

1. Project Information

Program	Microbial/CSP 2012
PMO Project	0
Seq Proj ID	1027112
Sequencing Project Name	Leptolyngbya sp. HL7711_P1F1 JGI 000148CP-G14
JGI Project ID	0

2. Read Statistics

Illumina Std PE Statistics

File name	7666.6.80850.ATTCCCT.fastq
Library	TGTN
Number of reads	29,511,318
Sequencing depth [†]	885X
Read type	2x150 bp

[†] A genome size of 5.0 Mbp was assumed in this calculation.

3. Read QC Results

The following are the results of reads screened against contaminants. Pairs of matching reads were removed from the dataset.

Illumina Std PE Read Filter Statistics

Description	Num Reads	Pct Reads
Input	29,511,318	100
Contam removed	166	0.0
Artifact removed	402,178	1.4
Total removed	9,511,318	32.2
Total remaining	20,000,000	67.8

List of Contaminants Removed

Description	Num Reads	Pct Reads
gi 357579577 Canis_lupus_familiaris_chr3	86	0.00
human_chr2	76	0.00
gi 357579535 Canis_lupus_familiaris_chr20	36	0.00
gi 357579571 Canis_lupus_familiaris_chr5	26	0.00
gi 362110642 Felis_catus_breed_Abyssinian_chrC2	18	0.00
gi 357579566 Canis_lupus_familiaris_chr6	18	0.00
human_chr14	4	0.00

human_chr3	4	0.00
human_chr22	2	0.00
human_chr9	2	0.00
human_chr8	2	0.00
gi 357579550 Canis_lupus_familiaris_chr12	2	0.00
human_chr17	2	0.00
human_chrX	2	0.00
human_chr10	2	0.00
human_chrY	2	0.00
human_chr4	2	0.00

The following are the results of reads screened against potential reagent and process contaminants but were not removed from the dataset.

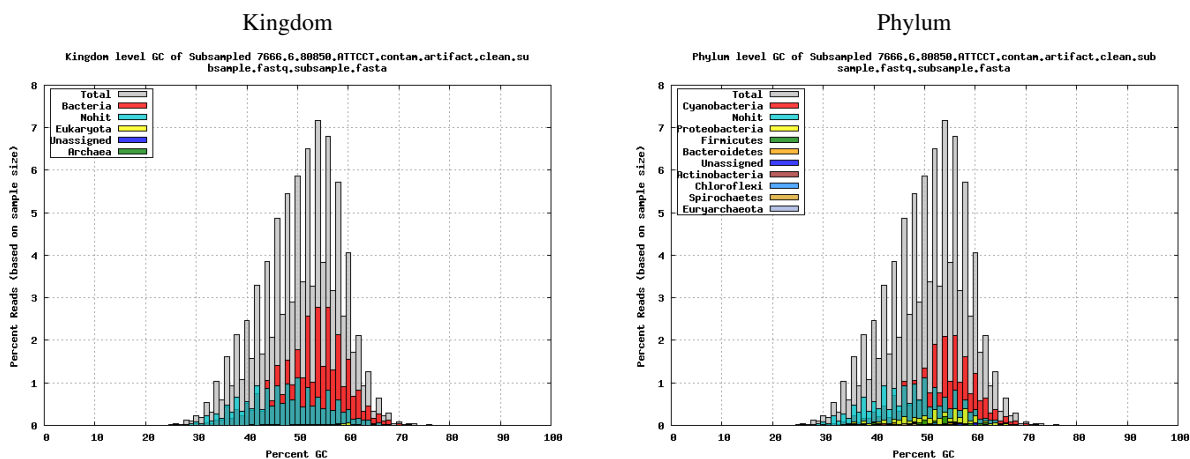
Illumina Std PE Contamination Identification Statistics

Description	Num Reads	Pct Reads
Input	29,511,318	100
Contam identified	10	0.0

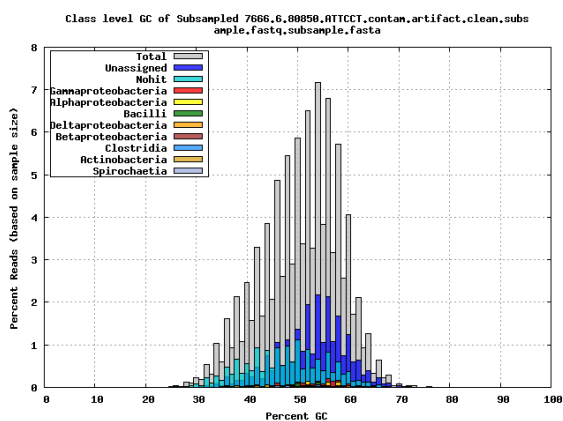
List of Contaminants Identified

Description	Num Reads	Pct Reads
<i>Escherichia</i>	8	0.00
<i>Ralstonia</i>	2	0.00

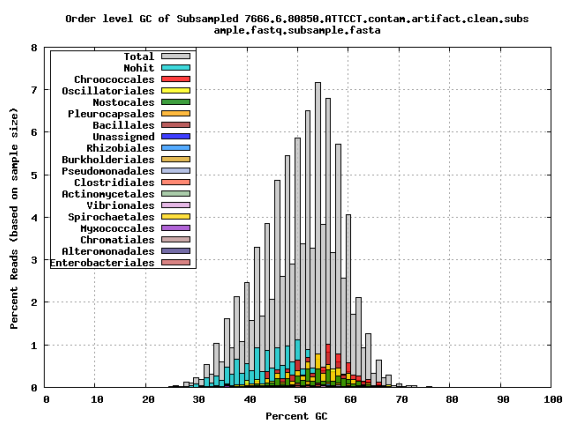
GC histogram of the reads subsampled to 10k, overlaid with GC of hits based on BLASTX, shown for different taxonomic levels.



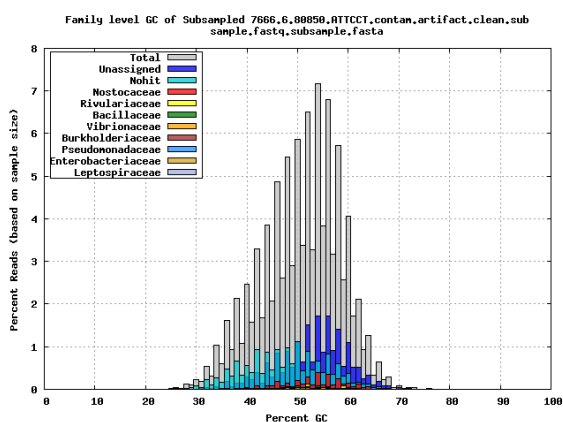
Class



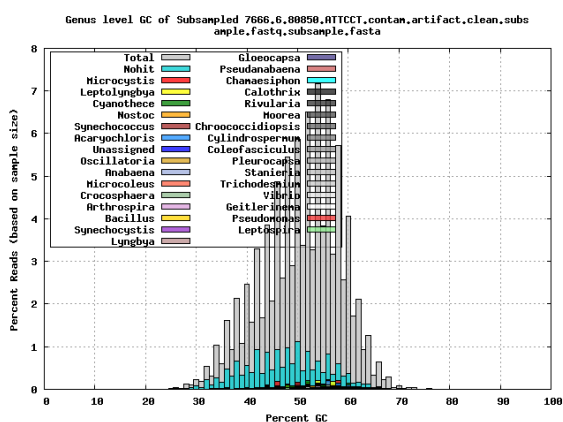
Order



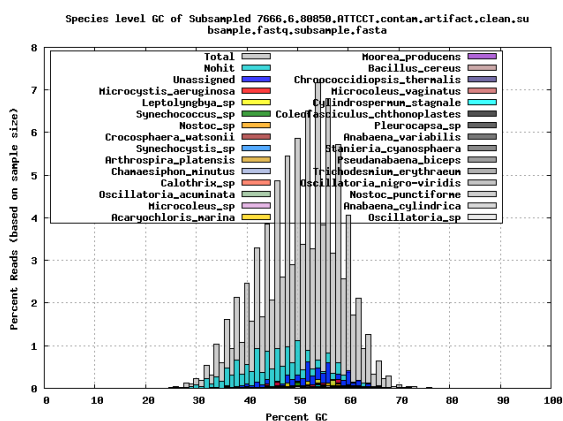
Family



Genus



Species

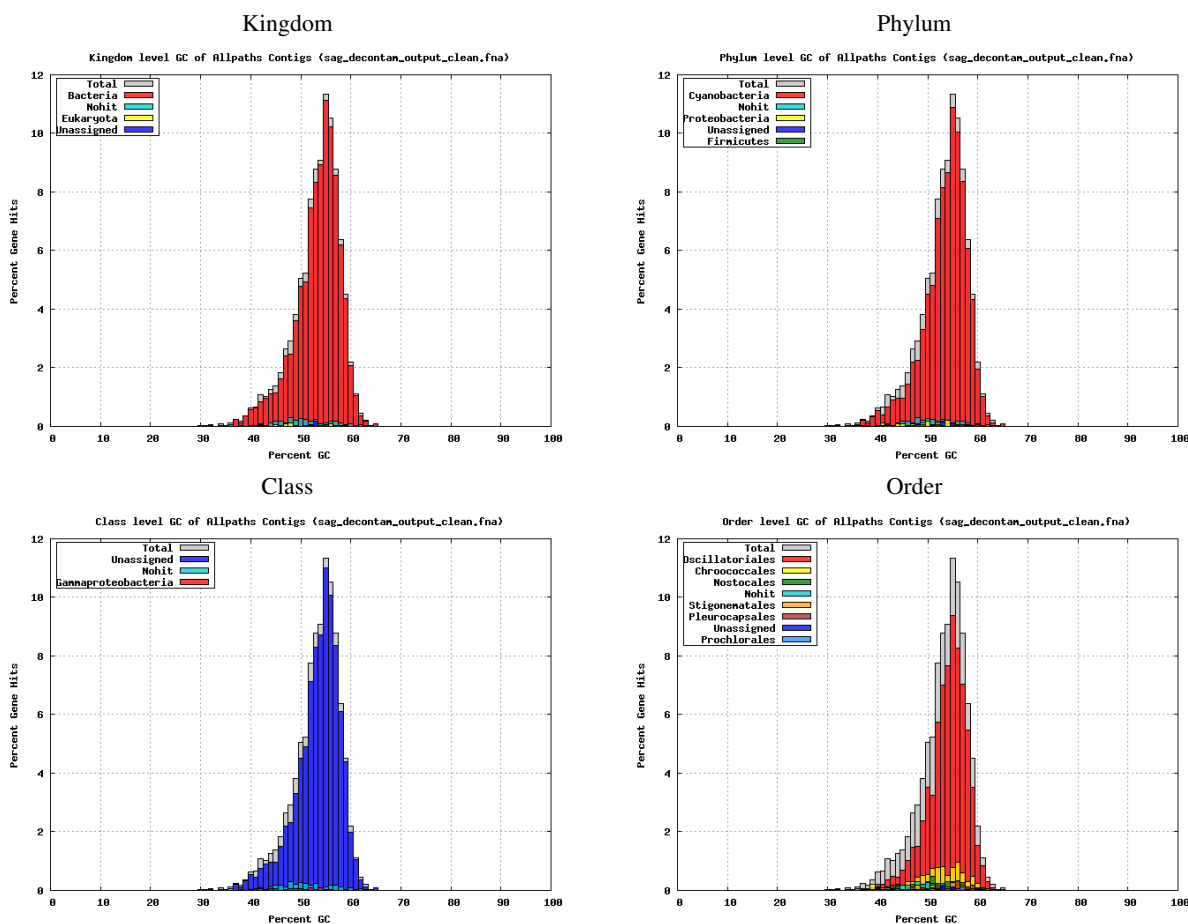


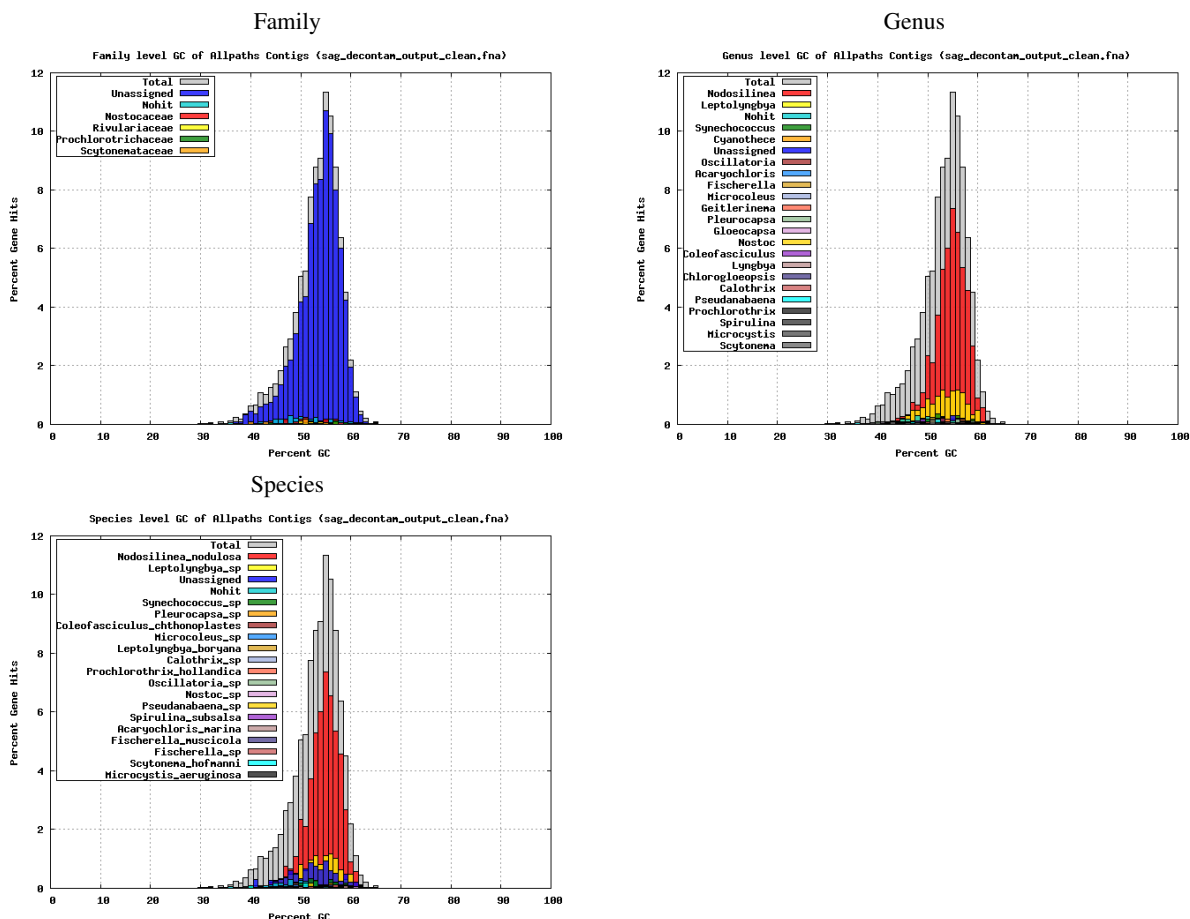
4. Assembly Statistics

Assembly method	SPAdes with auto decontamination
Scaffold total	171
Contig total	171
Scaffold sequence length	3.2 Mb
Contig sequence length	3.2 Mb (0.0% gap)
Scaffold N/L50	38/28.1 kb
Contig N/L50	38/28.1 kb
Largest Contig	78.1 kb
Number of scaffolds >50 kb	7
Pct of genome in scaffolds >50 kb	13.5
Pct of reads assembled (raw)	85.6
Pct of reads assembled (decontam)	62.6

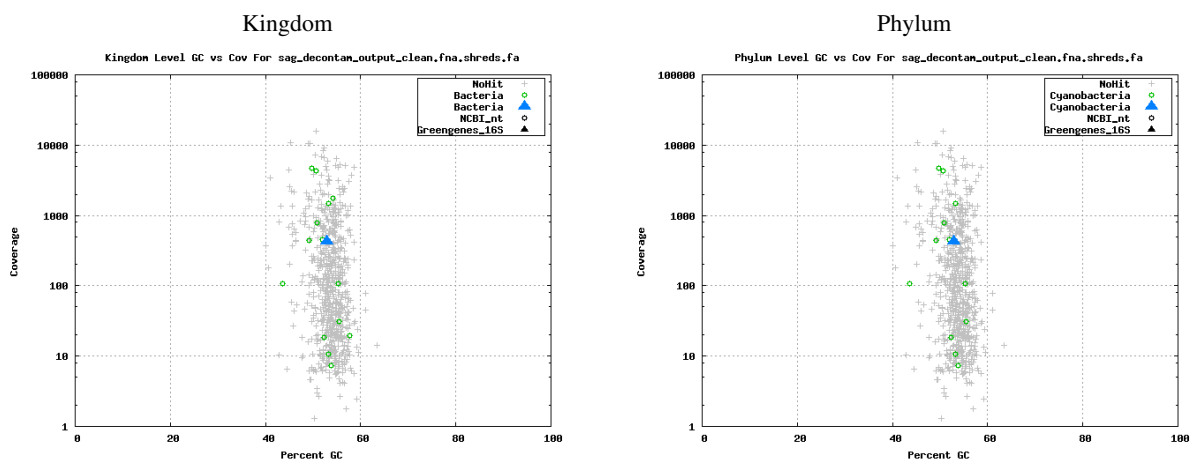
5. Assembly QC Results

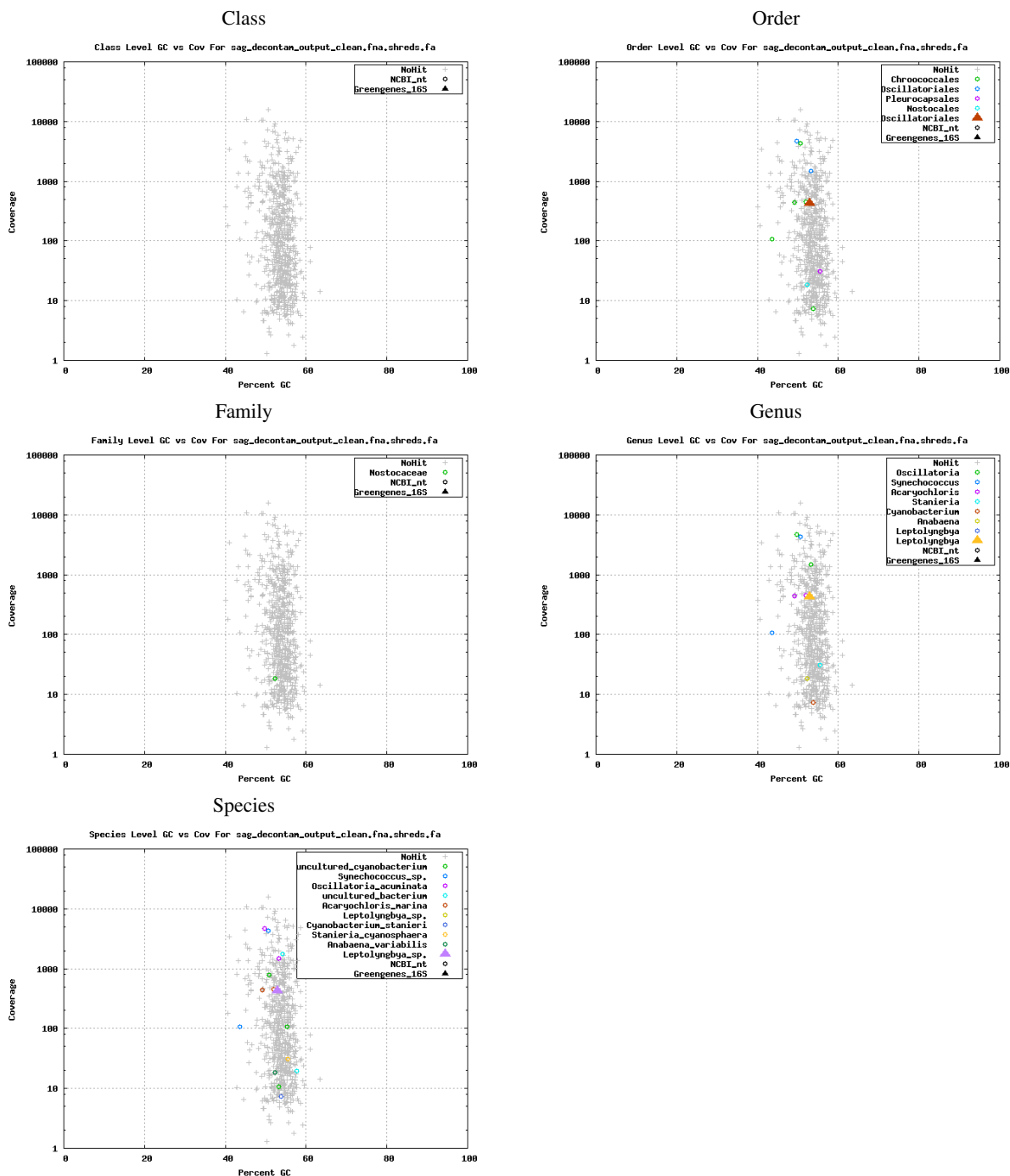
GC histogram of the predicted genes on each contig, overlaid with GC of hits based on BLASTP, shown for different taxonomic levels.



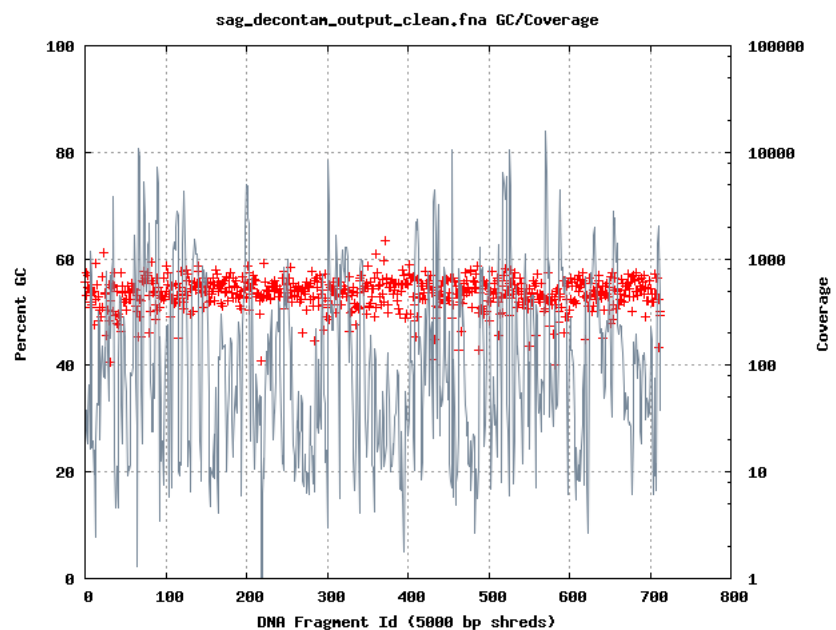


GC vs coverage based on GC of NCBI nt and Greengenes 16S rRNA gene hits to the assembly using megablast, shown for different taxonomic levels.

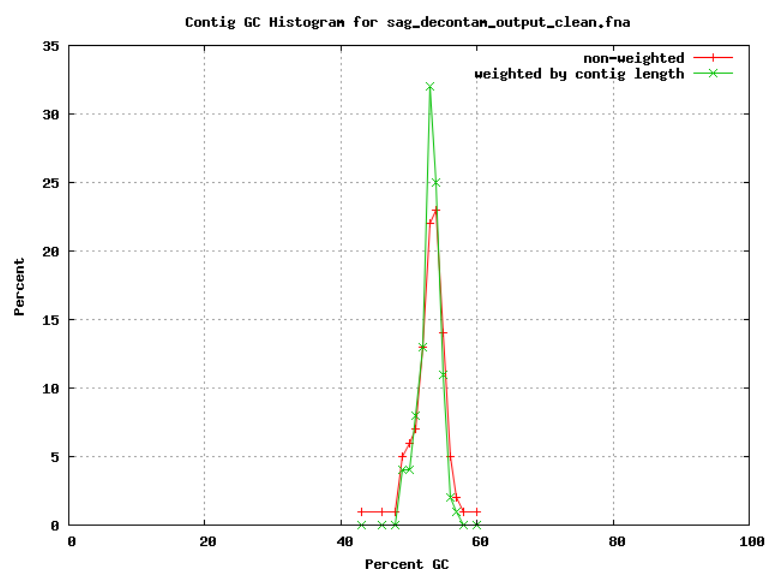




Coverage vs GC. Contigs were shredded into non-overlapping 5kbp and the GC of each shred was plotted as a point, colored by scaffold id. Coverage was calculated by mapping the fragment library to the final assembly and plotted as connected points.



GC histogram of the contigs, including contig length weighted distribution.



List of contigs and average percent GC, grouped in bins of 5:

Pct GC Bin	Contig Name
40	NODE_336_length_2270_cov_95.2862_ID_683
45	NODE_34_length_33055_cov_1320.17_ID_71, NODE_67_length_22044_cov_3273.32_ID_139, NODE_72_length_20320_cov_145.086_ID_149, NODE_80_length_18972_cov_362.643_ID_165, NODE_145_length_10718_cov_212.714_ID_299, NODE_160_length_8881_cov_7.32132_ID_329, NODE_167_length_7926_cov_12.0165_ID_343, NODE_186_length_6503_cov_132.967_ID_381, NODE_208_length_5299_cov_10.1421_ID_423, NODE_281_length_2998_cov_7141.17_ID_577

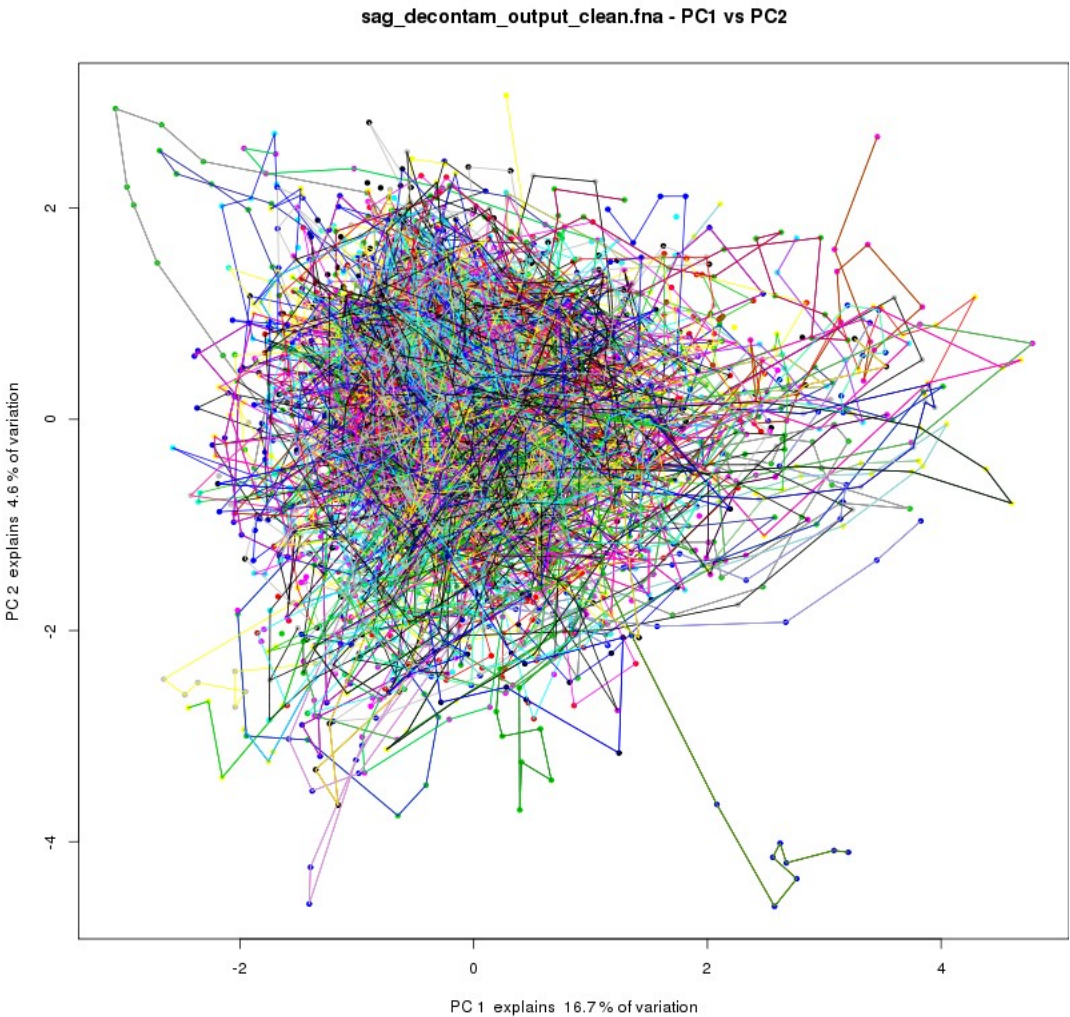
50	NODE.1.length.78081.cov.475.561.ID.1, NODE.2.length.70754.cov.872.51.ID.3, NODE.3.length.59613.cov.123.09.ID.5, NODE.4.length.57900.cov.54.5677.ID.7, NODE.5.length.56052.cov.608.598.ID.9, NODE.6.length.53683.cov.96.694.ID.11, NODE.7.length.52376.cov.147.37.ID.13, NODE.8.length.49443.cov.659.307.ID.19, NODE.9.length.49116.cov.112.606.ID.17, NODE.11.length.48485.cov.45.2019.ID.23, NODE.12.length.48247.cov.136.005.ID.25, NODE.13.length.47185.cov.1321.71.ID.27, NODE.14.length.43020.cov.351.343.ID.29, NODE.16.length.42381.cov.24.8253.ID.33, NODE.17.length.41439.cov.57.5533.ID.39, NODE.18.length.40728.cov.33.6784.ID.41, NODE.19.length.40448.cov.334.344.ID.43, NODE.20.length.40229.cov.243.067.ID.45, NODE.21.length.40044.cov.40.5757.ID.47, NODE.22.length.39397.cov.360.623.ID.35, NODE.23.length.39214.cov.88.0363.ID.49, NODE.25.length.37783.cov.799.468.ID.53, NODE.26.length.35779.cov.141.932.ID.55, NODE.27.length.35145.cov.1209.72.ID.57, NODE.28.length.34566.cov.1187.27.ID.59, NODE.29.length.34308.cov.106.573.ID.61, NODE.31.length.34063.cov.857.29.ID.65, NODE.32.length.33619.cov.372.096.ID.67, NODE.33.length.33206.cov.215.329.ID.69, NODE.36.length.31331.cov.339.544.ID.75, NODE.38.length.31176.cov.59.1077.ID.79, NODE.39.length.30951.cov.3378.04.ID.81, NODE.40.length.29735.cov.70.2803.ID.83, NODE.42.length.28899.cov.61.4613.ID.87, NODE.43.length.28082.cov.225.049.ID.89, NODE.44.length.27516.cov.259.125.ID.91, NODE.45.length.27472.cov.3224.7.ID.93, NODE.46.length.27007.cov.65.7749.ID.99, NODE.47.length.26824.cov.326.941.ID.101, NODE.49.length.26442.cov.1326.57.ID.105, NODE.50.length.26119.cov.2261.64.ID.107, NODE.51.length.25679.cov.103.232.ID.109, NODE.52.length.25655.cov.484.863.ID.111, NODE.54.length.24237.cov.50.1948.ID.115, NODE.55.length.24219.cov.62.239.ID.117, NODE.60.length.23683.cov.61.7016.ID.125, NODE.62.length.23154.cov.158.542.ID.129, NODE.63.length.23137.cov.762.63.ID.131, NODE.66.length.22349.cov.19.8687.ID.137, NODE.68.length.21905.cov.36.6306.ID.141, NODE.69.length.21366.cov.12.7103.ID.143, NODE.75.length.19554.cov.934.813.ID.155, NODE.77.length.19505.cov.21.0024.ID.159, NODE.78.length.19200.cov.7.02575.ID.161, NODE.79.length.19131.cov.86.7987.ID.163, NODE.82.length.18510.cov.9.24893.ID.169, NODE.83.length.17971.cov.40.3993.ID.171, NODE.84.length.17904.cov.120.86.ID.173, NODE.85.length.17741.cov.73.42.ID.175, NODE.86.length.17642.cov.8.03468.ID.177, NODE.87.length.17598.cov.17.8396.ID.179, NODE.89.length.17229.cov.66.7133.ID.183, NODE.91.length.16812.cov.151.395.ID.187, NODE.96.length.16075.cov.3490.8.ID.197, NODE.98.length.15914.cov.7.10675.ID.201, NODE.99.length.15822.cov.55.878.ID.203, NODE.100.length.15562.cov.151.48.ID.205, NODE.110.length.13800.cov.181.856.ID.225, NODE.111.length.13691.cov.6.42659.ID.227, NODE.112.length.13636.cov.9.28113.ID.229, NODE.115.length.13456.cov.94.5281.ID.235, NODE.116.length.13188.cov.32.8845.ID.237, NODE.119.length.12743.cov.40.7178.ID.243, NODE.120.length.12653.cov.24.2485.ID.245, NODE.124.length.12505.cov.22.5839.ID.253, NODE.129.length.11713.cov.29.7168.ID.263, NODE.131.length.11517.cov.27.0955.ID.267, NODE.132.length.11451.cov.14.4129.ID.269, NODE.136.length.11160.cov.46.9433.ID.277, NODE.142.length.10892.cov.45.3586.ID.289, NODE.144.length.10766.cov.81.6041.ID.293, NODE.146.length.10529.cov.8.05318.ID.301, NODE.147.length.10425.cov.7.05111.ID.303, NODE.151.length.9823.cov.14.1566.ID.311, NODE.155.length.9387.cov.7.74357.ID.319, NODE.156.length.9373.cov.6.67536.ID.321, NODE.157.length.9355.cov.23.4794.ID.323, NODE.159.length.9050.cov.5.80167.ID.327, NODE.163.length.8531.cov.7.12718.ID.335, NODE.164.length.8214.cov.40.1805.ID.337, NODE.165.length.8174.cov.25.5596.ID.339, NODE.172.length.7528.cov.7.29533.ID.353, NODE.173.length.7361.cov.254.915.ID.355, NODE.176.length.7293.cov.16.6365.ID.361, NODE.177.length.7159.cov.12.0234.ID.363, NODE.179.length.7132.cov.86.1389.ID.367, NODE.180.length.7085.cov.477.364.ID.369, NODE.181.length.7059.cov.7.32953.ID.371, NODE.183.length.6858.cov.693.135.ID.375, NODE.185.length.6638.cov.5.78627.ID.379, NODE.187.length.6291.cov.118.573.ID.383, NODE.188.length.6257.cov.11.744.ID.385, NODE.189.length.6100.cov.68.0015.ID.295, NODE.198.length.5747.cov.477.462.ID.403, NODE.214.length.4823.cov.13.9199.ID.443, NODE.215.length.4819.cov.4.11902.ID.445, NODE.217.length.4734.cov.4.58773.ID.449, NODE.220.length.4668.cov.8.62411.ID.455, NODE.222.length.4596.cov.15.0167.ID.297, NODE.226.length.4524.cov.15.4348.ID.463, NODE.233.length.4391.cov.6.69234.ID.477, NODE.234.length.4348.cov.5.355.ID.479, NODE.238.length.4136.cov.10.6853.ID.487, NODE.261.length.3350.cov.4.06707.ID.535, NODE.279.length.3045.cov.4.17324.ID.573, NODE.288.length.2865.cov.3.93737.ID.591, NODE.306.length.2696.cov.177.529.ID.625, NODE.323.length.2417.cov.5.48052.ID.659, NODE.348.length.2097.cov.108.351.ID.707, NODE.351.length.2079.cov.3.77273.ID.713, NODE.353.length.2062.cov.44.7992.ID.717, NODE.356.length.2028.cov.13.3801.ID.723
55	NODE.15.length.42605.cov.1380.73.ID.31, NODE.41.length.29607.cov.101.89.ID.85, NODE.53.length.24976.cov.259.854.ID.113, NODE.56.length.24163.cov.26.8871.ID.119, NODE.59.length.23844.cov.16.7926.ID.95, NODE.64.length.22494.cov.177.295.ID.133, NODE.71.length.21021.cov.223.291.ID.147, NODE.73.length.20193.cov.109.928.ID.151, NODE.74.length.19967.cov.16.631.ID.153, NODE.90.length.17044.cov.17.3102.ID.185, NODE.92.length.16563.cov.60.9687.ID.189, NODE.105.length.13970.cov.11.5487.ID.215, NODE.123.length.12525.cov.18.6406.ID.251, NODE.126.length.11936.cov.17.5561.ID.257, NODE.139.length.11037.cov.17.7559.ID.283, NODE.141.length.11034.cov.6.09773.ID.287, NODE.150.length.9876.cov.56.2347.ID.309, NODE.153.length.9801.cov.16.0112.ID.315, NODE.154.length.9537.cov.17.5719.ID.317, NODE.174.length.7349.cov.10.3248.ID.357, NODE.175.length.7314.cov.7.96845.ID.359, NODE.202.length.5482.cov.8.40335.ID.411, NODE.204.length.5420.cov.5.32861.ID.415, NODE.205.length.5327.cov.3.88373.ID.417, NODE.206.length.5319.cov.43.853.ID.419, NODE.211.length.4880.cov.16.696.ID.433,

	NODE_221_length_4552_cov_49.5971_ID_457, NODE_235_length_4289_cov_12.2827_ID_481, NODE_236_length_4280_cov_25.0495_ID_483, NODE_251_length_3766_cov_3.66801_ID_515, NODE_305_length_2714_cov_22.0835_ID_623, NODE_307_length_2693_cov_7.08453_ID_627, NODE_314_length_2581_cov_3.66429_ID_641, NODE_318_length_2365_cov_11.8277_ID_649, NODE_321_length_2458_cov_3.06159_ID_655, NODE_329_length_2333_cov_4.74978_ID_671, NODE_354_length_2050_cov_4.67218_ID_719
60	NODE_201_length_5590_cov_7.86305_ID_409

List of the top contig megablast hits against 16S ribosomal RNA genes.

Organism	Align Length (bp)	Pct Id	Contig Name
<i>142450_Leptolyngbya_sp_str_0BB30S02_AJ639892.1.1.1</i> 473	1,477	95.33	NODE_44_length_27516_cov_259.125_ID_91

Principal component analysis of tetramer frequencies of contigs. Detectable variations are highlighted in color.



Estimated genome recovery derived from analysis of universal single-copy genes detected in final assembly.

HMM	Pct Recovered
bacteria	67.95 %
archaea	32.92 %

6. Sequence Data Availability

The following sequence fasta files can be downloaded from our JGI portal website.

<http://www.jgi.doe.gov/genome-projects>

Filename	Description
sag_decontam_output_clean.fna	SPAdes with auto decontamination

7. Annotation Data Availability

The annotation of the assembled contigs can be found within IMG.

<http://img.jgi.doe.gov>

8. Methods

Single Cell Minimal Draft

Genome sequencing and assembly

The draft genome of was generated at the DOE Joint genome Institute (JGI) using the Illumina technology [1]. An Illumina std shotgun library was constructed and sequenced using the Illumina HiSeq 2000 platform which generated 29,511,318 reads totaling 4,426.7 Mb. All general aspects of library construction and sequencing performed at the JGI can be found at <http://www.jgi.doe.gov>. All raw Illumina sequence data was passed through DUK, a filtering program developed at JGI, which removes known Illumina sequencing and library preparation artifacts [2]. Following steps were then performed for assembly: (1) artifact filtered Illumina reads were assembled using SPAdes [3] (version 3.0.0), (3) Parameters for assembly steps were `-t 16 -m 120 -sc -careful -12`. The final draft assembly contained 171 contigs in 171 scaffolds, totalling 3.2 Mb in size. The final assembly was based on 3,000.0 Mb of Illumina data. Based on a presumed genome size of 5.0 Mb, the average input read coverage used for the assembly was 600.0X.

Genome annotation

Genes were identified using Prodigal [4], followed by a round of manual curation using GenePRIMP [5] for finished genomes and Draft genomes in fewer than 20 scaffolds. The predicted CDSs were translated and used to search the National Center for Biotechnology Information (NCBI) nonredundant database, UniProt, TIGRFam, Pfam, KEGG, COG, and InterPro databases. The tRNAScanSE tool [6] was used to find tRNA genes, whereas ribosomal RNA genes were found by searches against models of the ribosomal RNA genes built from SILVA [7]. Other non-coding RNAs such as the RNA components of the protein secretion complex and the RNase P were identified by searching the genome for the corresponding Rfam profiles using INFERNAL [8]. Additional gene prediction analysis and manual functional annotation was performed within the Integrated Microbial Genomes (IMG) platform [9] developed by the Joint Genome Institute, Walnut Creek, CA, USA [10].

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