

Bugged

Summer 2024



Department of Entomology
MICHIGAN STATE UNIVERSITY

Photo Credit: Elizabeth Bishop

FROM THE CHAIR

This past spring saw a flurry of activity with our annual awards celebration, including the inaugural presentation of two new awards, graduation, and the convening of the first Excellence in Insect Science Symposium!

Honors and Awards. At our April 25th Awards Celebration, we toasted 53 MSU Entomology Department Award winners. This included our Distinguished Alumnus Award winner, **Dr. Daniel K. Young**. Later that week, we celebrated the graduation of 16 MS and PhD students and 11 undergraduate majors and minors, including Entomology major **Nate Howder**, who was one of 272 graduates receiving the Board of Trustees Award for Academic Excellence in recognition of a 4.0 GPA. We are so pleased that Nate will be continuing their academic journey in our department, pursuing a master's degree under the direction of **Dr. Anthony Cognato**.

Elevating Excellence. With the generous support of the Tatter Family Endowment for Excellence in Entomology, we held the first Excellence in Insect Science Symposium (EIS) May 16 and 17th at the MSU Kellogg Center. (See *inside for more details*)

The goals of EIS were to center entomology in the discussion of Climate Resilience, One Health, and STEM Education; build new connections and collaborations;

and to create opportunities for growth. I am so eager to see where we go next from this exciting start!

Welcoming New Entomologist. We are thrilled to welcome back **Dr. Max Helmberger**, who will teach Turf Entomology; Insects, Globalization, and Sustainability; reinvigorate Organic Pest Management; and teach a new course in Integrated Pest Management. He will also be responsible for creating a summer course to train students in entomology field techniques. Max is a PhD alumnus of MSU Entomology, and we are so excited about his contributions to our academic programs!

EROF. This summer also brings with it a new cohort of Entomology Research and Outreach Fellows. These summer long internship experiences connect 3 students with mentors and hands-on research experiences and are supported via the Tatter Family Fund for Diversity and Inclusion in Entomology. Meet this summer's fellows and learn about their projects inside!

This fall we welcome the largest incoming class of undergraduate Entomology majors since I have begun my tenure with MSU Entomology - 12 new students from 4 states and including one international student! The consistent growth in our undergraduate program is a testament to both the outstanding education we provide

and the tremendous effort of Undergraduate Program Director and Advisor, **Dr. Amanda Lorenz**.

We will also begin interviews for a new faculty position supported through the Agricultural Climate Resiliency Program. This faculty member -- the integration of arthropod biology and ecology with new and emerging technologies to model insect population dynamics, pest risk, and develop novel management strategies in the face of climate change.

A Fond Farewell. As a final note, I would like to acknowledge and thank **Judi Melena Smelser**, MSU Entomology Communications Manager, in this, the last Bugged she will publish in that role. Judi will be moving to the MSU College of Engineering where she will be serving as their chief storyteller, a role she is so very well suited for. Her voice will be missed here at MSU Entomology, but we wish her the best in this new adventure! Bugged will continue, of course, next quarter!

Until then,

Hannah J. Burrack
Chairperson



Celebrate!

***Congratulations to all the
2023/2024 department award
recipients!***



Graduate Student Awards

Gordon E. Guyer Endowed Fellowship in Aquatic Entomology

Anthony Grigsby

Merritt Endowed Fellowship in Entomology

Anthony Grigsby

Roger and Barbara Hoopingarner Endowed Graduate Fellowship in Entomology

Jennifer Roedel

Rhodes (Gene) Thompson Endowed Fellowship

Ray Rantz

Robert R. Dreisbach Endowed Memorial Fellowship

Natalie Constancio
Jenna Walters

Paul Wooley Endowed Fellowship

Solo Arman Mercene
Ray Rantz

Olsen Entomology Fellowship

Solo Arman Mercene

Fred Stehr & Family Fellowship for Service In Entomology

DeShae Dillard
Haosu Cong

Larry Gut Memorial International Travel Awards

Kevin Postma
Shatrughan Shiva

J.E. and Jean M. McPherson Graduate Student Travel Award Recipients

Christopher Brown
Cynthia Fiser
Brianna Foster
Kayleigh Hauri
Jordy Hernandez
Laura Marmolejo
William Smith
Jenna Walters

Research Proposal Awards

Scriber Scholars in Butterfly Biology & Conservation Research Proposal Award

Cynthia Fiser

Ph.D. Hutson Endowment Research Proposal Award

Shatrughan Shivai
Kelly Waters

M.S. Hutson Endowment Research Proposal Award

Solo Arman Mercene

Department Awards

Outstanding Undergraduate Student Award

Winter Krajci

Outstanding M.S. Student Award

Jordy Hernandez

Outstanding Ph.D. Student Award

Kayleigh Hauri

Outstanding Graduate Student in Extension Award

Sharron Miller

Outstanding Graduate Student in Teaching Award

Ray Rantz

Outstanding Staff Award

Erik Dams

Outstanding Postdoc Award

Patrick Gorring

Sara Elizabeth Klein Undergraduate Scholarship in Entomology Award

August Duckworth
Liam Shine

Bug House Fellows

Bella Balabuszko-Reay
Jenna Byrne
Charlotte Caldon
Loren Campbell
Nathaniel Fellows
Emily Gallagher
Anthony Grigsby
Jordy Hernandez
Sabrina Hobson
Taylor Hori
Emily Inch
Cole Moras
Charlie Rudolph
Matthew Schiffer
Josh Striegler
Kelly Waters
Dominic Westbrook

External Faculty/Staff Awards

2023

University Distinguished Professor

Michigan State University

Rufus Isaacs
Ned Walker

ESA SysEB Thomas Say Award

Entomological Society of America

Sarah Smith

Syngenta Crop Protection Award

Society of Nematologists

Marisol Quintanilla

2024

Distinguished Achievement Award in Extension

Entomological Society of America

Rufus Isaacs

William J. Beal Outstanding Faculty Award

Michigan State University

Deb McCullough

Excellence in Integrated Pest Management

ESA - North Central Branch

Deb McCullough

Special Recognition Award for Promoting International Understanding

Michigan State University International Programs

George Bird

Charles A. Gliozzo International Award for Public Diplomacy

Michigan State University International Programs

Callista Rakhmatov

External Graduate Student Awards

2023

Dissertation Completion Fellowship

MSU Graduate School, Fall 2023

Omar Posos-Parra

Predocorial Fellowship

USDA/NIFA

Sharron Miller

Best Student Presentation Award

The Annual Meeting of the International Chemical Ecology Society-Bangalore, India

Kayleigh Hauri

Certis Travel Award

Society of Nematology

Luisa Parrado

Plant-Insect Ecosystem (P-IE) Integrated Pest Management Team Award - Sustainable SWD Management Team

Entomological Society of America

Hannah Burrack
Rufus Isaacs
Phillip Fanning (former post-doc)
Larry Gut (posthumously)

First Place

MSU-University of Florida-Purdue Debate Team

Entomological Society of America

Natalie Constancio
Kayleigh Hauri
DeShae Dillard

Third Place

MSU Entomology Games Team

Entomological Society of America

Taylor Hori
William Smith
Jordy Hernandez
Laura Marmolejo

You Belong Here Award

Michigan State University

Faculty Award
Karim Maredia

Student Award

Jenna Walters

2024

Dissertation Completion Fellowship

MSU Graduate School, Summer 2024

Natalie Constancio
Jenna Walters

Second Place, Cobb Bowl Competition

Society of Nematology Awards

Luisa Parrado
Ellie Darling
Rambika Thapa
Abigail Palmisano

MSU Entomology Games Team

Entomological Society of America-North Central Branch

Chris Brown
Jordy Hernandez
Laura Marmolejo
William Smith

Board of Trustees Award,

Michigan State University, Spring 2024

Nate Howder

You Belong Here Award

Michigan State University

Faculty Award
Callista Rakhmatov

Student Award

Ronnie Miller



Extreme heat during bloom affects pollen, causing harm to native pollinator reproduction and survival

Jenna Walters, Ph.D., a recent MSU Entomology graduate, published her research in the *Proceeding of the Royal Society B* on the effects of indirect heat stress on native bee behavior, development, and survival. The research shows how high temperatures, which negatively affect pollen germination and fertilization in blueberry plants, can also impact native bees, as they rely on pollen for their diets.



Jenna Walters, Ph.D.

Heat Wave: There was unusually hot weather in west Michigan in late May 2018, the same time blueberries were in bloom. Walters observed that yields were down that year and proposed that the extreme heat during bloom had disrupted the normal pollination process. In a separate research paper, Walters showed that the heat had disrupted pollen germination and pollen tube growth of blueberry pollen grains exposed to extreme heat, even for just 4 hours.

Because pollen is one of the sole food sources for bees, the next step was to find out how this heat-treated pollen affected native bee behavior, development, and survival. In this study, Walters and her team of undergraduate researchers (McKenna Barlass and Robin Fisher) exposed blueberry bushes to extreme heat conditions, similar to those observed in 2018. They also had a control group of plants that did not receive that heat exposure, experiencing temperatures historically typical of Michigan springs. Both the heat-treated plants and the control plants were then put in separate cages with blue orchard bees (*Osmia lignaria*), a native species, released into those cages to collect pollen and lay eggs.

A Packed Lunch: *Osmia lignaria* bees nest in cavities, like hollowed-out plant stems, and typically lives for 3-5 weeks in the spring. To feed their offspring, female blue orchard bees collect pollen provisions consisting of primarily pollen with a little nectar. When the mother has collected enough, she rolls it into a ball, lays an egg on it, and seals it into a chamber using mud. She will repeat this process over and over throughout her lifetime. That

“packed lunch” gives the larvae everything they need to develop through the spring and summer, hibernate during the winter, and finally emerge the next spring as adults.

Reproduction and Survival: The study shows that when female bees only have access to heat exposed plants and the pollen they can get from them, they lay fewer eggs and the majority of larvae don’t survive. This is despite bees from both groups having similar access to floral resources, similar foraging efforts, and similar amounts of pollen provided to larvae. Walters and the team also saw that larvae who consumed pollen from heat stressed plants resulted in fewer adults that made it through the winter, and additionally, those few survivors had shorter lifespans.



Osmia lignaria (Credit: Jenna Walters)

According to Walters, “This is important given concerns of native bee population declines, and efforts being made to understand the role of climate change exacerbating these declines..” She is working on a follow-up project to understand the changes to the actual nutritional make-up of the pollen itself as a result of extreme heat exposure.

Return on Investment: The Blueberry industry in Michigan is worth about \$100 million in terms of farm gate value. The yield reduction in 2018 cost the industry \$30 million in losses compared to just the year prior. Co-author and Walters Ph.D. advisor Rufus Isaacs, Ph.D. said, “This research is a huge return on investment for the growers.”. Isaacs also noted, “The two co-authors on this paper were undergraduate students from both biology and plant biology. They both did an amazing job, and we couldn’t have done this research without them.”

Going forward, Walters sees the results of the research in terms of larger systems, “I think once we have a better understanding of how extreme heat and climate change affects plant-pollinator interactions, native bee populations, and food production, we can start to develop mitigation strategies, which could not only help protect bees, but also benefit farmers and the community at large by ensuring good crop production and high quality, nutritious food.”

Connection, Collaboration, Impact EIS Tackles Global Challenges

The Excellence in Insect Science Symposium (EIS), held at the Kellogg Center, May 16 & 17, 2024, attracted 127 attendees from 6 countries, 20 states, and 46 universities or organizations! We featured 4 keynote speakers, 28 insect innovator panelists, and 29 poster presentations.

Day One featured speakers, MSU’s Rufus Isaacs, CDC’s Ben Beard, and The Bug Chicks’ Kristie Reddick and Jessica Honaker, set the stage for each of the three pillars: Climate Resilience, One Health and STEM Education. A poster session allowed graduate students and post docs to present their research ideas to the symposium participants.

The afternoon panel discussions built off the morning’s foundation, with next level, in-depth analysis and broad thinking for the audience to digest.

The evening reception took the idea of “Insects as Food” to a whole new level. The Kellogg Center chefs, in collaboration with Brooklyn Bug’s Joseph Yoon, created a menu incorporating a variety of insects into dishes such as pizza, 7-Layer Dip, cannolis and a Build-Your-Own Ramen bar. We also debuted our insect-enhanced ice cream collaboration with the MSU Dairy Store, “Cricket Crunch” – a vanilla ice cream base swirled with salted caramel and studded with chocolate and caramel coated crickets.



Day Two was all about conversation and idea generation. Participants got to offer their thoughts on what they heard the day before and how they might utilize that information to spark new research and foster new collaborations.

Cricket Crunch ice cream was also a big hit at the MSU Bug House and the OSU Bug Mobile joint outreach event, which was held on Friday, June 17 and featured hands-on interactions with insects at these two engagement spaces.

Asked what they would do after they left EIS, attendees said:

- “Push myself outside of my comfort zone to build collaborations and interactions with other academics and policy makers.”
- “Work with the Entomological Society of America to campaign about why we should eat ugly food (with insects)!”
- “Create content based off my experience to promote diversity and inclusivity in entomology!”
- “Develop teaching practices to generate interest in entomology (+ organismal biology) across undergraduate biology curricula.”

Faculty Promotion

Marianna Szucs, Ph.D.
Associate Professor



In Remembrance

Mark Whalon, Ph.D.
Professor Emeritus



Mark joined the Department of Entomology in 1978, which marked the beginning of a successful career in teaching, research and pesticide alternatives. Mark's passion was the success of the fruit growers. He loved to be on their farms helping them fight pests in more wholistic ways. The bumper sticker on his truck read "No Farms, No Food." Mark passed away June 18, 2024.

Welcome New Hires



Bridget Moricz
Post Doctoral Researcher
Milbrath Lab



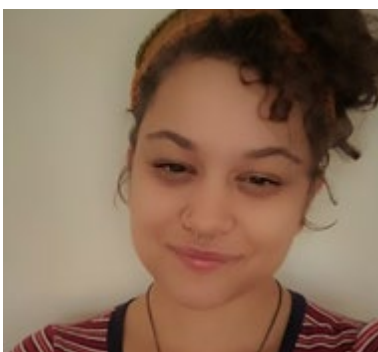
Abigail Cohen
Post Doctoral Researcher
Szendrai Lab



Max Helmberger, Ph.D.
Academic Specialist-Teacher
Applied Entomology &
Non-science Majors



Jordy Hernandez
Research Technologist
Chung Lab



Karma Thomas
Research Assistant
Szendrai Lab



Sarah Hughson, Ph.D.
Entomology Diagnostician

Meet the 2024 Entomology Research and Outreach Fellows (EROF)

Makayla Guenther

Mentor:
DeShae Dillard

College: Lansing Community College/MSU-Fall 24



What aspects of the program were of interest to you?

I was interested in the opportunity to do field work as well as experiencing what research will theoretically look like if I continue studying after undergrad. I was also interested in learning about data analysis to help me with classes in junior year.

What project are you working on?

I am currently working on a couple of projects together. The one I focused on and created a Mid-SURE poster with my mentor was about conservation management methods affecting slug abundance. The hope for this research is to show the damage that slugs can do without proper pest management, and to continue this research with methods of continuing conservation management while also not being affected by slug feeding injury to the crops.

What is your role in this project?

My role was to go to the KBS LTAR and to check slug traps and to scope the level of feeding injury on soybean. I would compile this data with the help of my mentor in a google sheet where they show me how to analyze the data. I would then use the analyzed data to make graphs for a poster.

What has been your favorite part of the EROF program so far?

My favorite part was the field work as I could really comprehend what I was doing pertaining to insects or pest damage on crops. To see an abundance and diversity of insects in-person is very new and exciting for me.

What has your mentor shared that has been the most helpful?

My mentor has been the most helpful with any questions I have on RStudio. DeShae has also been immensely helpful when I am out on the field with him as he explains what we are doing well.

What lessons will you take away from this experience?

I will take the RStudio guidance and the beauty of communication. Just saying to your superior like, "Hey, I don't understand this" is so much better than struggling with something for hours with no end.

How do you think this will help you in your education and/or career going forward?

I have decided to connect with more professors for undergraduate research opportunities. I have considered going into graduate school more than before. This job also helped motivate me to be more organized.

What would you say to other students considering this program?

If you are having difficulty with the work, speak about it sooner rather than later. Also, if you feel a little out of place or unintelligent, I had to tell myself I must change that and talk about it because no one can read your mind. Also, do not be afraid to talk or connect with your mentor.

Gwyneth Zamora

Mentor:
Raj Chowdanayaka

College: Lansing Community College/MSU-Fall 24



What aspects of the program were of interest to you?

The program actively seeks to include researchers from a wide range of backgrounds, regardless of their experience in the research field, including different ethnicities, cultures, etc. By doing so, EROF creates an inclusive environment where everyone feels valued and respected. I had never worked in such a diverse environment before, and being in this space truly enhanced my experience.

What project are you working on?

In my research, I am investigating the Cuticular Hydrocarbons (CHC) of the *Drosophila* *Suzukii*, D. Takahashi, and D. Biarmipes. Specifically, I aim to determine if there is a significant change in the amount of CHCs a female possesses before and after mating.

What is your role in this project?

I conducted many mating experiments and recorded their behaviors and time intervals, such as the initiation of male courtship behaviors and the duration between when copulation begins and ends. To ensure the accuracy of my experiments, I collected virgin flies for all three species, which were crucial for the conditions needed for my studies. Following the mating experiments, I extracted CHCs from both mated females and virgin female flies.

What has been your favorite part of the EROF program so far?

My favorite part of the EROF program has been the incredibly stress-free and relaxing environment in which we work. It's been such a joy to come to work every day without feeling the weight of constant pressure. Additionally, my lab mates have been exceptionally friendly and accommodating, everyone is incredibly friendly and always willing to help.

What has your mentor shared that has been the most helpful?

Never hesitate to ask questions. I used to find this intimidating, especially at the beginning of the fellowship, because I worried that my lack of knowledge would make me look inexperienced compared to others. However, this experience has shown me that not having all the answers is perfectly okay, and seeking help actually reflects strength and curiosity.

How do you think this will help you in your education and/or career going forward?

This experience has helped me develop a research-oriented mindset. I learned to approach problems with a more critical step and analytical perspective. I'm now more proactive in seeking answers and more thorough in examining the details in my work.

What would you say to other students considering this program?

This program is a fantastic opportunity to gain hands-on experience and expand your personal and professional growth. Plus, you'll also have the opportunity to present your research findings.

RE DeForest

Mentor:
Chris Brown

College: Lansing Community College/MSU-Fall 24



What aspects of the program were of interest to you?

The biggest interest I had was working directly with insects and gaining experience. Also being able to talk to those already in the field, gaining advice on how to also pursue entomology.

What project are you working on?

I'm helping with the MothED program, and was given the opportunity to run my own experiment to help with data collection. My research project was testing if height had an impact on catch abundance using DYI moth bottle traps. Along with running my own research, I helped and assisted others when needed, such as pinning, labeling, sorting, and cleaning.

What has been your favorite part of the EROF program so far?

Getting a taste of both field and lab work, and just a general understanding of what it's like to work in entomology. It's definitely helped and solidified my want to pursue a career in entomology.

What has been the biggest surprise?

That I am now completely comfortable with holding dead insects in my hands, mainly because of pinning.

What has your mentor shared that has been the most helpful?

Giving me a crash course in entomology, and teaching me how to identify the orders, which was something I was unable to do at the start of the job. Another thing would be teaching me the process of presenting research (poster, paper, etc.).

What lessons will you take away from this experience?

One big lesson is that I shouldn't overwork or stress myself out over things that I can't control. The weather this summer had a lot of rain, so I was unable to present complete data at Mid-SURE. My mentor told me that its okay to present partial data, which was something that I didn't know could be done.

Another thing is that research doesn't always have to prove some big finding. It's okay to go into an experiment and not find something big, but instead prove something that has already been known. It adds on to data and information which further confirms the finding.

How do you think this will help you in your education and/or career going forward?

I think this will help me because it gave me experience in entomology, and science in general. Experience both in the field and the lab, along with presenting my research at Mid-SURE looks really good on a resume.

What would you say to other students considering this program?

This program offers not just experience but also lots of knowledge! The mentors have so much to share, along with other connections to help you get information. The program will also give you insight into what a career in entomology would look like, and if you are interested in doing it.



**FEATURED
UNDERGRAD
SHELBY MAROCCO**

Hometown: Canton, MI
Studies: Environmental Studies and Sustainability major/
Entomology minor

What inspired your interest in entomology?

I was inspired to pursue entomology because I have always had a deep appreciation for animals, both large and small. After attending Bug Club, I was inspired to add an entomology minor into my academic studies.

What has been your best experience with entomology?

My best experience with entomology has been volunteering as a tour guide for the MSU Bug House. Talking to visitors and relaying the ecological importance of these tiny creatures have brought a new passion into my life. Every time I go to the Bug House, I learn something new from the faculty and visitors alike. My experience wouldn't be the same without the amazing educational space that is the Bug House.

How did you utilize insects to teach others?

I hold a fondness for Madagascar Hissing Roaches. During my time volunteering for Bug House events and tours, these large insects have helped me teach countless people that although insects may seem scary, dangerous, or gross, many of them are simply gentle, harmless animals.

What is your favorite insect and why?

My favorite insect, by far, is the *Asbolus verrucosus* or the blue death feigning beetle. This is because this was one of the first insects I held in the MSU Bug House and ever since then they have had a special place in my heart. Also, they look like blueberry's which I think is cute.

What is your favorite thing about MSU?

My favorite thing about Michigan State University is that this is a place where I can unapologetically be myself while also finding peers and faculty that share similar interests.

Do you have advice for anyone interested in an entomology major or minor?

If I had told my past self I would be graduating this May with an entomology minor, I wouldn't have believed you. Having that said, I would give a perspective entomology student the cliché advice to just go for it. After experiencing what the MSU entomology program has to offer, it's hard to believe you wouldn't want to further pursue this path.

**FEATURED
GRAD STUDENT
LAURA MARMOLEJO**



Hometown: San Marcos, TX
Previous education: B.S. in Entomology, Texas A&M University

What or who inspired your interest in entomology?

As a child my interest in the small bugs in my backyard turned into the opportunity to pursue a bachelor's degree in entomology. During my time as an undergraduate I was able to work under two great mentors, Anjel Helms and Morgan Thompson, who in turn inspired me to continue my education at Michigan State.

What is your favorite activity, class or responsibility as part of your graduate studies?

The most rewarding part of my research assistantship is being able to work with growers and members of the vegetable industry. Sharing my research findings at extension events brings a lot of fulfillment to me and makes it feel like the research I perform has a real effect on society. Such experiences motivate me to be a diligent scientist!

What are you researching?

My master's thesis focuses on the management of the common asparagus beetle utilizing various agricultural practices. More specifically, it entails conducting pesticide trials using both synthetic and organic insecticides that are available for use in commercial asparagus. I also aimed to determine asparagus beetle host selection and behavior between numerous asparagus characteristics. Lastly, I received additional funding through NC-SARE to determine how managing asparagus residue can affect overwintering beetle populations.

What is your favorite thing about MSU?

Michigan State's campus is by far the prettiest. The old brick buildings lined with crawling plants, the scenic river walk, and the various trees and plants are enough to encourage any student's learning. I always want to stroll around campus on a lovely day.

What is your favorite activity/way to spend your time outside of your studies?

My partner and I really enjoy thrifting, exploring local antique malls, and browsing estate sales. Saturday mornings are the best time to grab a cup of coffee and rummage through vintage relics (usually cameras and outdated entomology books). However, when I am home I love to cuddle up with my cat, Chips, and read or play video games.



Michigan State University
Natural Science Building
288 Farm Lane Room 243
East Lansing, MI 48824

Support Pollinators

2024 Bee Palooza - *“Bee the Change”*



Bee Palooza 2024 aims to raise awareness about the challenges faced by pollinators and inspire action to protect these crucial contributors to biodiversity and agriculture.

Visitors can explore a variety of interactive exhibits showcasing the diversity of pollinators and their habitats, participate in educational workshops led by experts in bee conservation, and learn practical tips for creating pollinator-friendly gardens.

Participants can conquer their fear of bees at the bee petting zoo. They can also make seed balls packed with native Michigan wildflowers to feed the bees and bring the prairies back to life. Folks can get their pollinator-related questions answered by MSU entomologists. And best of all, MSU pollinator-themed ice cream will also be available.

This event is FREE for all ages and open to the public.

**Sunday August 18, 2024
1:00-4:00 PM**

**MSU Horticulture Gardens,
1066 Bogue Street, East Lansing, MI**

Your Support Matters

Each year, when you submit your annual tax-deductible donation, in appreciation for your generous support, the Department of Entomology will send one of five commemorative coins.

Collect all five by committing your support over five years,

and then we will send you a shadow box to display your collection.

Your gift supports the department, and changes lives in the process. Become a part of **“Bugs Work!”**

DONATE TODAY!



Bugged newsletter

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