

Une seule santé et écologie du paysage. Leçons d'une pandémie.

Une seule santé au milieu du gué... ☹️

- Rappel/discussion sur le concept « Une seule santé »
- Quelques exemples
- Quel chemin encore à parcourir ?



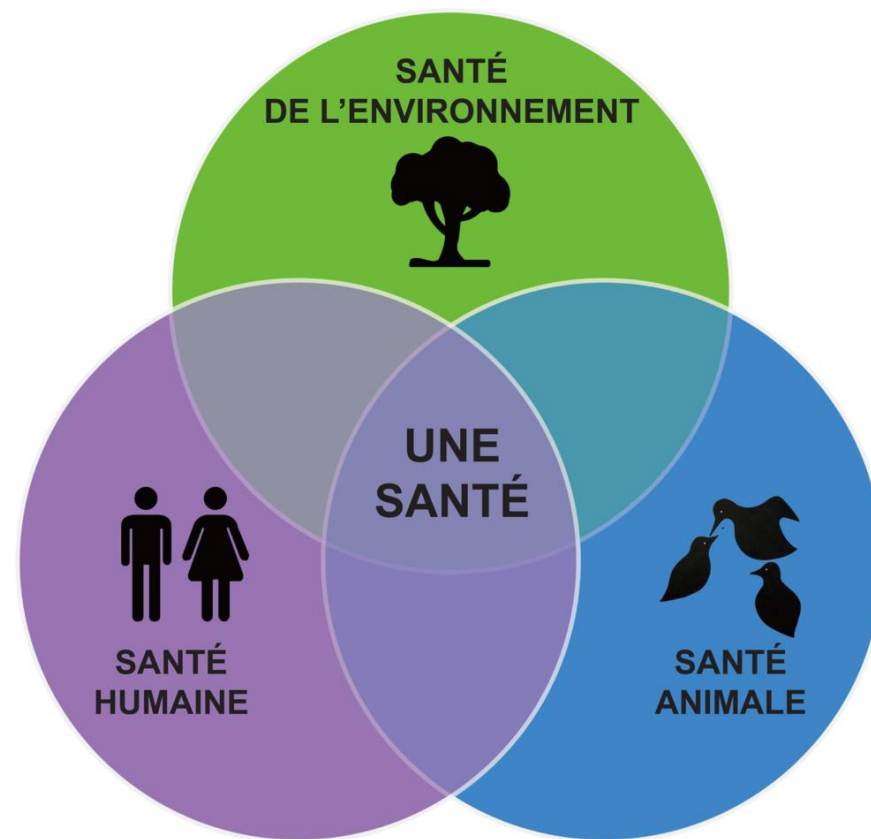
Bruegel l'ancien, vers 1562, « Le triomphe de la mort »

Définition



L'approche «Un monde, une santé» s'applique à la conception et la mise en œuvre de programmes, de politiques, législations et travaux de recherche pour lesquels plusieurs secteurs communiquent et collaborent en vue d'améliorer les résultats en matière de santé publique.

De nombreux professionnels aux compétences multiples, actifs dans différents secteurs tels que la santé publique, la santé animale, la santé végétale et l'environnement, doivent unir leurs forces à l'appui des approches «Un monde, une santé».



Le cas de la peste

Science Photo Library



Overview

Symptoms

Treatment

Plague is an infectious disease caused by *Yersinia pestis* bacteria, usually found in small mammals and their fleas. The disease is transmitted between animals via their fleas and, as it is a zoonotic bacterium, it can also transmit from animals to humans.

Humans can be contaminated by the bite of infected fleas, through direct contact with infected materials, or by inhalation.

Plague can be a very severe disease in people, particularly in its septicemic and pneumonic forms, with a case-fatality ratio of 30% - 100% if left untreated.

Although plague has been responsible for widespread pandemics throughout history, including the so-called Black Death that caused over 50 million deaths in Europe during the fourteenth century, today it can be easily treated with antibiotics and the use of standard preventative measures.

Plague is found on all continents except Oceania but most human cases since the 1990s have occurred in Africa. Democratic Republic of Congo, Madagascar and Peru are the three most endemic countries.



World Health
Organization

Le cas de la peste



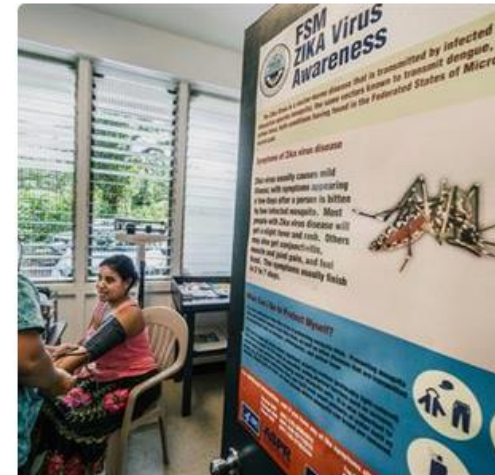
6 October 2017 | News release

WHO provides 1.2 million antibiotics to fight plague in Madagascar



7 November 2017

Encounters with plague: tracing and preventing illness



Streamlining operational R&D response during outbreaks



Developing norms and standards in the epidemic context

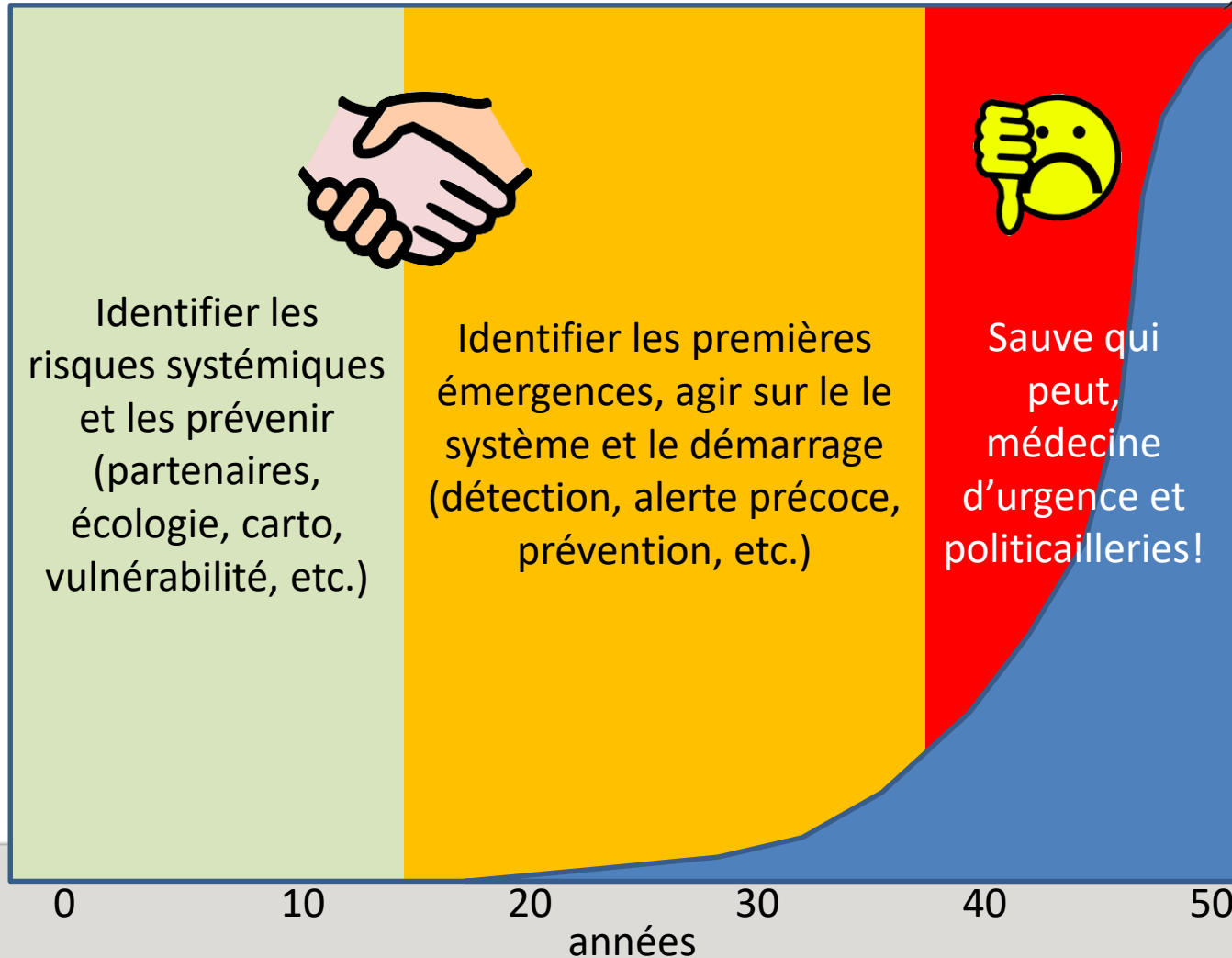


World Health Organization

Le cas de la peste



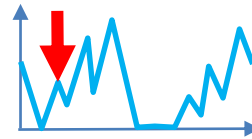
Epidémie



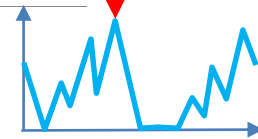
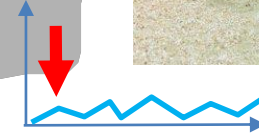
Transmission de la peste au Kurdistan



Meriones vinogradovi
habitat: cultures



Meriones persicus
habitat: zones
caillouteuses



M. vinogradovi



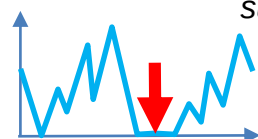
puces

M. persicus

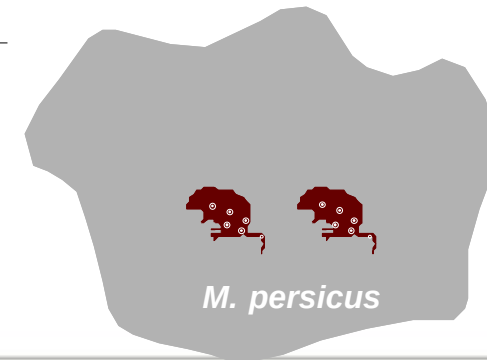


majorité des individus
éliminés

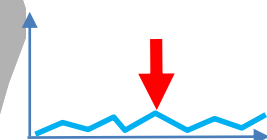
rare
survivants



M. vinogradovi



M. persicus



Eventuellement
transmission aux
hommes par les puces

Pandémie

Cycle
péridomestique
(rat, etc)

Golvan et Rioux, 1961, 1963
in Combes 1995

Golvan, Y.J., Rioux, J.A., 1963. La peste,
facteur de régulation des populations de
mériens au Kurdistan iranien. Revue
d'écologie - Terre et Vie 1, 3-34.
Golvan, Y.J., Rioux, J.A., 1961. Ecologie
des mériens du Kurdistan iranien.
Relation avec l'épidémiologie de la peste
rurale. Annales de Parasitologie Humaine
et Comparée 36, 449-558.

Les temps de l'action...



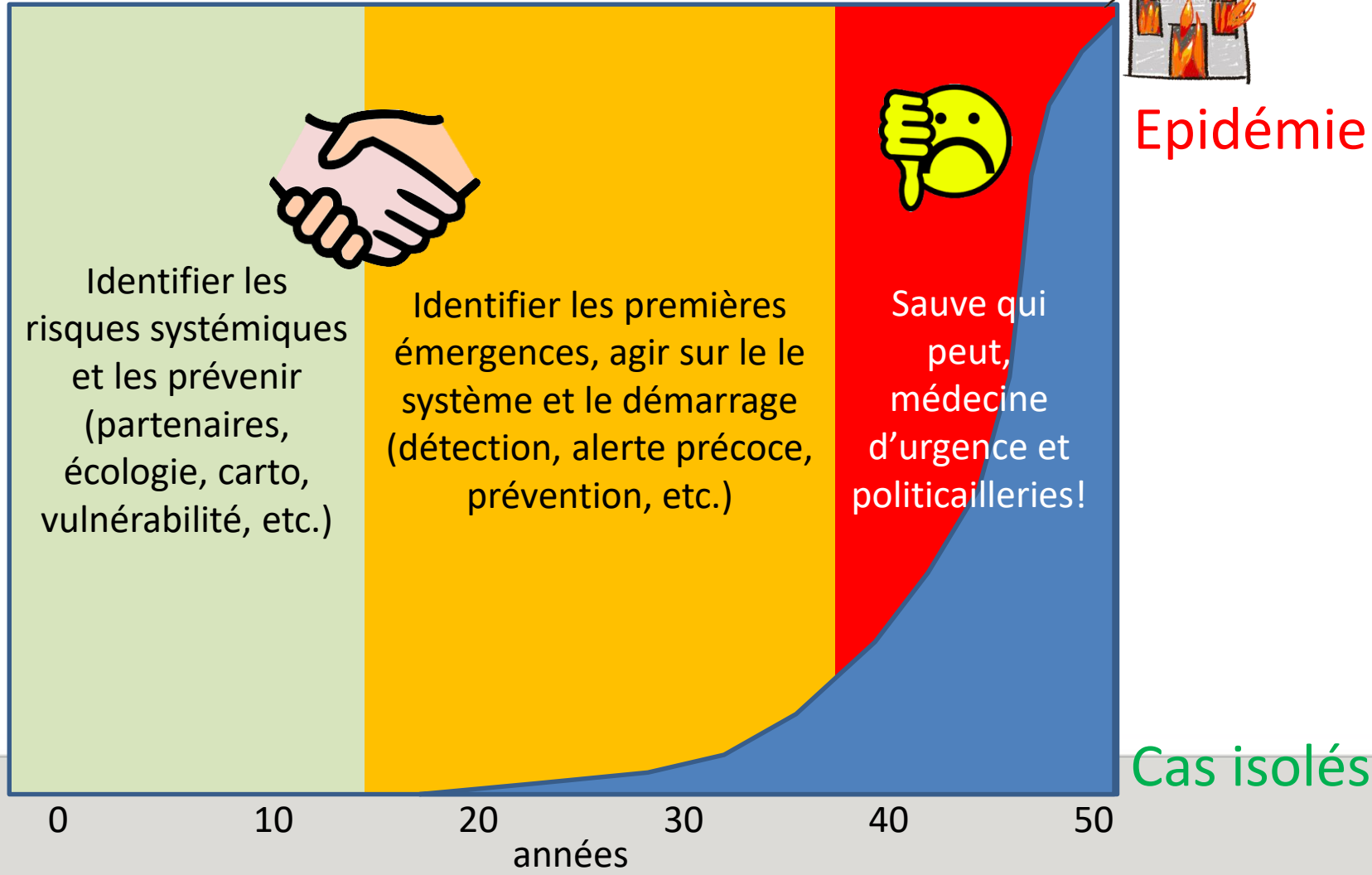
Didier Bompangue



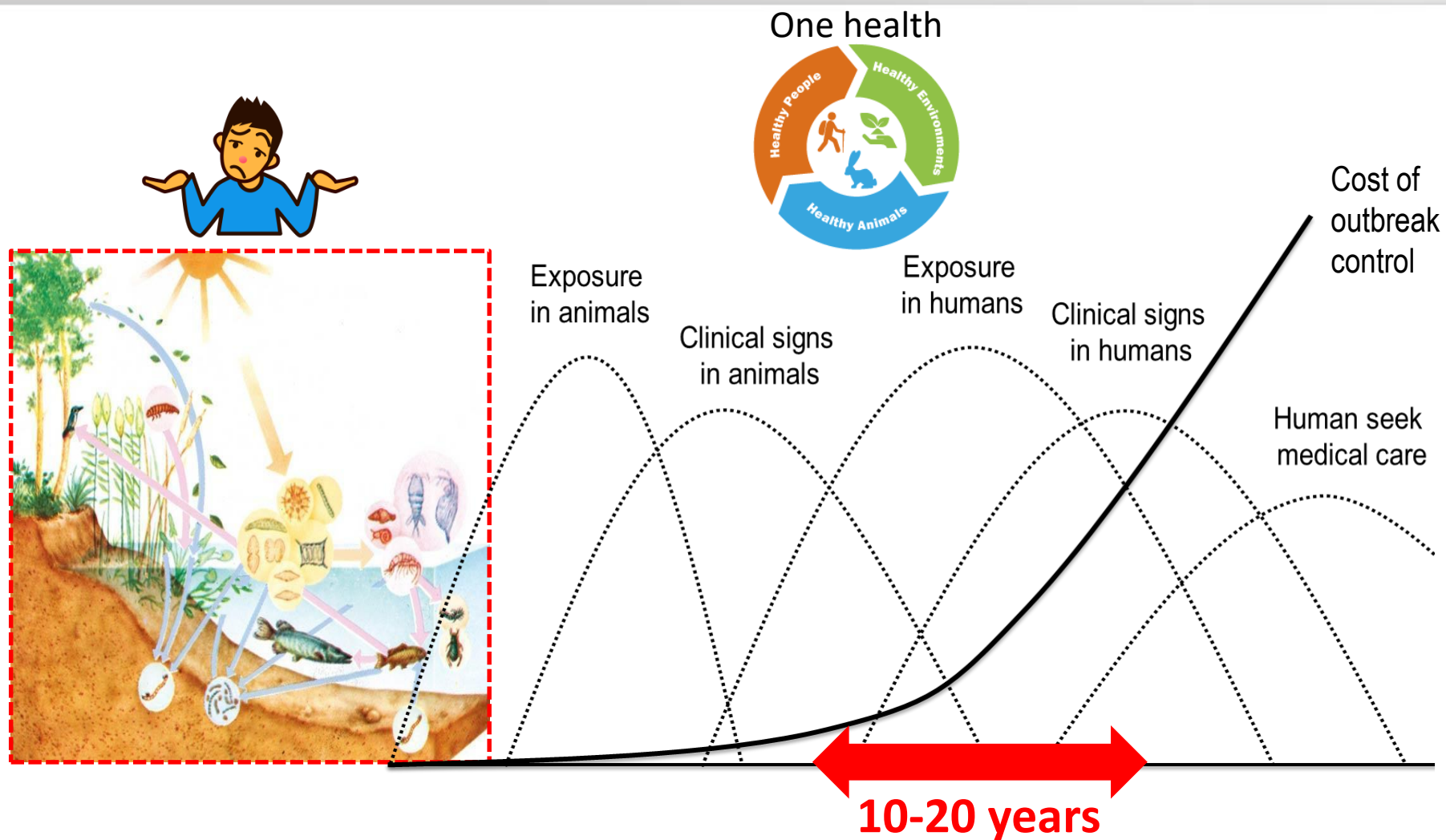
Master
ECOM-ALGER &
ECOGM



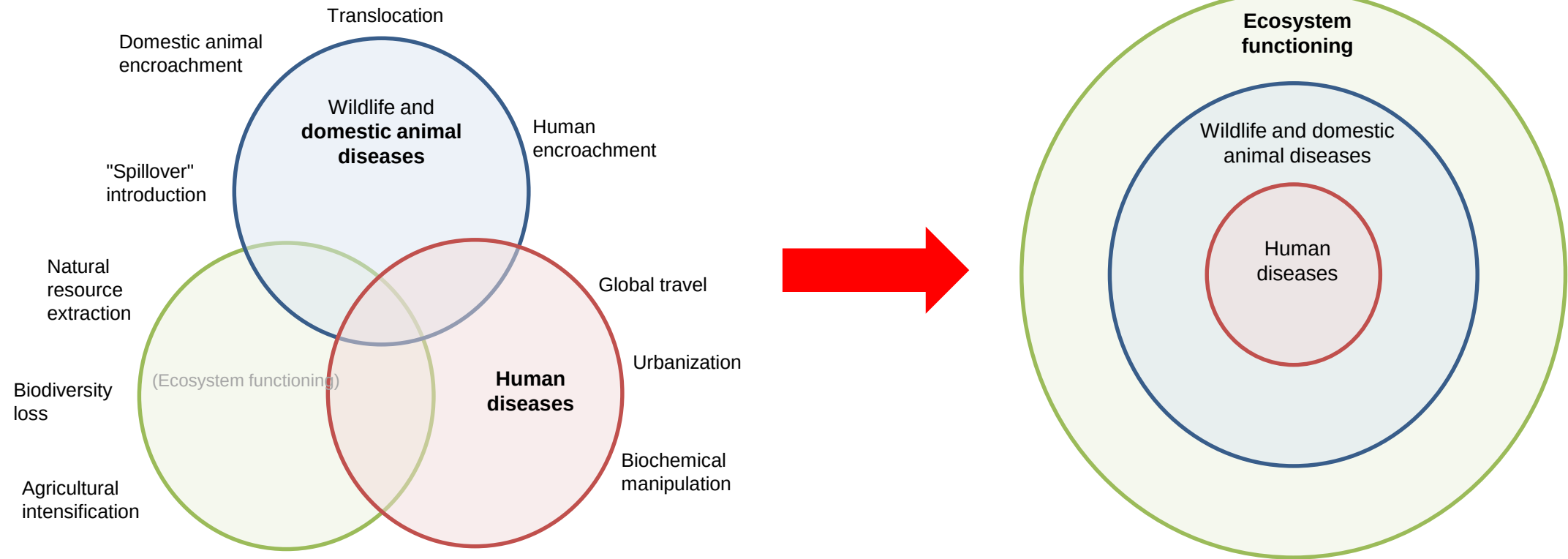
World Health
Organization



Où sont les écologues et les anthropologues dans vos études ?



Où sont les écologues et les anthropologues dans vos études ?



Une seule santé, vraiment ?

journal of **global** health

J Glob Health. 2016 Dec; 6(2): 020703.

Published online 2016 Nov 9. doi: [10.7189/jogh.06.020703](https://doi.org/10.7189/jogh.06.020703)

PMCID: PMC5112007

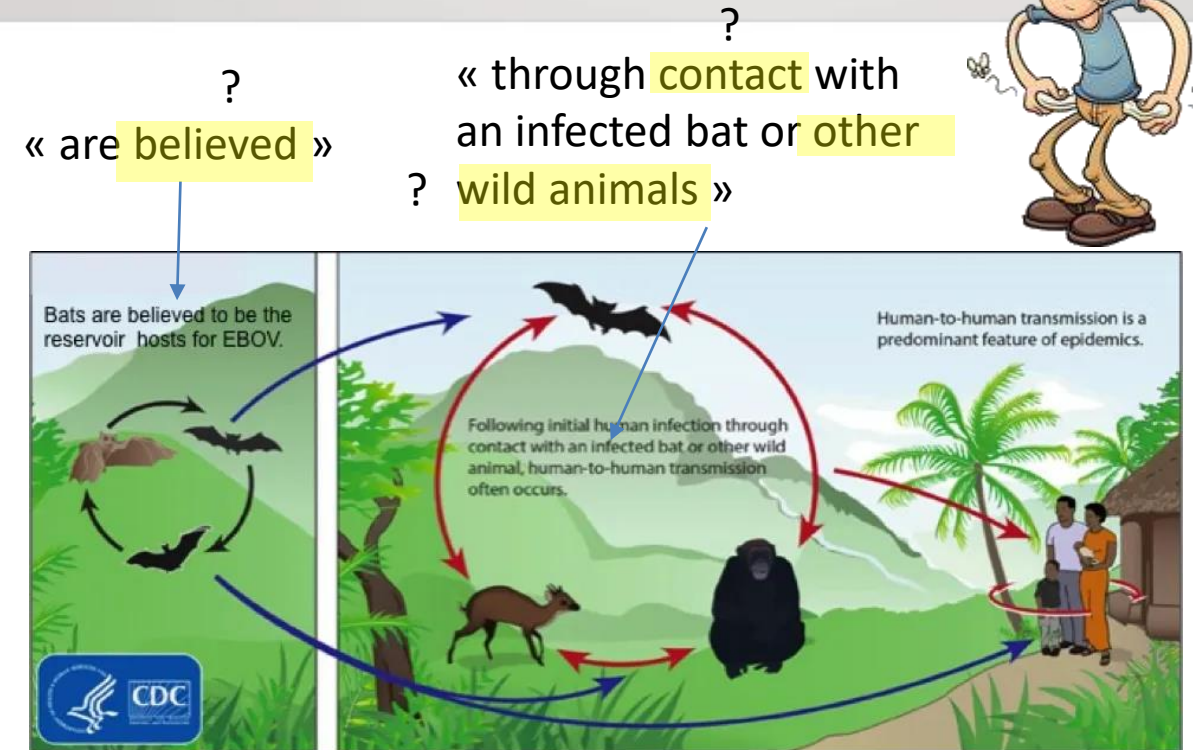
PMID: [27909582](https://pubmed.ncbi.nlm.nih.gov/27909582/)

Ebola research funding: a systematic analysis, 1997–2015

Joseph RA Fitchett,¹ Amos Lichtman,¹ Damilola T Soyode,¹ Ariel Low,¹ Jimena Villar de Onis,¹ Michael G Head,² and Rifat Atun¹

Funding for Ebola and Marburg virus research in 1997 to 2015 amounted to **US\$ 1.035 billion**

- ✓ 61.3% awarded for **vaccine** research
- ✓ 29.2% for **novel therapeutics** research such as antivirals and convalescent **blood products**
- ✓ 9.5% for **diagnostics** research.



Combien de personnes travaillent actuellement sur les terrains, « **au bout de la piste** » sur:

- La dynamique des populations d'hôtes potentiels ?
- Les conditions réelles de transmission et d'exposition (quand, où, comment) (écologie x anthropologie) ?

Quels financements ? 0 \$?

Une seule santé, vraiment ?

journal of **global** health

[J Glob Health](#). 2016 Dec; 6(2): 020703.

Published online 2016 Nov 9. doi: [10.7189/jogh.06.020703](#)

PMCID: PMC5112007

PMID: [27909582](#)

Ebola research funding: a systematic analysis, 1997–2015

[Joseph RA Fitchett](#),¹ [Amos Lichtman](#),¹ [Damilola T Soyode](#),¹ [Ariel Low](#),¹ [Jimena Villar de Onis](#),¹ [Michael G Head](#),² & [Rifat Atun](#)¹

Funding for Ebola and Marburg virus research in 1997 to 2015 amounted to **US\$ 1.035 billion**

- ✓ 61.3% awarded for vaccine research
- ✓ 29.2% for novel therapeutics research such as antivirals and convalescent blood products
- ✓ 9.5% for diagnostics research.

« are believed »



« through contact with an infected bat or other wild animals »



[The Scientist](#) APRIL 28, 2020

NIH Cancels Funding for Bat Coronavirus Research Project

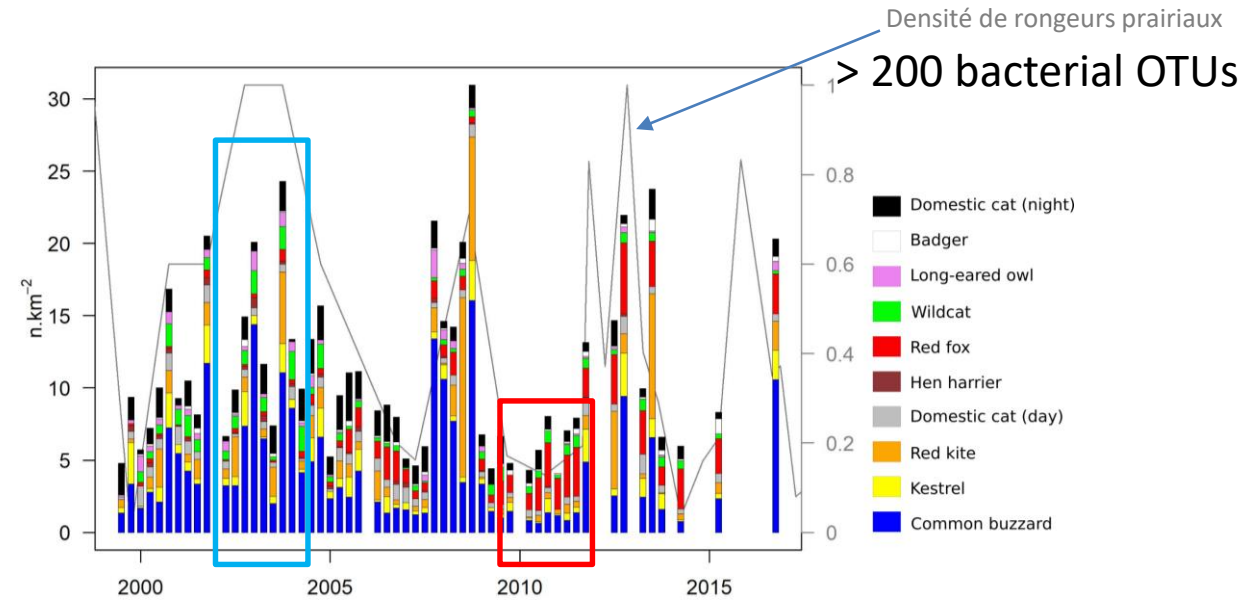
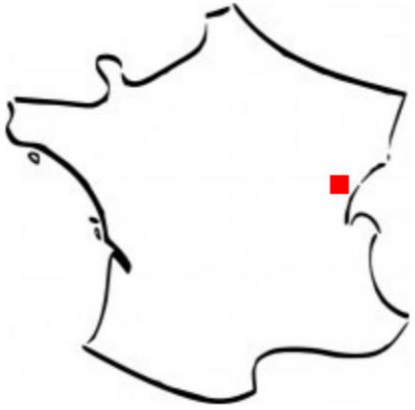


Combien de personnes travaillent actuellement sur les terrains sur:

- La dynamique des populations d'hôtes potentiels ?
- Les conditions réelles de transmission et d'exposition (quand, où, comment) (écologie x anthropologie) ?

Quels financements ? Doc introuvable... 0 \$?

Dynamique des populations: rappel



<https://zaaj.univ-fcomte.fr/spip.php?article118>

Giraudoux et al. 2020, *Ecology and Evolution*

Villette et al. 2020, *Scientific Reports*

Dynamique des populations: rappel

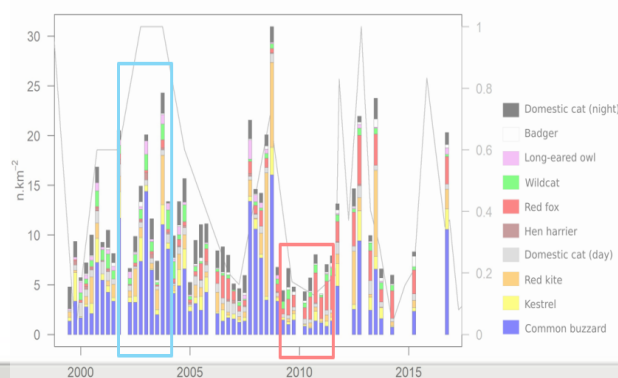


Decoding the RNA viromes in rodent lungs provides new insight into the origin and evolutionary patterns of rodent-borne pathogens in Mainland Southeast Asia

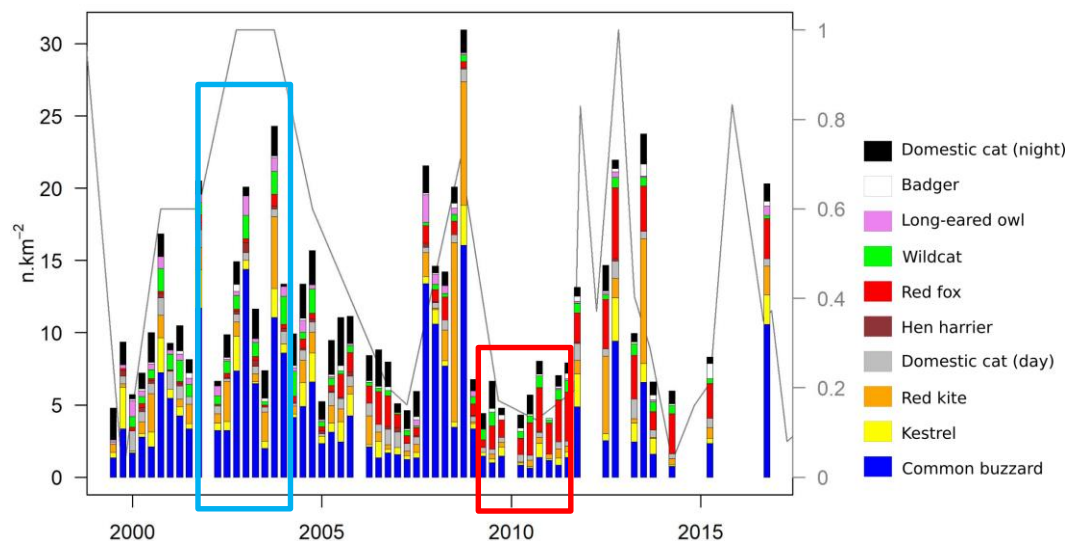
[Zhiqiang Wu](#) ✉, [Yelin Han](#), [Bo Liu](#), [Hongying Li](#), [Guangjian Zhu](#), [Alice Latinne](#), [Jie Dong](#), [Lilin Sun](#), [Haoxiang Su](#), [Liguo Liu](#), [Jiang Du](#), [Siye Zhou](#), [Mingxing Chen](#), [Anamika Kritiyakan](#), [Sathaporn Jittapalapong](#), [Kittipong Chaisiri](#), [Phillipe Buchy](#), [Veasna Duong](#), [Jian Yang](#), [Jinyong Jiang](#), [Xiang Xu](#), [Hongning Zhou](#), [Fan Yang](#), [David M. Irwin](#), [Serge Morand](#), [Peter Daszak](#), [Jianwei Wang](#) & [Qi Jin](#) ✉ [-Show fewer authors](#)

[Microbiome](#) 9, Article number: 18 (2021) | [Cite this article](#)

3284 rodents and insectivores (Thaïlande, Laos, Cambodge)
495 579 virus (96 familles), 7 610 virus à ARN non connus



Dynamique des populations: rappel



Quel chemin devant vous ?

Identifier les risques systémiques et les prévenir

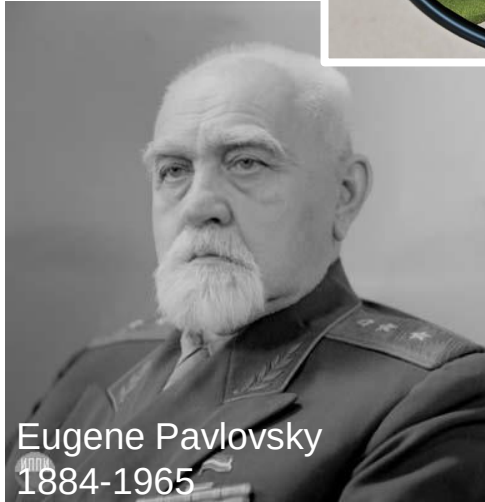
Identifier:

- ✓ Les espèces hôtes et vecteurs
- ✓ Les compétiteurs, prédateurs, etc.
- ✓ Le « portage »
- ✓ Les distributions spatiales et leurs co-variations
- ✓ Les dynamiques temporelles
- ✓ Les conditions d'exposition des personnes

- ☐ Taxonomie
- ☐ Dynamique des populations
- ☐ Écologie des communautés
- ☐ Monitoring long-terme
- ☐ Écologie du paysage
- ☐ Anthropologie
- ☐ Etc.

Où sont les apprenants ?
Les chercheurs dont ceux
« au bout de la piste » ?
Les collaborations inter-
disciplinaires ? Les
infrastructures de
recherche ?

Quel chemin devant vous ?



Eugene Pavlovsky
1884-1965

« Landscape epidemiology »

Pavlovsky, E.N. 1966. *The natural nidity of transmissible disease* (N.D. Levine, ed.). University of Illinois Press, Urbana.



Jean-Antoine Rioux
1925-2017

« Ecoépidémiologie »



Unhealthy Landscapes: Policy Recommendations on Land Use Change and Infectious Disease Emergence

Patz et al., 2004



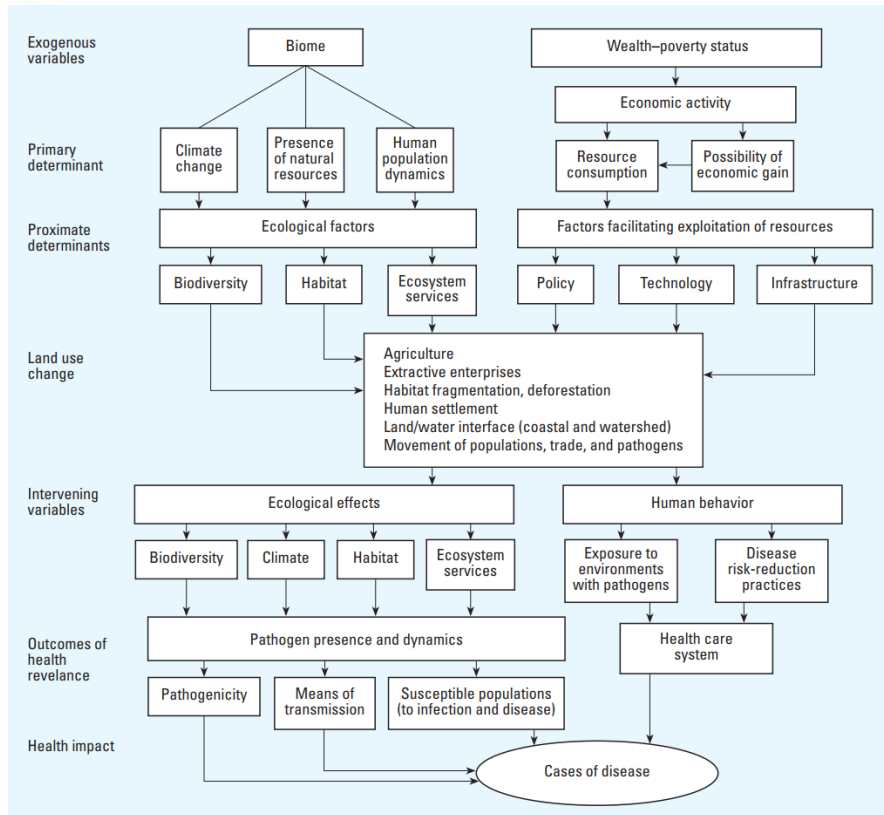
INTERNATIONAL JOURNAL
OF HEALTH GEOGRAPHICS

Lambin et al., 2010

Pathogenic landscapes: Interactions between land, people, disease vectors, and their animal hosts

Eric F. Lambin^{1,2*}, Annelise Tran^{3,4,5}, Sophie O. Vanwambeke¹, Catherine Linard⁶, Valérie Soti³

Quel chemin devant vous ?



Unhealthy Landscapes: Policy Recommendations on Land Use Change and Infectious Disease Emergence

Patz et al., 2004

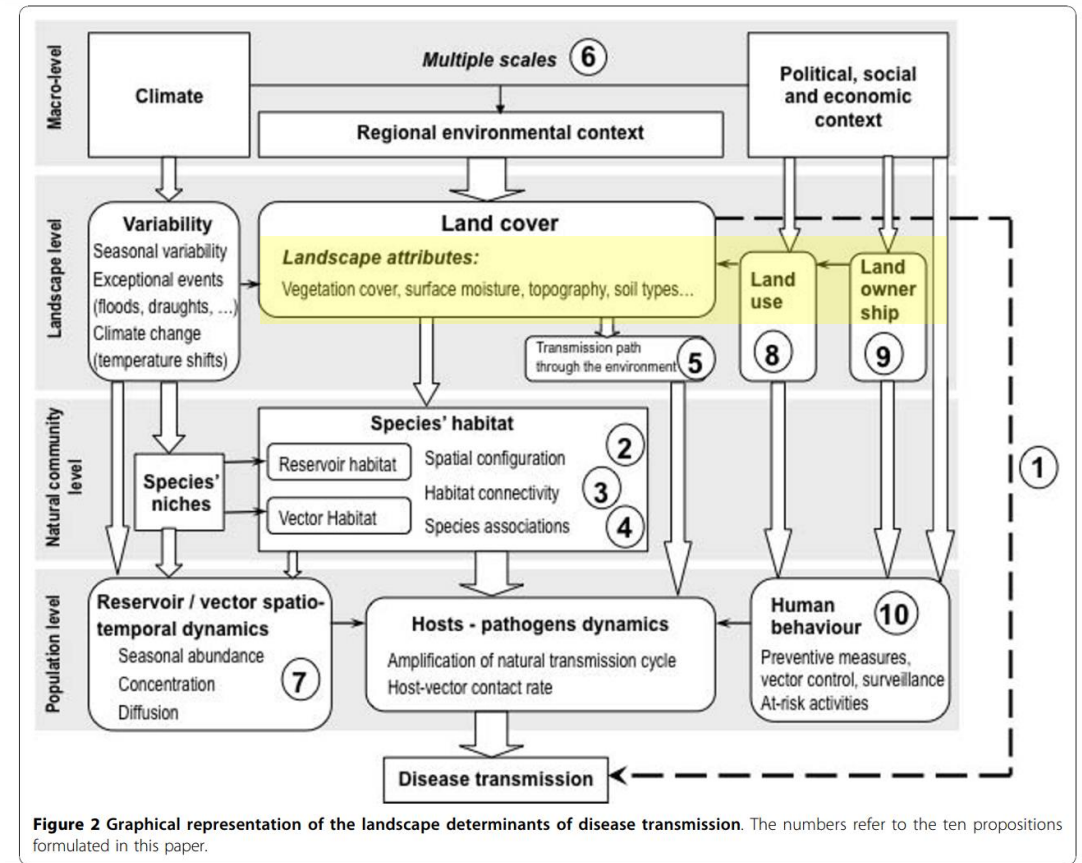
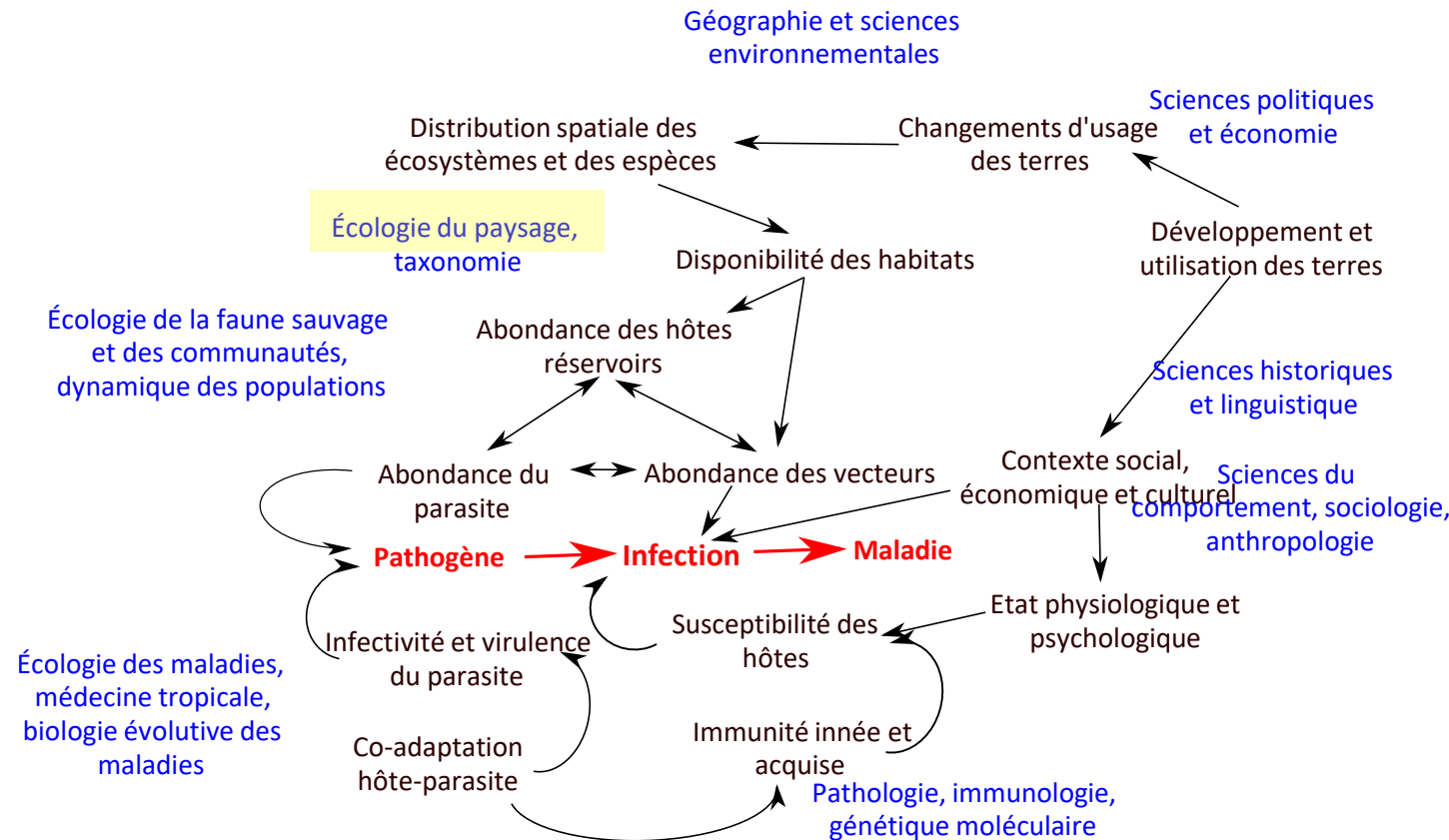
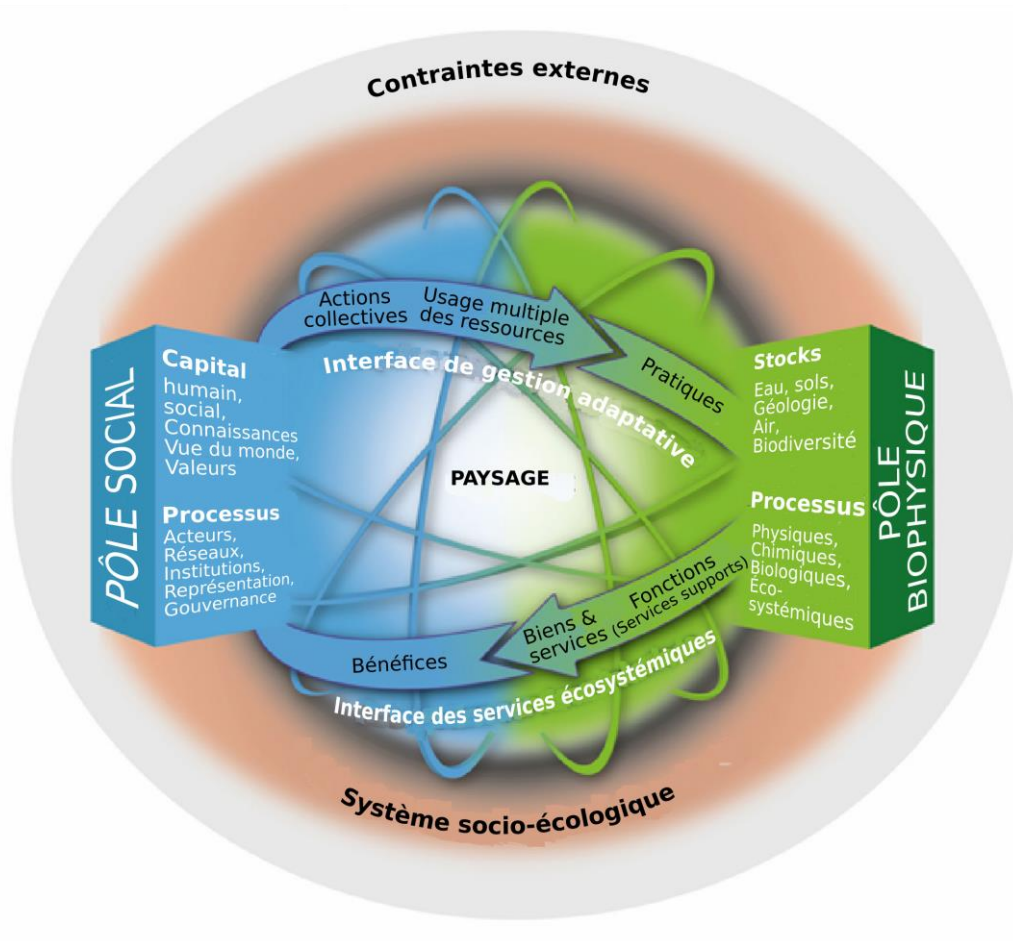


Figure 2 Graphical representation of the landscape determinants of disease transmission. The numbers refer to the ten propositions formulated in this paper.



Pathogenic landscapes: Interactions between land, people, disease vectors, and their animal hosts

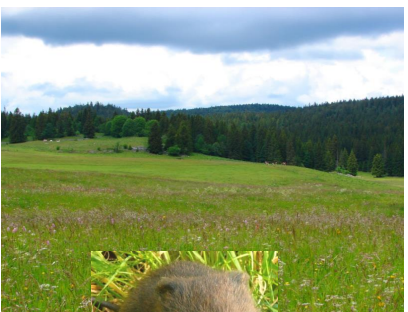


<https://anafrimed.net/editorial-pour-une-medecine-globale-preventive-et-ecologique>

Exemple 1 : peste agricole

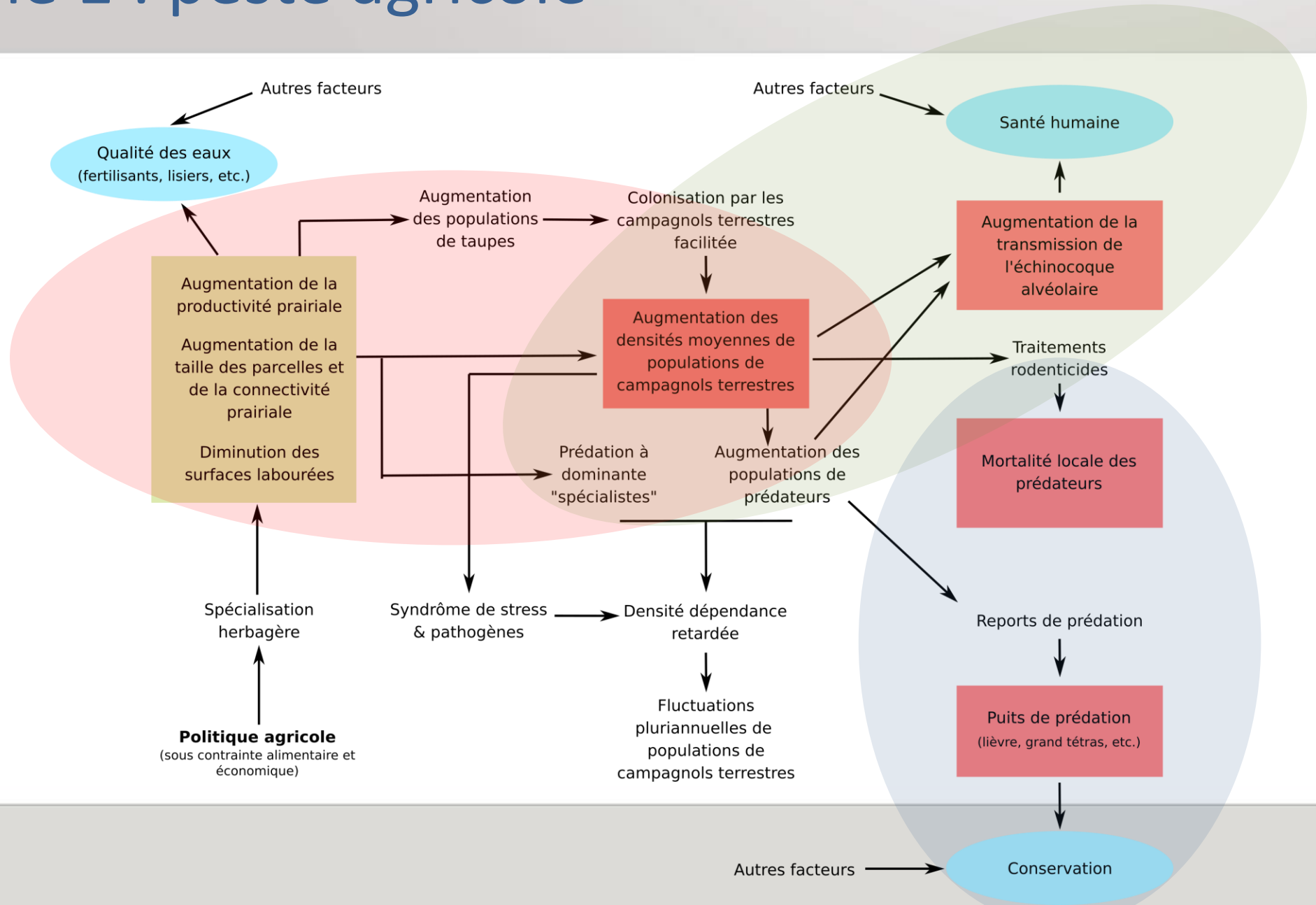


Exemple 1 : peste agricole

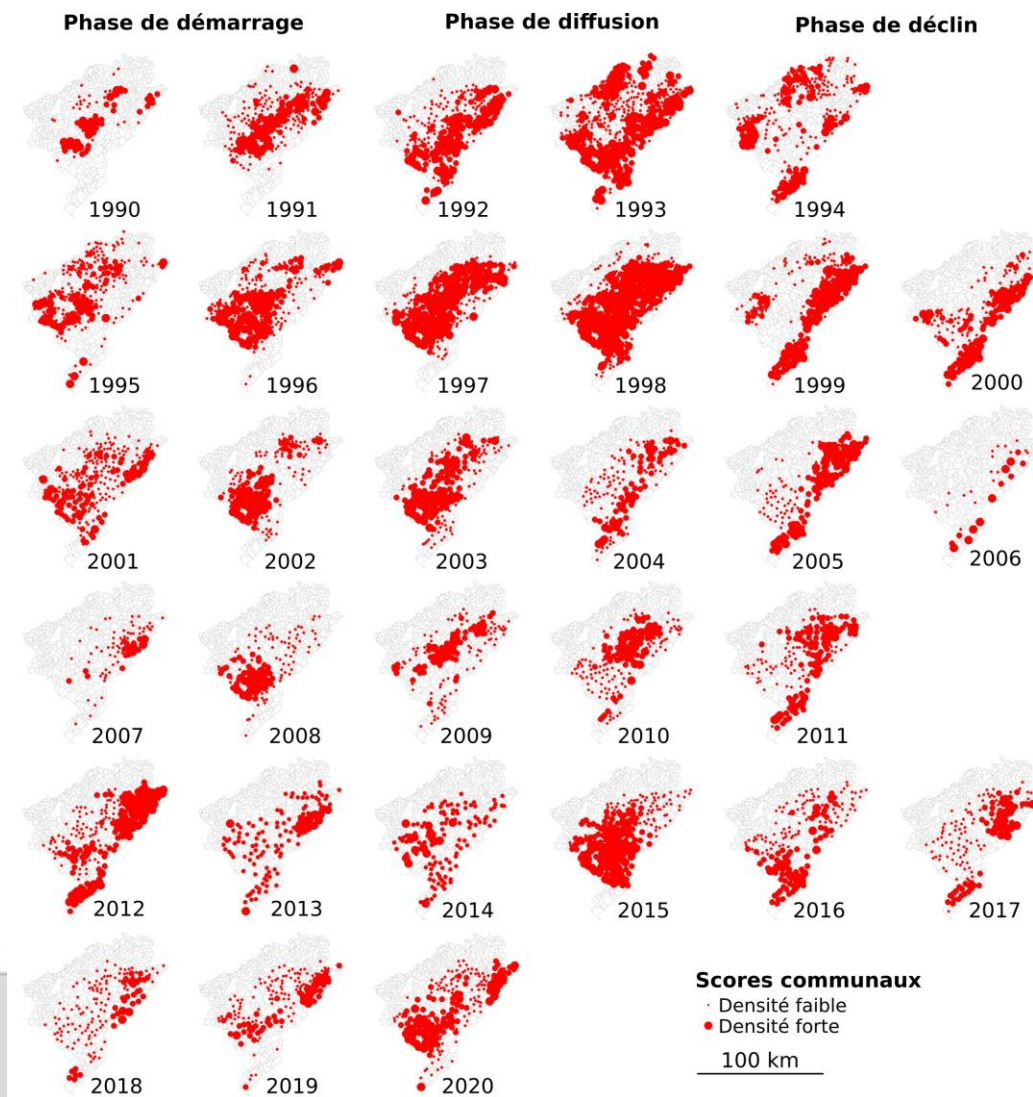


Augmentation des
densités moyennes de
populations de
campagnols terrestres

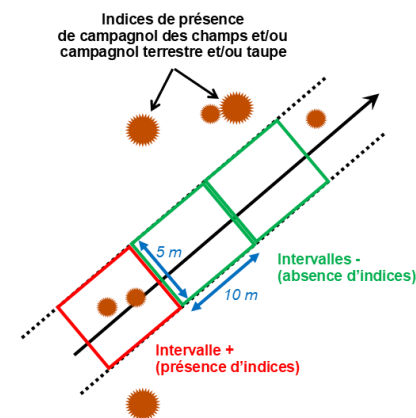
Exemple 1 : peste agricole



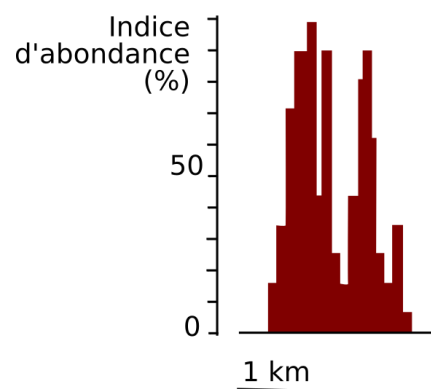
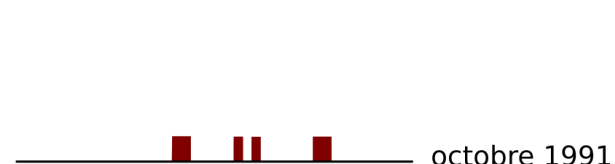
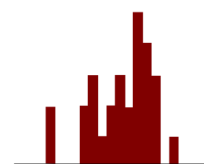
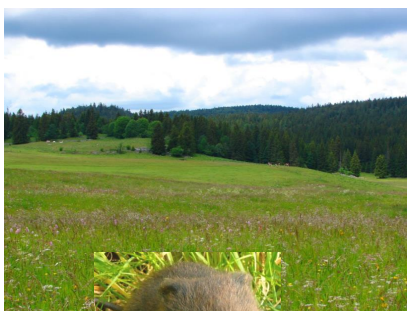
23 Exemple 1 : peste agricole



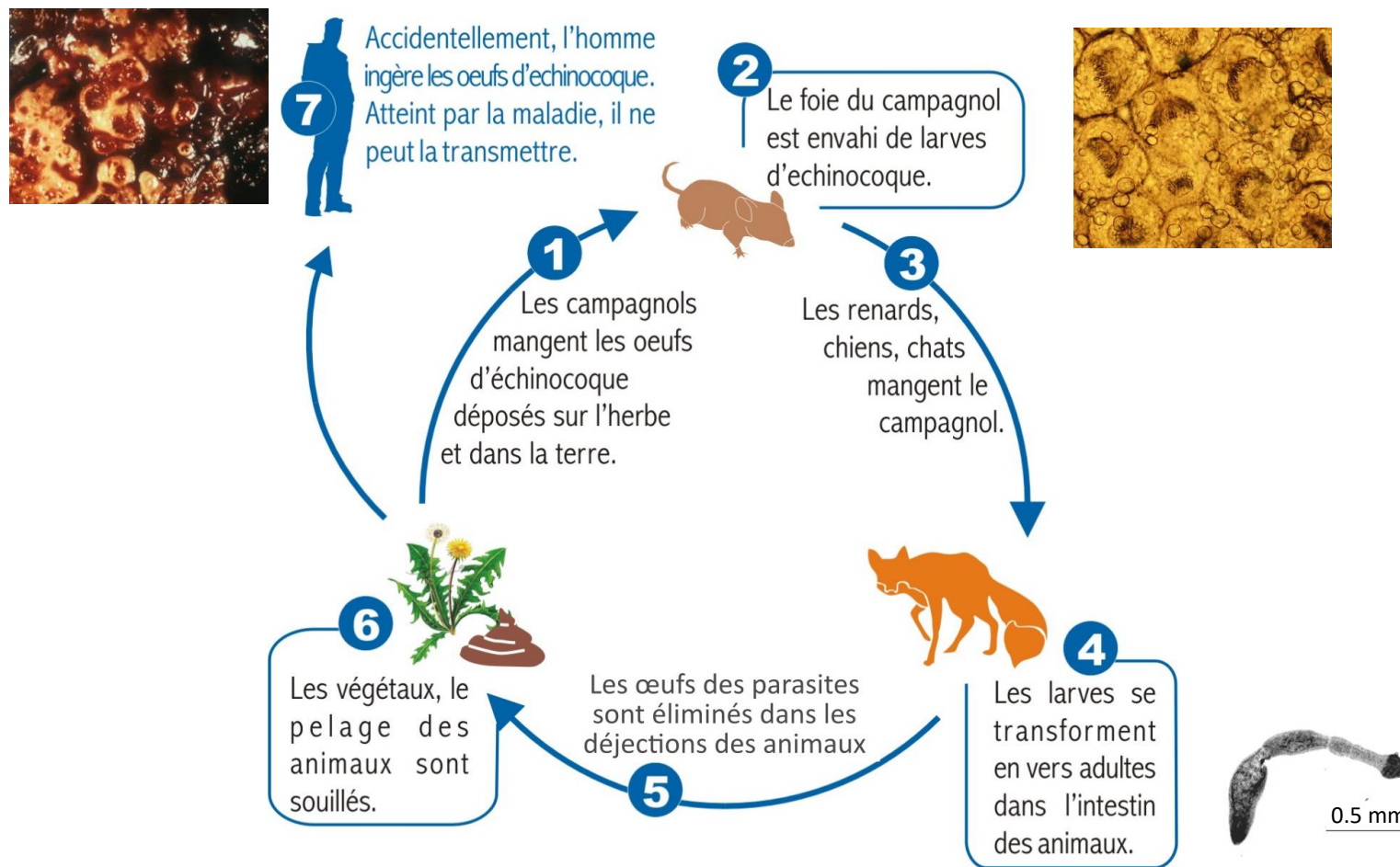
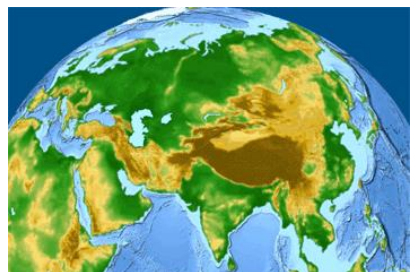
Transects indiciaires



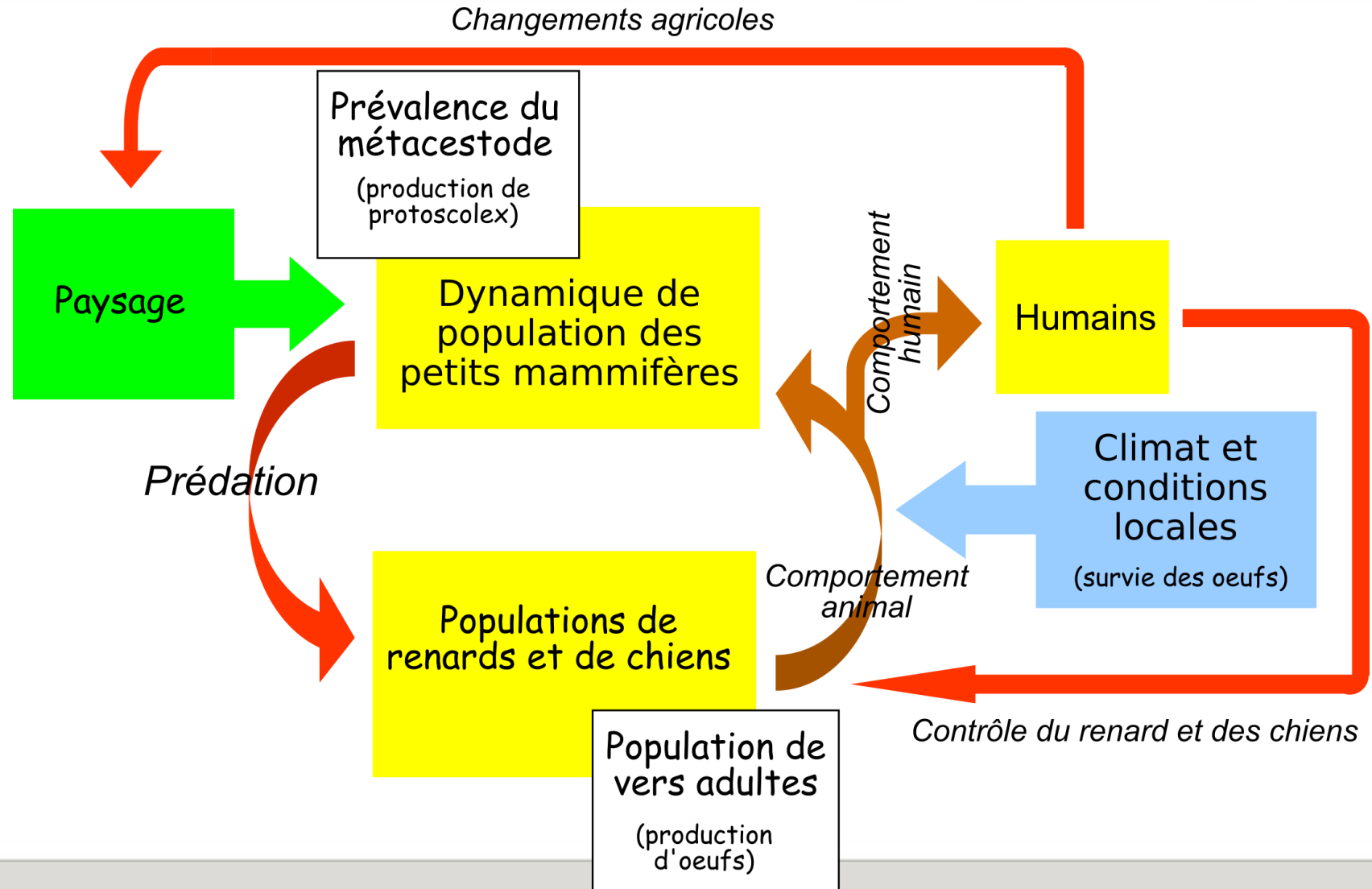
Exemple 1 : peste agricole



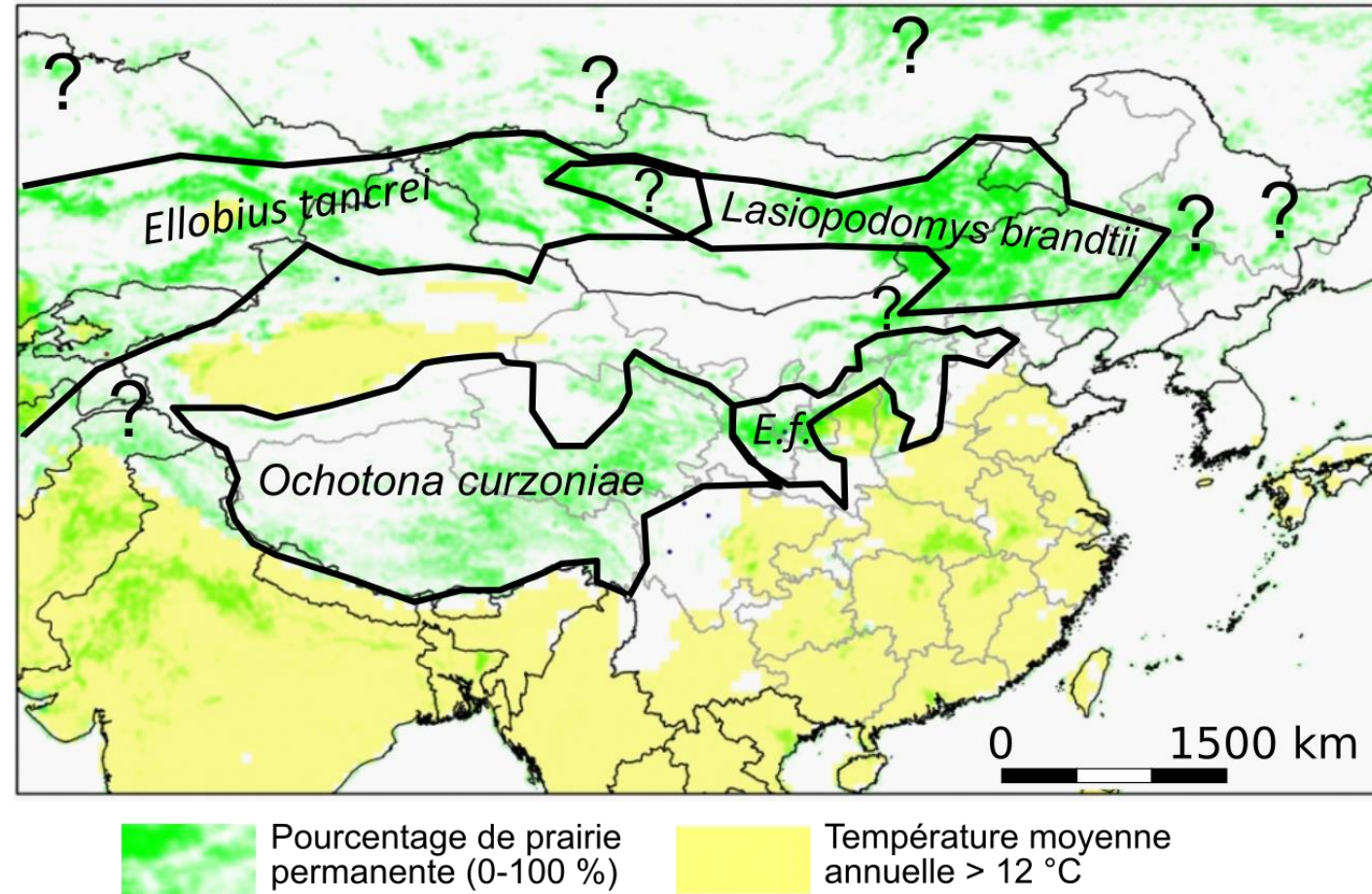
Exemple 2 : transmission de l'échinocoque alvéolaire



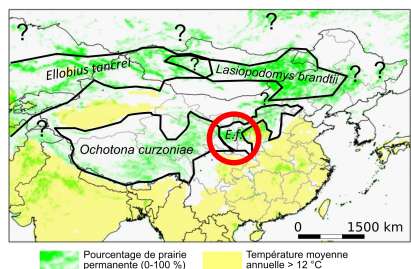
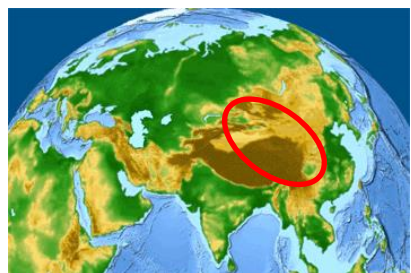
Exemple 2 : transmission de l'échinocoque alvéolaire



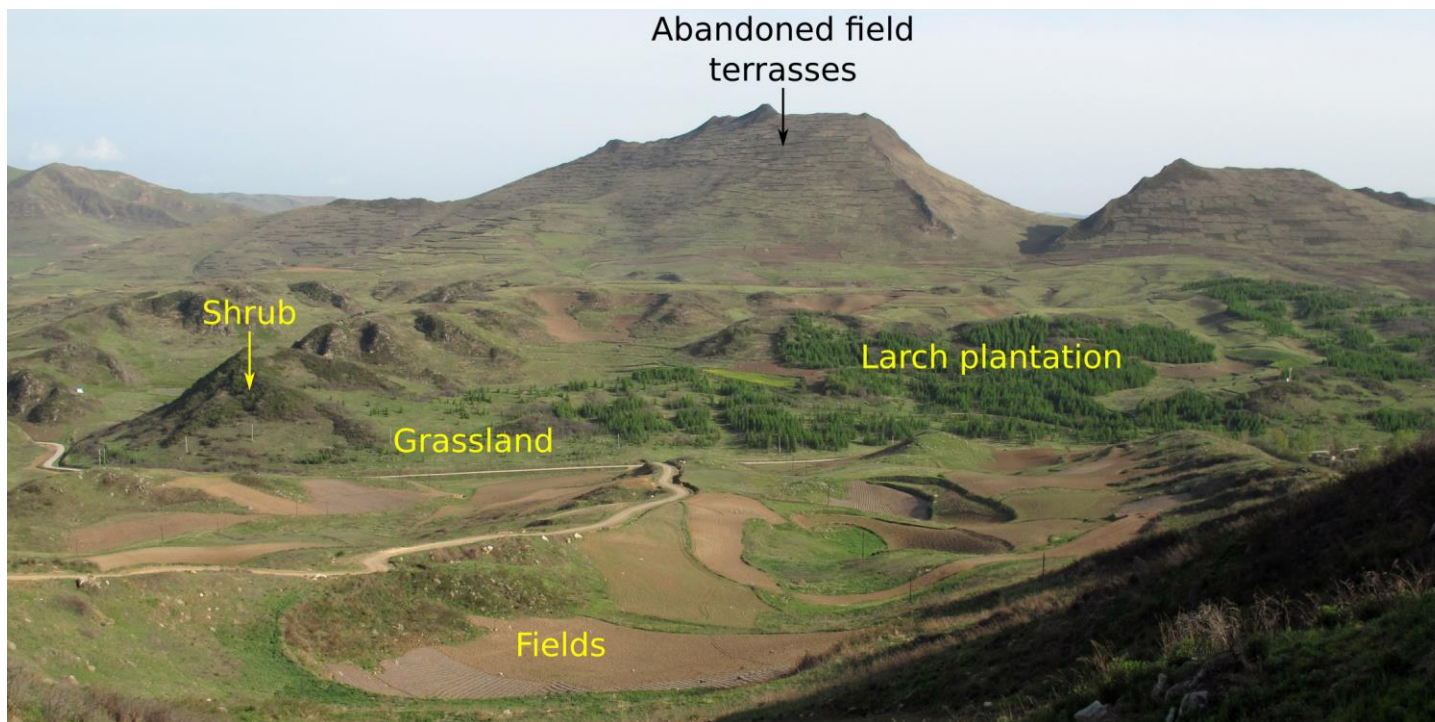
Exemple 2 : transmission de l'échinocoque alvéolaire



Exemple 2 : transmission de l'échinocoque alvéolaire

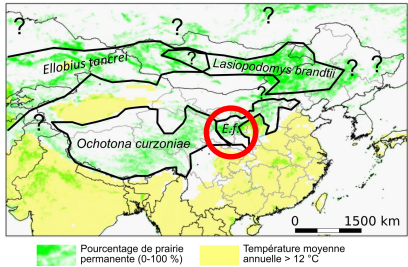


Zhang/Puma (South Gansu)

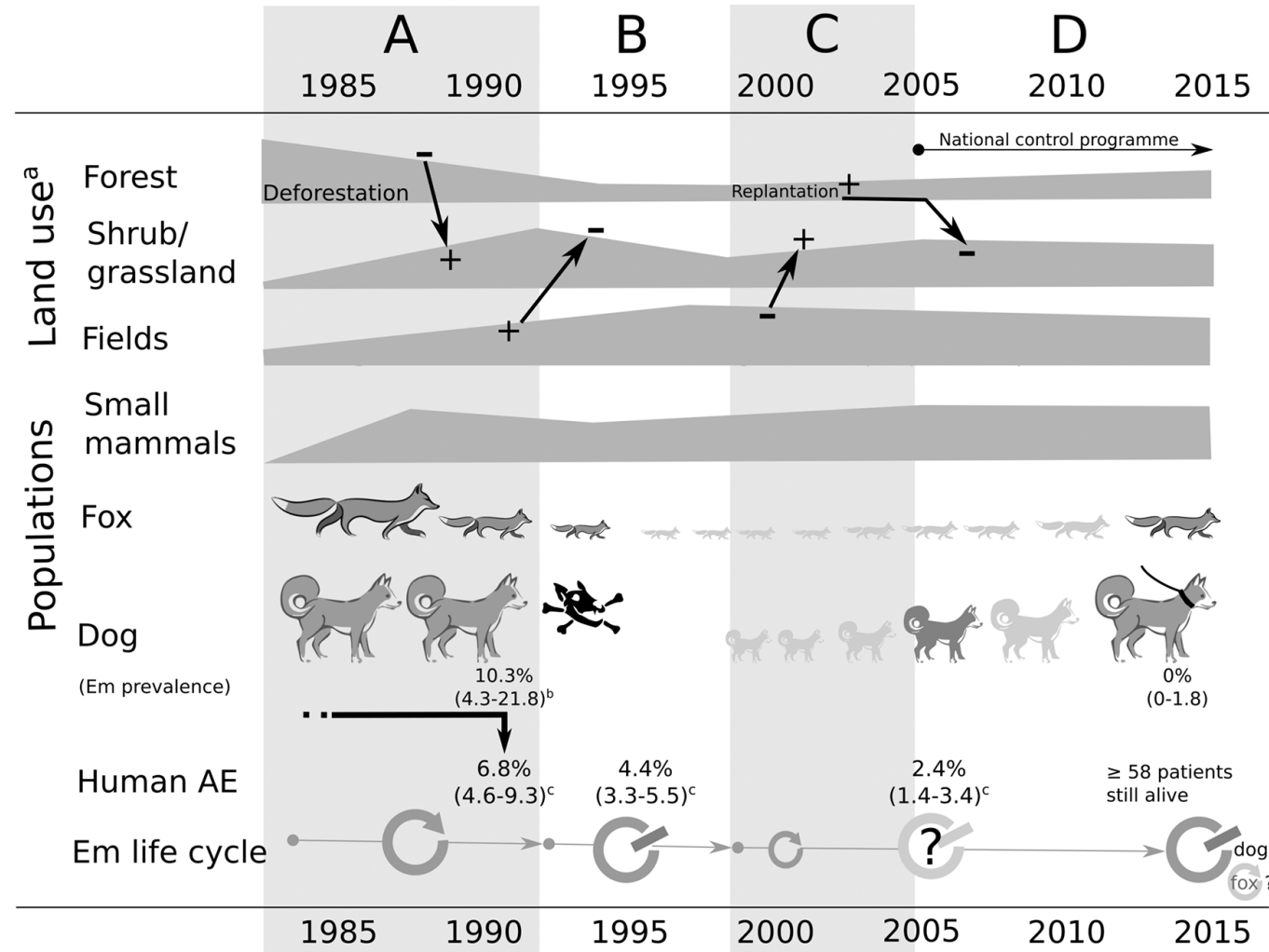
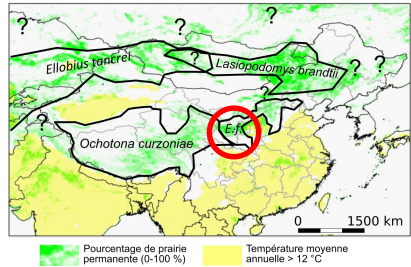


Exemple 2 : transmission de l'échinocoque alvéolaire

Zhang/Puma (South Gansu)

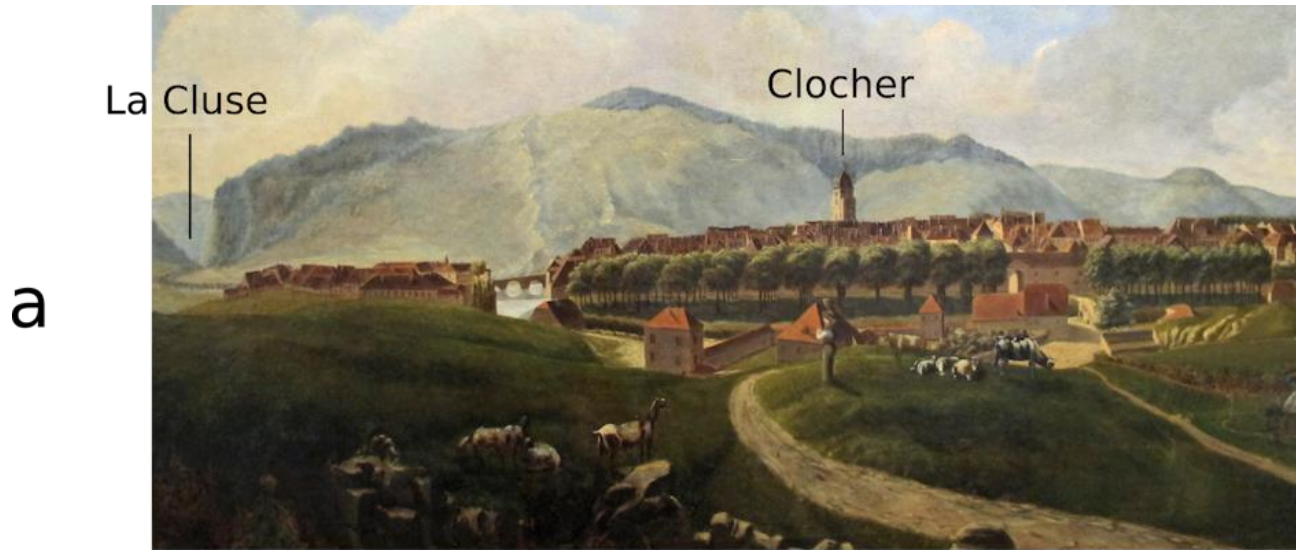


Exemple 2 : transmission de l'échinocoque alvéolaire

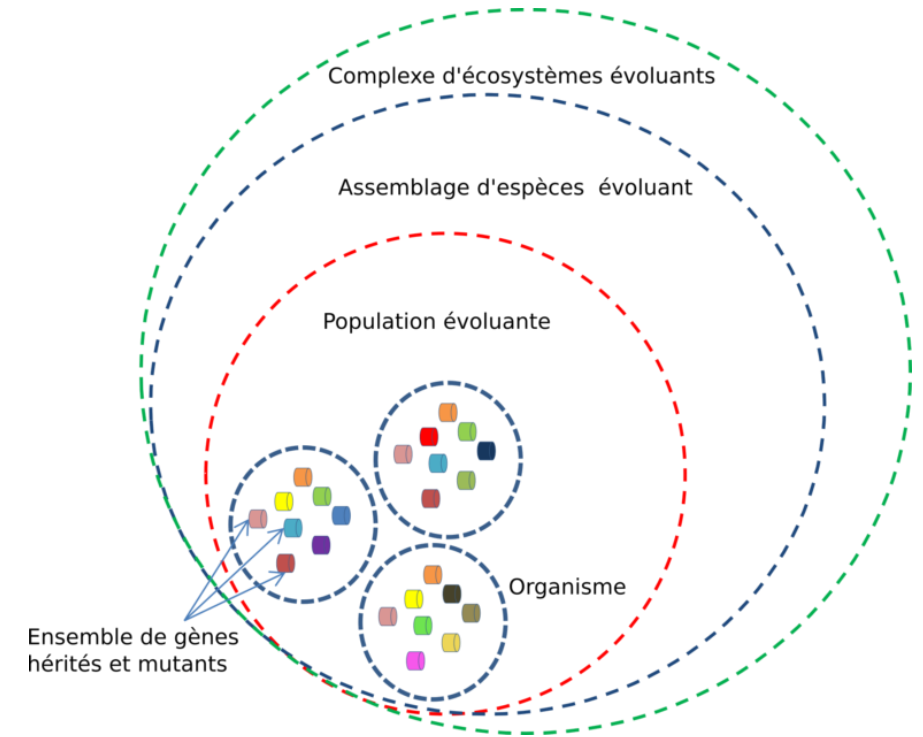


Référentiel de santé des écosystèmes ?

Pontarlier (entre 1838 and 1865), anonyme



Pontarlier en 2013



+ shifting baseline syndrome

Merci pour votre
attention !

