Artificial Intelligence for Epidemiological Surveillance in Animal Health

Mathieu Roche, **Sarah Valentin**,
Elena Arsevska, Carlène Trevennec

WOAH Epidemic Intelligence Webinar

GeoAI4EI

Grant Agreement
No. 101287260.

Production of health information by VSI

Sources

World Organisation for Animal Health

wahis

empres-i

ADIS

Official sources

Networks of experts and international experts

Web media

Expertise

Veille Sanitaire Internationale

Plateforme ESA

Productions

Notes

Alerts

Weekly newsletter

Time-consuming website visits

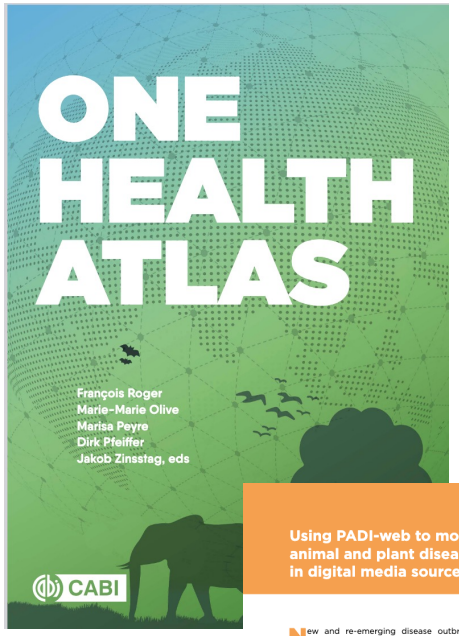
PADI - WEB

Since 2016 development of an **automated** monitoring system,

based on news reports from the web,

complementary to other sources

PADI-web and AI



Using PADI-web to monitor animal and plant diseases in digital media sources

Mathieu Roche, Carlène Trevennec, Isabelle Pieretti, Elena Arsevska

New and re-emerging disease outbreaks have become increasingly common in recent decades, driven by climate change, anthropization of natural environments and contact with wildlife due to human mobility and animal trade activities. A global approach to monitoring public, animal and plant health is needed to address this issue. Monitoring the news across digital media can provide relevant information on disease outbreaks and make disease surveillance and pandemic preparedness more comprehensive. However, manually extracting relevant information from unofficial digital news sources is time-consuming.

The Platform for Automated Extraction of Disease Information from the web (PADI-web[1]) was designed to make this task easier. PADI-web has been used since 2016 as part of the epidemic intelligence activities of the French National Animal Surveillance Health Plateform. This tool crawls Google news related to public, animal and plant health, including zoonotic diseases. It offers a multilingual approach, automated information classification and extraction modules, a notification tool configurable according to end-user needs, and maps for animal and plant health monitoring. The PADI-web pipeline involves five steps (Figure 1), and the algorithms associated with steps 3 and 4 use text mining and artificial intelligence approaches that are fine-tuned for animal and plant diseases. PADI-web for animal disease surveillance focuses specifically on zoonotic diseases such as avian influenza, which enables cases detected in mammalian species to be investigated (Figure 2). Human vector-borne diseases (e.g. chikungunya and dengue) have also been added to a new version of PADI-web, and the version for plant disease surveillance focuses on several EU quarantine pests, such as *Xylella fastidiosa* (Figure 3). The platform will be enhanced to enable syndromic surveillance for the early detection of emerging epidemics and new host plants.

PADI-web has been integrated into international projects, including the Monitoring Outbreaks for Disease Surveillance in a data science context (MOOD) project (H2020 2020–2024). The MOOD project seeks to develop innovative tools and services for the early detection, assessment, and monitoring of current and future infectious disease threats in the context of continuous global, environmental and climatic change. As part of the MOOD project, different case studies have focused on widespread diseases (e.g. avian influenza and West Nile) as well as neglected diseases (e.g. leptospirosis).

1. https://www.padi-web-one-health.org

References

Arsevska E., Valentin S., Rabatel J., de Goër de Hervé J., Falala S. *et al.* 2018. Web monitoring of emerging animal infectious diseases integrated in the French animal health epidemic intelligence system. *PLoS ONE*, 13(8). e0199960. https://doi.org/10.1371/journal.pone.0199960

Dupuy C., Lecquet C., Brard C., Dommergues L., Faure E. *et al.* 2024. The French National Animal Health Surveillance Platform: an innovative, cross-sector collaboration to improve surveillance system efficiency in France and a tangible example of the One Health approach. *Frontiers in Veterinary Science*, 11, 1249925. https://doi.org/10.3389/fvets.2024.1249925

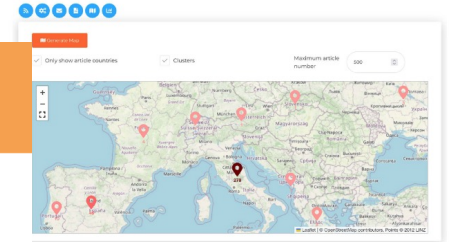
Roche M., Rabatel J., Trevennec C., Pieretti I. 2024. PADI-web for plant health surveillance. In: *Intelligent Information Systems: CAiSE* (Islam S., Sturm A., eds.). Lecture Notes in Business Information Processing, 520, pp. 148–156, Springer, Cham. https://doi.org/10.1007/978-3-031-61000-4_17

Valentin S., Arsevska E., Rabatel J., Falala S., Mercier A. *et al.* 2021. PADI-web 3.0: A new framework for extracting and disseminating fine-grained information from the news for animal disease surveillance. *One Health*, 13, 100357. https://doi.org/10.1016/j.onehlt.2021.100357



Figure 1. PADI-web pipeline.

Figure 2. Avian influenza (animal health) (01/05/2023–01/07/2023). (A) List of texts automatically classified as outbreak declarations focusing on Chile. (B) Examples of texts collected in English, French and Spanish that are formatted with PADI-web. Note that the first events of detection of avian influenza on mammals were identified in Chile with PADI-web on 25 May 2023 vs. 7 June 2023 with the World Animal Health Information System (WAHIS).



1. *Xylella fastidiosa* (plant health) (01/05/2024–01/09/2024). Geolocation of news collected and normalized with PADI-web and automatically classified vant using artificial intelligence approaches – 363 texts.

Welcome to The Animal Echo

The Animal Echo is WOAH's knowledge-sharing space designed to foster dialogue on the global challenges facing society today, through the lens of animal health. It publishes information, research findings and insights into the state and impact of animal health and welfare across the world.

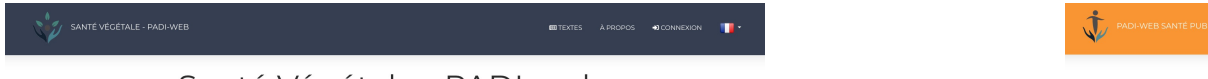






Animal Health - PADI-web

Consult PADI-web articles



Santé Végétale - PADI-web

Consult PADI-web articles





Santé publique - PADI-web

Consult PADI-web articles



PADI-web output based on machine learning and AI

Outputs

Email Notifications

Website consultation

CSV

14 new texts have been collected between **04 November, 2024 (00:00)** and **05 November, 2024 (07:00)**.

> Go to search page

If this email is not fully working in your mail client, please click here to read it in PADI-web.

CONTENTS

- Bluetongue (1)
  - Africa (1)
- African Swine Fever (6)
  - Europe (5)
  - Unknown (1)
- Avian Influenza (5)
  - Asia (1)
  - Europe (3)
  - North America (1)
- West Nile Virus (2)
  - Europe (1)
  - Unknown (1)
- Classification Information
- Keywords and Extracted Information

Bluetongue (1) ↑

Africa (1) ↑

Libyan Arab Jamahiriya (1) ↑

1 **Bluetongue disease affects sheep populations in Libya**
04 November, 2024 LIBYAN ARAB JAMAHIRIYA EN

Bluetongue disease affects sheep populations in Libya A veterinary official inspects sheep for signs of bluetongue disease at a local farm.The head of the National Center for Animal Health, Abdulrahman Ajbil, has confirmed an outbreak of blue-tongue disease affecting sheep across eastern and western regions of the country. Speaking to Libyan Express, Ajbil reassured that despite the spread, sheep mortality rates remain low.Bluetongue is a viral disease affecting ruminants, particularly sheep, and is characterised by inflammation of the mouth, nose, and tongue. While not transmissible to human...

www.libyanexpress.com
BLUETONGUE3_EN

RELEVANT | ALERT, PREPARDNESS | OUTBREAK DECLARATION

African Swine Fever (6) ↑

Europe (5) ↑

Italy (4) ↑

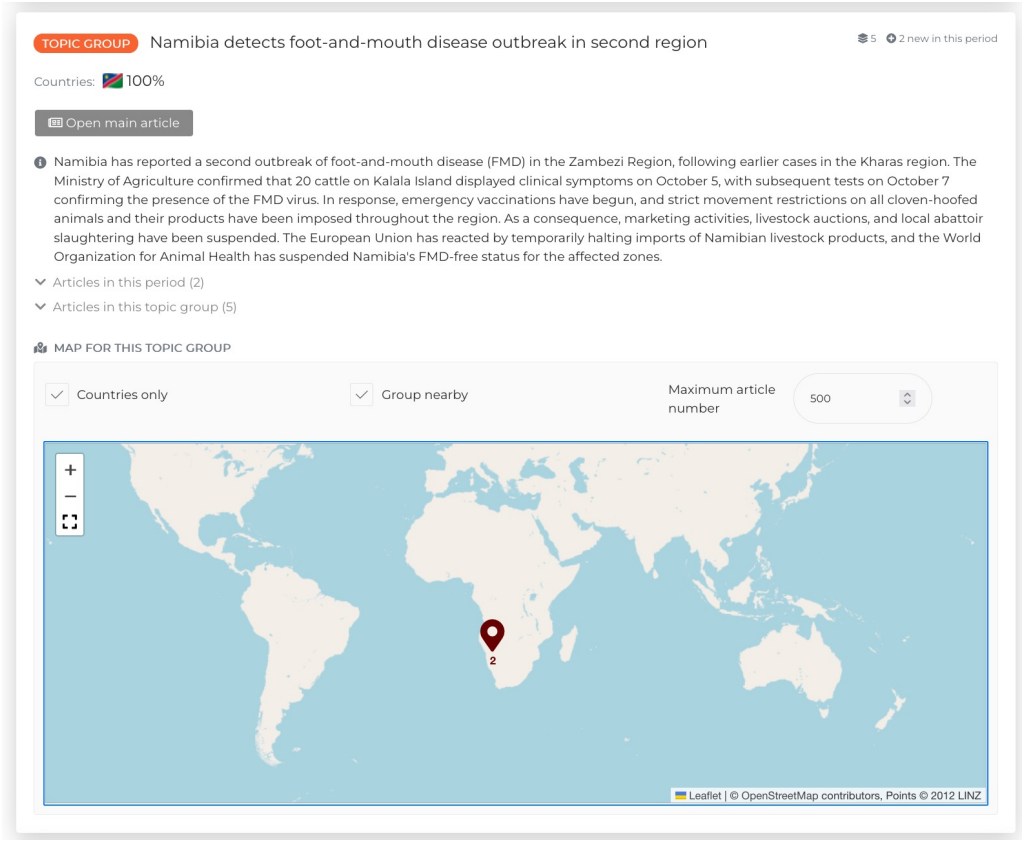
1 **600,000 euros for the fight against African swine fever in Lombardy**
04 November, 2024 ITALY IT

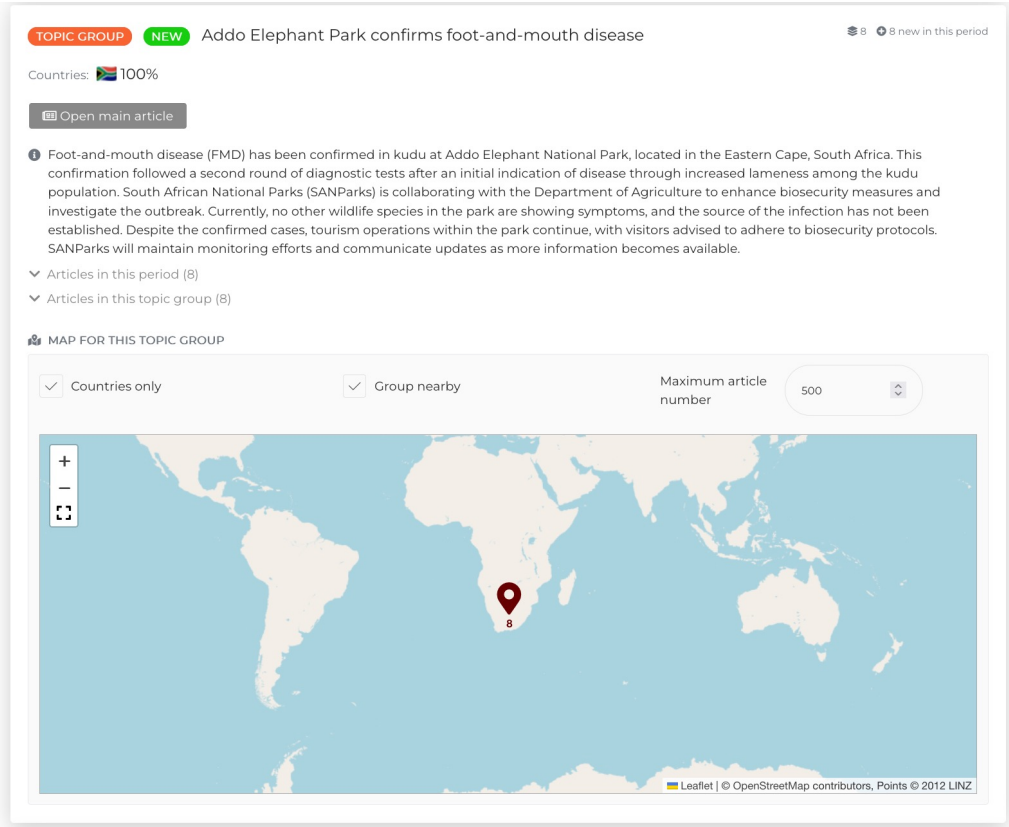
Different view points to define an event





PADI-web output: newsletter based on LLM





Example (1/3)

Language and country labels

Chile: Mysterious mass extinction of guano cormorants

DE → EN Show source language CL

ID: 8QTA0BGS1Q

Jun 4, 2023 · Jun 5, 2023 · Visit page

Source: latina-press.com

Chile: Mysteriöses Massensterben von Guano-Kormoranen

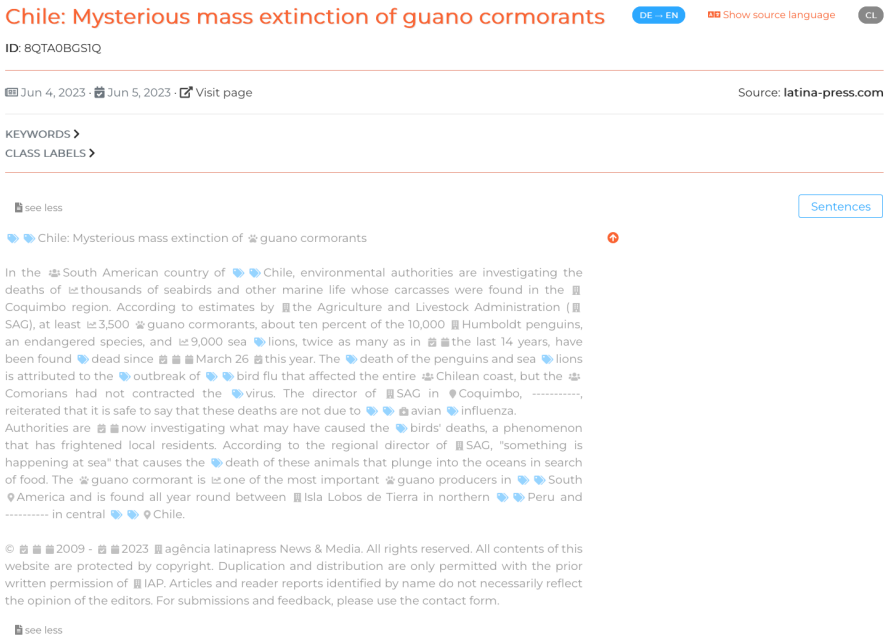


Die Behörden untersuchen nun, was den Tod der Vögel verursacht haben könnte, ein Phänomen, das die Anwohner verängstigt hat (Foto: Agência Ambiental Pick-upau)

Datum: **04. Juni 2023**
Uhrzeit: **15:49 Uhr**
Ressorts: **Chile, Natur & Umwelt**
Leserecho: **0 Kommentare**
Autor: **Redaktion**

Im südamerikanischen Land Chile untersuchen die Umweltbehörden den Tod von Tausenden von Seevögeln und anderen Meeresbewohnern, deren Kadaver in der Region Coquimbo aufgefunden wurden. Nach Schätzungen der Landwirtschafts- und Viehzuchtbehörde (SAG) sind seit dem 26.

PADI WEB



Example (2/3)

Chile: Mysterious mass extinction of guano cormorants

DE → EN · Show source language · CL

ID: 8QTA0BGS1Q

Jun 4, 2023 · Jun 5, 2023 · Visit page — Source: latina-press.com

KEYWORDS ›

CLASS LABELS ⌄

Relevance	RELEVANT
Fine-grained classificati...	OUTBREAK DECLARATION
Topic (BERT approach)	OUTBREAK DECLARATION

Class (topic)

see less — Sentences

Chile: Mysterious mass extinction of guano cormorants

In the South American country of Chile, environmental authorities are investigating the deaths of thousands of seabirds and other marine life whose carcasses were found in the Coquimbo region. According to estimates by the Agriculture and Livestock Administration (SAG), at least 3,500 guano cormorants, about ten percent of the 10,000 Humboldt penguins, an endangered species, and 9,000 sea lions, twice as many as in the last 14 years, have been found dead since March 26 this year. The death of the penguins and sea lions is attributed to the outbreak of bird flu that affected the entire Chilean coast, but the Comorians had not contracted the virus. The director of SAG in Coquimbo, ----------, reiterated that it is safe to say that these deaths are not due to avian influenza.
Authorities are now investigating what may have caused the birds' deaths, a phenomenon that has frightened local residents. According to the regional director of SAG, "something is happening at sea" that causes the death of these animals that plunge into the oceans in search of food. The guano cormorant is one of the most important guano producers in South America and is found all year round between Isla Lobos de Tierra in northern Peru and ---------- in central Chile.

Chile: Mysterious mass extinction of guano cormorants

DE → EN · Show source language · CL

ID: 8QTA0BGS1Q

Jun 4, 2023 · Jun 5, 2023 · Visit page — Source: latina-press.com

KEYWORDS ⌄

USER KEYWORDS

User dictionaries

disease	AVIAN INFLUENZA, INFLUENZA
host	AVIAN, MAMMAL
symptom	MORTALITY
various	OUTBREAK, VIRUS
location	AMERICAS, REPUBLIC OF CHILE, REPUBLIC OF PERU, SOUTH AMERICA

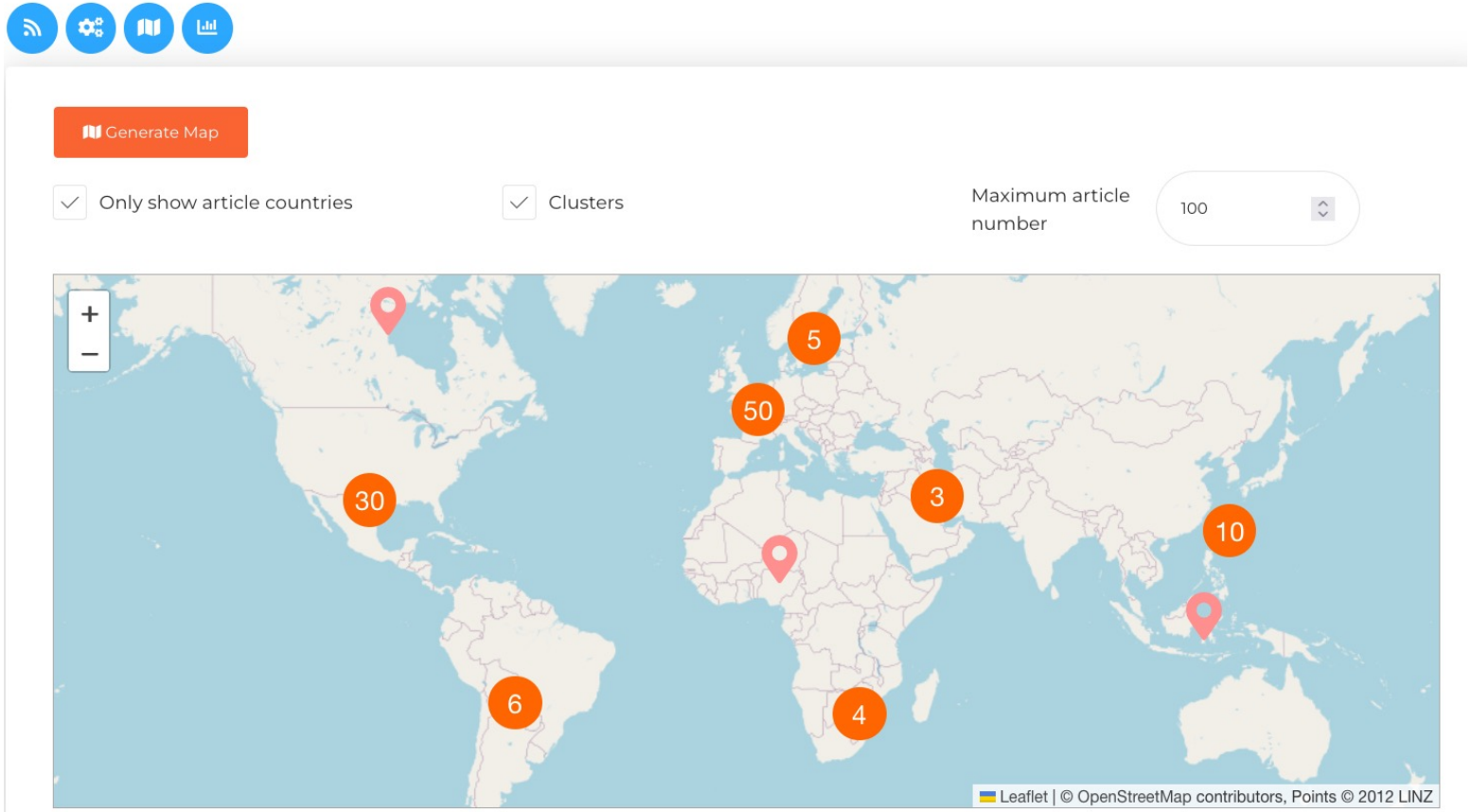
Keywords (epidemiological information)

AUTOMATIC KEYWORDS

Named Entity Recognition

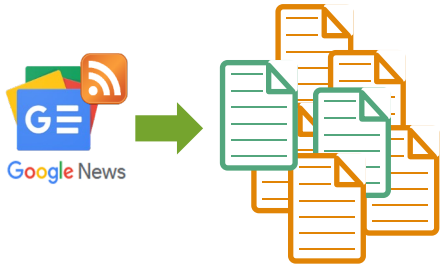
Extraction Institution	AGÊNCIA LATINAPRESS NEWS & MEDIA, COQUIMBO, HUMBOLDT, IAP, ISLA LOBOS DE TIERRA, SAG, THE AGRICULTURE AND LIVESTOCK ADMINISTRATION
Extraction People group	CHILEAN, COMORIANS, SOUTH AMERICAN
Extraction Location	COQUIMBO

Example (3/3)


Generate Map
Only show article countries
Clusters
Maximum article number
100
5
50
30
3
10
6
4
Leaflet | © OpenStreetMap contributors, Points © 2012 LINZ

PADI-web pipeline

① Data collection



② Data processing

- Text cleaning
- Language detection
- English translation

③ Data classification

Relevant document

Irrelevant document

④ Sentence classification

⑤ Information extraction

Disease
Host
Location
Date
Number of cases
Symptoms

⑥ Email Notifications

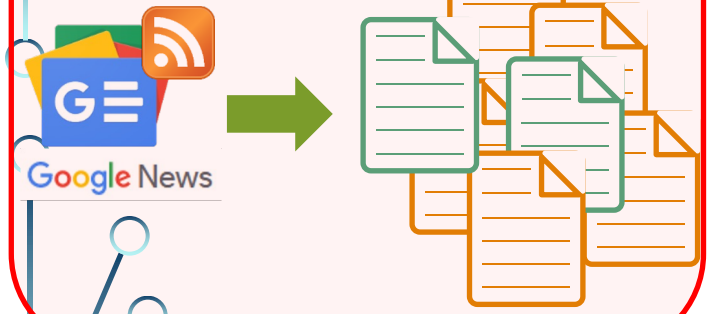
and/or Website consultation

https://padi-web.cirad.fr/en/

PADI - WEB

PADI-web pipeline

① Data collection



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- Language detection
- English translation

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Relevant document

Irrelevant document

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Event type
Information type

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Disease
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Symptoms

⑥ Email Notifications and/or Website consultation https://padi-web.cirad.fr/en/

Queries

○ Monitor known infectious diseases

Specific queries: contain the name of the disease

« avian flu OR avian influenza OR bird flu »

Monitored diseases:

- Highly pathogenic avian influenza
- African swine fever
- Bluetongue
- Foot-and-mouth disease
- Schmallenberg
- Lumpy skin disease
- Peste des petits ruminants
- West Nile fever
- Rift Valley fever
- Crimean–Congo haemorrhagic fever

○ Syndromic surveillance for new diseases

42 non-specific queries: contain associations of symptoms and hosts

« abortions AND cows »

In English, French, Chinese, Turkish, Italian, Spanish, Russian, Arabic, Hungarian, Greek, Bulgarian, Romanian, Danish, Czech, German, Latvian…

The terms used in the queries were selected using an approach combining text mining and the opinion of experts in the field



* African Swine Fever
* Antimicrobial resistance
* Avian Influenza
* Bluetongue
* Brucella
* Canine disease
* Classical Swine Fever
* Crimean-Congo Haemorrhagic Fever
* Diseases of bees
* Felin disease
* Foot and Mouth Disease
* Lumpy skin disease
* One health
* Peste des Petits Ruminants
* Rift valley fever
* RVF
* Schmallenberg Virus
* Small ruminants
* Tick-borne encephalitis
* Tropilaelaps
* Tularaemia
* Unspecified Disease
* Usutu
* West Nile Virus

* coffee berry disease
* coffee leaf rust
* CSSV
* CWBD
* Fusarium Oxysporum Tropical
* General Reporting
* HLB
* Phytophthora cocoa
* syndromic surveillance
* Xylella Fastidiosa

* Chikungunya
* Cholera
* Coronavirus
* Dengue
* Influenza
* Leptospirosis
* Mpox
* Nipah
* Rage
* Syndrome
* Zika
* Legionella

Step 2: data processing

① Data collection





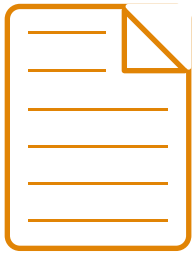
② Data processing

- Text cleaning
- Language detection
- English translation

③ Data classification



Relevant document



Irrelevant document

④ Sentence classification

Event type
Information type

⑤ Information extraction

Disease
Host
Location
Date
Number of cases
Symptoms

⑥ Email Notifications



and/or Website consultation
https://padi-web.cirad.fr/en/

Step 3: data classification

① Data collection

② Data processing

- Text cleaning
- Language detection
- English translation

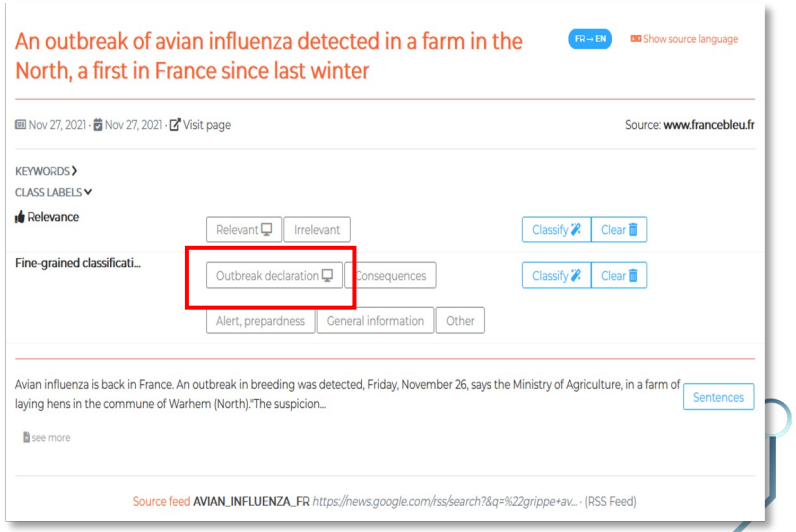
③ Data classification

Relevant document

Irrelevant document

***Fine-grained classification* task**

- Outbreak declaration
- Consequences
- Alert, preparedness
- General information
- Other

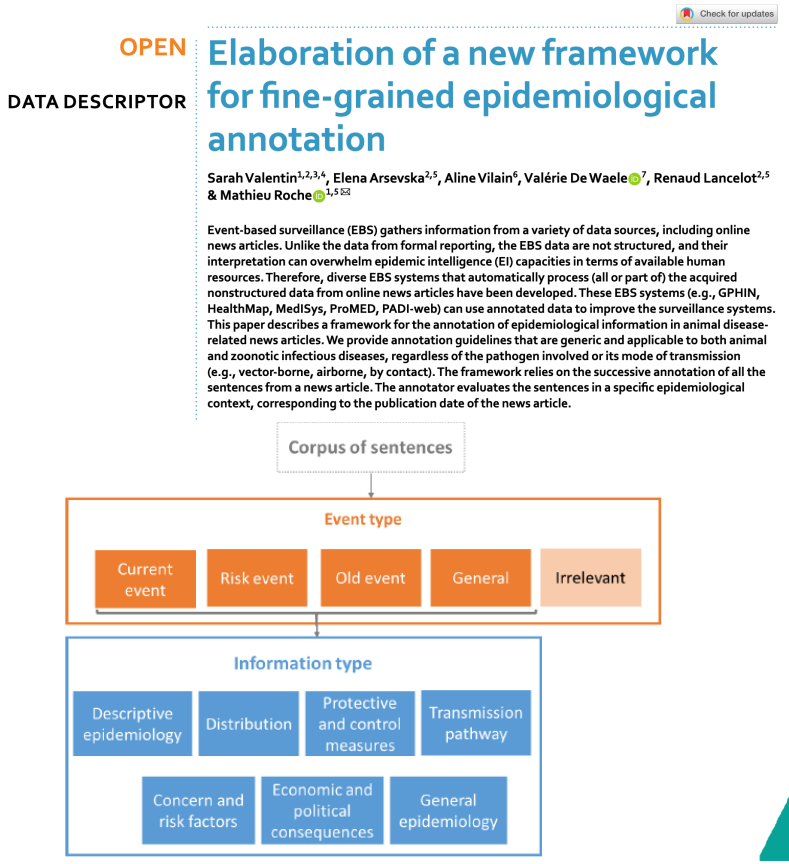


Step 3: annotation of corpus

Fine-grained classification

(Valentin *et al.*, Scientific Data 2022)

scientific **data**



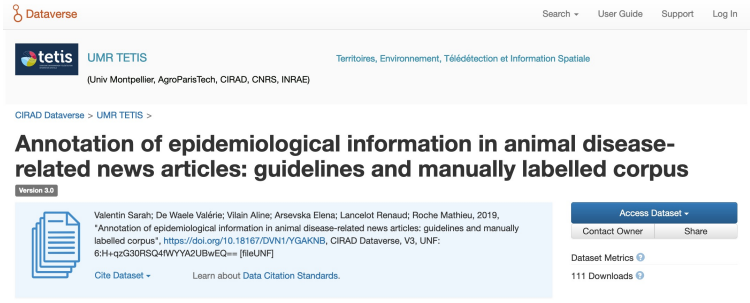
OPEN

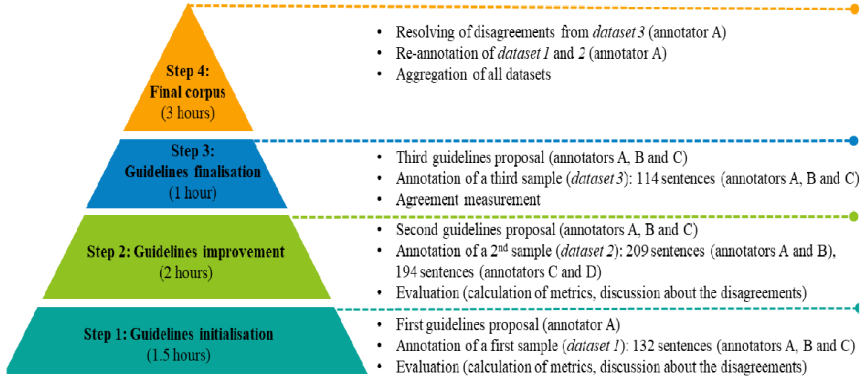
DATA DESCRIPTOR

Elaboration of a new framework for fine-grained epidemiological annotation

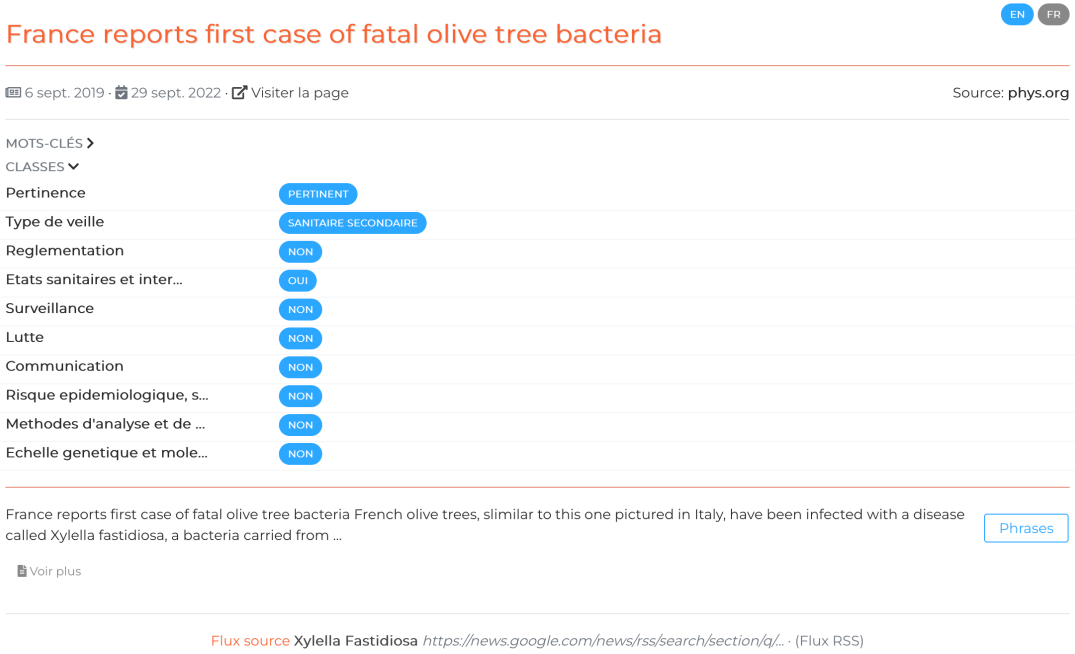
Sarah Valentin[1,2,3,4], Elena Arsevska[2,5], Aline Vilain[6], Valérie De Waele[7], Renaud Lancelot[2,5] & Mathieu Roche[1,5]

Event-based surveillance (EBS) gathers information from a variety of data sources, including online news articles. Unlike the data from formal reporting, the EBS data are not structured, and their interpretation can overwhelm epidemic intelligence (EI) capacities in terms of available human resources. Therefore, diverse EBS systems that automatically process (all or part of) the acquired nonstructured data from online news articles have been developed. These EBS systems (e.g., GPHIN, HealthMap, MedISys, ProMED, PADI-web) can use annotated data to improve the surveillance systems. This paper describes a framework for the annotation of epidemiological information in animal disease-related news articles. We provide annotation guidelines that are generic and applicable to both animal and zoonotic infectious diseases, regardless of the pathogen involved or its mode of transmission (e.g., vector-borne, airborne, by contact). The framework relies on the successive annotation of all the sentences from a news article. The annotator evaluates the sentences in a specific epidemiological context, corresponding to the publication date of the news article.





PADI-web and plant health surveillance



Random Forest:
Accuracy at 0.79 (5-fold cross-validation process)

RoBERTa:

Class	Accuracy	Precision	Recall
Communication/popularization	0.85	0.84	0.85
Genetic and molecular scale	0.90	0.89	0.90
Health statuses and interceptions	0.87	0.86	0.87
Fighting measures	0.85	0.84	0.85
Methods of analysis and detection	0.97	0.96	0.97
Regulation	0.94	0.88	0.94
Epidemiological, socio-economic and environmental risk	0.96	0.95	0.96
Monitoring	0.89	0.80	0.89

Step 4: sentence classification

① Data collection





② Data processing

- Text cleaning
- Language detection
- English translation

③ Data classification



Relevant document



Irrelevant document

④ Sentence classification

Event type
Information type

⑤ Information extraction

Disease
Host
Location
Date
Number of cases
Symptoms

⑥ Email Notifications



and/or Website consultation https://padi-web.cirad.fr/en/

Step 5: information extraction

① Data collection





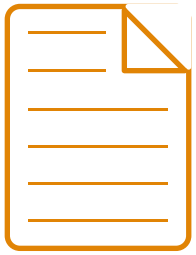
② Data processing

- Text cleaning
- Language detection
- English translation

③ Data classification



Relevant document



Irrelevant document

④ Sentence classification

Event type
Information type

⑤ Information extraction

Disease
Host
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Symptoms

⑥ Email Notifications



and/or Website consultation
https://padi-web.cirad.fr/en/

GeoNames

Agrovoc
Multilingual agricultural thesaurus

GliNER



Step 6: PADI-web output

① Data collection



② Data processing

- Text cleaning
- Language detection
- English translation

③ Data classification

Relevant document

Irrelevant document

④ Sentence classification

Event type
Information type

⑤ Information extraction

Disease
Host
Location
Date
Number of cases
Symptoms

⑥

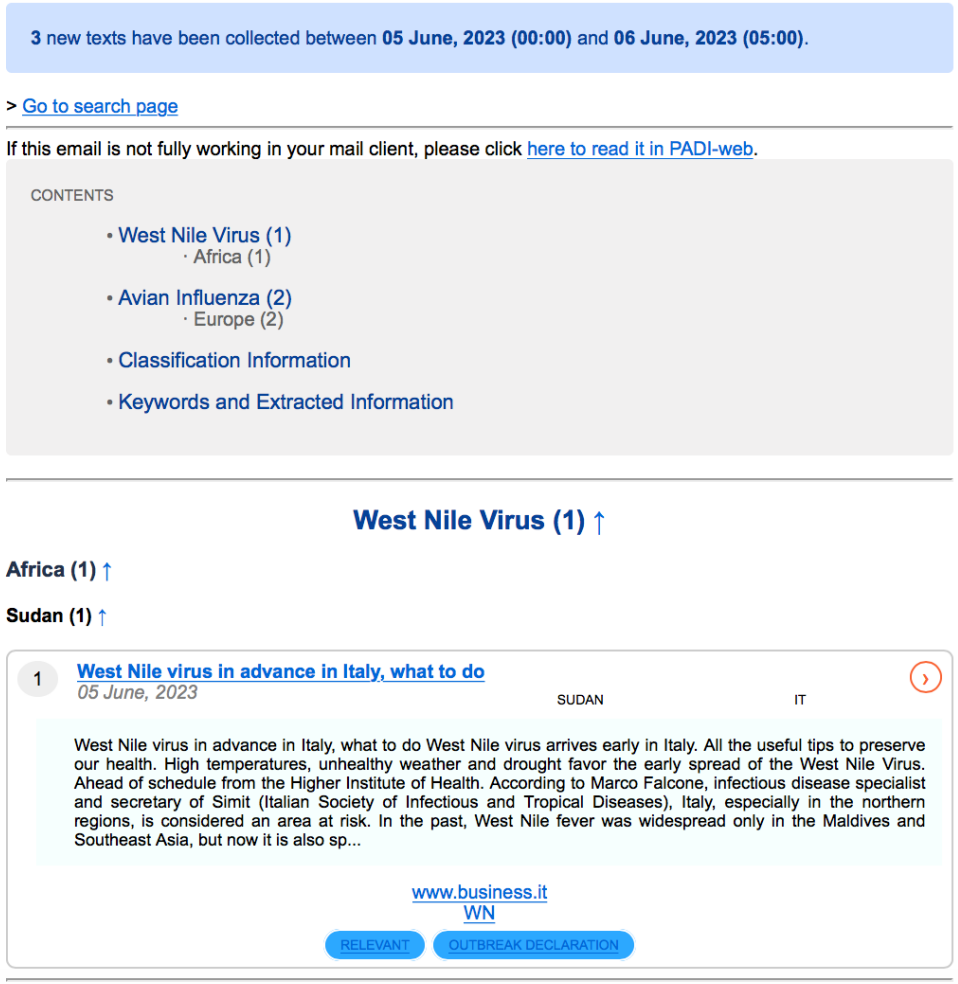
Email Notifications

and/or Website consultation https://padi-web.cirad.fr/en/

Step 6: PADI-web output

Example of notifications that you can receive by email every day.

These notifications indicate relevant articles retrieved by PADI-web. Subscription from the website.



3 new texts have been collected between **05 June, 2023 (00:00)** and **06 June, 2023 (05:00)**.

> Go to search page

If this email is not fully working in your mail client, please click here to read it in PADI-web.

CONTENTS

- West Nile Virus (1)
  - Africa (1)
- Avian Influenza (2)
  - Europe (2)
- Classification Information
- Keywords and Extracted Information

West Nile Virus (1) ↑

Africa (1) ↑

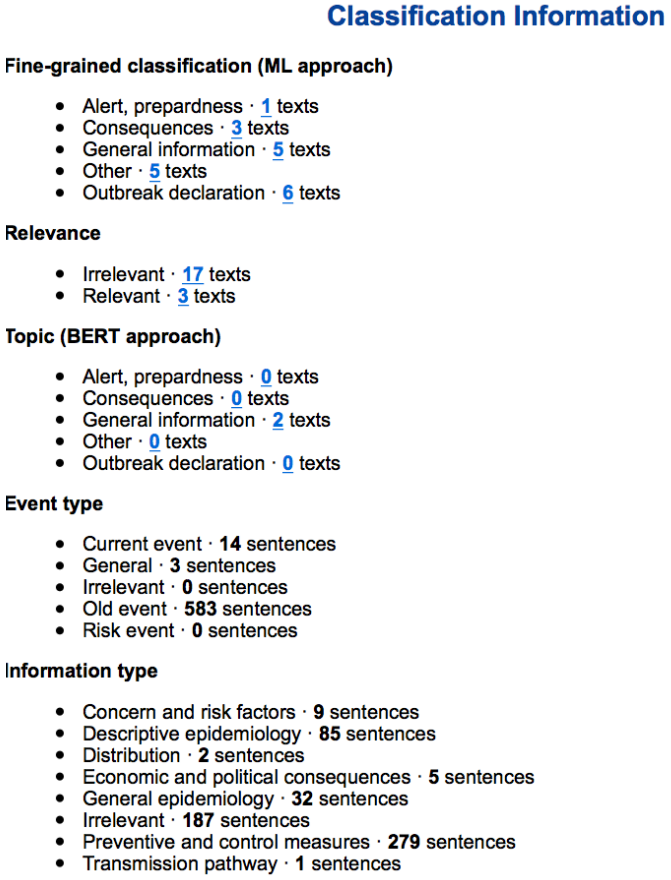
Sudan (1) ↑

1 **West Nile virus in advance in Italy, what to do**
05 June, 2023
SUDAN IT

West Nile virus in advance in Italy, what to do West Nile virus arrives early in Italy. All the useful tips to preserve our health. High temperatures, unhealthy weather and drought favor the early spread of the West Nile Virus. Ahead of schedule from the Higher Institute of Health. According to Marco Falcone, infectious disease specialist and secretary of Simit (Italian Society of Infectious and Tropical Diseases), Italy, especially in the northern regions, is considered an area at risk. In the past, West Nile fever was widespread only in the Maldives and Southeast Asia, but now it is also sp...

www.business.it
WN

RELEVANT OUTBREAK DECLARATION



Classification Information

Fine-grained classification (ML approach)

- Alert, prepardness · 1 texts
- Consequences · 3 texts
- General information · 5 texts
- Other · 5 texts
- Outbreak declaration · 6 texts

Relevance

- Irrelevant · 17 texts
- Relevant · 3 texts

Topic (BERT approach)

- Alert, prepardness · 0 texts
- Consequences · 0 texts
- General information · 2 texts
- Other · 0 texts
- Outbreak declaration · 0 texts

Event type

- Current event · **14** sentences
- General · **3** sentences
- Irrelevant · **0** sentences
- Old event · **583** sentences
- Risk event · **0** sentences

Information type

- Concern and risk factors · **9** sentences
- Descriptive epidemiology · **85** sentences
- Distribution · **2** sentences
- Economic and political consequences · **5** sentences
- General epidemiology · **32** sentences
- Irrelevant · **187** sentences
- Preventive and control measures · **279** sentences
- Transmission pathway · **1** sentences

Step 6: PADI-web output

Bulletin 12 Oct 2026 – 19 Oct 2026

Covers articles from 2026-10-12 10:00 to 2026-10-19 10:00. Generated on 2026-10-19 10:07.

194 TOPICS

284 ARTICLES

144 single articles · 179 new topics

Summary

Recent reports indicate a significant increase in health and disease management issues affecting livestock across various regions, particularly concerning African swine fever (ASF), avian influenza, and foot-and-mouth disease (FMD). During the period from October 12 to October 19, 2026, a total of 194 topics, including 179 new ones, were recorded, with 144 being single articles contributing to vital public health insights.

In Vietnam, authorities in An Giang province are intensifying efforts to combat ASF, with reports confirming the disease in eight households resulting in the culling of 191 pigs. Vinh Long province also faced outbreaks, leading to the slaughter of 357 pigs across multiple communes. Furthermore, Lao Cai province reported the culling of over 2,800 pigs due to infectious outbreaks, with measures including enhanced biosecurity and monitoring encouraged among farmers to prevent further spread.

In the UK, veterinary officials have sounded alarm bells regarding the increased risk of avian influenza due to the return of migratory birds. Confirmed cases of H5N1 avian influenza in poultry have impacted farms in Minnesota and Indiana in the U.S., prompting quick responses to enhance monitoring and biosecurity measures in both regions. Meanwhile, the USDA has emphasized the necessity for vigilant practices amongst poultry producers to mitigate the transmission risk alongside efforts to test dairy cattle for avian influenza following recent detections.

Namibia has been grappling with FMD outbreaks in both the Kharas and Zambezi regions, leading to emergency vaccinations and restrictions on livestock movement. These outbreaks have necessitated heightened surveillance and control measures, drawing international attention as the European Union has halted livestock imports from affected areas.

Simultaneously, concerns regarding bluetongue virus outbreaks have been rising in the UK, with over 3,300 confirmed cases reported since the season began. The ongoing impacts of various zoonotic diseases continue to highlight the importance of effective disease management practices, surveillance, and farmer cooperation to safeguard both livestock health and public welfare.

As the trends indicate, the complexities surrounding effective disease management and control require cooperative action among government bodies, veterinary authorities, and the farming community to respond to the rapidly changing landscape of animal health challenges.

This summary was automatically generated by AI and may contain inaccuracies.

Key themes

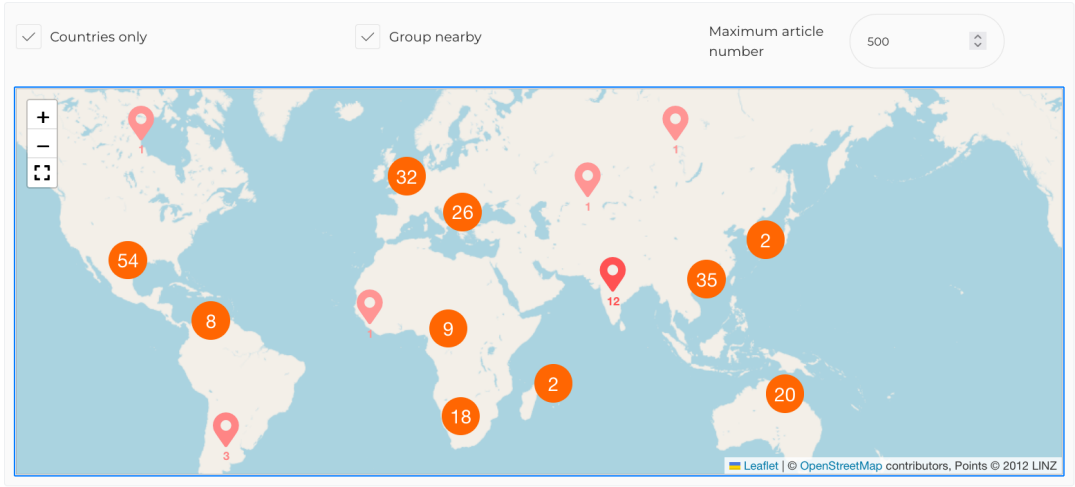
Top keywords: DISEASE (217) OUTBREAK (146) MAMMAL (144) SPREAD (139) VIRUS (137) CASES (129) FEVER (126) AVIAN (120) MORTALITY (118) OUTBREAKS (111)

Locations: AUSTRALIA (18) THE UNITED STATES (17) UK (17) ENGLAND (15) TASMANIA (15) MACQUARIE ISLAND (14) ANTARCTICA (13) SCOTLAND (13)

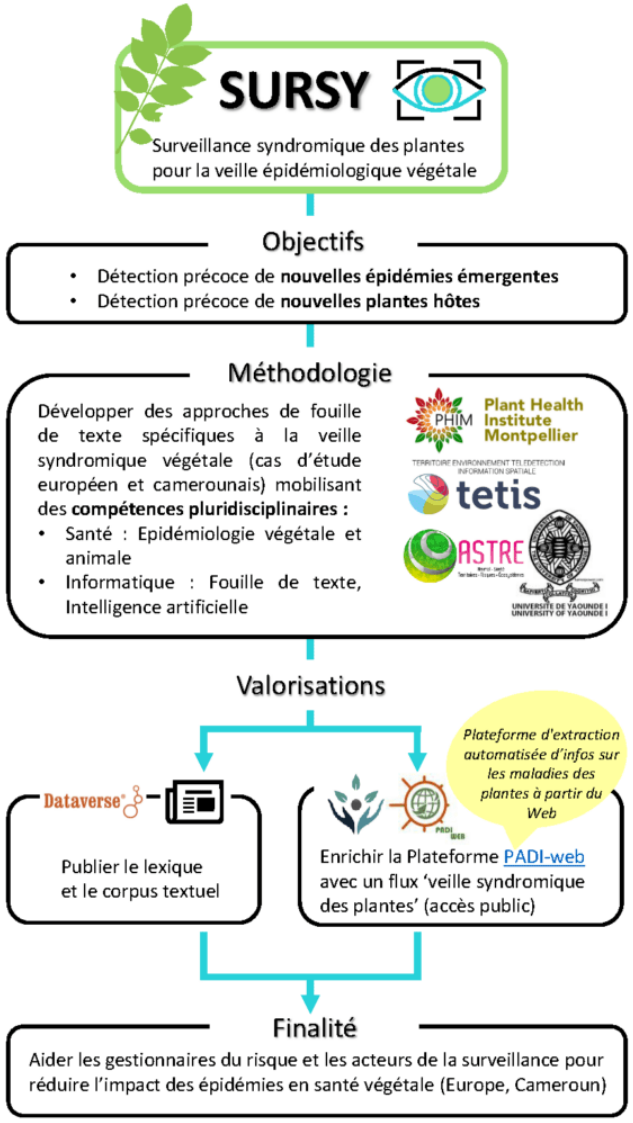
Diseases: AVIAN INFLUENZA (107) INFLUENZA (87) AFRICAN SWINE FEVER (80) FOOT-AND-MOUTH DISEASE (42) HIGHLY PATHOGENIC AVIAN INFLUENZA (41) H5N1 (38) BRUCELLOSIS (25) BLUETONGUE (21)

Geographic overview

Map of places linked to the articles in this bulletin.



Work in Progress (with Cameroun)



- **Syndromic surveillance** (by focusing on monitoring potentially new diseases (i.e. disease X) in plant health and the development of already existing diseases on new host plants)

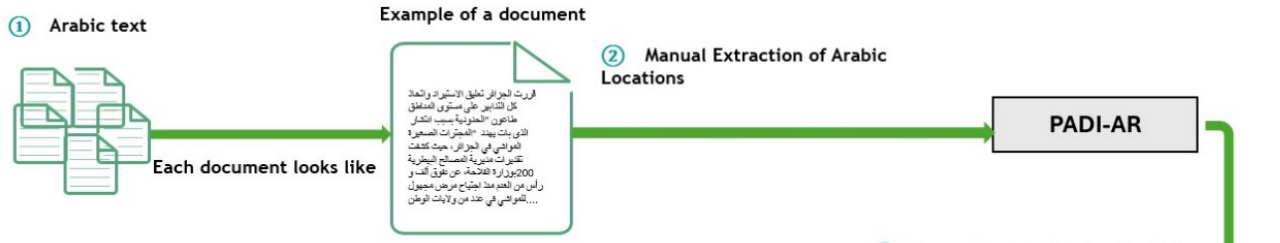
- Transfert learning beween plant and animal health for syndromic surveillance

(Nkounghawe Tomeyum *et al.*, CNIA-PFIA 2026)



Work in Progress (with Morocco and Madagascar)

- Evaluation of the pipeline in Arabic language



Id	Arabic location	English location	Type	Category
03P32WAHR8	أفريقيا	Africa	Continent	ASE
7CYPVEMII1	مصر	Egypt	Country	ASE
TVOB207PPH	شمال غربي الصين	Northwestern China	Geographical Region	RSE

Example of lines

(Ezzahra El Houbri *et al.*, DIB 2026)

- Identification of fake news using AI methods
- Integration of other sources of data (youtube data, radio data, etc.)

PADI-web team

Computer scientists



Mathieu Roche [2]
Senior Research Scientist



Sarah Valentin [2]
Research Scientist



Julien Rabatel
IT development

6 PhD students
> 10 Msc students
2 post-doc

Epidemiologists



Elena Arsevska [1]
Senior Research Scientist



Carlène Trevennec [1]
French Animal Health Epidemic Intelligence



Isabelle Pieretti [3]
French Plant Health Epidemic Intelligence

1 ASTRE – Animal · Santé Territoires · Risques · Écosystèmes

2 tetis – TERRITOIRE ENVIRONNEMENT TÉLÉDÉTECTION INFORMATION SPATIALE

3 PHIM

PADI-web publications (tool description)

PADI-web v1 (2018)

Web monitoring of emerging animal infectious diseases integrated in the French Animal Health Epidemic Intelligence System. Elena Arsevska, Sarah Valentin, Julien Rabatel, Jocelyn De Goër De Herve, Sylvain Falala, Renaud Lancelot, Mathieu Roche. 2018. *PLoS ONE* 13(8): e0199960. https://doi.org/10.1371/journal.pone.0199960

PADI-web v2 (2020)

PADI-web: A multilingual event-based surveillance system for monitoring animal infectious diseases. Sarah Valentin, Elena Arsevska, Sylvain Falala, Jocelyn de Goër De Herve, Renaud Lancelot, Alizé Mercier, Julien Rabatel, Mathieu Roche. 2020. *Computers and Electronics in Agriculture* 169: 105163. https://doi.org/10.1016/j.compag.2019.105163

PADI-web v3 (2021)

PADI-web 3.0: A new framework for extracting and disseminating fine-grained information from the news for animal disease surveillance. Sarah Valentin, Elena Arsevska, Julien Rabatel, Sylvain Falala, Alizé Mercier, Renaud Lancelot, Mathieu Roche. 2021. *One Health* 100357. https://doi.org/10.1016/j.onehlt.2021.100357

PADI-web Plant Health (2024)

PADI-web for Plant Health Surveillance. Mathieu Roche, Julien Rabatel, Carlène Trevennec, Isabelle Pieretti. 2024. *In Proc. of CAiSE'24 - 36th International Conference on Advanced Information Systems Engineering*, Springer, 148-156

THANK YOU FOR YOUR ATTENTION

Further questions and ideas on collaborations

padi-web@cirad.fr

https://www.padi-web-one-health.org