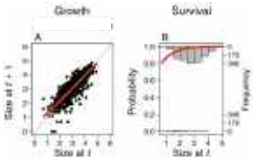
Is there really such a thing as ***Tropical*** Biology?

emilio m. bruna
university of florida
center for latin american studies &
dept. of wildlife ecology & conservation

@BrunaLab

github.com/BrunaLab
www.BrunaLab.org

1



$$n(y,t+1)=\int_L^U [p(x,y)+f(x,y)]n(x,t)dx.$$

λ

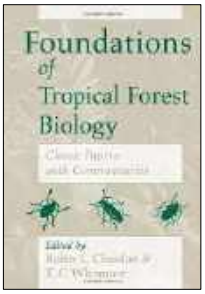
2

3

4

Caveats

This is not a comprehensive historical review.



Pires Campos & Scabelo da Silva (2016) *J Humanities & Social Sci.*

Christen (2002), *The Americas*

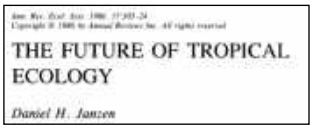
Burlingame (2002), *Rev. Biol. Tropical*

Driver and Yeoh (2002) *Singapore J of Trop. Geography*

Raby (2016) *Environmental History*

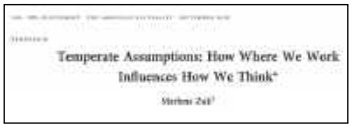
Hagen (1990) *History & Philosophy of the Life Sciences*

This is a question we have wrestled with for decades (centuries?)


THE FUTURE OF TROPICAL ECOLOGY

Daniel H. Janzen

Michael H. Robinson. 1978. Is tropical biology real. *Tropical Ecology* 19(1): 30-52.


Temperate Assumptions: How Where We Work Influences How We Think*

5

Is there really such a thing as **Tropical** Biology?

1. NO
2. MAYBE
3. YES

6

”The scope of your paper makes it more appropriate for a specialized journal focusing on tropical systems".

Sincerely,
Dr. *<name redacted>*
Editor, *<journal name redacted>*

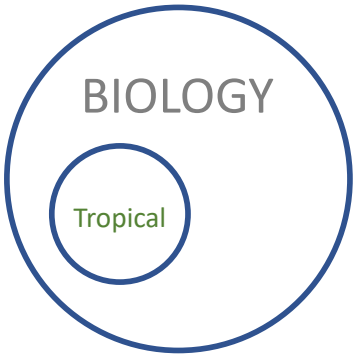
7

ASSOCIATION FOR TROPICAL BIOLOGY AND CONSERVATION

8

Approach & Tools

crosses systems & conceptual domains



Society for Mathematical Biology

ascb the american society for cell biology

SEB SOCIETY FOR EXPERIMENTAL BIOLOGY

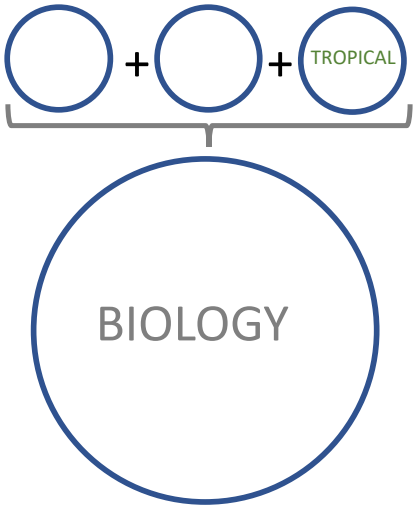
The Society for Integrative & Comparative Biology

SOCIETY FOR IN VITRO BIOLOGY

9

Conceptual Domain

crosses systems & approaches



Society for Conservation Biology

Society of Systematic Biologists

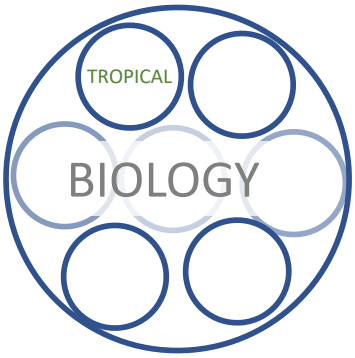
INTERNATIONAL SOCIETY of ETHNOBIOLOGY ISE

COLEVOL ASOCIACIÓN COLOMBIANA DE BIOLOGÍA EVOLUTIVA

10

Study System

crosses conceptual domain & approaches



taxonomy

geology/ geography

(bio)geography

11

ASSOCIATION FOR TROPICAL BIOLOGY AND CONSERVATION

~~Approach & Tools~~

~~Conceptual Domain~~

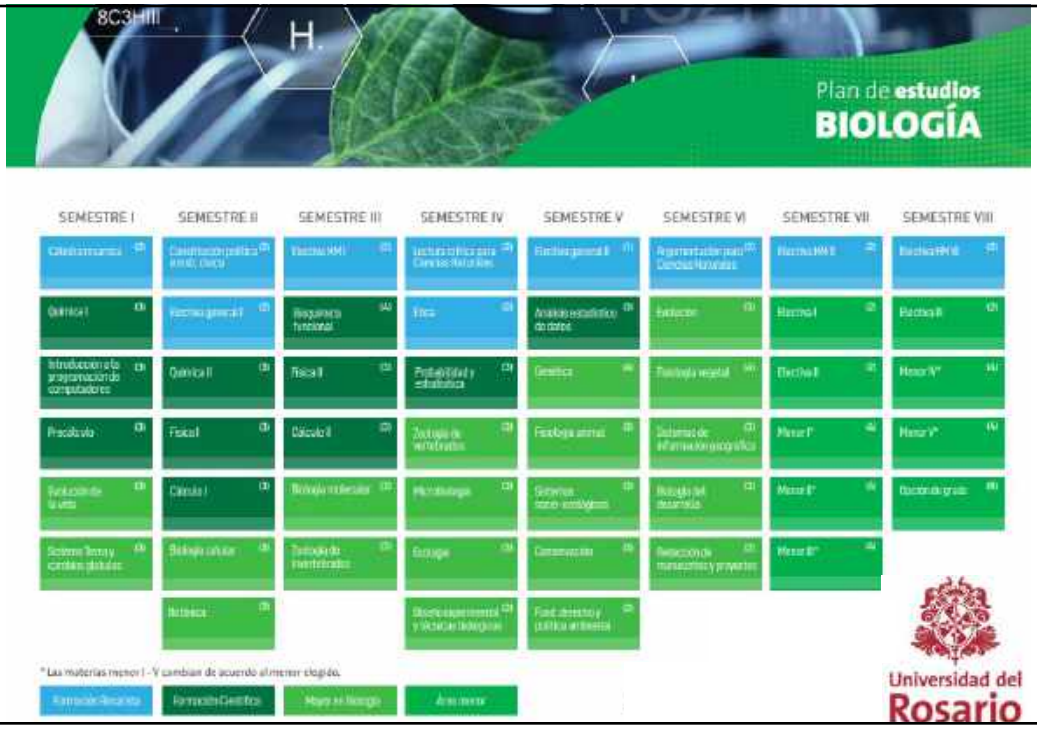
~~Study System~~

12

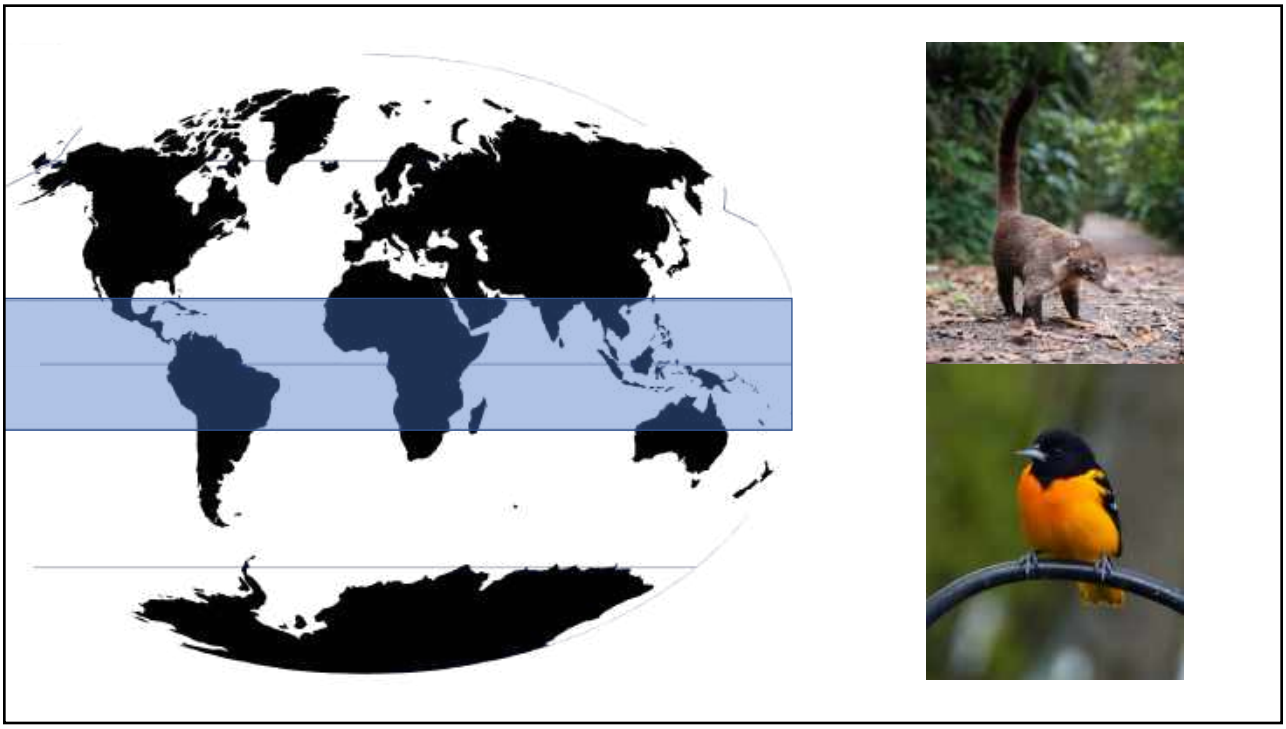
Graduates of the Universidad del Rosario get a degree in

"Biology"

13



14



15

RESEARCH LETTER

Where on Earth are the "tropics"?

Kenneth J. Feeley[1*] and James T. Stroud[2]

Table 1. Summary of eight criteria used to define the terrestrial tropics

Criterion	Brief description of tropics according to criterion
C1	Areas that receive direct overhead solar radiation
C2	Areas with a net positive energy balance
C3	Areas where mean annual temperatures do not vary with latitude
C4	Areas where temperatures do not go below freezing in a typical year
C5	Areas where the mean monthly temperatures are never <18°C
C6	Areas where the mean annual "biotemperature" ≥24°C
C7	Areas where the annual range of temperature is less than the average daily temperature range
C8	Areas where seasonality of precipitation exceeds seasonality of temperature

16

"The Tropics" *(sensu lato)* as a **distinct** & **unique** entity is a historical artefact.

17


Ginger


Pepper


Nutmeg


Canela

18

The Tropics as Paradise

"that if there be any place upon the earth of that nature, beauty, and delight that Paradise had, the same must be found within the tropics…"

Sir Walter Raleigh
History of the World (1614)

Albert Eckhout, *Mameluca woman under a fruiting cashew tree* (ca. 1641)

19

The Tropics as Hellscapes

Theodor DeBry's illustration of South Americans 'cannibals'., ca.1590

"I assure you all the men of this island…have heads like dogs, and teeth and eyes likewise…and eat everybody that they can catch."

The Travels of Marco Polo
Book 3, Ch. 13

20

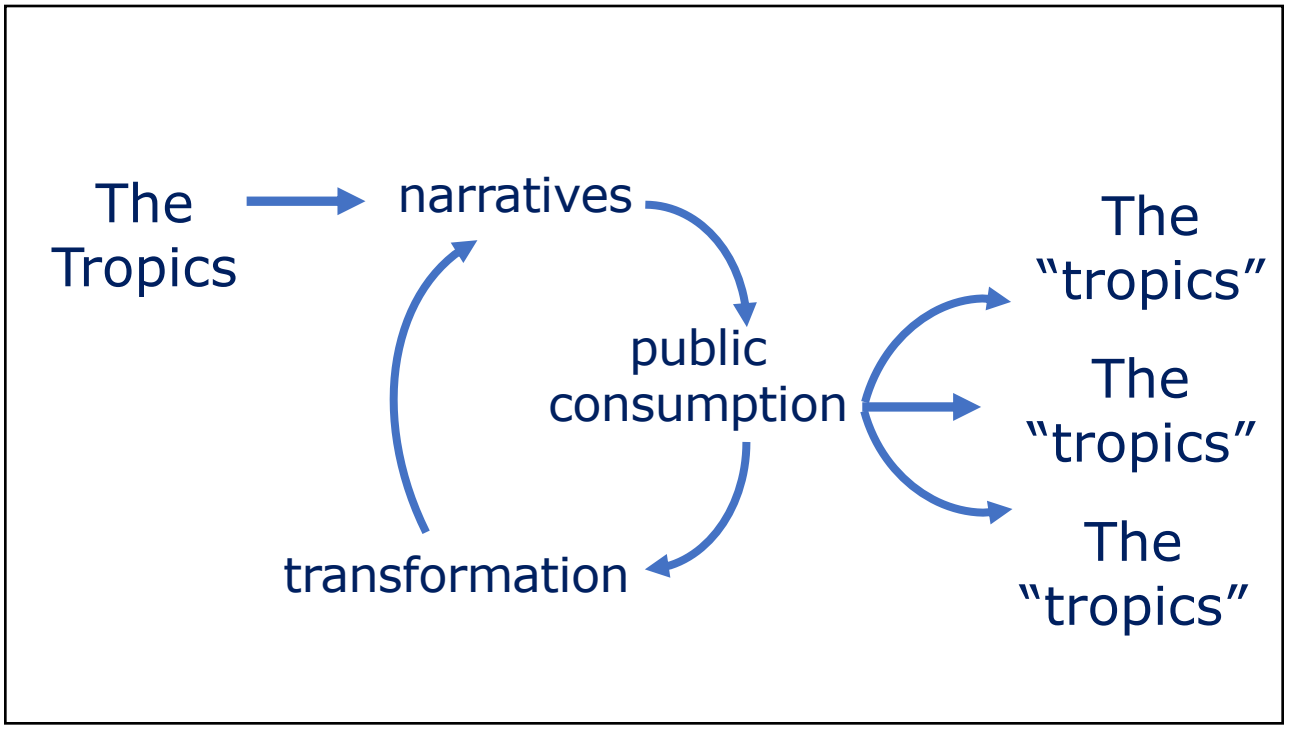
The Tropics as destinations for (self)discovery & proving oneself


Friedrich Georg Weitsch (1806): *Portrait of Alexander von Humboldt*


Hulki Okan Tabak


Photo: Library of Congress

21



22

23

"Calling a part of the globe 'the tropics' became a Western way of defining something environmentally and culturally distinct from Europe, while also perceiving a high degree of common identity between the constituent regions of the tropical world".

David Arnold (1996) *The Problem of Nature: Environment, Culture and European Expansion*, Oxford: Blackwell.

24

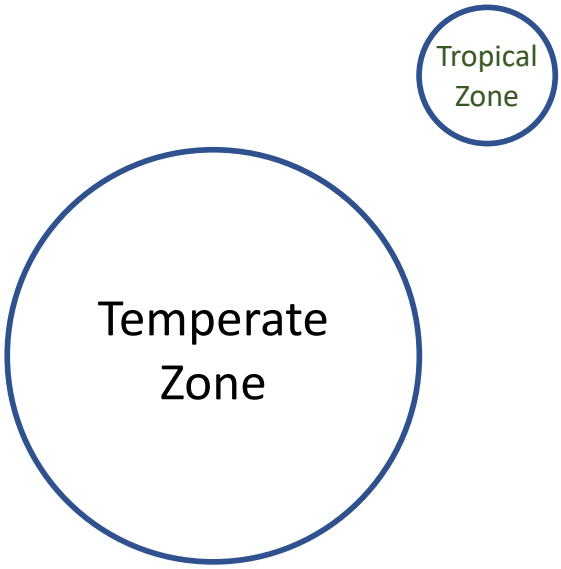

Exotic Tropical Field Site

25


“Pandora - The World of Avatar”
Disney World

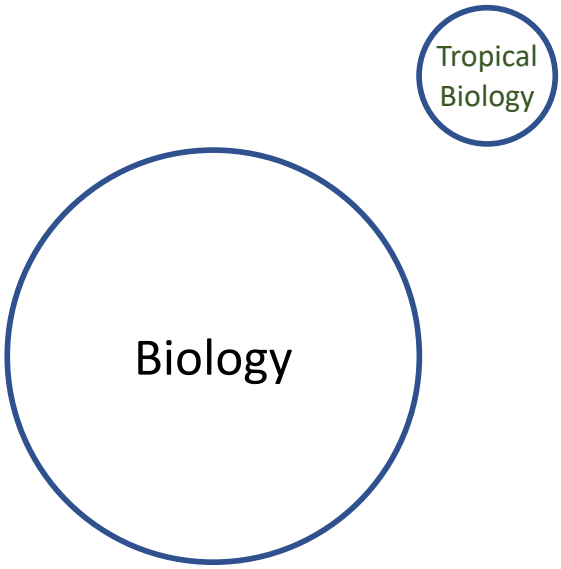
26

The **Tropics** are '**other**' & '**unique**'

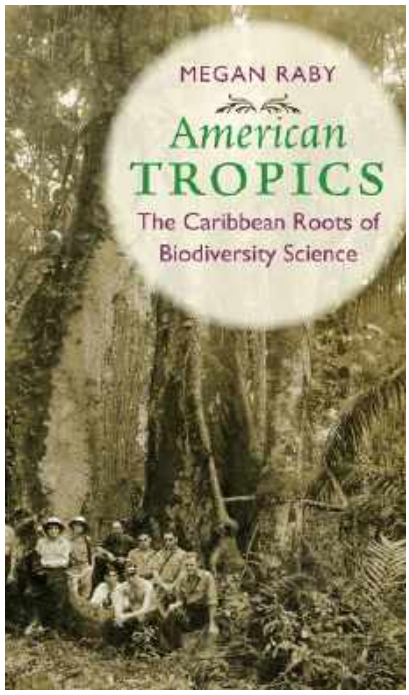


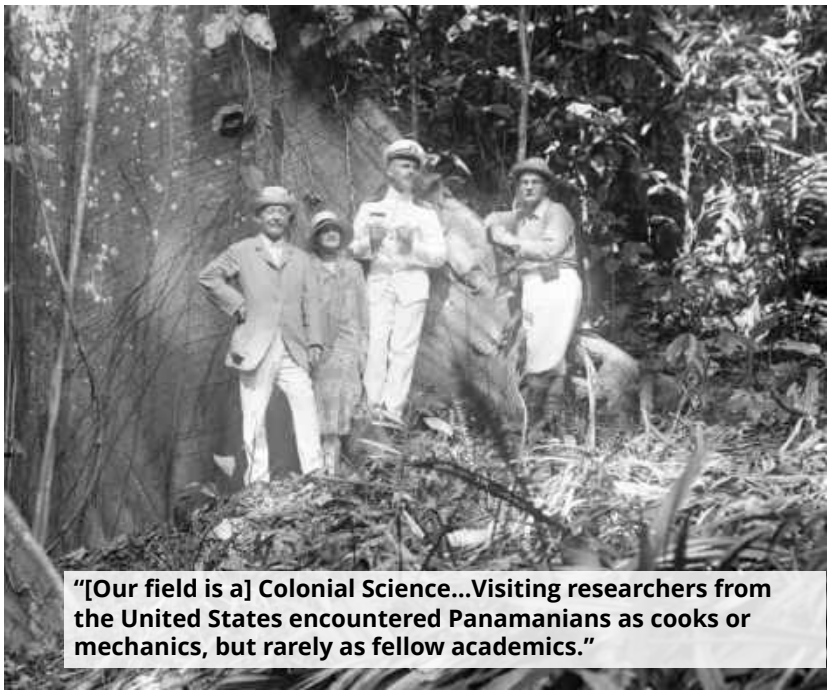
27

The **Biology of the Tropics** is '**unique**'



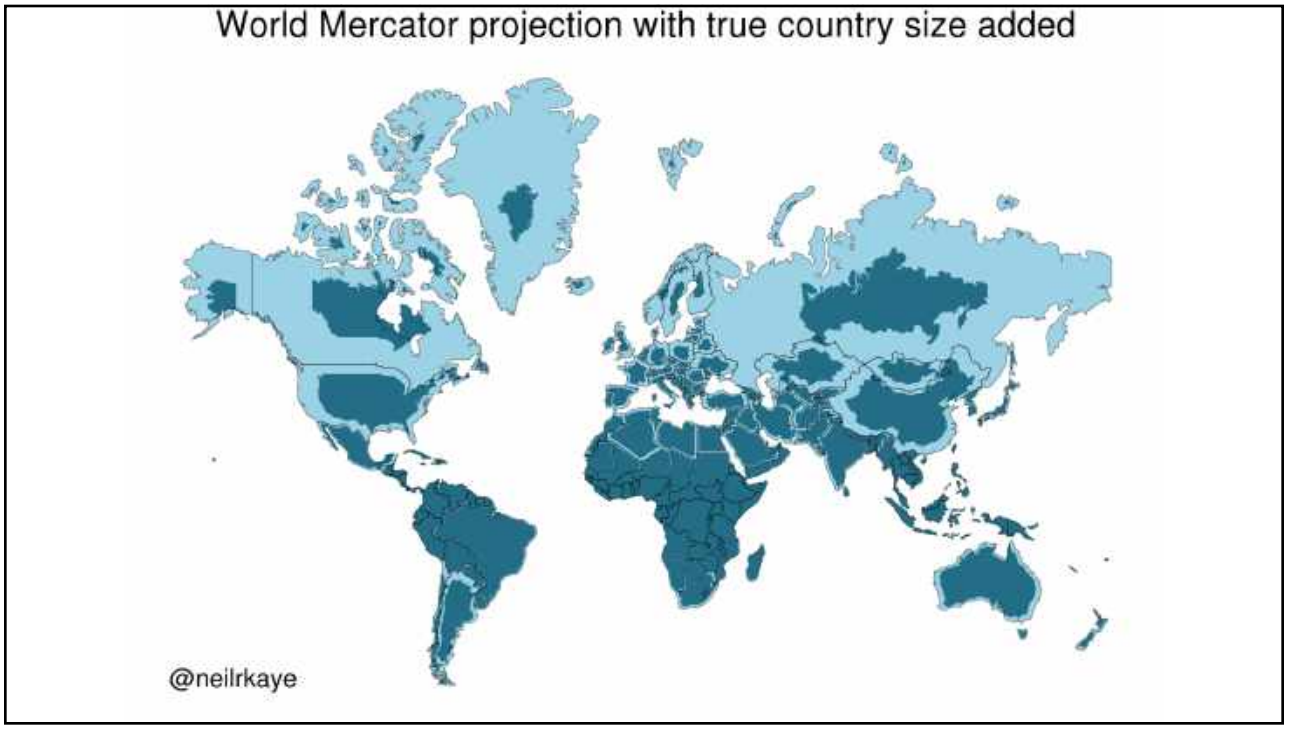
28





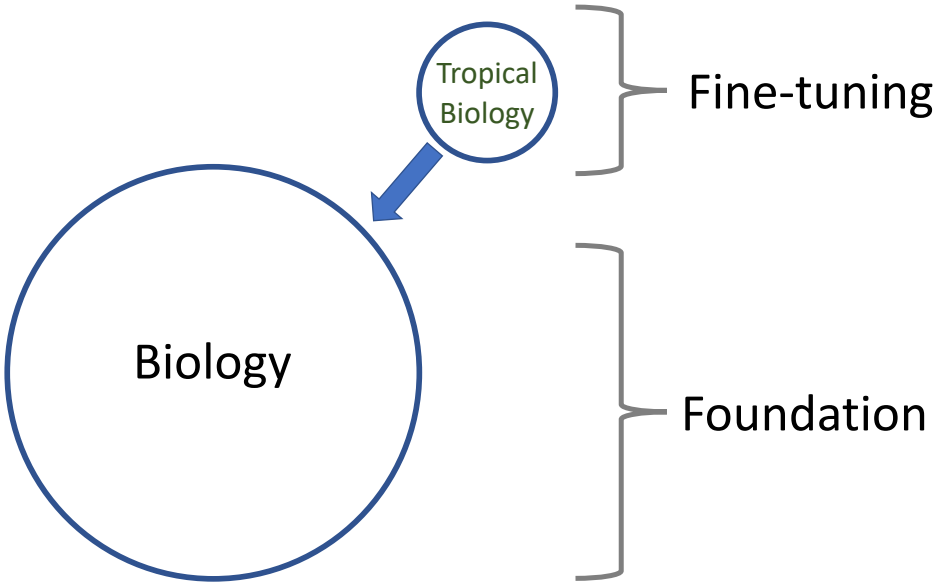
"[Our field is a] Colonial Science…Visiting researchers from the United States encountered Panamanians as cooks or mechanics, but rarely as fellow academics."

29



30

The Biology of the Tropics is "unique"



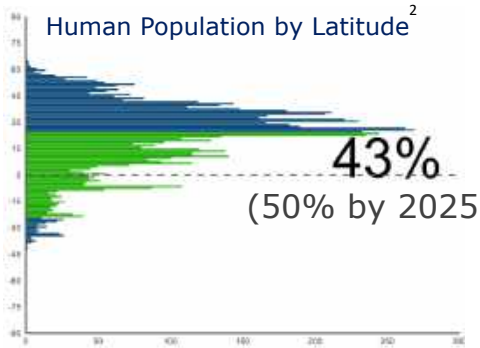
31

Biodiversity [1]

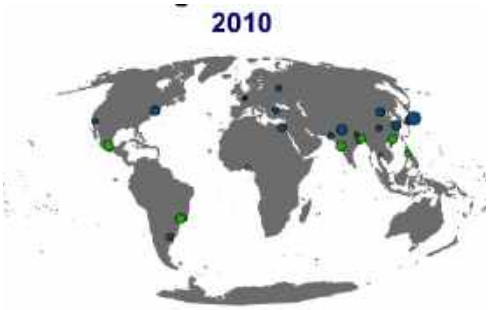
Terrestrial Land Area[2]

40%

Human Population by Latitude[2]



Global Megacities 2000-2100 [2]



[1] Clinton Jenkins, biodiversitymapping.org [2] github.com/BrunaLab

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Published: 25 April 1996
Insect species diversity, abundance and body size relationships in a North American Grassland
Evan Siemann, David Tilman & John Haarstad
Nature 380, 704–706 (1996) | Cite this article


Science
Why Are There So Many Species of Herbivorous Insects in Tropical Rainforests?
Authors Info & Affiliations

33


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Published: 25 April 1996
Insect species diversity, abundance and body size relationships in a North American Grassland
Evan Siemann, David Tilman & John Haarstad
Nature 380, 704–706 (1996) | Cite this article


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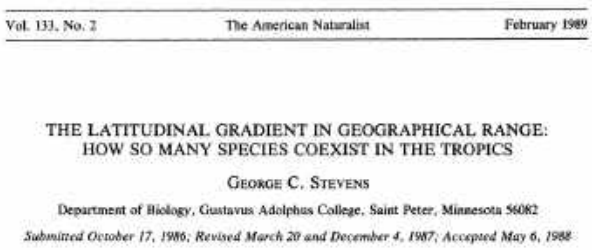
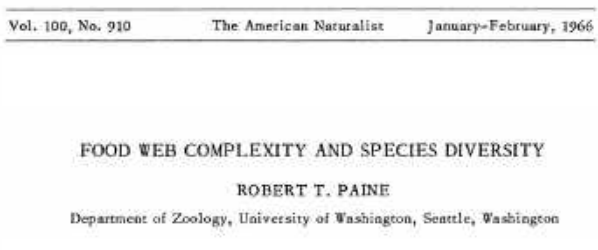

Vol. 133, No. 2 The American Naturalist February 1989
THE LATITUDINAL GRADIENT IN GEOGRAPHICAL RANGE: HOW SO MANY SPECIES COEXIST IN THE TROPICS
GEORGE C. STEVENS
Department of Biology, Gustavus Adolphus College, Saint Peter, Minnesota 56082
Submitted October 17, 1986; Revised March 20 and December 4, 1987; Accepted May 6, 1988


Vol. 100, No. 910 The American Naturalist January–February, 1966
FOOD WEB COMPLEXITY AND SPECIES DIVERSITY
ROBERT T. PAINE
Department of Zoology, University of Washington, Seattle, Washington

34

nature

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nature > letters > article

Published: 25 April 1996

Insect species diversity, abundance and body size relationships in a North American Grassland

Evan Siemann, David Tilman & John Haarstad

Nature 380, 704–706 (1996) | Cite this article

Science

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REPORTS

Why Are There So Many Species of Herbivorous Insects ~~in Tropical Rainforests~~?

Authors Info & Affiliations

Vol. 133, No. 2 The American Naturalist February 1989

THE LATITUDINAL GRADIENT IN GEOGRAPHICAL RANGE: WHY ARE THERE SO FEW SPECIES IN THE TEMPERATE ZONE

GEORGE C. STEVENS

Department of Biology, Gustavus Adolphus College, Saint Peter, Minnesota 56082

Submitted October 17, 1986; Revised March 20 and December 4, 1987; Accepted May 6, 1988

Vol. 100, No. 910 The American Naturalist January–February, 1966

SURPRISINGLY STRONG EFFECTS OF PREDATORY STARFISH ON THE MODERATE-DIVERSITY FOOD WEBS OF NORTH AMERICAN TIDE-POOLS.

ROBERT T. PAINE

Department of Zoology, University of Washington, Seattle, Washington

35

Perspectives in Tropical Biology

S. Dillon Ripley
The Smithsonian Institution

We, in the United States, are inevitably a temperate-zone oriented people. We have always lived and have evolved our culture in the temperate regions; this includes our science as well. Thus, it is not surprising that a disproportionate amount of the scientific information we have gathered concerns the phenomena immediately about us in cooler, strongly seasonal climates. As a result, in the case of biology, a major part of the accumulated biological knowledge is concerned with a rather minor part of the world's fauna and flora, because of the chance development of biology in the temperate zones.

An address given at the Panama Conference on Tropical Biology, Panama City, Nov. 9-12, 1966.

36


ASSOCIATION FOR
TROPICAL BIOLOGY
AND CONSERVATION

37


ASSOCIATION FOR
TEMPERATE BIOLOGY
AND CONSERVATION

38

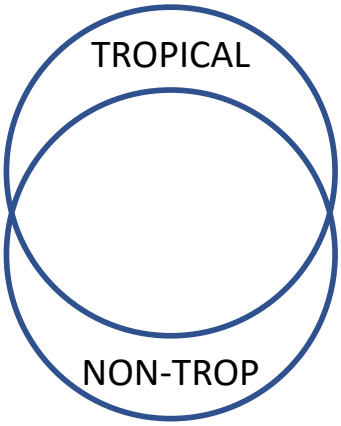
Is there really such a thing as **Tropical** Biology?

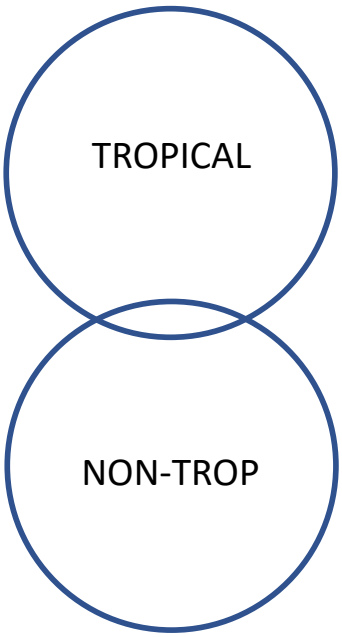
1. NO
2. MAYBE
3. YES

That said…

39

Research Focus





40

What are we studying?

1960-2022
N = 62,750 articles

1976-2022
N = 30,645 with KW
N = 220,612 keywords

41

Cluster Analysis

1

3

2

4

42

Key Words

amnat : 20345
bitr: 18437
ecology: 75727
evol: 37478
jae: 22569
jecol: 28427
jte: 13699
tcs: 3930

	kw	n
	<chr>	<int>
1	(species) diversity/biodiversity	1303
2	competition	1149
3	climate change	986
4	herbivory	861
5	dispersal	729
6	sexual selection	714
7	speciation	660
8	life history	621
9	phenotypic plasticity	614
10	predation	603
11	(tropical) rain forest(s)	588
12	disturbance	583
13	population dynamics	575
14	tropical forest(s)	556
15	adaptation(s)	544
16	seed dispersal	539
17	density dependence	516
18	species richness	511
19	trade-off	510
20	natural selection	421

43

Global Journals

	kw	n
	<chr>	<int>
1	competition	1085
2	(species) diversity/biodiversity	1008
3	climate change	901
4	herbivory	718
5	sexual selection	690
6	dispersal	663
7	speciation	615
8	life history	594
9	phenotypic plasticity	593
10	population dynamics	545
11	predation	543
12	adaptation(s)	522
13	density dependence	495
14	trade-off	495
15	disturbance	412
16	natural selection	403
17	species richness	403
18	coexistance	375
19	food web	367
20	body size	362

Tropical Journals

	kw	n
	<chr>	<int>
1	(tropical) rain forest(s)	415
	tropical forest(s)	324
	seed dispersal	294
	(species) diversity/biodiversity	291
5	brazil	267
6	costa rica	234
7	conservation	198
8	amazon(ia)	196
	ivore(s)	180
10	mexico	172
		171
12	panama	147
		135
14	seed predation	134
15	neotropics	126
16	tropical dry forest	123
17	phenology	121
18	atlantic forest	115
19	pollination	110
20	savanna	110

Anderson et al. 2021, Carmel et al. 2013

44

Title Words (bi-grams)

	word1	word2	n
	<chr>	<chr>	<int>
1	life	history	1148
2	population	dynamics	728
3	sexual	selection	588
4	body	size	538
5	drosophila	melanogaster	520
6	species	richness	443
7	density	dependent	399
8	plant	species	387
9	trade	offs	370
10	sex	ratio	360
11	natural	selection	353
12	rain	forest	346
13	genetic	variation	341
14	reproductive	success	337
15	community	structure	320
16	gene	flow	319
17	density	dependence	293
18	host	plant	277
19	plant	communities	275
20	tree	species	272

A tibble: 20 × 3

	word1	word2	n
	<chr>	<chr>	<int>
1	costa	rica	1167
2	rain	forest	837
3	tropical	forest	314
4	tree	species	309
5	tropical	rain	280
6	seed	dispersal	251
7	national	park	241
8	de	la	240
9	dry	forest	238
10	tropical	dry	219
11	puerto	rico	192
12	atlantic	forest	191
13	costa	rican	177
14	tropical	forests	134
15	cloud	forest	133
16	rain	forests	125
17	en	el	124
18	french	guiana	106
19	species	richness	105
20	tropical	montane	104

45

the  or the  ?

46

”The scope of your paper makes it more appropriate for a specialized journal focusing on tropical systems".

Sincerely,
Dr. *<name redacted>*
Editor, *<journal name redacted>*

47

Is there really such a thing as **Tropical** Biology?

1. NO
2. MAYBE
3. YES

48

What makes Tropical Biology distinct isn't **Biology.**

49

50


PHOTO: TUCA VIEIRA/FOLHA

51

wp

Sri Lankan president to resign next week, says Parliament speaker, after protesters storm residence


PHOTO: DINUKA LIYANAWATTE/REUTERS

52

53

~64%↓

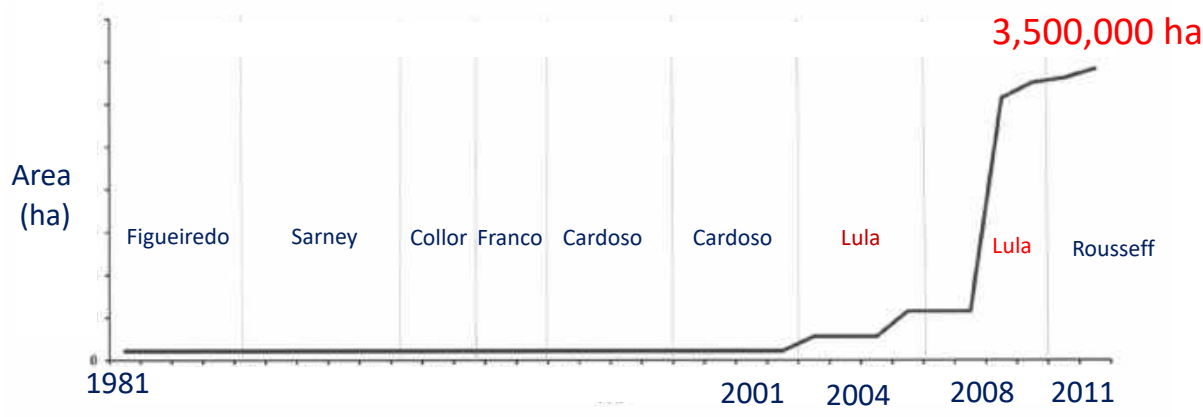
2019: R$5.2 bi 2021: R$1.88 bi

Revista Fapesp (2021)

54

55

Federal Protected Area, Brazil: Cumulative Area Downsized & Degazetted



Bernard, Penna & Araújo (2014)

56

Language

PLOS ONE

Disadvantages in preparing and publishing scientific papers caused by the dominance of the English language in science: The case of Colombian researchers in biological sciences

Valeria Ramírez-Castañeda[1,2,3,*]

1 Department of Catalan Philology, University of Barcelona, Barcelona, Spain, 2 Department of Integrative Biology, University of California, Berkeley, California, United States of America, 3 Museum of Vertebrate Zoology, University of California, Berkeley, California, United States of America

Citation

Conservation Biology

Geographic bias in citation rates of conservation research

Erik Meijaard

PLOS One

Articles by Latin American Authors in Prestigious Journals Have Fewer Citations

Rogerio Meneghini[1,2]*, Abel L. Packer[1,3], Lilian Nassi-Calò[1]

See also Maas et al. 2021, Campos-Arceiz *et al*., 2018; Espin *et al*., 2017; Pettorelli *et al*., 2021; Primack *et al*., 2019

57

Open Access

US$908 average APC for N = 4418 OA journals (Morrison & Singh 2019)

$1500

$1760

$4500

$5380

	MS	PhD
Brazil	$282	$413
Mexico	$493	$711
South Africa	$574	$588

Audrey C. Smith, L Merz, JB Borden, CK Gulick, AR Kshirsagar, EM. Bruna. 2021. Assessing the effect of article processing charges on the geographic diversity of authors using Elsevier's "Mirror Journal" system. *Quantitative Science Studies* 2021; 2 (4): 1123–1143.

58

"The scope of your paper makes it more appropriate for a specialized journal focusing on tropical systems".

Sincerely,
Dr. *<name redacted>*
Editor, *<journal name redacted>*

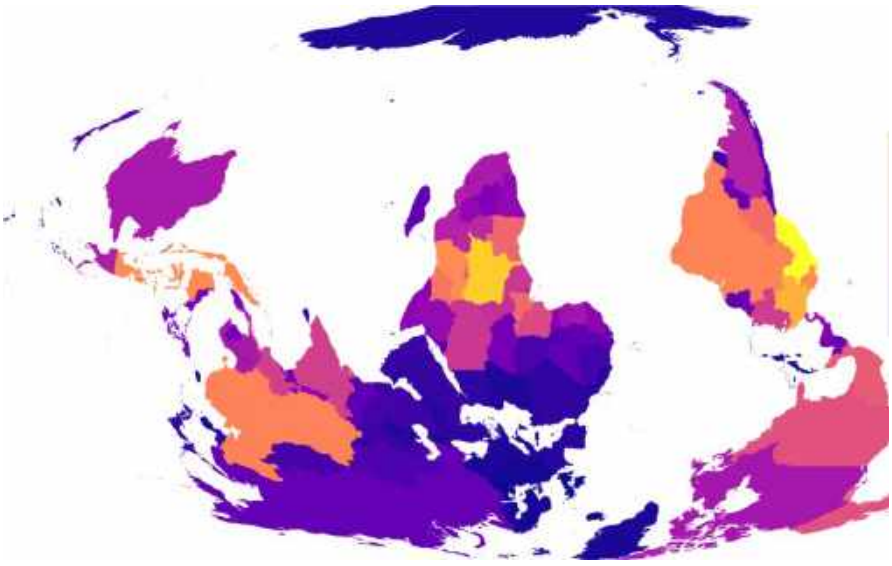
59

60

Tropical Biology sounds terrible.

61

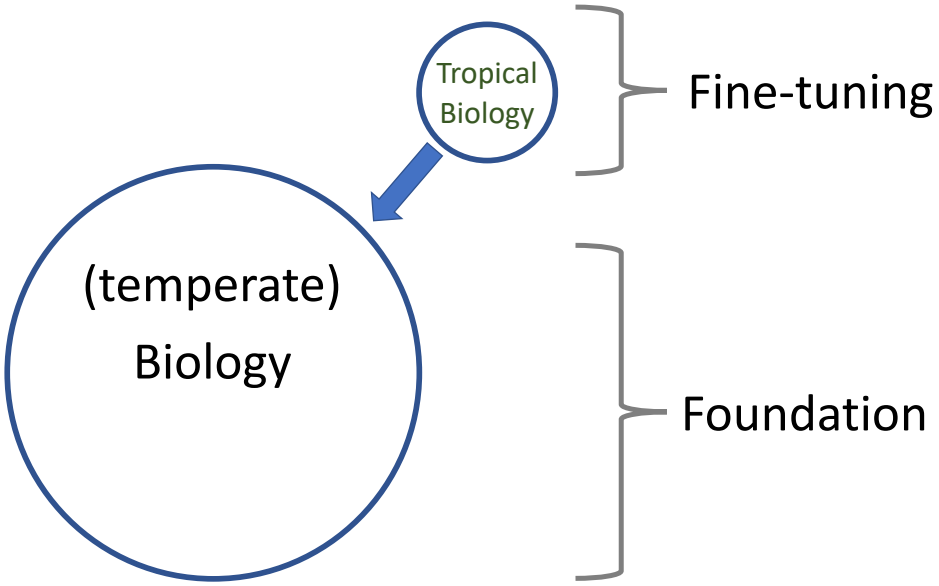
Take back and reshape the Tropical Narrative



Trisos et al. 2021 *Nature Ecology & Evolution*

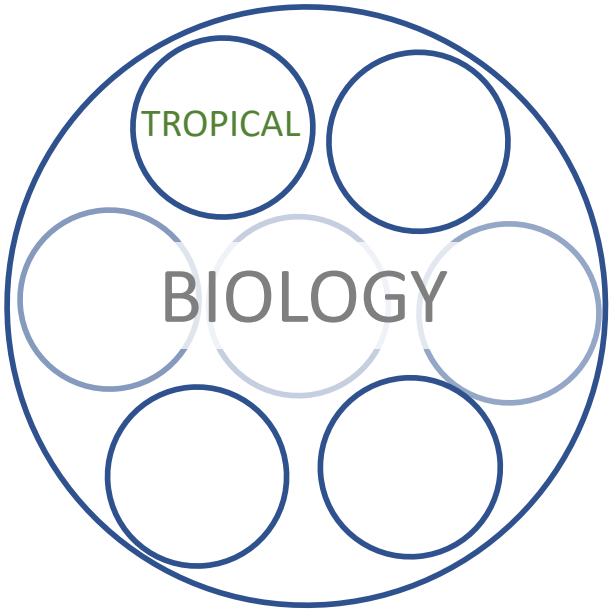
62

The Biology of the Tropics is "unique"



63

The Biology of the Tropics is Biology



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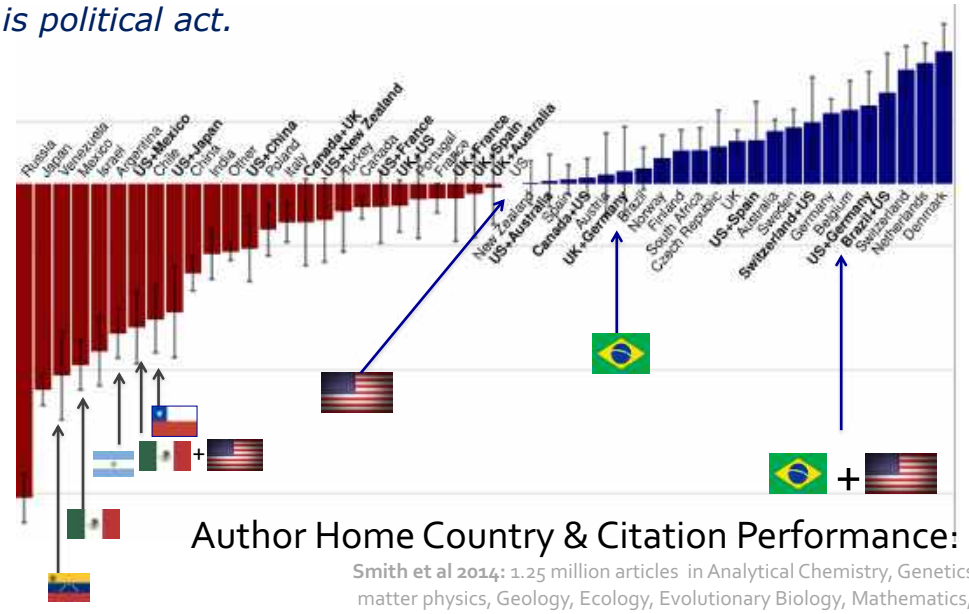
Cite with purpose

Citation is political act.



Author Home Country & Citation Performance: Ecology

Smith et al 2014: 1.25 million articles in Analytical Chemistry, Genetics, Condensed matter physics, Geology, Ecology, Evolutionary Biology, Mathematics, Psychology

65

Teach with purpose.

Elevate the research and biographies of scientists from the tropics on syllabi, speaker series, etc.

Emilie Snethlage (1868-1929)

66

Collaborate with purpose

Multinational Coauthorship pays off. But Coauthorship != Collaboration

67

536 of the articles reviewed in Stocks et al 2008, *Biotropica*

All authors foreign scientists **45%**

All authors in-country scientists **28%**

Multinational teams **27%**

"Informational Diversity"

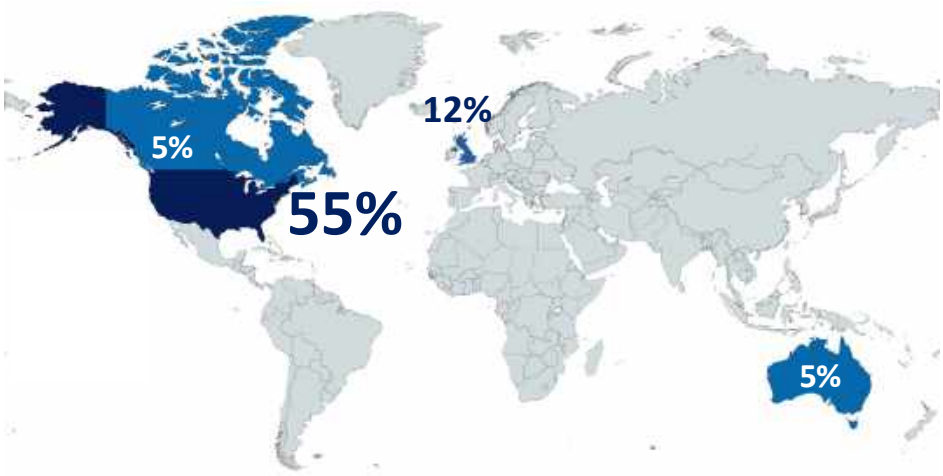
Diversity promotes hard work & creativity before any interpersonal interactions even take place

"Multi-Ethnic Team Indoors" by Ambro, freedigitalphotos.net

68

Expect Change / Make Change

publication practice, academic evaluation, DEIJ

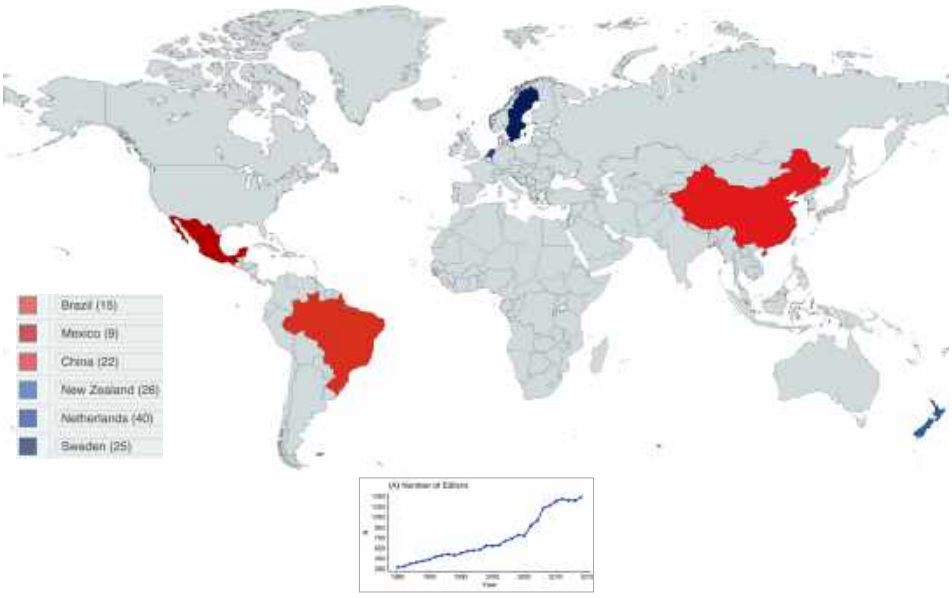


Geographic Distribution of >3800 Editors (1985-2013)

Espin et al. (2017) *PLoS Biol*

69

Brazil, Mexico, & China < Sweden, New Zealand, The Netherlands



70

Get in the Game

Support societies and their journals, join committees, run for office, Organize reading groups, Wikipedia hackathons, start a local student chapter, organize a local ATBC activity or speaker (we'll help with $)

Africa Chapter

Asia-Pacific Chapter

Neotropical Chapter

71

Find new ways to leverage public passion.

People engage with the tropics every day, even if they don't realize it.

72


LAFAYETTE LEOPARDS
FIU
EASTERN ILLINOIS PANTHERS
GEORGIA STATE
SOUTHERN JAGUARS
SOUTH ALABAMA JAGUARS
IUPUI JAGUARS
HIGH POINT UNIVERSITY
UNI
SLU
JACKSON STATE
PACIFIC
TOWSON
MILWAUKEE PANTHERS
TSU
PVAMU
LSU
GRAMBLING TIGERS
IDAHO STATE BENGALS

73

74


PUMA
Slazenger
JAGUAR
718 Cayman
LACOSTE
crocs
mailchimp
LOTUS
TIGER BALM
GORILLA
amazon

75

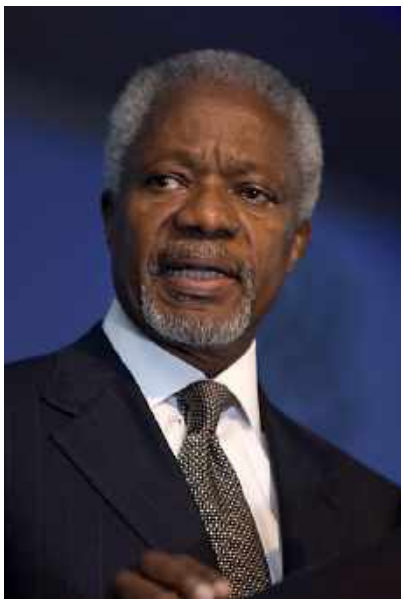

Balenciaga jungle print top and mini skirt ensemble, ss 2003
$7,022.57

76

Congratulate each other.

It takes Hard Work & Resilience to do this, but it really matters.

77



"95% of the new science in the world is created in the countries comprising only 1/5 of the world's population. And much of that science -- in the realm of health, for example -- neglects the problems that afflict most of the world's people.

Kofi Annan (2003) *Science* 299: 1485

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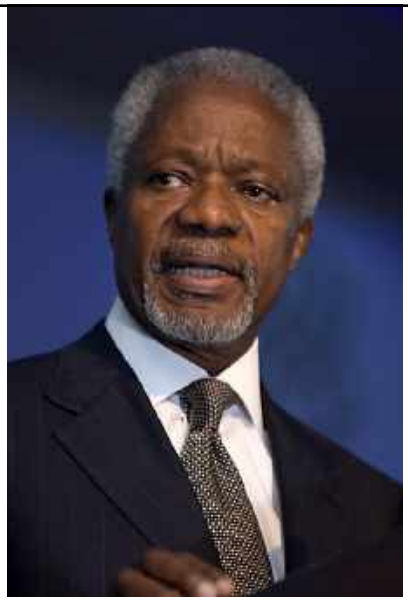


"This unbalanced distribution of scientific activity generates serious problems not only for the scientific community in the developing countries, but for development itself.
It accelerates the disparity between advanced and developing countries, creating social and economic difficulties at both national and international levels."

Kofi Annan (2003) *Science* 299: 1485

79

ASSOCIATION FOR TROPICAL BIOLOGY AND CONSERVATION

80

Some slides that had to be cut due to time constraints…

81

82

Other fields have no problem with journals that have an explicitly geographic focus.

83

Learn & Elevate the scientific history and contributions of tropical countries

1538	Santo Domingo (Santiago de La Paz) Dom Rep
1551	National University of San Marcos Peru
1551	**Royal and Pontifical University of Mexico**
1552	La Plata Bolivia
1580	Saint Thomas Aquinas University Colombia
1586	Quito (San Fulgencio) Ecuador
1613	National University of Córdoba Argentina
1621	Santiago (San Miguel) Chile
1621	Cuzco (San Ignacio de Loyola) Peru
1621	University of Saint Francis Xavier Bolivia
1623	Pontifical Xavierian University Colombia
1624	Real y Pontificia Universidad de Mérida (Yucatán)
1636	Harvard USA (1658)
1653	Universidad del Rosario Colombia

Brazil's *Museu Nacional* : 1818
Smithsonian 1846
AMNH: 1869
Field Museum: 1893

Revista de Marina (Chile) 1885

Memoria de la Sociedad Rural (Argentina) 1900

Anales - Museo Nacional de Hist Nat y Antropología (Uruguay) 1920

A Folha Médica (Brazil) 1920

Indian Plant classification in the Rigveda: 3700–3100 BP

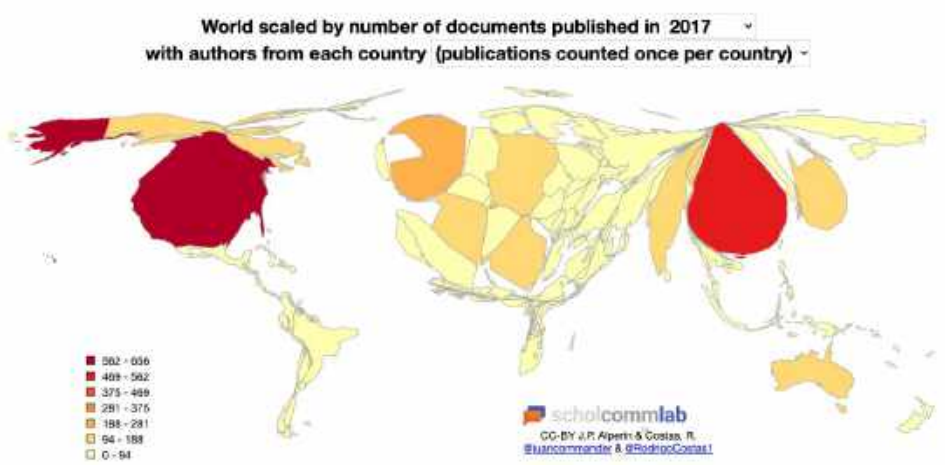
84

The Future of Tropical Biology

”There are few things more presumptuous than a US scientist holding forth on the future of tropical ecology”

Dan Janzen, “Whither Tropical Ecology” (1972)

85



Source: http://scholcommlab.ca/cartogram/

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