Contents

Phaff Collection News

Fall 2018

New yeast species named after Robert and Margrit Mondavi

In Fall 2008, the Phaff Yeast Culture Collection moved from a small, outdated space in Cruess Hall to spacious, new laboratory in the Robert Mondavi Institute. This building was named after winemaker Robert Mondavi, who with his wife Margrit donated $35 million to UC Davis in 2001 towards the building housing the Food Science & Technology and Viticulture & Enology departments, and the Robert and Margrit Mondavi Performing Arts Center.

This year, to honor the generosity of the Mondavi family, Phaff collection curator Kyria Boundy-Mills in collaboration with Gennadi Naumov and Elena Naumova named a yeast species after the Mondavis: *Komagataella mondaviorum.* Naming a yeast species involves publishing a scientific paper in a peer-reviewed journal. This publication was in a journal called Antonie van Leeuwenhoek, named after the inventor of the microscope. In the future, scientists studying this yeast can obtain it from the UC Davis Phaff Yeast Culture Collection, or the Westerdijk Institute in the Netherlands, or the USDA-ARS collection in Peoria, Illinois.

Some yeast species are named after a location, such as wine spoilage yeast *Brettanomyces bruxellensis* (named after Brussels, Belgium), or after the material it came from such as *Saccharomyces cerevisiae* (meaning "from beer"). Some are named after people, such as scientists who contributed to the field of yeast taxonomy or science in general, or benefactors such as supporters of habitat preservation. The genus *Komagataella* was named after Japanese yeast taxonomist Kazuo Komagata. Since there are only about 2,000 yeast species with names, *K. mondaviorum* is among a small number of yeast species named after people. This yeast species has been isolated from four different species of trees in California and Washington, USA.

The white yeast in this yeast art is Komagataella mondaviorum.

Antonie van Leeuwenhoek
https://doi.org/10.1007/s10482-018-1028-6

CrossMark

ORIGINAL PAPER

Description of *Komagataella mondaviorum* sp. nov., a new sibling species of *Komagataella* (*Pichia*) *pastoris*

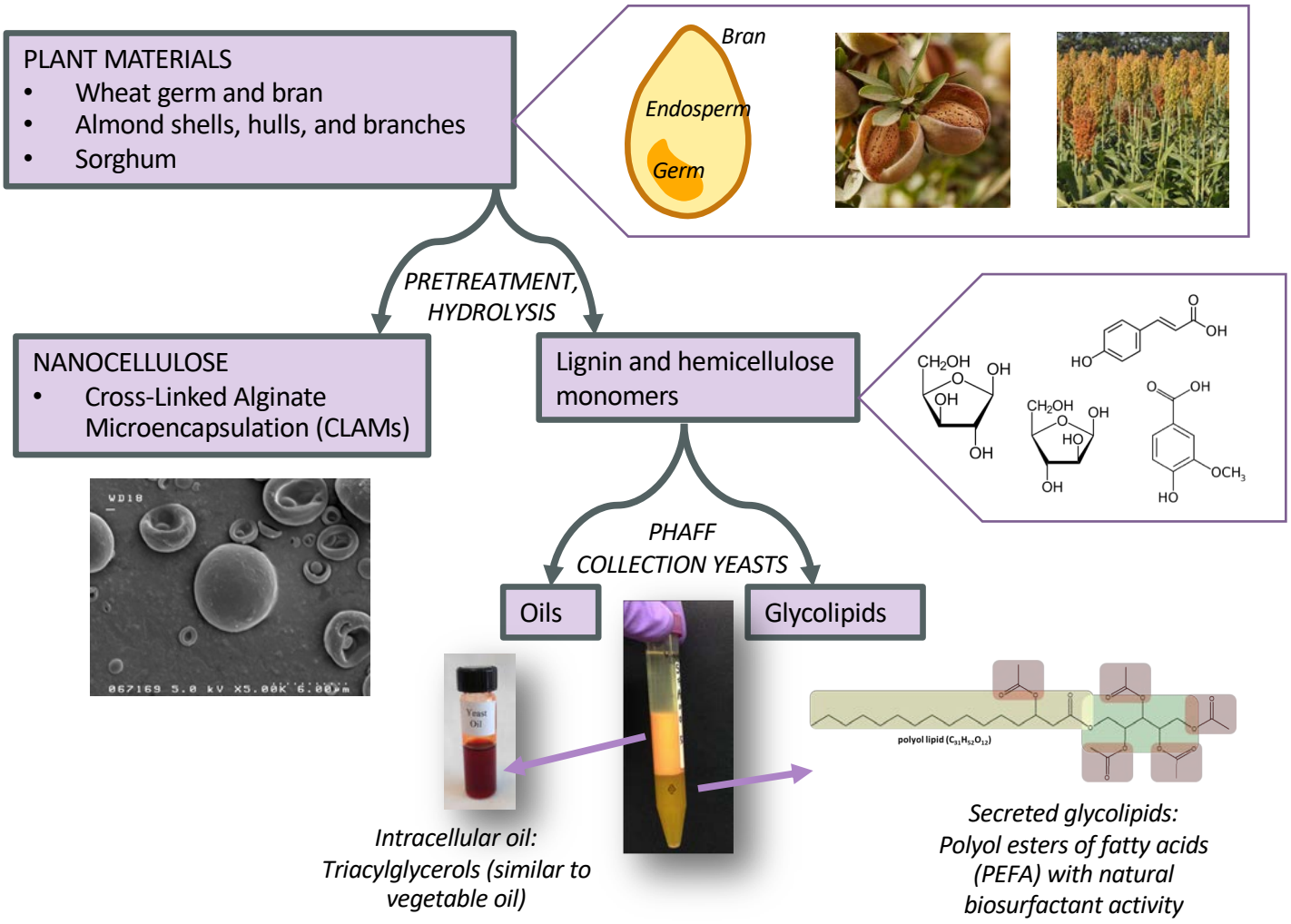
Gennadi I. Naumov · Elena S. Naumova · Kyria L. Boundy-Mills

UC Davis research using Phaff collection yeasts

Over 6,000 of the yeasts in the Phaff Yeast Culture Collection were gathered by Herman Phaff (1913-2001) during his studies of yeast ecology and taxonomy. Today, the same yeasts are being used at UC Davis and around the world for a broad range of basic and applied studies.

USDA award: Conversion of plant materials to nanocellulose, yeast oil, and glycolipids

A **$500,000 award** from the US Department of Agriculture (USDA-NIFA award 2018-67009-27901) is being used to develop technologies to convert agricultural and food processing residues to value-added products using yeast. Collaborating with Tina Jeoh (Biological and Agricultural Engineering) and Peter Hernes (Land, Air and Water Resources), the team will convert plant materials to nanocellulose for microencapsulation technology, and to oil and glycolipids using yeast.



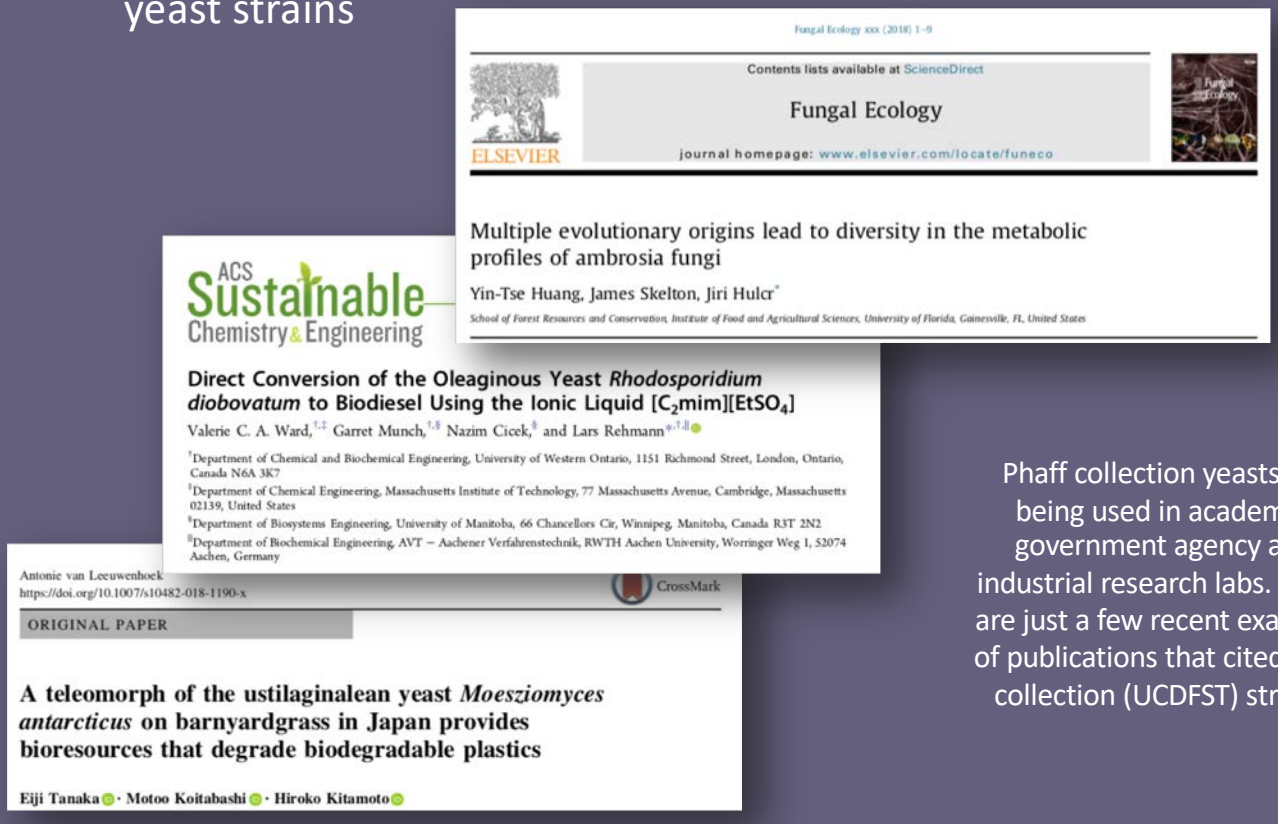
Almond Board of California: Conversion of almond hulls to protein

A **$200,000 award** from the Almond Board of California is being used to develop technologies to convert excess almond hulls to protein-rich yeast cell biomass, to be used in animal feed as a protein source.

During processing, the hulls are removed from the outside of almonds. These hulls are currently fed to dairy cattle. But, as almond production in California rises, dairy cattle numbers are decreasing. New uses for almond hulls are needed. Also, high quality feed for non-ruminant animals is needed.

We have shown that high protein yeasts can be grown on plant materials such as cassava leaves. In this project, Tina Jeoh (Biological and Agricultural Engineering department) is developing methods to liquefy almond hulls to release the nutrients, basically, turning almond hulls into “yeast food”. Phaff collection yeasts are being compared to determine which grow well on this yeast food, and also have high levels of amino acids important for animal nutrition, especially lysine, cysteine and methionine.

Publications by other labs that cited UCDFST yeast strains



Fungal Ecology xxx (2018) 1–9

Contents lists available at ScienceDirect

Fungal Ecology

journal homepage: www.elsevier.com/locate/funeco

ELSEVIER

Multiple evolutionary origins lead to diversity in the metabolic profiles of ambrosia fungi

Yin-Tse Huang, James Skelton, Jiri Hulcr*

School of Forest Resources and Conservation, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL, United States

ACS Sustainable Chemistry & Engineering

Direct Conversion of the Oleaginous Yeast *Rhodosporidium diobovatum* to Biodiesel Using the Ionic Liquid [C_2mim][$EtSO_4$]

Valerie C. A. Ward,[†,‡] Garret Munch,[†,§] Nazim Cicek,[§] and Lars Rehmann*[,†,∥]

[†]Department of Chemical and Biochemical Engineering, University of Western Ontario, 1151 Richmond Street, London, Ontario, Canada N6A 3K7

[‡]Department of Chemical Engineering, Massachusetts Institute of Technology, 77 Massachusetts Avenue, Cambridge, Massachusetts 02139, United States

[§]Department of Biosystems Engineering, University of Manitoba, 66 Chancellors Cir, Winnipeg, Manitoba, Canada R3T 2N2

[∥]Department of Biochemical Engineering, AVT – Aachener Verfahrenstechnik, RWTH Aachen University, Worringer Weg 1, 52074 Aachen, Germany

Antonie van Leeuwenhoek

https://doi.org/10.1007/s10482-018-1190-x

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ORIGINAL PAPER

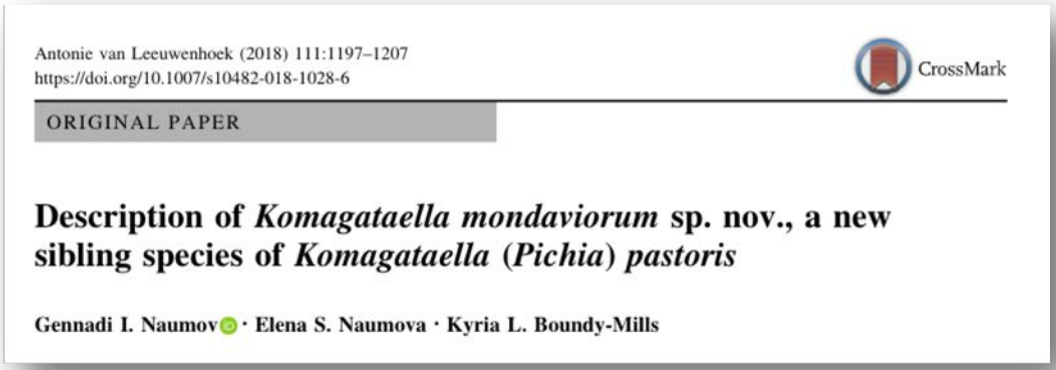
A teleomorph of the ustilaginalean yeast *Moesziomyces antarcticus* on barnyardgrass in Japan provides bioresources that degrade biodegradable plastics

Eiji Tanaka · Motoo Koitabashi · Hiroko Kitamoto

Phaff collection yeasts are being used in academic, government agency and industrial research labs. These are just a few recent examples of publications that cited Phaff collection (UCDFST) strains.

Our recent publications

The Boundy-Mills research lab performs research that taps the biodiversity in the Phaff Yeast Culture Collection. Some publications that came out recently include:



Antonie van Leeuwenhoek (2018) 111:1197–1207
https://doi.org/10.1007/s10482-018-1028-6

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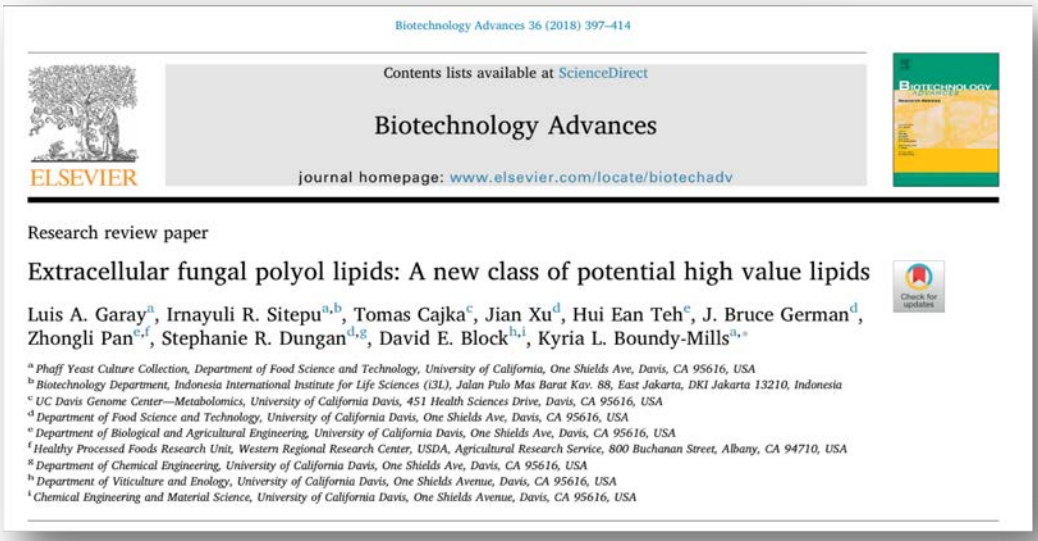
ORIGINAL PAPER

Description of *Komagataella mondaviorum* sp. nov., a new sibling species of *Komagataella* (*Pichia*) *pastoris*

Gennadi I. Naumov · Elena S. Naumova · Kyria L. Boundy-Mills

Our condolences go out to the friends and family of Dr. Gennadi Naumov, who died in 2018. Collaborating with him on this and other work has been a joy.



Biotechnology Advances 36 (2018) 397–414

Contents lists available at ScienceDirect

Biotechnology Advances

journal homepage: www.elsevier.com/locate/biotechadv

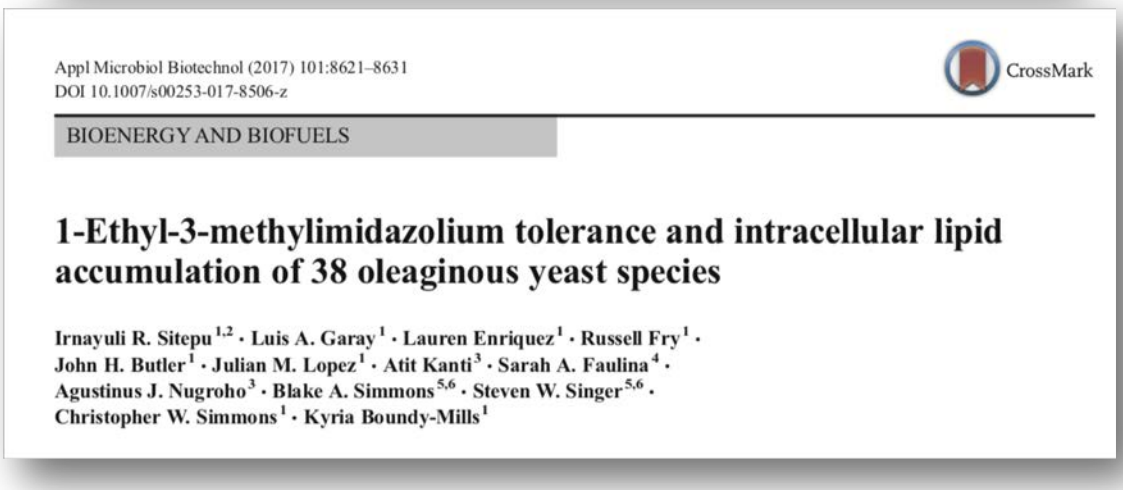
ELSEVIER

Research review paper

Extracellular fungal polyol lipids: A new class of potential high value lipids

Luis A. Garay[a], Irnayuli R. Sitepu[a,b], Tomas Cajka[c], Jian Xu[d], Hui Ean Teh[e], J. Bruce German[d], Zhongli Pan[e,f], Stephanie R. Dungan[d,g], David E. Block[h,i], Kyria L. Boundy-Mills[a,*]

[a] Phaff Yeast Culture Collection, Department of Food Science and Technology, University of California, One Shields Ave, Davis, CA 95616, USA
[b] Biotechnology Department, Indonesia International Institute for Life Sciences (i3L), Jalan Pulo Mas Barat Kav. 88, East Jakarta, DKI Jakarta 13210, Indonesia
[c] UC Davis Genome Center—Metabolomics, University of California Davis, 451 Health Sciences Drive, Davis, CA 95616, USA
[d] Department of Food Science and Technology, University of California Davis, One Shields Ave, Davis, CA 95616, USA
[e] Department of Biological and Agricultural Engineering, University of California Davis, One Shields Ave, Davis, CA 95616, USA
[f] Healthy Processed Foods Research Unit, Western Regional Research Center, USDA, Agricultural Research Service, 800 Buchanan Street, Albany, CA 94710, USA
[g] Department of Chemical Engineering, University of California Davis, One Shields Ave, Davis, CA 95616, USA
[h] Department of Viticulture and Enology, University of California Davis, One Shields Avenue, Davis, CA 95616, USA
[i] Chemical Engineering and Material Science, University of California Davis, One Shields Avenue, Davis, CA 95616, USA



Appl Microbiol Biotechnol (2017) 101:8621–8631
DOI 10.1007/s00253-017-8506-z

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BIOENERGY AND BIOFUELS

1-Ethyl-3-methylimidazolium tolerance and intracellular lipid accumulation of 38 oleaginous yeast species

Irnayuli R. Sitepu[1,2] · Luis A. Garay[1] · Lauren Enriquez[1] · Russell Fry[1] · John H. Butler[1] · Julian M. Lopez[1] · Atit Kanti[3] · Sarah A. Faulina[4] · Agustinus J. Nugroho[3] · Blake A. Simmons[5,6] · Steven W. Singer[5,6] · Christopher W. Simmons[1] · Kyria Boundy-Mills[1]

Participation in culture collection organizations

Since 2012, the US Culture Collection Network has brought collection curators and users together to advocate for the continued support and use of collections. The Phaff collection has benefitted from sharing ideas, best practices, and mutual support. Phaff collection curator Kyria Boundy-Mills has served on the steering committee since 2012. Contact Kyria Boundy-Mills to see how you can participate.

The World Federation for Culture Collections works to promote and support the establishment of culture collections and related services, and to ensure the long term perpetuation of important collections. Phaff collection curator Kyria Boundy-Mills has served on the Executive Board since 2015.

One particularly useful resource assembled by the WFCC is the Global Catalog of Microorganisms, a conglomeration of the catalogs of over 100 microbial collections from dozens of countries. You can simultaneously search over 100 collections to find one that distributes the microbes you need.

http://gcm.wfcc.info

UC Davis Biodiversity Museum Day

Twelve biological collections at UC Davis collaborate to put on an exciting open house event each year: UC Davis Biodiversity Museum Day! Over 4,000 people visited campus on Saturday February 17, 2018. Of these, over 500 came through the yeast exhibits.

Maha and Elaine demonstrating the amazing powers of yeast

Russell at the microscope showing what yeast cells look like

In 2018, the yeast exhibits were put on jointly by the Phaff Yeast Culture Collection and the Wine Yeast and Bacteria Collection, in the Robert Mondavi Institute Brewery, Winery and Food Processing building. Visitors enjoyed learning about yeast, fermented foods and beverages, the history of the collections, and recent research using the collections.

Visitors enjoyed:

- Touring the teaching winery and brewery
- Tasting vegemite and marmite
- Looking at yeasts and bacteria under the microscope
- Feeling a kombucha SCOBY, and tasting kombucha
- Smelling different species of yeast
- Coloring pictures of yeast
- Learning about Nobel prize-winning discoveries from studies of yeast
- Hearing (very corny) yeast jokes
- Seeing creative "yeast art"
- Learning about starter cultures for wine, beer, and bread

Mark your calendar!

If you will be in northern California, you are cordially invited to UC Davis Biodiversity Museum Day:

Saturday February 16, 2019

More information: http://biodiversitymuseumday.ucdavis.edu

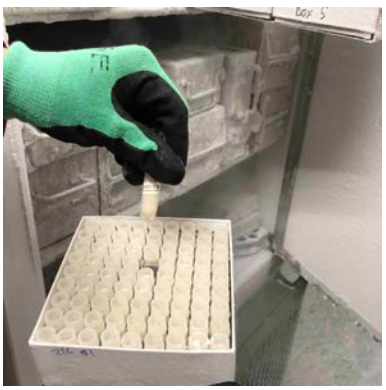
Rescue of "orphaned" yeast collections

In 2016, Phaff collection curator Kyria Boundy-Mills received funding from the US National Science Foundation to acquire the yeast collections of retired professors W. T. Starmer (Syracuse University) and P. Ganter (Tennessee State University). Most of these yeasts were isolated from cactus in the course of research on yeast ecology and taxonomy.

The viable yeast strains (roughly 2,600) will be added to the public catalog of the Phaff Yeast Culture Collection in coming months.

Number of yeast samples received	Over 5,000
Number of yeast strains viable and pure	2,600
Number of countries of origin	27
Number of different yeast species	141
Number of yeast species that may be novel	About 40

Ampoules of freeze-dried yeasts from the collection of Phil Ganter, Tennessee State University



Cryopreserved stocks stored at -80°C

The Phaff Yeast Culture Collection now houses the largest collection of cactus-associated yeasts.

WHY CACTUS?

Studies of cactus/yeast/insect associations from the 1960s to 2000s revealed basic concepts of yeast ecology.

This set of yeast strains contains large numbers of independent, wild-type isolates of cactus-associated yeast species from numerous countries and cactus species. For example, 300 strains of *Candida sonorensis*, 100 strains of *Pichia cactophila*, and 200 strains in the *Sporopachydermia cereana* complex are being incorporated into the Phaff collection.

All strains have been ribotyped. Traditional phenotypic data are being databased. Possible research uses include:

- Biogeography
- Comparative genomics
- Functional genomics
- New species descriptions

Nagoya Protocol

If you work with yeasts that **originated from another country**, you should be aware of the Nagoya Protocol. This component of the Convention on Biological Diversity asserts that nations own their biodiversity, and are entitled to share in the benefits that emerge from commercializing their biodiversity. Based on the framework outlined in the Nagoya Protocol, countries are enacting legislation to enforce benefits sharing.

Although the US did not ratify the CBD, US scientists are indeed affected by the Nagoya Protocol – even when working in their own lab in the US.

Phaff collection curator Kyria Boundy-Mills has co-authored several publications about the Nagoya Protocol, including an article in "Microbe", the newsmagazine of the American Society for Microbiology. For more information, or a copy of publications on this subject, email klbmills@ucdavis.edu.

Thank You to our donors in 2018:

Diane Phaff DeCamp

California Safe Soil, Inc.

If you would like to support the Phaff collection in 2019, send a check made out to "UC Regents", with "Phaff Yeast Culture Collection" on the memo line.
Mail to:
Kyria Boundy-Mills
Food Science, UC Davis
One Shields Ave
Davis, CA 95616

For more information please contact

Kyria Boundy-Mills
Curator, Phaff Yeast Culture Collection
Email: klbmills @ucdavis.edu
Phone: +1 (530)-754-5575