

Andrea Taddei – EURL for Insects and Mites

Giornata di formazione sulla sorveglianza fitosanitaria in Lombardia
ERSAF - Servizio Fitosanitario Regione Lombardia, Milano, 10 Dicembre 2020

The EU Reference Laboratories (EURL)

EURL for Insects and Mites

Designated under the Commission Implementing Regulation (EU) 2019/530 of 27 March 2019

29.3.2019

EN

Official Journal of the European Union

L 88/19

COMMISSION IMPLEMENTING REGULATION (EU) 2019/530

of 27 March 2019

designating European Union reference laboratories for pests of plants on insects and mites, nematodes, bacteria, fungi and oomycetes, viruses, viroids, and phytoplasmas



EURL for fungi and oomycetes:
ANSES (Nancy, France)



EURL for nematodes (consortium):
ANSES (Rennes, France)
ILVO (Merelbeke, Belgium)



Insects and mites (consortium):
ANSES (Montpellier, France)
AGES (Vienna, Austria)



EURL for bacteria (consortium):
NVWA-NRC (Wageningen, Netherlands)
ILVO (Merelbeke, Belgium)
CREA-DC (Rome, Italy)
NIB (Ljubljana, Slovenia)



EURL for viruses, viroids and phytoplasmas (consortium):
NVWA-NRC (Wageningen, Netherlands)
CREA-DC (Rome, Italy)
NIB (Ljubljana, Slovenia)



EURL for Insects and Mites, 10th December 2020

EURL for insects and mites

EURL for Insects and Mites

A consortium between:

- Entomology and Invasive Plants Unit of ANSES Plant Health Laboratory (Montpellier, France)
- Institute for Sustainable Plant Production of AGES (Vienna, Austria)

ANSES (French Agency for Food, Environmental and Occupational Health & Safety), created in 1996.

The Unit is located in CBGP (Center for Biology and Management of Populations) since January 2010

Activities as NRL: entomology (since 1996), invasive plants (since 2008)

AGES (Austrian Agency for Health and Food Safety) since 2002 (Health and Food Safety Act (GESG))
Institute for Sustainable Plant Production is NRL for Insects and Mites, Nematodes, Viruses, Viroids and Phytoplasmas, Bacteria, Fungi and Oomycetes

18 Federal Agencies & Offices merged

1,400 Staff, 900,000 samples tested with 7.2 million individual analyses/year



EURL for Insects and Mites, 10th December 2020

EURL for insects and mites: staff

EURL for Insects and Mites



Philippe Reynaud
 ➤ Head of EURL Laboratory
 ➤ Thysanoptera
 ➤ Acari
 ➤ General entomology



Raphaëlle Mouttet
 ➤ Deputy Head of EURL Laboratory
 ➤ Quality Assurance Manager
 ➤ Coleoptera
 ➤ DNA barcoding



Valerie Balmes
 ➤ Diptera
 ➤ Aphididae
 ➤ General entomology



David Ouvrard
 ➤ Homoptera
 ➤ Coccoidea
 ➤ General entomology



Jean-Marie Ramel
 ➤ Lepidoptera
 ➤ Hymenoptera



Andrea Taddel
 ➤ Lepidoptera
 ➤ Diptera
 ➤ DNA barcoding



Arturo Goldarazena
 ➤ Coleoptera
 ➤ Thysanoptera
 ➤ Acari



Sylvie Dubois
 ➤ Administrative support



Sylvia Blümel
 ➤ Quality assurance
 ➤ General entomology



Christa Lethmayer
 ➤ Coleoptera
 ➤ Diptera
 ➤ Homoptera
 ➤ General entomology
 ➤ Reference collection



Gudrun Strauss
 ➤ Auchenorrhyncha
 ➤ Coleoptera
 ➤ General entomology



Katharina Wechselberger
 ➤ Coleoptera
 ➤ Lepidoptera
 ➤ General entomology



Anna Moyses
 ➤ Thysanoptera
 ➤ Coleoptera
 ➤ Lepidoptera
 ➤ General entomology



Alois Egarter
 ➤ Diptera (Tephritidae)
 ➤ Coleoptera

EURL Staff- ANSES



Helga Reisenzein
 ➤ Deputy Head of EURL Laboratory
 ➤ Molecular identification by PCR
 ➤ DNA barcoding
 ➤ General phytoplasmology
 ➤ Quality assurance



Richard Gottsberger
 ➤ Molecular identification by PCR
 ➤ DNA barcoding
 ➤ General bacteriology



Claudia Heiss
 ➤ Technician



Christina Lippitz
 ➤ Technician

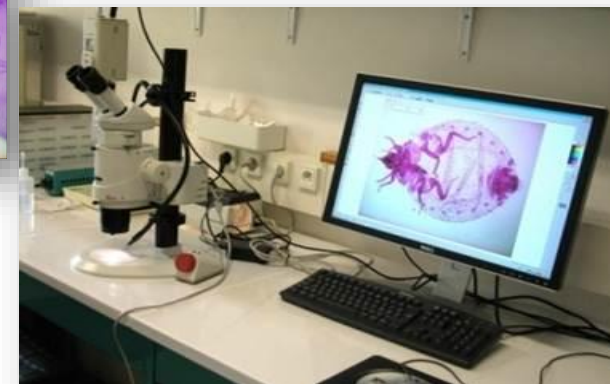
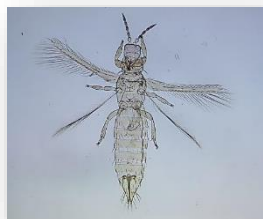


Doris Busch
 ➤ Administration

EURL Staff- Molecular Unit - AGES

EURL Staff- Morphological Unit - AGES

Equipment for morphological identification



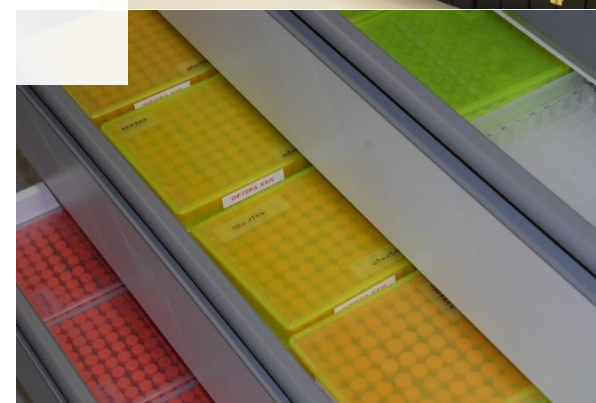
Specimens and slides collections

EURL for Insects and Mites

Main taxonomic groups covered:

- ✓ Thysanoptera
- ✓ Hemiptera Sternorrhyncha
- ✓ Diptera larvae
- ✓ Lepidoptera genitalia
- ✓ Coleoptera genitalia
- ✓ Acari

- 30 000 tubes (300 000 specimens)
- 15 000 slides
- More than 400 families
- More than 4000 species



Vouchers collection CBGP



1 000 000 specimens
60 000 species of insects
700 species of mites

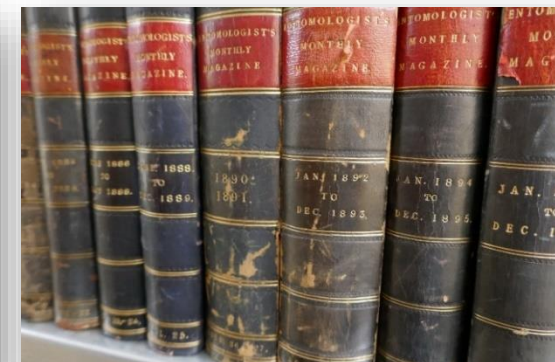


Specialized bibliography



Biobibliography:

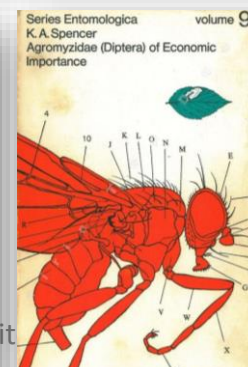
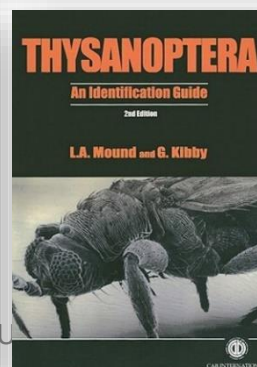
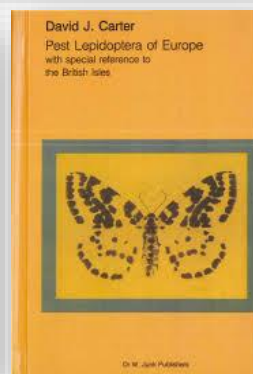
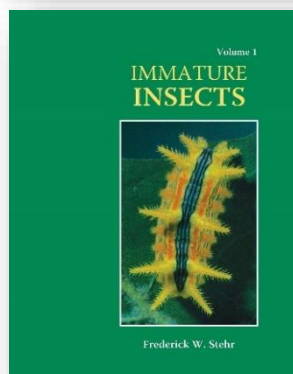
- hard copies
- web based identification keys/tools
- electronic database



Zoological
Record®

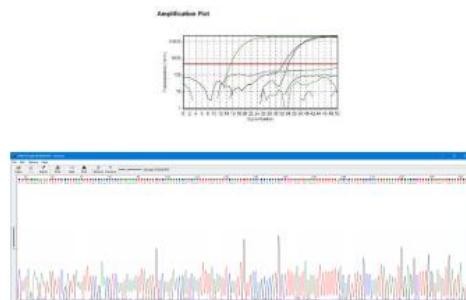


ELSEVIER
Scopus



Equipment and laboratory facilities for molecular identification

State of the art equipment

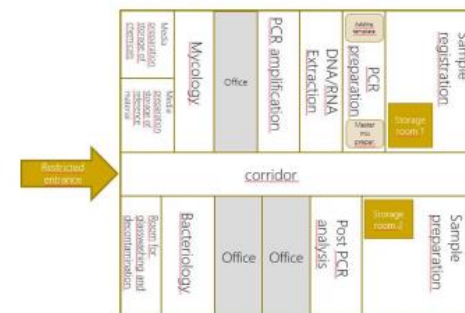


MIC cyclor



Capillary electrophoresis

Dedicated PCR working areas



DNA /RNA extraction and purification



Mastermix preparation



PCR amplification



- Post – PCR (Analysis of amplification products)
- Capillary electrophoresis/gel electrophoresis
 - Preparation of PCR amplification products
 - Sequence analysis (Geneious™ software)



We are designated as quarantine station

Reisenzein, EURL, 13/15 Oct. 2020

EURL activities and work programme

This EURL mission is carried out through different activities planned in two-year work programmes and based on the **Regulation (EU) 2017/625**, specific instructions of the European Commission and the needs of the European Union National Reference Laboratories (EU NRLs) network.

The work programme is structured around 4 main axes, which in turn include several subactivities:

1. to ensure availability and use of high quality methods and to ensure high quality performance by EU NRLs:
 - validation and the selection of reference protocols,
 - cooperate with NRLs and Commission to develop high standard methods of analysis,
 - provision of reference material (both as specimens and DNA),
 - organization of inter-laboratories proficiency tests;
2. to provide scientific and technical assistance to EU NRLs:
 - organization of training courses,
 - provision of relevant up-to-date scientific and technical information to the EU NRLs network through a dedicated website, a newsletter and workshops;
3. to provide scientific and technical assistance to the European Commission and other organizations, such as the European Food and Safety Authority (EFSA) and laboratories in third countries:
 - performance of confirmatory analysis at request of the European Commission or EU NRLs;
4. to establish a list of recommended reagents for molecular biology and reference collections of specimens and DNA.

SPECIAL FOCUS ON EU PRIORITY PESTS!

1. Reference methods for identification Selection of methods

- ☐ Extensive literature search (ELS), selection, pre-testing of methods and validation
- ☐ List of available identification methods for Priority pests
- ☐ List of useful bibliography for the identification of the main taxonomic groups
- ☐ Contribution to the production of official methods (EPPO, IPPC)



AVAILABLE IDENTIFICATION METHODS

The following table lists the methods that are currently available for the identification of EU Priority Pests and of pests included in the EURL work programme 2019-2020. See note at bottom of the page

Organism	Official methods (EPPO, IPPC)	Other methods	Validation data
<i>Agrilus anxius</i> Gory, 1841	<ul style="list-style-type: none"> EPPO (2016). PM 7/129 (1) DNA barcoding as an identification tool for a number of regulated pests. EPPO Bulletin, 46(3), 501-537. 	<ul style="list-style-type: none"> Parsons, G. L. (2008). Emerald Ash Borer <i>Agrilus planipennis</i> Fairmaire (Coleoptera: Buprestidae). A guide to identification in comparison to similar species. Michigan University. LINK Loersch, C. R. and E. A. Cameron (1985). Determination of larval instars of the bark borer, <i>Agrilus anxius</i> (Coleoptera: Buprestidae). Annals of the Entomological Society of America 76(5): 949-952. LINK Bright, D. E. (1987). The metallic wood beetles of Canada and Alaska. Coleoptera Buprestidae. Insects and Arachnids of Canada 15(12). Keharova, I., Jendek, E., Grebennikov, B., Bocak, L. (2019) First molecular phylogeny of <i>Agrilus</i> (Coleoptera: Buprestidae), the genus on Earth, with DNA barcode data for forestry pest diagnostics. Bull Entomol Res 109(2), 200-211 LINK Chamorro, M. L., Jendek, E., Haack, R., Petrice, T., Woodley, N. E., Konstantinov & Grebennikov, V. V. (2015). Illustrated 	<p>EPPO & IPPC STANDARDS AND PROTOCOLS</p> <p>EPPO</p> <ul style="list-style-type: none"> EPPO PM 7/3(3) <i>Thrips palmi</i> EPPO PM 7/4(1) <i>Popillia japonica</i> EPPO PM 7/100(2) <i>Epirix tucumanensis</i>, <i>E. zizyphi</i>, <i>E. submontana</i>, <i>E. tuberosa</i> EPPO PM 7/114(1) <i>Bactrocera zonata</i> EPPO PM 7/124(1) <i>Spodoptera littoralis</i>, <i>Spodoptera frugiperda</i>, <i>Spodoptera litura</i>, <i>Spodoptera exigua</i>, <i>Spodoptera eridania</i> EPPO PM 7/137(1) <i>Thaumetobia leucotreta</i> <p>IPPC</p> <ul style="list-style-type: none"> <i>Thrips palmi</i> DP 01 Genus <i>Anastrepha</i> DP 09 <i>Conotrachelus nenuphar</i> DP 29 <i>Bactrocera dorsalis</i> DP 29

EU priority arthropod pests (Commission Delegated Regulation (EU) 2019/1702)

Order	Family	Name	EU	No	Yes
Coleoptera	Buprestidae	<i>Agrilus anxius</i>	Annex II A	●	
Coleoptera	Buprestidae	<i>Agrilus planipennis</i>	Annex II A	●	
Coleoptera	Cerambycidae	<i>Anoplophora chinensis</i>	Annex II B	●	
Coleoptera	Cerambycidae	<i>Anoplophora glabripennis</i>	Annex II A	●	
Coleoptera	Cerambycidae	<i>Aromia bungii</i>	Annex II B	●	
Coleoptera	Curculionidae	<i>Anthonomus eugenii</i>	Annex II A	●	
Coleoptera	Curculionidae	<i>Conotrachelus nenuphar</i>	Annex II A		●
Coleoptera	Rutelidae	<i>Popillia japonica</i>	Annex II B		●
Diptera	Tephritidae	<i>Anastrepha ludens</i>	Annex II A		●
Diptera	Tephritidae	<i>Bactrocera dorsalis</i>	Annex II A		●
Diptera	Tephritidae	<i>Bactrocera zonata</i>	Annex II A		●
Diptera	Tephritidae	<i>Rhagoletis pomonella</i>	Annex II A	●	
Hemiptera	Triozidae	<i>Bactericera cockerelli</i>	Annex II A	●	
Lepidoptera	Lasiocampidae	<i>Dendrolimus sibiricus</i>	Annex II A	●	
Lepidoptera	Noctuidae	<i>Spodoptera frugiperda</i>	Annex II A		●
Lepidoptera	Tortricidae	<i>Thaumetobia leucotreta</i>	Annex II A		●
Total				9	7



1. Reference methods for identification Validation studies

- 2019-2020: Validation of diagnostic protocols for the morphological and molecular identification of *Bactrocera zonata* (EPPO PM7/114 (1)), *Bactrocera dorsalis* (IPPC ISPM 27 – DP 29) and *Epitrix* spp (EPPO PM7/ 109 (2))
- 2019-2020: Validation of diagnostic protocols for the molecular identification of *Thrips palmi* and *Spodoptera frugiperda*



Objective:

Provide evidence that the selected protocols are suitable to perform routine identification of the pest by evaluating the performance characteristics of the protocol

Performance criteria:

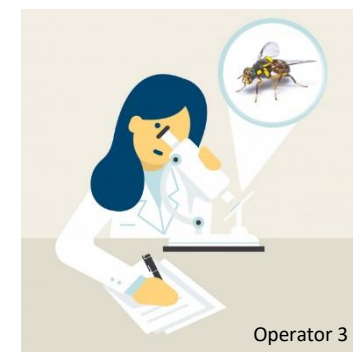
Specificity
Sensitivity
Accuracy
Repeatability
Reproducibility



Operator 1



Operator 2



Operator 3

Appendix 1 - Check lists for the morphological analysis

Operator: _____ Date: 30/10/2020

A combination of characters to diagnose the *Bactrocera dorsalis* complex (modified from Table 1 of [1])

Morphological character	Sample code	
	1	2
Head		
Face yellow with distinct facial spots present (Figures 9(a), 9(b), 12)	Y	Y
Colour mostly black to mostly red-brown (inter-regionally variable) (Figure 13)	Y	Y
Scutum		
Lateral vittae present (Figure 11) and yellowish (Figures 13 and 14)	Y	Y
Medial vittae absent (Figure 11)	Y	Y
Scutellum		
Yellowish colour (Figures 1 and 13)	Y	Y
With a dark basal band (Figures 11 and 13)	Y	Y
Never with other dark patterns (Figure 13)	Y	Y
Femora		
Entirely or mostly fulvous (reddish-yellow or tawny) colour but may possess dark patterns particularly on and	Y	Y
Wing		
Cells bc and c hyaline (colourless) or, at most, with an extremely pale tint (Figures 10 and 16)	Y	Y
Without dense microtrichia covering cells bc and c (Figure 10)	Y	Y
Costal band	Y	Y
Narrow and cross present (diagonal marking that is above anal lobe) (Figures 10 and 16)	Y	Y
Abdomen		
With a "T" pattern on tergites 3-5 (Figures 2(a) and 12)	Y	Y
Comments / Remarks	Y	Y
B. dorsalis complex confirmed?	Y	Y

Diagnostic key to six economically important species belonging to the *Bactrocera dorsalis* complex (adult) (modified from key 5.2.4, IPPC ISPM 27 DP29 *Bactrocera dorsalis*)

go to (mark the decision; note any comments)

Morphological character	Sample code							
	1	2	3	4	5	6	7	8
1 Postpronotal lobe yellow with dark anteromedial corner (Figures 19(b) and (d))	-Y	N	-	N	N	-	N	-
2 Postpronotal lobe entirely yellow (Figures 19(a), (c), (e), (f))	-N	-Y	-	-Y	-Y	-	-Y	-
3 Scutum entirely black (Figure 13(b)), abdominal tergites 3-5 with broad black dorsolateral markings (Figures 17(b) & 18(b)); lateral vittae narrow (Figure 4(b))	Y	-	-	-	-	-	-	-
4 Scutum mostly black (Figure 13(d)), abdominal tergites 3-5 with "T" pattern and tergites 4-5 with very narrow anterolateral black marking (Figures 17(d) and 18(d)); lateral vittae narrow (Figure 4(d))	Y	-	-	-	-	-	-	-
5 Costal band distinctly overlapping 82+3 and	Y	-	-	-	-	-	-	-
6 Abdominal broadly around apex of anal reaching mid-poster between 82+3 & 82+3 (Figure 18(a))	Y	-	-	-	-	-	-	-
7 Costal band whitening distally (Figure 18(c)) to moderate (Figure 18(a)) around apex of	Y	-	-	-	-	-	-	-
8 Abdominal broadly around apex of anal reaching mid-poster between 82+3 & 82+3 (Figure 18(a))	Y	-	-	-	-	-	-	-
9 Abdominal tergites 3-5 without broad black dorsolateral markings	-Y	-	-	-	-	-	-	-

POSSIBLE WEAK POINTS IN THE PROTOCOL?

1. Reference methods for identification Organization of Proficiency Tests (PT)

- 2019: two Proficiency Tests on *Spodoptera frugiperda* (one with a morphological method and one with a molecular method) with detailed reports and follow-up actions.
- 2020: two Proficiency Tests on *Thrips palmi* (morphological and molecular methods) under progress

Upcoming:

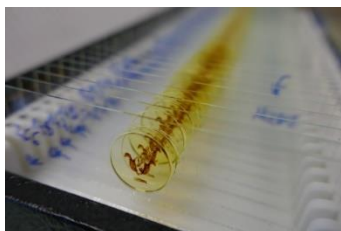
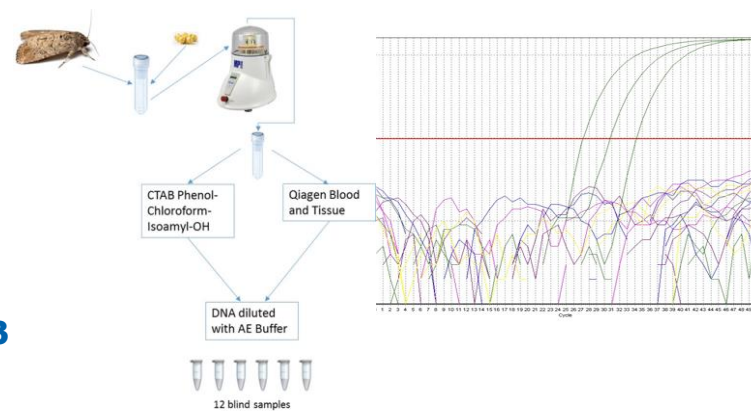
- 2021: Organization of one Proficiency Tests (morphological method) on *Popillia japonica* planned
- 2021: Organization of one Proficiency Tests (molecular method) on *Bactrocera zonata* planned

Objective:

evaluate the ability of participating laboratories to identify a pest through morphological and/or molecular analysis by evaluating the accuracy of their results



Fig. 63 Male genitalia *Spodoptera frugiperda*. Photos © J. Brambila, USDA-APHIS-PPQ.



2. Scientific and technical assistance to EU NRLs

Training courses and webinars

- Training sessions based on the results of PTs, actual needs and suggestions from NRLs (collected through a survey conducted in 2020 and an online form available on the website)

WEBINAR FOR THE MOLECULAR IDENTIFICATION OF SPODOPTERA FRUGIPERDA AND THRIPS PALMI

From 13 October 2020 to 15 October 2020

EVENT CONCLUDED

SAVE THE DATE!

We are pleased to invite you to participate in an interactive, live webinar hosted by AGES from 13th to 15th October 2020, entitled: **Molecular identification of *Spodoptera frugiperda* and *Thrips palmi*.**

Register for this webinar to learn:

- Best practices for molecular testing (real time PCR) to identify insects
- How to establish and optimize real time PCR tests for *Spodoptera frugiperda* and *Thrips palmi*
- Troubleshooting
- Guidance on validation and verification
- General quality assurance issues and requirements

The webinar will consist of **three half days**.

A detailed programme and registration form will be available soon on the Training documents page!



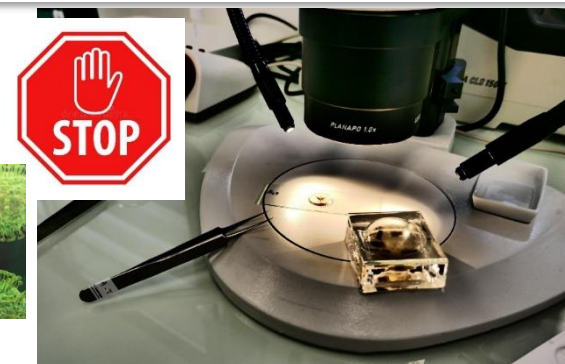
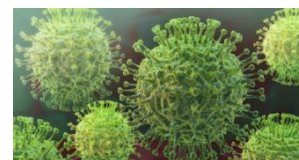
TRAINING SESSION ON THE MORPHOLOGICAL IDENTIFICATION OF SPODOPTERA FRUGIPERDA

From 08 July 2020 to 09 July 2020

POSTPONED - Training session on the morphological identification of *Spodoptera frugiperda*, including practical part on dissection technique and preparation of slide-mounted genitalia.

The training will take place in the **EURL facilities in Montferrier-sur-Lez (Montpellier)** and will last **1,5 days**. A maximum number of 5 participants is admitted. The costs will be reimbursed for **only one NRL representative per EU Member State** (travel, hotel expenses and daily allowance).

Full Programme and Registration Form are available on the EURL website Training Documents page. Please, fill the Registration form and return it before **May 29th** to eurl-insects-mites@anses.fr



2. Scientific and technical assistance to EU NRLs Website

□ A website has been implemented. It includes useful information for the NRLs network:

- The work programme
- Main European regulation in Plant Health



WELCOME TO THE WEBSITE OF THE EUROPEAN UNION REFERENCE LABORATORY FOR INSECTS AND MITES

The European Council and the Commission have designated EU Reference Laboratories (EURLs) with the aim to ensure high-quality, uniform testing in the EU and support Commission activities on risk management and risk assessment in the area of laboratory analysis.

The consortium between ANSES (France) and AGES (Austria) is designated as the European Union Reference Laboratory for the identification of regulated insect and mite species under COMMISSION IMPLEMENTING REGULATION (EU) 2019/530 of 27 March 2019.

Consortium presentation

ANSES

The French Agency for Food, Environmental and Occupational Health & Safety (ANSES) was created on 1 July 2010. It is an administrative public establishment accountable to the French Ministries of Health, Agriculture, the Environment, Labour and Consumer Affairs. ANSES undertakes monitoring, expert assessment, research and reference activities in a broad range of topics that encompass human health, animal health and well-being, and plant health (www.anses.fr).

AGES

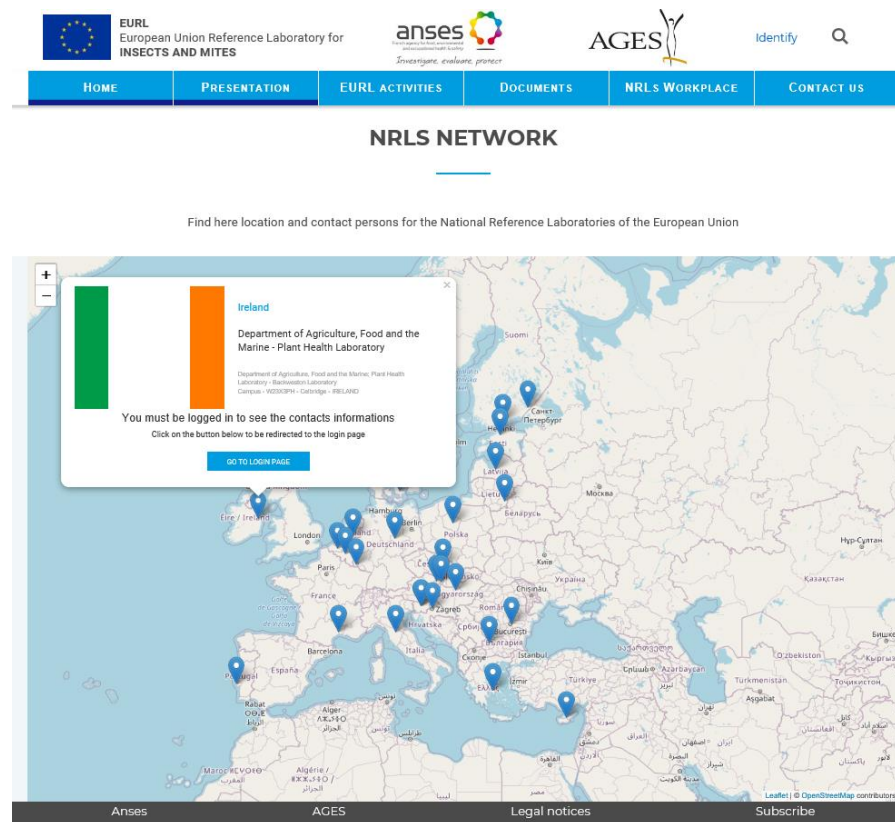
The Austrian Agency for Health and Food Safety (AGES), founded in 2002, is a company of the Republic of Austria, owned by two federal ministries (Ministry of Labour, Social Affairs, Health and Consumer Protection and Ministry for Sustainability and Tourism). Core tasks include the protection of human, animal and plant health, food safety and food quality, as well as the protection of consumers against fraud by providing professional and independent scientific expertise (www.ages.at).

The EURL activities are coordinated by ANSES.

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- The work programme
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- A network map of NRLs with contacts details



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- Information about the planned, ongoing and completed Proficiency Tests, Training sessions and Workshops



Our upcoming Proficiency Testings

<p>03 March 31 December 2020</p>	<p>PT 2020 Thrips palmi</p> <p>The PT 2020 on the morphological and molecular identification of Thrips...</p>
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Our last Proficiency Testings

<p>16 October 18 December 2019</p>	<p>PT 2019 Spodoptera frugiperda</p> <p>The PT 2019 on the morphological and molecular identification of Spodoptera...</p>
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- Information about the planned, ongoing and completed Proficiency Tests, Training sessions and Workshops
- A review of the available methods is published on the webpage of the EURL




EURL
European Union Reference Laboratory for
INSECTS AND MITES



anses
ANALYSE, SECOURS, ENVIRONNEMENT, SANTÉ
Investire, évaluer, protéger



AGES
ANALYSE, SECOURS, ENVIRONNEMENT, SANTÉ

andrea.taddei@anses.fr


HOME

PRESENTATION

EURL ACTIVITIES

DOCUMENTS

NRL'S WORKPLACE

CONTACT US

AVAILABLE IDENTIFICATION METHODS

The following table lists the methods that are currently available for the identification of EU Priority Pests and of pests included in the EURL work programme 2019-2020. See note at bottom of the page

Organism	Official methods (IPPC, EPPO)	Other methods	Validation data
<i>Agrilus anxius</i> Gory, 1841	• EPPO (2016). PM 7/129 (1) DNA barcoding as an identification tool for a number of regulated pests. EPPO Bulletin, 46(3), 501-537.	• Parsons, G. L. (2008). Emerald Ash Borer <i>Agrilus planipennis</i> Fairmaire (Coleoptera: Buprestidae). A guide to identification and comparison to similar species. Michigan State University. (LINK)	
		• Loerch, C. R. and E. A. Cameron (1983). Determination of larval instars of the bronze birch borer, <i>Agrilus anxius</i> (Coleoptera: Buprestidae). Annals of the Entomological Society of America 76(6): 948-952. (LINK)	
		• Bright, D. E. (1987). The metallic wood-boring beetles of Canada and Alaska. Coleoptera: Buprestidae. Insects and Arachnids of Canada 15(12).	
		• Kelnarova, I., Jendek, E., Grebennikov, V.V., Bocak, L. (2019) First molecular phylogeny of <i>Agrilus</i> (Coleoptera: Buprestidae), the largest genus on Earth, with DNA barcode database for forestry pest diagnostics. Bull Entomol Res., 109 (2), 200-211 (LINK)	
		• Chamorro, M. L., Jendek, E., Haack, R. A.,	

2. Scientific and technical assistance to EU NRLs Website

□ A website has been implemented. It includes useful information for the NRLs network:

- The work programme
- Main European regulation in Plant Health
- A network map of NRLs with contacts details
- Information about the planned, ongoing and completed Proficiency Tests, Training sessions and Workshops
- A review of the available methods is published on the webpage of the EURL
- A list of useful bibliography for the identification of the main taxonomic groups of insects and mites is available on the website

The screenshot shows the website header with logos for the European Union, ANSES, AGES, and the email address andrea.taddei@anses.fr. The navigation menu includes HOME, PRESENTATION, EURL ACTIVITIES, DOCUMENTS, NRLS WORKPLACE, and CONTACT US. The main content area is titled 'RELEVANT BIBLIOGRAPHY' and contains a table of bibliographic resources.

Taxonomic group	Bibliographic resources
Acari	<ul style="list-style-type: none"> • Krantz, G.W. & Walter, D.E. (2009). A Manual of Acarology. 3rd Edition. Texas Tech University Press, Lubbock: 807 pp • Lindquist, E. E., Bruin, J., & Sabelis, M. W. (Eds.). (1996). Eriophyoid mites: their biology, natural enemies and control (Vol. 6). Elsevier, 787 p. • (1986). Spider mites (World crops pests), Vol 1A, 1B, Elsevier Science; 1 edition 406 pp. • Vacante V. (2016). The handbook of mites of economic plants: identification, bio-ecology and control. Wallingford: CABI. 872 p. • Vacante, V. (2010). Citrus mites: identification, bionomy and control. Cabi. 378 p.
Auchenorrhyncha	<p>Cicadomorpha and Fulgoromorpha</p> <ul style="list-style-type: none"> • Asche M. (2015). The West Palaearctic Achilidae (Hemiptera, Fulgoromorpha: Fulgoroidea) - a review with description of five new species from the Mediterranean. Nova Supplementa Entomologica 25: 1-135. • Biedermann, R., & Niedringhaus, R. (2009). The plant- and leafhoppers of Germany. Identification key to all species. Wissenschaftlich Akademischer Buchvertrieb-Fründ. 409pp. • Della Giustina W. (1989). Homoptères Cicadellidae. Volume 3, compléments. Faune de France 73. INRA publications, Paris. 350 p. • Della Giustina W. (2019). Les Delphacidae de France et des pays limitrophes (Hemiptera, Fulgoromorpha). Faune de France n°100. Fédération Française des Sociétés de Sciences naturelles, Paris. Tome 1 : 432 pp., Tome 2 : 400 pp. • Dietrich C. H. (2005). Key to the families of Cicadomorpha and subfamilies and tribes of Cicadellidae (Hemiptera:

2. Scientific and technical assistance to EU NRLs Website


- A website has been implemented. It includes useful information for the NRLs network:

- The work programme
- Main European regulation in Plant Health
- A network map of NRLs with contacts details
- Information about the planned, ongoing and completed Proficiency Tests, Training sessions and Workshops
- A review of the available methods is published on the webpage of the EURL
- A list of useful bibliography for the identification of the main taxonomic groups of insects and mites is available on the website
- links to EPPO and IPPC standards and links to electronic keys for the identification of pests as possible useful tools


The screenshot shows the website's navigation bar with links: HOME, PRESENTATION, EURL ACTIVITIES, DOCUMENTS, NRLS WORKPLACE, and CONTACT US. Below the navigation bar, the main heading is "EPPO & IPPC STANDARDS AND PROTOCOLS". Under the "EPPO" subheading, there are seven cards listing standards: EPPO PM 7/3(3) Thrips palmi, EPPO PM7/ 74(1) Popillia japonica, EPPO PM7/ 109(2) Epitrix cucumeris, E. papa, E. subcrinita, E. tuberosa, EPPO PM7/ 114(1) Bactrocera zonata, EPPO PM7/ 124(1) Spodoptera littoralis, Spodoptera litura, Spodoptera frugiperda, Spodoptera eridania, and EPPO PM7/ 137(1) Thaumetobia leucotreta. Under the "IPPC" subheading, there are three cards: Thrips palmi DP 01, Genus Anastrepha DP 09, and Conotrachelus nenuphar DP 28. A fourth card for Bactrocera dorsalis DP 29 is partially visible below the IPPC section.

2. Scientific and technical assistance to EU NRLs Website


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WHITEFLY PUPA OF THE WORLD - Compendium and key to the Genera of the Aleurodicinae & the Aleyrodinae




Taxonomic checklist of the world's whiteflies (Insecta: Hemiptera: Aleyrodidae)




Lace bugs database - A database of all the species described in Tingidae family (Insecta: Heteroptera) with references, distribution and pictures


LEPIDOPTERA




LepIntercept - American tool for identification of frequently intercepted Lepidoptera




MothDissection - Images of British and European Lepidoptera preparations




North America Lepidoptera Genitalia Library




British Lepidoptera




Lepidoptera Mundi - Select your Country!




Lepiforum - Identification of Lepidoptera and their preimaginal stages




Microlepidoptera on Solanaceae



TortAI - Tortricidae of Agricultural Importance in the US




Global Taxonomic Database of Gracillariidae




The caterpillar key - interactive key for identifying families of Lepidoptera larvae


THYSANOPTERA




ThripsWiki - Providing information on the World's thrips




OzThrips - Thysanoptera in Australia




PaDIL - Thysanoptera



Thrips of New Zealand



Thrips of California



Identification and information tools for thrips in East Africa

2. Scientific and technical assistance to EU NRLs Website and workshop

□ A website has been implemented. It includes useful information for the NRLs network:

- The work programme
- Main European regulation in Plant Health
- A network map of NRLs with contacts details
- Information about the planned, ongoing and completed Proficiency Tests, Training sessions and Workshops
- A review of the available methods is published on the webpage of the EURL
- A list of useful bibliography for the identification of the main taxonomic groups of insects and mites is available on the website
- links to EPPO and IPPC standards and links to electronic keys for the identification of pests as possible useful tools

□ Annual Workshop

- November 4, 2020: 25 National Reference Laboratories (UE and Switzerland), 93 registered members and up to 76 workstations connected at the same time



2020 WORKSHOP INSECTS AND MITES

From 04 November 2020 to 04 November 2020

EVENT CONCLUDED

The EURL's Workshop 2020 is just around the corner!

The first workshop organised by EURL for insects and mites is getting closer and closer. It will take place on 4 November 2020 and will be held by videoconference.

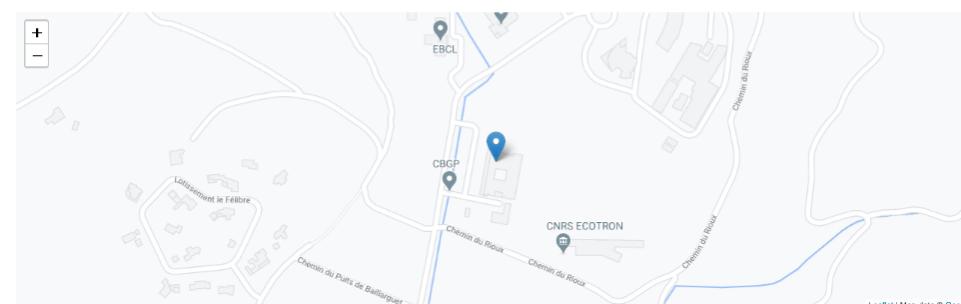
This decision was taken after collecting the NRLs' preferences on how the Workshop should be held, in light of the unpredictable evolution of the COVID-19 pandemic.

The videoconferencing format certainly limits the interactions between participants, but it has a positive side: it allows you to open the event to more than one participant per NRL, so don't hesitate to involve more members of your team!

The full agenda and the registration form are available in the Workshop Documents page. Please return the filled-in registration form by October 14.

IMPORTANT: the videoconferencing software used will be [Skype Business](#). You will receive an invitation with a link to attend the meeting. The connection will be made via the WebApp. A test will be scheduled the week before the Workshop.

EVENT CONCLUDED - Please find all the material (report and presentations) from the event by clicking **HERE**



3. Scientific and technical assistance to EC and other organizations

EURL for Insects and Mites

□ Providing **scientific assistance to the Commission**

- Example: availability of methods for identification of non-EU Fruit flies to species level (or genus level) at larval stage.

□ Collaborating with laboratories in **third countries** and with the **European Food Safety Authority (EFSA)**

□ Provide **confirmation of identification** at request of EC or EU NRLs. Some examples:

- Germany: *Eotetranychus lewisi*
- Luxembourg: Larvae of Tephritidae
- Estonia: *Dendrolimus pini*

Dendrolimus specimens from NRL Estonia, molecular results ambiguous. Possible *D. sibiricus*?

Query: unlabeled_sequence
Top Hit: Arthropoda Insecta - Lepidoptera - *Dendrolimus superans* (100%)

Search Result:

A species level match could not be made, the queried specimen is likely to be one of the following:

Dendrolimus superans
Dendrolimus sibiricus
Dendrolimus pini
Dendrolimus sibiricus
Dendrolimus superans sibiricus

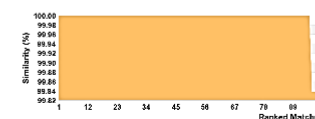
For a hierarchical placement - a neighbor-joining tree is provided:

TREE BASED IDENTIFICATION

Identification Summary

Taxonomic Level	Taxon Assignment	Probability of Placement (%)
Phylum	Arthropoda	100
Class	Insecta	100
Order	Lepidoptera	100
Family	Lasiocampidae	100
Genus	<i>Dendrolimus</i>	100

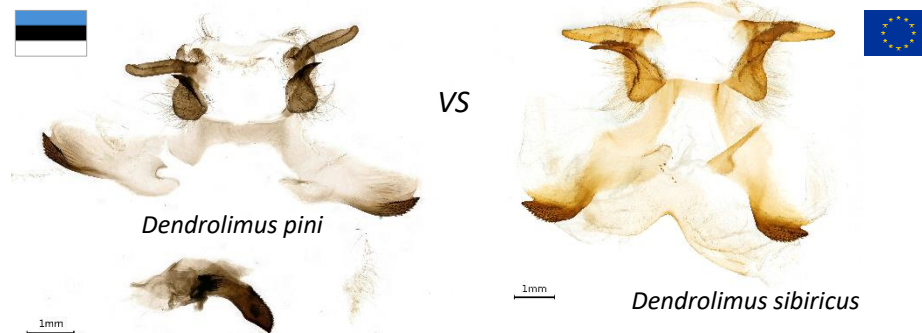
Similarity Scores of Top 100 Matches



Morphological and molecular taxonomy of *Dendrolimus sibiricus* Chetverikov stat.rev. and allied lappet moths (Lepidoptera: Lasiocampidae), with description of a new species

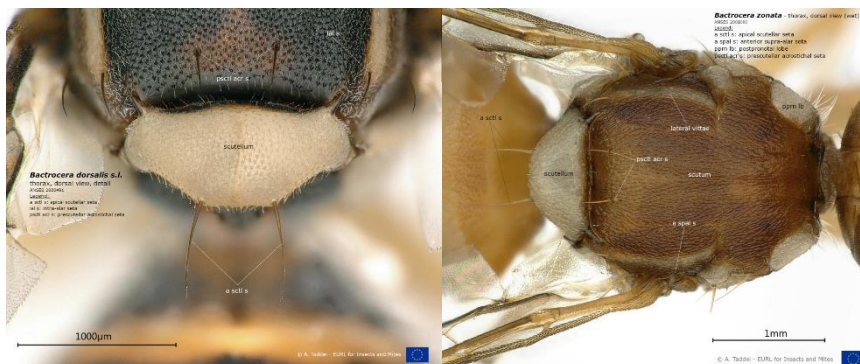
Kauri Mikkola & Gunilla Ståhls

Comparison with EURL *Dendrolimus sibiricus* reference material and available bibliography



4. Reagents and Reference Collection

- Coordinating or performing test for the verification of the **quality of reagents**
- Create and maintain a **Reference material collection**
 - Testing of the Specify® database to manage the EURL reference collection under progress
 - Quality assured framework conditions under consideration
 - A “three levels” reference collection is planned
 - “EURL reference collection” (barcoded, internal EURL use, high resolution pics)
 - “Reference Collection for NRLs” (available to NRLs)
 - “Working collection” (for PTs, trainings, validation studies)



HIGH RESOLUTION PICTURES FOR EU PESTS

High resolution images for EU regulated species are available on this webpage. The images can be a valuable aid in identifying specimens, especially when reference specimens are missing, by highlighting the key morphological characteristics of each species, as indicated in diagnostic standards. The use of images alone, however, without consultation of identification protocols, should NEVER be done.



EURL REFERENCE COLLECTION

The Reference collection gathers morphological specimens and DNA to be used in the EURL activities and to be shared within the NRLs network

Reference material is of primary importance to serve as reference standards during the process of morphological and molecular identification of insects and mites.

One of the main tasks of EURL for Insects and Mites is to establish and maintain a high quality collection of reference material, called [Reference collection](#) (Regulation (EU) 2017/625 Art. 94 (2b)). The EURL's efforts focus on the recovery of specimens for the 16 species considered as priority for the Union territory (Priority pests, Annex of Regulation (EU) 2019/1702). In addition, the Reference collection includes other EU-regulated insects and mites species (Regulation (EU) 2019/2072), based on their availability. This Reference collection will allow the EURL to carry out activities such as training sessions and proficiency testing and will include specimens and DNA extracts to be transferred to NRLs upon request to serve in their diagnostic activities.

Reference material is available in two forms:

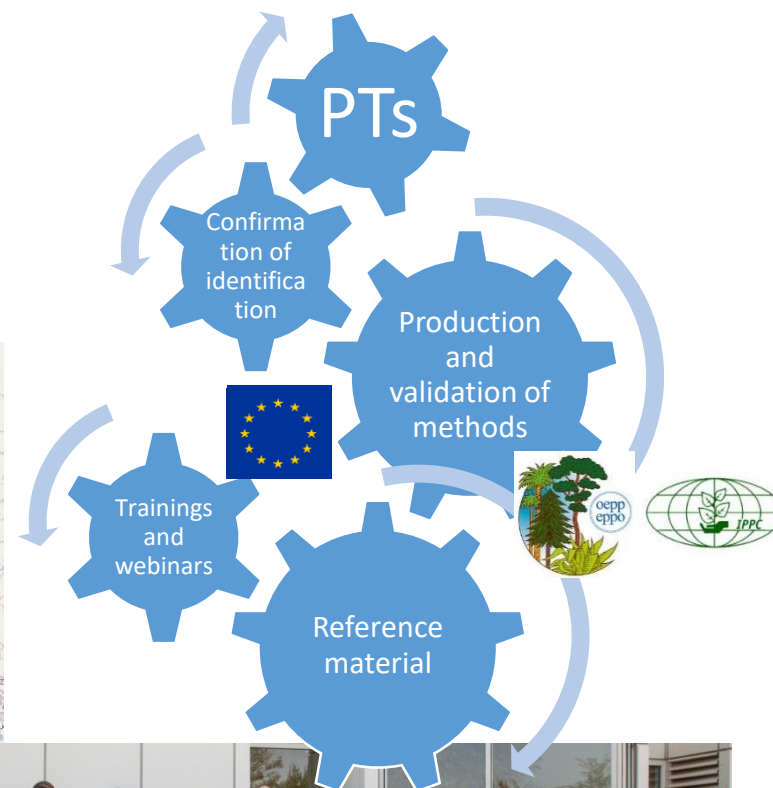
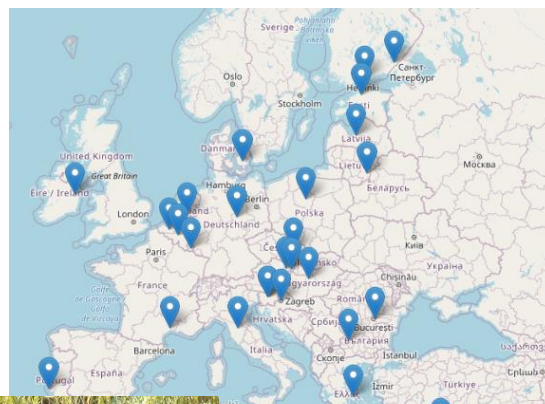
- **morphological specimens** (dry pinned material, preserved in vials with ethanol, slide-mounted)
- **DNA collections** (DNA extracts, artificial positive controls for selected pests (g-blocks) and sequence data)

A list of the available reference material will be uploaded soon at the bottom of this page, together with the instructions for submitting the request.

Work in progress, stay connected...

To conclude

The main objective of EURL-Insects and Mites is to coordinate the network of EU National Reference Laboratories (EU NRLs) to ensure accurate identification of regulated or invasive insect and mite species. The provision of validated reference methods, reagents and technical information on pests, annual assessment tests and training of NRL staff should improve the quality of diagnosis and harmonise diagnostic procedures at European level.



Thank you

***Bactrocera dorsalis* s.l.**
head, ventrolateral view
ANSES 2000491



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*The consortium between ANSES (France) and AGES (Austria)
is the European Union Reference Laboratory for the
identification of regulated insects and mites*

<https://eurl-insects-mites.anses.fr/>

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