

PROJECT FULL TITLE:
**COORDINATION AND COLLABORATION BETWEEN REFERENCE COLLECTIONS OF PLANT
PESTS AND
DISEASES FOR EU PLANT HEALTH POLICY**

GRANT AGREEMENT NO.: (612712)



Workpackage: WP2. Inventory of relevant phytosanitary collections
Deliverable: Deliverable Nr D2.3, Identification of gaps
Date: 1st September 2015
Partner responsible: INRA and EPPO

Analysis of the results of the Q-collect questionnaire on collections and identification of the gaps (1st of September 2015)

Introduction

This document presents the results of a survey on collections of biological material conducted in the framework of the Work Package 2 of the Q-collect project.

Methodology

- Establishment of the list of collections to be contacted during the survey

Lists of collections of quarantine organisms already available (EPPO, INRA, DLO) were compiled and an on-line interactive list was provided to all Q-collect partners by 2014/02/11. All partners were invited to complete and correct the list, especially to update the addresses and contact details, from 2014/02/11 to 2014/05/06.

The list was cleaned and formatted. It was validated by 2014/05/12.

The list included 154 laboratories and institutions that host collections of quarantine organisms. All groups of organisms are represented (Viruses & Viroids, Phytoplasmas, Bacteria, Fungi, Arthropods, Nematodes and Invasive Plants). The list is available in Deliverable D2.1.

- Establishment of the questionnaire

A first version of the questionnaire was produced by WP2 leaders based on a brainstorming session organized in the framework of the kick off meeting (Leiden, 2013/12/02) and was further developed taking into account questions included in the MIRRI questionnaires. It was provided to all Q-collect WP leaders, especially WP3 and WP4, for comments and suggestions. Comments from WP leaders were reviewed by WP2 coordinator and the EPPO staff involved and a revised version was prepared. This revised version was submitted on-line to all Q-collect partners who were given the possibility to provide feedback from 2014/02/11 to 2014/02/28.

Comments received were reviewed by WP2 coordinator and the EPPO staff involved and a second revised version of the Questionnaire was tested by 2014/04/30 in Montpellier.

The final version of the questionnaire was made available on-line on 2014/05/15 for the survey to start. The questionnaire is available in Appendix 1, the original questions are repeated throughout this document as blue inserts.

The questionnaire included 36 questions for a total of about 220 fields. Most fields had to be completed for each collection declared. Topics addressed were: scope, size, quality, availability and sustainability of material preserved. **It should be noted that collections were not asked to provide precisely the name of the species that are included in their collections. However, information about the possibility to access detailed information was requested. Consequently, the survey does not allow the identification of specific organisms for which no specimen is available in a collection in Europe. The consortium considered that requesting this detailed information would discourage the collections from providing information and it has not been possible to ask for further information in the timeframe of the project.**

Consequently the range of species represented in the collections remains a knowledge gap.

To identify the gaps in the different taxonomic groups, institutes/laboratories were requested to complete the questionnaire separately for the different groups of pests and declare as many collections as they deemed necessary. One of the strengths of the questionnaire was indeed the possibility for the respondent to create forms for as many collections as necessary (depending on the type of organism, including the possibility to create sub-collections) and to give details for each collection, although this was more time-consuming for the respondents who wished to give that level of detail. Approximately one hour was required to fill the on-line form for each collection created (according to a test carried out in Montpellier by the work package leader).

- Conduct of the survey

By 2014/05/15 an invitation to complete the Questionnaire on-line was sent to all curators of quarantine collections listed at the start of the project. Furthermore, information on the questionnaire was disseminated to all of the laboratories registered in the EPPO database on diagnostic expertise as well as to all EPPO Panels on diagnostic. An article was published in the

EPPO Reporting Service no. 4 to publicise the survey (publication 2014/06/10). The deadline to complete the questionnaire was 2014/07/31.

At the first Q-collect Workshop (Kleinmachnow, 2014-11-27/28) participants commented that some important collections seemed to be missing from the answers received. The project consortium was consequently encouraged to reopen the questionnaire on collections performed in the first part of the project to get an optimized overview of existing collections. The questionnaire was consequently reopened and the deadline to complete it was the 31st of January 2015.

- Interpretation of the results of the survey

During the Q-collect Workshop it was also suggested that the interpretation of the results of the survey should involve specialists from the different disciplines. A meeting was consequently organized on 2015-03-24/25 gathering the project's Work package leaders and representatives of European collections of bacteria, fungi, insects, nematodes, phytoplasmas, viruses and viroids. The information provided in this document mainly results from this meeting.

It should be noted that the implementation of new regulations regarding biological material, in particular the Nagoya Protocol is likely to improve the situation regarding the information on holdings of collections. Discussions are in progress on the practical implementation of this Protocol in the EU countries.

Additional information

Some information is provided in the table below on the number of quarantine pests in the EU Plant health directive by taxonomic groups as well as those recommended for regulation by EPPO.

Pest category	EU Plant Health Directive 2000/29	EPPO Pests recommended for regulation
Acari	4	4
Bacteria & Phytoplasmas	40	48
Fungi (including chrosmists)	62	64
Insects	155*	178
Nematodes	19	15
Plants	11 **	23
Viruses and Viroids	62	49

* It should be noted that for some families or genera, all non-European species are considered as regulated pests consequently accurate counting is not possible.

** parasitic plants

The questions of the survey are highlighted in blue

The findings are in a boxed text highlighted in orange

The gaps are in red

1 General information on the institutes / laboratories

1.1 Institutes/laboratories which responded to the questionnaire

Institutes / laboratories which participated	110
Finalized the questionnaire	93
Entered a collection but did not finalize the questionnaire	26 (17+9)*
Collections reported (a laboratory can host more than one collection)	152

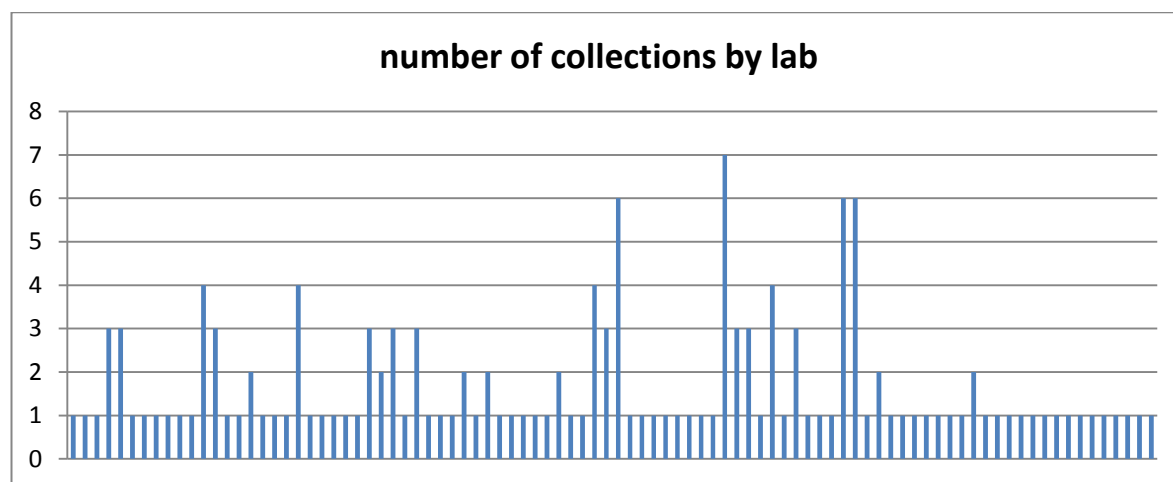
All institute/laboratory which answered more than 50 % of the questionnaire were considered in the analysis.

*Out of the 26 laboratories that did not finalize the answers for at least one collection, 9 had answered a majority of questions for the collection in question and were thus taken into account, and 17 collections had 30% of answers or less. 144 collections were thus taken into account.

Findings

- The rate of answers is satisfactory as 93 laboratories/institute out of the 154 contacted completed the questionnaire.
- It was valuable to reopen the questionnaire as 42 new laboratories/institutes finalized it.

1.2 Institute/laboratory hosting a collection containing plant pests



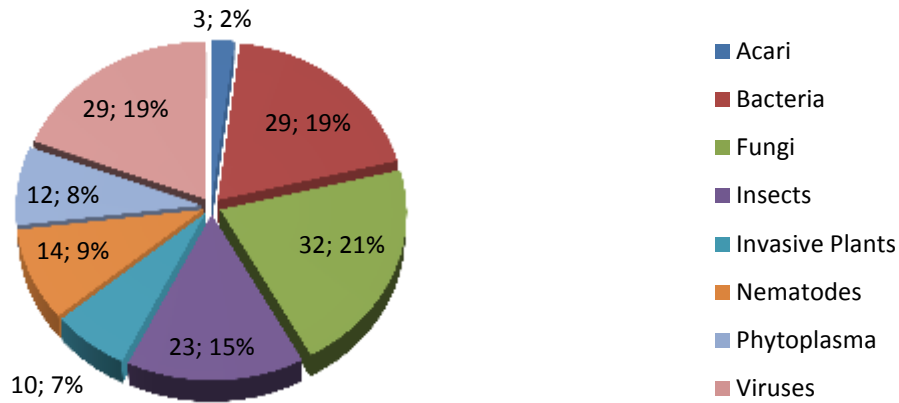
Findings

The majority of respondents host one collection. Only 25 institutes/laboratories host more than 2 collections. From this pattern it could be considered that scattered collections in Europe may provide more guaranties that the same species is present in more than one collection which provides more security in terms of conservation. However, as no specific information was collected on specific species this statement cannot be substantiated.

One disadvantage of scattered collections is that the information is dispersed so it is more difficult for the users to find biological material.

Division according to taxonomic groups:

collections and taxonomic groups



Findings

All taxonomic groups are represented in the Institute/Laboratories which answered the survey. The number of collections for Acari is limited but some known collections did not answer the survey and it is usually the case that insect collections also include Acari and answers have not been provided separately.

A mapping of all collections (global and per discipline) was done and is presented below.



Number and location of collections that took part in the survey (the size of the spots is linked with the number of collections in the locality).



Findings

Most plant health collections of bacteria known to the experts of Q-collect are represented.



Number and location of fungi collections that took part in the survey

Findings

A few fungi plant health collections are missing, for example MUCL (Leuven, Belgium)



Number and location of insects collections that took part in the survey

Findings

Most plant health collections of insects participated in the survey. However, national and international general collections are missing..



Number and location of nematodes collections that took part in the survey

Findings

All relevant plant health collections of nematodes are included apart from one collection from Italy (Bologna)



Number and location of phytoplasmas collections that took part in the survey

Findings

One important plant health collection of phytoplasma from Italy (Udine) did not take part in the survey.



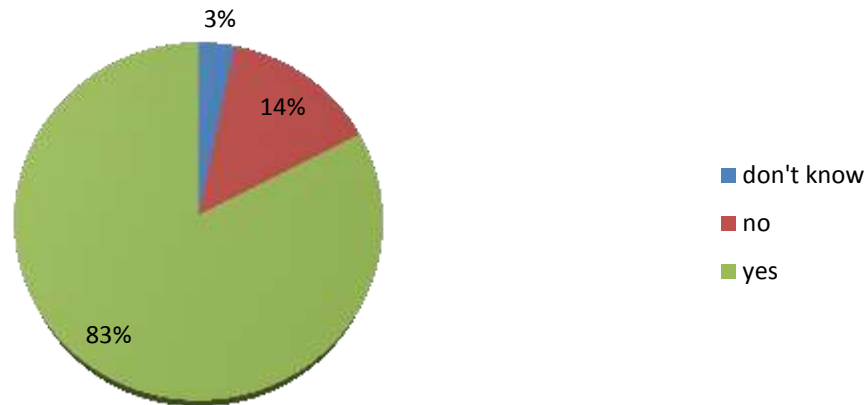
Number and location of acari collections that took part in the survey

Findings

Only 3 collections declared Acari. Some important collections for plant health are not included in the survey but collections of Acari are usually included in insect collections. Consequently the interpretation of the results of the survey for Acari is difficult. In any case it due to the low number of collections declared. However, it should be noted that few Acari are regulated.

1.3 Quarantine pests or their look-alikes in collections

Presence of quarantine pests or look alike in collection



Findings

Most collections which answered the questionnaire knowingly host quarantine pests or their look-alikes.

2 Information on the collection(s)

2.1. Purposes of the collections

Questionnaire

4.3 What are the purposes of the collection? (please choose one or several):

Research or working collection

National or international collection

Educational collection

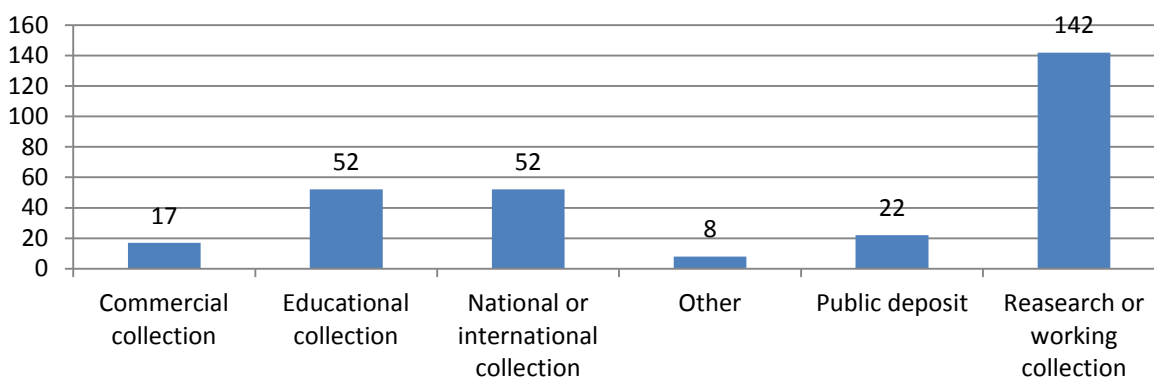
Commercial collection (sale of specimens)

Public deposit (e.g. a collection for safekeeping for other institutes / laboratories; please note that this is also includes mandatory deposit)

Other (specify)

The graph below gives the total cumulated numbers of collections for each purpose. Multiple answers were possible.

Declared purpose of the collections



Findings 142 collections (93%) are research or working collections but also have other purposes:

- 64 (42%) are research or working collections **only**
- 30 (20%) are working collections and education collections).
- 49 (32%) are national or international collections
- Among the national or international collections, 10 (6.5%) do not declare to conduct research activities or to be a working collection.
- Most Commercial and Public deposit are associated to national/international collections

[only 4 collections are commercial with no national/international status (one for each following group : virus, fungi, insecta and bacteria) and 2 have a public deposit with no national/international status].

The survey shows that most collections are research or working collections. The consortium considered that this could be an indicator that these are active collections updated regularly and probably associated with specialists of the pest groups. However it was also considered that few of these collections are likely to be organized to provide services to outside users.

There are very few collections dedicated to the conservation and the provision of services for (quarantine) pests organisms (commercial / public deposit / national or international status). But differences are important by discipline:

- Entomology and acarology: a few number of collections organized to provide services punctually
- Bacteriology : several important and international collections well organized
- Fungi: a few number of large international collections
- Viruses and viroids: one important collections is organized to provide services
- Phytoplasmas: one important collection organized to provide services
- Nematodes: a few number of collections organized to provide services punctually
- Invasive plants: no collection organized to provide services

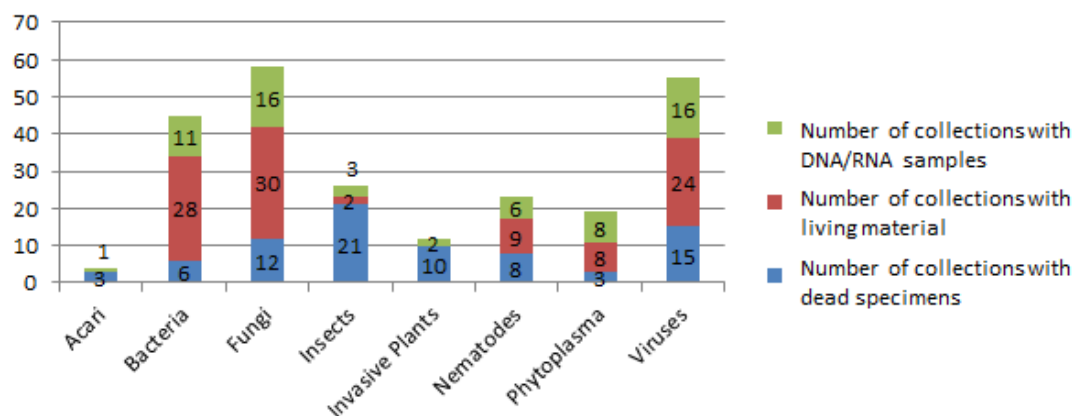
2.2. Material in the collections

2.2.1 Type of material in the collections

Type of material	Living material	Dead material (dry samples, fluid preserved samples ; plant herbarium samples, slides)	DNA/RNA
Total number of specimens <i>Explanatory note:</i> Provide the approximate number of specimens present in the collection for each type of material	nb	nb	nb
Number of specimens of quarantine organisms (or approx.)	nb <input type="checkbox"/> I don't know	nb <input type="checkbox"/> I don't know	nb <input type="checkbox"/> I don't know
Total number of species <i>Explanatory note:</i> provide the approximate number of species present in the collection	nb	nb	nb
Number of specimens of quarantine organisms (or approx.)	nb <input type="checkbox"/> I don't know	nb <input type="checkbox"/> I don't know	nb <input type="checkbox"/> I don't know
Accessibility <i>Explanatory note:</i> can the material be supplied (accessible) to a third party? If Yes please specify how below:	Y/N	Y/N	Y/N
Free access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Paid access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loan of material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On-site consultation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On-line/open access images	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Catalogue <i>Explanatory note:</i> do you have a catalogue of the collection? If Yes specify what form (paper, database...).	Y/N/partial	Y/N/partial	Y/N/partial
paper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
database	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
online	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

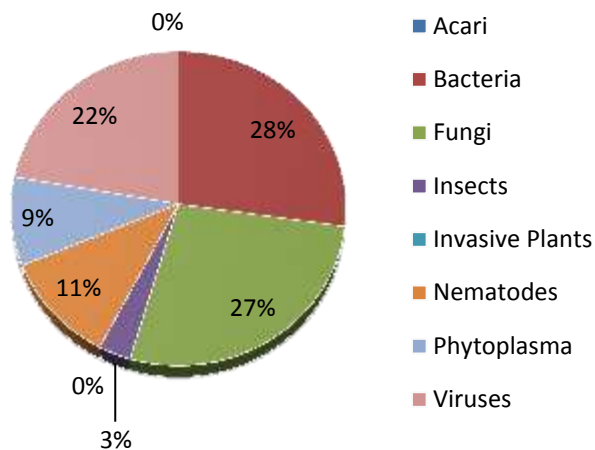
Website	link	link	link
Your judgment on the conservation status of your collection	Specimens in good condition/ Fit for purpose / Requires improvement	Specimens in good condition/ Fit for purpose / Requires improvement	Specimens in good condition/ Fit for purpose / Requires improvement
Are you willing to provide a separate list of specimens of the key quarantine pests (and if possible look alike) you hold?	Y/N/Partial	Y/N/partial	Y/N/partial

The following graph indicates per taxonomic group the number of collections and the type of material held.

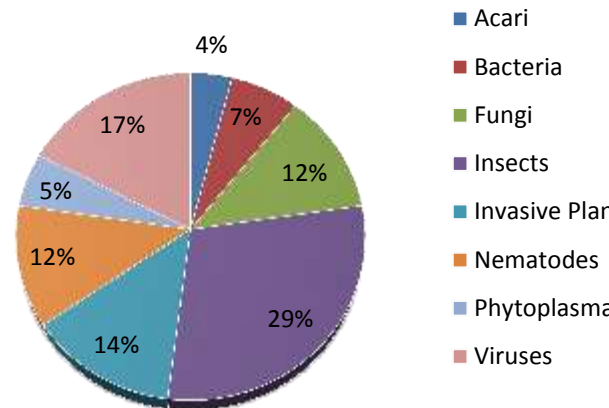


The following charts indicate, for each type of material (live, dead, or nucleic acids) the way they are distributed between taxonomic groups.

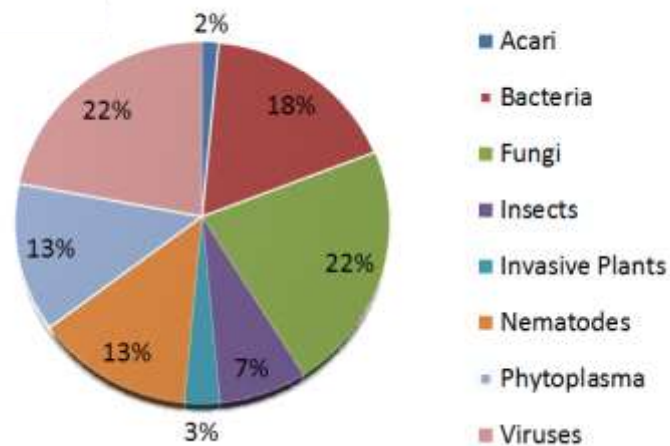
Living material in collections depending on taxonomic group



Dead material in collections depending on taxonomic group



DNA in collections depending on taxonomic group



Findings

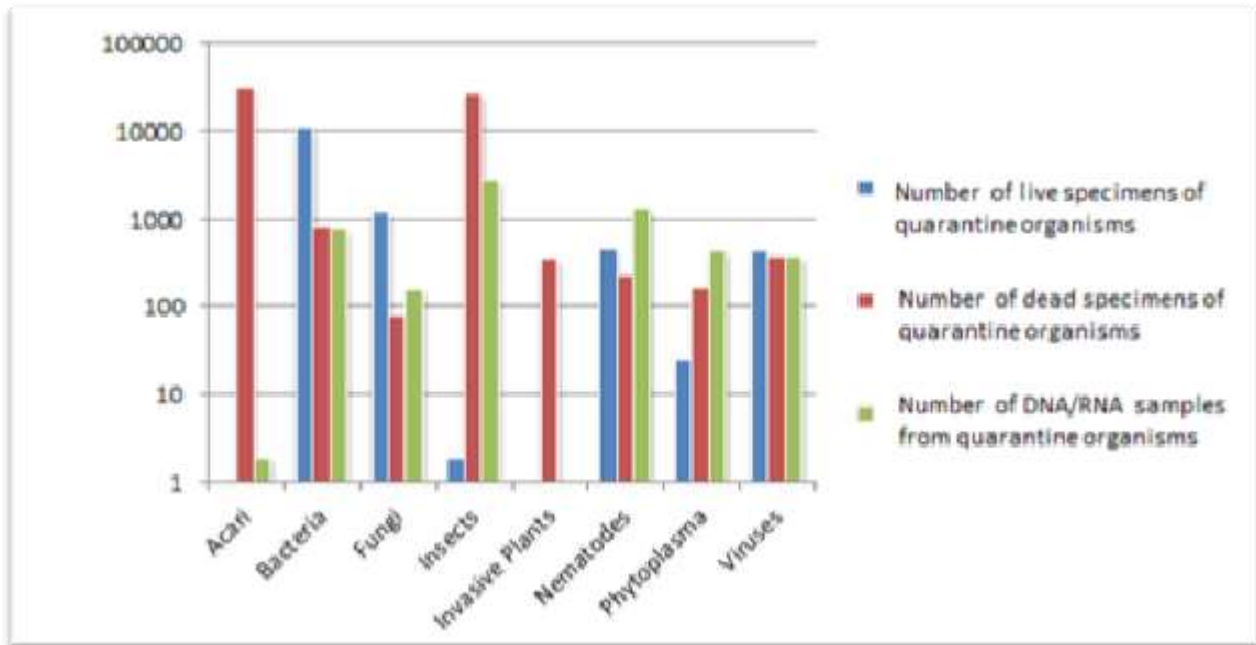
- 69,2% of collections host living material; 52,2% dead; 47,55% DNA. This result reflects the current practice.
- The number of collections that hold dead versus living material depends on the discipline. For some groups such as acari, insects and invasive plant there is very little living material in collections and dead material is usually appropriate for reference collections. On the other hand, collections of microscopic pathogens tend to be collections of live strain cultures.

2.2.2 Numbers of specimens in the collections

The information on the number of specimens is impossible to analyze for the following reasons:

- The determination of the number of specimens varies according to the respondent (counting each individual specimen or one population as a single specimen).
- As seen in the previous graphs, the types of collections vary greatly and are difficult to compare.
- Some collections were only able to provide an approximate number and a few (3 or less for each discipline) have been able to provide any figure.

a) Numbers of specimens of quarantine species per taxonomic groups and type of material (**Log10 scale**)



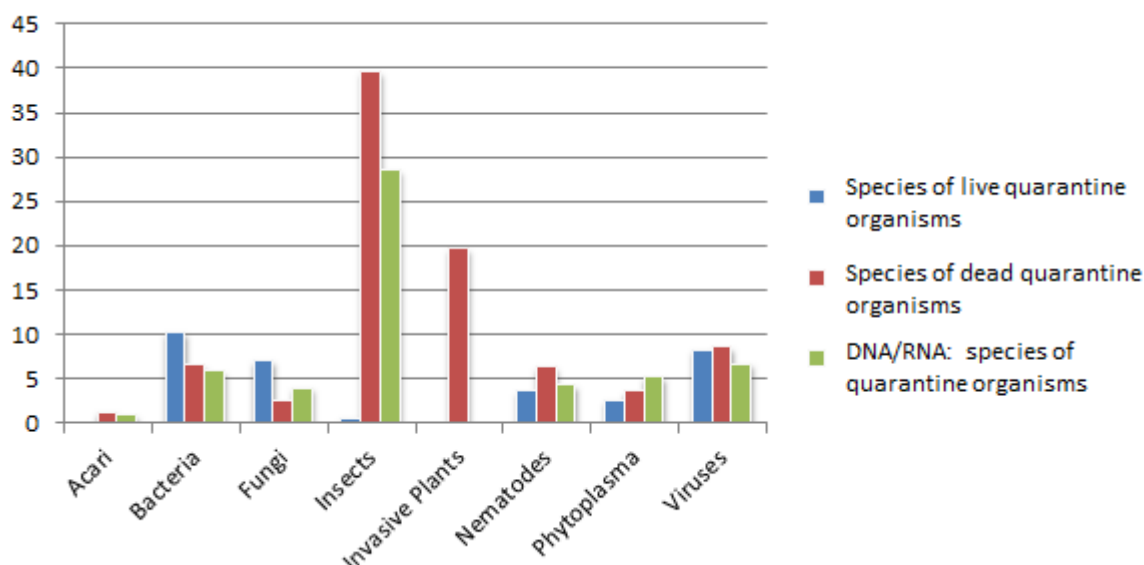
Findings

Without prejudice to the explanations provided before, this graph seems to better represent the reality, however, data for dead acari and insects are not correct, and are artificially increased by samples containing a very large number of individuals (it is as if individual bacteria were counted in a culture) this cannot be considered as reflecting reality.

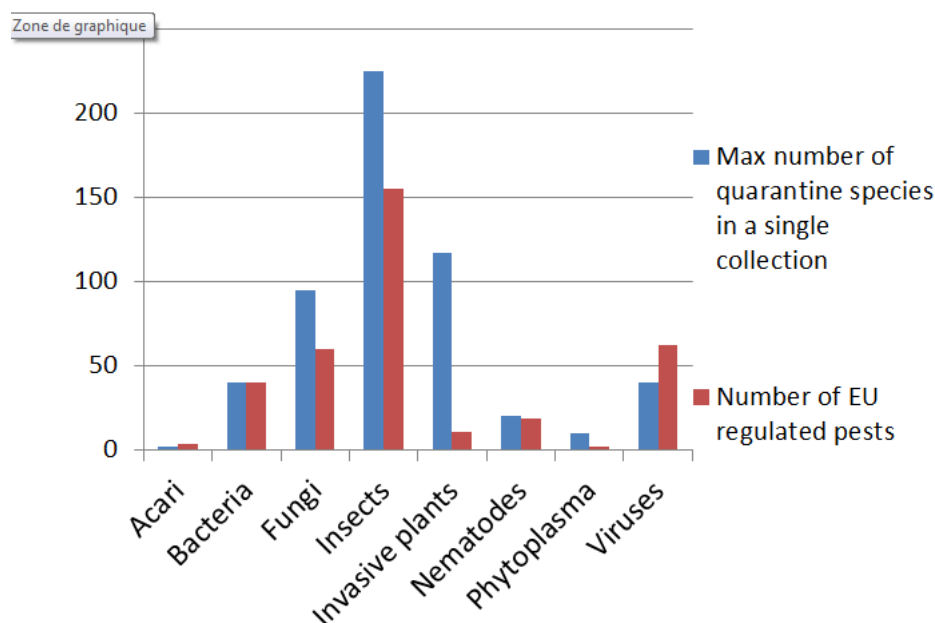
Data for other groups were considered by Q-collect partners to adequately reflect the current situation of collections.

'Insects' is the group with the highest number of DNA sequences but also the group with the highest number of quarantine species.

b) Average number of quarantine species in collections (the total number of quarantine species is not presented because of double counts).



c) The largest number of regulated pest taxa held in any single collection compared with the number of quarantine pests in EU legislation.



The number of EU regulated pests has been derived from the EU Directive 2000/29. It should be noted that for some families or genera, all non-European species are considered as regulated pests consequently accurate counting is not possible. This is the case in particular for Tephritidae or Scolytinae. Furthermore, some collections have probably also taken into account national regulated pest lists, EPPO lists...

As a result, the number of species reported is often greater than number derived from the list of the EU directive. This graph shows that the largest collections host a large number of quarantine pests but it cannot be concluded that all regulated species are represented (which is probably not the case). It should be noted that Invasive plants are not included in the EU Directive 2000/29 (only plants of the parasitic genus *Arceuthobium* are mentioned), however some countries have national regulation in place for invasive alien plants.

Collections having declared the largest number of quarantine species:

Acari 2 (CBGP-FR)

Bacteria 40 (NIBZ-SI) 26 (CFBP-FR)

Fungi 95 (LE-BIN-RU) 20 (DSMZ-DE)

Insects 225 (NPO-NL)

Invasive plants 117 (LSV-Anses)

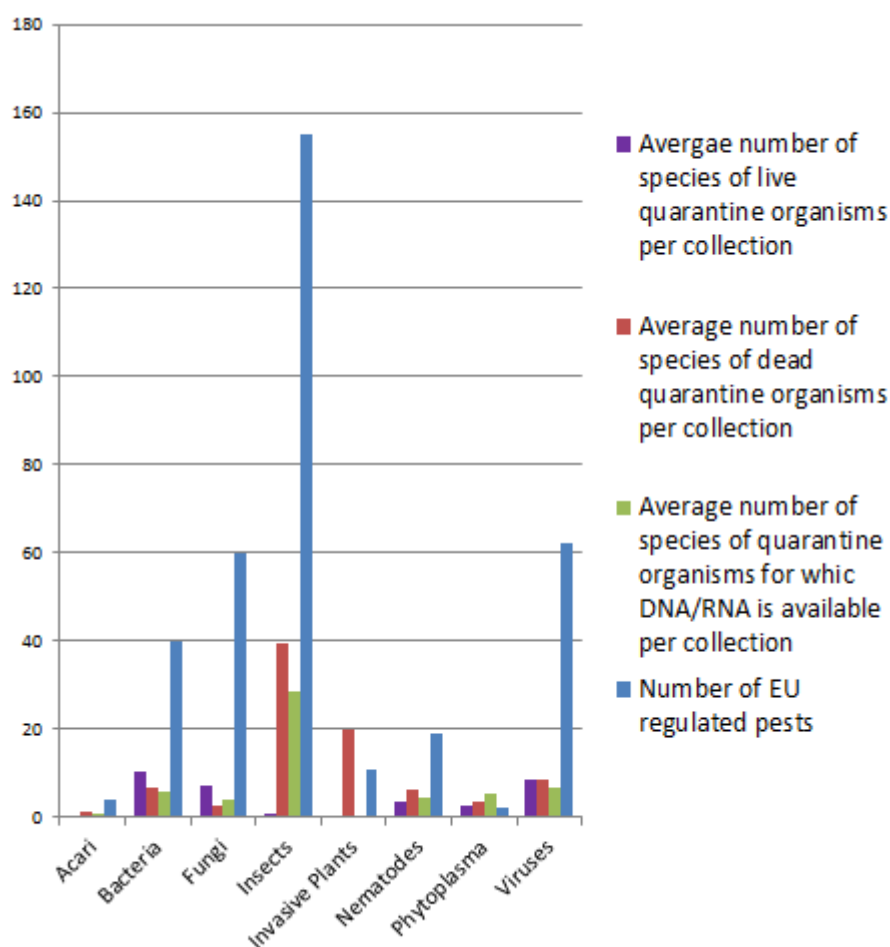
Nematodes 20 (NPPO-PL)

Phytoplasmas 10 (INRA Bordeaux)

Viruses 40 (DSMZ-DE)

d) Average number of quarantine species in collections

The following graph gives the average number of quarantine species in collections for each taxonomic group, compared with the number of quarantine pests in EU Directive 2000/29.



Findings

It is not possible to know how many specimens/species are represented (many collections do not have a catalog, and give approximate numbers).

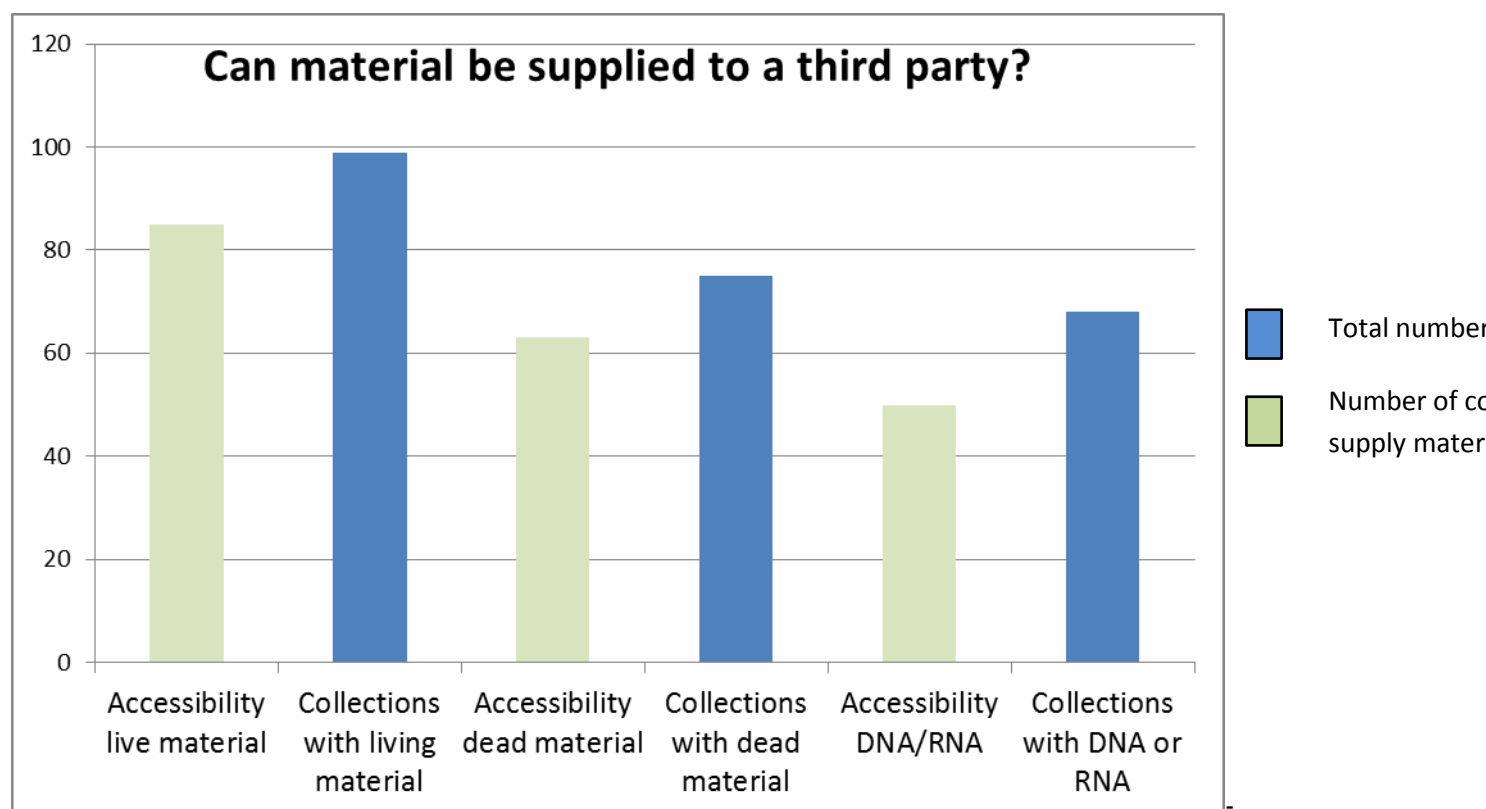
Collections did not count their numbers of specimens on the same basis: some counted the number of specimens (e.g. millions of acari...), whereas others counted the number of samples per species (not the number of specimens).

General collections host a large number of species and possibly regulated species, however these are usually difficult to access.

The average number of quarantine species represented in each collection is low (less than 10 for most discipline).

The number of specimens is difficult to interpret but some species are probably represented by a very low number of specimens (e.g. 1 or 2).

2.2.3 Accessibility of material:



Findings

Percentage of collections that give access to their material:

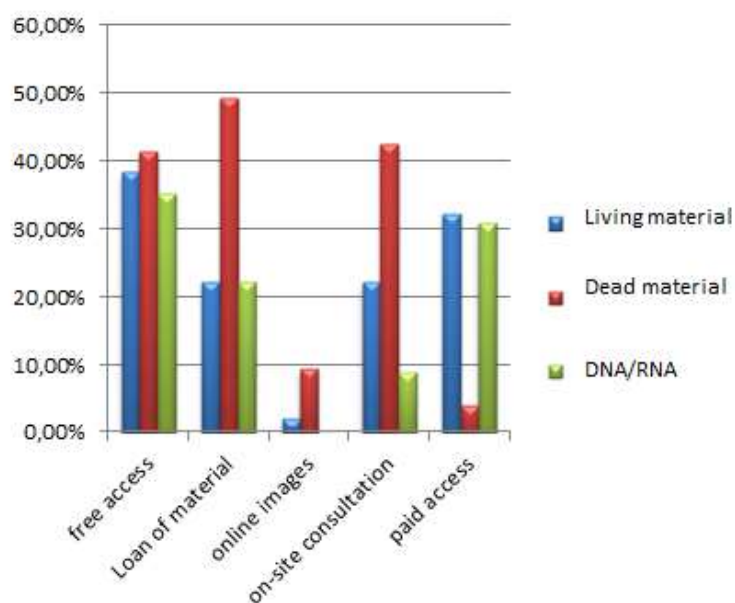
85,8% for living material

84% for dead material

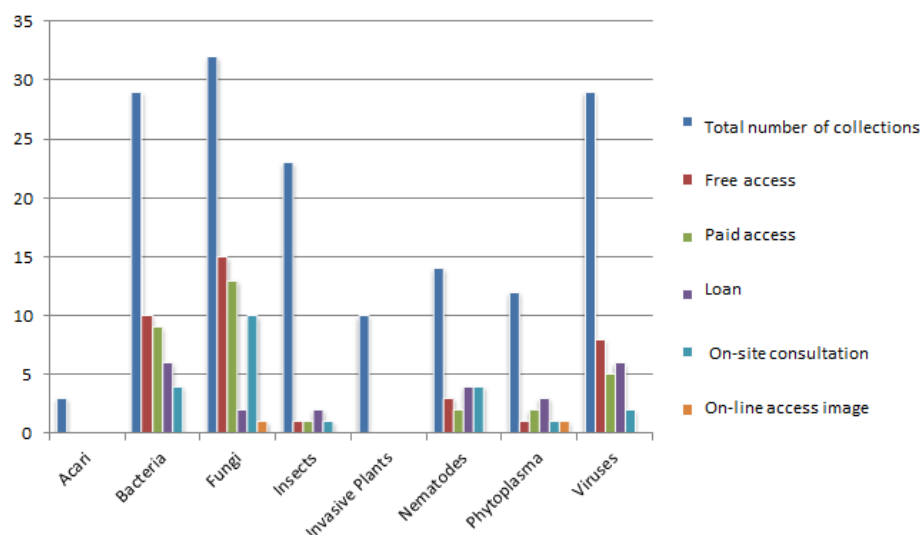
73% for DNA

Overall, a large proportion of collections give access to their material.

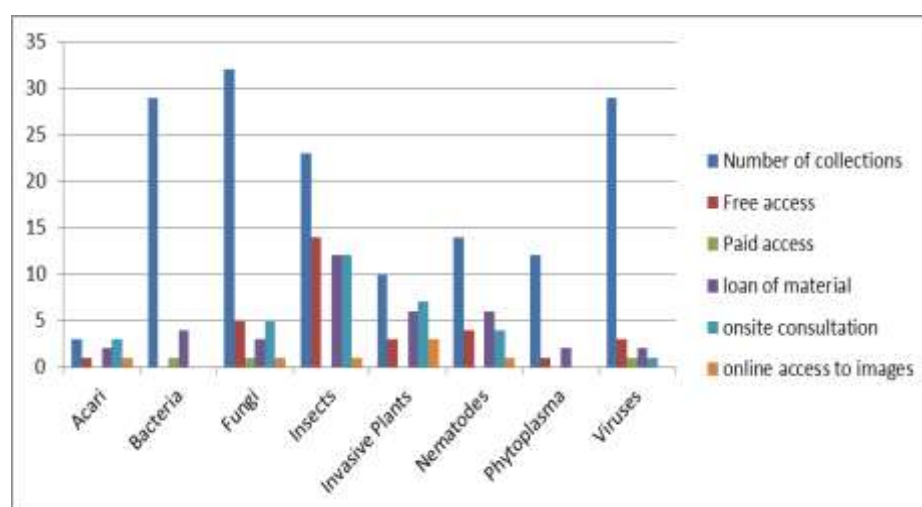
Percentage of collections that provide accessibility to their material for each category of material and type of accessibility.



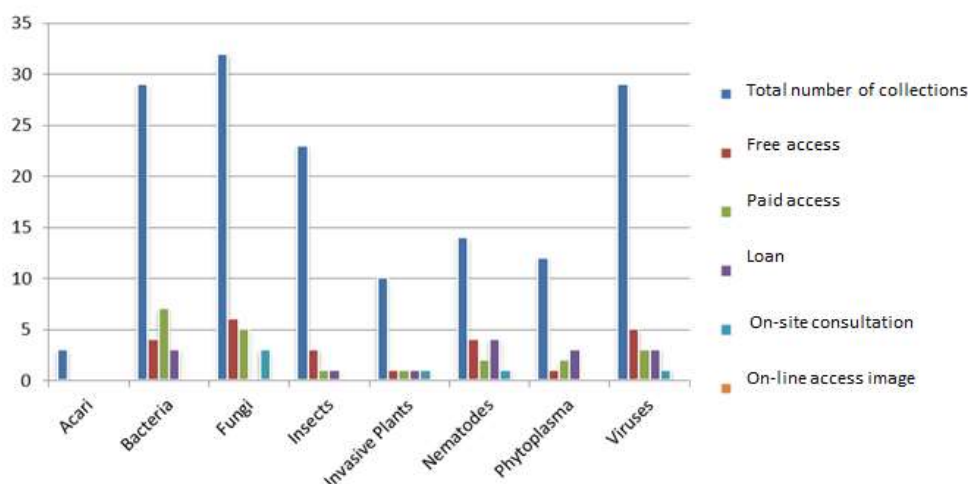
Access of living material by type of access.



Access of dead material by type of access.



Access of DNA/RNA samples by type of access.



Findings

Free access is the most frequent across taxa and types of material. Loan access is not clearly differentiated from free access, and could be considered a type of free access, especially for dead specimens that have to be returned.

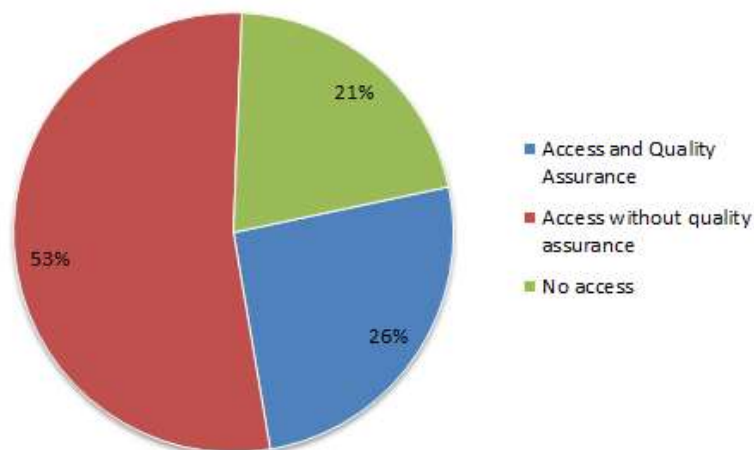
The low level of paid access, except for culture collections of live micro-organisms, could indicate that the incentive for sharing specimens is not financial. Culture collections may have a larger part of paid access due to the high costs of maintaining this type of material. Note that most paid access is on a cost-recovery basis

and not profit making.
Some collections offer two or more types of access

Access and quality assurance

It was considered useful to have an indication of the number of collections that share material, both for those who have and those who do not have any quality assurance system.

Quality assurance and sharing policies



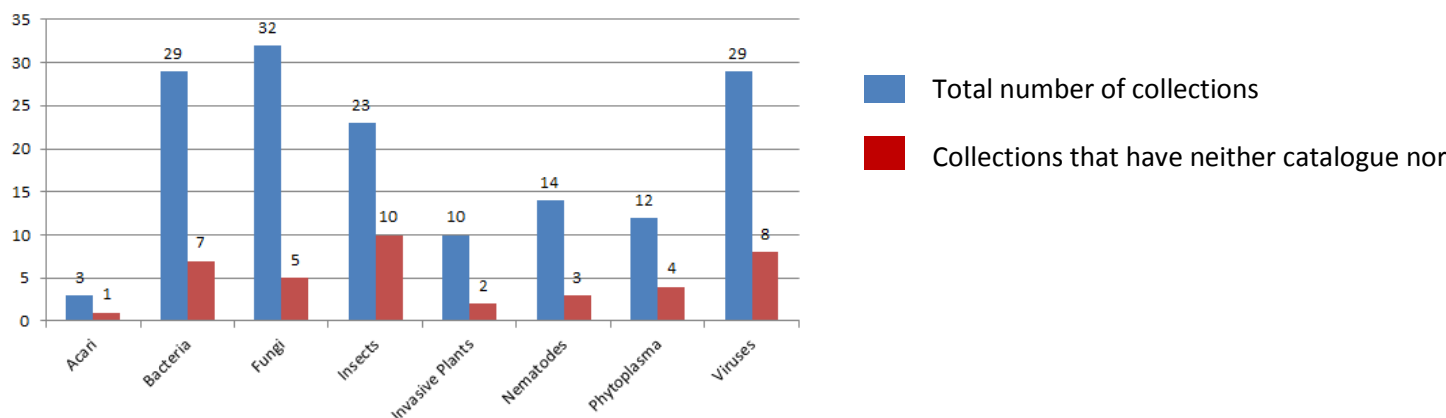
Findings

The percentage of collections sharing material with no quality assurance in place corresponds to more than half of the collections which answered the questionnaire. In such cases exchange of material is assumed to be based on trust, there is no formalized process ensuring the quality and authenticity of the specimens, which excludes in principle the use of such material in a formalized framework (such as use in the framework of official diagnostics performed under accreditation).

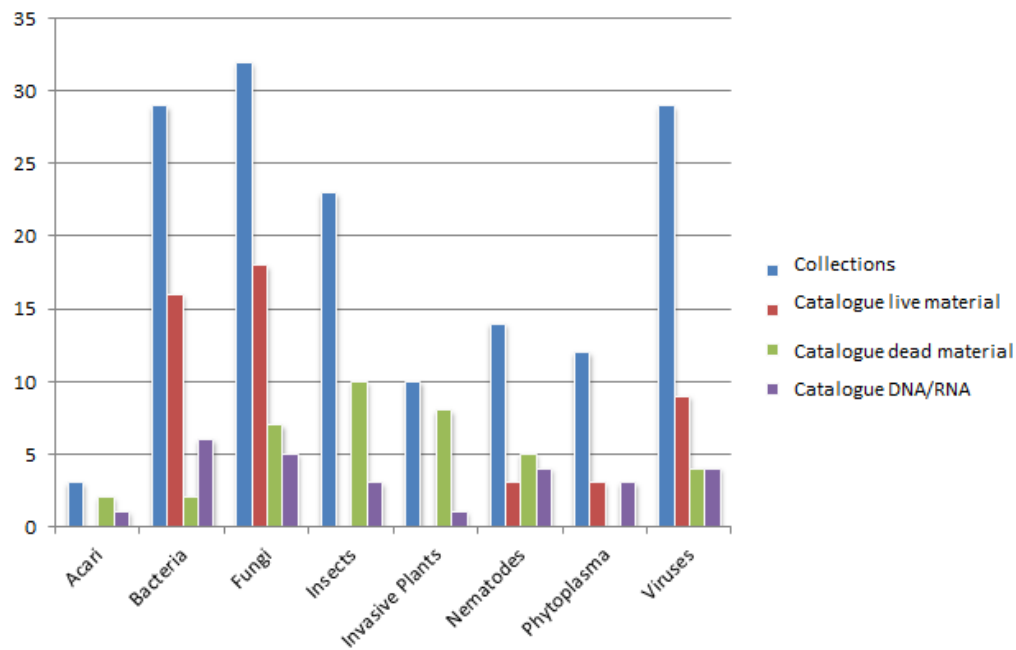
This is an important gap.

2.2.4 Catalogues

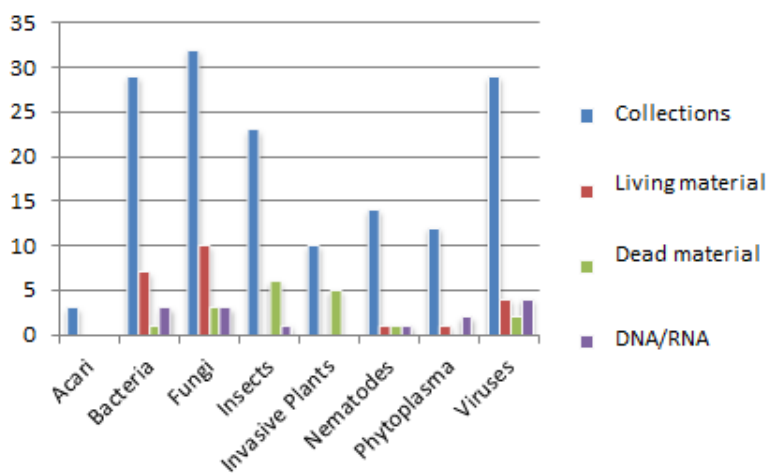
Collections that have neither catalogue nor list for their collection.



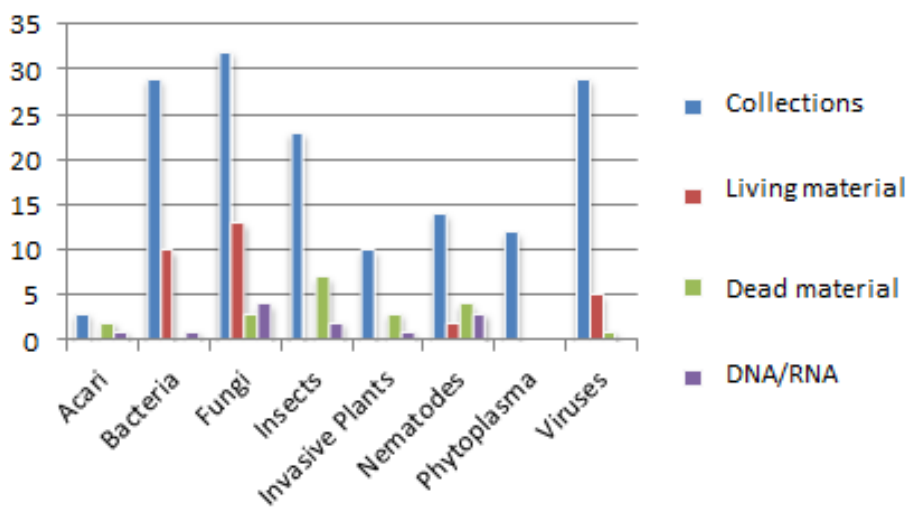
Number of collections with a catalogue for different types of material by taxonomic group
(note that one collection can have up to three catalogues for live, dead and DNA/RNA collections).



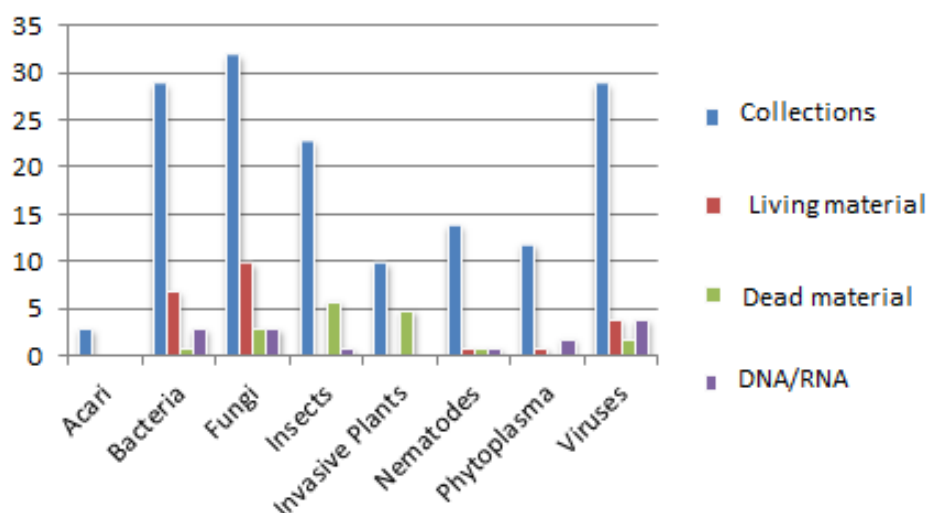
Paper catalogue:



Databases:



Online consultation:



Findings

This question should be interpreted with care, as no definition of a 'catalogue' was included, and it may have been interpreted as a publication containing a list.

The answers relating to paper, online or database catalogues are considered to be more reliable. To take this into account, the first graph gives the number of collections that have neither a 'catalogue' nor a 'list' (a list could be considered as a simple recording of material available). These collections could be considered to truly have no catalogue at all, leading to the conclusion of the gap stated below.

The percentage of collections that have neither a catalogue nor a list of their holdings is as follows.

Acari: 33%

Bacteria: 24%

Fungi: 16%

Insects: 44%

Invasive plants: 20%

Nematodes: 21%

Phytoplasma: 33%

Viruses: 28%

It is possible that a short list exist for quarantine material only but this could not be confirmed in the time frame of the project.

This is an important gap to ensure an easy access for users of biological material and solutions to improve the situation should be explored.

Catalogues on line (possibly overestimated because each collection can declare up to 3 catalogues (one for each type of material, alive/dead/DNA)

Acari: 0%

Bacteria: 34,5%

Fungi: 50,0%

Insects: 30,4%

Invasive plants: 50,0%

Nematodes: 21,4%

Phytoplasma: 25,0%

Viruses: 34,5%

Total: 36,7%

Collections with a website address

Acari: 1 (Qbank)

Bacteria: 5

Fungi: 7

Insects: 1 (Q bank)

Invasive plants: 1

Nematodes: 1

Phytoplasma: 0

Viruses: 1

Total: 15

The limited number of information available online is a gap to allow easy and straightforward online access to information on where biological material can be found.

Although collections were not asked to provide a list of species held, it can be inferred from the answers that the lists that could have been provided would have been partial.

2.2.5 Conservation status

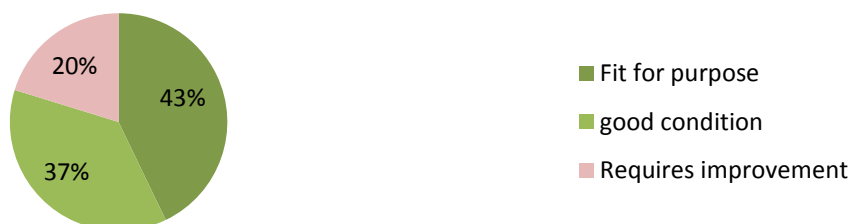
conservation status live material



Findings

No definition of the different categories was given, thus the answers reflect the perception of respondents more than any actual criteria. Nonetheless, it can be said that most of the material is fit for purpose or in good condition which is important both in term of material currently provided and for sustainability. For the 22% that requires improvement all the disciplines are included.

conservation status dead material



Findings

Most material is fit for purpose or in good condition which is important both in term of material currently provided and for sustainability. Most disciplines are represented in the 20% that require improvement.

conservation status DNA RNA



Findings

Most material is fit for purpose or in good condition which is important both in term of material currently provided and for sustainability. For the 10% that requires improvement the disciplines concerned are bacteriology, mycology, nematology and virology. This is interesting, as these collections could tend to be more structured, and have a more self-critical approach to conservation, in turn linked with the more frequent use of quality systems in these collections.

Findings

- About 30% of the material only is in good condition
 - 50% is fit for purpose
 - 20% requires improvement
 - Living and dead material are more critical, DNA is in better condition (but collections of DNA are newer)
 - Material requiring improvement can be found in all disciplines however this is more critical for fungi and bacteria collections where living material is an important part of the collection)
- For some groups such as bacteria or fungi, experts from the Q-collect project agreed on the fact that progress in conservation of micro-organisms strains have solved an important part of conservation issues. Problems remain only in small working collections. Living material is more difficult to preserve for viruses and phytoplasmata for which living plants are sometimes or always required.

The conservation status is a gap in 20% of the cases. It is important to reflect on this and to investigate if it is cost effective to improve the status of scattered material or to strengthen some collections.

2.2.6 Information recorded on the collection specimens

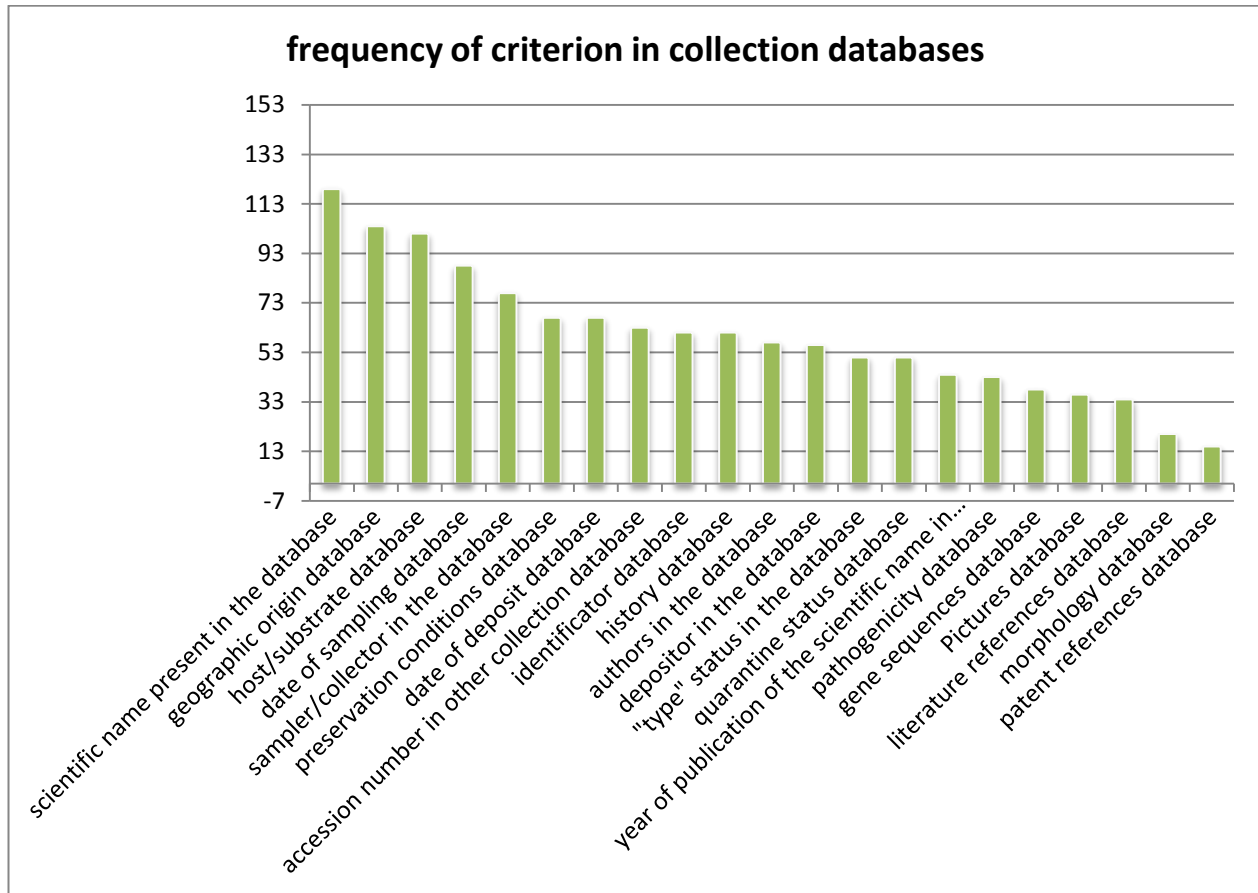
Questionnaire

4.5 Which subjects regarding the collection specimen are covered in the collection database(s), which ones are displayed online and which ones are mandatory to accept to include the material in the collection?

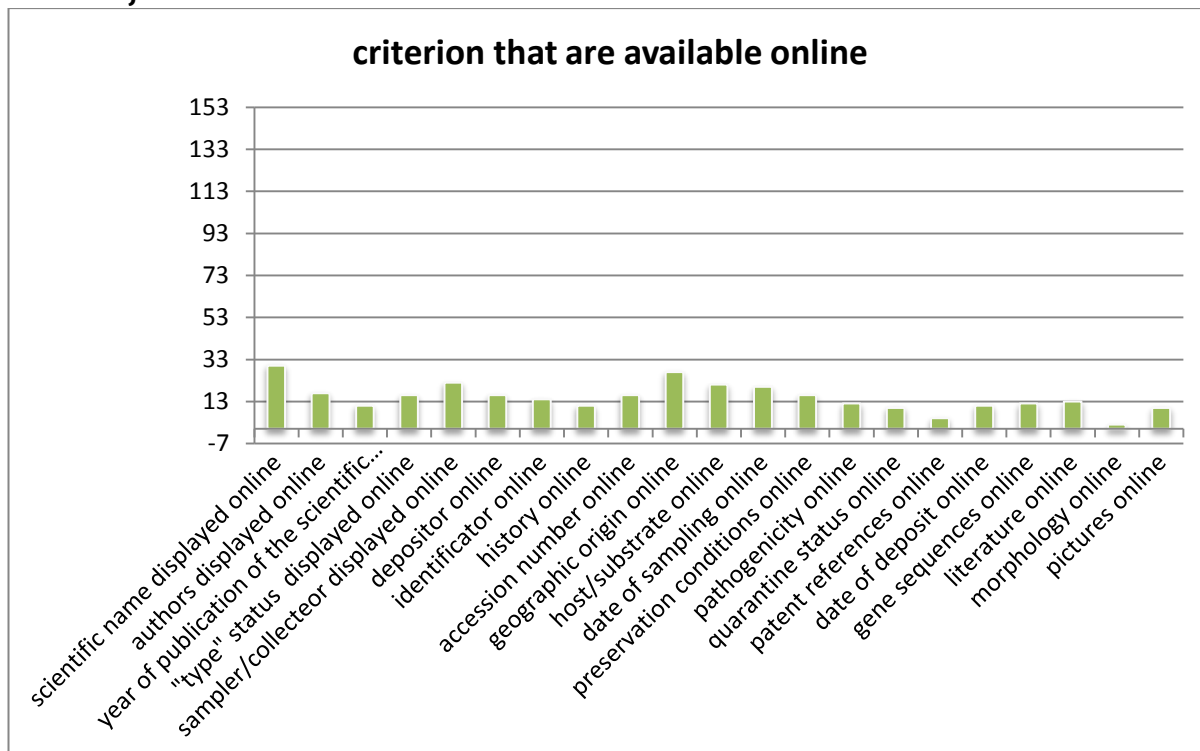
Note: answer if appropriate, if not leave empty

	In the database	Displayed online	Mandatory to accept a deposit
Scientific name	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Authors of the scientific name	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Year of publication of scientific name	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
"Type" status	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sampler/collector	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Depositor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person who made the identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
History (from sampling to arrival at the collection)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accession number in other collections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Geographic origin of specimen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Host/substrate from which the biological material was collected/sampled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Date of sampling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preservation conditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pathogenicity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quarantine status in Europe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Patent references	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Date of deposit in the collection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gene sequences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Literature references	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Morphology/morphometrics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Photos, images, pictures of the accession	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

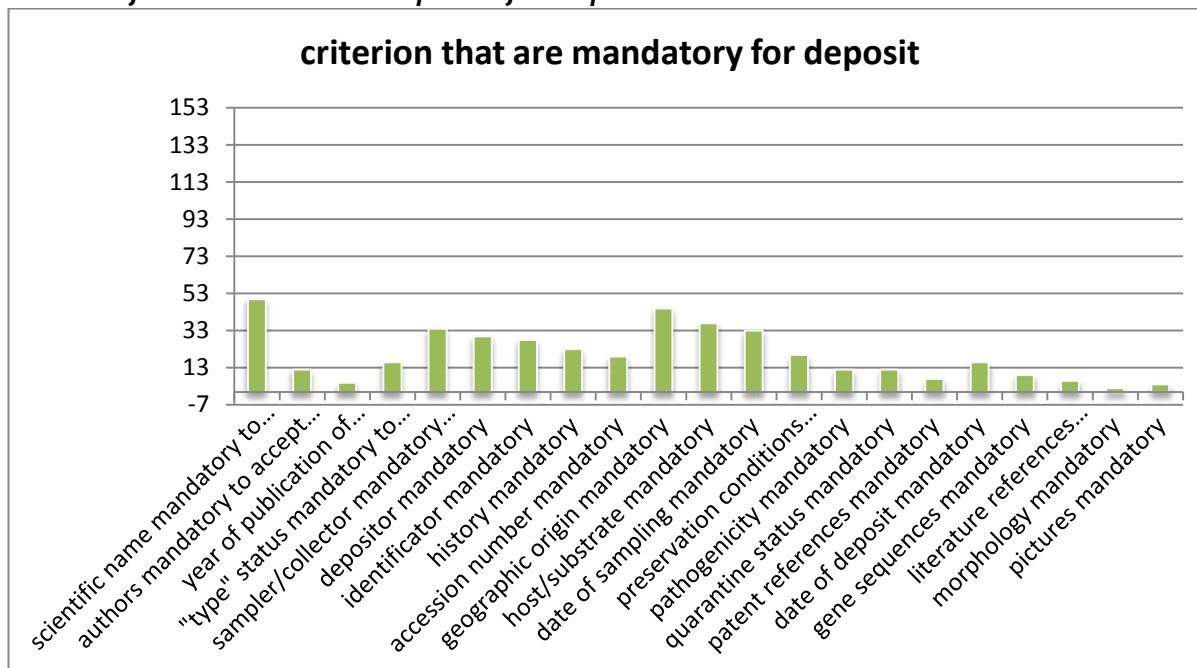
- *Information recorded in the database for the collection specimens*



- *Information that is available online:*



- *Information that is required for deposit:*



Findings

- The top five basic information recorded on specimens are scientific name, geographical origin, host/substrate, date of sampling and collector name)
- The fact that not all collections require the scientific name to be present in the database could be explained by the fact that not all collections have databases. It can still be seen as a gap not to have scientific names available. This can make retrieval of specimens difficult.
- These informations are rarely available online (it is not surprising as a few number of collections have information available online)
- The collections are not requiring many data for deposits
- The survey seems to reflect the reality
- + : basic data are associated with samples
- - : the basic information is not required by a substantial percentage of collections (20% for the scientific name up to 50% for the collector name)
- - : these data are usually not available online
- - : these data are not required for a deposit
- This is identified as an important gap and the level of information associated to collections should be improved.

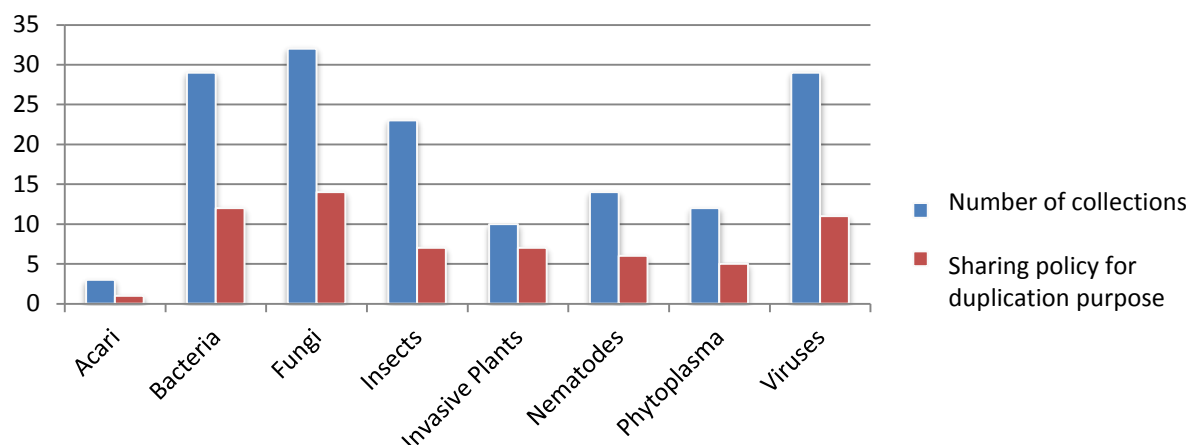
3 General questions on the collections

3.1 Sharing of material

5. Does your institute/laboratory have a policy of sharing material with other collections for duplication purposes?

Yes/No

- Policy of sharing material with other collections for duplication purposes



Or overall:



Findings:

It can be noted that almost 2/3 of collections (up to 70% for insects) do not share material for duplication. Although this can be linked with the type of specimens for the taxa (insects, acari, plants) where collections are mostly dead material that cannot be multiplied, it can be considered a gap for collections of live cultures, where incidents with buildings or equipment can lead to very fast destruction of samples.

Q-collect partners think that these numbers are too optimistic, it is possible that some collections answered that they shared material but not necessarily for the purposes of duplication to ensure preservation of specimens following accidental loss of all or part of a collection held at one location.

3.2 Collections members of networks (national or international)

6. Is your collection a member of national /international networks/associations?

If Yes, please specify (avoid acronyms) and, if possible, provide URL.



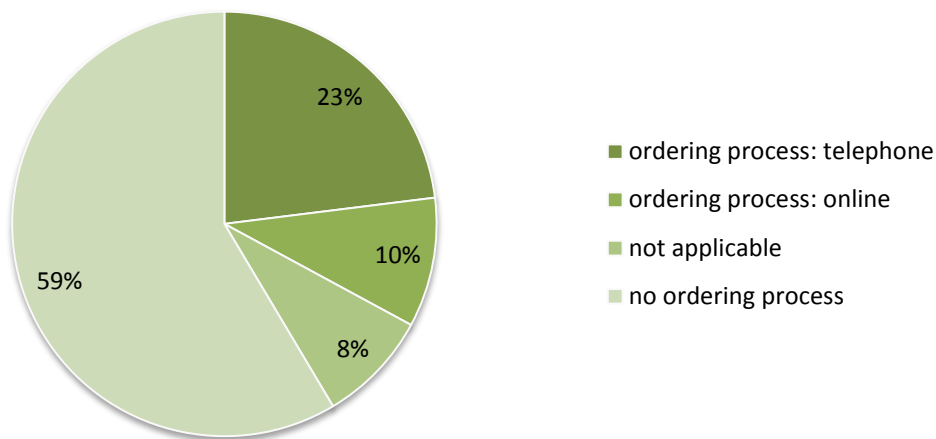
Findings

- 77% of collections are not part of a national/international network.
- Most collections are isolated not organized in network and not duplicated.
- **This is a gap for improvement of conservation**

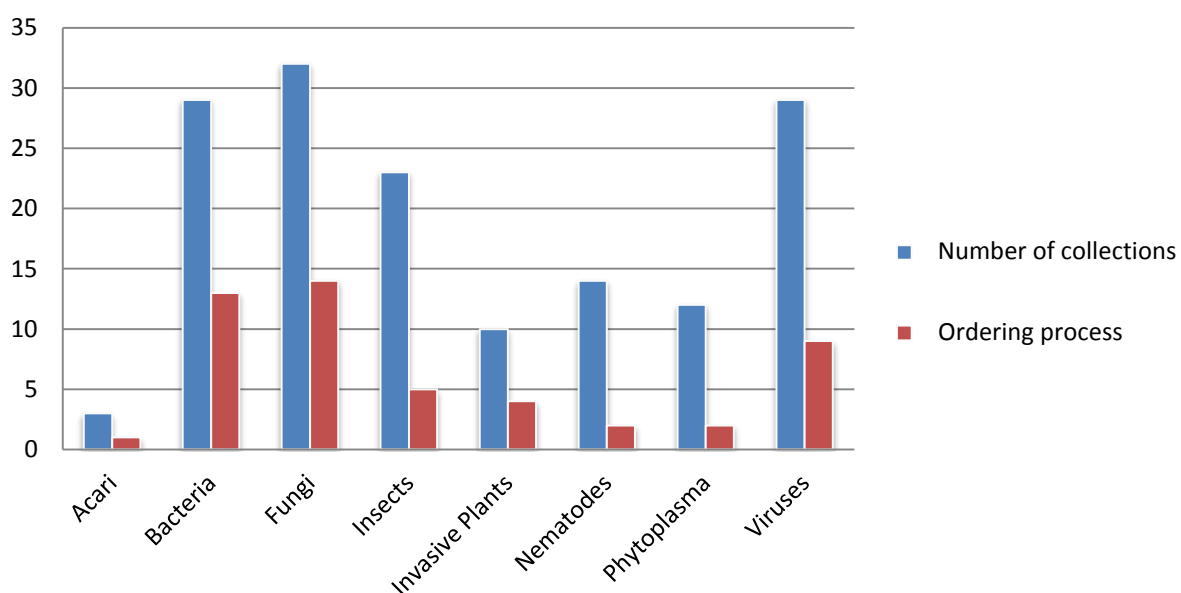
3.3 Institutes/ laboratories with an ordering process:

7. Does your institute/laboratory have an ordering process?

No/ by telephone or paper/online ordering form/Not applicable



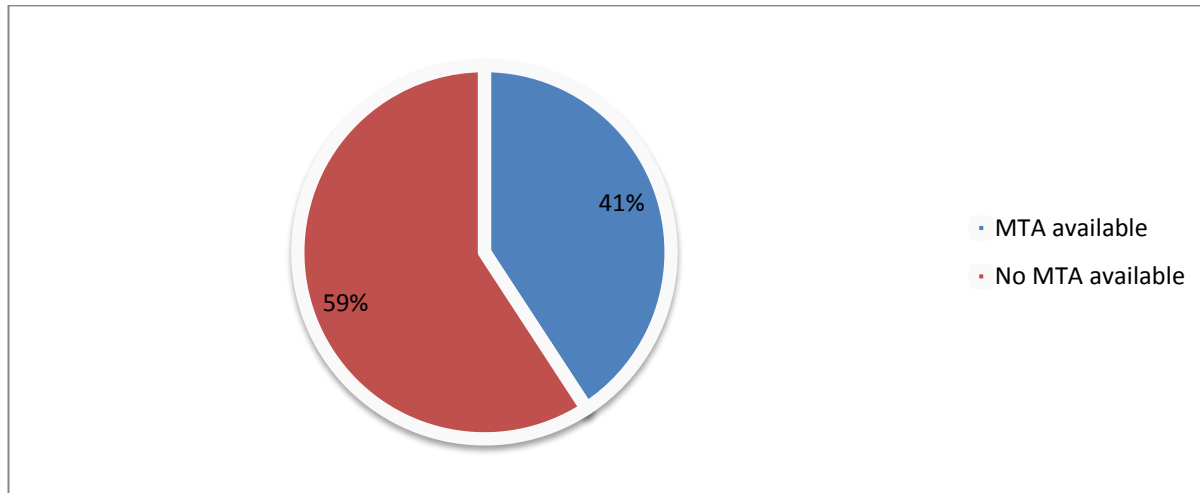
Answer as yes/no by taxonomic groups, for ordering process (as above) compared with total number of collections:



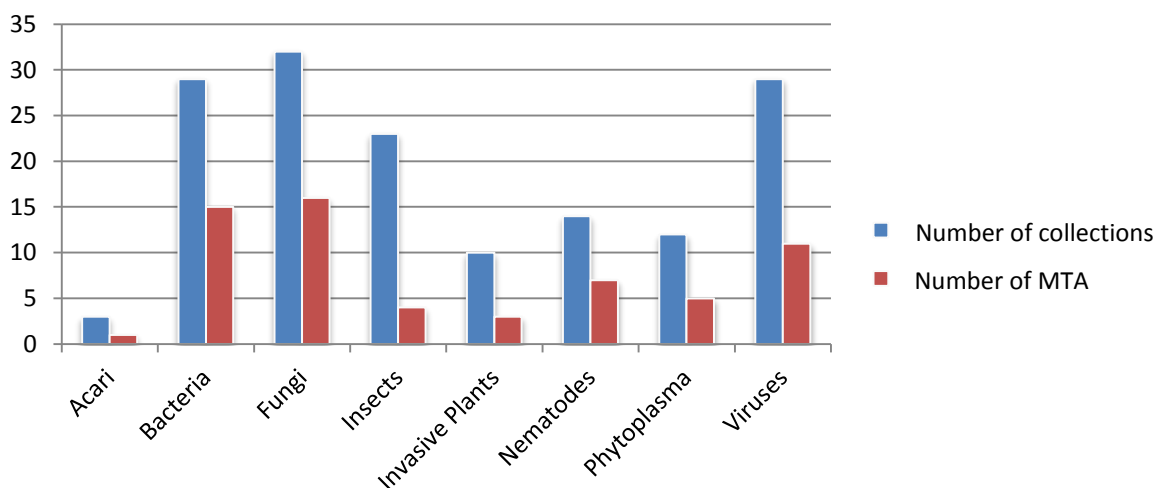
3.4 Collections with a Material Transfer Agreement:

8. Does your institute/laboratory have a Material Transfer Agreement (MTA)?

Note: The purpose of a material transfer agreement is to protect the transmission (for research purposes, or so as to assess a potential industrial partner...), of any and all form of materials (biological, vegetable, chemical, ...) which are not accessible to the general public, and to prevent the person receiving such materials from appropriating, publishing, or using them (or having them used) for commercial ends.



Divided by taxonomic groups (blue is total number of collections for reference)



Findings

Most of collections are working collections (60+8%) and have no procedure for ordering. It can consequently be inferred that these collections do not specifically plan to share material. This proportion of negative answers is shared throughout taxonomic groups, from 55,2% for bacteria up to 78,5% for entomology.

The proportion of collections that declared having an MTA available is similar to the proportion having an ordering process, which seems to confirm the hypothesis above. Nonetheless, some results are unclear. For instance, more nematode collections declared having an MTA than ordering process. It is possible that some of these collections excluded MTAs from ordering processes. It could also mean that 'having an ordering process' was interpreted very narrowly, and that there are more collections with semi-formal ordering processes than were revealed by the study.

Allowing for this very possible bias, these results nonetheless point to a gap in overall collection management.

- : collections are mostly working collections that do not plan to share material.

+ : but when they share material they are mostly aware of quarantine and intellectual property risks, and have a MTA in place.

3.5 Awareness of the EPPO Standard PM3/64 on Intentional Import of Organisms that are plant pests or potential plant pests:

9. Are you aware of the EPPO Standard PM3/64 on Intentional Import of Organisms that are plant pests or potential plant pests, in particular the appendix on confinement conditions?

Yes/No

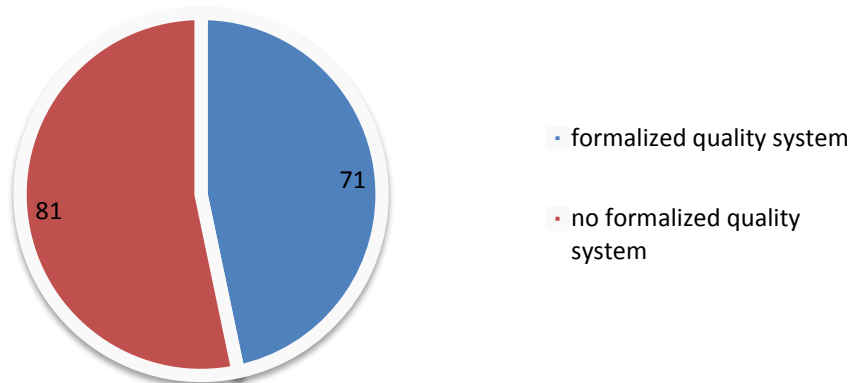


Findings

Awareness of PM 3/64 can be interpreted as awareness of quarantine risks associated with plant pests. Non-awareness of the Standard does not necessarily mean that collections are unaware of locally applicable legislation, in most cases EU Directive 2000/29. Furthermore PM3/64 does not apply to dead material. It can be asserted that most collections are aware of quarantine risk.

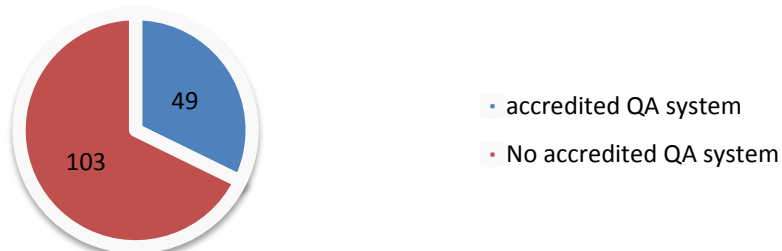
3.6 Collections with a formalized quality system for maintenance and management of the collection:

10. Does your institute/laboratory have a formalized quality system covering maintenance and management of the collection?

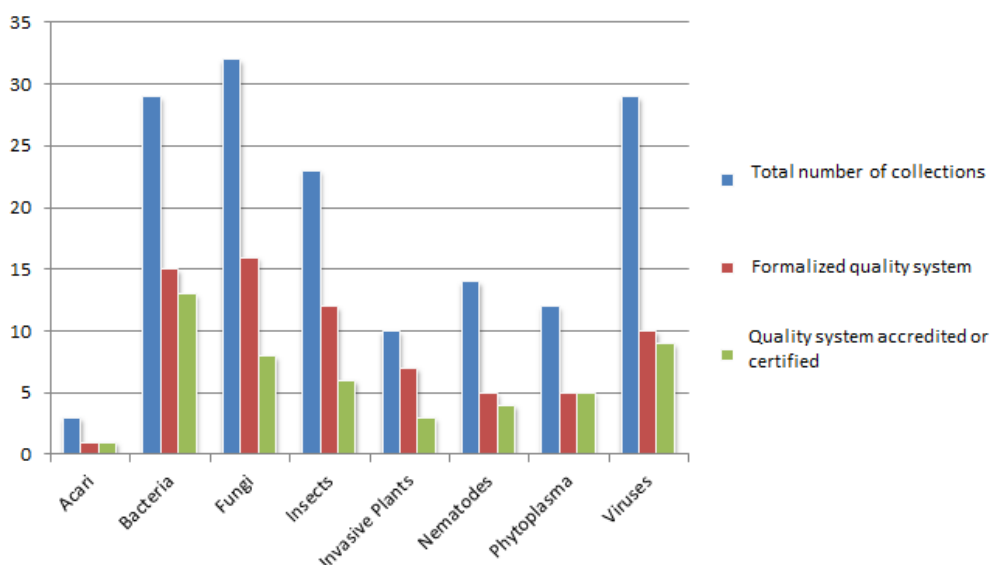


10.1. Is your Quality assurance system certified/accredited?

- Quality system certified or accredited



- Quality systems by taxonomic groups:



Findings

These answers were combined with the information on specimen sharing to identify the gap on collections sharing material without having quality assurance systems in place. This gap is presented under point 2.2.3 (accessibility of material). **The absence of quality assurance systems in collection is a major gap in particular for those who share material.**

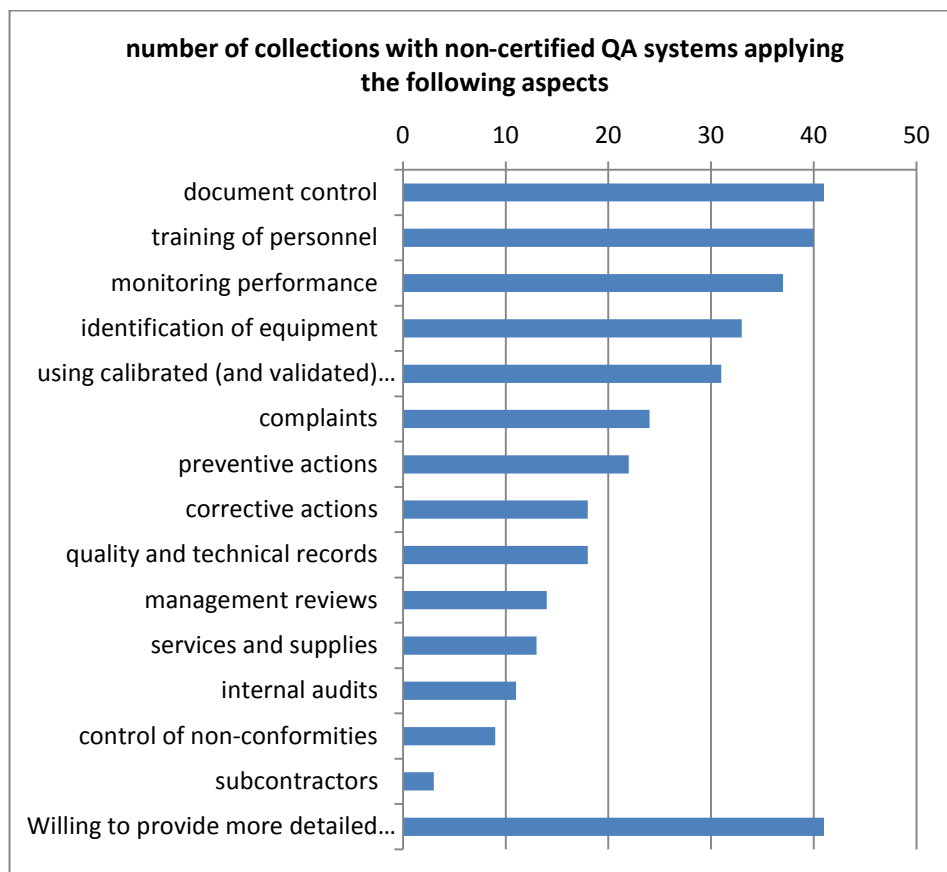
10.2. Do you apply any of the following aspects concerning maintenance and management of your collection(s):

Note: answer if appropriate, if not leave empty

- ☐ document control
- ☐ subcontractors
- ☐ services and supplies
- ☐ complaints
- ☐ control of non-conformities
- ☐ corrective actions
- ☐ preventive actions
- ☐ quality and technical records
- ☐ internal audits
- ☐ management reviews
- ☐ training of personnel
- ☐ identification and handling of equipment used in the production and the identification of the material
- ☐ monitoring performance of equipment used in the production and the identification of the material
- ☐ using calibrated (and validated) equipment
- ☐ using validated methods/published keys for identification/characterisation
- ☐ I am willing to provide more detailed information on our activities if contacted

This question was written to go into more detail on quality assurance than simply stating that collections had certified quality assurance or not. It is an attempt to explore which aspects of quality assurance systems have been set up in collections that have chosen to set up a quality system, but have lacked the resources or the need to achieve certification. The answers to this question will be used as inputs to the groups working on an EPPO Standard for Quality assurance in collections.

The following graphs lists in decreasing order the different aspects of quality assurance systems that can be found in collections without a certified QA system:



Findings

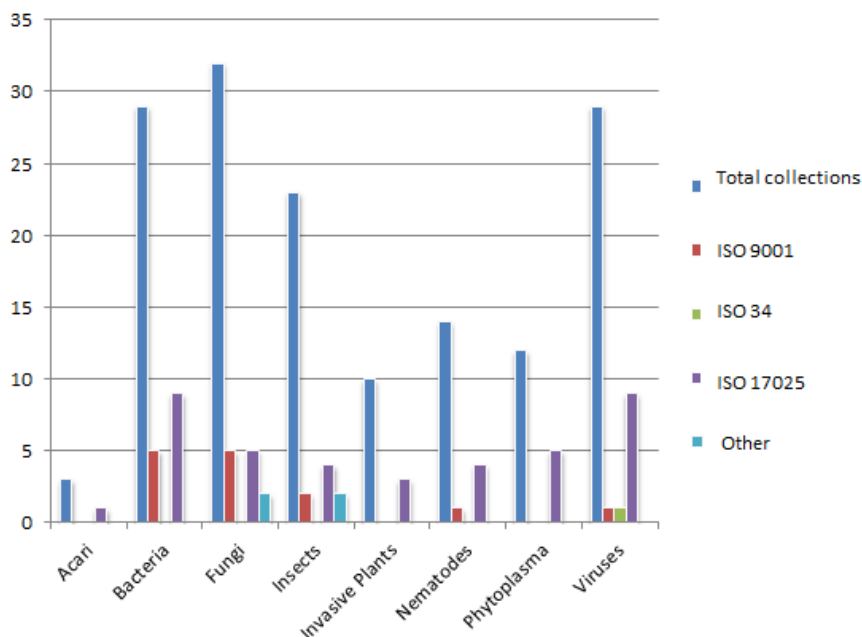
From these answers, it can be observed that the aspects of quality assurance most often implemented by non-certified/accredited collections are those linked with the practical issues arising from daily management of a collection (document control, personnel, performance, equipment, ...), and not the ones linked with the systematic approach to quality assurance (management of complaints, preventive and corrective actions, management reviews, etc.).

Note that these are the points that guarantee the quality of identification and traceability of samples.

Formalized quality systems types:

10.3. Does your quality system conform to:

- ISO 9001
- ISO 34
- ISO 17025
- Other quality standard please describe



Findings

Note: only the Standard ISO34 applies specifically to collections. Other standards apply to laboratories activities (in particular ISO 170025) in which case procedures to identify specimens are accredited).

- Less than 50% of collections have a formalized quality system, less than 1/3 have accredited procedures.
- There are significant differences in the rate of accreditation between taxonomic groups 28% for insects up to 44,8% for bacteria. This could be linked with the typology of collections, quality assurance being an interesting tool in enabling long-term maintenance of reliable culture collections.
- Amongst collections from accredited laboratories, ISO 17025 is the Standard most often referred to (40 laboratories), followed by the generic ISO 9001 (14 collections) and a single collection following ISO 34. It is reminded that a laboratory accredited for ISO 17025 will be compliant with ISO 9001.
- Only one collection is accredited against a Standard specifically focusing on supply of reference materials (ISO34).
- Most collections are associated to NPPO laboratories which have certain procedures accredited to the ISO17025 Standard. This could help explain the strong preference for this standard in the collections that have chosen to be certified.
- **The fact that few collections have a formalized quality system is considered as a gap.**

3.7 Documented procedures and records

11.1. Do you have documented procedures and archived records concerning characterization of specimens, including:

- Primary identification of the specimen Yes ☐ No ☐
- Classical morphological description? Yes ☐ No ☐ Not applicable ☐
- Phenotyping methods? Yes ☐ No ☐ Not applicable ☐
- DNA/RNA sequencing? Yes ☐ No ☐ Not applicable ☐
- Pathogenicity determination? Yes ☐ No ☐ Not applicable ☐

Other relevant procedures: Please describe briefly

11.2. Do you have documented procedures and archived records concerning material processing, handling and storage of specimens, including:

- Replication? Yes ☐ No ☐ Not applicable ☐
- Purification? Yes ☐ No ☐ Not applicable ☐
- Homogenisation? Yes ☐ No ☐ Not applicable ☐
- Isolation? Yes ☐ No ☐ Not applicable ☐

Prevention of contamination? Yes ☐ No ☐ Not applicable ☐

Preservation methods(e.g. drying, freezing)? Yes ☐ No ☐ Not applicable ☐

Storage conditions? Yes ☐ No ☐ Not applicable ☐

Assignment of unique identification numbers? Yes ☐ No ☐

Labelling? Yes ☐ No ☐ Not applicable ☐

Packaging? Yes ☐ No ☐ Not applicable ☐

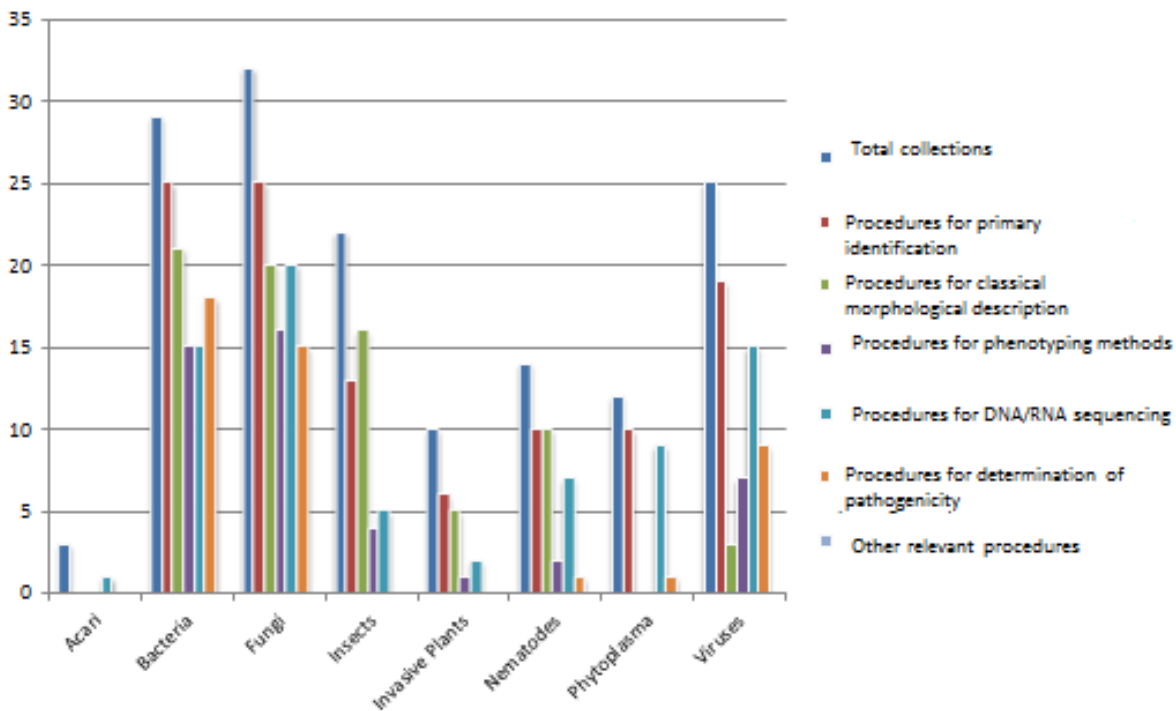
Shipment Yes ☐ No ☐ Not applicable ☐

Periodic assessment of authenticity and quality of specimens during storage? Yes ☐ No ☐ Not applicable ☐

Periodic assessment of authenticity and quality of specimens after an exchange? Yes ☐ No ☐ Not applicable ☐

Other relevant procedures, please specify

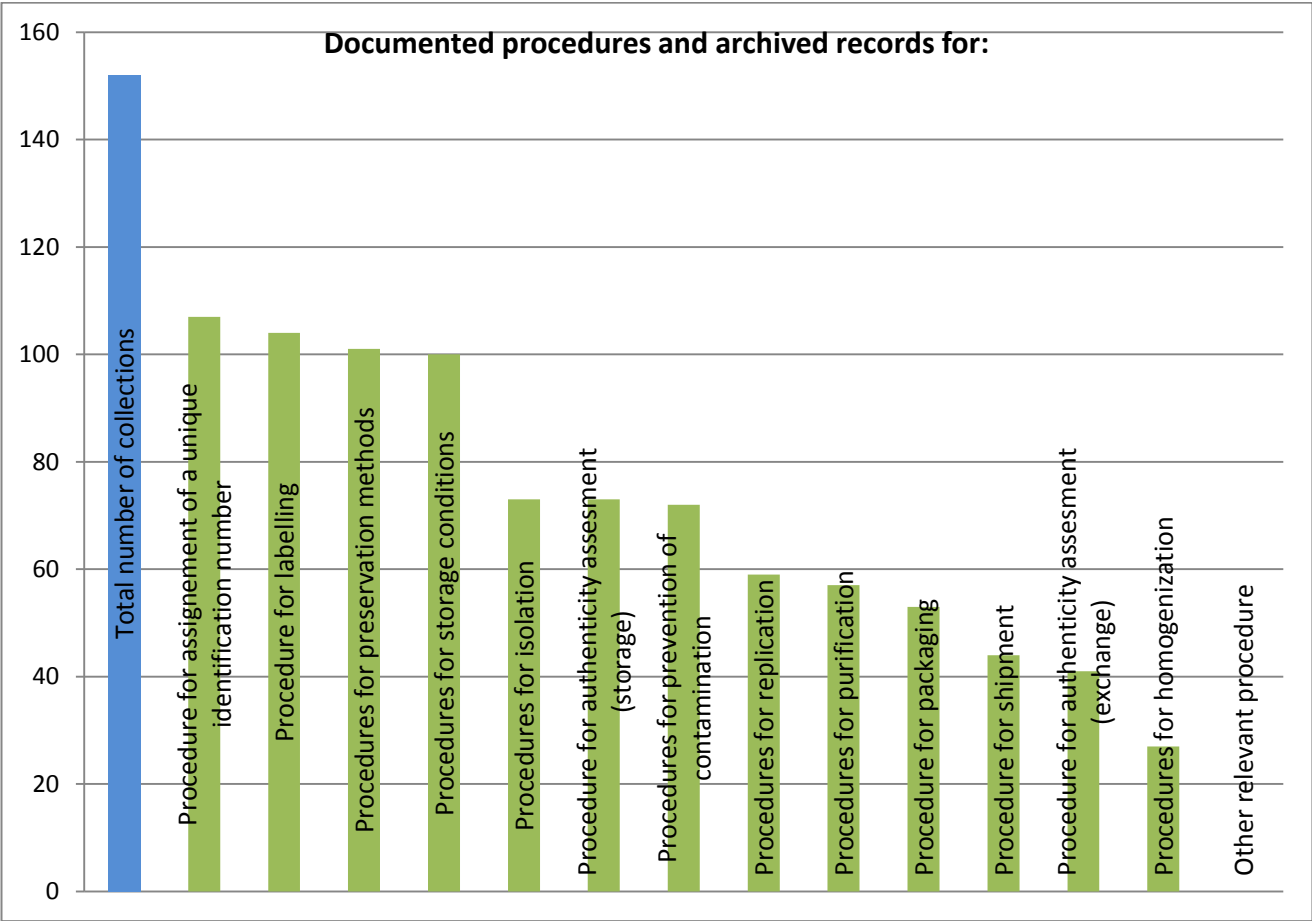
- Characterization of specimens



Findings

Many collections use several procedures for characterisation of specimens but is difficult to interpret.

Documented procedures and archived records for:



Findings

The 4 first procedures are relevant for all groups (others could be specific to certain groups and consequently more difficult to analyse).

Focusing on the 4 first types of procedures, it should be noted that nearly 30% of the collections have no documented standard procedure for numbering, labelling of samples, preservation and storage.

This is a gap and should be improved.

Identification and authentication of material

12. Is your collection of quarantine organisms generally characterized/ identified with a currently recognized method/ published procedure or generally agreed method?

Yes ☐ No ☐ Partial ☐

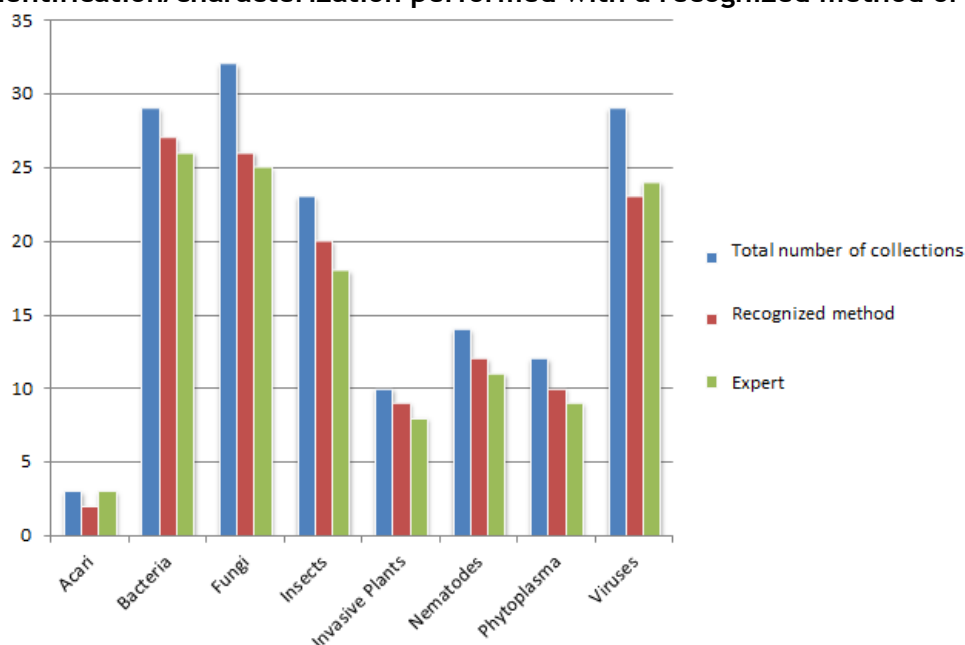
Explanatory note: This question focuses on what happens to individual specimens (process for identification), and not on the existence of a procedure.

12.1 Is the characterisation/identification performed by an expert?

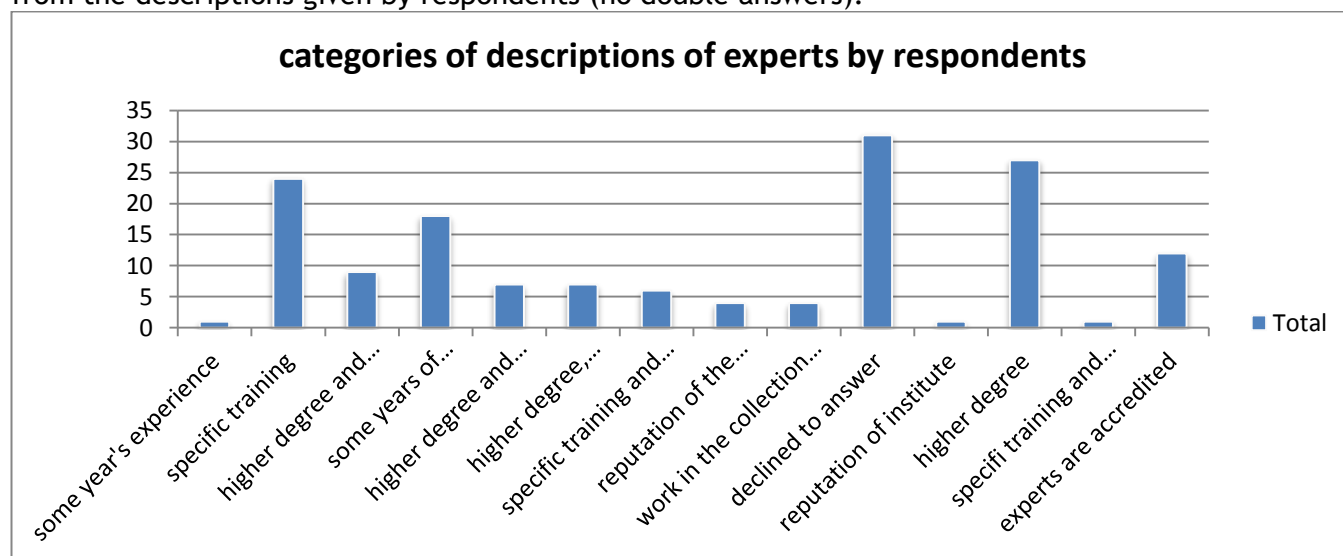
Yes ☐ No ☐

If Yes, specify the qualifications required of the expert(s)

Identification/characterization performed with a recognized method or by an expert



The following graph summarizes the categorization of expert qualifications made by the WP2 group from the descriptions given by respondents (no double answers):



Findings

- Most collections have at least a procedure for identification, or a definition of expert qualifications. Less than 1% declared having neither.
- Experts are defined by their experience, training, higher degrees, accreditation, reputation

- The role of publications in defining expertise has been outlined by one collection only.

3.8 Assessment of homogeneity

13. Do you carry out an assessment of the homogeneity of batches of individual specimens, including:

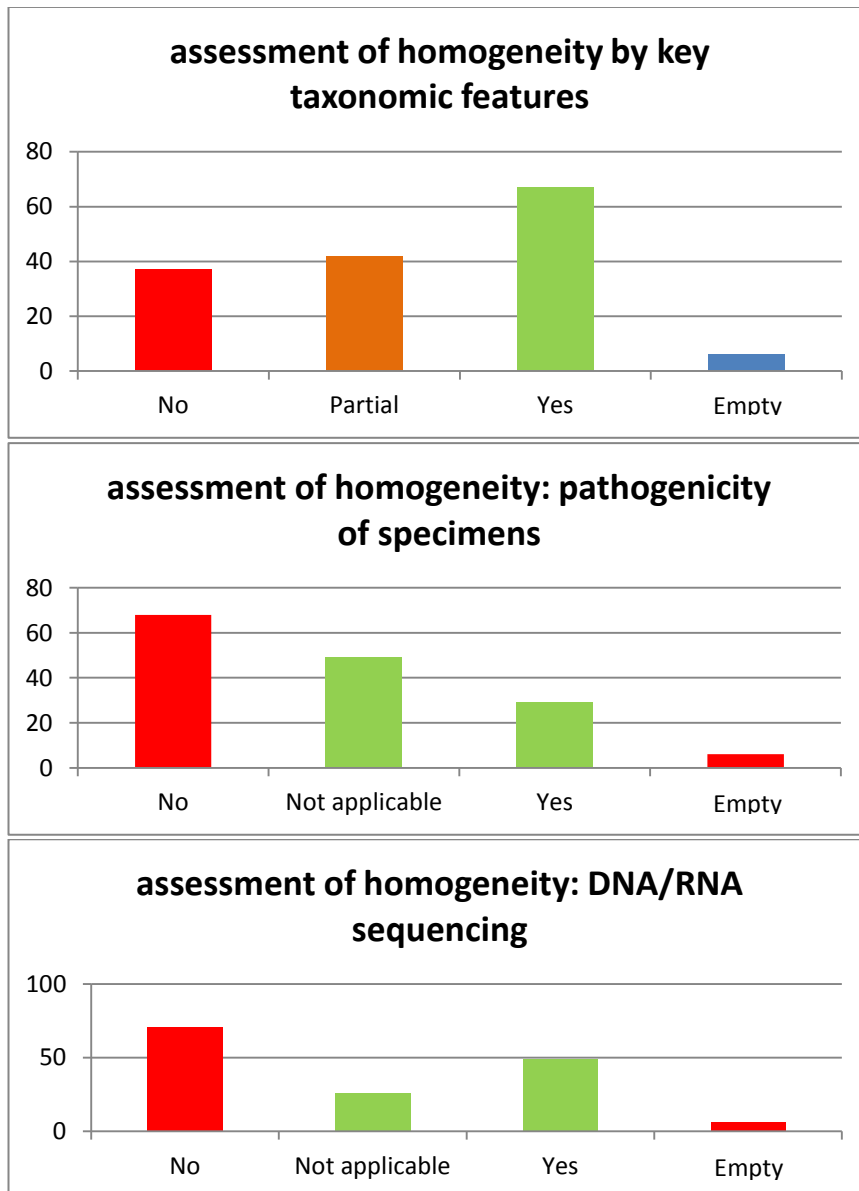
Key taxonomic features (e.g. morphometry)? Yes ☐ No ☐ Not applicable ☐

Viability? Yes ☐ No ☐ Not applicable ☐

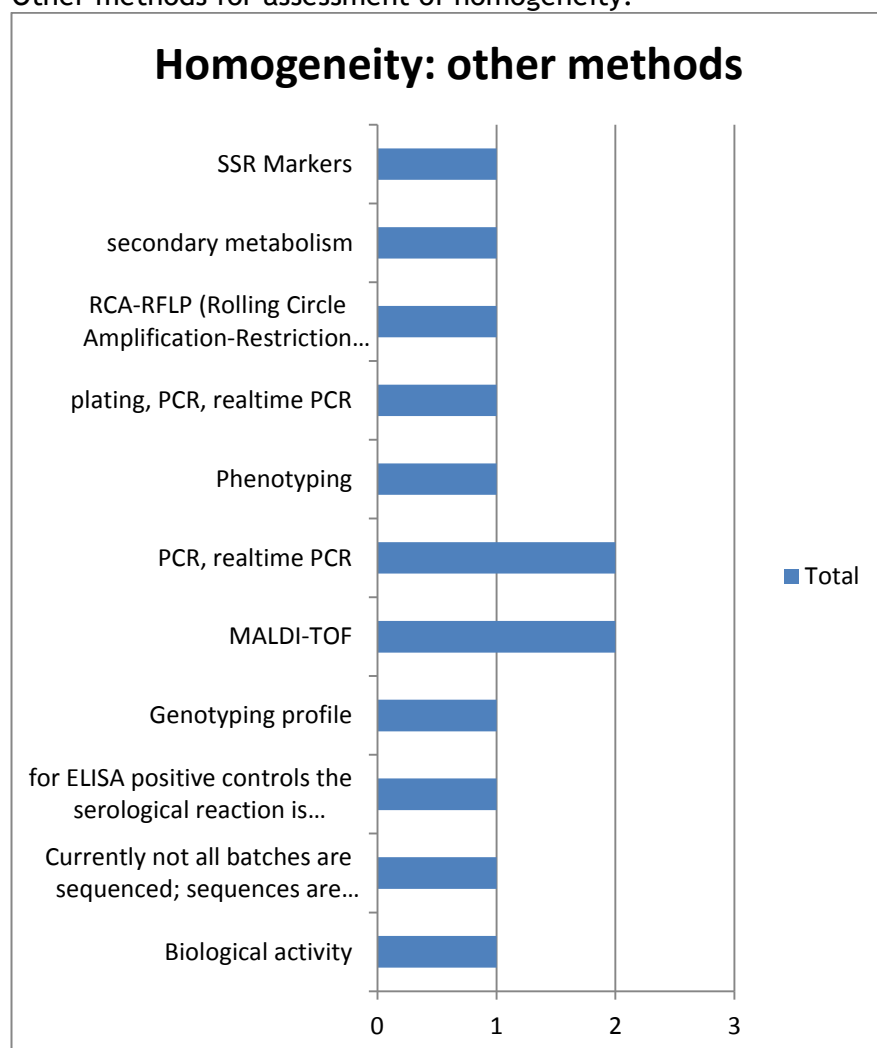
Pathogenicity? Yes ☐ No ☐ Not applicable ☐

DNA/RNA sequencing? Yes ☐ No ☐

Other relevant procedures, please specify



Other methods for assessment of homogeneity:



Findings

- 26 collections do not perform homogeneity assessment (neither on morphology, taxonomy, or DNA) : Acari 1, Bacteria 7, Fungi 4, Insects 1, Plants 3, Nematodes 3, Phytoplasmas 2, Viruses 5.
- Homogeneity is assessed taxonomically for 74,6% of collections, by DNA methods for 33,6%
- **There is a gap for 17% of collections that do not assess homogeneity.**
- Assessment of homogeneity based on pathogenicity
 - This is relevant mainly for viruses, bacteria, phytoplasmas, fungi, nematodes, (not for insects, acari and plants, especially for collections of dead specimens)
 - When relevant 29,9% of collections assess pathogenicity. This is an identified gap but Q-collect experts believe that assessing the pathogenicity is not systematically performed because of technical problems and feasibility. However it should be noted that there should at least be confirmation of pathogenicity of live organisms at the time of accession/deposit into the collection.
- Assessment of homogeneity based on viability
 - When considered relevant 57% of collections only assess viability. **This is a gap**

3.9 Assessment of stability:

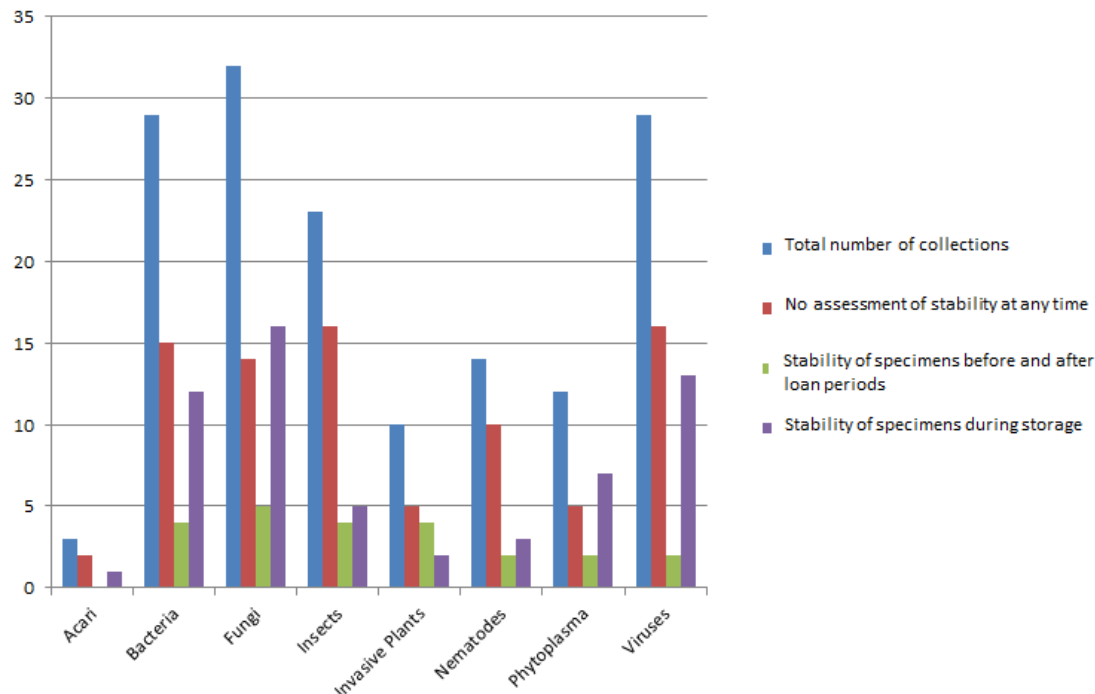
14. Do you carry out an assessment of the stability /authenticity of specimens:

14.1. During storage? Yes ☐ No ☐ Not applicable ☐

14.2. Before and after loan periods? Yes ☐ No ☐ Not applicable ☐

If Yes for either question, please briefly summarise procedures used:

Assessment of stability, divided by taxonomic groups:

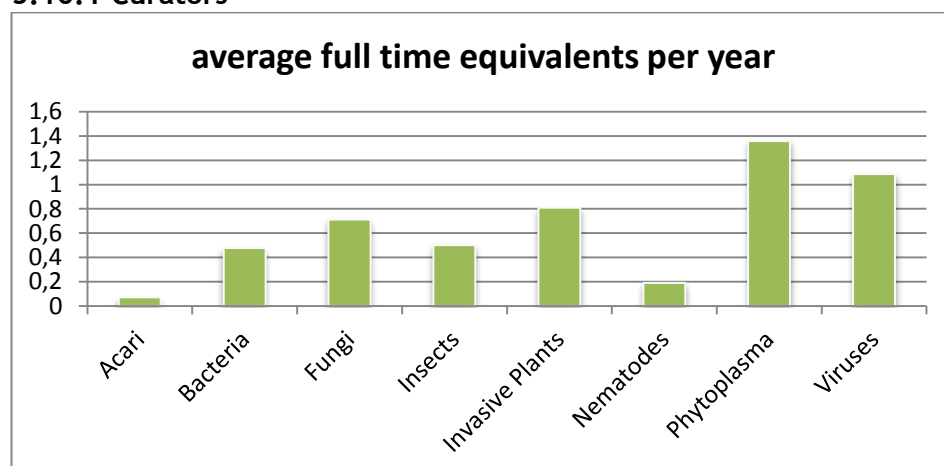


Findings

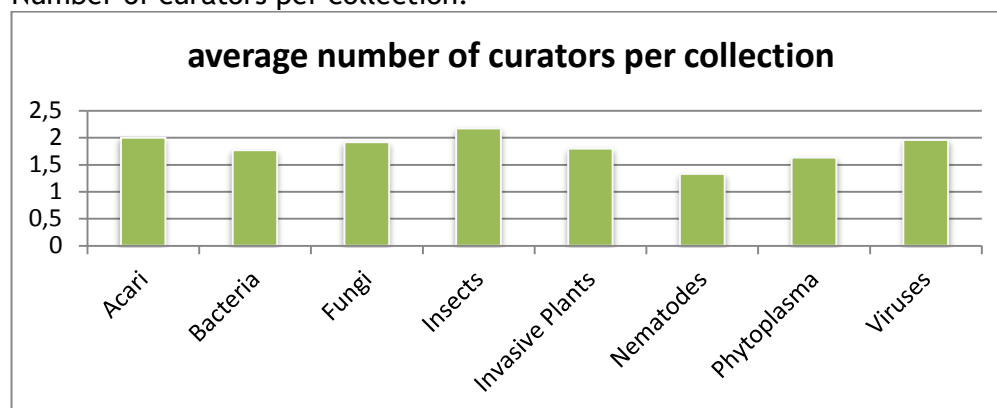
- Less than 50% of collections assess the stability of material during storage, very few of them during loan.
- For Q-collect experts, collections do not check the stability because in practice the stability of the material is considered sufficient. It is the case for insects, mites and plants that are usually dead and stable material, but also for bacteria and mycology for which commonly-used conservation techniques provide enough stability. However procedures to ensure freedom from contamination or pest infestation after a loan (e.g. dry collections) would help to ensure non-contamination of the entire collection.
- This point can be improved when relevant.

3.10 Maintenance of the collections (curators, budget, facilities...)

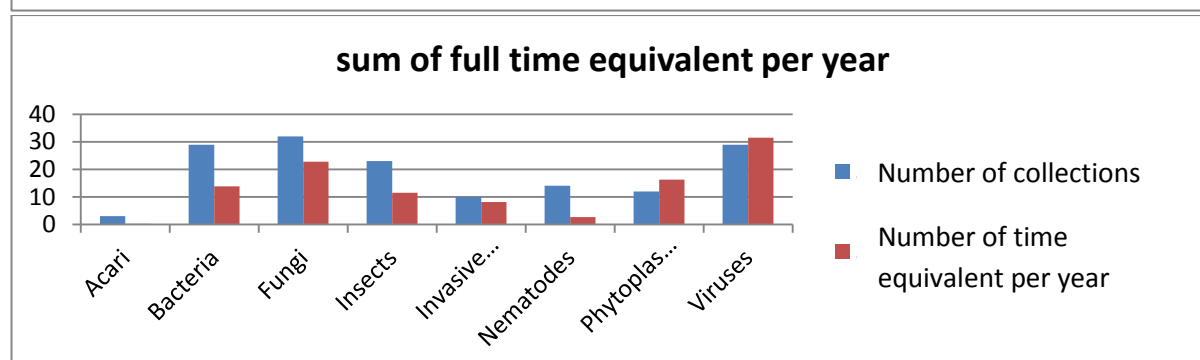
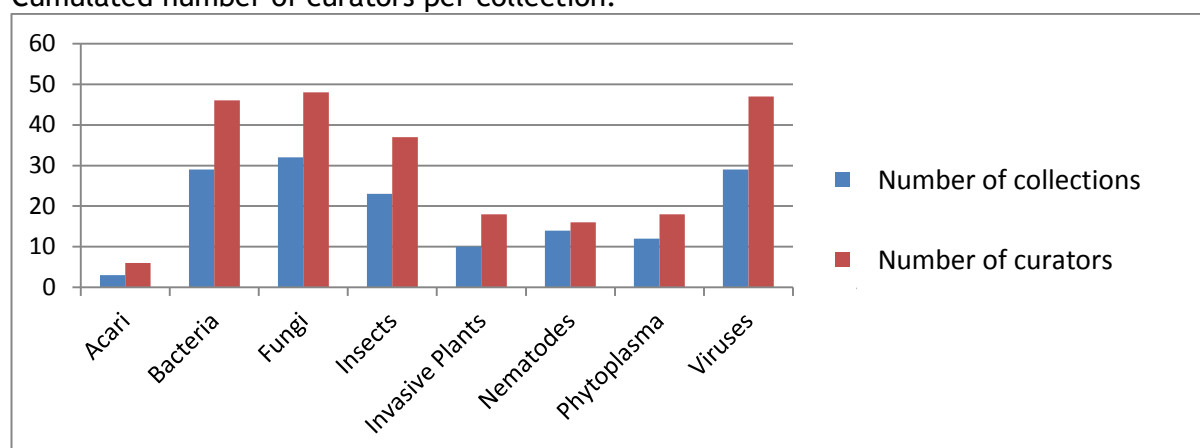
3.10.1 Curators



Number of curators per collection:



Cumulated number of curators per collection:

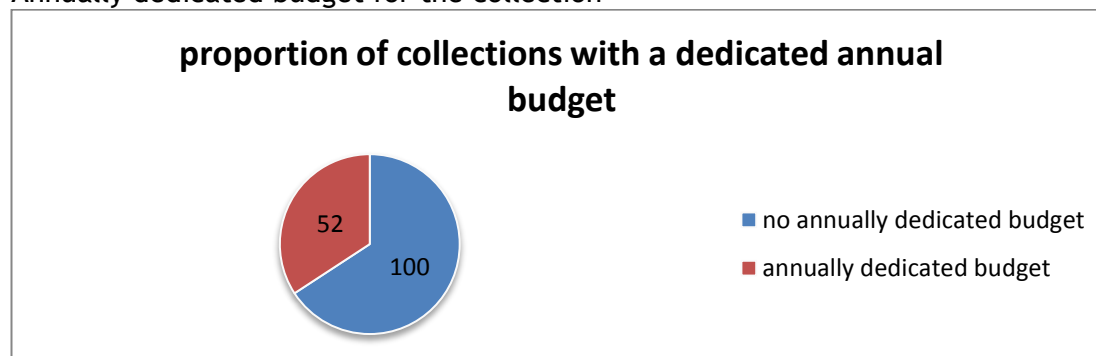


Findings:

Most collections have a limited number of curators (i.e. 1 per collection), and the general average full time equivalent per collection and per year does not greatly exceed 1. Collections in taxonomic groups where live cultures are more frequent (bacteria, viruses and viroids, phytoplasma and fungi) tend to have more full-time equivalents. The group reviewing the results of the survey stressed that there could have been confusion when filling in the questionnaire, as no definition of 'curator' was given. Some collections could have only identified the leader of a group of technicians in charge of the maintenance of the collection as a curator, where other collections could have counted as many curators as there are people working on physically maintaining the collection.

3.10.2 Budget

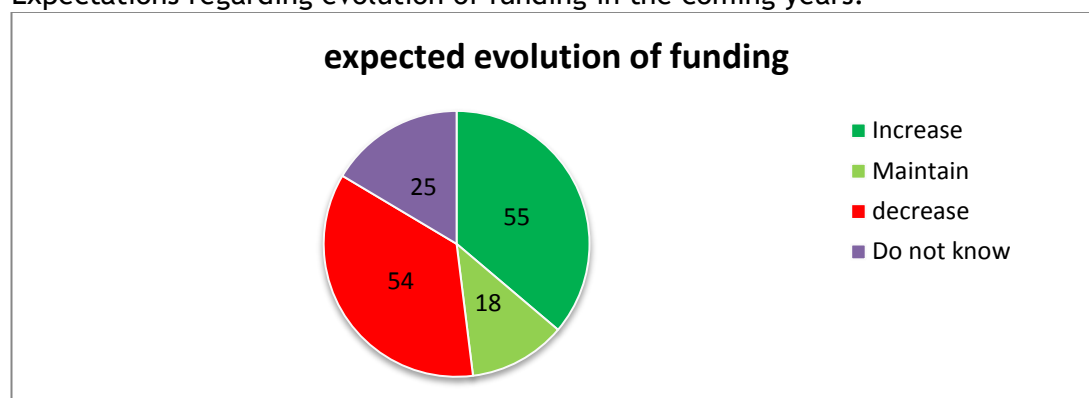
Annually dedicated budget for the collection



Findings:

A structural weakness of a majority of collections can be identified here. 2/3rd of collections do not have an annual dedicated budget, possibly meaning that they function on fund allocated for other activities such as research or diagnostics. This could mean that the funds necessary for maintenance of the collection could be difficult to identify. It also questions the long term future of the collections.

Expectations regarding evolution of funding in the coming years:



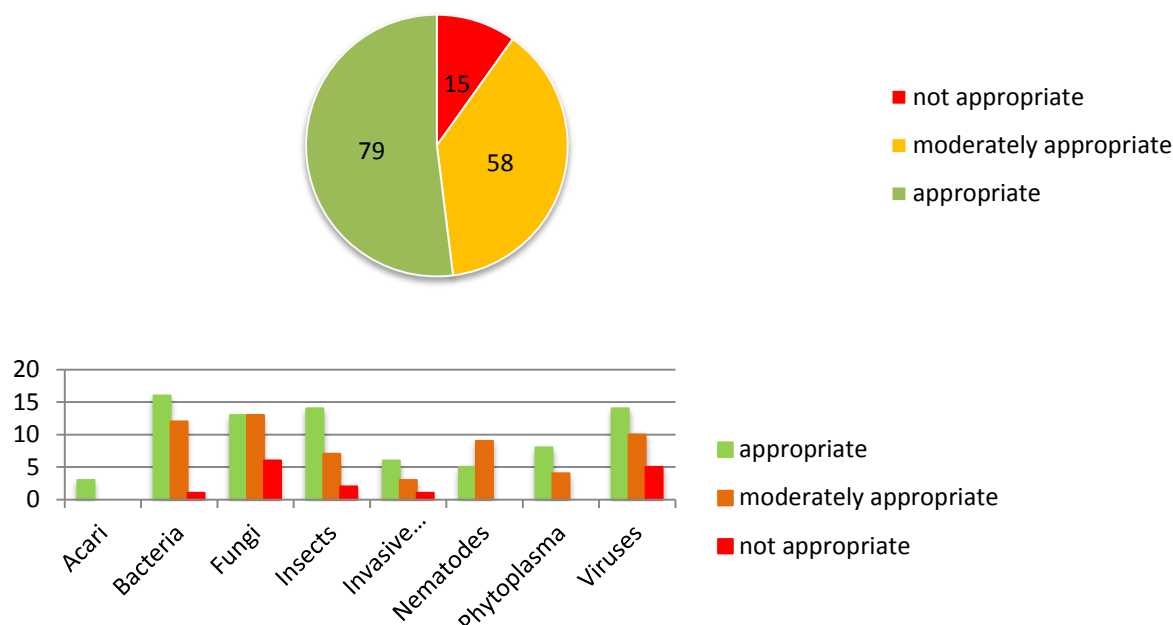
Findings:

The answers to this question seem difficult to interpret. On one hand, it is satisfactory that more than a third of collections can expect their funding to rise. On the other hand, almost the same number expect it to decrease, the rest (less than a third) not expecting any evolution or not knowing. Whilst the strong proportion of collections expecting a decrease is clearly a gap for continued availability of quality specimens, the comparable proportion of collections expecting an increase is a strength.

Overall, the answers to this question underscore the fact that there is no common policy towards collection management throughout the region.

3.10.3 Infrastructures:

Is infrastructure appropriate?



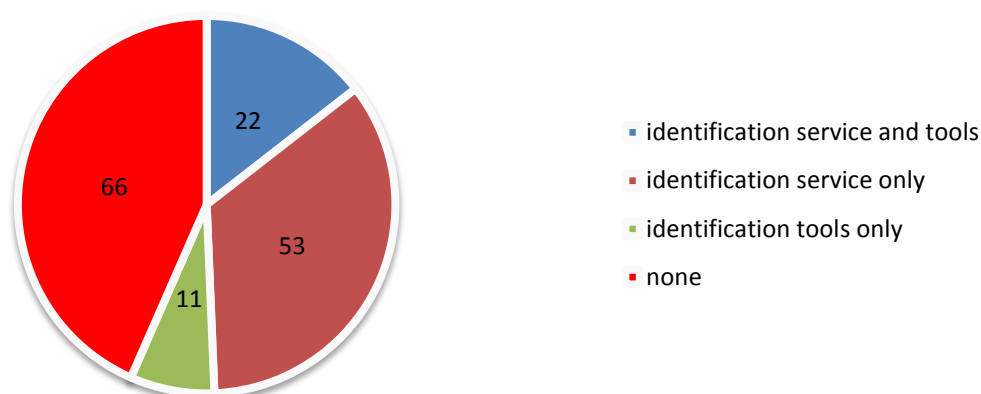
Findings:

Overall, the answers to this question do not signal a major issue with infrastructure, with only about 10% of collections signaling inappropriate facilities. This is a relatively minor gap, compared with other issues put to light in this survey.

It should be noted that the two highest numbers of 'inappropriate' facilities are for fungi and viruses, two taxonomic groups for which live culture collections require precisely monitored growth and conservation conditions; the requirements for facilities may thus be higher in those groups than for groups where dead material is predominately represented.

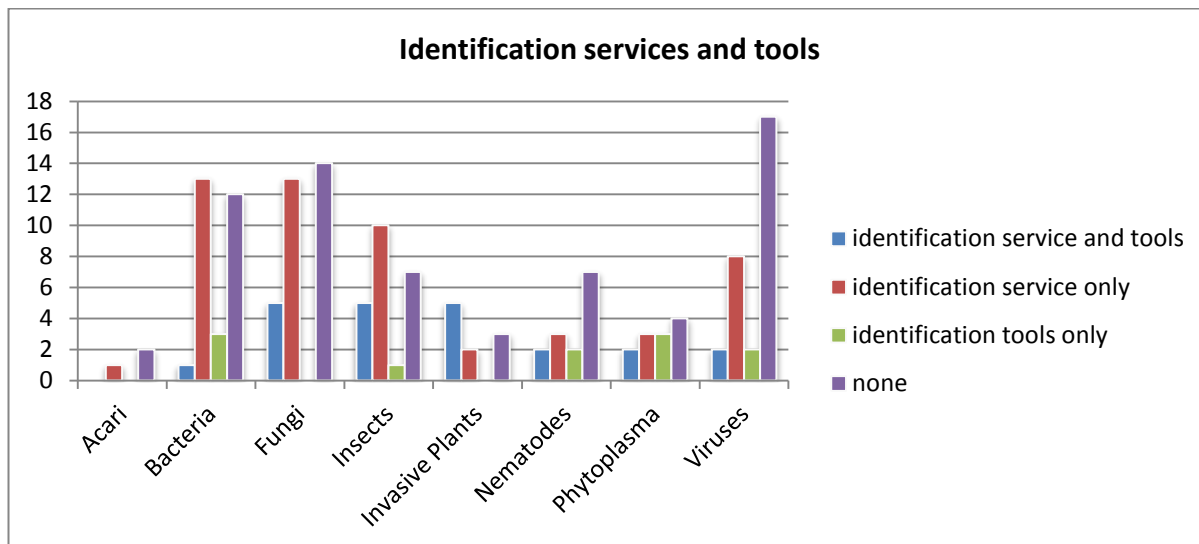
3.10 Identification services

Identification services and tools

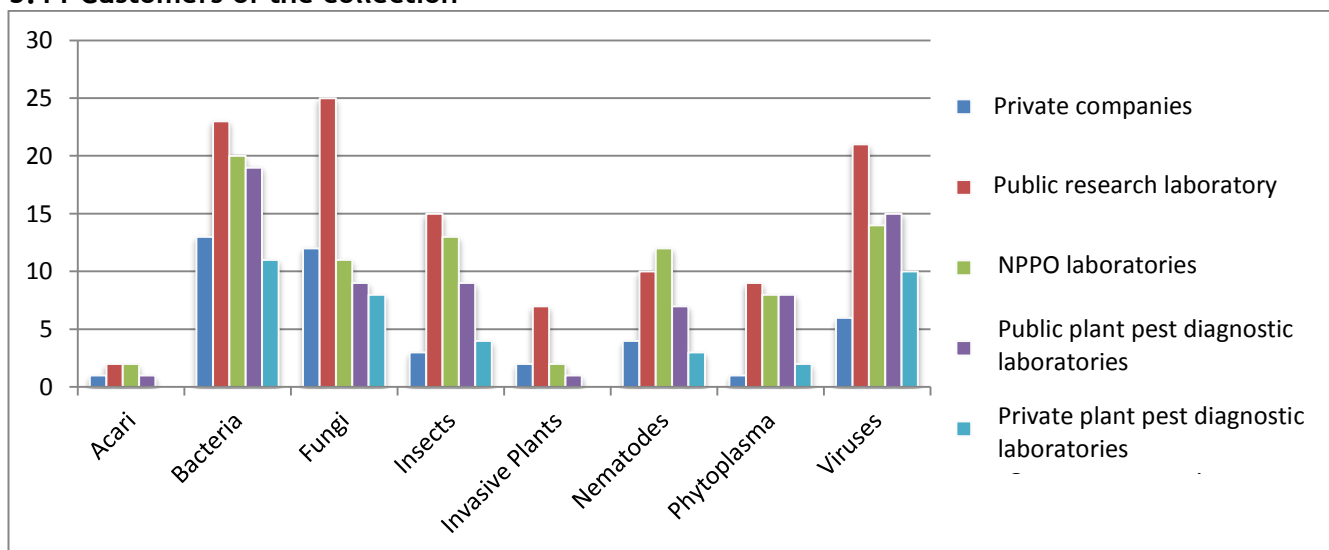


Findings:

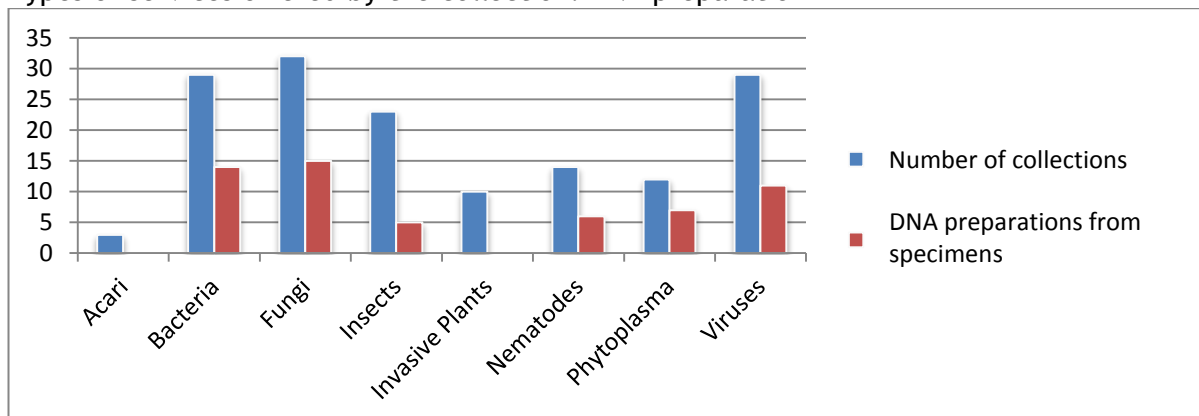
Overall, a high proportion of respondents declared providing no services to outside users. The answers could underscore the fact that research or working collections are mainly organized to provide services to the laboratory they are attached to.



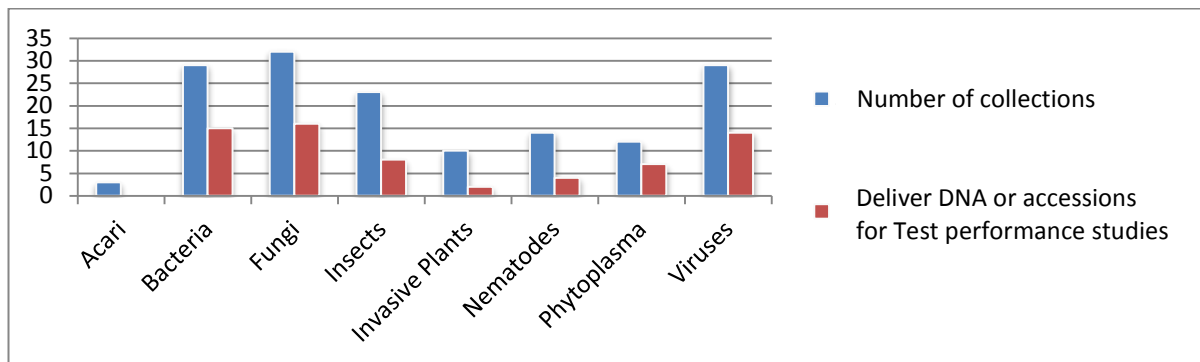
3.11 Customers of the collection



Types of services offered by the collection: DNA preparation



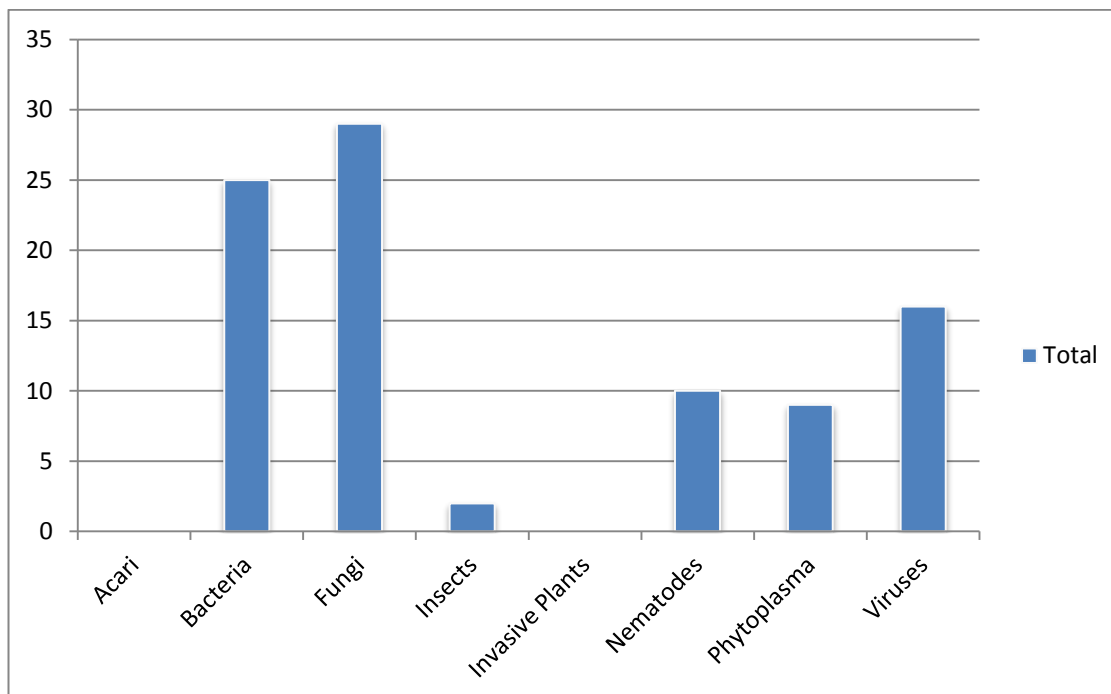
Types of services offered by the collection: DNA or accession providing for Test Performance Studies



Findings:

Not surprisingly provision of DNA material is more developed for disciplines for which molecular tests are commonly used. The corresponding low proportion of DNA preparation services in collections belonging to taxonomic groups where dead material is preserved could be linked with the strong emphasis on morphological identification described above for these collections.

Customers are interested in:



Findings:

It can be noted that the taxonomic groups more associated with live culture collections have much higher representation in the specimens that are of interest for customers, as the specimens they collect are more easily duplicated, and possibly easier to divide into strains than dead specimens. Furthermore strains can be used for other reasons than simple identification (manufacturing, plant selection, inoculum ...). Focus on strains is also very important in plant health in relation to these taxonomic groups.

Q-collect questionnaire (v2.3) 2014-07-03

Introduction to the questionnaire **to be read carefully before you start filling the questionnaire**

What is a collection in this questionnaire?

“Collection”: in this questionnaire, a “collection” is a group of preserved biological material from different plant pest groups i.e. bacteria, fungi and chromista, phytoplasma, viruses and viroids, nematodes, invasive plants, arthropods and other harmful organisms (e.g. molluscs, rodents...). All types of material are covered in this questionnaire: living, dead or genetic material. There is No lower or upper size limit, nor a restriction regarding the level at which a collection is defined. For example, if within a single group of pests the level of availability of information varies (e.g. for insects the collection for Lepidoptera is more detailed than for other orders), you may enter that group as a separate collection.

What is a plant pest?

A plant pest is any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products. **Please note that the term “pest” includes pathogens.**

What is a specimen in a collection for this questionnaire?

A specimen is a curatorial unit which includes a biological individual, a culture, a pin, a vial, a slide, DNA/RNA extracts.... These can also be called accessions.

Objectives of the questionnaire

This questionnaire is conducted in the framework of the EU FP7 project Q-collect.

The objective of the questionnaire is to make an inventory of collections which contain plant pests, in particular quarantine organisms, their taxonomically closely related species as well as other organisms with similar diagnostic features, also called look-alikes.

The questionnaire aims to gather information on the nature, size, content, availability, and quality of phytosanitary collections. Based on the inventory, gaps within the collections and the quality and availability of key specimens of plant health importance will be listed with a series of proposals to address them. The results of the project will be disseminated to stakeholders. The aim of Q-collect is to develop and organize a sustainable European network of phytosanitary collections to facilitate access to quality reference material and connected databases.

Access to specimens and in particular to reference material has been identified as a major challenge in phytosanitary detection and diagnosis, both for the development and validation of tests but also for inclusion of controls when performing diagnostic tests. This inventory is therefore of utmost importance to strengthen the plant health infrastructure. **Consequently, YOUR PARTICIPATION IN THIS INQUIRY IS ESSENTIAL and HIGHLY APPRECIATED and WE THANK YOU IN ADVANCE FOR YOUR ANSWERS TO THIS QUESTIONNAIRE.**

As the questionnaire is directed at all pest groups, some questions are not relevant to all of them. We appreciate this difficulty and an option to answer N/A has been included.

Depending on the size of the collection(s) hosted by your institute/laboratory, this questionnaire should take maximally 60 minutes per collection to be answered. This is not a one shot questionnaire, when you register your institute/laboratory, a link will be provided by email to access and modify your data. All answers and modifications will be automatically saved as long as you have not finalized your answers. To allow you to prepare the information requested a downloadable version of the questionnaire is accessible by clicking [here](#). Please do not hesitate to contact us at questionnaire@q-collect.eu if you have any questions.

General questions on your institute / laboratory

1 Please identify your institute/laboratory.

Laboratory:

Institute to which the laboratory belongs, if applicable:

Address:

Phone number:

Main contact:

(It will be possible to give a contact for each collection later in the questionnaire)

Email:

2. Does your institute/laboratory host a collection containing plant pests?

No ☐ If No : Thank you for this information. If you are interested to be informed about the results of the survey, please send a message to questionnaire@q-collect.eu

Yes ☐ If Yes: Please complete the questionnaire below for each collection that you have identified for your institute/laboratory. Remember that you can identify as many individual collections as necessary.

3. Do you have quarantine pests, or their look-alikes in your collection?

For look-alikes, consider organisms that could be confused with a quarantine pest during identification by routine diagnostic laboratories and could be usefully included during the validation of a test.

Explanatory note: in case of doubt consult the Annex I and II of the EU Council Directive 2000/29 and the EPPO A1 and A2 Lists on this link.

Yes ☐ No ☐ don't know ☐

Note for Q-collect members: a link will be provided online to the EPPO lists mentioned above.

Identification of collection(s) in your institute/laboratory

To identify the gaps in the different taxonomic groups, you are requested to complete the questionnaire separately for the different groups of pests. The table below will allow you to create as many collections as necessary within each group. (Please add as many individual collections as necessary).

Note for Q-collect members: following is a screenshot of what those answering the questionnaire will see.

Add a collection of Viruses and Viroids
Add a collection of Phytoplasmas
Add a collection of Bacteria
Add a collection of Fungi and Chromista
Add a collection of Nematodes
Add a collection of Invasive plants
Add a collection of Arthropods
Add a collection of another pest group

Note to Q-collect: The following questions will need to be completed for each collection.

4.1 Name of the collection:

Explanatory note:

Name each collection. Please provide the name and acronym if relevant (e.g. CBS - Fungal Biodiversity Centre, Netherlands), or provide the institute/laboratory and the main type of organisms if the collection has no separate name (e.g. INRA Sophia-Antipolis Nematode collection).

Name:

Acronym (if relevant):

Contact name:

Contact email:

4.2 Taxonomic group covered

4.3 What are the purposes of the collection? (please choose one or several):

- ☐ Research or working collection
☐ National or international collection
☐ Educational collection
☐ Commercial collection (sale of specimens)
☐ Public deposit (e.g. a collection for safekeeping for other institutes / laboratories; please note that this is also includes mandatory deposit)
☐ Other (specify)

4.4 Type of material (multiple choice)

Type of material	Living material	Dead material (dry samples, fluid preserved samples ; plant herbarium samples, slides)	DNA/RNA
Total number of specimens <i>Explanatory note:</i> Provide the approximate number of specimens present in the collection for each type of material	nb	nb	nb
Number of specimens of quarantine organisms (or approx.)	nb <input type="checkbox"/> I don't know	nb <input type="checkbox"/> I don't know	nb <input type="checkbox"/> I don't know
Total number of species <i>Explanatory note:</i> provide the approximate number of species present in the collection	nb	nb	nb
Number of specimens of quarantine organisms (or approx.)	nb <input type="checkbox"/> I don't know	nb <input type="checkbox"/> I don't know	nb <input type="checkbox"/> I don't know
Accessibility <i>Explanatory note:</i> can the material be supplied (accessible) to a third party? If Yes please specify how below:	Y/N	Y/N	Y/N
Free access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Paid access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loan of material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On-site consultation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On-line/open access images	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Catalogue <i>Explanatory note:</i> do you have a catalogue of the collection? If Yes specify what form (paper, database...).	Y/N/partial	Y/N/partial	Y/N/partial
paper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
database	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
online	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Website	link	link	link
Your judgment on the conservation status of your collection	Specimens in good condition/ Fit for purpose /	Specimens in good condition/ Fit for purpose / Requires	Specimens in good condition/ Fit for purpose /

	Requires improvement	improvement	Requires improvement
Are you willing to provide a separate list of specimens of the key quarantine pests (and if possible look alike) you hold?	Y/N/Partial	Y/N/partial	Y/N/partial

Comments:

4.5 Which subjects regarding the collection specimen are covered in the collection database(s), which ones are displayed online and which ones are mandatory to accept to include the material in the collection?

Note: answer if appropriate, if not leave empty

	In the database	Displayed online	Mandatory to accept a deposit
Scientific name	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Authors of the scientific name	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Year of publication of scientific name	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
"Type" status	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sampler/collector	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Depositor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person who made the identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
History (from sampling to arrival at the collection)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accession number in other collections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Geographic origin of specimen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Host/substrate from which the biological material was collected/sampled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Date of sampling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preservation conditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pathogenicity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quarantine status in Europe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Patent references	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Date of deposit in the collection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gene sequences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Literature references	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Morphology/morphometrics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Photos, images, pictures of the accession	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

General questions on the collection

5. Does your institute/laboratory have a policy of sharing material with other collections for duplication purposes?

Yes/No

6. Is your collection a member of national /international networks/associations?

If Yes, please specify (avoid acronyms) and, if possible, provide URL.

7. Does your institute/laboratory have an ordering process?

No/ by telephone or paper/online ordering form/Not applicable

8. Does your institute/laboratory have a Material Transfer Agreement (MTA)?

Note: The purpose of a material transfer agreement is to protect the transmission (for research purposes, or so as to assess a potential industrial partner...), of any and all form of materials (biological, vegetable, chemical, ...) which are not accessible to the general public, and to prevent the person receiving such materials from appropriating, publishing, or using them (or having them used) for commercial ends.

Yes/No

9. Are you aware of the [standard EPPO PM 3/64\(1\) Intentional import of organisms that are plant pests or potential plant pests](#), in particular the appendix on confinement conditions?

Yes/No

Questions on Quality

10. Does your institute/laboratory have a formalized quality system covering maintenance and management of the collection?

Explanatory note: if you need more details about what is covered in this set of questions, please consult the PDF version of this questionnaire.

Yes ☐ No ☐

If none, go to 10.2

If Yes go to 10.1.

10.1. Is your Quality assurance system certified/accredited?

Yes ☐ No ☐ If No , go to question 10.2

If Yes go to question 10.3

10.2. Do you apply any of the following aspects concerning maintenance and management of your collection(s):

Note: answer if appropriate, if not leave empty

- ☐ document control
- ☐ subcontractors
- ☐ services and supplies
- ☐ complaints
- ☐ control of non-conformities
- ☐ corrective actions
- ☐ preventive actions
- ☐ quality and technical records
- ☐ internal audits
- ☐ management reviews
- ☐ training of personnel
- ☐ identification and handling of equipment used in the production and the identification of the material
- ☐ monitoring performance of equipment used in the production and the identification of the material
- ☐ using calibrated (and validated) equipment
- ☐ using validated methods/published keys for identification/characterisation
- ☐ I am willing to provide more detailed information on our activities if contacted

10.3. Does your quality system conform to:

- ISO 9001
- ISO 34
- ISO 17025
- Other quality standard please describe

11. Documented procedures and archived records:

11.1. Do you have documented procedures and archived records concerning characterization of specimens, including:

- Primary identification of the specimen Yes ☐ No ☐
- Classical morphological description? Yes ☐ No ☐ Not applicable ☐
- Phenotyping methods? Yes ☐ No ☐ Not applicable ☐
- DNA/RNA sequencing? Yes ☐ No ☐ Not applicable ☐
- Pathogenicity determination? Yes ☐ No ☐ Not applicable ☐

Other relevant procedures: Please describe briefly

11.2. Do you have documented procedures and archived records concerning material processing, handling and storage of specimens, including:

- Replication? Yes ☐ No ☐ Not applicable ☐
- Purification? Yes ☐ No ☐ Not applicable ☐
- Homogenisation? Yes ☐ No ☐ Not applicable ☐
- Isolation? Yes ☐ No ☐ Not applicable ☐
- Prevention of contamination? Yes ☐ No ☐ Not applicable ☐
- Preservation methods(e.g. drying, freezing)? Yes ☐ No ☐ Not applicable ☐
- Storage conditions? Yes ☐ No ☐ Not applicable ☐
- Assignment of unique identification numbers? Yes ☐ No ☐
- Labelling? Yes ☐ No ☐ Not applicable ☐
- Packaging? Yes ☐ No ☐ Not applicable ☐
- Shipment Yes ☐ No ☐ Not applicable ☐
- Periodic assessment of authenticity and quality of specimens during storage? Yes ☐ No ☐ Not applicable ☐
- Periodic assessment of authenticity and quality of specimens after an exchange? Yes ☐ No ☐ Not applicable ☐
- Other relevant procedures, please specify

Identification and authentication of material

12. Is your collection of quarantine organisms generally characterized/ identified with a currently recognized method/ published procedure or generally agreed method?

Yes ☐ No ☐ Partial ☐

Explanatory note: This question focuses on what happens to individual specimens (process for identification), and not on the existence of a procedure.

12.1 Is the characterisation/identification performed by an expert?

Yes ☐ No ☐

If Yes, specify the qualifications required of the expert(s)

13. Do you carry out an assessment of the homogeneity of batches of individual specimens, including:

- Key taxonomic features (e.g. morphometry)? Yes ☐ No ☐ Not applicable ☐
- Viability? Yes ☐ No ☐ Not applicable ☐
- Pathogenicity? Yes ☐ No ☐ Not applicable ☐

DNA/RNA sequencing? Yes ☐ No ☐
Other relevant procedures, please specify

14. Do you carry out an assessment of the stability /authenticity of specimens:

14.1. During storage? Yes ☐ No ☐ Not applicable ☐

14.2. Before and after loan periods? Yes ☐ No ☐ Not applicable ☐

If Yes for either question, please briefly summarise procedures used:

Sustainability

15. What is the number of curators for the collection?

Explanatory Note: A curator is a staff member with time specifically allocated to work on the maintenance of the collection (this question refers to the number of curators and is not linked to the time spent by each curator see next question).

Number of curator (s)

16. How much full time equivalent is dedicated to the collection per year?

Full time equivalent

17. Do you have an annually dedicated budget for maintaining the collection?

Yes ☐ No ☐

18. What are your expectations with regard to the evolution of funding for the collection for the coming five years?

Increase ☐/ maintain ☐/ decrease ☐/ don't know ☐

19. How appropriate is the current infrastructure (buildings and equipment)?

Explanatory Note: Are the infrastructures appropriate to ensure appropriate long term conservation of material?

Appropriate ☐/moderately appropriate ☐/not appropriate ☐

Other services provided by your laboratory/institute

20. Do you offer identification services or tools (e.g. online identification tools)?

Explanatory Note: identification, characterisation of strain, online identification key ..., give a list and references and/or website if relevant.

Identification service and tools ☐/identification service only ☐/identification tools only ☐/None ☐

Comment

21 Do you provide DNA preparation from the specimens in your collection(s)?

Yes ☐ No ☐

22 Do you deliver accessions or DNA to research consortia or for test performance studies?

Yes ☐ No ☐

About your customers

23 Who are the customers for your collection?

- ☐ Private company
- ☐ Public research laboratory/institute
- ☐ Laboratory from the National Plant Protection Organisation
- ☐ Public laboratory for plant pest diagnostic
- ☐ Private laboratory for plant pest diagnostic
- ☐ other (please specify)

24 What are they most interested in?

- ☐ Living material
- ☐ Dead material (dry samples, fluid preserved samples ; plant herbarium samples, slides)
- ☐ DNA/RNA
- ☐ other (please specify)

Other information

25. Please briefly specify any restrictions you may have encountered which may affect access to your collection of quarantine organisms by other interested parties either within or outside of your country (e.g. import/export restrictions, intellectual property or ownership issues).

26. Do you have any other relevant comments you wish to make regarding your collection?

27. Do you agree to be listed as a respondent of the survey?

Yes/No

Note for Q-collect members: this questionnaire will be complemented by the questionnaire targeting « clients » of collections being prepared by WP4.