.] : Mundi-Prensa, 1995
- BC** Baselga Izquierdo, Manuel. Mejora genética del conejo de producción de carne / M. Baselga Izquierdo, A. Blasco Mateu . [1a. ed.] Madrid : Mundi-Prensa, 1989
- BC** Estructura, etnología, anatomía y fisiología / coordinador y director Carlos Buxadé Carbó ; con la participación de 21 autores . Madrid [etc.] : Mundi-Prensa, 1995
- BC** Forcada Miranda, Fernando. Alojamientos para ganado porcino / Fernando Forcada Miranda . 1ª ed. Zaragoza : Mira, 1997
- BC** Genética, patología, higiene y residuos animales / coordinador y director Carlos Buxadé Carbó ; con la participación de 29 autores . Madrid [etc.] : Mundi-Prensa, 1995
- BC** Guía John Gadd de soluciones en producción porcina / [revisión : Lorenzo Fraile] ; [traducción : Jesús Laborda, Sergio Fuentes, Belén González] . Zaragoza : Servet, Diseño y Comunicación, D. L. 2005
- BC** Orozco Piñán, Fernando. Mejora genética avícola / Fernando Orozco Piñán . [1a. ed.] Madrid : Mundi-Prensa, 1991
- BC** Porcinocultura intensiva y extensiva / coordinador y director, Carlos Buxadé Carbó ; con la participación de 26 autores . Madrid [etc.] : Mundi-Prensa, 1996
- BC** Producción animal acuática / coordinador y director, Carlos Buxadé Carbó ; con la participación de 23 autores . Madrid [ etc.] : Mundi-Prensa, 1997
- BC** Producción caprina / coordinador y director Carlos Buxadé Carbó ; con la participación de 28 autores . Madrid [etc.] : Mundi-Prensa, 1996
- BC** Producción ovina / coordinador y director, Carlos Buxadé Carbó ; con la participación de 25 autores . Madrid [etc.] : Mundi-Prensa, 1996
- BC** Producción vacuna de leche y carne / coordinador y director, Carlos Buxadé Carbó ; con la participación de

23 autores . Madrid [etc.] : Mundi-Prensa, 1996

- BC** Producciones cinegéticas, apícolas y otras / coordinador y director Carlos Buxadé Carbó ; con la participación de 20 autores . Madrid [ etc.] : Mundi-Prensa, 1997
- BC** Producciones cunícola y avícolas alternativas / coordinador y director Carlos Buxadé Carbó . Madrid [ etc.] : Mundi-Prensa, 1996
- BC** Producciones equinas y de ganado de lidia / coordinador y director Carlos Buxadé Carbó . Madrid [ etc.] : Mundi-Prensa, 1996
- BC** Reproducción y alimentación / coordinador y director Carlos Buxadé Carbó ; con la participación de 37 autores . Madrid [etc.] : Mundi-Prensa, 1995
- BC** Tratado de cunicultura. Vol. 1, Principios básicos, mejora y selección, alimentación / por Francesc Lleonart Roca...[et al.] . [1a. ed.] Arenys de Mar (Barcelona) : Real Escuela Oficial y Superior de Avicultura, 1980
- BC** Tratado de cunicultura. Vol. 2, Construcciones, manejo y producciones / por Toni Roca Casanovas, José A. Castelló Llobet y Jaime Camps Rabada . [1a. ed.] Arenys de Mar (Barcelona) : Real Escuela Oficial y Superior de Avicultura, 1980
- BC** Tratado de cunicultura. Vol. 3, Patología e higiene / por Francesc Lleonart Roca . [1a. ed.] Arenys de Mar (Barcelona) : Real Escuela Oficial y Superior de Avicultura, 1980

#### LISTADO DE URLs:

American Association of Swine Veterinarians, AASP-USA - [<http://www.aasp.org/>]

Asociación Nacional de Porcinocultura Científica, ANAPORC - [<http://www.anaporc.com/>]

Carabaño, R.(2003). Sistemas de producción de conejos en condiciones intensivas. En XXXVII Reunião Anual da SBZ, Viç 17-37) - [[http://www.actaf.co.cu/index.php?option=com\\_mtree&task=att\\_download&link\\_id=108&cf\\_id=24](http://www.actaf.co.cu/index.php?option=com_mtree&task=att_download&link_id=108&cf_id=24)]

Cepero, R. (1996). Avances en la investigación sobre calidad de huevo. Selecciones Avícolas, 4, 133-144 - [[http://ddd.uab.cat/pub/selavi/selavi\\_a1996m3v38n3/selavi\\_a1996m3v38n3p133.pdf](http://ddd.uab.cat/pub/selavi/selavi_a1996m3v38n3/selavi_a1996m3v38n3p133.pdf)]

Hernandez-Vergara, M.P., Perez-Rostro, C.I. (2014). Sustainable Aquaculture Techniques. Autores - [<https://www.intechopen.com/books/sustainable-aquaculture-techniques>]

La página del cerdo. Suscribirse cerdos-l, mensaje maiordomo@3tres3.com - [<http://www.3tres3.com/>]

La puerta a la avicultura en Internet - [<http://www.avicultura.com/>]

Multi-State Feeding and Nutrition Conference - [[https://www.eventreg.purdue.edu/conf/courselisting.aspx?1=%20&master\\_ID=2161%20&course\\_area=1151%20&course\\_n](https://www.eventreg.purdue.edu/conf/courselisting.aspx?1=%20&master_ID=2161%20&course_area=1151%20&course_n) ]

Nutrient Requirements of Poultry - [<http://www.nap.edu/openbook.php?isbn=0309048923>]

Ros breeders: Manual de manejo del pollo de engorde, 2000 - [[http://eu.aviagen.com/assets/Tech\\_Center/BB\\_Foreign\\_Language\\_Docs/Spanish\\_TechDocs/RossBroilerHandbook2014-E](http://eu.aviagen.com/assets/Tech_Center/BB_Foreign_Language_Docs/Spanish_TechDocs/RossBroilerHandbook2014-E)]

The updated recommended bibliography can be consulted in:

<http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28925&Identificador=14183>