



Profiling fungal communities in wood-decay ecosystem by DNA fingerprinting techniques (CE-SSCP and DHPLC)

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Background

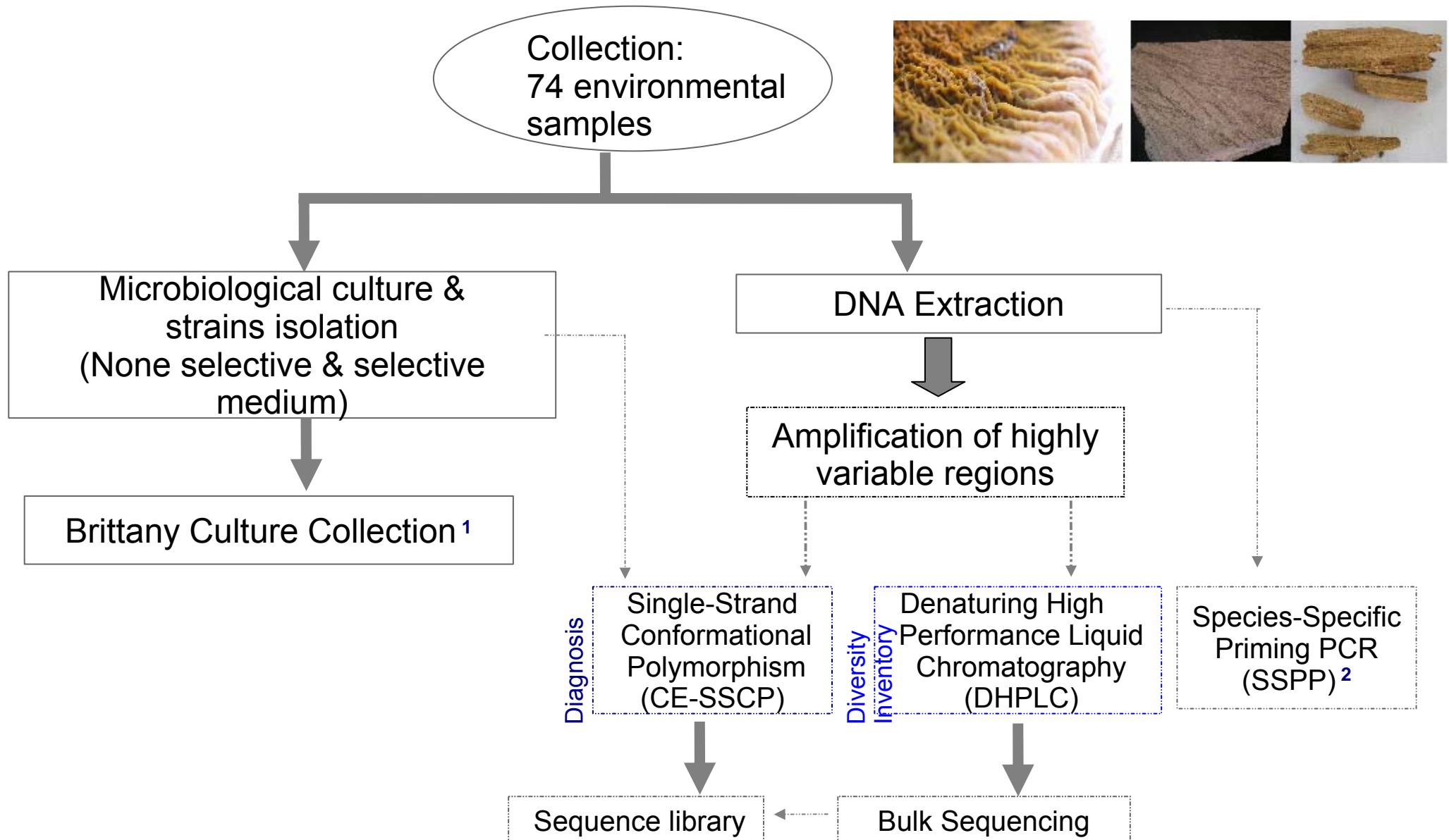
Problems engendered by indoor wood-inhabiting fungi :

- biological degradation of building materials resulting in considerable economical loss
- serious health hazards for residents (Lehrer S. B., *et al.* 1994)

Objectives

- Identify *Serpula lacrymans* and other wood-decay Basidiomycetes
- Profile fungal communities colonising timber in the indoor environment

Methodology



¹ <http://www-tmp.univ-brest.fr/souchotheque>

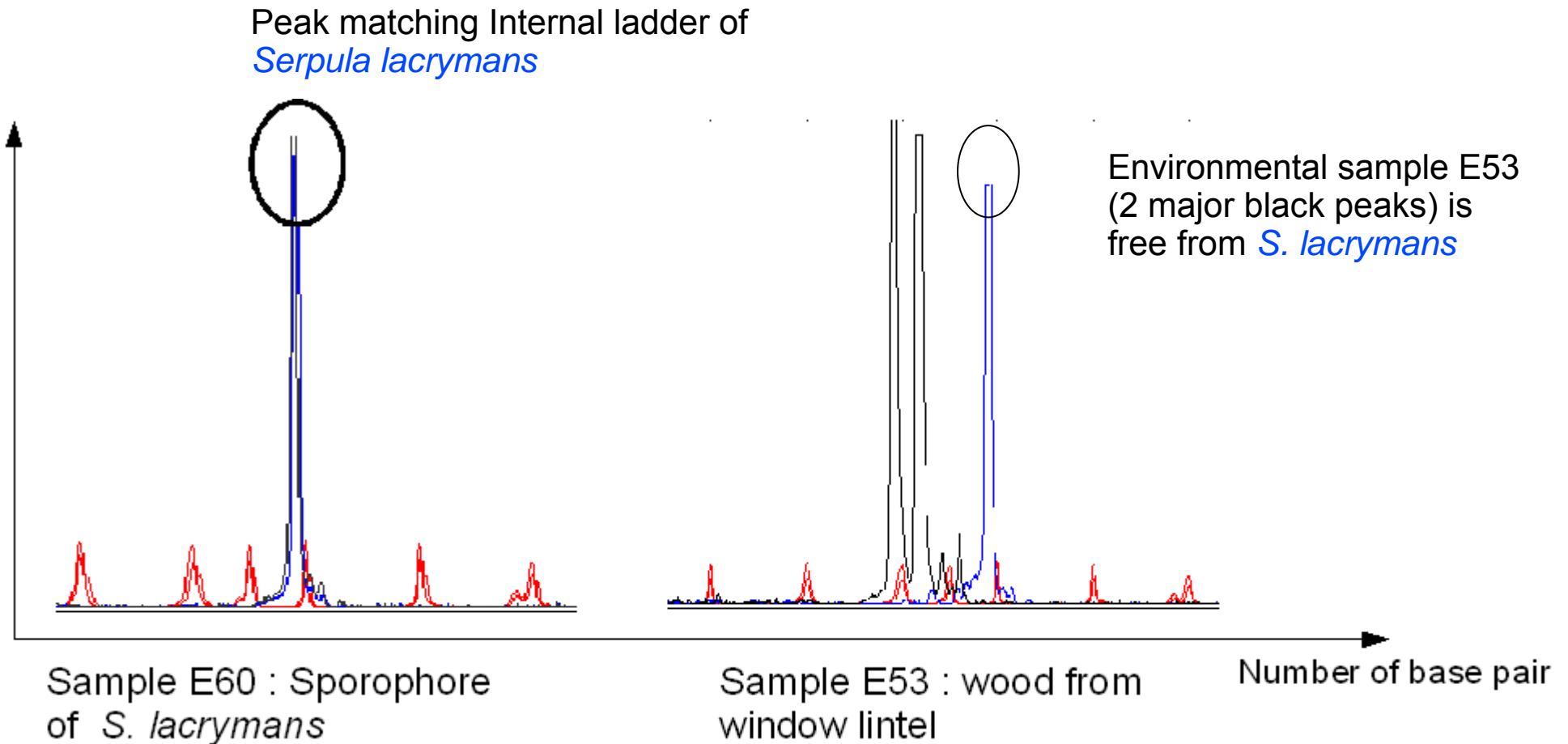
² Moreth & Schmidt 2000

Fingerprinting-based methods

	Single-Strand Conformational Polymorphism (SSCP)	Denaturing High Performance Liquid Chromatography (DHPLC)
Structure of PCR products	Labeled single-stranded nucleic acids	Single or double strands nucleic acids
Separation of species	Differences in sequence composition	Size and sequence differences
Identification of species	<ul style="list-style-type: none"> - Internal standard ladder - Comparison with the reference sequence library 	<ul style="list-style-type: none"> - Fraction collection & sequencing - Sequence library (DHPLC fractions)

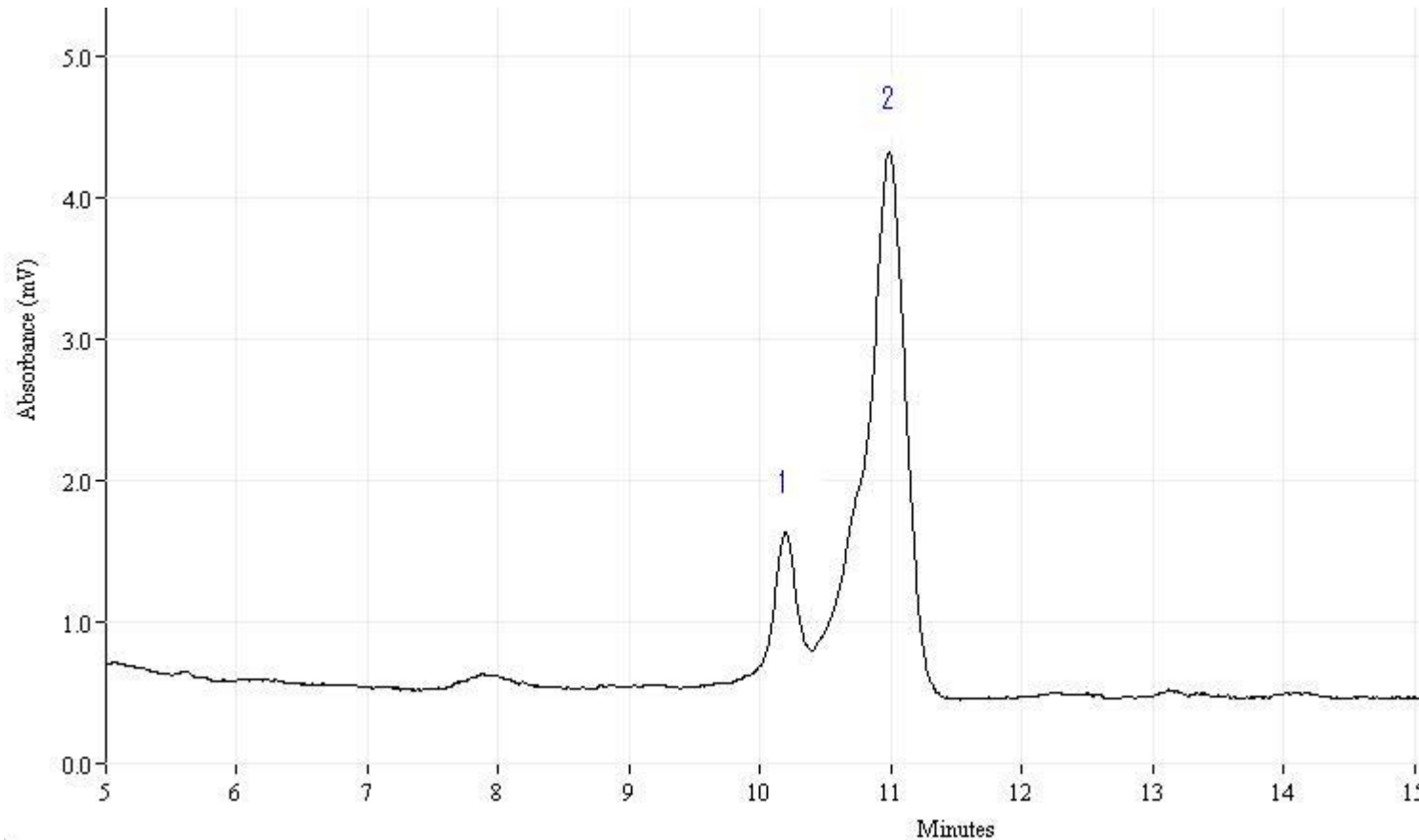
Results : Detection of *S. lacrymans* and other wood-decay Basidiomycetes

Fluorescence



- Detection of *Serpula lacrymans* in environmental samples
- Identification of 22 wood-decay Basidiomycetes

Results : Profiling fungal biodiversity in wood decay ecosystem



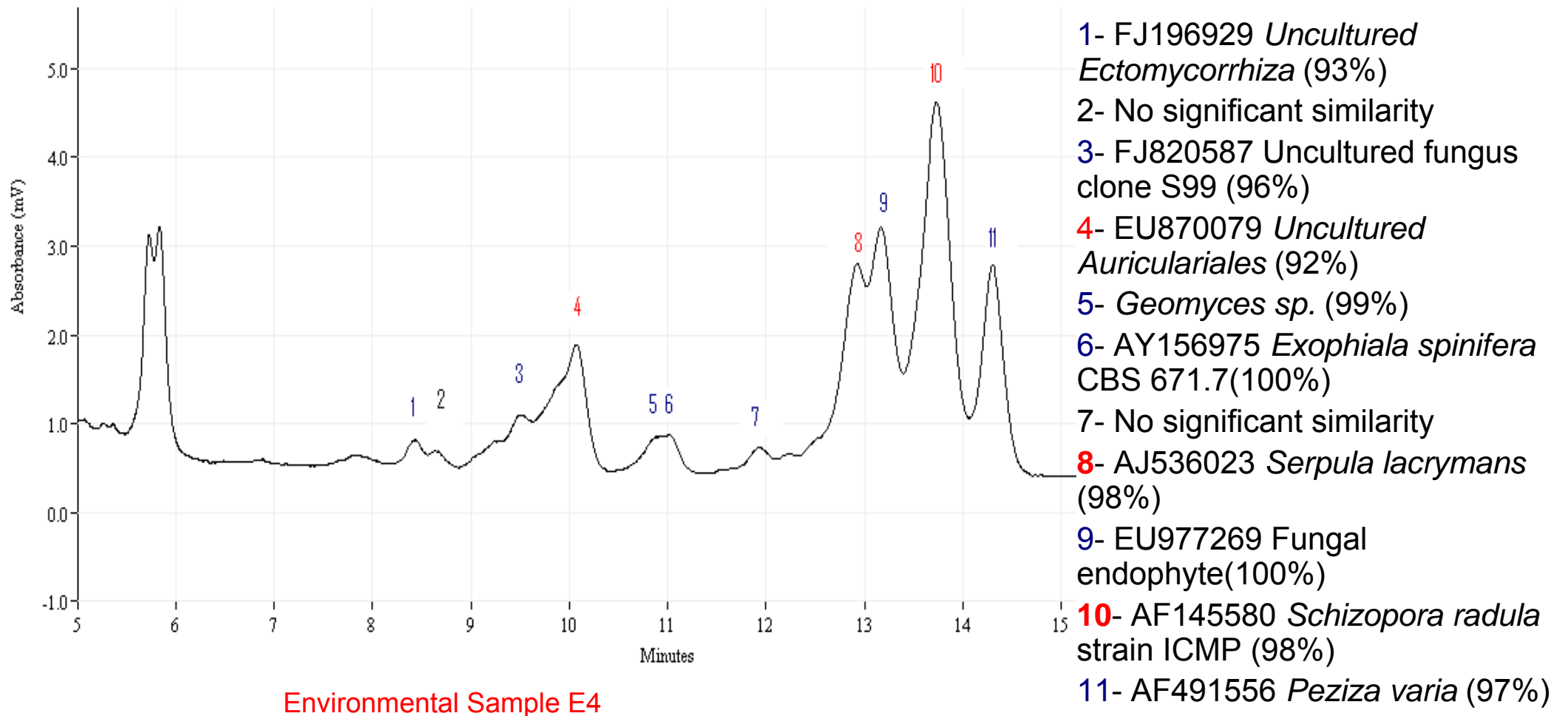
Sample E53 : Wood from window lintel

1- AJ876493 *Umbelopsis isabellina* (98%)

2- FM172890 *Calluna vulgaris* root inhabiting fungus (98%)

→ No Basidiomycete causing wood decay

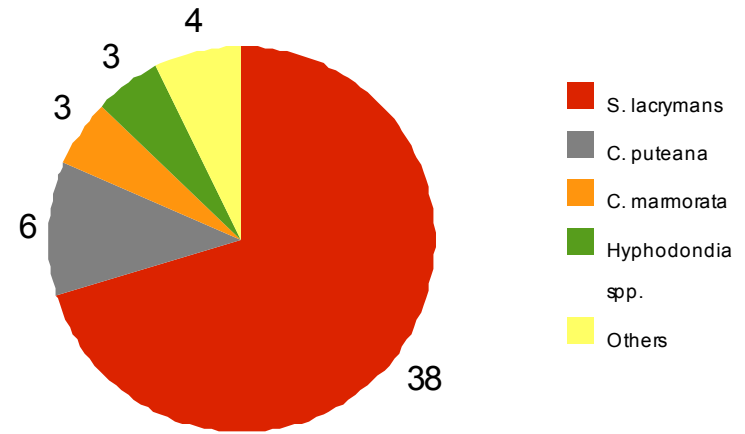
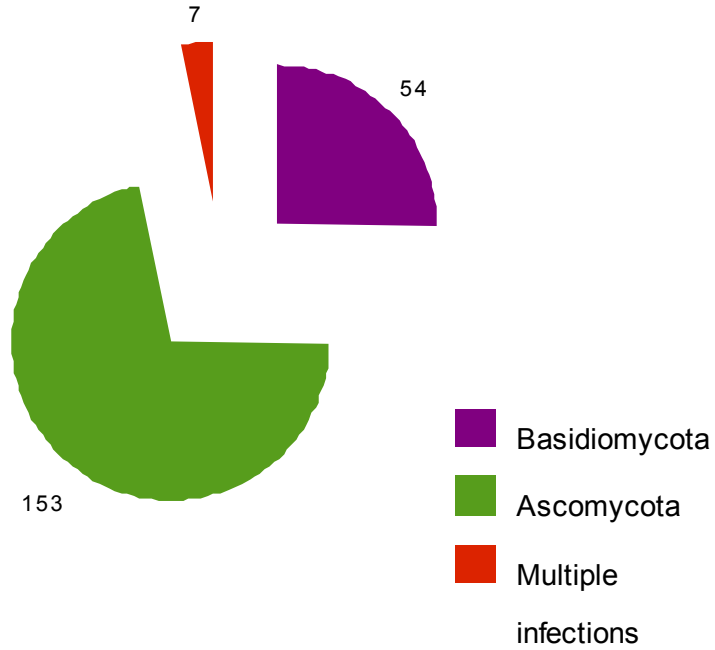
Results : Infections Involving several Basidiomycetes



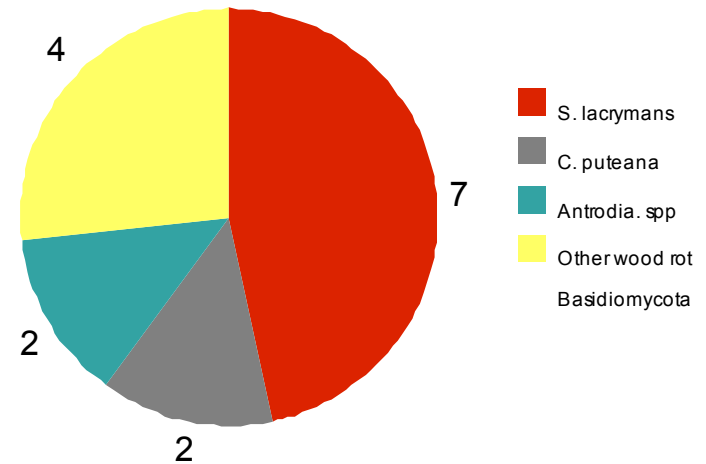
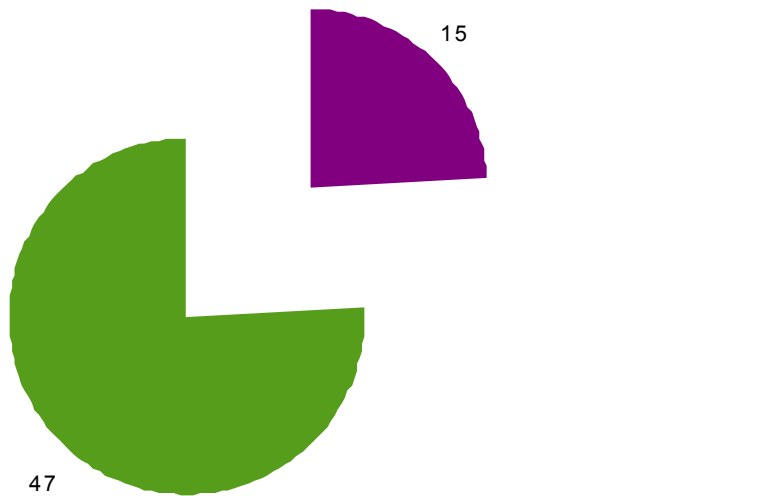
- Diverse ecosystem harbouring an average of 3.1 species
- 7 Multiple infections cases involving ≥ 2 wood rot Basidiomycetes
- Detection of *Serpula lacrymans* in co-existence with other wood rot fungi

Results : Profiling fungal diversity in wood decay ecosystem

DHPLC



Isolation



Results: Assessment of Basidiomycota Diversity

	North Germany (Huckfeldt & Schmidt 2005)	Present study (Maurice <i>et al.</i> , 2010)
Common	<i>Coniophora puteana</i> , <i>S. Antrodia</i> sp., <i>Coprophus</i> sp., <i>Donkioporia expansa</i> , <i>Antrodia serial</i>	<i>Coniophora puteana</i> , <i>S. Antrodia</i> sp., <i>Coprophus</i> sp., <i>Donkioporia expansa</i> , <i>Antrodia serial</i>
Rare	<i>Pezizella versicolor</i> , <i>Donkioporia expansa</i> , <i>Asterstroma cervicolor</i> , <i>Antrodia vaillantii</i> , (
First occurrence	<i>Diplomitoporus lindbladii</i> , <i>Asterostroma</i>	<i>Sclerotium</i> , <i>Grönladofusoides</i> , <i>Phlebotomus</i>

→ Acquiring data on the biodiversity of wood rot fungi in France

Conclusion

- Culture-independent techniques
- Detection of *Serpula lacrymans* and other wood rot fungi
- Profiling fungal diversity in wood-decay ecosystem
- Evidence of multiple infections involving ≥ 2 wood-decay Basidiomycetes

Forthcoming studies

- Apply these reliable fingerprinting tools for routine diagnosis of indoor wood-inhabiting fungi
- Evaluate the fungal complexity of wood rot ecosystem
- Describe the metabolically active species



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Thank you for your attention



France (Paris) - Porte St Denis, 1862