

Colombian special honeys



Libertad y Orden

Ministerio de Agricultura y Desarrollo Rural
República de Colombia



UNIVERSIDAD
NACIONAL
DE COLOMBIA
SEDE BOGOTÁ

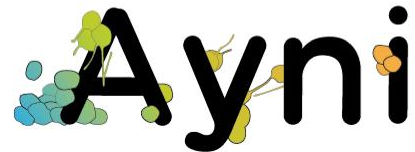
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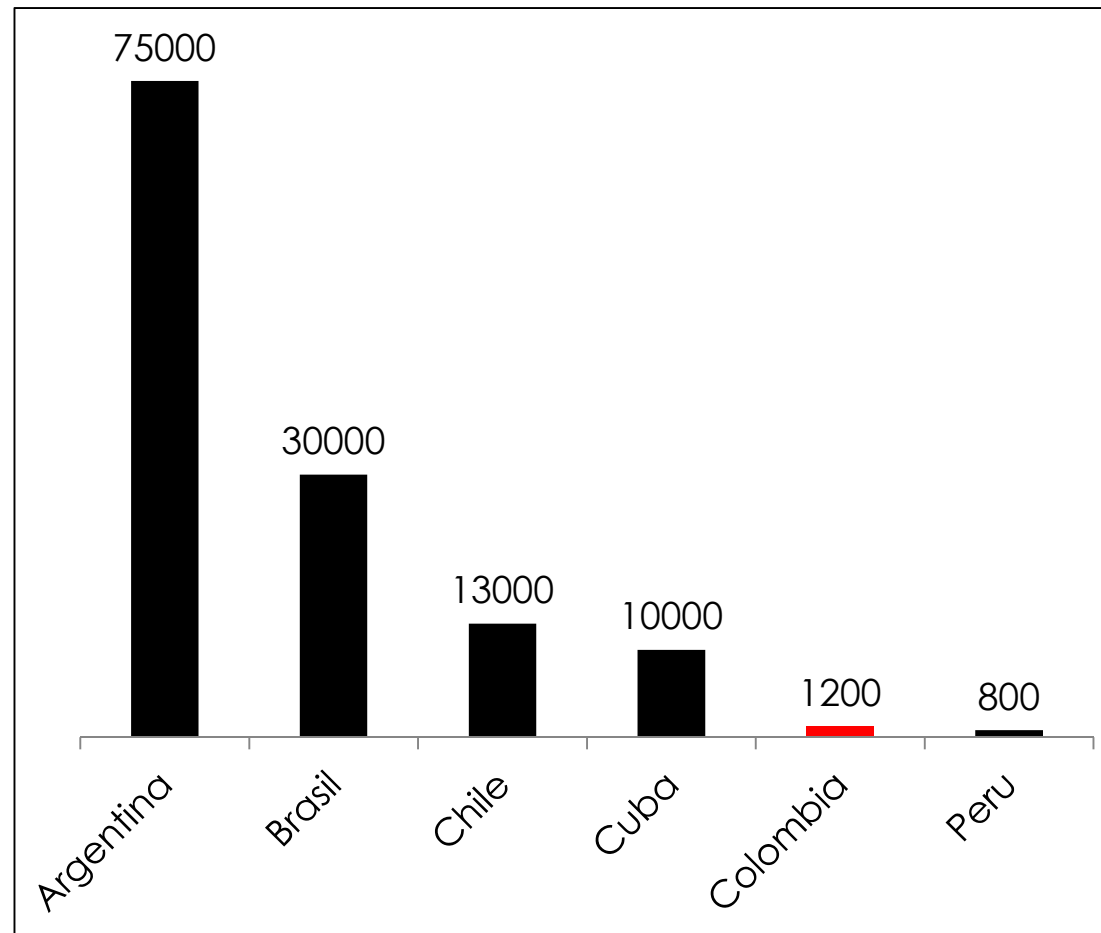
Colombia

Introduction

Area: 1 141 748 km²
Population: 45.925.397
Capital: Bogotá D. C
Language: Spanish



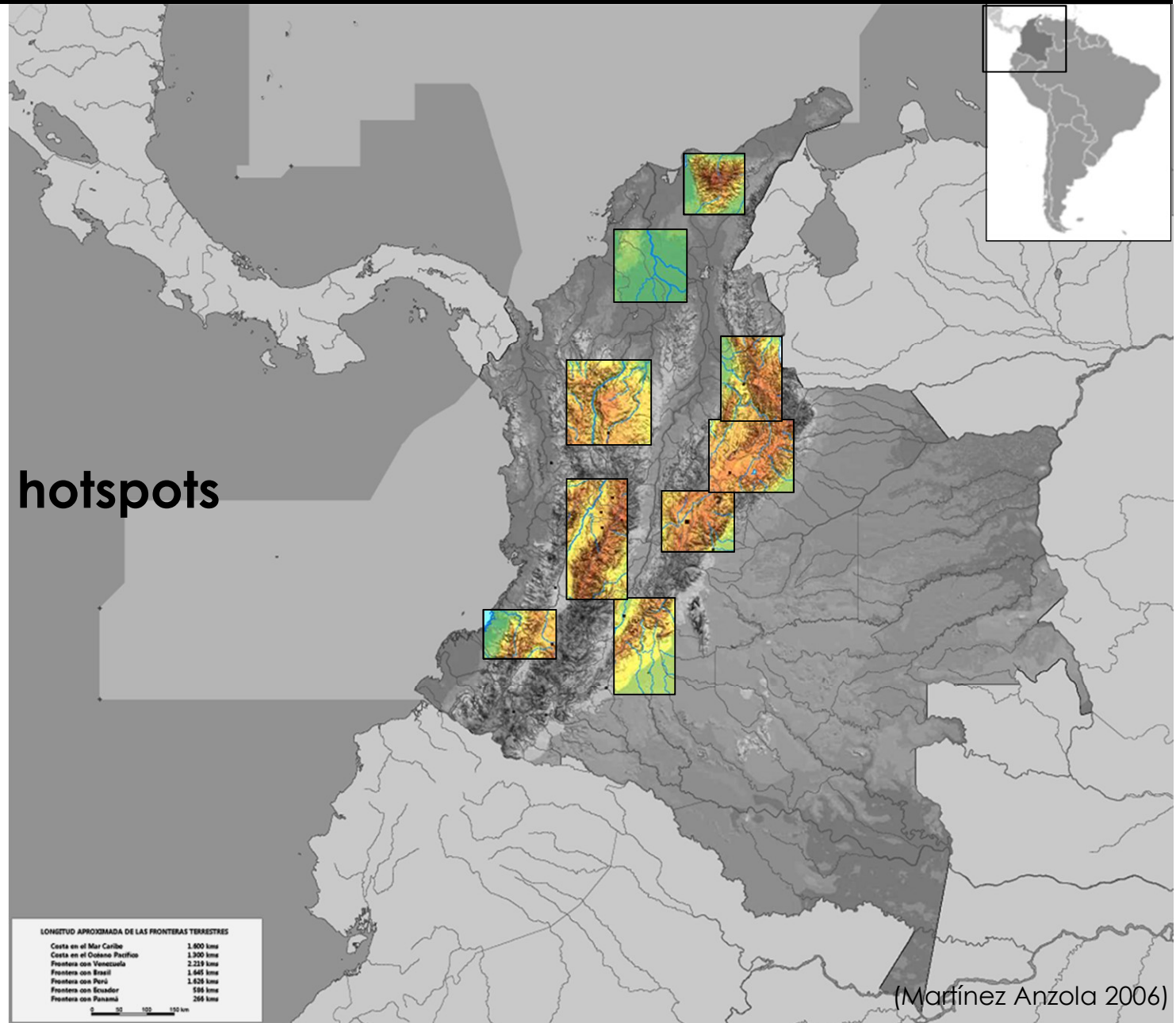
Honey production (Tons / year)



Beekeeping in Colombia

Introduction

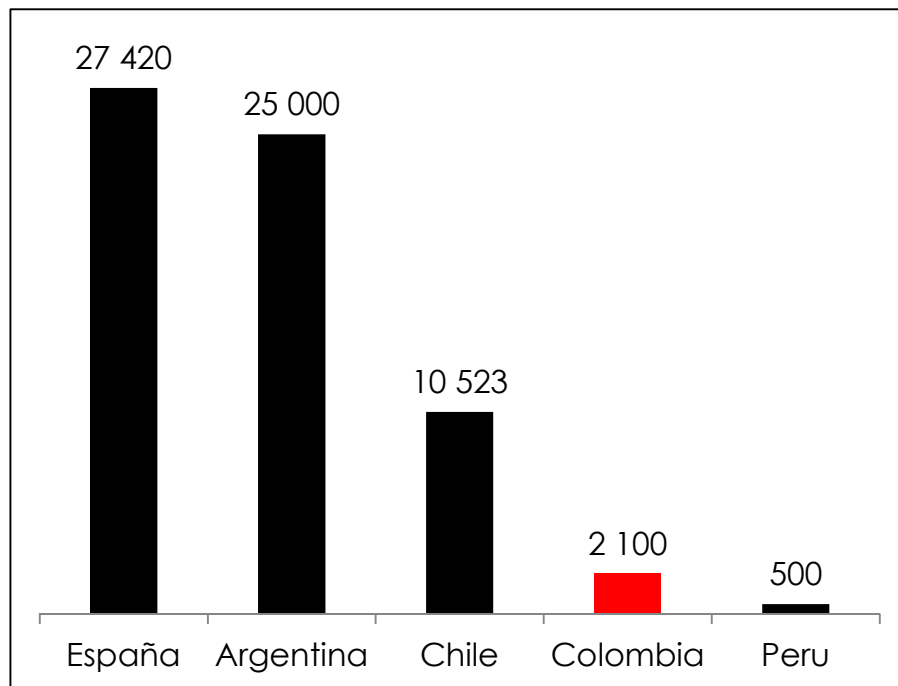
Production hotspots



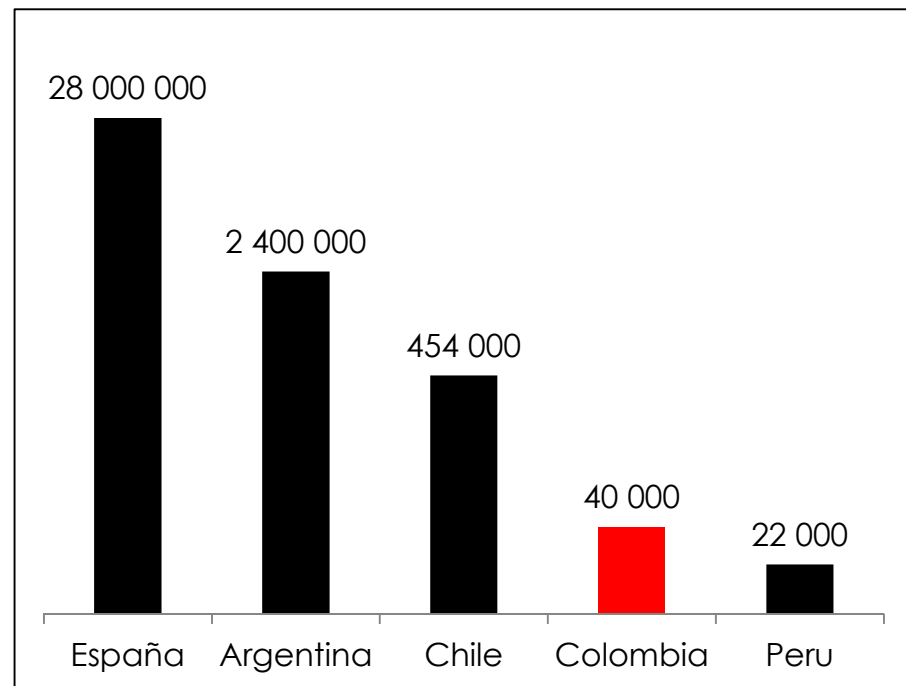
Beekeeping in Colombia

Introduction

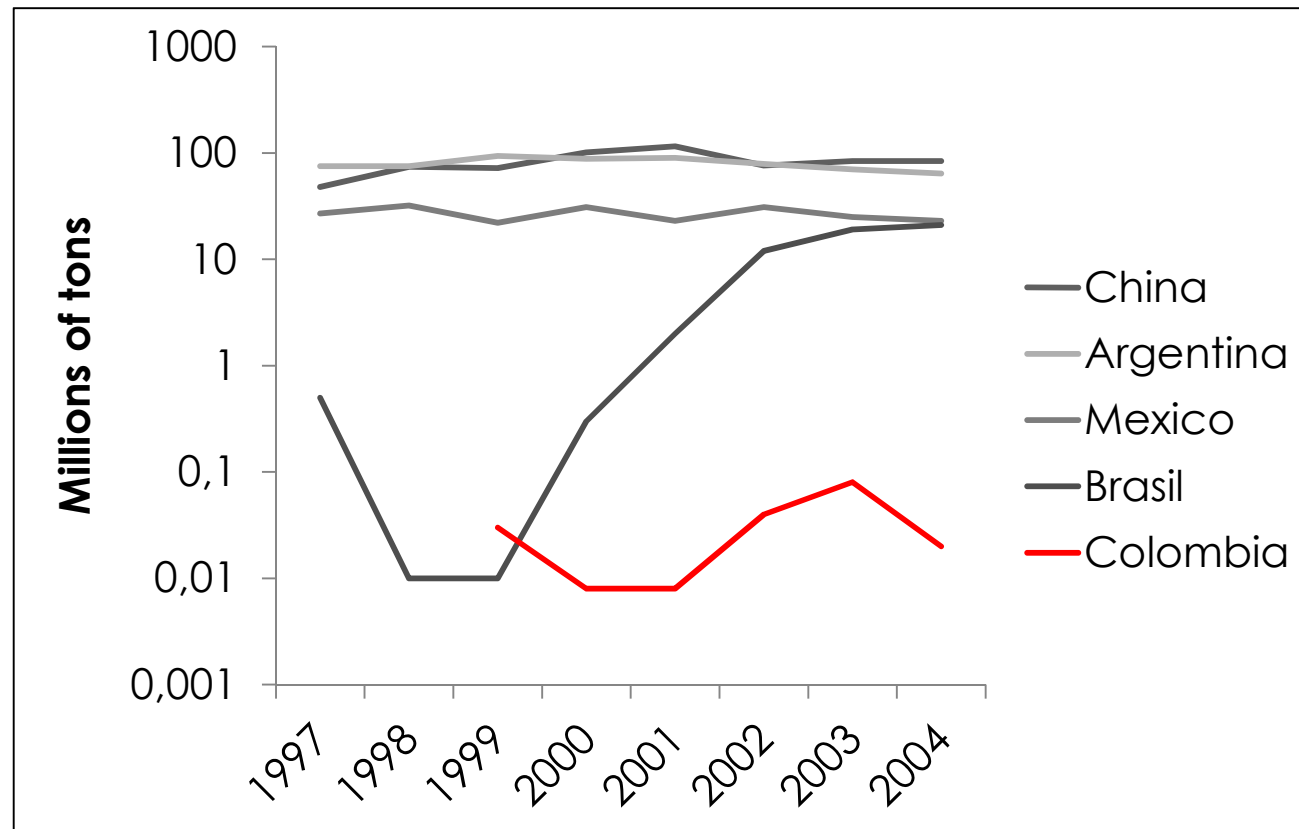
Number of beekeepers



Number of hives



Honey exportation

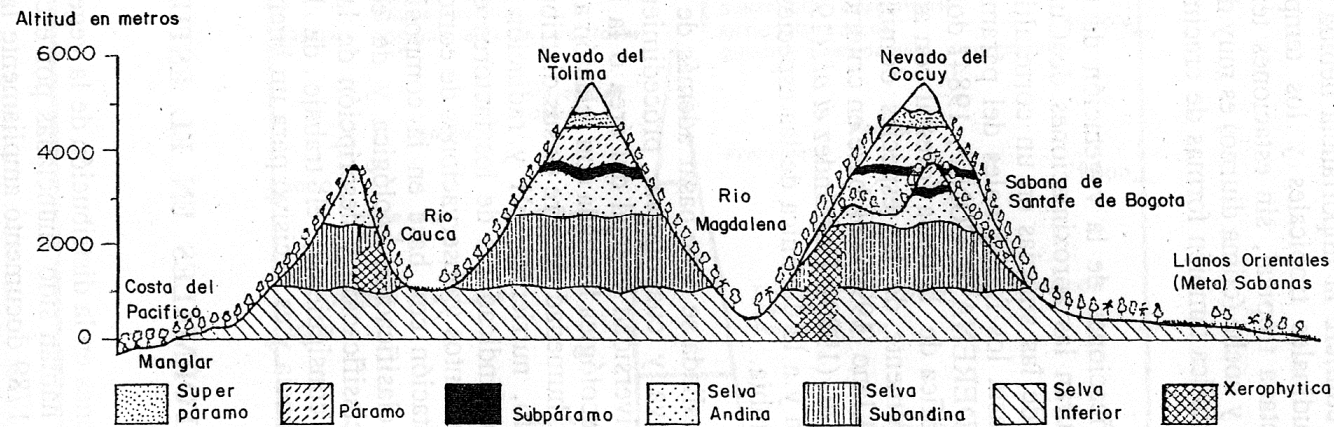


(FAOSTAT 2006)

The beekeeping potential

Introduction

Colombia is in the second place of major biodiversity in the world



The beekeeping potential

Introduction

Subandean / coffee region (1000-2000 masl)



The beekeeping potential

Introduction

Andean region (2000-3000 masl)



The beekeeping potential

Introduction

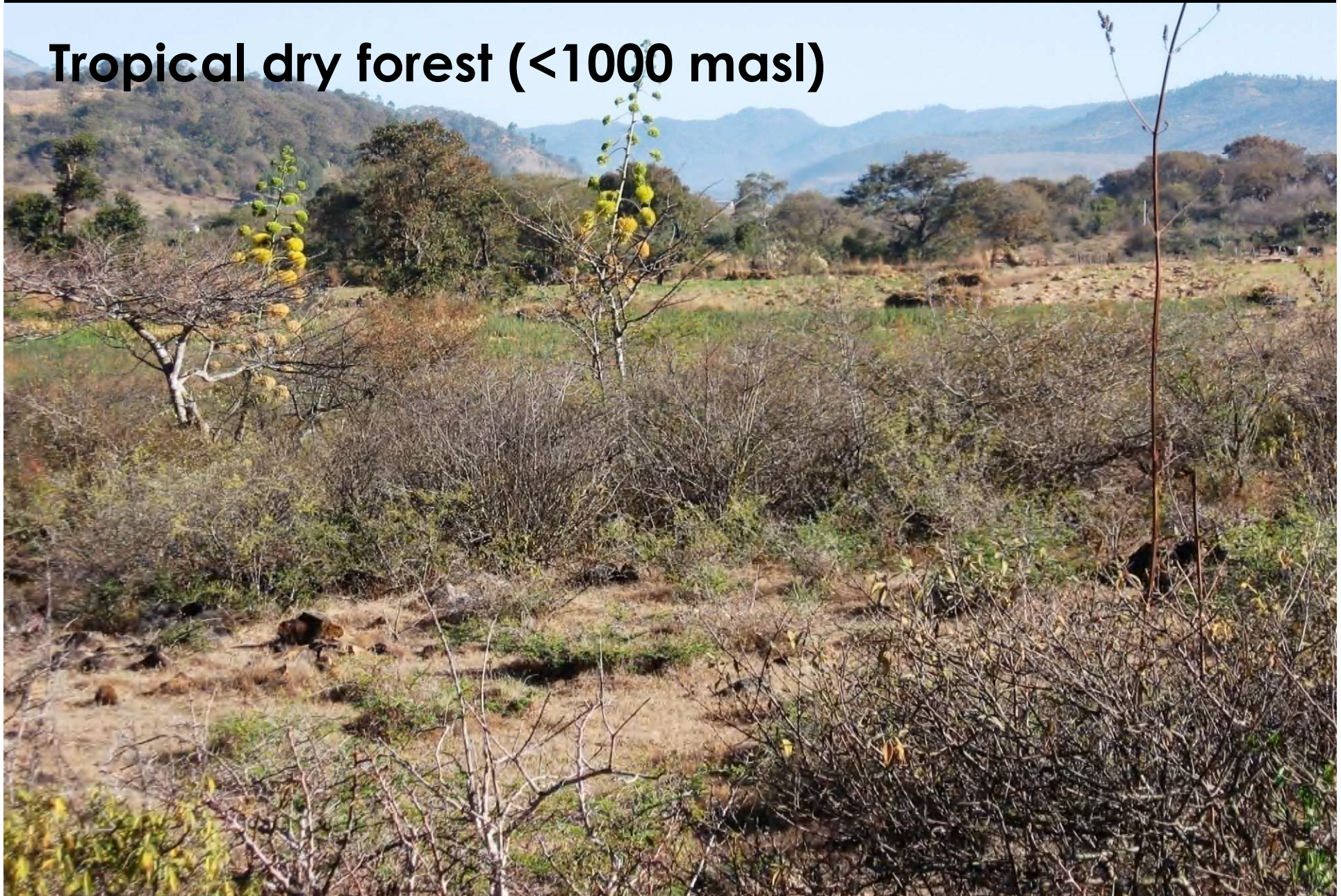
East Savannah (<1000 masl)



The beekeeping potential

Introduction

Tropical dry forest (<1000 masl)



Differentiated marketing

Introduction

- Botanic origin denomination
- Geographic origin denomination
- Methods of production



Strategies to establish origin denomination for bee products in Colombia

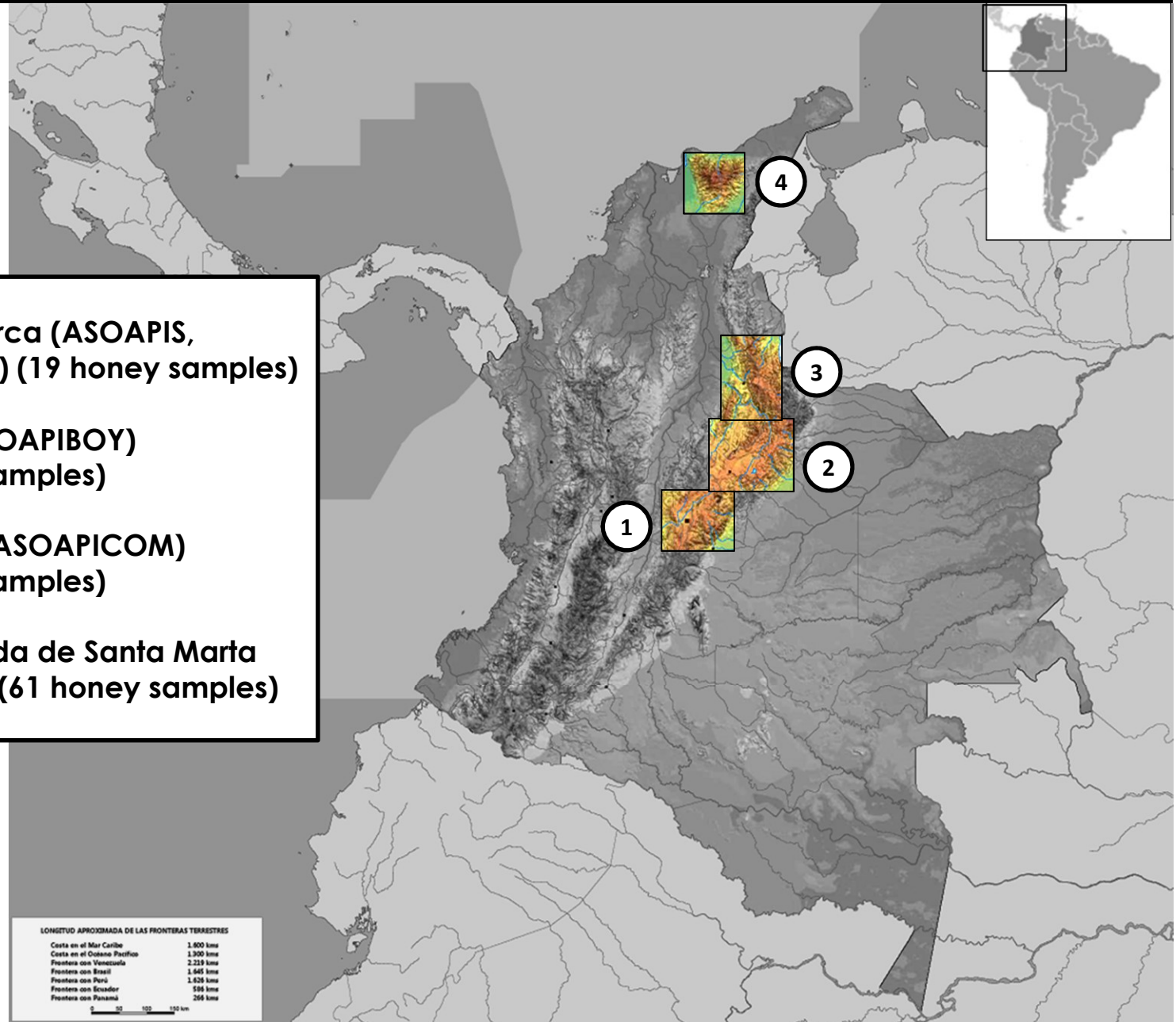
General objective:

To find and apply a group of strategies to establish differences in chemical composition, biological activity and botanical origin, for adding value to bee products.

Study area

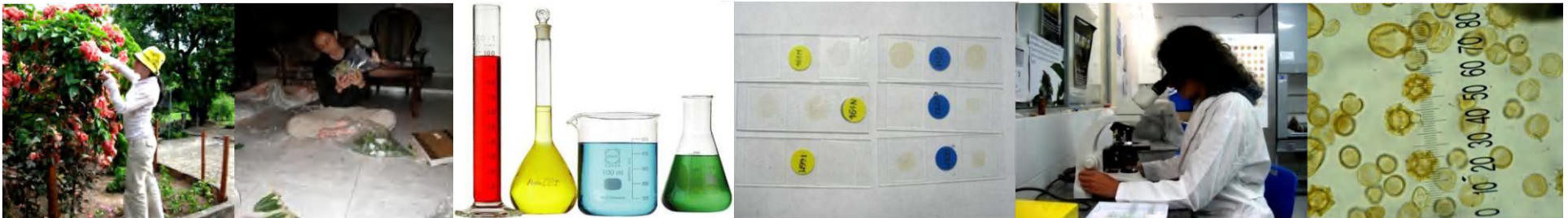
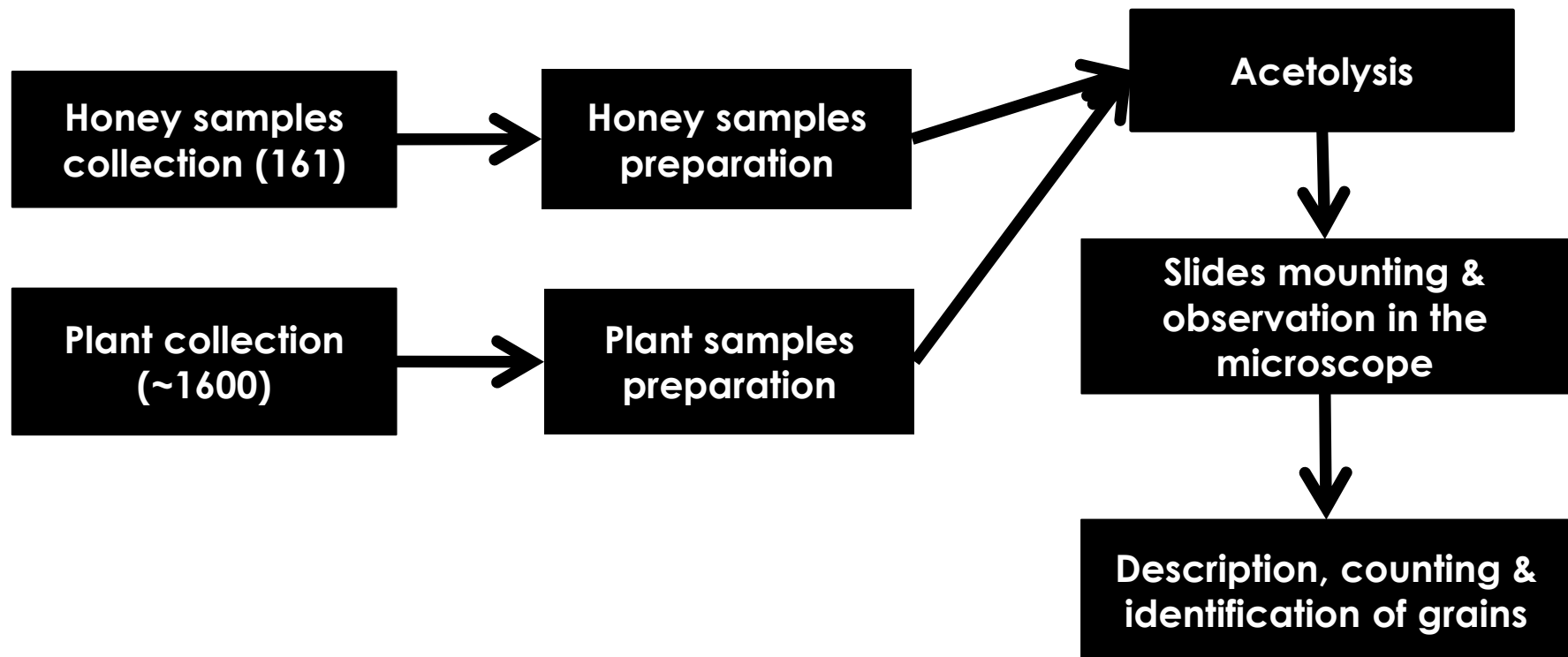
Methodology

- ① Cundinamarca (ASOAPIS, ASOAPICUN) (19 honey samples)
- ② Boyacá (ASOAPIBOY) (27 honey samples)
- ③ Santander (ASOAPICOM) (63 honey samples)
- ④ Sierra Nevada de Santa Marta (APISIERRA) (61 honey samples)



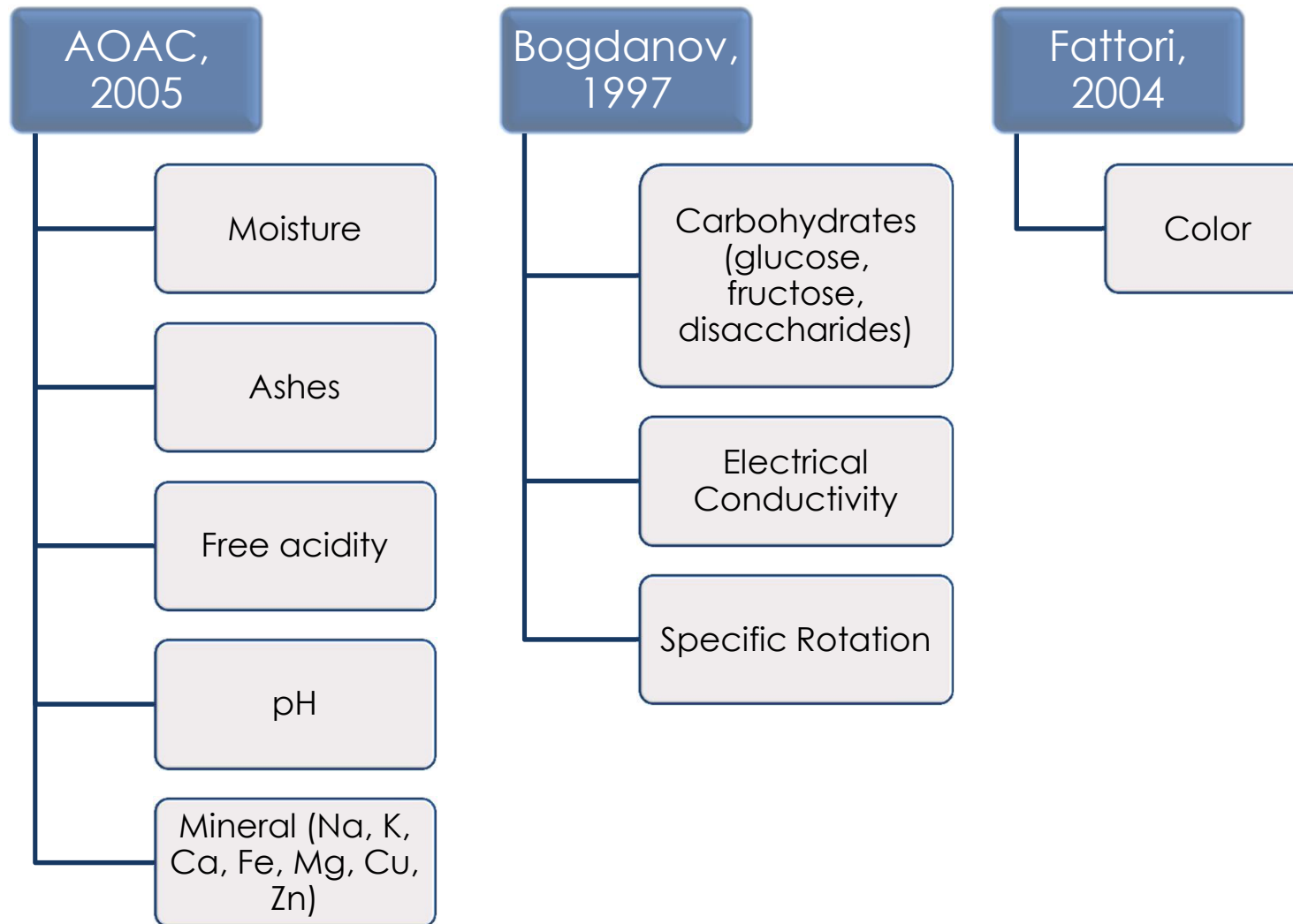
Mellisopalynological analysis

Methodology

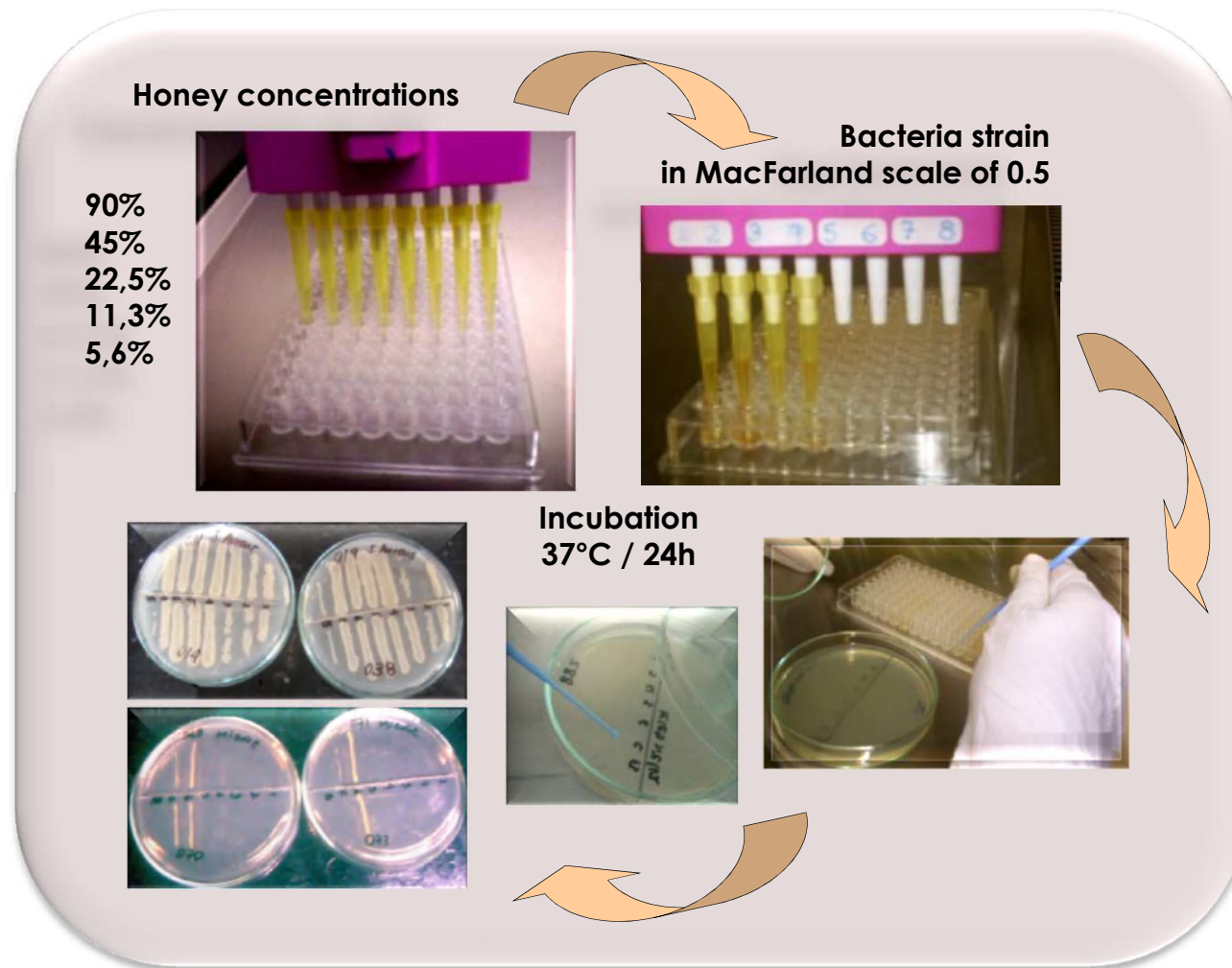


Physico-chemical analysis

Methodology



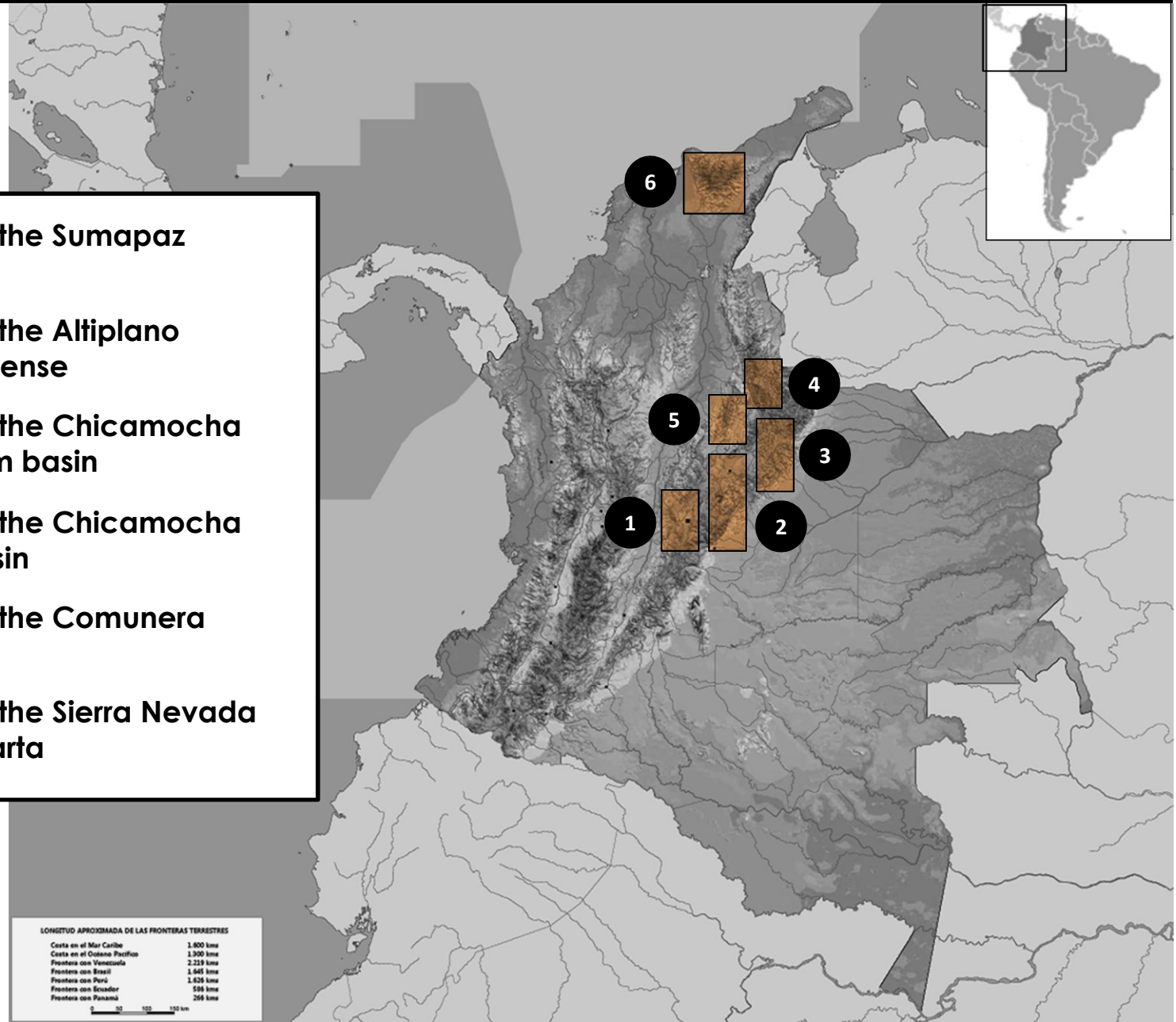
Minimum inhibitory concentration



Geographic differentiation

Results

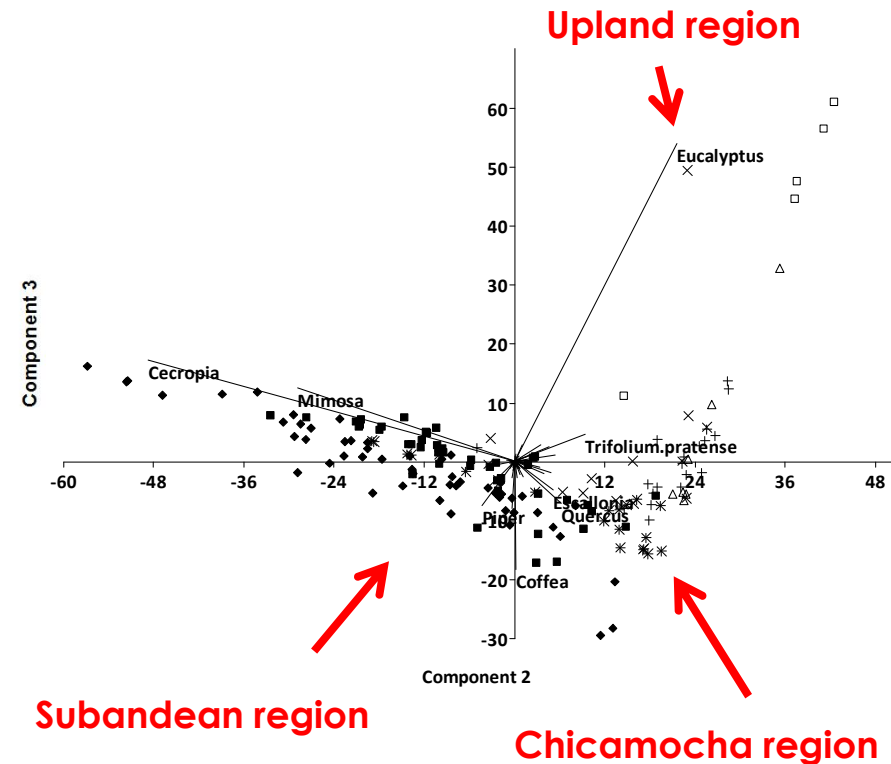
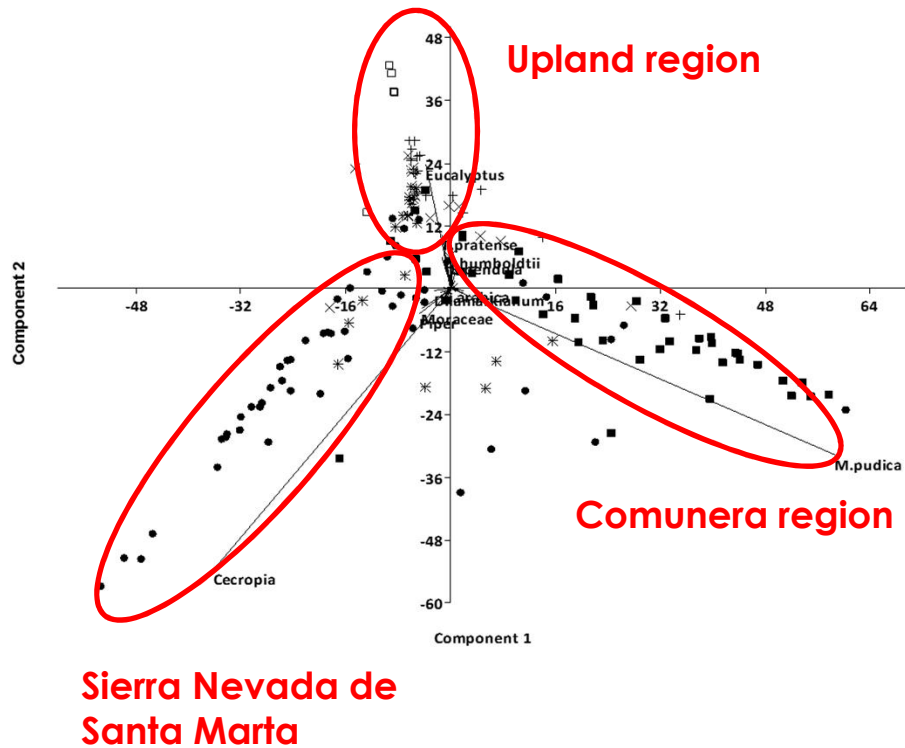
- 1 Honey from the Sumapaz river basin
- 2 Honey from the Altiplano cundiboyacense
- 3 Honey from the Chicamocha river medium basin
- 4 Honey from the Chicamocha river low basin
- 5 Honey from the Comunera region
- 6 Honey from the Sierra Nevada de Santa Marta



Statistical analysis

Results

Principal Component Analysis PCA



Neuronal Network NN

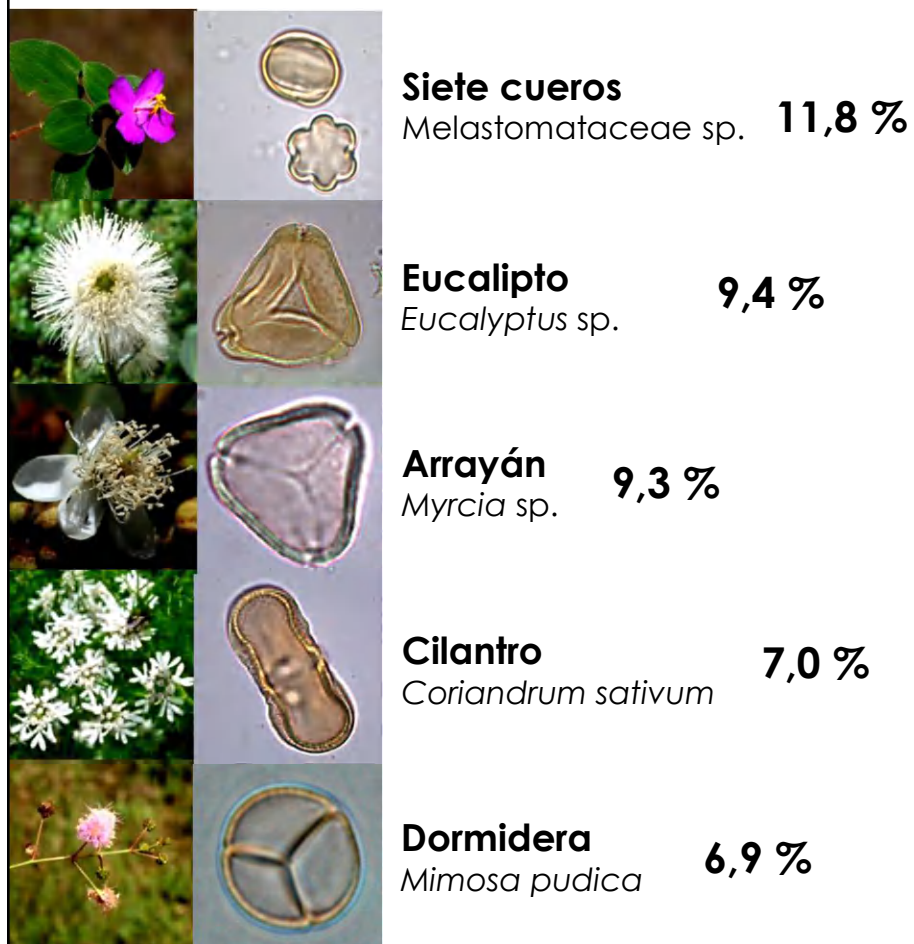
Error rate cross validation: 0,18

	ACB	L CHI	M CHI	COM	SNSM	SPZ
ACB	9		1	2		2
L CHI		15		4	1	
M CHI	1	1	29			
COM		1	2	31	9	
SNSM				6	55	
SPZ	3				1	11

Honey from the Sumapaz river basin

Results

Palynological spectrum

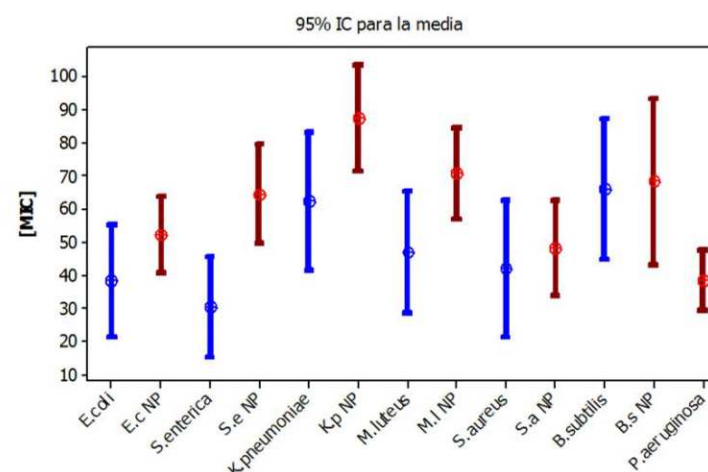


Physico-chemical characteristics

-Dark honeys (high Pfund value)
(73mmPfund)

-High free acidity
(35.4 meq/kg)

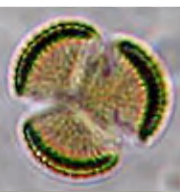
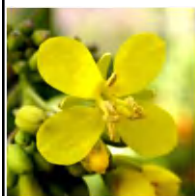
Microbiological characteristics



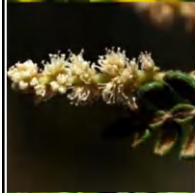
Honey from the Altiplano cundiboyacense

Results

Palynological spectrum



Nabo
Brassica sp. **22,3 %**



Encenillo
Weinmannia sp. **22,2 %**



Eucalipto
Eucalyptus sp. **13,2 %**



Roble
Quercus humboldtii **11 %**



Trébol blanco
Trifolium repens **7 %**

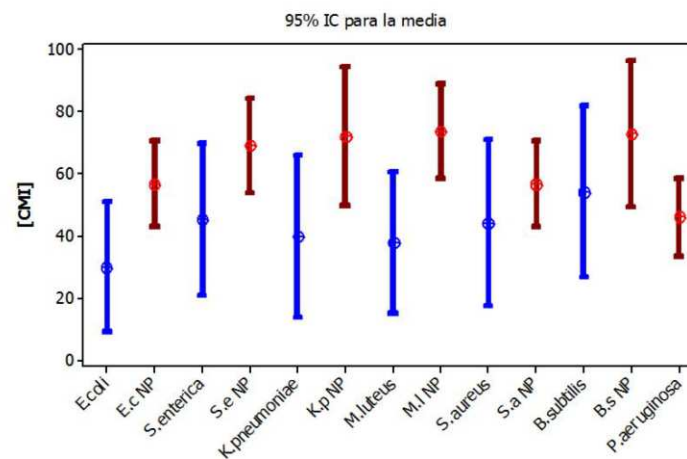
Physico-chemical characteristics

-High ash content
(0.25%)

-High electrical conductivity
(578 $\mu\text{S}/\text{cm}$)










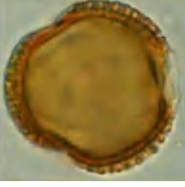
-High mineral content
(Na, K, Ca, Mg, Zn)

Microbiological characteristics



Honey from the Chicamocha medium basin Results

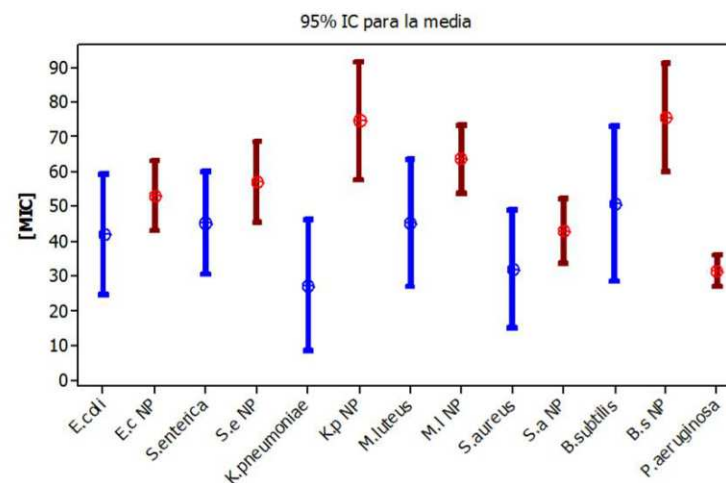
Palynological spectrum

		Trébol rojo <i>Trifolium pratense</i>	14,7 %
		Eucalipto <i>Eucalyptus sp.</i>	8,3 %
		Mangle <i>Escallonia pendula</i>	8,2 %
		Roble <i>Quercus humboldtii</i>	7,8 %
		Garrocho <i>Viburnum sp.</i>	7,7 %

Physico-chemical characteristics

-High pH (4.0)	- Low glucose/fructose content (28%/35%)	-High electrical conductivity (504 $\mu\text{S}/\text{cm}$)
-Low acidity (31 meq/kg)	- Dark honeys (high Pfund value) (77mmPfund)	-High mineral content (Na, K, Ca, Mg, Zn)
-High ash content (0.27%)		

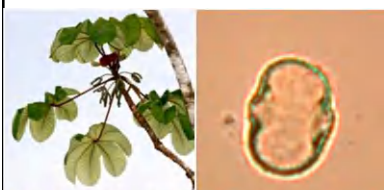
Microbiological characteristics



Honey from the Chicamocha low basin

Results

Palynological spectrum



Yarumo
Cecropia sp. **10,4 %**



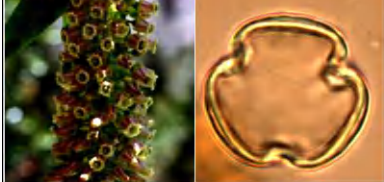
Roble
Quercus humboldtii **10,4 %**



Dormidera
Mimosa pudica **6,5 %**



Cordoncillo
Piper sp. **5,9 %**



Mangle
Escallonia pendula **5,9 %**

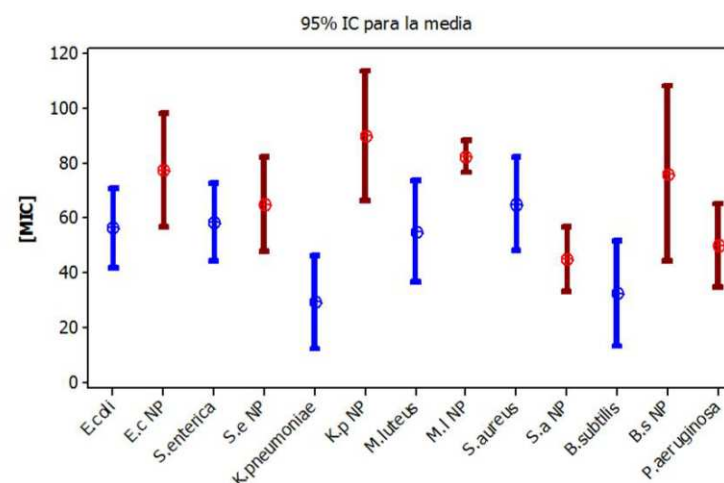
Physico-chemical characteristics

-Low ash content
(0.16%)

-High glucose/fructose content
(34%/40%)

-Low sodium and calcium content
(64 and 68 ppm)

Microbiological characteristics



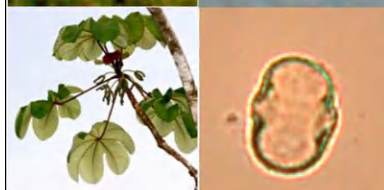
Honey from the Comunera region

Results

Palynological spectrum



Dormidera
Mimosa pudica **37,2 %**



Yarumo
Cecropia sp. **6,1 %**



Café
Coffea arabica **5,2 %**

Physico-chemical characteristics

-Low acidity
(31 meq/kg)

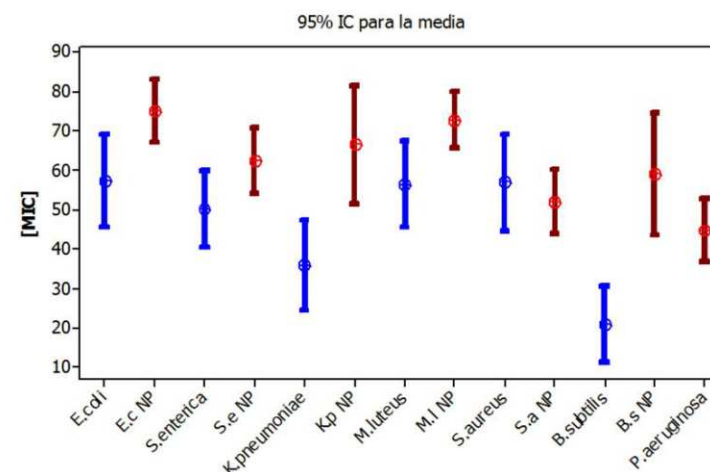
-Low ash content
(0.11%)

-Light honeys (low
Pfund value)
(50mmPfund)

-Low electrical
conductivity
(362 μ S/cm)

-Low mineral content
(Na, K, Ca, Mg, Zn)

Microbiological characteristics



Honey from the Sierra Nevada de Santa Marta

Results

Palynological spectrum



Yarumo
Cecropia sp. **31,2 %**



Dormidera
Mimosa pudica **9,6 %**



Cordoncillo
Piper sp. **7,9 %**



Moraceae sp.1 **6,9 %**



Palma
Dyctiocarium lamarckianum **6,0 %**

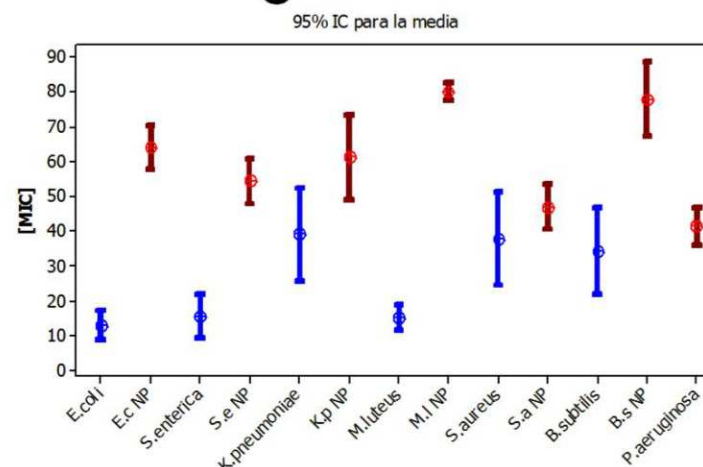
Physico-chemical characteristics

-High free acidity
(37 meq/kg)

-High glucose/fructose content
(34%/40%)

-High calcium content
(127 ppm)

Microbiological characteristics



Asteraceae honey

Results

Palynological spectrum

Species from family Asteraceae > 50%



Physico-chemical characteristics

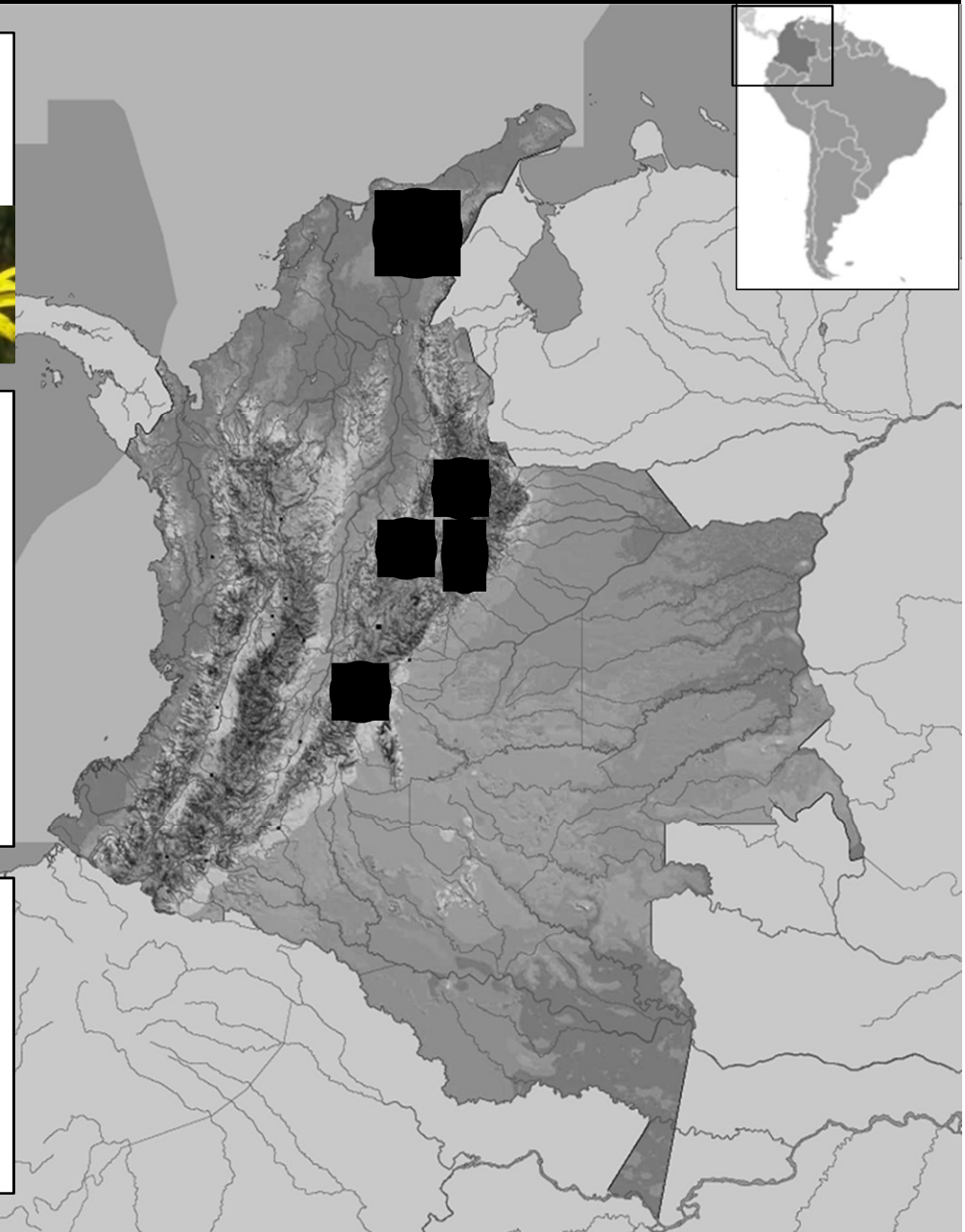
-High glucose/fructose content
(35%/40%)

-Low electrical conductivity
(321 $\mu\text{S}/\text{cm}$)

Microbiological characteristics

Low MIC for *Pseudomona aeruginosa*,
Staphylococcus aureus and
Salmonella enterica

Frontera con Panamá 200 km
0 100 200 km



Oak honeydew

Results

Palynological spectrum

Honeydew indicators > 50%

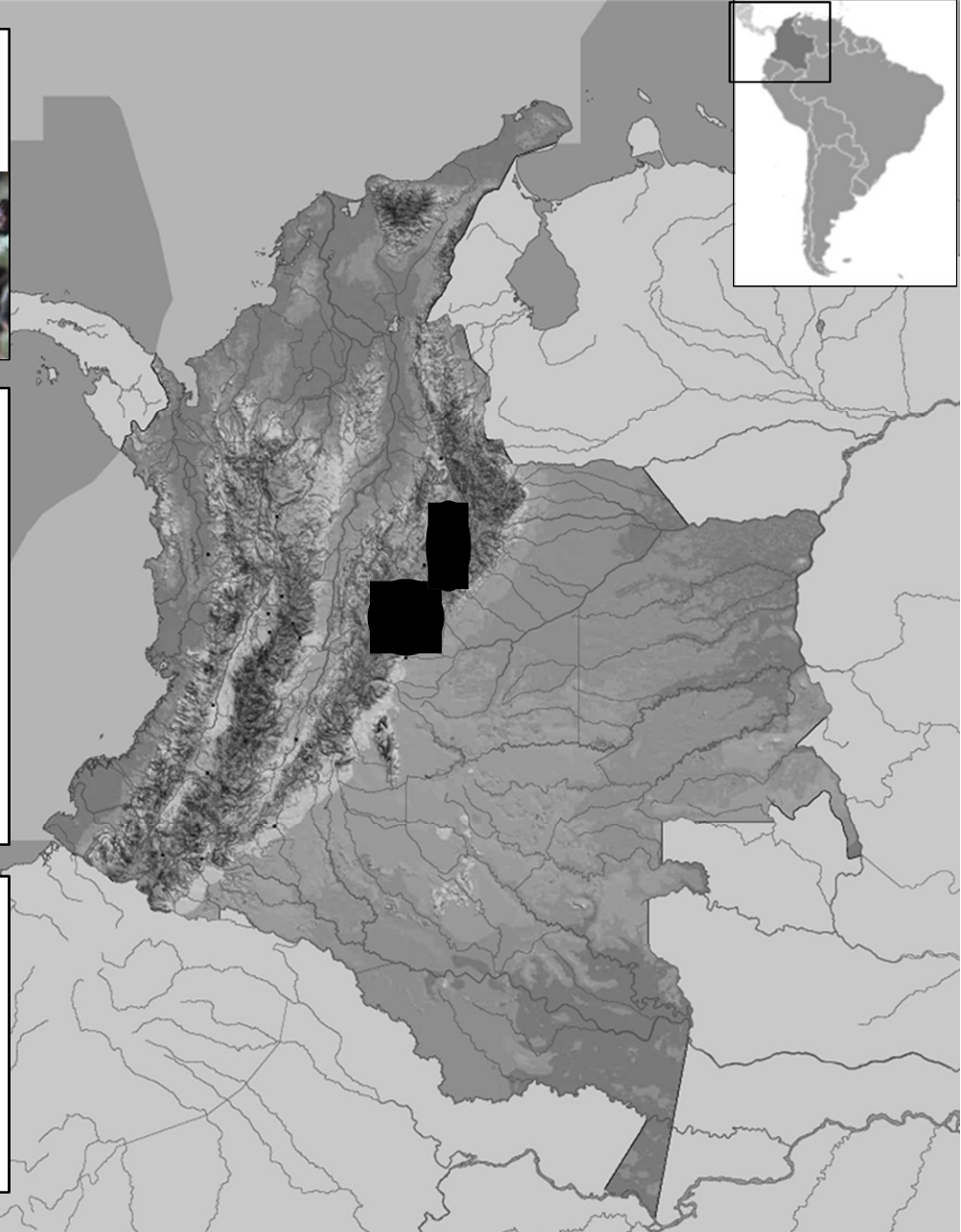


Physico-chemical characteristics

- | | | |
|--|--|--|
| -Higher pH
(4.2) | -Higher electrical
conductivity
(750 $\mu\text{S}/\text{cm}$) | -Higher potassium
content
(1115 ppm) |
| -Darker honeys
(high Pfund
value)
(85mmPfund) | -Lower fructose
content
(33%) | |

Microbiological characteristics

Low MIC for *Staphylococcus aureus* and
Salmonella enterica



- Six honey types differentiated by geographic origin were found.
- One type of honey and one type of honeydew were differentiated by botanical origin.
- Most honeys have antibacterial activity against the microorganisms evaluated with less frequency to *Bacillus subtilis* and *Klebsiella pneumoniae* .
- Honeys from the Sierra Nevada de Santa Marta were the best differentiated.

- We expect these results would serve as parameters for the origin denomination of these honeys.

A decorative border of red daisy-like flowers and green leaves frames a white central area. The flowers are arranged in a circular pattern around the center, with green leaves interspersed between them. The central area is a plain white space containing the word "Gracias!".

Gracias!