Supplementary Material
Exploring the evolutionary signature of food webs' backbones using functional traits

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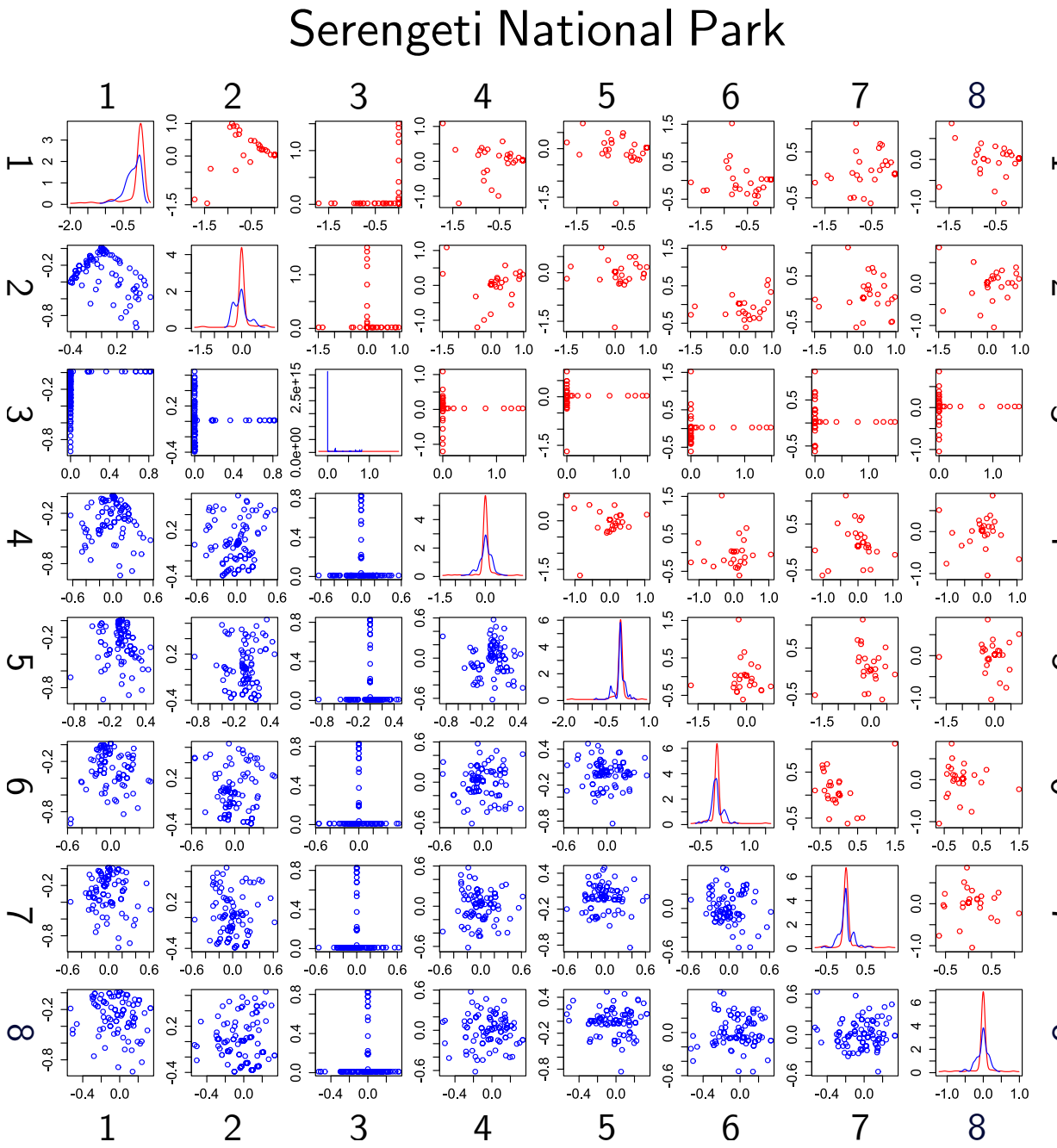
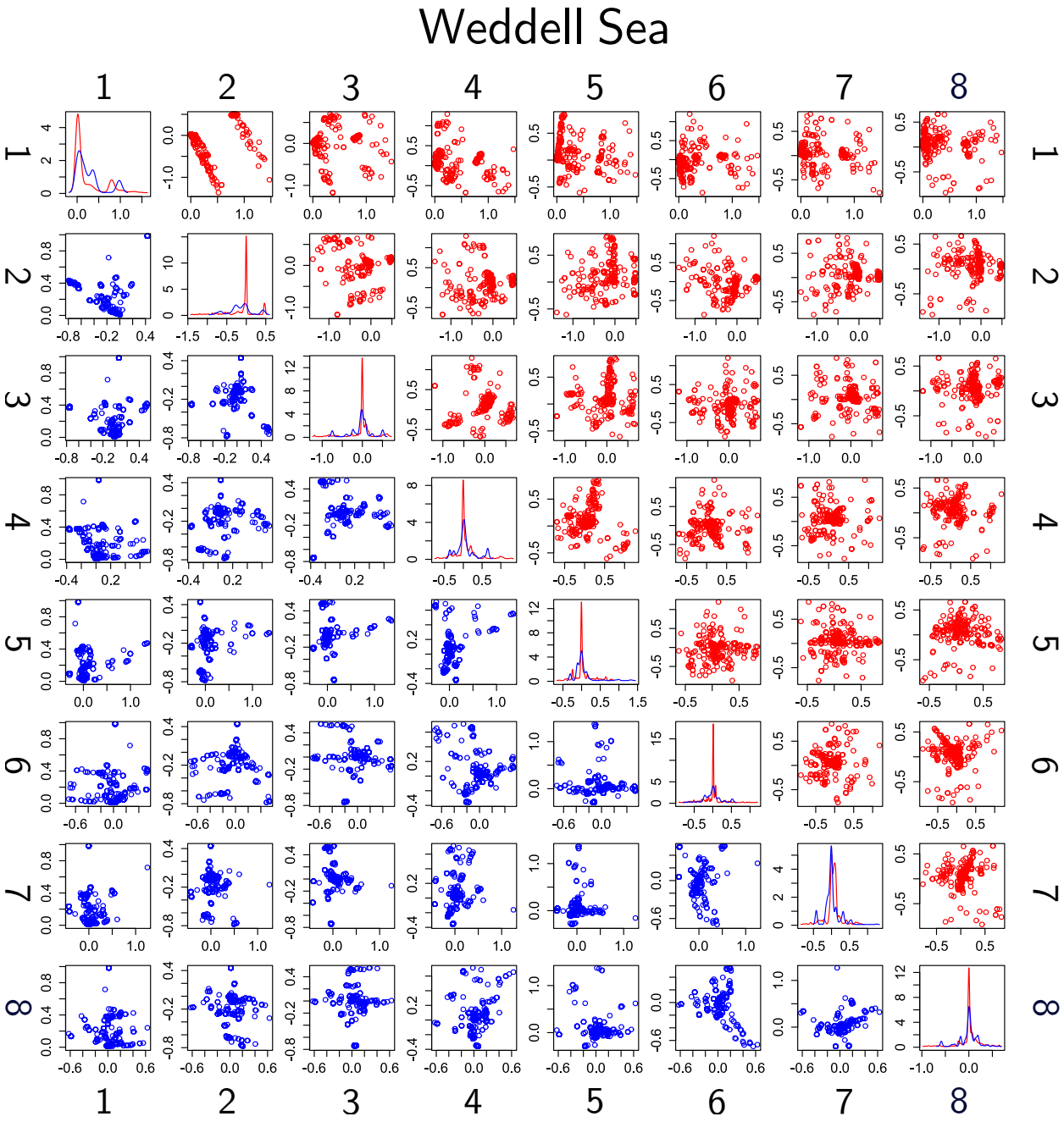
1 Functional traits space

The two following figures show the scatterplots of the -functional (in red) and out-functional (in blue) traits for the first 8 coordinates. On the main diagonal are depicted the densities for the corresponding coordinate of the in-functional (in red) and out-functional (in blue) traits. The relative relevance of the coordinates is decreasing moving toward the higher coordinates.


Serengeti National Park
1
2
3
4
5
6
7
8


Weddell Sea
1
2
3
4
5
6
7
8

2 Svds and dimensionality

In the 9 following pages we show the sequences of Singular Values (in two different representation, the top one on logarithmic x axis) and the optimal model dimension d as suggested by Zhu and Ghodsi, the Universal Singular Value Threshold and the Hard Singular Value Threshold methods. For the Zhu and Ghodsi we show the first three most likely d. As the three methods are growingly parsimonious (the value suggested by the Hard Singular Value Threshold method is always equal or less than the value suggested by the Universal Singular Value Threshold method, that is always equal or less than the value suggested by the Zhu and Ghodsi method) we just show the most parsimonious one in the case of an agreement.

Notice that all the values suggested are consistently (much) less than the adjacency matrices full rank.

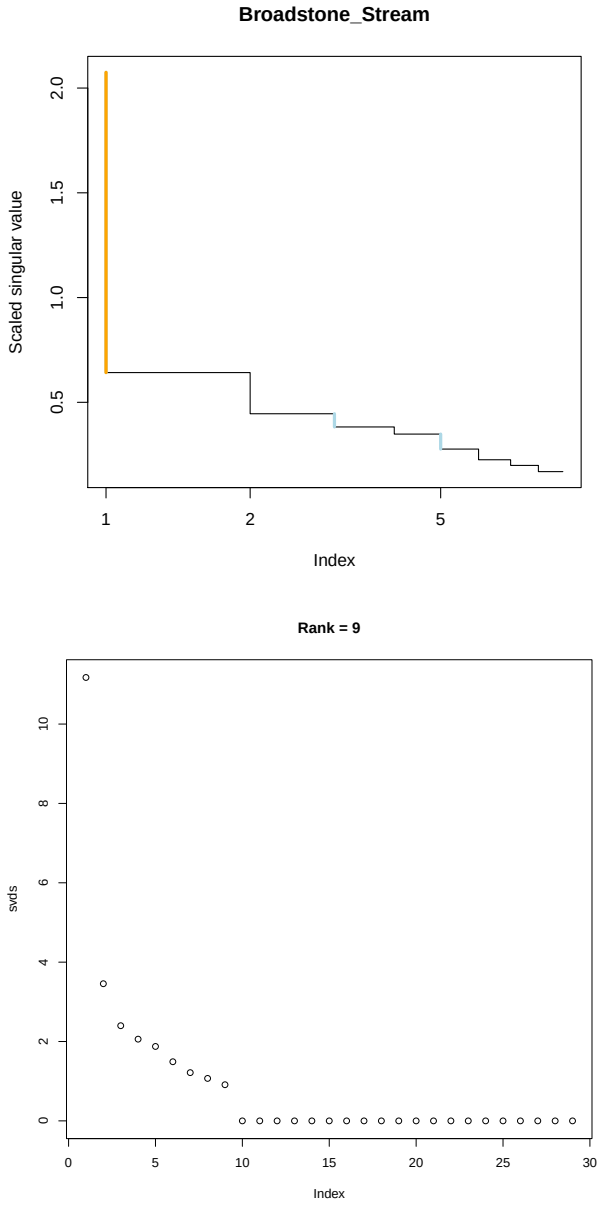


Figure 1: Broadston stream

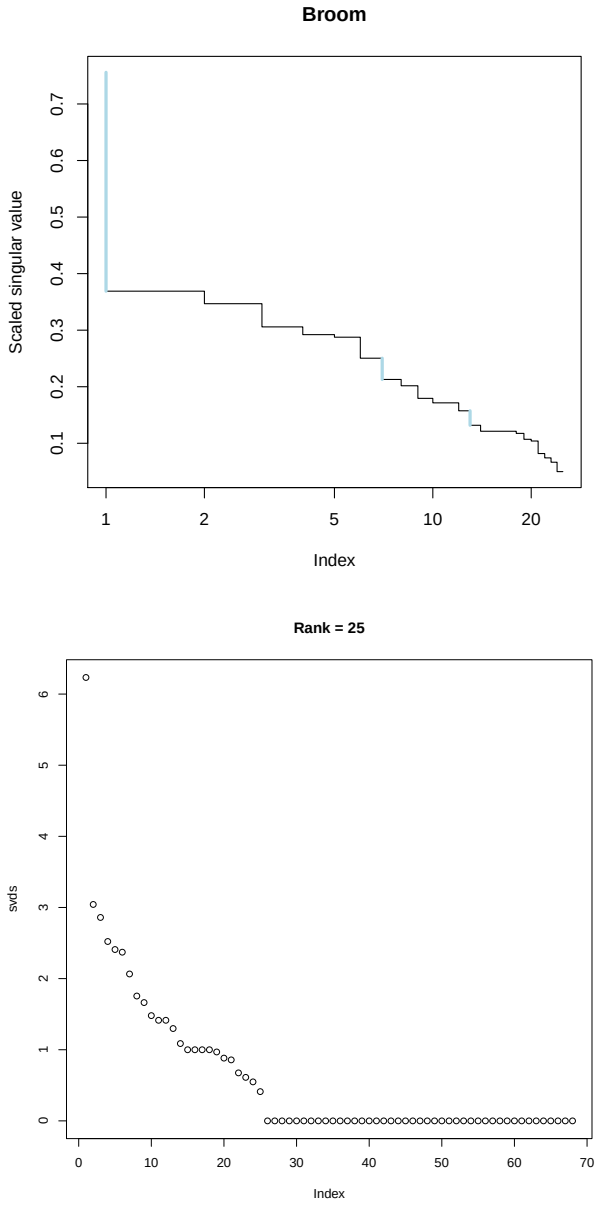


Figure 2: Broom

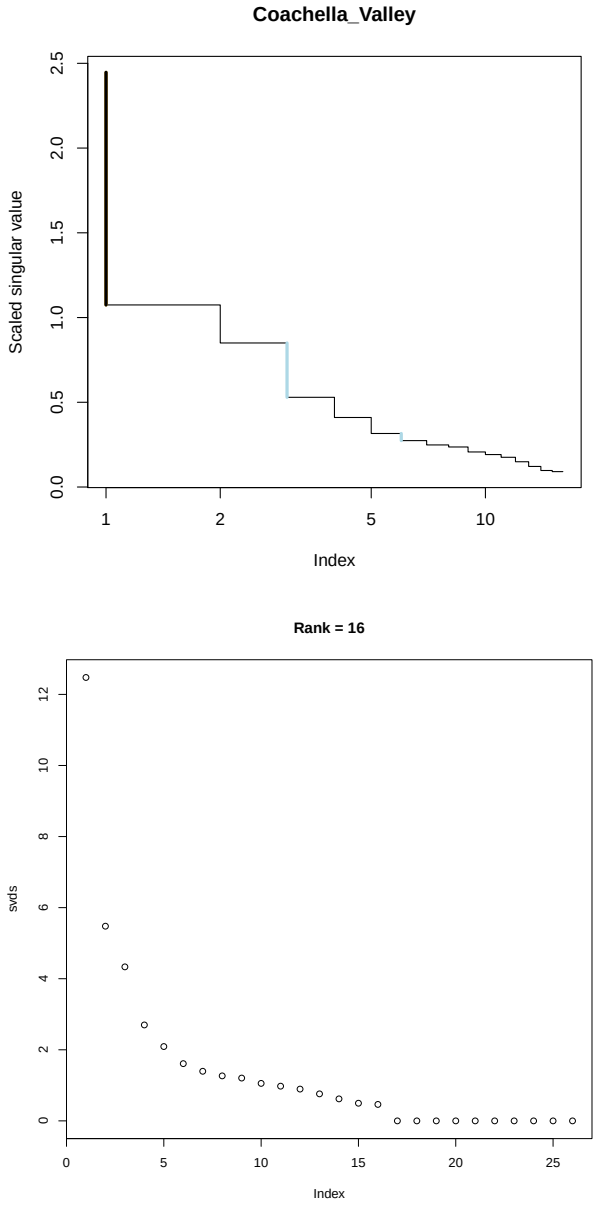


Figure 3: Coachella valley

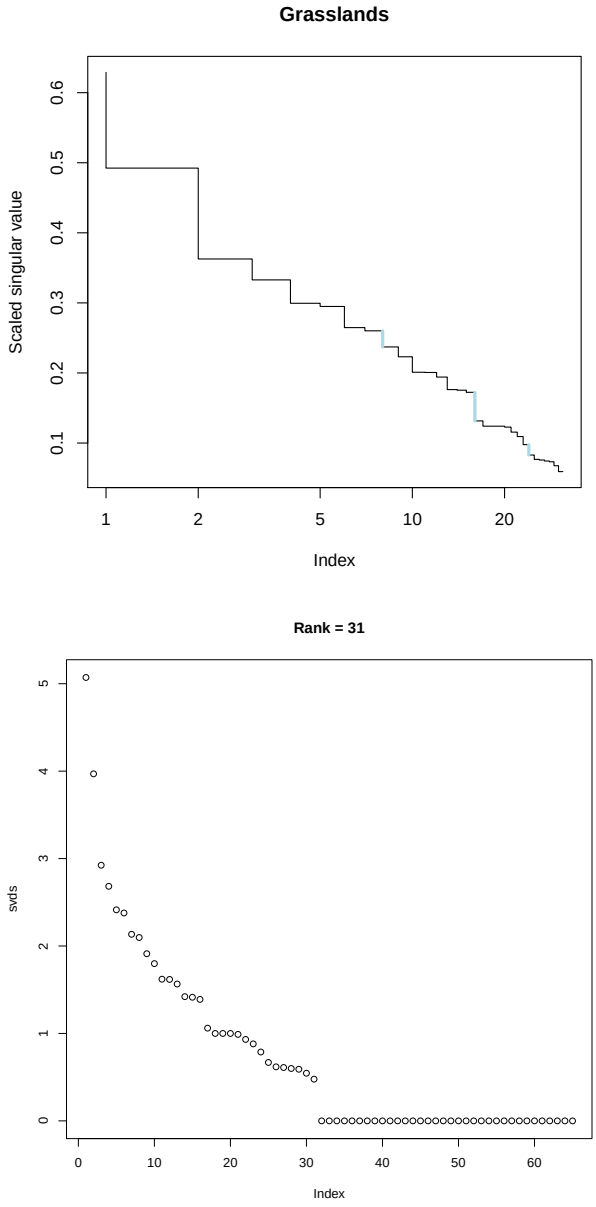


Figure 4: Grasslands

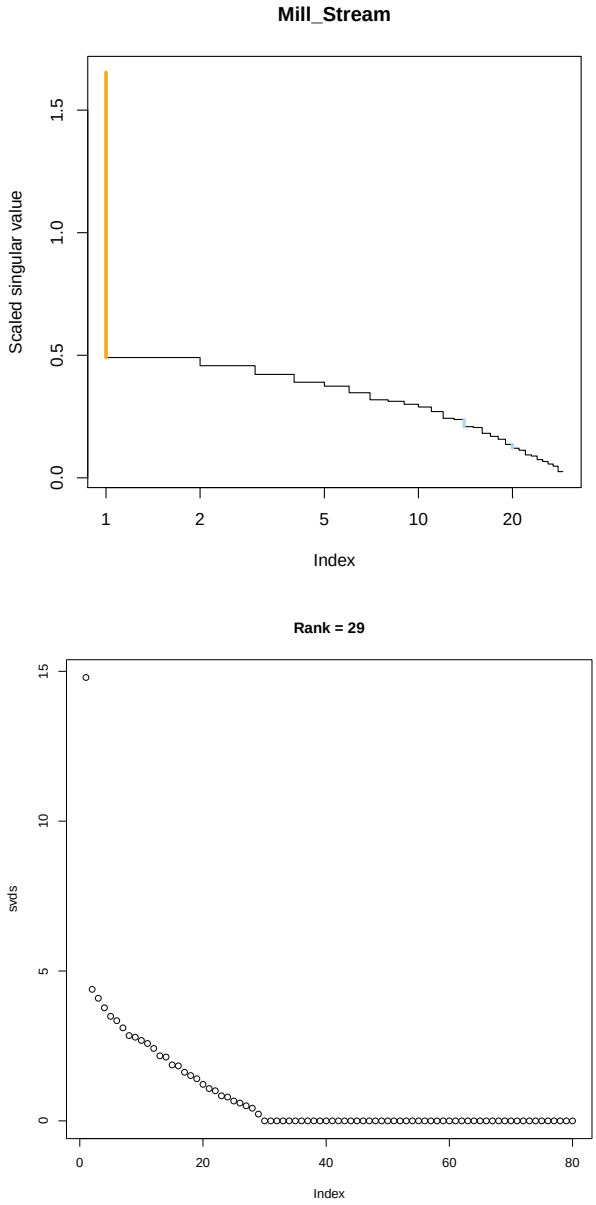


Figure 5: Mill stream

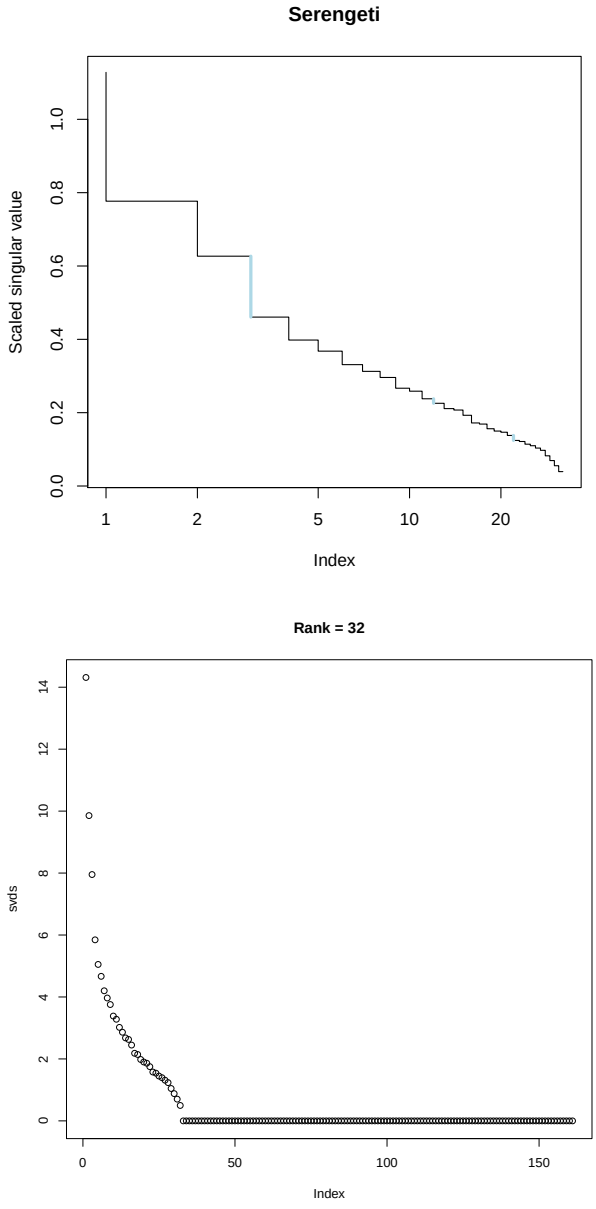


Figure 6: Serengeti National Park

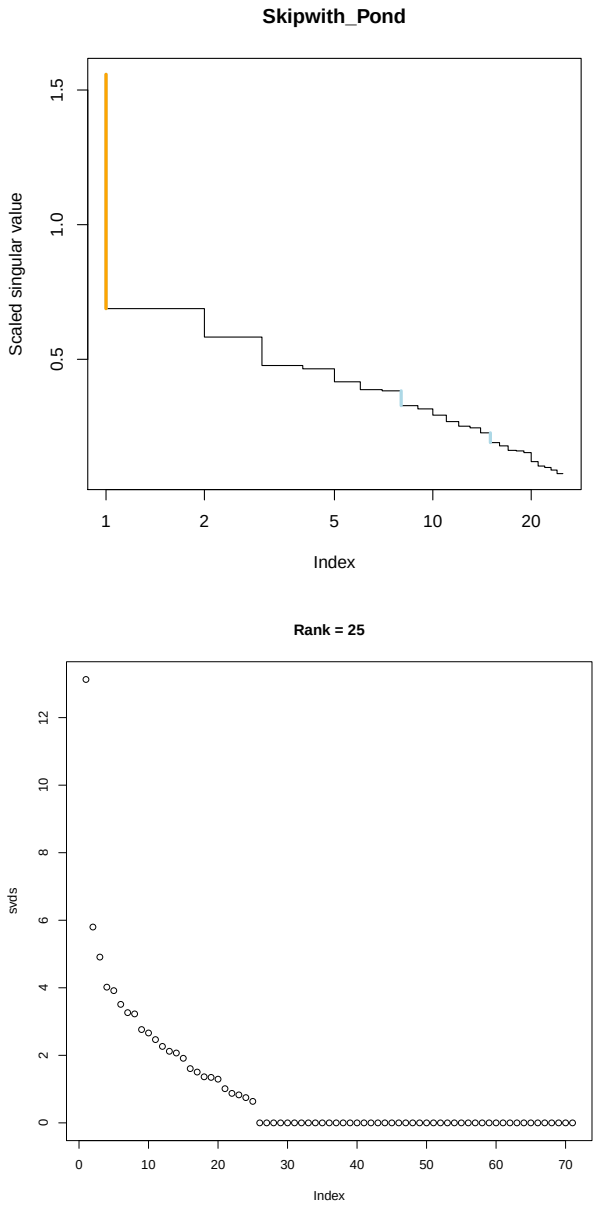


Figure 7: Skipwith pond

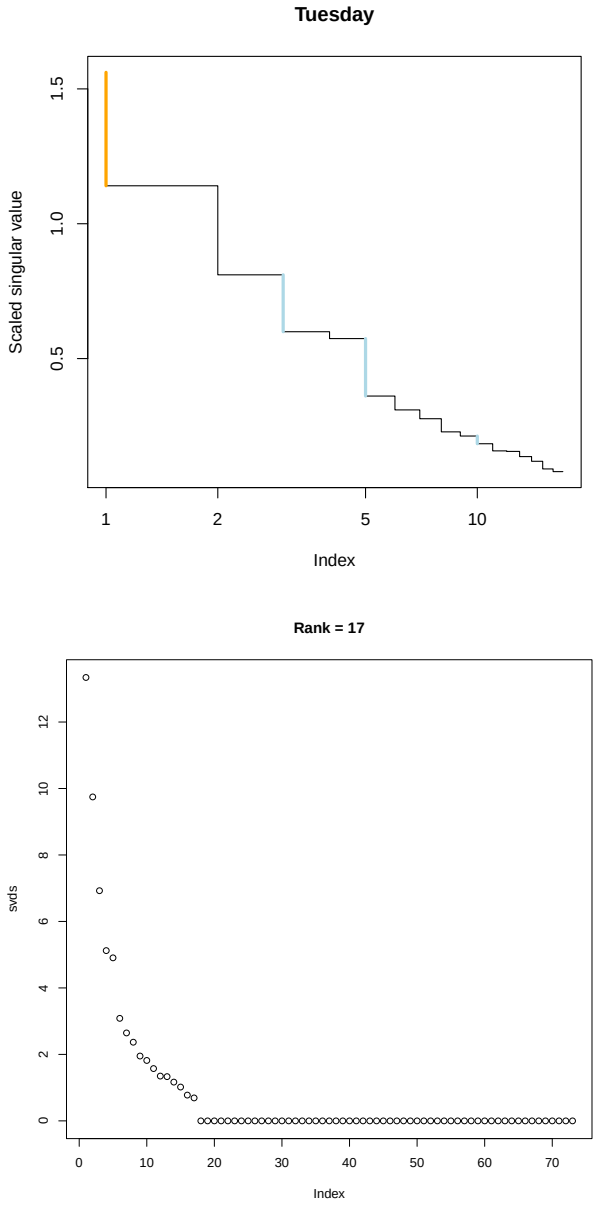


Figure 8: Tuesday lake

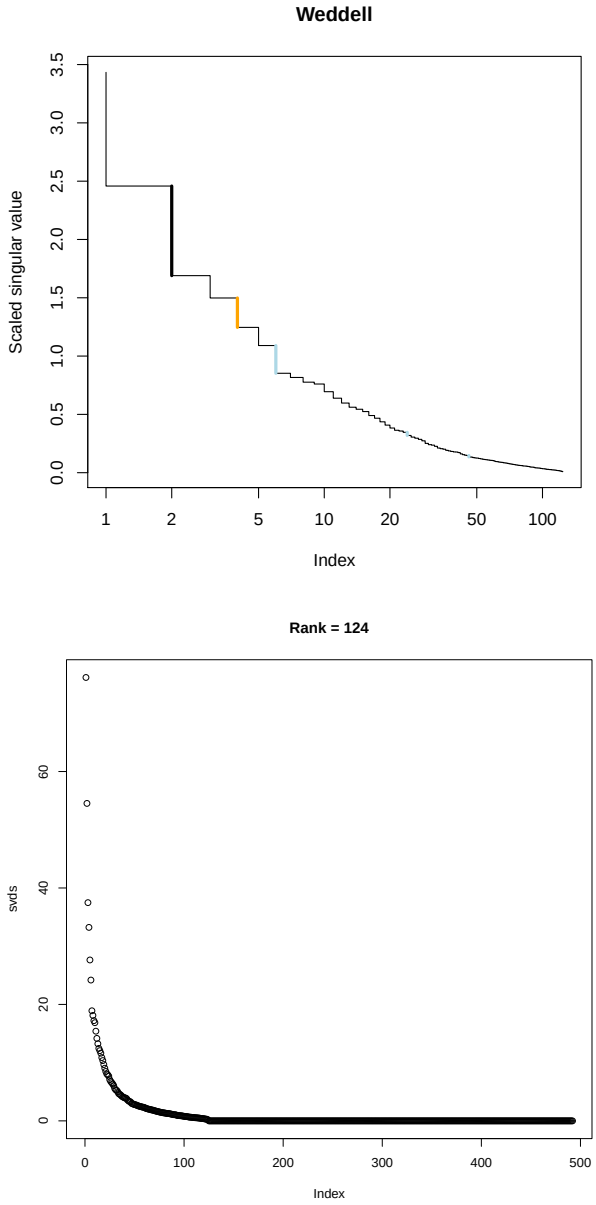


Figure 9: Weddell sea

3 Fitting performance

In the following 7 pages we show the fitting performance in terms of accuracy (top) and sensitivity (bottom) of the seven smaller food webs. The fitting performance of Rohr's (solid line) and Petchey's (dashed line) models are plotted for comparison and reference.

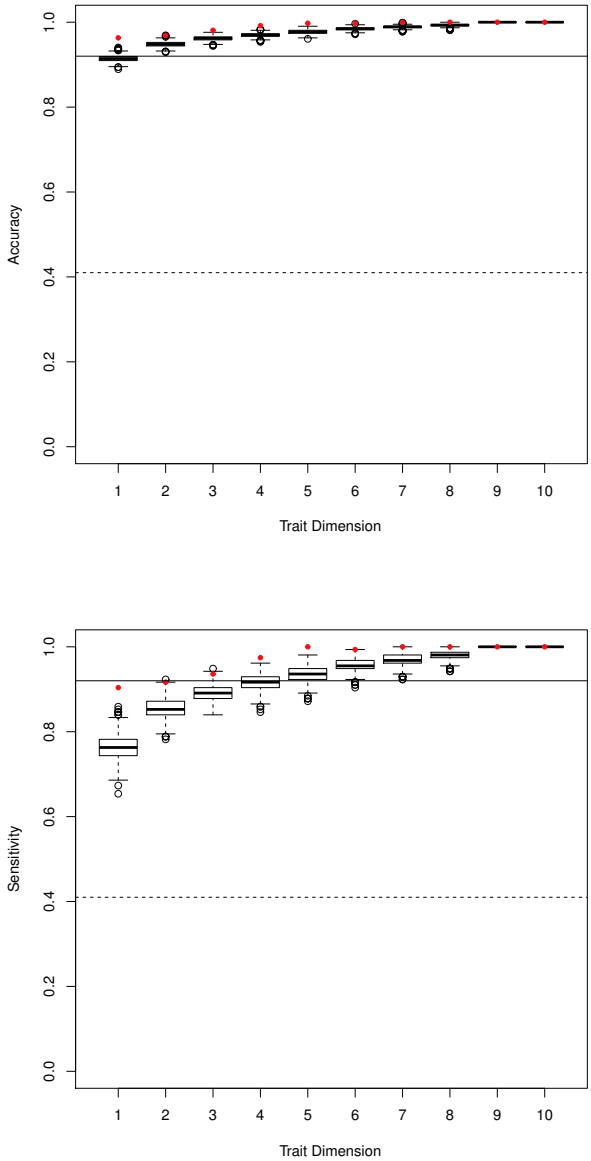
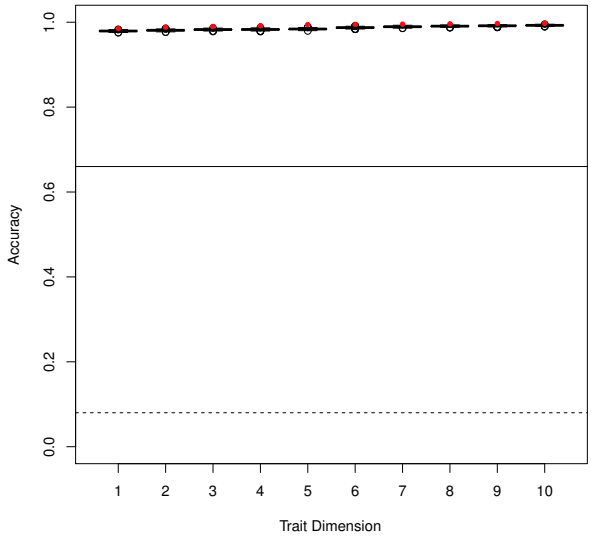


Figure 10: Broadston stream



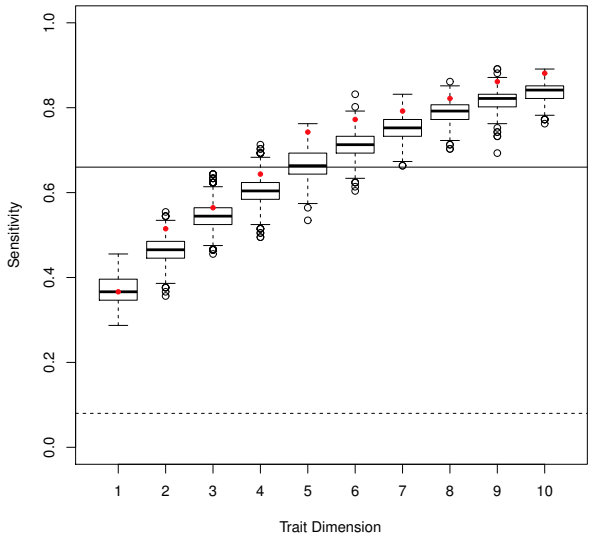


Figure 11: Broom

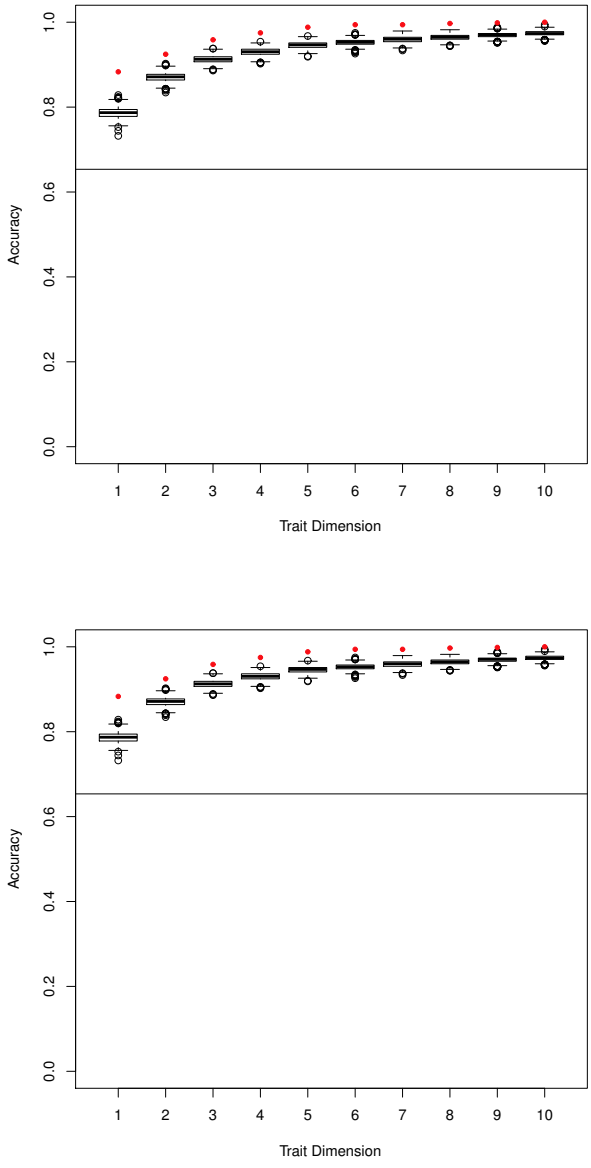


Figure 12: Coachella valley

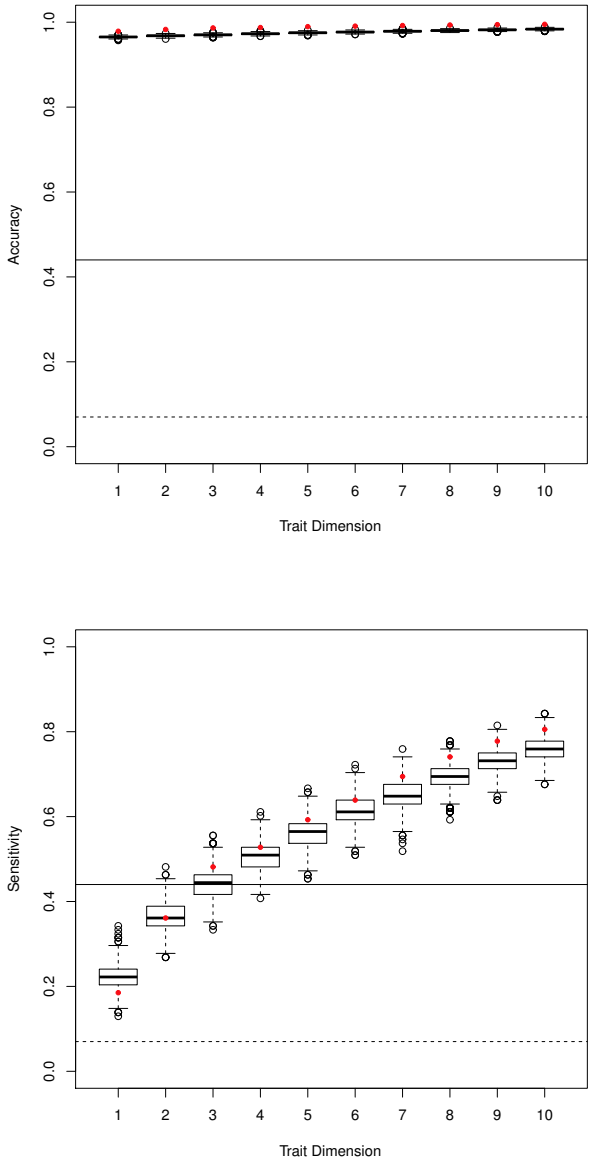
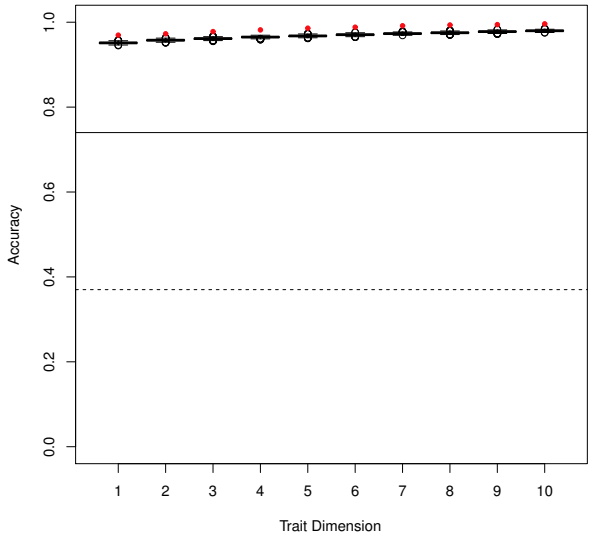


Figure 13: Grasslands



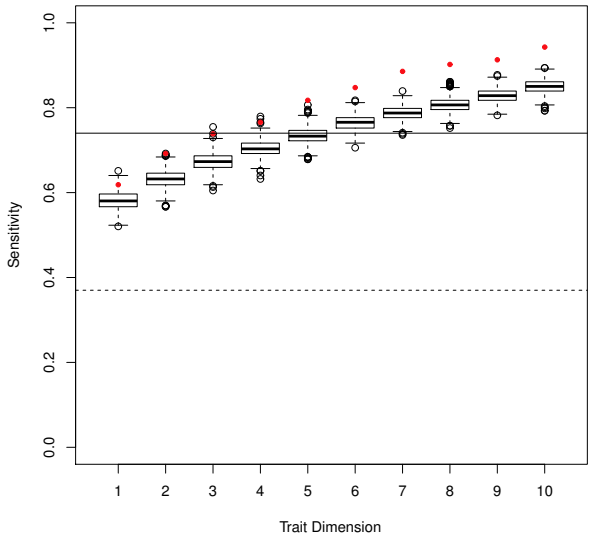
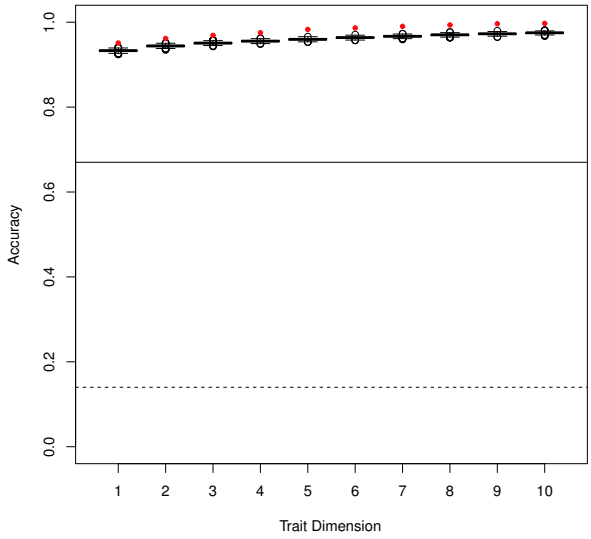


Figure 14: Mill stream



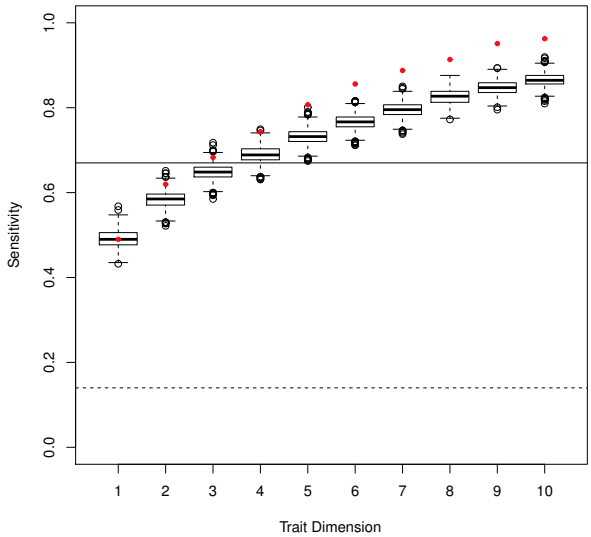
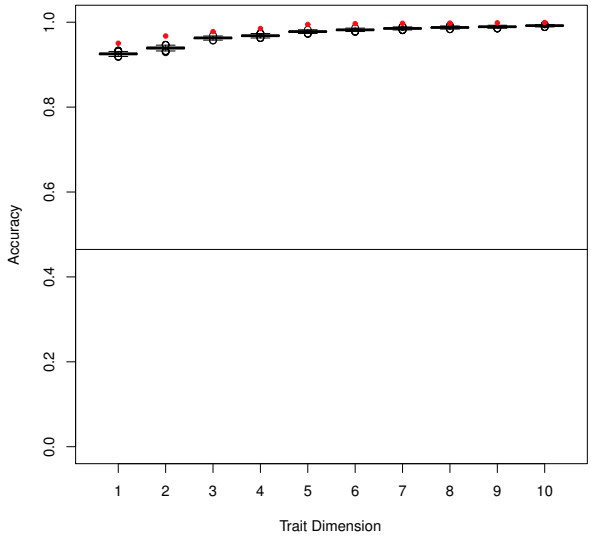


Figure 15: Skipwith pond



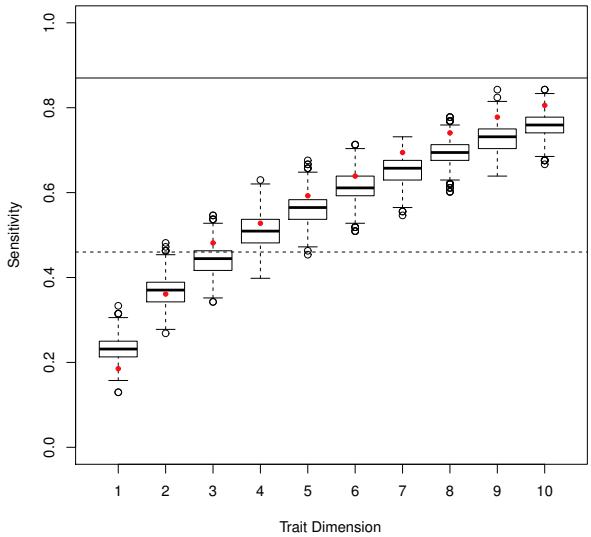


Figure 16: Tuesday lake

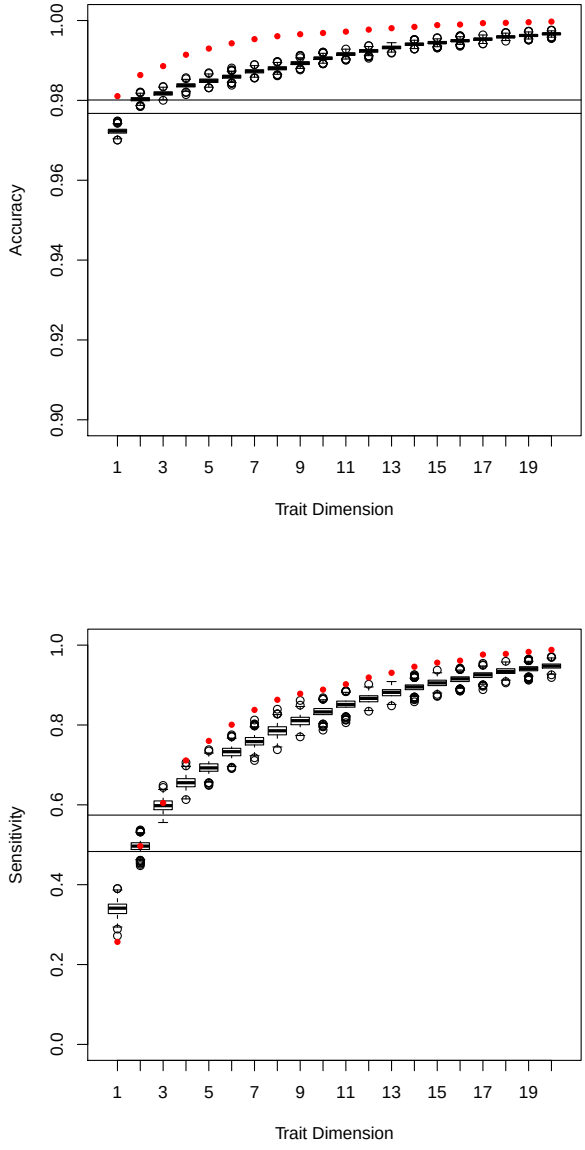


Figure 17: Serengeti National Park. The two black lines represent, respectively, the maximum and minimum value of the accuracy and sensitivity achieved over 100 simulation by the Group Model. Notice that the y-axis on the accuracy graph starts from 0.9 and not 0, for ease of reading.

4 Predictive performance

4.1 Akaike Information Criterion

In the following table we show the AIC, AICc, and BIC and the LogLikelihood for all the food webs we analysed. We computed the statistics for a trait vector length in $\{1, \ldots, 20\}$.

4.1.1 Broadstone stream

Dimension	AIC	AICc	BIC
1	298.235592748925	306.987510907493	572.841909027356
2	341.436039955785	378.927752662967	890.648672512647
3	423.298206771884	514.739648213326	1247.11715560718
4	513.287542757	691.103332230684	1611.71280787072
5	609.962275400806	916.835002673533	1982.99385679296
6	714.205374060527	1207.9126911337	2361.84327173111
7	822.035674062452	1583.51954503019	2744.27988801147
8	932.196149680324	2079.85572414841	3129.04667990777
9	1044	2761.01886792453	3515.45684650588
10	1160	3752.15384615384	3906.06316278431
11	1276	5312.45544554455	4296.66947906274
12	1392	8129.66666666666	4687.27579534117
13	1508	14746.8372093023	5077.8821116196
14	1624	48778	5468.48842789803
15	1740	-48778	5859.09474417646
16	1856	-17737.4545454545	6249.70106045489
17	1972	-11359.2602739726	6640.30737673332
18	2088	-8607.88235294118	7030.91369301175
19	2204	-7074.67175572519	7421.52000929019
20	2320	-6097.25	7812.12632556862
21	2436	-5419.77777777778	8202.73264184705
22	2552	-4922.5504587156	8593.33895812548
23	2668	-4542.08097165992	8983.94527440391
24	2784	-4241.56521739131	9374.55159068234
25	2900	-3998.19672131148	9765.15790696077

Dimension	LogLikelihood
1	-91.1177963744625
2	-54.7180199778924
3	-37.6491033859421
4	-24.6437713785
5	-14.9811377004027
6	-9.1026870302634
7	-5.01783703122622
8	-2.09807484016183
9	1.63935531816149E-12
10	1.63935531816149E-12
11	1.63935531816149E-12
12	1.63935531816149E-12
13	1.63935531816149E-12
14	1.63935531816149E-12
15	1.63935531816149E-12
16	1.63935531816149E-12
17	1.63935531816149E-12
18	1.63935531816149E-12
19	1.63935531816149E-12
20	1.63935531816149E-12
21	1.63935531816149E-12
22	1.63935531816149E-12
23	1.63935531816149E-12
24	1.63935531816149E-12
25	1.63935531816149E-12

4.1.2 Broom

Dimension	AIC	AICc	BIC
1	Inf	Inf	Inf
2	Inf	Inf	Inf
3	Inf	Inf	Inf
4	Inf	Inf	Inf
5	Inf	Inf	Inf
6	Inf	Inf	Inf
7	Inf	Inf	Inf
8	Inf	Inf	Inf
9	Inf	Inf	Inf
10	Inf	Inf	Inf
11	Inf	Inf	Inf
12	Inf	Inf	Inf
13	Inf	Inf	Inf
14	Inf	Inf	Inf
15	Inf	Inf	Inf
16	Inf	Inf	Inf
17	Inf	Inf	Inf
18	4917.89758545516	10430.681033731	20680.6073099974
19	5185.01379480809	11736.8921665589	21823.4296151582
20	5452.37212510619	13230.7431182749	22966.4940412642
21	5720.50766526399	14956.0390744321	24110.3356772299
22	5989.95297015513	16971.0148953544	25255.487077929
23	6259.23955682392	19352.9010952855	26400.4797604056
24	6529.30188860558	22212.8338974356	27546.2481879952
25	6800	25709.8937040065	28692.6523951975

Dimension	LogLikelihood
1	-Inf
2	-Inf
3	-Inf
4	-Inf
5	-Inf
6	-Inf
7	-Inf
8	-Inf
9	-Inf
10	-Inf
11	-Inf
12	-Inf
13	-Inf
14	-Inf
15	-Inf
16	-Inf
17	-Inf
18	-10.9487927275808
19	-8.5068974040442
20	-6.18606255309669
21	-4.25383263199637
22	-2.97648507756591
23	-1.6197784119577
24	-0.65094430278946
25	1.10911280160053E-12

4.1.3 Coachella Valley

Dimension	AIC	AICc	BIC
1	588.598697708174	597.446209746697	823.440737662408
2	488.274939979621	526.523626494507	957.959019888089
3	445.385228000458	539.766730890632	1149.91134786316
4	501.067955093287	687.243543958383	1440.43611491022
5	582.955046946652	909.991191524966	1757.16524671782
6	672.330548396714	1210.38013517357	2081.38278812212
7	765.694048718612	1620.09919341315	2409.58832839825
8	861.029094489507	2200.58121804163	2739.76541412338
9	957.263643215728	3077.95929538964	3070.84200280384
10	1055.45062708138	4551.19256256525	3403.87102662372
11	1154.56841412983	7518.76258888711	3737.8308536264
12	1255.00248764972	16549.1201347085	4073.10696710053
13	1355.96124168892	-913948.038758311	4408.90776109397
14	1458.10378155113	-18568.7641429772	4745.89234091041
15	1561.02273330233	-10042.4058381262	5083.65333261585
16	1664	-7164.73885350319	5421.47263926774
17	1768	-5718.5071770335	5760.31467922198
18	1872	-4848.55172413794	6099.15671917621
19	1976	-4267.65495207668	6437.99875913044
20	2080	-3852.27397260274	6776.84079908468
21	2184	-3540.4892086331	7115.68283903891
22	2288	-3297.84221748401	7454.52487899315
23	2392	-3103.63147792707	7793.36691894738
24	2496	-2944.67015706807	8132.20895890162
25	2600	-2812.16	8471.05099885585

Dimension	LogLikelihood
1	-242.299348854087
2	-140.13746998981
3	-66.6926140002291
4	-42.5339775466433
5	-31.4775234733263
6	-24.1652741983572
7	-18.8470243593059
8	-14.5145472447537
9	-10.6318216078641
10	-7.72531354069076
11	-5.28420706491433
12	-3.50124382486187
13	-1.98062084446048
14	-1.05189077556419
15	-0.51136665116642
16	2.21711538017643E-12
17	2.21667129096658E-12
18	2.2168933355715E-12
19	2.21667129096658E-12
20	2.2168933355715E-12
21	2.21711538017643E-12
22	2.21711538017643E-12
23	2.21711538017643E-12
24	2.21711538017643E-12
25	2.21711538017643E-12

4.1.4 Grasslands

Dimension	AIC	AICc	BIC
1	Inf	Inf	Inf
2	Inf	Inf	Inf
3	Inf	Inf	Inf
4	Inf	Inf	Inf
5	Inf	Inf	Inf
6	Inf	Inf	Inf
7	Inf	Inf	Inf
8	Inf	Inf	Inf
9	Inf	Inf	Inf
10	Inf	Inf	Inf
11	Inf	Inf	Inf
12	Inf	Inf	Inf
13	Inf	Inf	Inf
14	Inf	Inf	Inf
15	Inf	Inf	Inf
16	Inf	Inf	Inf
17	Inf	Inf	Inf
18	Inf	Inf	Inf
19	Inf	Inf	Inf
20	5229.58603340506	13557.9111565578	21736.3998368624
21	5487.14085590519	15467.903908114	22819.2953495354
22	5742.51241075901	17740.2543462429	23900.0075945621
23	5997.22323102174	20491.6964887203	24980.0591049976
24	6253.551519125	23893.9863017337	26061.7280832738
25	6510.99430050031	28206.5795161061	27144.511554822

Dimension	LogLikelihood
1	-Inf
2	-Inf
3	-Inf
4	-Inf
5	-Inf
6	-Inf
7	-Inf
8	-Inf
9	-Inf
10	-Inf
11	-Inf
12	-Inf
13	-Inf
14	-Inf
15	-Inf
16	-Inf
17	-Inf
18	-Inf
19	-Inf
20	-14.7930167025285
21	-13.5704279525929
22	-11.2562053795042
23	-8.61161551086875
24	-6.77575956250221
25	-5.49715025015686

4.1.5 Mill Stream

Dimension	AIC	AICc	BIC
1	1274.71238504038	1282.97011865154	2356.96090813602
2	1416.37500615924	1450.17003823688	3580.87205235052
3	1613.69426911761	1691.70744701928	4860.43983840453
4	1848.58681073736	1991.05598941421	6177.58090311993
5	2093.10182872432	2321.99984622744	7504.34444420253
6	2341.77153284359	2681.01036351099	8835.26267141744
7	2603.18042546881	3078.84627127294	10178.9200871383
8	2871.52913351347	3512.15425560763	11529.5173182786
9	3145.80277453612	3982.68117743993	12886.0394823969
10	3422.94612149265	4490.50186227198	14245.4313524491
11	3705.77919697055	5041.99820968881	15610.5129510226
12	3991.90789033607	5638.84693923092	16978.8901674838
13	4285.80048072452	6290.19038579514	18355.0312809679
14	4580.88678017703	6994.85167558458	19732.366103516
15	4883.8314891937	7765.75196931373	21117.5593356283
16	5184.36297644007	8599.91911085007	22500.3393459703
17	5490.84511220439	9514.28626469148	23889.0700048303
18	5799.00258358566	10514.7059083938	25279.4759993072
19	6109.32670709693	11613.72682618	26672.0486459141
20	6421.59262011882	12825.5938705096	28066.5630820317
21	6737.48625006825	14169.5099420722	29464.7052350767
22	7051.97005615259	15661.848486163	30861.4375642567
23	7368.91860132744	17332.9347837474	32260.6346325272
24	7686.15713163571	19213.6600624681	33660.1216859311
25	8003.99255158638	21346.2184790562	35060.2056289774

Dimension	LogLikelihood
1	-477.35619252019
2	-388.18750307962
3	-326.847134558803
4	-284.29340536868
5	-246.550914362159
6	-210.885766421795
7	-181.590212734407
8	-155.764566756734
9	-132.901387268061
10	-111.473060746325
11	-92.8895984852743
12	-75.953945168036
13	-62.9002403622599
14	-50.4433900885154
15	-41.9157445968504
16	-32.1814882200332
17	-25.4225561021966
18	-19.50129179283
19	-14.6633535484636
20	-10.7963100594098
21	-8.74312503412281
22	-5.98502807629542
23	-4.45930066371812
24	-3.07856581785269
25	-1.99627579318927

4.1.6 Serengeti National Park

Dimension	AIC	AICc	BIC
1	9255.52038143431	9263.64648503615	11883.9447924843
2	10214.0372526078	10246.9047949405	15470.8860747078
3	3416.30018909835	3491.16770532821	11301.5734222483
4	3807.40202220741	3942.20488027821	14321.0996664074
5	4277.54616601895	4490.93242681698	17419.6682212689
6	4738.07193548394	5049.44061982611	20508.6184017839
7	5260.16109537663	5689.70305430505	23659.1319727266
8	5805.40319314133	6374.14479697957	26832.7984815413
9	6371.04932675088	7100.89920947176	30026.8690262008
10	6950.18364192986	7863.98276087259	33234.4277524298
11	7532.780360593	8654.35565775986	36445.4488821429
12	8120.79504446048	9475.01702487398	39661.8879770604
13	8716.36940053183	10329.2139758516	42885.8867441818
14	9320.88832131961	11219.5033035726	46118.8300760195
15	9910.62096549504	12123.3976369033	49336.987131245
16	10520.2717978928	13076.9220290176	52575.0623746927
17	11135.6271496156	14067.266590093	55818.8421374655
18	11755.3455215733	15094.5834464392	59066.9849204732
19	12371.6259989586	16152.6624599222	62311.6898089085
20	12994.6003822881	17253.3313884483	65563.088603288
21	13619.2783573015	18393.4098950403	68816.1909893514
22	14246.4847397606	19575.656538444	72071.8217828605
23	14876.9335086826	20802.8535691774	75330.6949628325
24	15508.533199115	22075.1242281388	78590.7190643149
25	16140.8709756173	23394.4300131103	81851.4812518672

Dimension	LogLikelihood
1	-4305.76019071715
2	-4463.01862630391
3	-742.150094549176
4	-615.701011103705
5	-528.773083009476
6	-437.035967741968
7	-376.080547688316
8	-326.701596570663
9	-287.524663375442
10	-255.091820964928
11	-224.390180296501
12	-196.397522230242
13	-172.184700265917
14	-152.444160659806
15	-125.31048274752
16	-108.135898946382
17	-93.8135748078048
18	-81.6727607866706
19	-67.8129994793082
20	-57.3001911440609
21	-47.6391786507711
22	-39.2423698803076
23	-32.4667543413158
24	-26.2665995575071
25	-20.4354878086425

4.1.7 Skipwith Pond

Dimension	AIC	AICc	BIC
1	1499.23811879871	1507.52966636915	2425.83920387844
2	1484.50144867206	1518.53845455936	3337.70361883152
3	1564.02994832893	1642.87780268523	4343.83320356813
4	1715.03958367543	1859.57983412266	5421.44392399436
5	1893.70439906652	2126.87299029054	6526.70982446519
6	2103.13463680536	2450.20053938416	7662.74114728376
7	2321.65309967195	2810.54583323596	8807.86069523008
8	2546.66335260107	3208.36007391254	9959.47203323894
9	2779.73295110616	3648.71859703917	11119.1427168238
10	3034.10274791608	4148.92042747409	12300.1135987134
11	3285.6937150285	4689.60745855926	13478.3056509056
12	3542.46642623181	5284.26498738289	14661.6794471886
13	3805.40799154295	5940.38732779843	15851.2220975795
14	4066.46937208491	6657.64368401152	17038.8845632012
15	4331.78023008029	7451.38847750297	18230.7965062763
16	4601.22048536388	8332.61932929451	19426.8378466396
17	4873.89373170972	9313.96227702579	20626.1121780652
18	5148.30811598666	10410.5400000446	21827.1276474219
19	5422.98536547919	11641.5182433613	23028.4059819941
20	5698.62618256312	13033.5716371086	24230.6478841578
21	5976.92502925318	14621.5372741511	25435.5478159276
22	6257.04634229496	16447.5473861363	26642.2702140491
23	6536.72377127224	18566.0608625913	27848.5487281061
24	6818.02626641112	21055.6145017052	29056.4523083247
25	7099.99999999999	24020.8724832215	30265.0271269933

Dimension	LogLikelihood
1	-607.619059399355
2	-458.250724336028
3	-356.014974164463
4	-289.519791837714
5	-236.852199533261
6	-199.56731840268
7	-166.826549835974
8	-137.331676300534
9	-111.866475553079
10	-97.0513739580377
11	-80.8468575142488
12	-67.2332131159054
13	-56.7039957714744
14	-45.2346860424549
15	-35.890115040144
16	-28.6102426819387
17	-22.9468658548609
18	-18.1540579933295
19	-13.4926827395924
20	-9.31309128156066
21	-6.46251462658769
22	-4.52317114748067
23	-2.36188563611886
24	-1.01313320556146
25	5.74218450566372E-12

4.1.8 Tuesday Lake

Dimension	AIC	AICc	BIC
1	2698.7976989931	2707.08098729878	3659.61185580843
2	1471.42078405235	1505.39854417944	3393.04909768302
3	1417.97710526078	1496.62005004605	4300.41957570677
4	1524.15643317555	1668.18678730709	5367.41306043687
5	1677.70700293626	1909.82096552869	6481.77778701291
6	1913.51657057658	2258.6432552127	7678.40151146856
7	2167.71815683049	2653.32242993779	8893.4172545378
8	2428.24857251299	3084.68703405145	10114.7618270356
9	2696.8938423852	3557.83554642107	11344.2212537232
10	2969.95406804196	4072.88064508436	12578.0956361953
11	3249.20464233124	4636.00851121893	13818.1603672999
12	3531.36083248851	5249.06553047508	15061.1307142725
13	3813.79372066	5915.42753990198	16304.3777592593
14	4098.7383150823	6644.40213968644	17550.1365104969
15	4385.37230863624	7443.55586504159	18797.5846608662
16	4674.34451314918	8323.56376448608	20047.3710221945
17	4963.99999999999	9294.85453267743	21297.8406658606
18	5255.99999999999	10373.7866666667	22550.6548226759
19	5547.99999999999	11576.0736100235	23803.4689794913
20	5839.99999999999	12924.1528239203	25056.2831363066
21	6131.99999999999	14446.2546419098	26309.0972931219
22	6423.99999999999	16178.4007561437	27561.9114499372
23	6715.99999999999	18167.2913705584	28814.7256067526
24	7007.99999999999	20474.5789473684	30067.5397635679
25	7299.99999999999	23183.3730631704	31320.3539203832

Dimension	LogLikelihood
1	-1203.39884949655
2	-443.710392026177
3	-270.988552630389
4	-178.078216587777
5	-108.853501468129
6	-80.7582852882886
7	-61.8590784152469
8	-46.1242862564962
9	-34.4469211925996
10	-24.9770340209818
11	-18.6023211656176
12	-13.6804162442532
13	-8.89686033000108
14	-5.36915754114828
15	-2.6861543181191
16	-1.17225657459217
17	6.70252742196445E-12
18	6.70186128814967E-12
19	6.7020833327546E-12
20	6.70175026584721E-12
21	6.70152822124229E-12
22	6.70163924354475E-12
23	6.70175026584721E-12
24	6.70163924354475E-12
25	6.70152822124229E-12

4.1.9 Weddell Sea

Dimension	AIC	AICc	BIC
1	86179.5628073022	86187.6036569822	96410.1689213591
2	59378.0149015924	59410.2937245583	79839.2271297061
3	51009.8092600847	51082.7231452677	81701.6276022553
4	42871.6815643672	43001.8308712497	83794.1060205947
5	39408.9668046159	39613.1585370306	90561.9973749003
6	36224.3803602984	36519.6316105154	97608.0170446396
7	34304.3767134592	34707.9181783258	105918.619511857
8	33936.3066992801	34465.5862702286	115781.155611735
9	33581.0340648237	34253.7204936187	125656.489091335
10	34287.1197364943	35121.1063786443	136593.180877063
11	35034.6264717297	36048.035109546	147571.293726355
12	35454.7246132254	36665.9093605708	158221.997981908
13	36284.8830158228	37712.4343066533	169282.762498562
14	37331.8418535616	38994.590516429	180560.327450358
15	38466.3368217122	40383.358242459	191925.428532565
16	39650.046595726	41840.6649706746	203339.744420636
17	40909.9846185482	43393.777300555	214830.288557515
18	42234.2415908393	45031.0435306568	226385.151643863
19	43627.6247424805	46757.533027948	238009.140909561
20	45094.8217259029	48578.2002215613	249706.94400704
21	46594.9983258415	50452.4824156522	261437.726721036
22	48179.3310463884	52431.832482316	273252.665555639
23	49753.5863217572	54422.2981810661	285057.526945065
24	51395.2228702771	56501.6246244784	296929.769607642
25	53074.1144470157	58639.9771454977	308839.267298437

Dimension	LogLikelihood
1	-42105.7814036511
2	-27721.0074507962
3	-22552.9046300424
4	-17499.8407821836
5	-14784.483402308
6	-12208.1901801492
7	-10264.1883567296
8	-9096.15334964003
9	-7934.51703241186
10	-7303.55986824715
11	-6693.31323586486
12	-5919.36230661272
13	-5350.44150791139
14	-4889.92092678082
15	-4473.16841085612
16	-4081.02329786298
17	-3726.9923092741
18	-3405.12079541964
19	-3117.81237124027
20	-2867.41086295147
21	-2633.49916292073
22	-2441.66552319418
23	-2244.79316087861
24	-2081.61143513856
25	-1937.05722350785

4.2 Cross-validation

In the following 7 pages we show the predictive performance in terms of accuracy (solid dots) and sensitivity (1s) and specificity (0s) of the seven smaller food webs. The fitting performance of the null model where each links is indepently present with probability equal to the connectivity is plotted for comparison and reference.

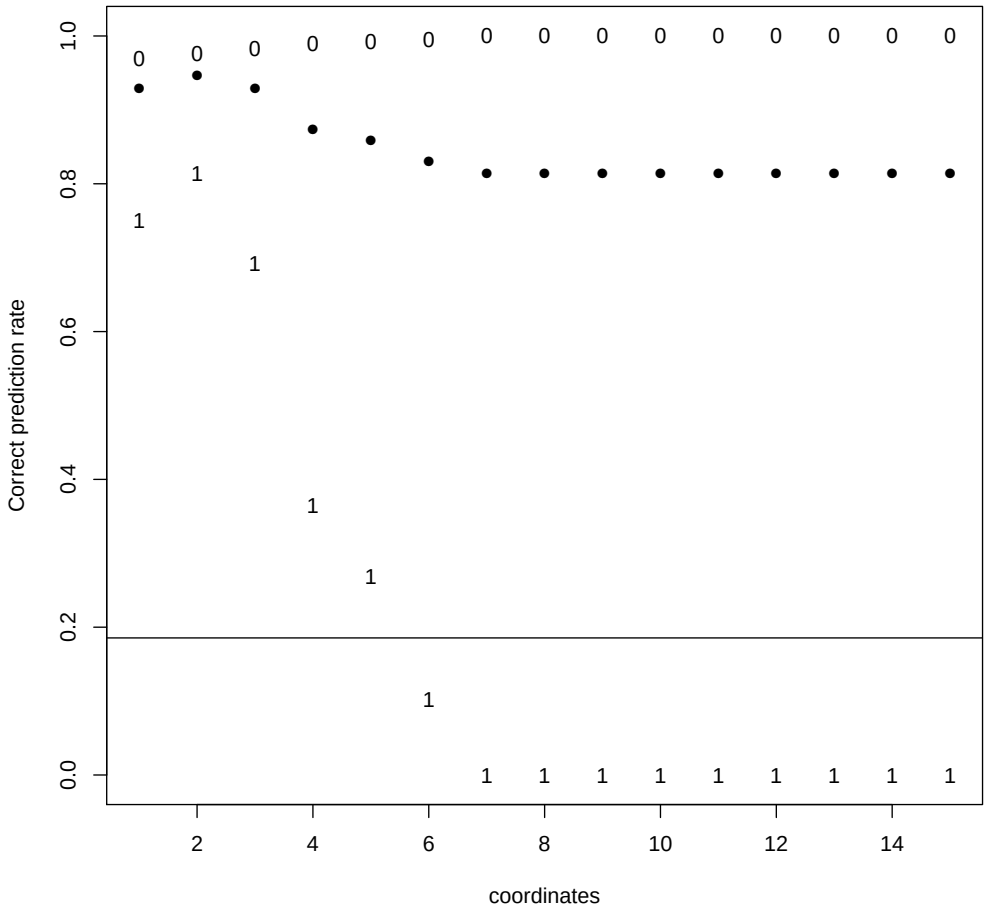


Figure 18: Broadston stream

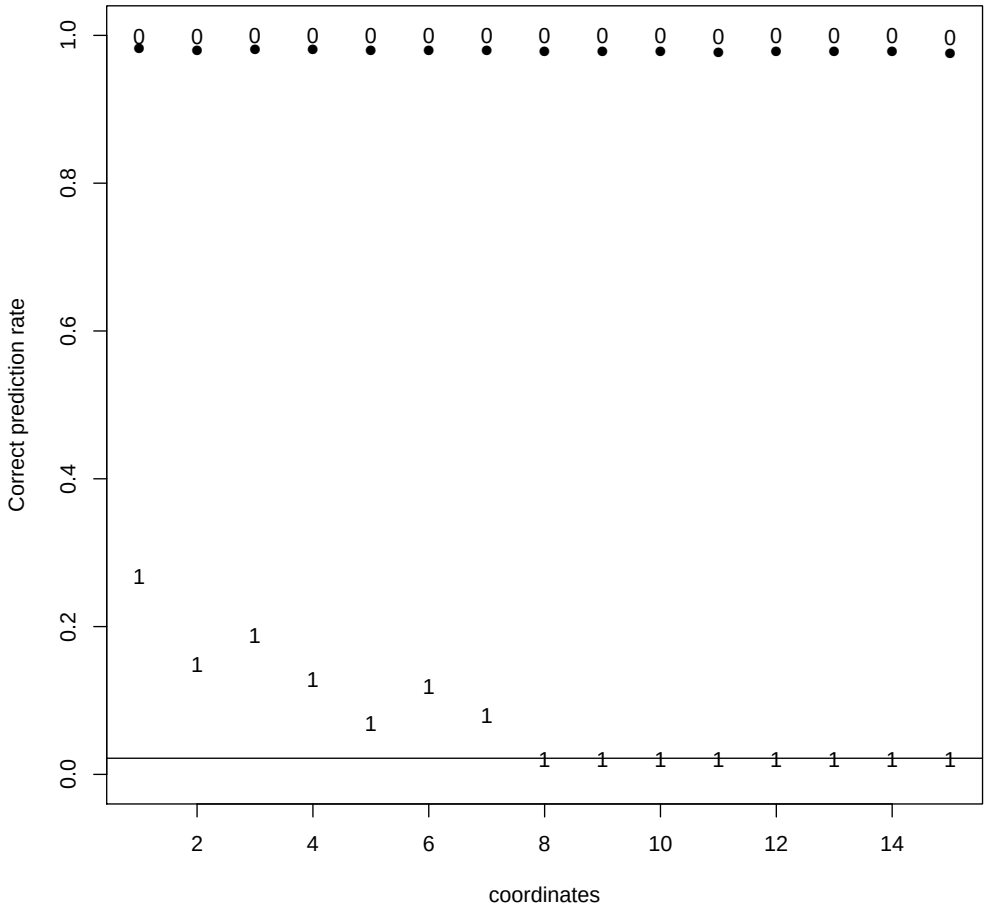


Figure 19: Broom

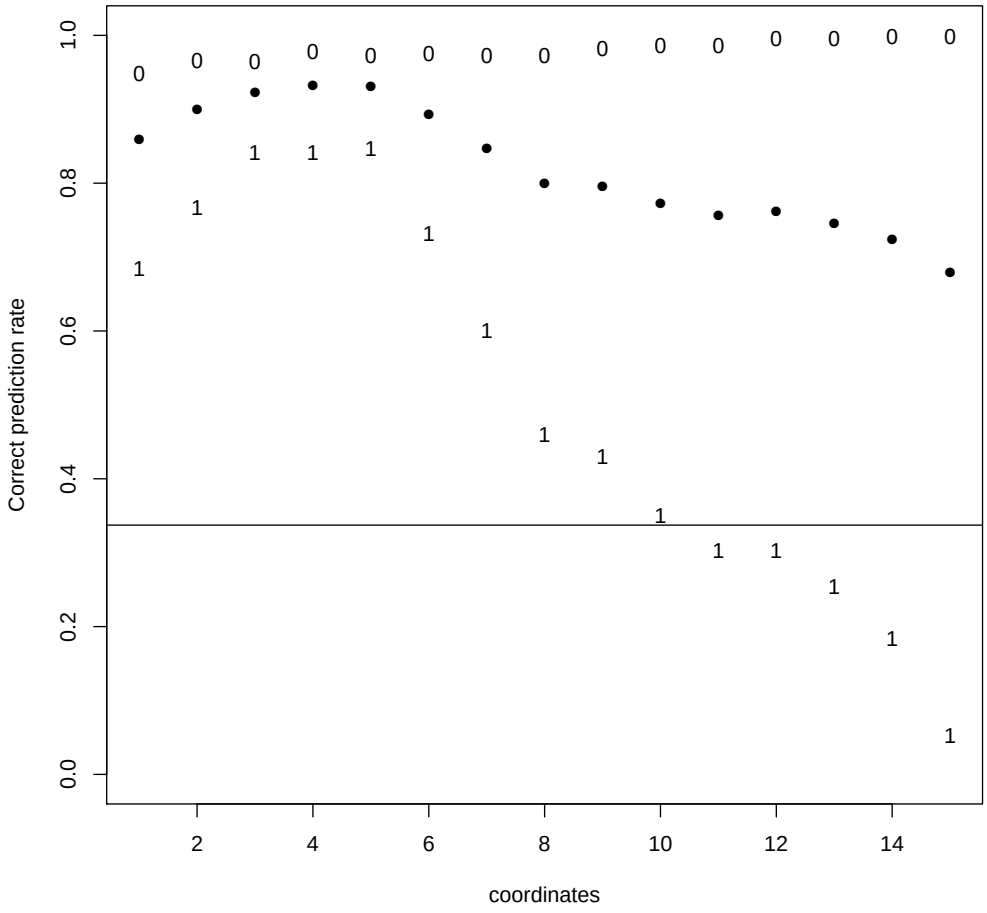


Figure 20: Coachella valley

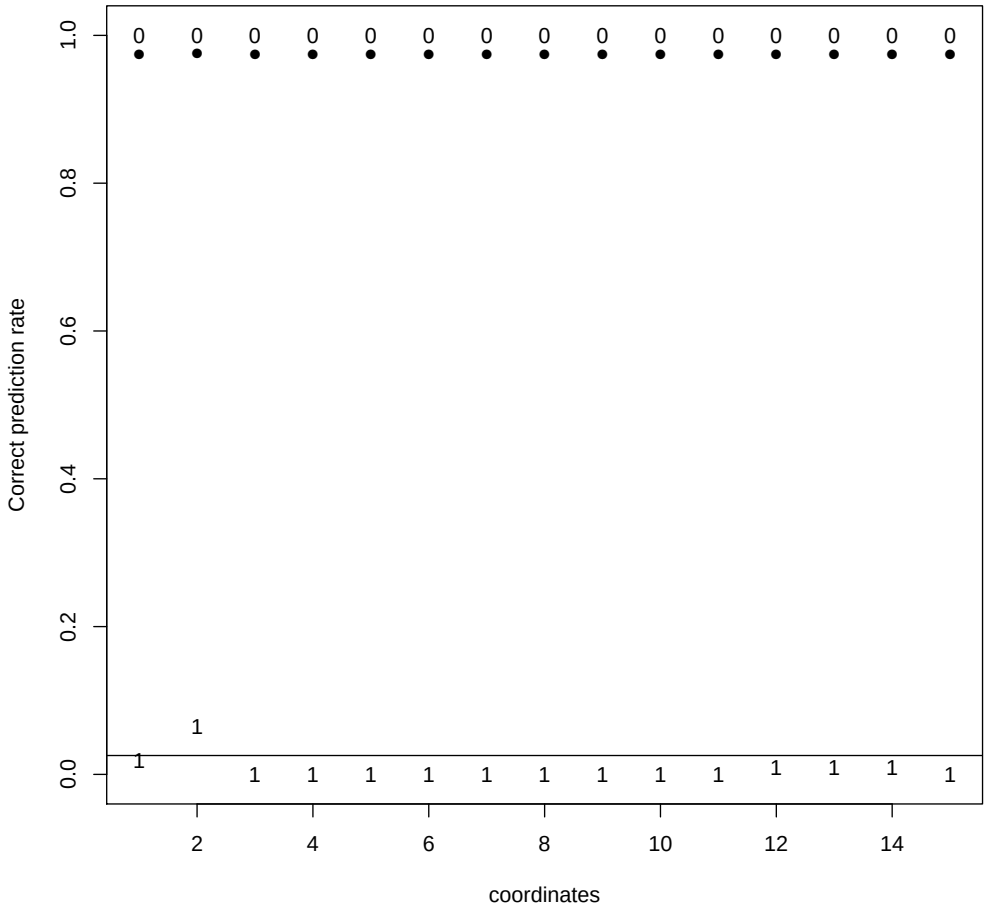


Figure 21: Grasslands

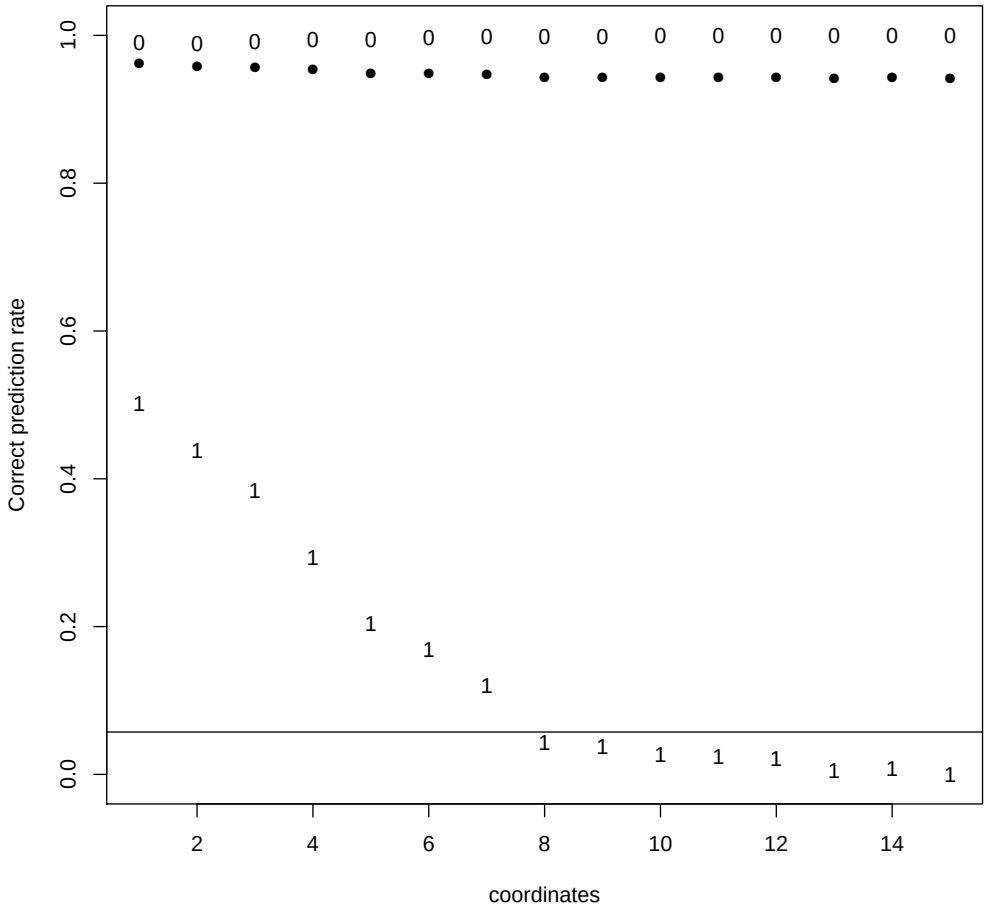


Figure 22: Mill stream

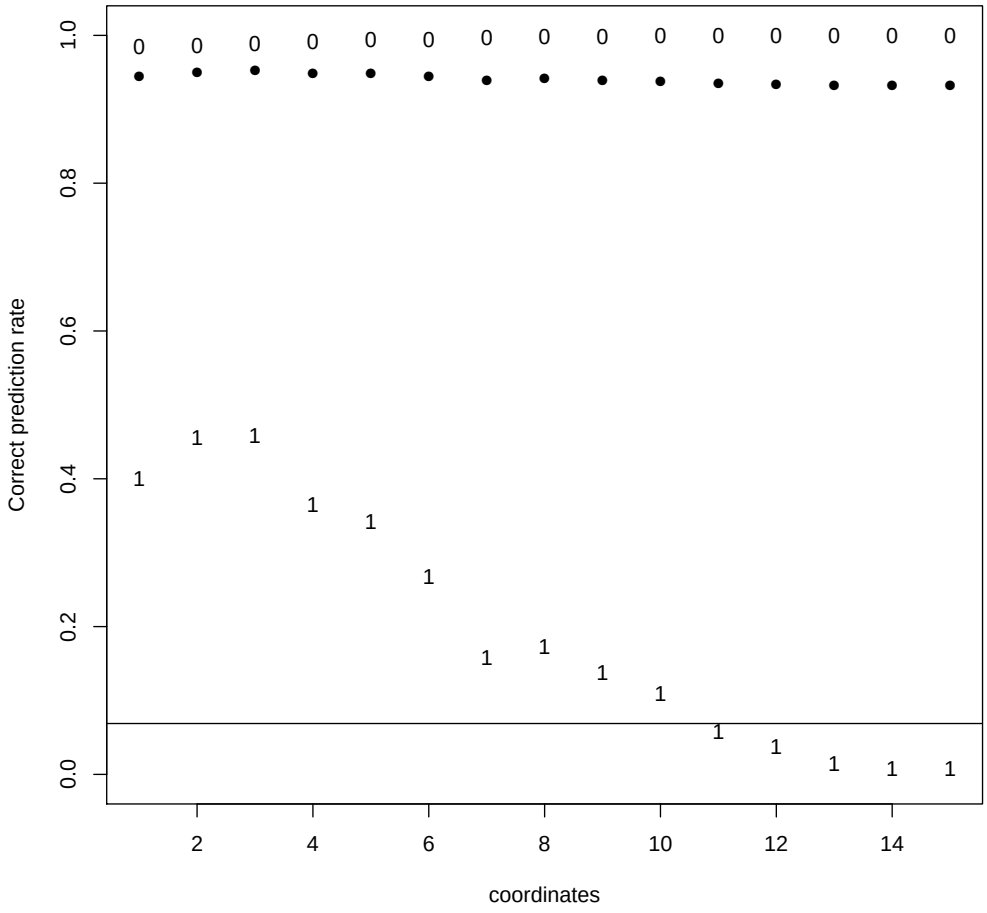


Figure 23: Skipwith pond

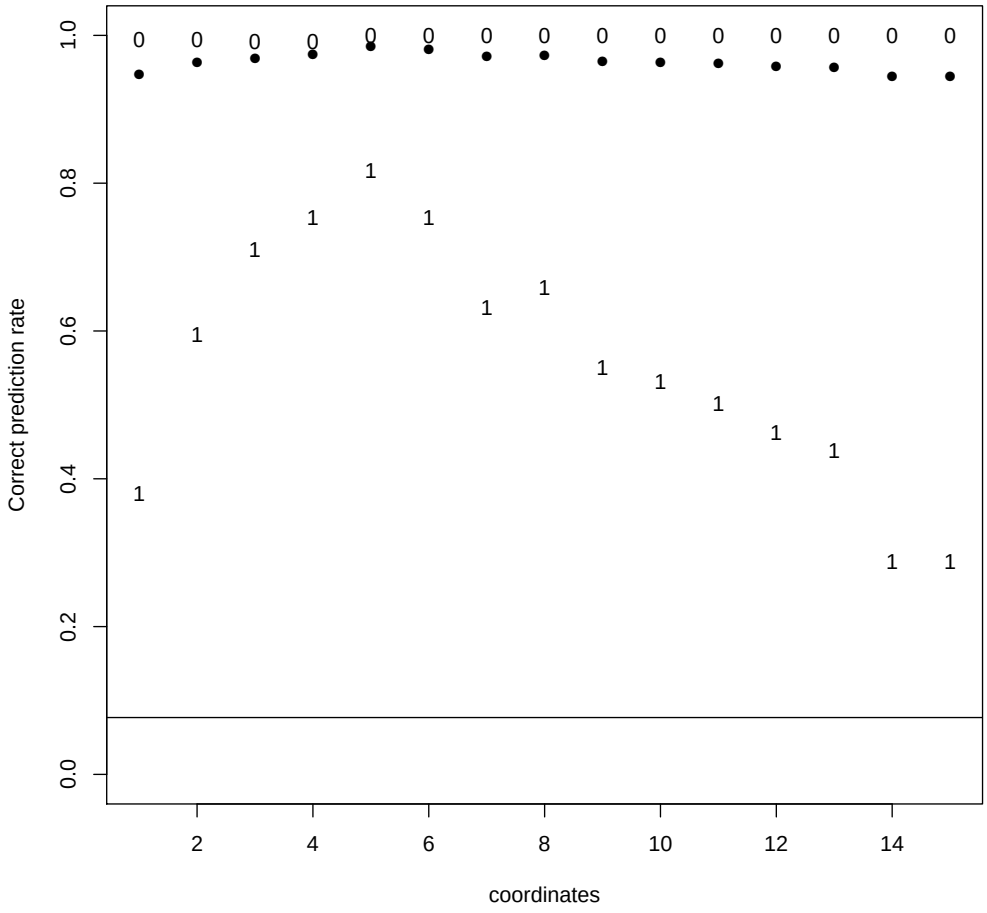


Figure 24: Tuesday lake

5 Evolutionary signal

The 12 following figures show the evolutionary signal, namely the strength and the significance of the correlation between the phylogenetic variance-covariance matrix of the species community and the Jaccard pairwise similarity matrix computed on 99 sampled food web realization, as function of the model dimension d (here rank) for the Serengeti National Park and Weddell sea food webs. The Jaccard similarity is computed either for species as predators, prey or predators and prey.

We can notice a saturating trend, with a non significant increase in mean and reduction in variance (as expected) for the increasing dimensionality and a decreasing signal (often not significant) for the single ranks.

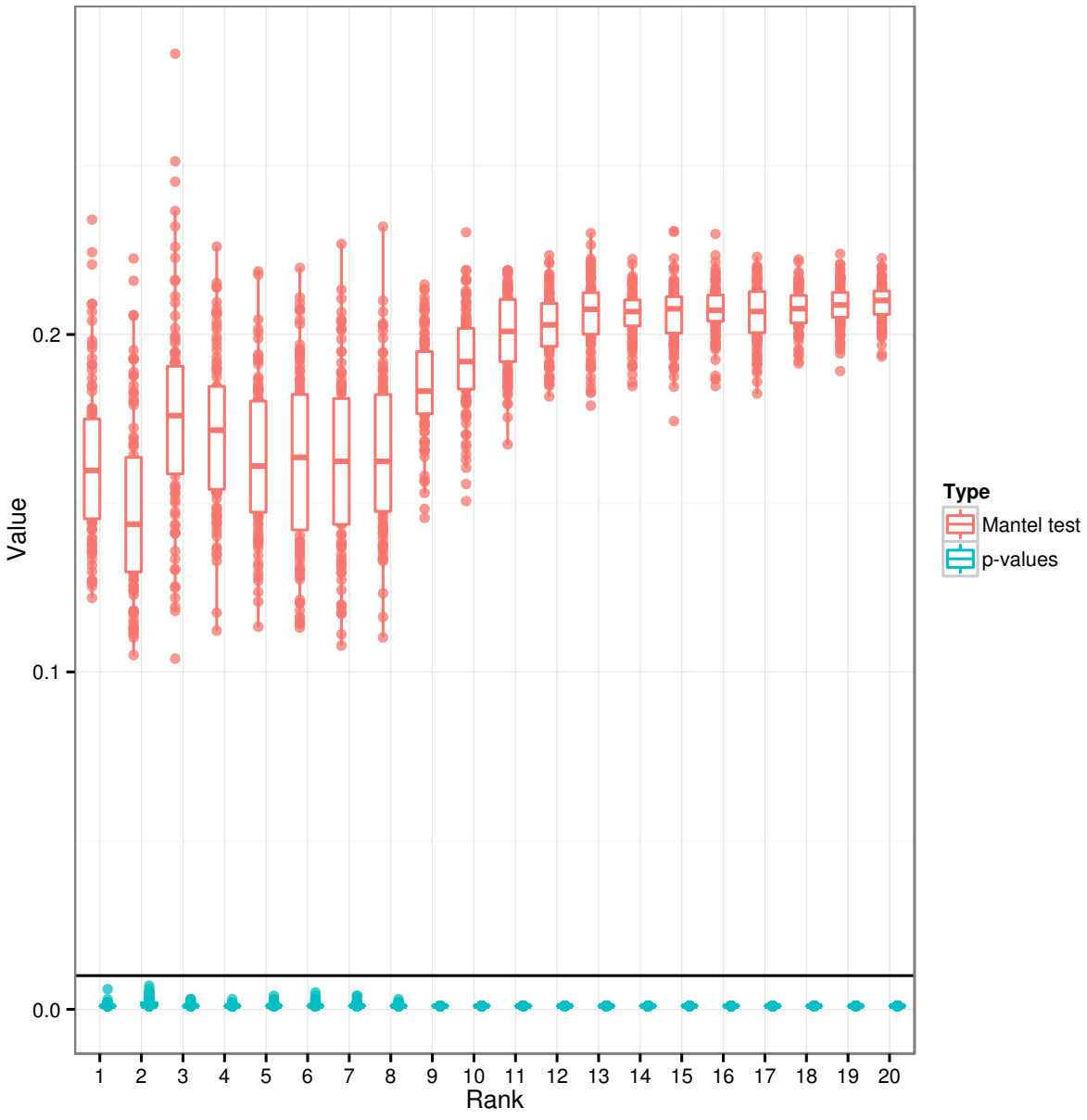


Figure 25: Serengeti National Park: increasing dimensionality; species as both predators and prey.

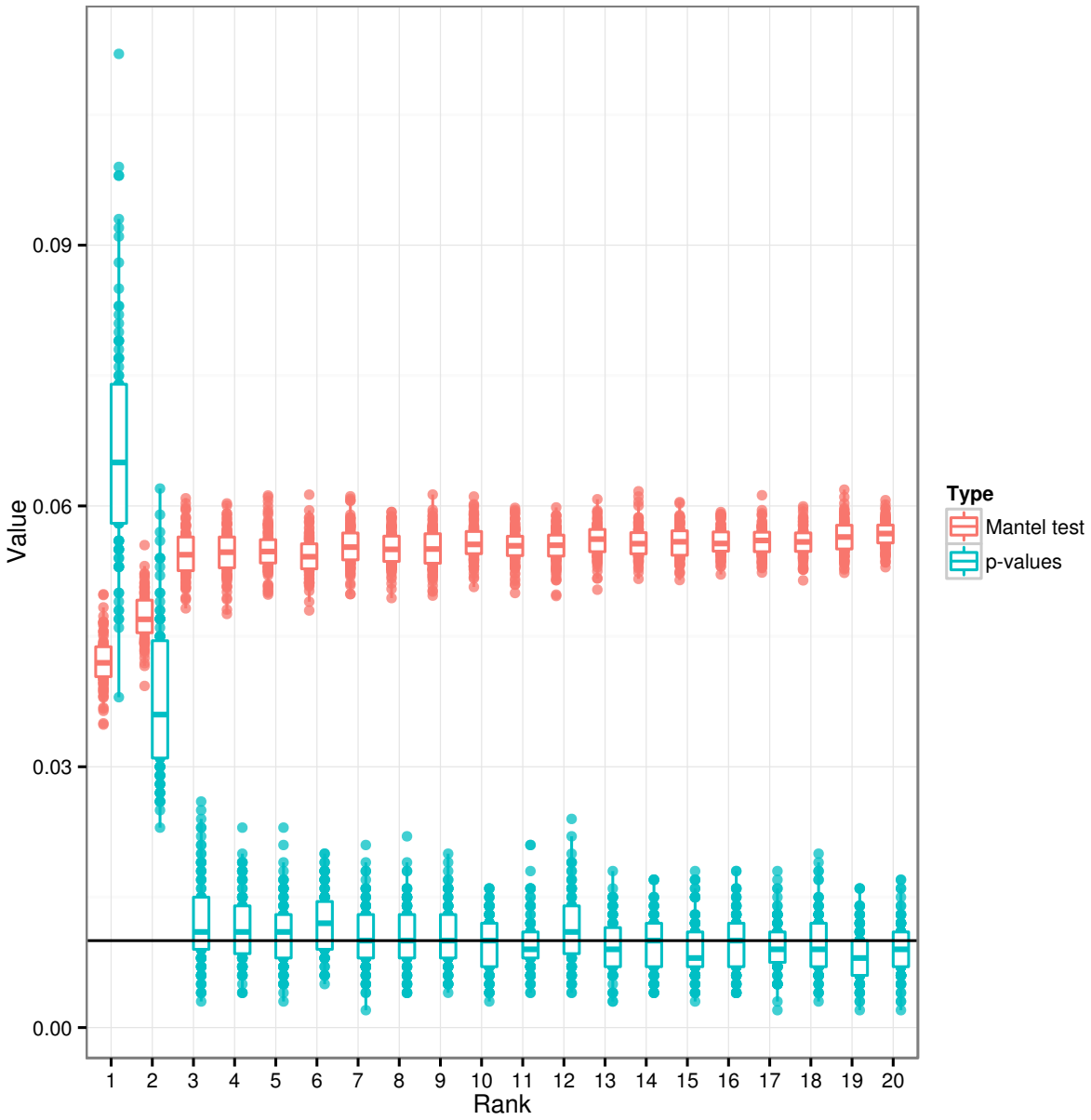


Figure 26: Serengeti National Park: increasing dimensionality; species as predators.

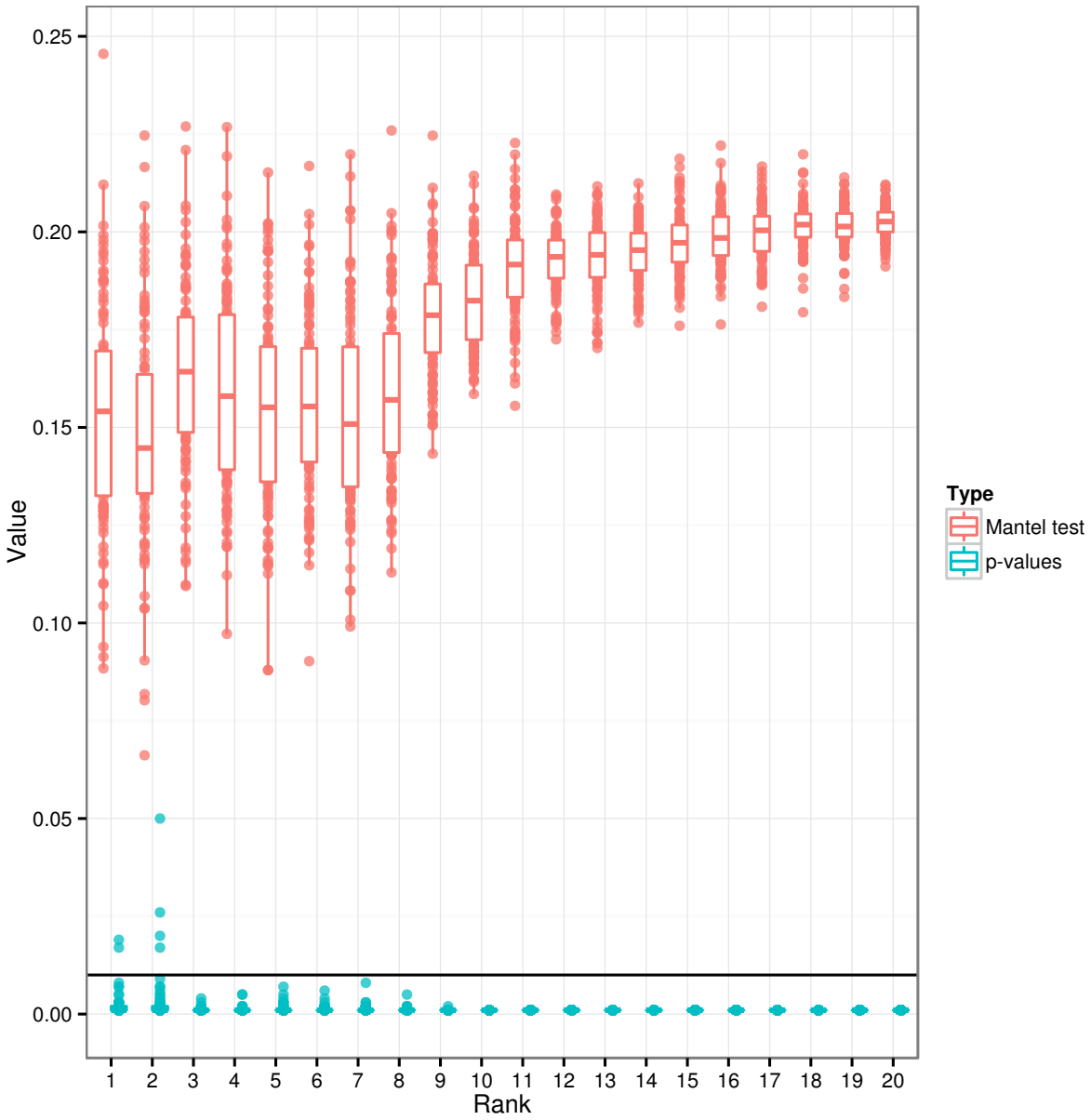


Figure 27: Serengeti National Park: increasing dimensionality; species as prey.

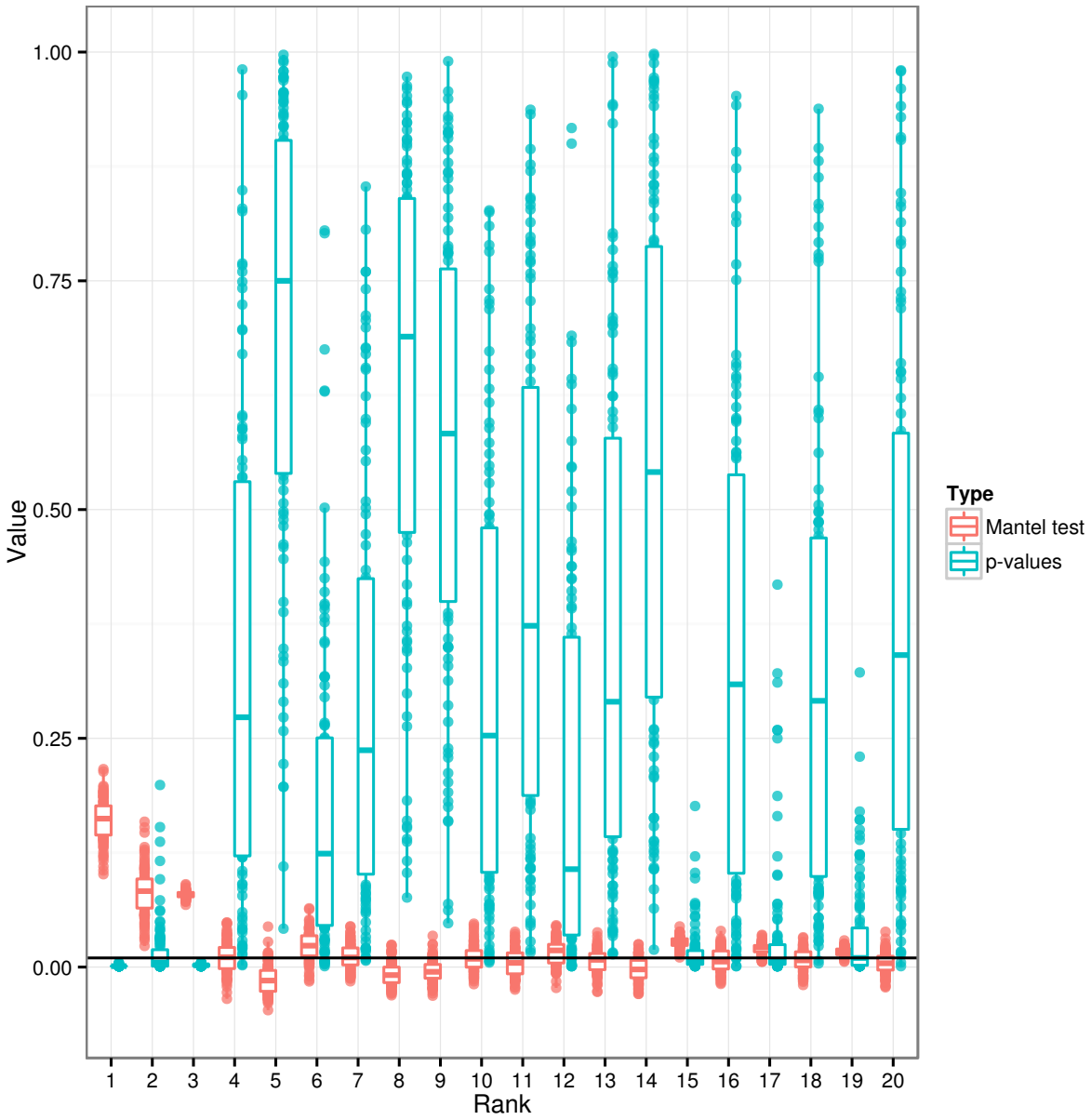


Figure 28: Serengeti National Park: single ranks; species as both predators and prey.

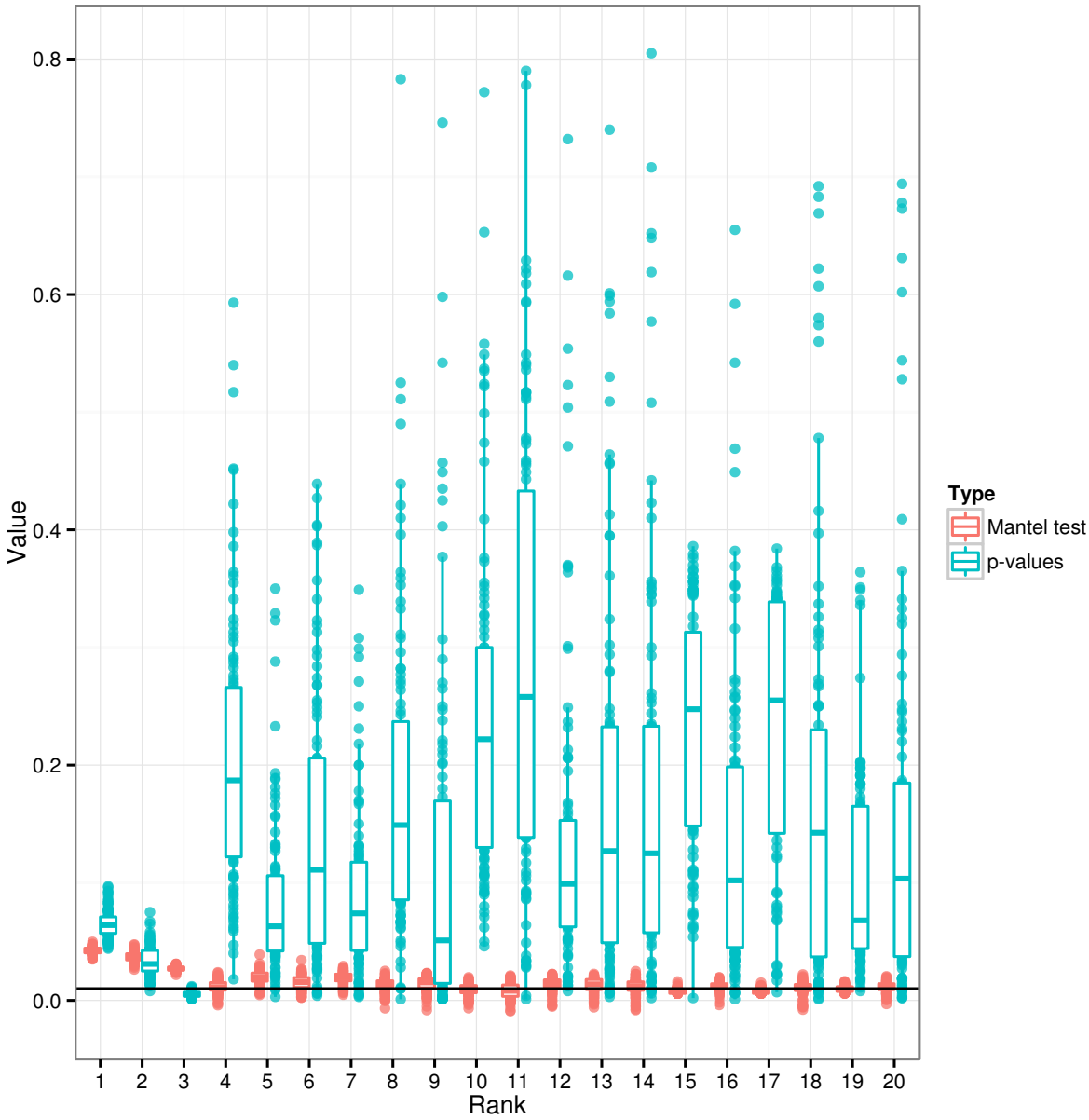


Figure 29: Serengeti National Park: single ranks; species as predators.

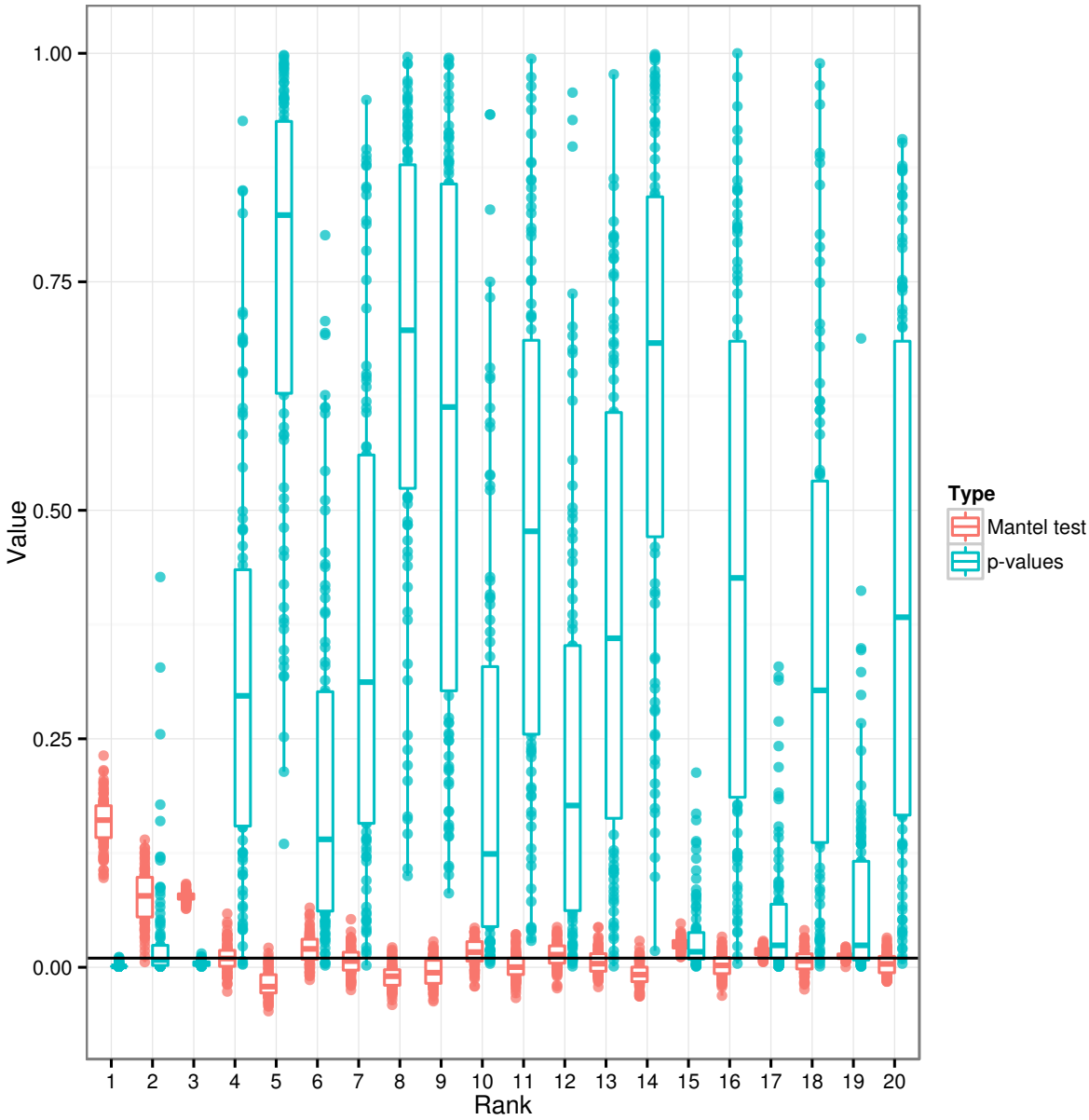


Figure 30: Serengeti National Park: single ranks; species as prey.

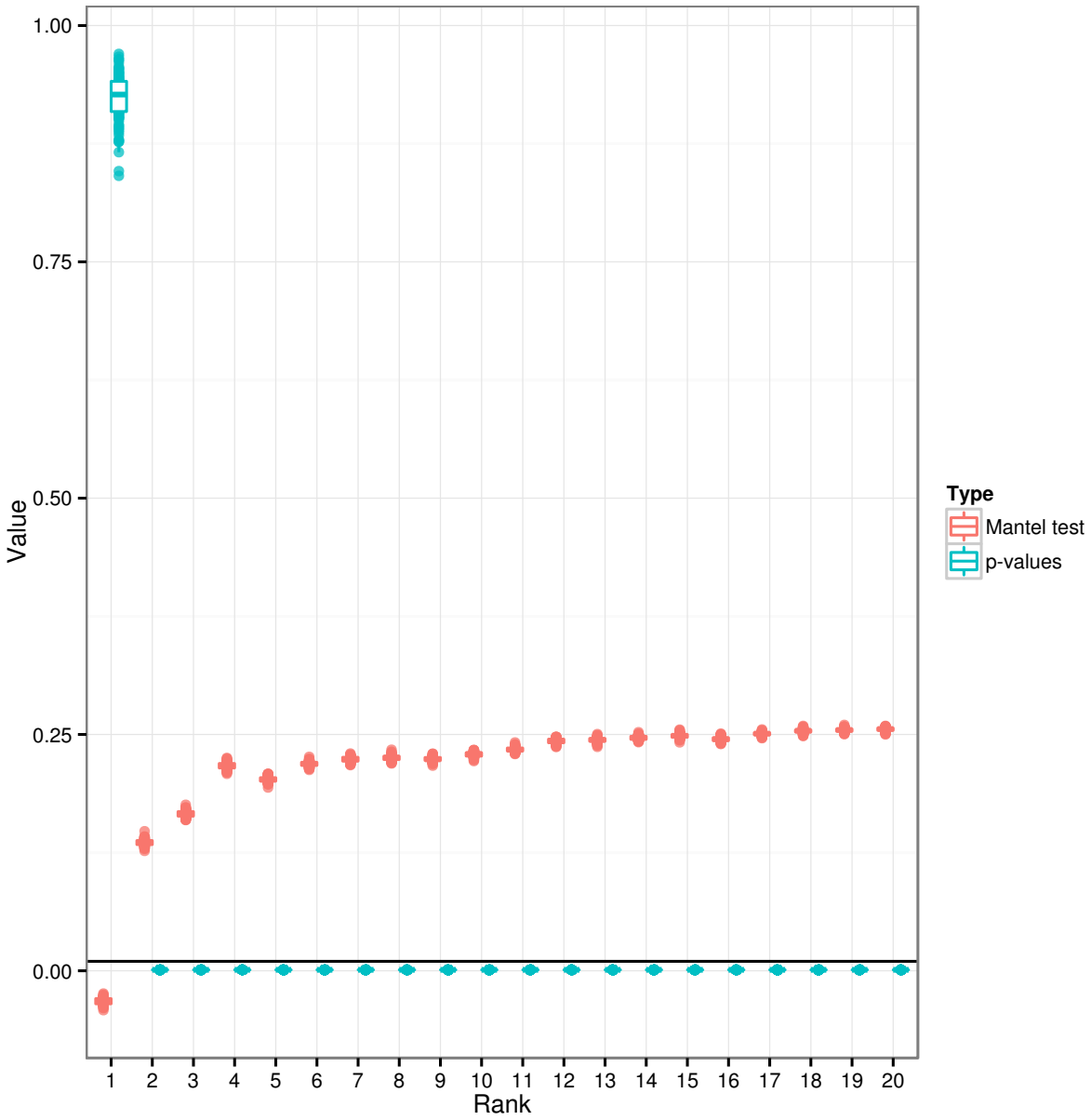


Figure 31: Weddell Sea: increasing dimensionality; species as both predators and prey.

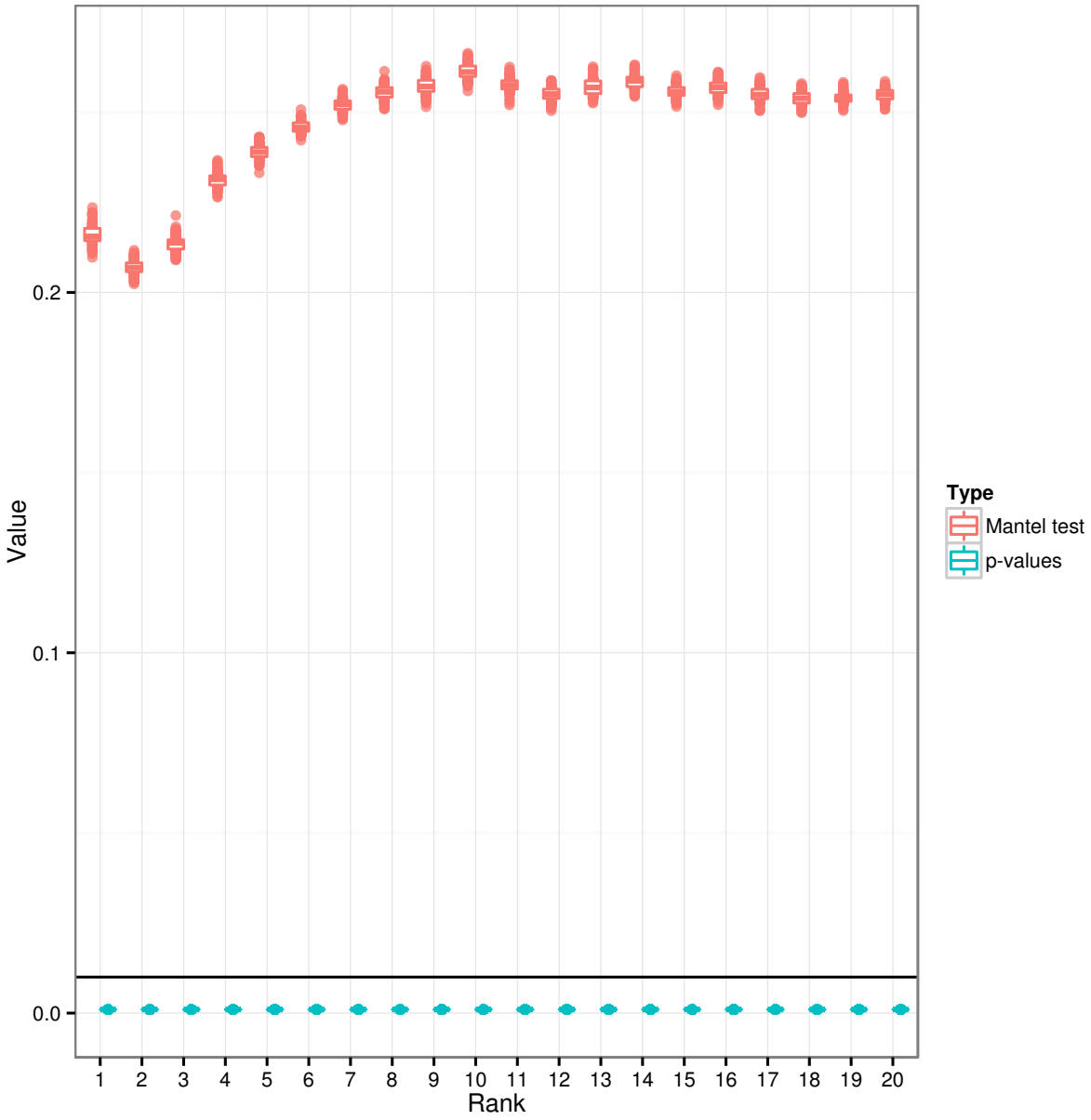


Figure 32: Weddell Sea: increasing dimensionality; species as predators.

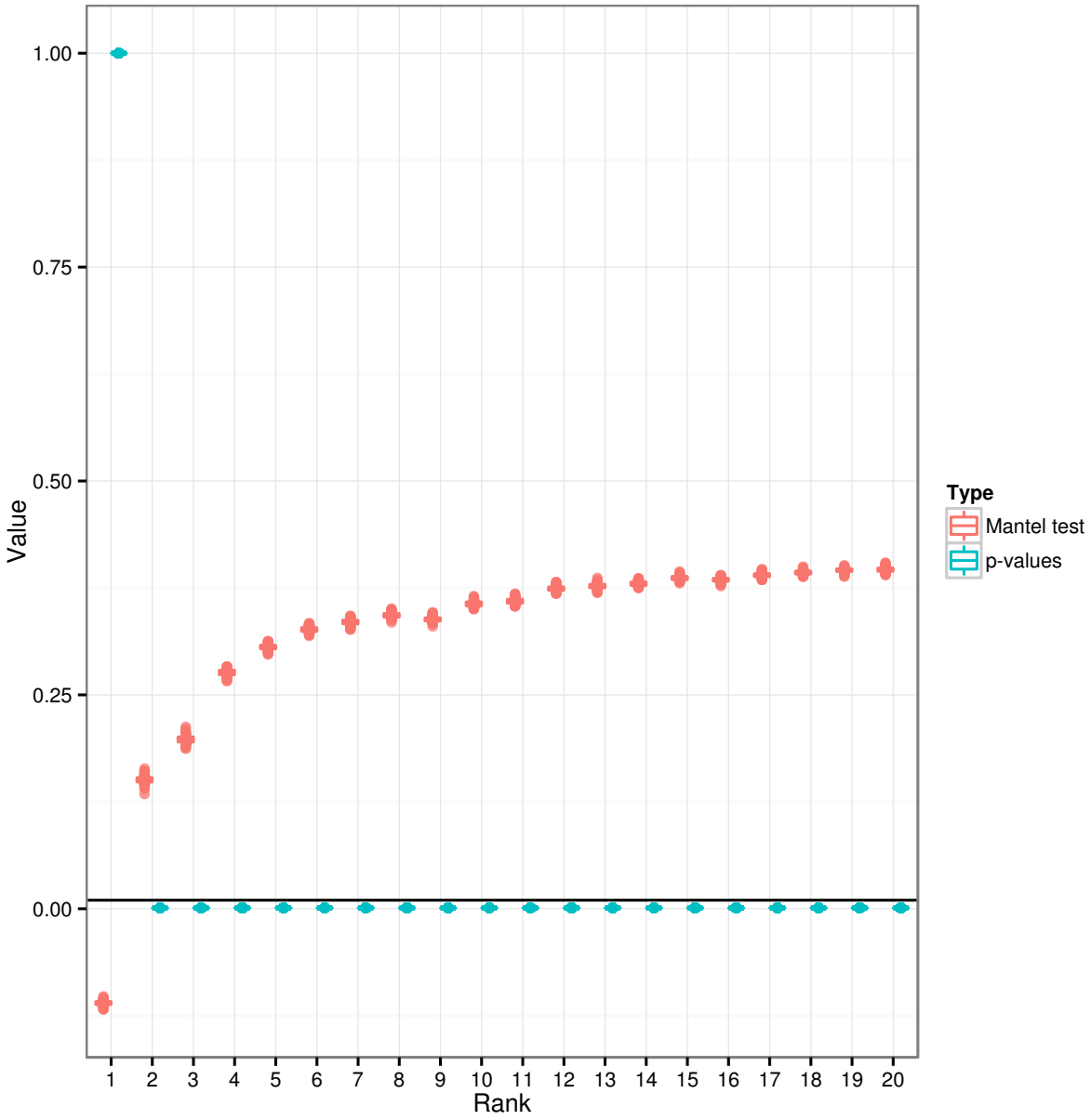


Figure 33: Weddell Sea: increasing dimensionality; species as prey.

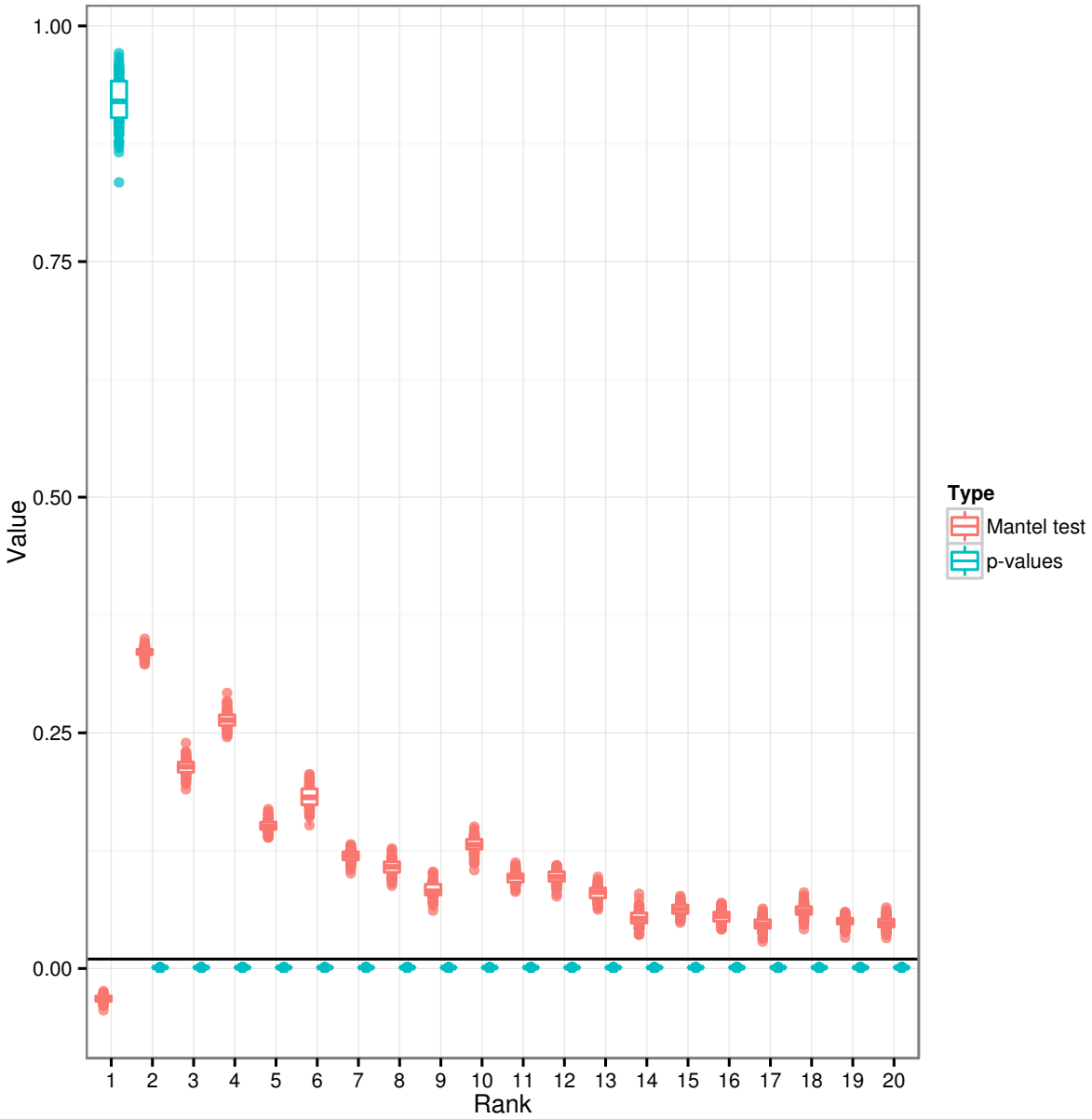


Figure 34: Weddell Sea: single ranks; species as both predators and prey.

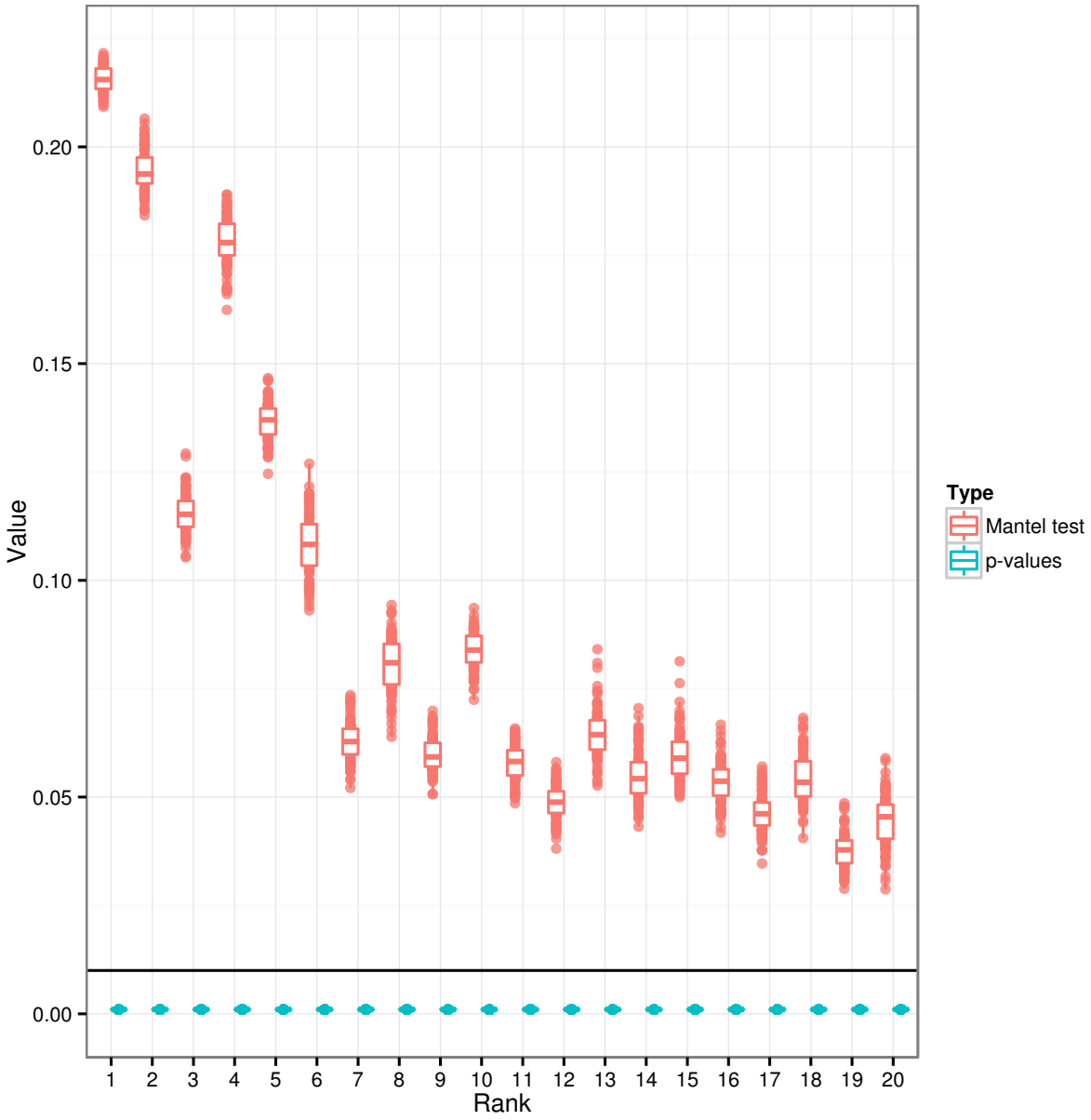


Figure 35: Weddell Sea: single ranks; species as predators.

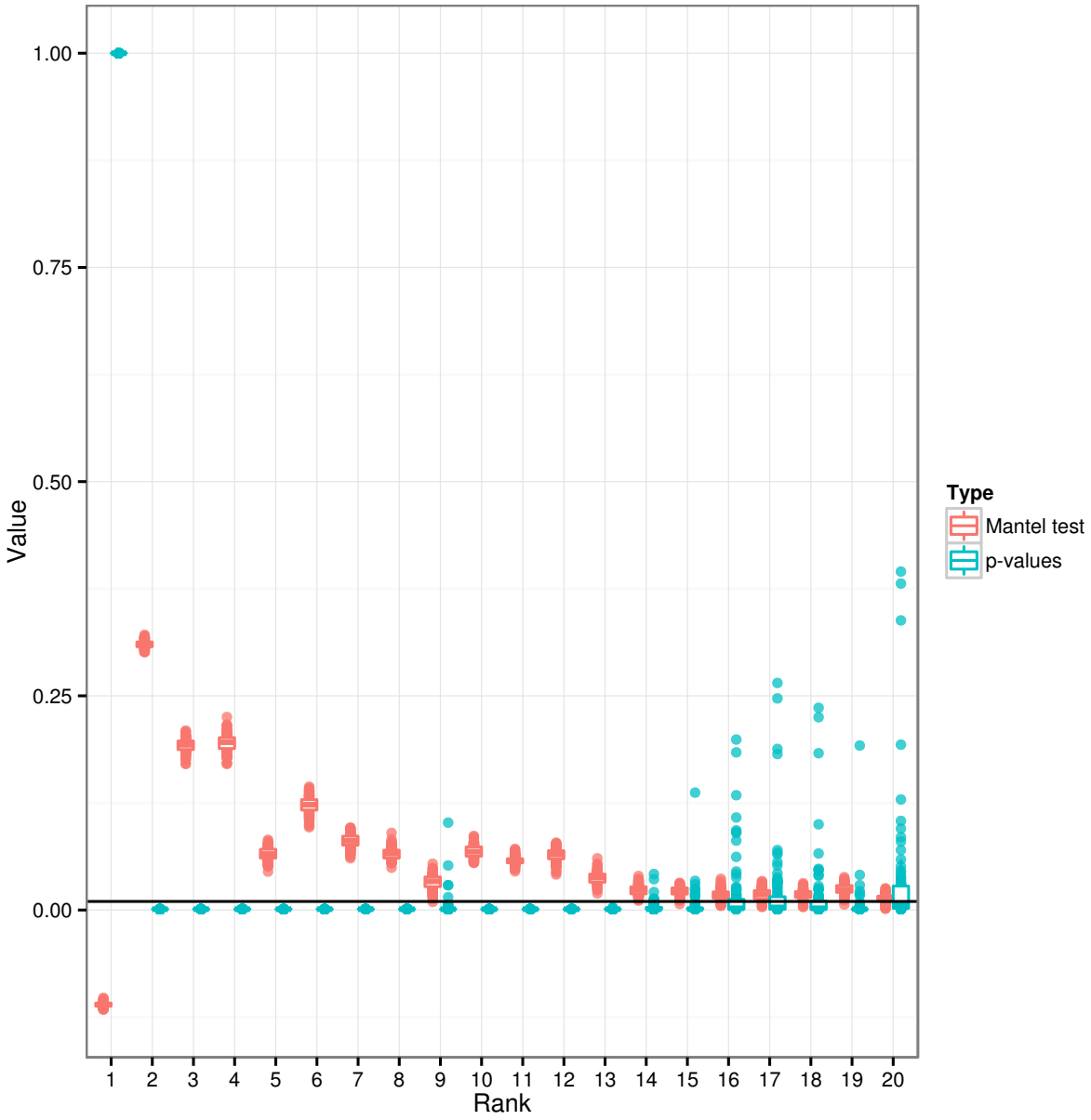


Figure 36: Weddell Sea: single ranks; species as prey.