

**Additional File 2.** List of primers used in this study.

| Primer Name               | Sequence (5'→3')                                            | Purpose                                            | Restriction site |
|---------------------------|-------------------------------------------------------------|----------------------------------------------------|------------------|
| <i>slr0168</i> UR FW      | TTT <b>GGTCTCT</b> <u>AGGT</u> ACAGGCCCTCAAGGCCCTG          | PCR of <i>slr0168</i> upstream region              | <i>BsaI</i>      |
| <i>slr0168</i> UR RV      | TTT <b>GGTCTCT</b> <u>GCCACT</u> GTTATTTTGATTGGTGGC         |                                                    | <i>BsaI</i>      |
| <i>slr0168</i> DR FW (P5) | TTT <b>GGTCTCT</b> <u>TTTCG</u> TTTGCGAATTTACACCAG          | PCR of <i>slr0168</i> downstream region            | <i>BsaI</i>      |
| <i>slr0168</i> DR RV (P6) | TTT <b>GGTCTCT</b> <u>AAGCT</u> AGGGTGGAGCCAGTGGC           |                                                    | <i>BsaI</i>      |
| selection cassette FW     | TTT <b>GGTCTC</b> <u>ACGTT</u> GGAATTCGATTGATCCGTCGAC       | PCR of <i>nptI_sacB</i> double selection cassette  | <i>BsaI</i>      |
| selection cassette RV     | TTT <b>GGTCTC</b> <u>CCATACT</u> TTTAGGCCCGTAGTCTGCA        |                                                    | <i>BsaI</i>      |
| Lux1 FW (P1)              | TTT <b>GGTCTCT</b> <u>CCAA</u> ATGAAGTTTGGAATATTTGTTTT TC   | PCR of <i>luxAB</i> first amplicon                 | <i>BsaI</i>      |
| Lux1 RV                   | TTT <b>GGTCTCT</b> <u>AACGC</u> ATAAAAGTCGTTTTGGGGATG       |                                                    | <i>BsaI</i>      |
| Lux2 FW                   | TTT <b>GGTCTCT</b> <u>TATG</u> TATGACTGCTGAGTCCGCAAG        | PCR of <i>luxAB</i> second amplicon                | <i>BsaI</i>      |
| Lux2 RV (P4)              | TTT <b>GGTCTCT</b> <u>CGAAT</u> TGTTGAATAAATCGAACTTTTGC     |                                                    | <i>BsaI</i>      |
| DS prom FW                | TTT <b>GGTCTCT</b> <u>TGGCCCC</u> ATGGAAAAACGACAATTAC       | PCR of <i>psaA2</i> promoter                       | <i>BsaI</i>      |
| DS prom RV                | TTT <b>GGTCTCT</b> <u>TTGGT</u> TATAATTCCTTATGTATTTGTCG     |                                                    | <i>BsaI</i>      |
| DS_ <i>nptI</i> RV (P2)   | AAGATGCGTGATCTGATCCTTC                                      | Primers used to check presence of <i>nptI_sacB</i> |                  |
| <i>sac_S2</i> (P3)        | AGCATATCATGGCGTGTAATATGGG                                   |                                                    |                  |
| A1 FW                     | GGCCGCG <b>GGGCC</b> CGATTTCCTTTCGGACTCTGAGCC AATTTG        | PCR of <i>Syn psaA</i> upstream region             | <i>Apal</i>      |
| A1 RV                     | TGGTTCCGGCGAACGAATAATCATGCAGGGTTCTCCTC GCTCGACAATG          |                                                    |                  |
| A2 FW (P9)                | <i>CATTGTCGAGCGAGGAGAACCC</i> TGCATGATTATTCGTTC GCCGGAACCAG | PCR <i>At psaA</i> first amplicon                  |                  |
| A1DS RV                   | TTCGAAT <b>GCGGCCG</b> CTGTAATTGTATAGC                      |                                                    | <i>NotI</i>      |
| A4DS FW                   | TCAAT <b>CACTAGT</b> ATGTATAGGAC                            | PCR <i>At psaA</i> second amplicon                 | <i>SpeI</i>      |
| A3 RV (P10)               | GGAAAACCCAACTTCAGCTCAAAGTTTATCCTACTGCAAT AATTCTTGC          |                                                    |                  |
| A4 FW                     | GCAAGAATTATTGCAGTAGGATAAACTTTGAGCTGAAG TTGGGTTTTCC          | PCR of <i>Syn psaA</i> downstream region           |                  |
| A4 RV                     | GGCCGCG <b>AGCTC</b> CGATCGGGCGAATGTTTAAAGGATC TTTAATC      |                                                    | <i>SacI</i>      |
| <i>psaA</i> gUR FW (P7)   | TGTGAGGGAACTTGGAATC                                         | Primers used to check presence of <i>Syn psaA</i>  |                  |
| <i>psaA_syn</i> RV (P8)   | GATCATAATCACGCACCATG                                        |                                                    |                  |

Restriction sites are indicated by bold characters. The *BsaI*-generated sticky ends used for Golden Gate Shuffling assembly of the pDSlux constructs are underlined. In the case of the pDSpsaA plasmid, regions used for assembly with overlapping PCR are indicated in italics. Abbreviations: *Syn*, *Synechocystis*; *At*, *Arabidopsis*.