

# Darwinian speciation, publication inflation, and social reproduction in science



Center for Theoretical & Evolutionary Genomics, UC Berkeley  
April 2, 2021

Christopher T. DiVittorio  
Pinecrest Research Corporation, Inc.

PART I: *Encelia* a model adaptive radiation

PART II: Publication Inflation & Sources of Marginalization in Science

PART III: Solutions

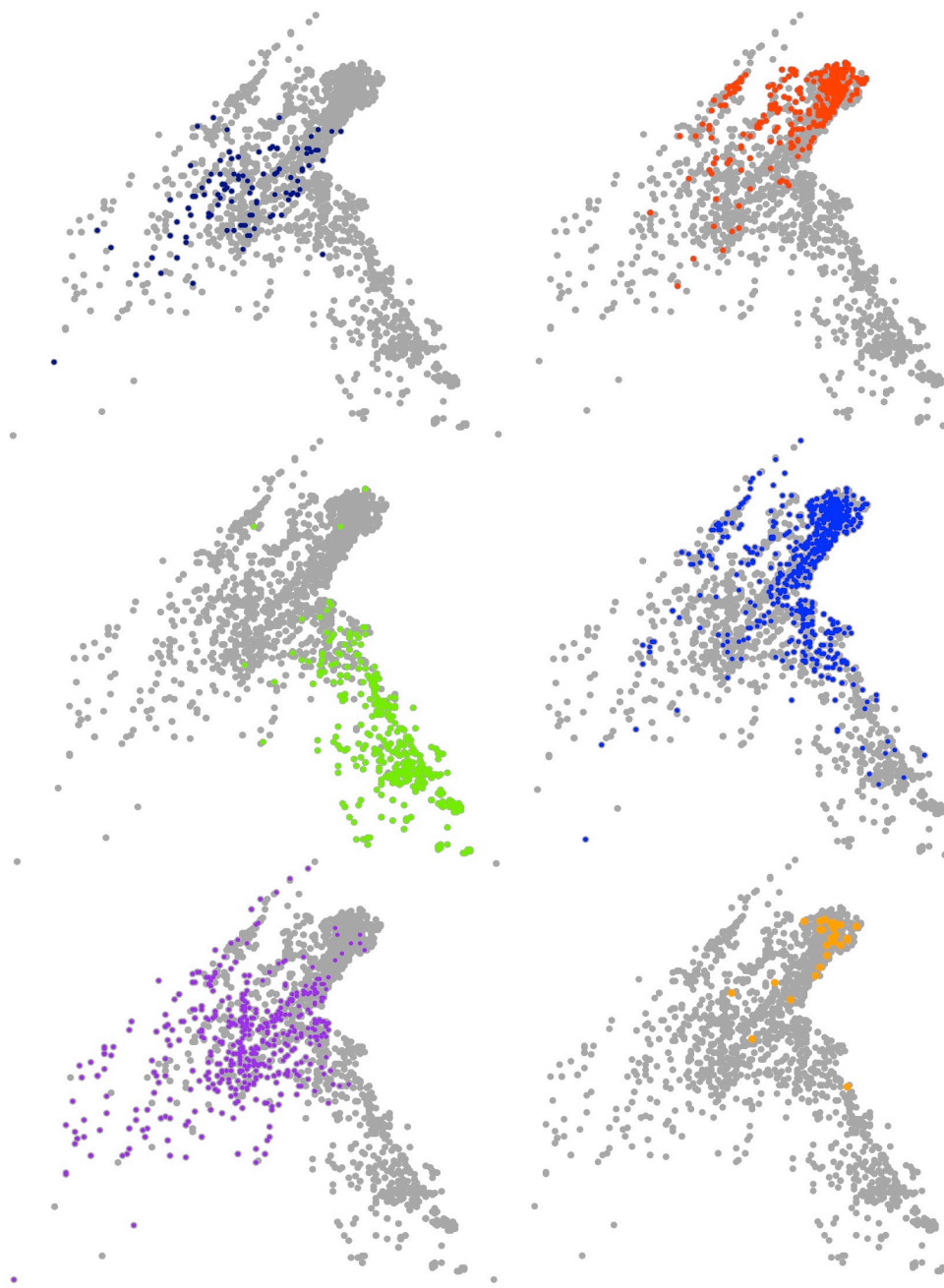








maximum temperature



minimum temperature

“Cases where species remain distinct only because of postzygotic isolation are extremely rare, if they exist at all.”

*Kirkpatrick and Ravigné (2002), p.23*

“The scanty evidence that is available indicates that speciation by geographical segregation without isolation is rare; if it occurs at all.”

*Mayr (1947), p.268*



**The Hybrid Nature of *Encelia laciniata* (Compositae:  
Heliantheae) and Control of Population  
Composition by Post-dispersal Selection**

DONALD W. KYHOS

*E. palmeri*



hybrid



*E. ventorum*





# *Encelia palmeri*





# *Encelia ventorum*

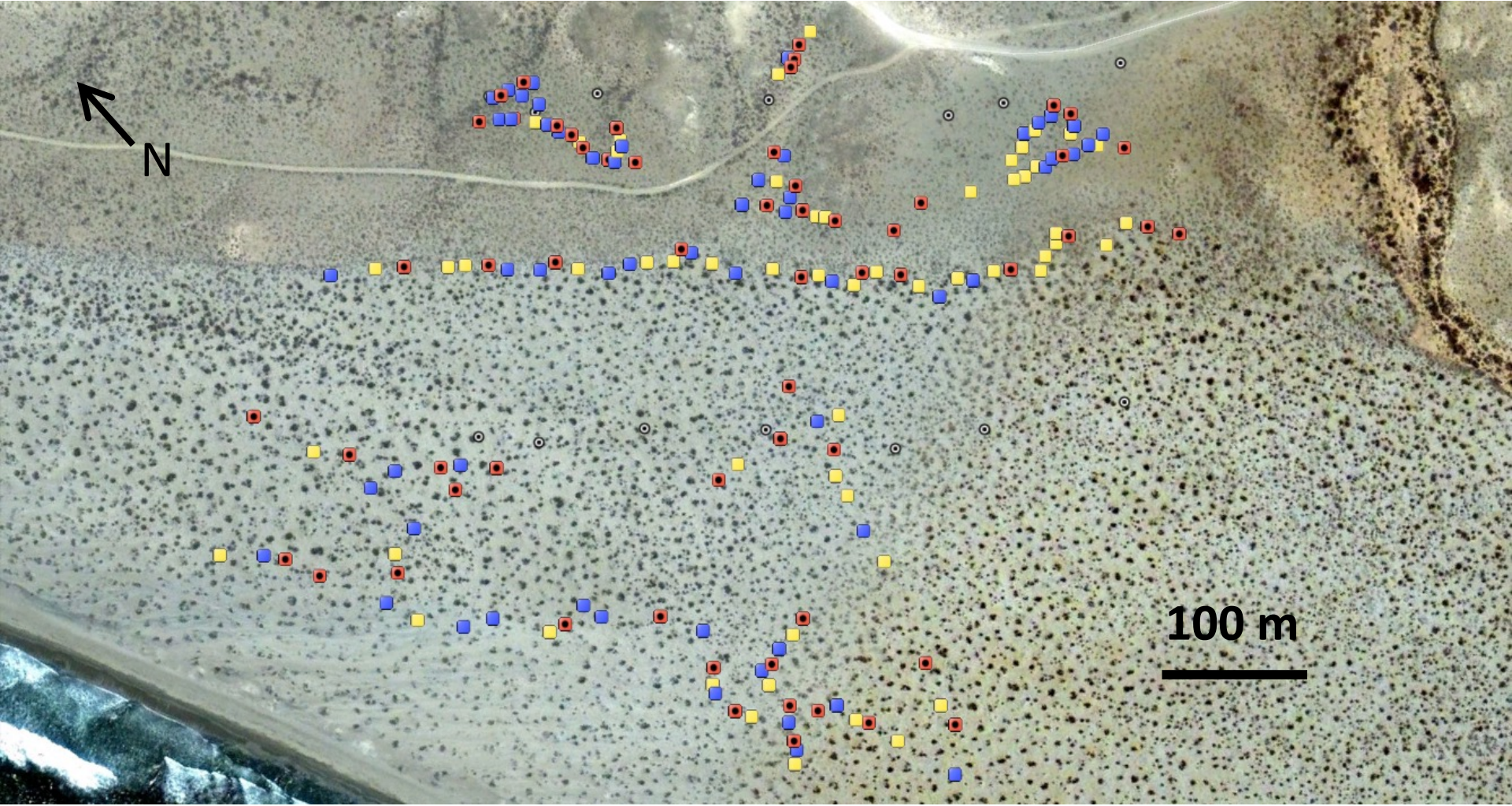




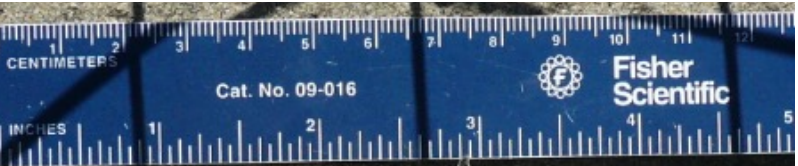




# RECIPROCAL TRANSPLANT / RESOURCE ADDITION EXPERIMENT



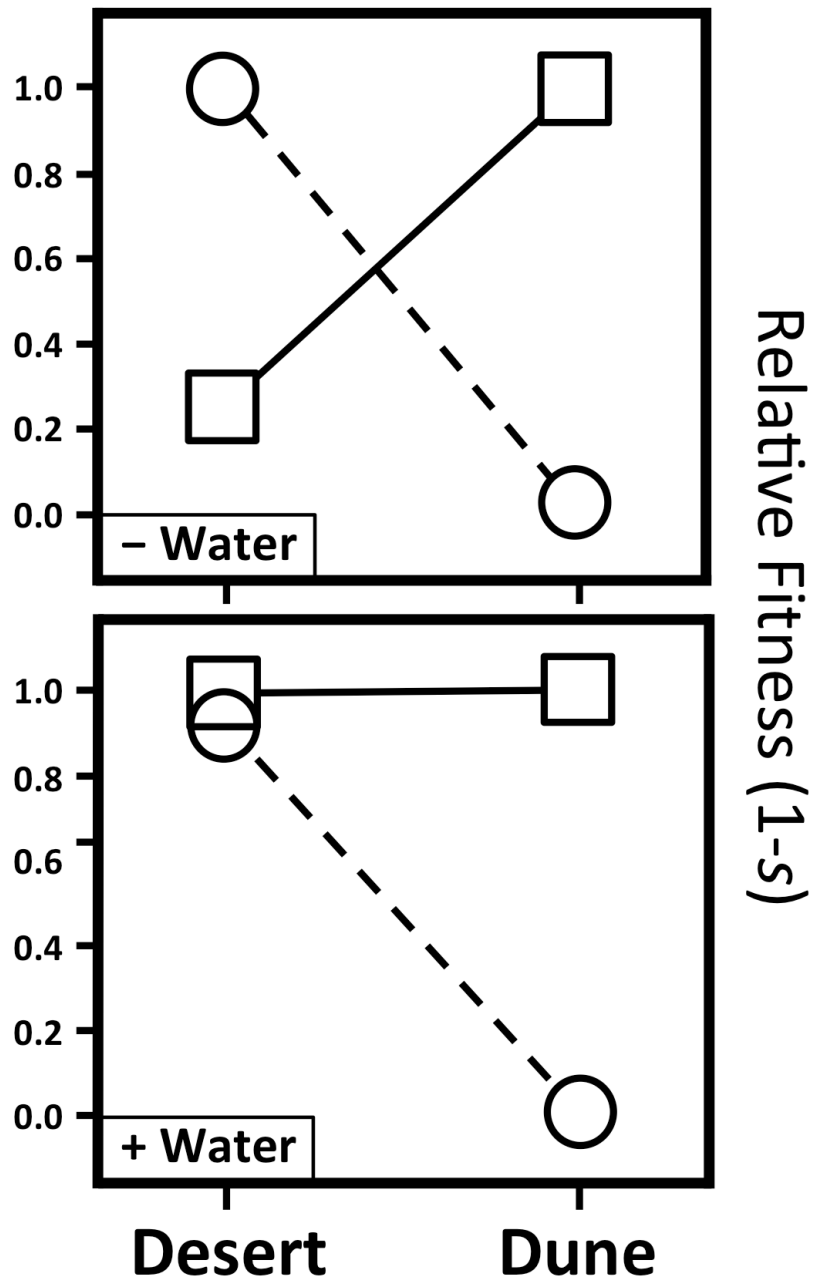














# ***BURIAL***





# ***HERBIVORY***









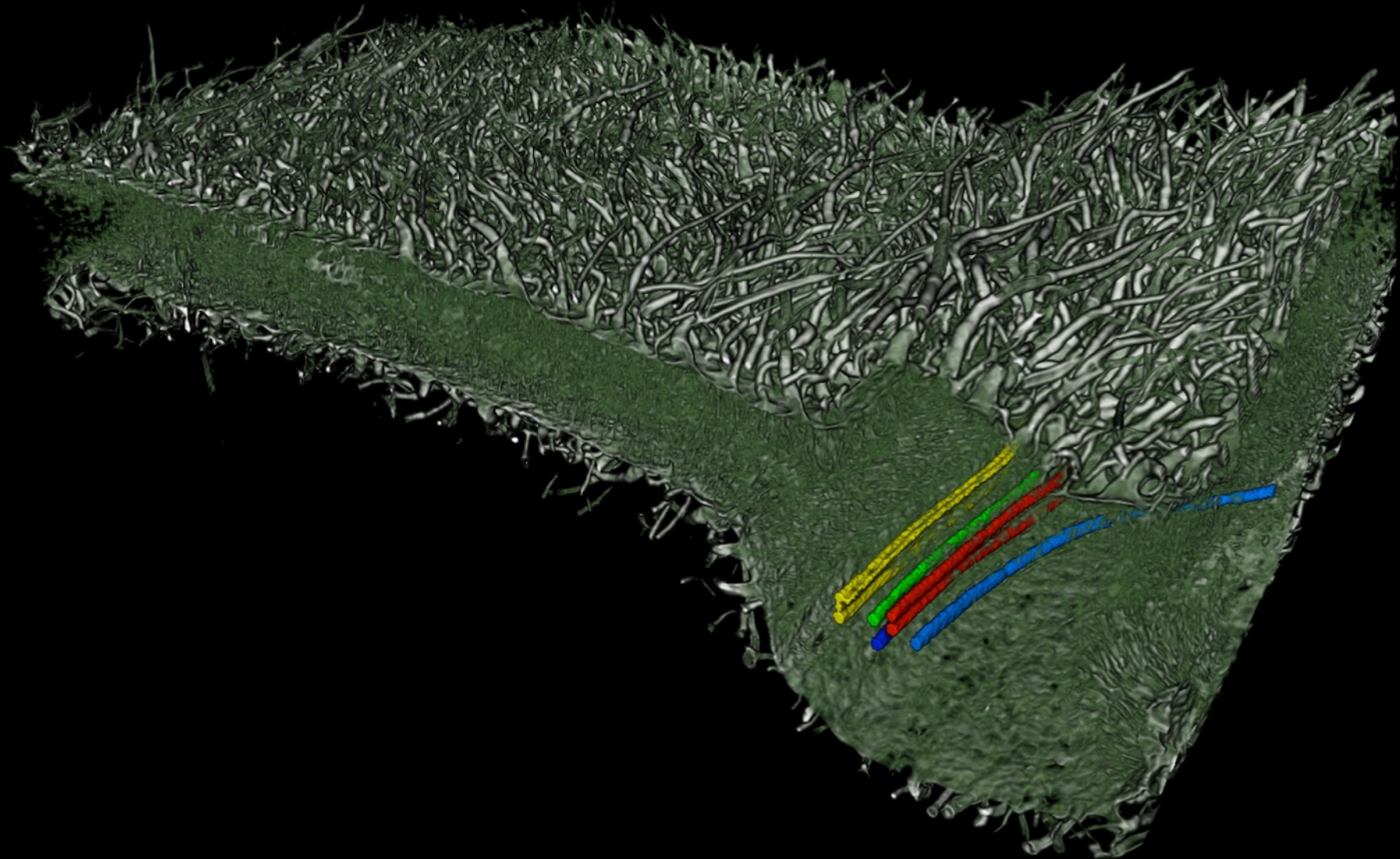


10  
C

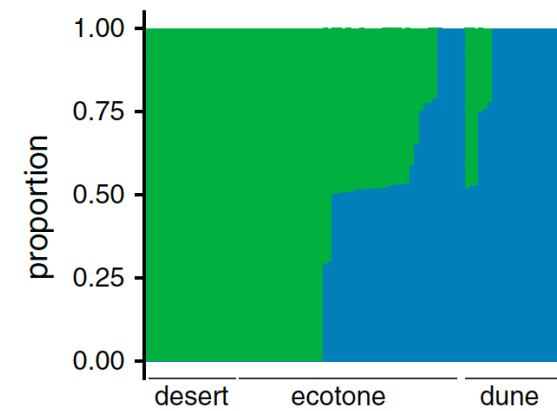
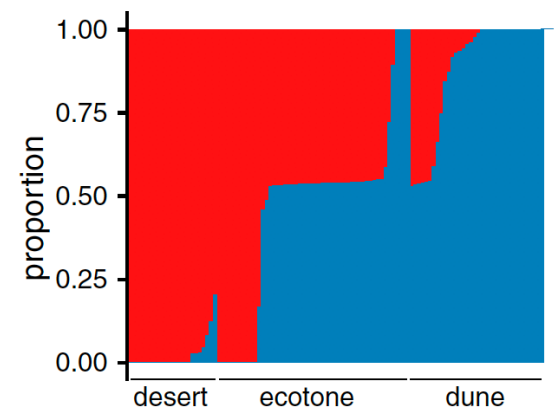
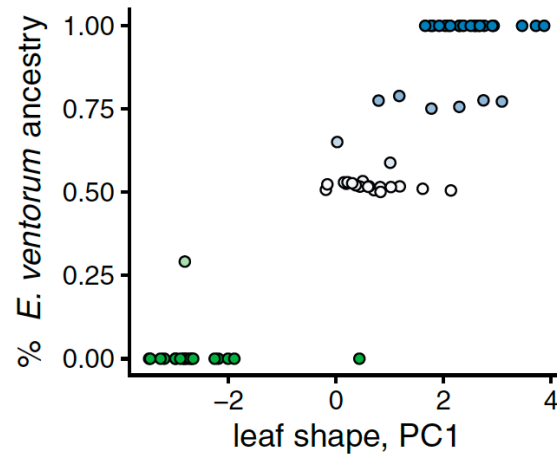
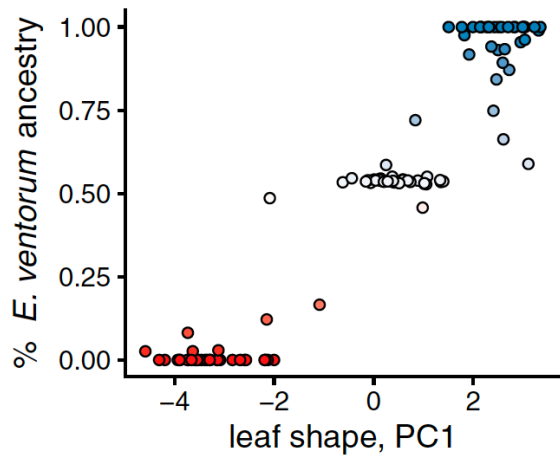
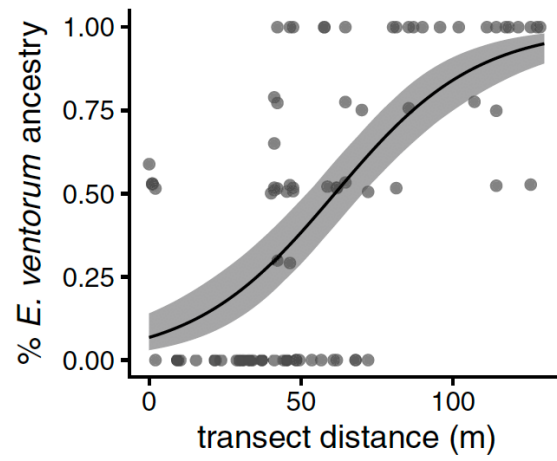
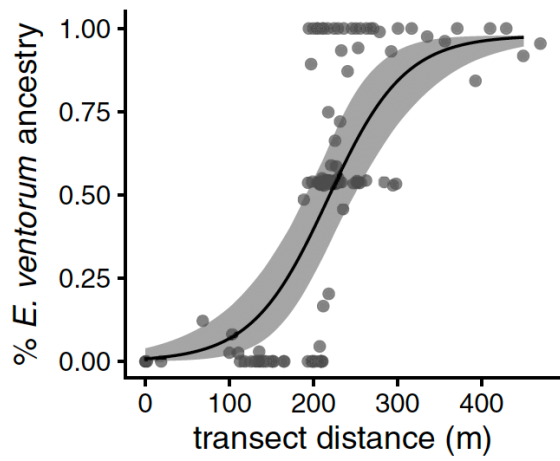
9  
C

10  
B

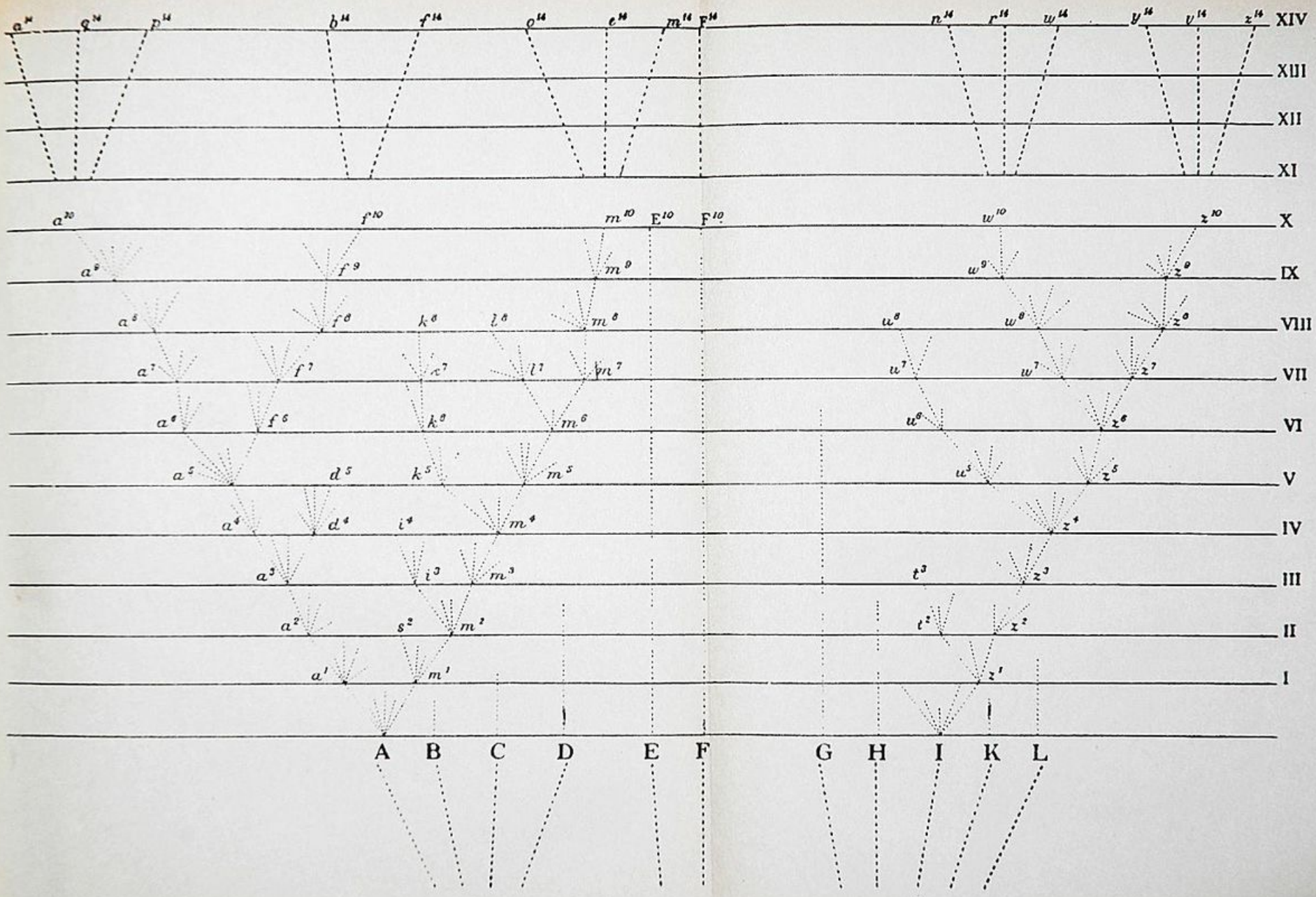




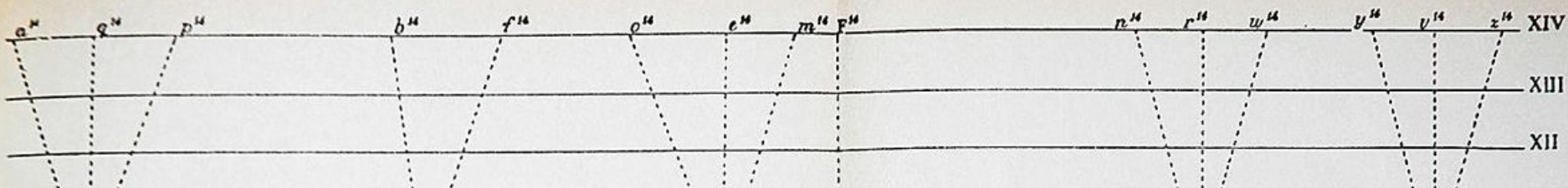








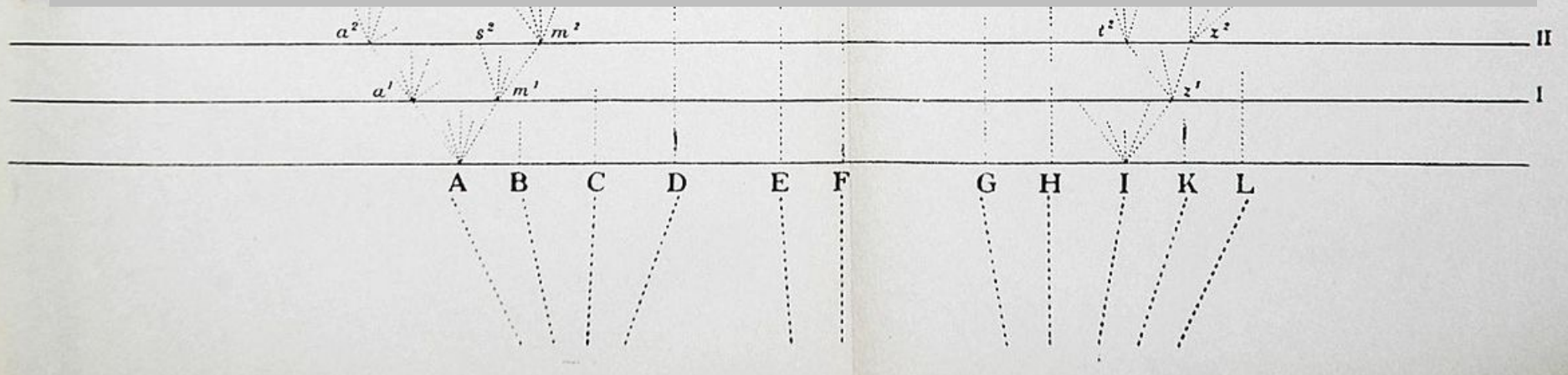




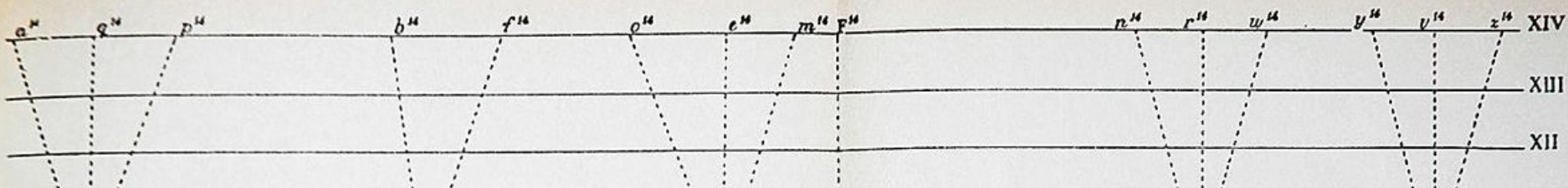
The original phylogeny from “Origin of Species” by C. Darwin had a caption that didn’t make it into the book.

Contrary to being a “black box”, Darwin had a mechanism clearly in mind.

Maybe we should call this Darwinian speciation instead of ecological speciation.

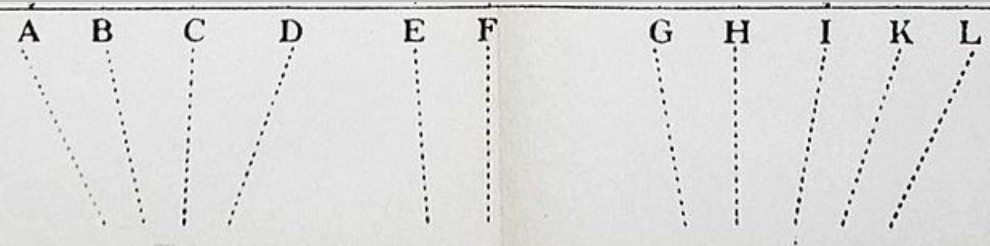






Stauffer, R. C. 1975. Charles Darwin's Natural Selection: being the second part of his big species book written from 1856 to 1858. Cambridge University Press. From pages 239-240:

"Let M inhabit a continuous area, not separated by barriers, & let it be a very common & widely diffused & varying plant. ... As  $m^1$  tends to inherit all the advantages of its parent M, with the additional advantage of enduring somewhat more drought, it will have an advantage over it ... if  $m^{1-10}$  had been produced, capable of enduring more drought, but not at the same time enduring an equal amount of moisture with the parent M, both parent & modified offspring might coexist: the parent ... in the dryer stations, &  $m^{1-10}$  in the very driest stations."





Many more opportunities for study...flower color polymorphism on Sea of Cortez





# Our alternative funding source: ourselves



SERVICES

ABOUT US

PROJECTS

RESEARCH

CONTACT

Science funding in the US is broken. A few researchers receive millions while most receive nothing. We started a company that allows us to pay our bills and pursue any projects we think are important.



Investigating ecology of *Encelia* shrubs in the Vizcaino Biosphere Reserve, Baja California Sur, Mexico.

## Research, Conservation & Social Justice

Pinecrest Research Corporation was conceived as an alternative way to support field investigations of all varieties, and to fund basic and applied research into neglected problems in ecological and evolutionary biology, plant and animal systematics, rare species conservation, population genomics, climate change, and environmental and social justice.

With roots in Oakland & the Emerald Triangle, we are deeply aware of the social and economic inequalities that prevent equal access to the environment, and to the benefits of economic development, financial security, and upward mobility.

We are actively seeking collaborations with students, academics, nonprofits, and private sector enterprises and have funding available for select projects. Contact us using the form below for more information on collaboration, employment, or research opportunities.



# PART II: Publication inflation

- 2008-2018 publications grew from 1.8 to 2.6 million articles published per year
- Increase of 45%
- Increase in # of tenure track faculty about 5%
- Increase in brain capacity up less than 1%
- Increase in hours in day up 0%
- # of papers needed to get tenure track job in IB in 2006 (~15) vs 2019 (~30)



# PART II: Publication inflation

- 2008-2018 publications grew from 1.8 to 2.6 million articles published per year
- Increase of 45%
- Increase in # of tenure track faculty about 5%
- Increase in brain capacity up less than 1%
- Increase in hours in day up 0%
- # of papers needed to get tenure track job in IB in 2006 (~15) vs 2019 (~30)

## WASTED EFFORT

- Up to half of publications are never read by more than the authors
- Desire to cite only new papers undermines the purpose of research, enabling this waste

## UNREASONABLE BURDEN

- Average cost of publishing a paper \$3,500 (nonprofit) - \$11,000 (Nature journal OA)
- Cost to researcher: \$100,000-\$300,000 to get a job at R1
- 30 papers take time to write for a person without permanent employment

## DECREASED QUALITY OF LIFE

- Inevitable trade-off with research quality & quantity
- No time to enjoy life, serious mental consequences
- No time to think deep thoughts, don't enjoy science anymore, "Putting out fires"
- Slippery ethical slope (200-author papers, minimum publishable unit, scam journals)



We outsourced the printing  
of our currency to bad  
actors.



# Support a Federal ban on profiteering from publishing taxpayer-funded research



change.org

90 have signed. Let's get to 100!



At 100 signatures, this petition is more likely to be featured in recommendations!

First name

Last name

Email

Oakland, 94605  
United States

Display my name and comment on this petition

[Sign this petition](#)

By signing, you accept Change.org's [Terms of Service](#) and [Privacy Policy](#), and agree to receive occasional emails about campaigns on Change.org. You can unsubscribe at any time.

Bloomberg



Markets

## Springer Nature Said to Kick Off 1 Billion-Euro IPO This Month

By [Aaron Kirchfeld](#), [Ruth David](#), and [Myriam Balezou](#)

September 4, 2020, 11:48 AM PDT

- Publisher preparing to announce Frankfurt listing plan
- Company considers seeking valuation of about 7 billion euros



LISTEN TO ARTICLE

▶ 2:10

Springer Nature, the private equity-backed academic publisher, is preparing to kick off a Frankfurt initial public offering, people familiar with the matter said.

SHARE THIS ARTICLE

[Share](#)  
[Tweet](#)

The company targets to announce its intention to float as soon as this month, according to the people. It plans to sell about 1 billion euros (\$1.2 billion) of new stock in the offering, said the people, asking not to be



[Christopher DiVittorio](#) started this petition to [U.S. House of Representatives](#)

Profiteering from the publication of taxpayer-funded research is unethical and the U.S. Congress should act now to make it illegal.

Despite decades of pushback from the scientific community, the vast majority of publicly-funded research remains behind paywalls, inaccessible to most of the world's population except for a select few currently employed at major research universities in Europe and the U.S.

# Support a Federal ban on profiteering from publishing taxpayer-funded research

Currently, academic publishers charge researchers thousands of dollars to publish their papers, expect those same students and professors to review their colleague's papers for free, and then charge the public to read the research they already paid for.

Using this business model investors like BC Partners and the Holtzbrinck family made \$440 million in profits in 2020 with a profit margin of 22.9% with their Springer-Nature family of journals.

For comparison the entire 2020 NSF Environmental Biology budget was \$141 million.

For comparison the average profit margin of large U.S. corporations is 7.9%.

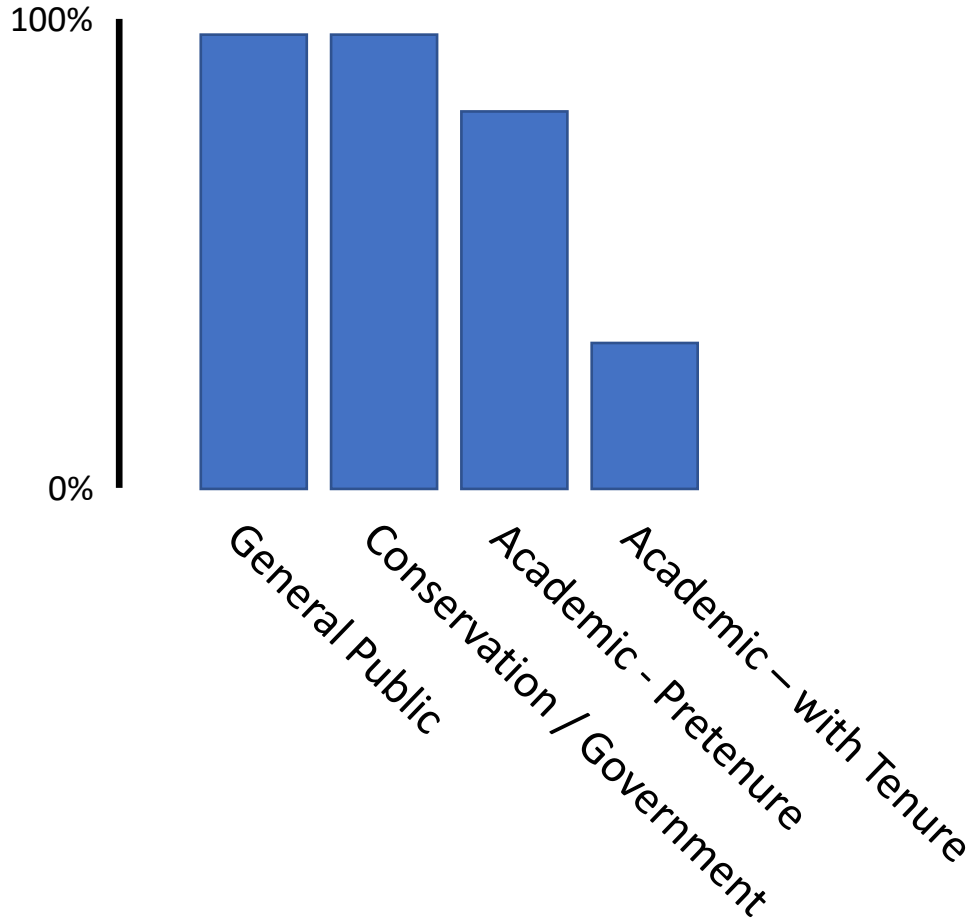
These profits come directly from taxpayers, student tuition, and school donations.



[change.org](https://www.change.org)



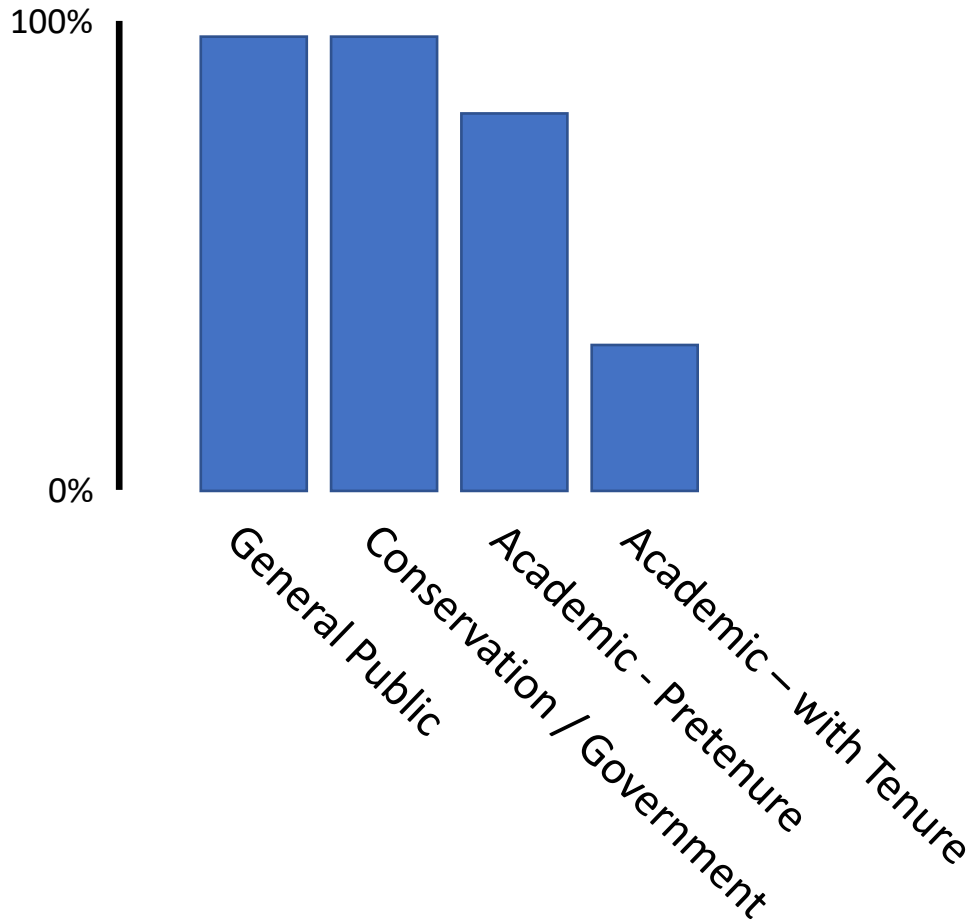
# Proportion that signed petition



[change.org](https://www.change.org)

ZERO negative comments

## Proportion that signed petition

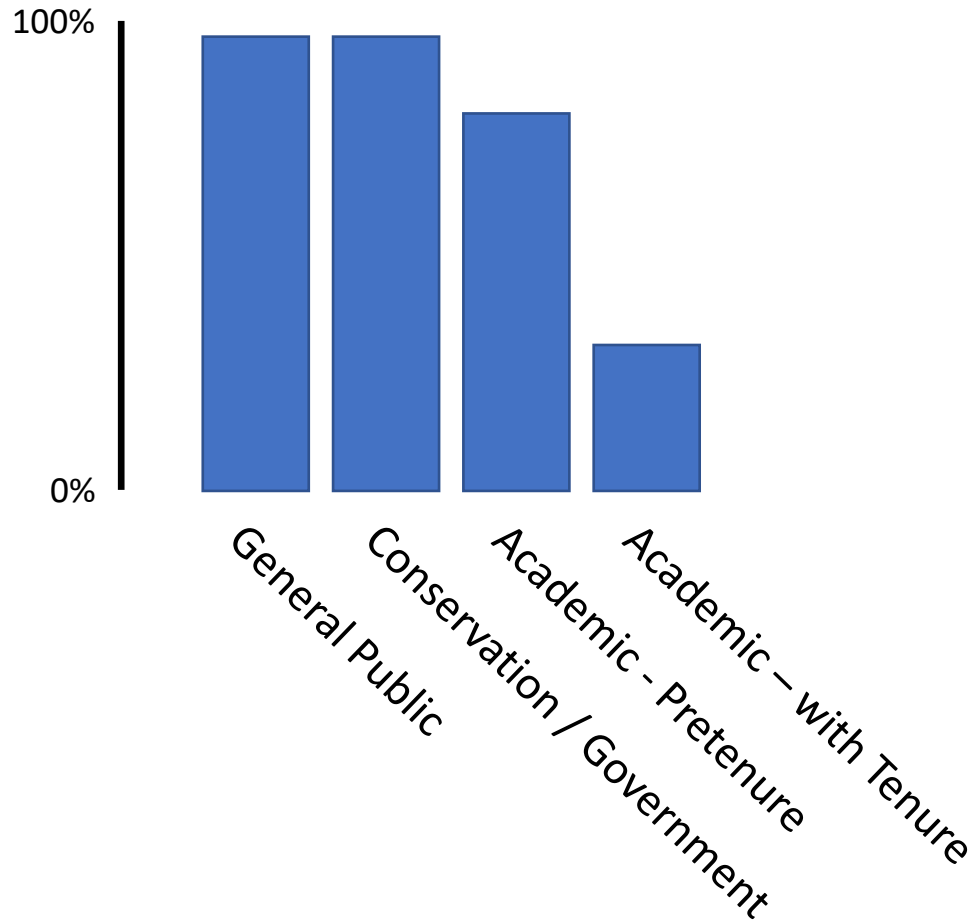


## Reason given for not signing





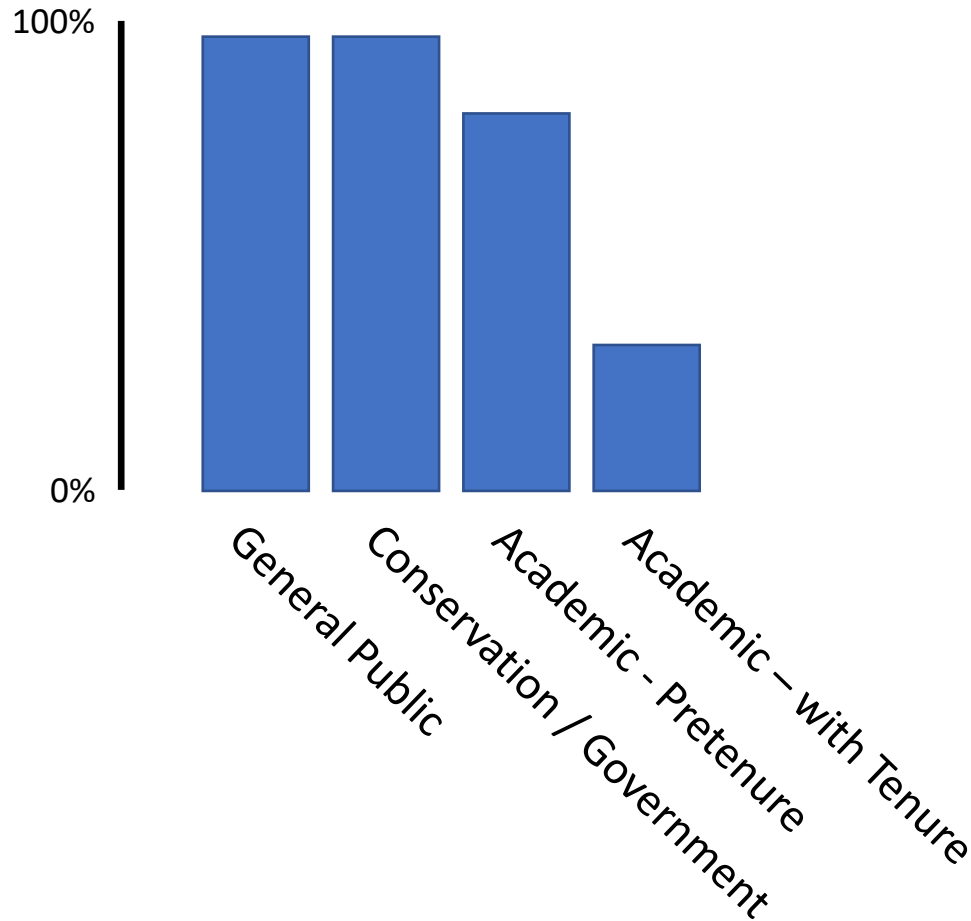
## Proportion that signed petition



## Reason given for not signing



## Proportion that signed petition



## Reason given for not signing



Fear was the only reason given





# PART II: Other Sources of Marginalization

## 1. Publication inflation

- previous slides, many issues; un-scientific; erodes quality of life

## 2. Living wage

- those with the least resources don't matriculate or drop out first
- "just make it work" is not a solution

## 3. Volunteering

- only an option for those that don't need to work
- includes passing reviews to graduate students, undergrad lab assistance

## 4. Anonymous reviews

- It's only anonymous for the reviewers! Authors are not anonymous.
- Who are we protecting? Only benefits those already in positions of power.
- No accountability; "You get what you pay for"

## 5. Tenure

- holdover from 1700's before labor laws and with-cause termination clauses
- no longer encourages taking risks or speaking out (see previous slide)
- at best protects faculty from unfair termination (but we have laws now...)
- at worst allows student abuse, encourages complacency
- enforces conformity; young faculty that challenge the system will lose their jobs

## 6. "Puppy Mill" mentality

- only 2% will get R1 jobs
- other 98% that go to USFWS, nonprofits, start businesses, etc.

# PART III: Solutions

## 1. Publication inflation

- legislation (real solution)
- publication caps, don't submit to for-profit journals (requires altruism)
- waivers (NO!) - who need it the most don't take it (requires cultural capital)
  - barriers work (e.g. Georgia election laws)
- BioRxiv, Sci-Hub (NO!) – separate and unequal, another barrier, also illegal

## 2. Living wage

- do not admit somebody if you cannot pay for their entire way

## 3. Volunteering

- if your work is worth their time, their time is worth your money
- Fair Labor Standards Act

## 4. Anonymous reviews

- get rid of it!

## 5. Tenure

- get rid of it!

## 6. “Puppy Mill” mentality

- get rid of it!
- 98% of people are there for a job to put food on the table, not accolades

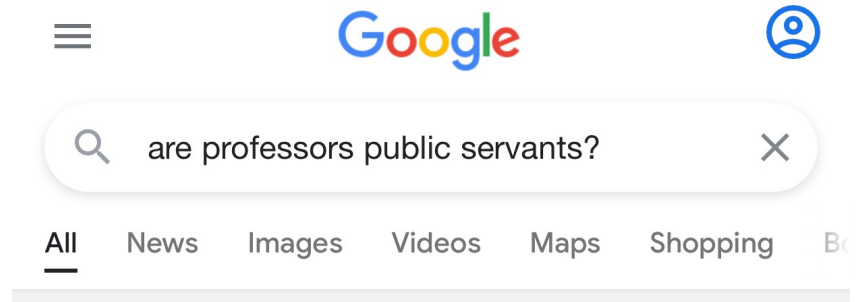


For Faculty:

Public serving....

Or

Self-serving?



**Professors** are **public servants**, most of them tenured and selected by **public** contests, where international research publications is a major criterion for hiring.

- Intense competition for jobs and unrealistic expectations for publication counts creates a slippery slope for researchers.
- The goal is to inform society and train scientists, not publish papers *per se*.
- Most papers that talk about “conservation implications” are not readable by conservation biologists and ecologists working on the ground.
- This short-circuits the purpose of why the public pays to fund science.
- Once problems in your institution have been identified it is not someone else’s problem anymore.

For Students:

# The last place dog at Westminster....



...is still an amazing dog