

PHAFF YEAST CULTURE COLLECTION
FOOD SCIENCE & TECHNOLOGY, UC DAVIS
[HTTP:// PHAFFCOLLECTION.UCDAVIS.EDU](http://phaffcollection.ucdavis.edu)
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A Busy Year at the Phaff Collection!

By Kyria Boundy-Mills

As 2019 winds down, I want to take the opportunity to thank all those who have supported and utilized the Phaff collection this year. Herman Phaff's yeasts have been used in many new and creative ways!

Feel free to forward this newsletter to your colleagues who may be excited to learn about yeasts and how they can be part of studies that uncover life's mysteries or solve society's challenges.

phaff collection
UCDAVIS

Presentations at Conferences

The Phaff Yeast Culture Collection distributes yeasts to researchers around the world, and is also used for in-house research projects under collection curator Kyria Boundy-Mills.

Dozens of Phaff collection strains have been used in a USDA-funded project to study conversion of phenolic compounds, a product of lignin degradation, to value-added products. Project co-PIs Boundy-Mills, Peter Hernes and Tina Jeoh, all of UC Davis, found that processed agricultural wastes can be converted to lignol-rich hydrolysates that can support growth of lipid-accumulating yeasts. Results were shared at the 41st Symposium on Biotechnology for Fuels and Chemicals in Seattle, Washington in April 2019.



These results and others were also shared by Dr. Boundy-Mills in an oral presentation at the 35th International Specialized Symposium on Yeasts in October in Antalya, Turkey.

Kyria Boundy-Mills with yeast colleagues Hiroshi Takagi, John Morrissey, Charles Abbas and Huseyin Erten

In another collaboration with Tina Jeoh, over 50 Phaff collection strains have also been used in a study funded by the Almond Board of California to find yeasts able to grow on pretreated almond hulls. These yeasts accumulated high concentrations of essential amino acid-rich protein, making them good candidates for a renewable, sustainable animal feed ingredient. Results were presented in a poster at the Almond Conference in Sacramento in December 2019.



OUR FIRST PATENT!

Since 2016, we have published a series of papers describing the synthesis and secretion of a novel class of glycolipids by several yeast species in the order Sporidiobolales. In 2015 and 2016, two patent applications were filed for a method of producing glycolipids using these yeasts. In February 2019, the first patent was issued! Co-inventors are Kyria Boundy-Mills, Tonio Garay, Irnayuli Sitepu and Bruce German.

(12) **United States Patent**
Boundy-Mills et al.

(10) **Patent No.:** **US 10,196,663 B2**
(45) **Date of Patent:** **Feb. 5, 2019**

(54) **METHODS OF PRODUCING GLYCOLIPIDS**

2011/0136110 A1* 6/2011 Van Bogaert C12N 15/01
435/6.1

Fun With Yeasts!

*Many yeasts in the Phaff collection have natural pigments.
Once in a while we get creative and make some yeast art on agar.*



REVIEW ARTICLE

Preserving US microbe collections sparks future discoveries

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- 4 Center for Forest Mycology Research, USDA-Forest Service, Northern Research Station, Madison, WI, USA
- 5 UTEX Culture Collection of Algae, The University of Texas at Austin, Austin, TX, USA
- 6 Department of Biochemistry and Molecular Biology, University of Massachusetts, Amherst, MA, USA
- 7 National Institute for Microbial Forensics & Food and Agricultural Biosecurity, Oklahoma State University, Stillwater, OK, USA
- 8 Dalla Lana School of Public Health, University of Toronto, Toronto, ON, Canada
- 9 USDA-Agricultural Research Service, Peoria, IL, USA
- 10 Soil Management and Sugar Beet Research Unit, USDA-ARS, Fort Collins, CO, USA
- 11 Institute of Applied Life Sciences, University of Massachusetts, Amherst, MA, USA
- 12 E. coli Genetic Stock Center, Department of Molecular, Cellular and Developmental Biology, Yale University, New Haven, CT, USA

Interactions with other biological collections

The US Culture Collection Network continues to provide a sounding board and encouragement for our fellow microbial culture collections. Dr. Boundy-Mills led a virtual online USCCN meeting in November. Over 40 people associated with culture collections participated. If you would like to participate in future virtual or in-person meetings, let us know!

Kyria Boundy-Mills and 12 other co-authors associated with various collections published a manuscript detailing the importance of preserving collections, with examples of many collections that have been rescued and then used in recent years. This publication includes a list of recommendations for researchers, funding agencies and journal editors to ensure that important microbes are not lost to future generations of researchers. These tips include:

1. *Organize your collection: Cull frequently, and assign a unique identifier to each strain. Label each vial clearly and permanently.*
2. *Assemble a database with basic fields, including information needed to comply with the Nagoya Protocol, and share it with someone outside your lab in case you are suddenly... unavailable.*
3. *Preserve microbes under conditions for long-term viability.*
4. *If possible, preserve a copy off-site.*
5. *Identify a new home for your collection that can properly preserve and distribute your microbes.*
6. *Explore options to fund the shipment and accession several years before you plan to retire.*

Publications using Phaff collection yeasts

Hundreds of Phaff collection yeast strains have been cited in Boundy-Mills' research program publications over the years. This trend continued in 2019. These studies revealed unexpected champions, and emphasize the importance of preserving a diversity of species, and strains within a species, for future research uses.

Bioresource Technology Reports 7 (2019) 100275

Contents lists available at ScienceDirect

Bioresource Technology Reports

journal homepage: www.journals.elsevier.com/bioresource-technology-reports

Ethanol production in switchgrass hydrolysate by ionic liquid-tolerant yeasts

Imayuli R. Sitepu^a, Lauren L. Enriquez^a, Valerie Nguyen^a, Carolyn Doyle^b, Blake A. Simmons^{c,d}, Steven W. Singer^{c,c}, Russell Fry^a, Christopher W. Simmons^a, Kyria Boundy-Mills^{a,*}

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The ability of 25 yeast strains (21 different species) to tolerate ionic liquids AND also produce ethanol was compared. Our friend *S. cerevisiae* was a dud; *Wickerhamomyces anomalus* was an unexpected champion!

Live cultures of fifteen species of yeasts from the Phaff collection were placed in McPhail insect traps in olive orchards. In addition to attracting a few olive flies, they attracted an unexpectedly LARGE number of lacewings, which are beneficial insects useful in controlling other pests such as aphids.

Journal of Chemical Ecology
<https://doi.org/10.1007/s10886-019-01060-w>

RAPID COMMUNICATIONS

Attraction of the Green Lacewing *Chrysoperla comanche* (Neuroptera: Chrysopidae) to Yeast

Elda Vitanović^{1,2} · Jeffrey R. Aldrich^{2,3} · Shaun L. Winterton⁴ · Kyria Boundy-Mills⁵ · Julian M. Lopez⁵ · Frank G. Zalom²

Research Article



Received: 21 July 2018 Revised: 27 October 2018 Accepted article published: 28 November 2018 Published online in Wiley Online Library: 28 January 2019

(wileyonlinelibrary.com) DOI 10.1002/jsfa.9517

Conversion of cassava leaf to bioavailable, high-protein yeast cell biomass

Kyria Boundy-Mills,^a Nardrapee Karuna,^{b,c} L Antonio Garay,^a Julian M Lopez,^a Calvin Yee,^b Alex Hitomi,^b Audry K Nishi,^b Lauren L Enriquez,^a Christopher Roberts,^{b,d} David E Block^{e,f} and Tina Jeoh^{b,*}

Forty-six Phaff collection yeasts were compared to see which could grow most quickly, and produce the highest amount of protein, when grown in cassava leaf hydrolysate.

UC Davis Biodiversity Museum Day

Twelve biological collections, 5,000 attendees! In February 2019, over 800 people from toddlers to retirees learned about microbes, yeast, the collection, our research, and beverage and food fermentations. The Phaff Yeast Culture Collection and the Wine Yeast and Bacteria Collection jointly put on the yeast exhibits. We led guided tours of the teaching winery and brewery, with emphasis on what yeasts do in these processes.



Attendees smelled different species of yeast growing on Petri plates, talked with scientists who work with the two yeast collections, tasted Vegemite, touched agar and a kombucha SCOBY, and heard about the role of yeast and bacteria in winemaking and brewing.



Maha Alshehab demonstrated how yeasts eat sugar and excrete CO₂ gas



Irnayuli Sitepu showed what yeast and bacteria cells in kombucha look like under the microscope

Mark your calendar! The next UC Davis Biodiversity Museum Day open house will be **Saturday February 15, 2020**. The yeast collections exhibits will be in the Robert Mondavi Institute Brewery, Winery and Food Processing building, open **10:00 AM – 2:00 PM**.

UC Davis Biodiversity Museum Day



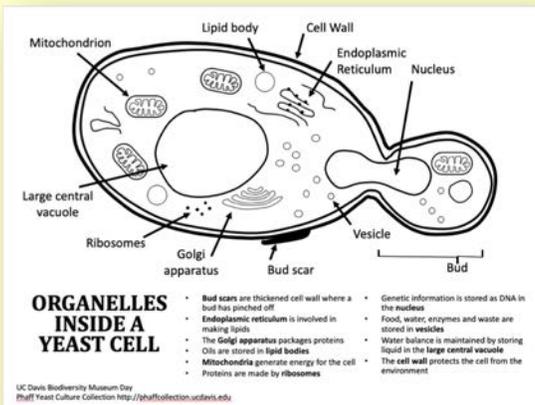
Touching agar in Petri plates



Bread baked with and without yeast.
"Those holes in your bread are YEAST FARTS!"



Kids love to color anything. Especially if it shows yeast guts and their functions.



Send Kyria an email if you would like to receive the yeast cell coloring page. We would love to see your artistic interpretation!

New catalog search feature: Source habitat category

Have you ever wondered whether the collection contains any yeasts from a certain category of sources such as dairy, or food processing facilities, or trees? We are adding a feature to make searching for these categories easier. When searching our online catalog, you can choose from the following drop down menu of source habitat categories:

Air	Industrial site	Plant cactus
Animal invertebrate	Industrial strain	Plant cactus fruit
Bird	Insect	Plant flower
Built environment	Insect frass	Plant fruit
Built environment air	Insect frass, plant tree	Plant leaf
Clinical isolate	Insect, cactus	Plant shrub or vine
Fish	Insect, flower	Plant stem
Food	Insect, fruit	Plant tree
Food bread	Insect, plant tree	Plant tree exudate or flux
Food dairy	Laboratory media	Plant tree rotting wood
Food fruit	Laboratory strain	Plant vegetable
Food meat	Lichen	Salt water
Food or beverage fermentation	Mammal	Soil
Food processing equipment	Manufactured objects	Unknown
Fresh water	Outdoor air	
Fungus or mushroom	Plant	

Thank You to our donors in 2019:

Diane Phaff DeCamp

California Safe Soil, Inc.

If you would like to support the Phaff collection in 2020, send a check made out to "UC Regents", with "Phaff Yeast Culture Collection" on the memo line.

Mail to:

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For more information
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