# MONARCH HEALTH NEWS
## 2016 MONITORING SUMMARY

*Celebrating 10 years of monitoring Monarch Health!*

## Monarch Health "Top 10" List!

**Top 10 Volunteers**:
Congratulations to the 10 volunteers who contributed the most samples over the past 10 years! Thank you for your hard work!

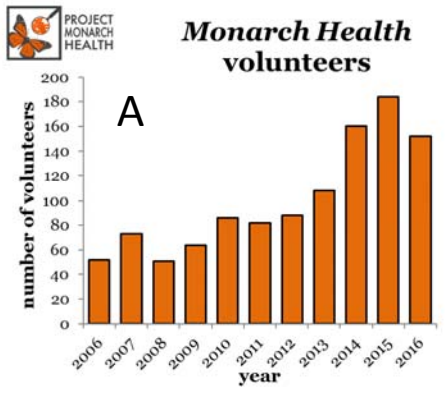
1. Jessica Miller: 2,598
2. Sondra Cabell: 1,582
3. Charles Cameron: 1,389
4. Vic Madamba: 1,195
5. Maureen Barrett: 922
6. Terri Dinesen: 769
7. Diane Rock: 677
8. Ilse Gebhard: 591
9. Gayle Morris: 558
10. Donna Zemba: 508

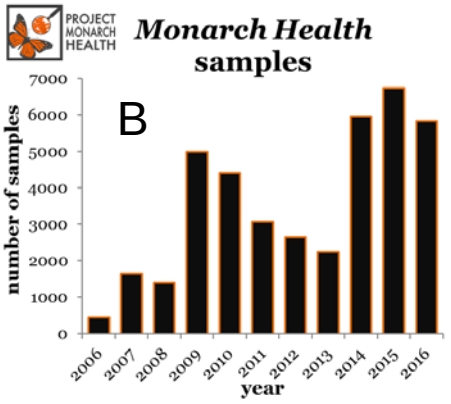
**Top 10 States**:
Congratulations to all volunteers that contributed data from our 10 best-sampled states! (number of samples per state shown below):

1. Wisconsin: 5,239
2. Texas: 3,572
3. Minnesota: 3,115
4. Florida: 2,957
5. Michigan: 2,342
6. California: 2,219
7. Pennsylvania: 2,202
8. Iowa: 2,144
9. Georgia: 1,919
10. North Carolina: 1,856

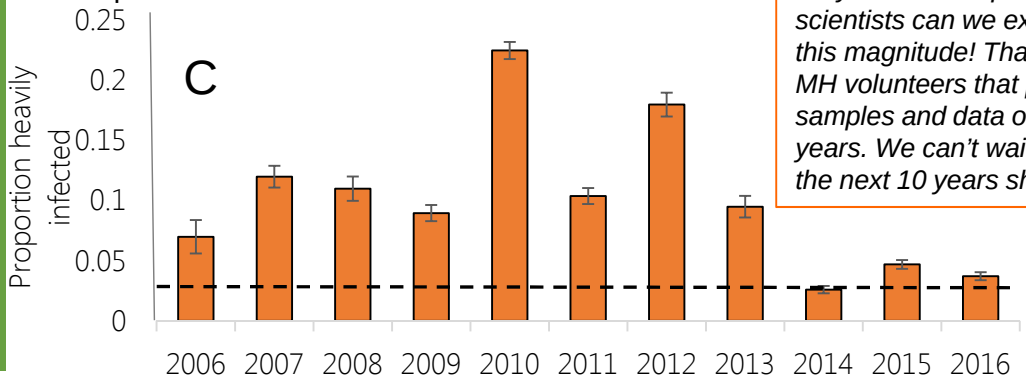
## 10 Year Anniversary Trends

The monitoring season that ended in 2016 marked the 10th year of Project Monarch Health! This project was launched in spring 2006 by UGA professor Sonia Altizer and then-undergraduate student Natalie Kolleda Tarpein (now a science teacher in SC). Over the past 10 years, a total of 609 volunteer participants sampled 36,829 monarchs for infection by the protozoan parasite *Ophryocystis elektroscirrha* (OE; Figures A and B on right). Long term data such as these are crucial for identifying trends that would go unnoticed when sampling only a few years. Historical infection data (1970-2000) showed low infection prevalence (~ 2%, indicated by dashed line below) in migratory monarchs from eastern N. America. Monarch Health results show that OE prevalence in the monarchs' summer breeding range increased to 10-20% (Figure C below; data from above 33° N), and then declined sharply in summer 2014, the year after the monarchs experienced their lowest recorded overwintering numbers in Mexico. Volunteer-provided samples further showed 5 to 8 times higher infection prevalence in non-migratory (winter breeding) monarch populations in southern US and coastal California, relative to seasonal summer breeding locations for migratory monarchs in other parts of the US and Canada.[1,2]




*Only with the help of citizen scientists can we examine data of this magnitude! Thank you to all MH volunteers that provided samples and data over the past 10 years. We can't wait to see what the next 10 years shows us!*




[1]Satterfield, D., Maerz, J. and Altizer, S. 2015. Loss of migratory behavior supports high parasite prevalence in a butterfly host. *Proc. Roy. Soc. B.* 1801: 20141734.
[2]Satterfield, D.A., Villablanca, F.X., Maerz, J.C. and Altizer, S., 2016. Migratory monarchs wintering in California experience low infection risk compared to monarchs breeding year-round on non-native milkweed. *Integr. Comp. Biol.*, p.icw030

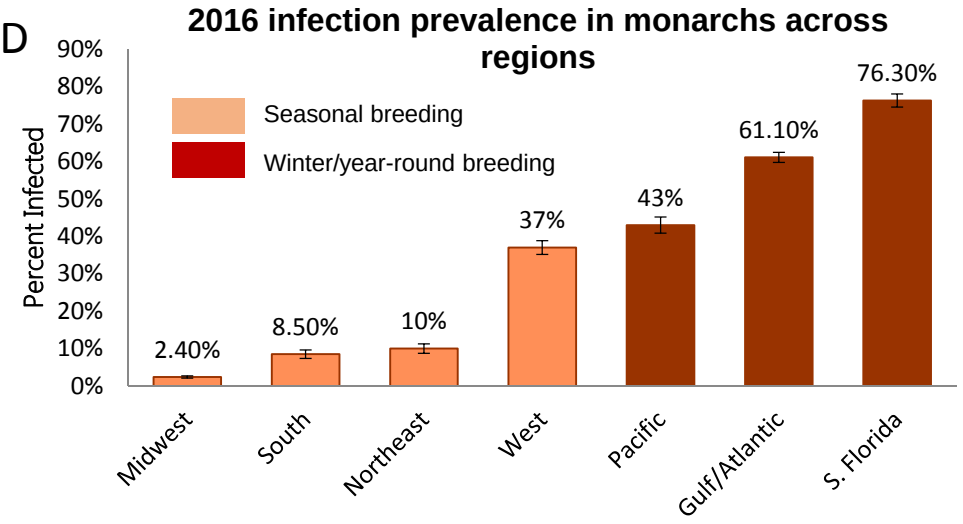
Donate: bit.do/monarchcrowdfunding • Visit our website: monarchparasites.org
Altizer Lab · Odum School of Ecology · University of Georgia · Athens, GA 30606 · (706) 542-3485 · monarchhealth@gmail.com

# MONARCH HEALTH NEWS
## 2016 MONITORING SUMMARY

## 2016 Season Summary

In 2016, **152** *Monarch Health* volunteers sampled **5,832** monarchs for OE! This past season, we noted a rise in OE prevalence in several locations relative to 2014 and 2015 levels. In areas *without* winter breeding (orange bars in Figure D below), infection prevalence in western N. America rose from 20% in 2015 to 37% in 2016. In the Southern and Northeast regions of eastern N. America, prevalence rebounded to approximately 10% (previously at 3% and 4%, respectively, in 2015). Prevalence in the Midwest was *lower* in 2016 (2.5%) relative to 2015 (5%). Monarchs sampled in regions with *year-round breeding* (non-migratory locations; dark colored bars) maintained high OE infection levels, as noted in 2015. These regions include the southern half of Florida, and along the Pacific and Gulf Coasts where tropical milkweed allows monarchs to breed throughout the winter months. Previous research indicated that the monarchs' long-distance migration plays an important role in lowering infection prevalence. When monarchs breed year round, they lose the benefits of escaping milkweed patches where OE spores accumulate, and sick individuals are not weeded out by the strenuous long-distance migration.

D




## Monarch Symposium in Toluca, Mexico

UGA Ph.D. student Ania Majewska and undergraduate Hayley Schroeder (shown at left) presented talks at the 4th international monarch butterfly conservation conference in Toluca, Mexico in March 2017. Ania discussed her work on the role tropical milkweed plays in OE transmission and monarch migratory behavior, and Hayley presented the findings of 10 years of Monarch Health citizen science data. After the conference, they visited several of the overwintering colonies and learned about the work being done in Mexico to protect and restore the oyamel fir forests, particularly after the devastating storm in March 2016 that tore down 11,000 trees.

## Monarch Health Lab Spotlight

Graduate student **Dara Satterfield** (middle) coordinated MH for from 2011-16. In July 2016, she defended her PhD and became Dr. Satterfield! Dara is now a Postdoctoral Research Fellow at the Smithsonian Migratory Bird Center in D.C., where she studies migratory insect conservation.

Undergraduate **Ian Yeager** (left) worked for MH for the past two years. Ian graduated in May 2017 with a degree in Biology! This summer he completed EMT training and plans to attend medical school to pursue a career in surgical practice.

Recent UGA graduate **Stuart Sims** helped compile and analyze the past 10 years of MH data. He is now the data coordinator for a Family Resource Center Association in Denver, CO, while he ponders graduate school options.


Altizer Lab · Odum School of Ecology · University of Georgia · Athens, GA 30606 · (706) 542-3485 · monarchhealth@gmail.com