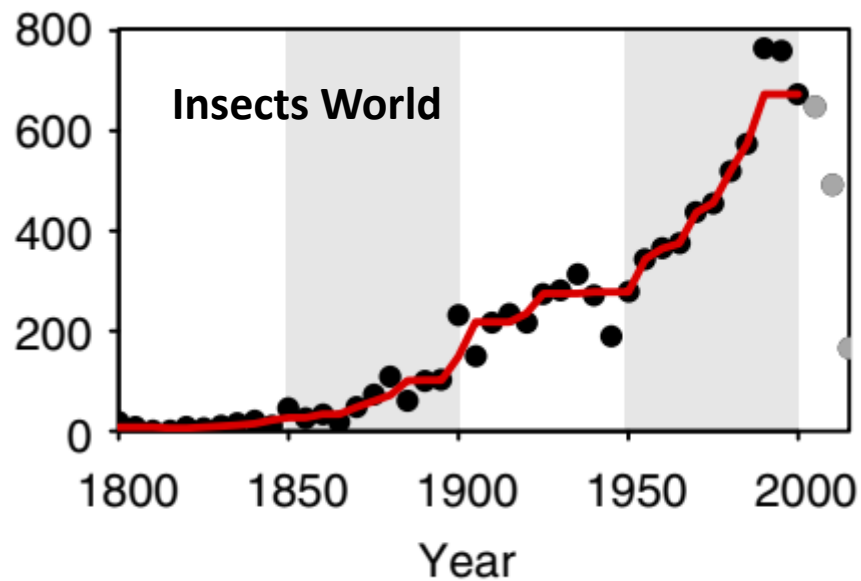


Towards a reference collection for the EURL “insects and mites”

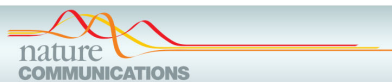
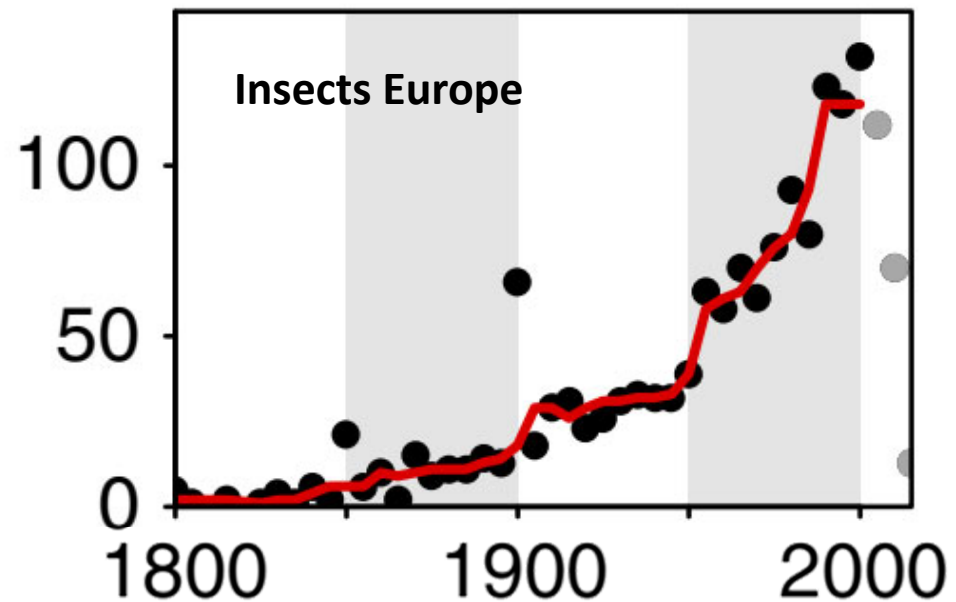
A tool to harmonize NRLs

AG CBGP/plateau collection
20th January 2022 – Montpellier (France)

The challenge ...



Global trend of established insect invasive species



ARTICLE

Received 16 Feb 2016 | Accepted 28 Dec 2016 | Published 15 Feb 2017

DOI: 10.1038/ncomms14435 OPEN

No saturation in the accumulation of alien species worldwide

Hanno Seebens *et al.*[#]

NRL : National Reference Laboratory

European Union:

27 countries... 25 NRLs !

- UK left in 2020, Ireland mandate for Ulster
- Denmark mandate for Sweden
- Nobody answers in Malta



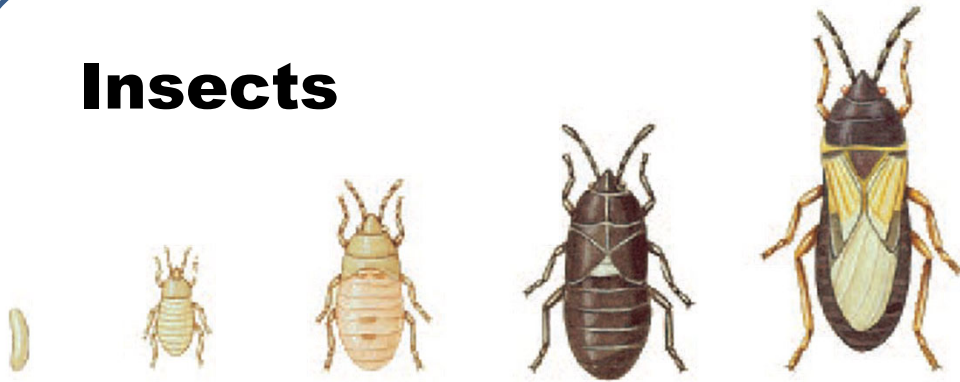
France

Anses-LSV « Insectes et plantes invasive »

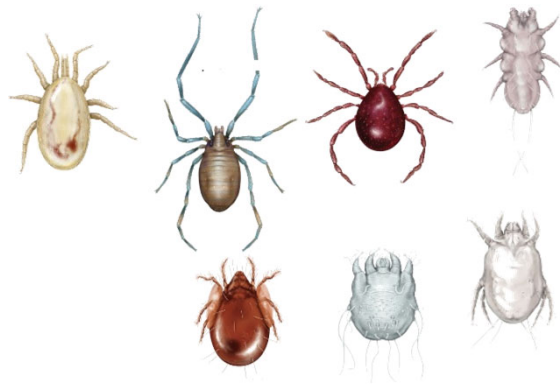
- Two NRL mandates since 2009 :
- « Insects, mites & auxiliaries »
- « Invasive plants »

NRLs field of competence

Insects



Mites



Not all arthropods !



NRLs missions

Main missions

- official analyses
- development, validation & optimization of methods
- involvement in associated researches

Object: regulated insects & mites (EU 2016/2072 & 2019/1702)

- 275 regulated non-quarantine (**RNQO**) pest/plant couples
- 151 quarantine organisms (**QO**, 80 insects)
- of which 16 insects are **Priority QO**



Which regulation?

	Annex II A	Annex II B	Annex III	Annex IV	Total
Acarida	2			5	7
Coleoptera	35	4	10	4	53
Diptera	25		3	2	30
Hemiptera	19	3	2	10	34
Hymenoptera			3		3
Lepidoptera	16		3	1	20
Thysanoptera	4				4
	101	7	21	22	151

Priority List →

	Annex II A	Annex II B	Total
Coleoptera	5	3	8
Diptera	4		4
Hemiptera	1		1
Lepidoptera	3		3
	13	3	16

The challenge of identifying insects

Scenarios that slip through the cracks

- Risk of entry directly related to risk of misidentification
- 25 NRLs = 25 different teams, methods, material...
- ... = 25 cumulative risks!

Here comes EURL

- European Union Reference Laboratory
- Main mission: to coordinate and harmonise NRLs action
- Mandate to Anses + Ages (2019)



How is the EURL organized?

Who are we?

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

A consortium between:

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



Who are we?



Philippe Reynaud
EURL Head



Raphaëlle Mouttet
Deputy head
(EURL-Anses)



Helga Reisenzein
Deputy head
(EURL-Ages)

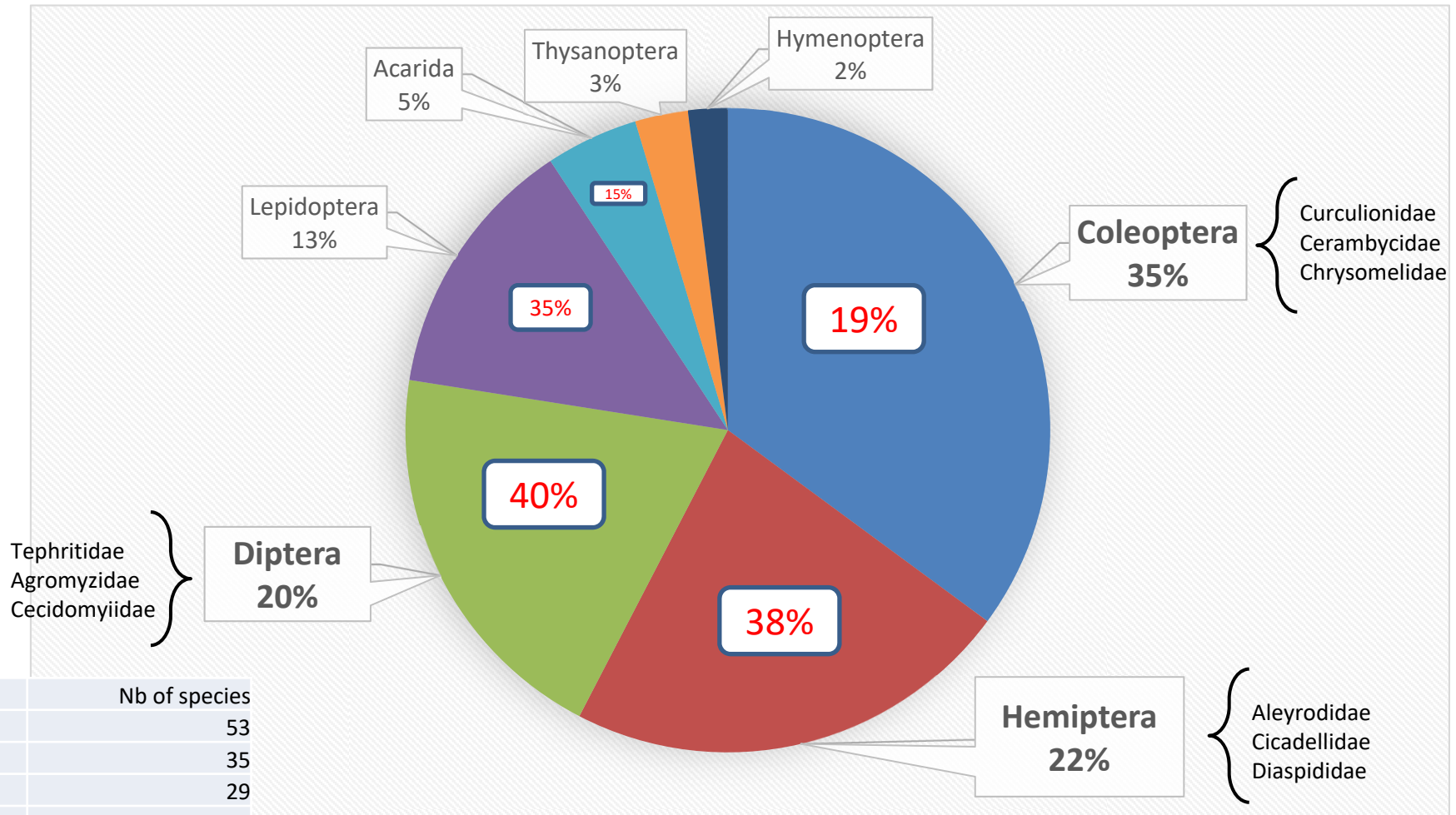
Which criteria for an EURL?

Eligibility/exclusion criteria

- EN/ISO 17025
- Impartial, free from any conflict
- Staff
- Infrastructure, equipment and products
- Knowledge of international standards and practices
- Able to face emergency situations
- Biosecurity standards



Regulated insects: which groups are involved?



















	Nb of species
Coleoptera	53
Hemiptera	35
Diptera	29
Lepidoptera	20
Acarida	7
Thysanoptera	4
Hymenoptera	3
Total	151

% of species with official ID method(s)

Priority List and availability of methods

Method ?

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>Thaumatotibia leucotreta</i>	Annex II A		
Total				7	9

The challenge of identifying insects

Too many bugs so little time!

Between 2 millions and 30 millions of arthropods species

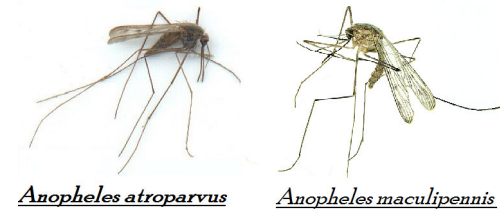
(Erwin, T. L. 1983. Tropical forest canopies: the last biotic frontier. Bulletin of the Entomological Society of America, Volume 29: 14-19)

Intra-specific variation



Philaenus spumarius

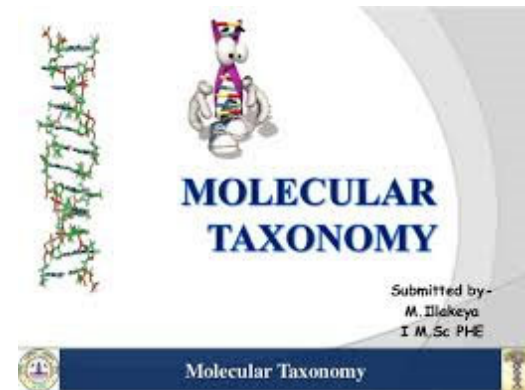
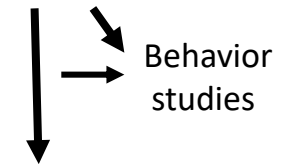
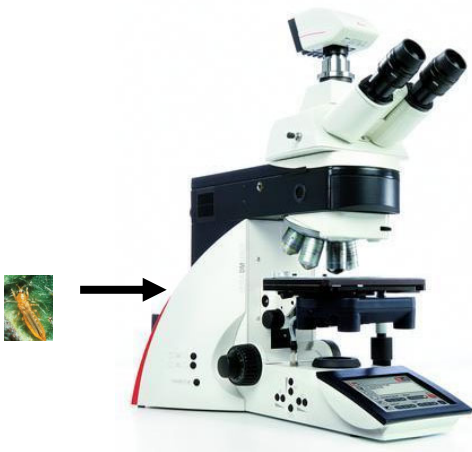
Sibling (cryptic) species



Anopheles atroparvus

Anopheles maculipennis

Tiny size (microscopic insects and mites that require complex slide mountings and powerful microscopes)



A consequence

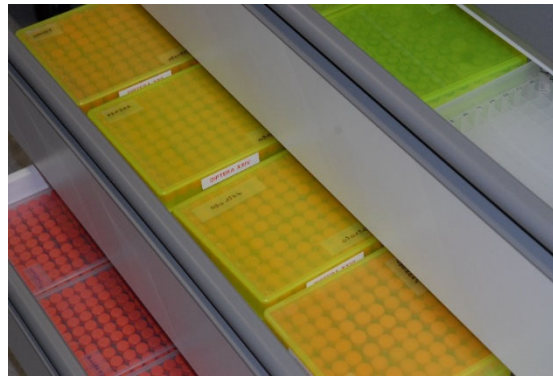
We need vouchers !

We need vouchers...



- For certified morphological & molecular ID
- For pre-testing and validation of ID methods
- For inter-lab Proficiency Tests (ISO 17043)
- For loans to NRLs

Hence, we need a collection...



- With dry-mounted, EtOH and slides vouchers...
- ... and the associated DNA



Hence, we need a database !



To be developed on Specify 7

- specifically designed for collection management
- open source
- external housing with technical support
- on trial at AGES for barcodes management
- used by numerous Museums & universities
- easy loan editing & tracking system

...with specific taxonomic tree

[Sp](#) [Data](#) [Trees](#) [Reports](#) [Interactions](#) [Statistics](#) [Query](#) [Workbench](#) [BatchEdit](#) [Plugins](#) [Attachments](#)

Cotonopsis

Life	Kingdom	Phylum	Class	Order	Family	Genus	Species
Life	Animalia						
		Acanthocephala					
		Arthropoda					
			Crustacea				
			Insecta				
				Blattodea			
				Diptera			
				Hymenoptera			
				Mecoptera			
				Odonata			
					Aeshnidae		
						Aeshna (0, 66)	
						Anax (2, 18)	
							amazili Burmeister, 1839
							azurea Charpentier, 1825
							bacchus Hagen, 1867
							bangweuluensis Kimmins, 1955
							chloromelas Ris, 1911
							concolor Brauer, 1865
							congolath Fraser, 1953
							dorsalis Burmeister, 1839
							dubius Lacroix, 1921
							formosus Vander Linden, 1820
							fumosus Hagen, 1867
							georgius Selys, 1872
							gibbosulus Rambur, 1842
							goliath Selys, 1872
							goliathus Fraser, 1922
							guttatus Burmeister, 1839
							immaculifrons Rambur, 1842
							imperator Leach, 1815 (12)
							indicus Lieftinck, 1942
							junius Drury, 1773
							longipes Hagen, 1861
							lunatus Kolenati, 1856
							maclachlani Foerster, 1898
							maculatus Rambur, 1842

Taxontree

- manually & via lists entered
- in accordance with taxonomic experts
- extandable & changeable

...with specific data for each object

Collection Object

IDs

- Collection Object
- Taxon
- Agent
- Geography
- Locality
- Collecting Information
- Storage
- Container

Determination

Record Sets

- Libellen_Graz_20181029_2018-11-7_15:34
- Test-Odo_aenea

Collecting

Workbench BatchEdit Plugins Attachments

Search: Cotonopsis

Info: Doubleclick on or hover over text for more information on field.

ABOL-Catalog #: 83

Process ID (Bold):

Museum ID (Bold): NOaS1-2019_Odo0083

Coll. Code (Bold): NOaS1-2019

Cataloger: Fischer, Iris

Connection to another Collectionobject:

Sample ID (Bold): NOaS1-2019_Odo0083

Field ID (Bold): Odo0083

Institution Storing (Bold): Naturhistorisches Museum, Wien

Cataloged Date: 08/01/2018

Determinations

Taxon: Anax imperator

Preferred Taxon: Anax imperator

Identification Method: morphological

Determination Key:

Determined Date: 19/06/2017

Taxonomy Notes:

Qualifier: Current

Addendum:

Type Status:

determined by: Fischer, Iris

Determination Citations

Reference Work:

Remarks:

1 of 2

Collecting Information

Method: net

Start Date: 19/06/2017

Collection Event ID:

Locality: NHM_LE-Libellen_2017-2019_Wienerwald_W03; Wien; 48.2144430000, 16.2201640000

Habitat:

Collecting Notes:

Event Time:

End Date:

Permit Number:

Collection Date Accuracy:

Sampling Protocol:

Site Code:

Collectors

Last Name	First Name	Remarks
Fischer	Iris	

Preparations

Prep Type	Tissue Descriptor	Prepared By	Sample Lab-Number	Is On Loan	Number of items	Storage	Instituion	Storage Location	Notes	Preparation Attachments

1 of 1

Welcome New Collection Object Query Query Results Collection Object Workbench Plugins

Invertebrata 1_NHM_Libellen omacek2

...with specific attachments as well

Preparations
(pinned; tissue; DNA)

Prep Type	Tissue Descriptor	Prepared By	Sample Lab-Number	Is On Loan	Number of items	Storage	Institution	Storage Location	Notes	Preparation Attachments
DNA Sam...	Leg	Sittenthaler,...		No						
EtOH	Leg	Fischer, Iris	8	No	2					
EtOH	complete	Fischer, Iris		No						

Life & Host

Col Obj Attribute

Sex: male Reproduction: sexual Life Stage: adult

Associated Taxa: Associated Specimens: Host-Sex: Host-Life-Stage: Host-Organ: Host-Specification:

Voucher Status: Vouchered:Registered Collection

Extra Info: External URLs:

Notes:

Attachment
(Photos reconstruction etc.)



DNA

DNA Sequence

go to: DNA 0

So far, still on Excel

EURL_reference_material_collection_list_050821.xlsx - Excel

ROUSSE Pascal Partager

Calibri 11

Normal Insatisfaisant Neutre Satisfaisant

Insérer Supprimer Format

Données

AI269

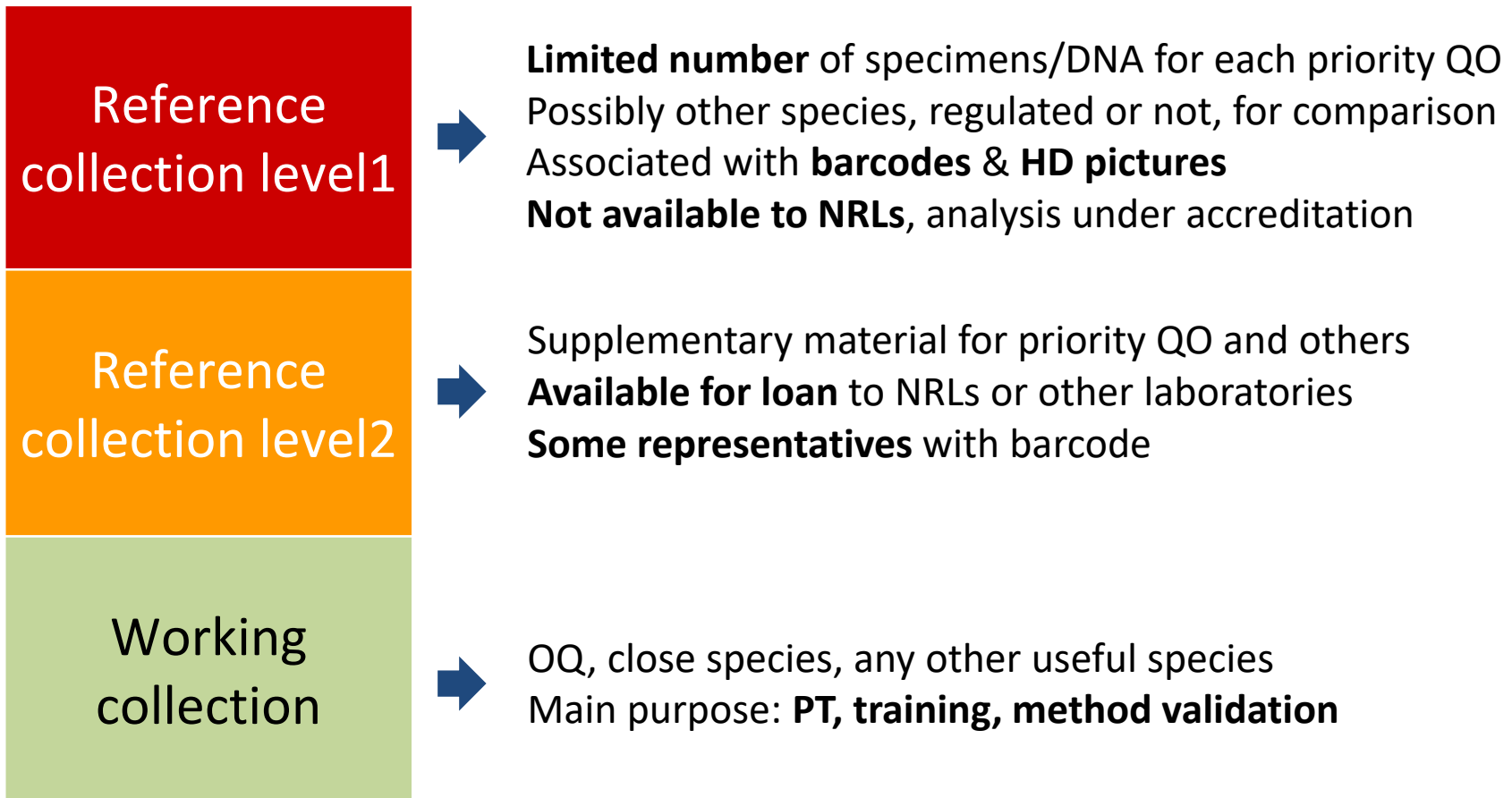
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1																				
2		Specimen scientific name (Taxon)	Specimen scientific name (Genus)	Specimen scientific name (Family)	Specimen scientific name (Order)	Authors of the current scientific name	Year of publication of scientific name	Specimen developmental stage	Quant	Sex	Geographic source of specimen (at least to country or region of origin); for quarantine pests unknown or not applicable	geographic place of isolation of specimen (especially import consignments); locality	Source such as host plant, host plant part, host plant material, substrate or other source (e.g. commodity, trap) from which specimen was collected; enter "N.A." if not applicable	Host plant taxon name (incl. variety if needed); for quarantine pests unknown or not applicable	specify which host plant part; for quarantine pests unknown or not applicable	Date (at least year) of sampling	Sampler/collector (name)	Sampler/collector (organisation)	Determinator (name)	Dete
3	in reference collection morphological* - Level1	required	required	required	required	required	required	required			optional (if available)	required	required	optional (if available)	optional (if available)	required	required	required	required	
4	in reference collection morphological* - Level 2	required	required	required	required	required	required	required			optional (if available)	required	required	optional (if available)	optional (if available)	required	required	required	required	
5	in working collection morphological* - Level 3	required	required	required	required	optional	optional	required			optional (if available)	required	required	n.a.	n.a.	required	required	required	required	
235	Level 2	Anoplophora glabripennis	Anoplophora	Cerambycidae	Coleoptera	(Motschulsky)	1854	adult	1		Trescore Balneario (BG), Italy	Acer saccharinum	n.a.	trunk in iron cage	spring 2018	Andrea Taddei	SFR Lombardia	Raphaëlle Mouttet	ANS Ento Invas	
236	Level 2	Anoplophora glabripennis	Anoplophora	Cerambycidae	Coleoptera	(Motschulsky)	1854	adult	1		Trescore Balneario (BG), Italy	Acer saccharinum	n.a.	trunk in iron cage	spring 2018	Andrea Taddei	SFR Lombardia	Raphaëlle Mouttet	ANS Ento Invas	
237	Level 2	Anoplophora glabripennis	Anoplophora	Cerambycidae	Coleoptera	(Motschulsky)	1854	adult	1		Trescore Balneario (BG), Italy	Acer saccharinum	n.a.	trunk in iron cage	spring 2018	Andrea Taddei	SFR Lombardia	Raphaëlle Mouttet	ANS Ento Invas	
238	Level 2	Anoplophora glabripennis	Anoplophora	Cerambycidae	Coleoptera	(Motschulsky)	1854	adult	1		Trescore Balneario (BG), Italy	Acer saccharinum	n.a.	trunk in iron cage	spring 2018	Andrea Taddei	SFR Lombardia	Raphaëlle Mouttet	ANS Ento Invas	
239	Level 2	Anoplophora glabripennis	Anoplophora	Cerambycidae	Coleoptera	(Motschulsky)	1854	adult	1		Trescore Balneario (BG), Italy	Acer saccharinum	n.a.	trunk in iron cage	spring 2018	Andrea Taddei	SFR Lombardia	Raphaëlle Mouttet	ANS Ento Invas	
240	Level 2	Anoplophora glabripennis	Anoplophora	Cerambycidae	Coleoptera	(Motschulsky)	1854	adult	1		Trescore Balneario (BG), Italy	Acer saccharinum	n.a.	trunk in iron cage	spring 2018	Andrea Taddei	SFR Lombardia	Raphaëlle Mouttet	ANS Ento Invas	
241	Level 2	Anoplophora glabripennis	Anoplophora	Cerambycidae	Coleoptera	(Motschulsky)	1854	adult	1		Trescore Balneario (BG), Italy	Acer saccharinum	n.a.	trunk in iron cage	spring 2018	Andrea Taddei	SFR Lombardia	Raphaëlle Mouttet	ANS Ento Invas	
242	Level 2	Anoplophora glabripennis	Anoplophora	Cerambycidae	Coleoptera	(Motschulsky)	1854	adult	1		Trescore Balneario (BG), Italy	Acer saccharinum	n.a.	trunk in iron cage	spring 2018	Andrea Taddei	SFR Lombardia	Raphaëlle Mouttet	ANS Ento Invas	
243	Level 2	Anoplophora glabripennis	Anoplophora	Cerambycidae	Coleoptera	(Motschulsky)	1854	adult	1		Trescore Balneario (BG), Italy	Acer saccharinum	n.a.	trunk in iron cage	spring 2018	Andrea Taddei	SFR Lombardia	Raphaëlle Mouttet	ANS Ento Invas	
244	Level 2	Anoplophora glabripennis	Anoplophora	Cerambycidae	Coleoptera	(Motschulsky)	1854	adult	1		Trescore Balneario (BG), Italy	Acer saccharinum	n.a.	trunk in iron cage	spring 2018	Andrea Taddei	SFR Lombardia	Raphaëlle Mouttet	ANS Ento Invas	
245	Level 2	Anoplophora glabripennis	Anoplophora	Cerambycidae	Coleoptera	(Motschulsky)	1854	adult	1		Trescore Balneario (BG), Italy	Acer saccharinum	n.a.	trunk in iron cage	spring 2018	Andrea Taddei	SFR Lombardia	Raphaëlle Mouttet	ANS Ento Invas	
246	Level 2	Anoplophora glabripennis	Anoplophora	Cerambycidae	Coleoptera	(Motschulsky)	1854	adult	1		Trescore Balneario (BG), Italy	Pheromone trap	n.a.	n.a.	10/07/2018	Simone Sala	ERSAF - SFR Lombardia	Raphaëlle Mouttet	ANS Ento Invas	

EURL European Union Reference Laboratory for INSECTS AND

A 3-levels collection

Level 1: identification by recognized specialists

Levels 2-3 : EURL staff



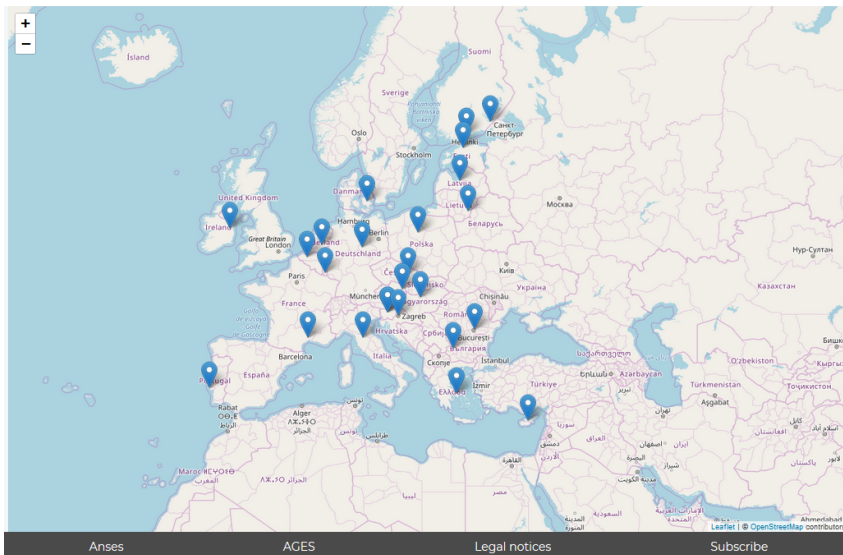
A bilocated collection



To be continued...

NRLS NETWORK

Find here location and contact persons for the National Reference Laboratories of the European Union



The screenshot shows the homepage of the EURL website. At the top, there are logos for EURL, ANSES, and AGES, along with a search bar. Below the logos is a navigation menu with links for HOME, PRESENTATION, EURL ACTIVITIES, DOCUMENTS, NRLS WORKPLACE, and CONTACT US. The main content area features a large image of a wasp and a news article titled 'OPENING OF THE EURL FOR INSECTS AND MITES WEBSITE'. Below the news article, there is a blue banner with the text 'sortium presentation' and a paragraph of text. At the bottom of the page, there is a blue banner with the URL <https://eurl-insects-mites.anses.fr>.

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

Thanks for your attention !