

Supplementary Table 3

Supplementary Table 3: Classification accuracy of *PhyloPythia* for genomic fragments of unknown organisms at different taxonomic ranks. For every clade, the clade-specific sensitivity (class *Sn.*) and specificity (class *Sp.*) is displayed. The two rightmost columns give the overall sensitivity (*Sn.*) and specificity (*Sp.*) of *de novo* sequence classification.

Rank	kernel	Wn															
Domain	Gaussian	6,6,1	Bacteria	Archaea	Eukaryota	Bacteria	Archaea	Eukaryota					<i>Sn.</i> (%)	<i>Sp.</i> (%)			
	Data		Class <i>Sn.</i> (%)			Class <i>Sp.</i> (%)											
	1 kb		85.22	34.14	53.67	97.38	77.01	69.47					57.68	81.29			
	3 kb		92.39	48.86	74.88	98.86	89.92	85.13					72.04	91.3			
	5 kb		95.9	33.22	78.33	98.57	99.71	92.47					69.15	96.92			
	10 kb		96.9	71.84	90.49	99.24	84.65	92.33					86.41	92.07			
	15 kb		98.98	51.87	79.73	98.56	97.68	99.09					76.86	98.44			
	50 kb		98.45	75.52	93.6	99.54	94.91	99.32					89.19	97.92			
Phylum	Gaussian	6,4,1	Other	Cyanobacteri	Proteobacteri	Firmicutes	Deinococcus-	Actinobacteri	Spirochaetes	Chlamydiae	Crenarchaeot	Euryarchaeot	Fusobacteria	Ascomycota	Arthropoda	Chordata	Bacteroidetes
	Data		Class <i>Sn.</i> (%)														
	1 kb		76.27	8.71	64.77	12.83	34.33	50.04	44.67	0	40	20.11	79.33	2.83	43	89.89	41.5
	3 kb		42.27	76.64	90.2	83.17	54.33	91.36	59.17	87.89	78	73.17	96	54.5	66.25	97.33	85
	5 kb		34.51	85.64	93.2	89.4	60.33	93.52	60.83	88.56	79.33	76.78	98	71.5	66.75	98.78	92
	10 kb		35.66	85.79	94.69	89.89	64.67	94.65	33.44	88.44	83.67	81.89	98.67	81.5	81.33	99.67	86.33
	15 kb		47.23	86.43	95.06	89.45	65.67	93.39	30.74	85.85	79.67	81.22	98.33	79.5	79.33	99.89	80.33
	50 kb		36.54	86.14	97.68	87.83	74.85	96.3	14.74	78.79	88.28	87.64	100	91.17	86.33	99.67	82.64
Class	Gaussian	5,5,1	Other	Gamma protec	Sordariomyce	Actinobacteri	Thermoprotei	Thermoplasm	Thermococci	Clostridia	Deinococci	Bacteroides(c	Fusobacteria(Spirochaetes(Chlamydiae(Methanomicrc	Alphaproteob
	Data		Class <i>Sn.</i> (%)														
	1 kb		92.55	26.68	0	16.88	38	25.75	10.67	3.78	26.67	48	58.67	3.17	0	2.5	7.04
	3 kb		70.33	87.39	77	85.52	89.67	84.5	95	65.56	54.67	94.67	94.67	60.83	84.44	55.75	81.71
	5 kb		57.81	93.21	88	90.52	91	90.75	98	73.67	62.33	98.33	98.67	65.33	89	64.75	91.25
	10 kb		46.79	96.12	94.67	93.24	94.33	98.25	99	76	65.33	100	99.67	65.89	89	79.25	93.39
	15 kb		43.87	97.13	97	93.35	96	99.25	99.33	76	66	100	99.33	60.74	86.27	85.5	93.67
	50 kb		43.68	98.92	96.33	95.81	99.31	100	100	73.24	74.85	100	100	31.09	79.65	94.58	97.68
Order	Gaussian	5,5,1	Other	hroococcal	Nostocales	rochloal	enthomonad	Vibrionales	asteurellal	epirochaetalk	Bacillales	bacteroidale	Clostridiales	actobacillalk	usobacteral	tinomycetah	odospirillal
	Data		Class <i>Sn.</i> (%)														
	1 kb		98.92	0.25	0	0	0	0	2.92	2.67	0	0	0	10.21	0	0	0
	3 kb		96.18	13.25	28	0	51.29	17.25	70.92	20.5	10.69	61.33	36.86	76.46	0	53.62	3.33
	5 kb		91.44	30.25	88.33	2.5	86	66.25	87.83	27.83	51.65	94.67	49.29	88.54	3.67	83.38	13.67
	10 kb		83.79	48.5	98	67.75	95.86	92.75	96.17	31.27	73.23	100	60.57	94.43	95.67	94.77	31.67
	15 kb		79.84	50.25	100	73.75	97.57	98.25	98.67	28.52	84.88	100	71	96.35	99.67	96.54	33.33
	50 kb		74.66	47.33	100	67.79	97.43	100	99.79	14.42	90.57	100	67.6	97.31	100	99.75	37.8
Genus	Gaussian	5,5,1	Other	ochlorococcc	phylococcc	treptococcc	Bacillus	Clostridium.	actobacillu	Listeria	rynebacteri	yobacteriu	treptomyce	ampylobact	elicobacte	lycoplasm	athanosarci
	Data		Class <i>Sn.</i> (%)														
	1 kb		99.05	0	0	0.35	0	0.17	7.75	0	0	0	0	0	11.75	6.4	0
	3 kb		96.56	0.75	75.5	74.65	15.9	63.33	23	30.25	4	31.14	57.33	38.8	29	29.2	17.67
	5 kb		93.32	26.75	94	83.94	60.9	76.17	25	73	44.33	64.29	85.67	54	37	43.8	52.33
	10 kb		87.53	50.5	99	92.12	85.3	81.17	31.25	96.5	71.33	89.57	99.67	58.8	53.75	52.42	78.33
	15 kb		84.9	70	99.67	97.53	88.2	82.5	44.27	98	81.67	94.14	99	85	68	60.47	86
	50 kb		81.96	67.79	100	99.85	89.46	83.18	46.51	99.58	98.87	97.37	99.67	100	72.52	75.25	95.73

Supplementary Table 3

Other	Cyanobacteria	Proteobacteria	Firmicutes	Deinococcus-	Actinobacteria	Spirochaetes	Chlamydiae	Crenarchaeot	Euryarchaeot	Fusobacteria	Ascomycota	Arthropoda	Chordata	Bacteroidetes	Sr. (%)	Sp. (%)	
Class Sp. (%)																	
6.47	93.13	92.62	97.26	91.15	93.57	42.68	-	93.75	94.27	82.07	73.91	29.01	78.09	71.55	40.55	79.47	
18.06	94.37	94.94	95.21	90.06	91.03	57.35	97.65	81.82	80.01	86.23	73.98	43.02	88.57	73.12	75.68	81.95	
24.64	93.09	94.98	95.03	87.02	91.04	64.49	96.96	84.4	79.98	88.55	69.98	42.58	92.51	72.73	79.28	82.38	
21.09	97.25	95.94	97.24	88.99	92.67	60.61	98.03	95.8	83.14	98.34	74.54	50	95.94	67.8	80.02	85.45	
22.39	97.27	96.92	98.04	94.26	95.6	71.24	96.12	97.95	88.02	100	77.81	52.31	97.51	64.61	79.47	87.69	
23.17	98.13	97.1	99.18	98.43	98.77	75.41	82.35	93.43	86.85	100	78.59	55.46	99.78	65.56	80.57	87.79	
Betaproteobacteria	Deltaproteobacteria	Epsilonproteobacteria	Mollicutes	Mammalia	Insecta	Actinopterygii	Bacilli	Other	Gammaproteobacteria	Sordariomycetes	Actinobacteria	Thermoprotei	Thermoplasmata	Thermococci	Clostridia	Deinococci	Bacteroidetes
Class Sp. (%)																	
33.38	7.38	83.8	72.33	72.5	32.5	43	0.54	14.82	94.63	-	98.37	73.08	92.79	100	97.14	86.96	80
85.08	48.5	94.7	92.67	92	67.75	80	80.11	44.58	92.13	74.28	90.59	85.67	92.6	86.1	86.38	83.25	80.91
89.62	54.75	96.6	94.67	96	71.75	84	91.39	58.34	92.16	65.51	88.16	89.8	91.21	76.56	75.95	84.62	74.12
93.08	59.75	98.2	94.71	99	77.25	92.33	95.2	67.98	92.51	63.82	84.93	93.09	95.39	72.62	74.03	83.4	70.26
94	60.62	98.9	96.15	100	79.25	95.67	96.46	71.98	92.95	62.85	83.43	95.36	93.41	69.95	74.84	84.62	68.49
96.48	63.54	99.71	97.75	99.5	84.25	96.33	97.55	82.67	93.62	65.68	87.12	94.12	92.81	69.03	85.71	91.24	72.12
Proteobacteria	Neisseriales	Coplasmatata	Planctobacteria	Thermococci	Thermoplasmata	Rhizobiales	Chlamydiales	Leifsoniales	Diptera	Uromyces	Rickettsiales	Chlamydiales	Thermobacteriales	Chlamydiales	Other	Thermococci	Nostocales
Class Sp. (%)																	
0	16.67	0.5	58.5	0	0.25	0	0	0	0	0.8	0	0	0	0	22.26	100	-
38.33	75.5	47.5	88.3	24	45	0	5.89	32	39.67	39.3	4.56	39.27	41.14	18.5	31.15	50.96	98.82
54	79.5	60.33	93.5	83.33	61.75	5.3	69.44	57.67	56.33	57.9	64.89	73.73	86.08	42	45.62	56.28	98.15
63.33	83.17	71.83	98	95.33	90.5	86.3	88.56	70	69.67	73.5	88.78	87.47	95.16	60	64.1	65.54	88.29
62.67	83.33	75.58	99.1	98.67	96.25	93.8	86.27	72.67	72	77.5	89.14	91.73	96.4	65.75	70.65	64.01	85.96
65.04	69.65	75.86	100	100	100	99.87	79.22	79.62	76	86.57	96.46	95.31	97.36	84.34	77.38	68.21	78.95
Pyrococcus	Brucella	Xylella	Leifsoniales	Chlamydiales	Buchnera	Neisseria	Bordetella	Escherichia	Salmonella	Shigella	Yersinia	Vibrio	Haemophilus	Rickettsia	Chlamydiales	Thermobacteriales	Other
Class Sp. (%)																	
1	0.33	0.75	0	0	0	13	0	0	0	0	0	0	0	1	0	0	51.27
64	69	49	35	45.14	11	68.75	30.75	28.43	46.38	4.25	2.29	24.75	0	49	60.83	60.33	62.91
87	93.67	70	66	74.71	65.67	72.75	66	54.71	64.5	20	59.71	60.25	0.25	76.5	91.5	90.33	74.55
96.33	98.33	94	85.57	94.86	94.21	86.5	73	65	86.25	40.75	96.86	80	80.5	96.5	99.67	99.33	85.47
98.67	99.33	98.5	94.71	98.29	98.41	95.25	75	66.71	96.5	55.5	98.29	95.75	91	100	99.79	99.67	90.57
100	100	99.04	99.86	99.86	100	100	79.43	93.79	98.74	76.84	98.77	99.47	97.87	100	100	100	95.31

Supplementary Table 3

Fusobacteria(Spirochaetes(Chlamydiae(Methanomicr Alpha(Proteob: Betaproteoba(Deltaproteoba(Epsilon(proteo(Mollicutes													Mammalia	Insecta	Actinopterygii	Bacilli	Sn. (%)	Sp. (%)
78.92	95	-	83.33	98.99	94.12	64.84	81.36	84.55	54.92	39.51	62.32	100	30.69	83.04				
88.2	89.24	96.82	69.04	95.61	92.65	60.62	93.39	92.36	66.67	45.93	76.68	96.05	79.24	83.42				
90.24	84.67	91.44	63.48	95.05	94.59	58.4	97.09	93.73	70.46	48.07	82.89	95.53	83.97	81.99				
92.86	88.14	85.12	56.71	92.4	96.67	58.79	98.69	95.07	75.57	47.69	84.97	95.54	86.98	81.74				
92.55	87.7	77.08	55.88	91.6	97.37	57.6	99.4	95.04	76.48	50.8	92.58	95.85	87.59	81.63				
91.24	89.81	45.32	65.01	92.75	98.19	64.46	100	96.67	78.66	55.98	98.63	94.28	87.84	82.84				
Prochloral(enthomonad(Vibrionales(astereu(lal(epirochaeta(Bacillales(lactero(idale(Clostridiales(actobacill(usobacter(al(Actinomyc(Rhodospiri(Rhodobact(Neisseriale(Mycoplas(r(Campylob(e(Thermococ(Thermopla																		
-	-	-	100	94.12	-	-	-	72.59	-	-	-	-	100	100	98.32	-	100	
-	96.51	95.83	98.84	83.11	99.29	99.46	88.36	91.38	-	99.29	14.71	98.29	99.12	84.32	98.55	100	100	
100	95.25	91.07	96.88	89.3	98.82	97.26	79.31	92.88	100	96.69	24.7	99.39	98.55	74.18	99.36	99.21	99.6	
100	89.59	78.11	95.37	89.47	97.99	89.29	75.58	94.84	99.31	93.2	34.55	100	99.6	68.47	99.8	90.79	99.45	
100	91.19	70.18	92.14	88.51	98.22	86.71	79.78	96.17	99.34	91.17	33.9	98.43	100	65.04	99.9	80.22	99.23	
82.79	95.35	67.38	87.25	95.74	96	80.43	87.83	93.89	100	92.09	34.32	98.86	99.54	63.31	100	72.3	96.99	
Prochlorococ(c(phylococ(c(treptococ(c(Bacillus(Clostridium(actobacill(Listeria(ryne(bacteri(y(cobacteri(utreptomyce(Campylob(e(Helicobact(Mycoplas(r(Methanosa(Pyrococ(c(Brucella(Xylella(Pseudomo																		
-	-	100	-	100	15.58	-	-	-	-	-	-	97.92	65.31	-	100	100	100	-
100	98.48	95.34	100	68.72	41.07	100	100	93.97	100	100	58.59	64.6	100	97.96	100	90.74	94.96	
100	98.43	93.88	96.36	63.83	42.37	98.98	96.38	87.89	94.83	99.63	60.41	69.3	96.32	91.58	99.29	88.61	85.08	
99.51	98.18	93.6	91.82	60.42	47.71	93.92	91.45	84.84	82.6	100	67.82	70.83	92.89	80.28	98.33	90.82	75.35	
97.56	99.34	94.36	89.63	59.07	59.59	94	90.07	83.21	76.35	100	73.12	74.28	88.36	75.51	97.07	93.81	74.41	
80.16	99.4	94.92	88.91	66.48	63.49	84.53	88.38	82.36	72.05	100	69.34	76	83.8	68.59	97.03	95.39	72.36	

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Rhizobiales	Chlamydiales	Desulfuror	Diptera	Pseudomonas	Rickettsiales	Burkholderia	Enterobacteriales	Methanosarcinales	Sn. (%)	Sp. (%)
-	-	-	-	100	-	-	-	-	6.39	96.11
-	100	98.97	63.3	81.37	100	99.16	99.87	100	35.95	89.98
100	100	95.58	59.72	79.21	100	98.22	99.66	93.85	60.37	90.11
96.75	98.15	91.7	53.18	78.44	99.13	97.84	99.28	86.02	79.53	87.92
94.08	94.24	90.46	52.17	77.89	97.82	97.59	98.99	83.23	82.32	86.43
85.33	60.4	94.95	54.42	80.06	89.71	97.74	98.92	87.5	83.32	84.15

Burkholderia	Buchnera	Neisseria	Bordetella	Escherichia	Salmonella	Shigella	Yersinia	Vibrio	Haemophilus	Rickettsia	Chlamydox	Fusobacterium	Sn. (%)	Sp. (%)
-	-	100	-	-	-	-	-	-	-	100	-	-	4.42	87.88
99.37	97.06	99.64	99.19	65.68	96.11	85	94.12	99	-	96.55	96.82	100	38.62	91.1
97.39	86.78	99.32	92.96	63.52	89.9	45.71	98.35	92.69	100	96.53	91.65	97.83	63.38	87.61
92.35	68.85	99.71	81.11	68.32	87.79	52.58	91.5	79.01	74.88	94.38	84.23	98.35	81.09	83.66
90.53	62.63	99.74	75.95	73.89	87.13	55.78	86.87	75.1	61.28	89.49	83.45	99.01	87.52	82.6
89.27	54.41	100	69.67	86.53	85.92	73	82.54	67.02	46.62	86.24	80.23	100	92.23	80.8