



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

GRANT AGREEMENT NO.: (612712)



Workpackage: WP4. Access
Deliverable: D4.3 Results from Users Questionnaire, with the addition of experts comments and analysis gathered on march 25th 2015 (expert meeting, EPPO, Paris), summary of the general types of needs from the users.
Date: 04 2015
Partner responsible: Partner 9 (INRA) – Partner 8 (ANSES)

Results from Users Questionnaire, with the addition of experts comments and analysis gathered on March 25th 2015 (expert meeting, EPPO, Paris).

1. Introduction

The objective of WP4 “Access” is to assess the users needs. This will permit to better understand which services the collections should offer in order to better fit the user’s needs in the objective to facilitate research on quarantine organisms.

In this purpose, WP4 “access” implemented questions in the questionnaire dedicated to collections, and set up a questionnaire directed to quarantine organisms users. These questionnaires were disseminated during summer 2014.

This report contains the results from the users questionnaires, associated with the results from relevant questions of the collections questionnaire.

The analyses and comments gathered during the experts meeting who took place in march 2015 were added.

Finally this report contains a summary of the different assessed needs.

2. General comments about the results obtained from on the users questionnaire.

We had a total of 44 answers

- Few compare to the potential
- Majority were from NPPO: may corresponds to the reality of users of quarantine resources

Because we let the different collections disseminate the questionnaire, a bias toward bacteria users may have been introduced (the questionnaire was more thoroughly sent to quarantine bacteria users).

However, after analysis, it appears that the answers gathered, do correspond to the reality of users needs. As a result, we decided, in accordance with the experts of the group, to consider these answers as valid.

3. Results from the different questions

Question 2: Who are you?

Private company	2
Public research laboratory / Institute	17
Public/NPPO laboratory for plant pest diagnostics	24
Private laboratory for plant pest diagnostics	1
Other	0
Total	44

Table 1: Number of respondents to the first question “Who are you?”

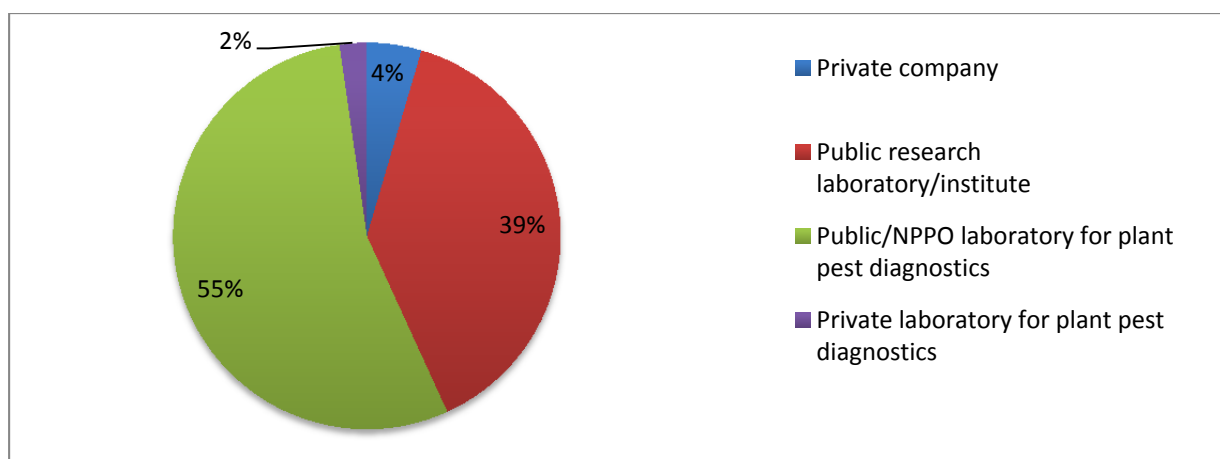


Figure 1: Number in percentage of respondents to the first question “Who are you?”

These answers have to be linked to the answers gathered from questionnaire WP2 for collection question n°23:

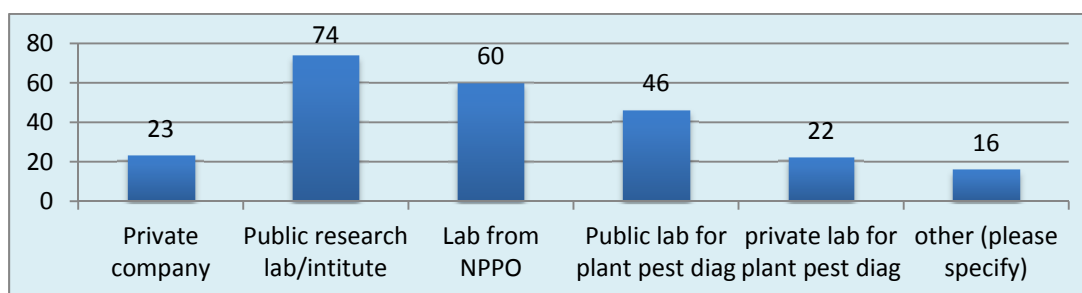


Figure 2: Number of respondents to the question n°23 “Who are the customers for your collection” in WP2 collections questionnaire.

Comments:

If we compare the answers to these two questions in both questionnaires, the main users of quarantine resources who answered both questionnaires belong in majority to NPPO and public laboratory for plant pest diagnostics: 47% for the WP2 questionnaire and 55% for the WP2 questionnaire. We have a noticeable difference for private users, the WP2 questionnaire having identified 20% of customers whereas only 6% answered for the WP2 questionnaire.

Question 3: For which purpose and for which pest groups do you need biological material?

	Viruses and viroids	Phloem limited bacteria/ Phytoplasma	Bacteria	Fungi (including chromista)	Nematodes	Insecta	Acari	Invasive plants	Total
Development of diagnostic tests (ex : reference material)	18	17	18	14	20	10	7	6	110
Positive controls to perform tests	19	20	21	16	20	12	9	5	122
Trials (e.g. for the development of treatments, epidemiological studies...)	6	6	12	7	8	2	1	3	45
Other scientific research	11	9	15	7	11	5	3	5	66
Educational purposes	7	7	7	6	8	8	6	5	54
Other (please specify below)	1	1	4	1	1	1	0	1	10
Total	62	60	77	51	68	38	26	25	407

Table 2: Number of respondents per organism and per purpose to the question 3 “For which purpose and for which pest groups do you need biological material?”

Other needs specified in comments:

- ✓ Viruses and viroids: Organisation of test performance and proficiency tests.
- ✓ Phloem limited bacteria: Organisation of test performance and proficiency tests
- ✓ Bacteria:
 - R.solanacearum & C.michiganensis ssp. sepedonicus
 - Ring testing
 - to maintain own collection
 - evaluation of resistance of plant material
- ✓ Fungi: to maintain own collection
- ✓ Nematod: to maintain own collection
- ✓ Insecta: to maintain own collection
- ✓ Invasive plants: to maintain own collection

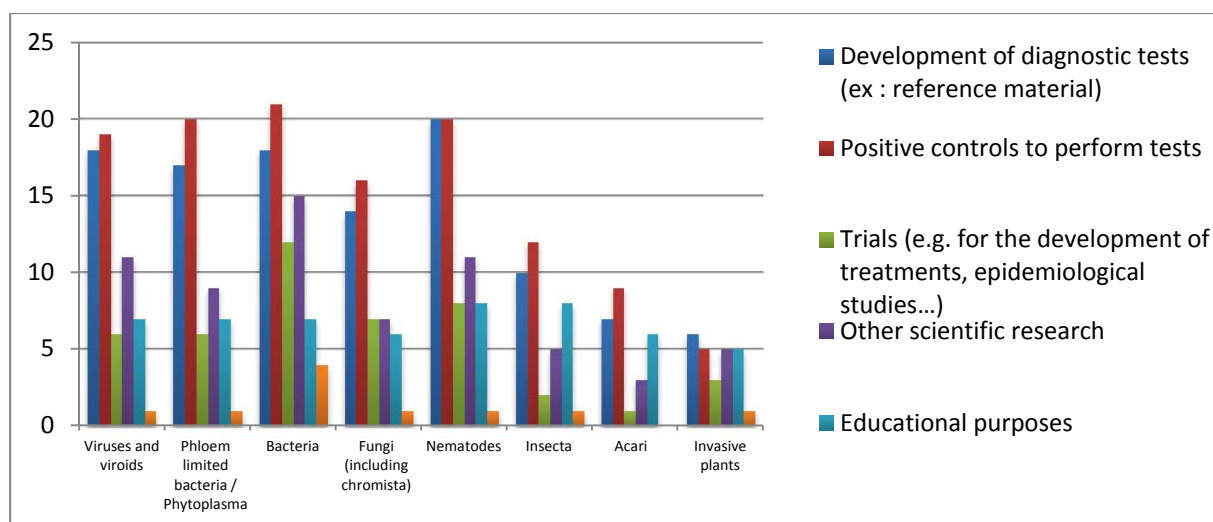


Figure 3: Number of respondents per organism to the question 3 “For which purpose and for which pest groups do you need biological material?”

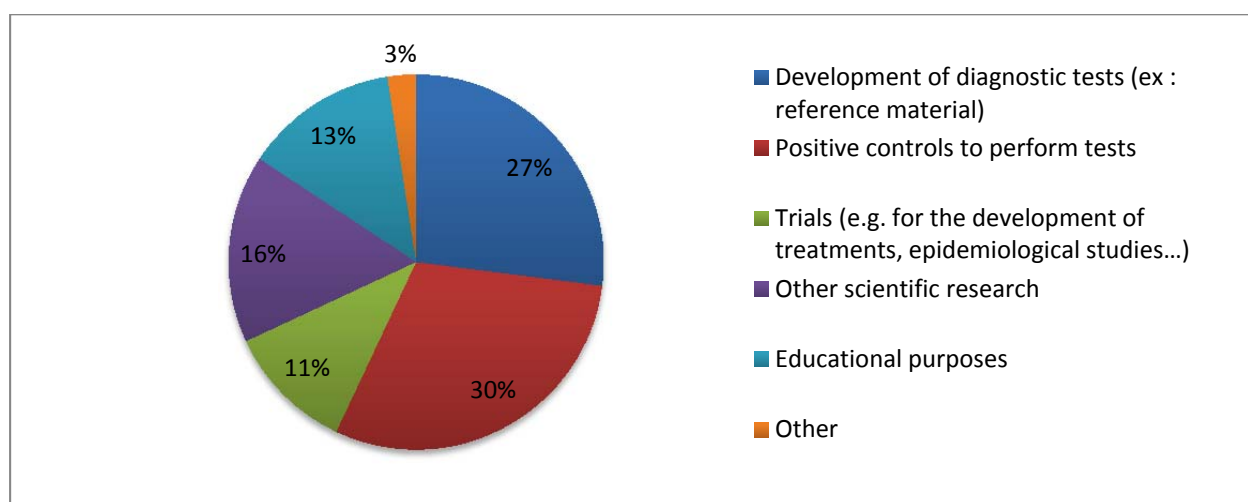


Figure 4: Overall number in percentage of respondents per needs to the question 3 “For which purpose and for which pest groups do you need biological material?”

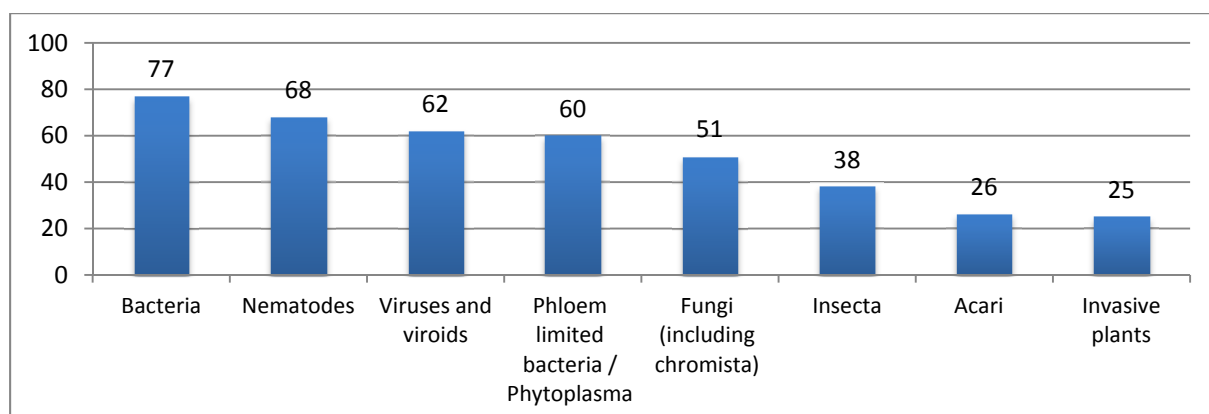


Figure 5: Number of respondents per organism to the question 3 “For which purpose and for which pest groups do you need biological material?”

Comments:

The users are generally working on several different organisms and are not limited to one.

The needs for all categories of organisms are almost the same (only inversion between the first two needs for invasive plants, which may not be statistically relevant).

- First need: for positive controls
- Second need: for development of diagnostic tests

Among the other needs specified in comments, only one corresponds to an unlisted need: "maintenance of collection".

The two main needs indicate:

- The necessity to have an access to reliable and well identified reference material.
- The necessity to preserve the diversity of the pathogens (the reference strains alone are usually not enough to set up reliable detection tests).

Question n° 4: What type of material do you need?

	Viruses and viroids	Phloem limited bacteria/ Phytoplasma	Bacteria	Fungi (including chromista)	Nematodes	Insecta	Acari	Invasive plants	Total
Living organisms (including freeze dried viable specimens)	16	11	27	16	15	8	5	8	106
Plant fragment containing the organism	15	14	6	8	9	2	1	2	57
Inactivated cells	2	1	5	1	2	0	0	0	11
Nucleic acids	15	16	16	10	15	7	4	2	85
Mounted specimens (pinned specimens) (dry specimens)	0	0	0	1	3	7	5	2	18
Liquid-preserved specimens (in alcohol)	0	0	0	0	6	7	5	1	19
Specimens on slides	2	1	2	5	13	9	6	1	39
Herbarium voucher specimens	0	0	0	3	1	1	1	6	12
Total	50	43	56	44	64	41	27	22	347

Table 3: Number of respondents per organism and per needs to the question 4 "What type of material do you need?"

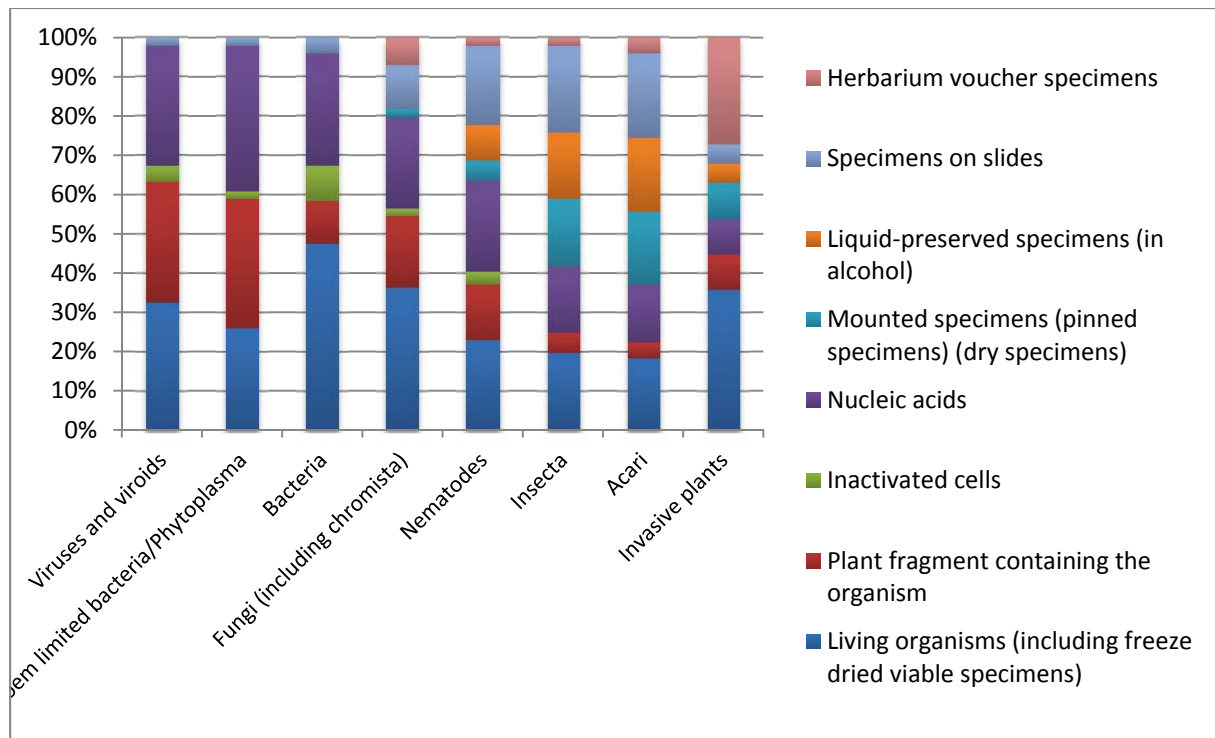


Figure 6: Number in percentage of respondents per organism and per needs to the question 4 "What type of material do you need?"

Comments:

The questionnaire was designed in a "transversal" way. This may have induced misunderstandings for some categories for the persons answering the questionnaire. This may explain some inappropriate answers. For example "inactivated cells" for Phytoplasma or "Herbarium voucher" for nematode do not corresponds to uses known by the experts.

After analysis, the experts suggested to merge some categories for a better understanding and analysis of the material needs. This will allows us to compare the results from WP2 questionnaire for collections and the results from the WP4 questionnaire for users. We decided to retain only three categories: "Living material", "Dead material" and "Nucleic acids".

"Living material" regroups the following categories:

- Living organisms (including freeze dried viable specimens)
- Plant fragment containing the organism

"Dead material" regroups the following categories:

- Inactivated cells
- Mounted specimens (pinned specimens) (dry specimens)
- Liquid-preserved specimens (in alcohol)
- Specimens on slides
- Herbarium voucher specimens

"Nucleic acids" corresponds to the "nucleic acids" category already listed.

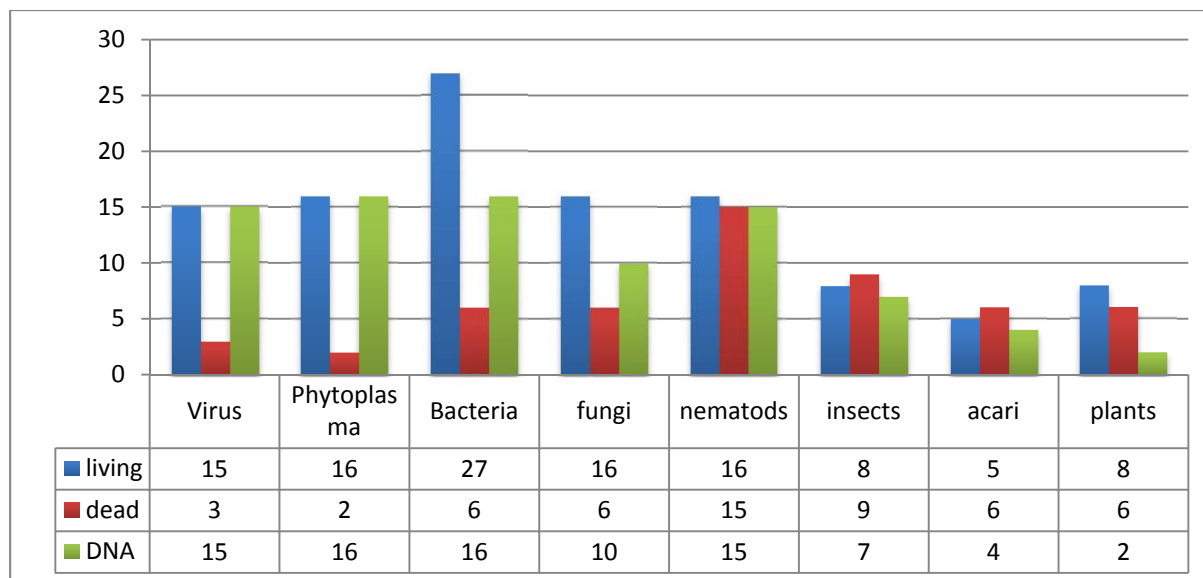
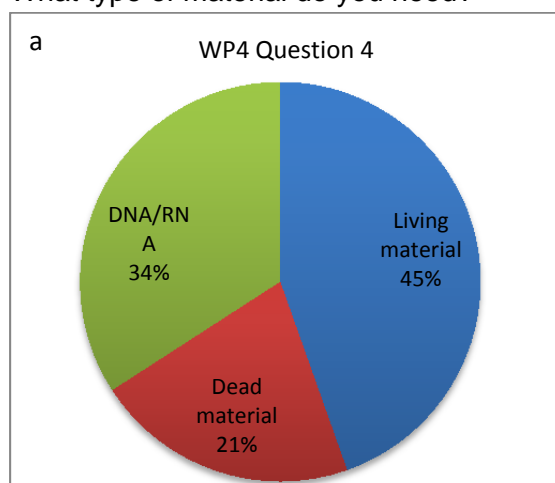


Figure 7: Number of respondents per organism and per merged needs to the question 4 "What type of material do you need?"

These results were linked to the needs of collection's users assessed by the collections (Questionnaire WP2 question n° 24).

WP4 Q4

What type of material do you need?



WP2 Q24

What are your customers interested in?

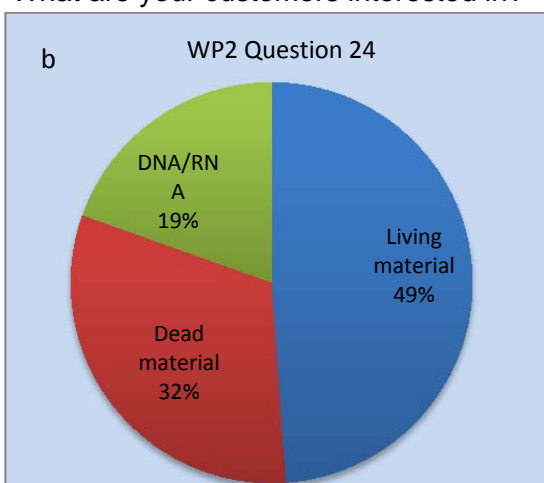


Figure 8: Overall number in percentage of respondents and per merged needs to (a) the question 4 of the WP4 "What type of material do you need?" and to (b) the question 24 of the WP2 "What are your customers interested in?".

Following the experts groups, the users needs assessed here correspond to the working habits of the different communities and to the users demand.

The demand between dead and alive material is equivalent for all kind of organisms except for bacteria (which can be explain by the relative easiness to handle them and by the existence of several highly organised and visible public collections).

The highest request for nucleic acids assessed by users (than assessed by collections), can be explained by the fact that the quarantine resources users were specifically targeted, and the collections answered in a general way, not focusing on quarantine resources. As the nucleic acids are not submitted to regulations, some users prefer this kind of material. This difference may be also due to a lack of visibility of collections' services. The users need nucleic acids but may not be aware that the collections can provide it. However, this high demand expressed by users for nucleic acids points out that this kind of material will be more and more requested over the next years. The collections may be prepared to face this upcoming demand.

Question n° 5: Do you have any difficulties to obtain this biological material?

	Viruses and viroids	Phloem limited bacteria/ Phytoplasma	Bacteria	Fungi (including chromista)	Nematodes	Insecta	Acari	Invasive plants	Total
YES for all or most organisms	4	5	1	2	4	2	1	2	21
YES only for some organisms	11	9	8	9	12	3	7	3	62
NO	5	6	17	5	5	3	3	3	47
Total	20	20	26	16	21	8	11	8	130

Table 4: Number of respondents per organism to the question 5 “Do you have any difficulties to obtain this biological material?”

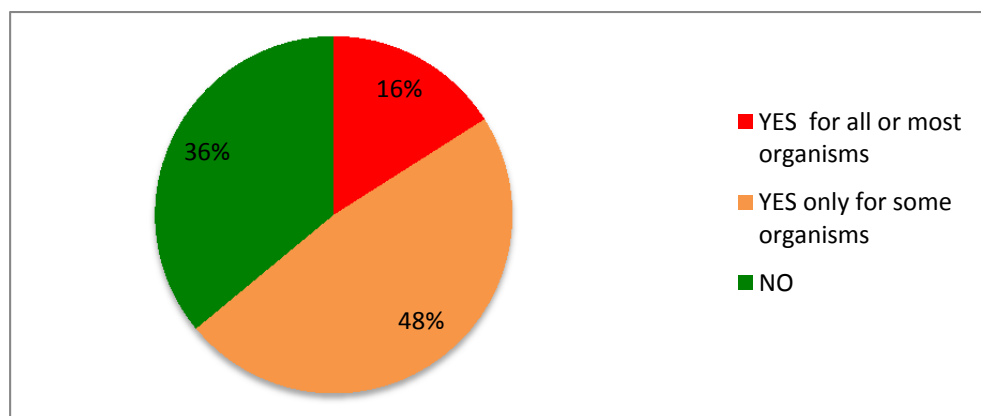


Figure 9: Overall number in percentage of respondents to the question 5 “Do you have any difficulties to obtain this biological material?”

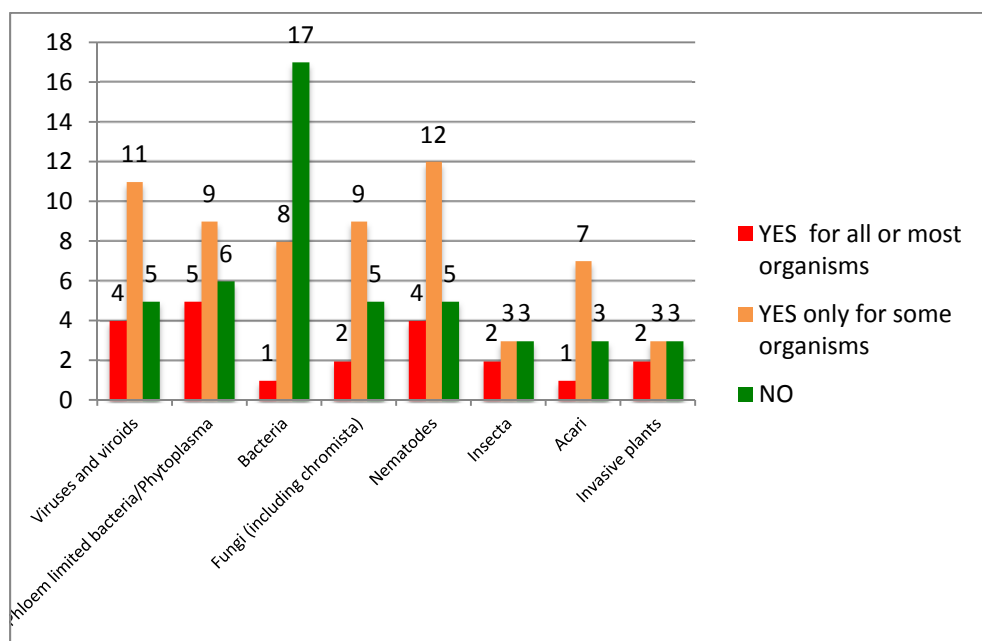


Figure 10: Number of respondents per organism to the question 5 “Do you have any difficulties to obtain this biological material?”

Comments:

The highest number of answers is for bacteria, however we had significant number of answers for other categories.

For all organisms, some users declare to have no problems to find the resources, indicating that globally the offer match the needs.

However, except for bacteria, the first answer is to state that some organisms may be difficult to be found.

We are facing a situation where the resources can mostly be found but with still gaps in the availability of material.

The situation is not equivalent for all kind of organisms.

For instance, in insects the demand for quarantine material is limited to one or two organisms. When facing an unknown insect, the scientists send it to the known specialist of the discipline.

In the other hand, for acari there are few specialists, as a consequence the scientists need more reference material for comparison when facing some unknown acari.

This habit of the “insect community” is a force, encouraging exchanges, but also it’s a great weakness as the system relies on the presence of specialists. When these specialists are no more available the competence is often lost.

As a consequence, the experts suggest strongly to extend the collections as much as possible towards the entire diversity of quarantine organisms (for all kind of organisms), in order to preserve the reference material for all concerned taxa.

Question n° 6: What are these difficulties?

	Viruses and viroids	Phloem limited bacteria/ Phytoplasma	Bacteria	Fungi (including chromista)	Nematodes	Insecta	Acari	Invasive plants	Total
Unavailability of material	10	10	6	7	9	7	6	2	57
Cost to purchase biological material	2	0	5	4	1	0	0	0	12
Contact/web	4	4	5	6	7	8	5	2	41
Restriction due to plant health or other regulation	4	2	7	3	6	1	0	2	25
Others (please specify)	0	0	1	0	1	0	0	1	3
Total	20	16	24	20	24	16	11	7	138

Table 5: Number of respondents per organism and per type of difficulties to the question 6 “What are these difficulties?”

Remark: Data for answers “Difficulties to identify contact” and “no web access” were pooled to help the analysis.

Three problems were specified in the comments of this question:

- Bacteria : authenticity
- Nematod: to obtain living material from old type localities can be difficult
- Invasive plants: we never have been able to be on the right time of the year to collect seeds

The specified problems for nematods and invasive plants might be associated to the unavailability of material.

The problem raised for bacteria could be generalised to all kind of organisms. The authenticity of the specimen is crucial and is based on the expertise of the curators of the different collections.

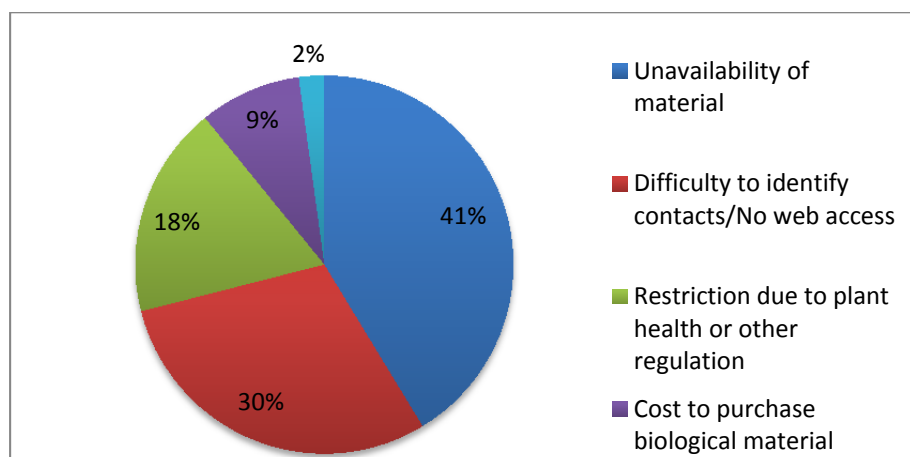


Figure 11: Overall number of respondents in percentage and per type of difficulties to the question 6 “What are these difficulties?”

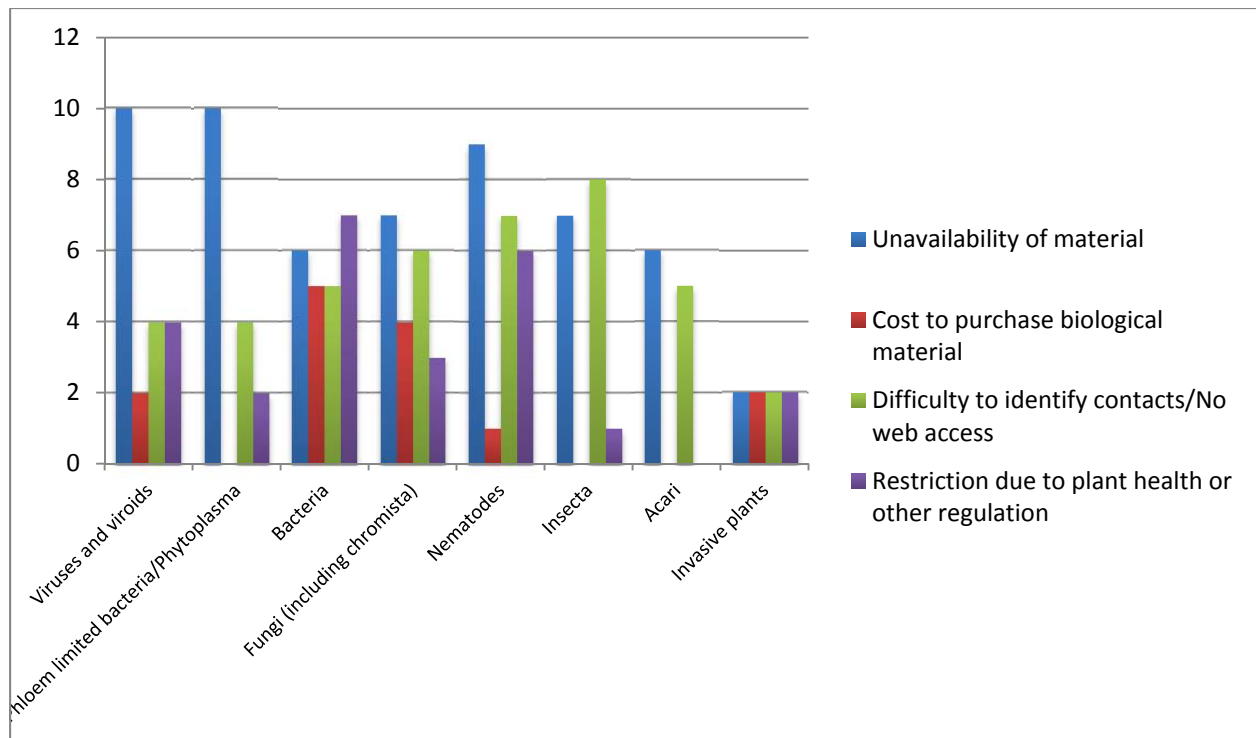


Figure 12: number of respondents per organism and per type of difficulties to the question 6 “What are these difficulties?”

Comments:

The first problem identified by the respondents is the **unavailability of material**, then the **difficulty to identify contact**.

Regulations procedures are then perceived as a difficulty to access to material.

The cost can be a problem but is not really important for the respondents. This is probably due to the fact that a lot of material is acquired via informal exchanges between scientists (see question 7).

Four categories can be distinguished:

- ✓ Viruses, Phloem limited bacteria, Fungi, Nematodes, Acari:
The availability of material is the most important problem, followed by the difficulties to identify contacts.
- ✓ Bacteria:
The most important problem seems to be the restrictions due to regulations. This is surprising as the users of quarantine resources should all have agreement for quarantine and have contacts with plant protection services permitting them to obtain the authorisations. However, this may be perceived as an administrative burden, which does not simplify the material exchange.
- ✓ Insecta:
For these organisms, the main problem is to find contacts.
- ✓ Invasive plants :
For these organisms, all the problems are equally important.

Question n°7: Where do you find biological material?

Answers:

	Viruses and viroids	Phloem limited bacteria/ Phytoplasma	Bacteria	Fungi (including chromista)	Nematodes	Insecta	Acari	Invasive plants	Total
National / international reference collection (formalised collection) a	8	5	19	11	6	2	1	3	55
Internal research or working collection (informal collection) b	11	12	14	11	9	5	4	4	70
Informal exchanges with experts from other laboratories/institutes	15	16	16	14	15	11	7	4	98
Direct field sampling	10	13	12	9	12	9	5	4	74
Total	44	46	61	45	42	27	17	15	297

Table 6: Number of respondents per organism and per source of material to the question 7 “Where do you find biological material?”

- This type of collection has the mission to propose biological material publically (under certain legal conditions), is supported by the government and works under quality standards.
- A collection that has no official mission about making available their biological material and specimens and may have no recognized quality standards. However, they are well organized and recognized as reliable in their research field.

Comments from respondents:

- “we do not have deal with acari for now”
- “For viruses and viroids there is no official reference collection in Europe. There is only one official public collection, i.e. DSMZ financed by the German government. Furthermore, not many institutes publish information on their collection material on the internet, neither in Europe nor abroad. Therefore, it might be challenging to get the desired isolates.”
- “We perform sampling on the field, identification and whenever appropriate, the specimens are prepared to be registered and integrated in a working collection.”

Answers to the question “Please, if you are willing to, indicate your suppliers”:

(Please mention as many details as necessary to identify them: name, laboratory, institution, country...):

- Gloria Mosquera, Rice and Bean plant pathology lab, International Center for Tropical Agriculture, Colombia
- Elizabeth Alvarez, Cassava, forages and tropical plant pathology lab, International Center for Tropical Agriculture, Colombia
- Assunta Bertaccini, Bologna University, Italy
- Xavier Foissac, Centre de recherche INRA de Bordeaux, France
- Silvia Restrepo, Universidad de los Andes , Colombia
- Lucia Afanador, Universidad Nacional de Colombia, Sede Medellin, Colombia
- Ron Walcott, The university of Georgia, Plant Pathology Lab, US

- DSMZ, Braunschweig, Germany
- PRI, Wageningen, the Netherlands
- SASA, Edinburgh, Scotland
- We have a list of our suppliers but they did not give authorization to identify them
- musea, taxon-experts; other NPPO's
- Évora University (ICAAM), Coimbra University and Superior Institute of Agronomy (ISA).
- Deutsche Sammlung von Mikroorganismen und Zellkulturen GmbH – Germany
- National Collection of Plant Pathogenic Bacteria – UK
- Microorganism collection of Latvia – Latvia
- Bioforsk Norwegian Institute for Agricultural and Environmental Research, Norway
- Service regional de la Protection des Vegetaux, France
- National / international reference collection : CIRM-CFBP
- NCPPB is the supplier of Bacterial controls

Pooled results:

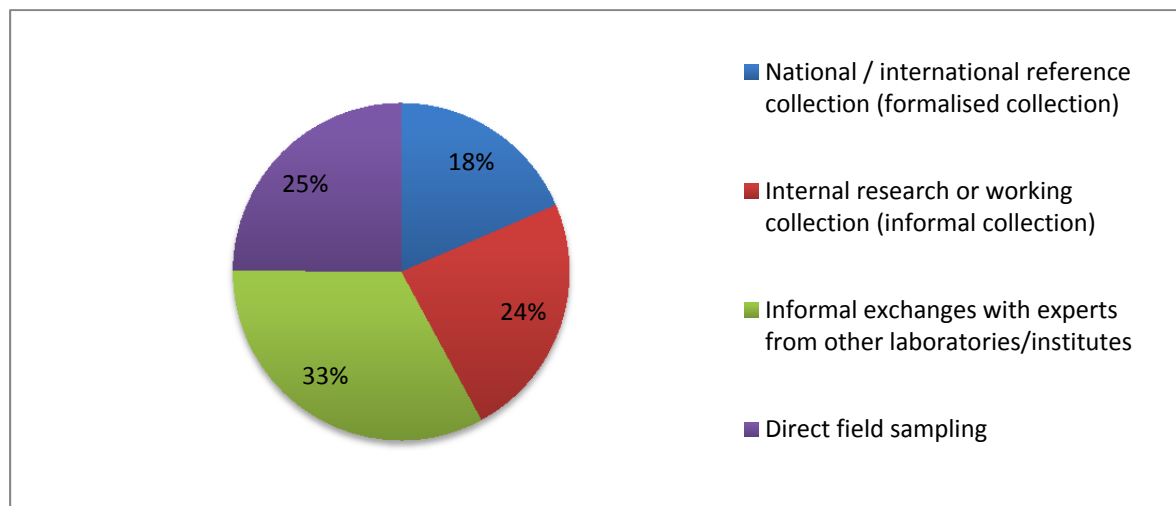


Figure 13: Overall number in percentage of respondents per type of sources of material.

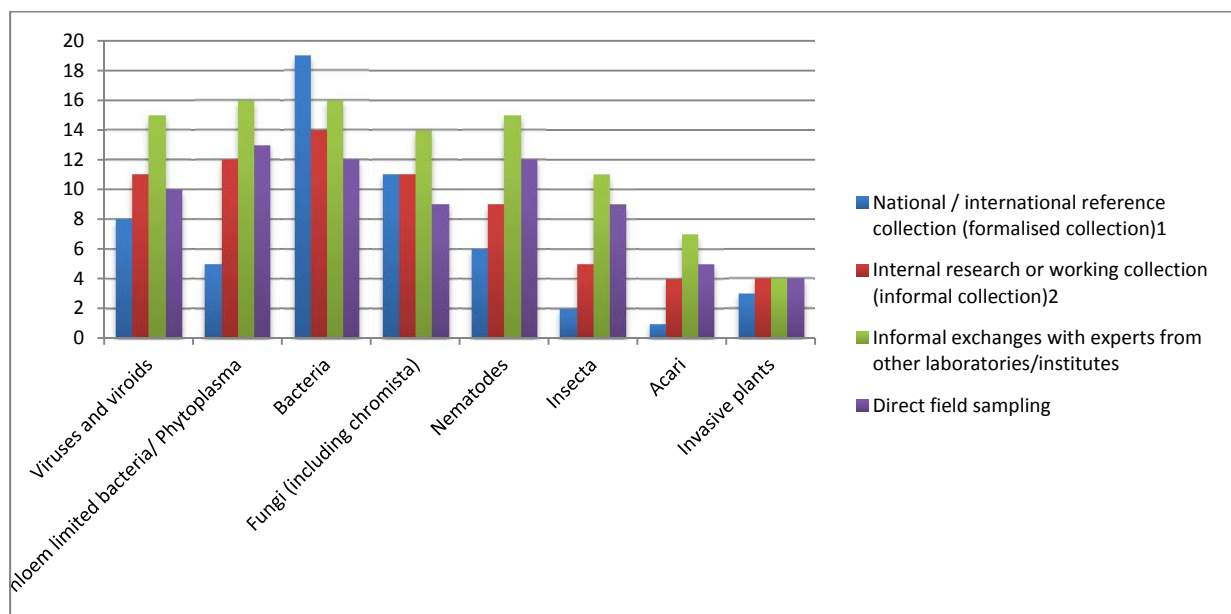


Figure 14: Number of respondents per organism and per sources of material.

Comments:

The supply sources are diverse. Except for bacteria, for which the reference collections are the main supply source, the majority of users retrieve their resources from informal exchanges with colleagues and from informal collections.

This can be due to either lack of resources in collections (or lack of collections) or to the working habits of the discipline. For instance, in insects the resources are scattered in numerous small collections each one strongly associated to one expert and often limited to a low number of families or even species.

The diversity of supply sources can insure to have access to the needed resources and to diversity. However, the question of the well characterisation and reliability of material can be raised toward supply sources outside formalised collections.

Thus the experts strongly suggest that at least the reference material should come from formal collections.

For the living material, the question of the traceability of material is crucial, as these resources are regulated. As a consequence, the experts strongly suggest all owners of living quarantine resources to trace accurately all material exchanges.

Question n° 8: What makes order of biological material easier?

Web site including on-line catalogue	32
Formalised ordering process	12
MTA (Material Transfer Agreement)	14
Other type of contracts	0
Guidance through the administrative process (LOA (Letter of Authorisation), quarantine agreement)	11
Direct contact	29
Other	0
Total	98

Table 7: Number of respondents to the question 8 “What makes order of biological material easier?”

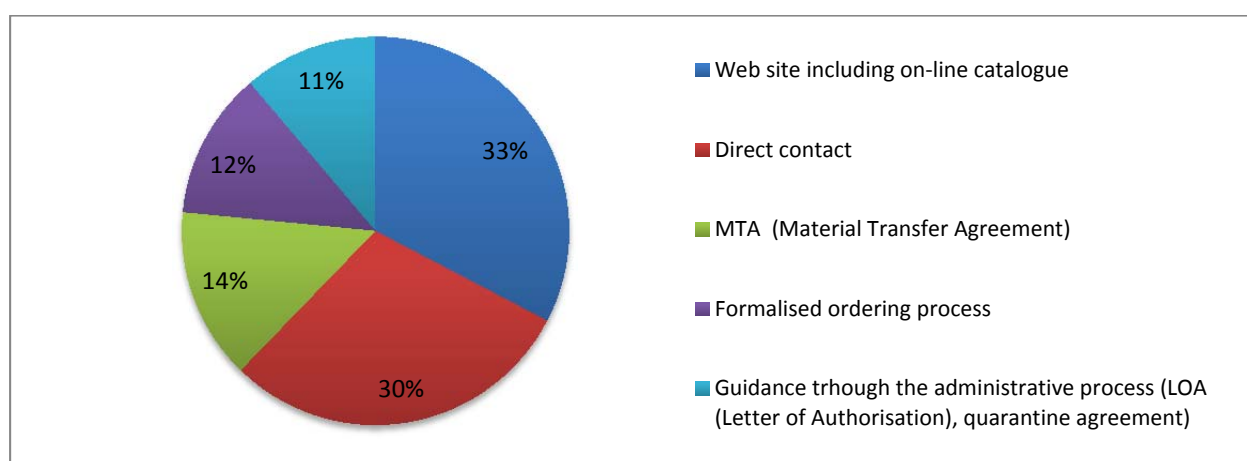


Figure 15: Overall number in percentage of respondents to the question 8 “What makes order of biological material easier?”.

Comments:

The answer is clear. The **visibility** and **clear contact person** for collection is essential to permit easy access to the resources. A formalised process to order (including material transfer agreement) is also important.

Do the collections propose this kind of services? : Questions 7 and 28 of the WP2 questionnaire gives insights (Figures 16 and 17).

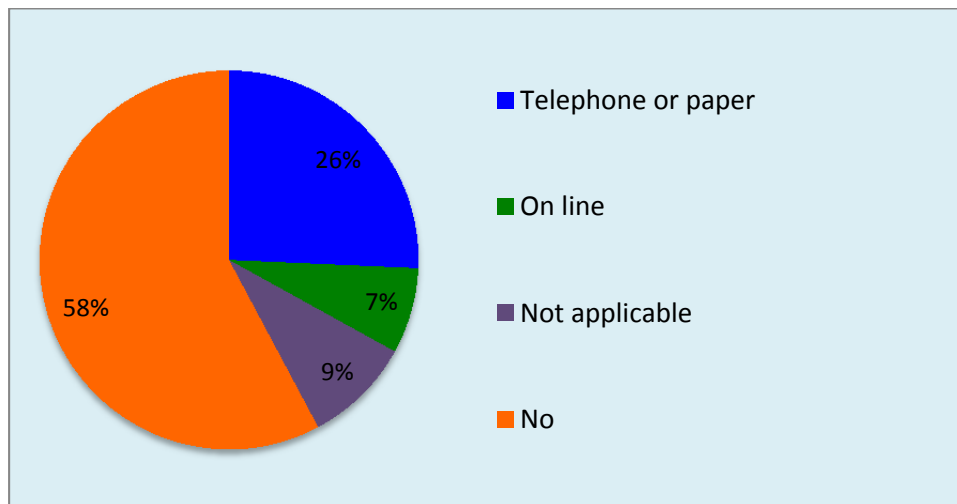


Figure 16: Overall number in percentage of respondents to the question of the WP2 question 7 "Does your institute / lab has an ordering process (by collection)?".

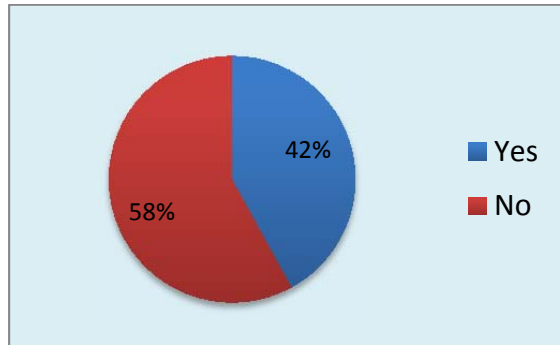


Figure 17: Overall number in percentage of respondents to the question of the WP2 question 24: "Does your institute/lab have a MTA?"

The majority of collections do not offer web site (visibility) neither formalised ordering process or MTA. A clear gap exists between users needs and collections offers.

These analyses give clear insights in which direction the collection may improve their services to help users to have access to the resources.

The absence of MTA for the majority of collections raises here again the question of traceability of exchanges. The Nagoya protocol has been established following the Convention on Biological Diversity. This protocol came into force in October 2014. Its objective is to ensure fair sharing of the benefits coming from the utilisation of the biological resources.

For the moment the national laws permitting its application are not yet ready. However, this Nagoya protocol will certainly require an accurate traceability of exchanges of biological material.

In this perspective, the experts suggest strongly the collections and owners of biological resources to implement procedures to trace these material exchanges. This can be achieved by the implementation of a formal ordering process.

The absence of visibility for the majority of collections is a problem difficult to overcome for a lot of collections.

After discussion, it appears that WP5 “info-portal” may be able to propose a solution to enhance visibility and to provide at least a simplified catalogue easily accessible and linked to Q-Bank.

Question n° 9: Do you have any suggestion to improve accessibility to the biological material?

The fourteen answers to this open question were grouped by topics and listed below. Among them, two answers were judged as non-relevant and discarded.

- ✓ Database / online catalogue, to search among the resources:
 - A More detailed online database;
 - Centralized database for all important collected phytopathological pathogens;
 - Continuation of Q-bank database and collections. To stimulate participation of laboratories to extend the network;
 - Opening up collections, indicating the state of the collections and the state (and origin, age) of the specimens and /or DNA in such collections and their accessibility;
 - Use Q-bank as a web platform.
- ✓ Web site for visibility:
 - Create web site with all necessary sample information;
 - Information on where to get which kind of material;
 - It would be interesting to have a list with the institutes/contacts which possess plant pests, and ready to share their collection;
 - List of collections on EPPO web pages;
 - To create a network of collection;
 - Website information needs to be up to date.
- ✓ More collections:
 - For nematodes, we just started Nematode Collection Europe, it is focussed on type slide material (not yet living material);
 - Observatory of ragweed is well identified by other research teams but we may need a more formalized network to spread data about what we could offer;
- ✓ Financing

- Financing by the European Commission.

Comments:

These different suggestions strongly confirm that visibility of collections on Internet associated with databases, eventually merged in one, is important for users. The association to Q-bank is recommended by the different users answering the questionnaire. This point was also emphasized by experts of the different working groups during the meeting in Paris.

Question n°10 Do you know that biological material can be deposited in collections?

Yes	37
No	5
Total	42

Table 8: Number of respondents to the question 10 “Do you know that biological material can be deposited in collections?”

Comments:

Majority of users are aware that they can contribute to collection (and then participate to insure the best possible access to resources). A proposition to encourage the users to deposit more resources in collections, will permit to help filling the gaps among the conserved material.

Question n° 11: Would you be willing to depositing biological material in collections?

Yes	27
No	2
Don't know	13
Total	42

Table 9: Number of respondents to the question 11 “Would you be willing to depositing biological material in collections?”

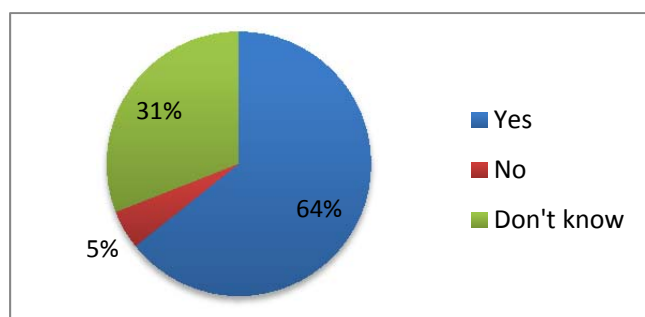


Figure 18: Overall number in percentage of respondents willing to deposit biological material in collections

Comments:

The majority of the respondents are willing to deposit material in collections. There is no strong opposition for material deposit in collections. One third does not know if they want to deposit material. This result arise the problem of visibility of this possibility and the interest to deposit material in collection. Furthermore, it could be interesting to insist in saying that resources can be deposited in more than one collection, which can insure even more availability for users.

One respondent justified why he doesn't want to deposit biological material in collection. Is answer was "we have an own collection of virulent strains".

To the first question, if the respondent answered "Yes", another question was proposed "which kind of deposit do you need".

Public deposit	23
Safe deposit	11
Patent deposit	2
Other	0
Total	36

Table 10: Table 11: Number of respondents to the part 2 of the question 11.

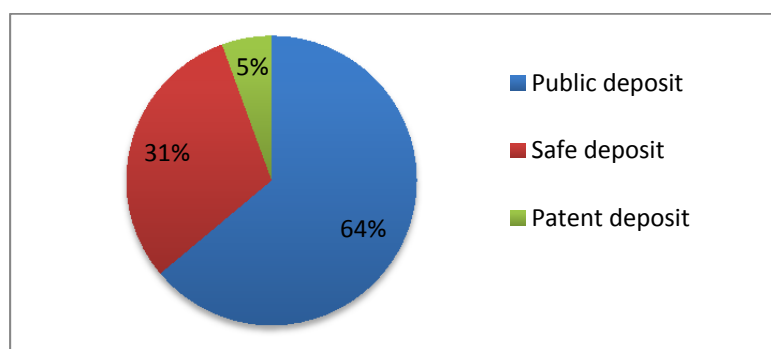


Figure 19: Overall number in percentage of type of deposit required by the respondents of the question 11.

Question n° 12: Have you already deposited material ?

Yes	21
No	21
Total	42

Table 11: Number of respondents to the question 12 "Have you already deposited material"

Following this first question, several sub questions were asked to go further into their way to deposit material.

Question 12b : “Where do you deposit material ?”

National / international reference collection	14
Internal research or working collection	10
Informal exchanges with experts from other laboratories/institutes)	12
Other	2
Total	38

Table 12: Nature of the different collections used by respondents to deposit material.

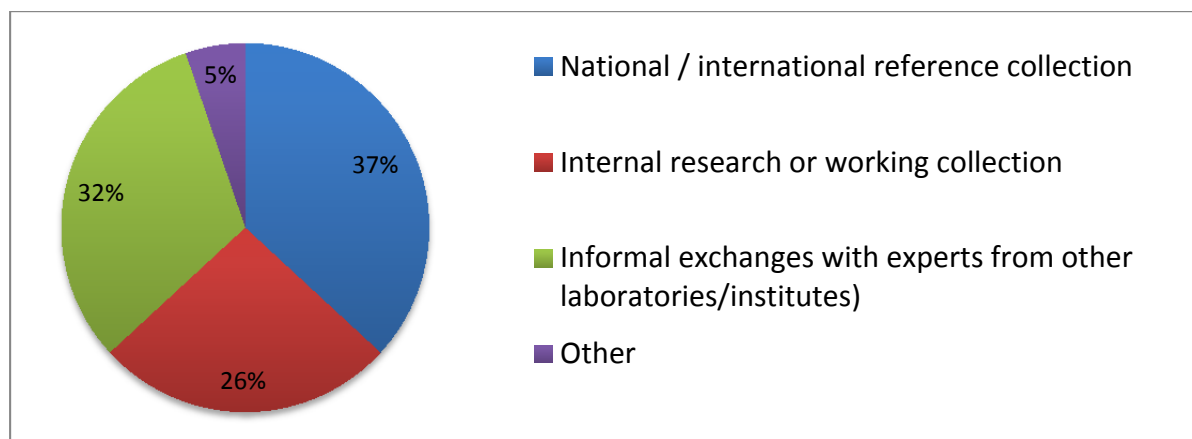


Figure 20: Overall number in percentage of nature of the different collections used by respondents to deposit material.

Question 12c: “Did you find this process easy?”

Yes	19
No	2
Total	21

Table 13: Number of respondents having found this process easy.

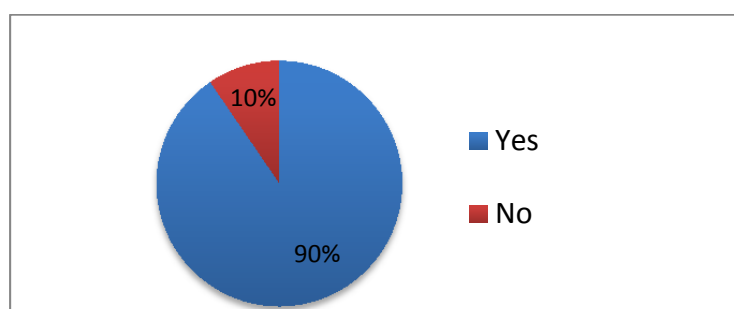


Figure 21: Overall number in percentage of respondents having found this deposit easy.

The possibility to let comments was offer to the respondents about the specificity of their difficulties and their proposal to facilitate deposit.

For their difficulties, they indicated:

- lack of overview of availability, accessibility, condition and amount of material;
- Financing.

For their proposal to facilitate deposit, they suggested:

- Improvement of knowledge / communication of our collection by the reference collection for example;
- We are working internal (research workers of INRA), that's why it is easy. But if our collection grows bigger, we may need a better frame of organization.

Comments:

Although the users are aware that deposit is possible in collections, only half of them have already done it and mostly into informal collections. On the other hand, 90% of those having deposit material found it easy. Here again, the lack of visibility of the collections and the services they offer is the only point that may explain this fact.

Question n° 13: Are you aware of the Convention on Biological Diversity (CDB; <http://www.cbd.int/>) and of the possible limitations for exchanges of biological material?

Yes	26
No	15
Total	41

Table 14: Number of respondents aware of the convention on biological diversity.

Comment: More than a third of users are not aware of the Convention on Biological Diversity, meaning that collections will have to make efforts to better explain this convention and Nagoya protocol and their potential consequences on material exchanges.

4. General conclusions on the results gathered from users questionnaire.

This questionnaire helped to better understand the users needs.

Moreover we were able to conclude that these answers correspond to the reality of users needs.

The analysis permitted also to point out that collections should extend their holdings toward being exhaustive in quarantine resources and should improve visibility.

5. D4.3: Summary of the different assessed needs

The results gathered from this questionnaire permitted to determine that there is no specific needs from a specific type of user (private company or NPPO for instance) neither specific need expressed by users of a specific kind of organism (i.e. bacteria users or insects). However, there is major difference if they need dead or alive material.

General needs expressed by all users:

- Collections holding the whole diversity of quarantine organisms.
- (Unavailability of material being considered as the first problem for users)

- Collections clearly visible (web-site including clear contact and on-line catalog)
- Easy ordering process
- Reasonable costs

Needs expressed specifically by users of living material

- Help for dealing with regulations

Emerging need

- Nucleic acids