

Phinch: An interactive, exploratory data visualization framework for –Omic datasets

@hollybik

Assistant Professor, Department of Nematology
University of California Riverside

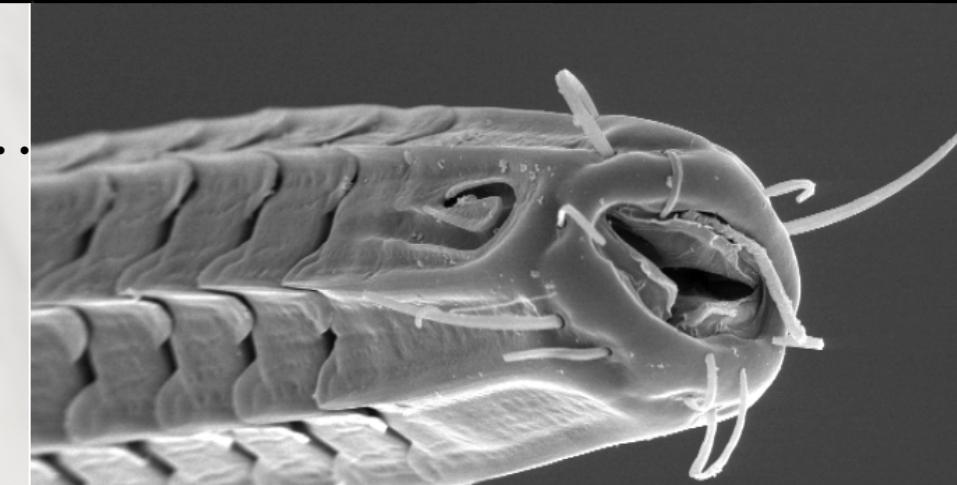
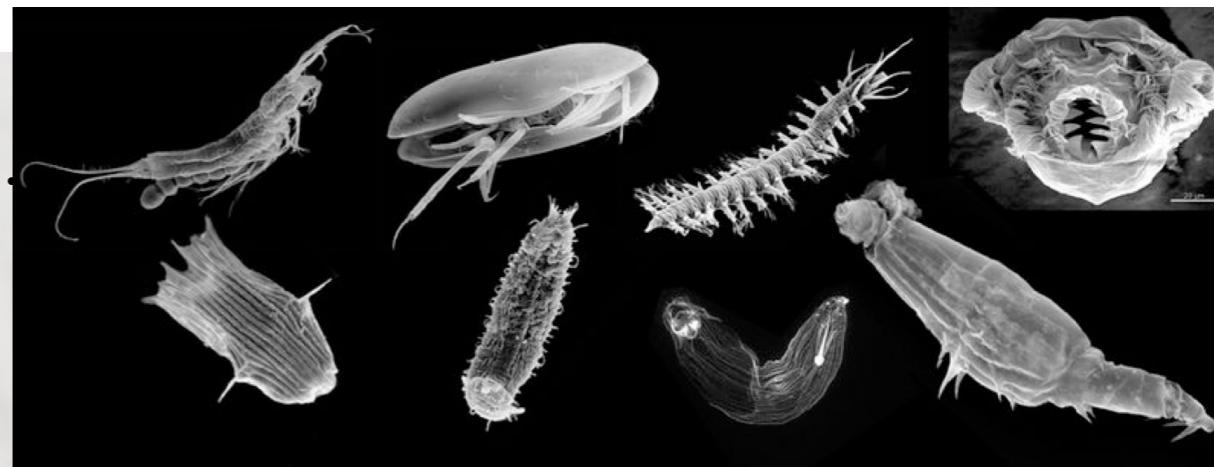


microbial eukaryotes (metazoa) in marine sediments

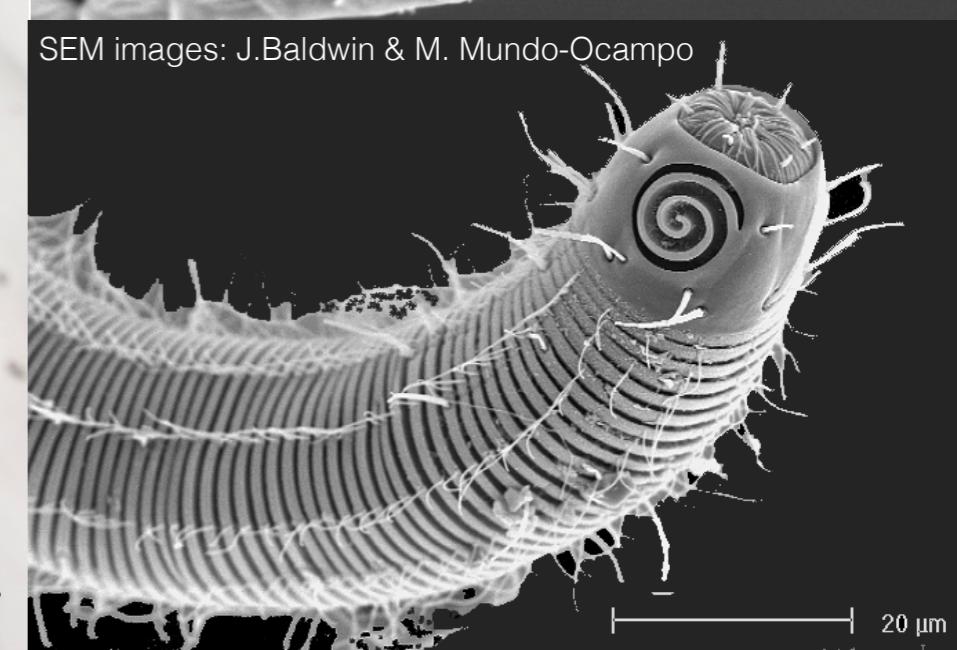
worms, crustaceans, protists, fungi...



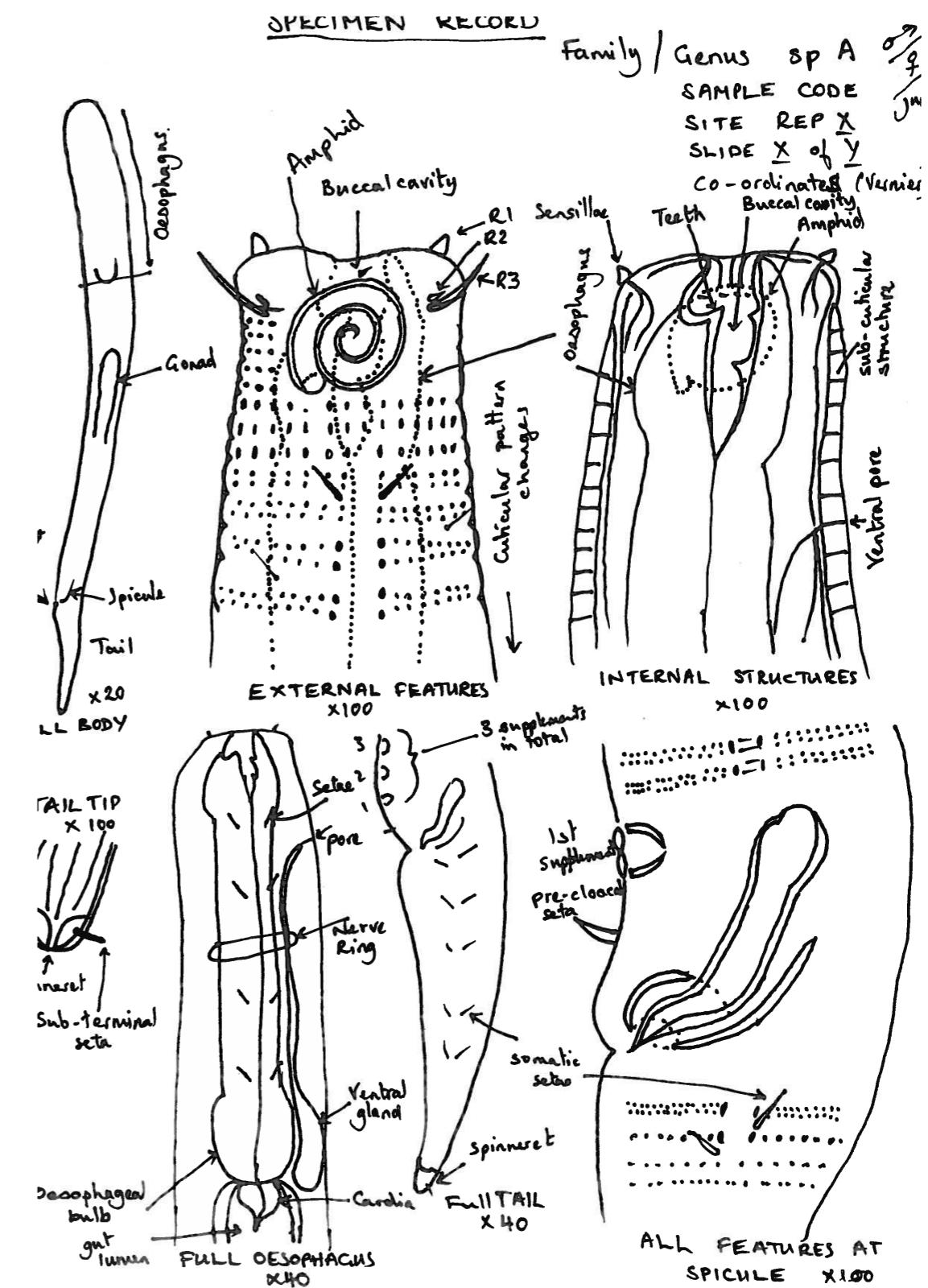
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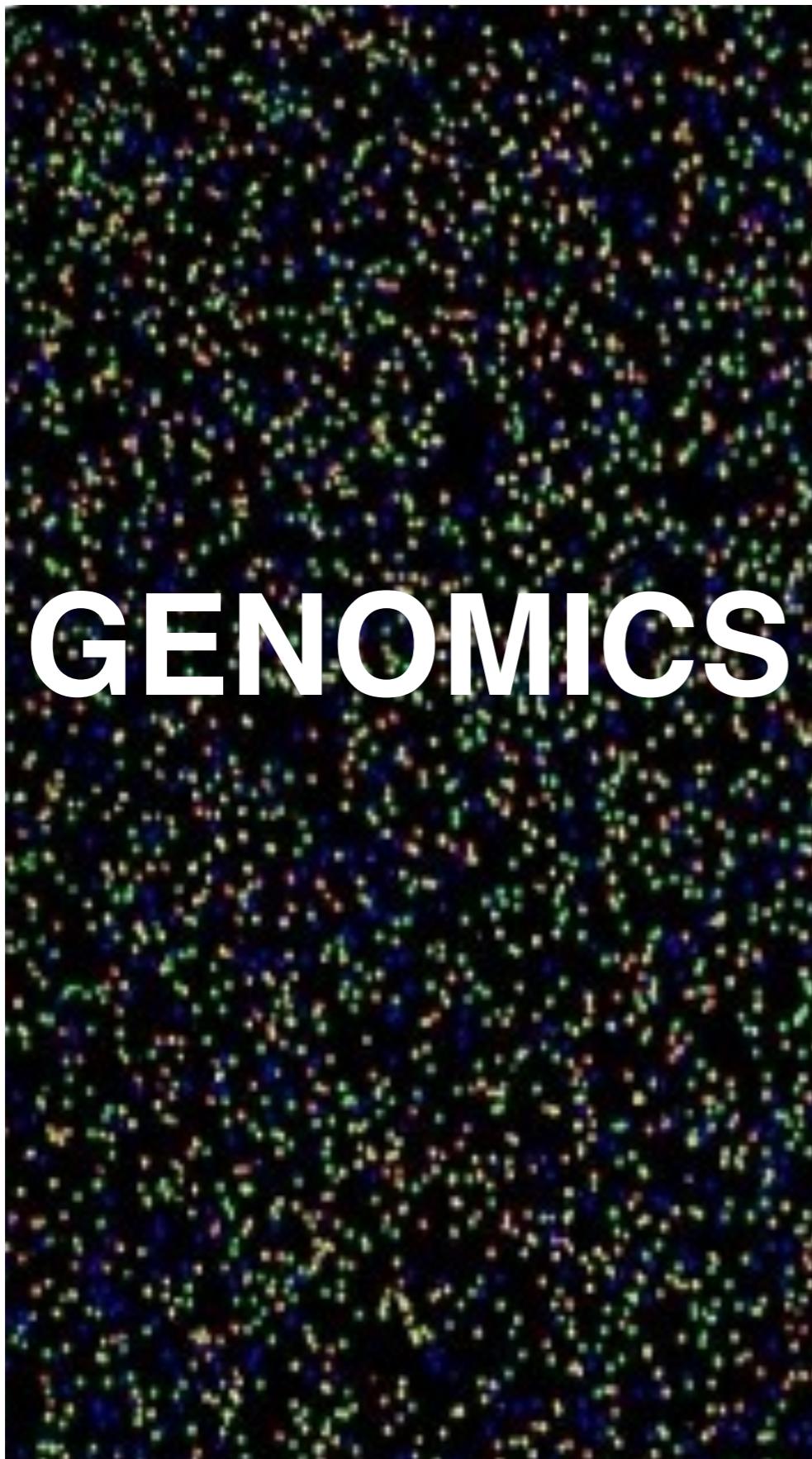
SEM images: J.Baldwin & M. Mundo-Ocampo



Taxonomy: The Olden Days



Genomics: The Modern Age



GENOMICS



SPACE

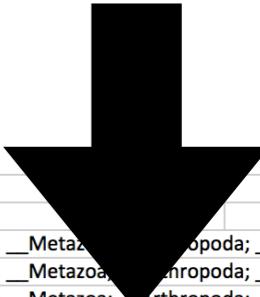
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How do we infer biology when data looks like this?



(JSON-formatted file)

or this (converted to Excel)



14,287 Operational Taxonomic Units clustered at 99% in QIIME

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|-------------------------------|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-------|---|
| New.CleanUp.ReferenceOTU44113 | 0 | 0 | 61518 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 61535 Eukaryota; __SAR |
| New.CleanUp.ReferenceOTU41069 | 0 | 0 | 44415 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44415 Eukaryota; __Opisthokonta; __Metazoa; __Stramenopiles; __Ostracoda; __Monotrichia; __ |
| New.CleanUp.ReferenceOTU21602 | 11102 | 5 | 30190 | 66 | 0 | 8 | 67 | 53 | 3 | 63 | 3 | 0 | 41560 Eukaryota; __Opisthokonta; __Metazoa; __Arthropoda; __Maxillopoda; __ |
| New.CleanUp.ReferenceOTU32206 | 12 | 10 | 88 | 0 | 0 | 0 | 33927 | 0 | 0 | 4048 | 0 | 0 | 38085 Eukaryota; __Opisthokonta; __Metazoa; __Arthropoda; __Maxillopoda; __ |
| New.ReferenceOTU2047 | 0 | 0 | 2307 | 25 | 5 | 0 | 33278 | 0 | 0 | 0 | 2 | 2 | 35619 Eukaryota; __Opisthokonta; __Metazoa; __Nematoda; __Chromadorea; __Sphaerulomycetes |
| New.CleanUp.ReferenceOTU65817 | 0 | 0 | 52 | 0 | 0 | 0 | 30645 | 0 | 0 | 0 | 4 | 0 | 30701 Eukaryota; __Opisthokonta; __Metazoa; __Annelida; __ |
| New.ReferenceOTU4763 | 161 | 0 | 229 | 713 | 0 | 0 | 22119 | 12 | 354 | 57 | 0 | 0 | 23645 Eukaryota; __Opisthokonta; __Metazoa; __Nematoda; __Chromadorea; __Monotrichia |
| New.ReferenceOTU7704 | 38 | 25 | 7128 | 2326 | 64 | 0 | 12400 | 0 | 0 | 0 | 0 | 0 | 21981 Eukaryota; __SAR; __Stramenopiles; __Labyrinthulomycetes; __Thraustochytria |
| New.CleanUp.ReferenceOTU21605 | 2833 | 0 | 18199 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21032 Eukaryota; __Opisthokonta; __Metazoa; __Nematoda; __Enoplea; __Oxystomiridae |
| New.ReferenceOTU10317 | 3 | 0 | 0 | 0 | 0 | 0 | 19781 | 0 | 0 | 0 | 0 | 0 | 19784 Eukaryota; __Opisthokonta; __Metazoa; __Arthropoda; __Maxillopoda; __ |
| New.ReferenceOTU10063 | 4124 | 227 | 1634 | 191 | 176 | 1 | 5962 | 66 | 454 | 1902 | 53 | 0 | 14790 Eukaryota; __Excavata; __Discoba; __Heterolobosea; __Tetramitida; __Vahlkampfiidae |
| New.CleanUp.ReferenceOTU19817 | 238 | 14 | 1841 | 119 | 238 | 1 | 9635 | 41 | 0 | 6 | 0 | 0 | 12133 Eukaryota; __Opisthokonta; __Metazoa; __Nematoda; __Chromadorea; __Linhida |
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| New.CleanUp.ReferenceOTU75550 | 2 | 0 | 507 | 53 | 0 | 0 | 10208 | 0 | 0 | 0 | 0 | 0 | 10770 Eukaryota; __Opisthokonta; __Metazoa; __Nematoda |
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| New.CleanUp.ReferenceOTU46453 | 1121 | 0 | 0 | 0 | 0 | 0 | 9295 | 0 | 0 | 0 | 0 | 0 | 10416 Eukaryota; __Opisthokonta; __Metazoa; __Nematoda; __Enoplea; __Oxystomiridae |
| New.ReferenceOTU10012 | 0 | 0 | 10290 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10290 Eukaryota |
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| New.ReferenceOTU2617 | 9 | 0 | 7615 | 609 | 0 | 0 | 740 | 0 | 0 | 0 | 0 | 0 | 8973 Eukaryota; __SAR; __Stramenopiles; __Peronosporomycetes; __ |
| New.ReferenceOTU10068 | 1879 | 0 | 0 | 0 | 0 | 0 | 6754 | 0 | 0 | 0 | 0 | 0 | 8633 Eukaryota; __Opisthokonta; __Metazoa; __Nematoda; __Enoplea; __Anticomidae |
| New.ReferenceOTU2075 | 395 | 3 | 922 | 446 | 98 | 0 | 6438 | 0 | 0 | 0 | 0 | 0 | 8302 Eukaryota; __Archaeplastida; __Chloroplastida; __Prasinophytaceae; __Prasinodermata |
| New.ReferenceOTU945 | 312 | 0 | 155 | 0 | 0 | 0 | 7657 | 0 | 0 | 0 | 0 | 0 | 8124 Eukaryota; __Opisthokonta; __Metazoa |
| New.CleanUp.ReferenceOTU299 | 8070 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8071 Eukaryota; __Opisthokonta; __Metazoa; __Annelida; __ |
| New.ReferenceOTU8794 | 7609 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7609 Eukaryota; __Opisthokonta; __Metazoa |
| New.ReferenceOTU4178 | 0 | 0 | 0 | 0 | 0 | 0 | 7377 | 0 | 0 | 0 | 0 | 0 | 7377 Eukaryota; __Opisthokonta; __Metazoa; __Annelida; __ |
| New.ReferenceOTU10243 | 0 | 0 | 6812 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6812 Eukaryota; __Opisthokonta; __Metazoa; __Arthropoda; __Ostracoda; __ |
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| New.ReferenceOTU1963 | 1 | 34 | 2764 | 0 | 0 | 0 | 3668 | 0 | 0 | 0 | 0 | 0 | 6467 Eukaryota; __SAR; __Alveolata; __Ciliophora; __Spirotrichaea; __Choreotrichia; __ |
| New.CleanUp.ReferenceOTU45981 | 0 | 6290 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6290 Eukaryota; __Opisthokonta; __Metazoa |

Data Visualization: ushering in the future by embracing the past

The Human Brain:
6 million years of evolution
visual cortex, pattern matching

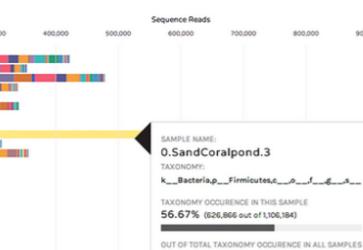
Taxonomic Knowledge:
280 years of scientific effort
species descriptions, drawings

GRAPH GALLERY

FILTER DATA

http://phinch.org

Taxonomy Bar Chart



TOP SEQUENCES

| | |
|--|-----------|
| K...Bacteria,p...Proteobacteria,c...o...f...g...s... | 3,760,570 |
| K...Bacteria,p...Firmicutes,c...o...f...g...s... | 1,550,289 |
| K...Bacteria,p...Bacteroidetes,c...o...f...g...s... | 1,422,979 |
| K...Bacteria,p...Cyanobacteria,c...o...f...g...s... | 1,119,423 |
| K...Bacteria,p...Planctomycetes,c...o...f...g...s... | 1,070,887 |
| K...Bacteria,p...Verrucomicrobia,c...o...f...g...s... | 313,502 |
| K...Bacteria,p...Acidobacteria,c...o...f...g...s... | 139,097 |
| K...Bacteria,p...Chloracidobacteria,c...o...f...g...s... | 126,938 |
| K...Bacteria,p...Acidobacteriia,c...o...f...g...s... | 104,130 |
| K...Archaea,p...Crenarchaeota,c...o...f...g...s... | 99,549 |

Bubble Chart

Kingdom — Phylum — Class — Order — Family — Genus — Species

BUBBLE LIST
1 — • ● — 1,788,577



Sankey Diagram

Kingdom — Phylum — Class — Order — Family — Genus — Species

search...

| |
|-------------------------|
| c...Gammaproteobacteria |
| p...Bacteroidetes |
| c...Flavobacteria |
| b...Flavobacteriales |
| c...Betaproteobacteria |
| p...Actinobacteria |
| c...Actinobacteria |
| p...Adidobacteria |
| c...Chloracidobacteria |
| b...Bacteroidia |
| y...Bacteroidales |
| c...Acidobacteria |
| b...Acidobacteriales |
| c...Syntrophobacterales |
| c...Acidobacteria-6 |

Donut Partition



Dynamic Stand.



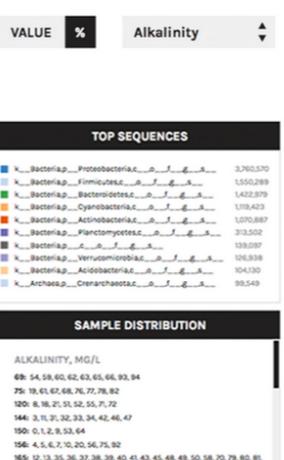
Dynamic Stand.

Dynamic Stand.

Attributes Column Chart

Kingdom — Phylum — Class — Order — Family — Genus — Species

search...



Principal Investigator,
project funded by



**ALFRED P. SLOAN
FOUNDATION**

Bik HM and Pitch Interactive
(preprint) bioRxiv,
doi: <http://dx.doi.org/10.1101/009944>

http://phinch.org



BLOG ABOUT HELP

Drop file here or browse

BROWSE

LOAD FILE

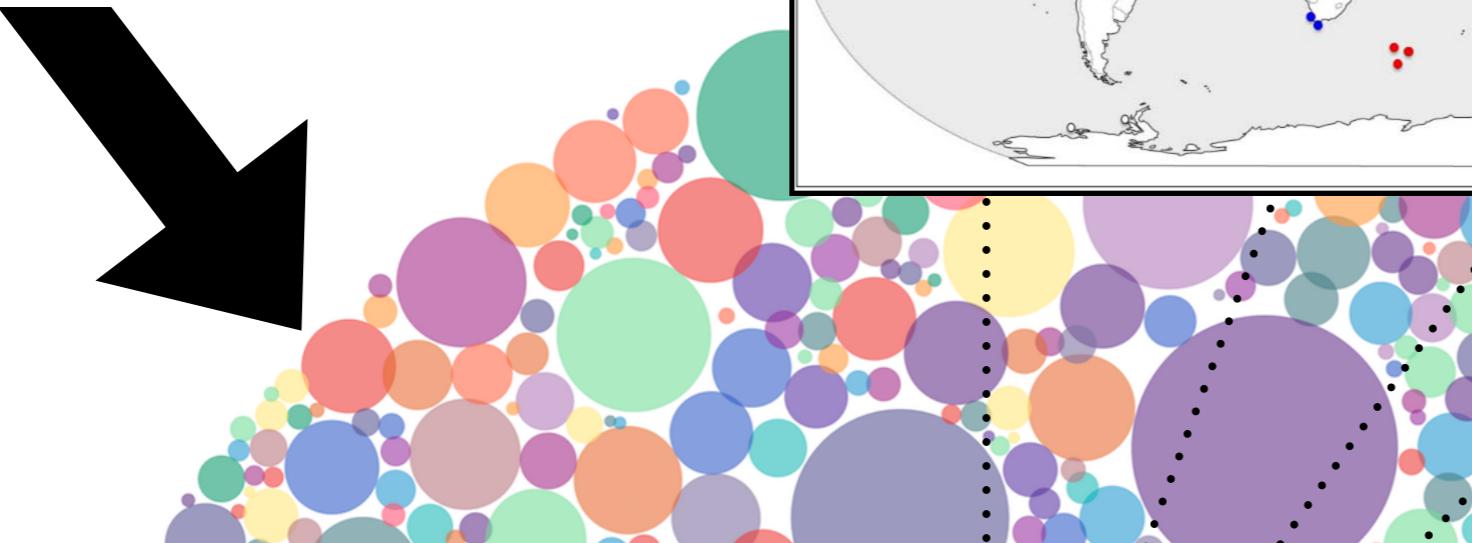
load a test file

Cite Phinch

Please cite the Phinch framework as follows: Bik, H.M., Bu, S., Grubbs, W. (manuscript in preparation) Phinch: An interactive, exploratory data visualization framework for environmental sequence data <https://github.com/PitchInteractiveInc/Phinch>

About Phinch

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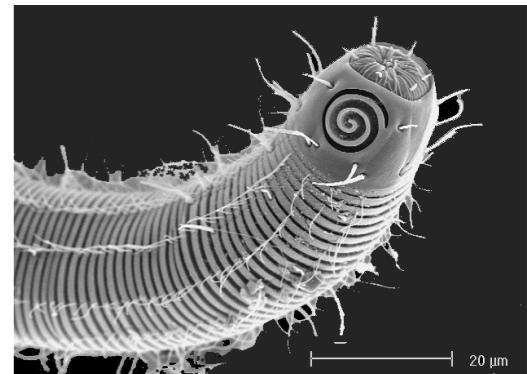
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Article Talk

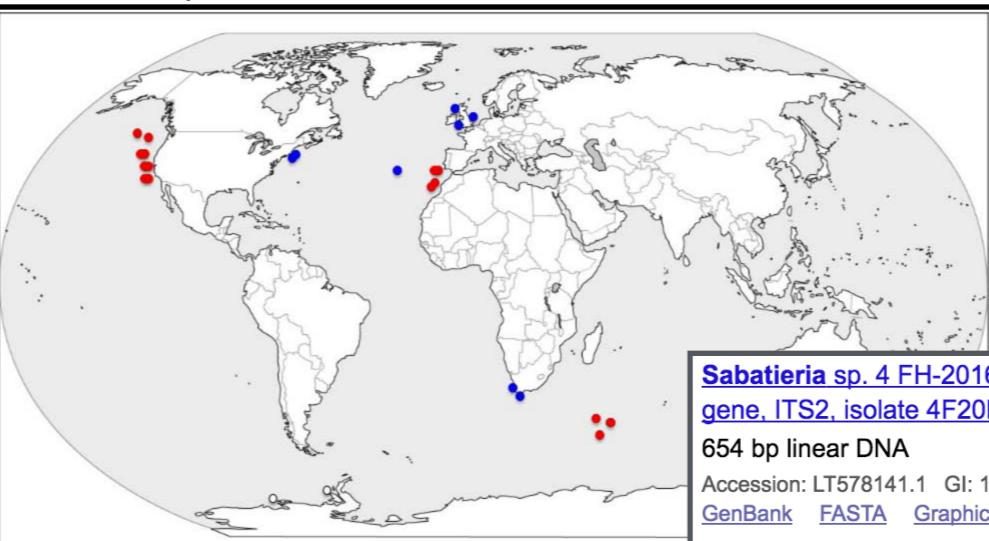


Nematode

From Wikipedia, the free encyclopedia



Sabatieria dispunctata



[Sabatieria sp. 4 FH-2016 genomic DNA sequence contains ITS1, 5.8S rRNA gene, ITS2, isolate 4F20B15|BX|IV](#)

654 bp linear DNA

Accession: LT578141.1 GI: 1052291549

[GenBank](#) [FASTA](#) [Graphics](#)

ORIGIN

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121 tctcgccgac agcgtatgtc cgggcacatgc ccctacgcgg ggtatgttta atgatgtccg
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421 gaacgatacg ggtcgtgcca gaggagcggg tgccttcggc gcggcggtc ctgtcgattt
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541 cggaaaggcg ccaaggcgtt aaaggatagt tcgcttggc gtcggaaagg gtcgttgggt
601 ccgaccttag atcagacgtg actaccgcgt gaacttaac atatcaactg gccggaggaaa
661 g
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Zootaxa 3900 (4): 505–525
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Article

ISSN 1175-5326 (print edition)

ZOOTAXA

ISSN 1175-5334 (online edition)

[Two new species and a new record of Comesomatidae \(Nematoda, Araeolaimida\) from Southern Hikurangi Margin, New Zealand](#)

NORLIANA ROSLI^{1,2,3}, DANIEL LEDUC¹ & P. KEITH PROBERT¹

¹Department of Marine Science, University of Otago, P.O. Box 56, Dunedin, New Zealand

²National Institute of Water and Atmospheric Research (NIWA) Limited, Private Bag 14901, Kilbirnie, Wellington, New Zealand

³Department of Biology, Faculty Science and Mathematics, Sultan Idris Education University, 35900 Tg. Malim, Perak, Malaysia
E-mail: rosli.norliana@gmail.com; Tel: +6443860468.

Abstract

We describe two new species and provide one new species record of the family Comesomatidae from a submarine canyon habitat on the Southern Hikurangi margin, New Zealand. *Vasostoma hexodontium* n. sp. is characterized by having an amphideal fovea with three turns, buccal cavity with six teeth and gubernaculum with long and straight caudal apophyses. *Sabatieria dispunctata* n. sp. is characterized by the absence of cuticle punctations, large amphideal fovea with 4.5 turns, pharynx with posterior bulb, absence of pre-cloacal supplements, strongly arcuate and cuticularized spicules, simple gubernaculum with short caudal apophyses, and vulva opening directed posteriorly. *Laimella subterminata* Chen & Vincx, 2000, which was originally described from the Beagle Channel and the Magellan Strait (Chile), is recorded from the Southwest Pacific for the first time.

Key words: Deep-sea nematodes, canyons, Southern Hikurangi margin, *Vasostoma hexodontium* n. sp., *Sabatieria dispunctata* n. sp., *Laimella subterminata*

Taxonomists & Ecologists:

new to genomic datasets, expertise
in one (few) microbial groups

-Omics Researchers:

who want to process and
visualize genomic data quickly

Citizen Scientists & Teachers:

data mining for those with no
technical expertise (but time & will)

Acknowledgements

UC Davis

Jonathan Eisen, Guillaume Jospin, David Coil, Jenna Lang, Sarah Hird, Alex Alexiev, Hannah Holland-Moritz

Pitch Interactive

Wesley Grubbs, Shujian Bu, Nick Yahnke



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