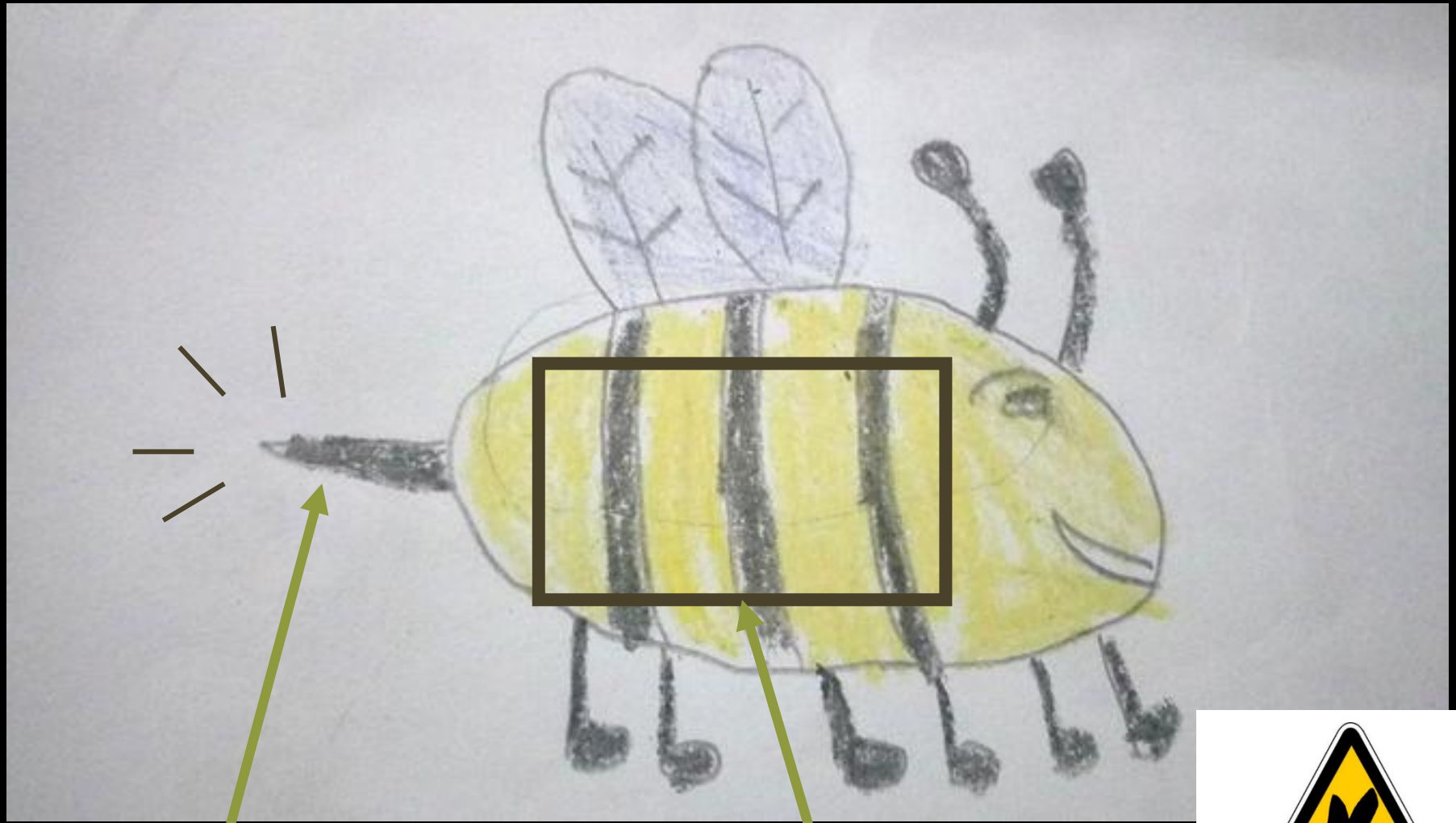


# Mimicry among bees and wasps and its (potential) impact in the evolution of their community

Adrien Perrard

Colin Fontaine, Marianne Elias,  
Marc Théry, Violaine Llaurens  
& Romain Le Divelec

# BEE OR WASP?



Defense

Aposematic signal





Wasp



Fly



Fly



©ALEXHYDE

Fly



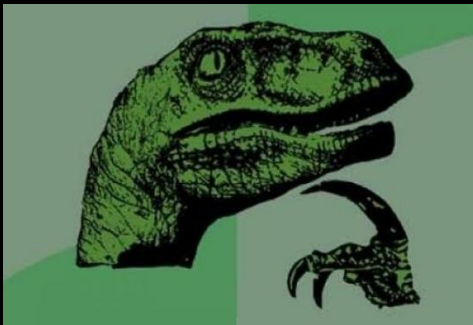
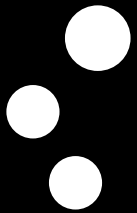
Sawfly



Beetle

Batesian mimics

# Mullerian mimics



## BEES



Megachilidae



Colletidae

## WASPS



Spheciform



Vespidae



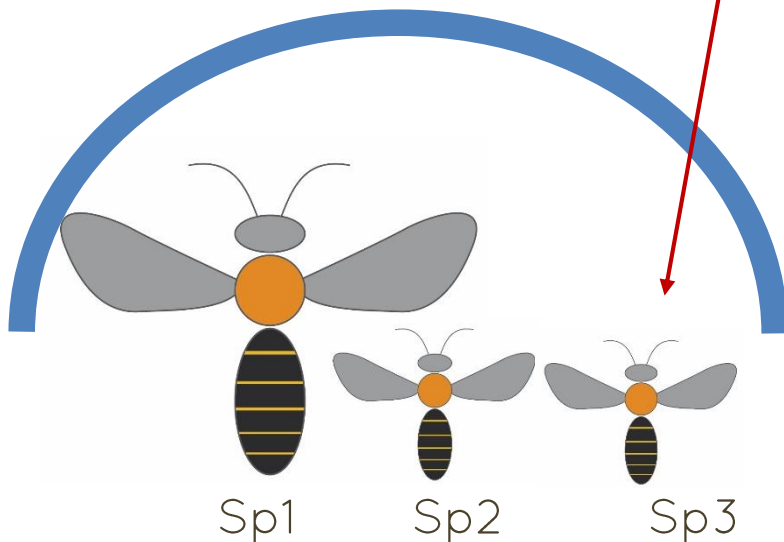
# Local diversity: different mimicry rings?



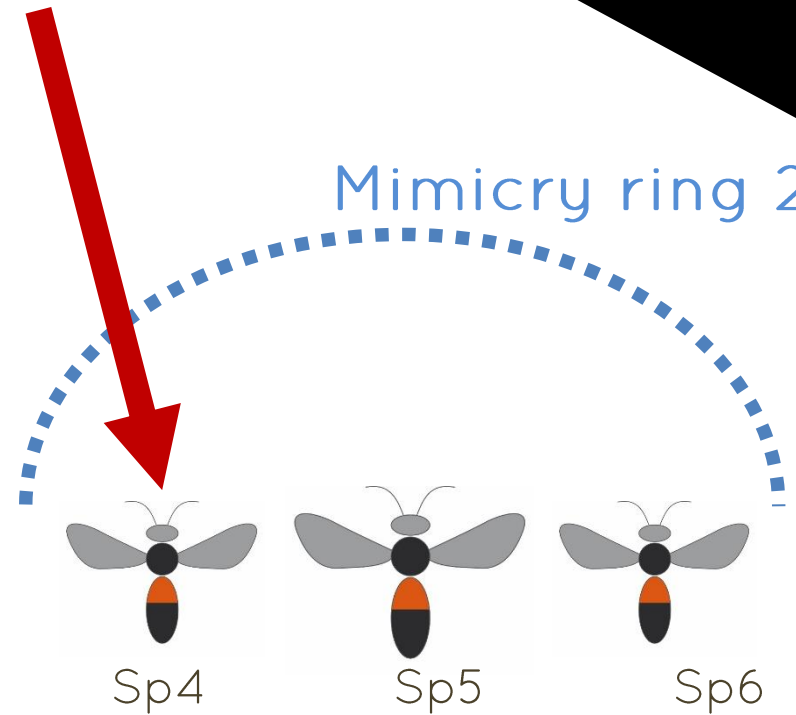
# Aposematism ← frequency of the signal



Mimicry ring 1



Mimicry ring 2

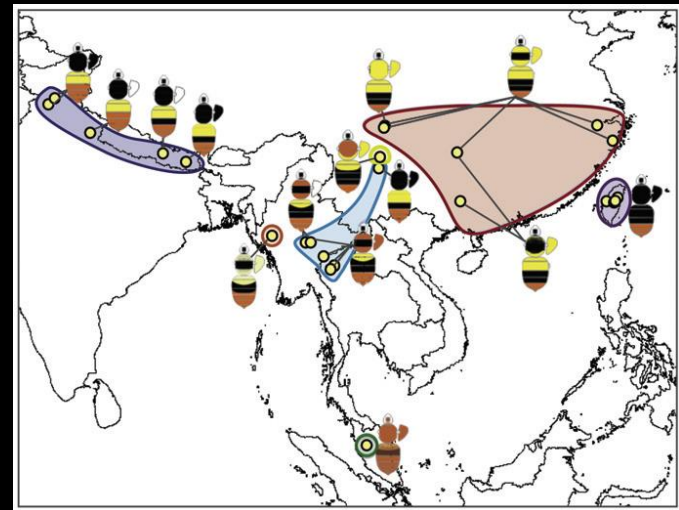


# Mimicry in bees and wasps poorly studied

*Bombus*

Williams 2007

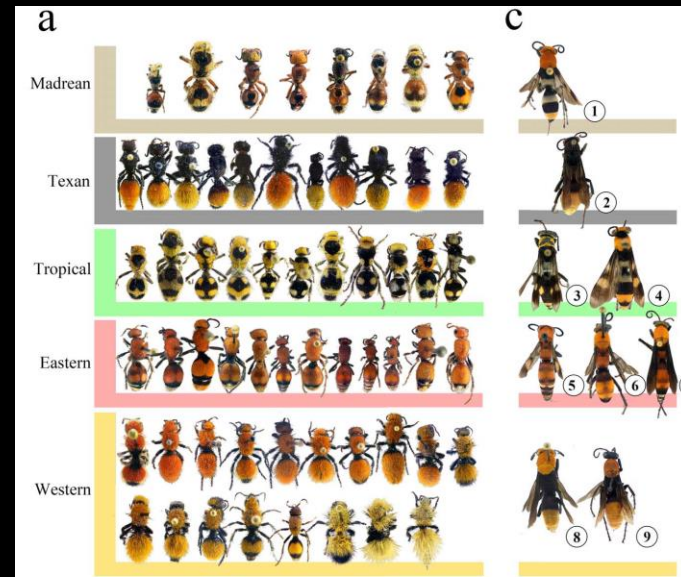
Hines *et al.* 2012



Pompilidae + Mutilidae

*e.g.* Rodriguez *et al.* 2014

Taxon-focused studies

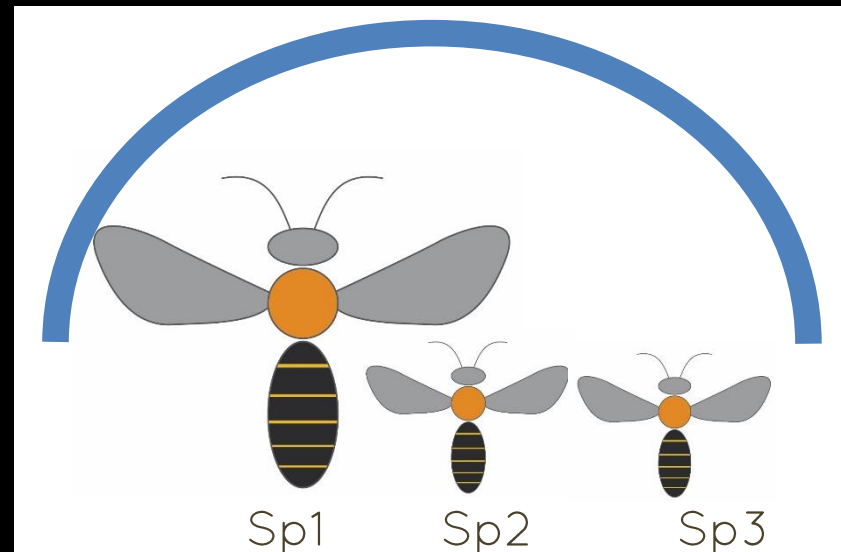


# Project:

- How common is mullerian mimicry in a community of bees and wasps?



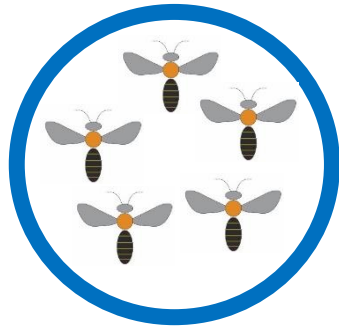
- Are species from strong mimicry groups more successful?





PAST  
(Reference)

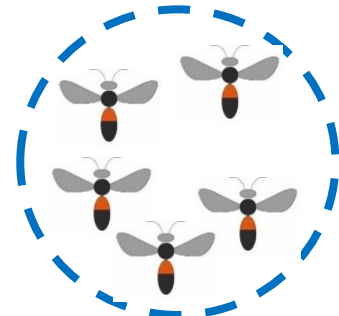
Community



Ring 1



Ring 2



Ring 3

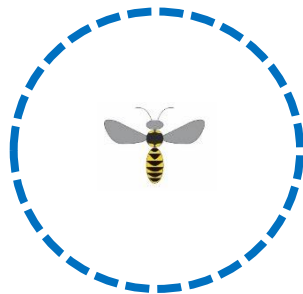


PRESENT

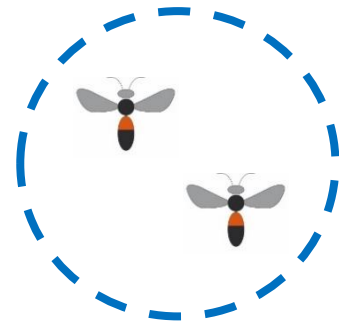
Community



Ring 1



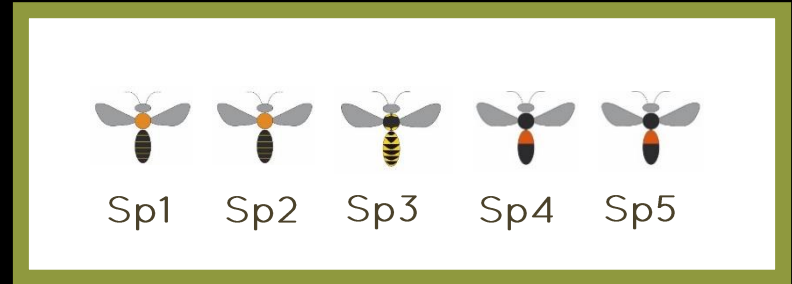
Ring 2



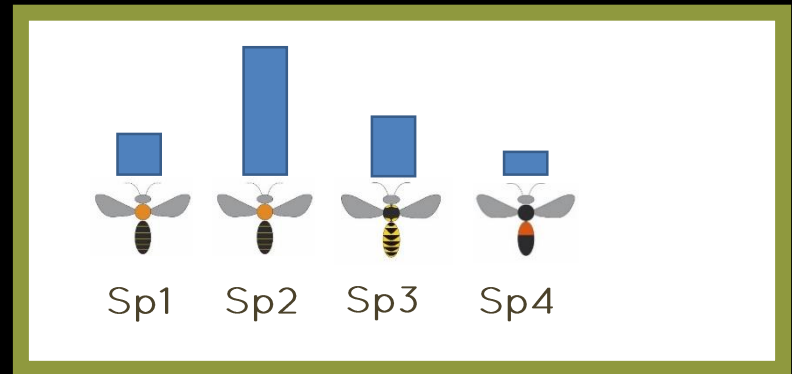
Ring 3

# What do we need?

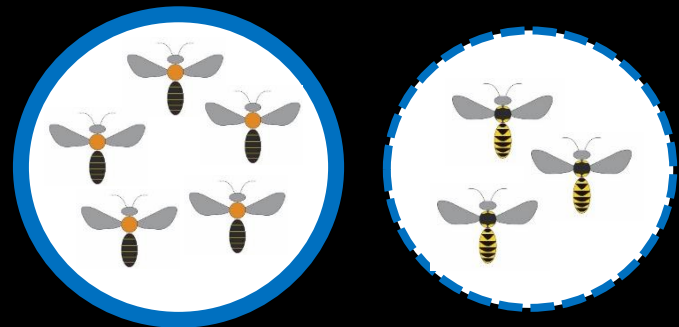
I. Species diversity (Past)



II. Current diversity + abundances (Present)



III. Mimicry rings definition



# I. Species diversity (Past)

- Ferton collection (XIX<sup>th</sup>)
- ~12 000 bees & wasps
- Bonifacio / 15 years
- Poorly studied



Charles Ferton



Digitization  
+ species identifications

# I. Species diversity (Past)

- ~7500 specimens digitized
- > 450 species (254 bees)
- Species new to France
- Taxonomic revisions needed (new species?)



... work in progress



# II. Current diversity & abundances

- March to November 2017
- 7 Localities





## II. Current diversity & abundances

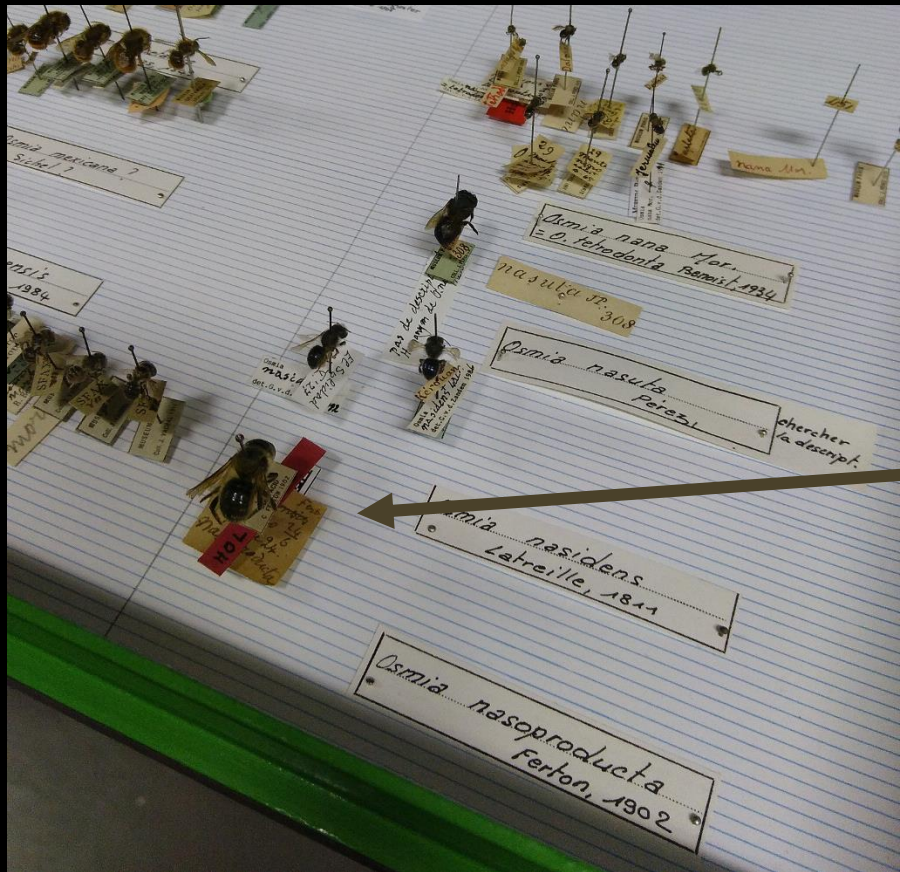
- March to November 2017
- 7 Localities
- 45 pan traps every 2 weeks
- 112 transects every month





# II. Current diversity & abundances

- >8000 bees & wasps collected in 2017



~60% found back  
Including rare species  
+ newly arrived species  
... work in progress

# III. Mimicry ring definition



*Anthophora sicheli*  
(bee)



*Eucera nigrilabris*  
(bee)

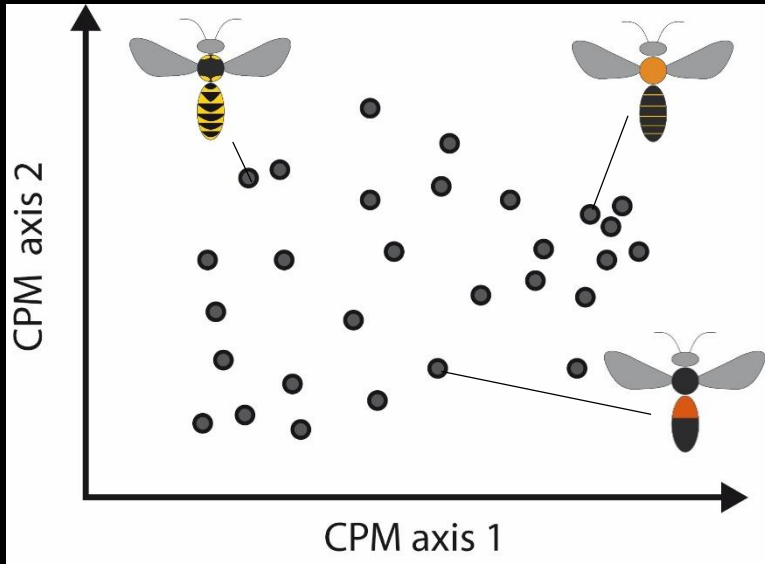


*Andrena sardoa* (bee)

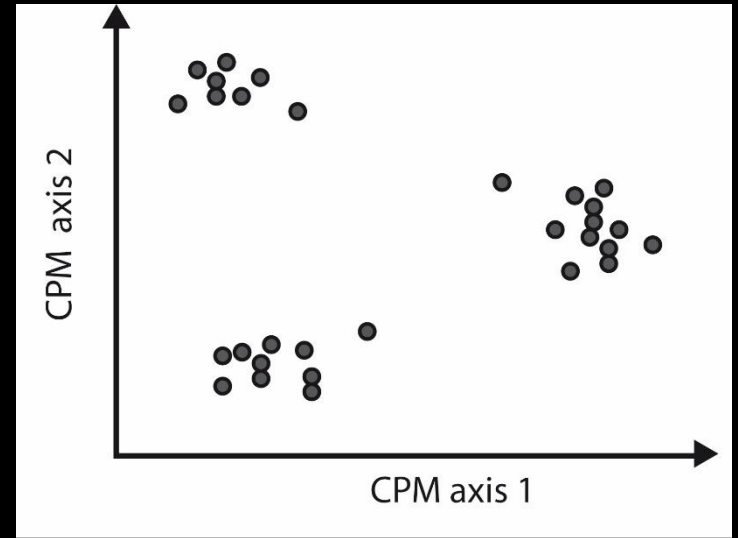


*Tachysphex* sp. (wasp)

# III. Mimicry ring definition



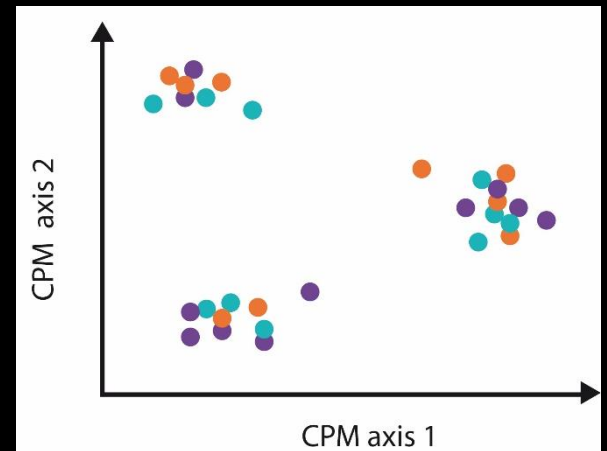
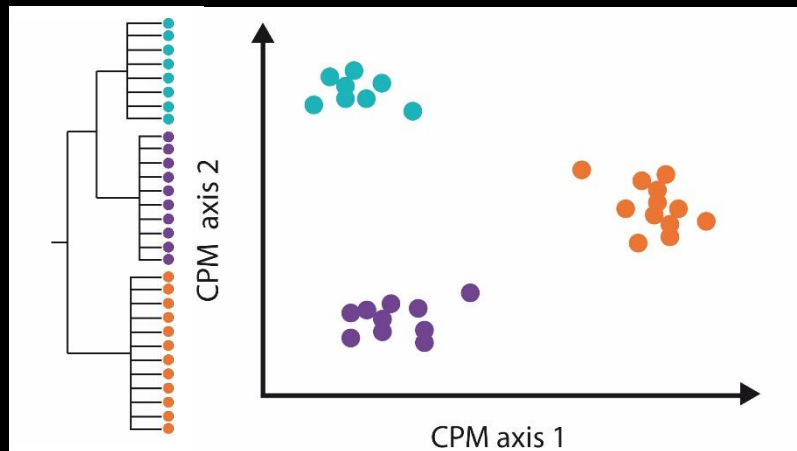
No Mimicry



Mimicry?

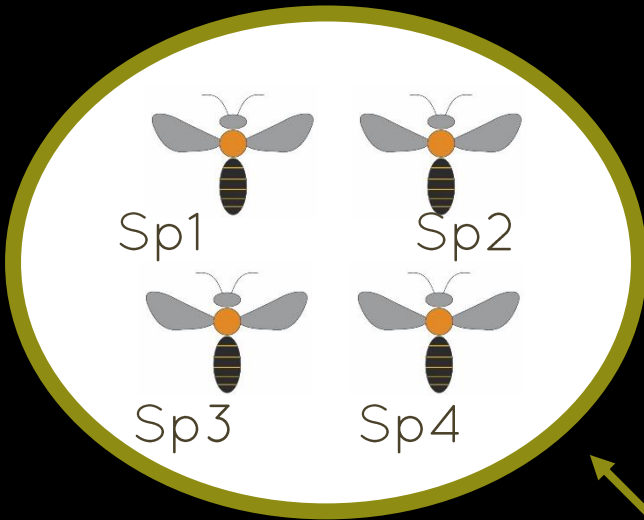
NO

YES

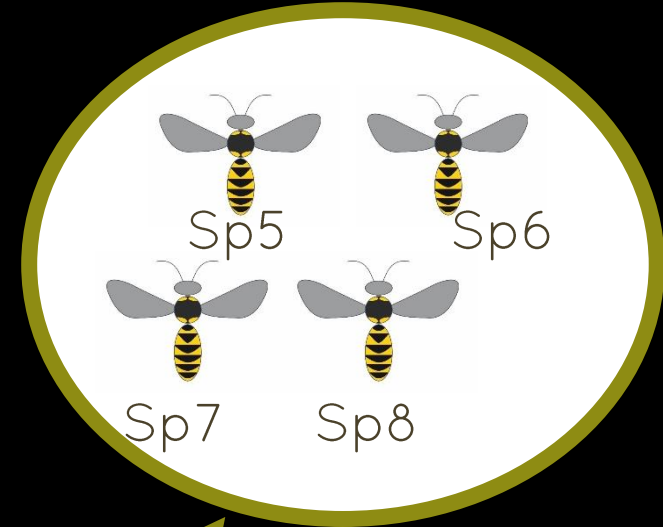




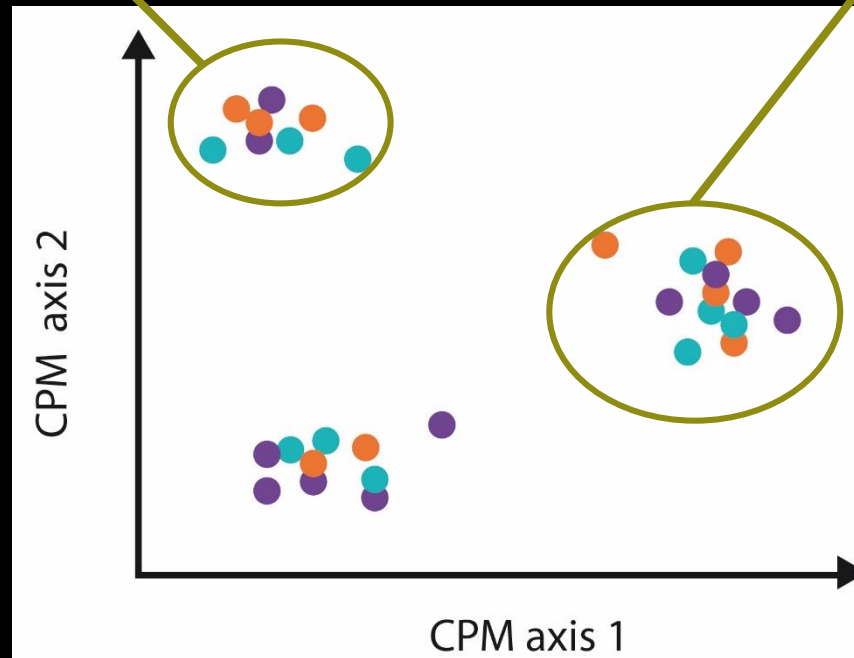
# III. Mimicry ring definition



Mimicry ring 1



Mimicry ring 2



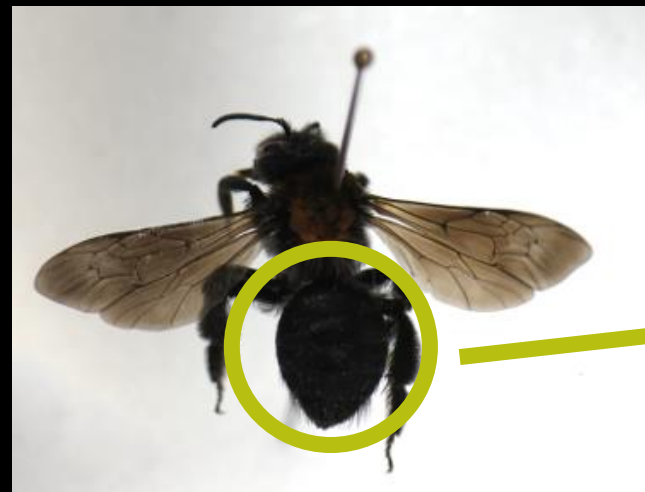
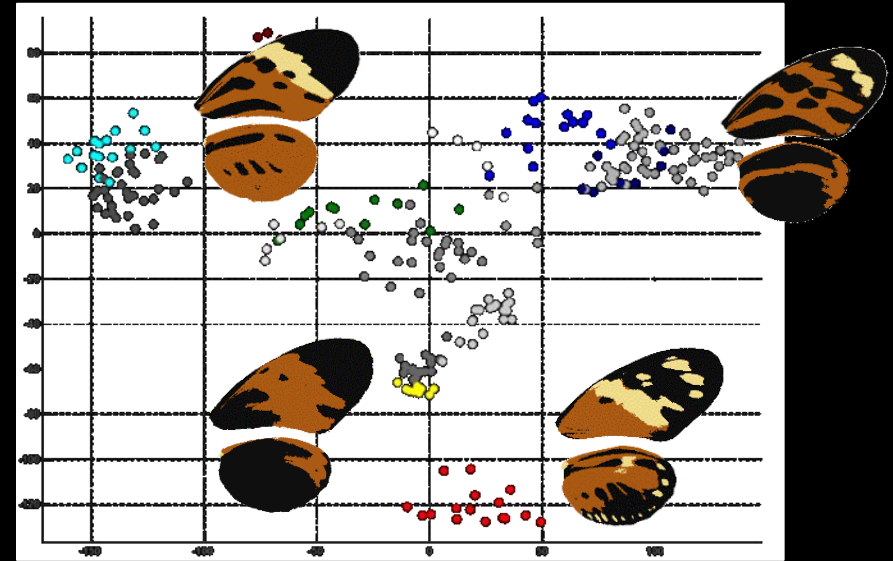


# III. Mimicry ring definition

- Color Pattern Modeling

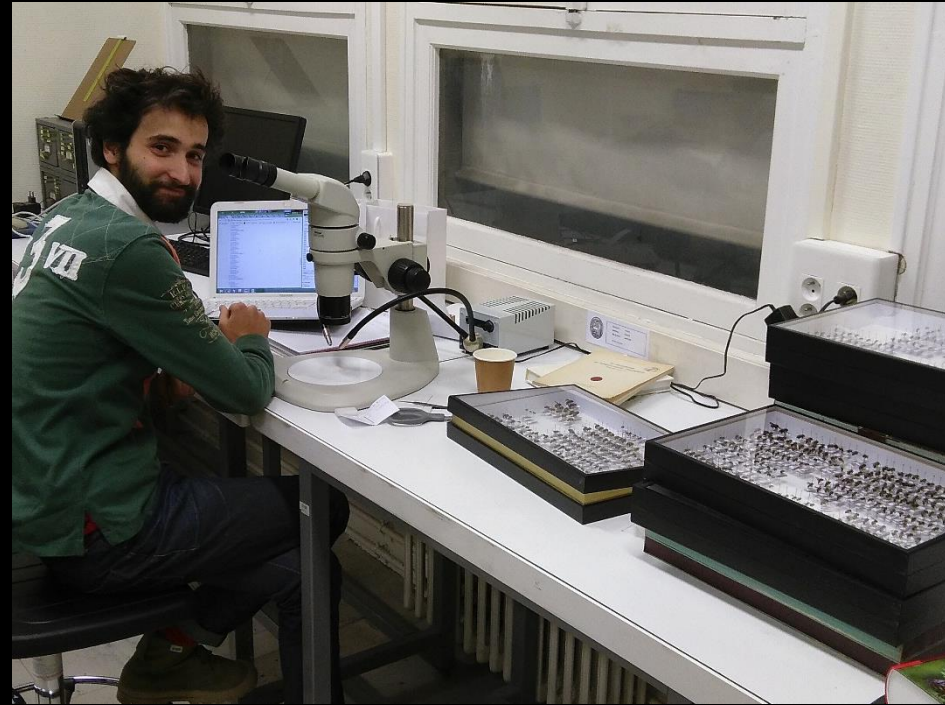
Le Poul *et al.*, 2014

- Adapted to  
3D shiny objects



# And now?

- New job: focus on the CPM analyses
- New recruit in entomology: Romain Le Divelec
- 2018: M2 on seasonal variations: Giulio Menegus



# THANK YOU!



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