L2

Module "Agents Infectieux, Hygiène"

Infections à spirochètes

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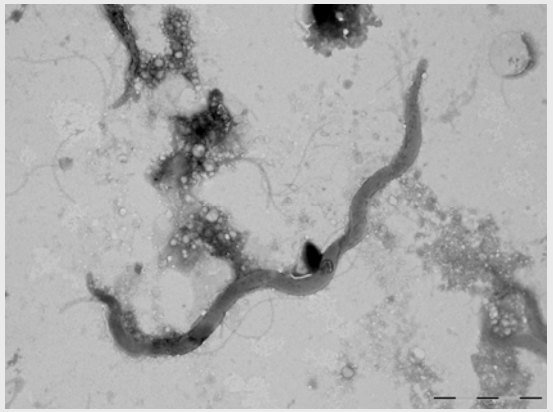
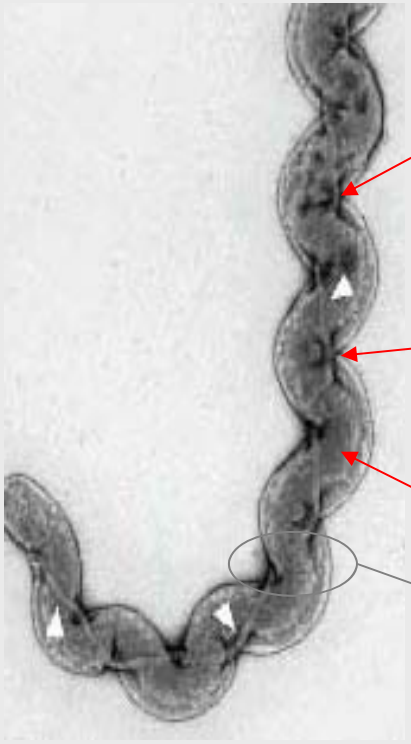
MEPHI

Spirochètes



- **Bactéries**
- **Gram « zéro »**
- **Très mobiles**
- **3 genres pathogènes pour l'homme**
    - Treponema: syphilis
    - Leptospira: leptospirose
    - Borrelia: maladie de Lyme et Fièvres récurrentes
- **Fastidieuses**

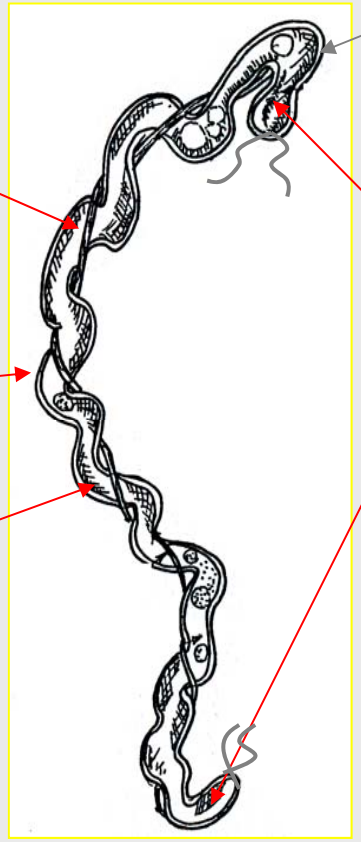
Morphologie - Structure



Filament axial
= 2 flagelles associés
Formant un axostyle

Enveloppe externe
Membrane externe ou LPS

Cylindre protoplasmique



Granule
d'insertion

Crochets
terminaux

6 µ
–
20 µ

0,1 µ

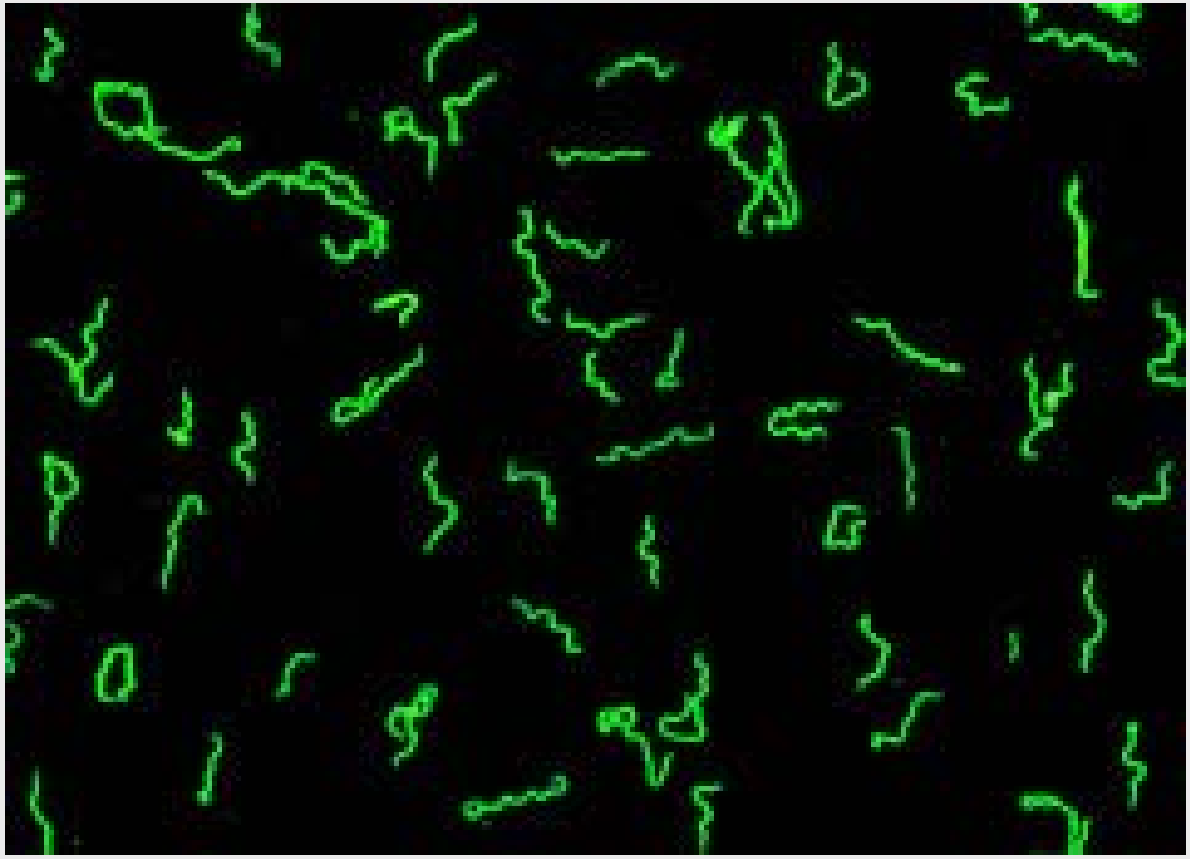
Genome Architecture

Green colour: region common between *B. duttonii* and *B. recurrentis*
Brown colour: region common between *B. crocidurae* and *B.duttonii*

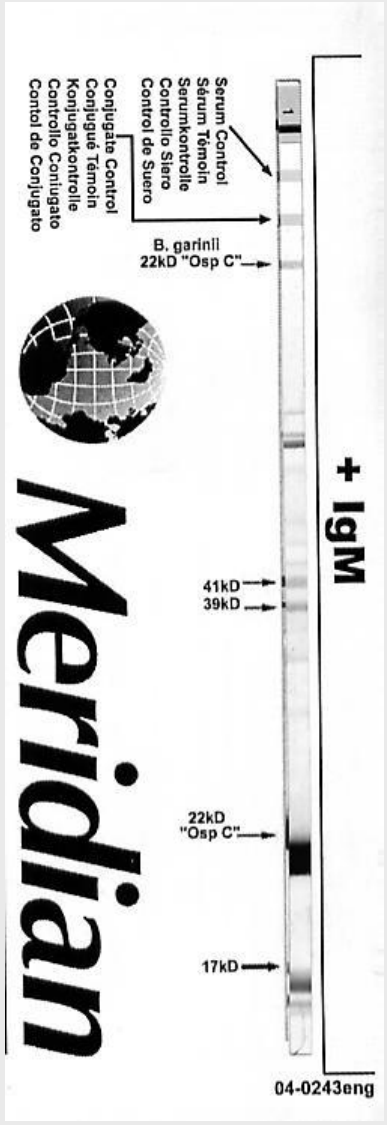
Genome alignment *of B. duttonii, B. recurrentis* and *B. crocidurae*

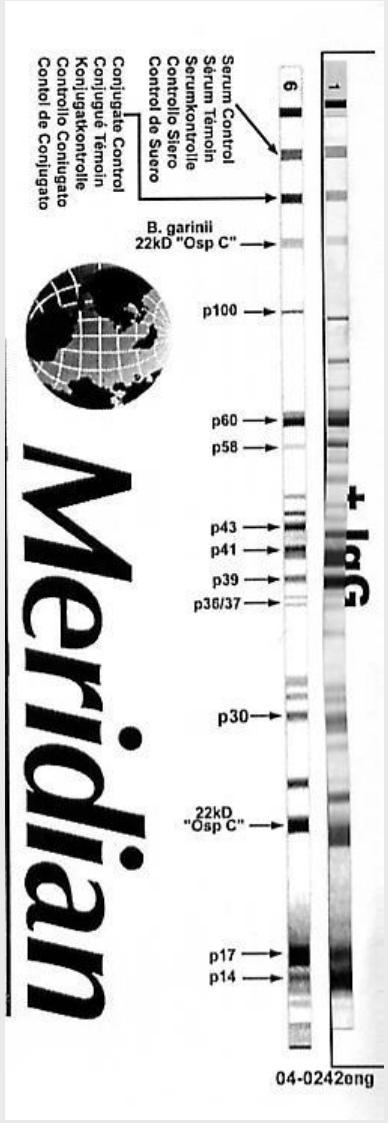
Diagnostic direct par PCR en temps réel

Sérologie par immunofluorescence: *Treponema pallidum*

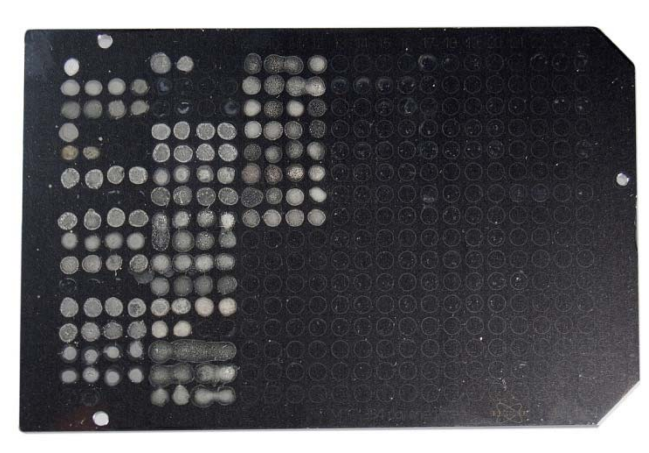


Sérologie par Western Blot:
Borrelia burgdorferi

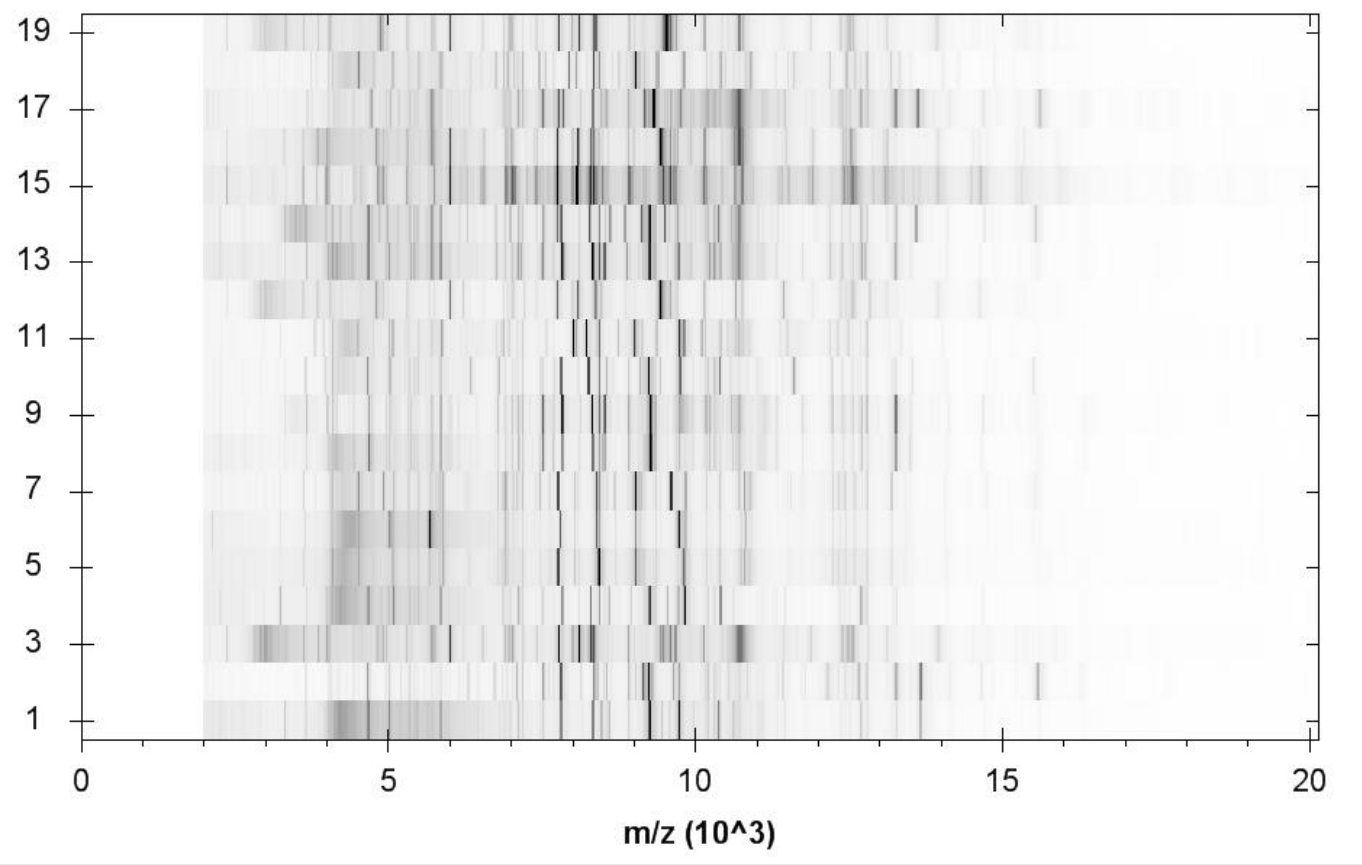




Identification rapide par MALDI-TOF



Identification rapide par MALDI-TOF: *Leptospira sp.*



Syphilis

CONCISE COMMUNICATIONS

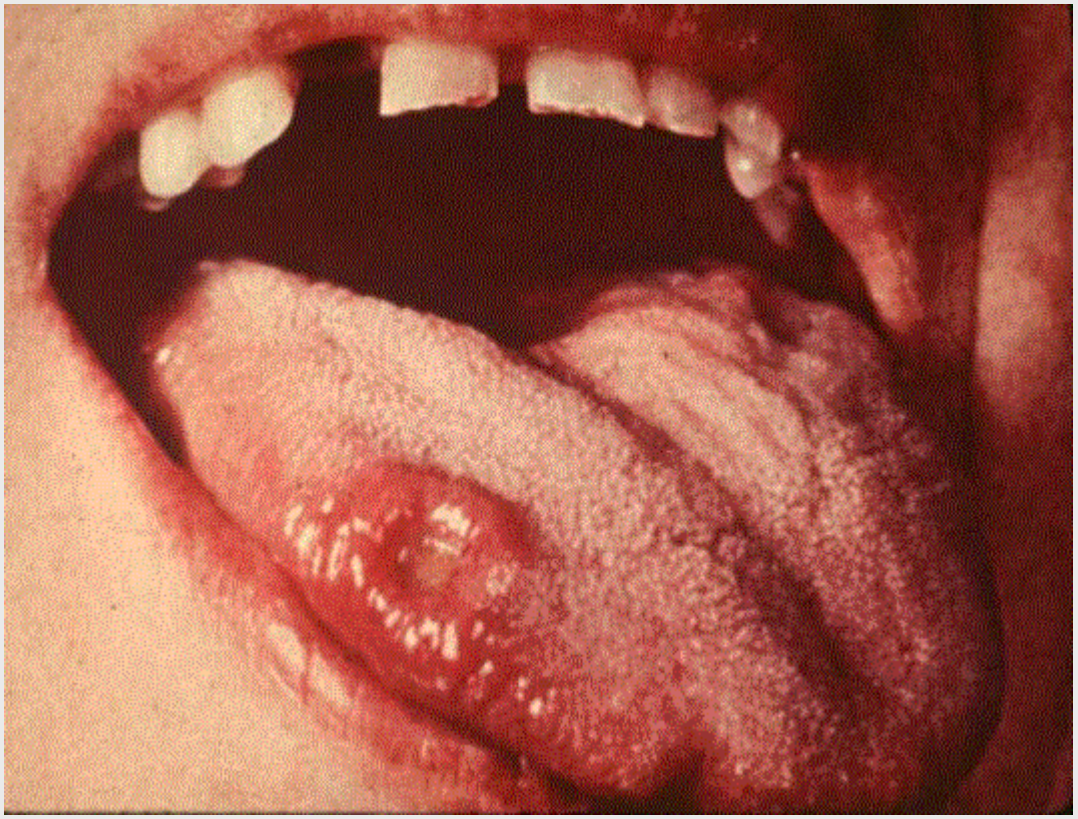
Identification of *Treponema pallidum* Subspecies *pallidum* in a 200-Year-Old Skeletal Specimen

Connie J. Kolman,[1,a] Arturo Centurion-Lara,[2] Sheila A. Lukehart,[2] Douglas W. Owsley,[3] and Noreen Tuross[1]

[1]*Smithsonian Center for Materials Research and Education, Suitland, Maryland;* [2]*Department of Medicine, University of Washington, Seattle;* [3]*Department of Anthropology, Smithsonian Institution, Washington, DC*

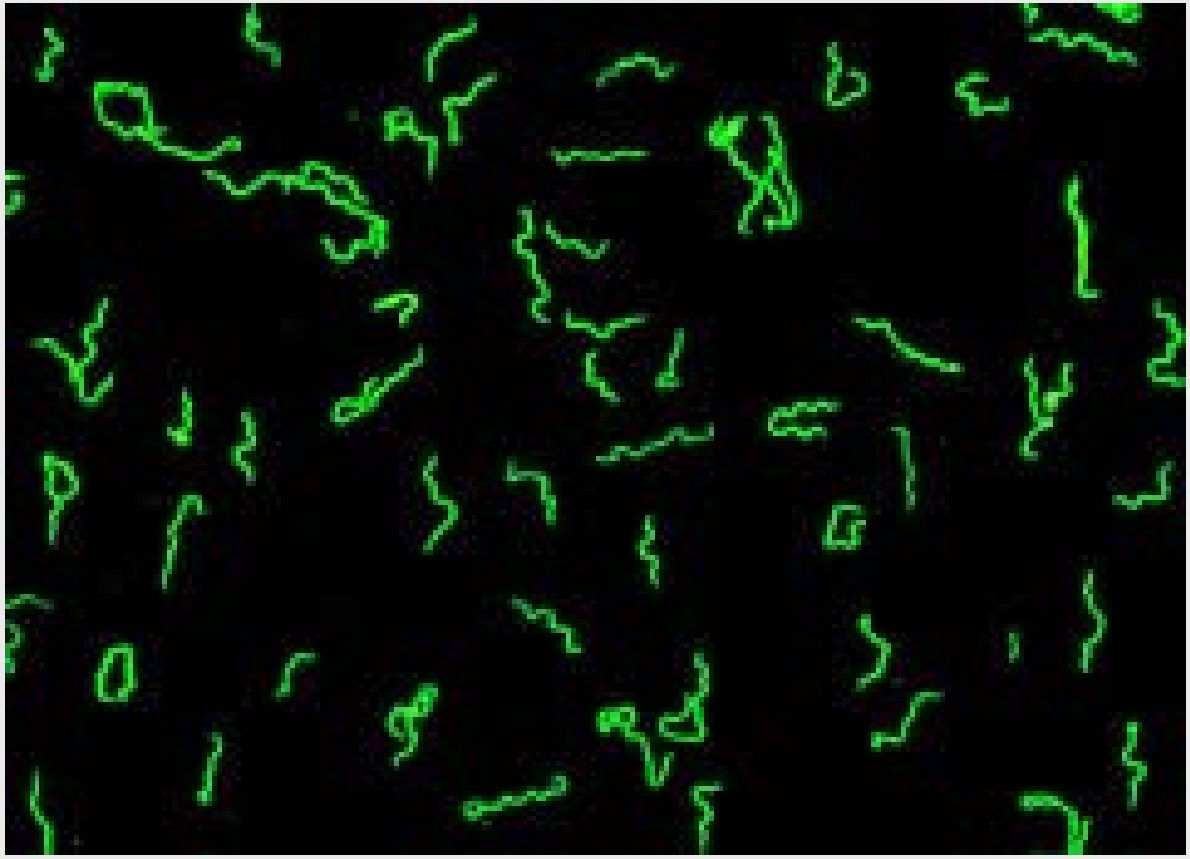
Treponema pallidum subsp. *pallidum,* the causative agent of venereal syphilis, was detected in a 200-year-old skeletal specimen from Easter Island. An initial diagnosis of treponemal infection was confirmed by extensive purification of immunoglobulin that reacted strongly with *T. pallidum* antigen. Extracted DNA exhibited a single-base polymorphism that distinguished *T.p.* subsp. *pallidum* from 4 other human and nonhuman treponemes. Extensive precautions against contamination of the subject matter with modern treponemal DNA were employed, including analysis of archaeological and modern specimens in 2 geographically separate laboratories. Molecular determination of historical disease states by using skeletal material can significantly enhance our understanding of the pathology and spread of infectious diseases.

Syphilis: transmission inter-humaine directe: IST



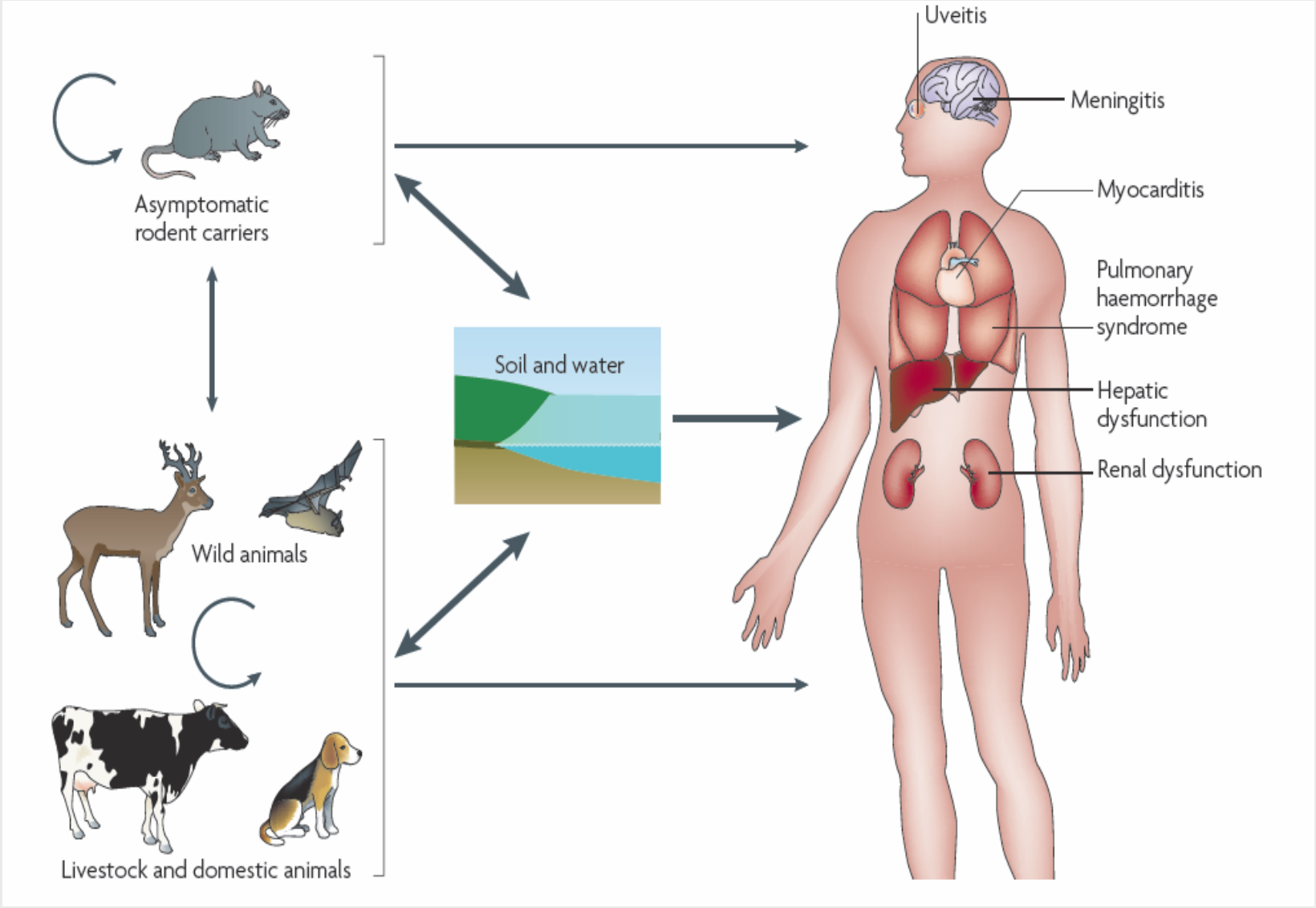
Syphilis: transmission inter-humaine directe: IST

Sérologie par immunofluorescence: *Treponema pallidum*



Leptospirose

Cycle épidémiologique



(Albert I. Ko, 2009. *Nature Reviews Microbiology* 7, 736-747)

Epidémiologie

Epidémiologie synthétique

* Bactérie à répartition mondiale

Endémique dans les pays à climat chaud et humide

→ Persistance annuelle du germe

→ Occurrence annuelle des leptospiroses

Occurrence saisonnière dans les pays à climat tempéré

→ Maladie du printemps, de l'été et de l'automne

* Nombreuses espèces animales sont réceptives

- Rôle des animaux sauvages = réservoirs notamment rongeurs: rats - Icterohaemorragiae)
- Rôle des animaux domestiques (bovins, porcins – Pomona; Chien - Canicola)

Fig. 1. Leptospirosis incidence in Europe in 2010 (cases/100,000 inhabitants) [ND = presence of leptospirosis, but lack of comprehensive data]

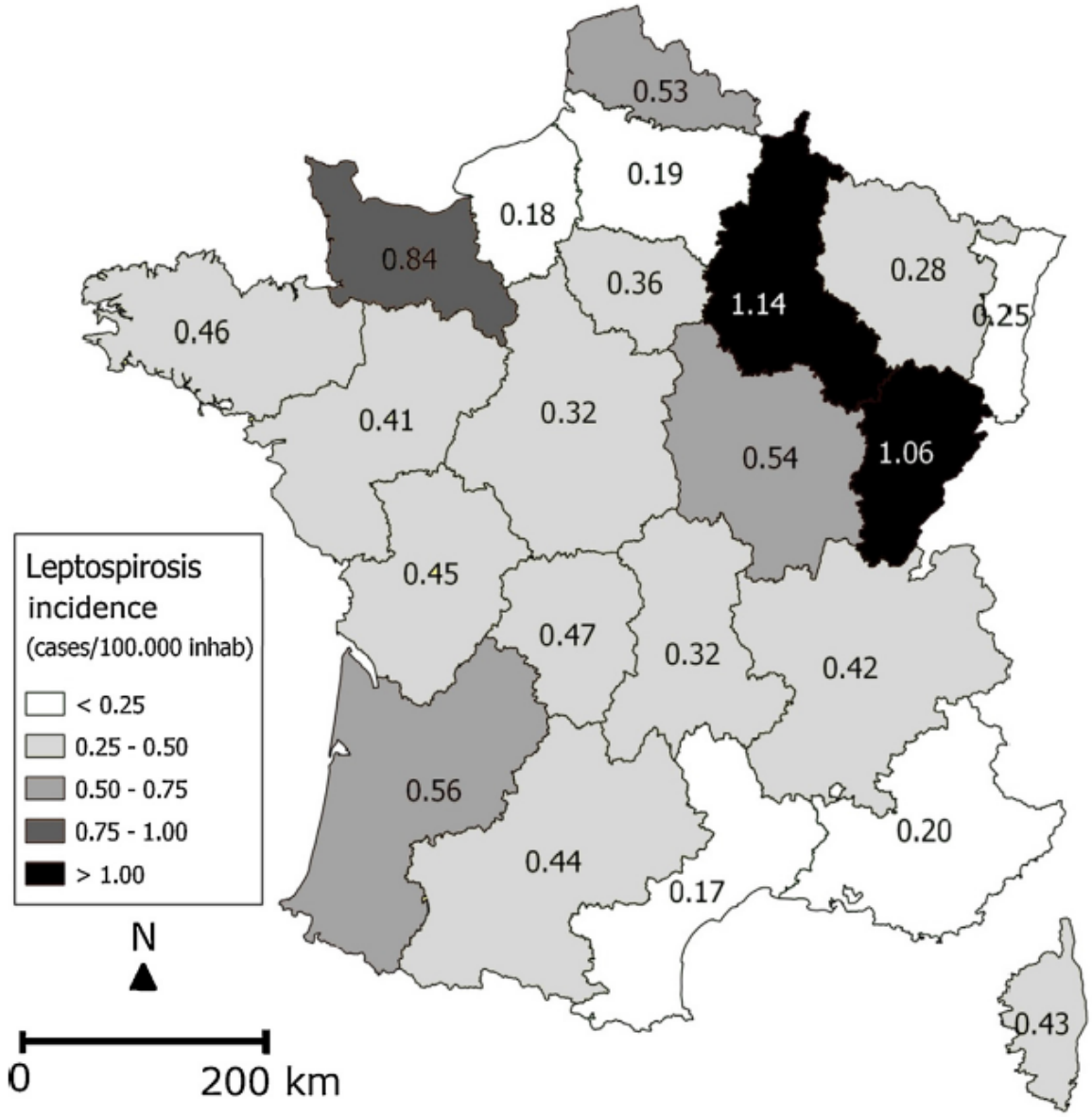


Fig. 3. Global leptospirosis incidence in France, 2006–2010 (cases/100,000 inhabitants) [11].

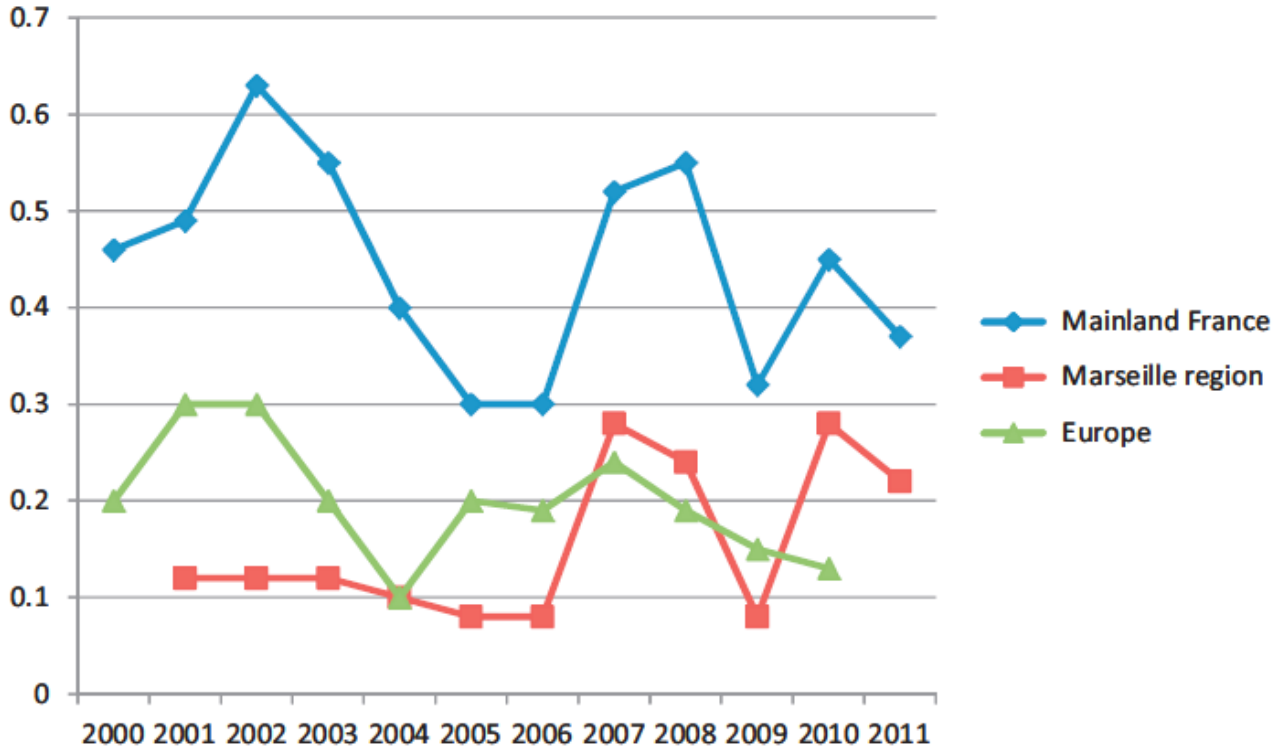
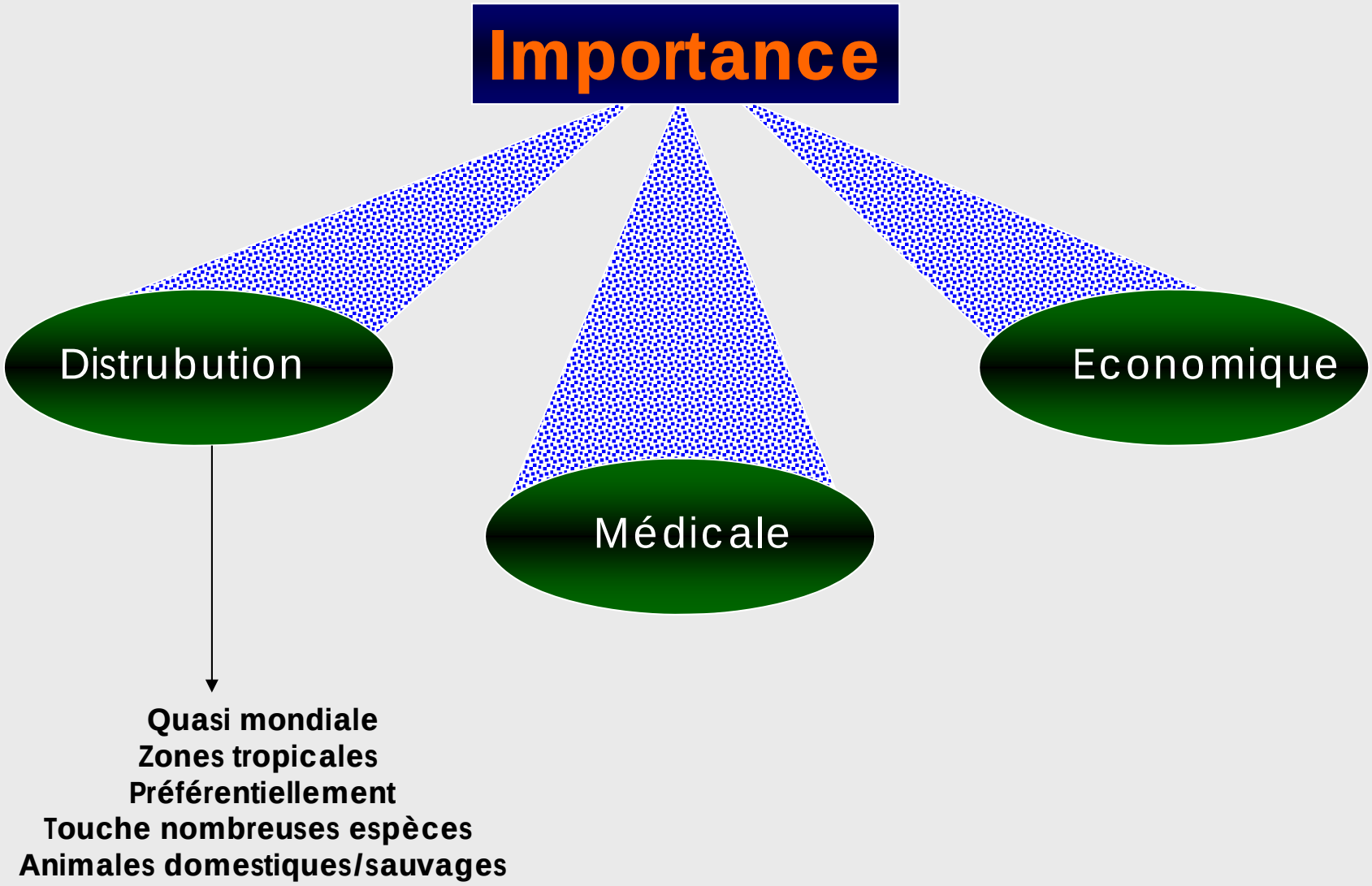
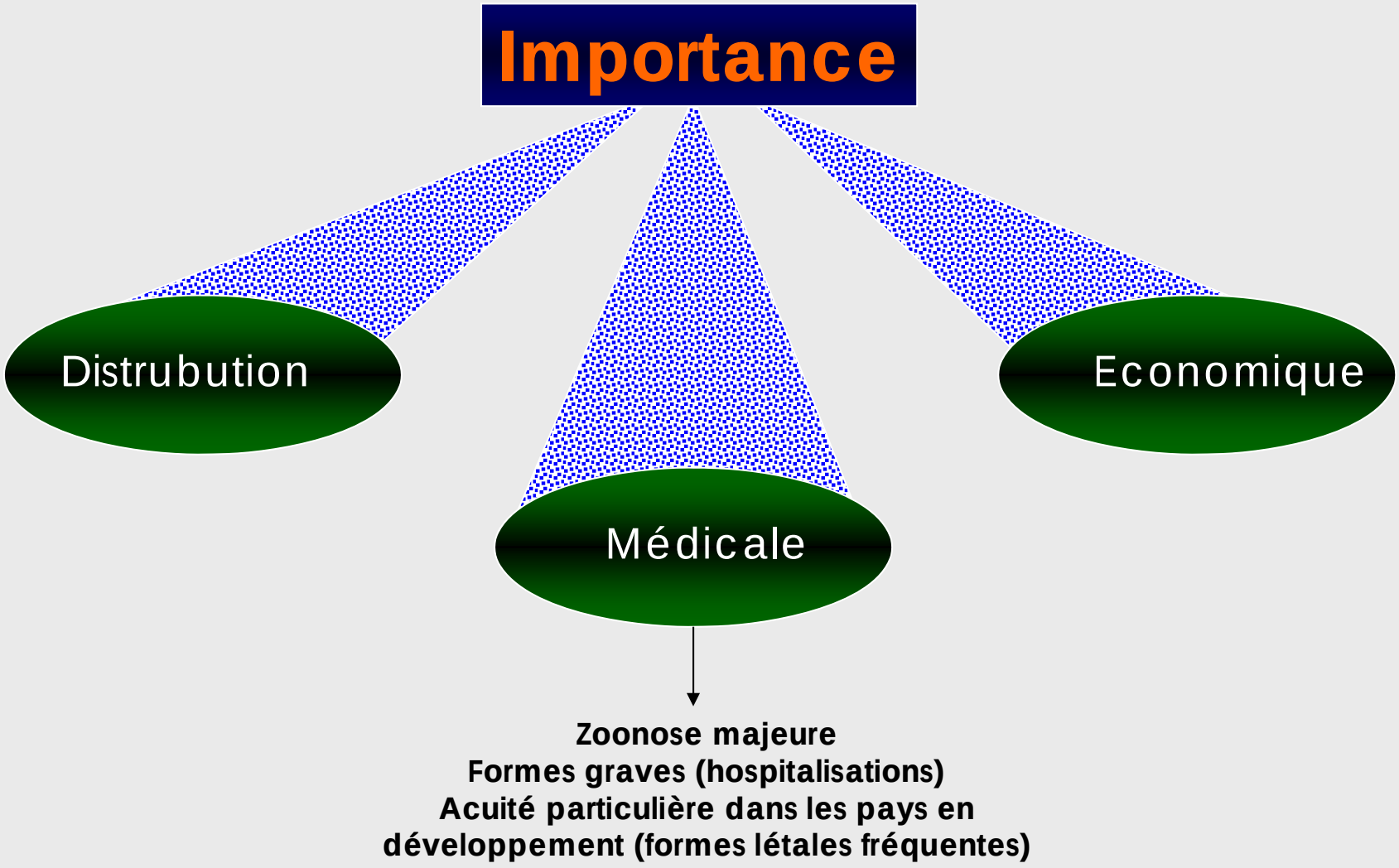
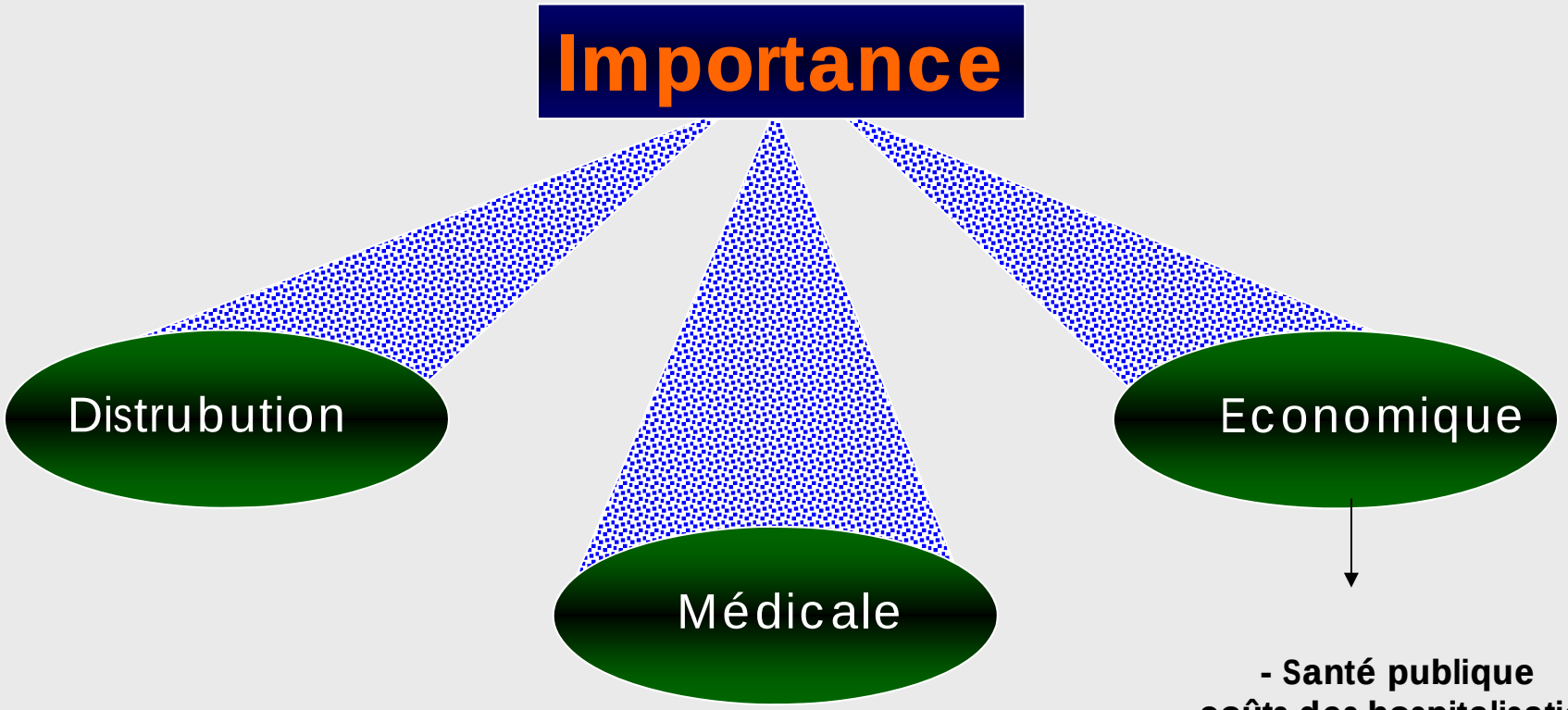


Fig. 2. Evolution of leptospirosis incidence in mainland France, the Marseille region, and Europe, 2000–2011 [9,11, personal communications].


Importance
Distrubution
Médicale
Economique
Quasi mondiale
Zones tropicales
Préférentiellement
Touche nombreuses espèces
Animales domestiques/sauvages


Importance
Distrubution
Médicale
Economique
Zoonose majeure
Formes graves (hospitalisations)
Acuité particulière dans les pays en développement (formes létales fréquentes)

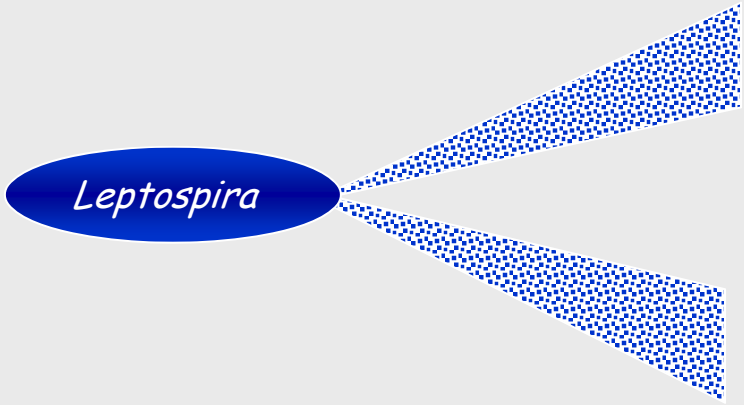


- Santé publique
coûts des hospitalisations)

Impacts sur les productions animales [Ruminants – Suidés]

Pouvoir pathogène

Caractéristiques générales



Leptospira biflexa sensu lato NON PATHOGENES

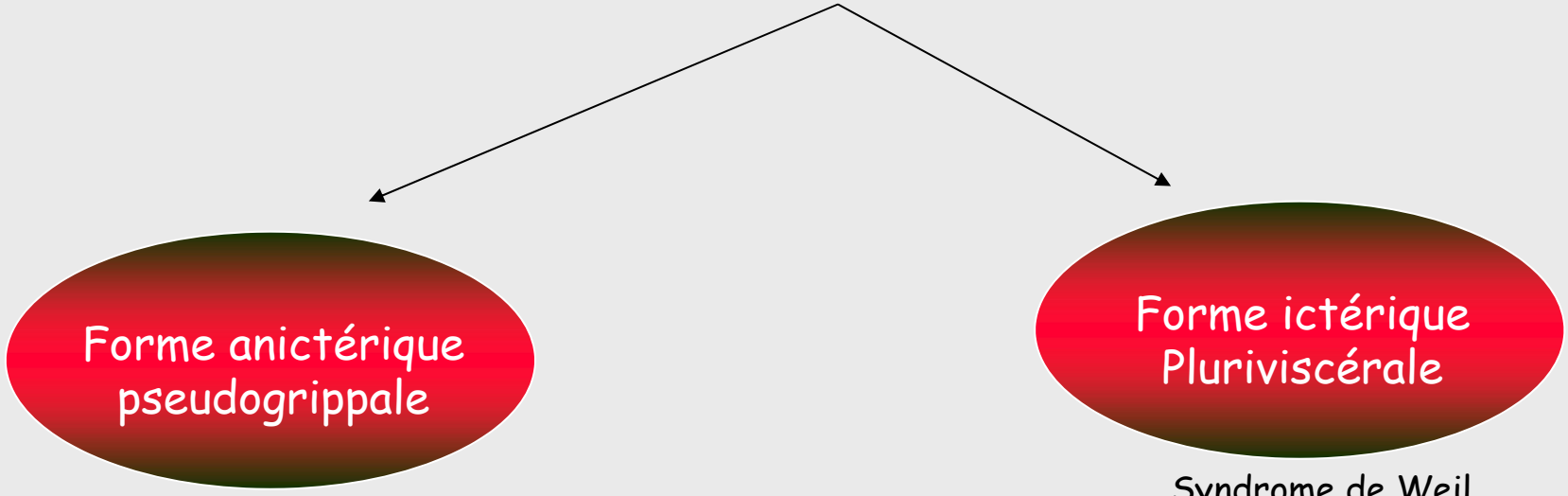
Leptospira interrogans sensu lato TOUS PATHOGENES

1) Notion d'espèce réceptive/sensible

2) Sérogroupes plus fréquents/espèce

Pouvoir pathogène naturel

Chez l'homme



Fièvre, céphalée
Myalgie, arthralgie
Spontanément régressives

Exceptionnellement:
Encéphalite et myélite
Tardivement complications oculaires

Pronostic généralement favorable

Syndrome de Weil

Atteinte hépatique et rénale
Avec insuffisance aiguë dans 15 à 40% des cas

Avec pronostic défavorable

5 à 10% de létalité

Prélèvements utiles au diagnostic de leptospirose

- Diagnostic direct
  - Urines
  - Sang
  - L.C.R.
- Diagnostic indirect: sérologie:
  - Serum

Maladie de Lyme

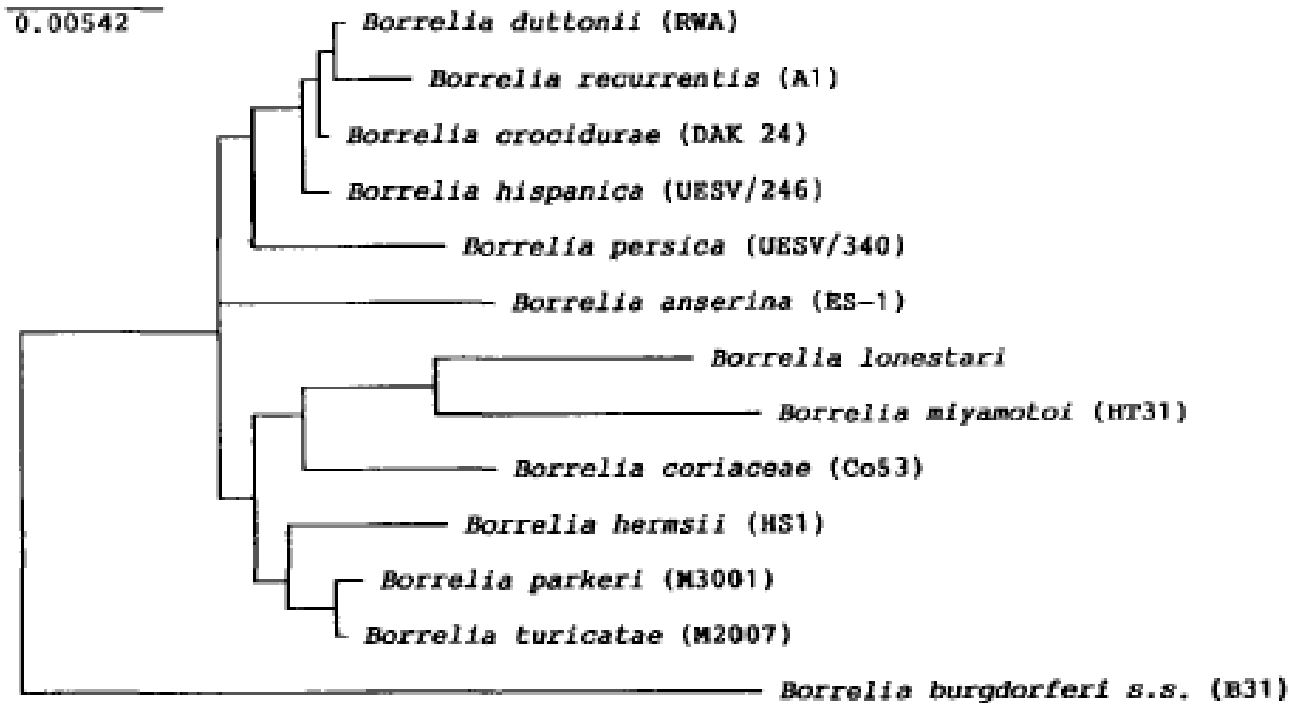


FIG. 1. Phylogenetic tree based on a comparison of the 16S rRNA sequences of RF *Borrelia* species. The branching pattern was generated by the neighbor-joining method.

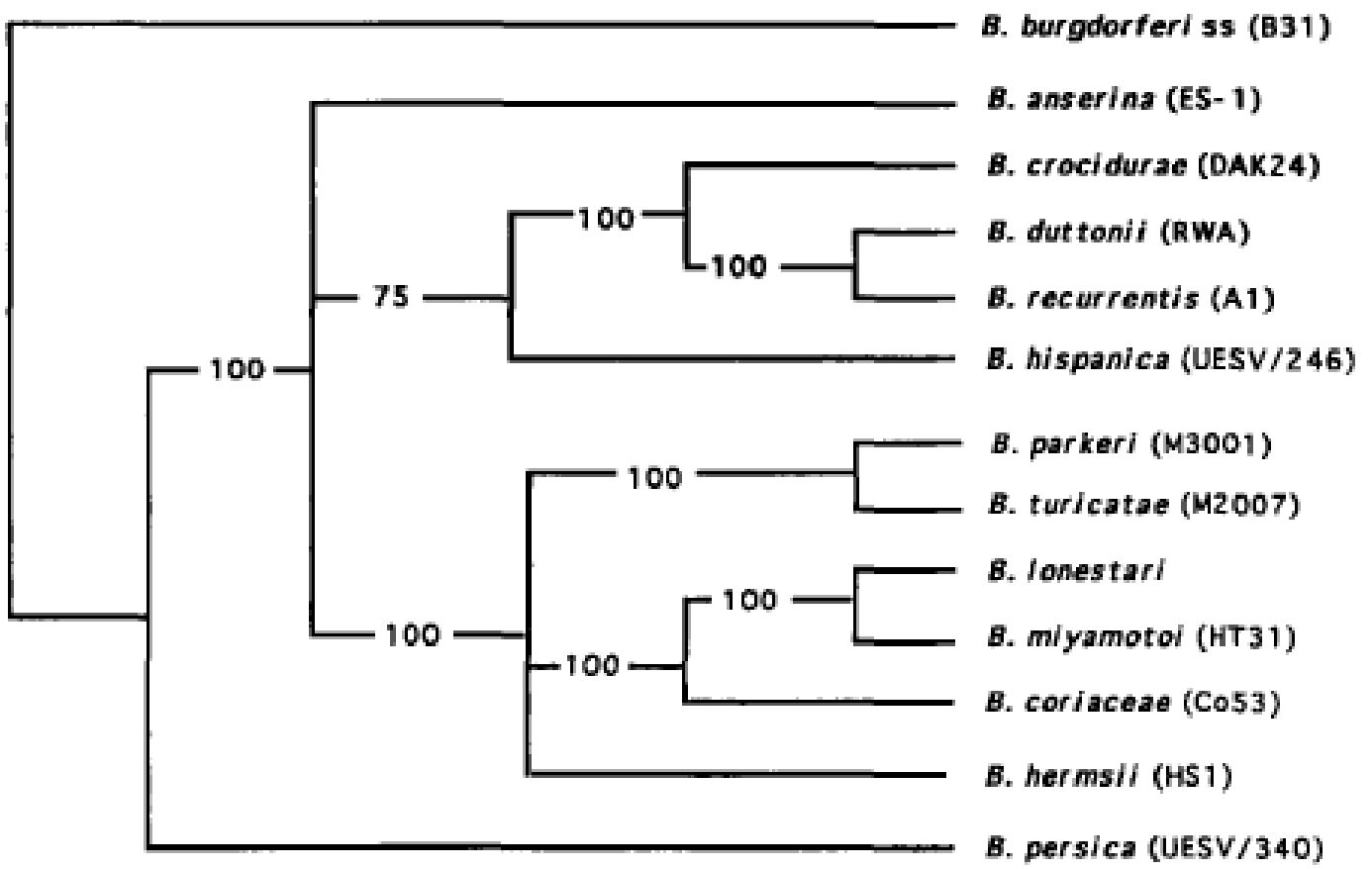


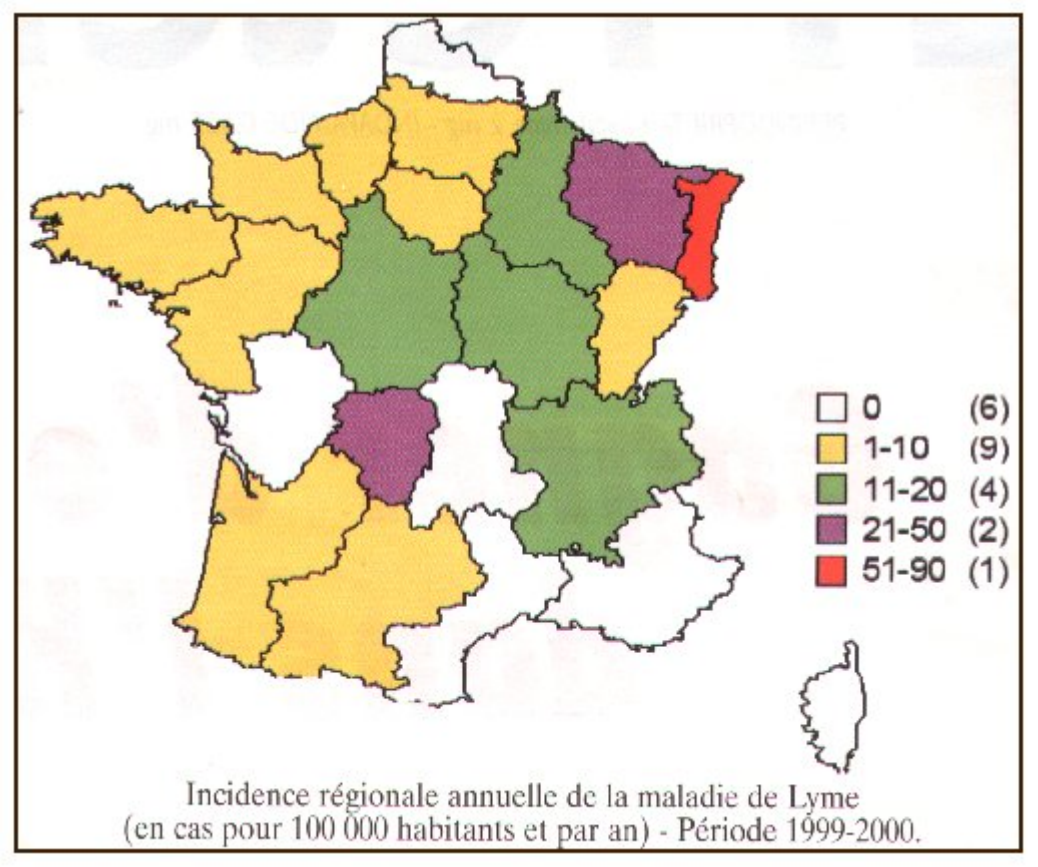
FIG. 2. Phylogenetic tree based on a comparison of the 16S rRNA sequences of RF *Borrelia* species. This 50% majority rule consensus tree based on 12 trees was obtained by using a maximum-parsimony method.

Maladie de Lyme: Erythème migrant

Maladie de Lyme: une infection véctorisée

Maladie de Lyme: USA

Maladie de Lyme: France



Incidence régionale annuelle de la maladie de Lyme
(en cas pour 100 000 habitants et par an) - Période 1999-2000.

Borrélioses récurrentes

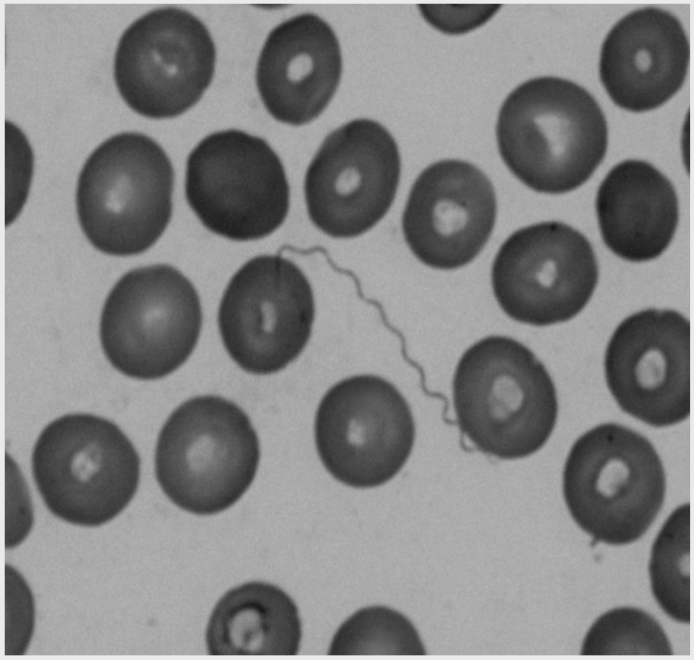
A-24-year-old man was hospitalised in February 2008 for fever, rigors and myalgia. The patient had visited his relatives in Marena's area, Mali for 2 months in December and January 2008. The patient recalled rat bite. He had no antimalarial prophylaxis.

At the end of January, he consulted in a local hospital in Mali for fever, headaches and rigors and was given intravenous quinine. The patient has been vaccinated against hepatitis A virus, yellow fever virus and diphtheria but did not benefit from anti malaria prophylaxis. Clinical examination found a high grade fever of 39°6 C, heart rate of 91/mn and bilateral inguinal lymph nodes. The electrocardiogram was normal.

Pertinent laboratory parameters included leukocytes of 6.34 Giga/liter with polymorphonuclear leucocytes of 4.61 Giga/liter, haemoglobin of 13.8 Giga/liter and platelet of 121 Giga/liter. Fibrine level was 6.88 Giga/liter and C-reactive protein of 290 mg/L. ALAT was 88 IU and ASAT of 92 IU. Three blood cultures remained sterile and serology for hepatitis B virus, hepatitis C virus, *Coxiella burnetii*, syphilis and human immunodeficiency virus were negative.

Thin blood smear did not fiind *Plasmodium* parasites.

Here’s the patient’s blood film after giemsa staining



What’s your diagnosis ?

Further microbiological investigations

16S rDNA sequencing : 100% sequence similarity with 10 homologous sequences for *B. crocidurae* and 7 homologous sequences for *B. recurrentis*

Fla sequencing : 100% sequence similarity with homologous sequence for *B. crocidurae*, *B. duttonii* and *B. recurrentis*.

16S-23S rDNA intergenic spacer (IGS) sequencing : 567/570 (99%) base position identical to *B. crocidurae* (GenBank accession number DQ000287) and 542/575 (94%) base positions identical to *B. duttonii* (GenBank accession number DQ000282).

And the diagnosis was…

Borrelia crocidurae infection

NOM : Prénom : **Sexe :**
Date de naissance:

Hôpital/Service: APHP Pompidou Med int
Médecin/Tel : Dr Planturu (interne) 01 56 09 27 86

Borrelia

SYMPTOMATOLOGIE

- ☐ **Date de début des symptômes** :
- ☐ **Durée d'incubation**:
- ☐ **Fièvre**
- X **Escarre unique / localisation : interieur du bras G infra centimétrique (pas de BCU, escarre tombé pdt le we du 7/03)**
- ☐ **Escarres multiples / localisation** :
- X **radiculite objectivée à l'EMG**
- X **placard érythémateux sur la face interne du bras gauche**

Rash : ☐ **Maculo-papuleux** ☐ **Purpurique** ☐ **Vésiculeux**

☐ **Confusion** ☐ **Syndrôme méningé** ☐ **Forme maligne**

EPIDEMIOLOGIE

- X **Lieu / date : Ethiopie en janvier 2010, piqure sur les hauts plateaux d'ethiopie**
- X **Piqûre de tique : interieur du bras G partiellement retirée avec une pince à épiler le 20/01/10**
- ☐ **Piqûre de puce/ Identification** :
- ☐ **Piqûre de pou** :
- ☐ **Piqûre d'autre insecte / Identification** :
- ☐ **Piqûre unique / localisation** :
- ☐ **Piqûres multiples/ localisation** :
- X **Contact avec des animaux : singe**
- ☐ **Contact avec les chats**

TRAITEMENT : Antibiotique / molécule: doxy 15 j, amélioration cutanée mais pas d'amelioration neuro, rocéphine 3 semaines

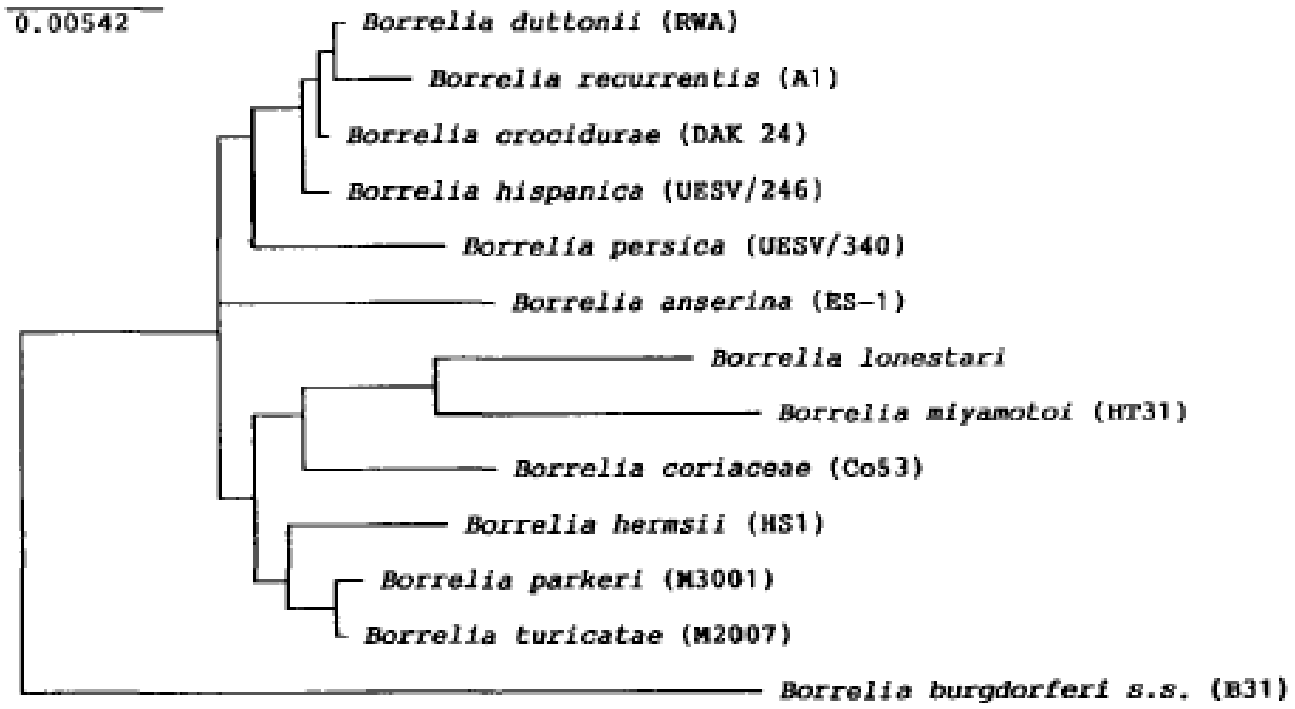
PHOTO: ☐ **OUI** ☐ **NON**

NB: séro rick neg chez eux, lyme IgG pos

Date	smarlab	Bartonella		*C. burnetii*		*Rickettsies*		*F. tularensis*		*Borrelia*		16S
		Sérologie	PCR	Sérologie	PCR	Sérologie	PCR	Sérologie	PCR	Serologie	PCR	
19/03/2010	25/02/2183						neg				33,49	

WB pos, séro IgG lyme pos


2010, CMIP, Dr PHC



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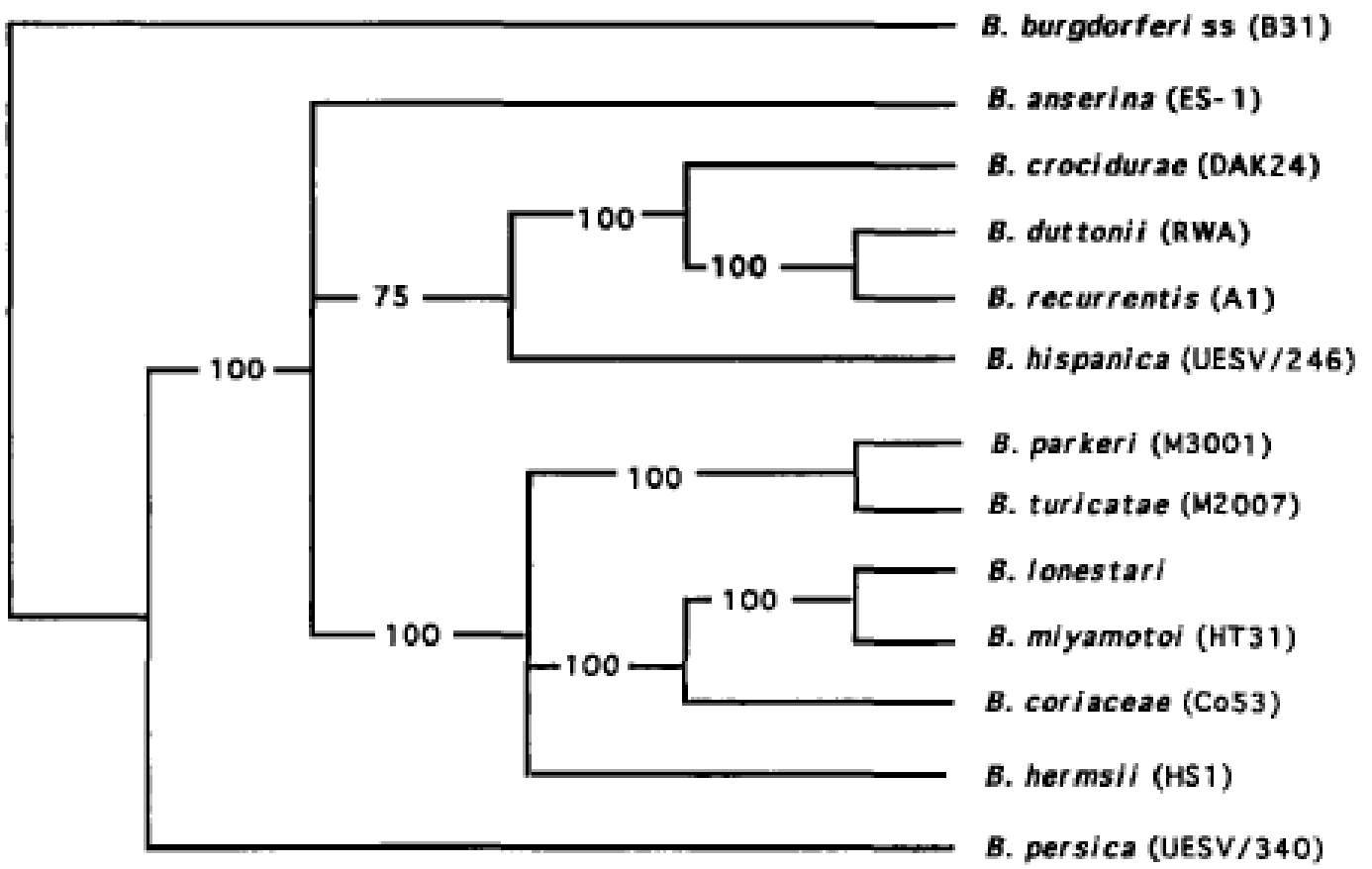

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ORNITHODOROS SOFT TICKS COLLECTED INSIDE HUMAN DWELLINGS FROM DIELMO AND NDIOP VILLAGES, SINE-SALOUM, SENEGAL


Burrow examined in a pantry from Ndiop village

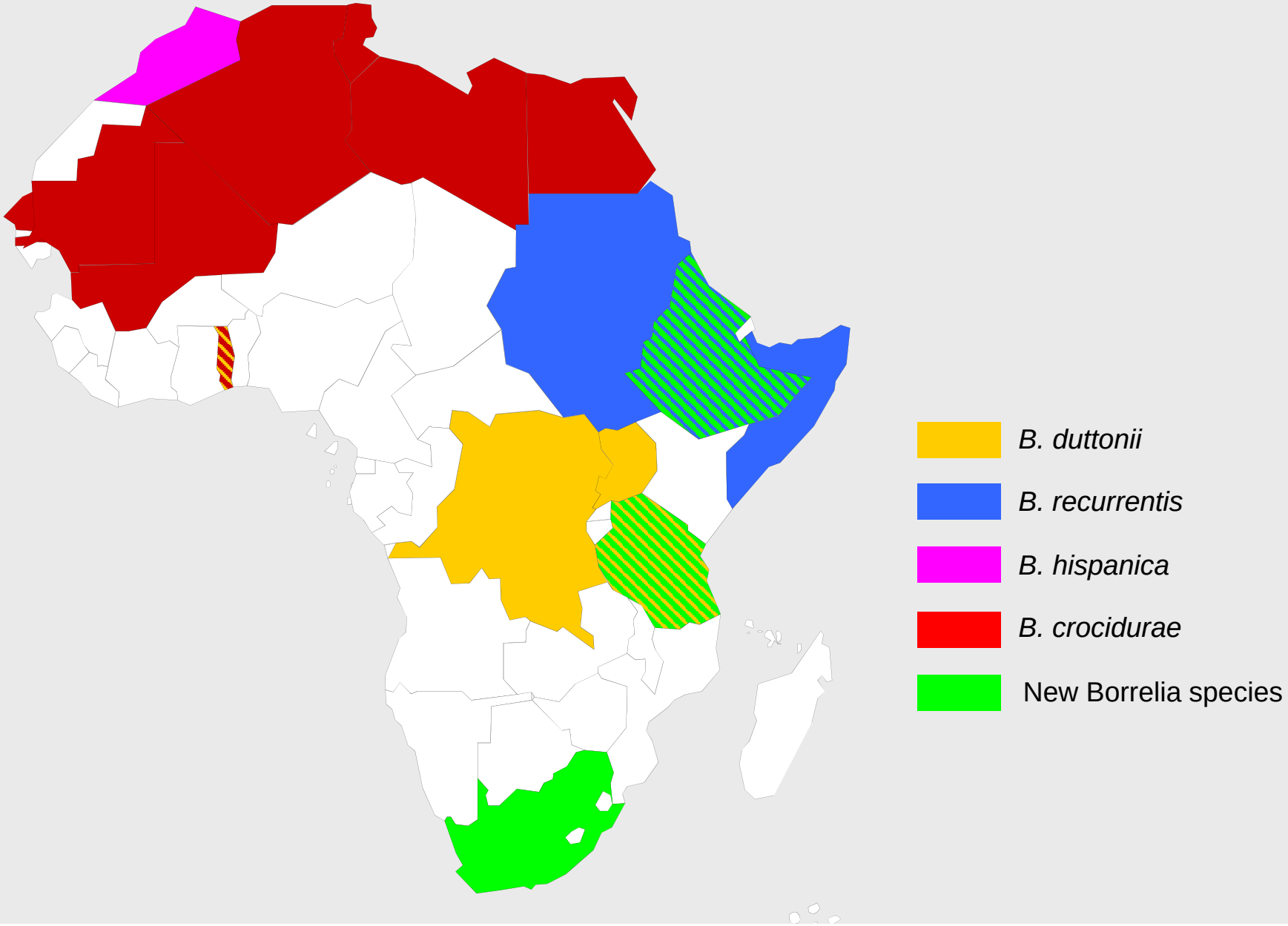
Ticks Vector: *Ornithodoros sonrai* group; Taille: 3-4 mm


Burrow examined in a bedroom from Ndiop village

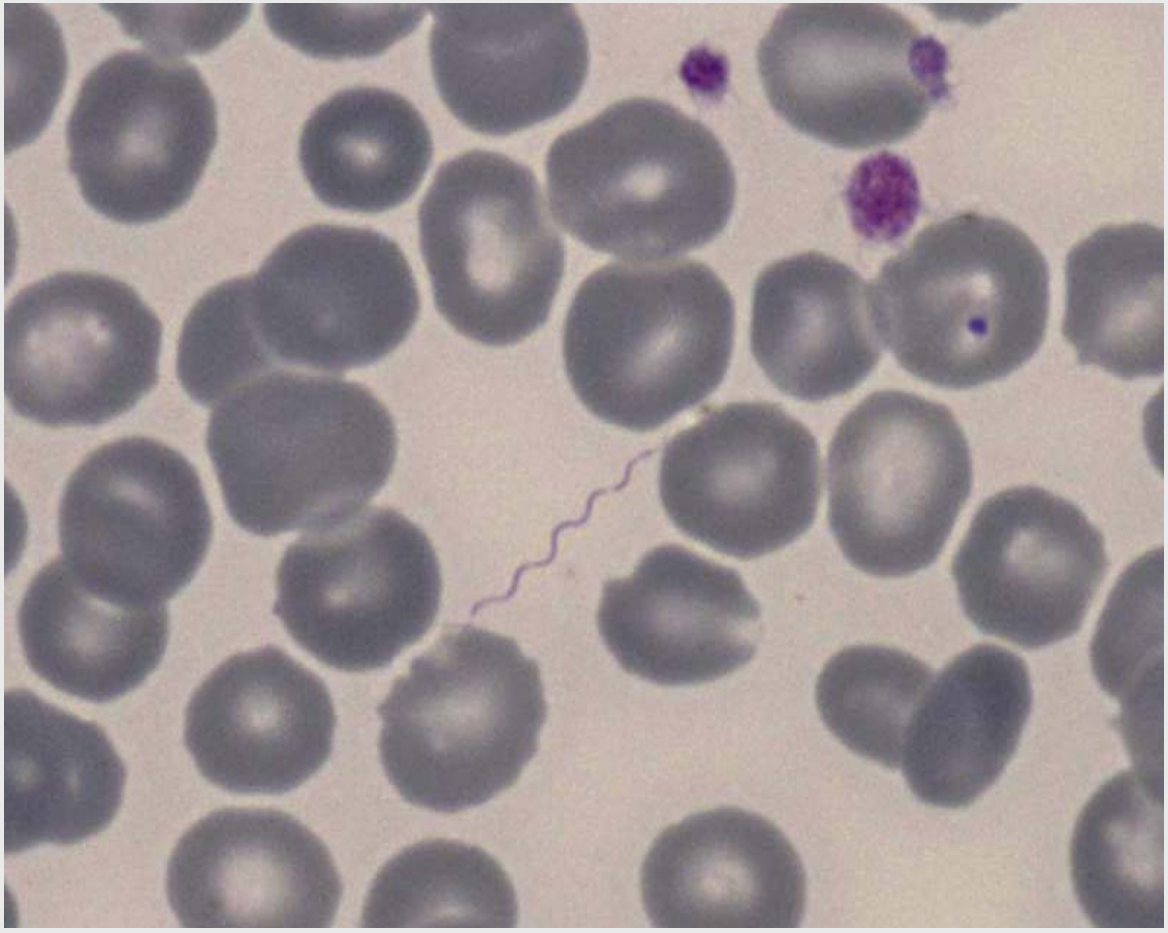

Burrow examined in a bedroom from Dielmo village


Burrows examined in a bedroom from Dielmo village

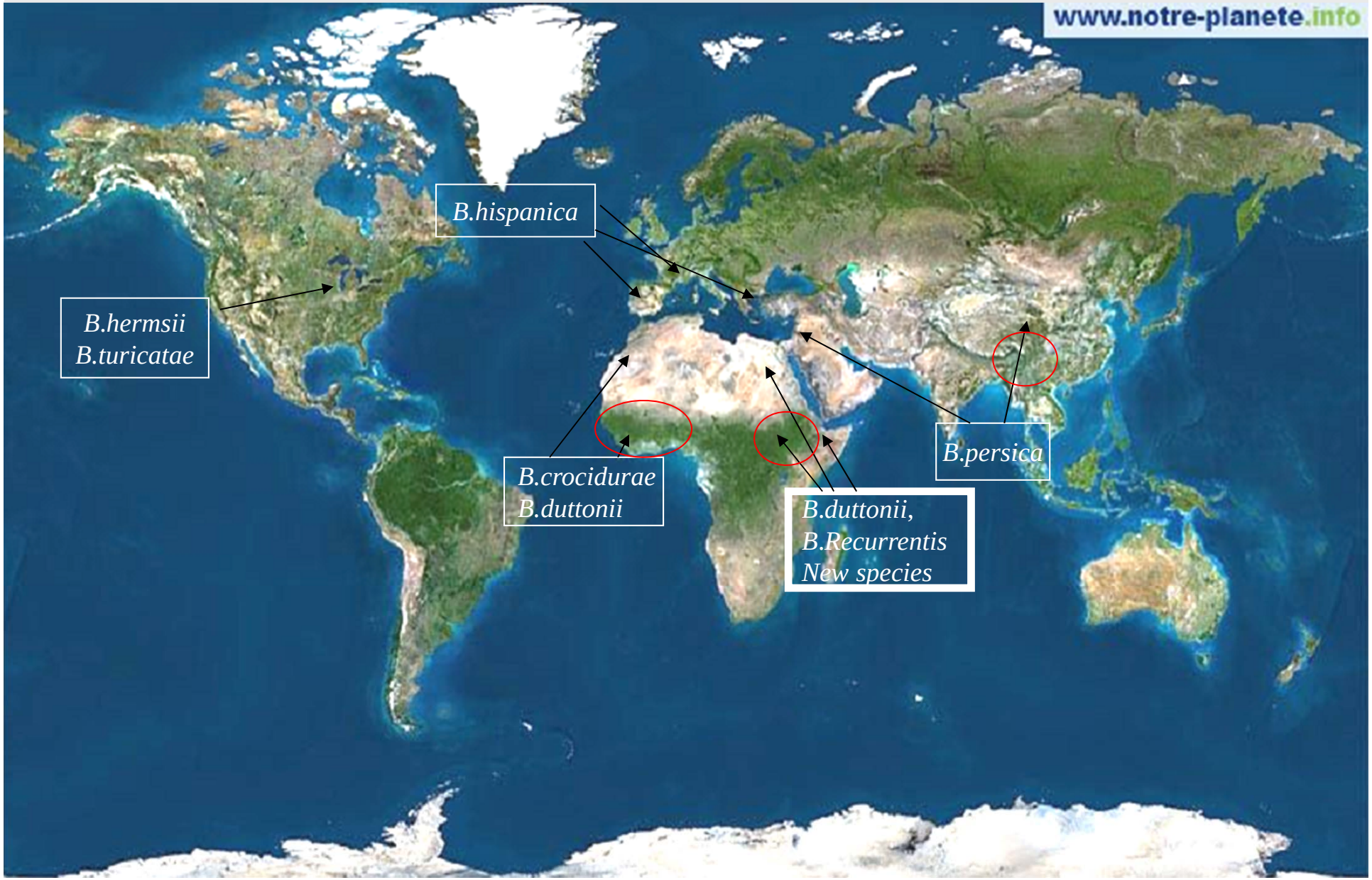
Relapsing fever borreliae in Africa



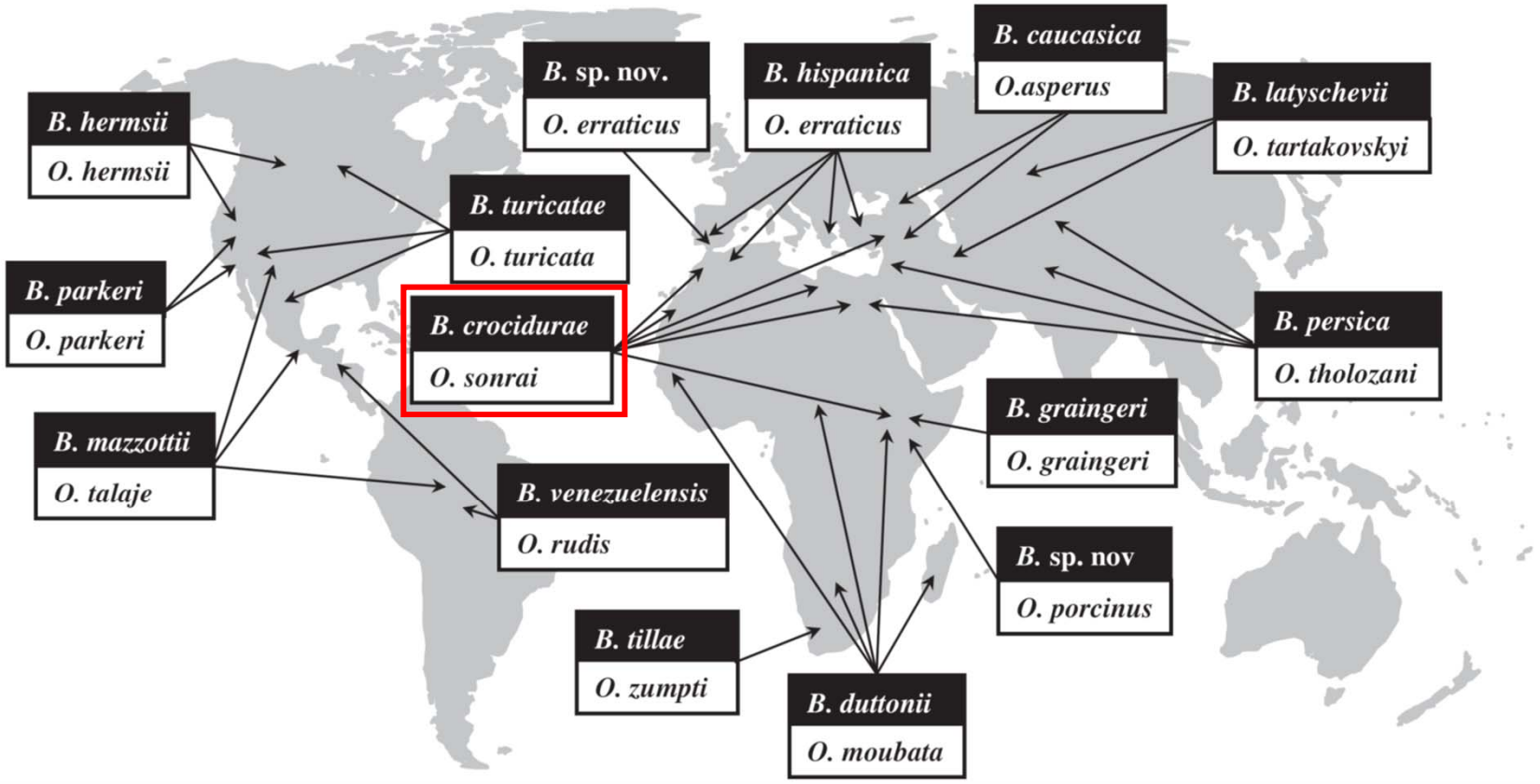
Diagnostic direct: examen microscopique



Worldwide distribution of RFG Borrelia spp.



Distribution of tick-borne relapsing fever borreliosis agents and their specific vectors of the genus Ornithodoros



Rebaudet S, Parola P. Epidemiology of relapsing fever borreliosis in Europe. FEMS Immunol Med Microbiol. 2006;48:11-15.

Body Lice and their Infecting Bacteria Around the World