Table 1: Complete Parameter List for Optimization

No.	Parameter	Code	Nominal value	Min Value	Max Value
1	$\varepsilon_{\mathrm{PAR}}$	p_PAR	0.4 (0.5)	0.3	0.5
2	λ_w	p_eps0	0.0435 (0.5)	0.04	0.047
3	$c_{R^{(2)}}$	p_epsR6	0.1e-3 (0.5)	0.5e-4	0.15e-3
4	$\varepsilon_Z^{(C)}$	p_pe_R1c	0.60 (0.2)	0.5	1.0
5	$\varepsilon_Z^{(N)}$	p_pe_R1n	0.72 (0.44)	0.5	1.0
6	$\varepsilon_Z^{(P)}$	p_pe_R1p	0.832 (0.664)	0.5	1.0
7	$r_P^{(0)}$	p_sum	1.6 (0.2)	1.0	4.0
8	b_P	p_srs	0.05 (0.5)	0.025	0.075
9	$d_P^{(0)}$	p_sdmo	0.05 (0.5)	0.025	0.075
10	$h_P^{(N,P)}$	p_thdo	0.1 (0.5)	0.05	0.15
11	β_P	p_pu_ea	0.05 (0.5)	0.025	0.075
12	γ_P	p_pu_ra	0.05 (0.5)	0.025	0.075
13	$a_P^{(N)}$	p_qun	0.025 (0.5)	0.0125	0.0375
14	$h_P^{(N)}$	p_lN4	1.5 (0.25)	1.0	3.0
15	$\phi_N^{(\min)}$	p_qnlc	6.87e-3 (0.5)	3.435e-3	1.0305e-2
16	$\phi_N^{(\mathrm{opt})}$	p_qncPPY	1.26e-2 (0.5)	6.3e-3	1.89e-2
17	$\phi_N^{(\max)} = val \times \phi_N^{(\mathrm{opt})}$	p_xqn	1.5 (0.5)	1.0	2.0
18	$a_P^{(P)}$	p_qup	2.5e-3 (0.5)	1.25e-3	3.75e-3
19	$\phi_P^{(\min)}$	p_qplc	4.29e-4 (0.5)	2.145e-4	6.435e-4
20	$\phi_P^{(\mathrm{opt})}$	p_qpcPPY	7.86e-4 (0.5)	3.93e-4	1.1179e-3
21	$\phi_P^{(\max)} = val \times \phi_P^{(\mathrm{opt})}$	p_xqp	1.5 (0.5)	1.0	2.0
22	$l_P^{(\mathrm{sink})}$	p_esNI	0.75 (0.66)	0.25	1.0
23	$w_P^{(\mathrm{sink})}$	p_res	0.5 (0.5)	0.25	0.75
24	$\alpha_{\mathrm{chl}}^{(0)}$	p_alpha_chl	1.52e-5 (0.5)	7.6e-6	2.28e-5
25	$\theta_{\mathrm{chl}}^{(0)}$	p_qlcPPY	0.016 (0.5)	0.008	0.024
26	c_P	p_epsChla	0.03 (0.5)	0.015	0.0 45
27	b_Z	z_srs	0.02 (0.25)	0.01	0.05
28	$r_Z^{(0)}$	z_sum	2.0 (0.25)	1.0	5.0
29	$d_Z^{(0)}$	z_sdo	0.25 (0.5)	0.125	0.375
30	d_Z	z_sd	0.05 (0.5)	0.025	0.075
31	η_Z	z_pu	0.5 (0.5)	0.25	0.75
32	β_Z	z_pu_ea	0.25 (0.5)	0.125	0.375
33	$h_Z^{(O)}$	z_chro	0.5 (0.5)	0.25	0.75
34	$h_Z^{(F)}$	z_chuc	200.0 (0.25)	100.0	500.0
35	μ_Z	z_minfood	50.0 (0.5)	25.0	75.0
36	$\varphi_{\mathrm{P}}^{(\mathrm{opt})}$	z_qpcMIZ	7.862e-4 (0.431)	7.0e-4	9.0e-4
37	$\varphi_{\mathrm{N}}^{(\mathrm{opt})}$	z_qncMIZ	1.258e-2 (0.258)	1.0e-2	2.0e-2
38	$\delta_{Z,P}$	z_paPPY	1.0 (1.0)	0.5	1.0
39	$\Lambda_{N^3}^{(\mathrm{nit})}$	p_sN4N3	0.01 (0.5)	0.005	0.015
40	$h_N^{(O)}$	p_clO2o	10.0 (0.5)	5.0	15.0
41	ξ_{CO_2}	p_sR6O3	0.1 (0.125)	0.05	0.45
42	$\xi_{N^{(1)}}$	p_sR6N1	0.1 (0.125)	0.05	0.45
43	$\xi_{N^{(3)}}$	p_sR6N4	0.1 (0.125)	0.05	0.45
44	ζ_{CO_2}	p_sR1O3	0.05 (0.0)	0.05	0.45
45	$\zeta_{N^{(1)}}$	p_sR1N1	0.05 (0.0)	0.05	0.45
46	$\zeta_{N^{(3)}}$	p_sR1N4	0.05 (0.0)	0.05	0.45
47	$v^{(\mathrm{set})}$	p_rR6m	1.0 (0.1)	0.5	5.5
48	λ_O	NRT_o2o	0.06 (0.12)	0.0	0.5
49	λ_{N^1}	NRT_n1p	0.06 (0.12)	0.0	0.5
50	λ_{N^2}	NRT_n3n	0.06 (0.12)	0.0	0.5
51	κ_{N^3}	NRT_n4n	0.05 (0.1)	0.0	0.5