

# Horizon Scanning - Media monitoring 2018-2019 Report

## TABLE OF CONTENTS

1	Categories, ontologies, filters, sources.....	7
1.1	Definitions.....	7
1.2	Medisys implementation process.....	9
a.	Categories and ontologies used on the Medisys platform.....	9
b.	Filters .....	11
i.	For known pests, listed or not .....	14
ii.	For unknown pests .....	15
c.	Sources (media, grey and scientific literature).....	16
1.3	Medisys platform.....	18
a.	Category editor .....	19
b.	Workspace .....	20
2	Project outputs .....	23
2.1	E-mail alerts .....	23
2.2	Monthly media and scientific newsletters .....	23
a.	Newsletter production process .....	23
b.	Pilot phase of the scientific newsletter editing .....	24
c.	Newsletter formatting .....	25
d.	Article selection criteria.....	27
e.	Improving the monitoring and “quality control” of keywords .....	30
i.	Case of unrelated articles (negative match).....	30
ii.	Case of related articles (positive match) .....	30
iii.	Case of relevant article found via unspecific keywords .....	31
3	Data analysis .....	32
3.1	Media newsletter .....	32
3.2	Scientific newsletter .....	33
4	Conclusions and prospects .....	45
4.1	Conclusions.....	45
4.2	Prospects .....	46
5	References .....	47
6	Appendix.....	48
6.1	Step-by-step guide: subscribing to Medisys email alerts .....	48
6.2	List and scope of the 73 journals providing only one article for the scientific newsletter .....	53

## LIST OF FIGURES

Figure 1: Summary of the Horizon scanning project – ANSES is in charge of media and literature monitoring (in green), scientific newsletter production (in orange) and ranking (scoring) in pink. ....	6
Figure 2: Ontology model used to define the keywords for each pest, the resulting set of keywords forming a category. Adapted from (O. Alomar et al. 2015).....	8
Figure 3: Ontology of the category <i>XylellaFastidiosa</i> -PHT .....	9
Figure 4: Medisys platform and its tools Left: the category editor for creating/modifying categories and filters Right: the workspace for selecting articles and publishing newsletters .....	19
Figure 5: Category Editor: a category containing keywords.....	20
Figure 6: Workspace - Edition of the newsletters, selection of articles .....	21
Figure 7: Workspace - Publication of the newsletters, extraction of a Word file to edit .....	21
Figure 8: Outputs of media monitoring with Medisys: Media and scientific newsletters and e-mail alerts .....	23
Figure 9: Monthly procedure for the production of the two newsletters .....	24
Figure 10: Media newsletter cover page.....	25
Figure 11: Contents of the media and scientific newsletters.....	26
Figure 12: Tables showing icons for the pests <i>Xylella fastidiosa</i> (upper part) and <i>Agrilus planipennis</i> (lower part) in a media and a scientific newsletter .....	26
Figure 13: Mind map used for the human-based selection of articles to be included in the newsletters (made with FreePlane: <a href="https://www.freeplane.org/">https://www.freeplane.org/</a> ) .....	29
Figure 14: Example of media article containing the generic keywords unrelated to plant pathology .....	30
Figure 15: Example of media article about a “first finding” .....	30
Figure 16: Example of a relevant scientific article about a “new pest” .....	31
Figure 17: Monthly published media articles found by the Medisys platform, with all the categories developed for plant health monitoring (no selection) – Histogram made with R (Andrea Maiorano, EFSA plant health team) .....	32
Figure 18: Published media articles by taxonomic group of the pests and by their regulatory status in the EU or their status in the EPPO lists.....	33
Figure 19: Monthly published scientific articles found by the Medisys platform, with all the categories developed for plant health monitoring (no selection) – Histogram made with R (Andrea Maiorano, EFSA plant health team) .....	33
Figure 20: Scientific articles from Medisys by taxonomic group of the pests and by their regulatory status in the EU or their status in the EPPO Lists .....	34
Figure 21: How articles selected and published were retrieved - For scientific newsletter issues 1 to 13 (period of publication from January 2019 to January 2020).....	35
Figure 22: Economic sector of the host plants for pests discussed in the articles selected for each newsletter - For scientific newsletter issues 1 to 13 (time period of publication from January 2019 to January 2020) .....	36
Figure 23: Economic sector of the host plants for pests discussed in the articles selected for all the newsletters - For scientific newsletter issues 1 to 13 (time period of publication from January 2019 to January 2020) .....	37
Figure 24: Share of the outputs of agricultural sectors in the EU for 2018.....	37
Figure 25: Taxonomy of the pests discussed in the selected articles - For scientific newsletter issues 1 to 13 (time period of publication from January 2019 to January 2020) .....	38
Figure 26: Status of the pests discussed in the articles selected for all the newsletters - For scientific newsletter issues 1 to 13 (time period of publication from January 2019 to January 2020).....	38
Figure 27: 20 scientific sources provide at least 4 articles each - For scientific newsletter issues 1 to 13 (time period of publication from January 2019 to January 2020) .....	39
Figure 28: Selection criteria for scientific articles published - For scientific newsletters 1 to 13 (time period of publication from January 2019 to January 2020) .....	40
Figure 29: Most discussed pests in the articles published - For scientific newsletters 1 to 13 (time period of publication from January 2019 to January 2020).....	40

Figure 30: Topics of the articles about <i>Xylella fastidiosa</i> published in the scientific newsletters (time period of publication from January 2019 to January 2020) .....	41
Figure 31: Topics of the articles about <i>Candidatus Liberibacter asiaticus</i> published in the scientific newsletters (time period of publication from January 2019 to January 2020).....	41
Figure 32: Taxonomy of the unlisted pests discussed in the scientific newsletters 1 to 13 regarding their host plants (time period of publication from January 2019 to January 2020) .....	43
Figure 33: Selection criteria used to retrieve the articles on not listed pests in the scientific newsletters 1 to 13 (time period of publication from January 2019 to January 2020).....	44

## INTRODUCTION

In the framework of the European Plant Health regime, the European Commission (EC) Directorate General Health & Food Safety (DG SANTE) requested EFSA to carry out a horizon scanning exercise on plant health threats to the European Union (EU).

In order to favour a proactive approach by EU Member States (MSs) toward emerging risks, EFSA is asked to regularly screen any relevant web-based mainstream media available and scientific journals to identify organisms that could be harmful to European plants if introduced into EU countries.

To monitor these pests<sup>1</sup>, EFSA uses the IT platform of Medisys, a tool developed by the European Commission's Joint Research Centre (JRC) with the initial scope to identify potential human health threats. Under the EFSA-funded project "Development and testing of the media monitoring tool Medisys for the monitoring, early identification and reporting of existing and emerging plant health threats" (Contract number OC/EFSA/PLH/2013/02) the tool was for the first time tested and adapted to plant health needs (Alomar et al., 2015 and 2016).

The platform thus developed, had then to receive input from sources specific to plant health. With this scope, EFSA appointed ANSES, through its Plant Health Laboratory (*Laboratoire de la santé des végétaux*, LSV) and Biological Risk Assessment Unit (*Expertise sur les risques biologiques*, or ERB unit), in the framework of a tasking grant GP/EFSA/ALPHA/2017/02 aimed at developing the monitoring of scientific journals and ensuring continuous monitoring of both general and specialised media, and scientific sources. The project also aims to add relevant keywords, cover a wider range of languages (including unc customary languages) and broaden the monitoring scheme to more pests.

Under the same tasking grant, ANSES has also been selected to design the ranking methodology for the pests highlighted by this automated media and scientific literature monitoring.

The first output, an initial list of pests from the ranking (newly-named scoring) has been submitted to the European Commission. This list identifies the harmful organisms highlighted thanks to the monitoring.

The corresponding information is designed to help MSs improve their border and territorial surveillance on harmful organisms so as to prevent these organisms from entering the country. Data from the monitoring can also be ranked (following a scoring exercise) so that the EC with the MSs can request EFSA for performing pest categorisation in view of the potential regulation of these pests. The objective of regulation EU 2016/2031 is to anticipate and prevent the introduction of new pests into the EU area.

Besides the monitoring and ranking (scoring), the other output of the monitoring exercise is the monthly publication of two newsletters, one reporting relevant media articles and the other reporting relevant scientific articles. The articles are selected in line with criteria presented in this report. Once validated by an editorial committee composed of scientific experts, both newsletters are submitted to the European Commission for consultation, during the sessions of the plant health commission of the Plant, Animal, Food and Feed (PAFF) committee to provide MSs risk managers with additional information.

The different steps of this project are presented in Figure 1.

ANSES has supported EFSA with its technical and scientific expertise for the monitoring and pest ranking (scoring) project known as "Horizon Scanning"

This report presents ANSES's contribution to the monitoring part of the project. The pest ranking (scoring) methodology is being developed in parallel.

For the automated monitoring task, ANSES was asked to work on the sources monitored and on keywords related to pests.

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<sup>1</sup> The term 'pests' is used in a general sense to mean all harmful organisms: bacteria and phytoplasmas, viruses and viroids, insects, nematodes, fungi and oomycetes.

More precisely, the Agency’s work focused on identifying new media and scientific literature sources, in addition to the broadening of keyword and language coverage to describe both known and more recently highlighted pests.

Besides this development work, ANSES routinely selected articles, edited the scientific newsletters and attended the working group that validates the newsletters.

Lastly, ANSES was also asked to summarise and analyse data generated by the monitoring task and to help draft the corresponding scientific and technical EFSA report.

### Horizon scanning – EFSA project, ANSES and JRC partnership

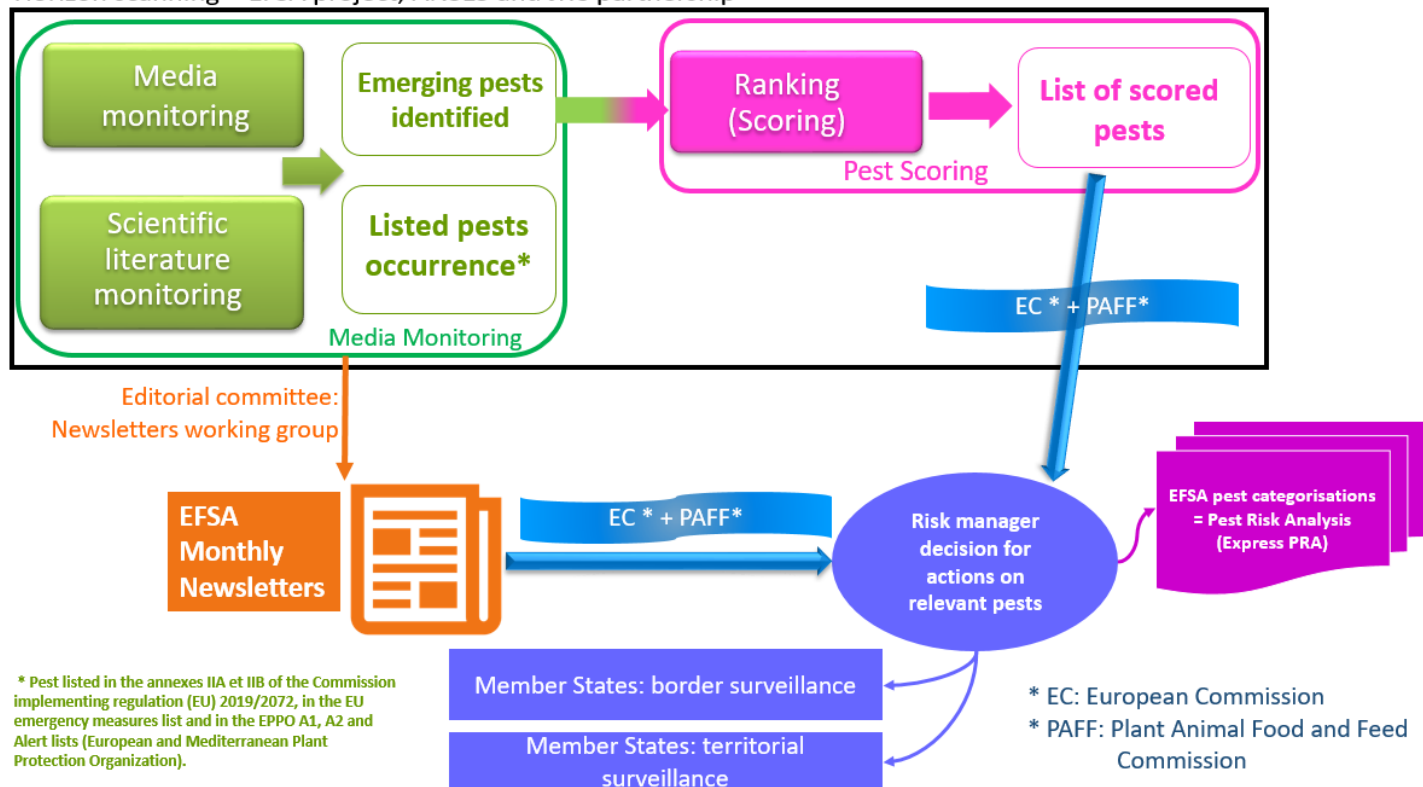


Figure 1: Summary of the Horizon scanning project – ANSES is in charge of media and literature monitoring (in green), scientific newsletter production (in orange) and ranking (scoring) in pink.

# 1 CATEGORIES, ONTOLOGIES, FILTERS, SOURCES

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In order to explain the principles behind Medisys, the main definitions of use for the Horizon Scanning project are presented in this first part of the report.

## 1.1 DEFINITIONS

A **category** is a set of “inclusion” and “exclusion” keywords corresponding to a given pest. The categories are named using the pest’s scientific name and according to the following nomenclature: GenusSpecies-PHT, in which “PHT” stands for Plant Health Threats. This nomenclature is requested by the JRC to differentiate the categories and therefore the keywords it contains, which will be used to monitor plant health. Thanks to this nomenclature, categories dedicated to plant health can be distinguished from all other categories defined for the other topics monitored by Medisys (e.g. human and animal health, nuclear safety, bioterrorism).

An **ontology** formally represents knowledge within a domain using a concrete vocabulary to denote the concepts, properties and interrelationships among them (Alomar et al. 2016). In this report, an ontology consists of all the categories corresponding to pests or groups of pests. Each category includes scientific and specific common pest names (named pests being monitored) or generic keywords to select information on unknown pests (Figure 2).

A **filter** is a way to organise the various categories. Categories describing pests that share one or more identical properties or the same regulatory status can be grouped using the same filter. For instance, a filter can gather together pests/categories belonging to the same regulatory list or belonging to the same taxonomic group or all the pests with the same host plant. Through filters, the search for information is carried out in a predefined regulatory and/or taxonomic framework. A filter can also contain keywords not directly linked to any known pest/category. This is the case for the EFSA Unknown Plant Health Filter (see paragraph: For unknown pests).

**Sources** are the media, scientific journals and other informal sources of information (called “grey” sources) used to look for articles. The article search is automatic through Medisys, but as the Medisys database of scientific journal sources is not exhaustive, we chose to duplicate the scientific article search via Scopus requests. Scopus is one of the most frequently used bibliographical research tool in the scientific community and was used for checking the source content’s relevance. Furthermore, expert members of the newsletter editorial committee (newsletter working group) also suggested other sources and articles.

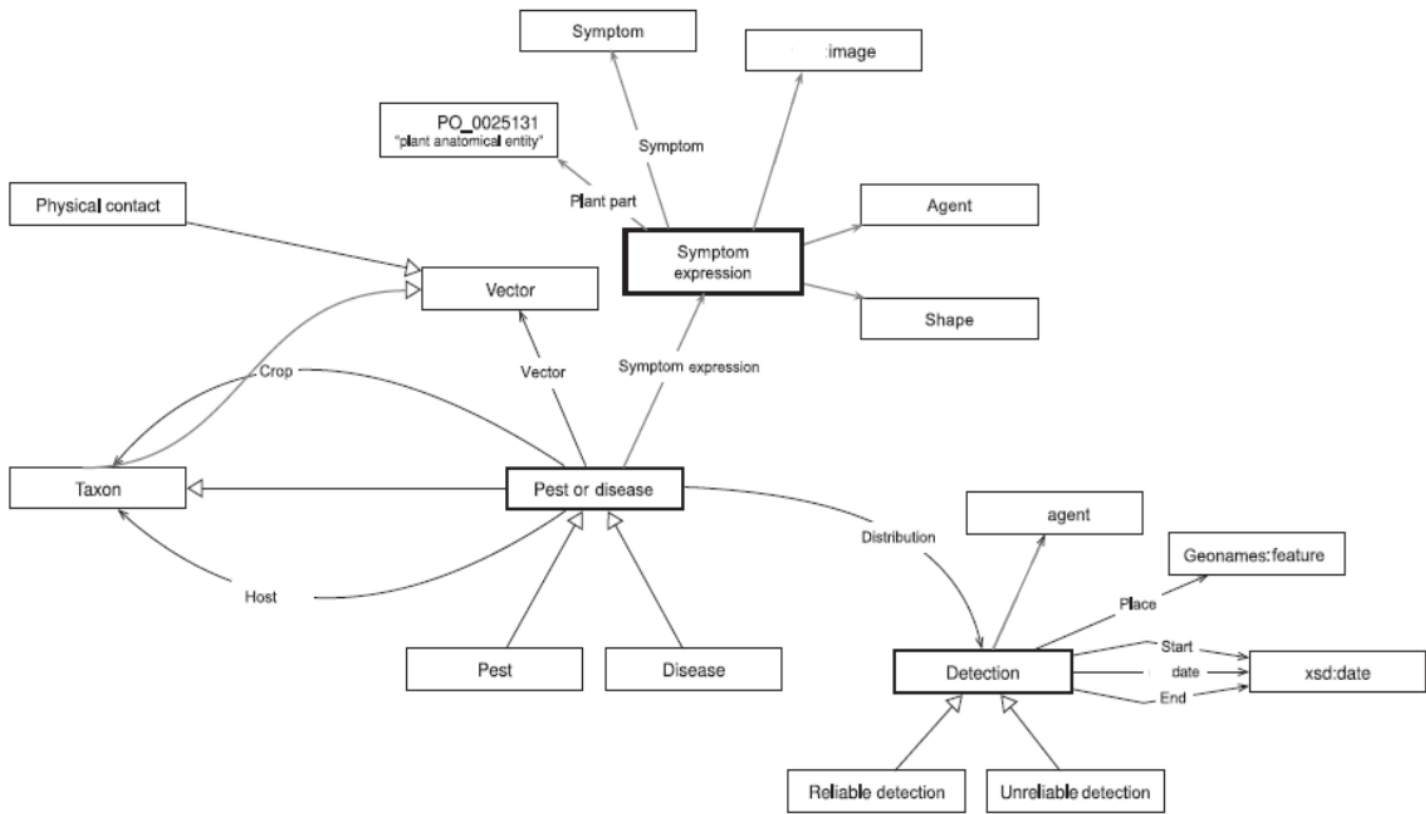


Figure 2: Ontology model used to define the keywords for each pest, the resulting set of keywords forming a category. Adapted from (Alomar et al., 2015)



## 1.2 MEDISYS IMPLEMENTATION PROCESS

### a. Categories and ontologies used on the Medisys platform

Before carrying out any information search for a given pest, it is necessary to establish the most complete set of keywords corresponding to the pest generated by the ontology.

For example, Figure 3 shows the ontology structuring the *XylellaFastidiosa*-PHT category, e.g. all the keywords corresponding to *Xylella fastidiosa*, which is pathogenic for a wide range of plants, including grapevine or olive trees. The inclusion keywords are related to several concepts linked to the pathogen itself (pest: scientific or common names), the disease (the different names of the corresponding diseases) or the symptoms (names of the corresponding hosts and specific symptoms). All the common names need to be displayed in as many languages as possible to maximise the amount of information found.

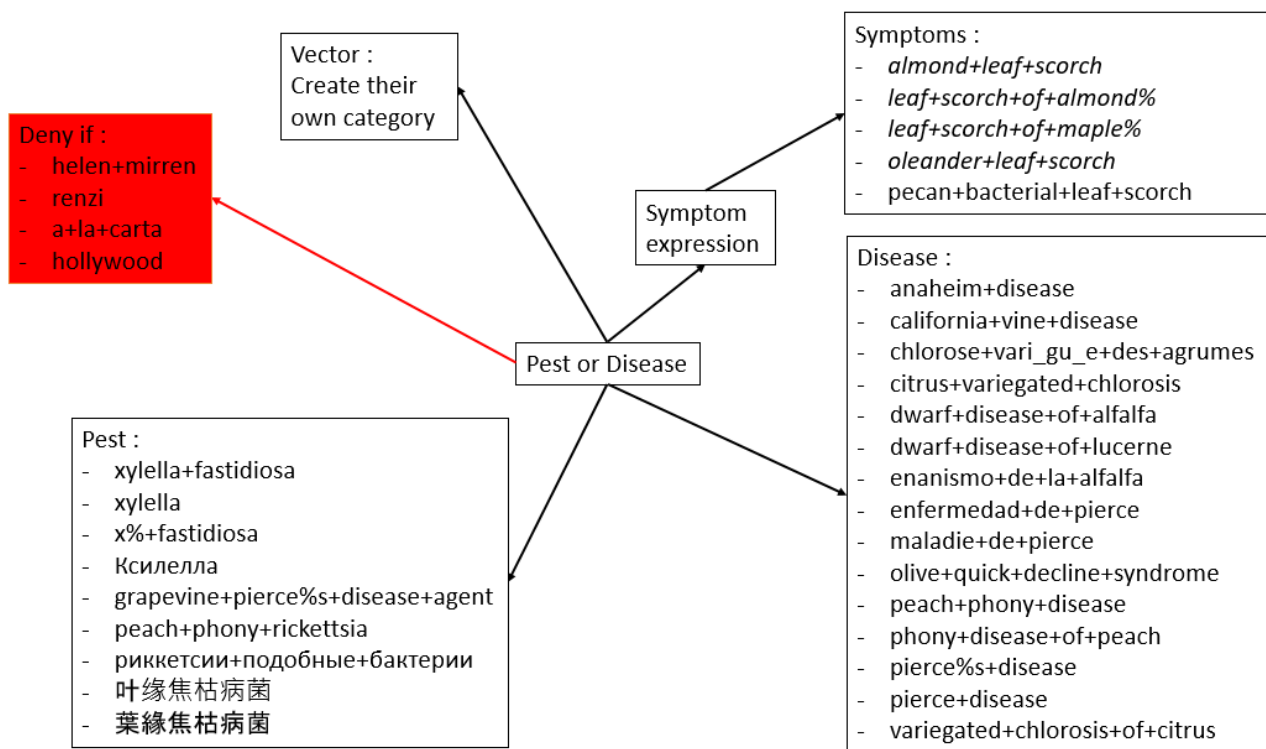


Figure 3: Ontology of the category *XylellaFastidiosa*-PHT

### Rules of bibliography searches

Once the ontology is established, Medisys searches for all the keywords in all the sources registered in its database, then displays the media articles and scientific references containing at least one of these inclusion keywords.

In the meantime, in order to minimise any background noise corresponding to non-relevant information, Medisys allows the user to add exclusion keywords (see Figure 3 in the red frame). The detection of at least one of these exclusion keywords in the same article cancels its selection. This function is designed to remove from the selection any articles that contain at least one inclusion keyword but are unrelated to the topics of the request (see 2.2 d Article selection cArticle selection criteria).

For instance, in the case of *Xylella fastidiosa*, the names of an actress (Helen Mirren) and of an Italian politician (Matteo Renzi) have been defined as exclusion keywords because both of them regularly mention *Xylella* in interviews whose topics are unrelated to plant health (see Article selection criteria). Likewise, the terms "a la carta", corresponding to a Spanish TV show, and "hollywood", which is often quoted in interviews of actors, have been identified as exclusion keywords. However, in order to avoid the rejection of accurate media or scientific articles, commonly used words (adjectives, nouns) should not be listed as exclusion keywords.

Another example is provided when the species of a pest is also an adjective in Italian or in Spanish: in the case of *Melanagromyza prolifica*, the keyword “m%+prolifca” will attract a lot of unnecessary interference (molto prolifica, mai prolifica, meno prolifica...). This issue can be solved by either excluding “m%+prolifca” from the list of inclusion keywords, or by manually adding the list of unwanted identified character strings in the list of exclusion keywords.

For this reason, the keyword lists contained by the categories are intended to be adapted, corrected and/or upgraded dynamically. Both inclusion and exclusion keywords can be added at any time in order to optimise the number and accuracy of the media and scientific articles selected by Medisys.

The automated information searches involving Medisys also address and take into account variations in the spelling of words depending on the different languages and accents. Broadly speaking, keywords are designed as character strings. Each word in a group of words is separated by the operator “+”. In addition, the writing of the keywords can be modulated using wildcard characters such as “%” and “\_”.

The “%” wildcard character is used in place of either:

- 1- at least one character
- 2- no character
- 3- a space

This means that the search can take into account the singular and plural forms of a given word at the same time, along with possible declinations used in several languages. For instance, “pat%olog%” can be used for “pathology”, “pathologie”, “pathologies”, “patología”, “patologías”...

The “\_” wildcard character is typically used for keywords written with accentuated letters (such as “é”, “à”, “ô”, “ï”, “ñ”...) since Medisys does not recognise accentuation in the keywords. For instance, one of the diseases caused by *Xylella fastidiosa* is referred to in French as “chlorose variéguée des agrumes”, which contains two accentuated letters and will be listed in the keywords as “chlorose+vari\_gu\_e+des+agrumes”.

Although Medisys is a multi-lingual tool and also covers non-Latin alphabets, the use of special wildcard characters as generic ones is restricted to languages using the Latin alphabet, and cannot be used for Asian, Arabic, Slavic, Greek or other non-Latin alphabet-based languages.

Since the writing of keywords is partially case-sensitive, if the keywords are written with an upper-case letter, only the articles containing this word with the upper-case letter will be selected (e.g. for the keyword: **Xylella**, only **Xylella** and not **xylella** will be picked up in the articles). In contrast, when writing a keyword with a lower-case letter, articles containing the corresponding upper- and lower-case keywords will be kept (keyword: **xylella** → **Xylella** and **xylella**). In order to maximise the scope when searching for articles, we chose to write all the keywords with lower-case characters.

### **Reliable data resources on pests**

In order to create the most exhaustive list possible of inclusion keywords, regarding either scientific or common names of pests, specific names of diseases or of symptoms, it is first necessary to identify reliable sources of data on pests.

Most common and scientific names of plant pests can be found in databases such as the EPPO Global Database<sup>2</sup> and CABI Crop Protection Compendium<sup>3</sup>. Online encyclopaedias like Wikipedia<sup>4</sup> can also sometimes

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<sup>2</sup> <https://gd.eppo.int/>

<sup>3</sup> <https://www.cabi.org/cpc>

<sup>4</sup> <https://www.wikipedia.org/>, [http://wiki.plantontology.org/index.php/Plant\\_Disease\\_Ontology](http://wiki.plantontology.org/index.php/Plant_Disease_Ontology)

be a source of information, but for such open collaboration-based encyclopaedias, keywords related to plant pests need to be cross-checked with the content of databases containing verified scientific content.

Specific databases are also available, such as those on insects<sup>5</sup> or viruses<sup>6</sup> while others are dedicated to a given economic sector like the forest<sup>7</sup>.

The various databases available among ANSES's documentary resources have also been used to broaden the number of common and scientific keywords. The ANSES documentation department helped lay the foundation for the bibliographical search methodology to find further relevant databases.

As the automated information search is designed to monitor recent or emerging pests, Medisys has been configured to retrieve articles related to these pests, even when no keyword corresponding to either scientific or common names or diseases or symptoms is available.

First of all, a list of generic inclusion keywords relevant to any plant pest but not specific to any particular established pest was therefore created. The bibliographical search is performed using a combination of keywords such as "dangerous", "first+report", "new+insect%", "agriculture", "vegetables", "grapevine", "wheat", "banana%", "apple", "damage%", "yield+loss", "threat%"... On the other hand, in order to reject articles unrelated to plant health, generic exclusion keywords such as "allergies", "breast+cancer" or "bomb+threat%" were also used.

An additional article selection criterion using a proximity operator of 15 words was also applied. A proximity operator is a range of words in which a combination of a predefined number of generic inclusion keywords must be present so as to identify the corresponding article as relevant to the topic of the bibliographical search. In application terms, to place an article above the Medisys selection limit (defined by the user) and thus to be selected by the platform using the "EFSA Unknown Pest Filter", (i) its text has to contain at least 3 of the generic inclusion keywords, (ii) it must not contain any of the exclusion keywords and (iii) the inclusion keywords needs to be included in the 15 words defined in the proximity operator. If an article does not meet all of these criteria, it will be rejected. This combination of criteria is not relevant for article selection based on categories specific to pests. As soon as one of the keywords specific to the pest is found, this triggers the article's selection by Medisys.

Furthermore, for each new pest of interest highlighted this way, a new category is created and a list of inclusion keywords is organised with the ontology and added to Medisys to characterise this new pest. As a result, the number of plant pests monitored progressively increases.

This process led to a significant increase in the number of pests covered by the bibliographical searches during the pre-2017 part of the project: 117 pests were being monitored in July 2018 and 1,148 by the end of 2019.

## **b. Filters**

As explained in the Definitions section, a filter can be used to classify pest categories, since it can group together several categories having one or more features in common. The features shared by pests classified through the same filter consist of lists (non-regulatory lists such as EPPO lists and regulatory lists displayed in Annex II of the Commission Implementing Regulation (EU) 2019/2072 and subject to EU emergency measures), host plant taxonomic groups, identical vectors, etc. Filters are used to retrieve information in a predefined regulatory and/or taxonomic framework.

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<sup>5</sup> <http://scalenet.info/>

<sup>6</sup> <https://www.genome.jp/virushostdb/view/>

<sup>7</sup> <https://www.forestryimages.org/>

When searching for articles about unknown pests, there are no category and specific keywords to describe them. The set of generic keywords designed to retrieve articles about unknown pests are put into the “EFSA Unknown Pest Filter”.

The filters are either about listed/regulated pests (EPPO lists, EU legislation and EU emergency measures) or filters containing not listed pests (Cf Table 1, column “Other filters”) or pests belonging to other additional lists (see Annexes 16 and 17 of the [EPPO Study on Pest Risks Associated with the Import of Tomato Fruit, UK plant health register](#)). The list of filters can evolve depending on EFSA plant health surveillance activity.

For instance, the filter “Pinus Thunbergii Pests” has been created to monitor 16 pests highlighted in the [Commodity risk assessment of black pine \(\*Pinus thunbergii\* Parl.\) bonsai from Japan](#) published in 2019. This last filter was created following the conclusion of the risk assessment publication, which states that as there is limited information about these 16 pests, additional data of use for a new risk assessment could be found by monitoring the literature. This example is the first of several new filters created following the conclusions of EFSA pest categorisations and commodity risk assessments validated by the EFSA panel on plant health. It was created around the same time as the Medisys tool was entering routine use.

Another example concerns *Xylella* vectors. In order to monitor *Xylella* vectors as comprehensively as possible, the categories of listed vectors are placed in their corresponding filters and a complementary filter containing the non-listed vectors of *Xylella* was created. The filter “Not Cicad Xyl Vect” contains the categories of not listed pests discussed in the [Pest categorisation of non-EU Cicadomorpha vectors of \*Xylella\* spp.](#)

All the current filters are displayed in Table 1.

Table 1: List of pests (EPPO, former and new EU legislation, EU emergency measures and other unofficial lists) and content of the filters (categories sharing one or more characteristics).

Listed Pests						Not listed pests
EPPO lists	Annexes of EC 2000/29 (former legislation)	Annexes of EC 2000/29 (former legislation) EFSA Pest categorisation	Annex II of EC 2019/2072 (new legislation)	Annex II of EC 2019/2072 (new legislation) EFSA Pest categorisation	EU emergency measures	Other filters
A1 list	AnnexIA1 Bacteria Phytoplasma	AnnexIA1 Insects NEU Monochamus	AnnexIIPartA Bacteria	AnnexIIPartA Insects and Mites NEU Choristoneura	EU emergency measures	<b>EFSA Plant Health Email Alert</b>
A2 list	AnnexIA1 Fungi	AnnexIA1 Insects NEU Pissodes	AnnexIIPartA Fungi and Oomycetes	AnnexIIPartA Insects and Mites NEU Margarodes		<b>EFSA Plant Health Scientific Email Alert</b>
Alert list Bacteria Phytoplasma	AnnexIA1 Insects Mites Nematodes	AnnexIA1 Viruses Viroids NEU Cydonia Malus Pyrus	AnnexIIPartA Insects and Mites	AnnexIIPartA Insects and Mites NEU Monochamus		EFSA Unknown Pest Filter
Alert list Fungi	AnnexIA1 Viruses Viroids	AnnexIA1 Viruses Viroids NEU Prunus	AnnexIIPartA Nematodes	AnnexIIPartA Insects and Mites NEU Pissodes		Not Cicad Xyl Vect
Alert list Insects Mites	AnnexIA1 Parasitic Plants	AnnexIA1 Viruses Viroids NEU Virus Fragaria	AnnexIIPartA Viruses Viroids Phytoplasmas	AnnexIIPartA Nematodes NEU Hirschmanniella		Not List Sci Med
Alert list Nematodes	AnnexIA2 Bacteria Phytoplasma	AnnexIA1 Viruses Viroids NEU Virus Vitus	AnnexIIPartB Bacteria	AnnexIIPartA Parasitic Plants NEU Arceuthobium		Not List Sci Sco
Alert list Viruses Viroids	AnnexIA2 Fungi	AnnexIIA1 Insects NEU Margarodes	AnnexIIPartB Fungi and Oomycetes	AnnexIIPartA Viruses Viroids Phytoplasmas NEU Cydonia Malus Pyrus		Not List Sci Oth
	AnnexIA2 Insects Mites Nematodes		AnnexIIPartB Insects and Mites			Others
	AnnexIIA1 Bacteria Phytoplasma		AnnexIIPartB Molluscs			Pinus Thunbergii Pests
	AnnexIIA1 Fungi		AnnexIIPartB Nematodes			Tomato Associated Pests Annex 16
	AnnexIIA1 Insects Mites Nematodes		AnnexIIPartB Viruses Viroids Phytoplasmas			Tomato Associated Pests Annex 17
	AnnexIIA1 Viruses Viroids					UK Plant Health Register

Filters have also been designed for not listed pests (Cf. paragraph below, 1.2 ii For unknown pests)

In addition, two other filters (“EFSA Plant Health Email Alert” and “EFSA Plant Health Scientific Email Alert”) have been created.

“EFSA Plant Health Scientific Email Alert” contains all the pest categories and all the plant health scientific sources from the Medisys database.

“EFSA Plant Health Email Alert” contains all the pest categories and all the sources from the Medisys database minus the scientific sources. This last filter will therefore collect information only from media sources.

The information gathered via both these filters is not monitored for our scientific or media monitoring exercise, but rather used to generate e-mail alerts (see 2.1 E-mail alerts).

i. ***For known pests, listed or not***

Pest monitored in the framework of the media and scientific literature monitoring project are either listed by the European commission (= regulated) (Annex II of the Commission Implementing Regulation (EU) 2019/2072 and EU emergency measures), by EPPO (= not regulated) (A1 list, A2 list and alert list<sup>8</sup>) or not listed anywhere. “Not listed” pests are not regulated for the EU and are not listed by EPPO, but are potential new threats for plant health within the EU.

The European Commission drew up a list of quarantine pests for the EU (Annex II of Commission Implementing Regulation (EU) 2019/2072 corresponding to the Plant Health regulation (EU) 2016/2031 implemented on 14 December 2019). The list displayed in this document has been split into two parts: part A is dedicated to pests not known to occur in the European Union territory and part B to pests known to occur in the European Union territory.

Regulated Non-Quarantine Pests (RNQPs) are not monitored here because they are not managed either by the EU or the MSs, but by the professional operators. An RNQP is as defined by the FAO IPPC in 1997 “a non-quarantine pest whose presence in plants for planting affects the intended use of those plants with an economically unacceptable impact and which is therefore regulated within the territory of the importing contracting party”.

Quarantine pests (which can be hosted not only on plants for planting but on all kinds of plant-based commodities) and RNQPs are both regulated as they are all unwanted, but they have significant differences notably considering the level of tolerance regarding their presence in plants. Plants need to be completely free of quarantine pests, while a certain degree of pest infestation is tolerated for RNQPs.

Articles are selected on the basis of criteria related to the change in distribution of the pest such as “new finding” or “first finding” in a country or region. The information found in an article about a new or first finding of a pest is often not detailed enough to assess whether the acceptance threshold of the RNQP is acceptable or not.

Pests included in EPPO A1 and A2 lists have been subject to a risk assessment by EPPO and are recommended for regulation as quarantine pests. Both lists represent background work for possible future inclusion in EU regulations. Nevertheless, the EPPO region<sup>9</sup> is more extensive than the EU area. It includes countries belonging to the Mediterranean region (Algeria, Morocco, Turkey, Israel, Jordan, Albania, Serbia...) and countries located to the east of the EU (Ukraine, Uzbekistan, Georgia, Russia...).

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<sup>8</sup> The A1 list contains pests absent from the EPPO region and the A2 list pests present in this region but not widespread. EPPO also publishes alert lists as an early warning for pests that may represent a risk for the EPPO region. These alert lists are not considered as a recommendation for regulation by the European Commission.

<sup>9</sup> [https://www.eppo.int/ABOUT\\_EPPO/eppo\\_members](https://www.eppo.int/ABOUT_EPPO/eppo_members)

All the pests in the aforementioned lists (EPPO A1, A2 and alert lists, or Annex II of Commission Implementing Regulation (EU) 2019/2072 corresponding to the Plant Health regulation (EU) 2016/2031) are gathered in a filter named after the corresponding list.

The filters are split into sub-filters. The goal of this is to divide the quantity of articles retrieved by distributing them into the various sub-filters, thus facilitating management of the numerous articles. As a consequence, article screening is more convenient and there is a smaller risk of missing a relevant article.

For instance, the Annex IIA and IIB lists have been split into sub-lists depending on the pest's taxonomic group (kingdom, phylum or class): bacteria, fungi and oomycetes<sup>10</sup>, insects and mites, nematodes, molluscs, viruses, viroids and phytoplasmas<sup>11</sup>.

A pest can be mentioned in several of the lists presented above. For example, *Xylella fastidiosa* is found i) in the EPPO A2 list, ii) in the EU Emergency measures list and iii) in the Commission Implementing Regulation (EU) 2019/2072 Annex IIB list. To avoid any redundancy, we chose to include the category of a pest listed in several lists in one filter only. Lists were prioritised as follows: first, Annex II of the Commission Implementing Regulation (EU) 2019/2072, then the EU emergency measures and finally the EPPO lists. In the case of *Xylella fastidiosa*, the corresponding category will only be placed in the filter for the bacteria listed in Annex IIB of the Commission Implementing Regulation (EU) 2019/2072.

The regulation of pests follows a timeline. When a pest absent from the EU is assessed as a threat for this territory, it is first listed in the European Commission lists (annexes of the regulation and emergency measures). If the pest then spreads in the EU, it will be ultimately removed from these lists and may be transferred to the RNQP list.

The content of filters is dynamic: it reflects changes in regulations. The purpose is to monitor emerging pests, so when a pest is no longer considered as a quarantine pest or is no longer an EPPO-listed pest, the benefits in monitoring this pest decrease. Thus, as the status of pests evolves, new unregulated pests will be removed from the monitored filter (all quarantine or EPPO list filters) to instead be added to the "No Longer Used" filter, which contains the pests no longer of interest for the monitoring work. It can be used to keep the categories of these pests in the event of novel emergences.

All the lists being monitored need to be checked regularly to keep their content updated.

## ii. ***For unknown pests***

The filter "EFSUnknownPestFilter" was designed to search for new harmful pests as potential threats for the EU. It contains a set of generic keywords relevant to plant pests as a whole but not specific to any pest (description in § 1.2.a Medisys Medisys implementation process).

Some of the articles retrieved by this filter are relevant regarding the selection criteria (see Article selection cArticle selection criteria).

When an article about a new pest is found, a category is created and added to one of the "not listed pests" filters, depending on how the article was found (via Medisys, Scopus or Other). The "not listed pests" are those absent from any of the EU quarantine lists or EPPO lists. The newly created category is also added to the two filters designed for e-mail alerts.

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<sup>10</sup> "Fungi form a separate kingdom and are evolutionarily related to animals. Oomycetes are classified in the kingdom Protocista and are related to heterokont, biflagellate, golden-brown algae. Fundamental differences in physiology, biochemistry and genetics between fungi and Oomycetes have been described previously." Oomycetes and fungi: similar weaponry to attack plants TRENDS in Microbiology Vol.11 No.10 October 2003 (doi: <https://doi.org/10.1016/j.tim.2003.08.002>)

<sup>11</sup> "Phytoplasma are phloem-limited bacterial plant pathogens that were first identified in 1967 in ultrathin sections of the plant phloem of plants infected with yellows disease, a syndrome that was previously thought to be caused by a virus" Matt Dickinson and Jennifer Hodgetts, *Phytoplasma: Methods and Protocols*, Methods in Molecular Biology, vol. 938, DOI 10.1007/978-1-62703-089-2\_1

As previously explained, sub-filters are created to manage more easily the quantity of information collected. Three different sub-filters have been created to organise the categories of unknown pests found by the monitoring scheme. The “NotListSciMed” filter contains the categories of pests highlighted via Medisys monitoring. The “NotListSciSco” filter contains the categories of pests found through the scientific monitoring of Scopus. The last filter, “NotListSciOth”, is used to retrieve the categories of pests found in other ways (for instance by EFSA working group experts in charge of validating the newsletters or EFSA plant health panel experts).

These filters can be customised further as needed to provide more information, like retrieving all pests known to be associated with a given host plant, an economic sector (such as forestry or fruit production) or vectors of a disease.

For instance, a filter has been created to better monitor the insects known to be vectors of *Xylella fastidiosa*. Thus, the filter “NotCicadXylVect” contains all the insect species proven to be vectors of *Xylella fastidiosa* except those belonging to the family *Cicadellidae*. The content of this filter is based on the pest categorisation conducted by the EFSA panel on plant health (EFSA Panel on Plant Health et al. 2019).

The articles retrieved through these sub-filters can provide specific information for Plant health expert panels (from safety agencies such as EFSA or ANSES, for example) interested in studying a given pest or its vectors in the framework of a research project, risk assessment, expert appraisal, development of an analytical method or the literature monitoring for that pest.

### **c. Sources (media, grey and scientific literature)**

Several kinds of information sources are monitored by Medisys: media providing general information, scientific journals and “grey”<sup>12</sup> sources of information.

The links leading to the most recent publications on each website are added to the Medisys source database by the JRC Text and Data mining unit in charge of Medisys development.

One of the tasks of the Horizon Scanning project consists in increasing the number of all kinds of monitored sources. Overall, all the potentially relevant sources can be split into two sets:

- a. Sources already considered as relevant by the community because they are known to be related to plant health.
- b. Unofficial information sources (general news, blogs, etc.): these sources are not known to be specifically about plant health. They can be found by doing a web search using different terms related to plant health

A specific process has been designed to find “weak signal” information about all kinds of pests (either already known, whether regulated or not, or previously unknown). This involves information of interest released in scientific publications with either a smaller readership or a highly specific scope or topic. Several criteria define “weak signal” articles, such as the authors’ measured impact and scientific productivity, or the current impact of the investigated field.

For scientific sources, the investigation work conducted by EFSA/ANSES during the pilot phase of the scientific newsletter's development led to an increase in the number of sources monitored by Medisys (from 318

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<sup>12</sup> “Grey Literature is a field in library and Information science that deals with the production, distribution, and access to multiple document types produced on all levels of government, academics, business, and organisation in electronic and print formats not controlled by commercial publishing i.e. where publishing is not the primary activity of the producing body.” [http://en.wikipedia.org/wiki/Grey\\_literature](http://en.wikipedia.org/wiki/Grey_literature)



to approximately 450 sources). Besides the quantity of sources monitored, the quality of the feed allowing access to the source also matters. The URL or RSS<sup>13</sup> link which feeds Medisys needs to provide recently published articles.

However, these articles are not always found on the homepage but sometimes on a “recently published”, “current issue” or “early access” webpage of scientific journal websites. The feed quality of the scientific sources already monitored by Medisys has been improved by ANSES/EFSA’s joint work. For instance, any scientific journal monitored but not providing any articles to the Medisys workspace has been investigated.

The issue to be resolved is: (i) a lack of articles because the journal has not published any articles containing at least one of the keywords listed or (ii) the feed is not working properly.

Media publishing general information are easier to monitor since the homepage is in most cases the page where the stream of recent articles is published.

If the two kinds of feeds (URL<sup>14</sup> or RSS) are available for a given source website, a choice has to be made since both methods cannot be used at the same time to stream information from the same source. However, several URL or several RSS feeds can be monitored for a given website. For instance, the URL or RSS feeds of a journal’s “current issue”, “latest issue”, “articles in press”, “online first articles”, “just published” can be monitored at the same time.

Another task of the Horizon Scanning project is to reinforce the exhaustiveness of the information filtered by Medisys by including new media, grey or scientific sources. As the source websites can evolve, a regular check should be made to verify that the feeds work. If not, the links of source websites must be updated.

The vast majority of sources are written in English and their feed has been found in EFSA publications, EPPO newsletters, Pest Lens/USDA newsletters, SCOPUS monitoring searches and ANSES’s scientific journal database among others.

Another objective of the Horizon Scanning project is to broaden the keyword language coverage. More than 10,000 general and grey sources from all over the world are currently under scrutiny. To be able to gather the maximum of relevant information, a wide range of alphabets needs to be taken into account.

A final Medisys feature of use is its ability to disseminate email alerts (see 2.1 E-mail alerts) containing the media, grey or scientific articles about one or more pests. It can be configured so that the user receives instantaneous alerts when Medisys finds articles about a particular pest. This option is still under development.

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<sup>13</sup> RSS: Really Simple Syndication is a web feed protocol which allows users and applications to access updates to websites in a standardised, computer-readable format

<sup>14</sup> URL: Uniform Resource Locator (URL), known more commonly as a web address

### 1.3 MEDISYS PLATFORM

Medisys is part of Europe Media Monitor (EMM) (Steinberger 2009), a system that provides a tool to survey online media by automatically monitoring thousands of information sources in more than 70 languages and extracting references and relevant content. It has been developed for media analysts, epidemiologists, decision-makers and politicians.

Medisys is a fully automatic public health surveillance system able to retrieve new articles from the internet, classify them according to predefined multilingual categories, identify entities (organisations, persons and locations), extract events, cluster new articles and calculate dedicated statistics in order to detect emerging threats (J P Linge et al. 2009).

Medisys has been adapted by EFSA in collaboration with the JRC to the areas in which EFSA works, a development that took several steps. An EFSA-specific menu was designed with new sources and categories in food and feed safety areas (Jens P. Linge and Belyaeva 2011). The use of Medisys was then expanded to animal and plant health, biological hazards, pesticides and GMOs (EFSA 2012) and its effectiveness in article search and classification via filters assessed. This demonstrated the tool's potential and allowed development to proceed to expert fine-tuning (Robinson et al. 2012). In order to fully exploit the system's potential, the platform was further tailored and tested for retrieving new articles on plant health threats (Alomar et al. 2015).

One of the aims of the project is to improve searches based on keywords, which will lead to better automation of article screening, requiring less human involvement.

A total of 12,391 sources of all kinds are currently monitored on the Medisys platform. To extend this monitoring activity, 442 scientific sources are now being monitored. At the beginning of the project, 117 categories corresponding to pests or groups of pests (for example, *Epitrix*Sp-PHT is a category grouping all the species of the genus *Epitrix* covered by the [Emergency control measures](#) were defined by a multilingual ontology. Ad hoc categories allowing the retrieval of articles on unknown pests to monitor potential new threats for plant health have also been developed. The tool is also used to issue newsletters. Email alerts have also been set up to report news on plant pests.

The main feature used in this project is the system's ability to automatically recover news from the internet (from all kinds of sources without any kind of targeting: general news media, specialised websites (technical reports, unpublished experiments, professional websites, scientific journals, etc.) by searching for predefined keywords. A high-volume flow of articles is automatically gathered by Medisys, then the articles are screened by humans, a step needed to spot the relevant articles with well-defined criteria (see Article selection Article selection criteria).

All of these articles can be retrieved via the Medisys website<sup>15</sup>.

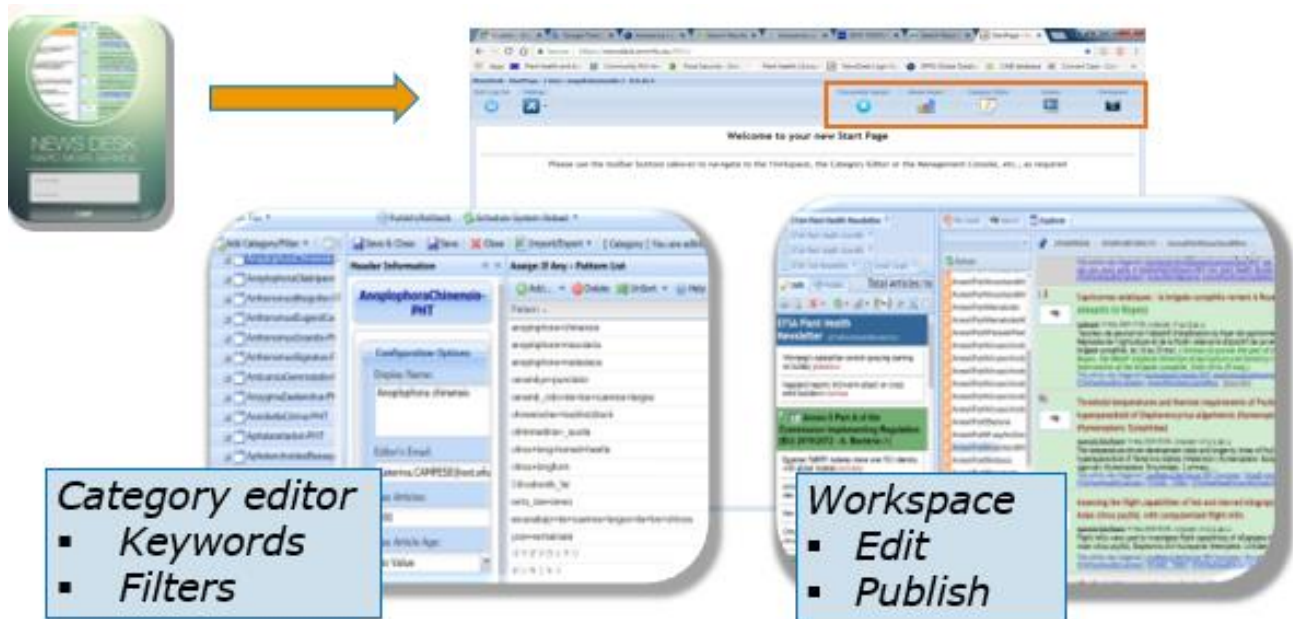


Figure 4: Medisys platform and its tools Left: the category editor for creating/modifying categories and filters Right: the workspace for selecting articles and publishing newsletters

The NewsDesk tool of Medisys is an interactive web-based application, available under a paying subscription scheme via an internet browser (Figure 4). NewsDesk can be used to produce and publish newsletters.

The Category Editor of NewsDesk is used to create, customise and organise the keywords and filters used to structure the article flow provided by the sources. It is the back-end of the application, in which keywords are entered and structured via filters.

The front-end of Medisys is known as the workspace, which is part of the NewsDesk web app. It is used to display the platform's automatic selection of articles, gather selected articles into *ad hoc* templates and edit the draft newsletters.

### a. Category editor

The category editor (Figure 5) is used to create and customise categories. As explained above, categories are composed of specific keywords related to the pest's name (scientific or common names) and symptoms or the disease caused by the pest. In order to avoid unrelated articles, some exclusion keywords can be added. A dedicated filter containing generic keywords has been designed to perform a non-targeted search in order to find articles related to unknown pests, which do not yet have a category.

<sup>15</sup> <https://medisys.newsbrief.eu/medisys/groupedition/en/PlantHealthAll.html>

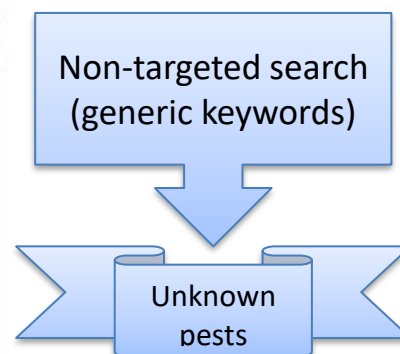
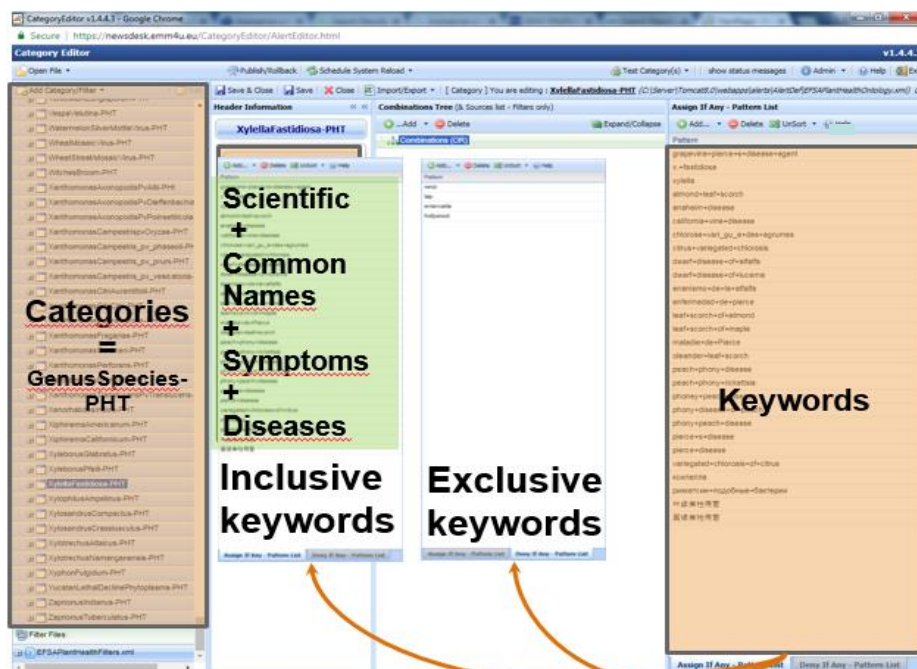


Figure 5: Category Editor: a category containing keywords

The categories can be grouped by filters. This function can be used to structure the categories (all the pests monitored) more systematically (e.g. by grouping those categories corresponding to a specific taxonomic group of quarantine pests).

## b. Workspace

The structure of the filters customised in the category editor reflects the way articles are displayed in the workspace. For instance, the articles concerning pests grouped using the same filter will be displayed together in the workspace (Figure 6).

The workspace allows users to explore all the articles found through the automated search. They can be explored and further screened by clicking on the corresponding filter.

The articles are selected using the "Edit" tab of the workspace. Articles are displayed together with the associated data (metadata), such as title and link to the original article, description (the first sentences of a media article, all or part of the abstract of a scientific article). If the article is not already written in English, Medisys automatically suggests translation into English.

When an article is considered as relevant to the topic of the bibliographical search (regarding the Article selection c), it is selected, moved into and stored in the left window of the workspace (drag and drop), corresponding to the newsletter template.

When the selection is considered as complete, the workspace allows the end user to download all the selected articles through the function "Publish", already in specific file formats (Docx, Pdf, Xml).

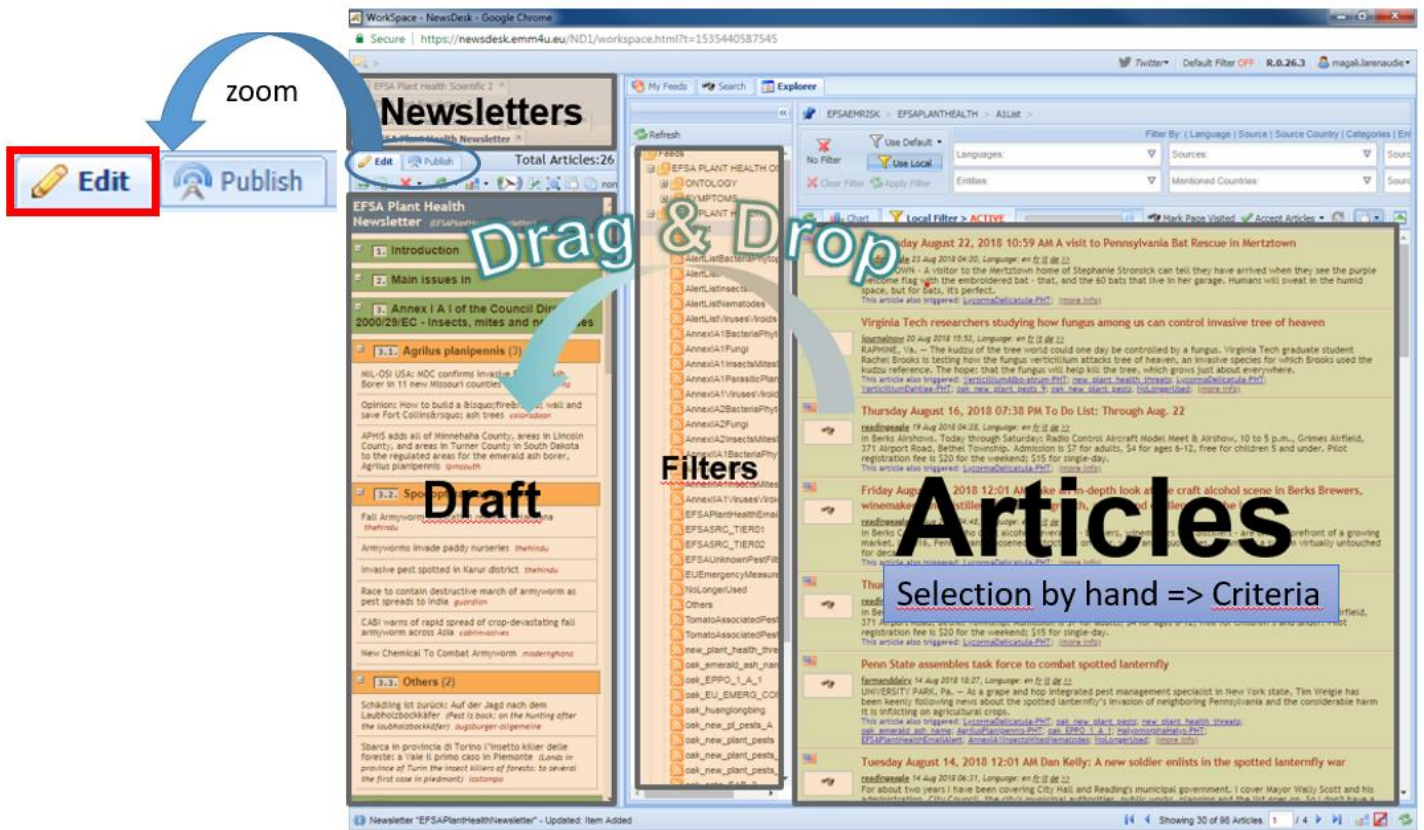


Figure 6: Workspace - Edition of the newsletters, selection of articles

Once the articles have been selected (at the end of the current month), the “Publish” tab of the workspace is used to create a Word file which contains all the articles listed in the draft (Figure 7).

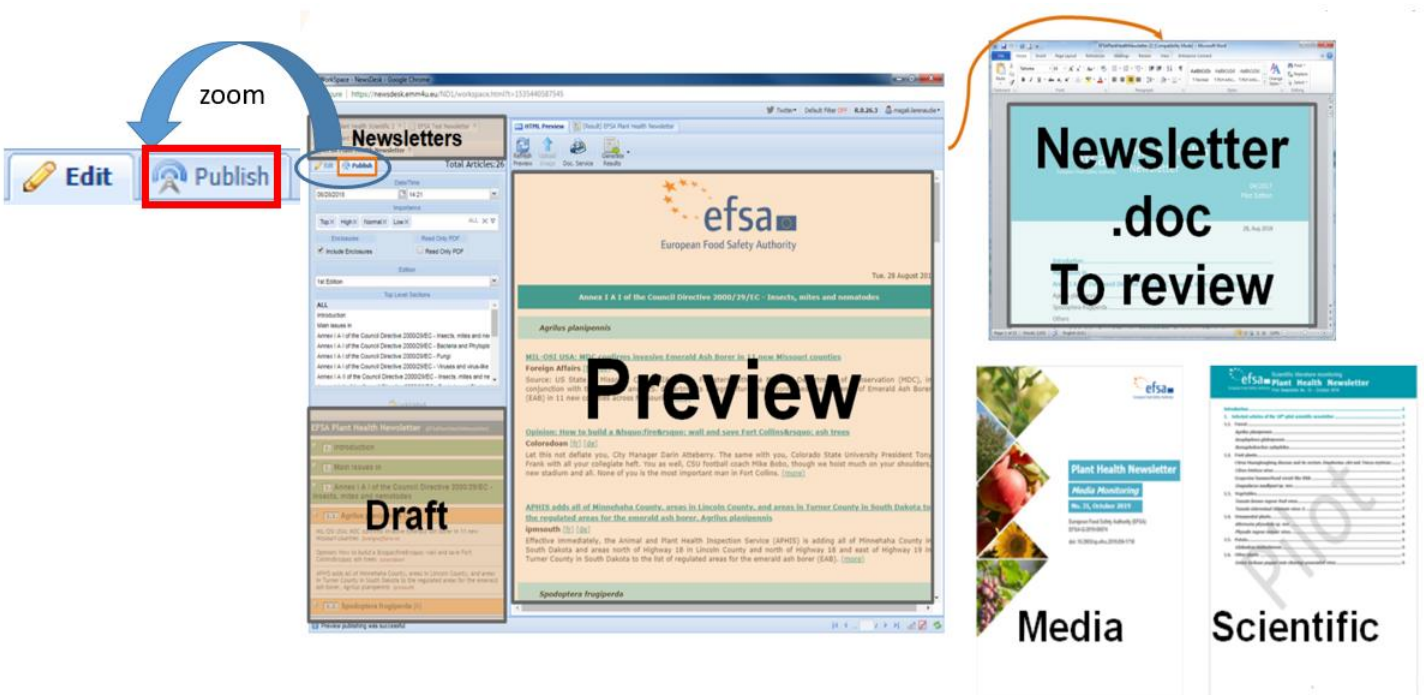


Figure 7: Workspace - Publication of the newsletters, extraction of a Word file to edit

After reviewing, two drafts are produced, one for the newsletter dedicated to media articles and the other for the scientific article newsletter.

Both the draft newsletters are sent to the experts of the working group for their suggestions before the monthly meeting during which the relevancy of the articles selected through the monitoring of Medisys and Scopus and the articles suggested by the experts is discussed.

## 2 PROJECT OUTPUTS

The project's outputs (email alerts and newsletters) are shown in Figure 8.

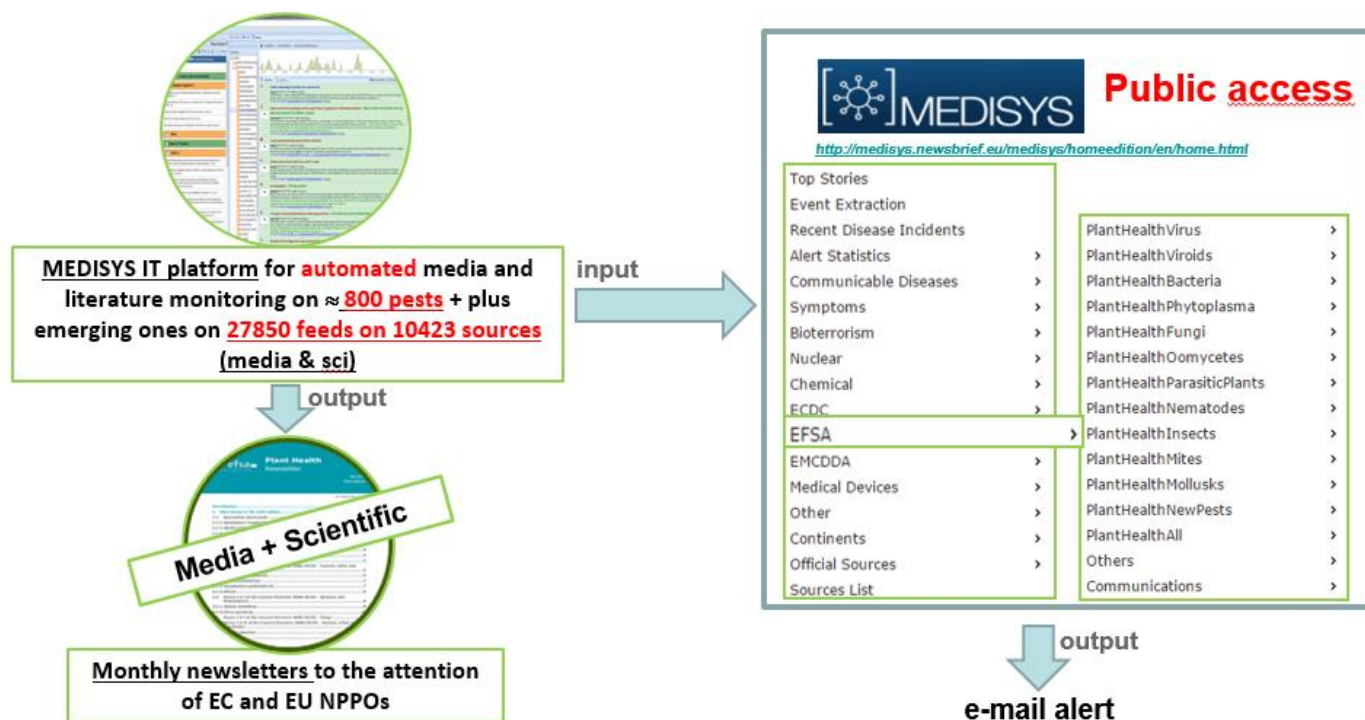


Figure 8: Outputs of media monitoring with Medisys: Media and scientific newsletters and e-mail alerts

The newsletters and e-mail alerts are presented below.

### 2.1 E-MAIL ALERTS

The platform can send e-mail alerts. By subscribing on the [Medisys website](#), users are invited to select a pest category or a filter in order to receive in their mailbox those articles corresponding to the selection in Medisys.

The two filters “EFSAPlantHealthEmailAlert” and “EFSAPlantHealthScientificEmailAlert” contain all the existing categories (minus the ones in the No Longer Used filter). The only difference between the two filters is the sources from which the articles are retrieved. The first filter searches for information in all the sources minus the scientific ones, whereas the second one searches only the scientific sources.

The procedure for subscribing to the e-mail alerts is described in the appendix (6.1 Step-by-step guide: subscribing to Step-by-step guide: subscribing to Medisys email alerts).

### 2.2 MONTHLY MEDIA AND SCIENTIFIC NEWSLETTERS

#### a. Newsletter production process

As shown in Figure 9, the monthly production of the media and scientific newsletters follows a precise procedure. Articles are selected from the first to the final day of each month (using Medisys for both newsletters and Scopus for the scientific newsletter only). A few days before the end of the month, both newsletters are drafted. They are then sent to the working group experts and the articles' relevancy is discussed during a monthly meeting. The meeting for newsletter validation usually takes place the week after the end of the considered month.

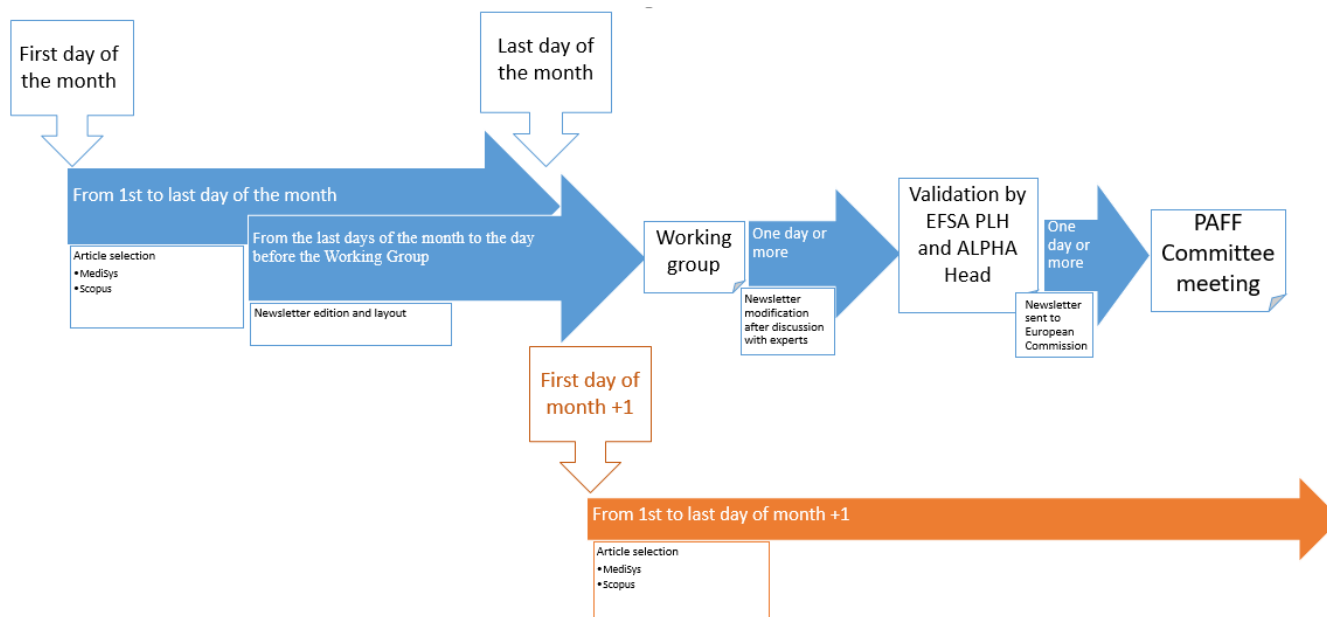


Figure 9: Monthly procedure for the production of the two newsletters

The working group is composed of three experts, whose biological field of expertise (entomology, virology and mycology/bacteriology) can result in a bias in the article suggestions. The articles about these scientific fields are less investigated but more represented than other fields like nematology.

The newsletter drafts are discussed during the meeting and consequently modified when needed. The modified documents are then proposed for validation to the EFSA PLH<sup>16</sup> team leader and then to the head of ALPHA<sup>17</sup> unit (who can suggest modifications).

Once validated, both newsletters can be sent to the PAFF<sup>18</sup> Committee of the European Commission, section Plant Health. The newsletters are transmitted to each MS representative before the monthly meeting of the PAFF Committee, then presented and commented by EFSA during this meeting. The feedback from MSs can also be taken into consideration to improve the scanning methodology.

Meanwhile, the following month has started and the future articles to be published need to be monitored for inclusion in the next issue of the newsletters.

## b. Pilot phase of the scientific newsletter editing

During this development phase, the scientific article search performed using Medisys is complemented with Scopus searches, while supplementary sources can be added to Medisys by the JRC.

The monthly article search is performed with the help of EFSA's AMU<sup>19</sup> unit (which creates the Scopus search requests and sends the Scopus alerts weekly to ANSES): all the pest "categories" are scanned in Scopus except the categories created for a non-targeted screening (not containing specific keywords). External suggestions of articles are also taken into account (by working group experts, EFSA Plant Health panel members, etc.) and can be added to the newsletter.

The cover page and the newsletter layout will also be developed during the pilot phase, which is expected to end in the second semester of 2020. Once the pilot phase is over, all the previously edited scientific newsletters starting from the first edition and all the new issues will be published in the [EFSA journal](#).

<sup>16</sup> PLH: Plant Health team

<sup>17</sup> ALPHA: Animal and Plant Health unit

<sup>18</sup> PAFF: Plant Animal Food and Feed

<sup>19</sup> AMU: Assessment and Methodological Support Unit (formerly EFSA AMU unit)



### c. Newsletter formatting

The two newsletter templates have been designed by EFSA after discussion with the European Commission.

The media newsletter cover page is presented in Figure 10. The cover page of the scientific newsletter will be developed during the pilot phase.



Figure 10: Media newsletter cover page

The two tables of contents of the media and scientific newsletters are presented in Figure 11.

The media newsletter consists of two main parts: 1) a first section presenting the main topics reported in the media ("Main issues"), 2) a second section including links to the selected articles on plant pests classified according to the regulated lists (EU) or to the EPPO lists and on organisms for which the status is not defined. Pests are also classified regarding their taxonomy ("Selected articles").

The topics selected in the "main issues" section of the media newsletter are the following: new pests, new findings of pests that are already regulated (Annex II of the Commission Implementing Regulation (EU) 2019/2072 and EU emergency measures) or listed by EPPO (A1 list, A2 list and alert list) and also an outbreak of pests that are neither regulated nor listed by EPPO. In the scientific newsletter, there is no "main issues" topic because all the articles are of interest for the scientific community.

The articles included in the scientific newsletter are displayed with their links in the "Selected articles" section and are grouped into sub-sections according to the host plant. The economic sectors of the considered host plant are the following: Forest, Fruit plants, Vegetables, Ornamental and flower plants, Cereals, Oil plants, Potato. The sub-section "Other plants" includes articles on plants of minor economic importance in the EU.

Each sub-section includes the name of the pest referred to in the articles, with its taxonomy and regulatory status. For each article, the selection criterion, title, source, date of publication and first lines of the abstract are displayed together with their English translation for articles published in other languages. Two links for the article's direct translation into French and German are also included.

In both newsletters, to provide further information on the pest, a table displaying icons is displayed when data are available on main crops or plants affected, host range or feeding habit, type of impact and presence or absence of the pest in the EU (Figure 12).

Media newsletter		Scientific newsletter	
<b>Plant Health Newsletter</b> Media monitoring No. 32, November 2019		Scientific literature monitoring <b>Plant Health Newsletter</b> European Food Safety Authority Pilot Newsletter No. 9 – September 2019	
Introduction.....	2	Introduction.....	2
1. Main issues in the No. 32.....	3	1. Selected articles of the 9 <sup>th</sup> pilot scientific newsletter.....	3
1.1. Pests listed in the EU legislation.....	3	1.1. Forest.....	3
<i>Agrilus planipennis</i> .....	3	<i>Neocystodidymella dimidiatum</i> .....	3
Tomato brown rugose fruit virus.....	3	<i>Pseudodidymella fagi</i> .....	3
2. Selected articles.....	4	<i>Pseudomonas daroniae</i> sp. nov. & <i>Pseudomonas dryadis</i> sp. nov.....	3
2.1 Annex I A I of the Council Directive 2000/29/EC - Insects, mites and nematodes.....	4	<i>Xanthomonas perforans</i> .....	4
<i>Agrilus planipennis</i> .....	4	1.2. Fruit plants.....	5
Others.....	4	Apple rootstock virus A.....	5
2.2 Annex I A II of the Council Directive 2000/29/EC - Insects, mites and nematodes.....	5	<i>Anastrepha bahiensis</i> .....	5
2.3 Annex I A II of the Council Directive 2000/29/EC - Bacteria and Phytoplasma.....	5	<i>Arbordia kakoparwana</i> .....	5
2.4 Annex II A I of the Council Directive 2000/29/EC - Bacteria and Phytoplasma.....	6	Blueberry green mosaic-associated virus.....	5
2.5 EU emergency measures.....	7	Citrus Huanglongbing disease and its vectors <i>Diaphorina citri</i> and <i>Triozia erytraea</i> .....	6
Tomato brown rugose fruit virus.....	7	<i>Colletotrichum florimiae</i> .....	6
2.6 EPPO A1 List.....	7	<i>Disporthea areis</i> .....	6
2.7 EPPO A2 List.....	7	Grapevine virus G, H, I and J.....	7
		Peach virus M.....	7
		Physalis rugose mosaic virus.....	7
		<i>Pseudomonas syringae</i> pv. <i>actinidiae</i> .....	8
		Strawberry vein banding virus.....	8
		<i>Suffetula anania</i> sp. n.....	8
		<i>Thaumatotibia leucotreta</i> .....	9
		<i>Thekopsora minima</i> .....	9
		<i>Xanthomonas citri</i> pv. <i>citri</i> .....	9
		<i>Xylella fastidiosa</i> .....	10
		1.3. Vegetables.....	10
		Tomato brown rugose fruit virus.....	10
		1.4. Ornamental plants.....	11
		Ti ringspot-associated virus.....	11
		Coconut lethal yellowing phytoplasma.....	11
		1.5. Cereal.....	12
		<i>Spodoptera frugiperda</i> .....	12
		1.6. Other.....	13
		Cowpea mosaic virus.....	13
		<i>Meloidogyne moensii</i> sp.....	13
		1.7. Articles of general interest.....	14

Figure 11: Contents of the media and scientific newsletters

After the table of contents, in both the media and scientific newsletters, an introduction specifies the background of the monthly newsletter summarising the results of the monitoring on plant pests carried out according to the EC mandate. This introduction includes a table to explain the icons used in the newsletter.

Examples of the table of icons used to illustrate the articles are shown in Figure 12.

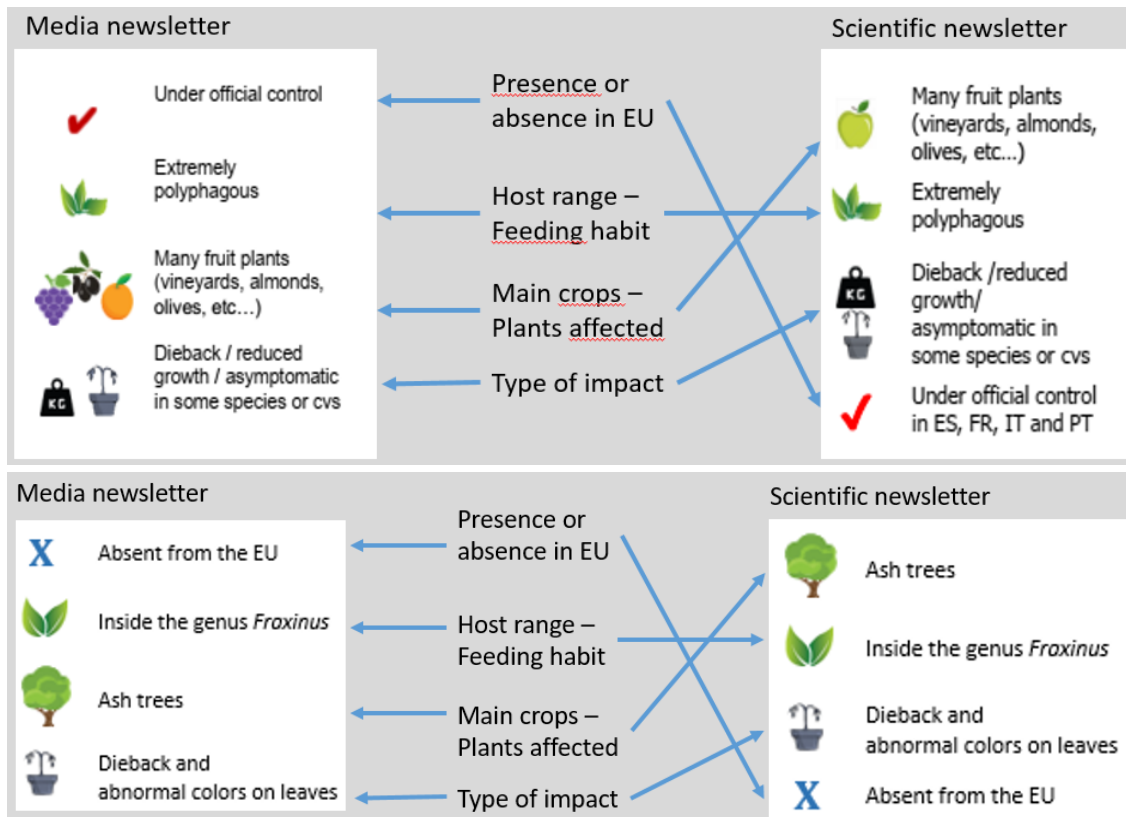


Figure 12: Tables showing icons for the pests *Xylella fastidiosa* (upper part) and *Agrilus planipennis* (lower part) in a media and a scientific newsletter

The European Commission and EFSA decided on the order of the icons for both the media and scientific newsletters.

The icon tables for the scientific newsletter shows first of all the main host plants affected, whereas in the media newsletter, the first item in the icon tables describes the known distribution of the pest in EU MSs (a red tick means the pest is present in the EU, a blue cross means it is not).

For both newsletters, the tables presents the pest's host range and feeding habits. It can be monophagous if only one plant species is attacked, oligophagous when several species of the same genus are under threat or polyphagous when at least two different genuses are attacked.

The type of impact comes third in the icon tables for the scientific newsletter and fourth in that for the media newsletter. It shows the main damage caused by the pest (qualitative or quantitative production losses or death of the plant).

Both newsletters include a concluding box for Acknowledgements and a Disclaimer right at the end. In the Acknowledgements, all the participants, including experts, from EFSA, the JRC and ANSES are thanked for their work. The Disclaimer gives specifications about the period covered by the newsletter, EFSA's responsibilities and the reliability of translations.

#### d. Article selection criteria

The human-based selection process to assess the relevance of articles is summarised in Figure 13 and is described below.

Several questions structured in two steps are addressed in view of the newsletter's compilation:

1- First step: **what pest** or group of pests is the article about?

- Does a **scientific** or a **common name** refer to the pest?
- Is the pest **listed** in any of the lists described previously? (EPPO lists, EU lists)
- In the case of a newly-discovered pest (**new pest**): Does the pest discussed in the article cause **damage** to its host plant?

For instance, some articles present new viruses discovered by New Generation Sequencing (NGS). Such reports are only "*in silico*" and corresponding symptoms on a plant have not been investigated and no evidence for pathogenicity is available. Others present the taxonomy of a newly-discovered insect without relating it to any plant symptoms. Furthermore, particular attention needs to be paid to organisms such as fungi or nematodes that do not attack plants but are entomopathogenic.

- Is the pest already **widely distributed** within European Union MSs?

The first or new finding of a pest already widespread in Europe is not relevant.

2- Second step: what is the article's **topic**?

- Does it report a **first** or **new finding** in a place previously described as free from this pest?  
A "first finding" corresponds to the first discovery of a pest in an area considered free of the pest. A "new finding" corresponds to another discovery of a pest in an area in which the pest is already known to exist.
- Does it report the **eradication** of a pest in a place known to be infested?
- Does it refer to a **new host plant** for this pest?  
The host plant needs to be looked for in databases of already known host plants for the pest. If it is absent from the known host plants list, it qualifies for being a new host plant.
- Does it report a **detection method**, a **control measure**, an **identification** or **surveillance method**?  
Is it ready to be used or still under development? (For instance, has the method only been tested *in vitro*? Or has it only been tested on a plant model plant?)
- The **effects of implemented measures** are also relevant.  
This topic has been retained to select articles concerning the impact on the sector of mandatory control measures in the EU on pests such as *Xylella fastidiosa*.
- Finally, for **scientific articles** (only) which do not refer to only one given pest, the criterion **Article of general interest** can be considered

The mind map used to select articles for inclusion in the newsletter is presented in Figure 13.

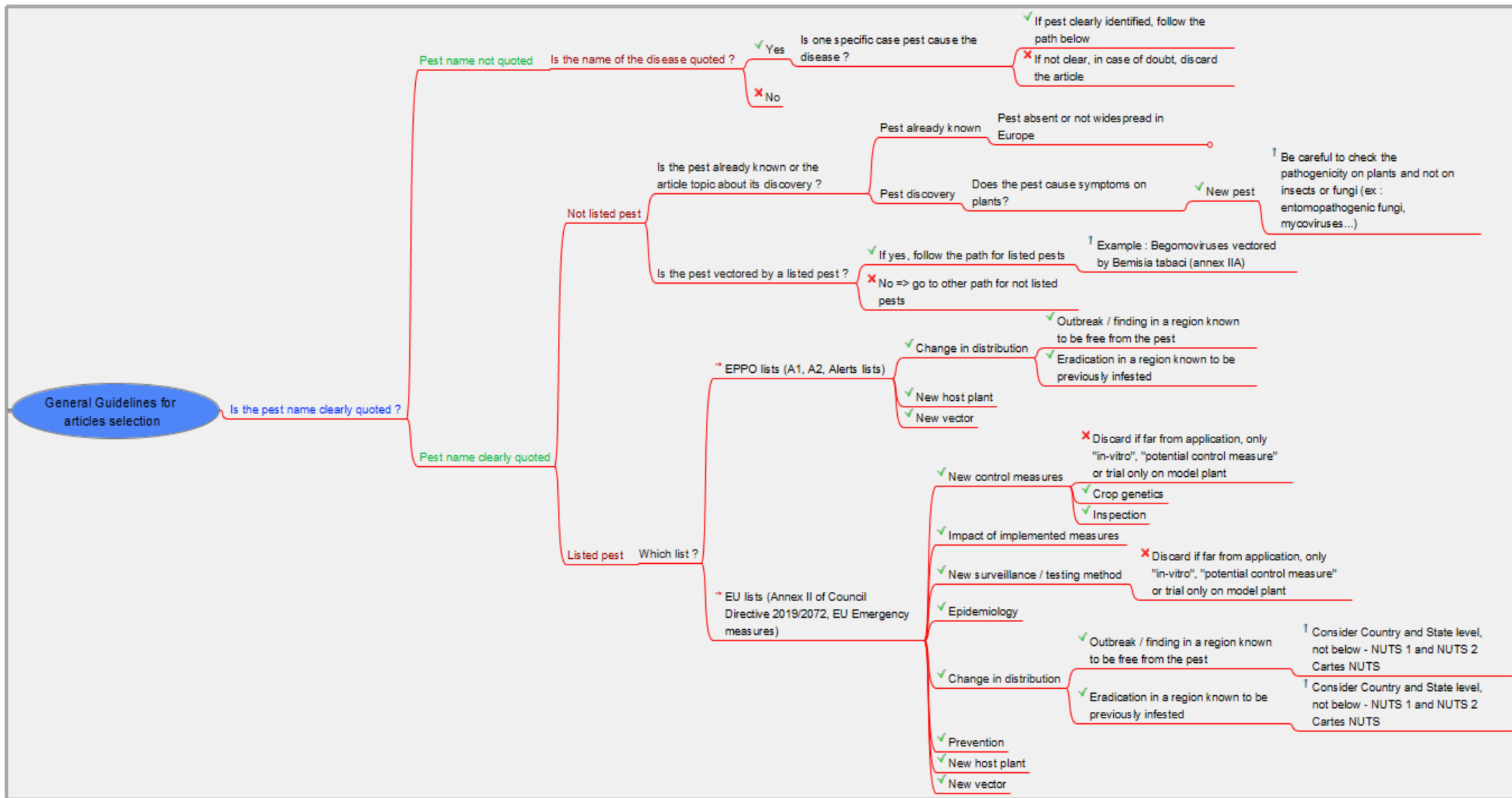


Figure 13: Mind map used for the human-based selection of articles to be included in the newsletters (made with FreePlane: <https://www.freeplane.org/>)

## e. Improving the monitoring and “quality control” of keywords

### i. Case of unrelated articles (negative match)



Figure 14: Example of media article containing the generic keywords unrelated to plant pathology

Figure 14 highlights the case of an irrelevant media article selected by Medisys through the filter “EFSAS Unknown Pest Filter” (containing keywords not specific to plant pests). The corresponding text contains the words “death”, “Pine” and “mysterious” but is clearly unrelated to plant pathology. It is an example of background noise.

The term “Pine” is in fact not related to the conifer but to the surname of an actor, Chris Pine. To avoid the selection of any further unrelated articles, the keyword “chris+pine” is added to the list of the filter’s exclusion keywords.

From now on, the combination of inclusion and newly-added exclusion keywords will allow a more relevant selection of articles. The dynamic evolution of keywords improves the article search made by Medisys.

### ii. Case of related articles (positive match)

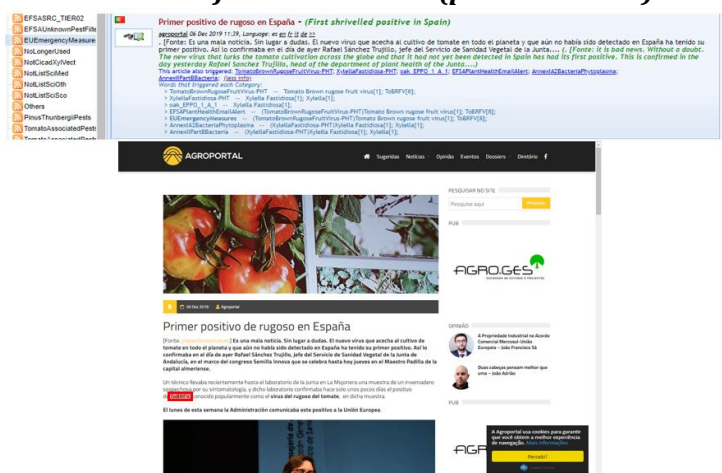


Figure 15: Example of media article about a “first finding”.

Figure 15 highlights a relevant media article selected as a “first finding” for a media newsletter issue. The article contains the two inclusion keywords “Tomato Brown Rugose Fruit Virus” and “ToBRFV”. It was found via the “EU emergency measures” filter in which the category related to the *Tomato brown rugose fruit virus* is stored, among other pests on the EU emergency list.

The finding of this article is a validation of the keywords associated with the pest as the expected keywords were retrieved in a relevant article.

iii. **Case of relevant article found via unspecific keywords**

**Diaporthe sinensis, a new fungus from Amaranthus sp. in China**  
maress-ot 12 Dec 2019 07:40, Language: en fr it de es  
Abstract During an exploration of plant pathogens in vegetables occurring in Zhejiang province, China, a novel fungal species, was found. Three strains ZJUP0033-4, ZJUP0036-3 and ZJUP0132 were isolated from black round lesions in the stems and leaves of Amaranthus sp.  
This article also triggered: [pgu\\_plant\\_health\\_threats](#); [FLHMagaliCheck](#); [fless\\_info](#)  
Words that triggered each Category:  
> new\_plant\_health\_threats -- fungal[1]; new fungus[1]; fungus[1]; pathogens[1]; plant[1]; vegetables[1];  
> EFSAUnknownPestFilter -- (new\_plant\_health\_threats/fungal[1]; new fungus[1]; fungus[1]; pathogens[1]; plant[1]; vegetables[1];  
> FLHMagaliCheck, -- Triggered by Meta-Category Combinations

**Phytotaxa**  
2019 Impact Factor: 1.088  
HOME ABOUT LOGIN REGISTER SEARCH CURRENT ARCHIVES  
ABOUT THE JOURNAL  
Diaporthe sinensis, a new fungus from Amaranthus sp. in China  
Abstract  
During an exploration of **vegetables** occurring in Zhejiang province, China, a novel fungal species was found. Three strains ZJUP0033-4, ZJUP0036-3 and ZJUP0132 were isolated from black round lesions in the stems and leaves of Amaranthus sp. Phytotaxa articles based on keywords from the green database (the online database) are listed in the table below. The table shows the number of articles found for each keyword. The table is sorted by the number of articles found. The table is sorted by the number of articles found. The table is sorted by the number of articles found.  
Keywords  
Diaporthe, phyllogeny, taxonomy, Fungi  
Full Text  
PDF (1000 KB)  
DOI: <https://doi.org/10.11646/phytotaxa.423.1.1>  
References

Figure 16: Example of a relevant scientific article about a “new pest”

Figure 16 shows a relevant scientific article found in the “EFSA unknown pest filter” thanks to the keywords “fungal”, “new+fungus”, “pathogens”, “plant” and “vegetables”. This article is about a new pest named *Diaporthe sinensis* for which a new category has since been created so that it can be monitored by the Medisys platform.

Since the pest is a new discovery, no more specific keywords other than its scientific name have been found in databases. The article is selected for the scientific newsletter under the criterion “new pest”.

## 3 DATA ANALYSIS

### 3.1 MEDIA NEWSLETTER

Figure 17 shows the temporal distribution of media articles found by Medisys using all the keywords developed for plant health monitoring since January 2017.

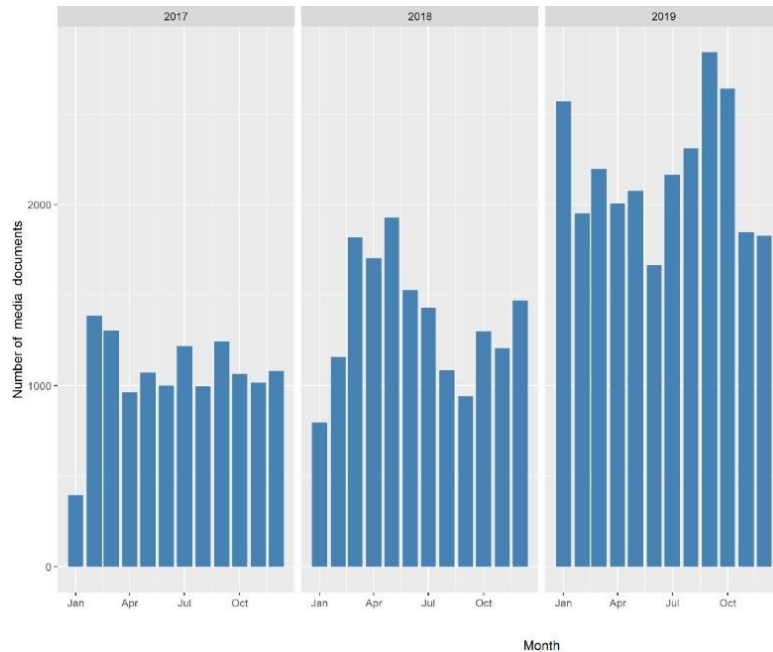


Figure 17: Monthly published media articles found by the Medisys platform, with all the categories developed for plant health monitoring (no selection) – Histogram made with R (Andrea Maiorano, EFSA unit in charge of plant health )

An important rise in the number of media articles is seen in 2019 compared to the two previous years.

This increase is assigned to the combined effect of the creation of new pest categories, the inclusion of additional pest-specific keywords in pre-existing categories and the addition of non-specific keywords to the dedicated filter.

Figure 18 shows that 85% of the articles selected by Medisys (between January 2017 and December 2019) are about EU-regulated pests. Most are bacteria (37% of the total number of articles) or insects and mites (39% of the total number of articles). The published media articles selected by Medisys focused on 494 out of the 1,148 pests monitored at the end of 2019 (around 43% of the total recorded pests).



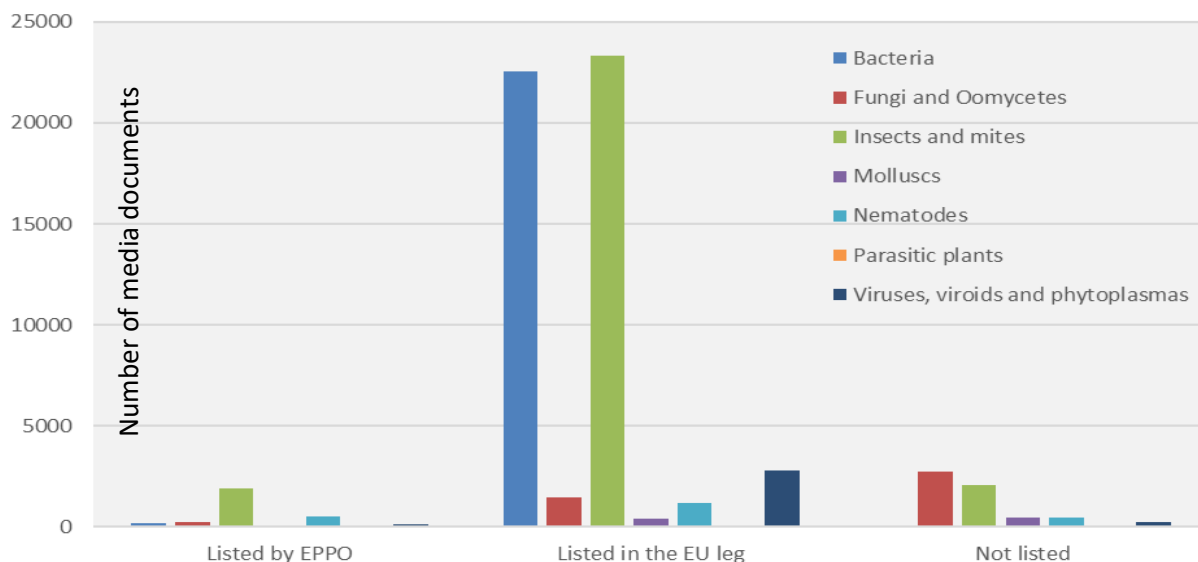


Figure 18: Published media articles by taxonomic group of the pests and by their regulatory status in the EU or their status in the EPPO lists

Among pests not regulated in the European Union, the most represented taxonomic groups are i) fungi and oomycetes and ii) insects and mites.

### 3.2 SCIENTIFIC NEWSLETTER

Figure 19 shows the temporal distribution of 9,500 scientific articles collected from 348 sources via Medisys using all the keywords developed for plant health monitoring since the beginning of this media monitoring in 2017. The articles were written in 14 different languages, around 90% were written in English and 5% in Spanish.

As for media articles, the histogram shows a strong rise in the number of scientific articles found by Medisys at the beginning of 2019. This is the result of the combination of two actions: addition of scientific sources to the Medisys source database and creation of relevant keywords (whether or not specific to plant pests) in the categories.

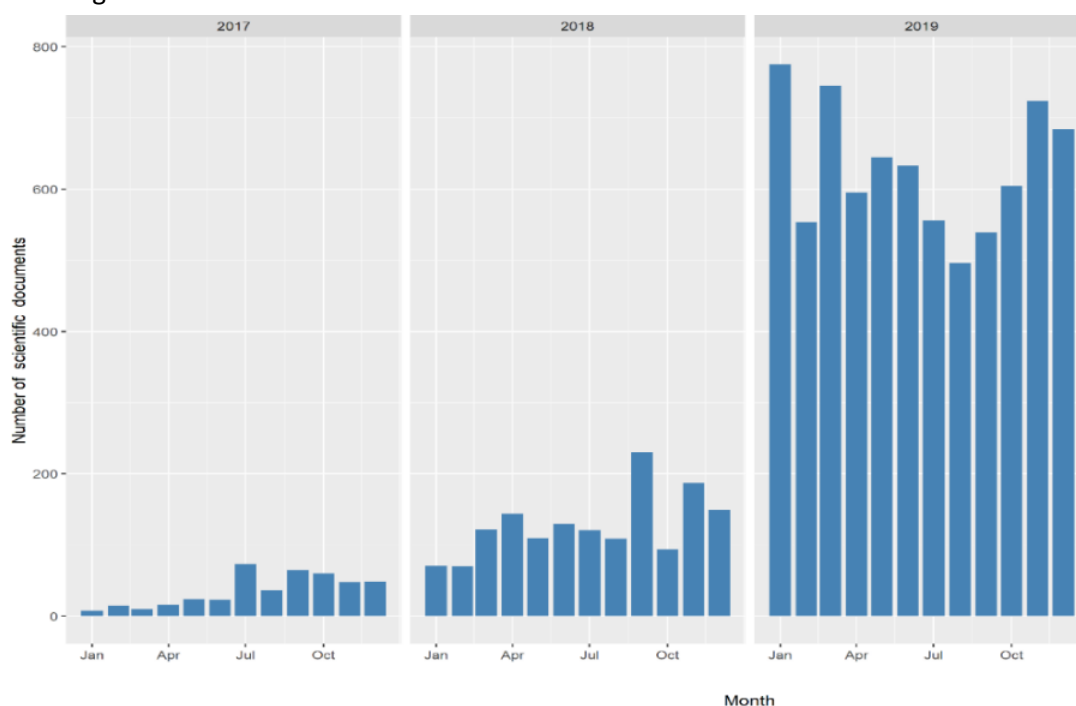


Figure 19: Monthly published scientific articles found by the Medisys platform, with all the categories developed for plant health monitoring (no selection) – Histogram made with R (Andrea Maiorano, EFSA plant health team)

New keywords added to the Medisys database can either come from other databases (such as the EPPO global database and CPC CABI for most of them) or from articles. For instance, an article can be selected by Medisys because it contains a pest’s scientific name. The article text can also contain a common name of the pest unknown so far. This new keyword can be added to the set of pest-specific keywords. Some unspecific keywords can come from the analysis of the text of selected articles.

Articles are distributed among the Medisys filters created depending on their keyword content. An article containing pest-specific keywords will be displayed in the filter we assigned to the pest and an article containing a certain set of keywords unspecific to pests (see Categories and ontologies used on the Medisys platform) will be placed in the “unknown plant pest” filter.

The scientific articles automatically selected by Medisys covered 573 out of the 1,148 pests monitored at the end of 2019. Of these scientific articles, 63% concerned EU-regulated pests (Figure 20).

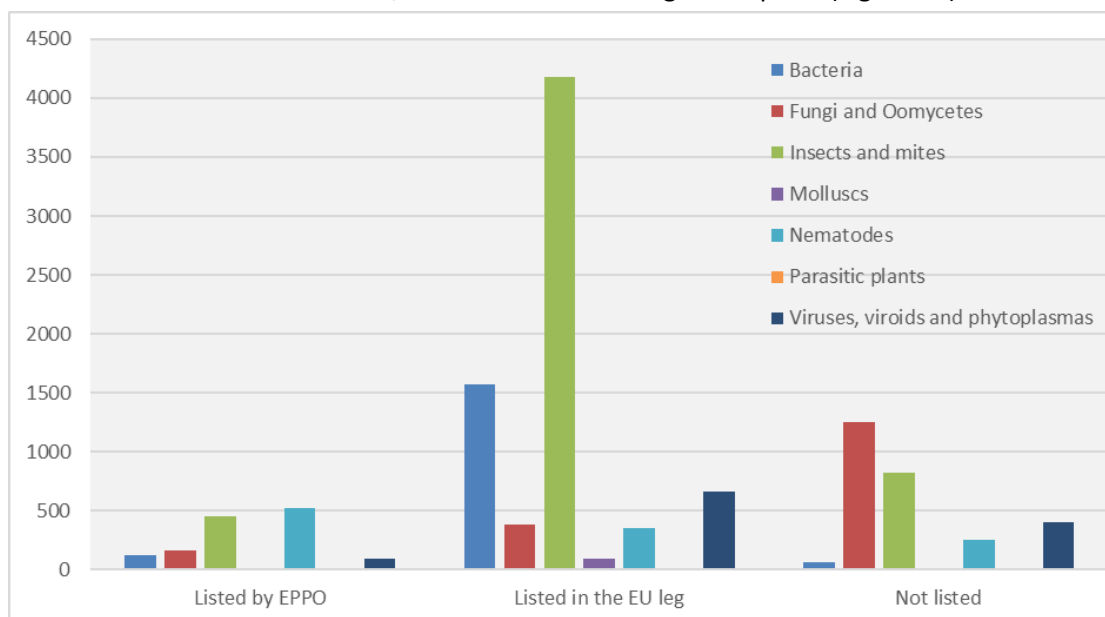


Figure 20: Scientific articles from Medisys by taxonomic group of the pests and by their regulatory status in the EU or their status in the EPPO Lists

Among them the most frequent taxonomic group of pests was ‘Insects and mites’, with 37% of the total number of articles. Pests not listed in the EU legislation or by EPPO represent a larger group here (25%) than in media, where around 10% of items were about this category of monitored pests.

*Spodoptera frugiperda* (Smith), *Bemisia tabaci* (Gennadius) and *Xylella fastidiosa* Wells, Raju, Hung, Weisburg, Parl & Beemer, all regulated in the EU, are the most recurrent pests reported by scientific sources monitored by Medisys. They are the topic of around 43% of the articles found through this platform out of 573 monitored pests.

Figure 21 represents the proportion of the articles selected for the newsletters according to the way they were retrieved: Medisys, Scopus or other ways (article suggestions by experts).

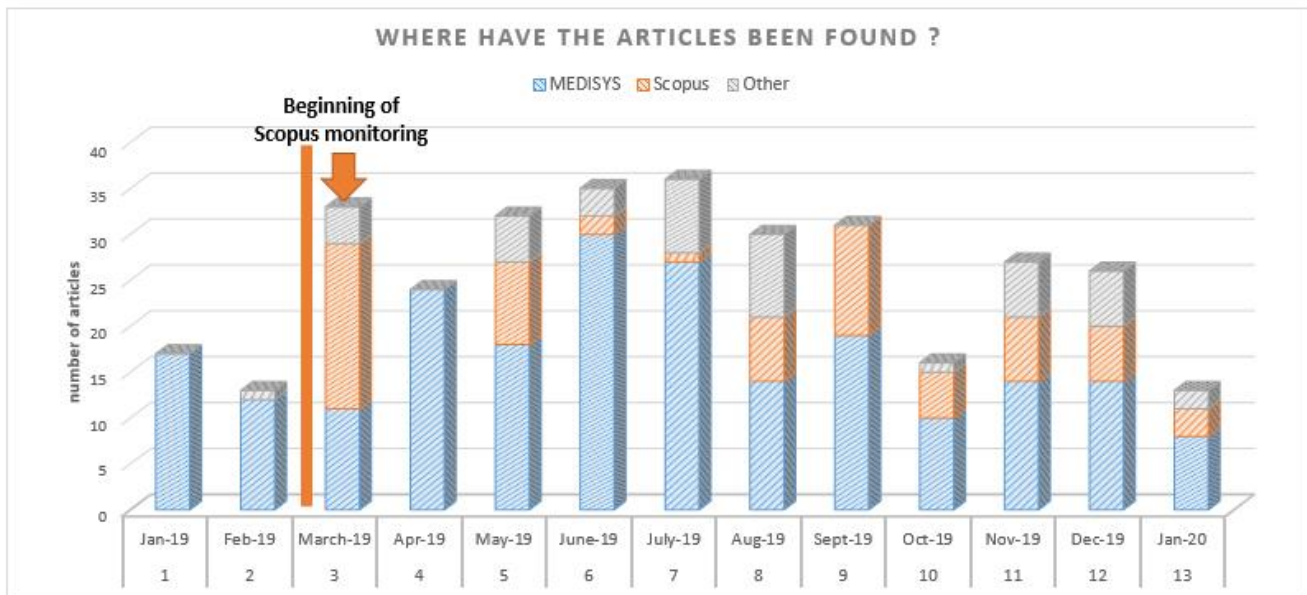


Figure 21: How articles selected and published were retrieved - For scientific newsletter issues 1 to 13 (period of publication from January 2019 to January 2020)

The Scopus search provides a significant number of articles every month (orange boxes), but this bibliographical search tool usually finds fewer articles than Medisys. The use of Scopus supplements the article display while the Medisys source database is still being developed. If the same article is found by both Medisys and Scopus, it will be identified as a Medisys article (blue boxes).

The beginning of Scopus monitoring in February 2019 (articles included in the scientific newsletter of March 2019) coincides with work on the quality of the monitoring of scientific sources with the JRC, the project's partner in charge of the Medisys IT platform and its improvement. In the meanwhile, numerous new scientific sources have been added to the Medisys database. The influence of this addition of sources was observed one month later, in the articles published in March 2019 (for inclusion in the April 2019 issue).

By adding new sources to Medisys, we should see a decrease in the number of articles selected thanks to Scopus in the coming newsletter issues. We can also note that some published articles are suggested by members of the working group (results shown as grey boxes). The experts have not only suggested articles but also proposed new scientific sources.

Figure 22 shows the economic sector of the host plants on which the pests discussed in the scientific newsletters have been found

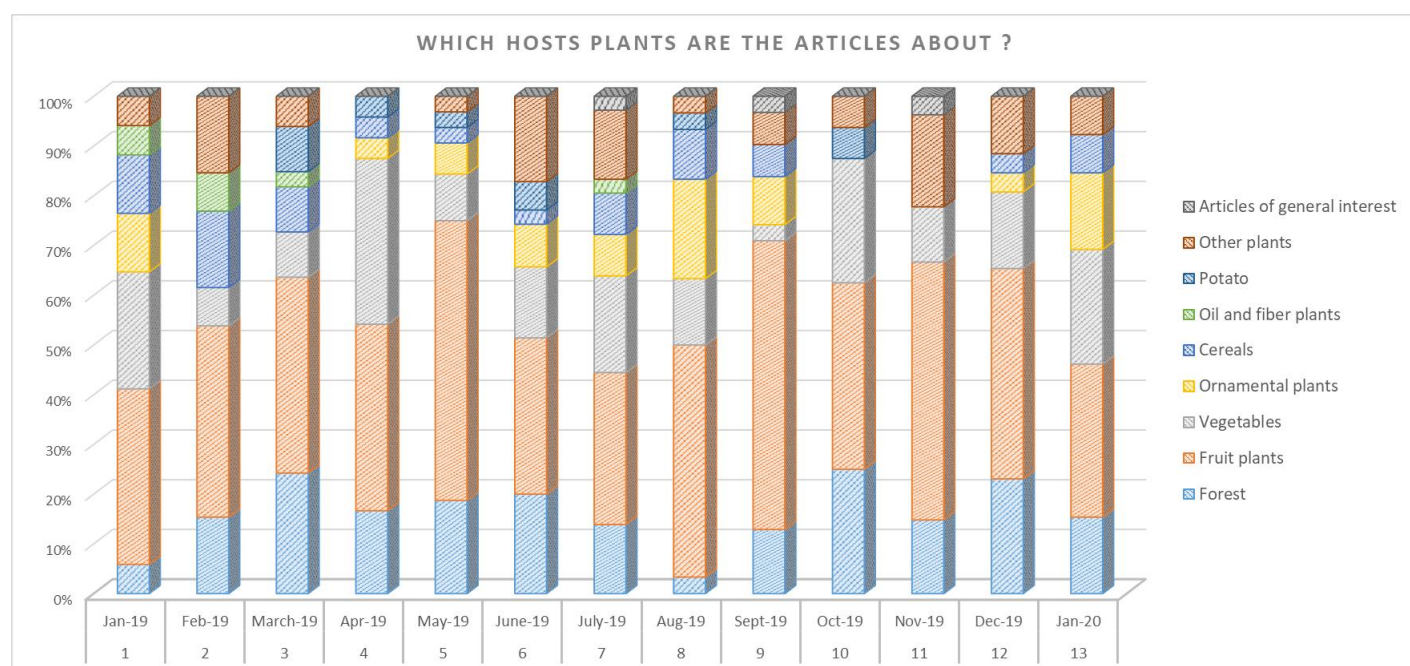


Figure 22: Economic sector of the host plants for pests discussed in the articles selected for each newsletter - For scientific newsletter issues 1 to 13 (time period of publication from January 2019 to January 2020)

For all the newsletters considered, between 60% and 80% of the articles target three main agricultural economic sectors: fruit plants, forest and vegetables. The other agricultural economic sectors are less represented.

The “other plants” item is designed to take into consideration articles with relevant information but for which host plants cannot fit into the other items. The host plants found in this item are plants of minor economic interest for the EU area, such as Sichuan pepper (*Zanthoxylum schinifolium*), okra (*Abelmoschus esculentus*), sugarcane (*Saccharum* spp.), cardamom (*Elettaria cardamomum*) or African basil (*Ocimum gratissimum*).

The “articles of general interest” item has also been added to the newsletter in the case of an article of interest which is not specifically about one pest but whose topic deals with several (for instance oomycetes or wood-boring insects). The articles of general interest selected for the scientific newsletters (from January 2019 to January 2020) are listed in Table 2.

Table 2: Articles of general interest selected for the scientific newsletters - For scientific newsletter issues 1 to 13 (time period of publication from January 2019 to January 2020)

Issue no.	Month of publication	Year of publication	Date of article publication	Journal name	Host plants	Origin of the article	Title	Link
7	Jul	2019	21/06/2019	New Phytologist	Articles of general interest	Medisys	Expecting the unexpected: factors influencing the emergence of fungal and oomycete plant pathogens	<a href="https://doi.org/10.1111/nph.16007">https://doi.org/10.1111/nph.16007</a>
9	Sep	2019	29/07/2019	Nature Plants	Articles of general interest	Medisys	Non-invasive plant disease diagnostics enabled by smartphone-based fingerprinting of leaf volatiles	<a href="https://doi.org/10.1038/s41477-019-0476-y">https://doi.org/10.1038/s41477-019-0476-y</a>
11	Nov	2019	19/08/2019	Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy	Articles of general interest	MediSys	Ability of near-infrared spectroscopy for non-destructive detection of internal insect infestation in fruits: Meta-analysis of spectral ranges and optical measurement modes	<a href="https://doi.org/10.1016/j.saa.2019.117479">https://doi.org/10.1016/j.saa.2019.117479</a>

In Figure 23, the total number of articles in scientific newsletter issues 1 to 13 are considered (published from January 2019 to January 2020). The topics of articles are mainly about fruit plants (42%), forest (16%) and vegetables (15%). These 3 agricultural economic sectors are of great interest to the agricultural and food industries for the European Union (Figure 24).

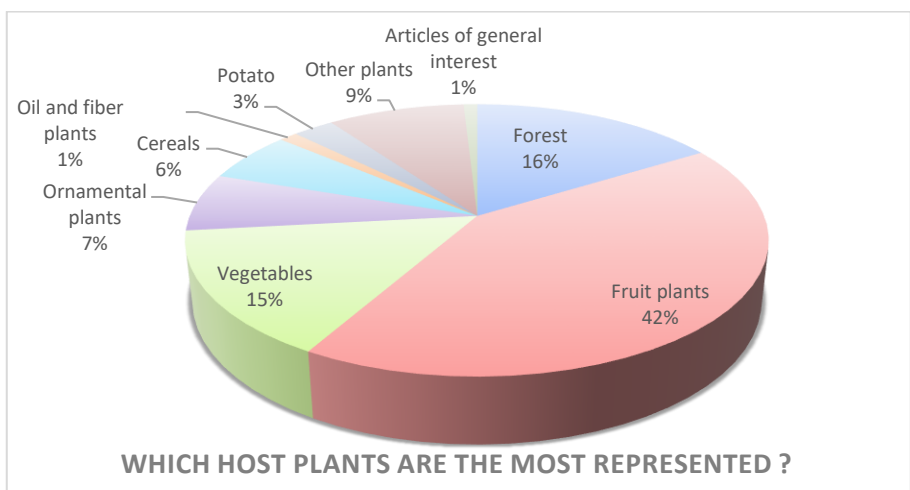
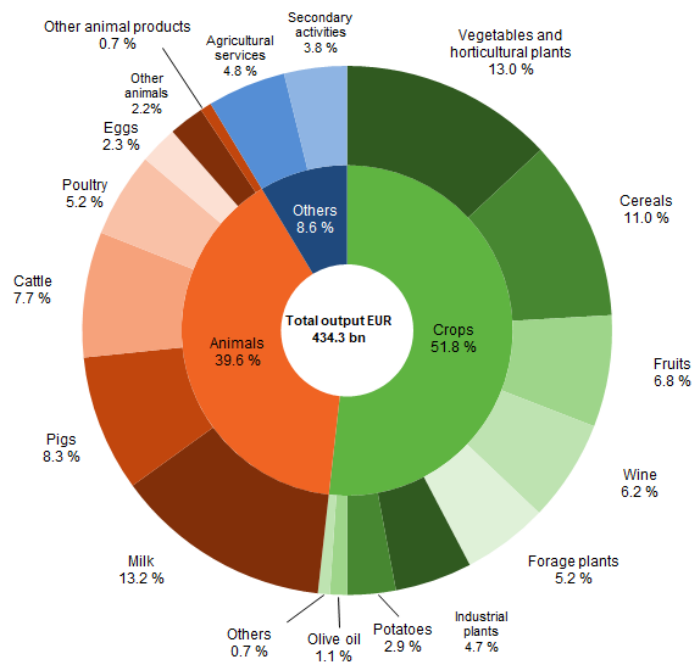


Figure 23: Economic sector of the host plants for pests discussed in the articles selected for all the newsletters - For scientific newsletter issues 1 to 13 (time period of publication from January 2019 to January 2020)

### Output of the agricultural industry, EU-28, 2018 (% of total output)



Note: values at basic prices.

Source: Eurostat (online data code: aact\_eaa01)



Figure 24: Share of the outputs of agricultural sectors in the EU for 2018

The pest taxonomy is shown in Figure 25.

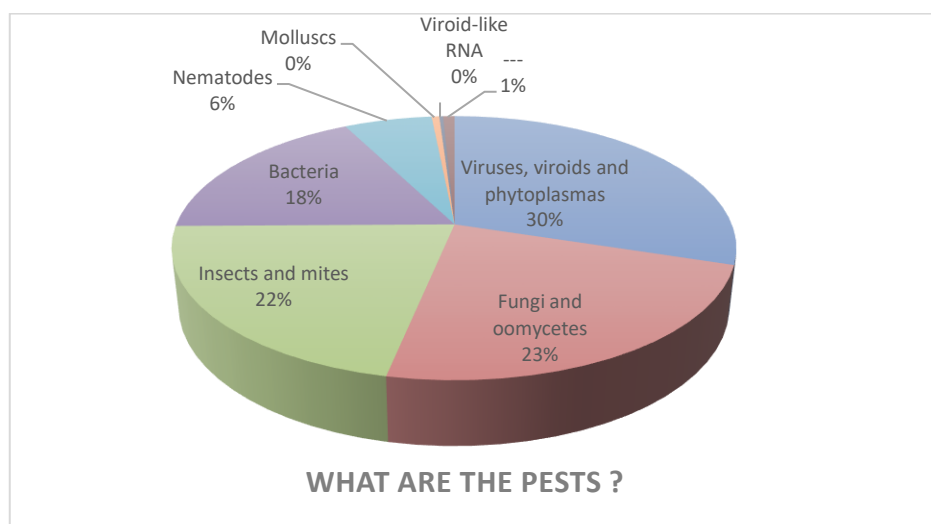


Figure 25: Taxonomy of the pests discussed in the selected articles - For scientific newsletter issues 1 to 13 (time period of publication from January 2019 to January 2020)

All 13 newsletters grouped together 333 articles about 272 pests (out of a total of 1,148 pests monitored at the end of 2019 and 573 pests for which Medisys has retrieved articles). Most of these organisms are viruses, viroids and phytoplasmas.

One of the reasons for this high number of viruses might be the NGS<sup>20</sup> which are very powerful technologies for sequencing and thus are involved in the discovery of many new viruses discussed in the articles selected.

Nematodes are poorly represented, probably because their detection and identification are based on morphological criteria, thus requiring a longer scientific procedure than molecular detection, used for other pests such as bacteria. Ways of improving the quality of monitoring for all nematology-related journals already included in the Medisys database need to be considered. This could entail focusing on the search for and addition of new sources related to nematology.

The hyphen (“---”) category refers to articles of general interest for which no single specific pest is considered. The articles of general interest selected for the scientific newsletters are listed in Table 2.

The pests discussed in the scientific newsletters considered are displayed in Figure 26.

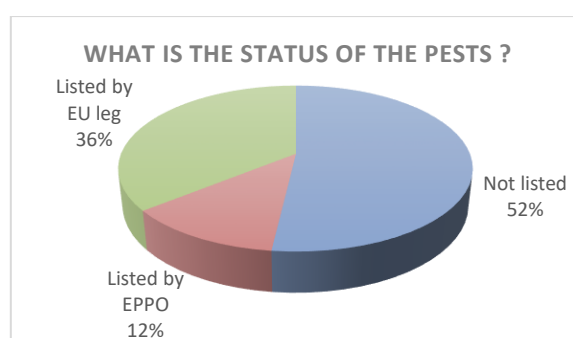


Figure 26: Status of the pests discussed in the articles selected for all the newsletters - For scientific newsletter issues 1 to 13 (time period of publication from January 2019 to January 2020<sup>21</sup>)

More than half of the pests highlighted (52%) are not listed, while the other pests are either listed in EU legislation (36%) or by EPPO (12%).

<sup>20</sup> NGS: New Generation Sequencing

<sup>21</sup> The newsletter of January 2020 contains articles published in December 2019

The 20 scientific journals that most frequently provided articles (at least 4 included in the newsletters published in 2019), are shown in Figure 27.

These sources provided 203 articles, representing more than half (61%) of the total number of selected articles. When looking at the scope of these journals, all of them are related to plant health and provide articles on all the topics covered by the scientific newsletters.

It is worthwhile to note that Biorxiv (at the middle position on the name journal axis) is not a scientific journal but an open access preprint repository for the biological sciences. Papers hosted on Biorxiv are not peer-reviewed, but undergo basic screening to be published and their contents are checked against plagiarism. The benefits of monitoring such a preprint repository is to acquire information as soon as it is available, before its publication in a scientific journal. Changes in their scientific content may occur after the peer review.

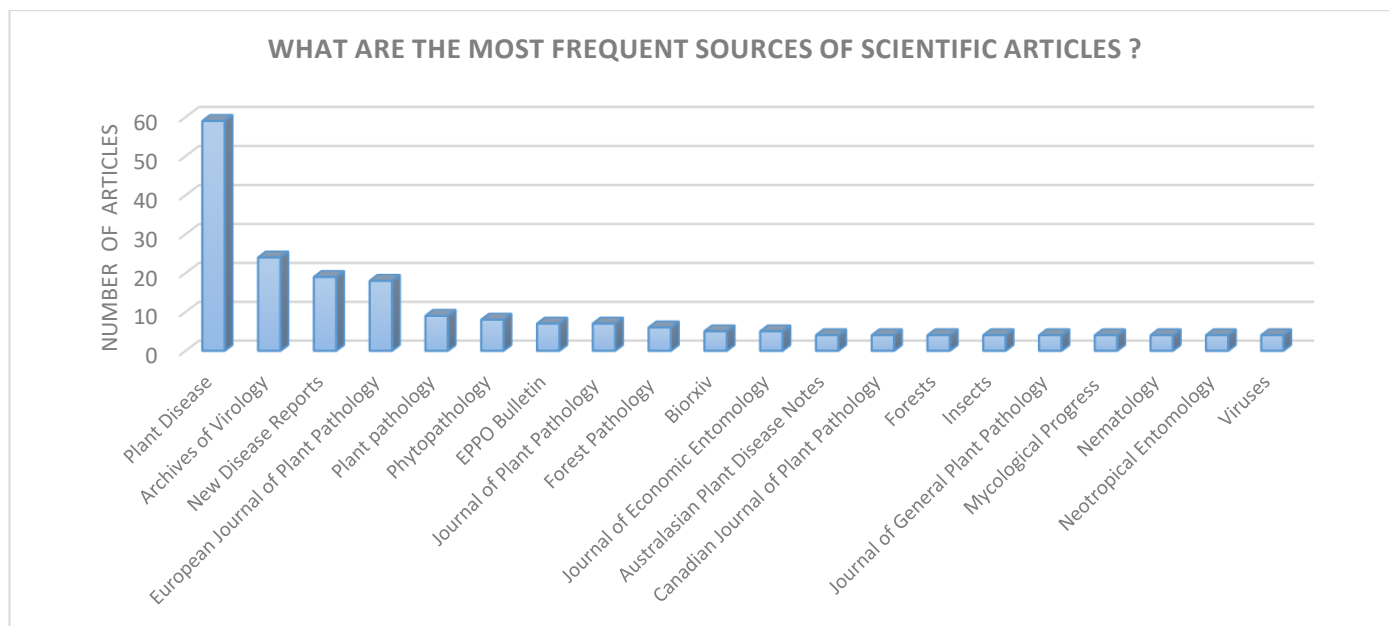


Figure 27: 20 scientific sources provide at least 4 articles each - For scientific newsletter issues 1 to 13 (time period of publication from January 2019 to January 2020<sup>22</sup>)

Out of all the scientific journals, 73 of them each provided only one article included in the scientific newsletters. Their list and scope are presented in the Appendix (6.2 List and scope of the 73 journals providing only one article for the scientific newsletters).

Specific attention can be drawn to four journals: i) “Laser Physics”, ii) “International Journal of Recent Technology and Engineering”, iii) “International Journal of Advanced Computer Science and Applications” and iv) “Romanian Reports in Physics”. Their scope is respectively i) “Industrial and Manufacturing Engineering”, ii) “Engineering”, iii) “General Computer Science” and iv) “General Physics and Astronomy”.

The articles selected from the journals “Laser Physics”, “International Journal of Recent Technology and Engineering” and “International Journal of Advanced Computer Science and Applications” focus on detection methods. While the abstracts of these articles do not contain the scientific names of some pests, but only their common names, the abstract of the article from the journal “International Journal of Advanced Computer Science and Applications” quotes only the scientific name of *Fusarium circinatum*. Therefore, we can conclude that an enrichment of the keywords (pests and disease-related common names) and of the sources will obviously improve the retrieval of relevant articles.

<sup>22</sup> The newsletter of January 2020 contains articles published in December 2019

The topics of the articles are mainly “new pest”, “first finding” and “detection method” (Figure 28).

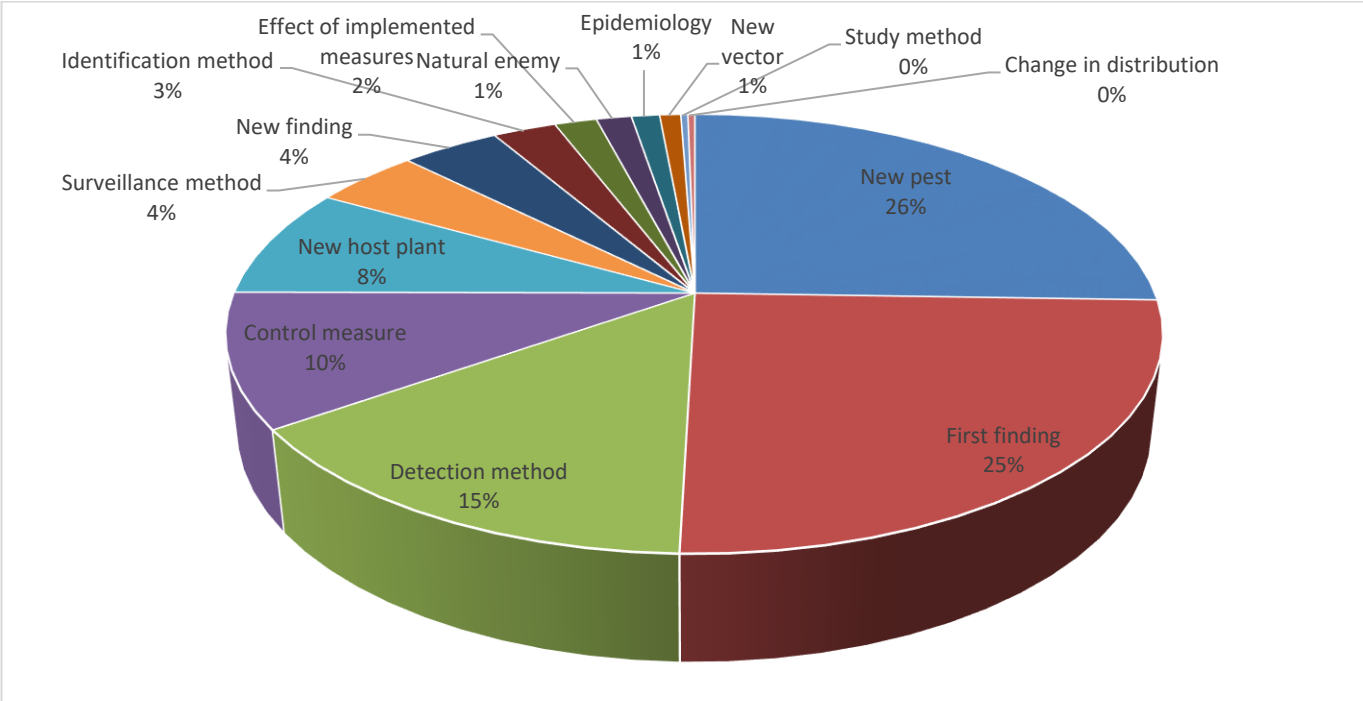


Figure 28: Selection criteria for scientific articles published - For scientific newsletters 1 to 13 (time period of publication from January 2019 to January 2020)

Half of the articles (51 %) are about new pests and first findings of known pests in regions previously free from them, the most relevant information considering the purpose of the horizon scanning activities. The other half cover 12 different topics. Among them, the most frequent are detection methods, control measures and new host plants (33% of the total number of articles). For illustration purposes, the most frequent pests in the scientific newsletters are presented in Figure 29. Among them, 5 pests are priority pests for the EU. Two pests are quarantine pests only and Tomato brown rugose fruit virus is a new pest (at the end of 2019).

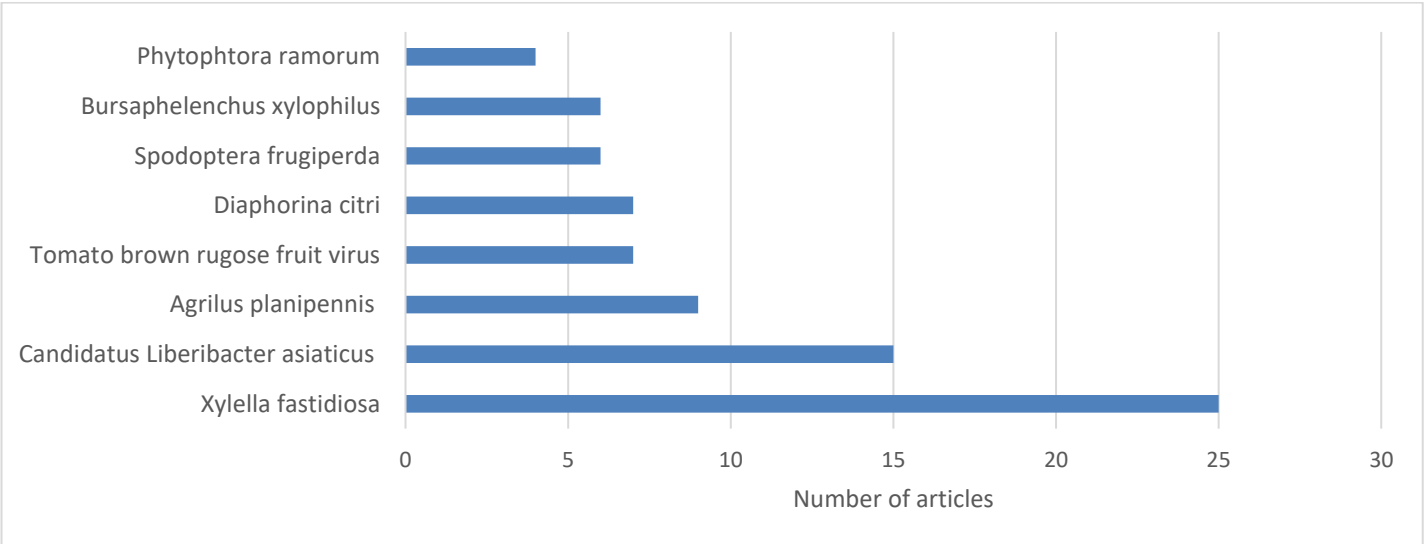


Figure 29: Most discussed pests in the articles published - For scientific newsletters 1 to 13 (time period of publication from January 2019 to January 2020)

Some details concerning scientific articles selected for these pests are given below.



- ***Xylella fastidiosa*** Wells, Raju, Hung, Weisburg, Parl & Beemer

As in the media newsletter, this EU priority quarantine pest is the most cited pest in the selected articles. The scientific newsletters included 25 publications about *X. fastidiosa*.

The topics covered by these articles are displayed in Figure 30.

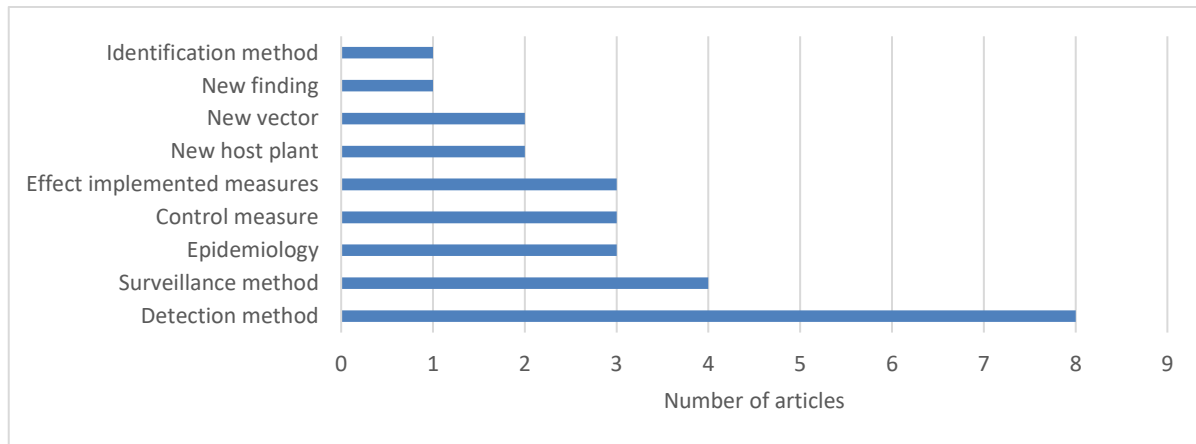


Figure 30: Topics of the articles about *Xylella fastidiosa* published in the scientific newsletters (time period of publication from January 2019 to January 2020)

Out of the 25 articles, two were retrieved using two selection criteria (“Detection & Identification method” and “Detection method & Effect of implemented measures”) whereas only one selection criterion was applied for the remaining 23 articles.

Twelve articles provided information about detection and surveillance methods. The other articles discussed topics distributed across 7 other criteria.

- ***Candidatus Liberibacter asiaticus*** Jagoueix, Bové & Garnier

*C. L. asiaticus* is listed in Annex IIA of the Commission Implementing Regulation (EU) 2019/2072 and is a priority pest.

Fifteen articles about *C. Liberibacter asiaticus* have been included in the scientific newsletters. The bacterium causes the Huanglongbing disease, a deadly *Citrus* disease absent from the EU territory where citrus represent an important economic sector in particular in southern countries. It is therefore important to monitor at the same time the bacterium and its vectors, to raise the alert about the risk of this disease entering the EU.

The main topics covered by the articles are displayed in Figure 31.

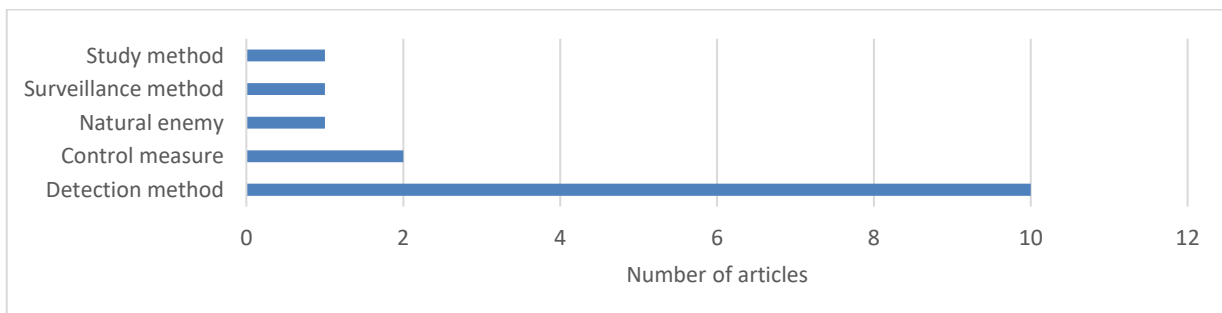


Figure 31: Topics of the articles about *Candidatus Liberibacter asiaticus* published in the scientific newsletters (time period of publication from January 2019 to January 2020)

The majority of the articles are about the detection of this disease. The other articles are either about “Control measures”, “Natural enemy”, “Surveillance method” or “Study method”. This information may be of interest for pest management in the event of it becoming established in the EU.

- ***Agrilus planipennis*** Fairmaire

Nine articles about this EU-regulated insect were selected. This forest pest is absent from the EU but is present close to its border since it was recently reported in Ukraine.

This event was reported in several scientific articles in August, October and November 2019. The articles included were first published on pre-print servers (Preprints and Biorxiv) before publication on journal websites. This shows the advantage of monitoring these servers in order to acquire information as soon as it is available, keeping in mind that changes in the content may occur after the peer review.

The other articles are about detection and surveillance methods and control measures. These topics are of great interest since the presence of this pest has been recently confirmed again near the eastern border of the EU.

- ***Tomato brown rugose fruit virus***

*Tomato brown fruit rugose virus*, first discovered in Jordan in April 2015 and detected in some EU MSs, is subject to EU emergency measures.

Seven scientific articles were selected about this virus. They were mainly about first findings in regions previously free from this pest. In the European Union at the end of 2019, it was found in Germany, Italy, Greece, the Netherlands, Spain and the United Kingdom. In the Middle East, it was detected in Turkey and Palestine. The remaining article reports a detection method.

- ***Diaphorina citri*** Kuwayama

*Diaphorina citri*, an insect currently absent from Europe, is listed in Annex IIA of the Commission Implementing Regulation (EU) 2019/2072.

Seven scientific articles about *D. citri* were selected. This pest is of great interest because it is one of 2 known vectors of the Huanglongbing disease, caused, among other things, by the bacterium *C. Liberibacter asiaticus*. The selected articles are about surveillance methods and control measures, topics that may be of interest in the event of the insect entering the EU.

- ***Spodoptera frugiperda*** (Smith)

*Spodoptera frugiperda* is listed in the Annex IIA of the Commission Implementing Regulation (EU) 2019/2072 and is regulated by EU emergency measures (Commission Implementing Decision 2002/757/EU). The insect is absent from Europe.

Six articles on *S. frugiperda* were selected. The topics discussed are control measures, identification, detection and surveillance methods. This information may be of interest in the event of the insect entering the EU.

- ***Bursaphelenchus xylophilus*** (Steiner & Buhrer) Nickle

*Bursaphelenchus xylophilus* is listed in Annex IIB of the Commission Implementing Regulation (EU) 2019/2072 and is regulated by EU emergency measures (Commission Implementing Decision 2012/535/EU). This nematode, vectored by insects of the genus *Monochamus* (Coleoptera), is present in the EU in Spain and Portugal and causes the death of trees belonging mainly to the genus *Pinus*.

Six articles about *B. xylophilus* were selected. They are about detection methods, surveillance, and identification methods. One article relates the effects of the control measures implemented on the nematode's spread in Europe.

- ***Phytophthora ramorum*** Werres, De Cock & Man in 't Veld

*Phytophthora ramorum* is listed in Annex IIA of the Commission Implementing Regulation (EU) 2019/2072 and is regulated by EU emergency measures (Commission Implementing Decision 2002/757/EU).

Four articles about *P. ramorum* were selected. This pest is an oomycete and causes the dieback of many trees, major hosts belong to the genera *Fagus*, *Quercus* and *Castanea*. It also feeds on ornamental plants such as *Rhododendron* sp. Since the pest occurs in many EU Member States, causing serious damage, articles reporting detection methods and control measures may be of interest. An example is the article on the effect of measures implemented to eradicate the pest from oak trees: [“Efficacy of local eradication treatments against the sudden oak death epidemic in Oregon tanoak forests”](#)

- Not listed pests discussed in the scientific newsletters

Besides reporting articles related to known listed pests, the purpose of the scientific newsletters is to report information on the occurrence of potentially harmful organisms not known yet as possible threats for the EU. The taxonomy of the not listed pests reported in the scientific newsletters is displayed according to their host plant in Figure 32.

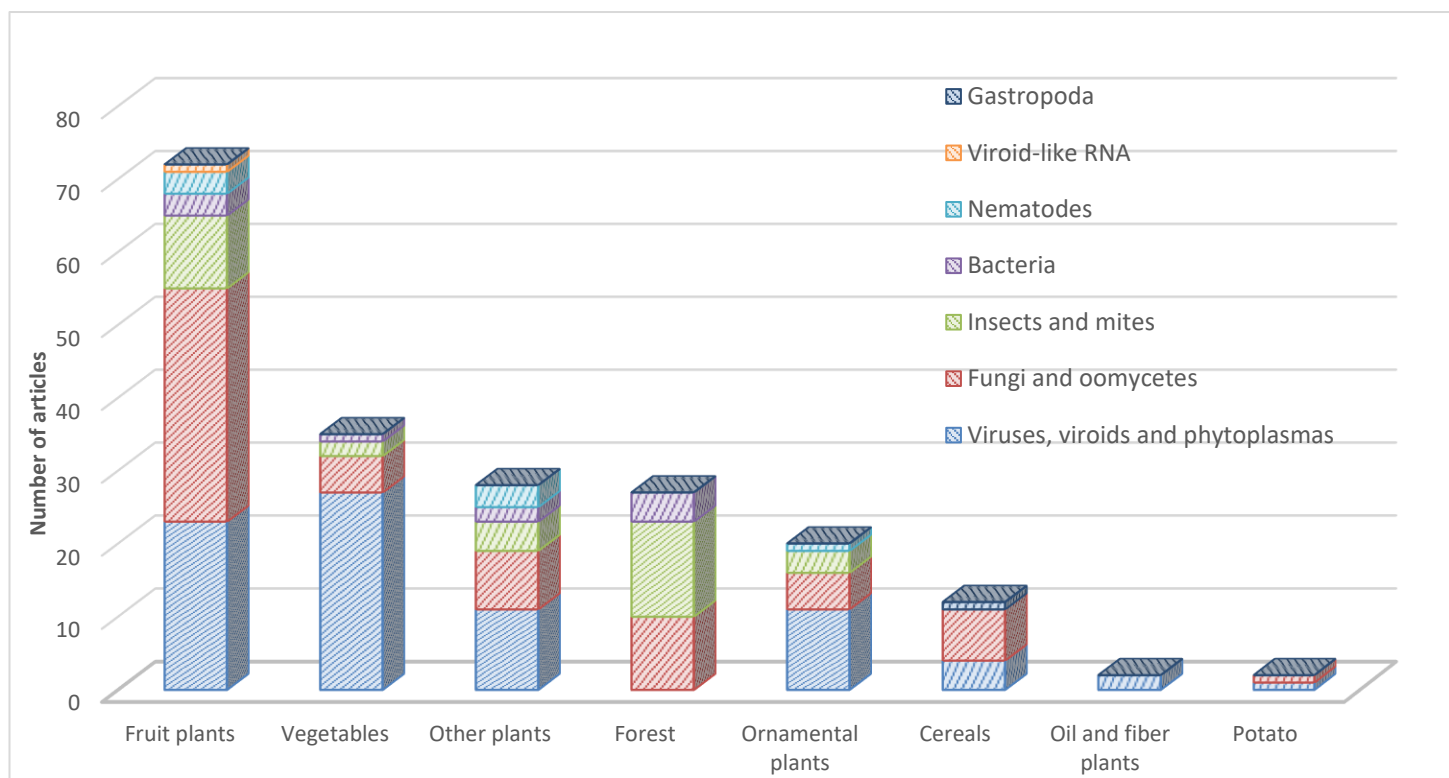


Figure 32: Taxonomy of the unlisted pests discussed in the scientific newsletters 1 to 13 regarding their host plants (time period of publication from January 2019 to January 2020)

The most prevalent pests are (1) viruses, viroids and phytoplasmas, and to a lesser extent (2) fungi and oomycetes. These organisms represent more than 75% of the not listed pests discussed. Bacteria, Nematodes and molluscs are the remaining organisms.

The fact that viruses, viroids and phytoplasmas are the most frequent pests can be partly explained by the expansion of High Throughput Sequencing (HTS) tools, able to efficiently identify novel viruses or viroids.

Fruit plants and vegetables are the most frequent host plants of these pests, though other well represented hosts are forest and ornamental plants (Figure 32). Fruit plants are mainly threatened by fungi and oomycetes and viruses, viroids and phytoplasmas. The latter group of pests is also the biggest threat for vegetables.

The selection criteria for the articles on not listed pests is shown in Figure 33.

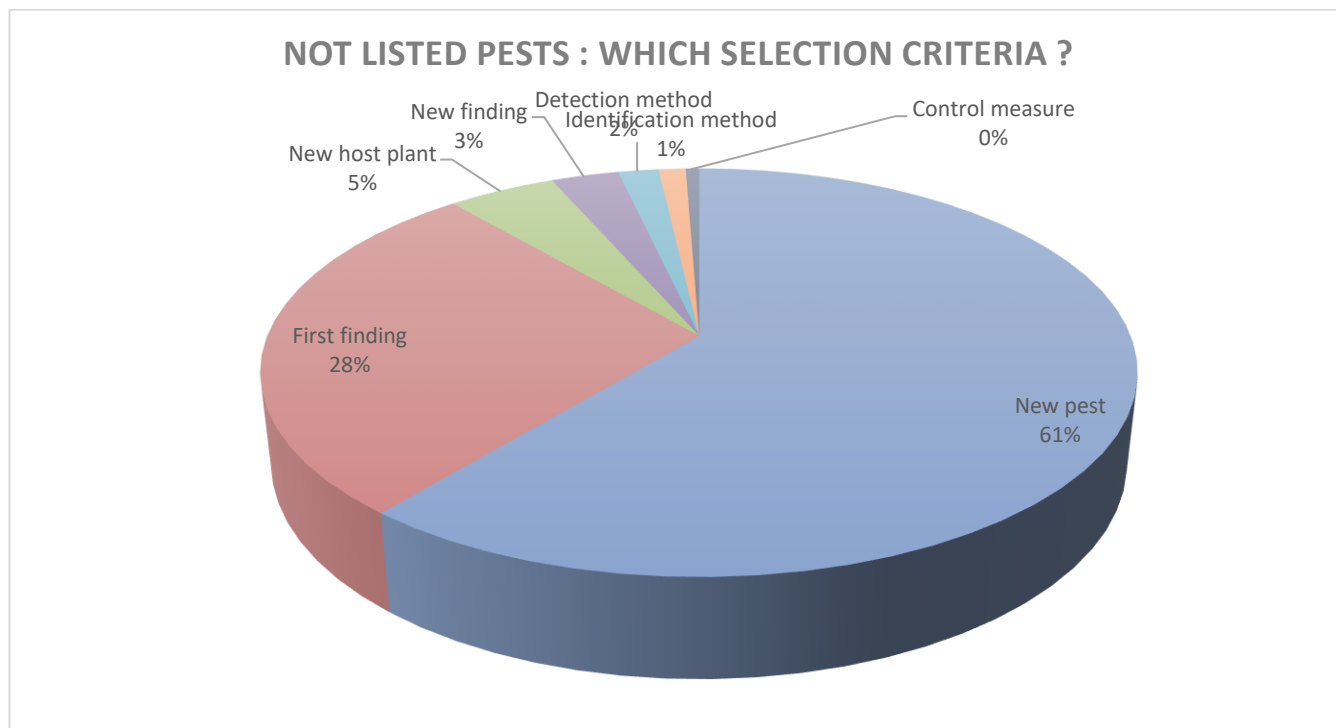


Figure 33: Selection criteria used to retrieve the articles on not listed pests in the scientific newsletters 1 to 13 (time period of publication from January 2019 to January 2020)

When considering the topics of the articles about “not listed” pests, most (61%) of the articles were selected because they report a “new pest”. The purpose of the scientific newsletters is to report information on the occurrence of potentially harmful organisms not yet described as possible threats for the EU. By reporting a majority of articles about new pests, the goal of the project is reached.

The second main topic of retrieved articles is “first finding” (28%). It is the first report of a pest in a place previously considered free of this previously described pest: it is considered as an emerging pest. This other selection criterion is in line with the scientific newsletters’ early warning purpose, the second goal of the Horizon Scanning project.

The remaining articles discussing “not listed” pests (11%) are about the following topics: new host plant, new finding, detection and identification method and control measures. All these topics are important for detecting any changes in the presence and spread of new pests or new emerging pests.

All these identified pests will be submitted to a ranking (scoring) exercise. The step scoring will select some of the pests considered as the biggest threats for the EU and for which a risk assessment (pest categorisation) can be conducted.

## 4 CONCLUSIONS AND PROSPECTS

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### 4.1 CONCLUSIONS

This report presents an overview of the achievements of the media monitoring project between July 2018 and December 2019 (corresponding to the beginning and end of the ANSES tasking grant GP/EFSA/ALPHA/2017/02).

The monitoring of plant health threats carried out by the Medisys platform has been improved in several regards.

1. The first improvement is the increase in the pests monitored by the Medisys platform, which rose from 117 at the beginning of the work to 1,148 by the end of 2019;
2. The other main improvement is the increase in the number of scientific sources monitored by the Medisys platform, which rose from 318 to 442.

In addition, Medisys was used to find relevant articles related to plant health and generate scientific and media newsletters after a manual selection step based on selection criteria, as explained in the report. The pests of concern can be either already known quarantine pests or non-regulated pests, whether already known or not (new pests). The monitoring work conducted is beneficial in two respects: i) to monitor pests already known to be threats and ii) to detect potential new threats before they enter the EU. There was a focus on detecting “weak signals” to have early warning on these pests so that effective eradication measures could be taken by risk managers.

During this period, a scientific newsletter and a media newsletter containing articles published during the previous month were issued every month to inform the European Commission and Member States (PAFF committee) once the articles selected had been scientifically validated by the experts in the newsletter working group.

The scientific newsletter is still under development (pilot phase), whereas the media newsletter development phase is over and the newsletter is published every month in the EFSA Journal (Wiley). When the development phase of the scientific newsletter is also over, it will likewise be published in the EFSA Journal (Wiley). During its development phase, the scientific newsletter has been shared with the ANSES plant health laboratory and with the French national Epidemiological Surveillance Platform for plant health as its content is of interest not only for European Commission risk managers but also to anyone involved in risk assessment, territorial surveillance or the development of new analysis methods such as ANSES technicians and researchers. In addition, some news on the project’s development was given on 27 September 2019 via the ANSES intranet and “ANSES Hebdo”, a weekly ANSES newsletter.

The data obtained on unregulated pests during the media monitoring were used for a ranking (scoring) exercise in order to prioritise newly-identified pests for risk assessments. This result was also presented to the European Commission’s PAFF committee in July and November 2019.

In parallel, the project was presented to the Plant health panel of ANSES (the Expert Committee (CES) on “Biological risks for plant health”) in January 2019 and to the scientific guests from the government of Kosovo in the framework of a TAIEX<sup>23</sup> study visit on the implementation of international standards for pest risk analysis in October 2019.

Updates on the project’s evolution were given on several occasions to the EFSA PLH panel and network (September 2018, December 2018, June 2019 and December 2019).

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<sup>23</sup> TAIEX: Technical Assistance and Information Exchange Instrument of the European Commission

## 4.2 PROSPECTS

Several ways of improving the media monitoring project have already been identified:

### **System improvement:**

- The Medisys tool's database of sources will be supplemented with sources from various origins (such as the ANSES documentary resource, more than 1,000 sources) in collaboration with the JRC. The aim of the Horizon Scanning project has always been to provide accurate information regarding the sources added to Medisys. This explains why the system has been fed both quantitatively (number of sources) and qualitatively (ensuring the URL is correct or the RSS link is up to date). In addition, the frequency of the Medisys scan of sources needs to be tailored to each scientific journal according to their information update frequency to optimise the retrieval of new information. The links given to Medisys need to be regularly checked and updated since changes can occur on the journal websites.
- Among future developments, nematology journals should be the subject of a special focus since only 6% of the articles reported in the scientific newsletters are about nematodes (whereas viruses, fungi, insects and bacteria represent between 18% and 30% of articles selected) and only a few sources already monitored are about nematodes.
- Language coverage could be improved so as to cover more articles retrieved from sources published in languages other than English. A diversification of keywords to include the common names of pests, diseases and symptoms in Asian or Arabic languages, for example, will allow us to collect more articles. This development requires technical and scientific support in order to extract relevant keywords from thesaurus databases such as AGROVOC.

### **Diversification of monitoring:**

- The monitoring of social media such as "Twitter" is currently being considered. Monitoring the Twitter feed of researchers, media and scientific journals could provide some relevant information even before its publication in scientific journals. It seems particularly relevant to monitor such channels as news of new findings of pests can be quickly exchanged through these media.

### **Publishing:**

- During the pilot period, the scientific newsletter's cover page was developed; as soon as the layout is consolidated, the pilot period will end and the scientific newsletter will be published in the EFSA Journal (Wiley).
- The other Medisys tool improvement that could be made as a project follow-on is to solve the e-mail alert addressing issues. This work will be conducted by the JRC.

For the project's follow-on, it seems important to establish links between the Horizon Scanning project and ANSES activities in order to transfer skills and knowledge on automated bibliographical searches.

Technical support is already being provided to the international health monitoring working group of ANSES's epidemiological surveillance platform. This support aims to improve the selection criterion of articles in order to publish a monthly newsletter on plant health.

From a more general point of view, the information search methodology has been used for the expert appraisals conducted by ANSES and the ERB<sup>24</sup> unit, for example to find articles on ToBRFV for expert working groups (February 2020). Another new development would be to provide support upstream of any new expert appraisals so as to help develop an ad hoc bibliographical search for particular topics.

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<sup>24</sup> ERB: Expertise sur les Risques Biologiques / Expertise on Biological Risks

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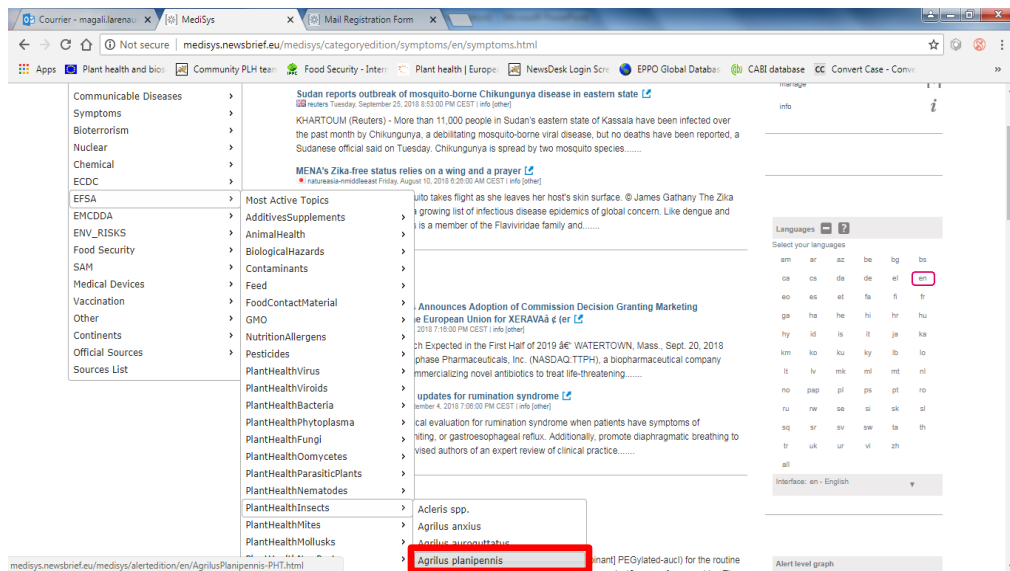
## 6 APPENDIX

### 6.1 STEP-BY-STEP GUIDE: SUBSCRIBING TO MEDISYS EMAIL ALERTS

To subscribe to Medisys e-mail alerts, click on the link:

<https://medisys.newsbrief.eu/medisys/homeedition/en/home.html>

In the menu on the left, choose the pest or group of pests you want to follow, in this example *Agrilus planipennis*.



Below is the list of all the Plant Health links:

<http://medisys.newsbrief.eu/medisys/groupedition/en/PlantHealthAll.html>

<http://medisys.newsbrief.eu/medisys/groupedition/en/PlantHealthNewPests.html>

<http://medisys.newsbrief.eu/medisys/filtereditection/en/EFSAPlantHealthEmailAlert.html>

<http://medisys.newsbrief.eu/medisys/filtereditection/en/EFSAPlantHealthScientificEmailAlert.html>

<http://medisys.newsbrief.eu/medisys/groupedition/en/PlantHealthVirus.html>

<http://medisys.newsbrief.eu/medisys/groupedition/en/PlantHealthViroids.html>

<http://medisys.newsbrief.eu/medisys/groupedition/en/PlantHealthBacteria.html>

<http://medisys.newsbrief.eu/medisys/groupedition/en/PlantHealthPhytoplasma.html>

<http://medisys.newsbrief.eu/medisys/groupedition/en/PlantHealthFungi.html>

<http://medisys.newsbrief.eu/medisys/groupedition/en/PlantHealthOomycetes.html>

<http://medisys.newsbrief.eu/medisys/groupedition/en/PlantHealthNematodes.html>

<http://medisys.newsbrief.eu/medisys/groupedition/en/PlantHealthMollusks.html>

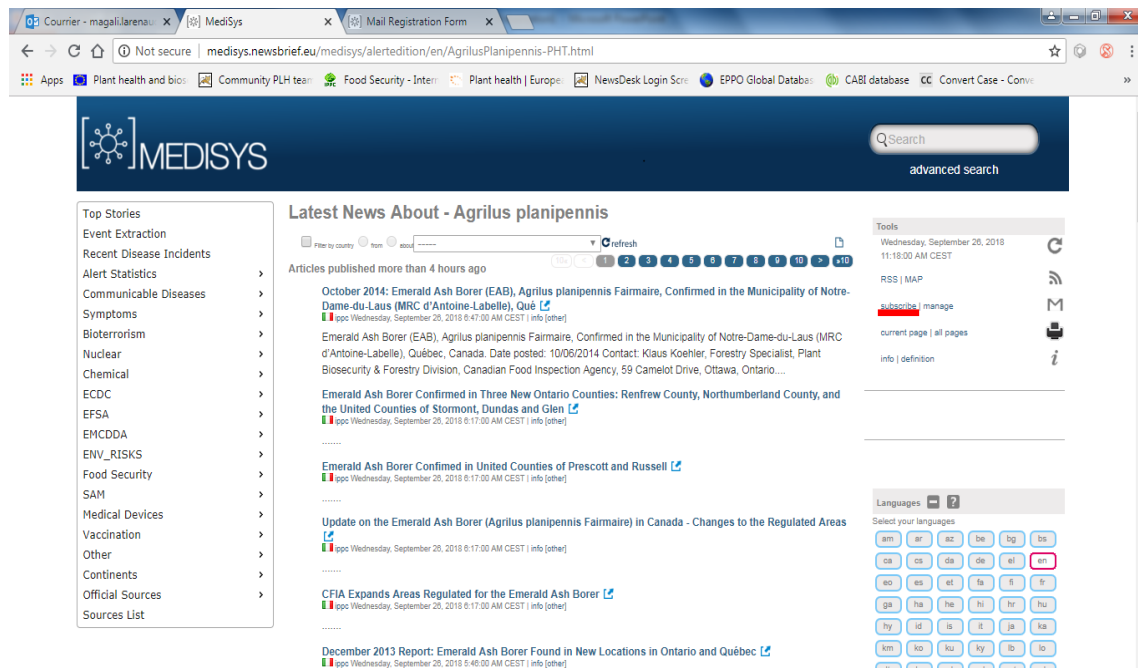
<http://medisys.newsbrief.eu/medisys/groupedition/en/PlantHealthInsects.html>

<http://medisys.newsbrief.eu/medisys/groupedition/en/PlantHealthMites.html>

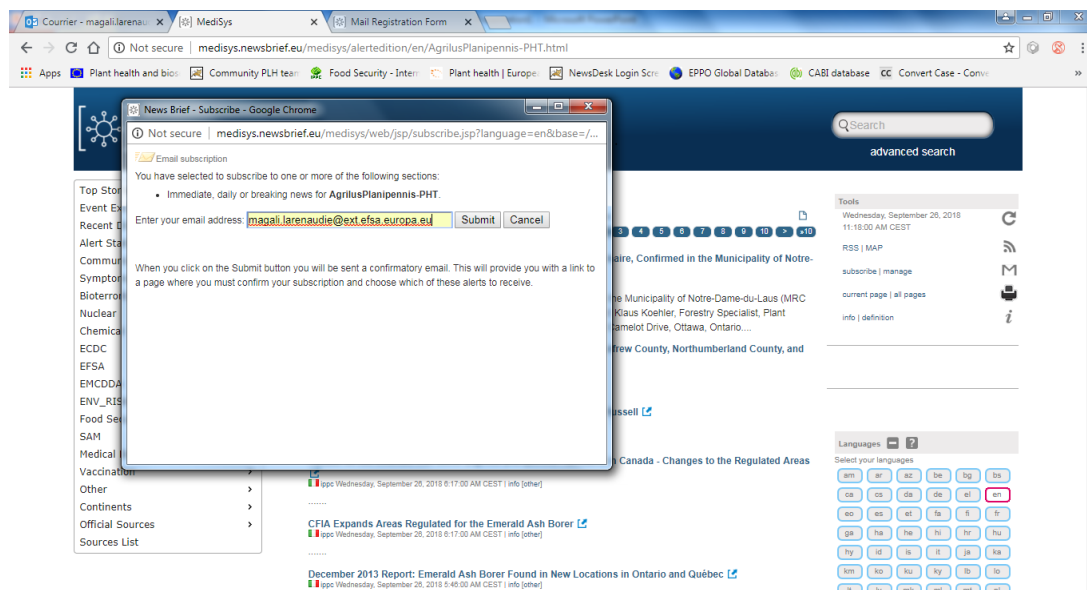
<http://medisys.newsbrief.eu/medisys/groupedition/en/PlantHealthParasiticPlants.html>



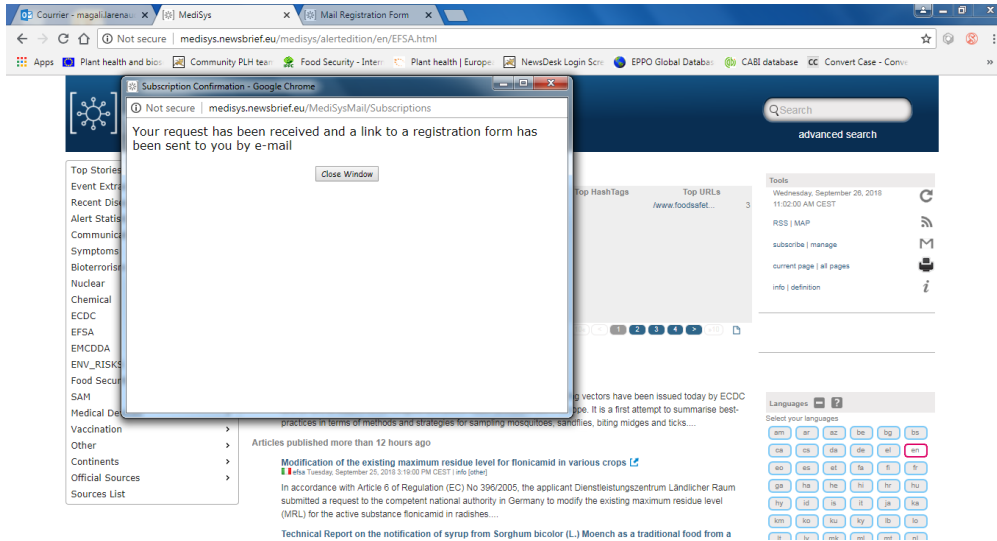
Next, click on the “subscribe” link on the right of the screen.



Then, enter your email address and click on “submit”.

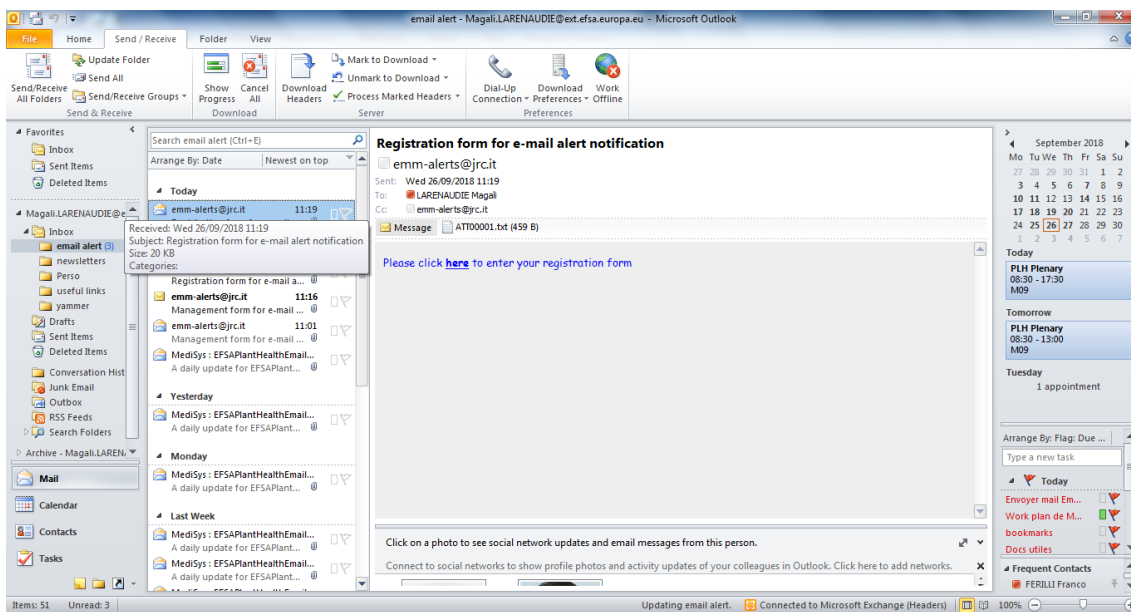


This window is displayed.



The e-mail arrives in your inbox (it can take some time).

Click on the link contained in the "registration form" message:



The window below is displayed: “mail registration form”:

You can choose how often you want to receive the e-mail alert

- **Daily** and at **what time** you want to receive it (scroll down the menu)
- **Immediate**: as soon as a new article on the subject is published in Medisys, you will receive a notification
- You can choose a priority (**Breaking**), by scrolling the menu (elevated, high or very high)

To finish and validate, click on “**update details**”.

Time of daily alert: 8h00 CET / EST

Alert: Daily Immediate Breaking

Your current subscriptions

EFSAPlantHealthEmailAlert:  no breaking news

Update Details

Languages: en

Please select the categories and the type of e-mail you wish to receive, or de-select those you no longer wish to receive

The daily e-mail will be sent to you every day at the time you have selected and will contain the relevant articles detected in the last 24 hours. If more than the maximum number of articles has been found, you will receive only these last articles. Immediate mail means that you will receive an immediate e-mail notification every time the category content is updated. Your current subscriptions are ticked. Subscriptions to other categories can be managed from the relevant category pages.

This window is displayed, telling you that you have subscribed to a new e-mail alert.

Your subscription details have been updated. Thank you for using our service.

Close Window

To view your subscriptions and edit as needed, go to any page of Medisys and click on “**Manage**”.

Medisys

Search: advanced search

Top Stories

Event Extraction

Recent Disease Incidents

Alert Statistics

Communicable Diseases

Symptoms

Bioterrorism

Nuclear

Chemical

ECDC

EFSA

EMCDDA

ENV\_RISKS

Food Security

SAM

Medical Devices

Vaccination

Other

Continents

Official Sources

Sources List

Most Active Topics - EFSA

No articles to show

There are no active themes for the current selection. Select an item from the menu to view items by category.

Tools

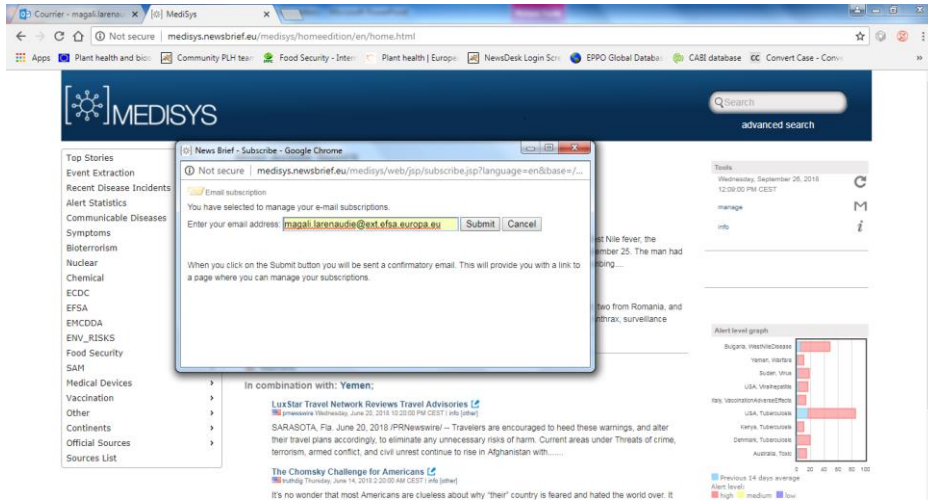
Wednesday, September 25, 2018

manage

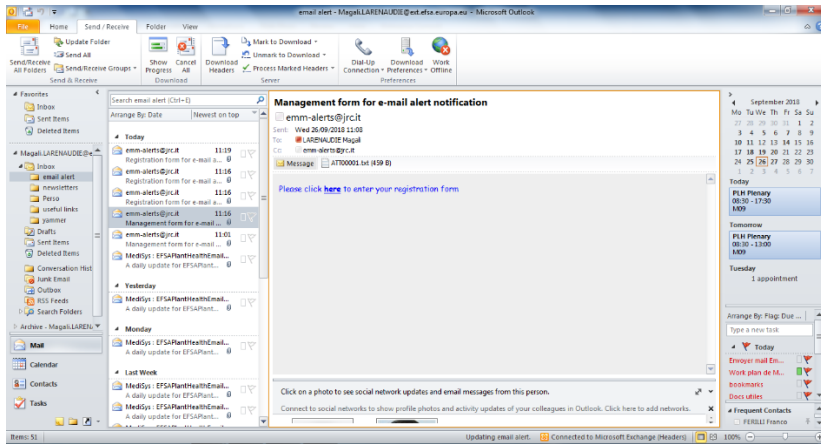
info

Languages: en

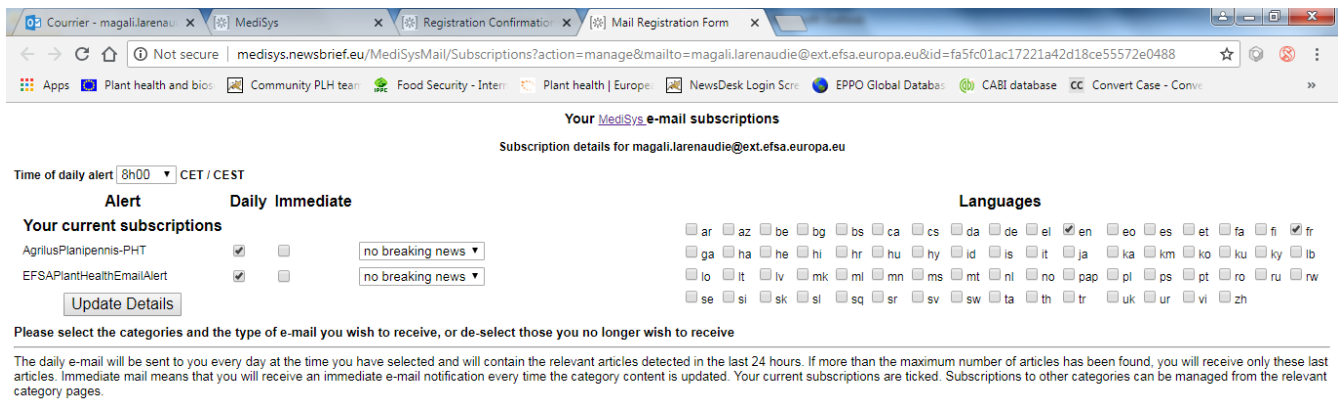
Enter your e-mail address and click on "submit".



You will receive a message "management form for e-mail alert notification". Click on the link contained in the message.



You can edit your alerts on the page that appears. To no longer receive an alert, you must uncheck the boxes of the category. Always finalise changes by clicking on "update details" to take them into account.



The daily e-mail will be sent to you every day at the time you have selected and will contain the relevant articles detected in the last 24 hours. If more than the maximum number of articles has been found, you will receive only these last articles. Immediate mail means that you will receive an immediate e-mail notification every time the category content is updated. Your current subscriptions are ticked. Subscriptions to other categories can be managed from the relevant category pages.

## 6.2 LIST AND SCOPE OF THE 73 JOURNALS PROVIDING ONLY ONE ARTICLE FOR THE SCIENTIFIC NEWSLETTER

About plants	Agriculture and Biology	Entomology	Microbiology / Parasites	Other Biology	Chemistry	Engineering / Computer science / Physics	Multidisciplinary
Acta Horticulturae	Frontiers of Agricultural Science and Engineering	Applied Entomology and Zoology	Fungal Biology	Aerobiologia	Environmental Science and Pollution Research	Biosensors	Preprints
American Journal of Potato Research	Japan Agriculture Research Quarterly	Austral Entomology	International Journal of Systematic and Evolutionary Microbiology	Annals of Applied Biology	Food Analytical Methods	International Journal of Advanced Computer Science and Applications	Proceedings of the National Academy of Sciences of the United States of America
Frontiers in Plant Science	ITEA-Información Técnica Agraria	Bulletin de la Société entomologique de France	Journal of Applied Microbiology	Journal of Natural Science, Biology and Medicine	Journal of Electroanalytical Chemistry	International Journal of Recent Technology and Engineering	
Japanese Journal of Phytopathology	Zoological studies	Bulletin of Entomological Research	Journal of Virological Methods	Theoretical and Applied Genetics	AMB Express	Laser Physics	
Nature Plants	Russian Journal of Biological Invasions	Entomological News	Journal of Virology	Proceedings of the National Academy of Sciences, India Section B: Biological Sciences	American Society of Agricultural and Biological Engineers Annual International Meeting	Remote sensing of environment	
The Journal of Horticultural Science and Biotechnology	Agricultural and Forest Entomology	International Journal of Tropical Insect Science	Systematic and Applied Microbiology	Saudi Journal of Biological Science	Analytical and Bioanalytical Chemistry	Romanian Reports in Physics	
Plant Health – Research and Practice	BioControl	Journal of Asia-Pacific Entomology	Virus Genes	Rendiconti Lincei. Scienze Fisiche e Naturali	Analytical Science	Sensors	
New Phytologist	Biological Invasions	Transactions of the American Entomological Society	Mycology		Applied Biosafety: Journal of ABSA International		
Plants People Planet	International Journal of Pest Management	Turkish Journal of Entomology	Mycologia		Applied Ecology and Environmental Research		
	Pest Management Science	Proceedings of the Hawaiian Entomological Society	Mycology		Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy		
	Redia – Journal of Zoology	Proceedings of the Entomological Society of Washington	Helminthologia		Talanta		
		Revista Brasileira de Entomologia	Pathogens				
		International Journal of Acarology	Biofilm				