Identification of Mixed Tropical Hardwood in Pulp and Paper

Dr. Andrea Olbrich
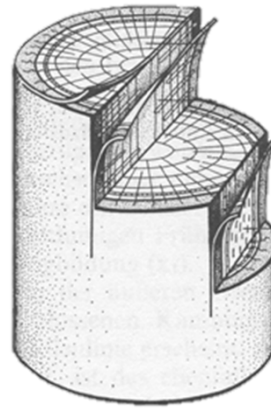Thünen Institute of Wood Research
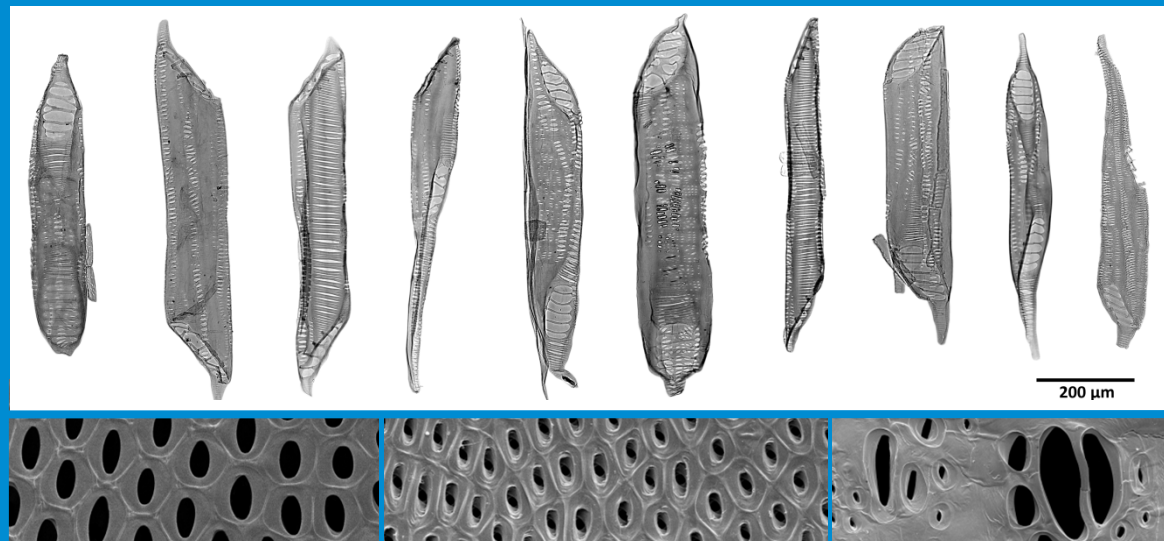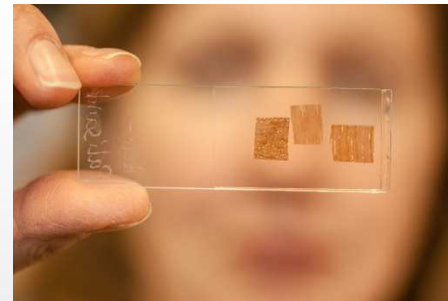
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Introduction

Wood identification

– scientific collection

    12.000 species

    35.000 specimens

– 80-100 characters

Photos: Ilja Hendel
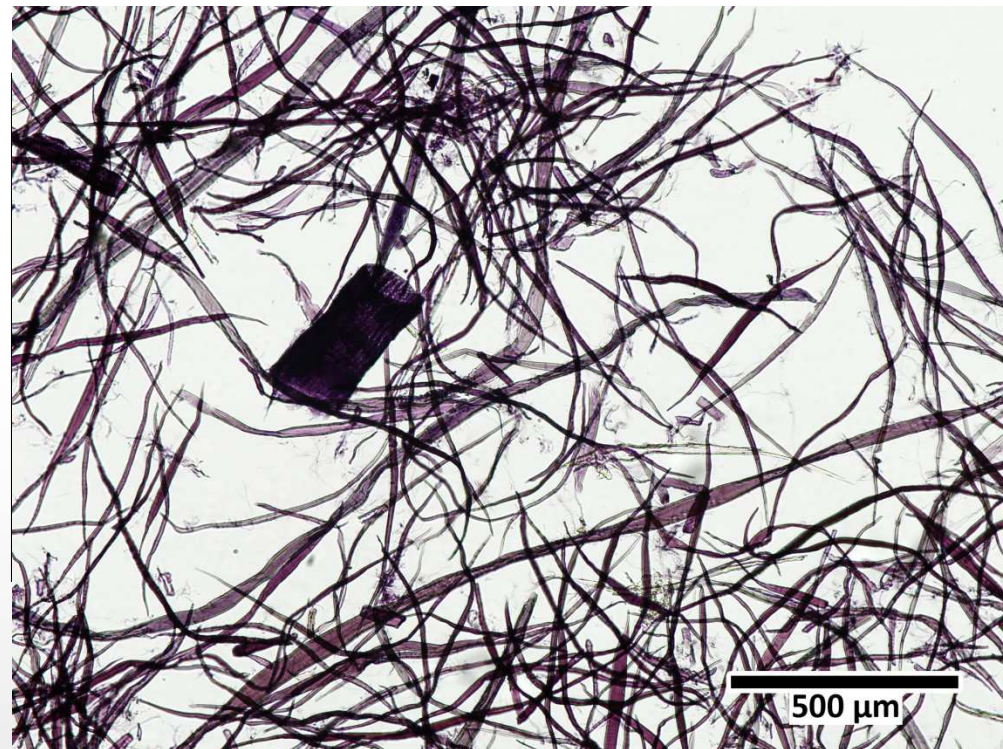
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Introduction

Identification of pulp and paper

- Defibration, staining of cells

- light microscopy

- 12 main characters

- matching with references

500 µm

Introduction

Identification of Mixed Tropical Hardwood in paper

references from Southeast Asia

28 timbers: macerated cells

23 timbers: pulp

microscopy

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References

- 28 timbers of scientific collection

- maceration
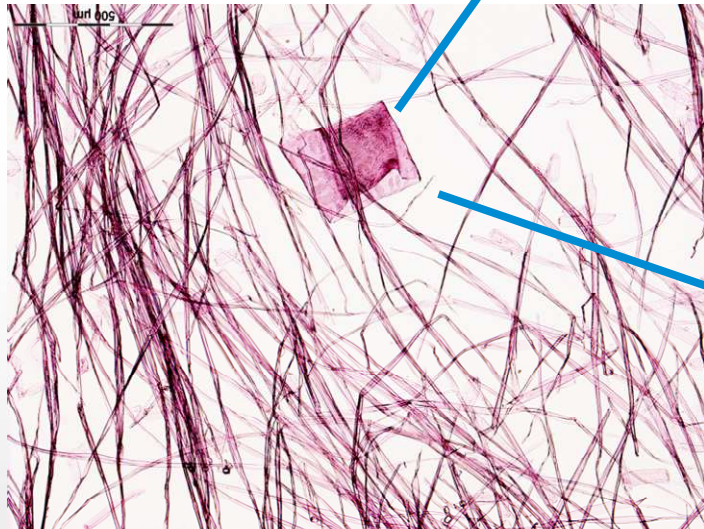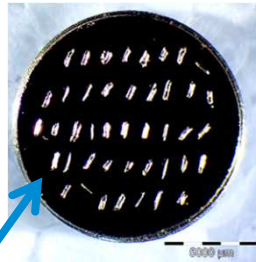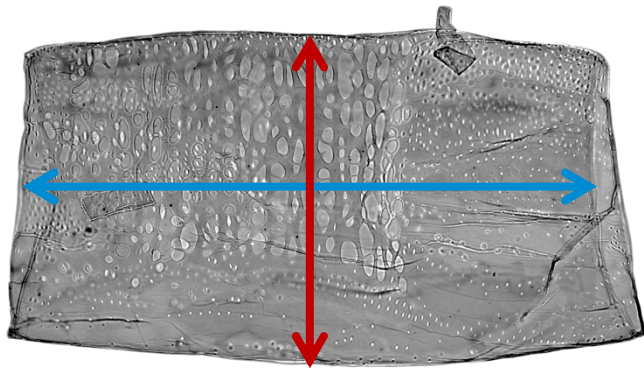
- preparation

- microscopy
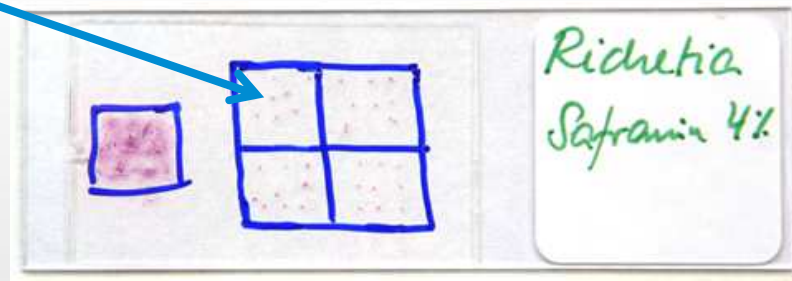
Photo: Ilja Hendel

Light Microscopy

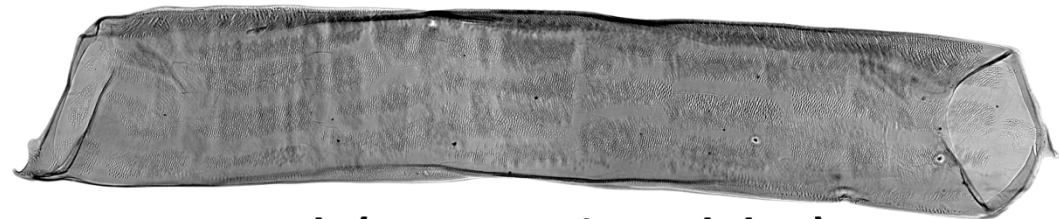## Dimensions of vessel elements

Keruing (*Dipterocarpus* spp.)

Punah (*Tetramerista glabra*)

↔ Length
↔ Width

Api Api (*Avicennia marina*)

Ramin (*Gonystylus* spp.)

Red Mangrove (*Rhizophora* spp.)

1 mm

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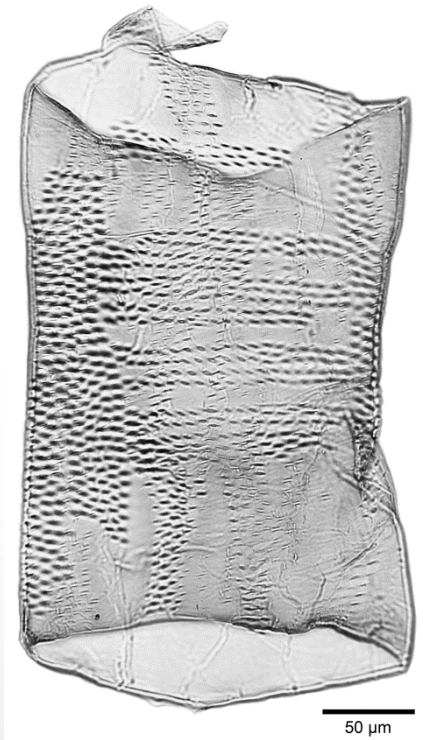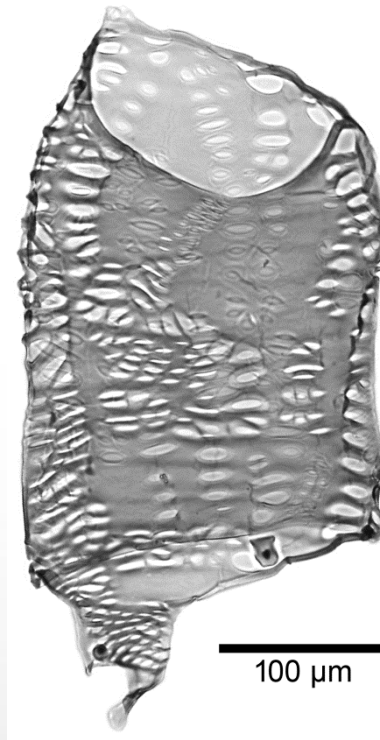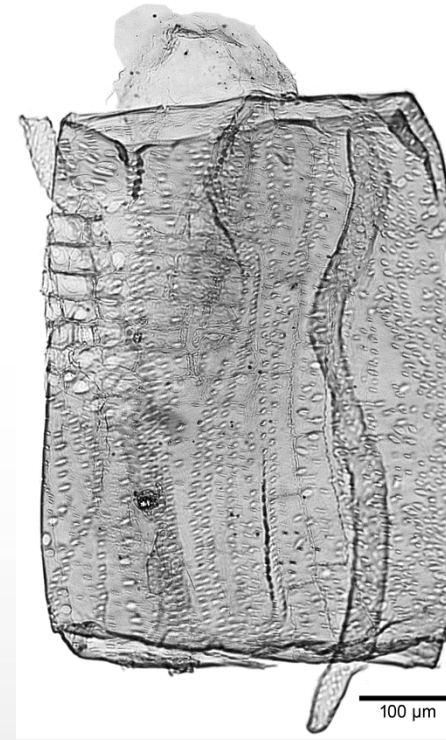
Light Microscopy

Perforations (simple and scalariform)

Acacia mangium

Mangifera spp.

Shorea subg. *Anthoshorea*

Rhizophora spp.

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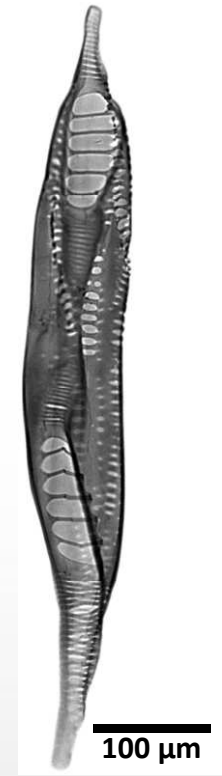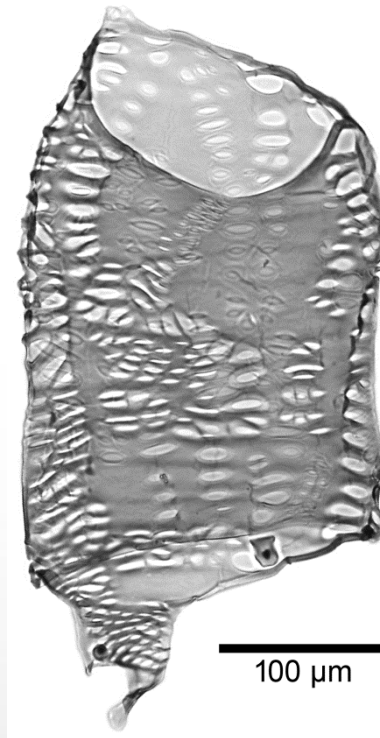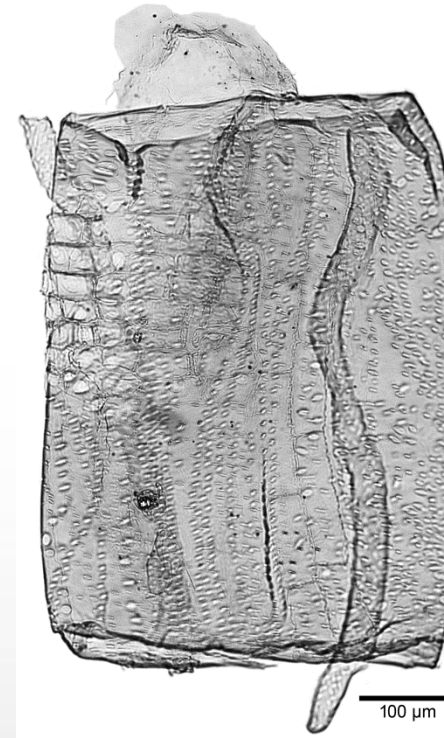
Light Microscopy

Size and shape of different pit types

Acacia mangium

Mangifera spp.

Shorea subg. *Anthoshorea*

Rhizophora spp.

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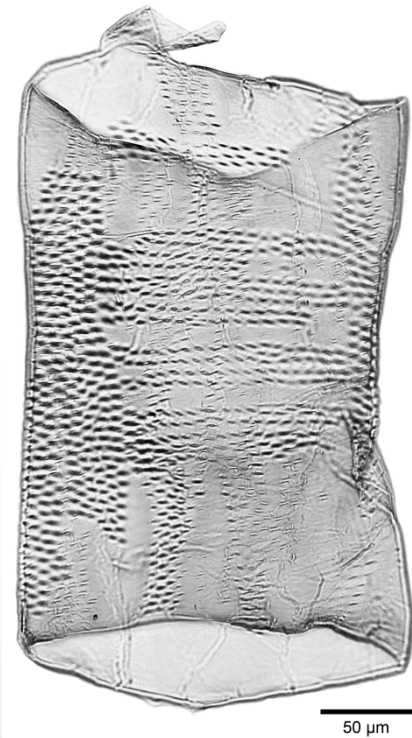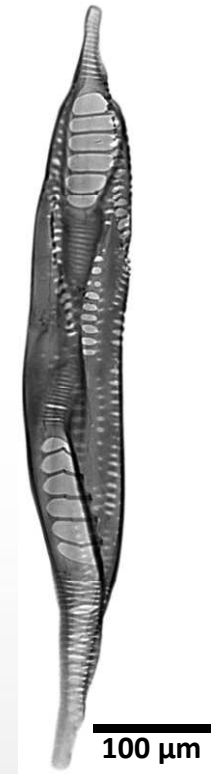
Light Microscopy

Swintonia spp.

Vessels

Parenchyma cells

Fibers

200 µm

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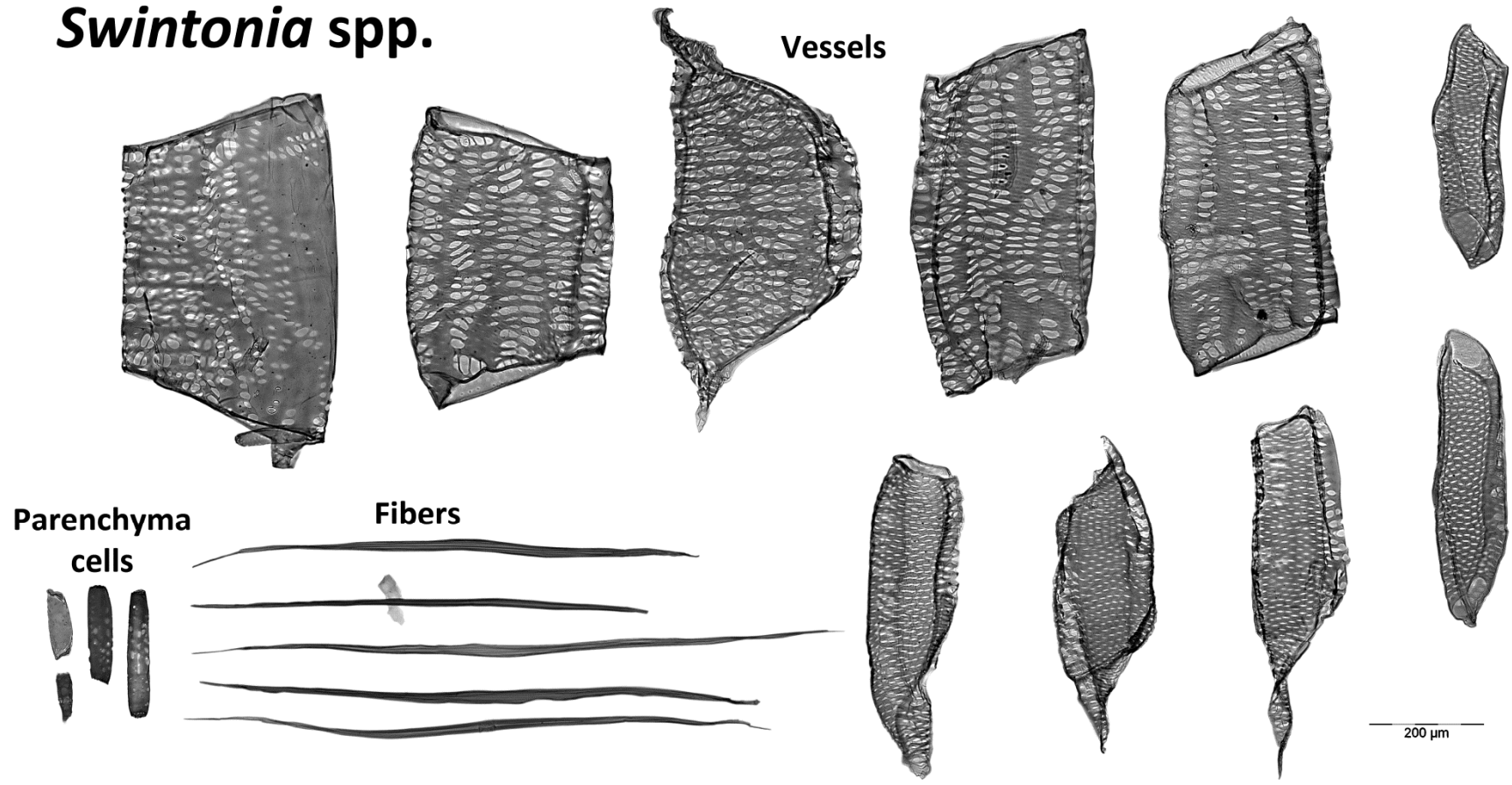
Ramin (*Gonystylus* spp.) CITES Annex II

Vessels

Parenchyma cells

Fibers

200 µm
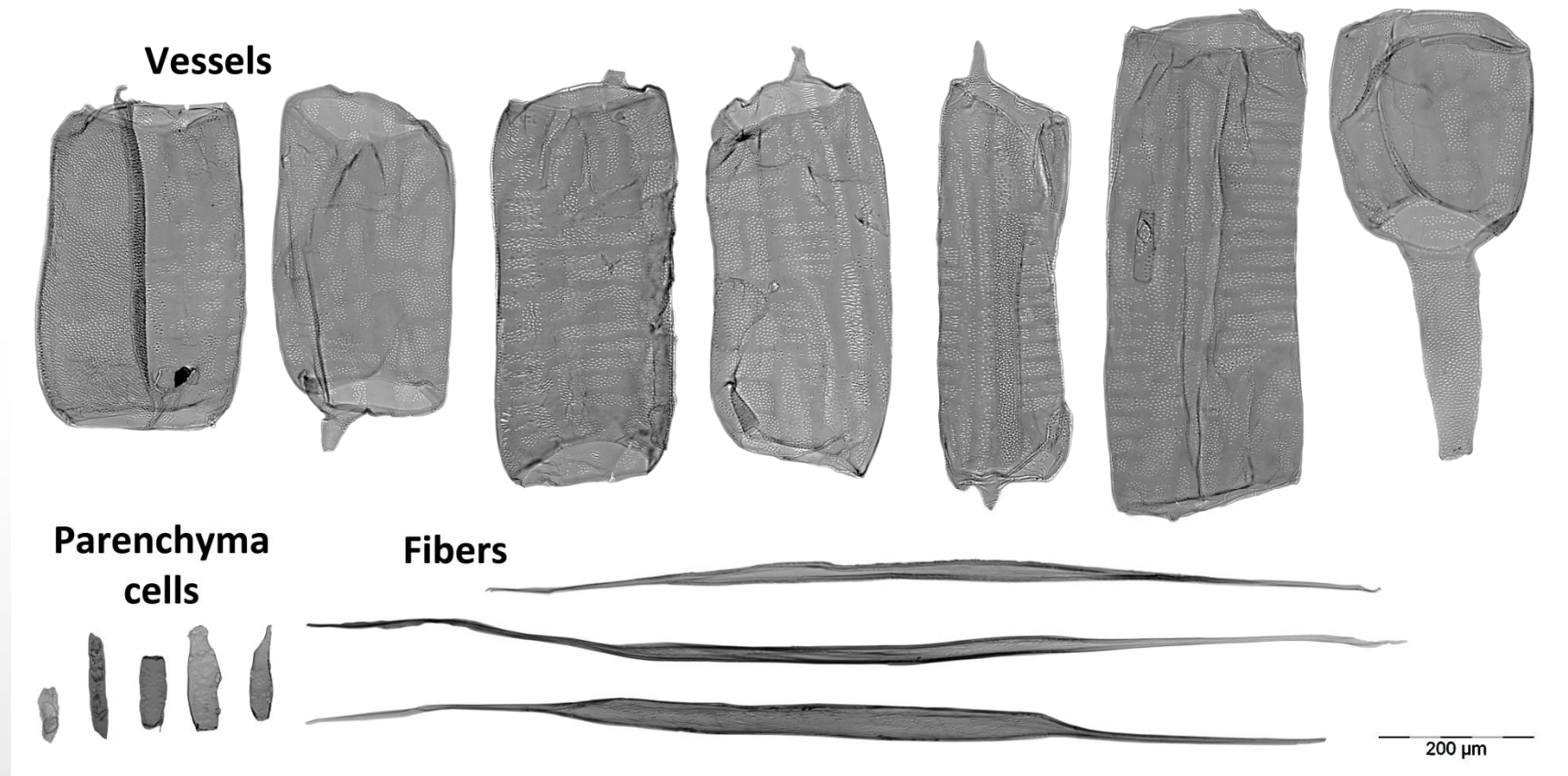
Light Microscopy

Subgenera not distinguishable
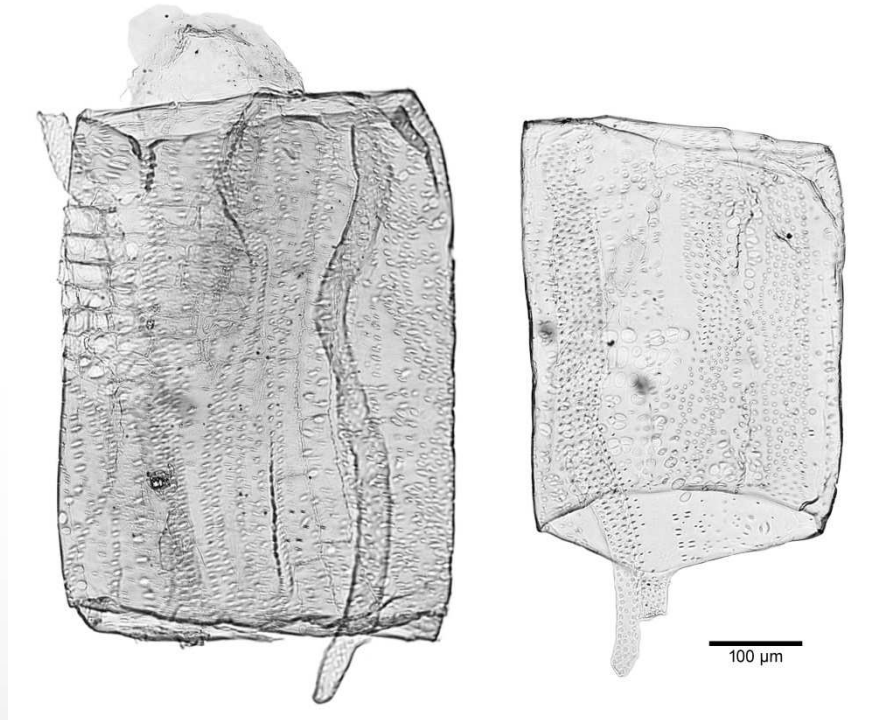
Shorea subg. *Anthoshorea*   *Shorea* subg. *Rubroshorea*

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Light Microscopy

More references are needed

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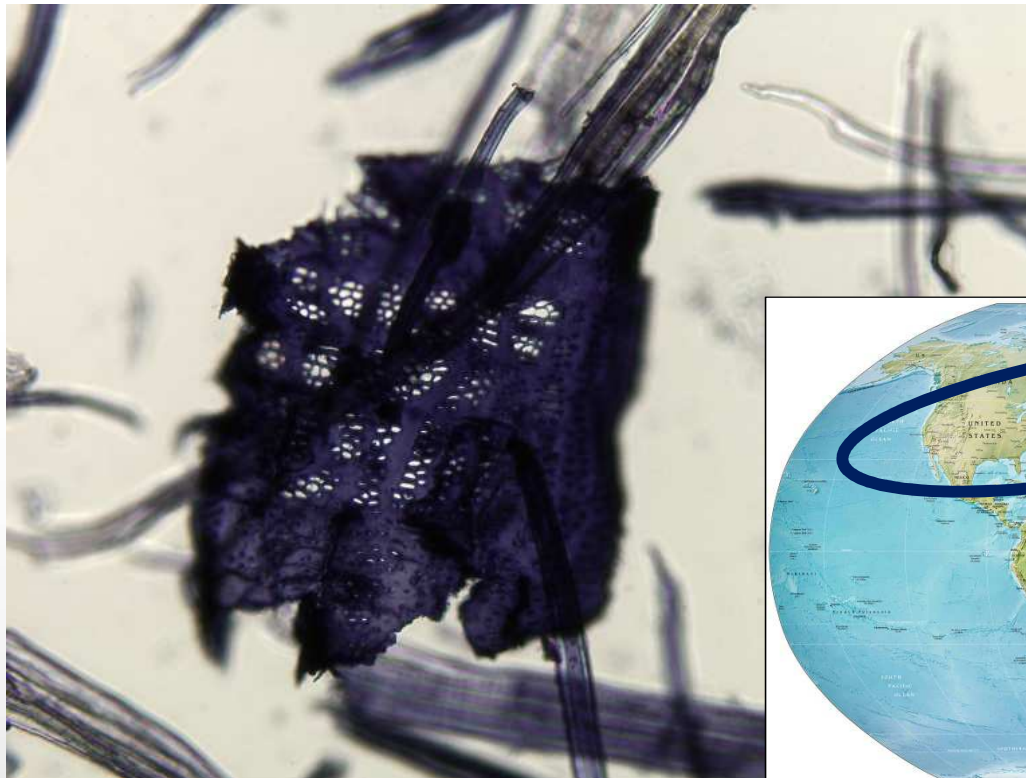
Scanning Electron Microscopy

Going into detail…

Gonystylus spp. ⊢————————— 400 µm ———————⊣
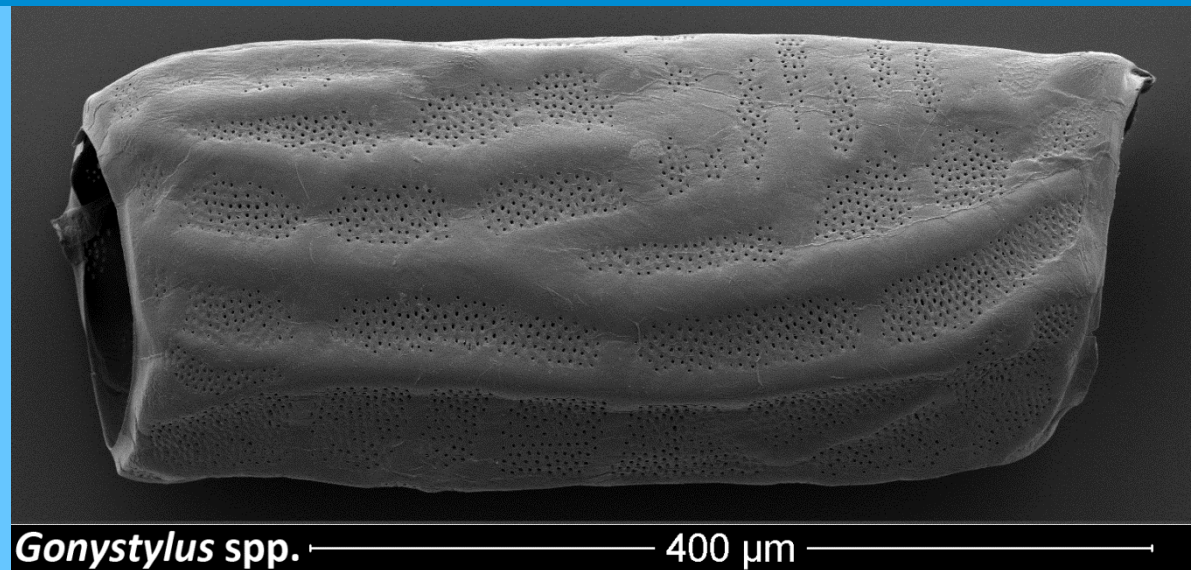
Scanning Electron Microscopy

Intervessel pits
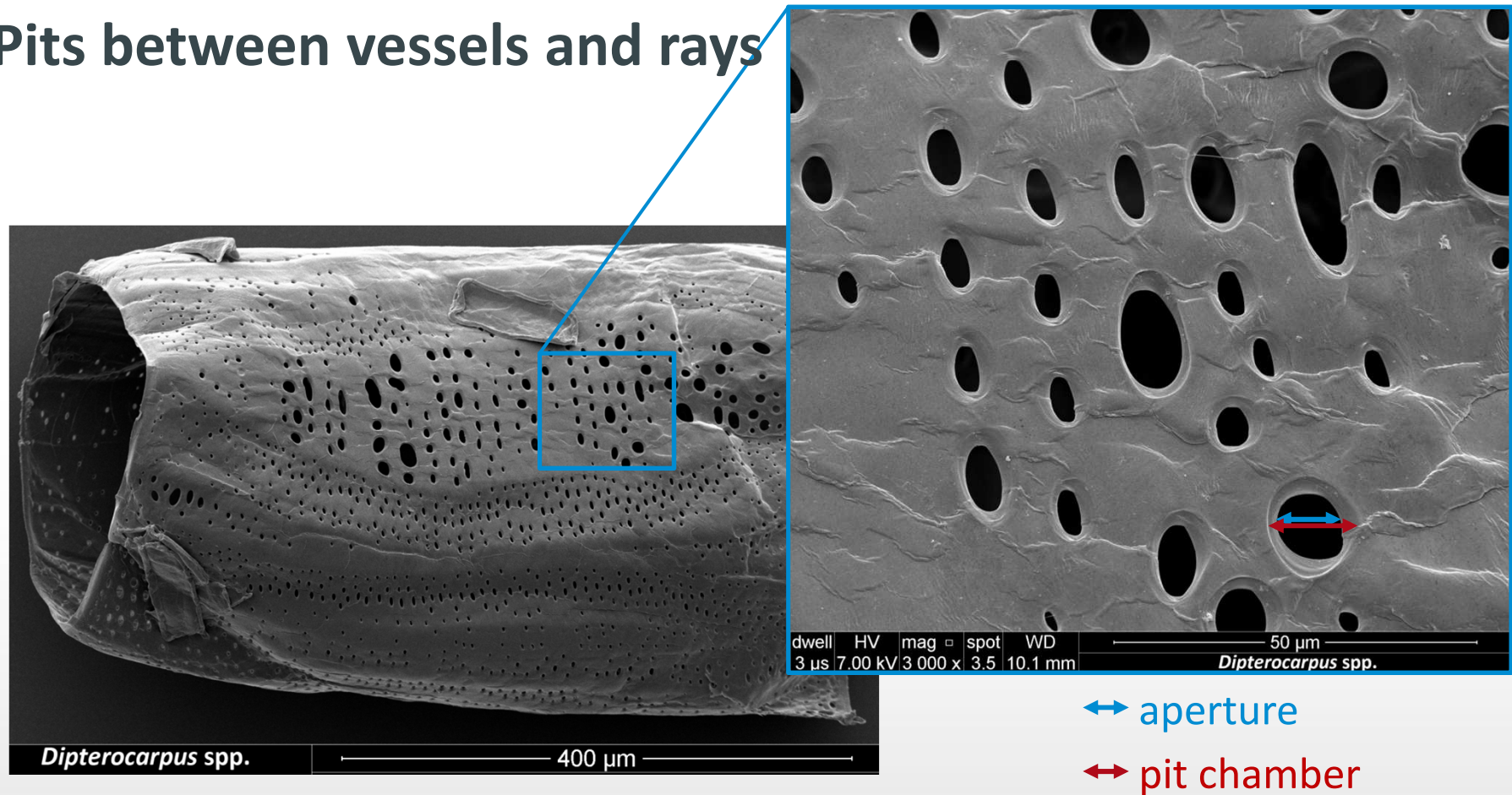
↔ aperture
↔ pit chamber

Scanning Electron Microscopy

Pits between vessels and rays

400 µm

Dipterocarpus spp.

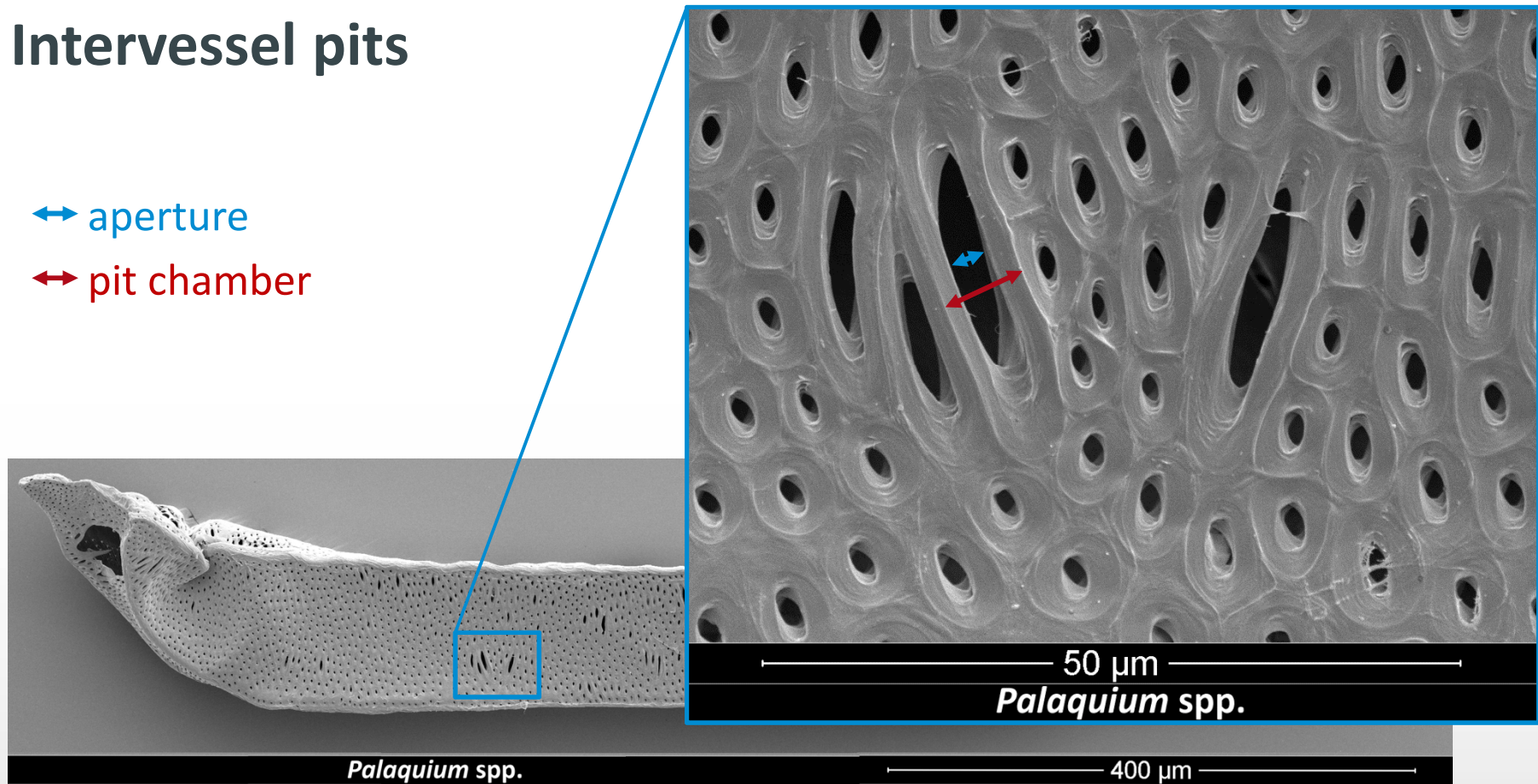| dwell	HV	mag □	spot	WD	50 µm
3 µs	7.00 kV	3 000 x	3.5	10.1 mm	*Dipterocarpus* spp.

↔ aperture
↔ pit chamber

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Summary

– **Identification of pulp and paper to the generic level by light microscopy is possible**

– **Good references, but more are required**
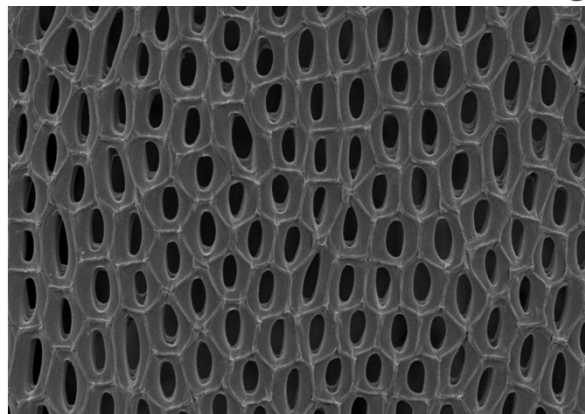
– **Detailed information provided by electron microscopy**

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Thanks

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U·H

Universität Hamburg

Dr. Gerald Koch

Dr. Jürgen Odermatt

Dr. Othar Kordsachia

Stephanie Helmling

Lena Tepe

Saskia Poth

Arne Kuck

Nils Grützmann

Alina Wassink