

# **Yeast diversity in some selected habitats**

*Recent research at NCAIM, Hungary*

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# NCAIM

## *National Collection of Agricultural and Industrial Microorganisms*

- The predecessor, the Hungarian Microbiological Gene Bank (HMGB) was established in 1974.
- In 1986 NCAIM was approved as an International Depository Authority.
- Holdings
  - 1100 bacteria
  - 1500 yeasts
  - 400 filamentous fungi

# Deciduous forests as a yeast habitat



# The most frequently sampled tree species:

- Oak (*Quercus* spp.)
- White poplar (*Populus alba*)
- Poplar (*Populus* spp.)
- Hornbeam (*Carpinus betulus*)
- Beech (*Fagus sylvatica*)
- Pine (*Pinus* spp.)

# Methanol-assimilating yeasts from 186 tree exudates: *7 new / from 15 isolated species*

- *Komagataella pastoris* (95) (63%)
- *Ogataea populialbae* (19)
- *Candida boidinii* (15)
- *Komagataella pseudopastoris* (6)
- *O. trehaloabstinens* (3)
- *O. pignaliae* (2)
- *Kuraishia floccosa* (2)
- *O. pini* (1)
- *O. trehalophila* (1)
- *O. cf. trehalophila* (1)
- *Kuraishia cidri* (1)
- *Kuraishia molischiana* (1)
- *C. succiphila* (1)
- *C. nitratophila* (1)
- *C. cf. boidinii* (1)

# Methanol-assimilating yeasts from 220 rotten wood samples:

*12 new / from 20 isolated species*

- *Komagataella pastoris* (72) (52%)
- *Candida boidinii* (19)
- *Komagataella pseudopastoris* (8)
- *Kuraishia capsulata* (4)
- *Ogataea trehalophila* (4)
- *C. succiphila* (4)
- *Kuraishia molschiana* (3)
- *Ogataea trehaloabstinens* (3)
- *Ogataea nitratoaversa* (3)
- *Kuraishia cidri* (2)
- *Kuraishia hungarica* (2)
- *Kuraishia ogatae* (2)
- *Ogataea dorogensis* (2)
- *Ogataea zsoltii* (2)
- *Ogataea saltuana* (2)
- *Ogataea cf. trehalophila* (2)
- *Ogataea pilisensis* (1)
- *Ogataea deakii* (1)
- *Ogataea polymorpha* (1)
- *Candida nitratophila* (1)

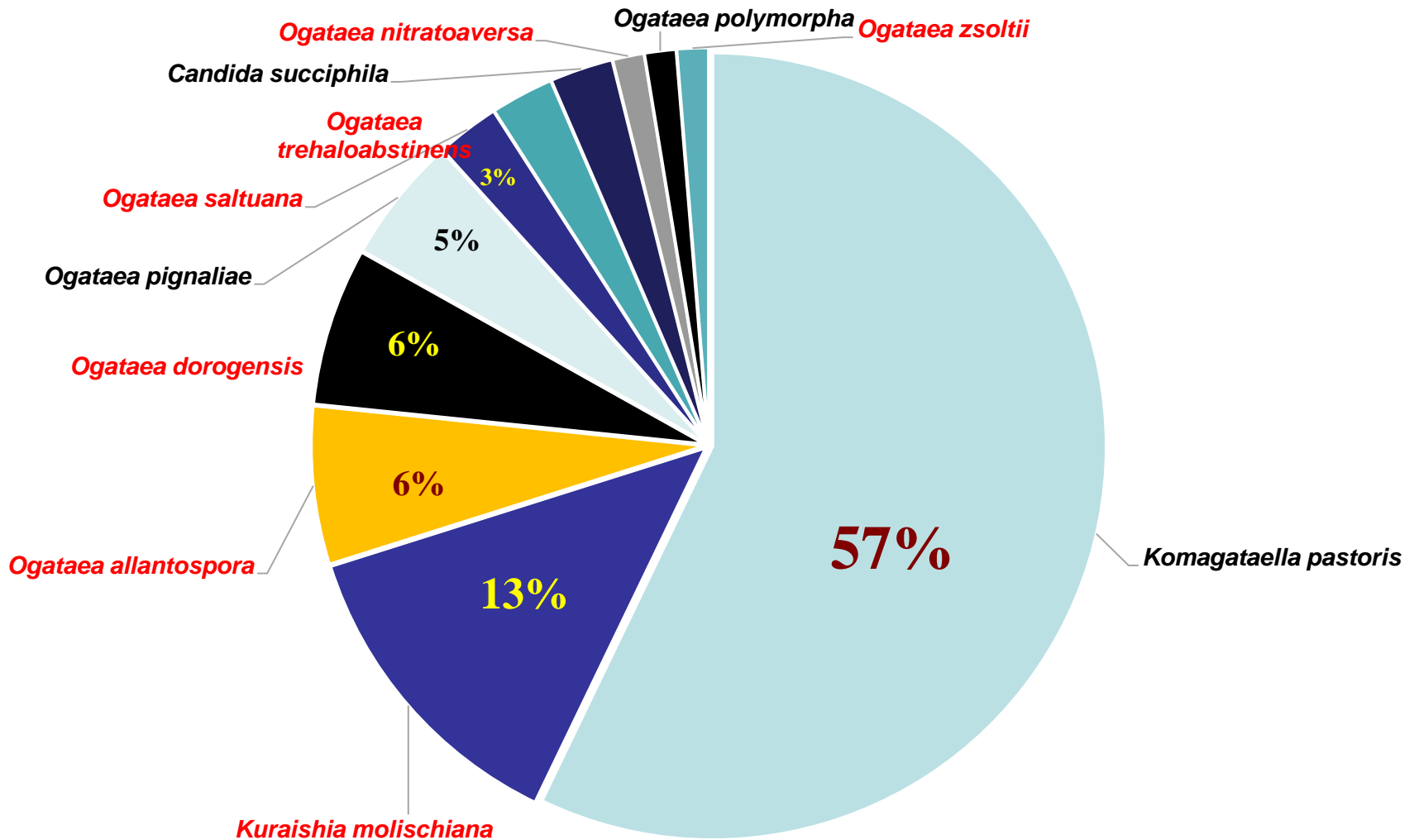
# Phyllosphere as a microbial habitat

- 
- area about  $2 - 6 \times 10^8 \text{ km}^2$
  - yeast count up to  $10^7$  cells/g
  - dominant phyllosphere yeast colonists are mostly basidiomycetous
  - nutrient supply provided (et least partly) by leaves  
(including methanol)

# Methanol-assimilating yeasts from leaves

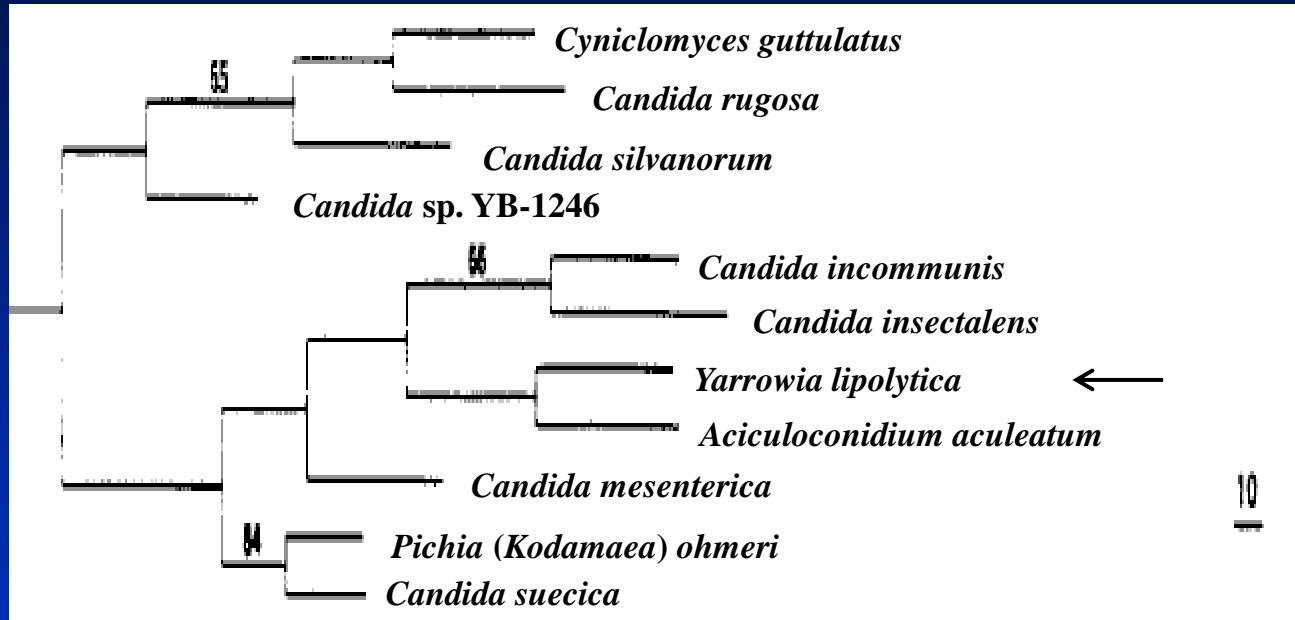
From 120 samples 67 were „+”

**7 new / from 11 isolated species**



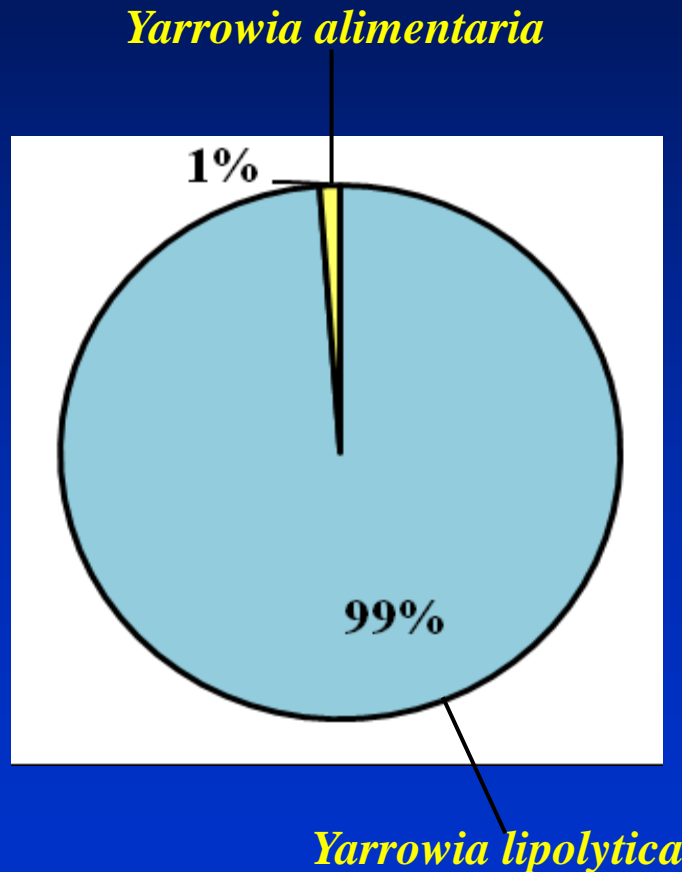


# Yarrowia

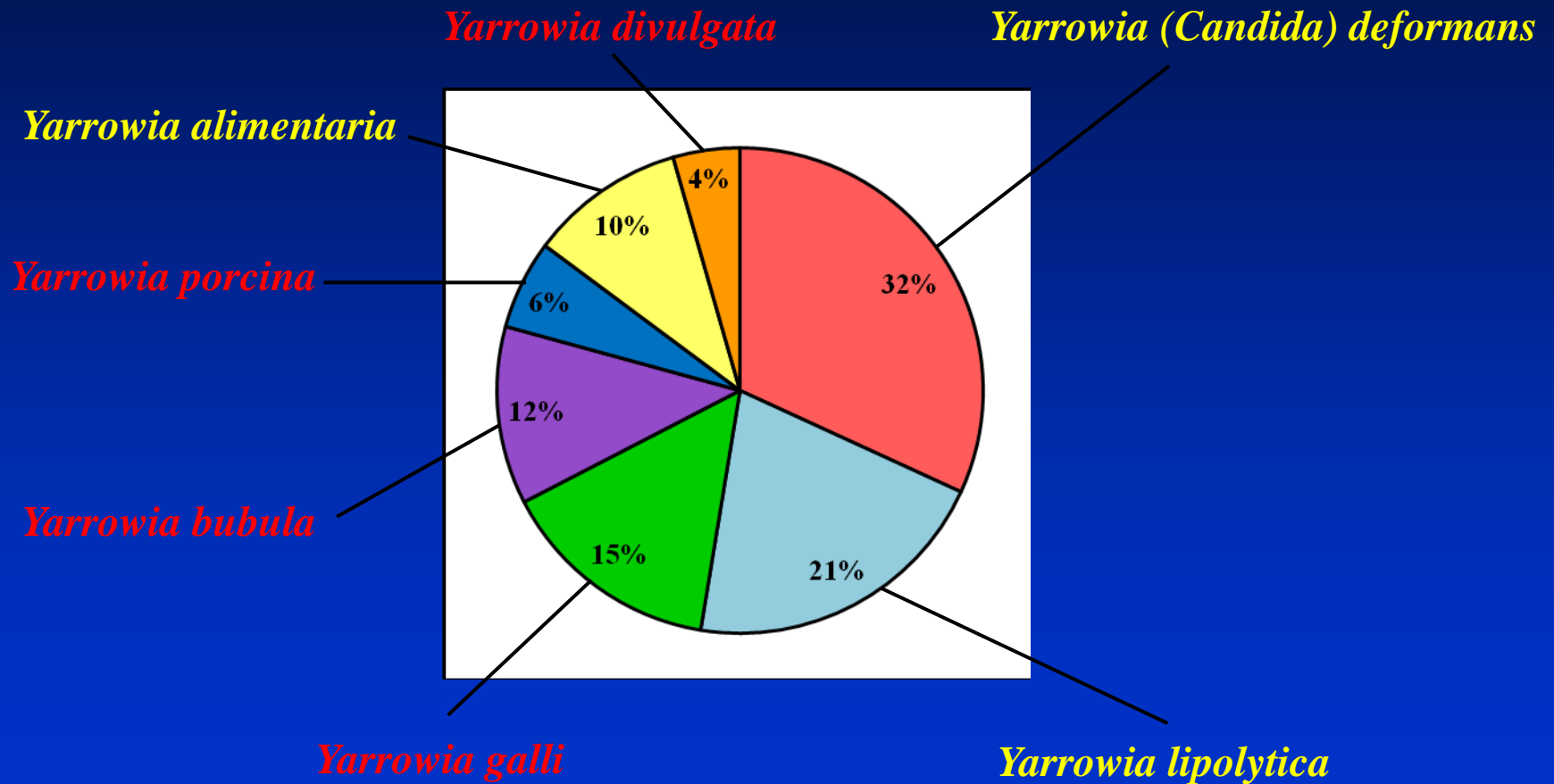


Kurtzman CP & Robnett CJ (1998) Identification and phylogeny of ascomycetous yeasts from analysis of nuclear large subunit (26S) ribosomal DNA partial sequences. *Antonie van Leeuwenhoek* 73: 331–371

**The distribution of the *Yarrowia* strains isolated from milk and milk products (86 strains from 67 samples)**



# The distribution of the *Yarrowia* strains isolated from raw meat (135 strains from 66 samples, 4/7)

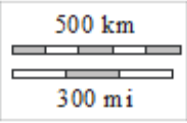


# Olive oil as a yeast habitat



# Olive oil as a yeast habitat





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Hungary

Slovenia

Italy

Spain

Portugal

Morocco

Algeria

Tunisia

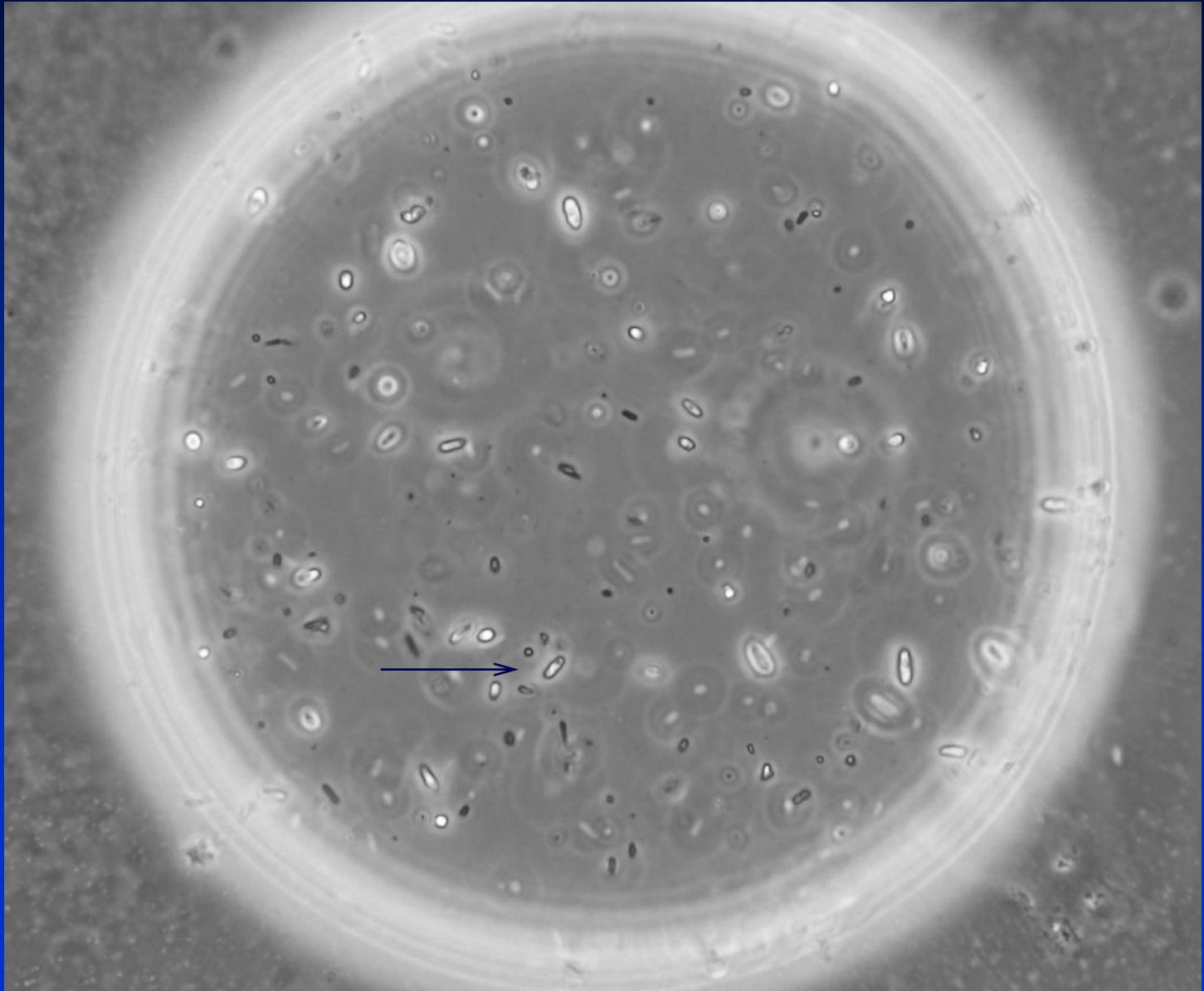
Greece

Turkey

Syria

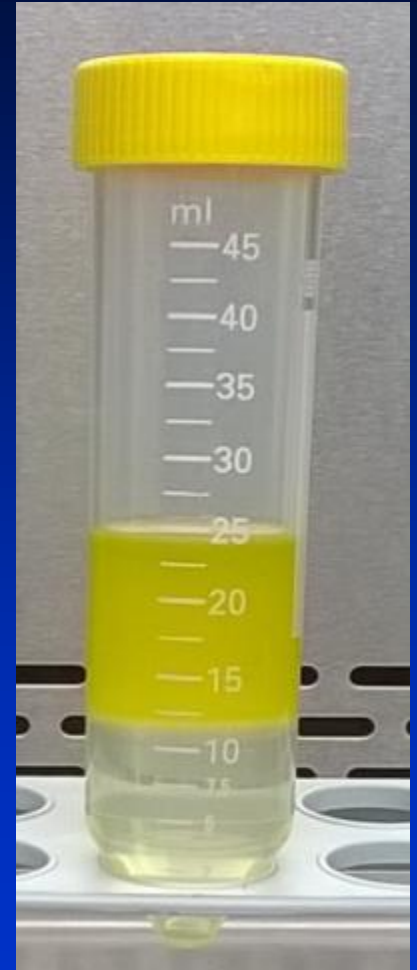
Egypt

# Yeasts in olive oil



# Yeasts in olive oil

- Transferring the yeasts to water by centrifugation →





# Yeasts isolated from olive oil and from sediments of olive oil

~200 strains were isolated from ~100 samples representing 8 new from 23 detected species

Isolation frequency

*Nakazawaea molendini-olei*

*Ogataea histriana*

*Candida adriatica*

*Yamadazyma terventina*

*Saccharomyces cerevisiae*

*Groenwaldozyma auringiensis*

*Nakazawaea wickerhamii*

*Myxozyma udenii*

*Ogataea kolombanensis*

*Lachancea fermentati*

*Candida diddensiae*

*Candida boidinii*

*Pichia manshurica*

*Candida railenensis*

*Candida oleophila*

*Kuraishia mediterranea*

*Candida tenuis*

*Galactomyces geotrichum*

*Brettanomyces acidodurans*

*Zygorhynchus mrakii*

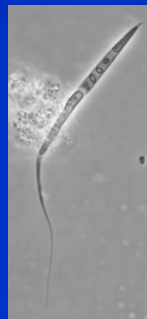
*Eremotecium sp.*

Debaryomycetaceae sp. nov. (1 strain)

Taphrinomycotina sp. nov. gen. nov. fam. nov.



Phylogenomic analysis is in progress  
(Neža Čadež, Slovenia)



**Thank you for your  
attention !!**