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## **Working with citizens to monitor tick-associated risk**

Jonas Durand, Irène Carravieri, Clémence Leyat, Costanza Puppo, Julien Marchand, Cyril Galley, Sandrine Capizzi, Gwenaël Vourc'h, Marie Préau, Pascale Frey-Klett, et al.

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# Working with citizens to monitor tick-associated risk

Lessons learned from the CiTIQUE project

**Jonas Durand**, Irene Carravieri, Clémence Leyat, Costanza Puppo, Julien Marchand, Cyril Galley, Sandrine Capizzi, Gwenaël Vourc'h, Marie Préau, Pascale Frey-Klett, Annick Brun-Jacob





# Poll questions on stereotypes about ticks

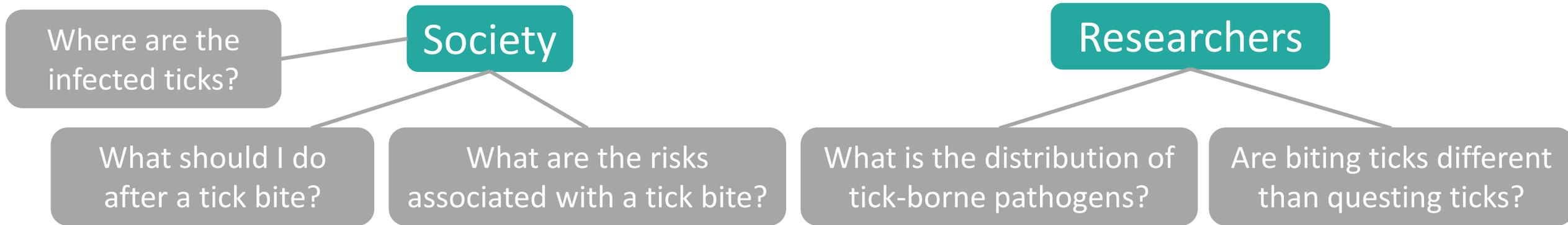
- Do ticks fall from trees to bite you?
  1. Yes
  2. No
  3. It's better than trees falling on me!
- Should you care about ticks when you're taking care of your garden?
  1. Yes
  2. No
  3. I can only dream to have a garden
- It's dangerous to let the mouthparts of the ticks in your skin after removing its body?
  1. Yes, because it can still infect you with a pathogen
  2. No, because the pathogens are localized in its body
  3. Yes, because the body will regrow from the mouth parts

# Ticks and tick-borne diseases

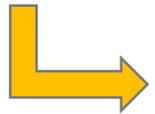
- In Europe, ticks are the most important vector for vector-borne diseases for both human and animal health.
- Tick-borne diseases can be caused by bacteria (e.g. Lyme disease), parasites (e.g. babesiosis), viruses (e.g. tick-borne encephalitis).
- There are around 900 different species of ticks in the world, adapted to different ecosystems.



# Ticks and citizen science



- Importance of Tick-borne Diseases (TBDs) for public health and society.

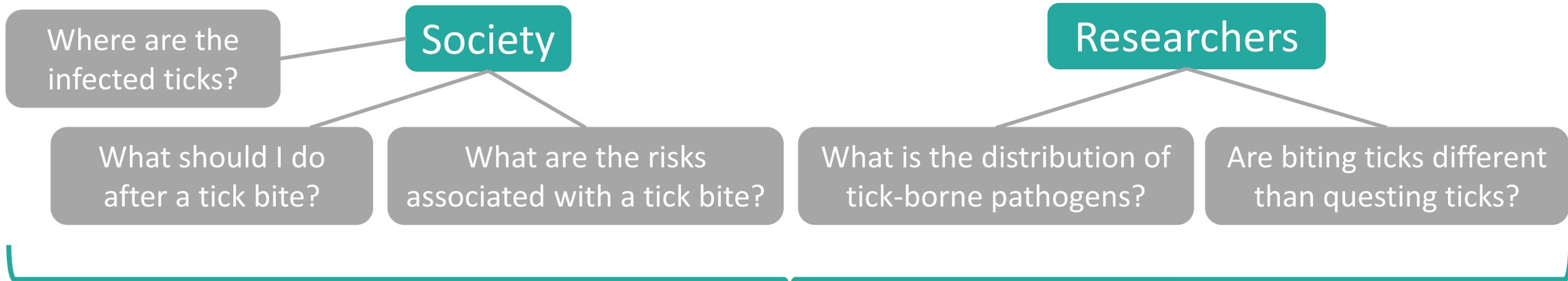


TBDs are a social problem that calls for the implication of citizens.

- Citizen science projects on ticks are increasing in the world.



# CiTIQUE: a citizen science program



Started in 2017

To improve our knowledge of ticks and tick-borne disease ecology in order to improve prevention



# CiTIQUE: How can citizens participate?

# Different levels of citizen engagement

Started in 2017

**Level 4**

*Co-construction of prevention messages with professionals*



**+ 100 trained professionals**

**Level 3**

*Analyzing the ticks during small internships*



**19 internships**  
**197 students-researchers**  
**77 citizen-researchers**

**Level 2**

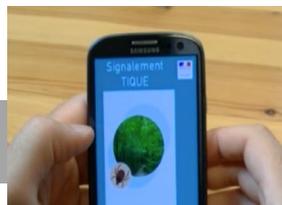
*Sending biting ticks*



**+ 50 000 biting ticks stored in the 1<sup>st</sup> biting tick bank in France**

**Level 1**

*Reporting tick bites*



- [www.citique.fr](http://www.citique.fr)
- App Signalement Tique
- Paper form



**+ 61 000 animal and human tick bite reports**

**Level 0**

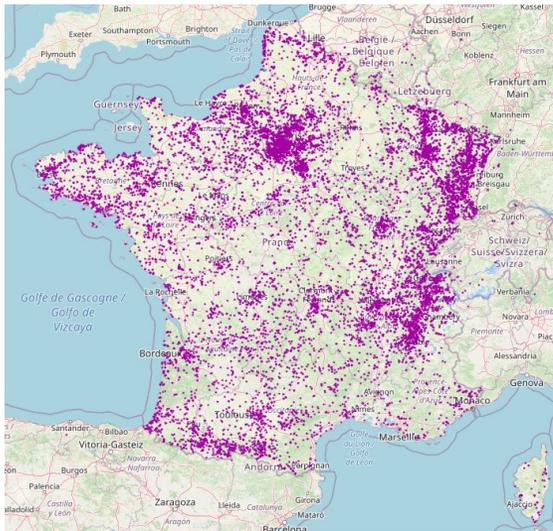
*Helping with the outreach of the program*  
*Adopting good methods to prevent tick bites*



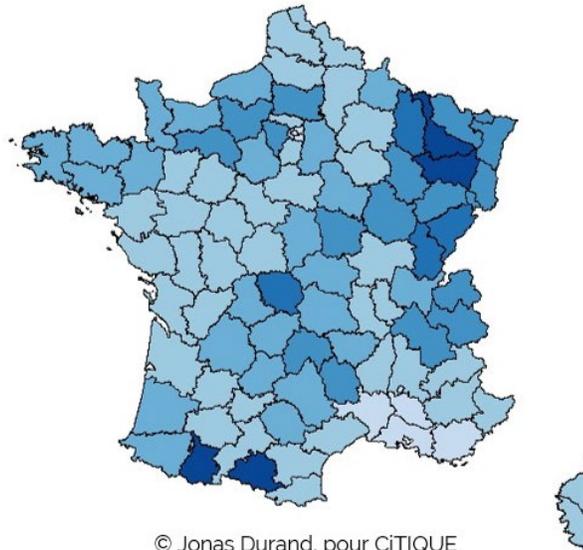
**+ 100 partners (Associations, professionals, companies, collectivities...)**

# Level 1 & 2: results from 2020

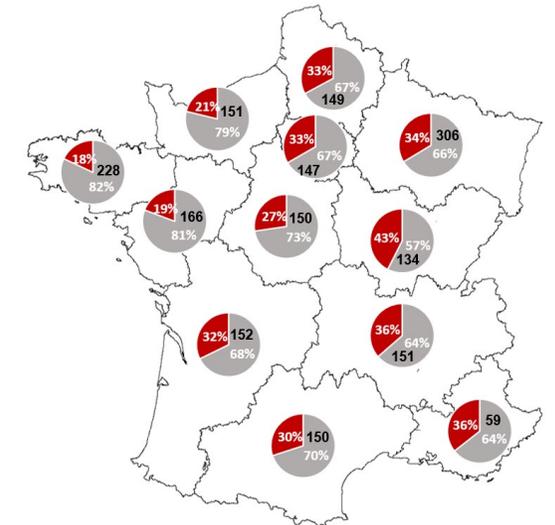
18 306 human and 5 300 animal tick bite reports in 2020



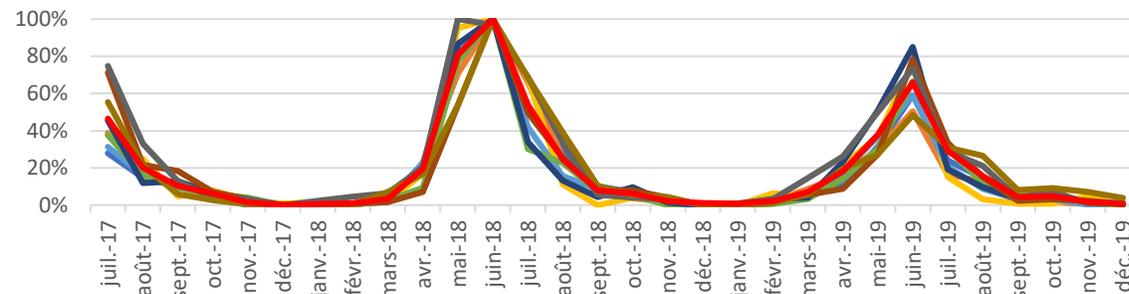
Location of tick bite reports



© Jonas Durand, pour CITIQUE  
Number of human tick bites per 100 000 inhabitants



Percentage of ticks infected by a pathogen



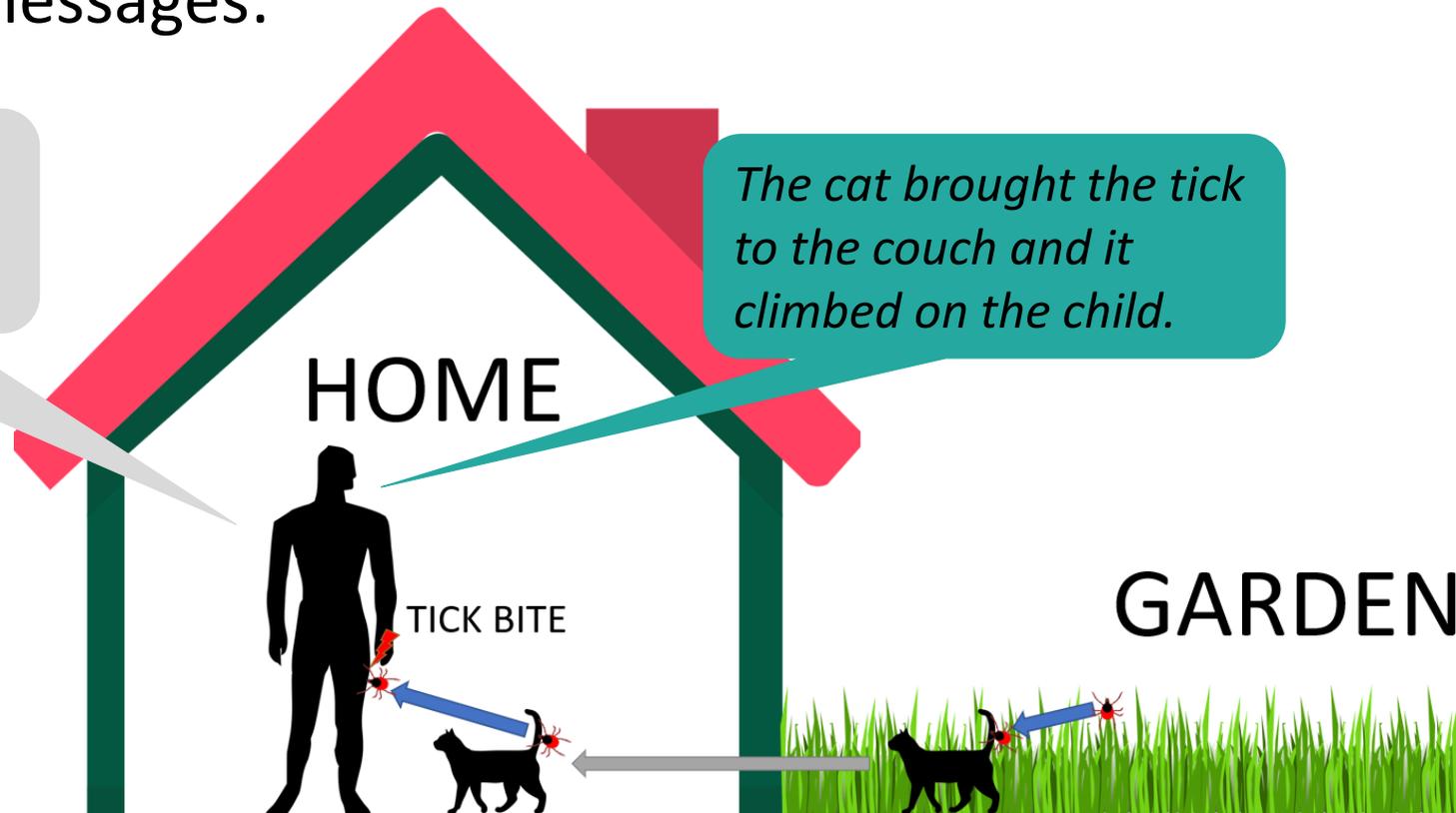
Dynamics of tick bite reports

# Level 1 & 2: Importance of citizens' contribution

- More than 2000 emails in two years, and 1-2 phone calls per day during peak tick activity.
- Examples of messages:

*Tick probably brought back by my cat who then slept against me.*

*The cat brought the tick to the couch and it climbed on the child.*



# Level 3: Tous Chercheurs internships

- Tous Chercheurs = Everyone's a researcher
- Tutored by scientists
- Example of a 2-days program:

## First Day

**Discovery and discussion** of the scientific method,  
ticks and tick-borne pathogens ecology  
Co-construction of a research question, hypothesis

**1st experiment:** morphological identification of  
ticks

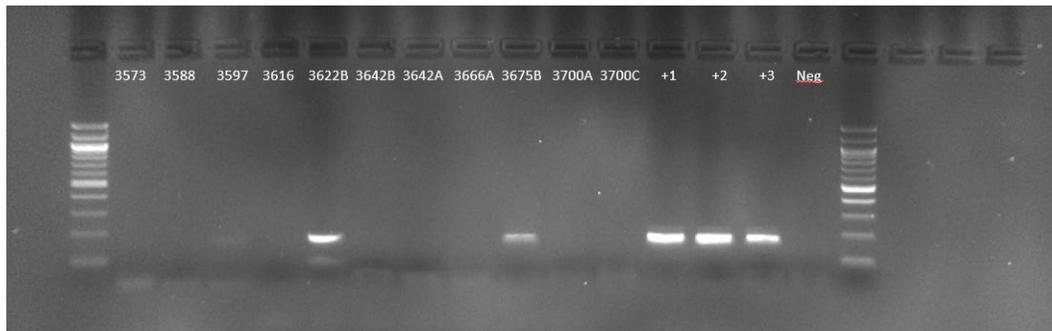
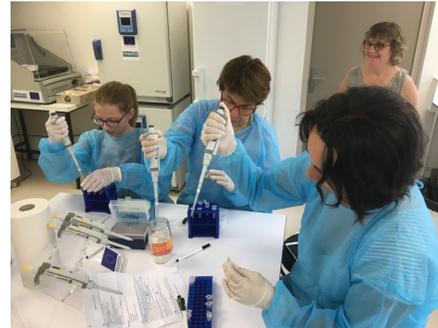
## Second Day

**2<sup>nd</sup> experiment:** PCR on tick DNA to look for  
*Borrelia* infection

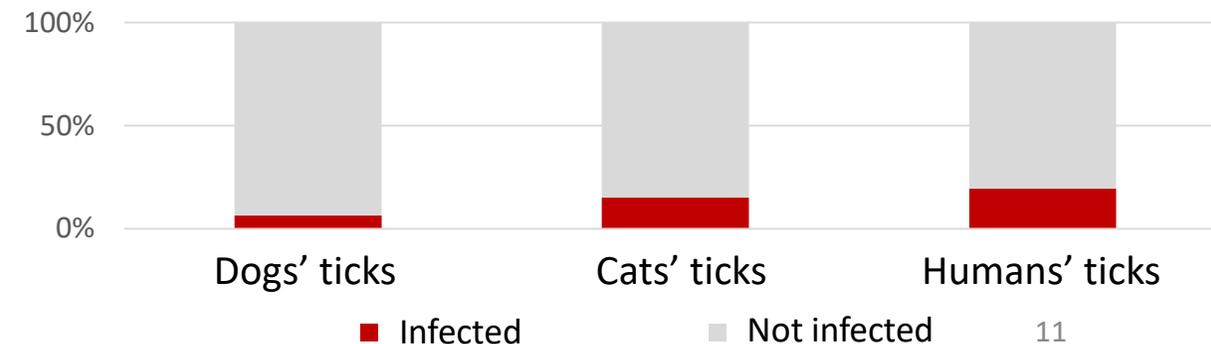
**Analysis and discussion** of the results

# Level 3: Tous Chercheurs internships

- Started in 2019
- Are pet-biting ticks representing a risk for human health?
- 19 internships (people from 11 to 73 yo)
- 502 analyzed ticks



Percentage of *Borrelia burgdorferi* sensu lato infected ticks

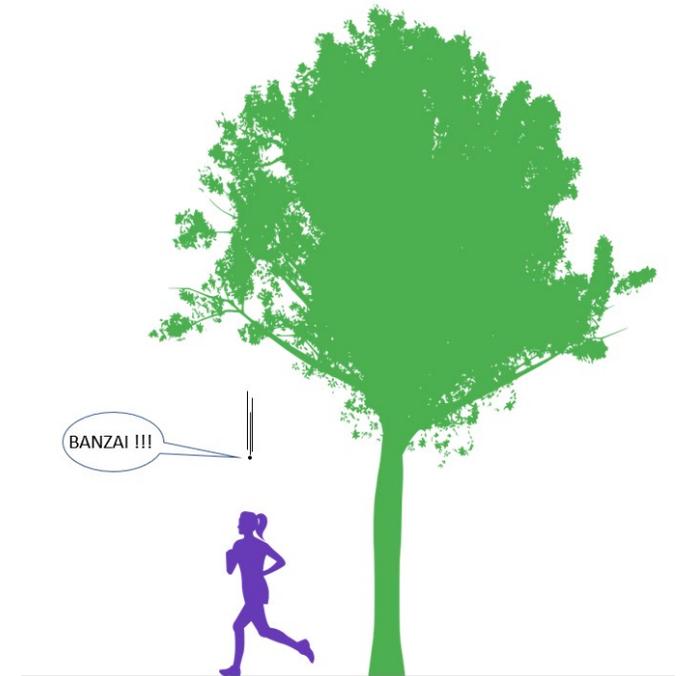


# Level 3: Impact of Tous Chercheurs internships

- Humanities and social science study by Leyat C., Puppo C. and Préau M. (2021)
- **Impact on prevention:** citizens more aware of the risks, more confident to prevent tick bites and to share their knowledge with others.
- **Impact on science representation:** renewal of confidence in scientists, new (or confirmed) attraction for science.
- **Impact on stereotypes:** 3 main stereotypes have been the most cited.

# Level 3: Impact of Tous Chercheurs internships

- Impact on stereotypes: Results from the polls
- Ticks do not fall from the trees to bite you
- Ticks can be found in private gardens
- If you left the tick mouth parts in your skin when you remove it, it's not dangerous as pathogens are contained in its body.





# How to make it work?

# CiTIQUE: a small team



Julien Marchand  
Cyril Galley  
and Irene Carravieri



Annick Brun-Jacob  
and Sandrine Capizzi  
Enseignants-chercheurs



Tom Beycart

Jonas DURAND

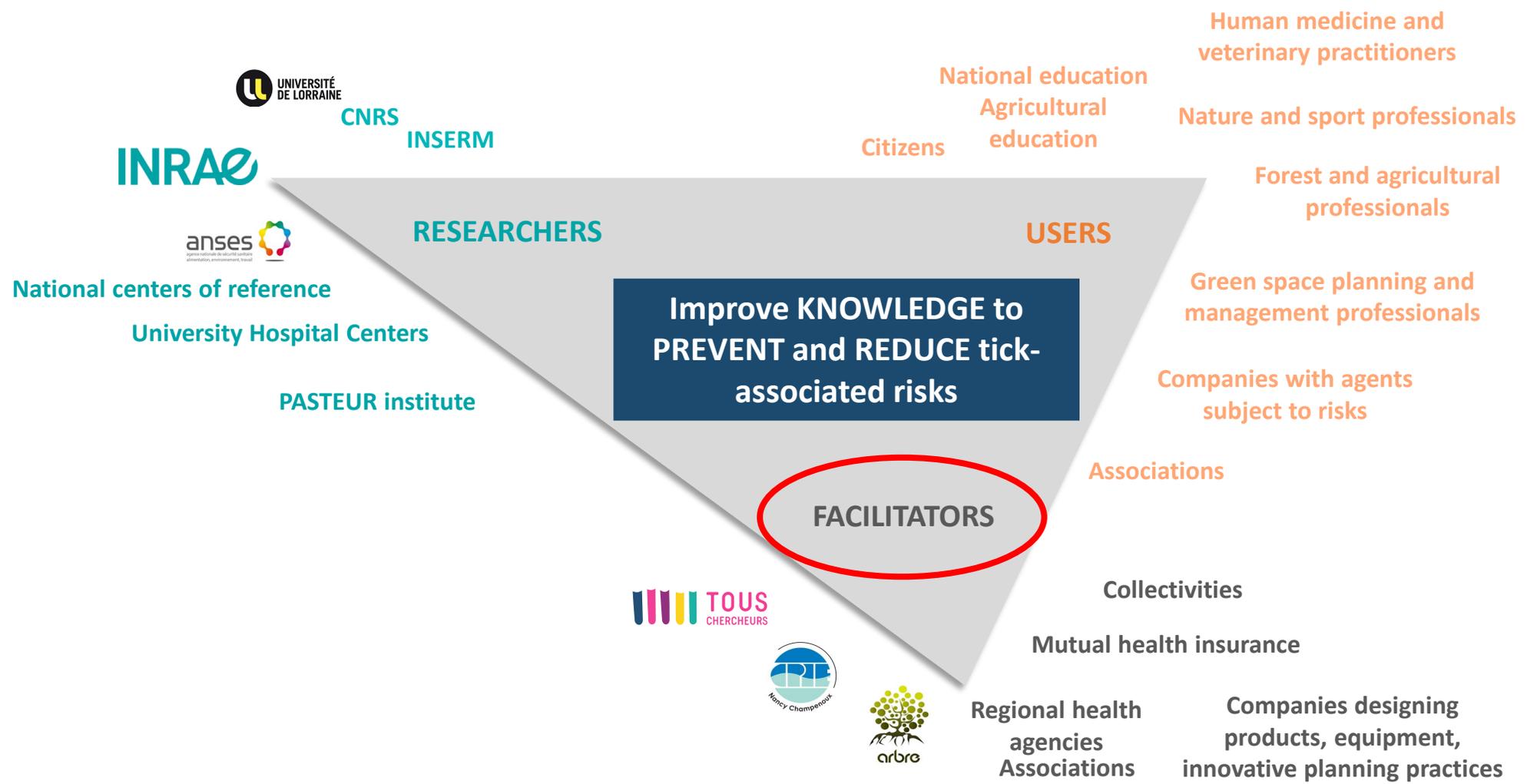


Gwenaël Vourc'h  
INRAE



Pascale Frey-Klett  
INRAE

# CiTIQUE: a multi-actors program focused on research





# Facilitators with different roles

- Linking researchers and users
- Fostering and maintaining engagement in the program
- Program's ambassadors
- Science communication
- Establishment of structures for participatory research (physical or virtual structures)



# Take-home messages

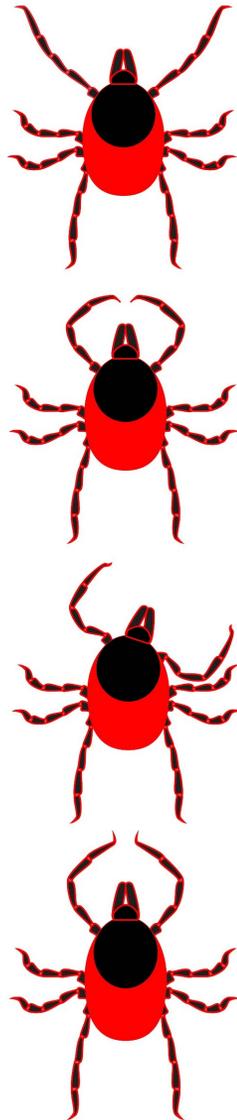
- Interaction with citizens is important: they do not have to only be data providers.
- Proposing different level of engagement for citizens.
- It is possible to make scientist-grade research with citizens in an open lab.
- You cannot do everything alone! Facilitators are important.

# Acknowledgements

- All the citizens participating in CiTIQUE
- EWDA Network Meeting organizers
- Our financers:



Thank you for your attention!



Bonus : diapos non utilisées

# What is a classical citizen science program

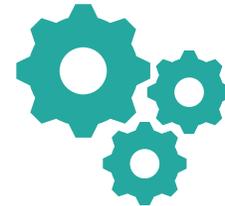
Scientists ask a question



Citizens help as data gatherer



Scientists analyze the data



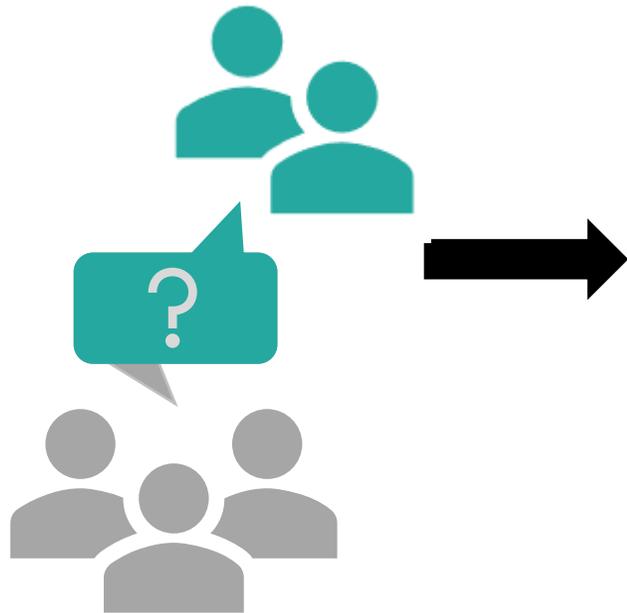
Scientists find the answer



Contributory citizen science

# CiTIQUE: a citizen science program with a participatory approach

Scientists and citizen  
co-construct a question



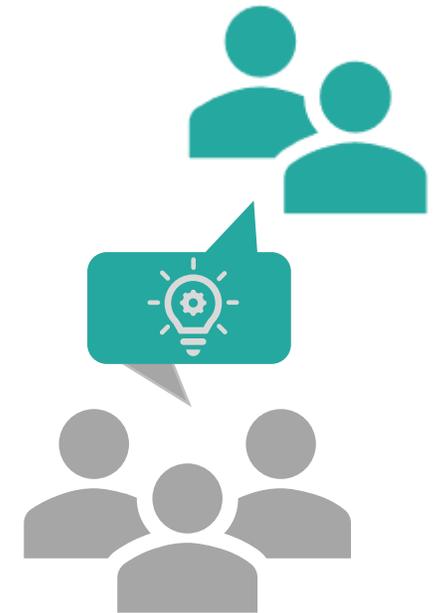
Citizens help as  
data gatherer



Scientists and citizens  
analyze the data



Scientists and citizens  
find the answer



Participatory citizen science