



Analysis of the genetic structure of bees in Chile: identification of africanized bees using mitochondrial DNA

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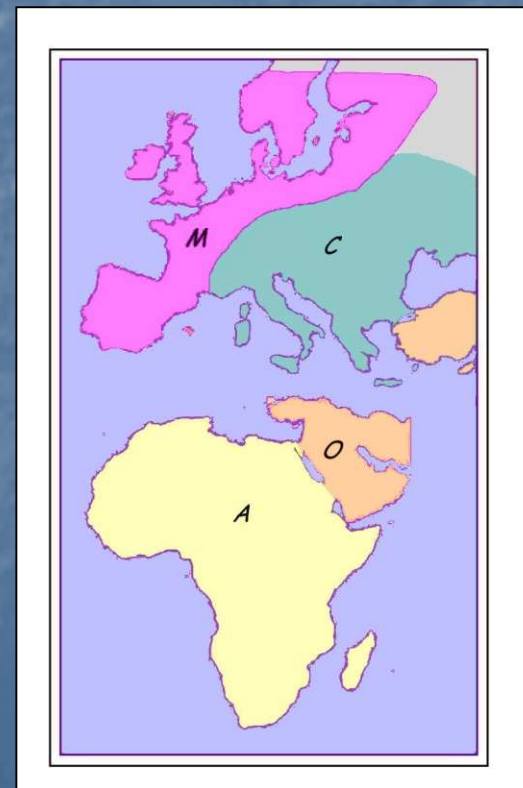
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INTRODUCTION

- A: African. *A.m. intermissa*, *A.m.sahariensis*, *A.m.scutellata*
- C: North mediterranean. *A.m.ligustica*, *A.m.carnica*
- M: West mediterranean. *A.m.mellifera*, *A.m.iberica*
- O: Middle East and Near East. *A.m.caucasica*, *A.m.anatoliaca*



INTRODUCTION

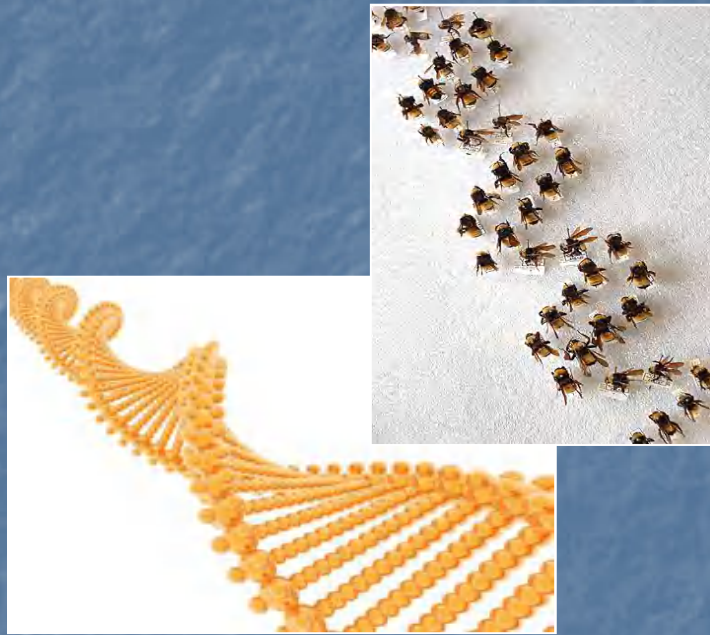
- AFRICANIZATION PROCESS
 - ✓ 1956: W. Kerr. Genetic improvement.
 - ✓ 47 queens from Southafrica (*A.m.scutellata*)
 - ✓ 1957: 26 queens scaped
 - ✓ Mating with european bees
 - ✓ Hybrid: "Africanized bee"
 - ✓ 1989: africanization in México, Venezuela, Brasil, Uruguay, Colombia, etc.



Source: Rinderer et al, 1993

QUESTIONS

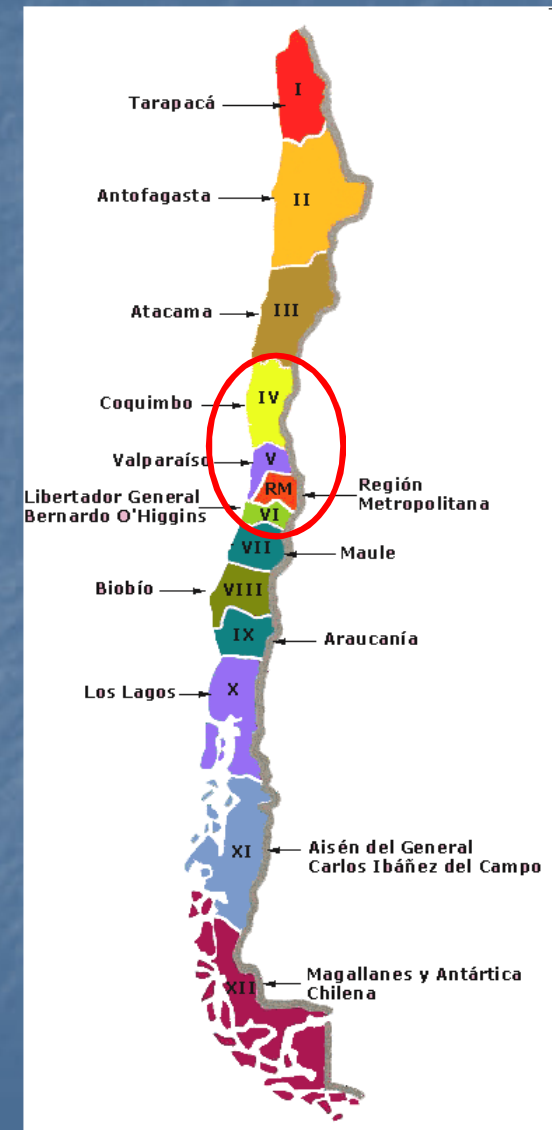
1.- ARE THERE AFRICANIZED BEES IN CHILE?



2.-WHAT IS THE GENETIC STRUCTURE OF THE POPULATION OF BEES IN CHILE?

MATERIALS AND METHODS

- SAMPLES:
 - ✓ Total of 435 from 4 different regions
 - ✓ IV, V, VI y RM → Risk regions
 - ✓ 10 apiaries per region
 - ✓ 10 colonies
 - ✓ 1 worker per colonie
 - ✓ 200 bees from 2 colonies of the region



MATERIALS AND METHODS

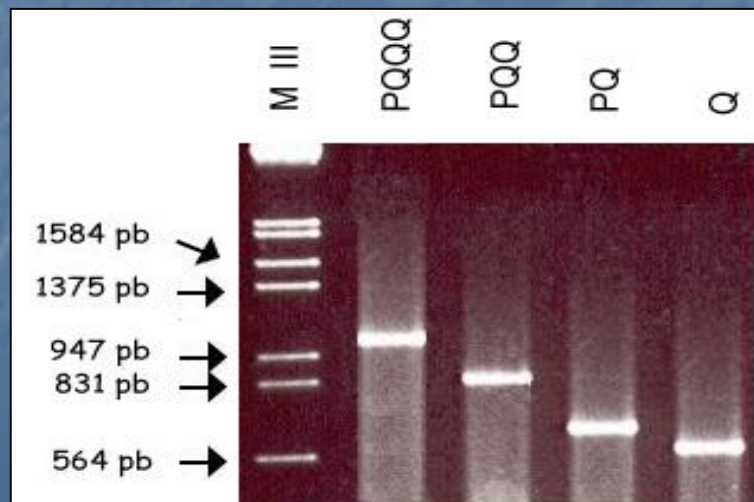
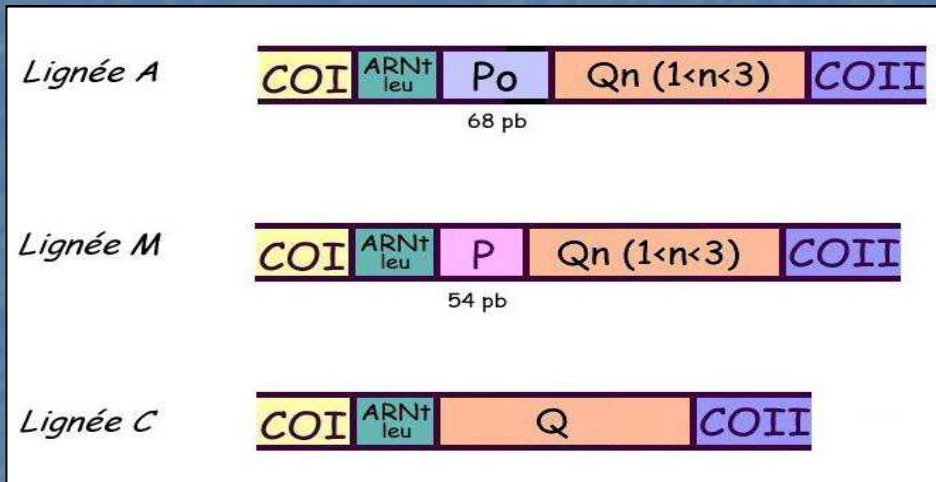
- mDNA STUDY:
- ✓ DNA Extraction → From the head, chelex method



- ✓ Amplification of COI-COII region
- ✓ Revelation in a 1,4 % agarose gel
- ✓ Digestion with enzyme Dra I
- ✓ Revelation in 10% acrylamide gel

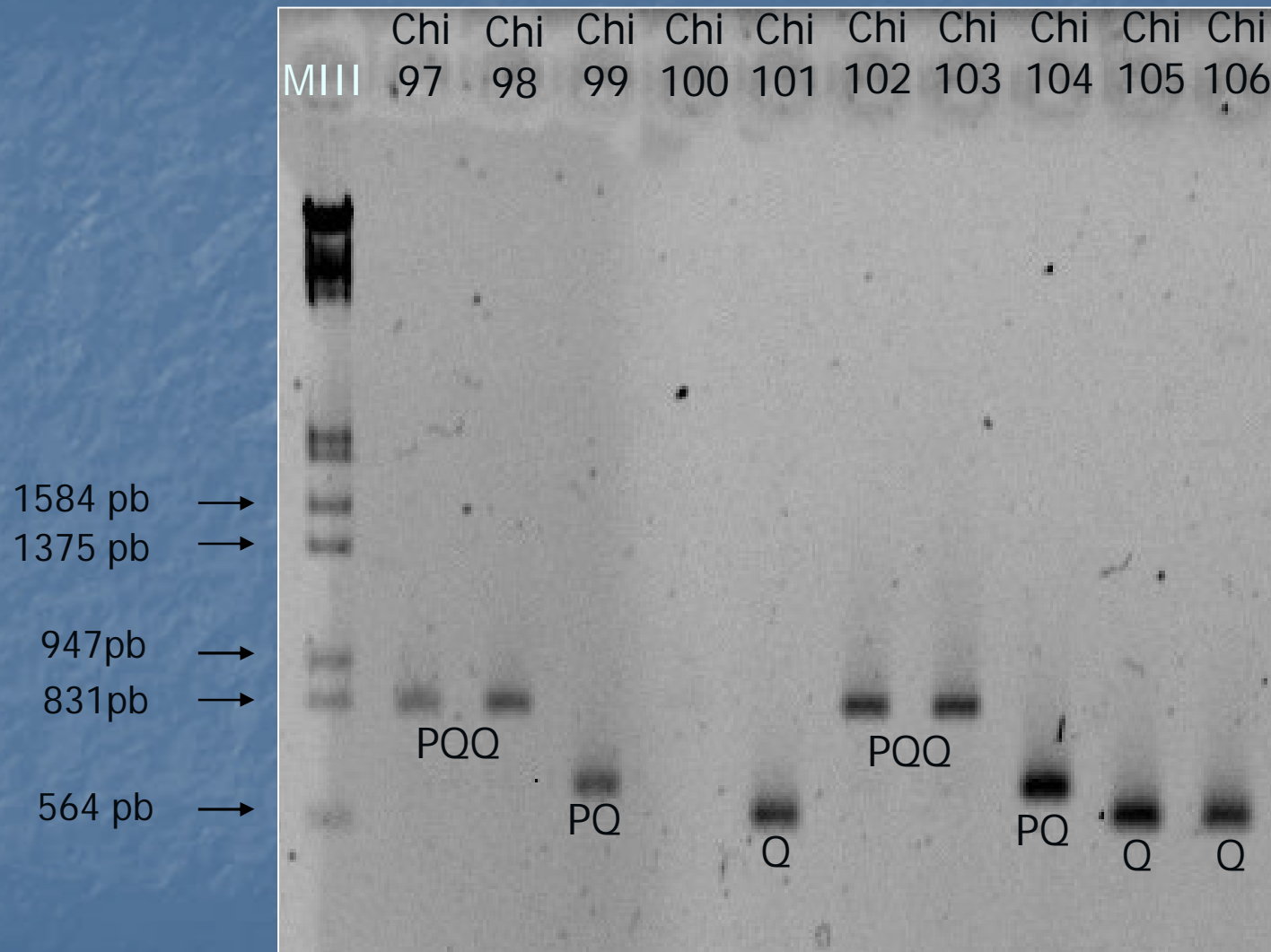
RESULTS

- mtDNA STRUCTURE

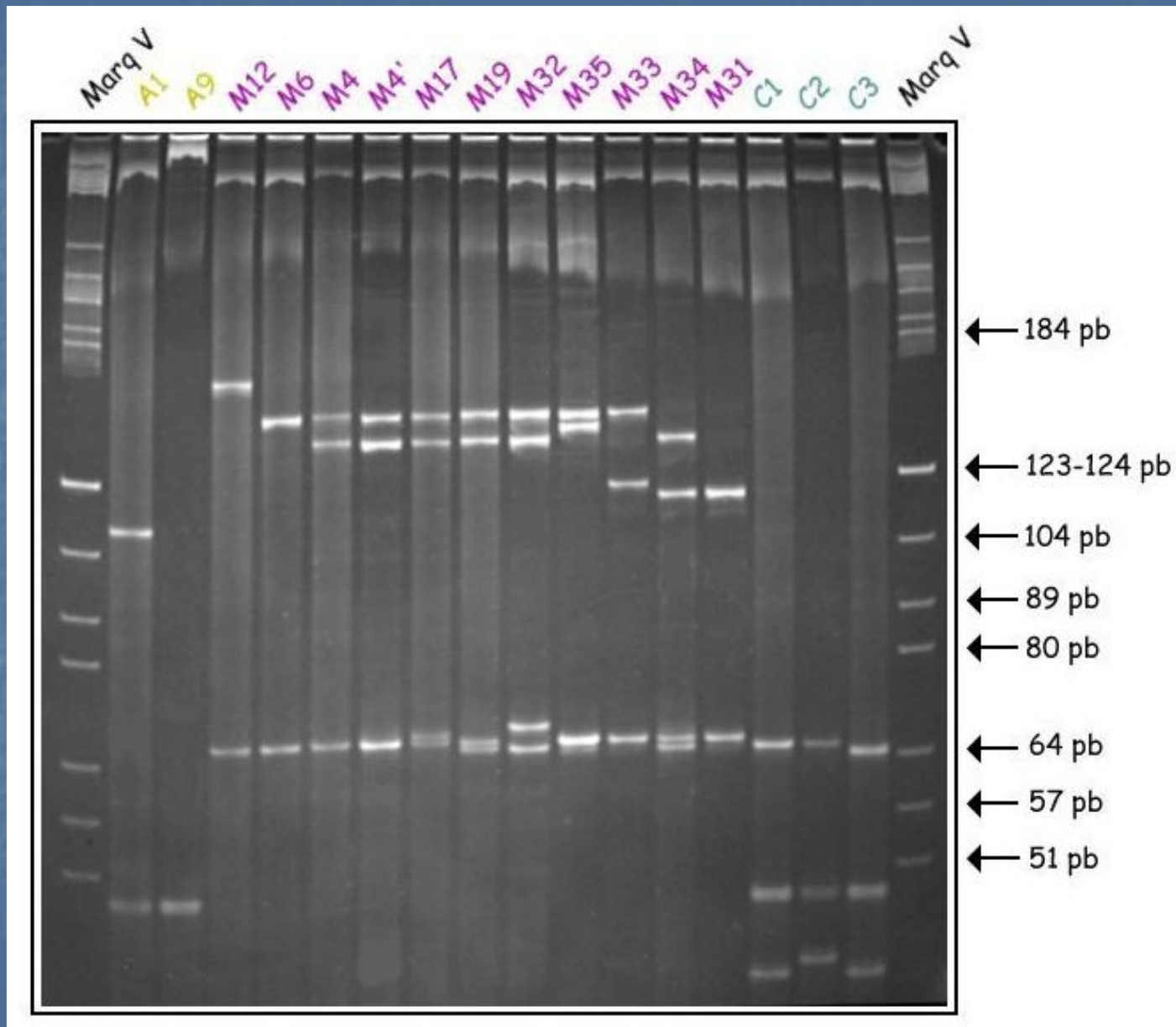


Intergenic Sequence Structure	Total number
Q	313
PQ	2
PQQ	118
PQQQ	1

RESULTS

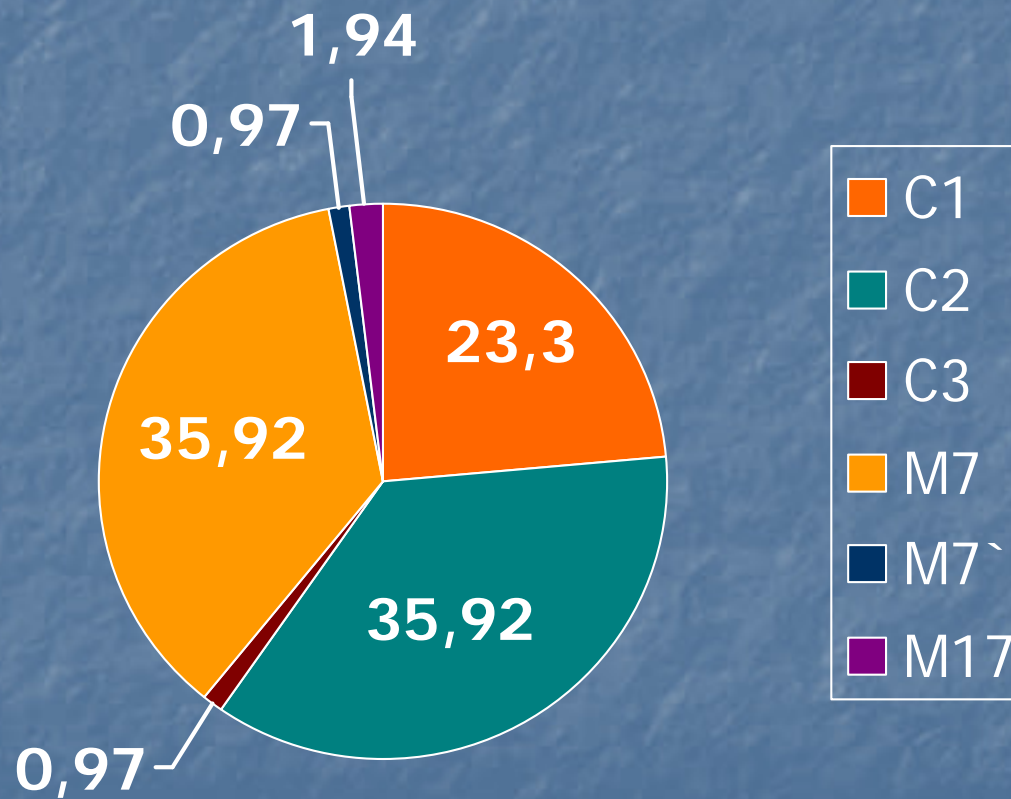


RESULTS



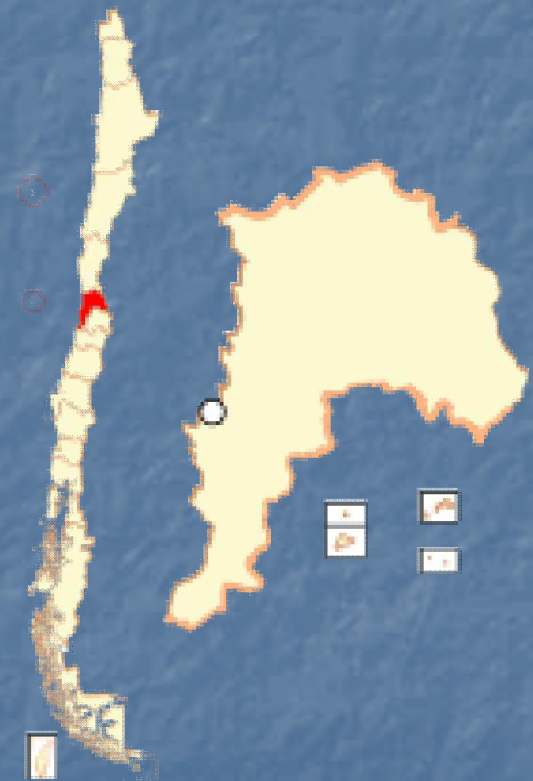
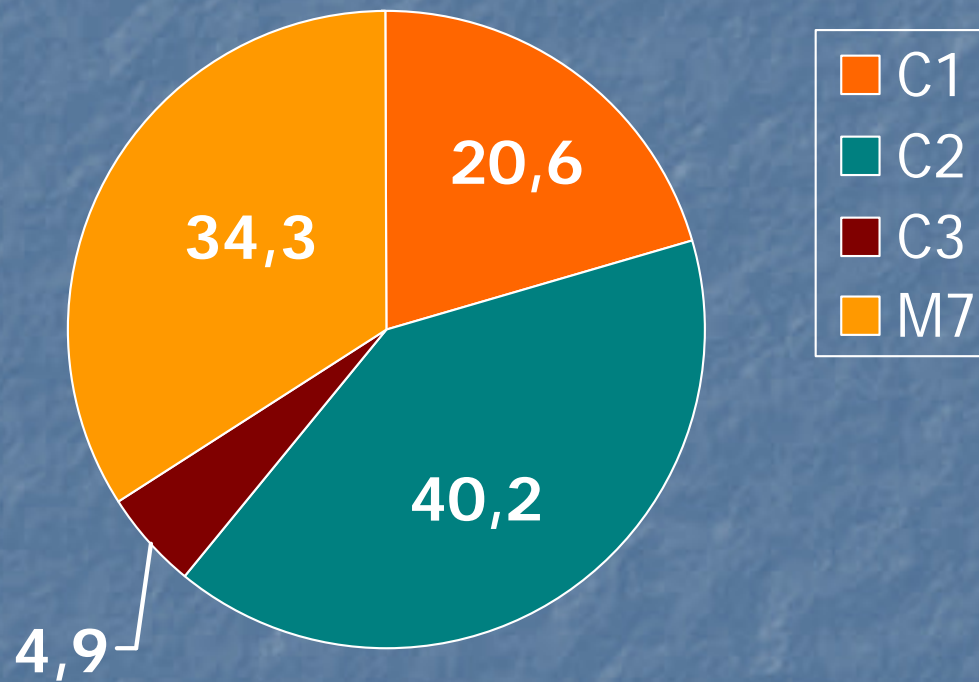
RESULTS

✓ PERCENTAJE OF HAPLOTYPES IN IV REGION



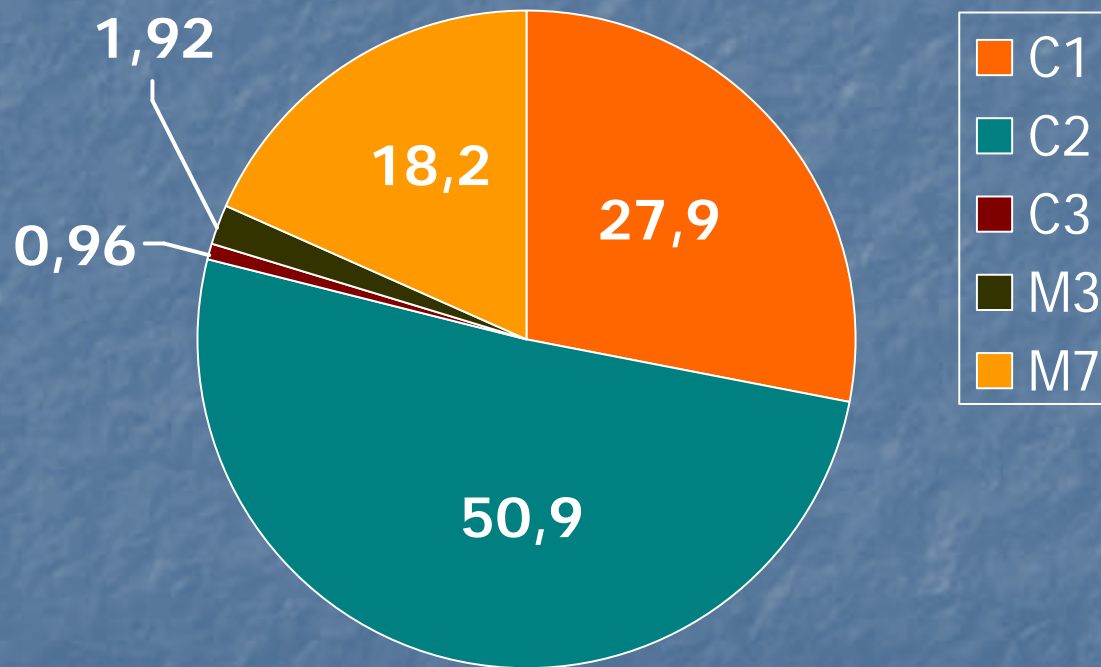
RESULTS

✓ PERCENTAJE OF HAPLOTYPES IN V REGION



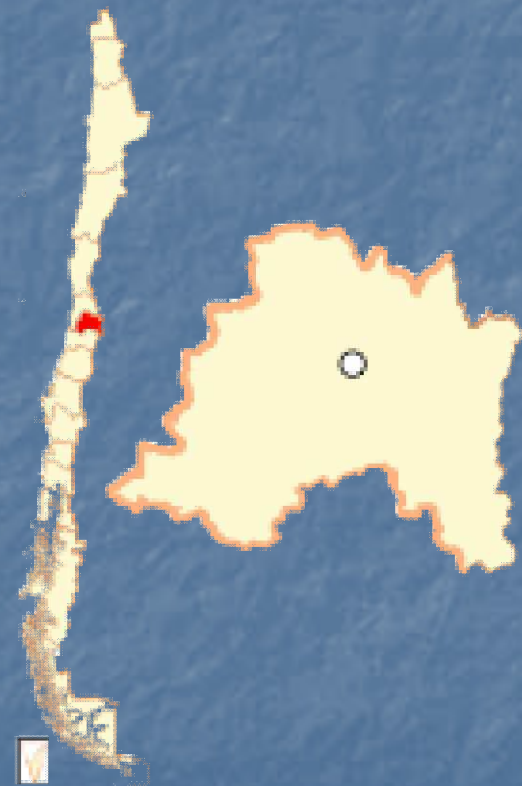
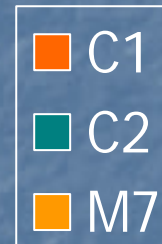
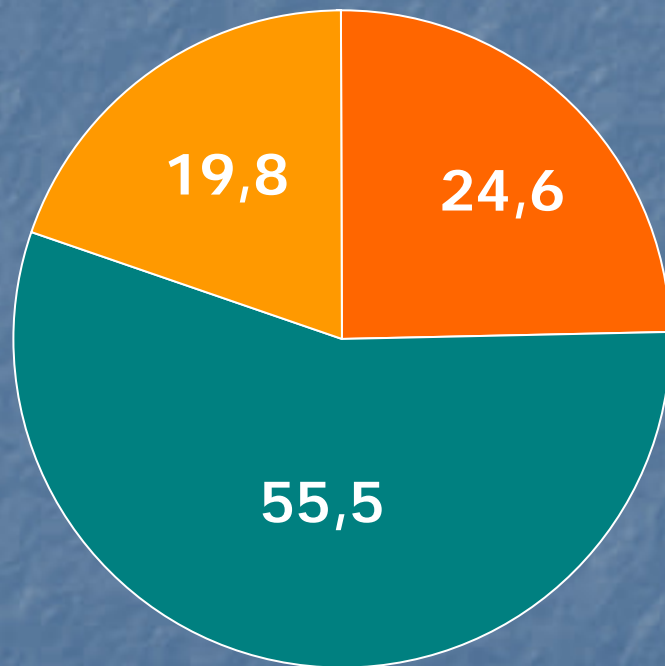
RESULTS

✓ PERCENTAJE OF HAPLOTYPES IN VI REGION



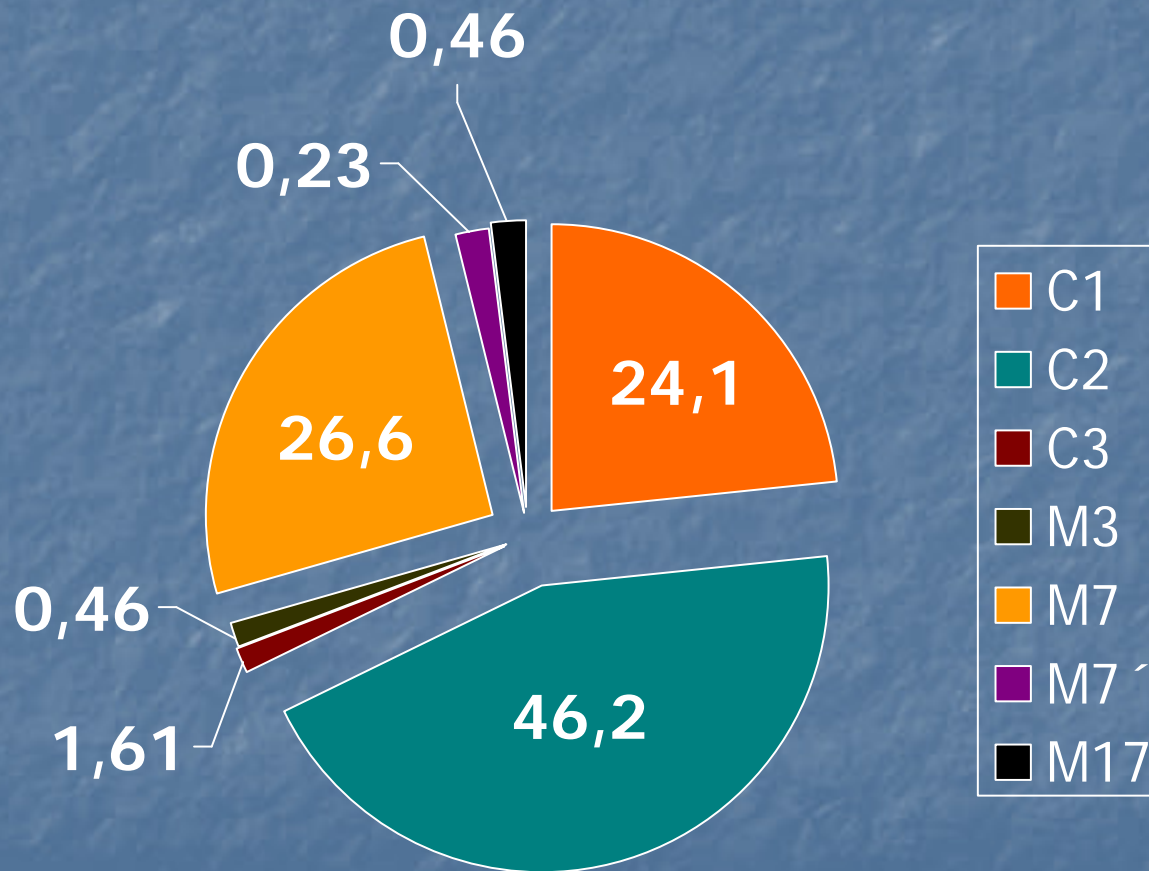
RESULTS

✓ PERCENTAJE OF HAPLOTYPES IN RM REGION



RESULTS

✓ TOTAL PERCENTAJE OF EACH HAPLOTYPE



CONCLUSIONS AND DISCUSSION

- There is no africanization in the maternal line
- The population is formed mainly of C and M lineage
- The population seems to be from european origin: Italy, North of France, Spain

CHILE (Meza, Estay and Hinrichsen, 2010)

- ✓ Same methods
- ✓ C lineage : *A.m. ligustica*, *A.m. carnica*
- ✓ M lineage: *A.m. mellifera*

CHILE (Del lama et al, 2004)

- ✓ 1884: *A.m. ligustica*
- ✓ XX century: *A.m. mellifera*
- ✓ More *A.m. ligustica* than *A.m. mellifera*





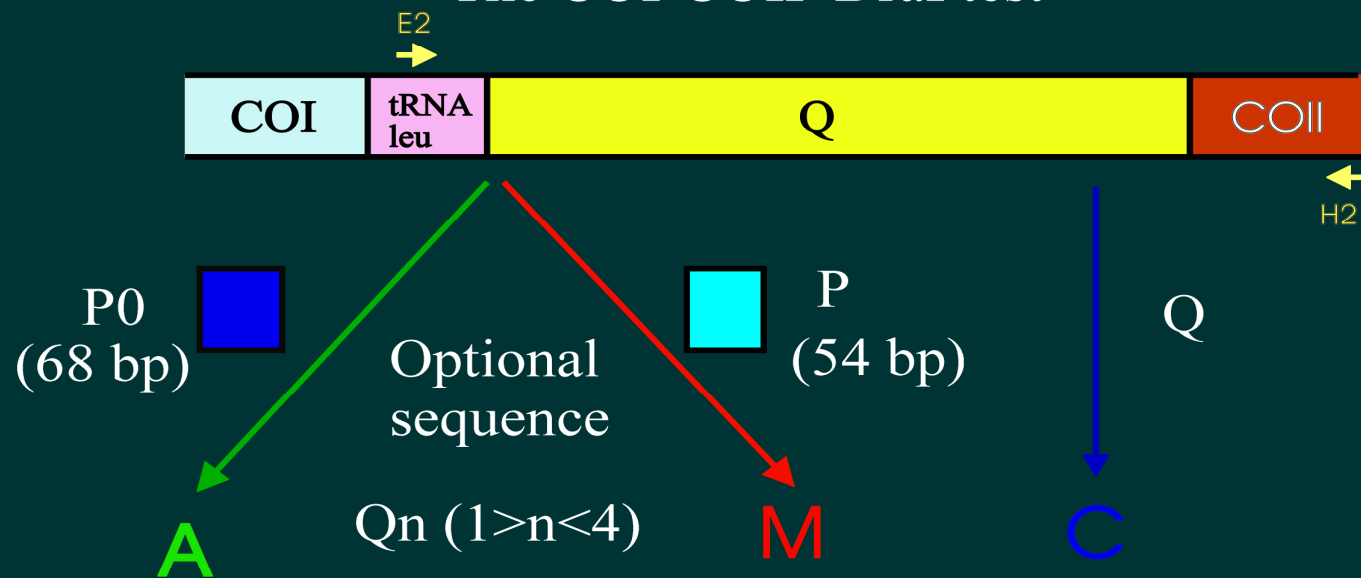


✓ THANK YOU VERY MUCH FOR YOUR
ATTENTION

✓ GRACIAS POR SU ATENCIÓN

✓ MERCY DE VOTRE ATTENTION

The COI-COII DraI test



Structural organisation of the COI-COII région
in the 3 lineages