



Department of Biology

January 24, 2023

UNIVERSITY OF VICTORIA

'What's up' in the Department of Biology UVic

The Taylor Lab

During the past year our sablefish research has flourished. Each spring our collaborators at *Golden Eagle Sablefish* make crosses using wild-caught and farm-raised broodstock to produce hundreds of thousands of offspring in their Saltspring Island hatchery. Eggs are often fertilized by milt from >1 male and, if females produce less than 1L of eggs, eggs from >1 female are mixed prior to fertilization. This makes it very difficult to know (e.g., by counting offspring) if a particular male-female pair was especially successful. In January we published a paper reporting the results of a microsatellite-based parentage study. We discovered that a large proportion of the hatchery offspring (juveniles sampled in October 2021) were the progeny of just a few of the crosses made the previous spring.

In April we learned that our NSERC Alliance/MITACS Accelerate grant had 'landed'. With this funding, we launched a sablefish genomics project. The goal is to use Genome Wide Association Studies (GWAS) and Genome Prediction to develop a fast-growing, disease-resistant 'domestic' lineage. Two major steps toward this objective have been achieved. First, in collaboration with Ben Koop, Anne-Marie Flores and Kris Christensen, we sequenced and assembled a new sablefish genome: In addition to generating a 'long-read' (Oxford Nanopore Technology) assembly from one fish, we sequenced the genomes (Illumina short reads) of parents and offspring from six of the families identified in the parentage study to produce a genetic map (85 individuals in total). This genetic map helped us assemble the long-read-derived contigs and scaffolds into a high quality, 24-chromosome genome (now available at NCBI). The manuscript describing this work is in review.

Second, in collaboration with the Centre for Aquaculture Technology (CAT) we produced a new SNP genotyping panel. Xuekui Zhang's group in Math and Stats is helping analyze data from 380 fish that were genotyped using this 300-locus panel and we have identified a subset of SNPs that collectively predict sablefish weight to its true weight +/- 500 grams... not perfect for a population that ranges from 1.6 kg to 4 kg, but a step in the right direction. Some of these results were presented at the World Aquaculture.

Conference by John in St. John's in August. DNA from a second set of fish, a 'validation' population, has just been sent to CAT for genotyping. In addition, we developed a comparatively simple, but useful, molecular tool for determining the sex of a sablefish. Bitā Raeisi and Maddy Inch, both undergrads, used this PCR-based test to show that growth rates for males and females are about the same up to age 1 yr, but diverge rapidly, with females growing faster, after that.



Sablefish embryos (N=12) on the blade of a scalpel. Collected for qPCR and immunostaining.

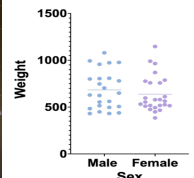
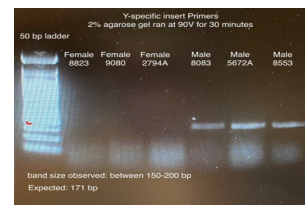
Running parallel to the applied research, our work on non-visual opsins in sablefish has progressed in an intriguing way. *Golden Eagle Sablefish* have been great partners, allowing us to sample at all stages in development. Hayley Barnes, who defended her MSc in September, characterized the sablefish opsin repertoire and used qPCR to quantify the expression of a subset of the non-visual opsins (melanopsins/Opn4 genes) in a diversity of tissues and developmental stages. Just before finishing up, Hayley generated some preliminary evidence using an immuno-probe, a gift from colleagues at Oxford, suggesting that melanopsins are expressed in radial glial cells in the optic tectum of juvenile sablefish. Many thanks to Bob Chow and others in the 'neuro group' for helping Hayley with this. Might these cells, known to play key roles in neurogenesis during development, be light sensitive? Nilou Mokaraisl (PhD candidate) has been consolidating Hayley's observations. She has tracked melanopsin expression during sablefish development (using qPCR) and with great support from Brent Gowen, she is employing a suite of immunohistochemistry probes to identify the cells that express melanopsin in sablefish eyes and brain.



A photo of the sablefish farm site in Kyuquot Sound. If you zoom-in, you can see adult fish temporarily 'corralled' for sampling. Fish are transported to this site from the Saltspring Island hatchery when they are about 10 months old.

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Data that would have been very difficult to collect without Bitā and Maddy's PCR-based sex test because males and females look the same (Weight = grams). By the time the average size of the population is 2 Kg, females are a lot bigger than males.

Biology Seminars

Forest Biology

Claire McPolin

40 min Grad Student Talk

“Endemic ectomycorrhizal fungi of the PNE and rainforest nutrition”

Supervisor:

Dr. Barbara Hawkins

Wednesday, January 25, 2023
2:30 pm
Cunningham 146

Biology

Dr. Niki Diogou

“TBA”

Host: Dr. Francis Juanes

Friday, February 3, 2023
3:30 pm
MBS 150

Biology

Dr. Tim Green

“TBA”

Host: Steve Perlman

Friday, February 10, 2023
3:30 pm
MSB 150

Biology

Dr Andrea Reid

“TBA”

Host: Dr. Francis Juanes

Friday, March 10, 2023
3:30 pm
MSB 150

Calendar

Important Dates:

Wednesday, January 25

Last day for adding courses that begin in the second term (except for Faculty of Law)

Senate meets

Friday, February 3

Last day for 50% reduction of tuition fees for standard courses 100% of tuition fees will be assessed for courses dropped after this date. For non-standard courses see [undergraduate](#) and [graduate](#) course add and drop dates

Sunday, February 12

Wednesday, February 15

Faculty of Graduate Studies deadline to apply to graduate for Spring Convocation

Monday February 20

Family Day. University closed

Monday, February 20 to Friday February 24

Reading Break for all faculties



Research Organism of the Month



This is a new feature of the newsletter, and I've made the executive decision to start with my personal favourite. I hope you will all make nominations! Send your cool photos and short descriptions of your favourite research organisms to Laura (bioclerk@uvic.ca) to nominate for the next month.

Hybrid aspen (or hybrid poplar), *Populus tremula* x *P. tremuloides*.

This hybrid is very common in the Constabel Lab because it can be genetically transformed, but the parental species (*P. tremuloides*) is the most widespread tree in North America. This individual is shown in top view - its leaves are turning red because we deprived it of nitrogen.

Submitted by Dr. Peter Constabel.

Biology News

NSERC USRA'S 2023-23

NSERC Undergraduate Student Research Awards (USRA) 2023 Application information. Application Deadline: February 15, 2023. Email to biology@uvic.ca

Alumni News

Congratulations to Dr. Matthew Adeleye on his new Assistant Professor position at [University of Cambridge](https://www.geog.cam.ac.uk/people/adeleye/)! Matthew completed a MSc at UVic in 2018 with **Dr. Terri Lacourse**, before heading down under for a PhD and post-doc at Australian National University. His latest research was just published in *Nature Ecology & Evolution*: [Changing plant functional diversity over the last 12,000 years provides new perspective for the future](https://www.nature.com/articles/s41559-022-01943-4). We wish Matthew continued success!

Here are the two links included above:

<https://www.geog.cam.ac.uk/people/adeleye/>

<https://www.nature.com/articles/s41559-022-01943-4>

Publications

R. B. CORTESE and T. E. REIMCHEN, 2023. [View from below: experimental manipulation of water surfaces to evaluate visual integrity of heron-like models through Snell's window](#). *Biological Journal of the Linnean Society*, 2023, 138, 132–140.

“The water–air interface is a globally widespread habitat for interactions between prey and predators. We experimentally manipulated water surface conditions (flat, smooth waves, three levels of current-induced turbulence) and digitally quantified the visual integrity of above-surface models from a subsurface perspective. Progressive fragmentation was present in each of the models (upright heron, crouched heron, vertical block, horizontal block) with increased departure from flat surface conditions. Smooth directional waves produced multiple horizontal bands (shadows) that moved across the models while surface currents distorted the profile, including progressive disintegration of the models appearance into multiple fragments of different sizes. This fragmentation is caused by scattered surface irregularities interacting with waves and is accentuated at the broken periphery of the optical window, reducing recognition of the models. Unexpectedly, we found that bands and fragments emerging from different surface conditions resemble common frontal plumage patterns on some Ardeidae and shorebirds (Charadriiformes). While these natural plumages are widely recognized to reflect a diversity of adaptations, including camouflage in terrestrial habitats, we suggest that their resemblance to water surface-induced fragmentation might also reflect foraging adaptations of predators through the water–air interface”.

Welcome New Biology Grad Students

Welcome!

Andrew Bickell
Korrina Gilchrist
Muskan Karmani
Kevan Rastello
Lydia Walton

Supervisor: Dr. Amanda Bates
Supervisor: Dr. Steve Perlman
Supervisor: Dr. Nicole Templeman
Supervisor: Dr. Mark Lewis
Supervisor: Dr. Amanda Bates



Webinar: Salmon-Safe BC

**SALMON-SAFE WEBINAR:
RESILIENT AGRICULTURE**

JANUARY 26, 2023
12:00 PM - 1:00PM

REGISTER ONLINE VIA [SALMONSAFE.CA/EVENTS](https://salmonsafe.ca/events)

HEAR FROM SALMON-SAFE CERTIFIED PRODUCERS WHO ARE
WORKING TOWARD MORE RESILIENT AND SUSTAINABLE FARMS.

The webinar offers a chance to hear from Salmon-Safe certified producers on how the program has helped their farms become more sustainable, protect salmon, promote healthy watersheds, and become more resilient in a changing climate. There will be an opportunity to learn more about some of tips and tricks these producers have used to be Salmon-Safe and enhance their sustainable practices. Please share this invitation to anyone in your network who would be interested in attending as is open to everyone. Registration can be done through the [Eventbrite](https://www.eventbrite.com).

Job Opportunities

BullfrogControl.com Inc. Stan A. Orchard, President - Amphibian & Reptile Specialist

A POSTING FOR 2023 SUMMER EMPLOYMENT:

The Bullfrog Control Program continues in 2023 in the Western Communities and is currently looking to fill six positions for fieldwork technicians. Work term is from late-April to late-September, possibly into early October. Must be available five nights per week for 4 hours per night beginning at dusk. However, work is weather-dependent, e.g. cannot work in high wind or rain.

- Proficiency in the English language
- Valid BC Driver's licence, clean driving record, and personal vehicle to get to and from the office
- Physically fit for rowing, often in rigorous conditions, as well as wielding the electro-frogger pole with sufficient ease as to avoid repetitive stress issues and while maintaining balance in the boat
- Professional interest in biological fieldwork, herpetology, invasive species, conservation biology, etc
- **Rower:** Superior abilities at rowing an inflatable boat backwards, manoeuvring it through aquatic vegetation, intuitively understanding where the back of the boat needs to be relative to the target bullfrog and for the person at the back of the boat to properly operate the electro-frogger, must hold a fixed position during captures, must be able to quickly improvise solutions in positioning and holding the position of the boat to benefit the crew partner. Amphibian identification skills.
- **Electro-frogger Operator:** Superior balance and agility while sometimes working from a standing position. Good upper body strength including arms and shoulders for wielding the seven foot electro-frogger pole, often through obstructive and weighty vegetation. Occasionally leaving the boat to retrieve bullfrogs located out of the water.
- Excellent eyesight for spotting bullfrog eye reflections at night. Amphibian identification skills.

This notice is not connected in any way with the UVic Co-op Program.

Applicants should contact **Stan Orchard** for an interview anytime between now and April.

Contact details below:

69A Burnside Road West (250) 858-3764 (FROG)
Victoria, British Columbia bullfrogcontrol@shaw.ca
CANADA V9A 1B6 www.BullfrogControl.com

If you have stories or announcements that you would like to share in the Biology newsletter, please email:

Jennie Bartosik at biology@uvic.ca or Laura Alcaraz-Sehn at bioclerk@uvic.ca



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