

<b>Position</b>	<b>Strand</b>	<b>CDS</b>	<b>function</b>
97882	98115 -	rps12	ribosomal protein S12"
139889	140122 +	rps12	ribosomal protein S12"
456	1517 -	psbA	PSII 32 KDa protein"
32471	33343 +	psbA	PSII 32 KDa protein"
2144	3718 -	matK	maturase K"
121561	121653 -	matK	maturase K"
5257	5490 -	rps16	ribosomal protein S16"
6353	6400 -	rps16	ribosomal protein S16"
7134	7319 +	psbK	PSII K protein"
135391	135444 -	psbK	PSII K protein"
7756	7866 +	psbI	PSII I protein"
5245	5304 +	psbI	PSII I protein"
10125	11612 -	atpA	ATPase alpha subunit"
52702	53598 -	atpA	ATPase alpha subunit"
11677	12087 -	atpF	ATPase I subunit"
12818	12964 -	atpF	ATPase I subunit"
13379	13624 -	atpH	ATPase III subunit"
147012	147056 -	atpH	ATPase III subunit"
14356	15102 -	atpI	ATPase a subunit"
124918	125028 -	atpI	ATPase a subunit"
15364	16074 -	rps2	ribosomal protein S2"
90081	90185 -	rps2	ribosomal protein S2"
16291	20448 -	rpoC2	RNA polymerase beta" subunit"
37468	37524 +	rpoC2	RNA polymerase beta" subunit"
20637	22256 -	rpoC1	RNA polymerase beta' subunit"
23018	23461 -	rpoC1	RNA polymerase beta' subunit"
23488	26706 -	rpoB	RNA polymerase beta subunit"
76835	76888 -	rpoB	RNA polymerase beta subunit"
28267	28356 +	petN	cytochrome b6/f complex subunit VIII"
93928	93960 -	petN	cytochrome b6/f complex subunit VIII"
28931	29035 -	psbM	PSII low MW protein"
32444	33505 +	psbD	PSII D2 protein"
609	1496 -	psbD	PSII D2 protein"
33489	34874 +	psbC	PSII 43 KDa protein"
71862	72209 +	psbC	PSII 43 KDa protein"
35524	35712 +	psbZ	photosystem II protein Z"
42231	42320 -	psbZ	photosystem II protein Z"
36711	37013 -	rps14	ribosomal protein S14"

139013	139150 -	rps14	ribosomal protein S14"
37145	39349 -	psaB	PSI P700 apoprotein A2"
39393	41534 -	psaB	PSI P700 apoprotein A2"
39375	41627 -	psaA	PSI P700 apoprotein A1"
37166	39328 -	psaA	PSI P700 apoprotein A1"
43264	43494 -	ycf3	photosystem I assembly protein Ycf3"
42310	42462 -	ycf3	photosystem I assembly protein Ycf3"
44976	45581 -	rps4	ribosomal protein S4"
15991	16095 -	rps4	ribosomal protein S4"
48432	48908 -	ndhJ	NADH dehydrogenase subunit J"
76885	76962 -	ndhJ	NADH dehydrogenase subunit J"
49016	49693 -	psbG	photosystem II G protein"
39887	40012 +	psbG	photosystem II G protein"
49750	50112 -	ndhC	NADH dehydrogenase subunit C"
55286	55357 -	ndhC	NADH dehydrogenase subunit C"
51911	52309 -	atpE	ATPase epsilon subunit"
123002	123109 -	atpE	ATPase epsilon subunit"
52306	53802 -	atpB	ATPase beta subunit"
10263	11321 -	atpB	ATPase beta subunit"
54597	56027 +	rbcl	rubisco Large subunit
12783	12851 -	rbcl	rubisco Large subunit
57353	58297 +	accD	carboxytransferase beta subunit"
58347	58391 +	accD	carboxytransferase beta subunit"
58857	58970 +	psaI	PSI I protein"
38829	38915 -	psaI	PSI I protein"
59396	59950 +	ycf4	photosystem I assembly protein Ycf4"
114210	114278 +	ycf4	photosystem I assembly protein Ycf4"
60329	61018 +	cemA	putative heme-binding protein"
100661	100717 -	cemA	putative heme-binding protein"
61247	62209 +	petA	cytochrome f"
63336	63371 -	psbJ	PSII component"
63515	63631 -	psbL	PSII L protein"
40101	40133 -	psbL	PSII L protein"
63653	63772 -	psbF	PSII cytochrome b559"
23358	23399 +	psbF	PSII cytochrome b559"
63782	64033 -	psbE	PSII cytochrome b559"
49440	49631 +	psbE	PSII cytochrome b559"
65192	65287 +	petL	cytochrome b/f complex 3.5 kDa subunit"
101572	101643 -	petL	cytochrome b/f complex 3.5 kDa subunit"

65475	65588 +	petG	cytochrome b subunit V"
103984	104073 -	petG	cytochrome b subunit V"
66314	66454 +	psaJ	PSI J protein"
6683	6805 +	psaJ	PSI J protein"
66884	67084 +	rpl33	ribosomal protein L33"
127624	127668 -	rpl33	ribosomal protein L33"
67235	67489 +	rps18	ribosomal protein S18"
67842	68147 -	rpl20	ribosomal protein L20"
62672	62761 -	rpl20	ribosomal protein L20"
97882	98115 -	rps12	ribosomal protein S12"
139889	140122 +	rps12	ribosomal protein S12"
70110	70403 -	clpP	ATP-dependent protease subunit"
69294	69521 -	clpP	ATP-dependent protease subunit"
71865	73391 +	psbB	PSII 47KDa protein"
33546	34370 +	psbB	PSII 47KDa protein"
73568	73669 +	psbT	PSII T protein"
116249	116290 -	psbT	PSII T protein"
73735	73866 -	psbN	PSII low MW protein"
59588	59623 -	psbN	PSII low MW protein"
73971	74195 +	psbH	PSII 10KDa phosphoprotein"
120848	121051 +	psbH	PSII 10KDa phosphoprotein"
75144	75791 +	petB	cytochrome B6"
80369	80497 +	petB	cytochrome B6"
76761	77237 +	petD	cytochrome b/f"
148091	148216 -	petD	cytochrome b/f"
77443	78426 -	rpoA	RNA polymerase alpha subunit"
140673	140753 -	rpoA	RNA polymerase alpha subunit"
78516	78908 -	rps11	ribosomal protein S11"
6055	6162 -	rps11	ribosomal protein S11"
79041	79154 -	rpl36	ribosomal protein L36"
107909	107929 -	rpl36	ribosomal protein L36"
79632	80036 -	rps8	ribosomal protein S8"
80875	80922 -	rps8	ribosomal protein S8"
80270	80638 -	rpl14	ribosomal protein L14"
84014	84046 +	rpl14	ribosomal protein L14"
80760	81161 -	rpl16	ribosomal protein L16"
4143	4196 +	rpl16	ribosomal protein L16"
82489	83145 -	rps3	ribosomal protein S3"
83610	83888 -	rps19	ribosomal protein S19"

154116	154229 +	rps19	ribosomal protein S19"
85058	85453 -	rpl2	ribosomal protein L2"
152551	152946 +	rpl2	ribosomal protein L2"
85472	85753 -	rpl23	ribosomal protein L23"
152251	152532 +	rpl23	ribosomal protein L23"
145006	151923 -	ycf2	Ycf2"
86081	92998 +	ycf2	Ycf2"
94263	95042 -	ndhB	NADH dehydrogenase subunit 2"
142962	143741 +	ndhB	NADH dehydrogenase subunit 2"
96800	97267 -	rps7	ribosomal protein S7"
140737	141204 +	rps7	ribosomal protein S7"
128068	129084 -	ycf1	Ycf1.1"
108938	109927 +	ycf1	Ycf1.1"
109967	112156 -	ndhF	NADH dehydrogenase subunit 5"
115625	116485 -	ndhF	NADH dehydrogenase subunit 5"
112796	112954 +	rpl32	ribosomal protein L32"
97633	97683 -	rpl32	ribosomal protein L32"
114075	115073 +	ccsA	cytochrome c biogenesis protein"
142327	142461 -	ccsA	cytochrome c biogenesis protein"
115316	116836 -	ndhD	NADH dehydrogenase subunit 4"
110675	111790 -	ndhD	NADH dehydrogenase subunit 4"
116975	117220 -	psaC	PSI 9KDa protein"
119057	119242 -	psaC	PSI 9KDa protein"
117462	117767 -	ndhE	NADH dehydrogenase subunit 4L"
118110	118583 -	ndhG	NADH dehydrogenase subunit 6"
49409	49618 -	ndhG	NADH dehydrogenase subunit 6"
118919	119422 -	ndhI	NADH dehydrogenase subunit I"
117023	117199 -	ndhI	NADH dehydrogenase subunit I"
119559	120035 -	ndhA	NADH dehydrogenase subunit 1"
121162	121692 -	ndhA	NADH dehydrogenase subunit 1"
121694	122875 -	ndhH	NADH dehydrogenase 49KDa protein"
122978	123244 -	rps15	ribosomal protein S15"
51911	52018 -	rps15	ribosomal protein S15"
123655	129084 -	ycf1	Ycf1.2"
108938	109927 +	ycf1	Ycf1.2"
96800	97267 -	rps7	ribosomal protein S7"
140737	141204 +	rps7	ribosomal protein S7"
94263	95042 -	ndhB	NADH dehydrogenase subunit 2"
142962	143741 +	ndhB	NADH dehydrogenase subunit 2"

145006	151923 -	ycf2	Ycf2"
86081	92998 +	ycf2	Ycf2"
85472	85753 -	rpl23	ribosomal protein L23"
152251	152532 +	rpl23	ribosomal protein L23"
85058	85453 -	rpl2	ribosomal protein L2"
152551	152946 +	rpl2	ribosomal protein L2"
70	1 +	trnH-CAC	
4443	1793 +	trnK-AAA	
6795	6724 +	trnQ-CAA	
7957	8044 +	trnS-AGC	
44653	44626 +	trnS-AGC	
8749	9527 +	trnG-GGA	
9732	9803 +	trnR-AGA	
27793	27863 +	trnC-UGC	
30054	29981 +	trnD-GAC	
30572	30489 +	trnY-UAC	
30708	30636 +	trnE-GAA	
31255	31326 +	trnT-ACC	
35073	35165 +	trnS-UCA	
36259	36329 +	trnG-GGC	
36548	36475 +	trnfM-AUG	
44565	44654 +	trnS-UCC	
7985	7958 +	trnS-UCC	
46043	45971 +	trnT-ACA	
46811	47434 +	trnL-UUA	
47795	47867 +	trnF-UUC	
51521	50830 +	trnV-GUA	
51706	51778 +	trnM-AUG	
65796	65723 +	trnW-UGG	
65943	65870 +	trnP-CCA	
85992	85919 +	trnI-CAU	
152012	152085 +	trnI-CAU	
93679	93599 +	trnL-UUG	
144325	144405 +	trnL-UUG	
100036	100107 +	trnV-GUC	
137986	137915 +	trnV-GUC	
100339	101829 +	rrn16S	ribosomal RNA
137683	136193 +	rrn16S	ribosomal RNA
102122	103140 +	trnI-AUC	

135900	134882 +	trnI-AUC	
103205	104078 +	trnA-GCA	
134817	133944 +	trnA-GCA	
104240	107048 +	rrn23S	ribosomal RNA
133782	130974 +	rrn23S	ribosomal RNA
107147	107249 +	rrn4.5S	ribosomal RNA
130875	130773 +	rrn4.5S	ribosomal RNA
107497	107617 +	rrn5S	ribosomal RNA
130525	130405 +	rrn5S	ribosomal RNA
107871	107944 +	trnR-CGU	
130151	130078 +	trnR-CGU	
108617	108546 +	trnN-AAC	
129405	129476 +	trnN-AAC	
113890	113969 +	trnL-CUA	
108617	108546 +	trnN-AAC	
129405	129476 +	trnN-AAC	
107871	107944 +	trnR-CGU	
130151	130078 +	trnR-CGU	
107497	107617 +	rrn5S	ribosomal RNA
130525	130405 +	rrn5S	ribosomal RNA
107147	107249 +	rrn4.5S	ribosomal RNA
130875	130773 +	rrn4.5S	ribosomal RNA
104240	107048 +	rrn23S	ribosomal RNA
133782	130974 +	rrn23S	ribosomal RNA
103205	104078 +	trnA-GCA	
134817	133944 +	trnA-GCA	
102122	103140 +	trnI-AUC	
135900	134882 +	trnI-AUC	
100339	101829 +	rrn16S	ribosomal RNA
137683	136193 +	rrn16S	ribosomal RNA
100036	100107 +	trnV-GUC	
137986	137915 +	trnV-GUC	
93679	93599 +	trnL-UUG	
144325	144405 +	trnL-UUG	
85992	85919 +	trnI-CAU	
152012	152085 +	trnI-CAU	