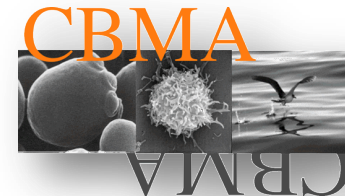


# THE BIOGEOGRAPHY OF FERMENTATIVE YEAST POPULATIONS FROM THE VINEYARDS OF THE AZORES ARCHIPELAGO

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Campus de Gualtar, 4710-057 Braga, Portugal  
[dschuller@bio.uminho.pt](mailto:dschuller@bio.uminho.pt)

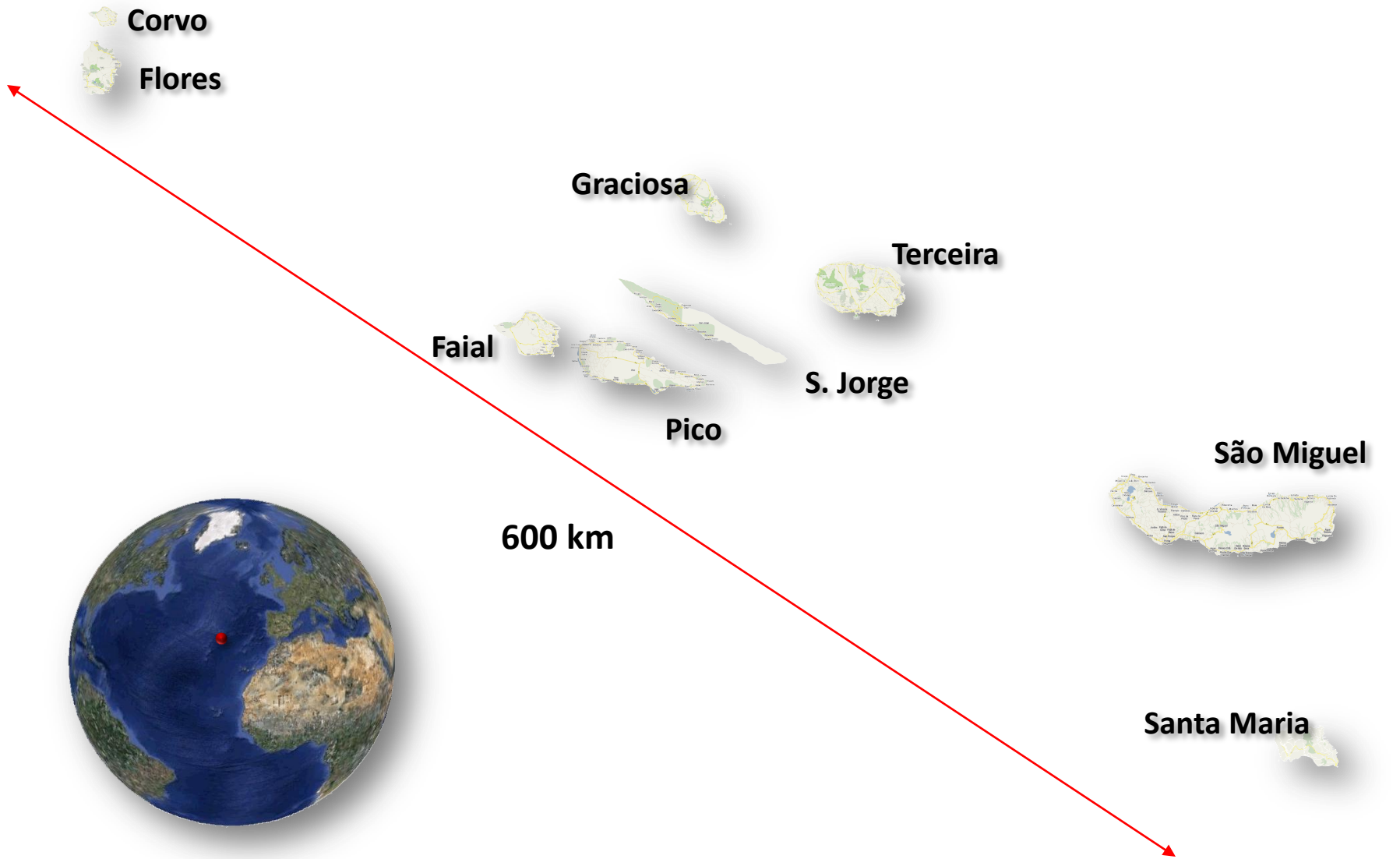


- Evaluate the biogeography of the fermentative yeast flora from the vineyards of the Azores Archipelago;
- To build a *Saccharomyces cerevisiae* strain collection as a resource for:
  - Preservation of yeast genetic diversity;
  - Selection and improvement of wine strains;
  - Equitable sharing of genetic data;
  - Evolutionary studies of this species in isolated island environments.



# INTRODUCTION

## Azores Archipelago



Non-abandoned vineyards



Abandoned vineyards



# MATERIAL AND METHODS

# SAMPLING LOCATIONS

Santa Maria



São Miguel



Terceira



Graciosa



Pico

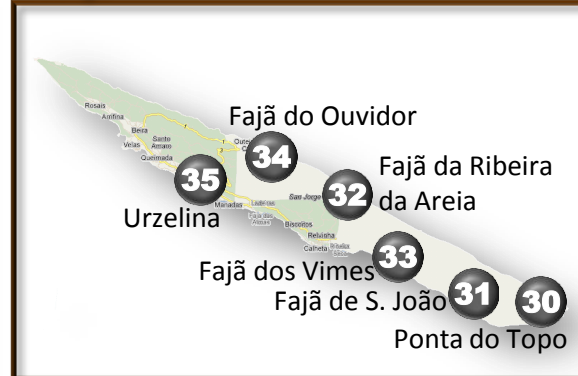


● Appellations of origin  
● No appellations of origin

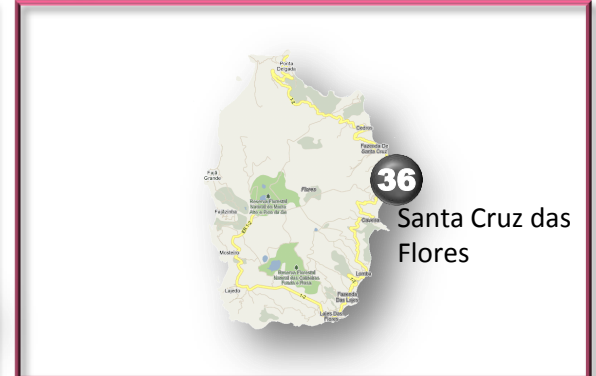
Faial



S. Jorge



Flores



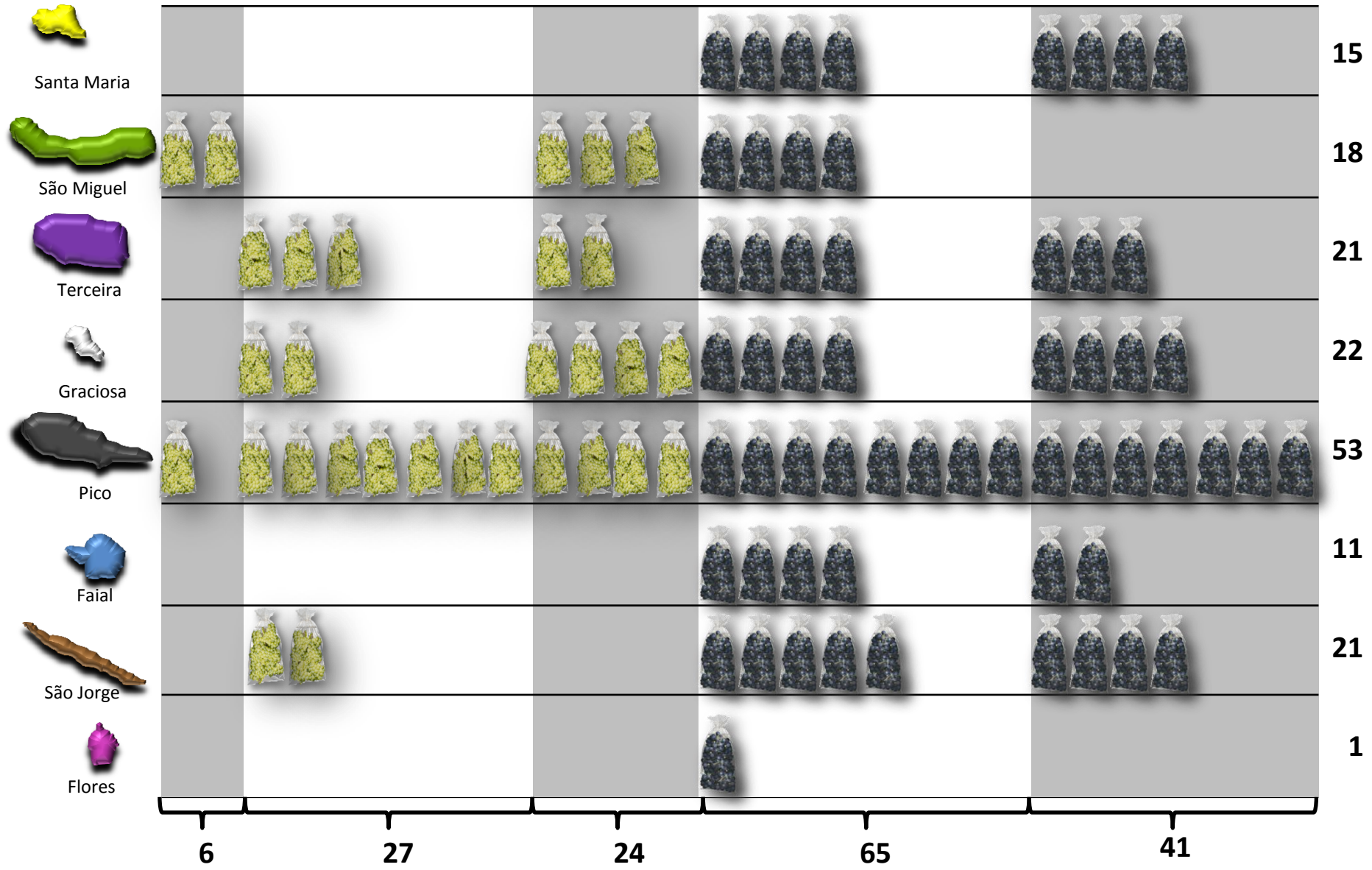
# MATERIAL AND METHODS

# SAMPLING

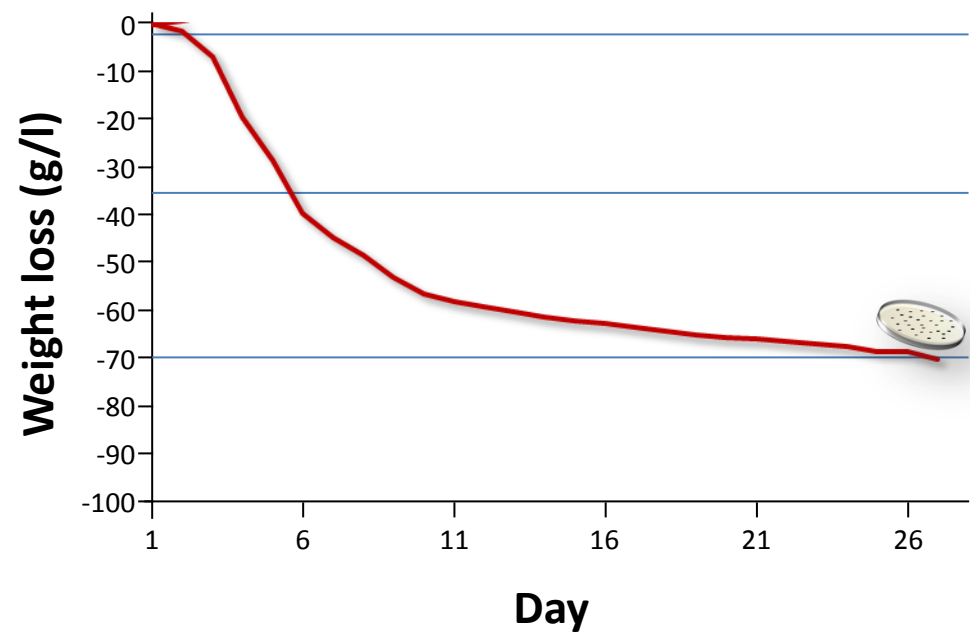
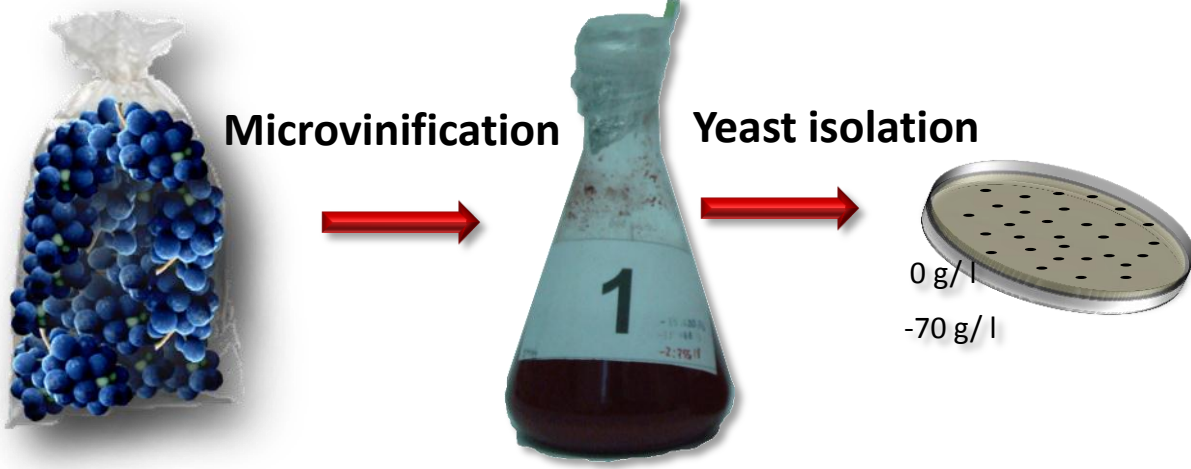
Traditional varieties

Hybrid varieties

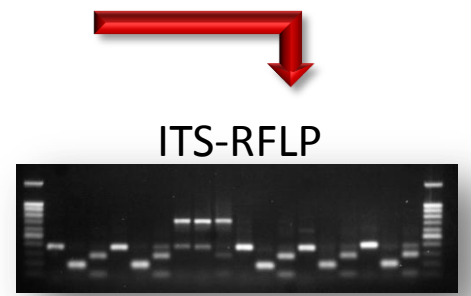
Terrantez      Arinto      Verdelho      Non-abandoned vineyards      Abandoned vineyards



# MATERIAL AND METHODS



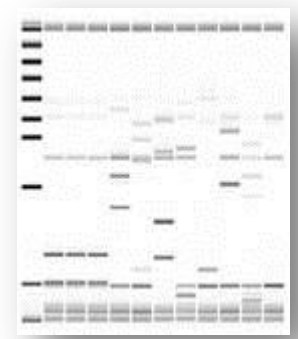
## Species identification



## DNA sequencing

***S. cerevisiae***  
**strains**  
**delimitation**

**Interdelta**  
**Sequences**



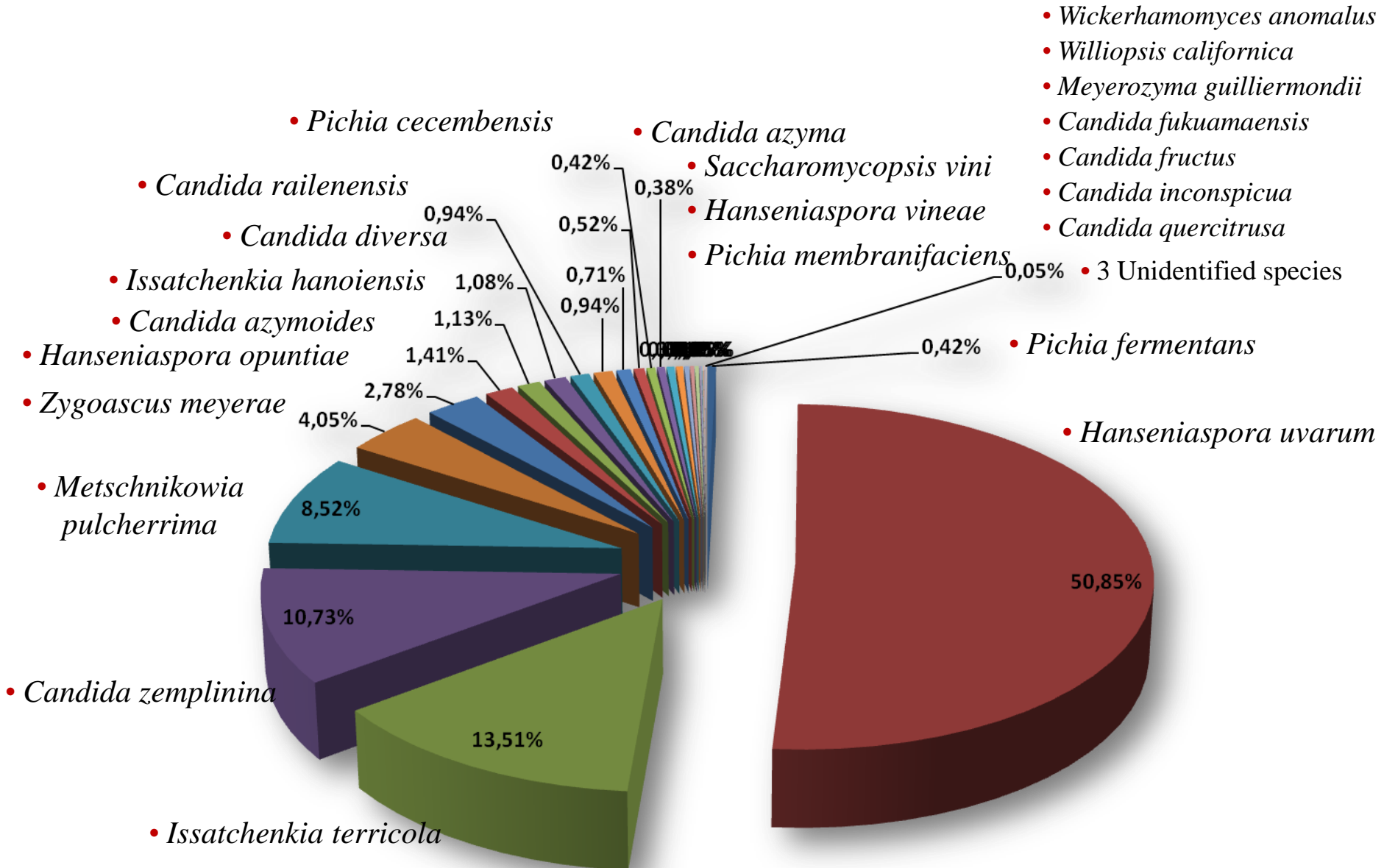
# RESULTS

## Number of yeast isolates

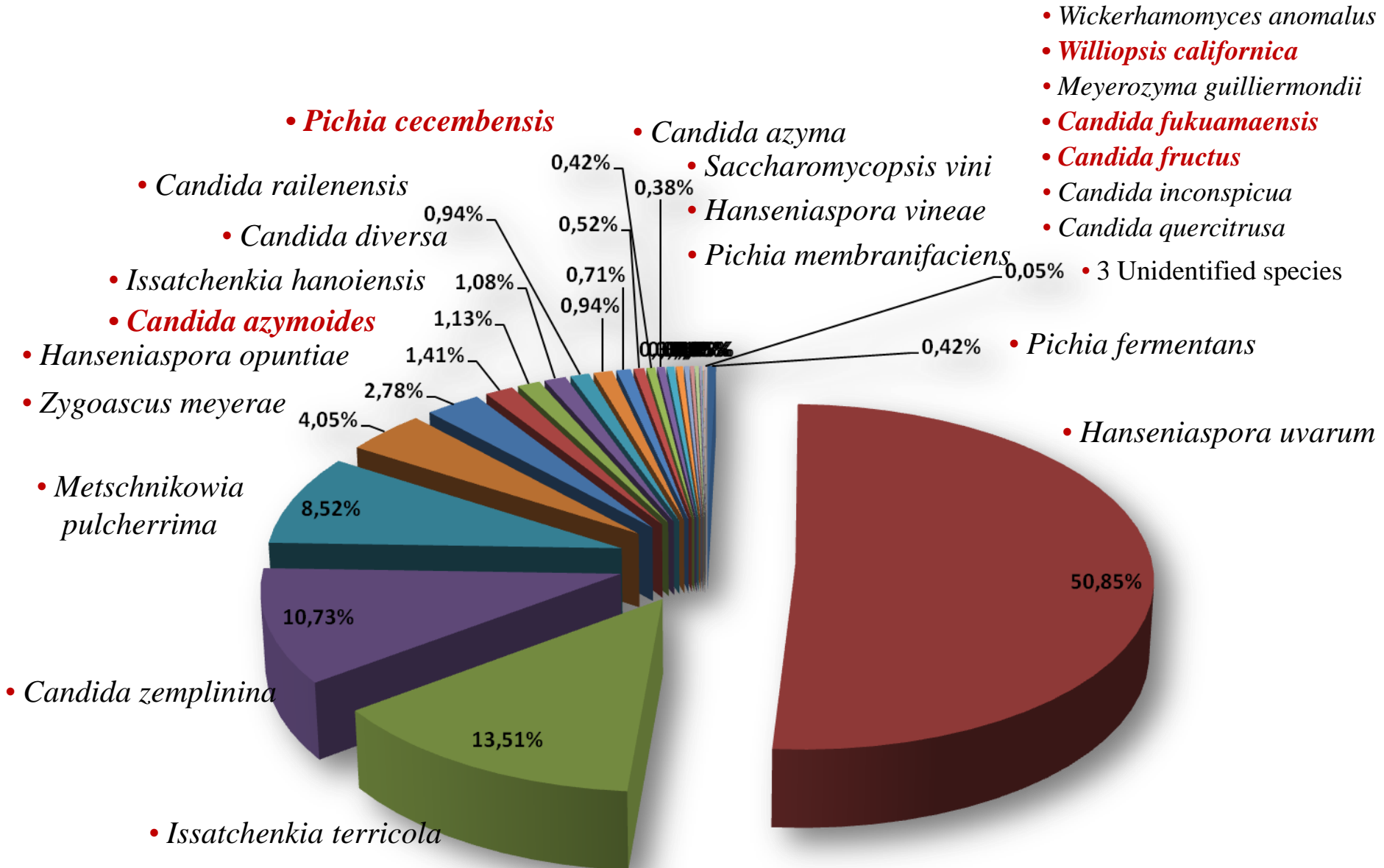
	Fermentation initial stage	Fermentation final stage	Total
2009	2640	1470	4110
2010	2250	1170	3420
Total	4890	2640	7530



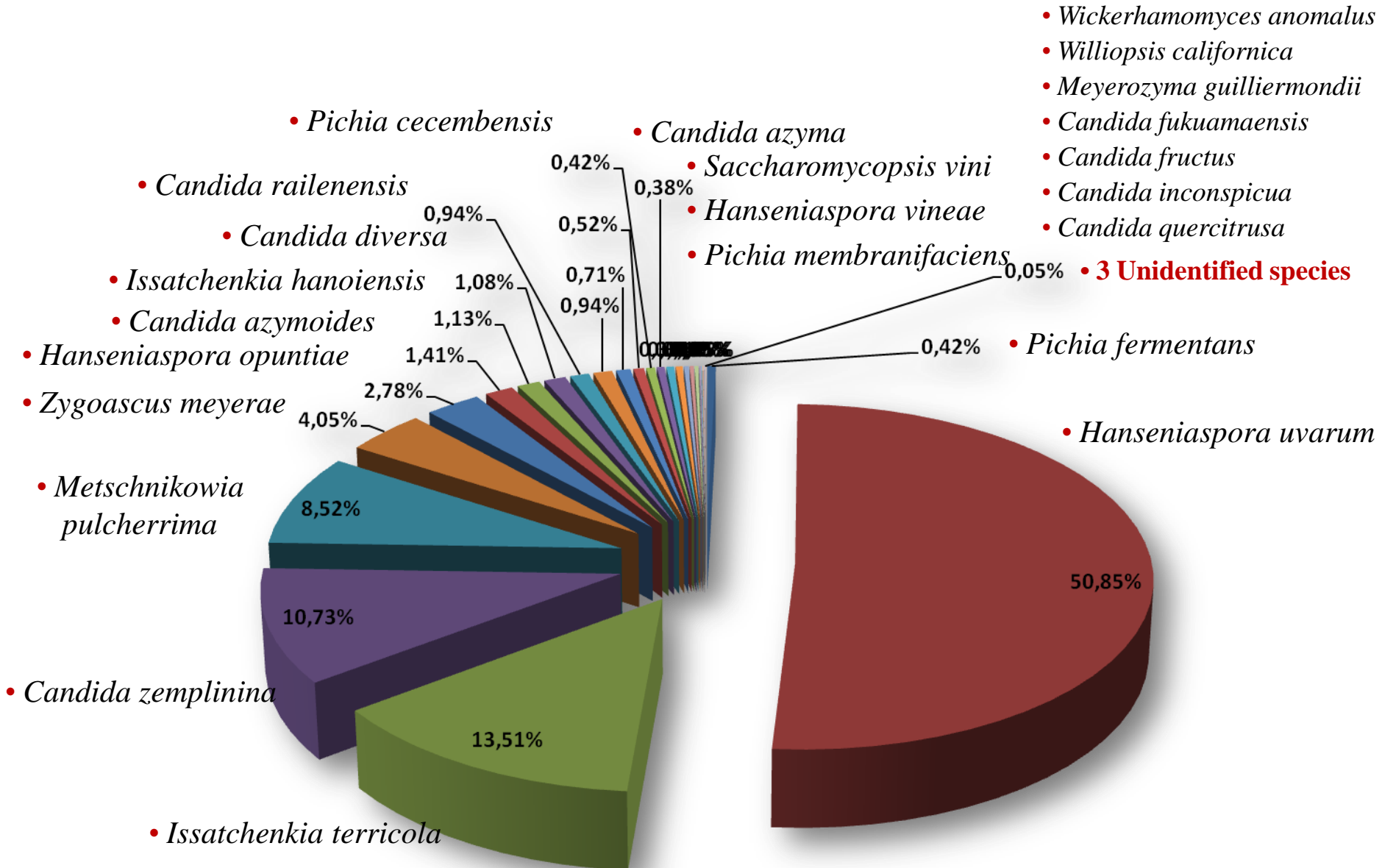
# RESULTS Yeast species occurring in initial fermentative stages



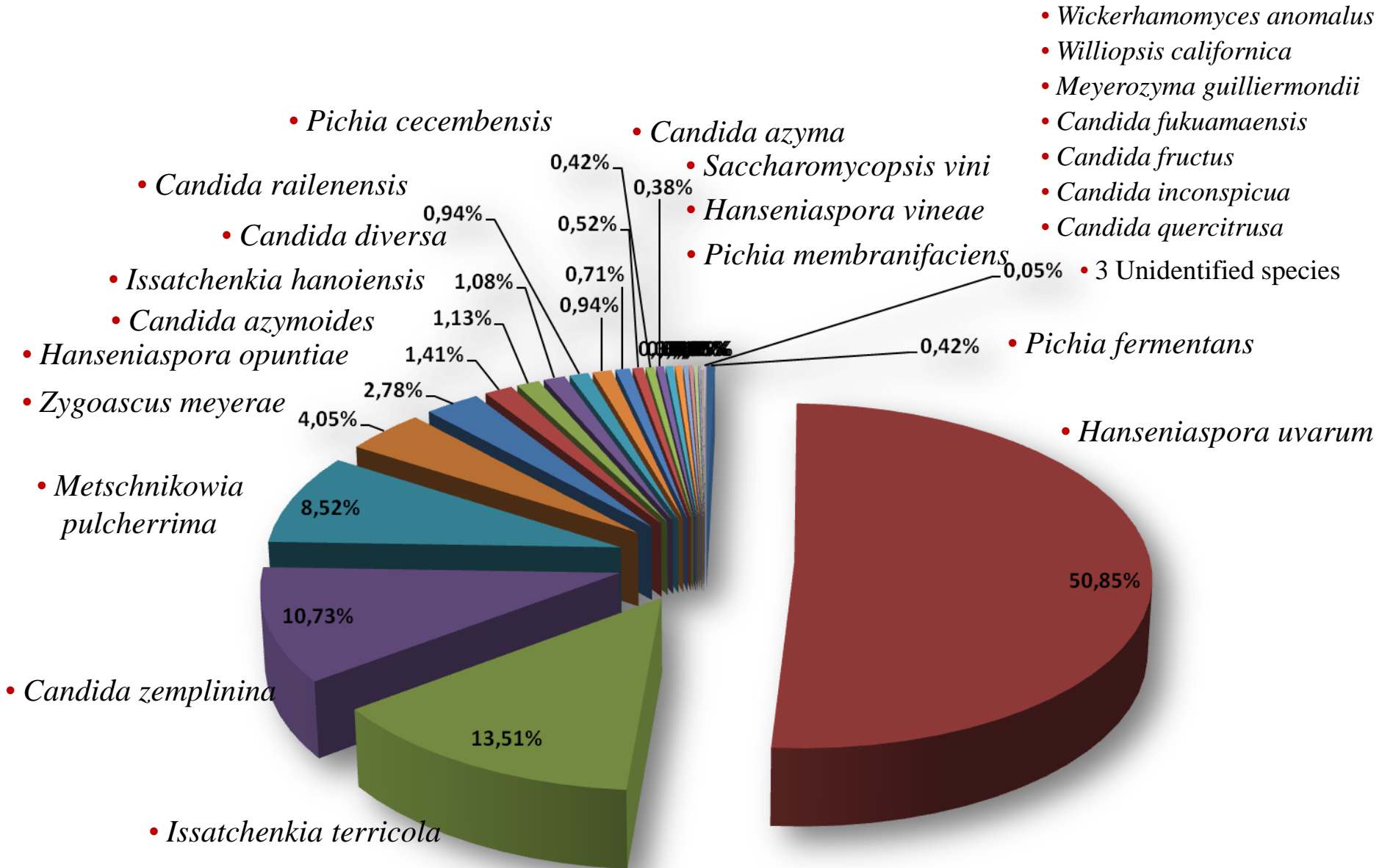
# RESULTS Yeast species occurring in initial fermentative stages



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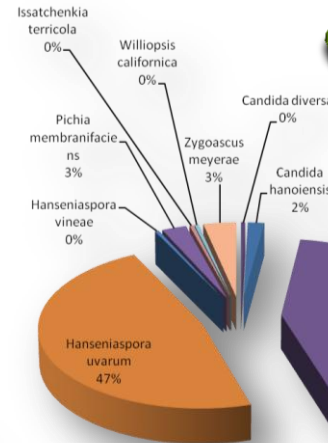


# RESULTS Yeast species occurring in initial fermentative stages

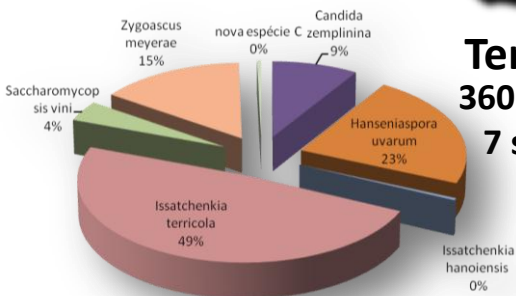
**S. Maria**  
240 isolates  
8 species



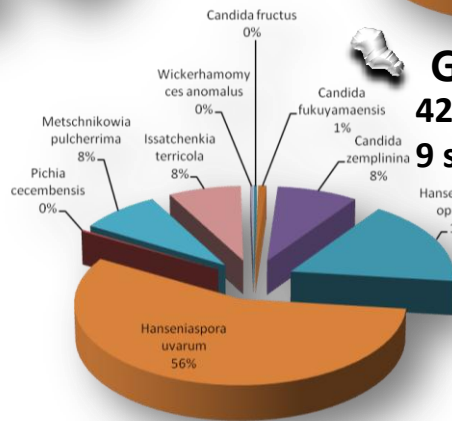
**S. Miguel**  
270 isolates  
9 species



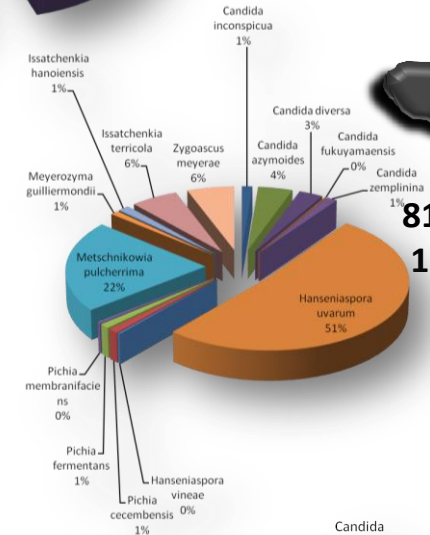
**Terceira**  
360 isolates  
7 species



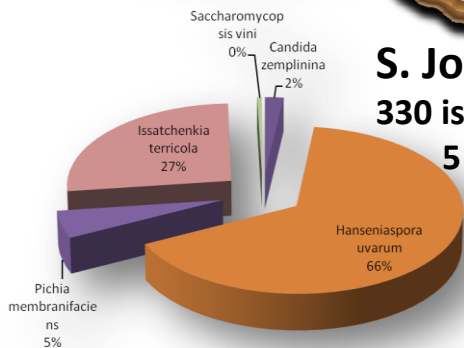
**Graciosa**  
420 isolates  
9 species



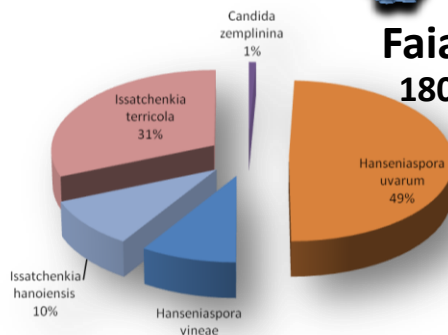
**Pico**  
810 isolates  
15 species



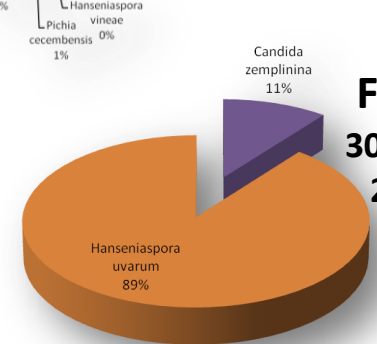
**S. Jorge**  
330 isolates  
5 species



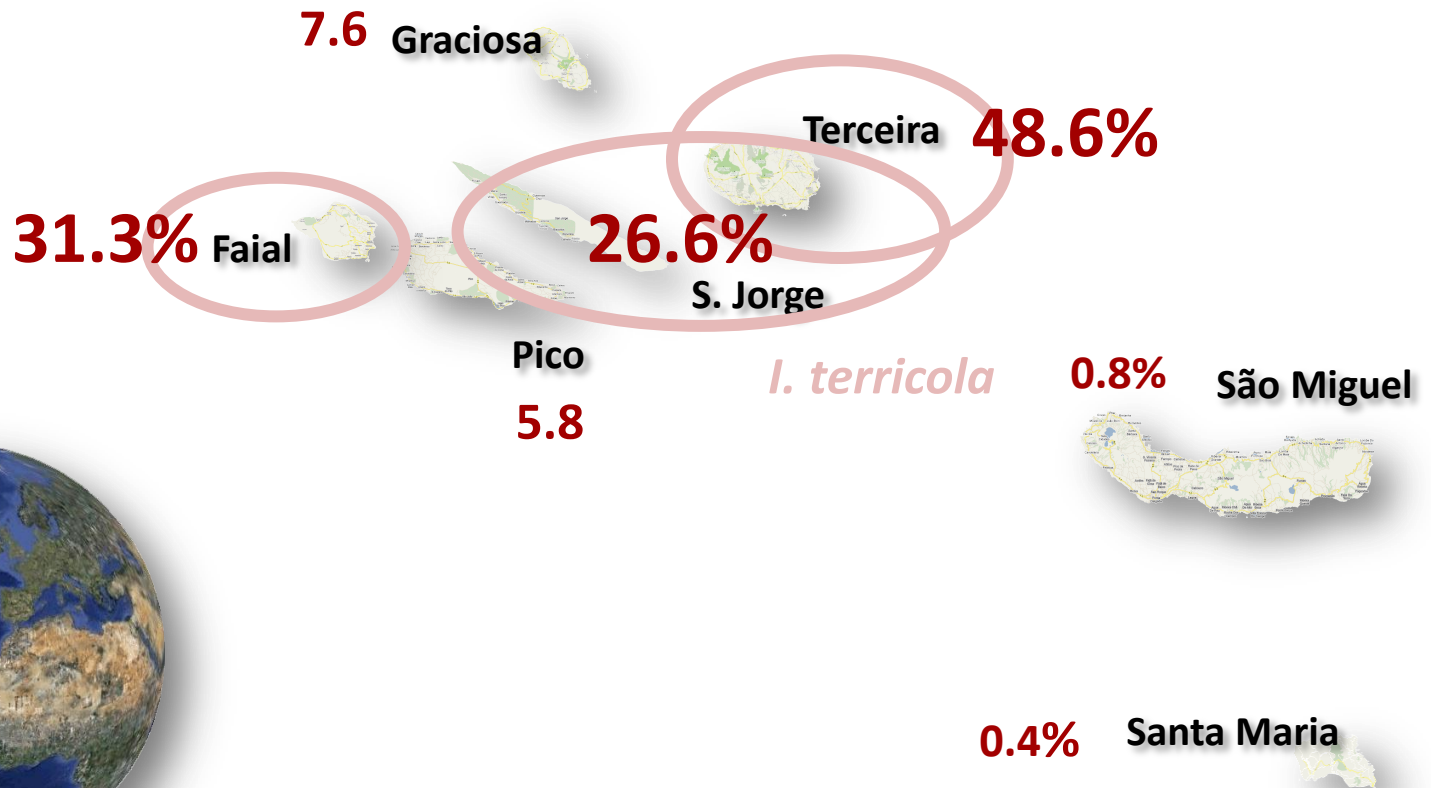
**Faial**  
180 isolates  
5 species



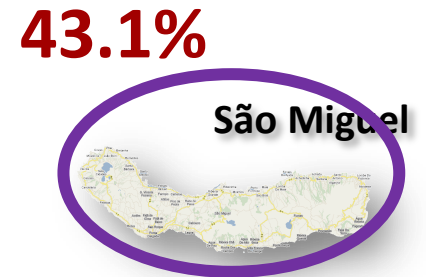
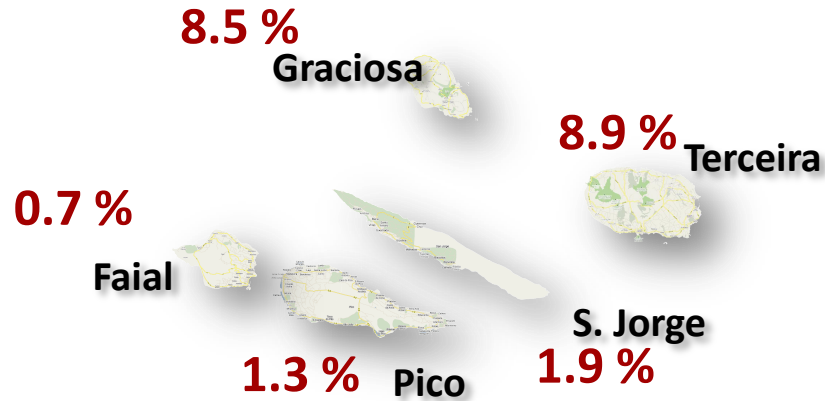
**Flores**  
30 isolates  
2 species



# RESULTS Yeast species occurring in initial fermentative stages



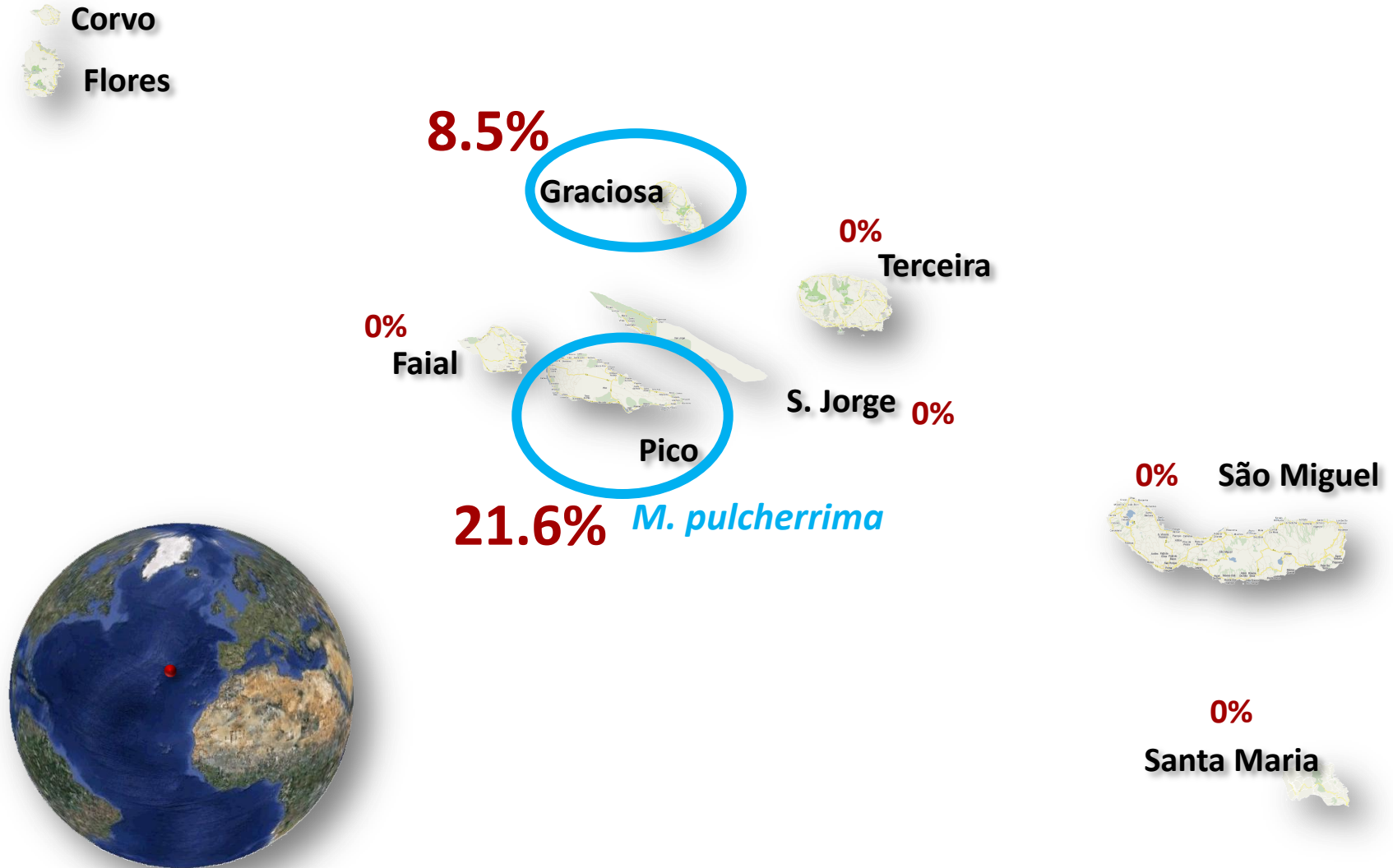
# RESULTS Yeast species occurring in initial fermentative stages



*C. zemplinina*



# RESULTS Yeast species occurring in initial fermentative stages









# RESULTS

## Number of yeast isolates

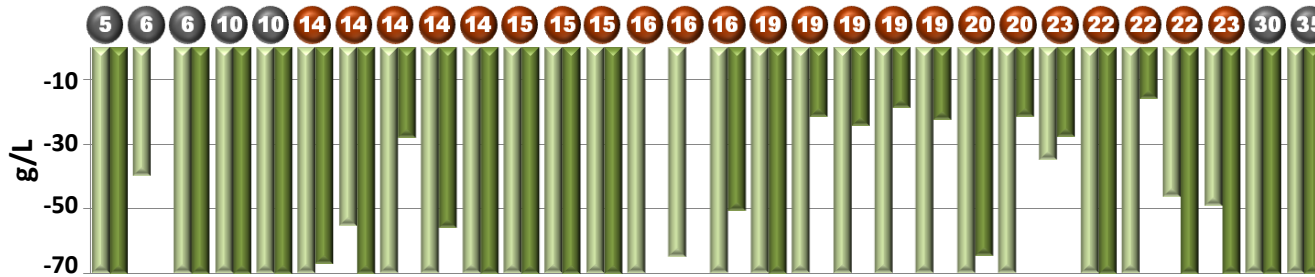
	Fermentation initial stage	Fermentation final stage	Total
2009	2640	1470	4110
2010	2250	1170	3420
Total	4890	2640	7530

# RESULTS

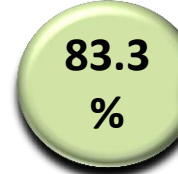
## Fermentations data

Finished fermentations

### SAMPLES OF TRADITIONAL VARIETIES FROM NON-ABANDONED VINEYARDS



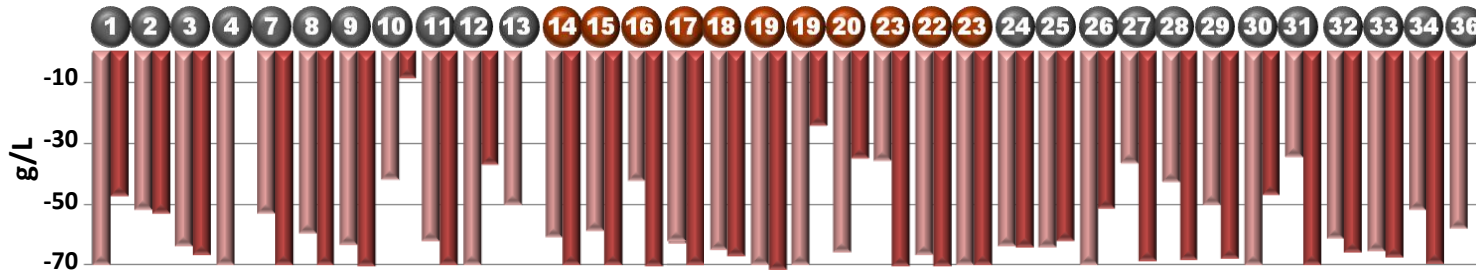
2009



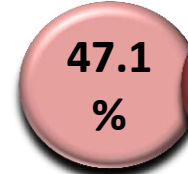
2010



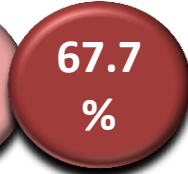
### SAMPLES OF HYBRID VARIETIES FROM NON-ABANDONED VINEYARDS



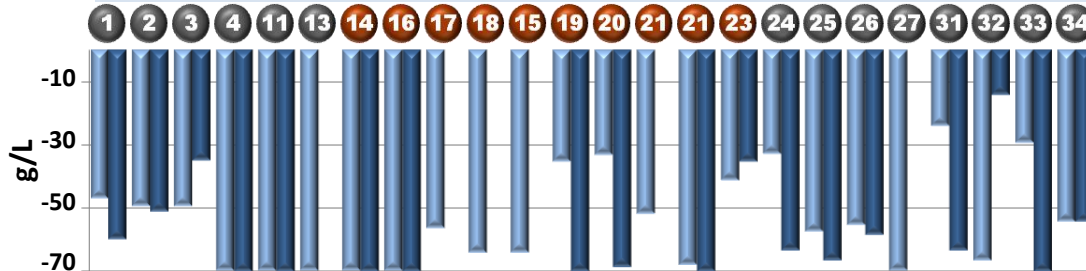
2009



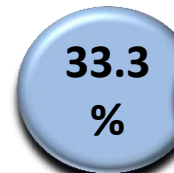
2010



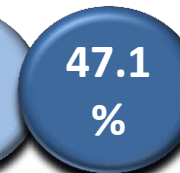
### SAMPLES OF HYBRID VARIETIES FROM ABANDONED VINEYARDS



2009



2010



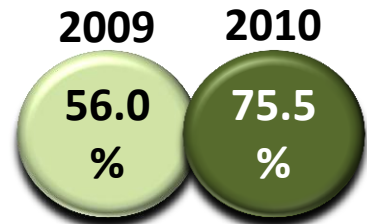
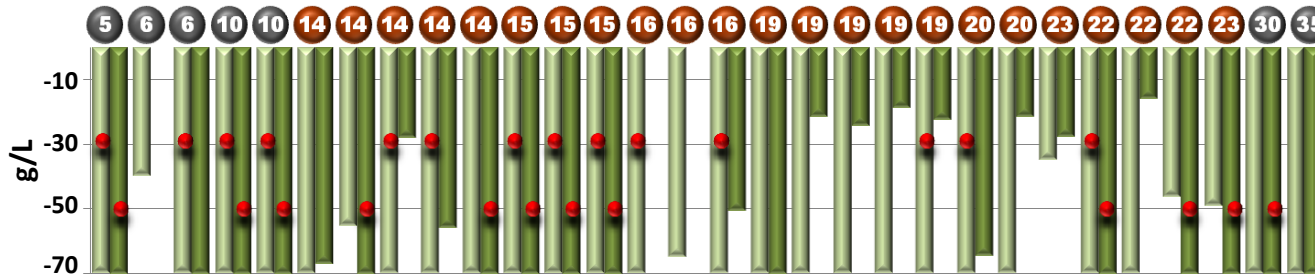
- Samples from appellations of origin
- Samples from other winemaking regions

# RESULTS

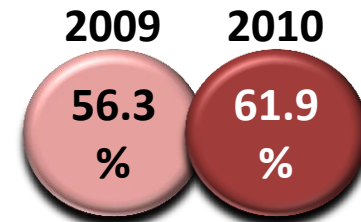
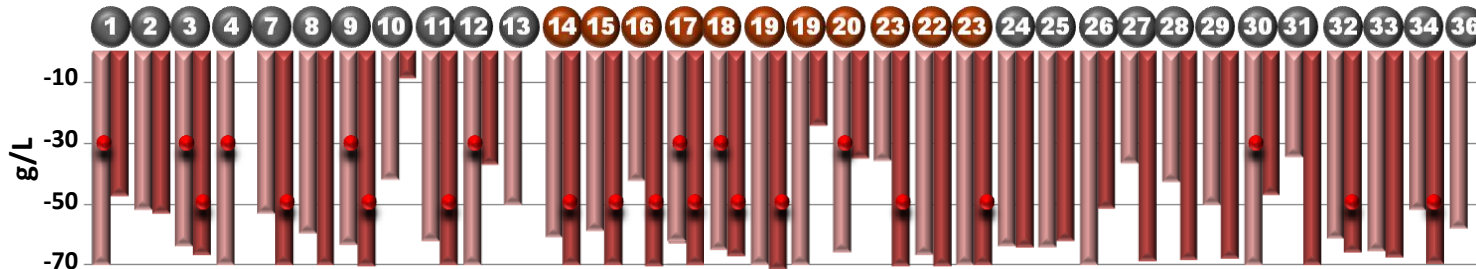
## Fermentations data

Fermentations finished by *S. cerevisiae*

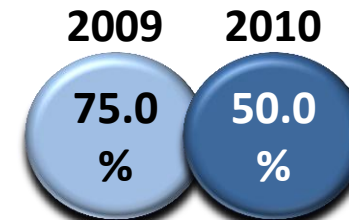
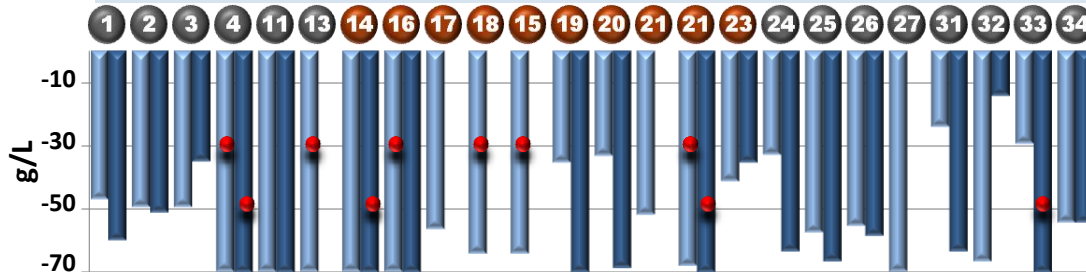
### SAMPLES OF TRADITIONAL VARIETIES FROM NON-ABANDONED VINEYARDS






### SAMPLES OF HYBRID VARIETIES FROM NON-ABANDONED VINEYARDS



### SAMPLES OF HYBRID VARIETIES FROM ABANDONED VINEYARDS

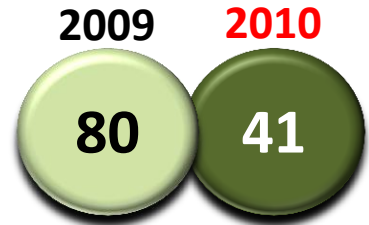
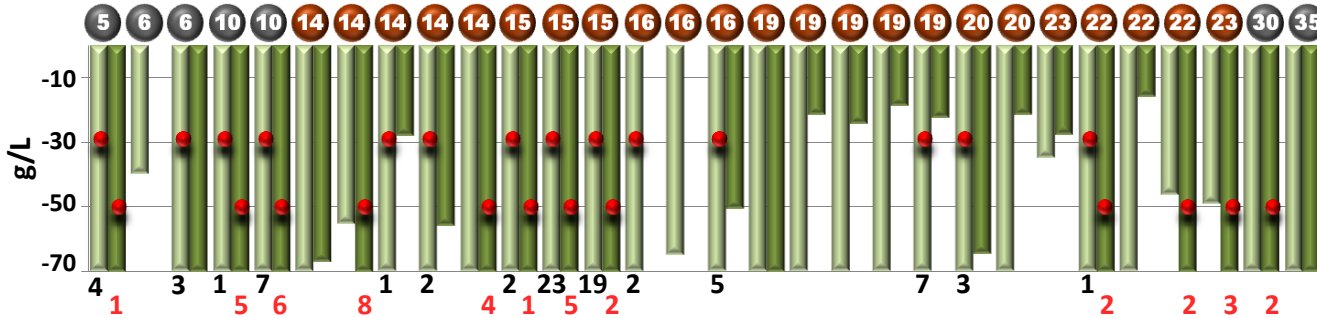


-  Fermentations completed by *S. cerevisiae*
-  Samples from appellations of origin
-  Samples from other winemaking regions

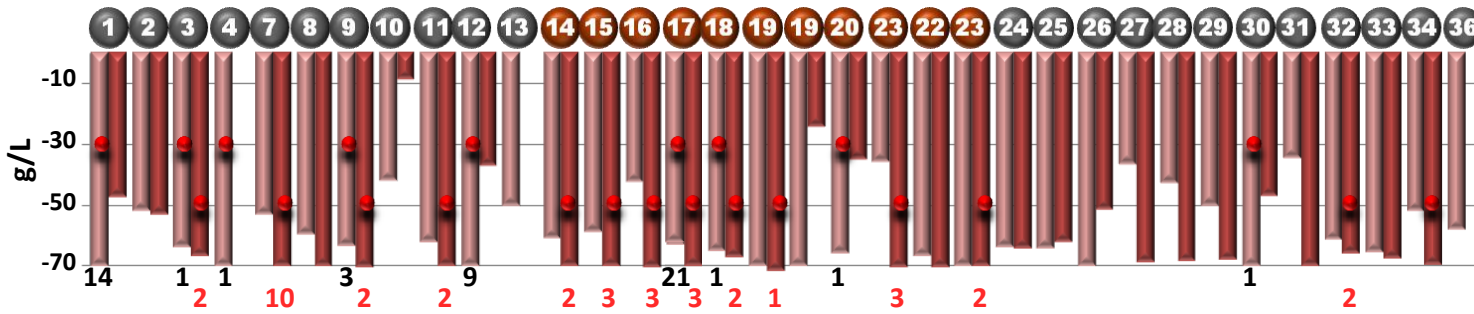
# RESULTS *S. cerevisiae* microflora composition

Total number of *S. cerevisiae* strains

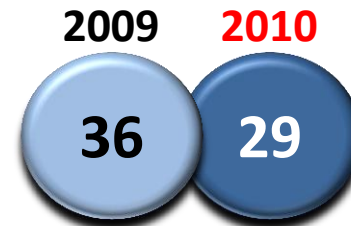
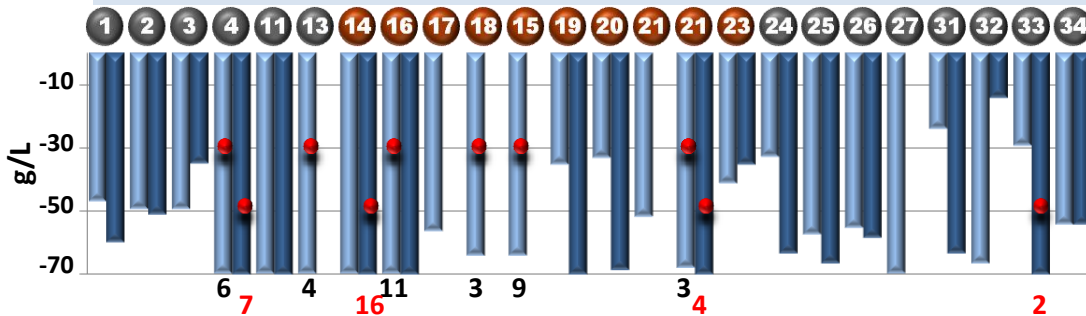
## SAMPLES OF TRADITIONAL VARIETIES FROM NON-ABANDONED VINEYARDS



## SAMPLES OF HYBRID VARIETIES FROM NON-ABANDONED VINEYARDS



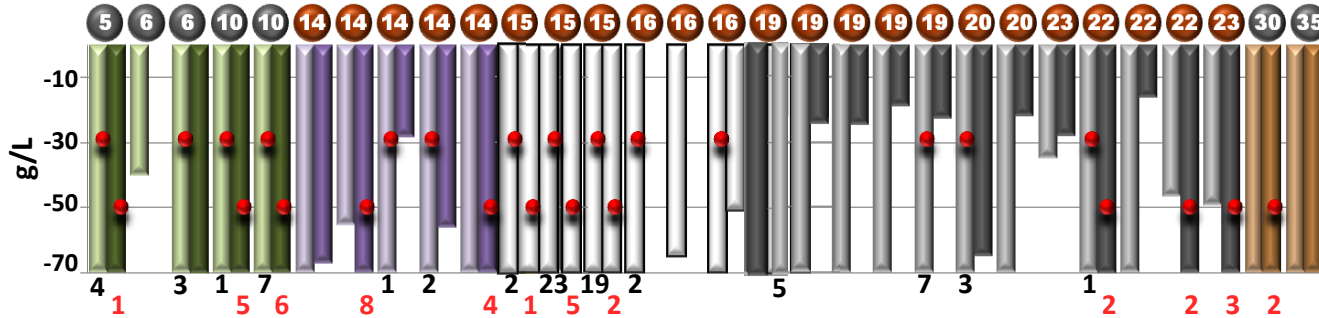
## SAMPLES OF HYBRID VARIETIES FROM ABANDONED VINEYARDS



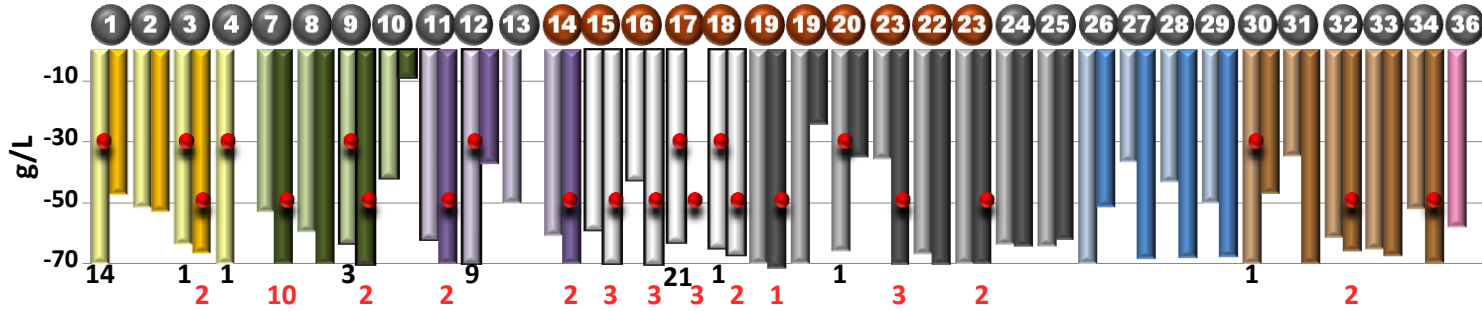
- Fermentations completed by *S. cerevisiae*
- Samples from appellations of origin
- Samples from other winemaking regions

# RESULTS *S. cerevisiae* microflora composition per island

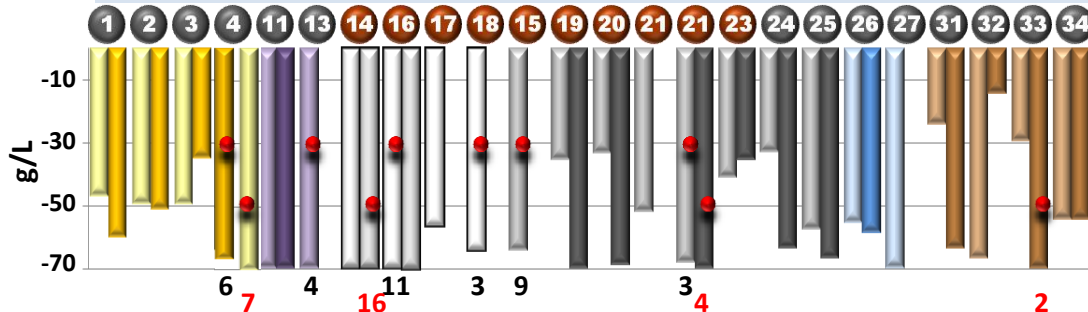
## SAMPLES OF TRADITIONAL VARIETIES FROM NON-ABANDONED VINEYARDS



## SAMPLES OF HYBRID VARIETIES FROM NON-ABANDONED VINEYARDS

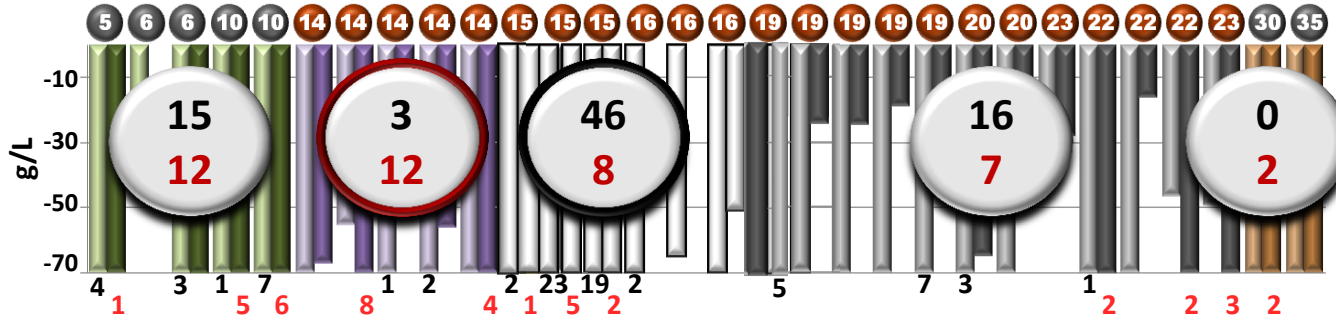


## SAMPLES OF HYBRID VARIETIES FROM ABANDONED VINEYARDS



# RESULTS *S. cerevisiae* microflora composition per island

## SAMPLES OF TRADITIONAL VARIETIES FROM NON-ABANDONED VINEYARDS



2009

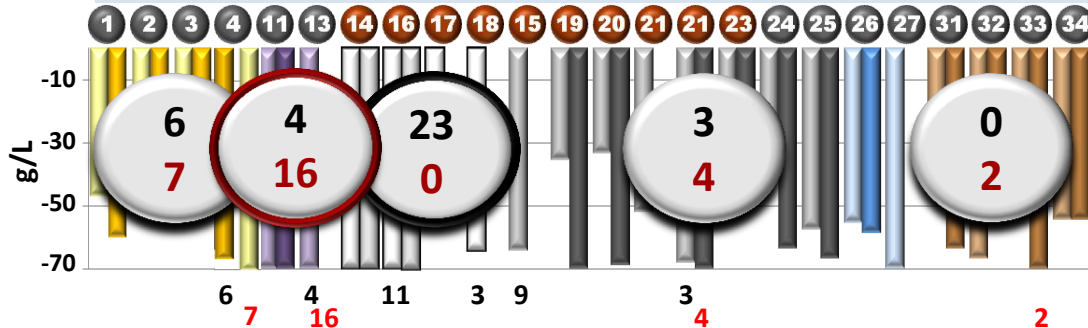
2010



## SAMPLES OF HYBRID VARIETIES FROM NON-ABANDONED VINEYARDS



## SAMPLES OF HYBRID VARIETIES FROM ABANDONED VINEYARDS





# CONCLUSIONS

1. Occurrence of ten yeast genera (corresponding to 23 species) and 3 (potentially) new species.
  2. The species distribution depends on the island localization, grape variety and type of vineyard:
    - *H. uvarum* was predominant (in particular in abandoned vineyards);
    - *I. terricola* predominates in the central group of islands;
    - *C. zemplinina* predominates Santa Maria and São Miguel islands;
    - *M. pulcherrima*, was associated with the traditional grape varieties.
  3. *S. cerevisiae*: high genetic diversity (275 strains)
-

# ACKNOWLEDGMENT



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**Ricardo Duarte Eugénia Vieira Inês Mendes**



**Elza Fonseca Nuno Fonseca Raquel Pereira Ana Xavier**

