

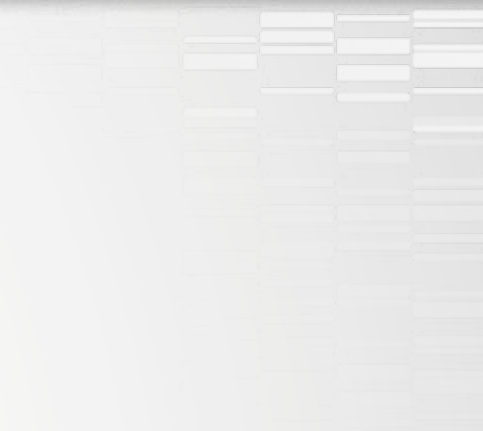


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Val de Loire research Centre

September 2015





**Catherine Beaumont**  
President of the Val de Loire  
research Centre

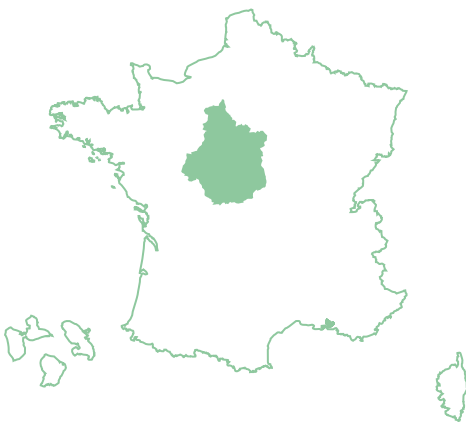
“Located in Orleans, Tours and Bourges, the INRA Val de Loire centre conducts research on the biology of animals, trees and associated organisms, animal health and sustainable management of livestock, forests and soils.”

### THE VAL DE LOIRE RESEARCH CENTRE

The Val de Loire centre with its staff of over 900 including 640 permanent INRA contracts, develops generic research and integrated and multidisciplinary studies, providing innovation for improved sustainability of natural resources, farming and forestry systems. Its technological platforms enable analyses to be conducted at the molecular, individual, population and ecosystem scales. Imaging can now be used to visualize and monitor physiological and physiopathological mechanisms over time.

Spread over 1,300 hectares, the centre’s experimental facilities enable new models to be developed and genetic, animal, plant and microbial resources to be studied to obtain particularly original data. They also provide possibilities to test new sustainable approaches such as anaerobic digestion of effluents.

Centred on the region’s themes of excellence and with 12% of local scientific strength, the Val de Loire centre plays an important part in regional research.



### THE STRENGTHS OF THE CENTRE

Focused on themes which are particularly important for the future of agriculture and providing one of the largest facilities for animal health research in Europe, the centre aims to become a reference site for animal science and a resource site for environmental sciences. To this end, it is developing numerous regional, national and international partnerships, particularly through the coordination of three European projects and also through an international laboratory in partnership with Mexico and regular exchanges with Argentina. This is achieved with the support of the centre’s research, experimental facilities and technological platforms as well as its genetic resources and animal and forestry models.

### CONTEXT AND OUTLOOK

Centred on fields of excellence in the region, the centre brings together research on infectious diseases and natural resources. Its activities fit into three of the Region’s six lines of smart specialisation: environmental engineering and meteorology for activities with a high demand in natural resources; biotechnologies and services applied to health and cosmetics; services and ICT for heritage tourism. The hosting of private partners at the centre receives the full support of the regional authorities with a view to economic development.

### Our regional partners



# Our research priorities



1 INTEGRATIVE ANIMAL BIOLOGY, PUBLIC AND ANIMAL HEALTH, SUSTAINABLE MANAGEMENT OF LIVESTOCK SYSTEMS

2 INTEGRATIVE BIOLOGY OF TREES AND ASSOCIATED ORGANISMS, SUSTAINABLE MANAGEMENT OF FOREST ECOSYSTEMS

3 SOIL DYNAMICS AND ENVIRONMENTAL MANAGEMENT



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**Livestock systems need to combine the three cornerstones of sustainable development: economic to ensure the industry's competitiveness, social to ensure the coexistence of small and large farms, and environmental to limit inputs and to manage the landscape.**

With this aim, researchers study animal reproductive and behavioural functions through a predictive integrative biology approach by describing and modelling the functioning of systems. The aim is to provide biotechnical innovations to assess and enhance the adaptation of livestock to environmental, social and feeding conditions, and the efficacy of breeders, and to contribute to addressing issues of human fertility.

Poultry species (chickens, guinea fowl, ducks, quail, etc.) are also the target of integrative biology research from the molecular scale to that of the animal in its environment. In terms of size and scientific impact, the animal health centre is one of the largest European research facilities specifically dedicated to research on animal pathogens. The research conducted contributes to both animal and public health, in particular through the control of diseases constituting a public health risk (notably linked to consuming food of animal origin), or responsible for high economic losses in the livestock sectors. The work aims to understand and control diseases by analysing mechanisms of infection and host response.

## Research and service units

- The Physiology of reproduction and behaviour joint research unit (PRC)
- The Infectious diseases and public health joint research unit (ISP)
- The Poultry research unit (URA)
- The Agenae service unit

## Experimental units

- The Domaine de Bourges - La Sapinière experimental unit
- The Orfrasière animal physiology experimental unit (PAO)
- The centre for poultry experimentation of Tours (PEAT)
- The experimental infectious disease platform (PFIE)

## Collective scientific facilities

- Surgery and imaging for research and education (CIRE)
- The platform for integrative analysis of biomolecules (PAIB2)
- Labex Mabimprove
- Animal biology infrastructure Animal biological resource centre

## Academic partners

- University of Tours
- CNRS
- The French institute of horses and riding (IFCE)
- University hospital of Tours (CHRU Tours)



## 2

France has 16 million hectares of forest, a considerable renewable natural resource; it is important to guarantee the sustainability of this resource and the biodiversity living within it.

Work focuses particularly on characterising and preserving biodiversity, the processes involved in wood formation and the tolerance of trees to disease and water stress. At the same time, insect populations living within these ecosystems are also studied, in particular to understand the processes involved in the expansion under environmental change of species with a potential economic and ecological impact on the population or even on public health.

### Research units

- Forest Tree Improvement, Genetics and Physiology research unit (AGPF)
- Unit under contract with the Laboratory of trees and intensive culture biology (LBLGC)

- Forest zoology research unit (URZF) - Trees and responses to hydric and environmental constraints unit (ARCHE)
- The conservatory of forest tree genetics (CGAF)

### Experimental unit

- Orleans Forest genetics and biomass experimental unit (GBFOR)

### Collective scientific facilities

- Genobois Platform
- Equipex Xyloforest
- Genius project on biotechnology and bioresources

### Academic partners

- University of Orleans
- National forestry department (ONF)



For more information  
on our current projects and research  
[www.val-de-loire.inra.fr](http://www.val-de-loire.inra.fr)



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## 3

Soils play a role both in agriculture and in environmental protection and their study is particularly important for sustainable development.

In addition to the cartographic inventory and soil quality surveillance, teams study what determines soil functioning in order to protect soils from subsidence and the effects of erosion, to improve water supply to arable crops and to reduce greenhouse gas emissions from soils.

### Research and service units

- Soil science research unit
- InfoSol service unit

### Collective scientific facilities

- The European soil sample conservatory
- Rain simulator
- Labex Voltaire
- Biology and health infrastructure ANAEE-S

### Academic partners

- The French geological survey (BRGM)
- University of Orleans
- CNRS



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## PARTNERSHIPS, ADDING VALUE, INNOVATION

### Socio-economic and agricultural partnerships

The INRA Val de Loire centre hosts around thirty staff of agricultural partners. In Tours, the French technical institute for poultry production (ITAVI) is associated with INRA in a combined technological unit which studies poultry farming systems, and the French union of poultry and fish breeders (SSAAF) provides support for breeding companies. In Orleans, the ONF is involved in the conservation of genetic resources. The centre also hosts Arbocentre, the Regional interprofessional organisation for the forestry and timber industry and The French organization for the study of soil (AFES). It also works in collaboration with the chambers of agriculture.

Since 2009, the site of Tours has been the home of Repropharm, a start-up originating from its research. A policy strengthening socio-economic partnerships is conducted with funding from regional authorities. This has enabled setting up a team from Alice (formerly the National union of livestock farming and insemination cooperatives, UNCEIA) to study methods of improving reproduction. The centre also possesses an anaerobic digester which adds value to animal effluents. In addition, premises are available to host partners wishing to benefit from the centre's scientific platforms.

### Involvement in innovative projects

The centre is involved in six projects funded by the French *Investissements d'avenir* (investments for the future) programme:

- ▶ Two excellence laboratories mark the quality of its regional partnerships: Mabimprove, on improving therapeutic antibodies which opens the way to developing biomedicines and Voltaire, which studies exchanges between soil, water and the air, particularly in terms of gases.
- ▶ Two projects in a network:
  - The CRB-Anim project which focuses on ways of preserving animal genetic resources.
  - The EquiPEX Xyloforest project on the properties and the functional genomics of wood;
- ▶ Genius, a molecular engineering project;
- ▶ ANAEE-S an analytical and experimental project on ecosystems.

### Collective scientific facilities and infrastructures

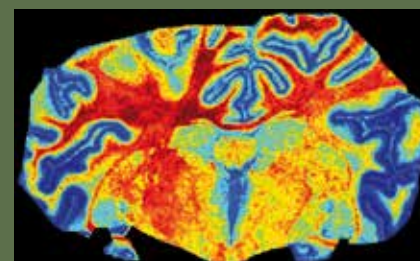
The Val de Loire centre includes three facilities of international visibility:

- ▶ The European soil sample conservatory managed by the InfoSol service unit within the framework of the scientific interest group Gis Sol and which is responsible for monitoring 2,200 sites throughout France;
- ▶ The experimental infectious disease platform, the largest experimental facility in France for studying infectious diseases, which is ISO 9001:2000, thus allowing experimentations at level A2 and A3 containment;
- ▶ CIRE the platform for surgery and imaging for research and education, ISO 9001 accredited, equipped with an MRI 3Tesla and a scanner, for neurobiological, reproductive and behavioural studies or for monitoring infectious processes on the same animal.

### The impact of some of the research from the Val de Loire centre

Our research provides support for public policies. It influences the management and classification of soils, and the integrated management of animal and plant health, in particular to limit the development of invasive invertebrate populations.

It enables new animal and plant genetic resources which are more resistant to disease, adaptable and sustainable to be developed or maintained for the agriculture sector. Studies targeting physiological and physiopathological mechanisms at the scale of the cell have an impact on the development of medical treatments for animals and humans.



Molecular image of a cross-section of a sheep brain obtained through mass spectrometry. Tissue analysis enables lipids to be located and their concentrations determined (blue to red: low to high abundance).

©Platform for integrative analysis of biomolecules, INRA

#### Focus on...

### The European soil sample conservatory (CEES)

Managed by the InfoSol unit, the European soil sample conservatory (CEES) constitutes a major scientific and logistic tool for conserving soil samples from France and, over time, from Europe. Originating from the Scientific interest group Sol (Gis-Sol)\* and European programmes, it aims to ensure acquisition, characterisation, long-term conservation and availability of soil samples for the national and European scientific community. This conservatory, which already houses 35,000 samples, will provide a medium- and long-term dashboard of the quality of soils and their possible deteriorations. Through its linkage with a national data base, this tool is a true "memory of soils". It also benefits from the proximity of a conference room for 150 people and rooms for processing and modelling data and for training partners close at hand.



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## INRA: AN OVERVIEW

INRA is the largest agricultural research institute in Europe, with **8,290 researchers, engineers, and technicians**, and is the second-largest producer of agricultural science publications. INRA contributes to development of knowledge and innovation in the fields of food, agriculture, and the environment.

INRA carries out its work across **13 scientific divisions** through a research network that is unique in Europe, with more than **230 research units and experimental units** located in **17 research centres throughout France**. Its aim is to contribute internationally to the development of healthy, high-quality food, competitive and sustainable agriculture, and a protected and valued environment.

## KEY FIGURES VAL DE LOIRE CENTRE 2014

### Research and support units

**16** units including 1 support unit, 2 joint research units and 5 experimental units

**897** INRA staff: 640 permanent contracts with 305 women and 335 men, 257 short-term contracts with 151 women and 106 men

**103** staff of our partners working in the units of our centre

### Resources

A budget of **60,7** million euros of which 12.7 million of self-generated funds (contracts and revenue)

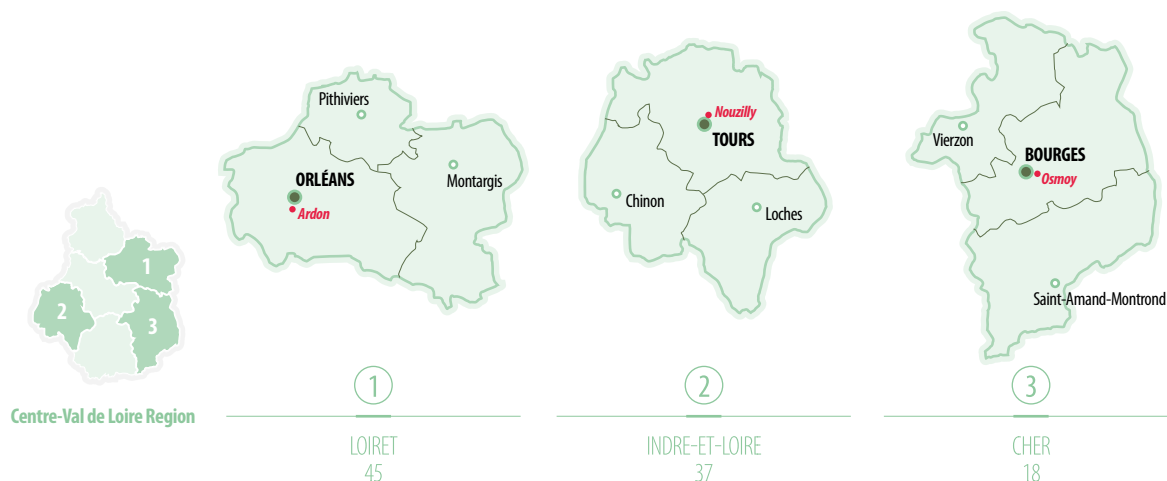
### Some results

**61** new contracts per year including **4** with Europe

**20** patents and **15** licences

**250** publications in peer-reviewed journals

## MAP OF THE VAL DE LOIRE CENTRE FACILITIES



**INRA**  
SCIENCE & IMPACT

### Val de Loire research Centre

2163 avenue de la Pomme de pin  
CS 40001 Ardon  
45075 Orléans Cedex 2  
Tel.: 33 (0)2 38 41 78 00

37380 Nouzilly  
Tel.: 33(0)2 47 42 77 00

18390 Osmoy  
Tel.: 33(0)2 48 30 65 00

[www.val-de-loire.inra.fr](http://www.val-de-loire.inra.fr)  
[contact@val-de-loire.inra.fr](mailto:contact@val-de-loire.inra.fr)

