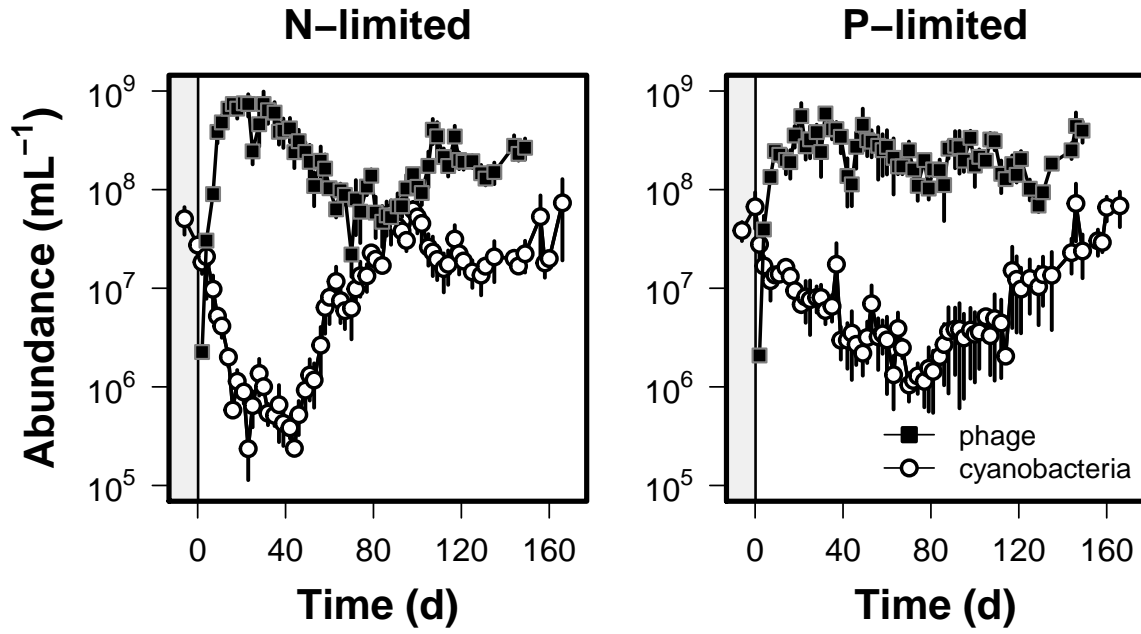


# Population Dynamics

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## 1 Data Reduction and Figures

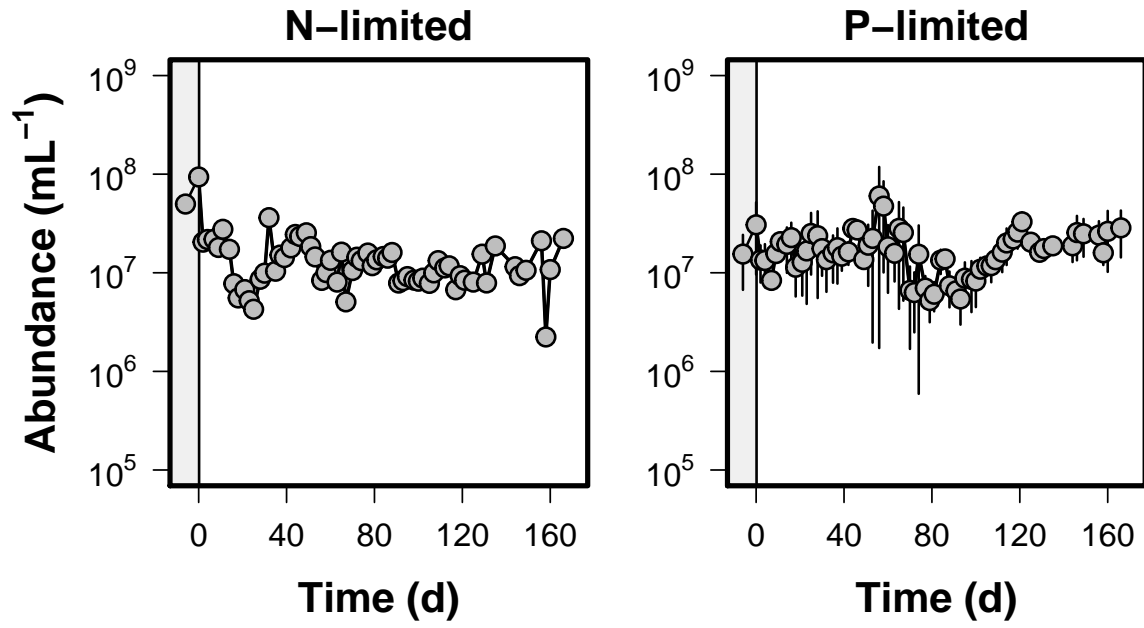
### 1.1 Figure 1: *Synechococcus* and phage average ( $n = 3$ ) population dynamics in N-limited and P-limited treatments



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1.2 Figure S2: Average *Synechococcus* ( $n = 3$ ) population dynamics in N-limited and P-limited treatments



## 2 Calculations and Statistics

### 2.1 Repeated Measures ANOVA (RMANOVA)

Table 1: RMANOVA table for SRIM8 phage between N-limited vs. P-limited environments

	numDF	denDF	F-value	p-value
<b>(Intercept)</b>	1	230	14010	0
<b>lim</b>	1	4	0.3592	0.5812
<b>day.fac</b>	58	230	10.22	0
<b>lim:day.fac</b>	58	230	2.588	2.771e-07

Table 2: RMANOVA table for +Ph Synechococcus between N-limited and P-limited environments

	numDF	denDF	F-value	p-value
<b>(Intercept)</b>	1	245	12432	0
<b>lim</b>	1	4	0.5225	0.5098
<b>day.fac</b>	62	245	3.354	1.14e-11
<b>lim:day.fac</b>	62	245	2.437	6.993e-07

Table 3: RMANOVA table comparison between -Ph and +Ph Synechococcus

	numDF	denDF	F-value	p-value
<b>(Intercept)</b>	1	305	19415	0
<b>lim</b>	1	5	0.002236	0.9641
<b>day.fac</b>	62	305	2.87	1.107e-09
<b>type</b>	1	5	8.787	0.03136
<b>lim:day.fac</b>	62	305	2.354	8.796e-07
<b>lim:type</b>	1	5	0.3204	0.5958
<b>day.fac:type</b>	62	305	1.244	0.1198
<b>lim:day.fac:type</b>	62	305	1.121	0.2639

Table 4: RMANOVA for -Ph Synechococcus in N-limited vs. P-limited environments

	numDF	denDF	F-value	p-value
<b>(Intercept)</b>	1	60	1629	0
<b>lim</b>	1	1	0.01077	0.9342
<b>day.fac</b>	62	60	0.9176	0.6315
<b>lim:day.fac</b>	62	60	0.9089	0.6454

## 2.2 Stability (CV) and associated tables

Table 5: Average population density and stability by treatment

Limitation	Treatment	Synechococcus mean density (+/- SEM)	Synechococcus mean stability	Phage mean density (+/- SEM)	Phage mean stability
N	Control	1.3e+07(4e+06)	2.1	NaN(NA)	NA
N	Infect	1.7e+07(1e+07)	0.75	2.5e+08(1.4e+08)	1
P	Control	1.8e+07(9e+06)	1.1	NaN(NA)	NA
P	Infect	1.1e+07(1e+07)	0.59	2.4e+08(9.5e+07)	1.5

Table 6: Average population density and stability by chemostat

Chemostat	Treatment	Synechococcus mean density (+/- SEM)	Synechococcus mean stability	Phage mean density (+/- SEM)	Phage mean stability
NL1	Control	1.3e+07(4e+06)	2.1	NaN(NA)	NA
NL2	Infect	1.8e+07(1e+07)	0.84	1.5e+08(7.9e+07)	1.1
NL3	Infect	1.6e+07(1e+07)	0.93	2.9e+08(1.5e+08)	1.2
NL5	Infect	1.7e+07(2e+07)	0.59	3.1e+08(1.6e+08)	1.1
PL1	Control	2.5e+07(1e+07)	1.4	NaN(NA)	NA
PL2	Infect	1.3e+07(1e+07)	0.52	1.6e+08(5.9e+07)	1.6
PL3	Control	9864044(4e+06)	1.4	NaN(NA)	NA
PL4	Infect	1.1e+07(7e+06)	0.94	2.4e+08(8.8e+07)	1.6
PL5	Infect	9399556(1e+07)	0.52	3.1e+08(1.1e+08)	1.6

## 2.3 Topographic statistics and associated tables

Table 7: Descriptive statistical summary of population data. (continued below)

lim	cID	microbe	mean	var	sem	stab	start.abd
N	NL2	Phage	151575375	1.881e+16	79190498	1.105	2102121
N	NL3	Phage	292205382	6.38e+16	145831435	1.157	2362910
N	NL5	Phage	312565642	7.765e+16	160881119	1.122	2299688
P	PL2	Phage	161267374	1.047e+16	59073946	1.576	2102121
P	PL4	Phage	243403403	2.342e+16	88361764	1.59	2299688
P	PL5	Phage	312523940	3.66e+16	110450827	1.634	1841331
N	NL2	Syn	17594096	4.371e+14	12070003	0.8416	9599786
N	NL3	Syn	16110168	3.023e+14	10039048	0.9265	22353787
N	NL5	Syn	16985817	8.152e+14	16484799	0.5949	23186422
P	PL2	Syn	12944893	6.116e+14	14277915	0.5234	42190080
P	PL4	Syn	10812795	1.329e+14	6655700	0.938	31571541
P	PL5	Syn	9399556	3.232e+14	10380093	0.5228	9874066

final.abd	min.day	min.abd	max.day	max.abd
157137459	72	1422488	16	573074216
261895765	2	2362910	30	940323547
378381691	2	2299688	30	1.029e+09
237940680	2	2102121	32	659870095
378302664	2	2299688	146	7.46e+08
5.74e+08	2	1841331	21	859404750
20629744	23	93339	98	84902597
17710626	44	300299	100	80035767
1.82e+08	39	117089	166	1.82e+08
74192632	79	496642	146	153895345
19439567	63	297912	146	52700866
111891383	93	393297	166	111891383

Table 9: t-test summary for population mean and stability of +Ph Synechococcus and phage

microbe	analysis	df	pvalue
syn	mean	2.68	0.01793
syn	stability	3.63	0.5036
phage	mean	3.92	0.855
phage	stability	3.94	4e-05