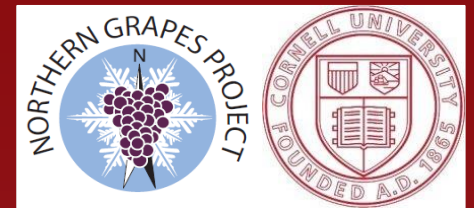
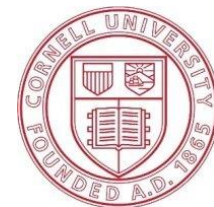


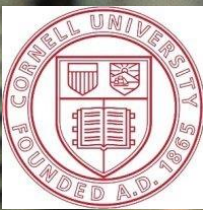
Put a Cork in it?

Wine Closure Selection

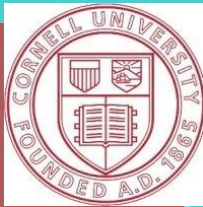


Anna Katharine Mansfield
Associate Professor of Enology
Cornell Enology Extension Laboratory

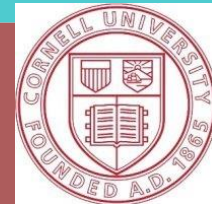
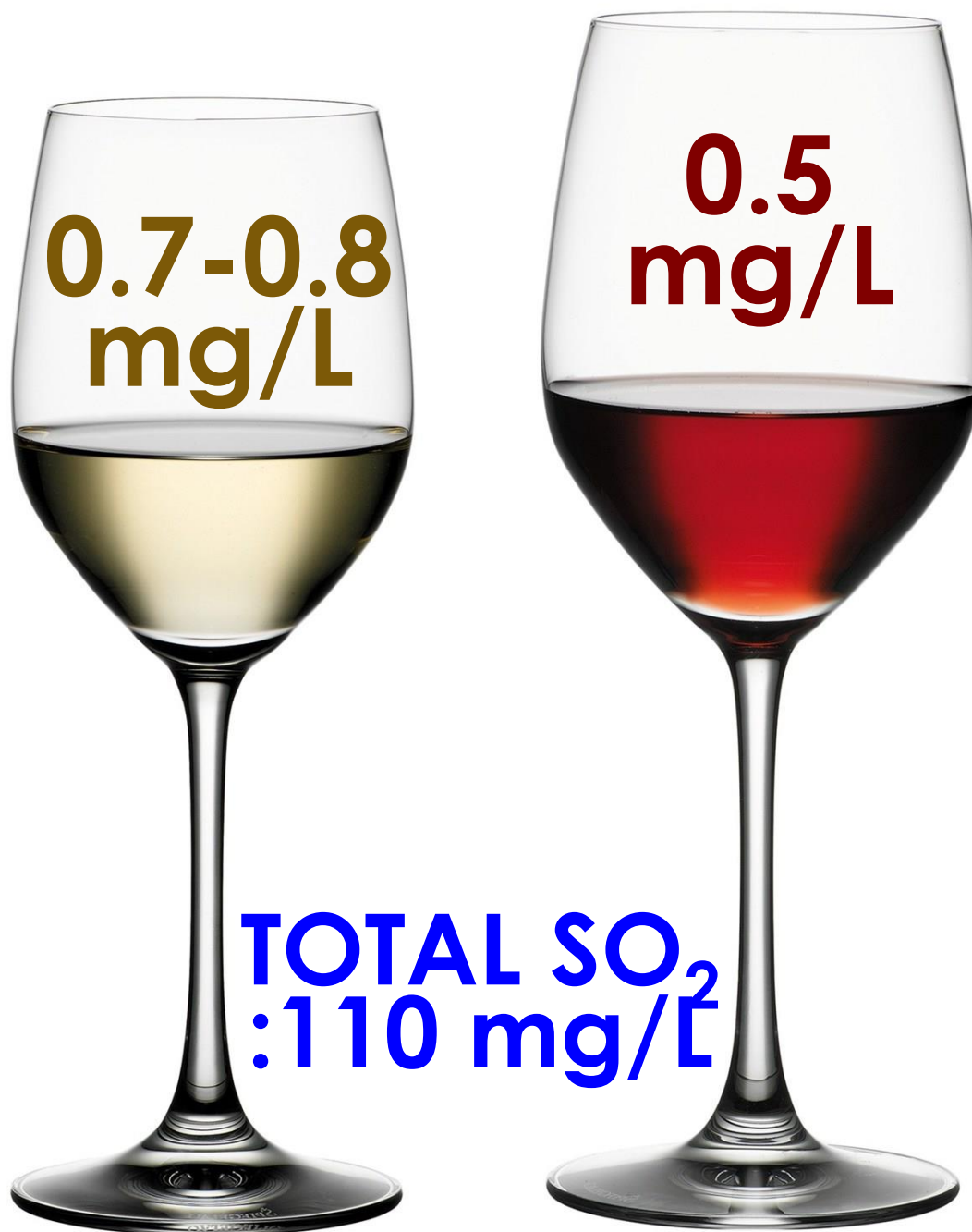




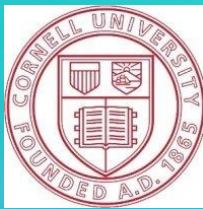
FREE MOLECULAR



FREE MOLECULAR







OXYGEN



**Saturation:
8 mg/L**

OXYGEN IN BOTTLE

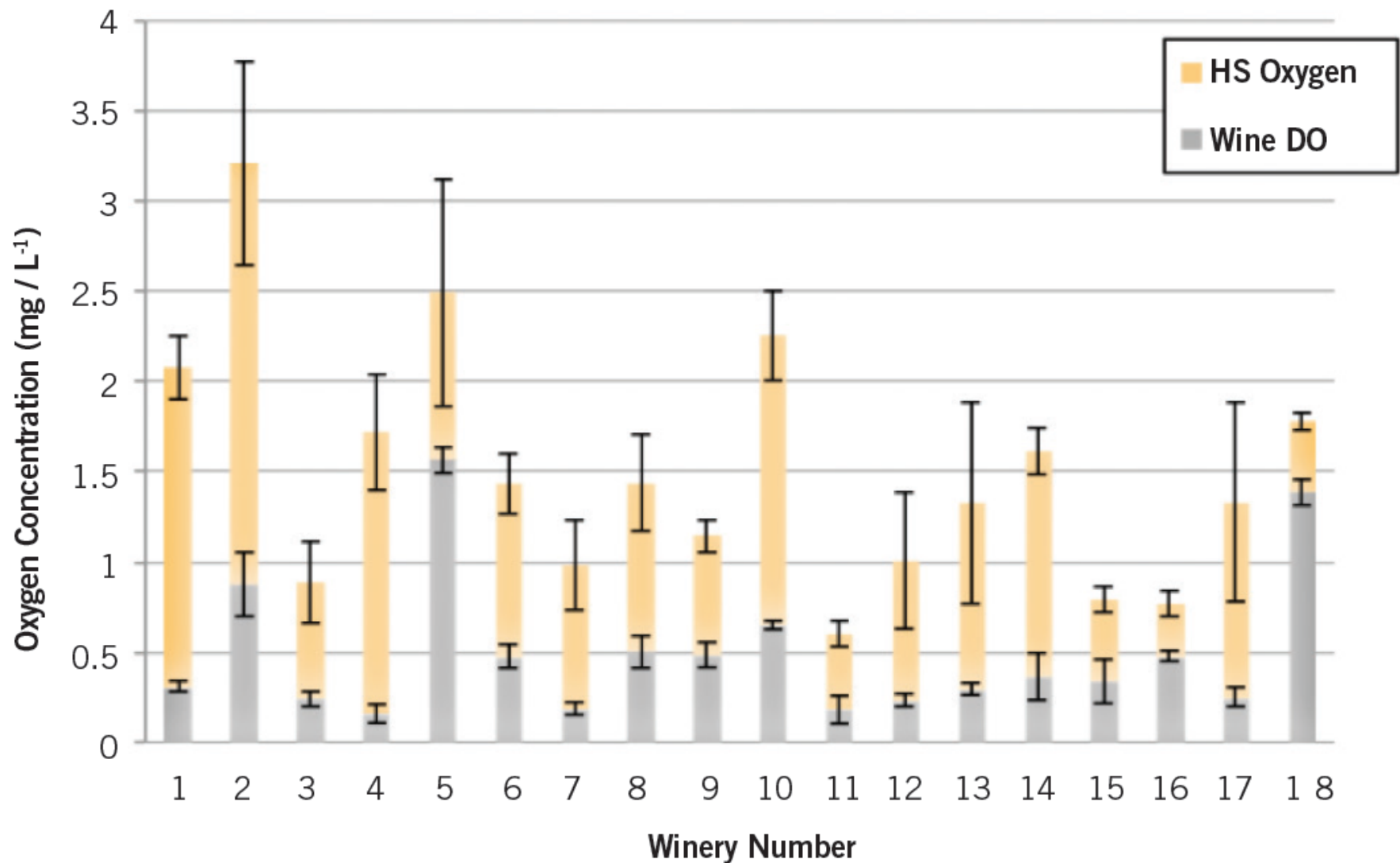


60%




NOMACORC®

TPO Partitioning Measured by 18 Trials at 17 California Wineries



Wineries differ widely in levels and variability of TPO.



Nomacorc
Select



Nomacorc
Classic+



1+1



Agglomerated

(Extruded synthetic corks)



Micro
Agglomerated



Colmated



High-End
Natural



Injection
Molded

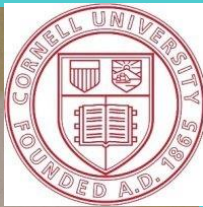
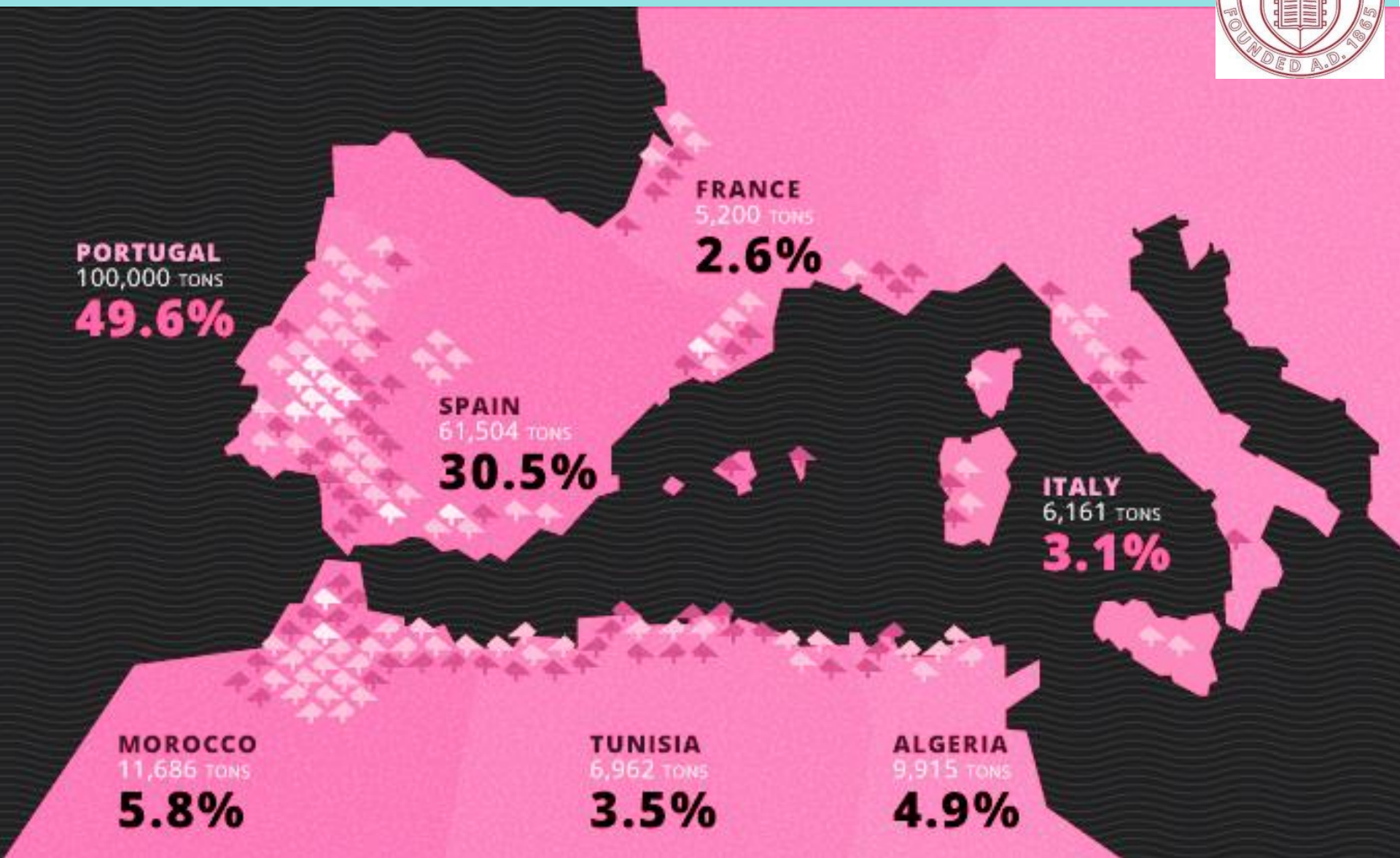
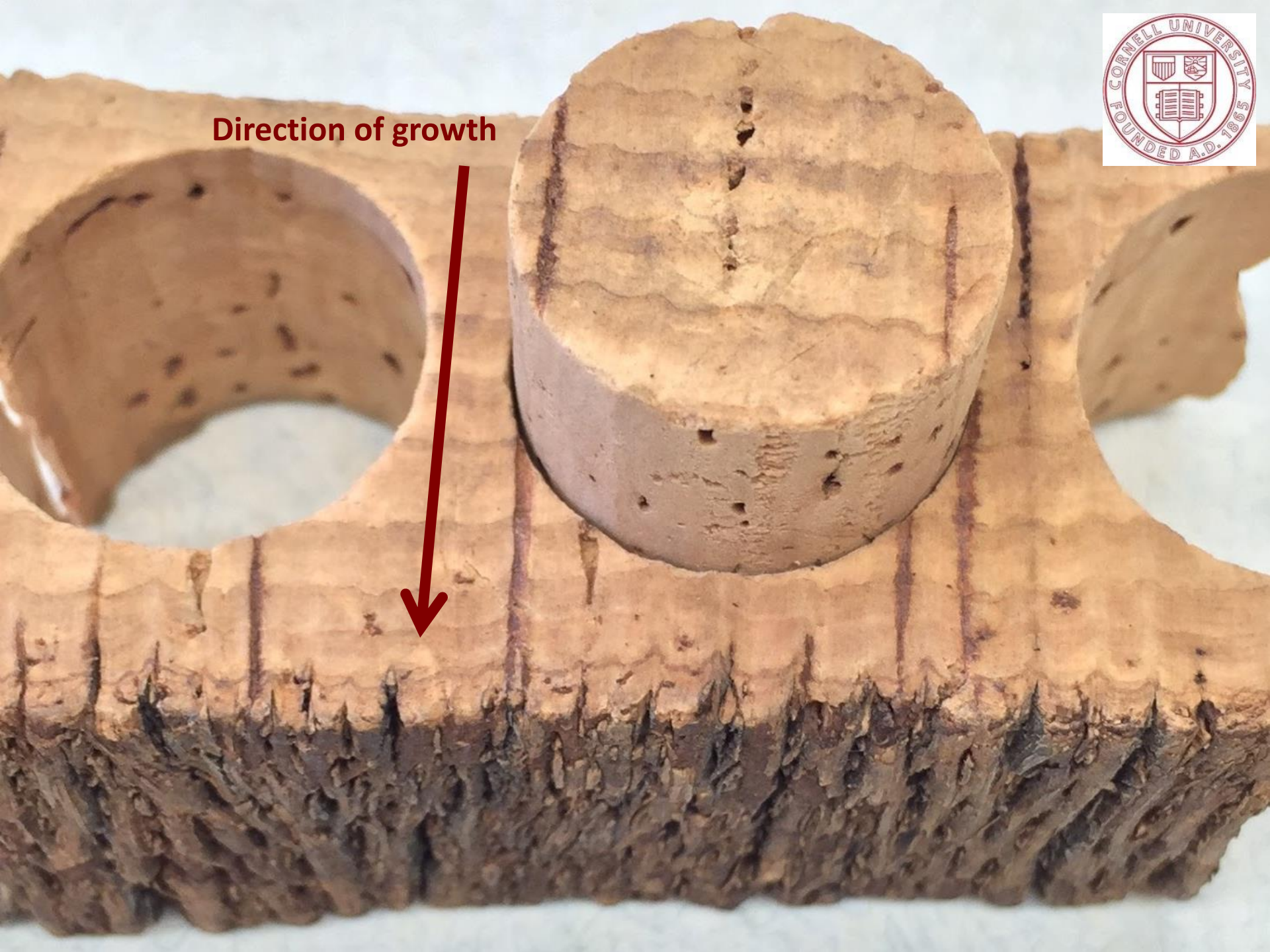
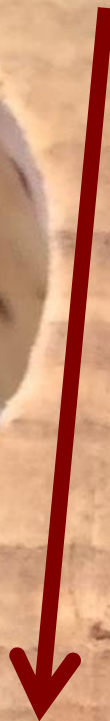
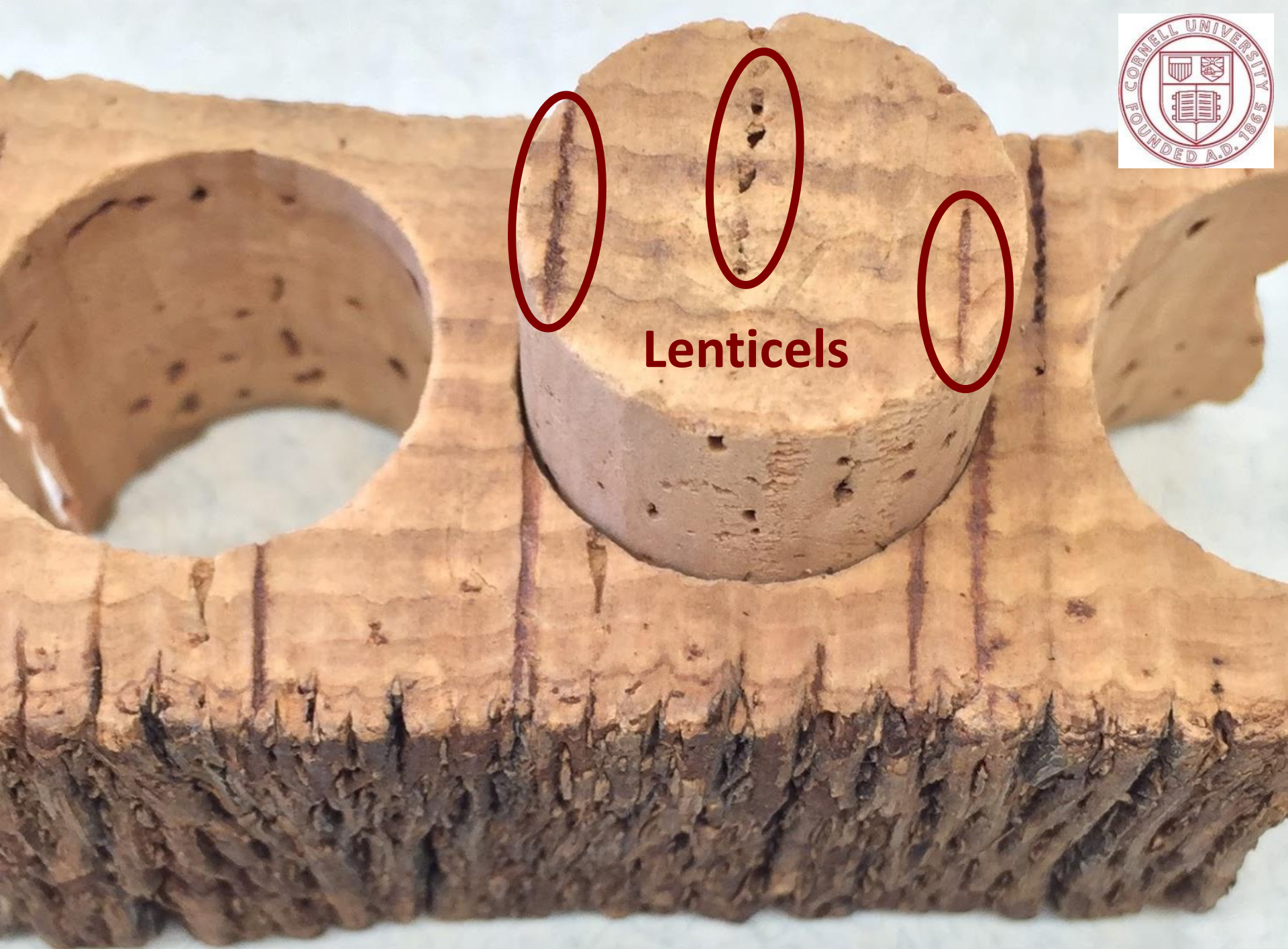


Photo courtesy Thomas Karbowiak, IUVV Jules Guyot UB



Direction of growth



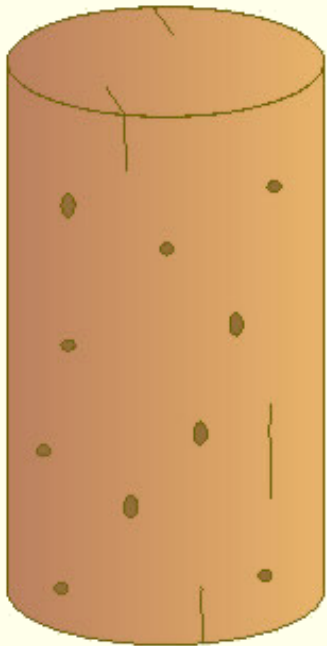


Lenticels

CQC Visual Grading Standards

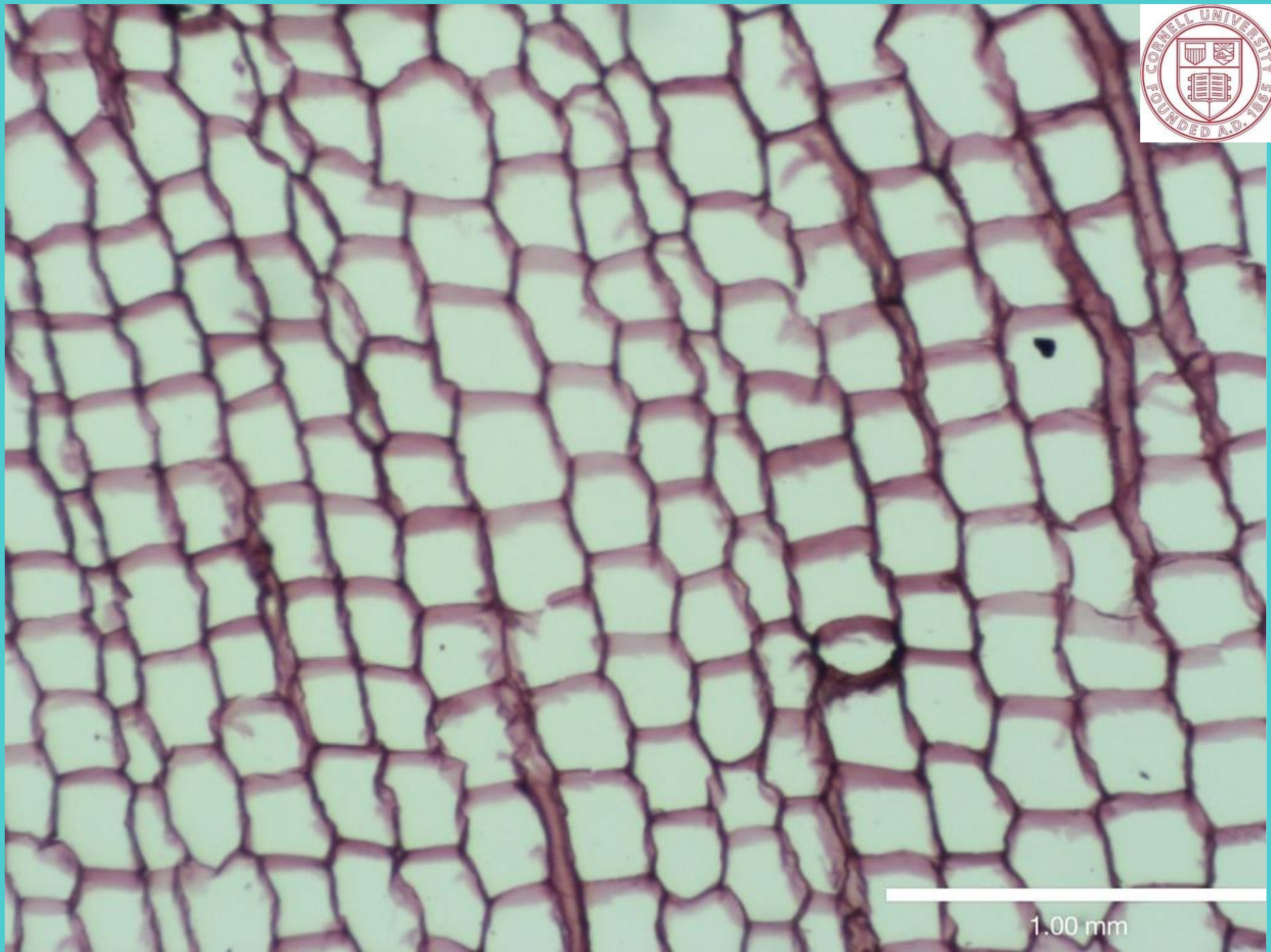
The following grading system has been adopted by CQC members to provide a common terminology in defining the visual grades of wine corks. It has become a standard used by most wineries.

GRADE A



These are corks with top quality visual appearance - excellent surfaces, with no major visual flaws and few small ones.

- No holes or pores which exceed 2mm.
- No cracks originating at the ends which exceed 11% of cork length.
- No cracks in the body of the cork to exceed 18% of cork length.
- All cracks must be tight and not open.
- No horizontal cracks.
- No worm holes, hardwood, belly spots, or greenwood.
- Several narrow and shallow lenticels are acceptable if they are free of dust and particles.



1.00 mm

27%
Lignin

45%
suberin

12%
polysaccharides

6%
tannins

6%
ceroids

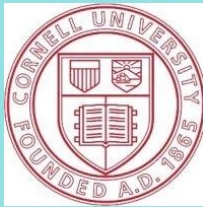
DON MELCHOR

DON MELCHOR

DON MELCHOR

DON MELCHOR





ADHESIVE RISK?







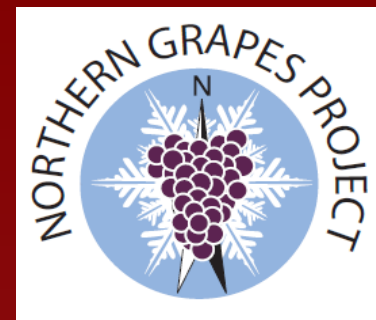




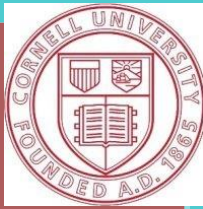








Post-bottling Oxygen

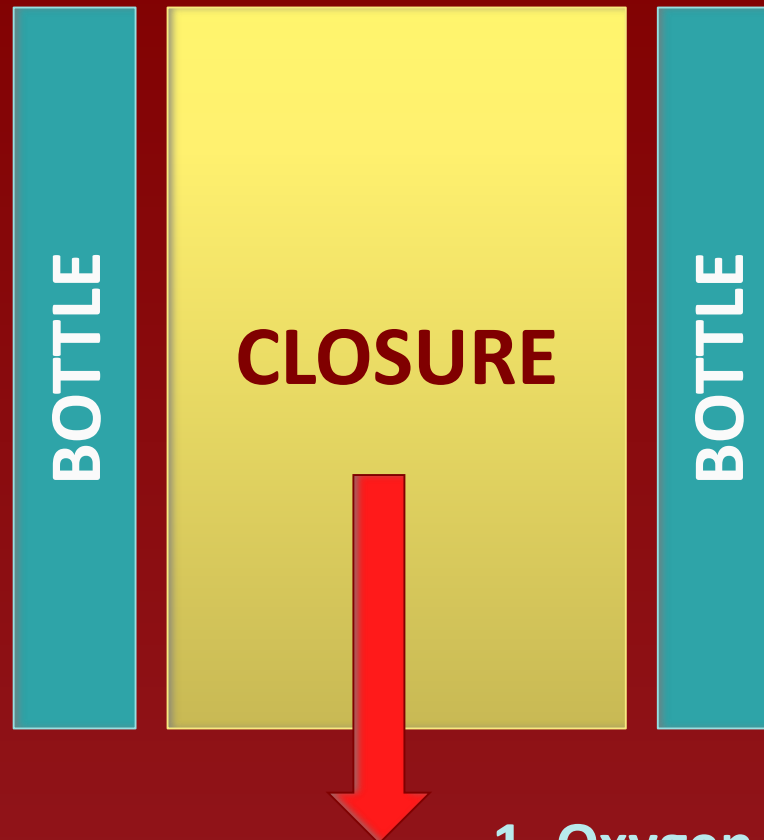
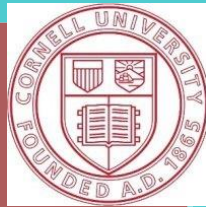


BOTTLE

CLOSURE

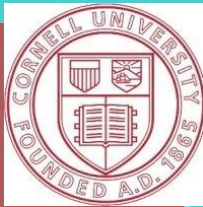
BOTTLE

Post-bottling Oxygen

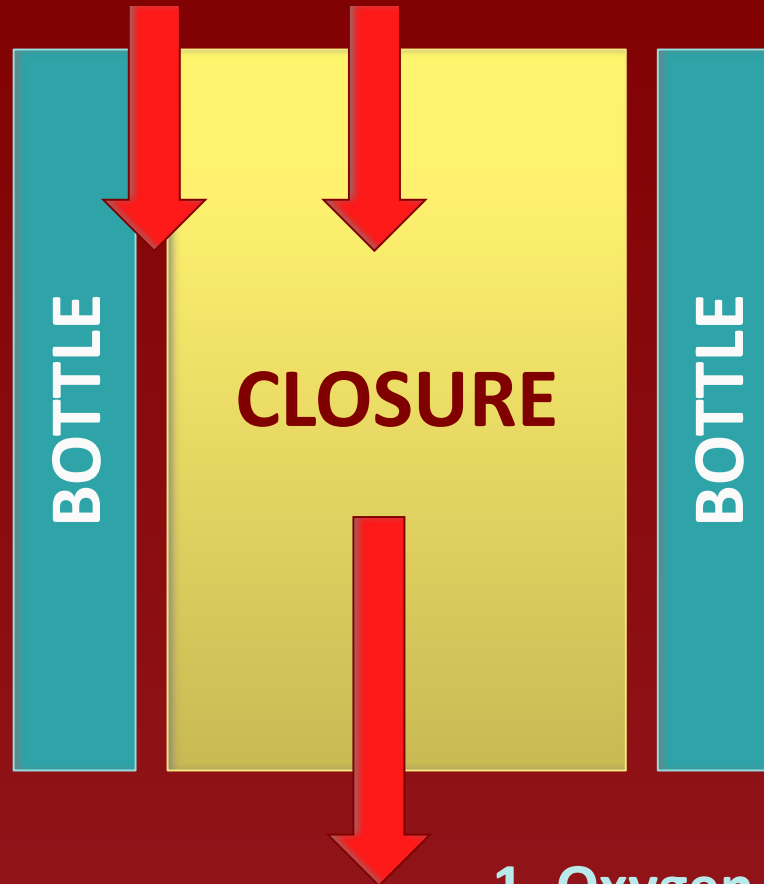


1. Oxygen from bottling and expelled from closure- rapid

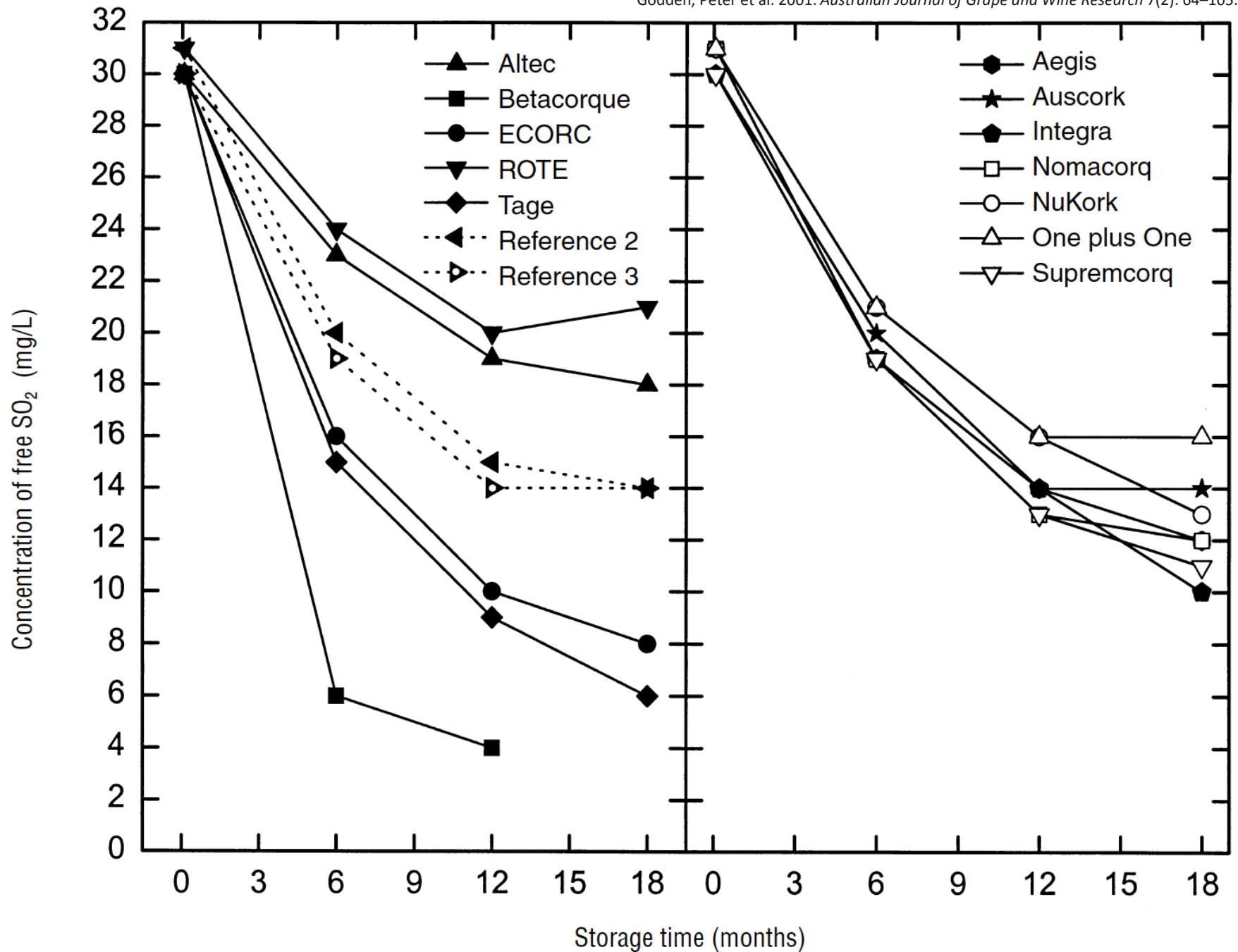
Post-bottling Oxygen

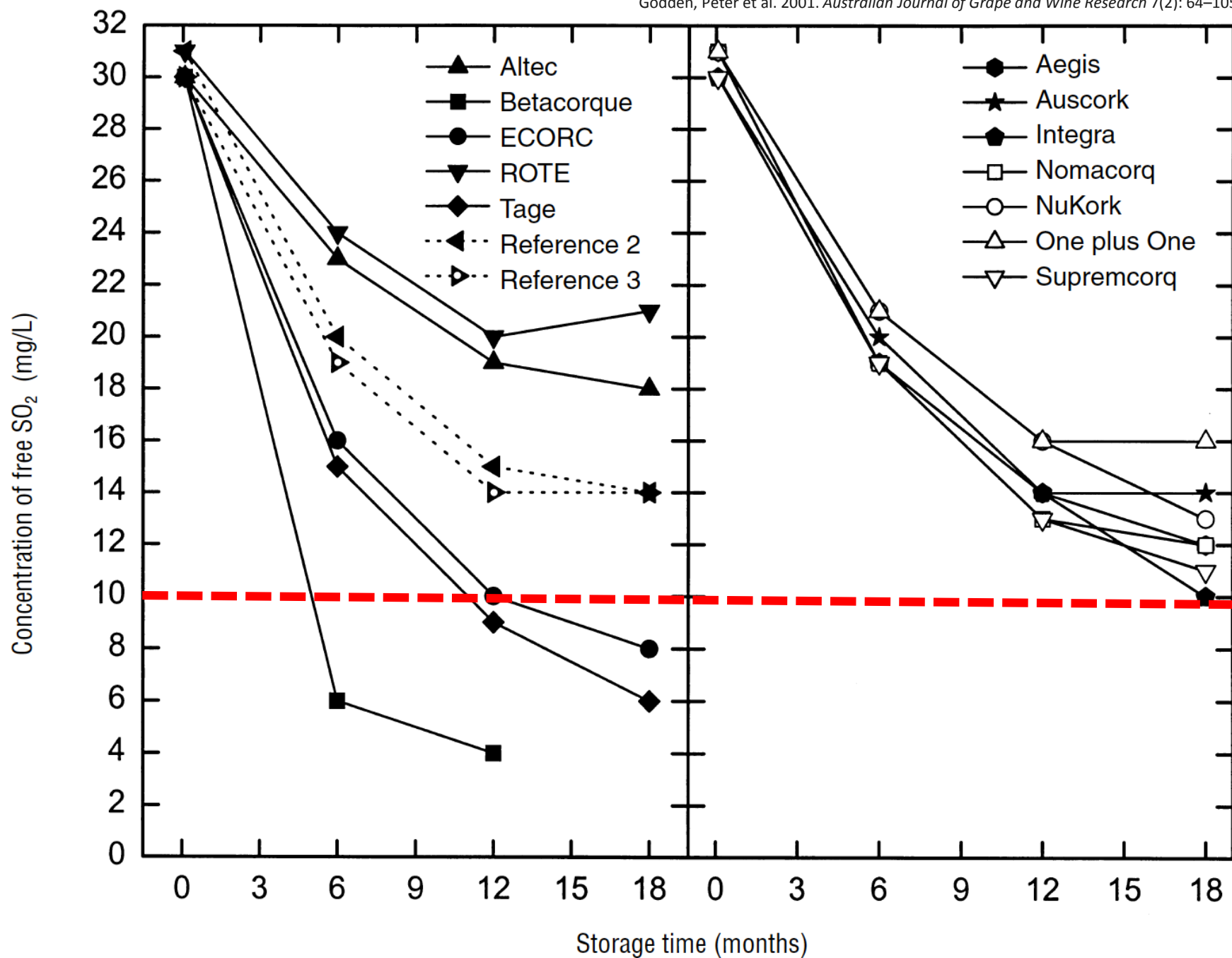


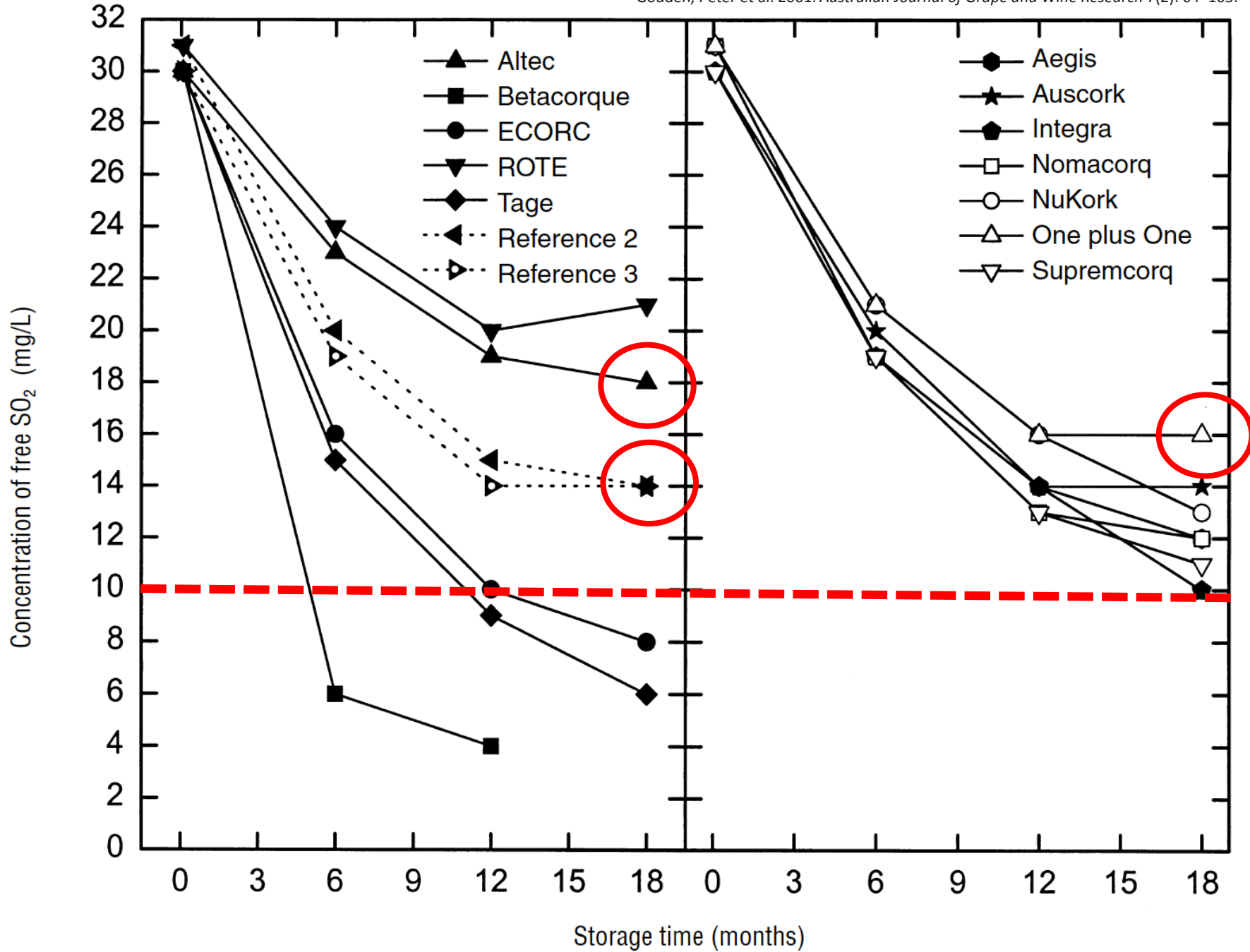
2. Oxygen permeation through sides and/or body of closure

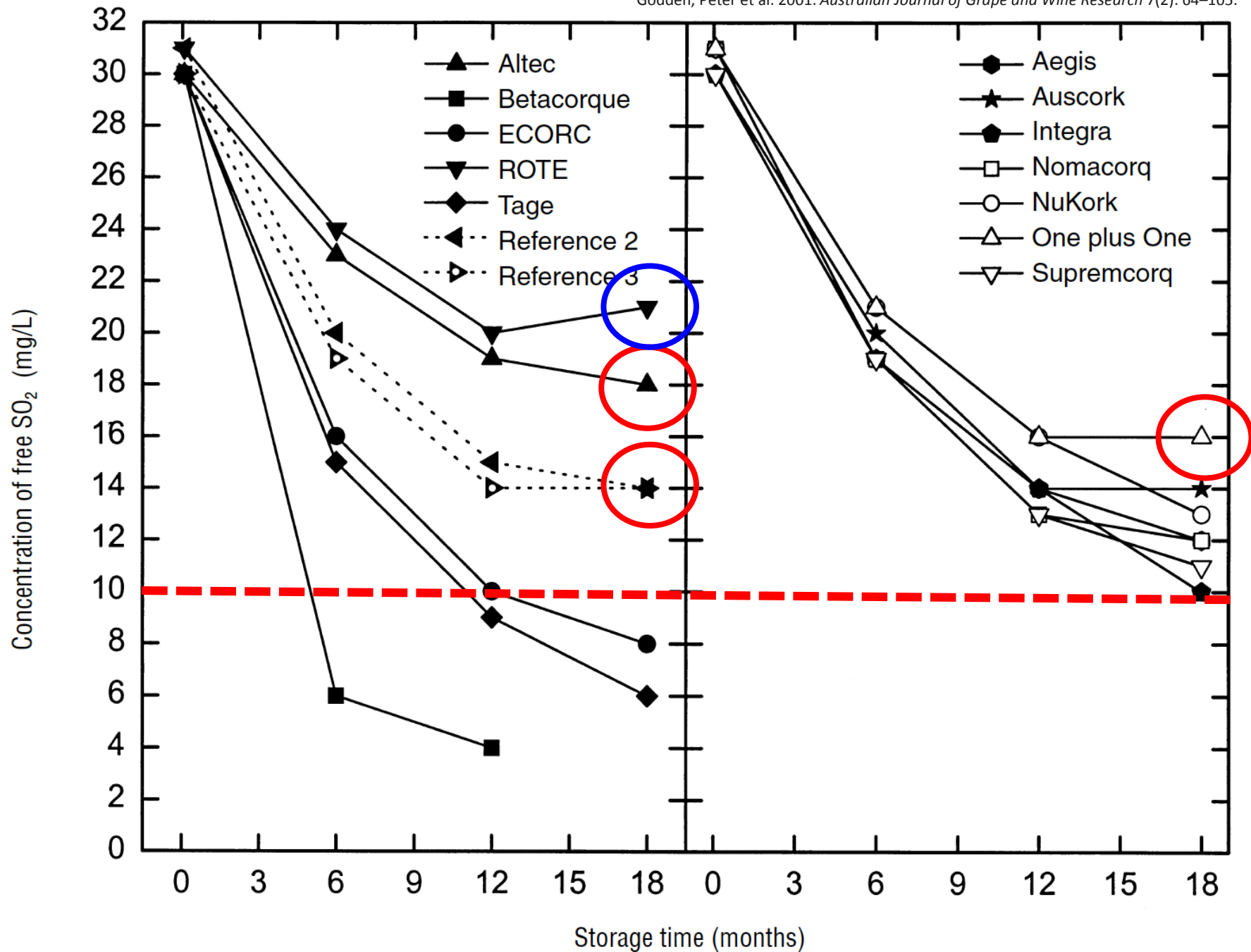


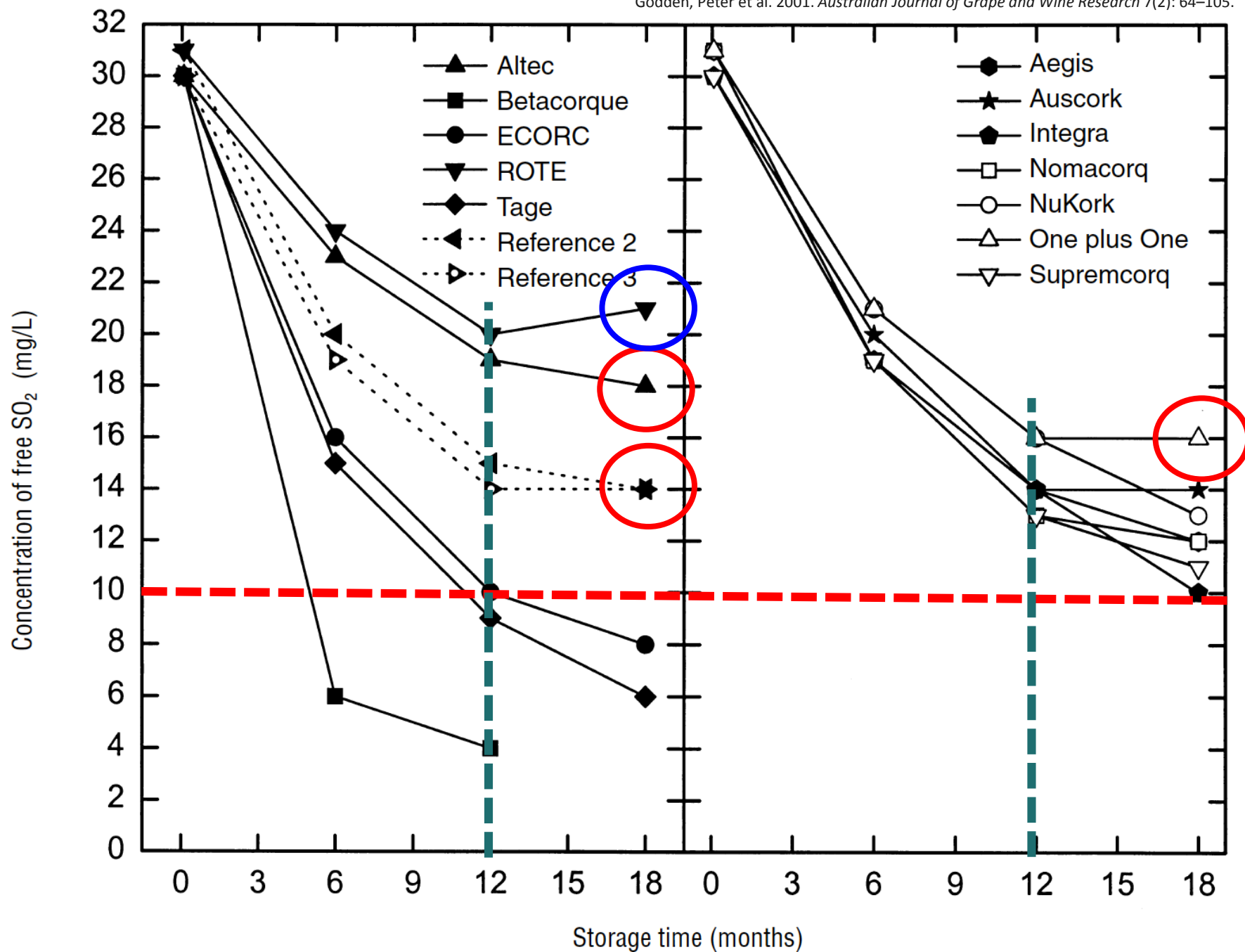
1. Oxygen from bottling and expelled from closure- rapid

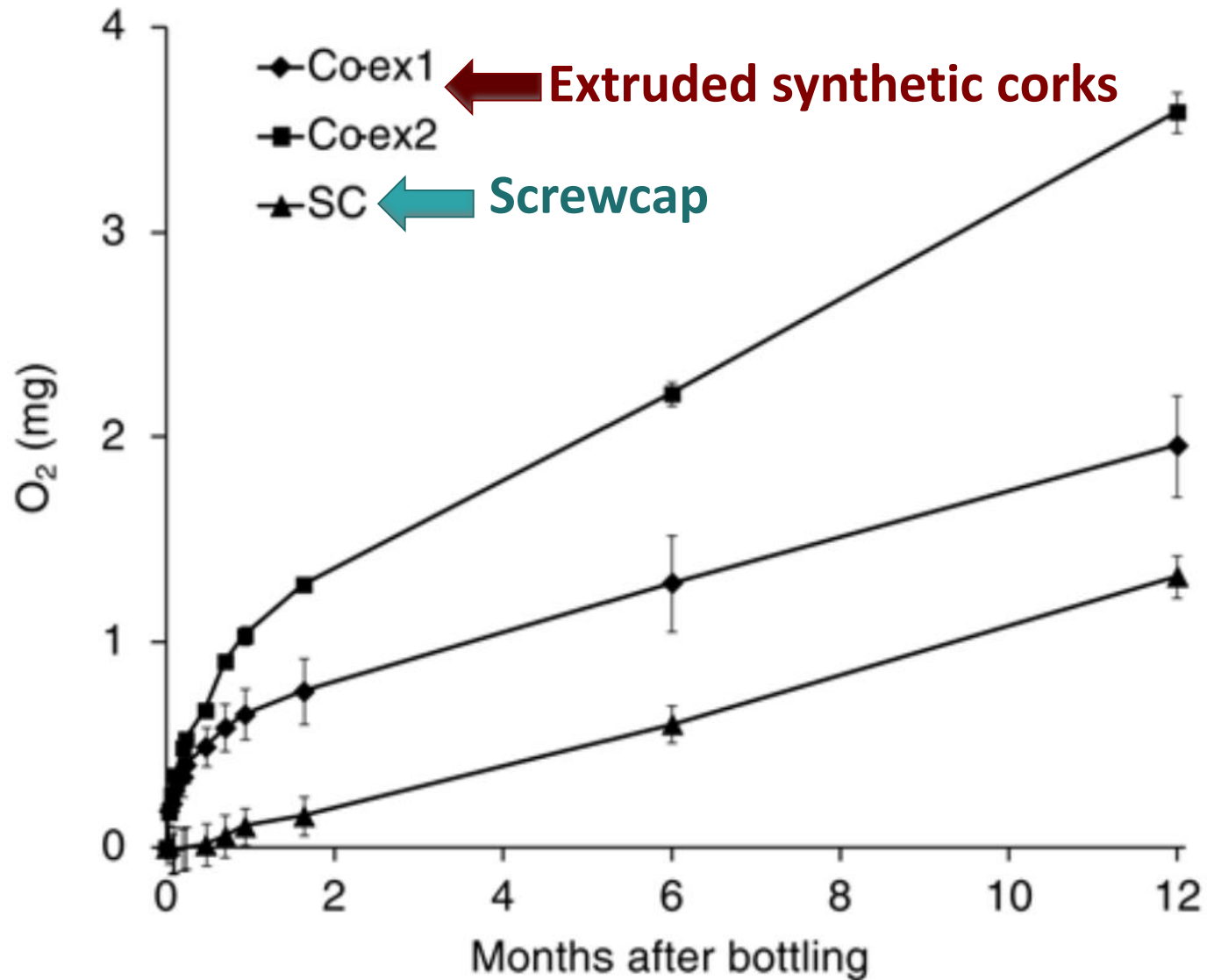


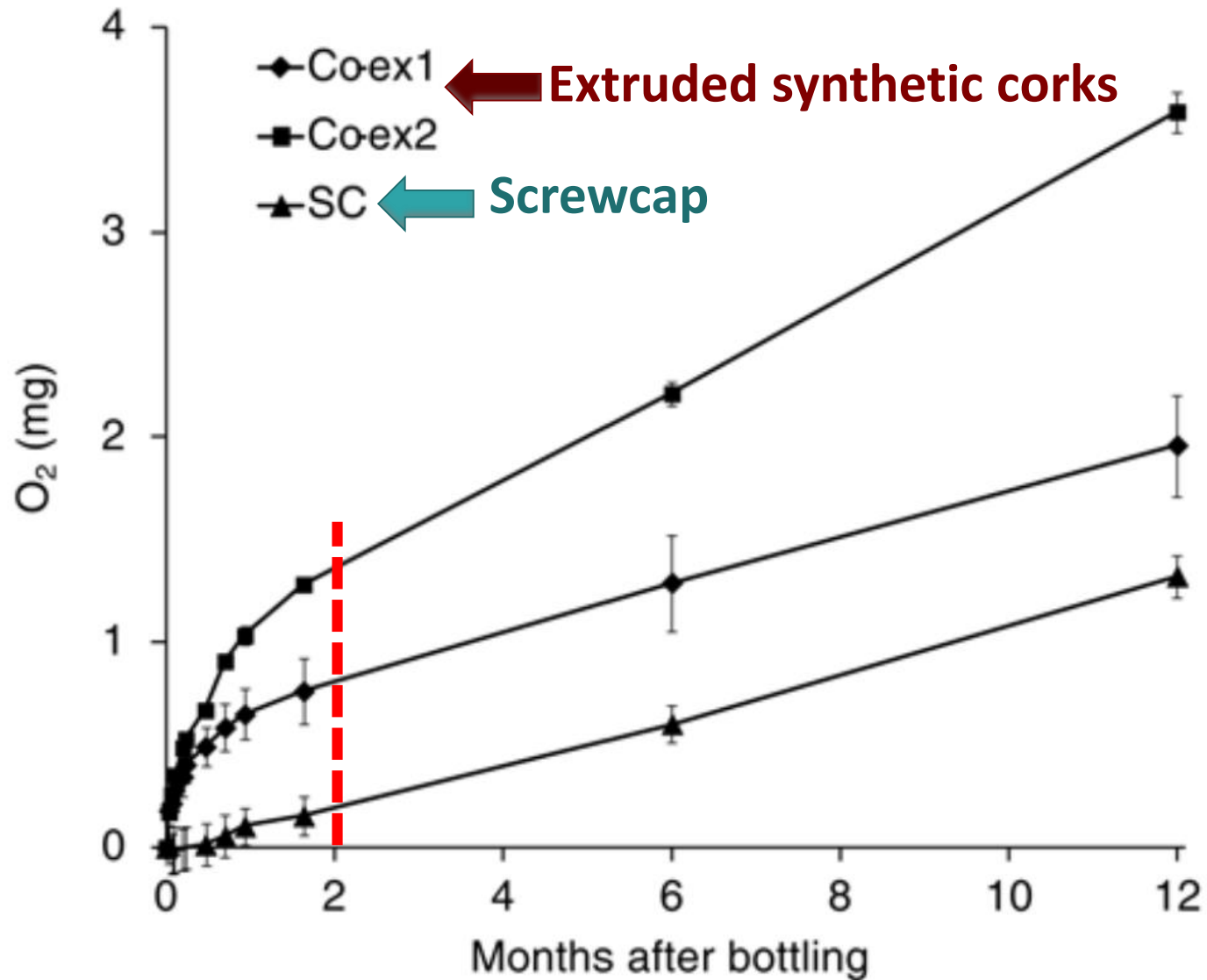


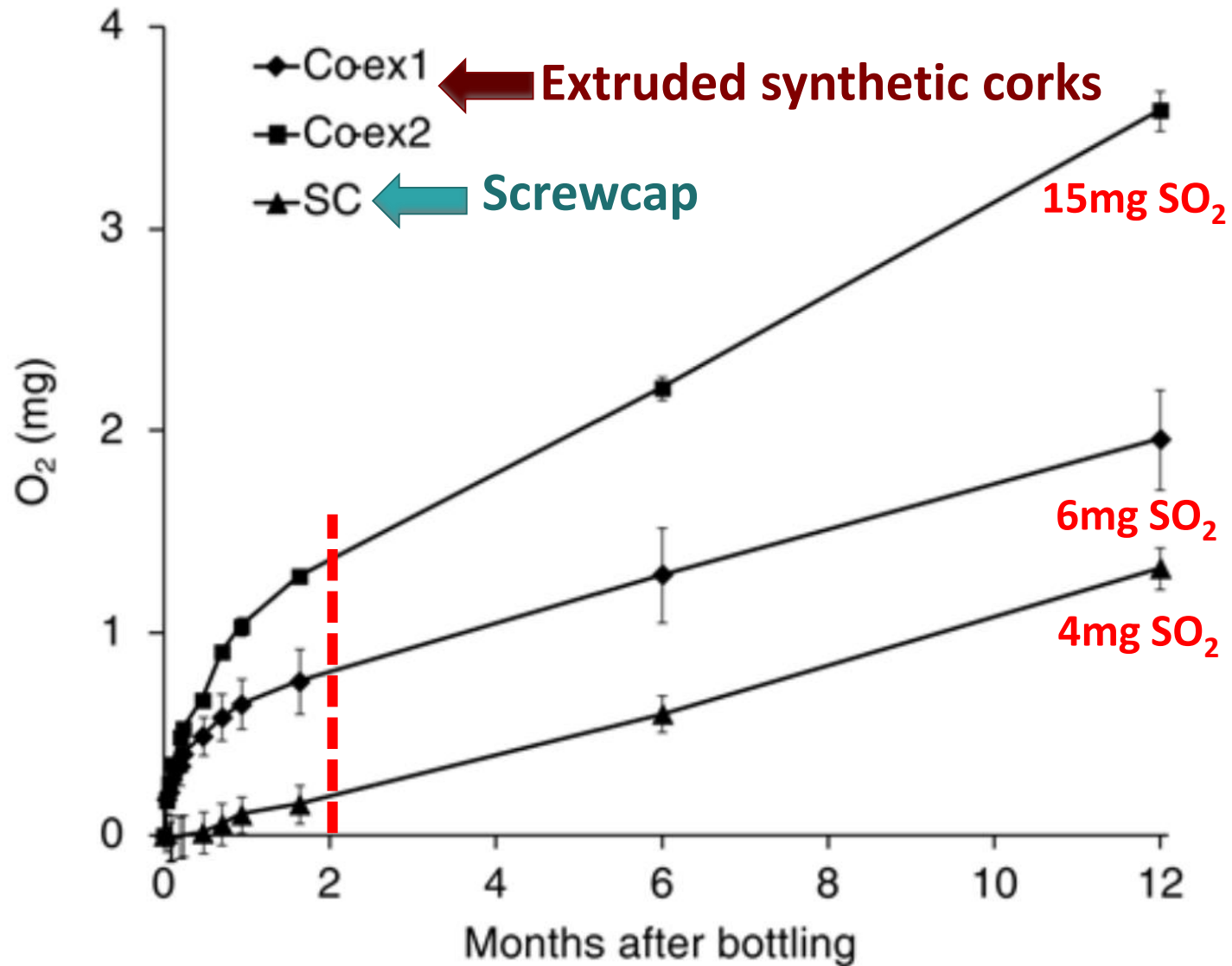




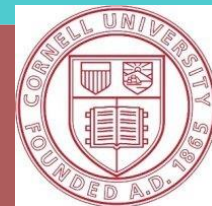




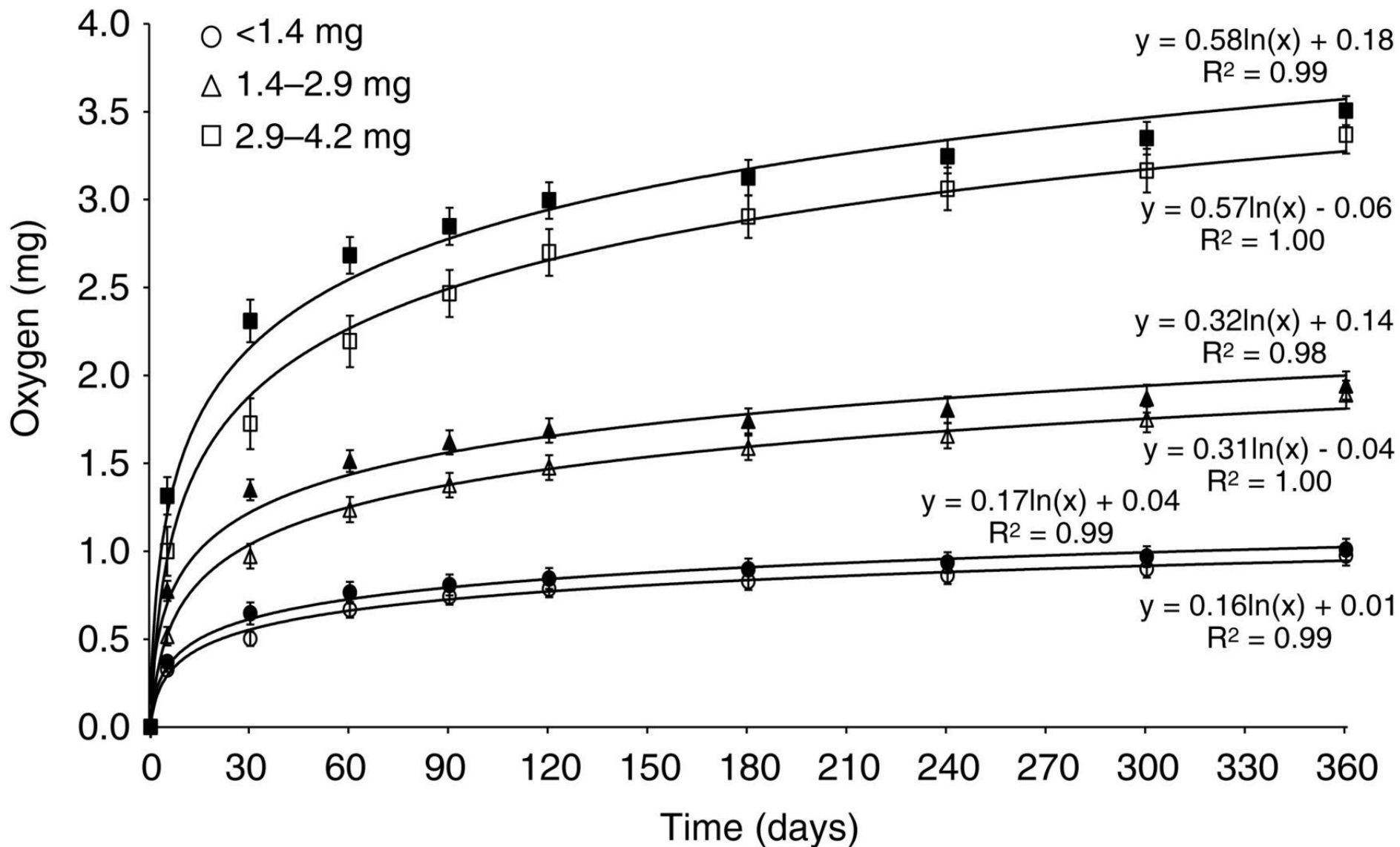




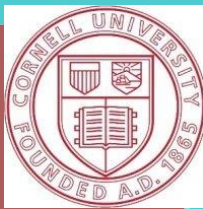
O₂ Ingress: natural cork



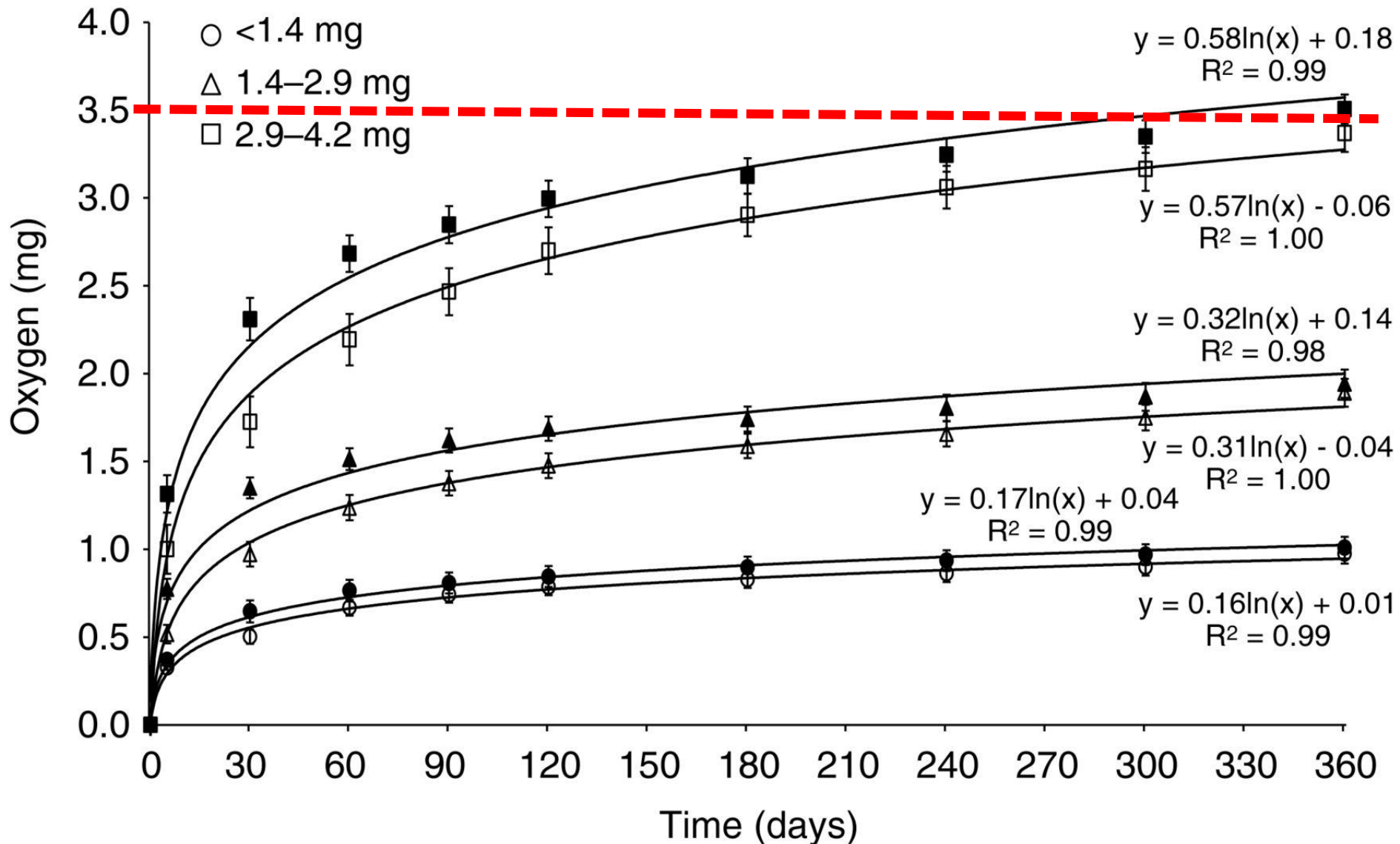
Oliviera et al. 2013. American Journal of Enology and Viticulture 64(4): 395-399.



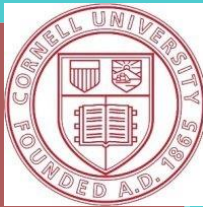
O₂ Ingress: natural cork



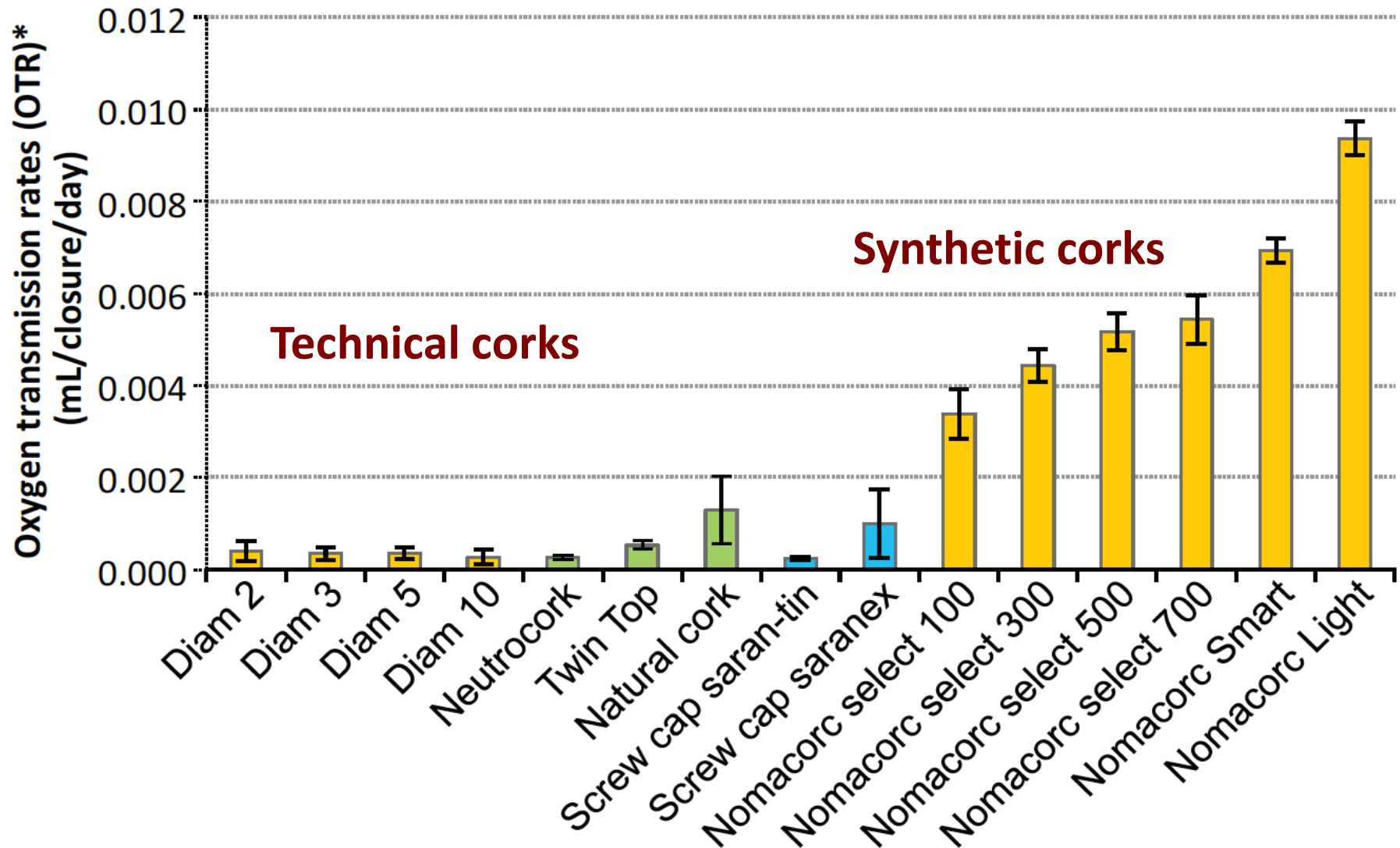
Oliviera et al. 2013. American Journal of Enology and Viticulture 64(4): 395-399.



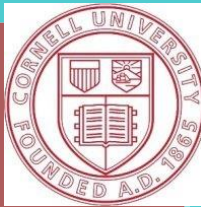
O₂ Ingress: Various closures



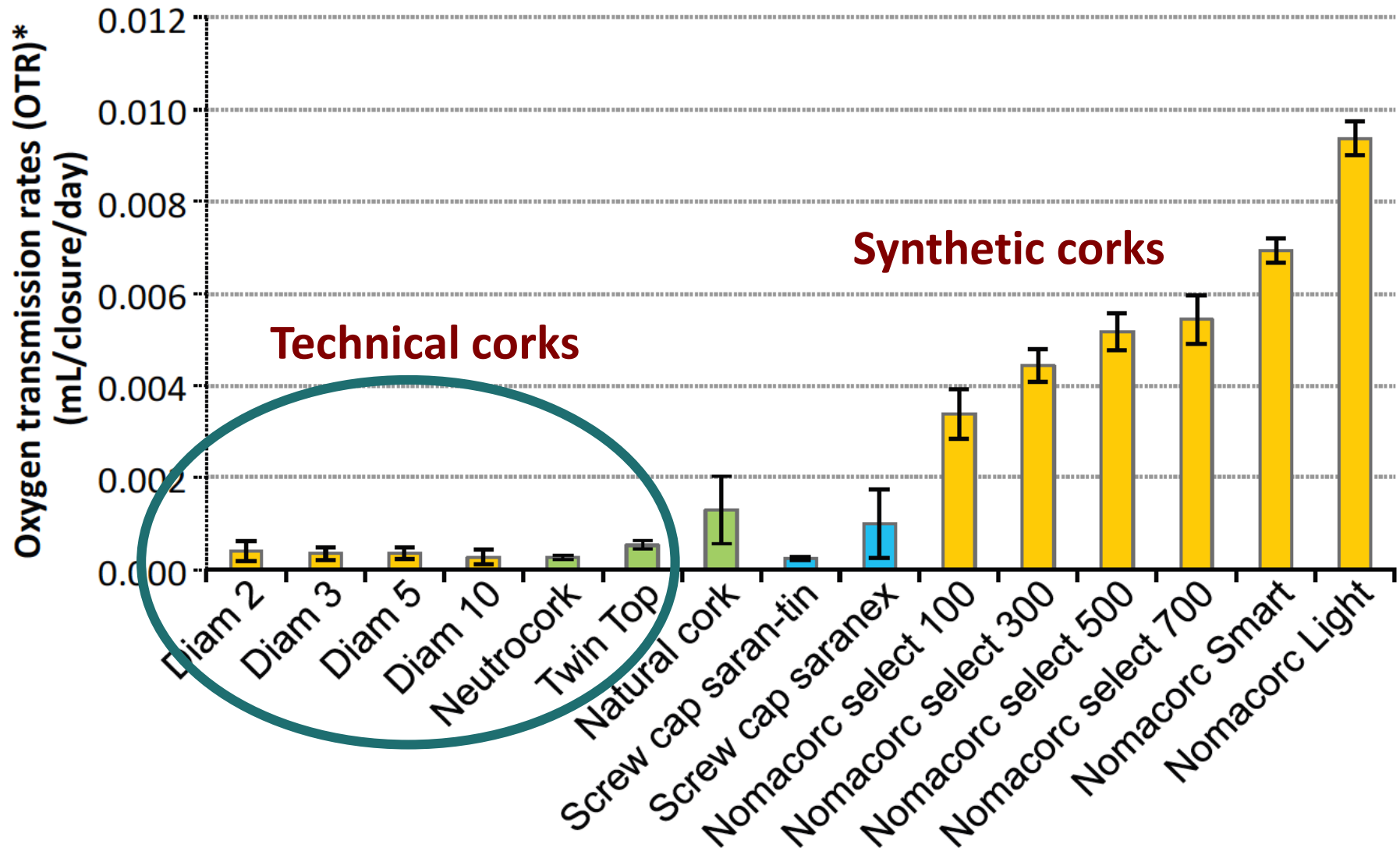
Lopes et al. 2015. Practical Vineyard and Winery. January: 38-42.



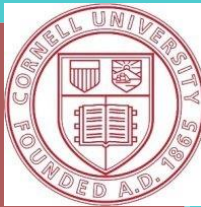
O₂ Ingress: Various closures



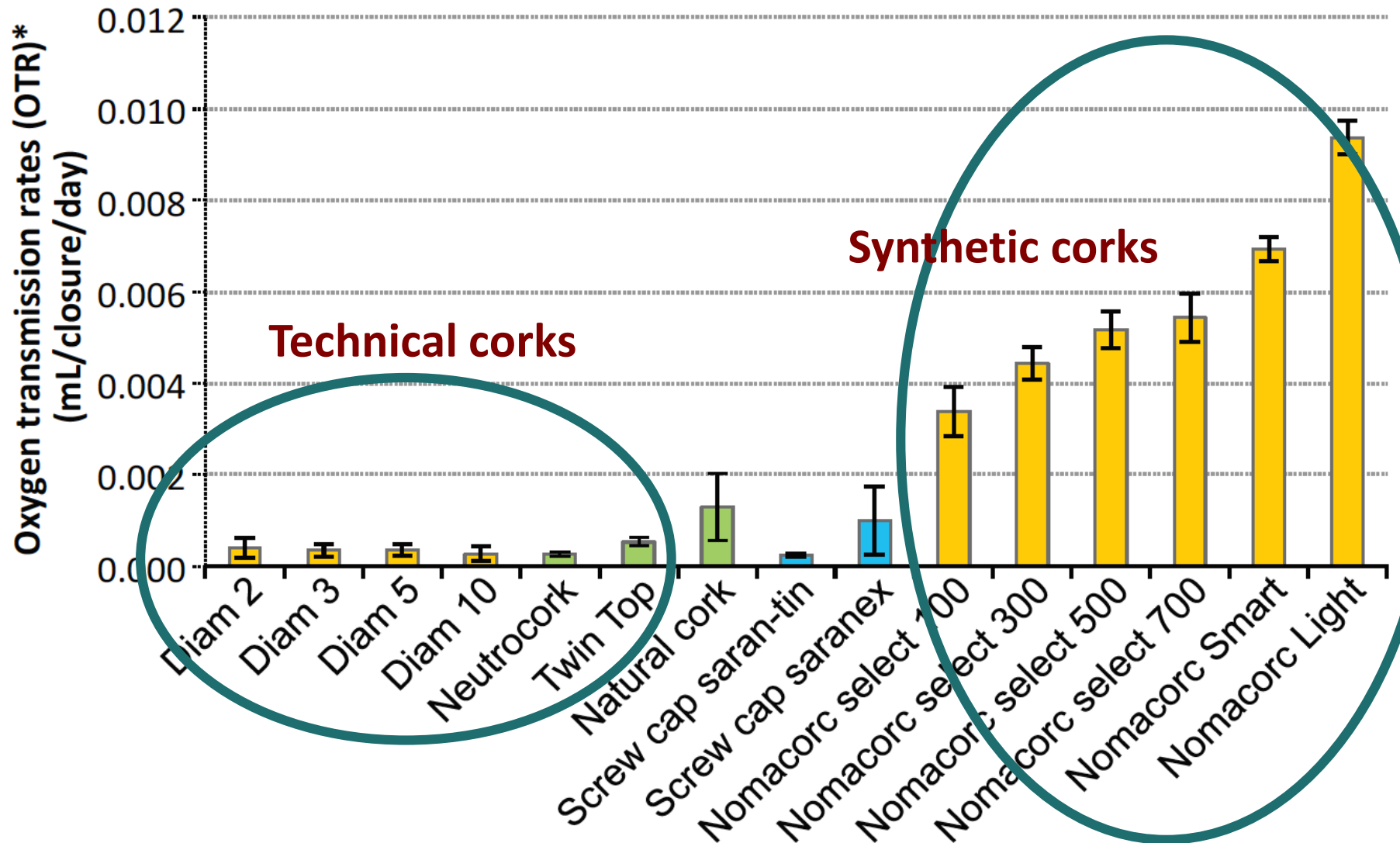
Lopes et al. 2015. Practical Vineyard and Winery. January: 38-42.

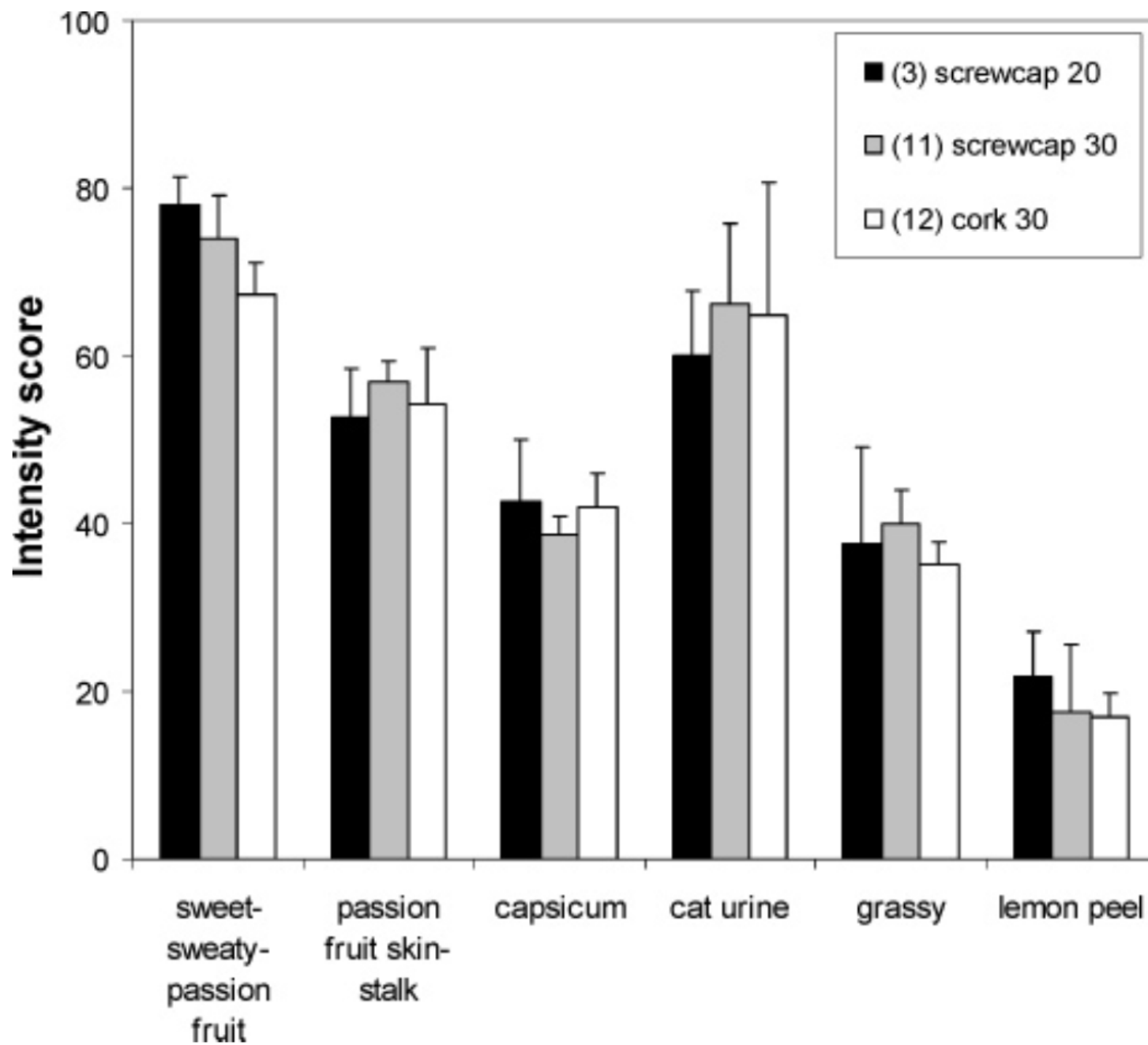


O₂ Ingress: Various closures

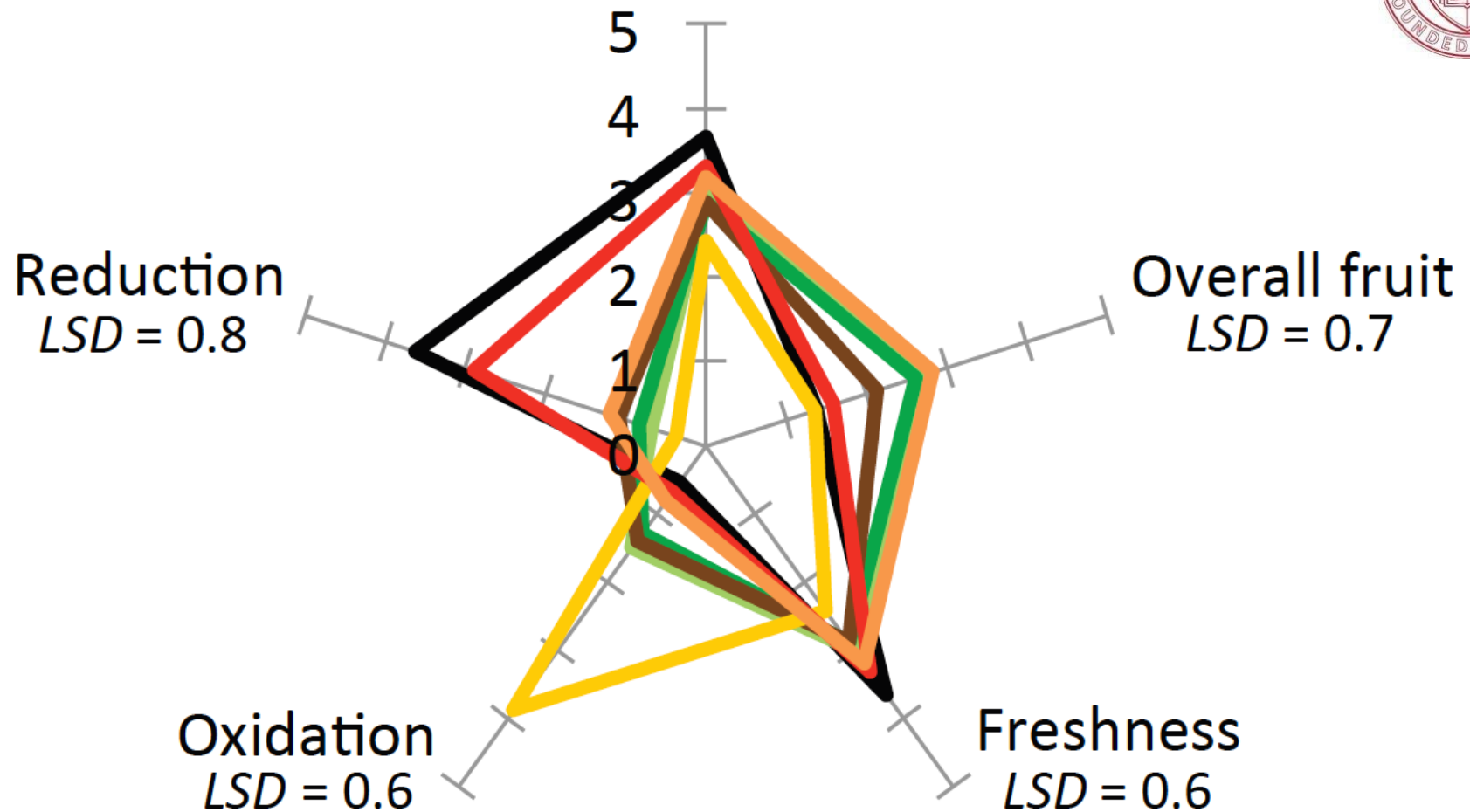


Lopes et al. 2015. Practical Vineyard and Winery. January: 38-42.



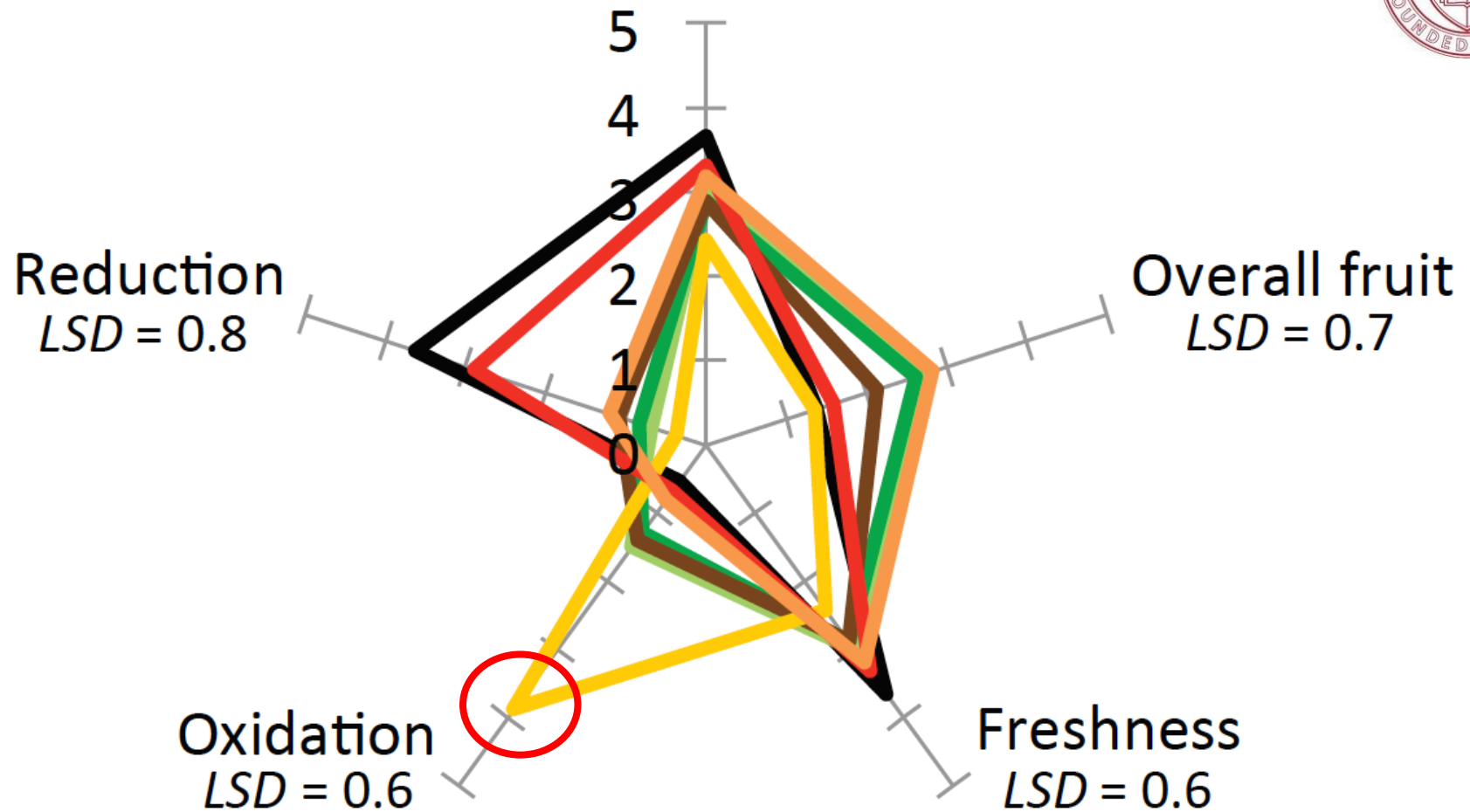


Aromatic intensity, $LSD = 0.7$



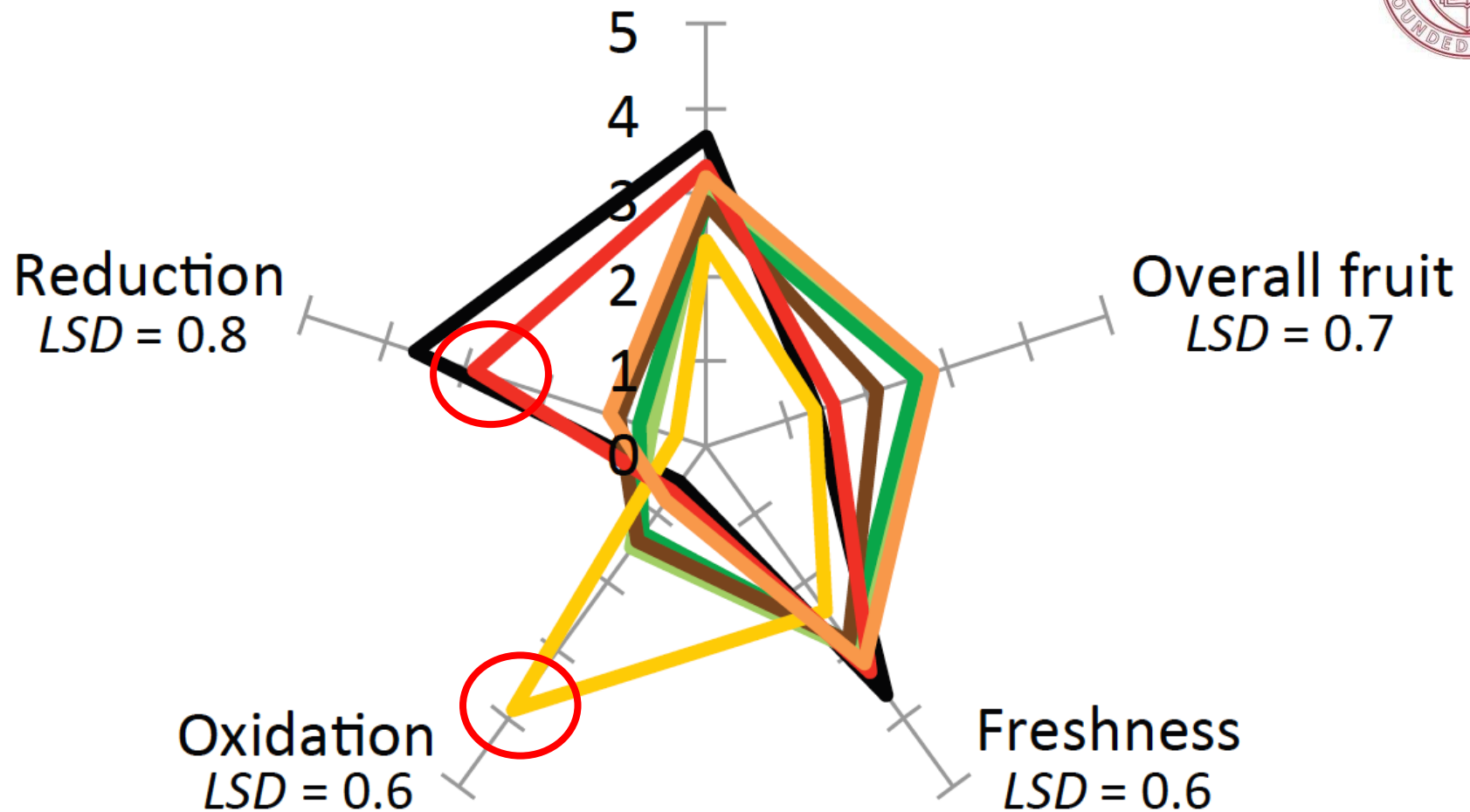
- | | | |
|--------------------|----------------|-----------------|
| — Bottle ampoule | — Natural cork | — Colmated cork |
| — Microagglomerate | — Synthetic | — Sc saran-tin |
| — Sc saranex | | |

Aromatic intensity, $LSD = 0.7$



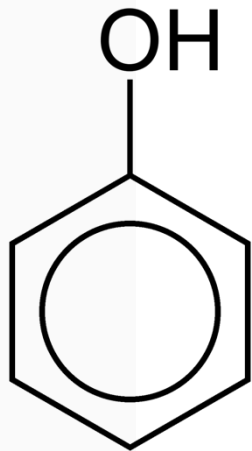
- Bottle ampoule
- Microagglomerate
- Sc saranex
- Natural cork
- Synthetic
- Colmated cork
- Sc saran-tin

Aromatic intensity, $LSD = 0.7$

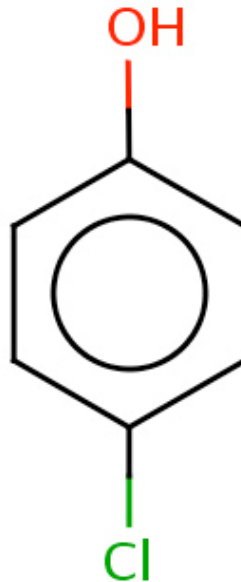


- | | | |
|--------------------|----------------|-----------------|
| — Bottle ampoule | — Natural cork | — Colmated cork |
| — Microagglomerate | — Synthetic | — Sc saran-tin |
| — Sc saranex | | |

Phenol

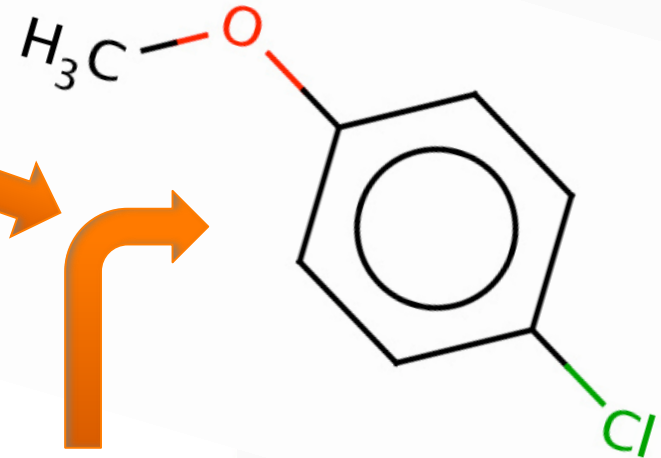


Chlorophenol



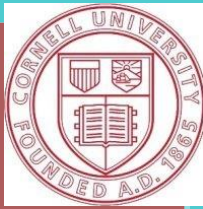
Chlorination

Chloroanisole



Methylation by
microorganisms

TCA Ingress



BOTTLE

CORK

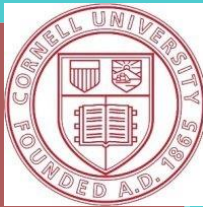
BOTTLE

BOTTLE

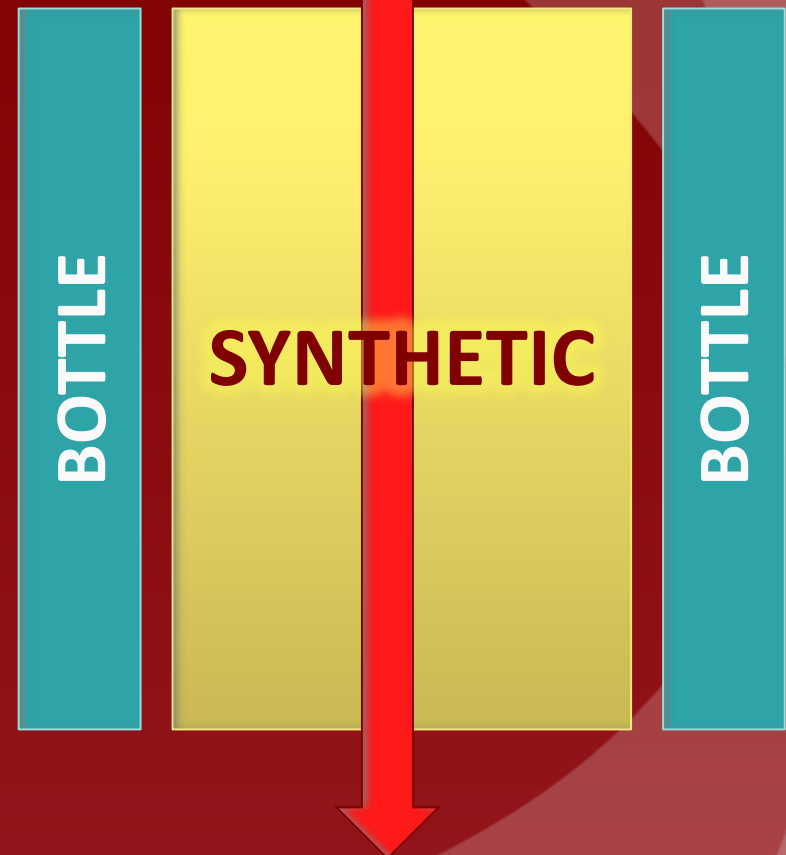
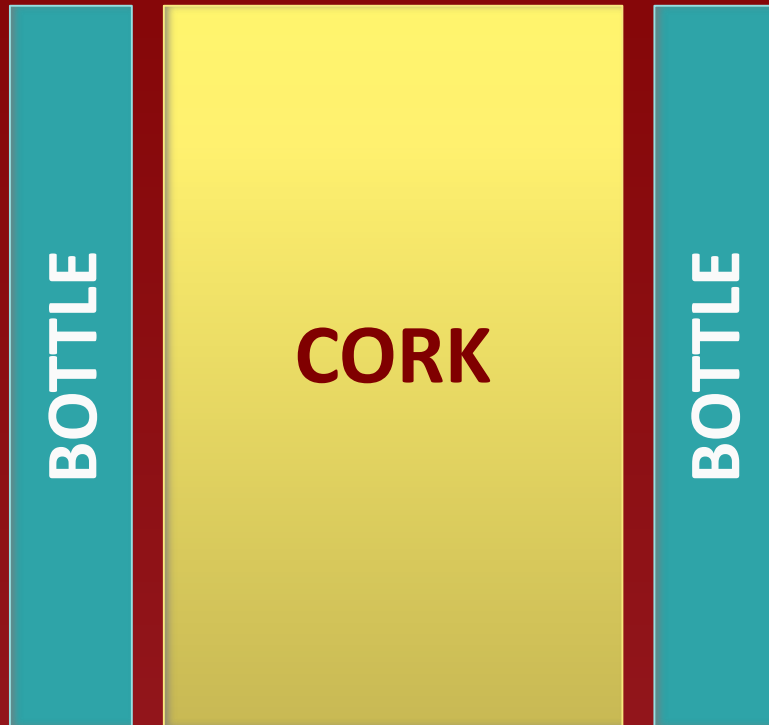
SYNTHETIC

BOTTLE

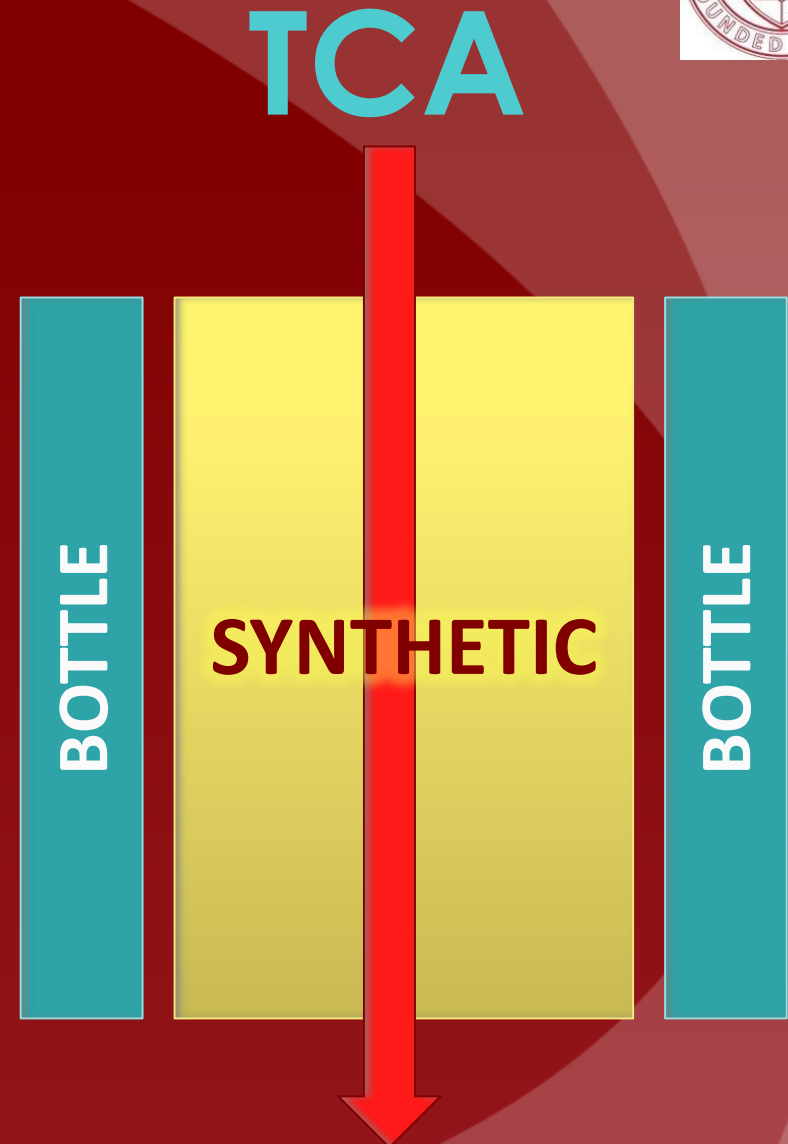
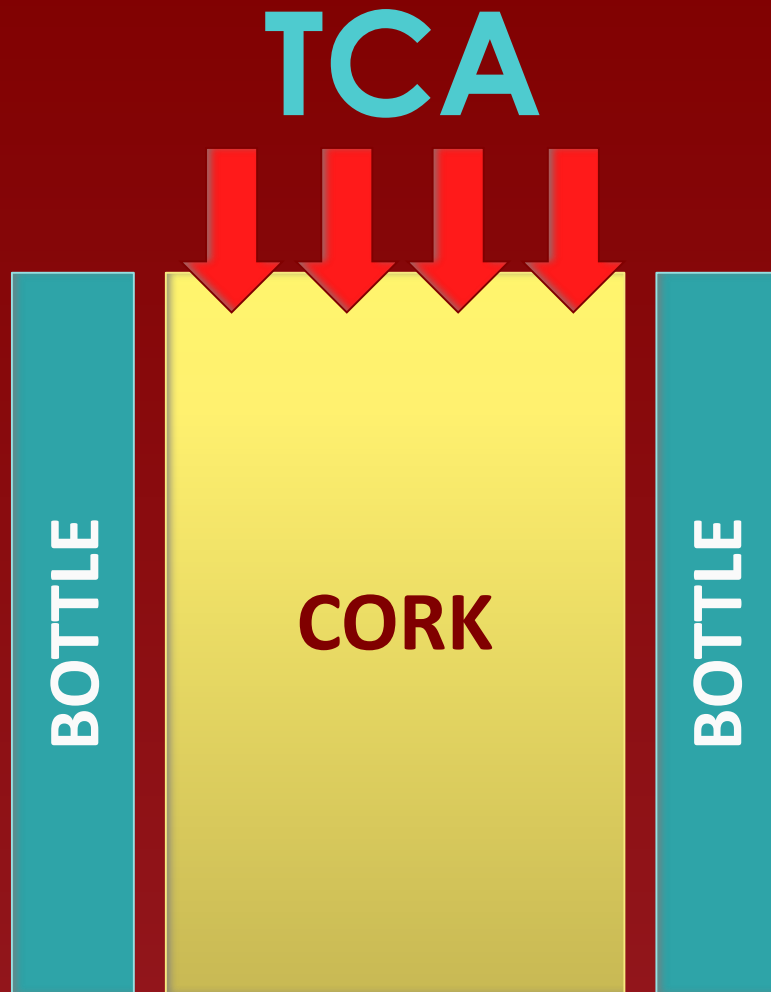
TCA Ingress

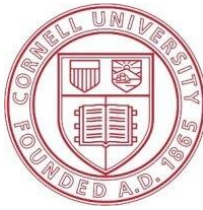


TCA



TCA Ingress





SO_2 management

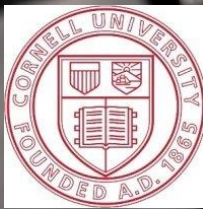
Pre-Bottling Sanitation

O_2 exclusion
& ingress





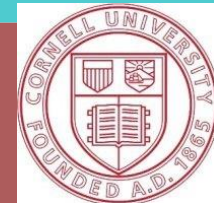
Wine Type



COST

**Aging
period**

Thanks to our enology colleagues:



- Dwayne Bershaw
- Chris Gerling
- Gavin Sacks

