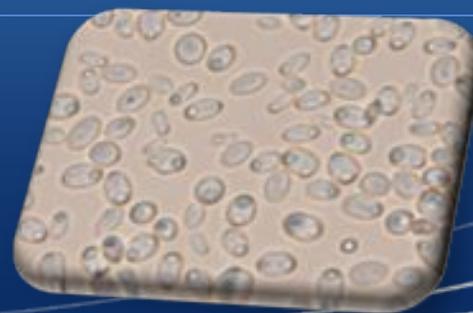


# Phaff Collection News

Yeasts of yesterday and today, for research of tomorrow

The mission of the Phaff Yeast Culture Collection is to serve the academic, industrial and government agency research community through provision of high quality yeast cultures, characterization information, and expertise, for use in educational, research and industrial applications. Collection personnel shall strive to increase knowledge of yeast microbiology through activities that build the collection.



## 2011: A busy year at the Phaff Yeast Culture Collection

The Phaff Collection lab at the University of California Davis is a vibrant hub of activity, including collection maintenance, strain distribution, and research utilizing this 100-year-old treasure trove. Research projects are listed under “Projects in the Lab”. New deposits to the collection this year are listed under “New Additions”.

Our biggest project this year, an NIH-funded biodiversity survey in Indonesia, is described in “Adventures in the Rain Forest”.

The Phaff collection partners with industry to screen the collection for yeasts with valuable properties such as carotenoid pigments, fatty acids, and hosts for heterologous protein expression. Visit our website, [www.phaffcollection.org](http://www.phaffcollection.org), or contact curator Kyria Boundy-Mills for more information on ordering yeasts or setting up a screening project.

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*Kyria Boundy-Mills, Ph.D., has worked with the Phaff collection since 1999, first as assistant curator under Dr. Herman Phaff (1999-2001), then as curator (2001-present).*



## Research projects at the Phaff Yeast Culture Collection and the Boundy-Mills lab

Many undergraduate and graduate students helped to maintain the collection, build the collection, and characterize yeasts and other microbes.

- Postdoc Irna Sitepu and technician Laura Ignatia, both from Indonesia, isolated, preserved, and identified hundreds of bacteria, yeasts and filamentous fungi from Indonesia. They also screened dozens of species of yeasts for high lipid content, and identified several new oleaginous yeast species. Laura also characterized the xylanase gene sequences in various species of filamentous fungi.
- Visiting scientist Alejandro Hernandez, assistant professor at Universidad de Extremadura, Badajoz, Spain, worked in the lab for 6 months. He studied yeasts and bacteria in cherries and raspberries infested with

*Drosophila suzukii*, and characterized new yeast species.

- Panachon Lor and Neil Isip studied the cell morphology of new yeast species.
- Enrique Fernandez prepared dried yeast formulations to test attraction of insect pests.
- Jessica Wijaya studied microbes in fermented foods.
- Ain Mobeen studied the stability of xylanase enzyme activity after exposure to heat, acid, base and solvents.
- Elaine Chow identified hundreds of microbes by ribosomal sequencing. She put in long hours performing Blast searches, to allow us to import identified microbes from Indonesia to the US.
- Ngoc-Lien Nguyen and Pazao Lor are building a database of yeast ribosomal sequences.



The Boundy-Mills lab

June 2011

Clockwise from top: Ryder Diaz, Paul Park, Kyria Boundy-Mills, Sonia Medina, Mary Stump, Irnayuli Sitepu, Elaine Chow, Marie Stark, Laura Ignatia, Alejandro Hernandez, Matan Shelomi

## Campus collaborations

Students in other departments at UC Davis consult with Kyria Boundy-Mills on yeast aspects of their projects. For example:

- Ryder Diaz, graduate student in Population Ecology, is isolating and characterizing yeasts and bacteria from solitary bees and their brood provisions.
- Kelly Hamby, a graduate student in the Entomology department, is identifying yeasts and bacteria associated with *Drosophila suzukii* adults and larvae.

## Adventures in the Rain Forest

Collection curator Kyria Boundy-Mills took over leadership of an NIH-funded study, “Biodiversity Surveys in Indonesia and Discovery of Health and Energy Solutions.” This is a collaboration of the University of California, USDA Forest Service, the Indonesian Institute of Science (LIPI) and the Indonesian Ministry of Forestry.

Overall aims of the project are:

- Perform a biodiversity survey of the plants, insects, and vertebrates in the Mekongga Mountain Range;
- Encourage improved forest conservation policies;
- Screen microbes for biofuels applications
- Discover novel therapeutics

The microbe survey segment of this project is helping to build the Phaff collection, as well as microbe collections at LIPI and the Ministry of Forestry, with over 1,000 microbes deposited to date: bacteria, yeasts and filamentous fungi. Yes, the Phaff collection mission has been expanded to embrace bacteria and filamentous fungi.

In our November 2011 expedition, our main target was to isolate microbes from the guts of wood-feeding beetle larvae. We reached our target numbers, and then some, with over 400 microbes purified. We saved leftover beetle larva gut contents, and plan to pursue metagenome studies in the near future. Thanks to Nathan Schiff, entomologist with the USDA Forest Service, the larval species are being identified by DNA barcoding. We found a particularly interesting set of Buprestid beetle larvae, and are eager to identify yeasts associated with this family of wood-feeding beetles that infest freshly dead trees.

Continued on p. 4



*Isolation of yeasts from the guts of wood-feeding beetle larvae. These are buprestid larvae.*

*Working in the jungle is VERY different from working in the lab. Luckily, the microbiology team is working closely with the field biologists, who provided recommendations of the best brand of mosquito net, water purifier, and snakebite kit. We have used the first two, but fortunately haven't had to use the third – our local guide beat that 7-foot venomous snake dead with a stick before it could bite any of us. (Really.)*



*“Adventures in the Rain Forest” Continued from page 3*

To date, we have discovered upwards of **30 novel yeast species!** Discoveries coming out of this project also include new insights into beetle-yeast associations, oleaginous yeast species, and cellulolytic enzymes of filamentous fungi.

Microbes collected in Sulawesi are also being screened by the natural product chemists and LIPI and at UC Berkeley to identify therapeutic activities. We are especially excited about effects of microbial compounds on opioid receptors, as these compounds may lead to new non-addictive pain relievers.



**New Additions to the Phaff Collection in 2011**

Hundreds of new strains were added to the Phaff Yeast Culture Collection in 2011:

- Yeasts, filamentous fungi and bacteria from wood-feeding beetle larvae and infested wood in Indonesia
- Yeasts from various plants: cherry, raspberry, mulberry, fig, apple, olive and nectar from many species of flowers
- Yeasts and bacteria from brood provisions of solitary bees
- Many strains of *Saccharomyces cerevisiae* including clinical, beer, wine and distilling strains deposited by Duke University researcher John McCusker
- Yeasts from *Drosophila suzukii* (spotted wing Drosophila) adults and larvae
- Yeasts and bacteria from the guts of walking stick insects, and the leaves they feed on

Phaff Collection Numbers:

- Over **7,000** strains in the public catalog
- Over **750** different yeast species (roughly half of the known yeast species)
- Oldest yeast isolated by the UC Berkeley cellarmaster in **1893**
- Percent of strains not available from any other collection: **80%**

Contact Information:

Kyria Boundy-Mills, Ph.D., curator  
Food Science and Technology  
University of California Davis  
One Shields Ave  
Davis, CA 95616 USA  
Phone 530-754-5575  
Email [klbmills@ucdavis.edu](mailto:klbmills@ucdavis.edu)