

Supplemental Table 3. Analysis of statistical relevance in changes of photosynthetic pigments level (a: chlorophyll a, b: chlorophyll b, c: chlorophyll a/chlorophyll b ratio, d: violaxanthin, e: neoxanthin, f: lutein, g:  $\beta$ -carotene) as well as in yield of Photosystem II (h).

a

Chl a

	0CL	1CL	2CL	3CL	4CL	0CD	1CD	2CD	3CD	4CD	0UVD	1UVD	2UVD	3UVD	4UVD	0UVL	1UVL	2UVL	3UVL	4UVL	
0CL										2											3
1CL									1	3				1	2					2	3
2CL										2					1					1	3
3CL										3					2					2	3
4CL									2	3				2	3					3	3
0CD										2					1					1	3
1CD										2											2
2CD										1											2
3CD			1			2											1				
4CD	2	3	2	3	3	2	2	1				1				3	3				
0UVD																					
1UVD										1											2
2UVD																					2
3UVD			1			2															
4UVD			2	1	2	3	1										2	1			
0UVL										1	3				2					2	3
1UVL										3					1						2
2UVL																					
3UVL			2	1	2	3	1										2	2			
4UVL	3	3	3	3	3	3	3	2	2				2	2		3	3				

One-way ANOVA with Tukey post-test

empty cell- not significant

1:  $P < 0.05$ 2:  $P < 0.01$ 3:  $P < 0.001$

b

Chl b

	0CL	1CL	2CL	3CL	4CL	0CD	1CD	2CD	3CD	4CD	0UVD	1UVD	2UVD	3UVD	4UVD	0UVL	1UVL	2UVL	3UVL	4UVL	
0CL										2											2
1CL									1	3					2					1	3
2CL										3											2
3CL										2											2
4CL									2	3					2					2	3
0CD										2											2
1CD										2											2
2CD										1											
3CD		1			2												1	1			
4CD	2	3	3	2	3	2	2	1				2					3	3			
0UVD																					2
1UVD										2											2
2UVD																					
3UVD																					
4UVD		2			2												1	1			
0UVL									1	3					1					1	3
1UVL									1	3					1					1	3
2UVL																					
3UVL		1			2												1	1			
4UVL	2	3	2	2	3	2	2										3	3			

One-way ANOVA with Tukey post-test

empty cell- not significant

1:  $P < 0.05$

2:  $P < 0.01$

3:  $P < 0.001$

C

Chl a/Chl b

	0CL	1CL	2CL	3CL	4CL	0CD	1CD	2CD	3CD	4CD	0UVD	1UVD	2UVD	3UVD	4UVD	0UVL	1UVL	2UVL	3UVL	4UVL	
0CL																					
1CL																					1
2CL																					1
3CL															1					2	3
4CL																				1	2
0CD																					
1CD																					1
2CD																					1
3CD															1					2	3
4CD											1	1	2	3	3				2	3	3
0UVD										1											
1UVD										1											
2UVD										2											
3UVD									1	3											
4UVD				1						3											
0UVL																					1
1UVL																					1
2UVL										2											
3UVL				2	1				2	3											
4UVL		1	1	3	2		1	1	3	3						1	1				

One-way ANOVA with Tukey post-test

empty cell- not significant

1: P<0.05

2: P<0.01

3: P<0.001

d

## Violaxanthin

	0CL	1CL	2CL	3CL	4CL	0CD	1CD	2CD	3CD	4CD	0UVD	1UVD	2UVD	3UVD	4UVD	0UVL	1UVL	2UVL	3UVL	4UVL	
0CL																					
1CL										1					1						
2CL										2					1						1
3CL										1					1						1
4CL										2				1	2						2
0CD																					
1CD																					
2CD																					
3CD																					
4CD		1	2	1	2																
0UVD																					
1UVD																					
2UVD																					
3UVD																					
4UVD		1	1	1	2																
0UVL																					
1UVL																					
2UVL																					
3UVL																					
4UVL			1	1	2																

One-way ANOVA with Tukey post-test

empty cell- not significant

1:  $P < 0.05$

2:  $P < 0.01$

3:  $P < 0.001$

e

## Neoxanthin

	0CL	1CL	2CL	3CL	4CL	0CD	1CD	2CD	3CD	4CD	0UVD	1UVD	2UVD	3UVD	4UVD	0UVL	1UVL	2UVL	3UVL	4UVL	
0CL																2					
1CL																2				1	1
2CL																					3
3CL																					2
4CL																					2
0CD																					2
1CD																					1
2CD																					1
3CD																					
4CD																		1			
0UVD																					
1UVD																					
2UVD																					
3UVD																					
4UVD		2	2																		
0UVL																					1
1UVL										1					2					1	3
2UVL																					
3UVL			1																1		
4UVL			1	3	2	2											1	3			

One-way ANOVA with Tukey post-test

empty cell- not significant

1:  $P < 0.05$ 2:  $P < 0.01$ 3:  $P < 0.001$

f

Lutein

	0CL	1CL	2CL	3CL	4CL	0CD	1CD	2CD	3CD	4CD	0UVD	1UVD	2UVD	3UVD	4UVD	0UVL	1UVL	2UVL	3UVL	4UVL	
0CL										1											
1CL									1	3					1						2
2CL										2											2
3CL										2											1
4CL										3											2
0CD																					
1CD																					
2CD																					
3CD			1														1				
4CD	1	3	2	2	3												3				3
0UVD																					
1UVD																					
2UVD																					
3UVD																					
4UVD			1														1				2
0UVL										1	3					1					2
1UVL																					3
2UVL																					1
3UVL																					
4UVL		2	2	1	2						3					2	2	3	1		

One-way ANOVA with Tukey post-test

empty cell- not significant

1:  $P < 0.05$

2:  $P < 0.01$

3:  $P < 0.001$

	0CL	1CL	2CL	3CL	4CL	0CD	1CD	2CD	3CD	4CD	0UVD	1UVD	2UVD	3UVD	4UVD	0UVL	1UVL	2UVL	3UVL	4UVL	
0CL																					
1CL									2	2					1						2
2CL										2											1
3CL										2											
4CL									1	3			1	2	3			1	2	3	
0CD																					
1CD																					
2CD																					
3CD			2			1										1	1				
4CD			2	2	2	3										2	2				
0UVD																					
1UVD																					
2UVD						1															
3UVD						2															
4UVD			1			3															
0UVL											1	2									
1UVL											1	2									1
2UVL						1															
3UVL						2															
4UVL			2	1		3													1		

One-way ANOVA with Tukey post-test

empty cell- not significant

1:  $P < 0.05$

2:  $P < 0.01$

3:  $P < 0.001$



h

QYmax

	0CL	1CL	2CL	3CL	4CL	0CD	1CD	2CD	3CD	4CD	0UVD	1UVD	2UVD	3UVD	4UVD	0UVL	1UVL	2UVL	3UVL	4UVL	
0CL									3	3				2	3	3		3	3	3	3
1CL									3	3				2	3	3		3	3	3	3
2CL									3	3					3	3		3	3	3	3
3CL									3	3				1	3	3		3	3	3	3
4CL									3	3				1	3	3		3	3	3	3
0CD									3	3				2	3	3		3	3	3	3
1CD									3	3					3	3		2	3	3	3
2CD									3	3						3			3	3	3
3CD	3	3	3	3	3	3	3	3	3	3				3	3	3		3	1		3
4CD	3	3	3	3	3	3	3	3	3	3				3	3	3		3	3	3	
0UVD									3	3					3			2	3	3	3
1UVD									3	3						3		1	3	3	3
2UVD	2	2		1	1	2			3	3					1	3			3	3	3
3UVD	3	3	3	3	3	3	3	3	3	3				3	3	1		3		3	3
4UVD	3	3	3	3	3	3	3	3	3	3				3	3			3	3		3
0UVL									3	3						3		3		3	3
1UVL	3	3	3	3	3	2	2		1	3	2	1			3				3	3	3
2UVL	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			3	3		1
3UVL	3	3	3	3	3			3	3	3	3	3	3	3	3	3	3	3	3	1	
4UVL	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	

One-way ANOVA with Tukey post-test

empty cell- not significant

1: P&lt;0.05

2: P&lt;0.01

3: P&lt;0.001