

## PhD PROPOSAL FOR THE DOCTORAL SCHOOL « Ecologie, Géosciences, Agronomie, ALimentation »

### GENERAL INFORMATION

<b>Thesis title:</b> Lameness in young bulls: epidemiological features and zootechnical impact
<b>Acronym:</b> FEEDLAME
<b>Disciplinary field 1:</b> Agronomy <b>Disciplinary field 2:</b> Select an element
<b>Three keywords:</b> Epidemiology; Animal health; Cattle
<b>Research unit :</b> UMR Oniris & INRAE Biology Epidemiology and Risk Analysis in animal health
<b>Name of the thesis director HDR (Habilitation thesis to supervise research) required:</b> Guatteo, Raphaël <b>Email address of the thesis director:</b> <a href="mailto:raphael.guatteo@oniris-nantes.fr">raphael.guatteo@oniris-nantes.fr</a> <b>Name of the thesis co-supervisor 1 (if applicable):</b> Relun, Anne <b>Email address of the thesis co-supervisor 1 (if applicable):</b> <a href="mailto:anne.relun@oniris-nantes.fr">anne.relun@oniris-nantes.fr</a> <b>Name of the thesis co-supervisor 2 (if applicable):</b> <b>Email address of the thesis co-supervisor 2 (if applicable):</b>
<b>Thesis grant (funding origin and amount):</b> CIFRE
<b>Contact(s) (mailing address and E-mail):</b> UMR Oniris & INRAE BIOEPAR, Oniris, La Chantrerie, 101 route de Gachet, CS40706, 44307 Nantes, France; <a href="mailto:anne.relun@oniris-nantes.fr">anne.relun@oniris-nantes.fr</a> ; <a href="mailto:raphael.guatteo@oniris-nantes.fr">raphael.guatteo@oniris-nantes.fr</a>
<b>Recruitment process:</b> Recruitment process depends on thesis funding. To select the corresponding recruitment process, please visit the EGAAL website <a href="#">here</a> . This information is needed for proposal publication. <input type="checkbox"/> <b>Doctoral school contest</b> <input type="checkbox"/> <b>Interview</b> <input checked="" type="checkbox"/> <b>Other (indicate) : interview</b> <b>for CIFRE grant</b>

**All sections must be filled. Once filled, please save the proposal form in pdf format using the following naming: Supervisor Name\_Unit\_Subject Acronym\_EN.pdf**

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## SCIENTIFIC DESCRIPTION OF THE PhD PROJECT

### **Socio-economic and scientific context: (10 lines)**

Lameness in cattle is a multifactorial disease, mostly caused by foot lesions. It is increasingly reported in young bulls in France, particularly at the end of the fattening period, becoming the main cause of economic losses and animal welfare concerns in some feedlots. Farmers and their advisors are often helpless to choose control measures, with a sometimes abusive use of antibiotics, because knowledge is lacking on the origin of lameness in young bulls, with few control measures adapted to this production system. The results of this thesis will help determine the epidemiological characteristics and estimate the zootechnical impact of foot lesions in young bulls in France. They will thus help raise stakeholders awareness of lameness as a problem in these animals, promote appropriate antibiotic use and provide the first steps towards improving their control in indoor confined feedlots.

### **Assumptions and questions (8 lines)**

The control of lameness in young bulls in France is likely to be limited because: (1) their clinical and zootechnical impact is poorly known and probably underestimated; (2) foot lesions are different from those reported in other countries and in dairy cattle as they are associated with specific animal characteristics and rearing conditions; (3) young bulls breeders have limited knowledge of lameness and its control and strong technical and economic constraints to control it. This thesis thus aims to answer the following questions in the French context:

- What is the prevalence of foot lesions in late-fattening young bulls?
- What is the distribution (breed, calving season, etc.) of these foot lesions?
- What is the zootechnical impact of lameness in young bulls?
- What are the practices currently used by farmers to control lameness in young cattle?
- What are the limits for the implementation of lameness control measures in indoor feedlots?

### **The main steps of the thesis and scientific procedure (10-12 lines)**

To this purpose, the PhD student will:

- Familiarize with the state of the art on lameness, its origins, impacts and control measures in young bulls;
- Design, set up and carry out a large-scale observational epidemiological study in slaughterhouses in France to estimate the prevalence and distribution of foot lesions in young bulls at the end of fattening and to estimate their zootechnical impact;
- Design, set up and carry out semi-directive interviews and questionnaires with young bulls breeders to investigate the limits for the implementation of measures to control lameness in indoor feedlots and to precise their prevalence and zootechnical impact;
- Analyse and valorize the results, write the thesis manuscript.

### **Methodological and technical approaches considered (4-6 lines)**

The PhD student will use descriptive observational epidemiological studies, whether to estimate the prevalence of lameness and foot lesions, their distribution and zootechnical impact, or to describe practices and limitations for the implementation of control measures. The data collected will be analysed using descriptive analyses and multivariate models.

### **Scientific and technical skills required by the candidate**

The candidate:

- should have a DVM degree or a degree (Master's degree, engineer) in epidemiology or animal science with an interest in animal health and welfare;
- should have a demonstrable interest in data analysis;
- should have good writing and communication skills in the English and French language, both within the academic as well as the non-academic setting.

Being familiar with statistical software packages (especially R) will be a real advantage.

## THESIS SUPERVISION<sup>1</sup>

<b>Unit name:</b> UMR BIOEPAR	<b>Team name:</b> PEPS
<b>Unit director name:</b> Nathalie BAREILLE	<b>Team director name:</b> Raphaël GUATTEO
<b>Mailing address of the unit director:</b> <a href="mailto:nathalie.bareille@oniris-nantes.fr">nathalie.bareille@oniris-nantes.fr</a> BIOEPAR, Oniris, La Chantrerie, route de Gachet, CS40706, 44307 Nantes, France	<b>Mailing address of the team director:</b> <a href="mailto:raphael.guatteo@oniris-nantes.fr">raphael.guatteo@oniris-nantes.fr</a> BIOEPAR, Oniris, La Chantrerie, route de Gachet, CS40706, 44307 Nantes, France
<b>Thesis director</b> Surname, first name: Guatteo, Raphaël Position: Professor Obtained date of the HDR (Habilitation thesis to supervise research): 2013 Employer: Ministère de l'Agriculture et de l'Alimentation Doctoral school affiliation: EGAAL Rate of thesis supervision in the present project (%): 50% Total rate of thesis supervision in ongoing theses (supervisions and co-supervisions) (%): 50% (at the end of December 2022) Number of current thesis supervisions/co-supervisions: 1	
<b>Thesis co-supervisor 1 (if applicable)</b> Surname, first name: Relun, Anne Position: Associate professor Habilitation thesis to supervise research <input type="checkbox"/> yes <input checked="" type="checkbox"/> no If yes, date diploma received: Employer: Ministère de l'Agriculture et de l'Alimentation Doctoral school affiliation: EGAAL Rate of thesis supervision in the present project (%): 50% Total rate of thesis supervision in ongoing theses (supervisions and co-supervisions) (%): 0 Number of current thesis supervisions/co-supervisions: 0	

<sup>1</sup> In EGAAL Doctoral School, if only one scientist in thesis supervision = 100% of supervision rate; if 2 people involved in thesis supervision = from 50% to 70% of supervision rate for the director; if 3 people involved in thesis supervision = 40% / 30% / 30% of supervision rate distribution among supervisors.

**Private partner (if CIFRE funding, private funding,...)**

Surname, first name: Duvauchelle-Waché, Aurore

Position: Project manager

Employer: Idele (French Livestock Institute)

Rate of thesis supervision in the present project (%): 0 (proofreading, committee, accompanying the doctoral student in the company)

Total rate of thesis supervision in ongoing theses (supervisions and co-supervisions) (%): 0

Number of current thesis supervisions/co-supervisions: 0

**International partner (if Cotutelle thesis)**

Surname, first name:

Position:

Employer:

Rate of thesis supervision in the present project (%):

Total rate of thesis supervision in ongoing theses (supervisions and co-supervisions) (%):

Number of current thesis supervisions/co-supervisions:

**Professional status of previous PhD students supervised by both director and co-supervisors (from 5 years)**

*Please provide the following information for each PhD students supervised*

Surname, first name: Ariza, Juan Manuel

Date of PhD beginning and PhD defence: 2015 - 2018

Thesis supervision: R. Guatteo

Professional status and location: Associate professor, Oniris, Nantes, France

Contract profile (post-doc, fixed-term, permanent): fixed-term

List of publications from the thesis work:

Ariza, J.M., Levallois, P., Bareille, N., Arnoult, A., Guatteo, R., 2020. Short communication: Evaluation of a foot dirtiness scoring system for dairy cows. J. Dairy Sci.

<https://doi.org/10.3168/jds.2019-17178>

Ariza, J.M., Bareille, N., Lehebel, A., Oberle, K., Relun, A., Guatteo, R., 2019. Evaluation of a biocide footbath solution in the occurrence and healing of digital dermatitis lesions in dairy cows: A clinical trial. Prev. Vet. Med. 163, 58–67.

<https://doi.org/10.1016/j.prevetmed.2018.12.017>

Ariza, J.M., Bareille, N., Oberle, K., Guatteo, R., 2019. Current recommendations for footbath solutions renewal rates in dairy cattle: the need for adaptation? Animal 13, 1319–1325.

<https://doi.org/10.1017/S1751731118002847>

Ariza, J.M., Relun, A., Bareille, N., Oberle, K., Guatteo, R., 2017. Effectiveness of collective treatments in the prevention and treatment of bovine digital dermatitis lesions: A systematic review. *J. Dairy Sci.* 100, 7401–7418. <https://doi.org/10.3168/jds.2016-11875>

**Five main recent publications of the supervisors on thesis subject:**

Aubineau, T., **Relun, A.**, Gentin, B., **Guatteo, R.**, 2021. Short communication: Informative value of an ELISA applied to bulk tank milk to assess within-herd prevalence of digital dermatitis in dairy herds. *J. Dairy Sci.* 104, 963–968. <https://doi.org/10.3168/jds.2020-18673>

Riaboff, L., **Relun, A.**, Petiot, C.-E., Feuilloy, M., Couvreur, S., Madouasse, A., 2021. Identification of discriminating behavioural and movement variables in lameness scores of dairy cows at pasture from accelerometer and GPS sensors using a Partial Least Squares Discriminant Analysis. *Prev. Vet. Med.* Accepted, 105383. <https://doi.org/10.1016/j.prevetmed.2021.105383>

Ariza, J.M., Bareille, N., Lehebel, A., Oberle, K., **Relun, A.**, **Guatteo, R.**, 2019. Evaluation of a biocide footbath solution in the occurrence and healing of digital dermatitis lesions in dairy cows: A clinical trial. *Prev. Vet. Med.* 163, 58–67. <https://doi.org/10.1016/j.prevetmed.2018.12.017>

Ariza, J.M., Bareille, N., Lehébel, A., Oberle, K., **Relun, A.**, **Guatteo, R.**, 2018. Evaluation of a new biocide footbath solution in the prevention and healing of digital dermatitis lesions in dairy cows. A randomized controlled clinical trial., in: National Congress of the Italian Association for Buiatrics (SIB) - General Meeting of the European College of Bovine Health Management (ECBHM). Bologne, Italie, p. 74.

Ariza, J.M., **Relun, A.**, Bareille, N., Oberle, K., **Guatteo, R.**, 2017. Effectiveness of collective treatments in the prevention and treatment of bovine digital dermatitis lesions: A systematic review. *J. Dairy Sci.* 100, 7401–7418. <https://doi.org/10.3168/jds.2016-11875>

Geldhof, J., Bergsten, C., Blowey, R., Cation, N., Fiedler, A., Holzhauer, M., Kloosterman, P., **Relun, A.**, Hemling, T., Lopez, M., Lanckriet, A., 2017. 5 Point Plan For Control Of Digital Dermatitis, in: Fiedler, A., Schindhelm, K. (Eds.), *Proceeding of the 19th International Symposium and 11th Conference Lameness in Ruminants*. Munich, Germany, p. 152.

**Relun, A.**, Grand, B., Heily, V., Denis, G., Tocze, C., Dorso, L., Assié, S., Fusellier, M., Douart, A., **Guatteo, R.**, 2017. Outbreaks of digital dermatitis in beef fattening units: clinical findings and control, in: Fiedler, A., Schindhelm, K. (Eds.), *Proceeding of the 19th International Symposium and 11th Conference Lameness in Ruminants*. München, Germany, pp. 159–160.

Orsel, K., Plummer, P., Shearer, J., De Buck, J., Carter, S.D., **Guatteo, R.**, Barkema, H.W., 2017. Missing pieces of the puzzle to effectively control digital dermatitis. *Transbound. Emerg. Dis.* <https://doi.org/10.1111/tbed.12729>

## THESIS FUNDING

**Origin(s) of the thesis funding:** CIFRE grant (Idele-BIOEPAR) on Carnot F2E proposal

**Gross monthly salary:** 2,760 €

**Thesis funding state :** Partly acquired (co-funding) (half PhD scholarship F2E, half PhD scholarship CIFRE grant; CIFRE grant application submitted to ANRT once the candidate has been identified)

**Funding beginning date/Funding ending date:** CIFRE grant application file submitted to the ANRT as soon as the candidate has been identified and the letter of commitment from the ED has been obtained; start of the thesis according to the ANRT's deadline for response, desired May 2022. 3 years funding.

**Date:** 01/02/2022