



Focus on a laboratory

The Plant Health Laboratory

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Anses, The Plant Health Laboratory (France)

V. Molinéro-Demilly, F. Poliakoff, P. Reynaud, G. Anthoine, R. Iloos, J.-E. Gerbault, J.-C. Streito, B. Hostachy, N. Franquet (2012). *The Plant Health Laboratory, EuroReference, No. 6, ER06-12F01. <http://www.anses.fr/euroreference/numero6/PN4010.htm>*

The French National Laboratory for Plant Protection (LNPP) was incorporated into ANSES on 1 January 2011 and is now known as the Plant Health Laboratory. Bringing it under the control of an independent Agency was the logical outcome of national consultations on the health sector which requested that plant risk assessment and management be kept separate. The LNPP, previously a laboratory under the Ministry of Agriculture's Directorate General for Food, had been responsible for expert assessment of organisms harmful to plant health.



The Plant Health Laboratory now provides ANSES's supervisory authorities with scientific and technical support for the monitoring and control of quarantine plant pests. It has 80 members of staff on 6 sites around France. Its administrative offices are in Angers, on the campus of Vegepolys, internationally-recognised as a centre for research, development and higher education in plant sciences.

Two missions

It has two main missions, to conduct expert appraisals and risk assessment in the field of plant health; and to develop, validate and disseminate methods for identifying organisms officially recognised as harmful⁽¹⁾, genetically modified organisms and invasive plant species.

These two missions are handled by two cross-cutting units: the Expert Assessment of Biological Risks (ERB) Unit and the Analysis and Methods Development (DMA) Unit, **which organise the appraisals and analyses carried out by six specialised units.**

The five units located in Angers, Montpellier, Nancy, Rennes and Saint-Pierre-de-la Réunion (Reunion Island), cover respectively bacteriology, virology and GMOs; entomology and invasive plant species; mycology; nematology; and tropical pests and pathogens. The station in Clermont-Ferrand contributes to these activities but is mainly involved in quarantining plants introduced under import regulation waivers.

Angers hosts the Reference Laboratory for bacteriology, virology and GMOs. It also houses the laboratory management and the two cross-cutting units: in 2009, the station increased the surface area of its laboratories and created a 3P (biosafety level 3)-level containment facility. It welcomes foreign delegations and organises training courses.

Montpellier is the site of the Reference Laboratory for entomology and invasive plant species. Since 2010, the station has been located on the premises of the Centre for Biology and Management of Populations surrounded by other scientific organisations (INRA, CIRAD and IRD), allowing it to benefit from exceptional collections of insects and library resources.



The Plant Health Laboratory – Angers



The Plant Health Laboratory – Montpellier

(1) An organism harmful to plants is a species, strain or biotype of a plant, animal or pathogen that is harmful to plants or plant products. The type of harm may be financial (loss of yield, reduced quality, etc.), environmental (impact on biodiversity or ecosystems, etc.) or social (loss of jobs, impact on tourism, etc.).



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The Plant Health Laboratory – Nancy



The Plant Health Laboratory – Clermont-Ferrand



The Plant Health Laboratory – Rennes



The Plant Health Laboratory – Réunion

Nancy hosts the Reference Laboratory for mycology. Its remit includes all pathogenic fungi and oomycota affecting cultivated plants and forestry species.

Clermont-Ferrand hosts the quarantine unit for plants brought into Europe via France. It recently obtained ultra-modern biosafety level 3 containment facilities. The unit can now safely perform a wide array of studies and analyses of propagative plant material brought into the EU under waiver of general plant health regulations.

Rennes hosts the Reference Laboratory for nematology (plant parasites). It concentrates particularly on the genera *Globodera*, *Meloidogyne*, *Ditylenchus* and *Bursaphelenchus*. In its field of competence, the Unit has been ISO 17025 accredited since 2002.

The Reunion Island site was opened in July 2007 further to the establishment of the 3P or *Pôle de Protection des Plantes* centre, which brings together the Laboratory for Plant Health, CIRAD Réunion, various development services (FDGDON [Departmental Federation of Defence Groups against Harmful Organisms], FARRE [Forum for Integrated Agriculture and Environmental Protection], etc.) and State services, all on the same site. The Reunion Island site includes the Tropical Pests and Pathogens Unit, which works on regulated and emerging organisms.

The Plant Health Laboratory has been accredited and recognised as a **“National Reference Laboratory” (by Ministerial Order of 19 October 2011)**. As such, it runs the network of approved laboratories in its field of competence. It participates in European and international working groups and in joint research projects with INRA, CIRAD and French and other universities and leading colleges. It is frequently asked by the Ministry of Agriculture’s Directorate General for Food to issue opinions on the risk presented by a particular pest (arthropod, nematode, etc.) or plant pathogen and it carries out expert appraisals on various issues in the field of plant health.

The reform of the LNPV in 2007 led to its joining ANSES in 2011

In 2007, the French National Laboratory for Plant Protection was reorganised and since the end of 2010 its operations have taken place in six specialised units. The Clermont-Ferrand site became the only French station with the facilities for quarantine activities, an essential requirement for verifying the safety of plant material imported under waiver.

The Plant Health Laboratory now therefore focuses on biological risk. The analysis of plant health risk is a valuable tool for risk management and for international negotiations. This activity is divided up between the cross-cutting unit for Expert Assessment of Biological Risks and the specialised units at the six stations. The Laboratory also carries out expert appraisal of plant health risk assessment originating in the European Union or other countries.

Since 2007, the Plant Health Laboratory has also concentrated on developing and disseminating methods for regulatory analyses requested by the inspectors of the Regional Food Services of the Ministry of Agriculture and assists private or public approved laboratories involved in performing such regulatory analyses.



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The challenges of monitoring and controlling organisms harmful to plant health

The work of the Plant Health Laboratory is influenced by:

- the challenge of the increasing globalisation and volume of trade;
- the variety of plant products, increasingly exotic products and the ensuing unsuspected risks;
- the export of French plant products to other countries with ever-stricter requirements;
- the challenges set by the *Grenelle* Environment Round Table four years ago, particularly to update agricultural practices in the field of plant protection with the application of the Ecophyto 2018 plan, whose goal is to propose the reduction of plant health treatments between 2008 and 2018, if possible by 50%;
- the growing demands of consumers in terms of food safety. These changes increase the propagation risk of harmful organisms. It is ANSES's mission to anticipate these risks in order to improve control measures.

The missions and activities of the Plant Health Laboratory

The missions as defined in the introduction are coordinated by two cross-cutting units which are presented below.

1. Assessment and measurement of plant health risk (coordinated by the ERB Unit)

The work of the Plant Health Laboratory's Expert Assessment of Biological Risks (ERB) Unit principally concerns the assessment and measurement of plant health risk. Since its incorporation in the Agency, a considerable effort has been made to ensure that the working methods of the Laboratory's ERB Unit converge with those of ANSES's own Risk Assessment Department, with a view to complete harmonisation.

Activities of the Expert Assessment of Biological Risks Unit

The Unit both coordinates and participates in the drafting of opinions and scientific and technical expert appraisals by the Laboratory's six stations in the field of plant health. It works closely with the Risk Assessment Department's Expert Appraisal Unit to verify the quality of expert appraisals, by identifying the most suitable tools and methods and by offering training and information within its field of competence. It has a team of four to work on these missions, all based at the main site in Angers. In order to keep abreast of techniques for plant health risk assessment, the Unit is also involved in various European projects (developed in more detail below, in the Methodology monitoring section).

The Expert Assessment of Biological Risks Unit mainly receives the following two types of request:

- for expert appraisals, resulting in an Opinion issued by ANSES concerning risk assessment (including Pest Risk Analyses, or PRAs). These are carried out according to the NF X 50-110 standard;
- for technical support for the supervisory authorities, leading to a report, note or opinion issued by the Plant Health Laboratory.

Expert appraisals resulting in an Opinion by ANSES

The ERB Unit organises and coordinates the work of monitoring the expert appraisal process, which is carried out according to the NF X 50-110 standard. It guarantees that the appraisal process is traceable and that the methodology complies with the organisational principles laid down by the Agency. The Unit is currently selecting the experts to form an Expert Committee entitled the CES for *Biological risks to plant health*. This CES will start work in the first half of 2012 and will deal with:

- regulated organisms in mainland France and its overseas territories, in Europe or in export sectors;
- invasive and harmful organisms, or emerging organisms likely to require mandatory control measures because of their potential impact;
- organisms considered to be "high quality" and whose development would be a matter of public policy.

This CES will be supported, as necessary, by working groups (WGs) and or emergency collective expert assessment groups (GECUs).

The ERB Unit will ensure the competence and independence of the experts participating in these bodies, by verifying each curriculum vitae and each public declaration of interest. It will also ensure the scientific quality of the proceedings by designating a scientific coordinator from among its permanent staff for each expert appraisal.

During the transitional period until the CES becomes active, the ERB Unit continues to organise expert appraisals by setting up *ad hoc* groups of experts as required. These experts are henceforth appointed and managed in line with ANSES practices.

Pest Risk Analysis

Pest Risk Analysis (PRA) is a specialised type of assessment that consists in using international standards to assess biological evidence and other scientific or financial data to determine whether a harmful organism should be regulated (or deregulated) and the nature of any plant health measures to be taken against it. PRA is a three-stage process: initiation, assessment and proposal of risk management options.

International standards

PRAs must be carried out in strict compliance with the requirements of the International Plant Protection Convention (IPPC), with special attention to the provisions of two of the International Standards for Phytosanitary Measures, ISPM no. 2 (Guidelines for pest risk analysis) and ISPM no. 11 (Pest risk analysis for quarantine pests, including analysis of environmental risks and living modified organisms). In practice, the ERB Unit benefits from and actively participates in the improvement of the standards of the European and Mediterranean Plant Protection Organization (EPPO). On the basis of Standards 2 and 11, the EPPO has developed and adopted a "scheme" for plant health risk assessment with a complementary "scheme" for plant health risk management, grouped together as ISPM 5/3(5)⁽²⁾.

Technical support

In answer to the strong demand from the supervisory Ministries, and as a complement to ANSES Opinions, the ERB Unit's laboratory staff provides technical support in the form of reports, notes or opinions on behalf of the Plant Health Laboratory. Requests can involve warning notes, simplified

(2) <http://archives.eppo.org/EPPOStandards/pr.htm>



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risk assessments, opinions on risk management measures or specialised scientific or technical issues related to the reference activity. On request from the Ministries, some of the staff also conduct outside audit missions or participate in national or international working groups. Under special agreements, the Unit may carry out customised studies for the Ministries, such as a study to prioritise quarantine pests. If the technical competence necessary to provide the expected technical support is not available within the laboratory, the ERB Unit brings in outside expertise through consultations or by setting up informal groups of experts.

Methodology monitoring

Plant health risk assessment involves the use of numerous scientific techniques such as biomodelling (CLIMEX, MAXENT), geographic information systems (GIS), themed databases and other specialised software (CAPRA, PQR, CPC, etc.). The ERB Unit participates in several European projects related to Pest Risk Analysis which enables it to remain at the cutting edge in the field of plant health risk assessment. The European PRATIQUE project (supported by the European Commission's 7th Framework Programme) aims to improve Pest Risk Analysis techniques and tools. The Plant Health Laboratory participates in testing and selects the best tools for modelling the potential distribution of a harmful organism as a function of climate. This work enhances the Unit's competence in the field of GIS and biomodelling and also raises its profile at European level. PRIMA PHACIE, a project funded by the European Food Safety Authority (EFSA), will select and test different standards for application in Pest Risk Assessment. One of these (or a combination of several) will be adopted by EFSA as the reference standard for its future risk analyses.

An activity in growing demand

Expert appraisal activity practically doubled between 2009 and 2010, with the number of opinions, studies, expert appraisals and risk analyses carried out or published by the six stations increasing from 149 to 293.

Among the more important subjects dealt with in 2010 were work on plum pox, or Sharka, a viral disease affecting Prunus species, especially peach and apricot trees, which threatens the profitability of fruit farms in south-west France. These expert appraisals were requested by the Ministry of Agriculture to assist in the revision of the Ministerial Order governing the national campaign to combat the disease. Western corn rootworm (*Diabrotica virgifera*), a North American beetle that is particularly invasive in Europe, is another critical issue on which the Unit has provided expert appraisals and opinions contributing to the revision of methods for combating the pest. Lastly, the nematology sector was called on concerning several plantparasites nematodes (*Meloidogyne* spp.) on field crops.

Find out more

- Presentation of the Plant Health Laboratory: <http://www.anses.fr/PNTC10.htm>
- ISPM 2, Framework for pest risk analysis (2007) (PDF - 131.7 kb).
- ISPM 5, Glossary of phytosanitary terms (2007) (PDF - 171.9 kb).
- ISPM 11, Pest risk analysis for quarantine pests including analysis of environmental risks and living modified organisms (2004) (PDF - 349.9 kb).

2. Methods and analysis development activities (coordinated by the DMA Unit)

The Plant Health Laboratory assesses and develops analytical methods for pests and is a National Reference Laboratory. The principal pathogens and animal pests concerned are fungi, bacteria, viruses, phytoplasmas, nematodes, insects and mites. The laboratory also works on the identification of genetically modified organisms, weeds and invasive plants on cultivated land. The Plant Health Laboratory also oversees the quarantine of plant materials prohibited in Europe but brought in for research purposes or for varieties development.

Together with the specialised stations concerned, the Analysis and Methods Development (DMA) Unit coordinates and harmonises practices, including for the accreditation and delegation of analyses to approved laboratories (19 to date in the plant field) by transferring methods and know-how. By keeping the network constantly active and by organising inter-laboratory proficiency tests (ILPTs), the laboratory ensures the quality and reliability of analytical services.

The DMA Unit serves as an interface between the Laboratory management and the stations for scientific aspects, overseeing several scientific and technical studies and the participation of the Laboratory's teams in national or international projects. As examples, the Plant Health Laboratory has participated actively in the following European programmes:

- within the European EUPHRESKO I project, the Nancy station organised a ring test for the diagnosis protocol for identifying and detecting *Gibberella circinata* on pine seeds (13 European partners), while the Rennes station led an inter-laboratory test to validate a method to detect and identify *Meloidogyne chitwoodi* and *M. fallax* by real-time PCR and organised workshops on this theme. In bacteriology, the Unit participated in the ILT2 ring test (*Ralstonia* and *Clavibacter* on potatoes) and a project on *Dickeya solani* is ongoing;
- at the end of 2011, all the stations participated in the QBOL programme, "Development of a new diagnostic tool using DNA barcoding to identify quarantine organisms in support of plant health", by evaluating the methods proposed. The entomology, mycology and nematology stations have already been involved in compiling the reference collection of quarantine organisms: supplying specimens (exchanges with foreign laboratories, field missions to find specimens of rare organisms) and confirming the identification of reference specimens;
- in the framework of the European COST 873 programme concerning stone-fruit trees, one staff member attended a training course on detection of *Xylella fastidiosa* bacterium.

In 2010, the Plant Health Laboratory carried out 15,284 biological analyses in the fields of bacteriology, mycology, virology, entomology, nematology and genetically modified organisms. Eighty-eight percent of these were mandatory analyses. Its analytical activity accounts for 13% of all official plant health analyses (about 102,000 official analyses are carried out within the network of accredited laboratories and the Plant Health Laboratory). Since 2007, 55 official methods have been approved. The laboratory concentrates its activities on emerging pathogens and animal pests (see box) and invasive plants.

The Plant Health Laboratory has taken on a greater role as a reference laboratory as the result of a quality assurance process. In 2009, 13 cross audits of various sectors of activity, quality management or the traceability of tests were carried



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out in five of the six stations. The five stations visited by the COFRAC in 2009 and 2010 are now accredited according to the 17025 standard for nematology activities (Rennes), mycology (Nancy), bacteriology and GMOs (Angers), viruses (Angers and Clermont-Ferrand) and tropical bacteria and viruses (Reunion Island). The entomology station expects to undergo a COFRAC audit in the spring of 2012.

Find out more

- List of official analytical methods used in plant health studies: <http://www.anses.fr/PN1110.htm>
- List of methods used in public consultations: <http://www.anses.fr/PNR210.htm>
- Presentation of the Plant Health Laboratory: <http://www.anses.fr/PNRC10.htm>
- <http://agriculture.gouv.fr/ecophyto-2018>

Emerging pathogens and animal pests in 2010

The main emerging plant pests are:

- kiwi fruit bacterial canker (*Pseudomonas syringae* pv *actinidiae*); walnut fly (*Rhagoletis completa* – one case in the PACA region in south-east France); fruit flies (*Drosophila suzukii*) on red fruits, generating 469 identification analyses; the oriental chestnut gall wasp (*Dryocosmus kuriphilus*) a hymenoptera discovered in the Rhône-Alpes region; the emerging leafhopper (*Orientalus ishidae*), a vector of phytoplasmas in vines (one case in Alsace); first report in Reunion Island of the papaya mealybug (*Paracoccus marginatus*) and in France of the mealybug *Rhizoecus amorphophalli* (a pest of ornamental plants);
- the State has ordered its services to intensify surveillance for *Bursaphelenchus xylophilus* (a pine wood nematode threatening French pine plantations, after Portugal and a few local outbreaks in Spain). Outbreaks of *Meloidogyne fallax* and *M. chitwoodi* (microscopic worms that mainly attack root vegetables) in different regions are monitored and need land to be left fallow for several years to control the pest;
- lastly, *Black Sigatoka*, a fungal disease affecting banana plants (caused by *Mycosphaerella fijiensis*), which was first detected in French overseas territories in French Guiana in 2009, has recently appeared in banana plants in Martinique.