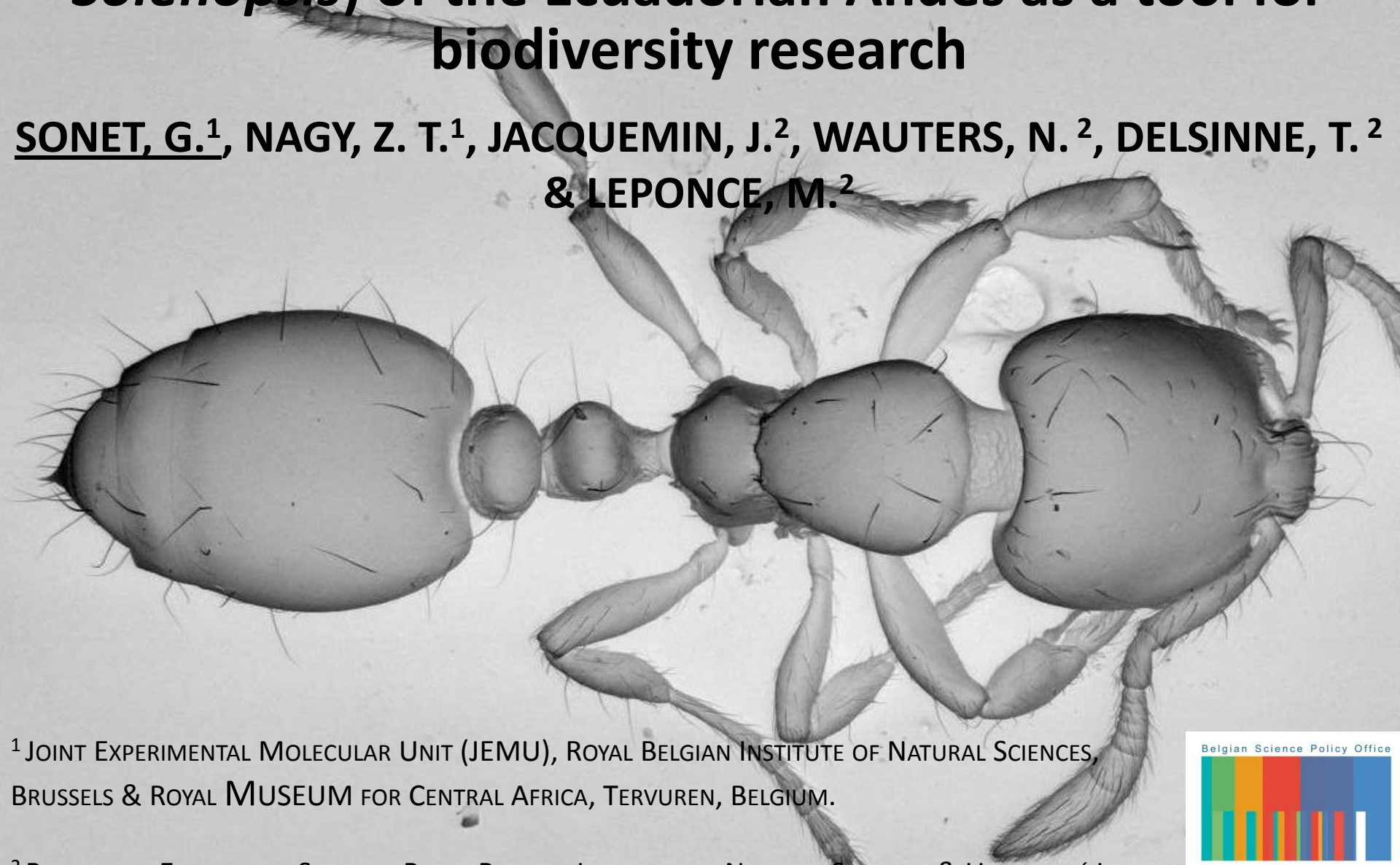


# DNA barcoding of fire and thief ants (genus *Solenopsis*) of the Ecuadorian Andes as a tool for biodiversity research

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# INTRODUCTION: *Solenopsis* spp.

Genus: *Solenopsis*

Subfamily: Myrmicinae

Family: Formicidae

Order: Hymenoptera

## Interesting traits:

invasive species,  
social parasitism,  
intracellular symbionts,  
interspecific  
hybridizations,  
worker polymorphism,  
polygyny, etc.



# INTRODUCTION: *Solenopsis* spp.

Abundant and represented by invasive and damaging pest species.

	Nbre of species in Brazil	Abundance in Ecuador	Abundance in Florida (pitfall)	Abundance in Florida (bait)
1 <sup>st</sup> (most represented)	<i>Pheidole</i>	<b><i>Solenopsis</i></b>	<b><i>Solenopsis</i></b>	<b><i>Solenopsis</i></b>
2 <sup>nd</sup>	<b><i>Solenopsis</i></b>	<i>Pheidole</i>	<i>Pheidole</i>	<i>Pheidole</i>
3 <sup>rd</sup>	<i>Apterostigma</i>	<i>Octostruma</i>	<i>Paratrechina</i>	Monomorium
4 <sup>th</sup>	<i>Hypoponera</i>	<i>Hypoponera</i>	<i>Forelius</i>	Crematogaster
5 <sup>th</sup>	<i>Paratrechina</i>	<i>Paratrechina</i>	<i>Camponotus</i>	<i>Paratrechina</i>
Ref.	Braga et al 2010	Leponce et al 2007	Lubertazzi & Tschinkel 2003	Lubertazzi & Tschinkel 2003

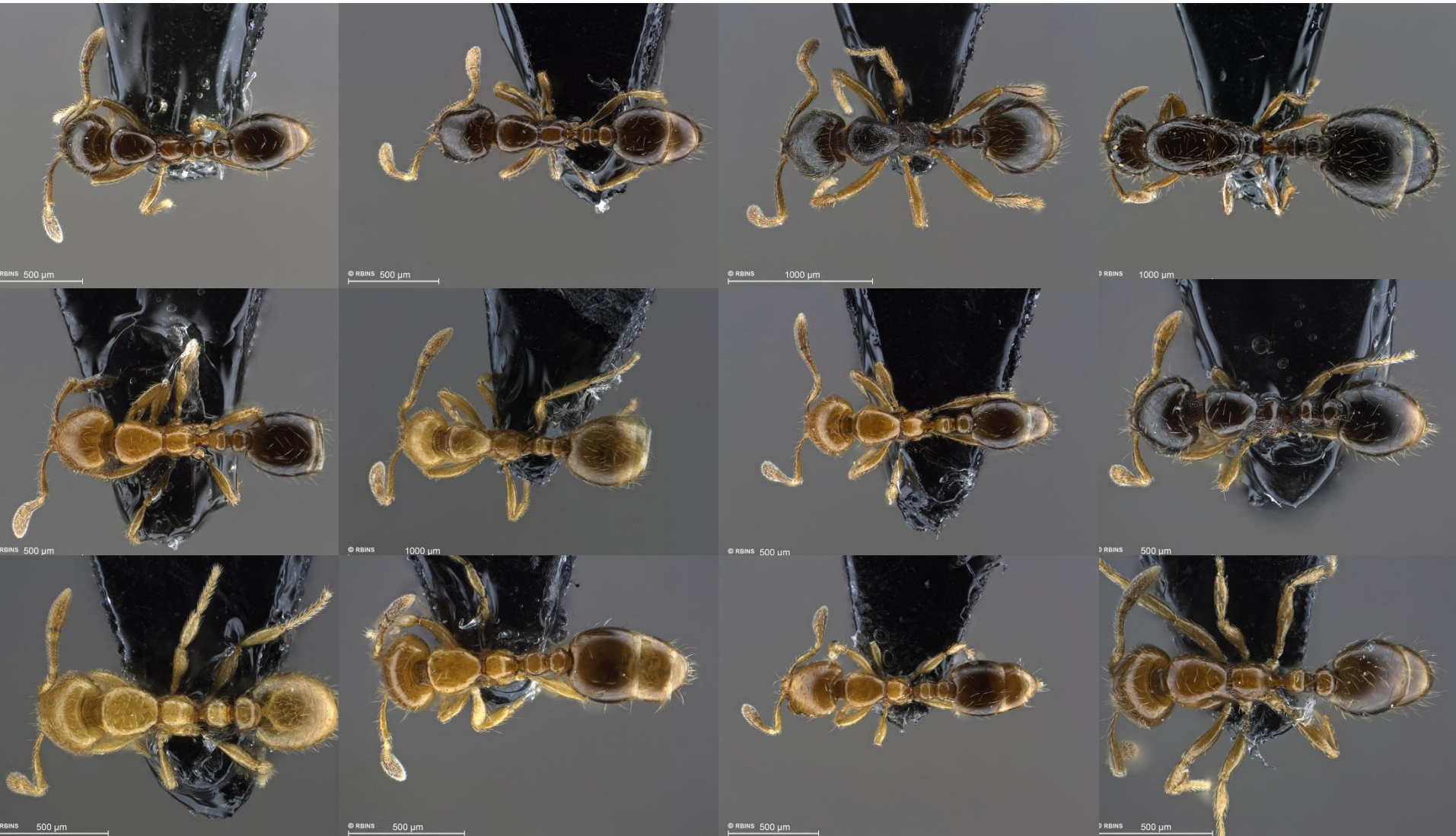
Braga D. L., Louzada J. N. C., Zanetti R. & Delabie J (2010) Rapid Evaluation of Ant Diversity in Land Use Systems in Southern Bahia, Brazil *Neotropical Entomology* 39(4):464-469.

David Lubertazzi and Walter R. Tschinkel (2003) Ant community change across a ground vegetation gradient in north Florida's longleaf pine flatwoods, *Journal of Insect Science*, 3:21.

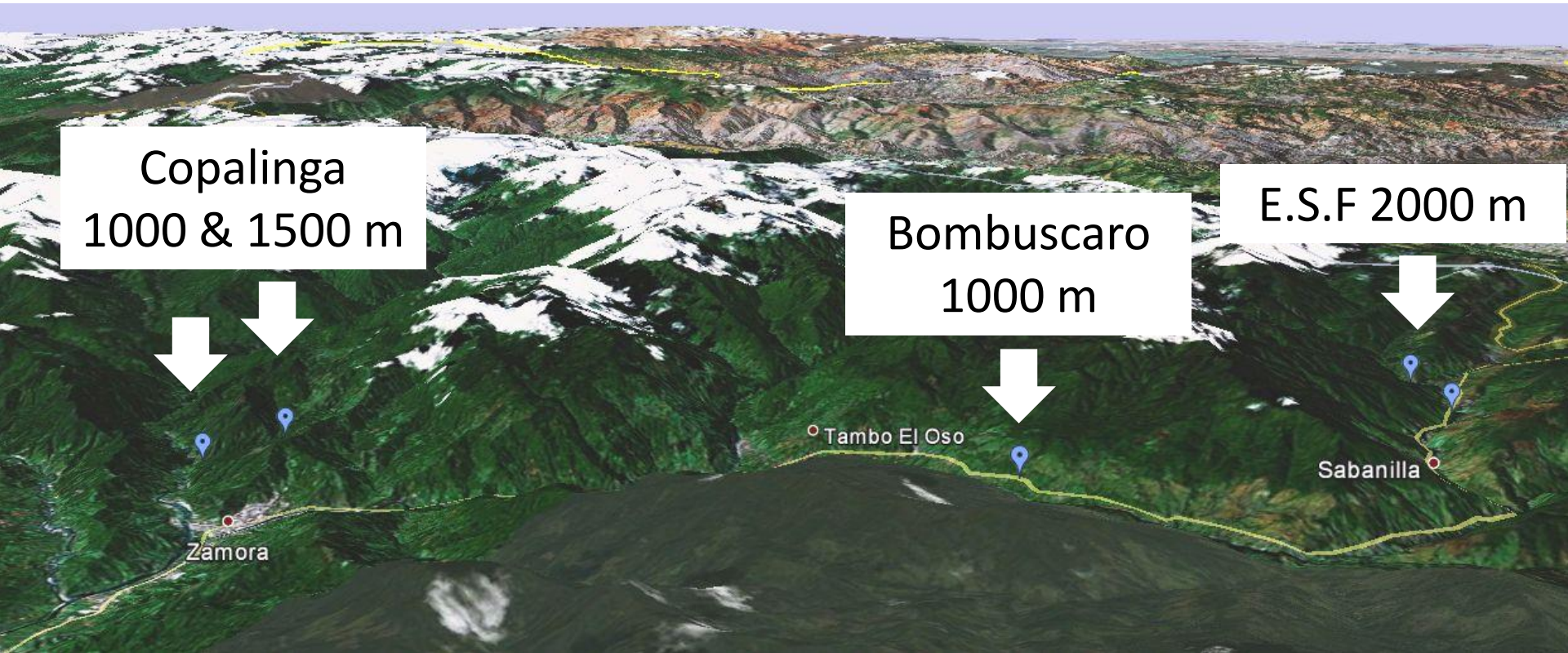
Leponce M., Schmidl J., Riede K., Pollet M. & Roisin Y. (2008). Inventory and monitoring programme for arthropods at EDIT ATBI site 680 - Podocarpus National Park, Ecuador: Progress report and proposal to EDIT and DFG RU-816 for the period 2007-2009. RBINS, Brussels, August 2008, 64p.

# INTRODUCTION: *Solenopsis* spp.

Hyperdiversity: more than 200 described species worldwide



# MATERIAL & METHODS: sampling



2 km

North

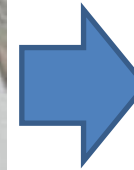
# MATERIAL & METHODS: sampling



4x 5x5 x 1m<sup>2</sup> leaf litter sampled and sifted

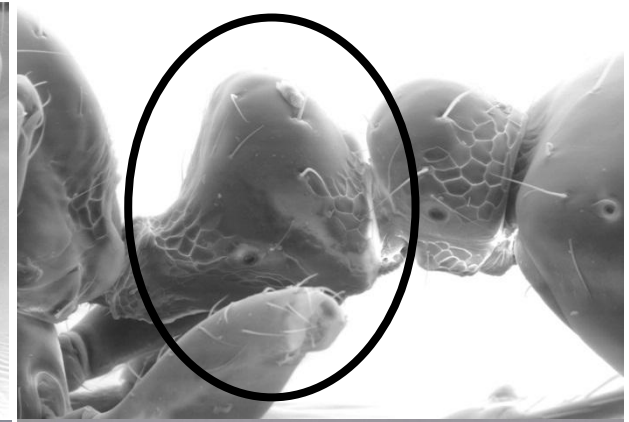
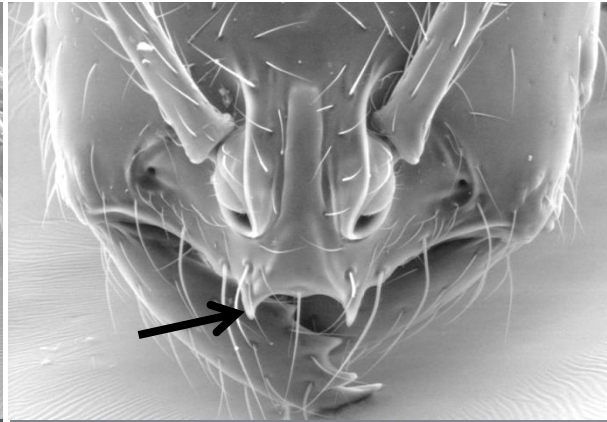
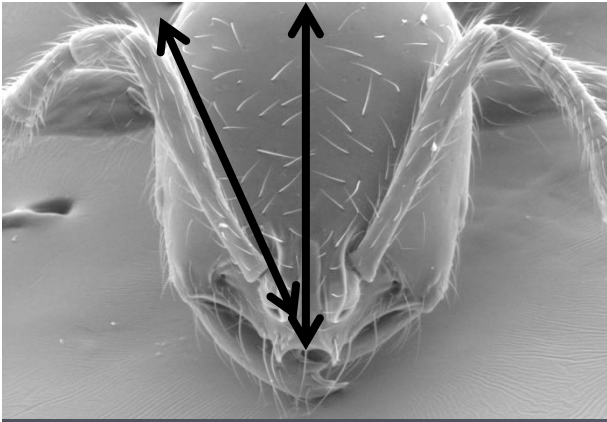


Extraction of ants from the leaf litter with a Winkler for 48h



Preservation in 95% ethanol

# MATERIAL & METHODS: Morphological identification



# MATERIAL & METHODS: DNA extraction and voucherization



DNA extraction





# RESULTS: COI sequences

## Worker

RBINS:TD:4038212



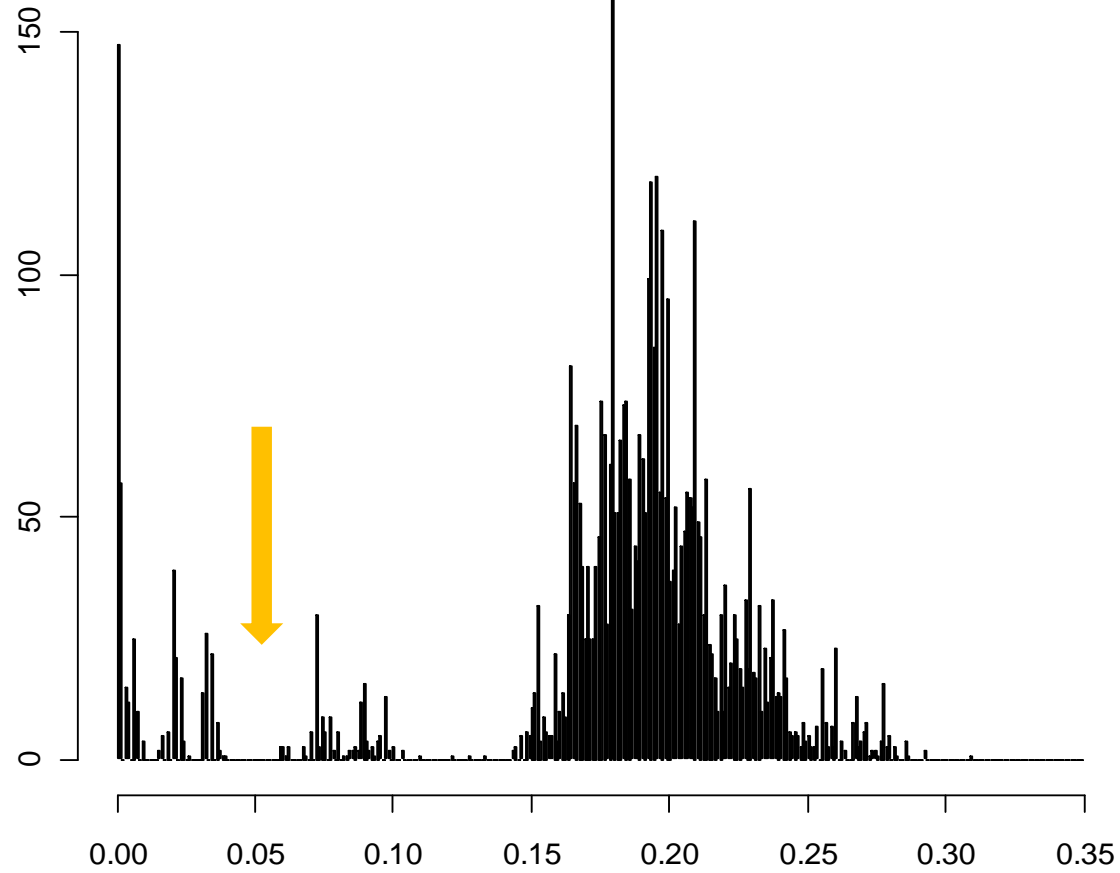
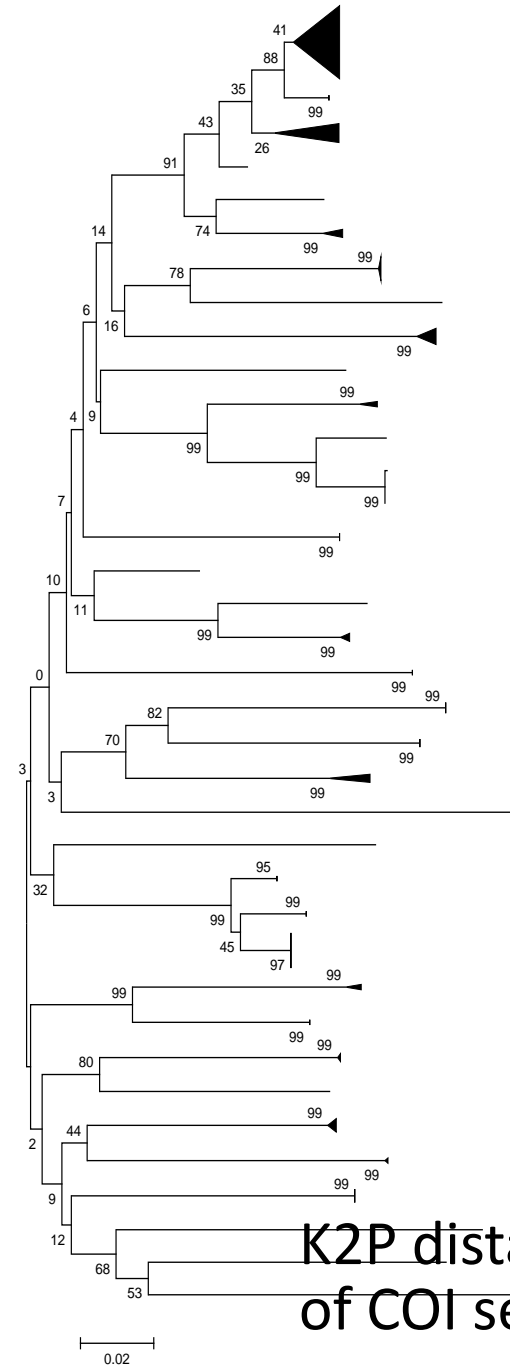
RBINS:TD4039608



RBINS:TD4039521



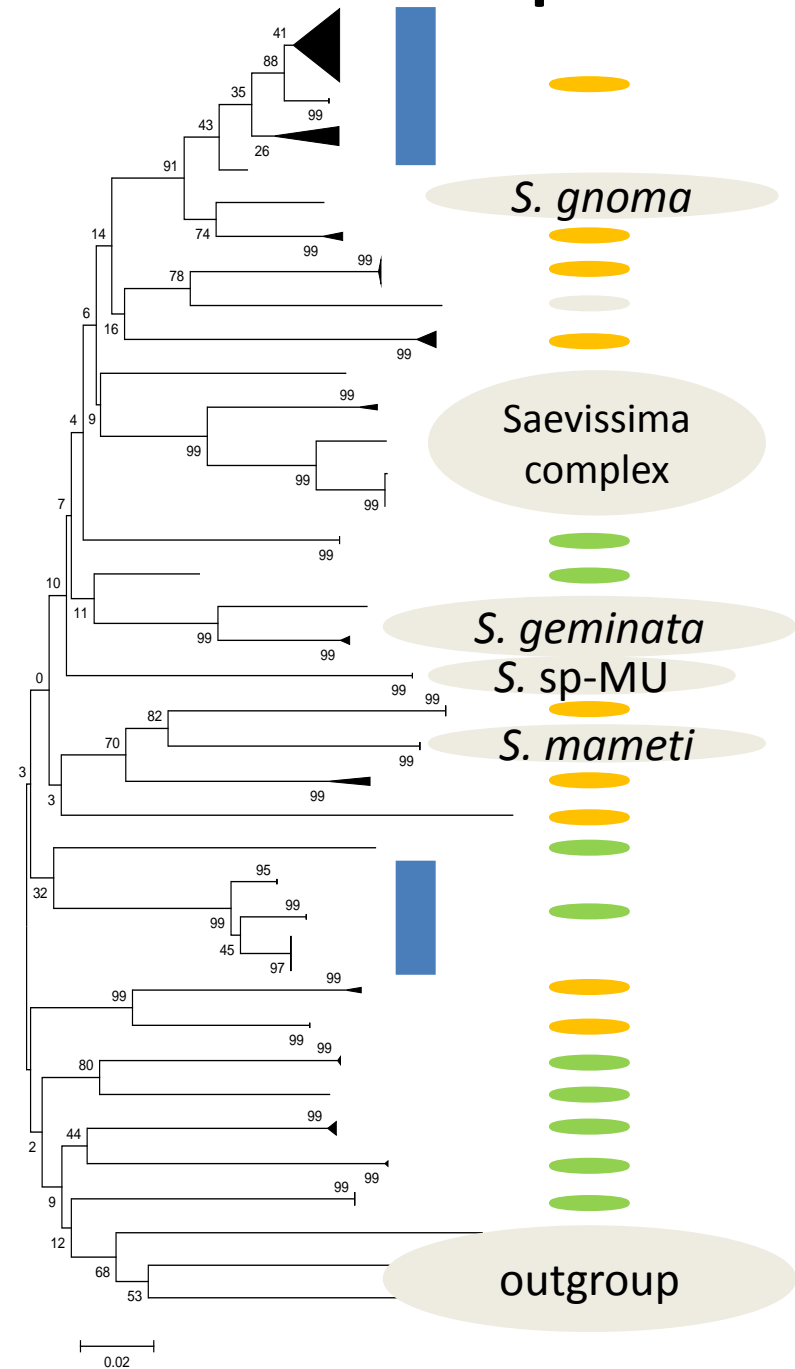
# RESULTS: 107 COI sequences (barcode region)



Distribution histogram of pairwise distances (COI)

K2P distance-based neighbor-joining tree of COI sequences

# RESULTS: COI sequences



18 clades ↔ 12 morphospecies

9 clades = 9 morphospecies

9 clades ← 3 morphospecies

*Wolbachia* detected: 62%

Nuclear wingless genes consistent

# RESULTS:

Clade-by-elevation contingency table

MOTU	1000 m	1500 m	2000 m
1		4	
2		3	
3	9		
4		5	
5	2		
6	2		
7	12	15	14
8			6
9			17
10	1		
11		3	
12	5		
13	2	1	
14		2	
15	1		
16		1	
17	1		
18		1	

# Acknowledgements

We thank Isabelle Bachy, Julien Cillis and Yves Laurent for the digitization of the ants.

