RÉPUBLIQUE FRANÇAISE
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INRAE

JOB POSITION

POSTDOCTORAL CONTRACT: Integration of performance testing of candidates' crossbred offspring into genetic improvement programmes for laying hens

The French National Research Institute for Agriculture, Food, and the Environment (INRAE) is a public research establishment. It is a community of 12,000 people with more than 200 research units and 42 experimental units located throughout France. The institute is among the world leaders in agricultural and food sciences, in plant and animal sciences, and is 11th in the world in ecology and environment. INRAE's main goal is to be a key player in the transitions necessary to address major global challenges. In the face of the increase in population, climate change, scarcity of resources and decline in biodiversity, the institute develops solutions for multiperformance agriculture, high quality food and sustainable management of resources and ecosystems.

WORKING ENVIRONMENT AND ACTIVITIES

➥ You will be welcomed into the joint research unit Physiologie, Environnement et Génétique pour l'Animal et les Systèmes d'Élevage (UMR PEGASE), located in Brittany, 10 km from Rennes. INRAE and Institut Agro staff there carry out research and deliver teaching in animal biology and livestock farming systems.

Within the unit, the Avian Genetics and Genomics team (GGA) studies, among other things, the genetic determinism of laying hens' adaptation to innovative and sustainable farming environments, as well as the optimisation of innovative genetic improvement strategies to increase the multi-performance and longevity of laying hens, thereby promoting more resilient farming systems.

The COCORIX project, lasting 24 months, aims to optimise the genetic improvement of laying hens, specifically targeting the use of crossbreeding. Indeed, crossbreeding ability is not currently a parameter that is estimated and used in selection, which can be a significant obstacle to the dissemination of genetic gain. The future postdoctoral researcher's objectives will notably include calculating these parameters for survival traits, egg weight and hen body weight, in both purebred and crossbred populations, using data provided by the breeding company Novogen. A central part of the project will be to quantify the genetic correlation between performance within purebred lines and in crossbreeding, as well as to estimate General Combining Ability (GCA) and Specific Combining Ability (SCA) in the various purebred lines, in order to better understand their crossbreeding abilities. Finally, the postdoctoral researcher will simulate and analyse new selection schemes incorporating the phenotypes and genotypes of crossbred individuals. The ultimate aim is to formulate recommendations for the integration of crossbred progeny test data, with or without genotyping, in order to accelerate genetic gain, improve profitability and strengthen the competitiveness of the laying hen sector.

➥ You will more specifically be in charge of:
A first part of the project will focus on calculating the genetic parameters of survival traits, egg weight and hen body weight. For a given trait, the genetic correlation between purebred performance and crossbred performance will be studied. Our hypothesis is that the genetic correlation between purebred and crossbred performance for the same trait is below 0.80, and that, as a result, data from crossbred progeny testing adds value for optimising selection schemes in laying hens. Data from three populations will be made available by the breeding company (under a research contract):

- Two purebred laying hen lines, each with several tens of thousands of individuals (one sire line and one dam line). The two purebred lines are reared in a selection nucleus under identical conditions. All purebred animals are genotyped.
- One population of approximately 100,000 hens from the F1 cross of the two purebred lines. The crossbred offspring are reared in full-sibling cages on commercial farms, under rearing conditions that differ from those of the selection nucleus (biosecurity standards, housing and rearing equipment, lighting programme, feed, etc.). At present, no crossbred animals are genotyped.

A second part of the project will focus on estimating the GCA and SCA of the aforementioned lines, in order to study the crossbreeding abilities of these different lines. Our hypothesis is that these genetic parameters, commonly used in agronomy, will make it possible to assess the crossbreeding abilities of the purebred lines and to optimise selection strategies in animal science.

Finally, innovative selection schemes will be simulated to assess their impact on genetic gain and on the genetic diversity of the purebred lines. Our hypothesis is that some scenarios are more desirable than others on both the technical (genetic gain and diversity) and organisational levels.

➥ Special conditions of activity:
This contract is co-funded by the Animal Genetics department of INRAE and the Brittany region (BIENVENÜE scholarship). It builds on a public-private partnership between INRAE and NOVOGEN, a laying hen breeding company (Plédran, France).

During this project, the contract researcher will collaborate with Nicolas Bédère and Sophie Allais (UMR PEGASE). Meetings with INRAE experts in non-additive genetics, both in plants and in animals, will be organised, and meetings with Novogen's R&D team will take place.

TRAINING AND SKILLS REQUIRED

➥ Qualifications: PhD with a specialisation in quantitative genetics or biostatistics
➥ INRAE funding conditions: PhD defended less than 3 years ago
➥ BIENVENÜE funding conditions: Must have resided or carried out their main activity in France for no more than 12 months in the three years preceding the application deadline (mobility rule), i.e. between 2023 and 2026.
➥ Desired knowledge: Advanced command of statistical tools and programming. Experience with non-additive genetic effects and a background in stochastic simulations would be a major asset.
➥ Skills sought: Scientific rigour, curiosity about the challenges of the agroecological transition, ability to work autonomously and as part of a team, and communication skills to interact with industrial and academic partners. Proficiency in technical English is required for the international dissemination of your work.

INRAE'S LIFE QUALITY

You will be employed under an INRAE doctoral contract, funded by the INRAE Animal Genetics department and the Brittany region. You will benefit from:
➥ up to 30 days of annual leave + 15 days of RTT per year (for full-time staff);
➥ parenting support: childcare vouchers (CESU) and leisure benefits;
➥ skills development schemes: training and career guidance;
➥ social support: advice and a listening ear, social assistance and loans;
➥ holiday and leisure benefits: holiday vouchers (chèque-vacances) and subsidised accommodation;
➥ sports and cultural activities;
➥ a staff canteen.

Reception modalities

➥ Unit: PEGASE
➥ Postal code + city: 35590 Saint-Gilles, FRANCE
➥ Type of contract: INRAE doctoral contract
➥ Duration of the contract: 24 months
➥ Starting date: december 2026
➥ Salary: between €3,135 and €3,559 gross per month, depending on experience.

How to apply

Send a motivation letter end a CV to :
Nicolas Bédère and Sophie Allais

By e-mail: nicolas.bedere@inrae.fr and sophie.allais@institut-agro.fr

⚠ Deadline for applications: **30/11/2026**