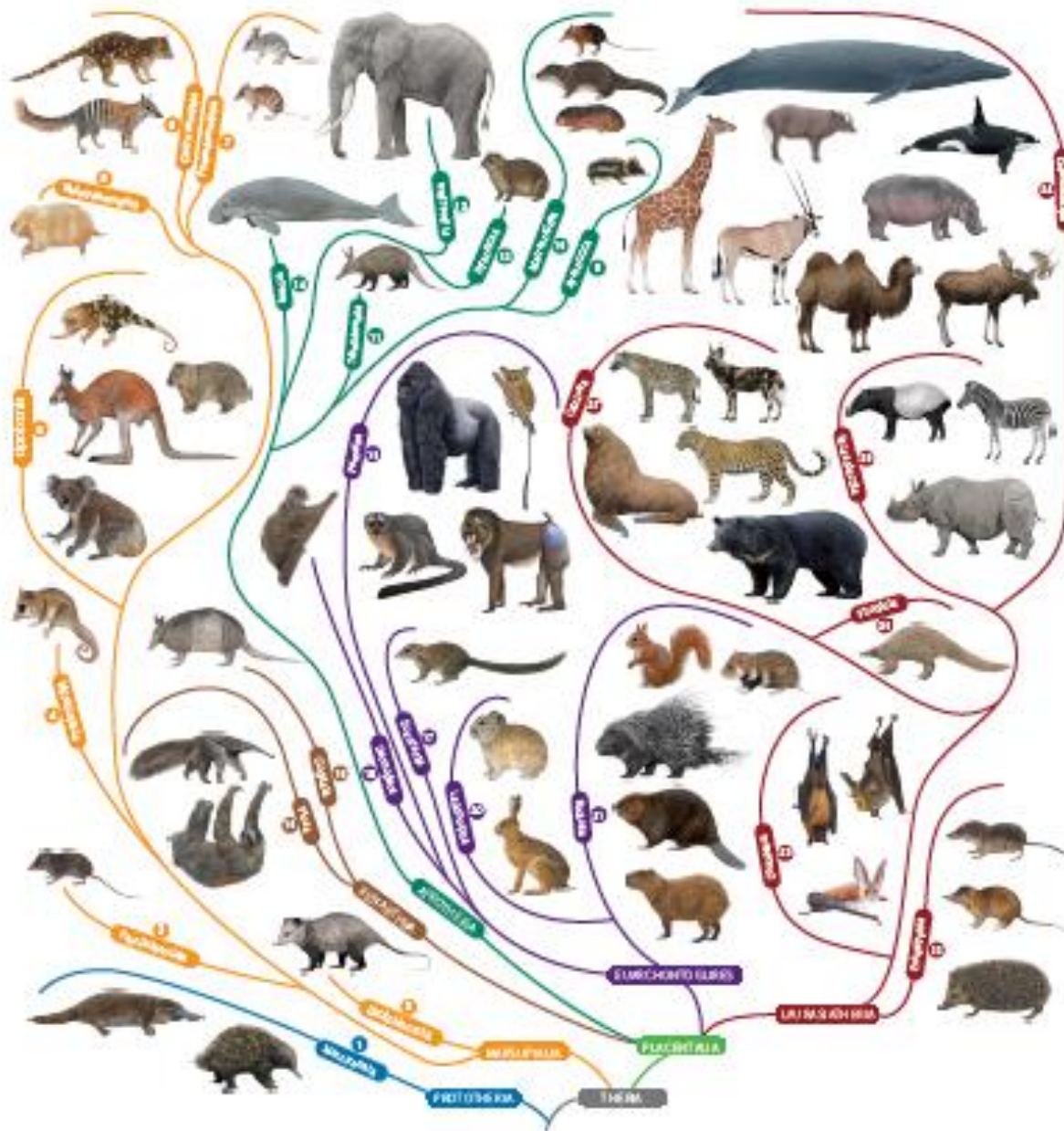


Modification des paysages et maladies émergentes : le cas des chauves-souris

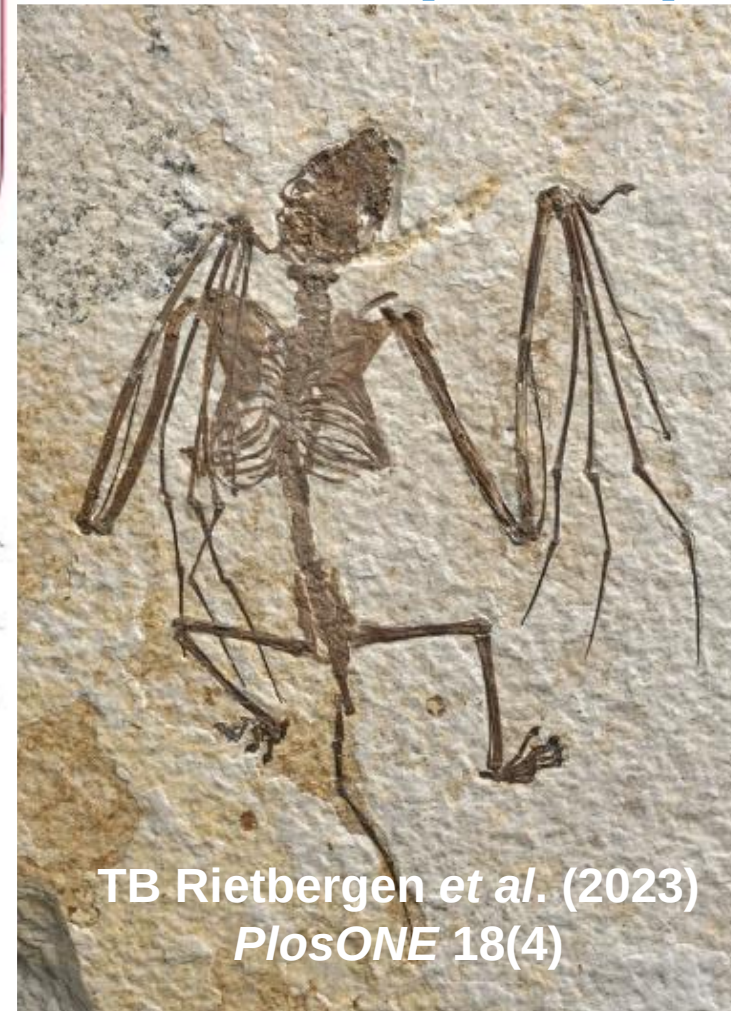


AEEMA 01 juin 2023
Maisons-Alfort

Les chauves-souris sont des mammifères anciens (52MA)



© Illustrated Checklist of the Mammals of the World (2020)



TB Rietbergen *et al.* (2023)
PlosONE 18(4)

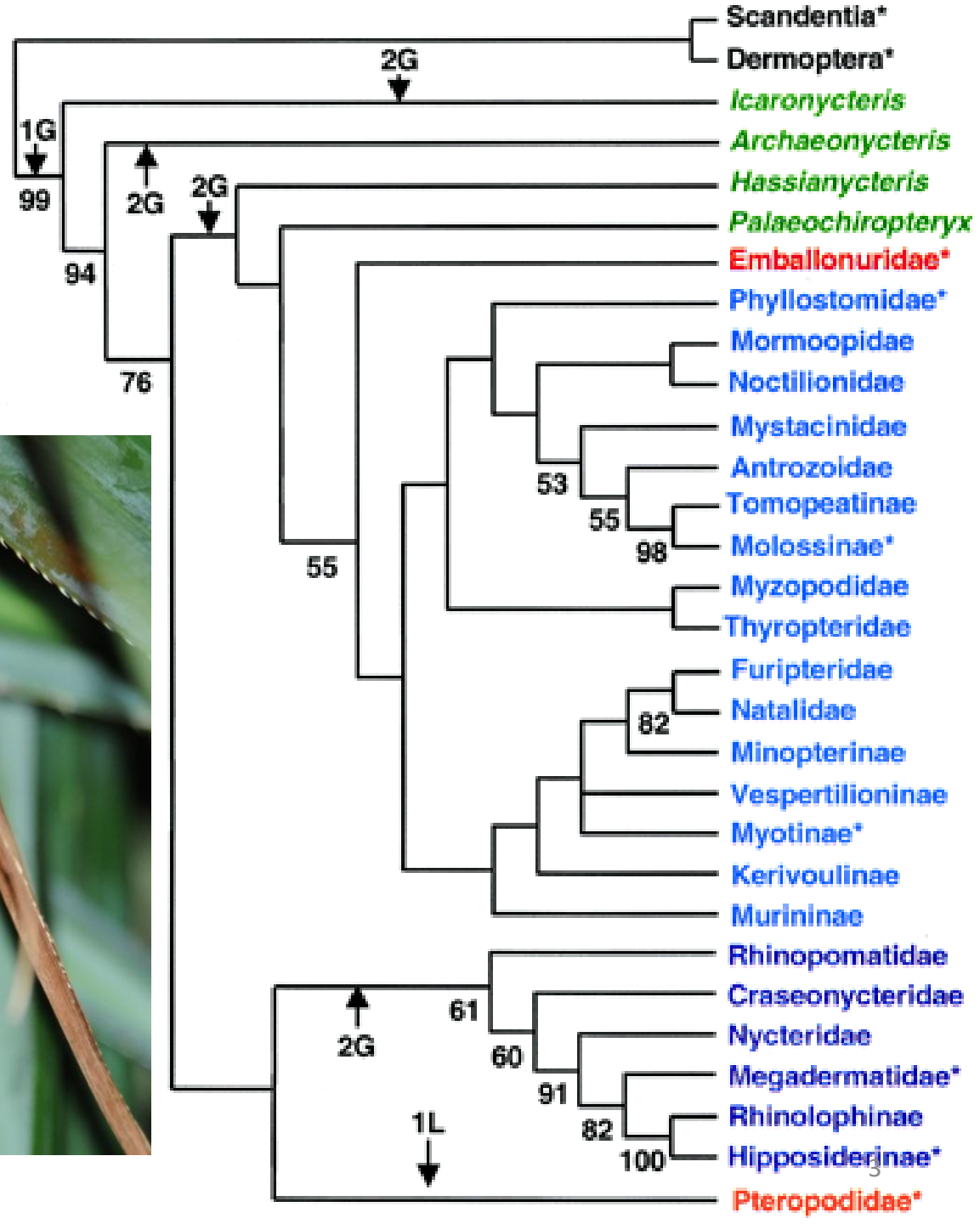
Plus de 1400 espèces,
21 familles

Yinpterochiroptera et
Yangochiroptera

Environ 200 ptéropodidés



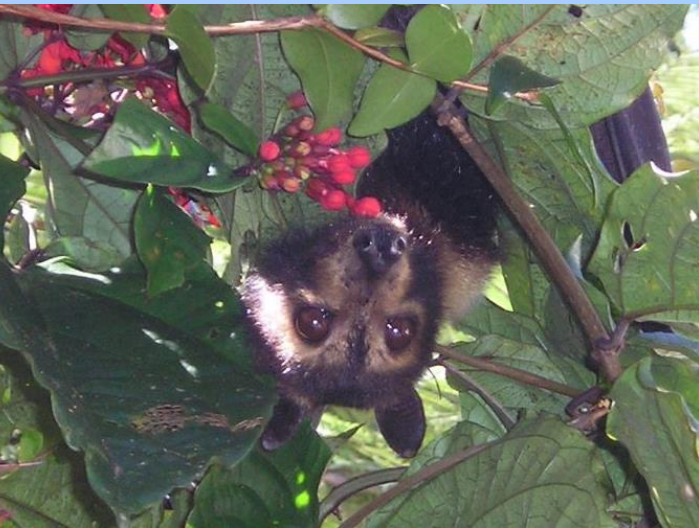
PNAS (2001) 98: 6241-6246



Ptéropodidés

Régions tropicales

Afrique Asie



CHIROPTÈRES ET VIRUS

QUELQUES EXEMPLES

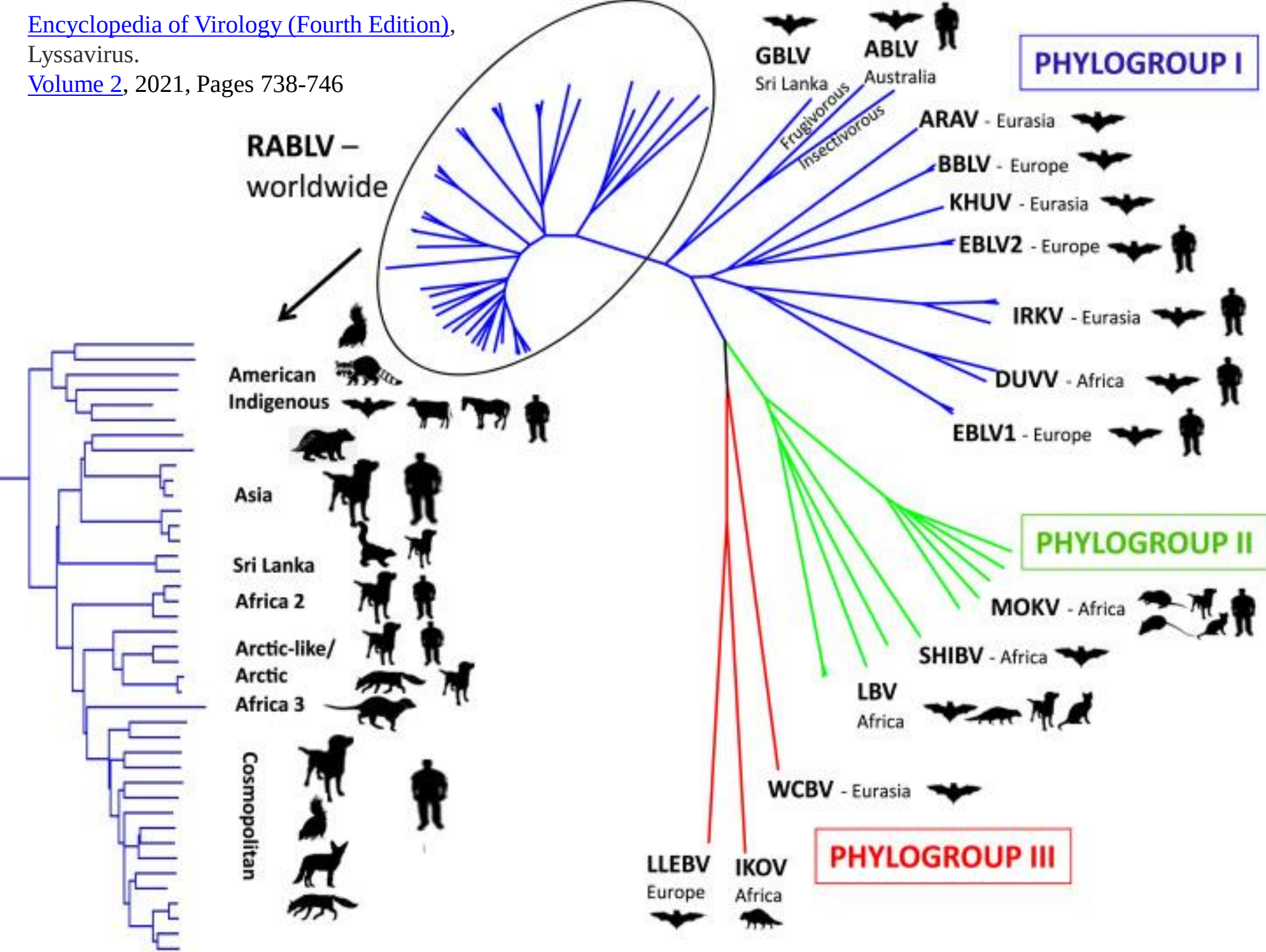
Lyssavirus (14 génotypes sur 16)
rage, Lagos bat virus, Duvenhage,
EBL1, EBL2, ABL, etc...

Henipavirus, Nipah (Asie),
Hendra (Australie)

Coronavirus, SARS, MERS-CoV,
SARS-CoV-2

Filovirus, Ebola, Marburg (Afrique),
Reston (Philippines)





Relation virus zoonotiques / virus par ordre mammifères et oiseaux

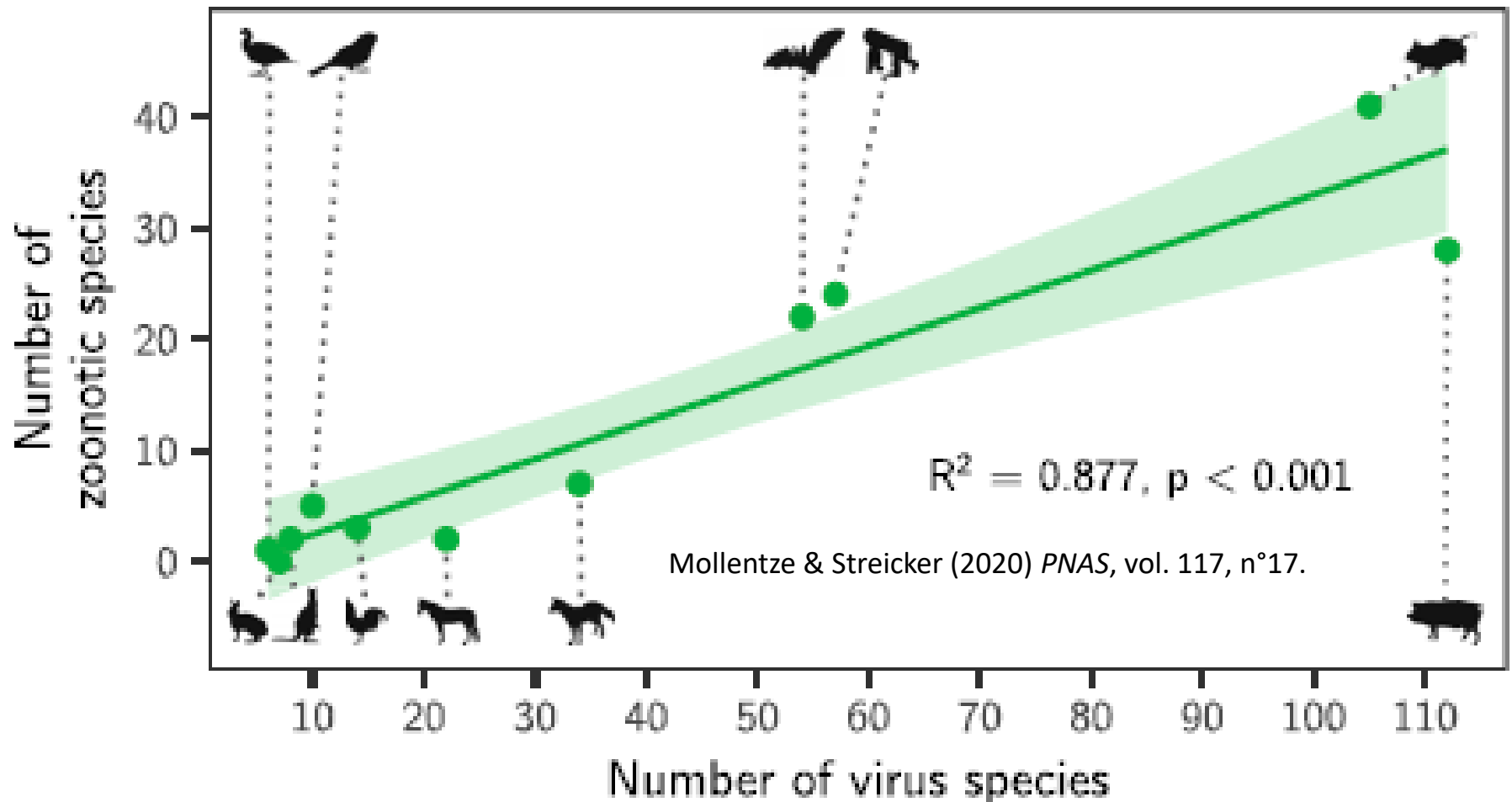
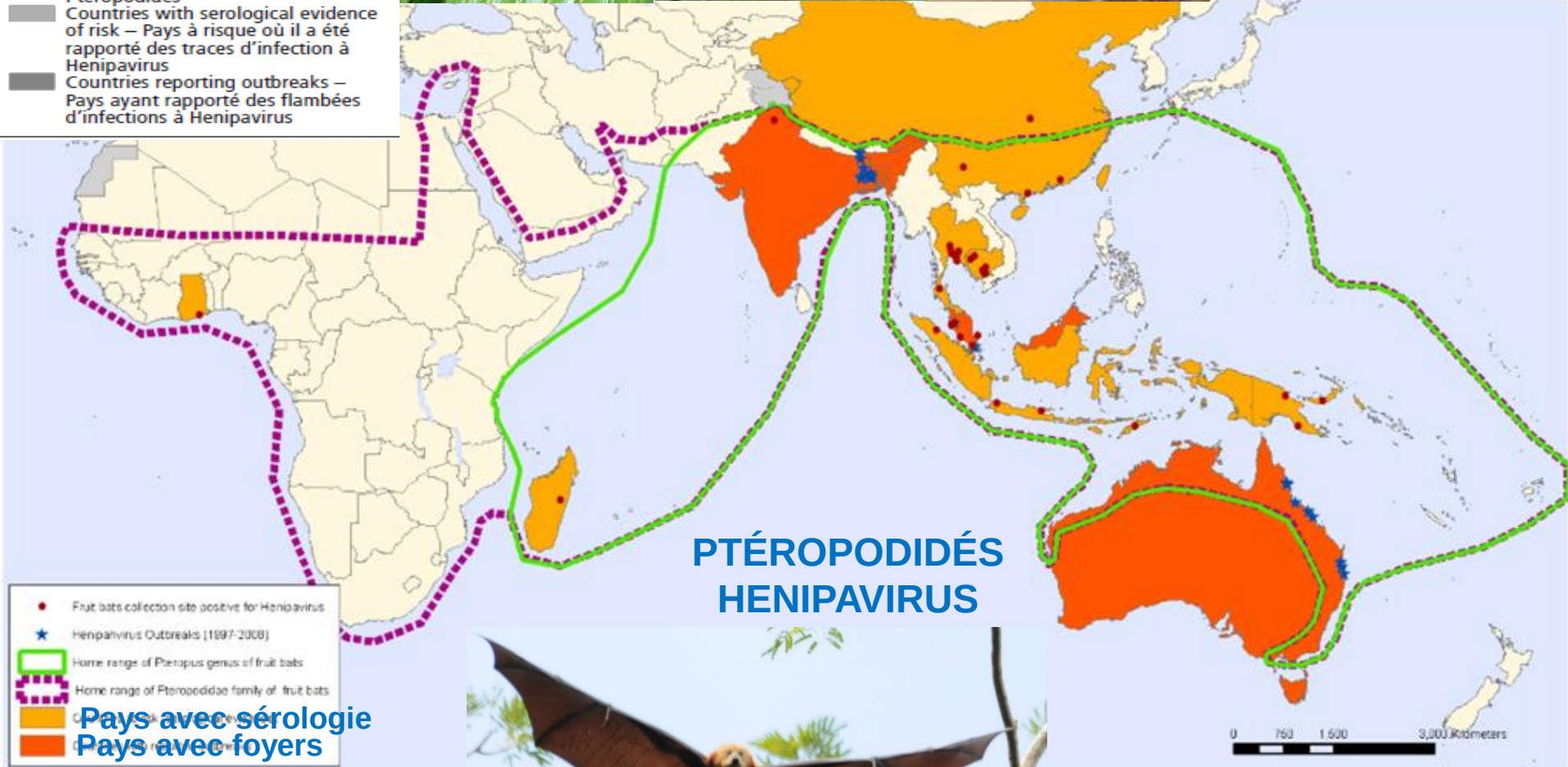


Fig. 3. Relationship between the number of virus species and the number of zoonotic species maintained by each reservoir group. The line shows a linear regression fit, with its 95% CI indicated by the shading.

- Fruit bat collection site positive for Henipavirus – Sites de prélèvement de chauves-souris frugivores où l'on a détecté une infection à Henipavirus
- ★ Henipavirus outbreaks, 1997–2008 – Flambées d'infections à Henipavirus (1997-2008)
- Home range of *Pteropus* genus of fruit bat – Aire de répartition des chauves-souris du genre *Pteropus*
- ▤ Home range of *Pteropodidae* family of fruit bat – Aire de répartition des chauves-souris de la famille des *Pteropodidés*
- Countries with serological evidence of risk – Pays à risque où il a été rapporté des traces d'infection à Henipavirus
- Countries reporting outbreaks – Pays ayant rapporté des flambées d'infections à Henipavirus



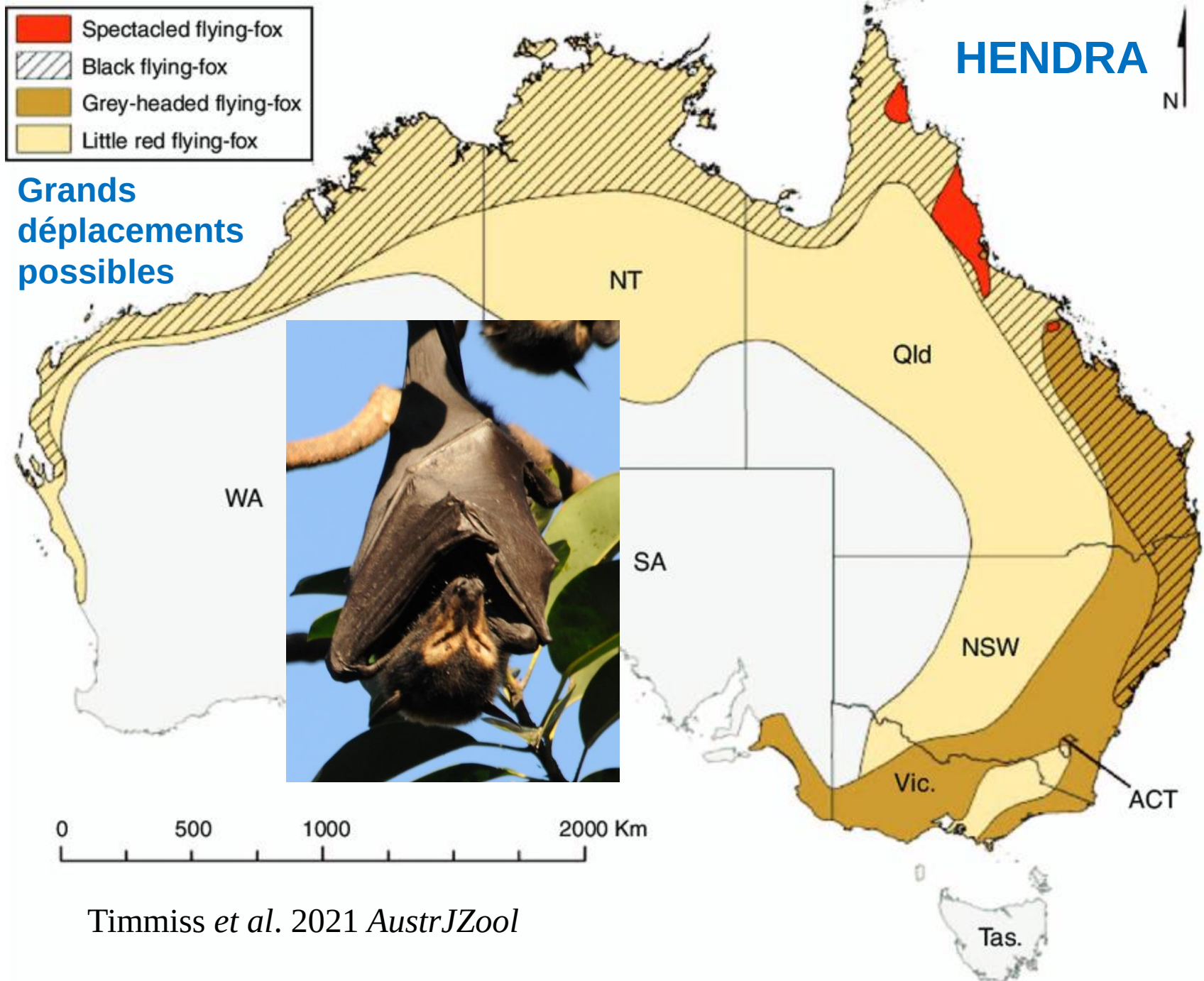
The boundaries and names shown and the designations used on the part of the World Health Organization concerning the legal or concerning the delimitation of its frontiers or boundaries. Do not imply any opinion on the part of the World Health Organization concerning the legal or concerning the delimitation of its frontiers or boundaries. Do not imply any opinion on the part of the World Health Organization concerning the legal or concerning the delimitation of its frontiers or boundaries. Do not imply any opinion on the part of the World Health Organization concerning the legal or concerning the delimitation of its frontiers or boundaries.

Alert and Response Department
Global Health Information
Systems (GIS)



**World Health
Organization**

© WHO 2008. All rights reserved



Timmiss *et al.* 2021 *AustrJZool*

Jardin botanique, Adélaïde, Australie du Sud



IMPORTANT HEALTH MESSAGE

Grey-headed Flying-foxes and other bat species can carry a rabies-type infection called Australian Bat Lyssavirus.

- ⚡ NEVER attempt to touch or handle any bats - living or dead.
- ⚡ FIRST AID: If you are scratched or bitten by a bat, or come into contact with bat saliva -

IMMEDIATELY:

- Clean the wound / contact area thoroughly with soap and water.
- Apply an antiseptic solution (if available).
- Contact a doctor or hospital emergency department straight away for further assessment.

If you observe a Flying-fox that is dead, sick, injured or behaving aggressively, please report this immediately to:

Fauna Rescue 24 hour Wildlife Volunteer Helpline: 08 8289 0896



The Grey-headed Flying-fox is a vulnerable species and is nationally protected.



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Espèce protégée



Pathogen spillover driven by rapid changes in bat ecology

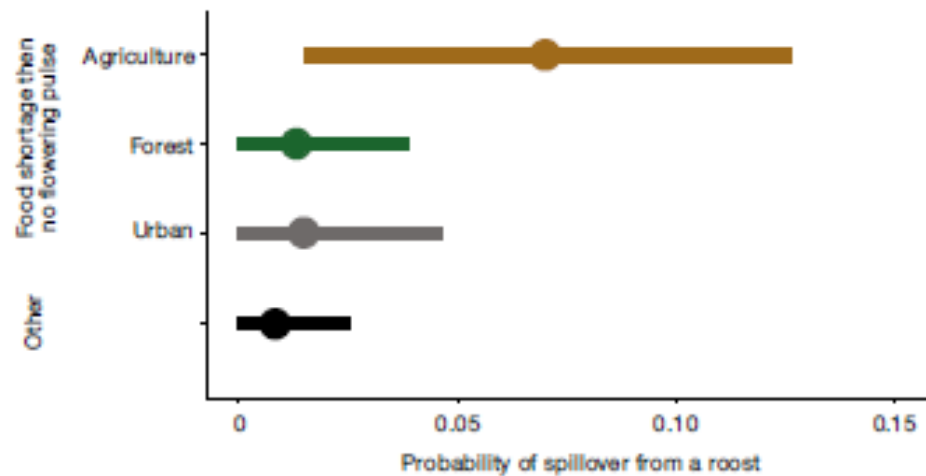
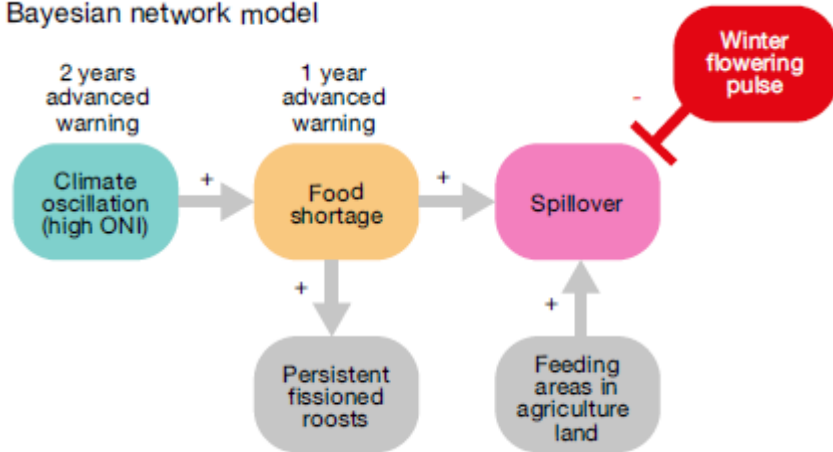
Virus Hendra et roussette à tête grise (*Pteropus poliocephalus*)

P. Eby *et al.* (2022) *Nature*,
<https://doi.org/10.1038/s41586-022-05506-2>

- El Nino
- Fragmentation
- Floraison hivernale
- Rapprochement
des habitations
- Analyse 25 ans



Bayesian network model

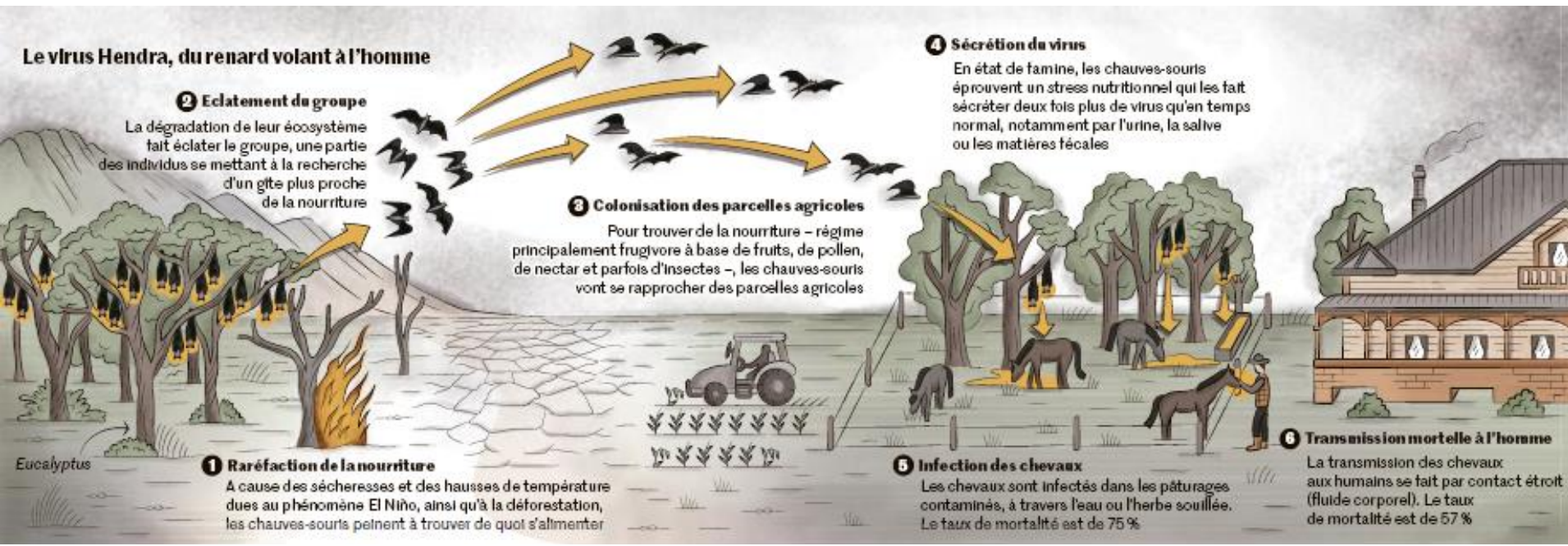


P. Eby *et al.* (2022) *Nature*,
<https://doi.org/10.1038/s41586-022-05506-2>

Avant les européens ?

D.J. Becker *et al.* (2022) Ecological conditions predict the intensity of Hendra virus excretion over space and time from bat reservoir hosts. *Ecology Letters*

© Le Monde 04 janvier 2023



K. Choden et al. (2019) *Pteropus lylei* primarily forages in residential areas in Kandal, Cambodia.
Ecology and Evolution, 9 (7), pp.4181-4191.

NIPAH

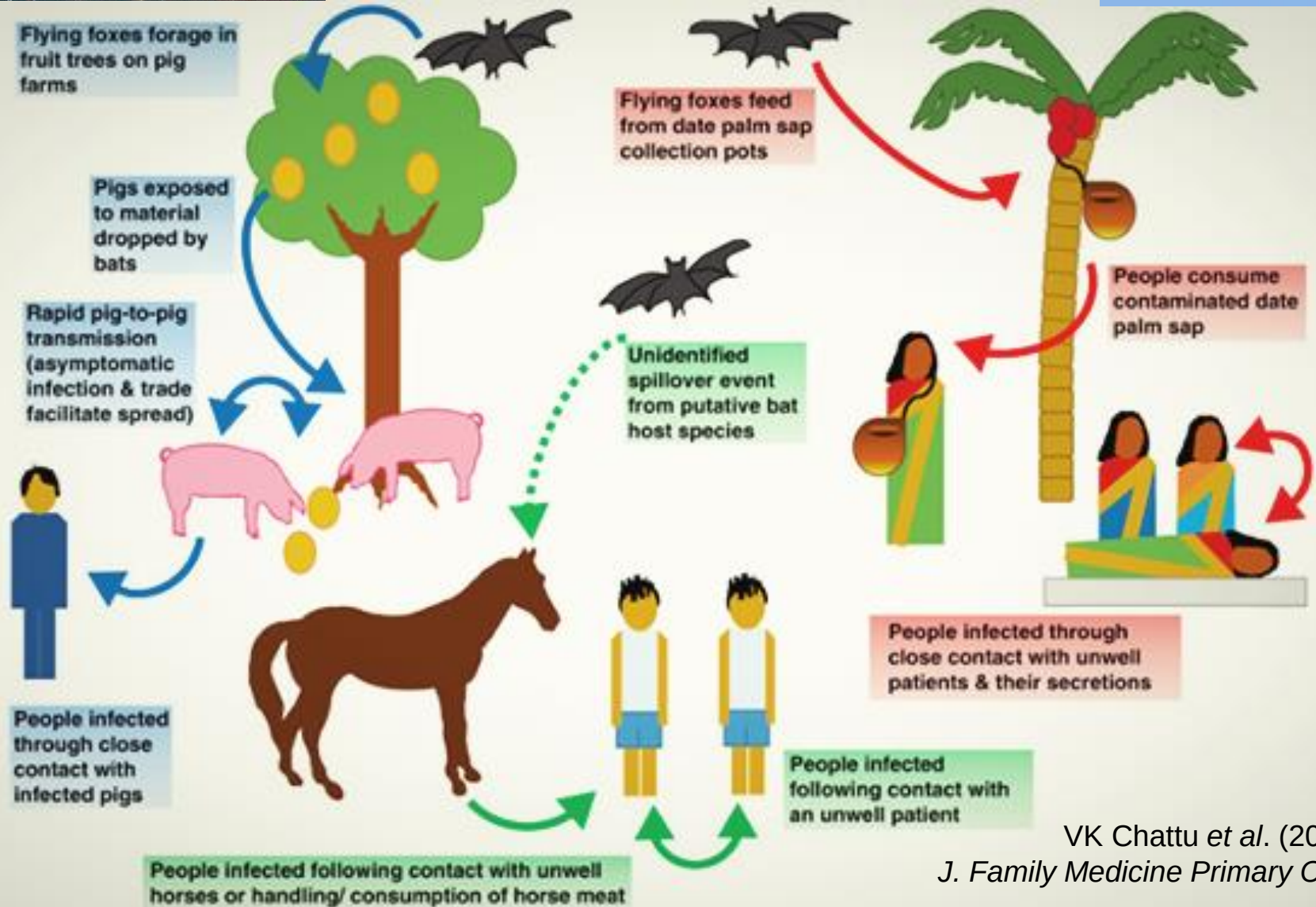
Asie du sud-est

P. lylei, Cambodge





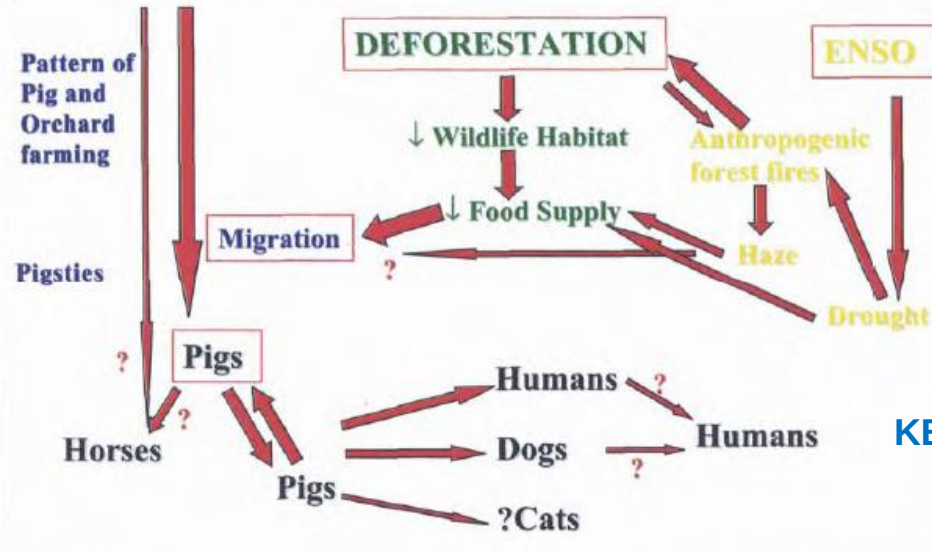
Cycles Nipahvirus Malaisie, Bangladesh



The Web of Nipah Virus Emergence

Natural Reservoir Hosts of Nipah virus

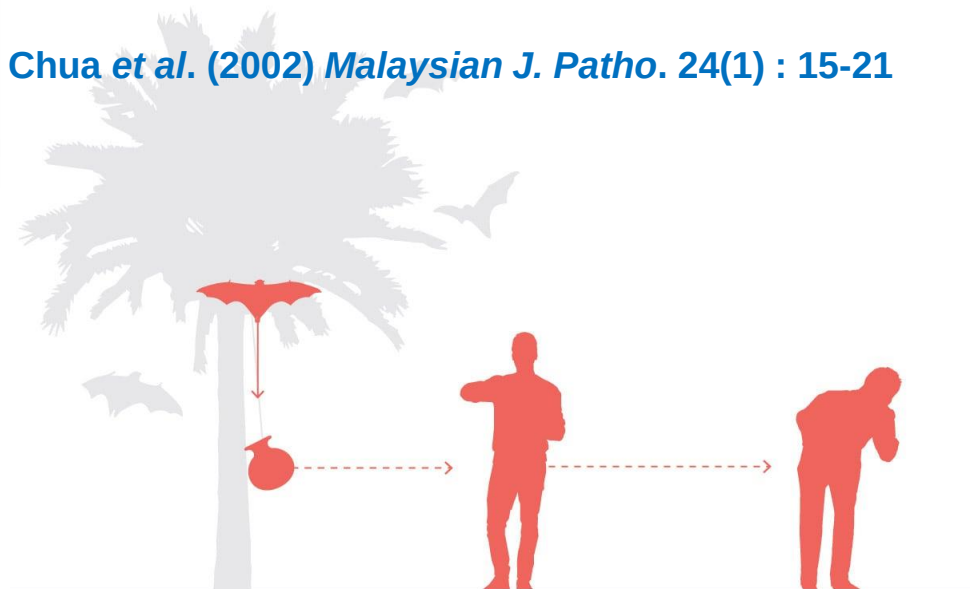
P. vampyrus ↔ *P. hypomelanus*



KB Chua et al. (2002) *Malaysian J. Patho.* 24(1) : 15-21

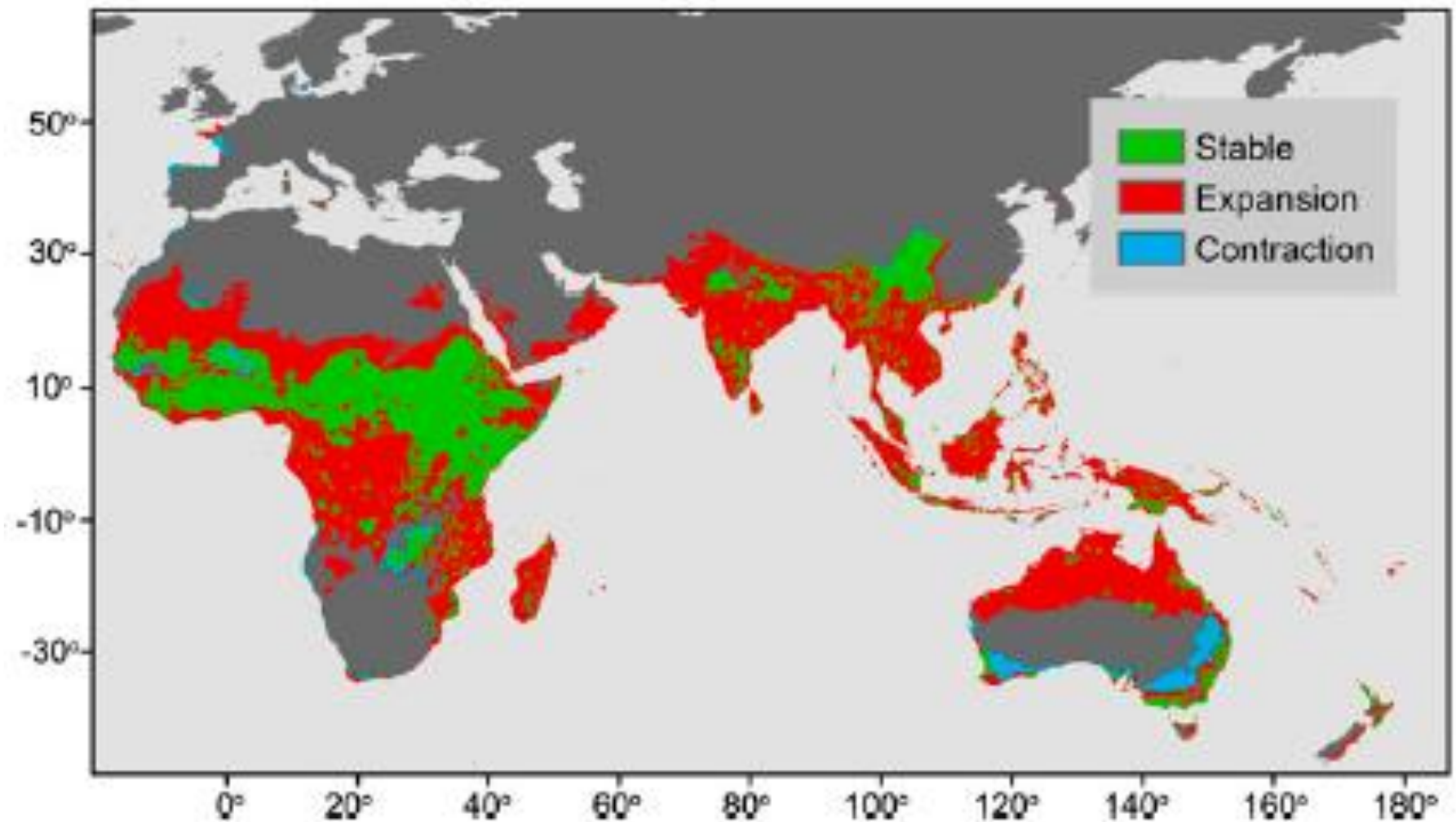


Malaisie



Bangladesh

P. Daszak *et al.* (2013) Interdisciplinary approaches to understanding disease emergence : The past, present, and future driver of Nipah virus emergence. *PNAS* (110) Suppl.1
Variation climatiques, 13 espèces de chiroptères



SARS 1, MERS, SARS 2

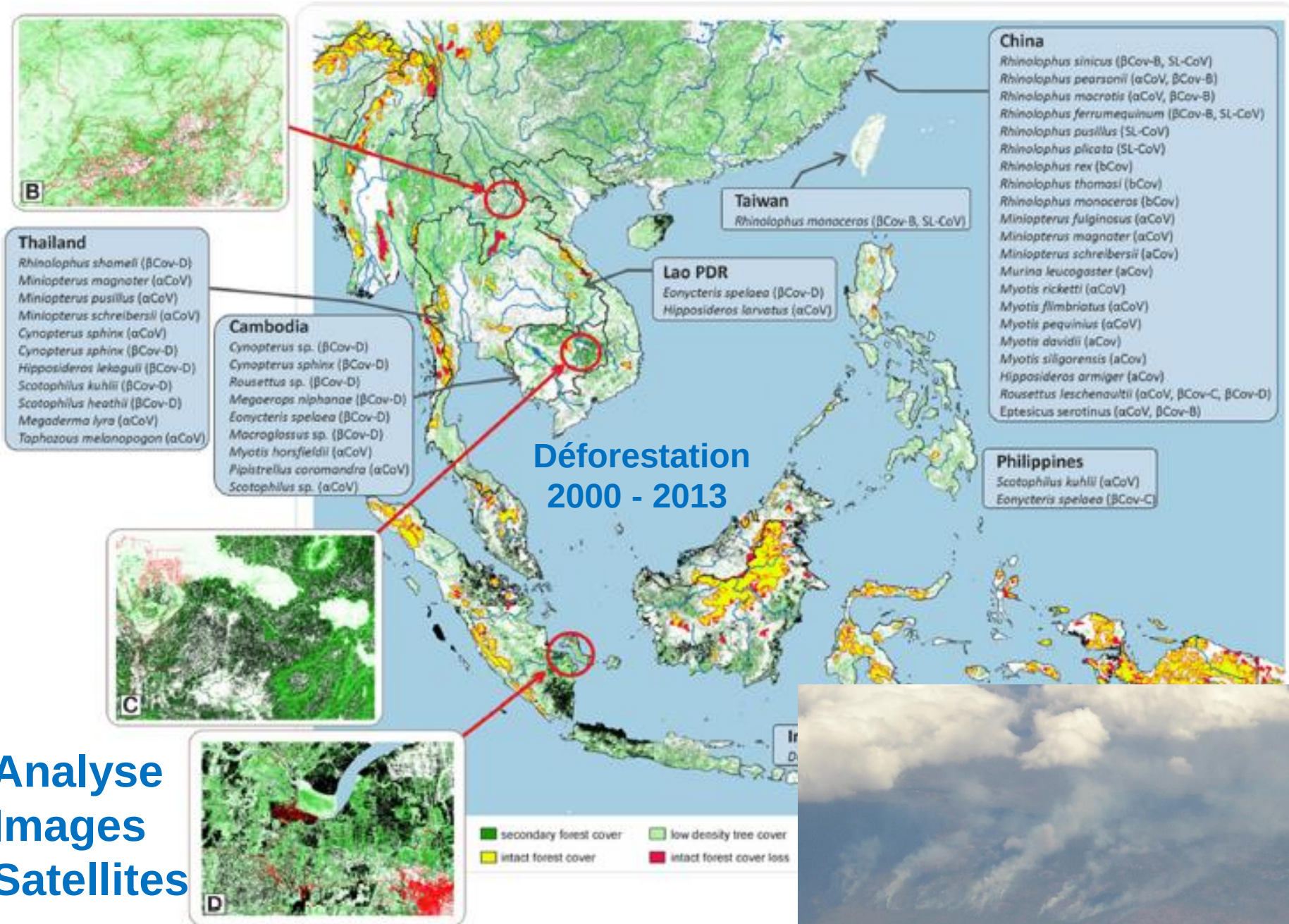
Le virus
responsable de
chaque maladie
humaine n'est
pas le virus
identifié chez les
chauves-souris

COMMENT
ANTICIPER ?

**Civette palmiste
masquée (2003)**

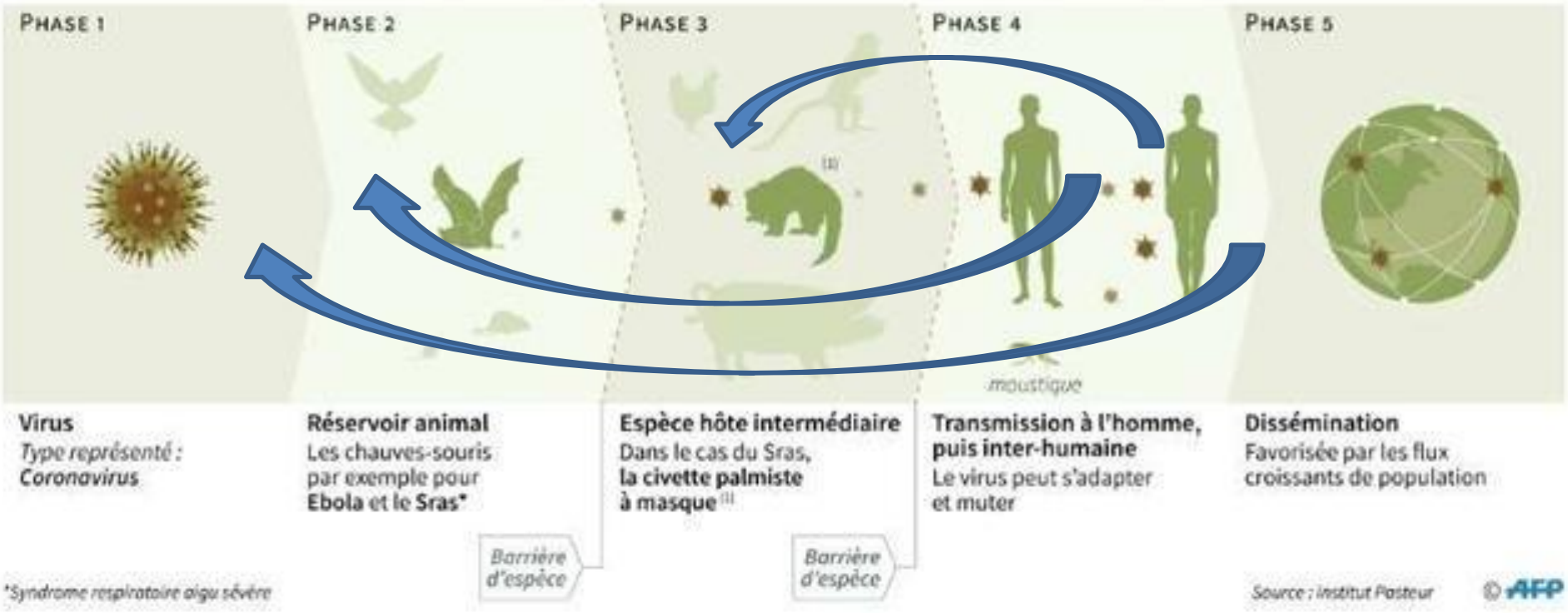
**Rhinolophe
des Célèbes**





Analyse
Images
Satellites

Du monde animal à l'homme : l'émergence d'un nouveau virus



**Bourse aux Insectes, Juvisy
29 septembre 2019
Chauves-souris indonésiennes en « papillotte »**





CONCLUSION



- Les chiroptères sont les seuls mammifères volants. Mobiles, certaines espèces sont capables de longs déplacements rapides.
- En régions tropicales les espèces frugivores explorent de vastes surfaces à la recherche d'arbres en fleurs et en fruits.
- D'assez grande taille les renards volants souffrent de la chasse et de la déforestation.
- Ceci les conduit à se rapprocher des zones habitées augmentant les risques de contacts.

Merci pour
votre
attention