

Using R for teaching ecology

Gaurav S. Kandlikar


Department of Ecology and Evolutionary Biology
University of California - Los Angeles

@gauravsk_

gauravsk.github.io



ecological research excels when
quantitative and computational methods
are applied to compelling questions about nature



presenting quantitative and computationally-challenging
ecological concepts using R and Shiny
can help train a new generation of researchers

$$\frac{1}{N_1} \frac{dN_1}{dt} = r_1(1 - \alpha_{11}N_1 - \alpha_{12}N_2)$$

$$\frac{1}{N_2} \frac{dN_2}{dt} = r_2(1 - \alpha_{21}N_1 - \alpha_{22}N_2)$$



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Bacteroidetes;Chitinophagia;Chitinophagales;Chitinophagaceae;;	108	70	97	183	276	45	37	74	62	21
Actinobacteria;Actinobacteria;Geodermatophilales;Geodermatophilaceae;Blastococcus;Blastococcus sp. L1961							83	153	84	307
Proteobacteria;Alphaproteobacteria;Rhizobiales;;; 70	89	109	114	371	30	55	28	34	38	57
Gemmatimonadetes;Gemmatimonadetes;Gemmatimonadales;Gemmatimonadaceae;Gemmatimonas;				119	26	88	109	466	6	6
Actinobacteria;Actinobacteria;;; 47	35	117	59	572	12	20	22	33		
Proteobacteria;Alphaproteobacteria;Sphingomonadales;Sphingomonadaceae;Sphingomonas;				92	111	96	153	168	40	35
Proteobacteria;Betaproteobacteria;Burkholderiales;;; 87	139	95	72	80	118	60	65	33	20	75
Bacteroidetes;Chitinophagia;Chitinophagales;Chitinophagaceae;Segetibacter;Segetibacter koreensis						28	98	47	69	438
Actinobacteria;Actinobacteria;Pseudonocardiales;Pseudonocardaceae;Actinoalloteichus;Actinoalloteichus sp. 10-82								0	0	0
Planctomycetes;Planctomycetia;Planctomycetales;Planctomycetaceae;NA;planctomycete LX80	103	17	61	176	290	1	10			
Proteobacteria;Alphaproteobacteria;Sphingomonadales;Sphingomonadaceae;Sphingomonas;Sphingomonas sp. URHD0085				85	33	90	64			
Acidobacteria;Blastocatellia;;Pyrinomonadaceae;Brevitalea;Brevitalea deliciosa	62	12	23	36	466	0	23	3		
Proteobacteria;Alphaproteobacteria;Sphingomonadales;Sphingomonadaceae;Sphingomonas;Sphingomonas jaspsi	71	89	103	86	166					
Bacteroidetes;Chitinophagia;Chitinophagales;Chitinophagaceae;Segetibacter;Segetibacter aerophilus		9	78	33	88	286				
Planctomycetes;Planctomycetia;Planctomycetales;Planctomycetaceae;NA;planctomycete WWH14	98	10	104	105	220	3	11			
Planctomycetes;Planctomycetia;Planctomycetales;Planctomycetaceae;; 133	25	170	74	133	2	13	11	32		
Proteobacteria;Alphaproteobacteria;Rhizobiales;Beijerinckiaceae;Beijerinckia;	7	159	47	122	242	4	4	11		
Actinobacteria;Actinobacteria;Geodermatophilales;Geodermatophilaceae;; 15	28	24	188	299	3	5	14	6		
Planctomycetes;Planctomycetia;NA;NA;NA;Planctomycetia bacterium LP82	103	19	73	124	150	5	10	9	35	
Acidobacteria;;;;; 102	17	40	117	122	5	7	7	41	47	21
Actinobacteria;Thermoleophilia;Solirubrobacterales;Solirubrobacteraceae;Solirubrobacter;				88	17	80	57	192	1	
Proteobacteria;Alphaproteobacteria;Sphingomonadales;Sphingomonadaceae;; 52	49	38	121	151	7	18	17	22		
Verrucomicrobia;Spartobacteria;NA;NA;NA;bacterium Ellin511	70	34	53	91	135	6	21	17	22	19
Firmicutes;;;;; 157	7	70	27	94	0	29	6	63	37	5
Actinobacteria;Thermoleophilia;Solirubrobacterales;;; 59	20	39	43	235	5	7	10	19	29	18
Planctomycetes;Planctomycetia;Planctomycetales;Gemmatataceae;Gemmatata;	61	12	57	59	193	1	12	6	21	

deSolve

Differential Equation Solvers

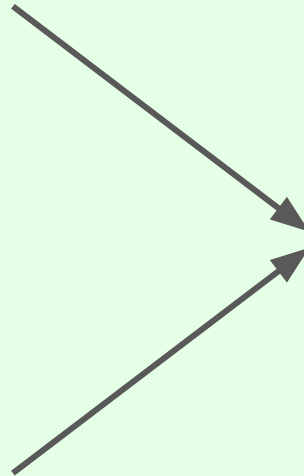
Soetart et al. 2010



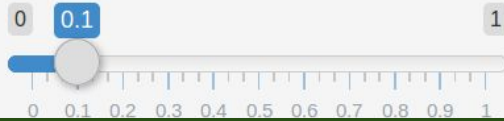
rANACAPA

Interactive eDNA results

Kandlikar et al. 2018



Effect of species 1 on species 1



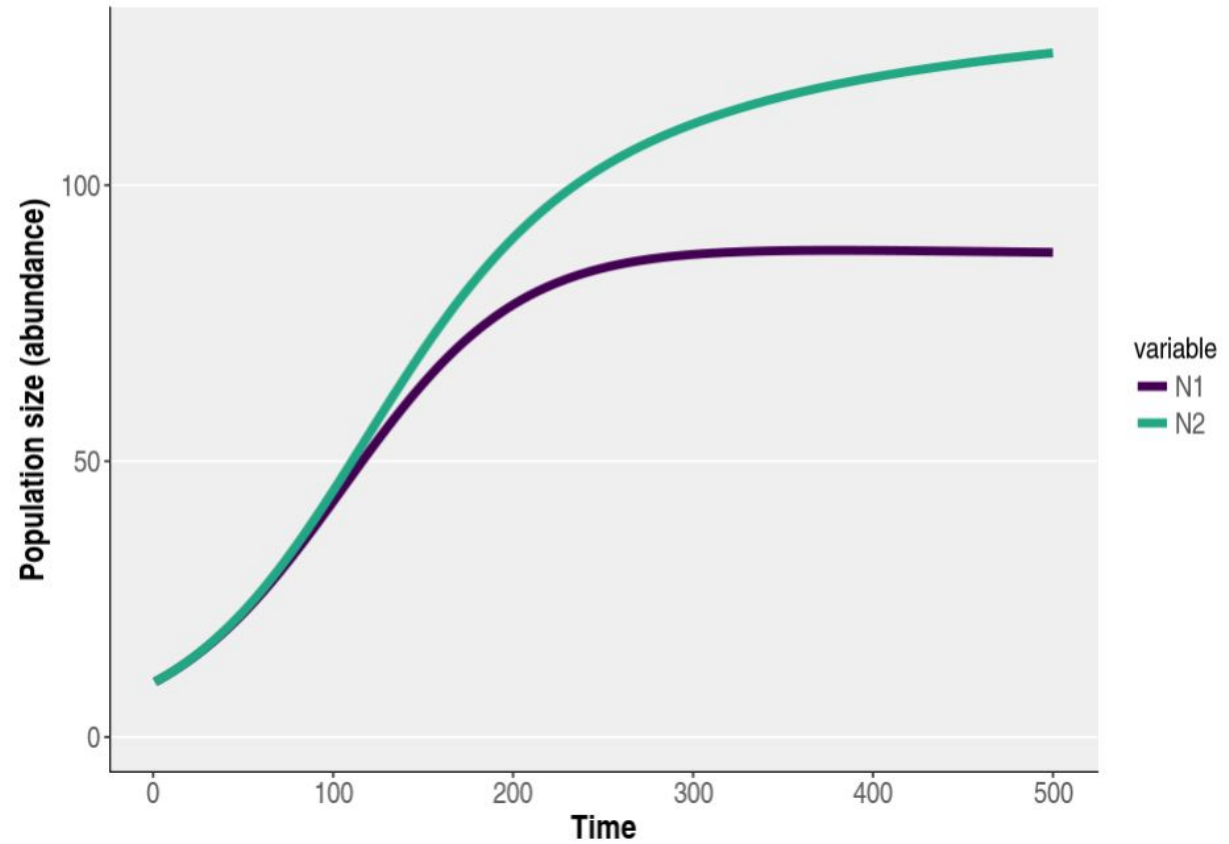
Effect of species 2 on species 1



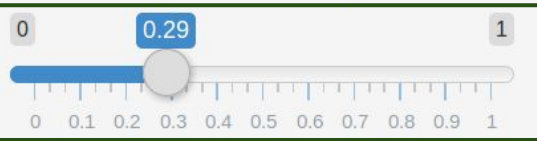
Effect of species 1 on species 2



Effect of species 2 on species 2



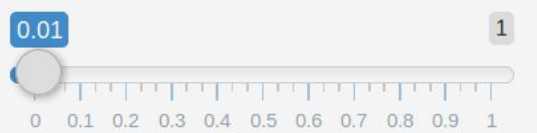
Effect of species 1 on species 1



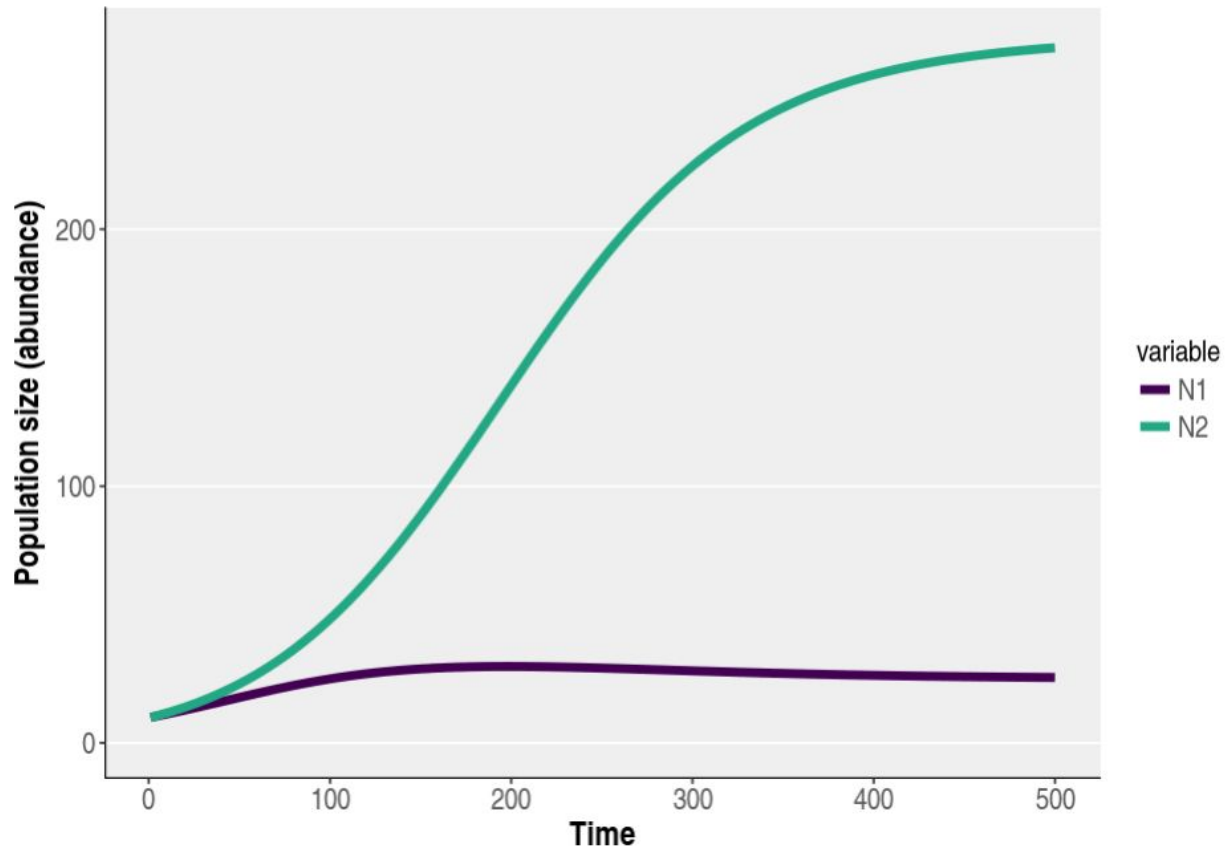
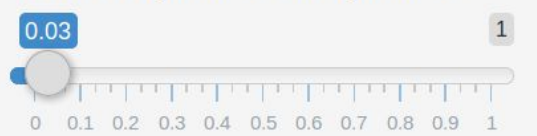
Effect of species 2 on species 1



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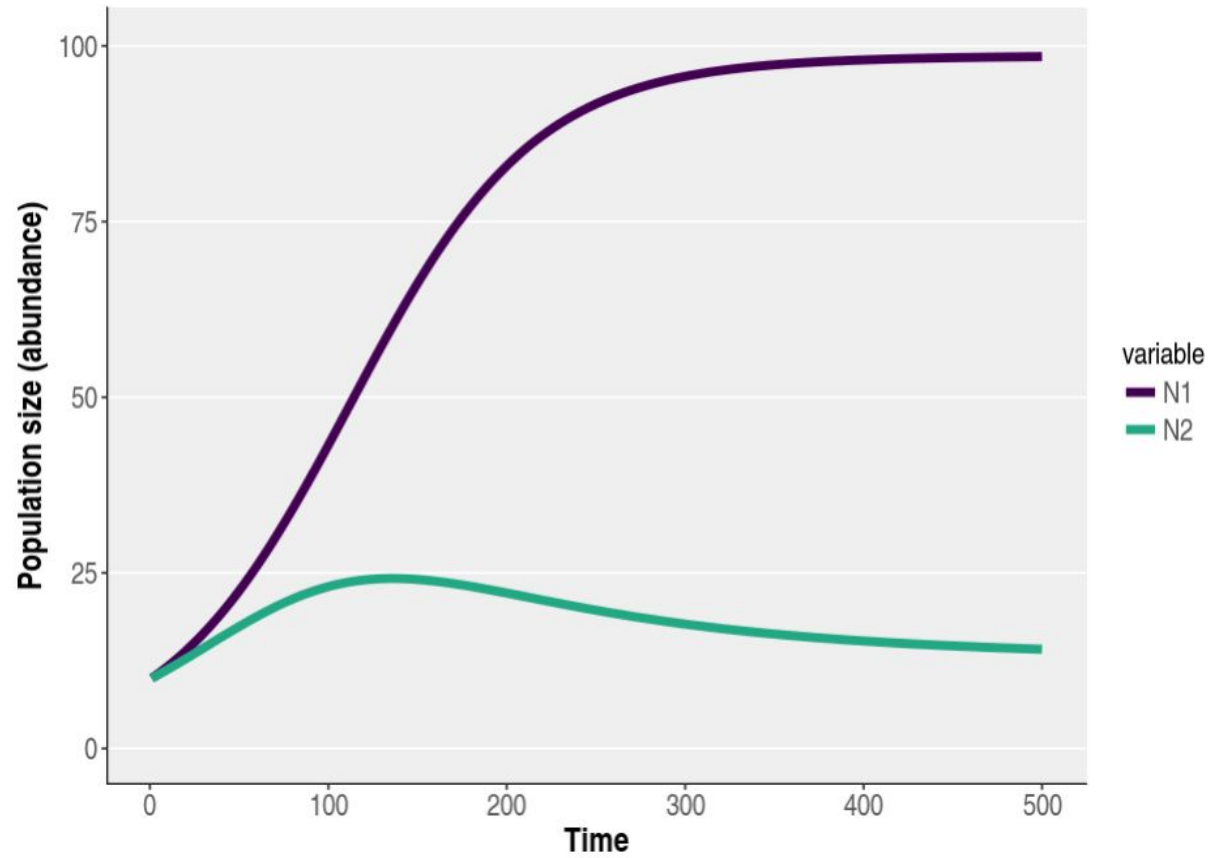
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Effect of species 2 on species 2



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rANACAPA

<https://gauravsk.shinyapps.io/ranacapa/>

eDNA Data exploration

Run with demo data or custom dataset?

- ☒ Demo
☐ Custom

Press the button below to run the app!

RUN THE APP!

Congrats, no errors detected!

WELCOME! DATA IMPORT SEQUENCING DEPTH TAXONOMY BARPLOT TAXONOMY HEATMAP ALPHA DIVERSITY PLOTS ALPHA DIVERSITY STATS BETA DIVERSITY PLOTS BETA DIVERSITY STATS DATA EXPORT

Please verify that the files below look as expected, and click on 'Run the app!' to get started!

Input taxonomy file

Show 10 entries

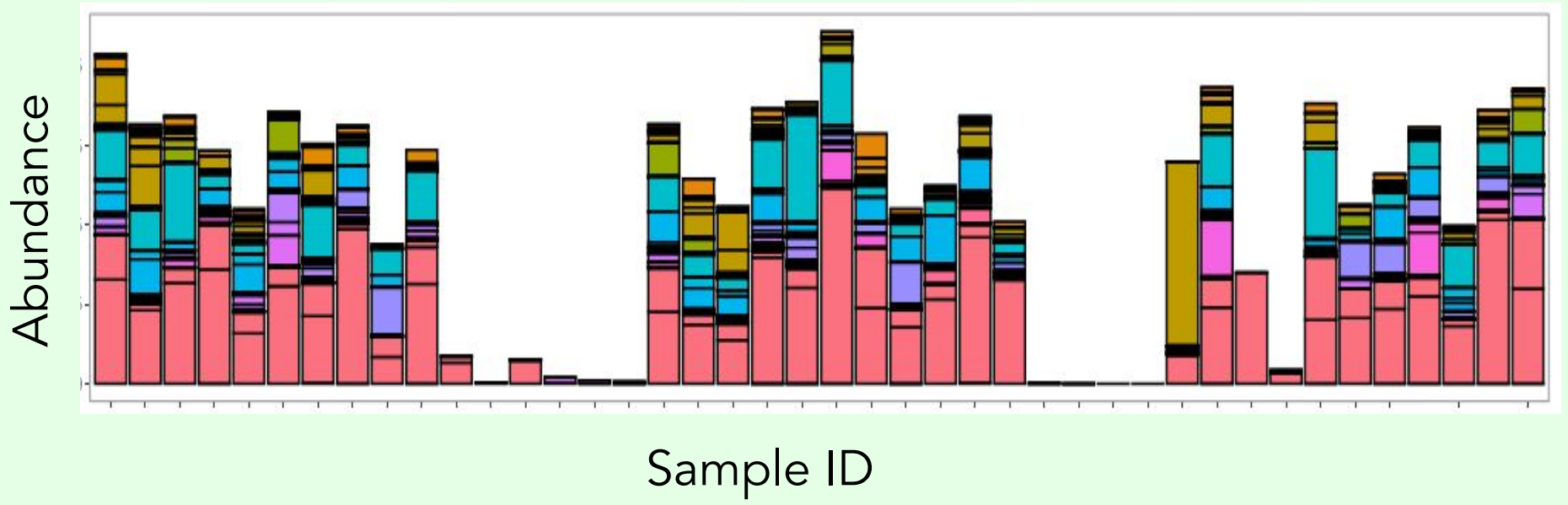
Search:

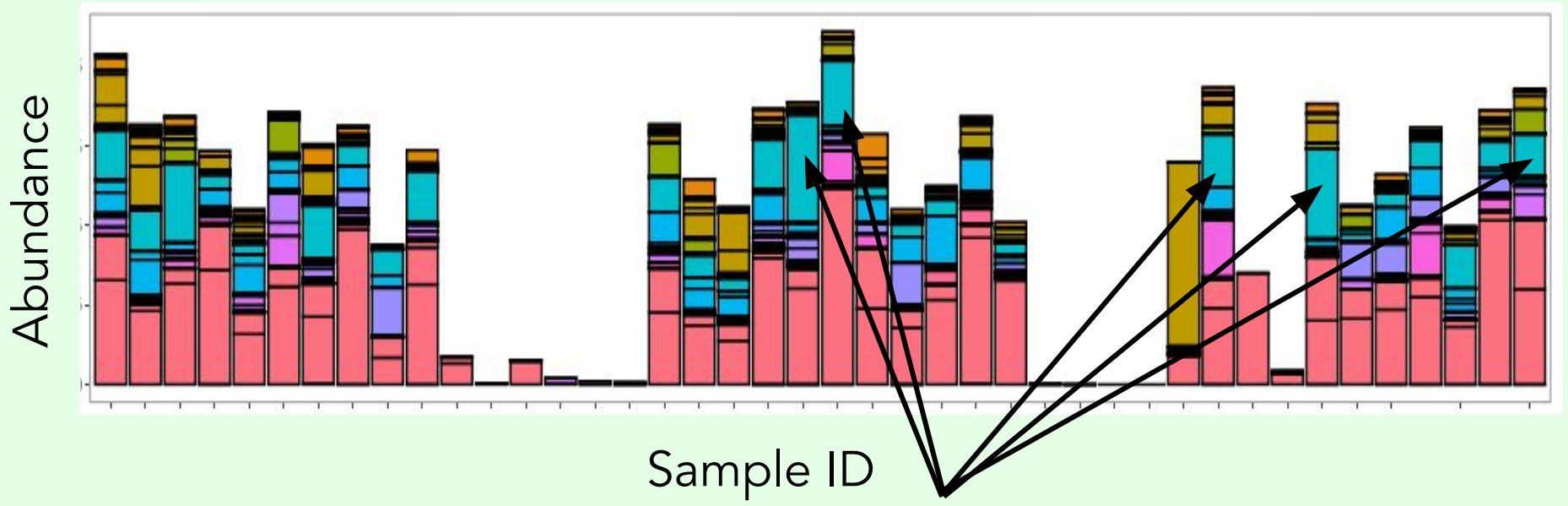
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3	Annelida;Clitellata;Haplotaxida;Megascolecidae;Amynthes;Amynthes sp. YN201102-05	0	0	0	0	0
4	Annelida;Clitellata;Haplotaxida;Megascolecidae;Amynthes;Amynthes thakhantho	0	0	0	0	0
5	Annelida;Polychaeta;Capitellida;Maldanidae;Axiothella;Axiothella rubrocincta	0	0	0	0	0
6	Annelida;Polychaeta;Capitellida;Maldanidae;Clymenella;Clymenella torquata	0	0	0	0	0
7	Annelida;Polychaeta;Eunicida;Eunicidae;Marphysa;Marphysa californica	0	0	0	0	0
8	Annelida;Polychaeta;Eunicida;Lumbrineridae;Lumbrineris;Lumbrineris japonica	0	0	0	0	0
9	Annelida;Polychaeta;Eunicida;Onuphidae;Diopatra;Diopatra cf. ornata JZ-2010	0	0	0	0	0
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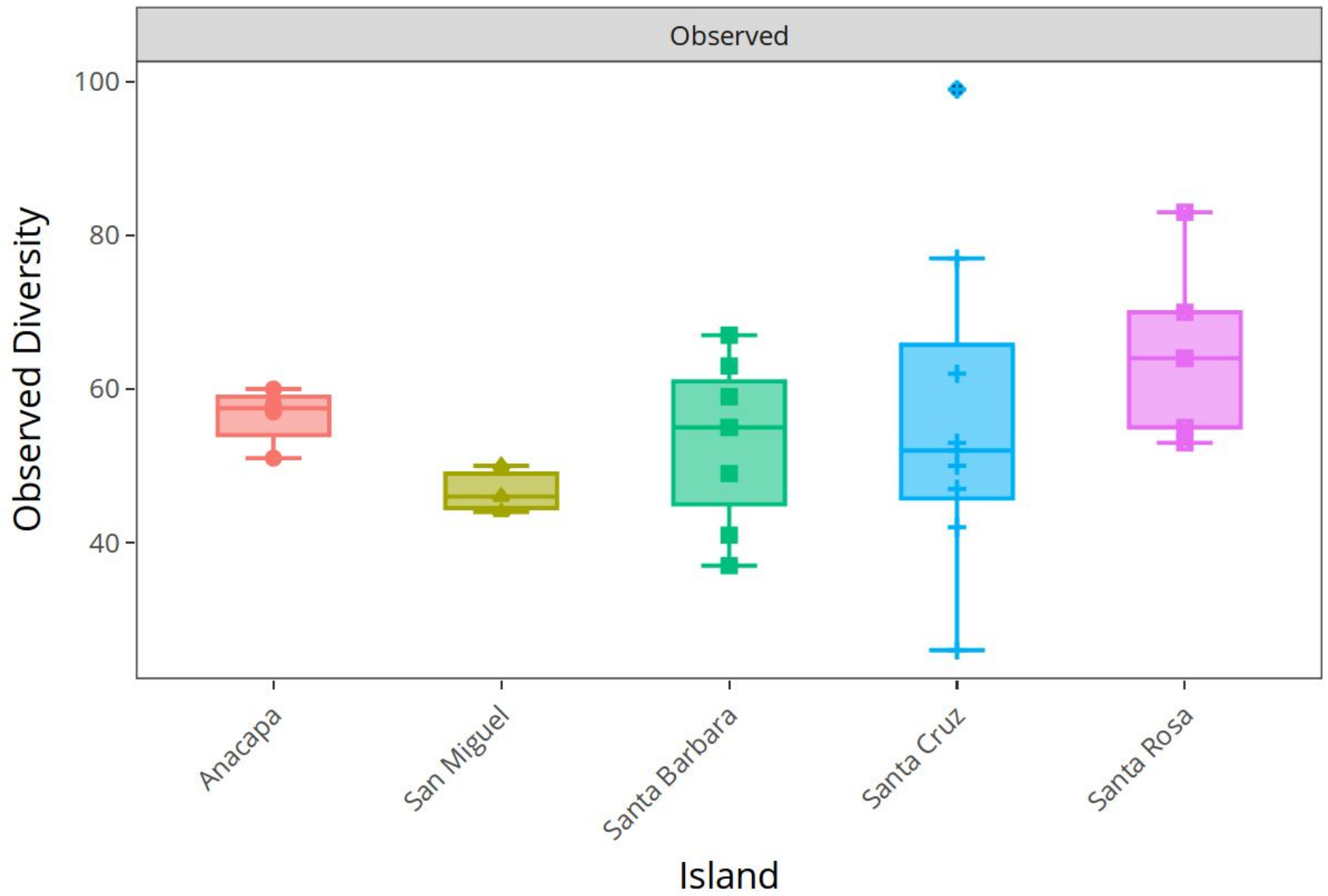
Showing 1 to 10 of 1,435 entries

Previous 1 2 3 4 5 ... 144 Next

Input metadata file








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