

Figure S1. Zeaxanthin content and growth pattern of *D. tertiolecta* strains selected during mutant screening. (A) Zeaxanthin contents of wild type, *zea1*, and three mutants (based on chlorophyll *a*). The *mut12* was named as *mp3* mutant; (B) Growth pattern of wild type, *zea1*, and three mutants.

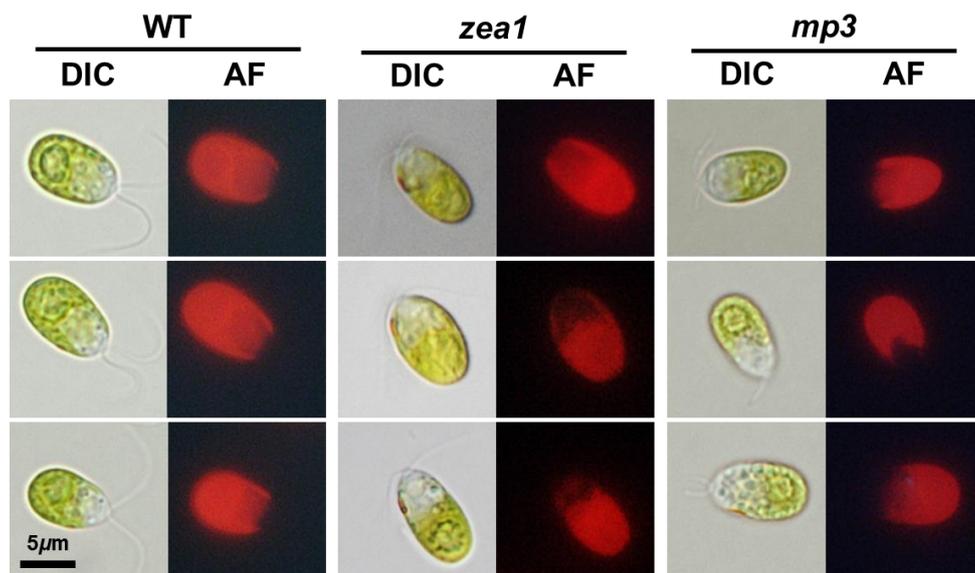


Figure S2. Microscopic images of wild type *D. tertiolecta*, and *zea1* and *mp3* mutants. The plastid regions (green) of the wild type and *zea1* were larger than that of the *mp3* mutant, whereas auto-fluorescence signal patterns were similar. Left side, differential interference contrast (DIC) images; right side, auto-fluorescence (AF) images.

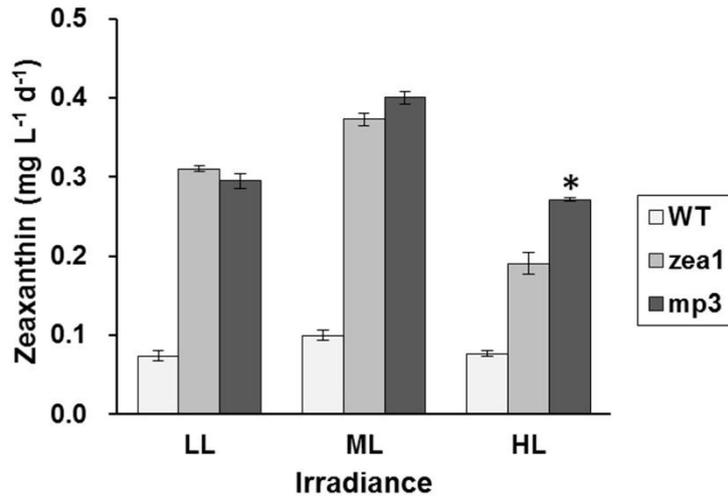


Figure S3. Zeaxanthin productivity of wild type *D. tertiolecta*, and *zea1* and *mp3* mutants. Experimental light conditions were low-light (LL), mid-light (ML) and high-light (HL). Statistical analyses were performed using Student's t-test, * $p < 0.05$. All experiments were conducted in more than triplicate.

Table S1. Effects of salinity on volumetric and cellular biomass. (A) Volumetric biomass of wild type (WT), *zea1* and *mp3* mutant ($\text{g}\cdot\text{L}^{-1}$); (B) Cellular biomass of wild type (WT), and *zea1* and *mp3* mutants ($\text{mg}\cdot 10^6\cdot\text{cells}^{-1}$).

$\text{g}\cdot\text{L}^{-1}$	DW (culture volume base)			
	0.3 M	0.6 M	1.5 M	3.0 M
WT	0.469 (± 0.016)	0.458 (± 0.011)	0.360 (± 0.003)	0.259 (± 0.010)
<i>zea1</i>	0.420 (± 0.012)	0.420 (± 0.009)	0.357 (± 0.004)	0.239 (± 0.015)
<i>mp3</i>	0.380 (± 0.003)	0.364 (± 0.005)	0.353 (± 0.003)	0.245 (± 0.010)

$\text{mg}\cdot 10^6\cdot\text{Cells}^{-1}$	DW (cell number base)			
	0.3 M	0.6 M	1.5 M	3.0 M
WT	0.072 (± 0.002)	0.069 (± 0.001)	0.070 (± 0.003)	0.060 (± 0.003)
<i>zea1</i>	0.073 (± 0.001)	0.068 (± 0.002)	0.074 (± 0.000)	0.065 (± 0.002)
<i>mp3</i>	0.066 (± 0.002)	0.065 (± 0.002)	0.069 (± 0.001)	0.064 (± 0.004)

Table S2. Effects of irradiance on specific growth rates of wild type (WT), *zea1* and *mp3*.

d^{-1}	Specific growth rate (μ)		
	Low-light	Mid-light	High-light
WT	0.72 (± 0.03)	0.97 (± 0.01)	1.01 (± 0.02)
<i>zea1</i>	0.54 (± 0.02)	1.11 (± 0.02)	1.03 (± 0.03)
<i>mp3</i>	0.46 (± 0.04)	1.18 (± 0.02)	1.21 (± 0.04)