



Parasites, faeces et fourrures

Thierry Cambier &
Daan Dekeukeleire

- Souvent seulement l'attention pour les chauves-souris
- ⇒ Avec un peu d'effort, une chauve-souris capturée peut fournir beaucoup plus d'informations que la détermination de l'espèce



Les parasites

- Les parasites des espèces en danger sont également en danger!
- expliquer le comportement des chauves-souries?
 - Eg. Déplacement des colonies
 - Eg. reste solitaire, en petit groupe ou a grande groupe?
 - Infection
 - 'allo-grooming'
 - Eg. poids et taille, sex
 - Préférence pour les femelles et individus en condition 'moyenne'
 - Mauvaise condition: parasites sont plutôt conséquence que cause
- 'Tag sur les chauve-souris'

Acariens

- Acariens sur les membranes alaires (*Spinturnix spec.*)

	Espèces hôtes typique
<i>Spinturnix andegavinus</i>	<i>Myotis daubentoni</i>
<i>Spinturnix acuminata</i>	<i>Nyctalus noctula</i>
<i>Spinturnix helvetiae</i>	<i>Nyctalus leisleri</i>
<i>Spinturnix bechsteini</i>	<i>Myotis bechsteinii</i>
<i>Spinturnix myoti</i>	<i>Myotis myotis, Myotis nattereri</i>
<i>Spinturnix emarginata</i>	<i>Myotis emarginatus</i>
<i>Spinturnix kolenati</i>	<i>Eptesicus serotinus</i>
<i>Spinturnix mystacina</i>	<i>Myotis mystacinus, Myotis brandtii, Myotis alcaethoe</i>
<i>Spinturnix plecotina</i>	<i>Plecotus auritus</i>
<i>Spinturnix punctata</i>	<i>Barbastella barbastellus</i>
<i>Eyndhovenia euryalis</i>	<i>Rhinolophus ferrumequinum, Rhinolophus hipposideros</i>



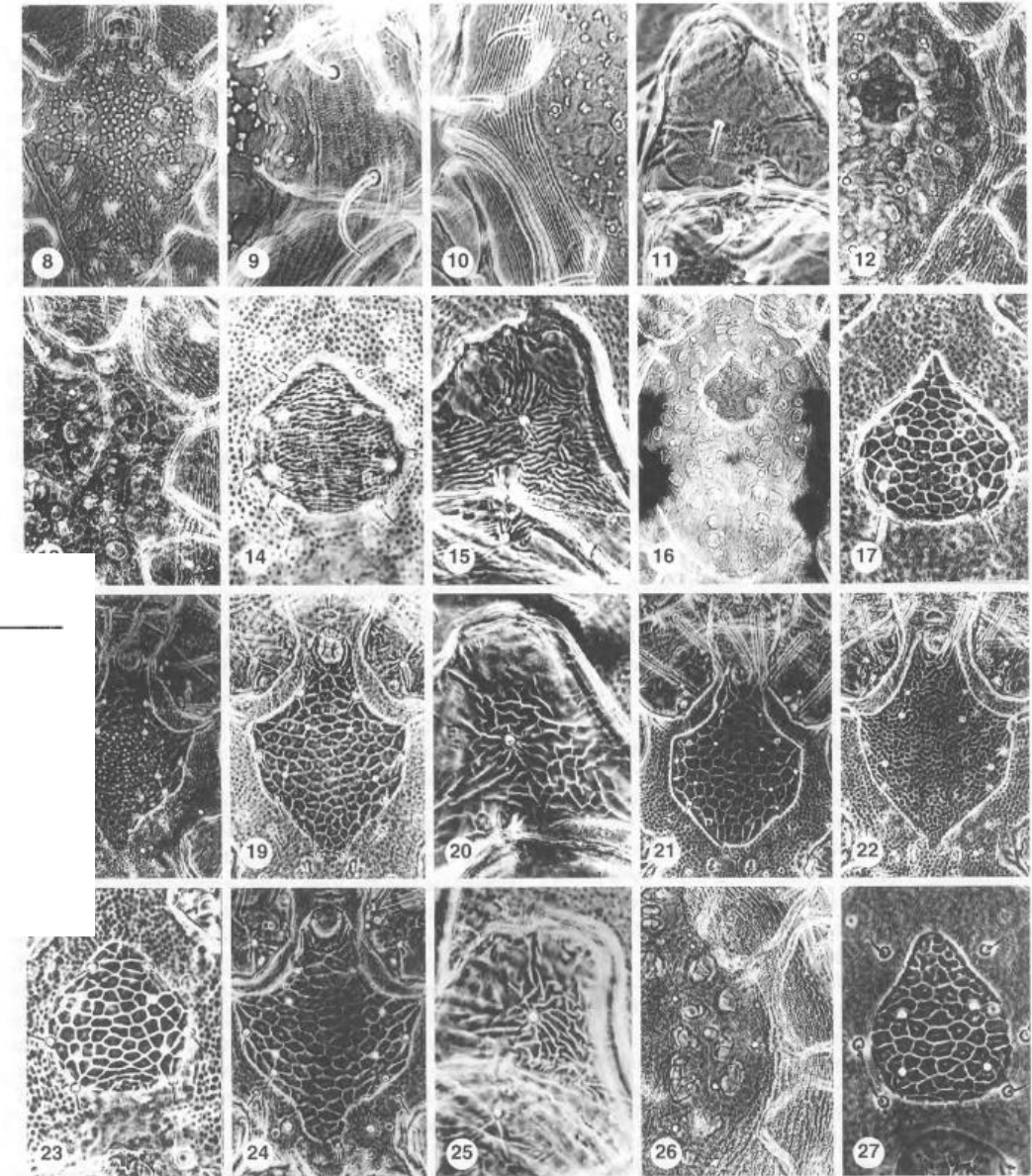
Acariens

- Acariens sur les membranes alaires
(*Spinturnix spec.*)

FOLIA PARASITOLOGICA 41: 287-304, 1994

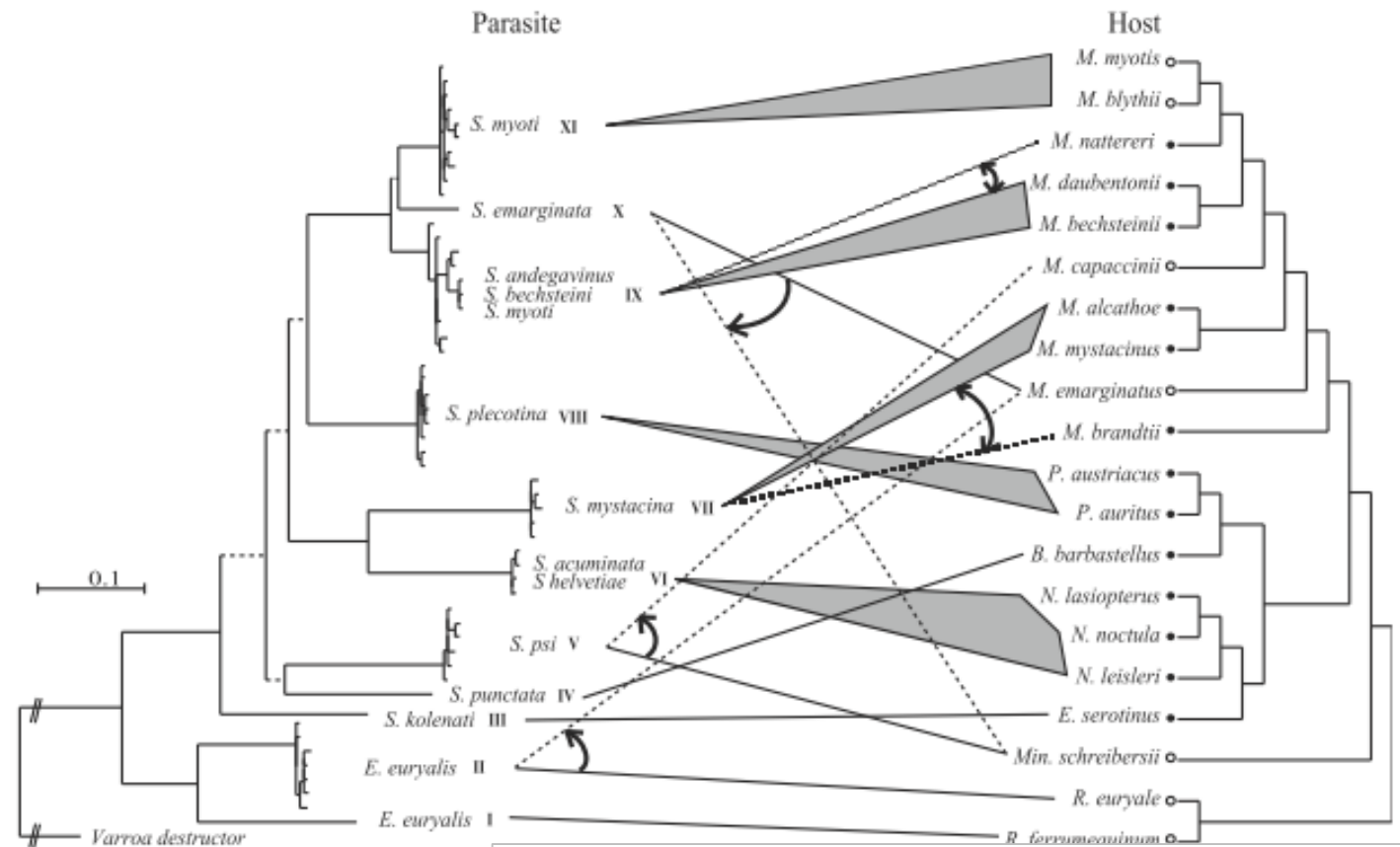
Contribution to the taxonomy of the genus *Spinturnix* (Acari: Spinturnicidae), with the erection of a new genus, *Emballonuria*

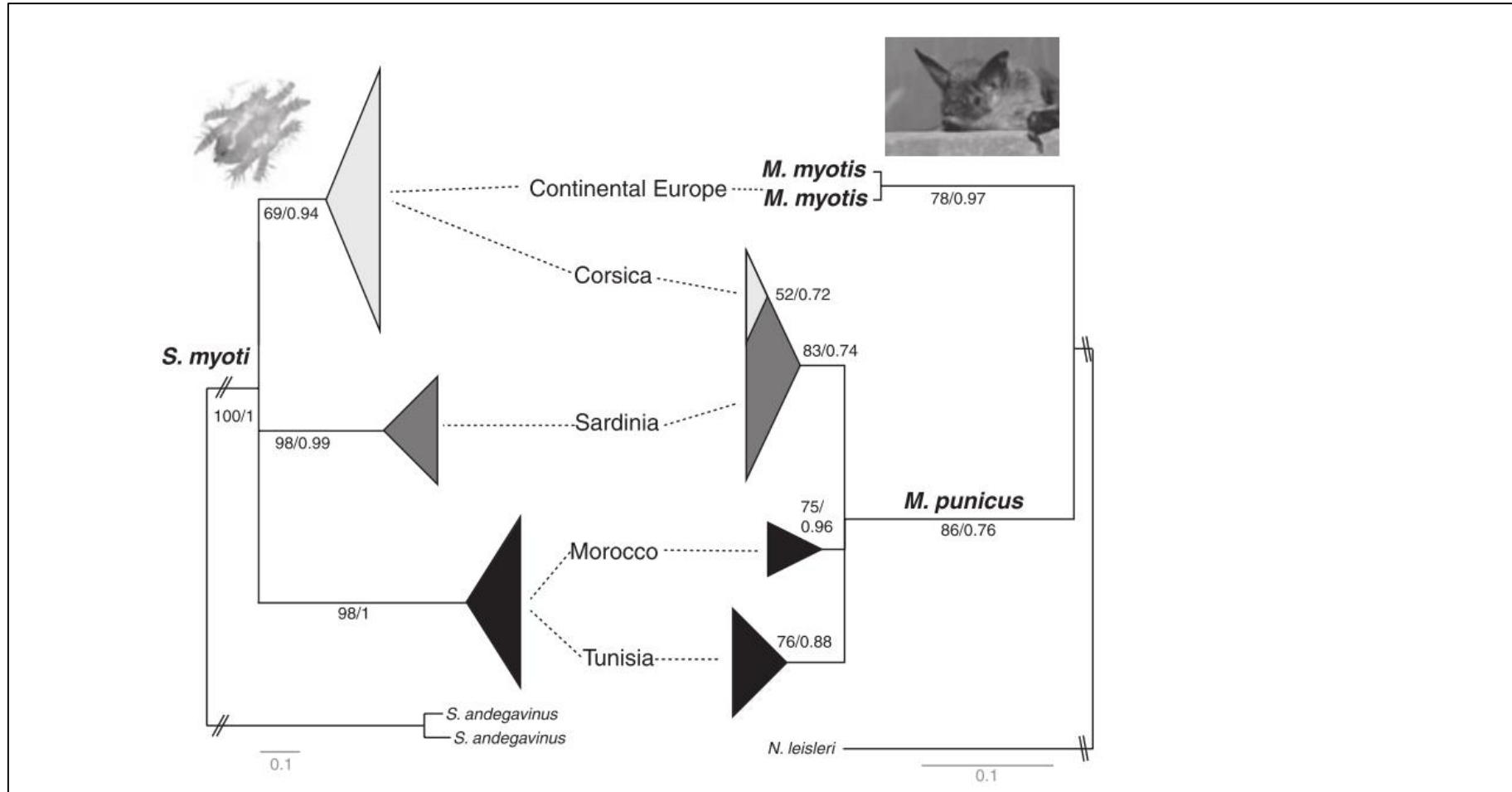
K. Uchikawa¹, Meng-Yu Zhang^{1,2}, B. M. O'Connor³, and H. Klompen³



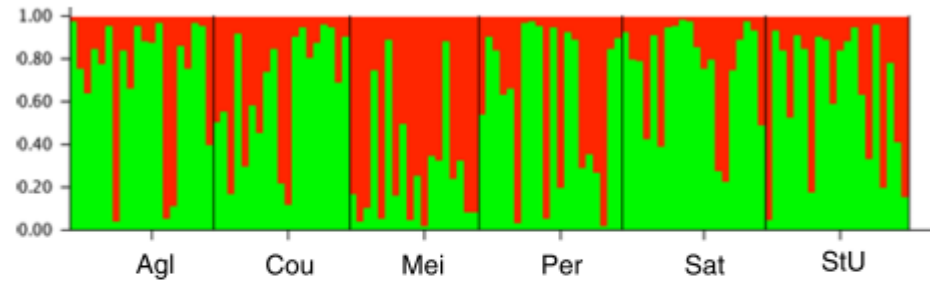
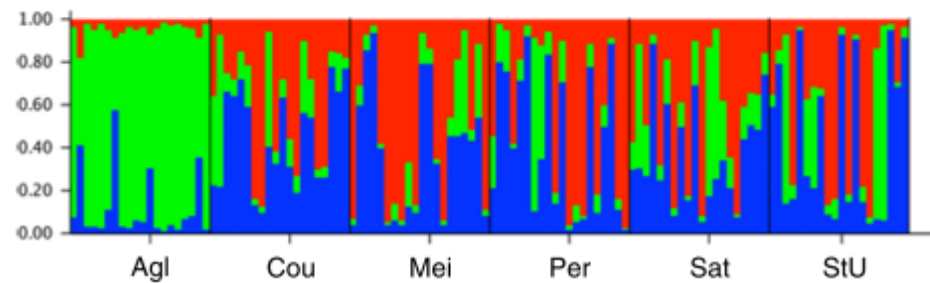
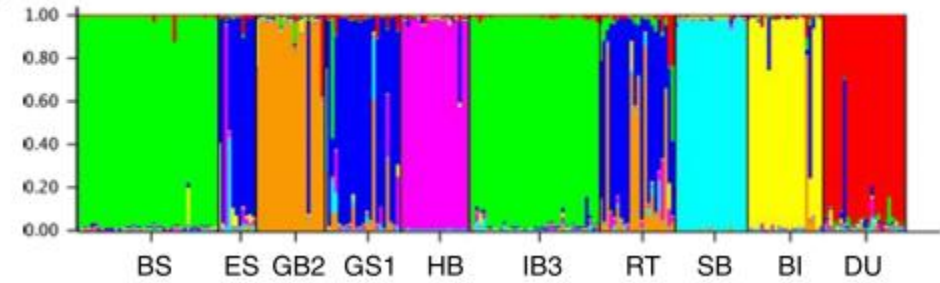
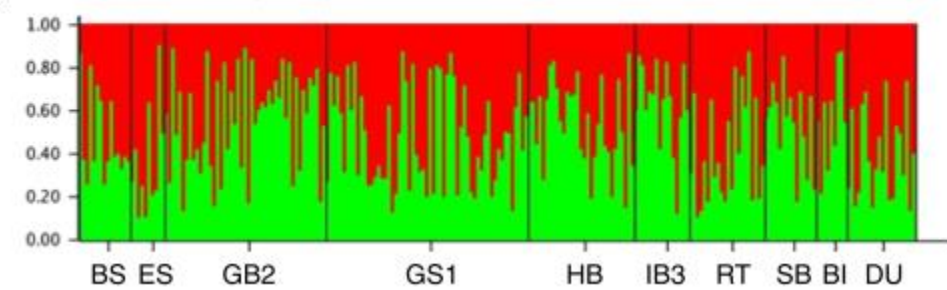
Acariens

- Acariens sur les membranes alaires (*Spinturnix spec.*)
 - Co-evolution: phylogeny
 - Morphologie peu claire!





Bruyndonckx et al. 2010 Mites as biological tags of their hosts. Mol. Ecol.

a) *S. myoti* (K=2)b) *M. myotis* (K=3)c) *S. bechsteini* (K=7)d) *M. bechsteinii* (K=2)

Acariens

- Acariens sur les oreilles
 - *Leptotrombidium spec.*
- Autres acariens
 - *Macronyssus spec*
 - *Steatonyssus spec*



Ixodoidea

- *Argas vespertilionis*
 - *Pipistrellus* sp & *Nyctalus* sp
- *Ixodes vespertilionis*,
- *Ixodes ariadnae*
 - première observation 2014
 - Des caves



Hornok et al. (2014). Bat ticks revisited: *Ixodes ariadnae* sp. nov. and allopatric genotypes of *I. vespertilionis* in caves of Hungary. Parasites & Vectors
 Hornok, Krawczyk (2016) First record of *Ixodes ariadnae* in Western Europe, Belgium. Acta Veterinaria Hungarica

Hemiptera

- des punaises des lits (Cimex)
 - Dans les colonies
 - Tres rare SUR les chauve-souris
 - 5 especes en Europe



Diptera

- Nycteribiidae
 - Aptère, 'ressembler à des araignées'
- Dans le fourrure, se déplacer très rapidement
 - Puparia dans les colonies

Nycteribiidae	Espèces hôtes typique
<i>Basilina nana</i>	<i>Myotis bechsteinii</i> , <i>Myotis nattereri</i> , <i>Plecotus auritus</i>
<i>Nycteribia kolenatii</i>	<i>Myotis daubentonii</i>
<i>Penicillidia dufourii</i>	<i>Myotis myotis</i>
<i>Pthiridium biarticulatum</i>	<i>Rhinolophus ferrumequinum</i> , <i>Rhinolophus hipposideros</i>



Intro

Ecto Parasites

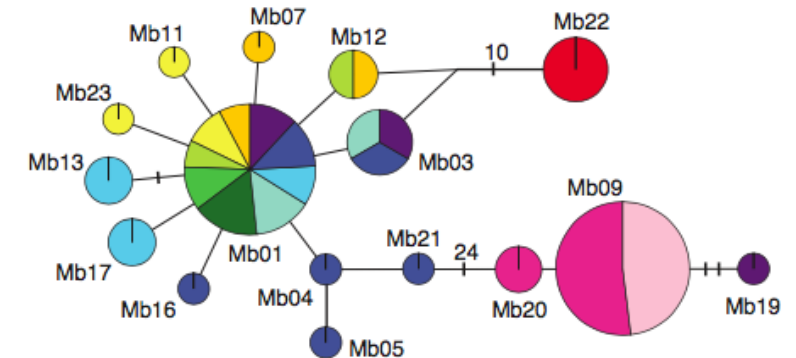
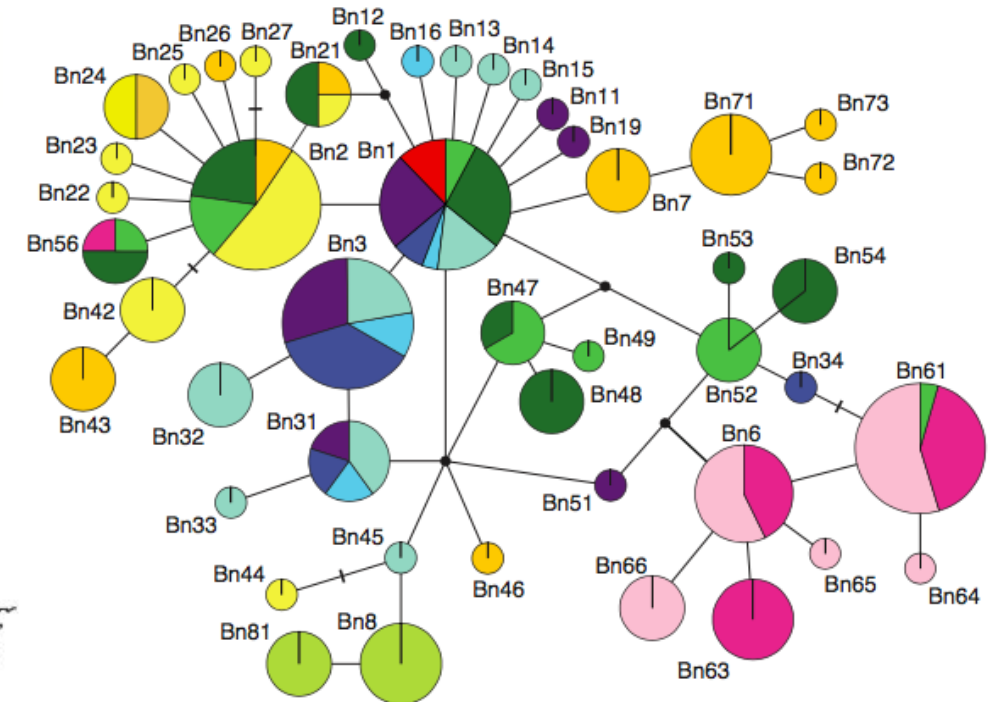
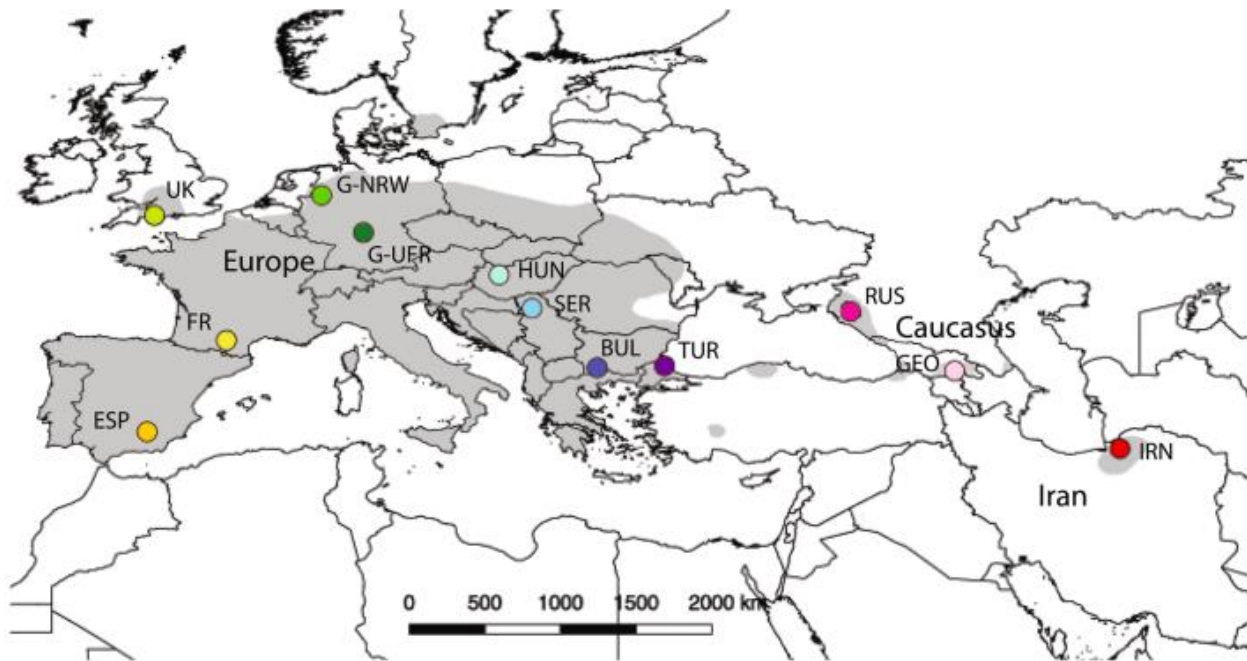
faeces

fouurrure



Diptera

- Nycteribiidae
 - “Parasites as tag on their host”



Siphonaptera

- Puces (Ischnopsyllidae)
- Les larves dans faeces (colonies)
- Adultes dans les fourrure

Ischnopsyllidae	Espèces hôtes typique
<i>Ischnopsyllus intermedius</i>	<i>Myotis myotis</i> , <i>Myotis dasycyneme</i>
<i>Ischnopsyllus simplex</i>	<i>Myotis mystacinus</i> , <i>Myotis nattereri</i> , <i>Myotis bechsteinii</i>
<i>Ischnopsyllus hexactenus</i>	<i>Plecotus auritus</i>
<i>Ischnopsyllus octatenus</i>	<i>Barbastella barbastellus</i>
<i>Ischnopsyllus elongatus</i>	<i>Eptesicus serotinus</i> , <i>Nyctalus noctula</i>
<i>Rhinolophopsylla unipectinata</i>	<i>Rhinolophus ferrumequinum</i> , <i>Rhinolophus hipposideros</i>



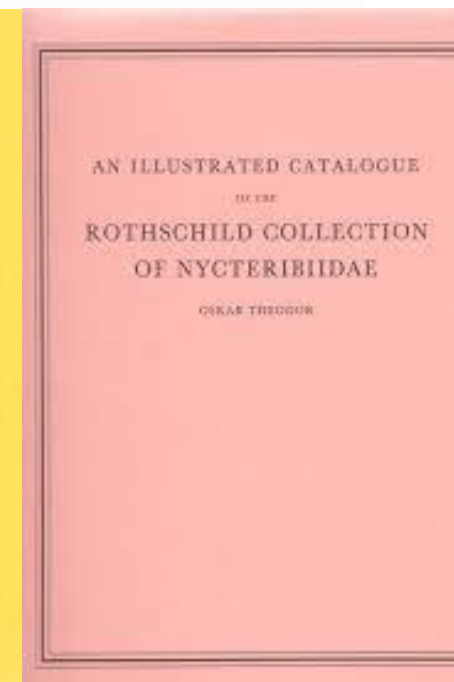
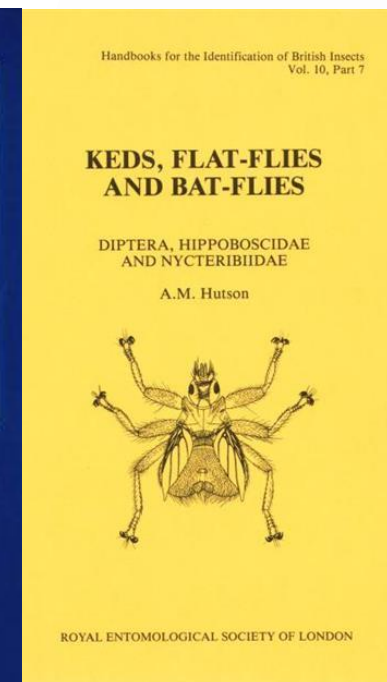
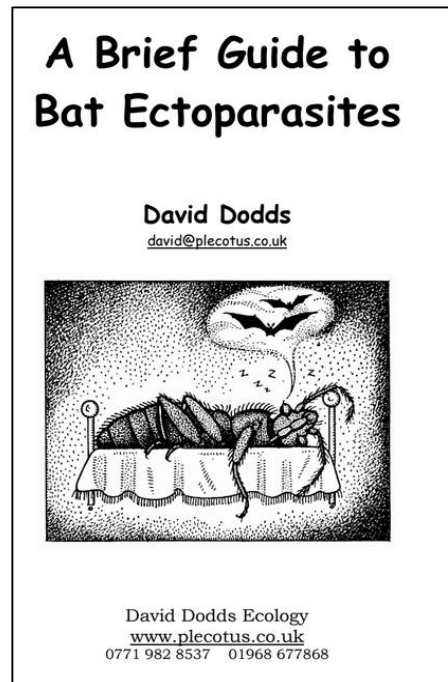
Endo Parasites

- Nematodes
- Protozoa (Malaria)
- Viruses, bacteria...
- Difficile a trouvé!
- Difficile a identifié!



Conseils pour la collecte

- Conseils pour la collecte
 - Ethanol (>70%)
 - Note l'espèce, âge et sexe d'hôte!
- Identification
 - littérature ancienne



Faeces

- L'ADN pour l'identification d'espece
 - AND mitochondrial (cyt B)
 - ca 50 euro (Inbo)



DE GRUYTER DOI 10.1515/mammalia-2013-0040 — Mammalia 2014; 78(2): 251–255

Short Note

Sébastien J. Puechmaile** and Emma C. Teeling

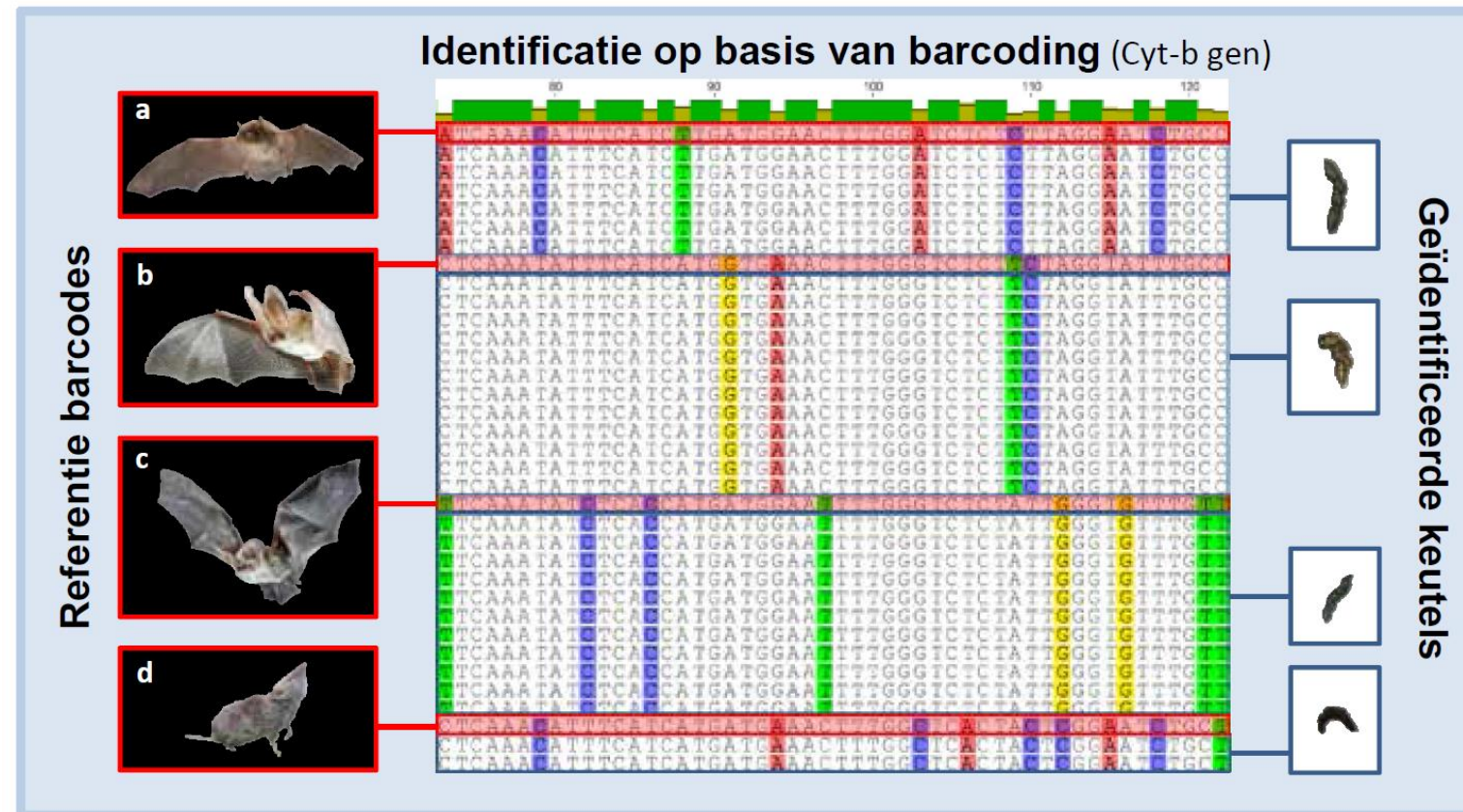
Non-invasive genetics can help find rare species: a case study with *Rhinolophus mehelyi* and *R. euryale* (Rhinolophidae: Chiroptera) in Western Europe

Abstract: The reliability of species identification is of primary importance as much of biodiversity studies, ecology, legislation, and conservation are based on this taxonomic level. Species identification problems can obscure the conservation status, especially for rare and endangered species, which are of special concern for conservation. This problem is especially significant for some taxonomic groups such as chiropterans, as many monitoring programs are run during the hibernation season when animals should not be disturbed, hence not handled. In the present study, we used *Rhinolophus mehelyi* as a case study to develop and propose a new monitoring strategy via the use of non-invasive genetics to reliably identify individuals to species.

Keywords: Chiroptera; monitoring; non-invasive genetics; species identification; threatened species.

of a former visiting taxon, individuals no longer visit the region. This will depend on how much effort has been devoted to searches for the taxon, which in turn will vary, both with organism and region*. One could be fairly confident in saying that a large mammal is RE if it has not been observed over the last few decades; however, this might be rather difficult with small elusive mammals such as bats. Further difficulties arise when the species of interest is morphologically very similar to another more common species (Boston et al. 2010, Puechmaile et al. 2012).

Non-invasive genetic techniques, using biological material left behind by animals as a source of DNA, are becoming routinely used in conservation biology and monitoring programs, particularly for threatened and protected species (Luikart et al. 2010). The DNA obtained can be used to identify the species from which the sample originated, most commonly through sequencing of a short fragment of mitochondrial DNA (Kohn and Wayne 1997).



Faeces

- L'ADN pour le structure génétique des populations
 - Plus difficile et plus cher
 - Eg. Le structure de la population de *Myotis emarginatus* en Benelux



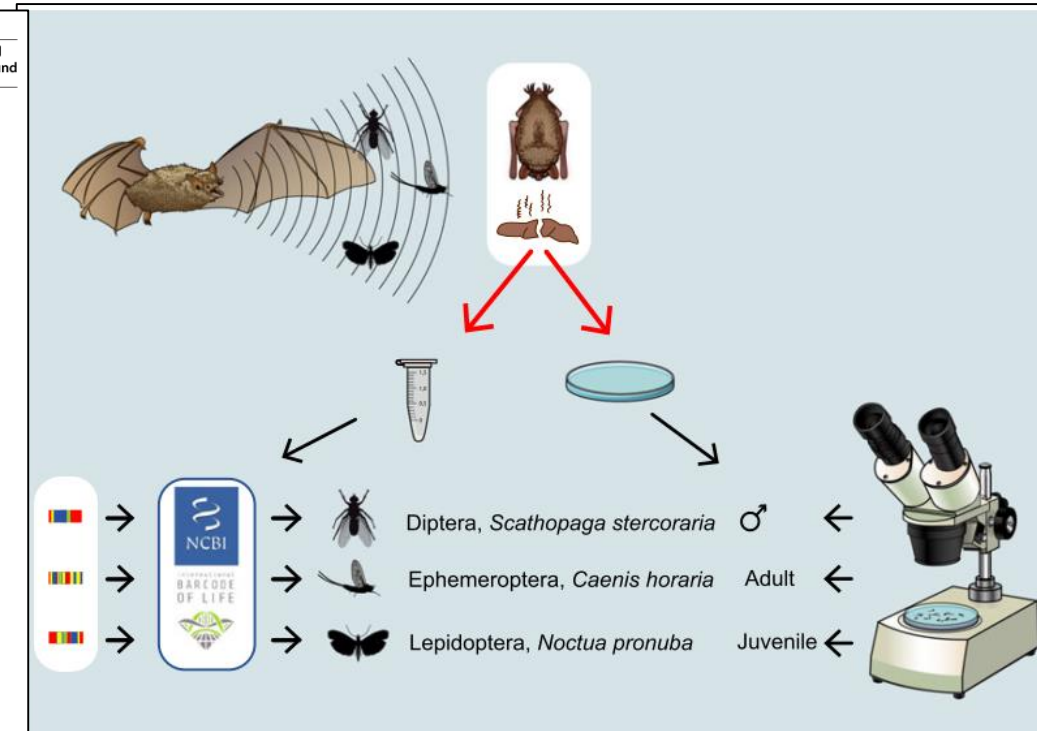
Faeces

- L'ADN pour Analyse alimentaire
 - Beaucoup Plus difficile
 - (Beaucoup) Plus cher...



Table 2 List of prey identified within *M.natterei* faecal pellets through high-throughput sequencing

Order	Family	Species	Confidence level	Sequence Similarity %	Number of faecal pellets in which found
Lepidoptera	Geometridae ¹	<i>Agriopsis marginaria</i>	2	100	4
		<i>Alcis resplandata</i>	2	100	2
	Noctuidae ¹	<i>Operophtera brumata</i>	1	100	19
		Unknown	4	100	7
		<i>Anaplectoides prasina</i>	2	100	1
		<i>Apamea epomidion</i>	1	100	1
		<i>Apamea crenata/epomidion</i>	3	100	2
		<i>Conistra vaccinii/ligula</i>	3	98.72	2
		<i>Diarsia rubi</i>	2	100	2
		<i>Noctua sp.</i>	1	100	3
		<i>Noctua janthe</i>	3	100	1
		<i>Noctua pronuba</i>	3	100	39
		<i>Omphaloscelis lunosa</i>	1	100	2
		<i>Orthosia incerta</i>	2	100	6
		<i>Phlogophora meticulosa</i>	2	100	1
	<i>Xestia c-nigrum</i>	2	100	12	
	<i>Xestia sextrigata</i>	2	100	8	
	<i>Xestia triangulum</i>	2	100	13	
	<i>Xestia xanthographa</i>	2	100	50	
	Tortricidae	<i>Tortricodes alternella</i>	1	100	9
Ypsolophidae	<i>Ypsolopha ustella</i>	2	100	1	
Diptera	Calliphoridae	<i>Pollenia rudis</i>	1	100	4
		<i>Pollenia pediculate</i>	1	99.36	1
		<i>Pollenia sp.</i>	1	100	14
	Chironomidae	<i>Prodiamesa olivacea</i>	1	98.72	1
	Culicidae	<i>Culex torrentium/piapiens</i>	3	100	1
	Muscidae	<i>Eudasyphora cyanicolor</i>	1	99.36	1
		<i>Musca domestica</i>	1	100	2



Faeces

- Conseils pour la collecte
 - Garder froid et sèche,
 - Silica ou ethanol (>80%)
 - un excrément par pot
- L'ADN continuera à être utile pendant des décennies
 - 1924...?



Vleermuiskeutels van 10-tallen jaren oud bevatte voldoende DNA!

Published on April 17, 2015



Kees van Bochove [Follow](#)
Oprichter at Datura Molecular Solutions BV



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Fourrures

- Spécifique à l'espèce
 - excepte: *Myotis brandtii* & *Myotis mystacinus*
 - excepte: *Pipistrellus pipistrellus* = *Pipistrellus pygmaeus*
- Les fourrures dans faeces: avalé pendant nettoyer
 - Pas cher...
 - ... Mais difficile!
- Collection de reference!

