**Supplementary data**

**Regulation of Gene Expression of phiEco32-like Bacteriophage 7-11**

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**Supplementary Table 1. Primers used for transcription and primer extension experiments.**

Number “x” in a primer name “Px” indicates primers used to obtain a PCR fragment, containing SaPh711\_gp47-promoter x. Primers named “Px\_pe” were also used for primer extension reactions. Primers labeled as “s70\_” correspond to 70 promoters.

|  |  |
| --- | --- |
| **Primer** | **sequence** |
| P1 | GAT ATC CCA TCT ATC AGT GT |
| P1\_pe | CCT GCT GTA TTA CCC TTG |
| P8 | GCG TAA TTC CTT CAA TTT CC |
| P8\_pe | AAG GTC GTA AGA AAC TAA AGT AG |
| P16 | CAT CCG ACT ACT CCT TAA G |
| P16\_pe | ACA TAG GTA TTG AGA CCC AC |
| P22 | ACC TAG TGA CCA AGA CCA GC |
| P22\_pe | GAA CGG AGT TGA TTC ATG CG |
| P28 | AGG GTG TCA GAG ACC TCA GC |
| P28\_pe | AGT TGC GTT CCC AGA AGT CTT TA |
| P48 | CAT TTG CCG GTG ATT TC |
| P48\_pe | CGC GCA TCA TAT ACA TCG |
| P69 | TAA TGT ATC GTC GAG TCA CAC GC |
| P69\_pe | CGT CAC GCA TTT TAA AAC ACC |
| s70\_P151\_1 | TAC AAA CCC TTG TAC TAG TG |
| s70\_P151\_1\_pe | TAA GAA ACA ACG TTT CGA AC |
| s70\_P151\_2,3 | ATA TTC AAT TCA TCG GGA GG |
| s70\_P151\_2,3\_pe | ACC TAT TTA CTA ACA TCG CC |
| s70\_P42 | GGC TAA AGT TGT CGA TGT TG |
| s70\_P42\_pe | GCG GCC AGA AGA ACA T |
| s70\_P99 | CCT TGA AAG GTC CGT AGT C |
| s70\_P99\_pe | GGT AGC ACG ACC GAT TAC |
| S.N.\_PompX\_pe | AAC AGA ACG TTT CCA TAT CG |
| gp47\_pe | GTT TTC TTA GGA GTT GGA GCA C |

**Supplementary Table 2. List of all homologues genes among phiEco32-like phages.** The result of searchers of core genes of the phiEco32 subgroup phages and core genes of the 7-11 subgroup of phages are presented.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 7-11  NC\_015938 | GAP52  NC\_019402 | phiEco32  NC\_010324 | NJ01  NC\_018835 | KBNP1711  KF981730 | ECBP2  NC\_018859 | | SU10  KM044272 | | 172-1  KP308307 | | |
| SaPh711\_gp001 | D858\_gp001 | phi32\_6 | NJ01\_016 | ECBP3\_0004 | | ECBP2\_0004 | | SU10\_04 | | 1721\_23 |
| SaPh711\_gp004 | D858\_gp112 | phi32\_7 | NJ01\_017 | ECBP3\_0005 | | ECBP2\_0005 | | SU10\_05 | | 1721\_24 |
| SaPh711\_gp005 | D858\_gp111 | phi32\_8 | NJ01\_018 | ECBP3\_0006 | | ECBP2\_0006 | | SU10\_06 | | 1721\_25 |
| SaPh711\_gp007 | D858\_gp108 | phi32\_10 | NJ01\_020 | ECBP3\_0008 | | ECBP2\_0008 | | SU10\_08 | | 1721\_27 |
| SaPh711\_gp012 | D858\_gp102 | phi32\_13 | NJ01\_023 | ECBP3\_0011 | | ECBP2\_0011 | | SU10\_11 | | 1721\_30 |
| SaPh711\_gp021 | D858\_gp093 | phi32\_14 | NJ01\_024 | ECBP3\_0012 | | ECBP2\_0012 | | SU10\_12 | | 1721\_31 |
| SaPh711\_gp017 | D858\_gp097 | phi32\_18 | NJ01\_028 | ECBP3\_0016 | | ECBP2\_0016 | | SU10\_16 | | 1721\_35 |
| SaPh711\_gp018 | D858\_gp096 | phi32\_19 | NJ01\_029 | ECBP3\_0017 | | ECBP2\_0017 | | SU10\_17 | | 1721\_36 |
| SaPh711\_gp020 | D858\_gp094 | phi32\_24 | NJ01\_034 | ECBP3\_0022 | | ECBP2\_0022 | | SU10\_22 | | 1721\_41 |
| SaPh711\_gp024 | D858\_gp090 | phi32\_26 | NJ01\_038 | ECBP3\_0024 | | ECBP2\_0024 | | SU10\_24 | | 1721\_43 |
| SaPh711\_gp045 | D858\_gp075 | phi32\_33 | NJ01\_043 | ECBP3\_0029 | | ECBP2\_0028 | | SU10\_29 | | 1721\_49 |
| SaPh711\_gp047 | D858\_gp073 | phi32\_36 | NJ01\_046 | ECBP3\_0032 | | ECBP2\_0031 | | SU10\_32 | | 1721\_52 |
| SaPh711\_gp048 | D858\_gp072 | phi32\_40 | NJ01\_049 | ECBP3\_0036 | | ECBP2\_0035 | | SU10\_37 | | 1721\_55 |
| SaPh711\_gp068 | D858\_gp061 | phi32\_58 | NJ01\_067 | ECBP3\_0056 | | ECBP2\_0054 | | SU10\_56 | | 1721\_72 |
| SaPh711\_gp079 | D858\_gp050 | phi32\_65 | NJ01\_077 | ECBP3\_0065 | | ECBP2\_0061 | | SU10\_64 | | 1721\_82 |
| SaPh711\_gp073 | D858\_gp052 | phi32\_67 | NJ01\_081 | ECBP3\_0069 | | ECBP2\_0065 | | SU10\_66 | | 1721\_86 |
| SaPh711\_gp086 | D858\_gp044 | phi32\_77 | NJ01\_092 | ECBP3\_0080 | | ECBP2\_0075 | | SU10\_78 | | 1721\_97 |
| SaPh711\_gp099 | D858\_gp036 | phi32\_80 | NJ01\_096 | ECBP3\_0083 | | ECBP2\_0079 | | SU10\_82 | | 1721\_100 |
| SaPh711\_gp101 | D858\_gp034 | phi32\_82 | NJ01\_098 | ECBP3\_0085 | | ECBP2\_0081 | | SU10\_84 | | 1721\_102 |
| SaPh711\_gp102 | D858\_gp033 | phi32\_83 | NJ01\_099 | ECBP3\_0086 | | ECBP2\_0082 | | SU10\_85 | | 1721\_103 |
| SaPh711\_gp103 | D858\_gp032 | phi32\_84 | NJ01\_100 | ECBP3\_0087 | | ECBP2\_0083 | | SU10\_86 | | 1721\_104 |
| SaPh711\_gp104 | D858\_gp031 | phi32\_85 | NJ01\_101 | ECBP3\_0088 | | ECBP2\_0084 | | SU10\_087 | | 1721\_105 |
| SaPh711\_gp105 | D858\_gp030 | phi32\_86 | NJ01\_102 | ECBP3\_0089 | | ECBP2\_0085 | | SU10\_088 | | 1721\_106 |
|  |  | phi32\_4 | NJ01\_004 | ECBP3\_0002 | | ECBP2\_0002 | | SU10\_02 | | 1721\_21 |
|  |  | phi32\_5 | NJ01\_015 | ECBP3\_0003 | | ECBP2\_0003 | | SU10\_03 | | 1721\_22 |
|  |  | phi32\_9 | NJ01\_019 | ECBP3\_0007 | | ECBP2\_0007 | | SU10\_07 | | 1721\_26 |
|  |  | phi32\_12 | NJ01\_022 | ECBP3\_0010 | | ECBP2\_0010 | | SU10\_10 | | 1721\_29 |
|  |  | phi32\_15 | NJ01\_025 | ECBP3\_0013 | | ECBP2\_0013 | | SU10\_13 | | 1721\_32 |
|  |  | phi32\_16 | NJ01\_026 | ECBP3\_0014 | | ECBP2\_0014 | | SU10\_14 | | 1721\_33 |
|  |  | phi32\_21 | NJ01\_031 | ECBP3\_0019 | | ECBP2\_0019 | | SU10\_19 | | 1721\_38 |
|  |  | phi32\_23 | NJ01\_033 | ECBP3\_0021 | | ECBP2\_0021 | | SU10\_21 | | 1721\_40 |
|  |  | phi32\_30 | NJ01\_041 | ECBP3\_0027 | | ECBP2\_0026 | | SU10\_27 | | 1721\_47 |
|  |  | phi32\_32 | NJ01\_042 | ECBP3\_0028 | | ECBP2\_0027 | | SU10\_28 | | 1721\_48 |
|  |  | phi32\_38 | NJ01\_047 | ECBP3\_0034 | | ECBP2\_0033 | | SU10\_34 | | 1721\_53 |
|  |  | phi32\_42 | NJ01\_050 | ECBP3\_0037 | | ECBP2\_0036 | | SU10\_39 | | 1721\_56 |
|  |  | phi32\_44 | NJ01\_054 | ECBP3\_0040 | | ECBP2\_0039 | | SU10\_42 | | 1721\_60 |
|  |  | phi32\_47 | NJ01\_057 | ECBP3\_0044 | | ECBP2\_0043 | | SU10\_45 | | 1721\_62 |
|  |  | phi32\_48 | NJ01\_058 | ECBP3\_0045 | | ECBP2\_0044 | | SU10\_46 | | 1721\_63 |
|  |  | phi32\_49 | NJ01\_059 | ECBP3\_0046 | | ECBP2\_0045 | | SU10\_47 | | 1721\_64 |
|  |  | phi32\_54 | NJ01\_063 | ECBP3\_0053 | | ECBP2\_0051 | | SU10\_52 | | 1721\_68 |
|  |  | phi32\_56 | NJ01\_065 | ECBP3\_0054 | | ECBP2\_0052 | | SU10\_53 | | 1721\_70 |
|  |  | phi32\_57 | NJ01\_066 | ECBP3\_0055 | | ECBP2\_0053 | | SU10\_54 | | 1721\_71 |
|  |  | phi32\_66 | NJ01\_079 | ECBP3\_0067 | | ECBP2\_0063 | | SU10\_65 | | 1721\_84 |
|  |  | phi32\_69 | NJ01\_083 | ECBP3\_0071 | | ECBP2\_0067 | | SU10\_68 | | 1721\_88 |
|  |  | phi32\_70 | NJ01\_084 | ECBP3\_0072 | | ECBP2\_0068 | | SU10\_69 | | 1721\_89 |
|  |  | phi32\_73 | NJ01\_088 | ECBP3\_0076 | | ECBP2\_0071 | | SU10\_73 | | 1721\_93 |
|  |  | phi32\_76 | NJ01\_091 | ECBP3\_0079 | | ECBP2\_0074 | | SU10\_77 | | 1721\_96 |
|  |  | phi32\_78 | NJ01\_094 | ECBP3\_0081 | | ECBP2\_0077 | | SU10\_80 | | 1721\_98 |
|  |  | phi32\_79 | NJ01\_095 | ECBP3\_0082 | | ECBP2\_0078 | | SU10\_81 | | 1721\_99 |
|  |  | phi32\_81 | NJ01\_097 | ECBP3\_0084 | | ECBP2\_0080 | | SU10\_83 | | 1721\_101 |
|  |  | phi32\_87 | NJ01\_103 | ECBP3\_0090 | | ECBP2\_0086 | | SU10\_089 | | 1721\_107 |
|  |  | phi32\_88 | NJ01\_104 | ECBP3\_0091 | | ECBP2\_0087 | | SU10\_090 | | 1721\_108 |
|  |  | phi32\_89 | NJ01\_105 | ECBP3\_0092 | | ECBP2\_0088 | | SU10\_091 | | 1721\_109 |
|  |  | phi32\_90 | NJ01\_106 | ECBP3\_0093 | | ECBP2\_0089 | | SU10\_092 | | 1721\_110 |
|  |  | phi32\_93 | NJ01\_108 | ECBP3\_0096 | | ECBP2\_0091 | | SU10\_094 | | 1721\_112 |
|  |  | phi32\_94 | NJ01\_109 | ECBP3\_0097 | | ECBP2\_0093 | | SU10\_095 | | 1721\_113 |
|  |  | phi32\_95 | NJ01\_110 | ECBP3\_0095 | | ECBP2\_0095 | | SU10\_096 | | 1721\_114 |
|  |  | phi32\_101 | NJ01\_115 | ECBP3\_0101 | | ECBP2\_0101 | | SU10\_100 | | 1721\_120 |
|  |  | phi32\_107 | NJ01\_123 | ECBP3\_0107 | | ECBP2\_0104 | | SU10\_105 | | 1721\_127 |
|  |  | phi32\_108 | NJ01\_124 | ECBP3\_0108 | | ECBP2\_0105 | | SU10\_106 | | 1721\_128 |
|  |  | phi32\_112 | NJ01\_130 | ECBP3\_0112 | | ECBP2\_0108 | | SU10\_110 | | 1721\_2 |
|  |  | phi32\_114 | NJ01\_133 | ECBP3\_0114 | | ECBP2\_0109 | | SU10\_112 | | 1721\_5 |
|  |  | phi32\_115 | NJ01\_134 | ECBP3\_0115 | | ECBP2\_0110 | | SU10\_113 | | 1721\_6 |
|  |  | phi32\_116 | NJ01\_136 | ECBP3\_0116 | | ECBP2\_0113 | | SU10\_115 | | 1721\_8 |
|  |  | phi32\_120 | NJ01\_001 | ECBP3\_0119 | | ECBP2\_0115 | | SU10\_117 | | 1721\_12 |
|  |  | phi32\_123 | NJ01\_004 | ECBP3\_0121 | | ECBP2\_0117 | | SU10\_119 | | 1721\_15 |
|  |  | phi32\_124 | NJ01\_005 | ECBP3\_0122 | | ECBP2\_0118 | | SU10\_120 | | 1721\_16 |
|  |  | phi32\_127 | NJ01\_009 | ECBP3\_0125 | | ECBP2\_0119 | | SU10\_124 | | 1721\_19 |
|  |  | phi32\_128 | NJ01\_010 | ECBP3\_0126 | | ECBP2\_0120 | | SU10\_125 | | 1721\_20 |
| SaPh711\_gp008 | D858\_gp107 | phi32\_11 |  |  | |  | |  | |  |
| SaPh711\_gp023 | D858\_gp091 | phi32\_25 |  |  | |  | |  | |  |
| SaPh711\_gp097 | D858\_gp039 | phi32\_29 |  |  | |  | |  | |  |
| SaPh711\_gp053 | D858\_gp067 | phi32\_43 |  |  | |  | |  | |  |
| SaPh711\_gp063 | D858\_gp064 | phi32\_53 |  |  | |  | |  | |  |
| SaPh711\_gp078 | D858\_gp051 | phi32\_68 |  |  | |  | |  | |  |
| SaPh711\_gp081 | D858\_gp049 | phi32\_72 |  |  | |  | |  | |  |
| SaPh711\_gp082 | D858\_gp047 | phi32\_74 |  |  | |  | |  | |  |
| SaPh711\_gp084 | D858\_gp046 | phi32\_75 |  |  | |  | |  | |  |
| SaPh711\_gp111 | D858\_gp023 | phi32\_117 |  |  | |  | |  | |  |
| SaPh711\_gp037 | - | phi32\_35 |  |  | |  | |  | |  |
| SaPh711\_gp052 | - | phi32\_47 |  |  | |  | |  | |  |
| SaPh711\_gp080 | - | phi32\_60 |  |  | |  | |  | |  |
| SaPh711\_gp076 | - | phi32\_61 |  |  | |  | |  | |  |
| SaPh711\_gp074 | - | phi32\_64 |  |  | |  | |  | |  |
| SaPh711\_gp113 | - | phi32\_92 |  |  | |  | |  | |  |
| SaPh711\_gp116 | - | phi32\_99 |  |  | |  | |  | |  |
| SaPh711\_gp135 | - | phi32\_112 |  |  | |  | |  | |  |
| SaPh711\_gp003 | D858\_gp113 | - |  |  | |  | |  | |  |
| SaPh711\_gp006 | D858\_gp109 | - |  |  | |  | |  | |  |
| SaPh711\_gp009 | D858\_gp106 | - |  |  | |  | |  | |  |
| SaPh711\_gp010 | D858\_gp104 | - |  |  | |  | |  | |  |
| SaPh711\_gp011 | D858\_gp103 | - |  |  | |  | |  | |  |
| SaPh711\_gp013 | D858\_gp101 | - |  |  | |  | |  | |  |
| SaPh711\_gp014 | D858\_gp100 | - |  |  | |  | |  | |  |
| SaPh711\_gp015 | D858\_gp099 | - |  |  | |  | |  | |  |
| SaPh711\_gp016 | D858\_gp098 | - |  |  | |  | |  | |  |
| SaPh711\_gp019 | D858\_gp095 | - |  |  | |  | |  | |  |
| SaPh711\_gp022 | D858\_gp092 | - |  |  | |  | |  | |  |
| SaPh711\_gp028 | D858\_gp086 | - |  |  | |  | |  | |  |
| SaPh711\_gp029 | D858\_gp087 | - |  |  | |  | |  | |  |
| SaPh711\_gp030 | D858\_gp088 | - |  |  | |  | |  | |  |
| SaPh711\_gp033 | D858\_gp082 | - |  |  | |  | |  | |  |
| SaPh711\_gp040 | D858\_gp081 | - |  |  | |  | |  | |  |
| SaPh711\_gp041 | D858\_gp058 | - |  |  | |  | |  | |  |
| SaPh711\_gp042 | D858\_gp078 | - |  |  | |  | |  | |  |
| SaPh711\_gp043 | D858\_gp077 | - |  |  | |  | |  | |  |
| SaPh711\_gp044 | D858\_gp076 | - |  |  | |  | |  | |  |
| SaPh711\_gp046 | D858\_gp074 | - |  |  | |  | |  | |  |
| SaPh711\_gp049 | D858\_gp070 | - |  |  | |  | |  | |  |
| SaPh711\_gp050 | D858\_gp069 | - |  |  | |  | |  | |  |
| SaPh711\_gp064 | D858\_gp063 | - |  |  | |  | |  | |  |
| SaPh711\_gp065 | D858\_gp062 | - |  |  | |  | |  | |  |
| SaPh711\_gp069 | D858\_gp059 | - |  |  | |  | |  | |  |
| SaPh711\_gp071 | D858\_gp055 | - |  |  | |  | |  | |  |
| SaPh711\_gp072 | D858\_gp053 | - |  |  | |  | |  | |  |
| SaPh711\_gp083 | D858\_gp083 | - |  |  | |  | |  | |  |
| SaPh711\_gp085 | D858\_gp045 | - |  |  | |  | |  | |  |
| SaPh711\_gp094 | D858\_gp043 | - |  |  | |  | |  | |  |
| SaPh711\_gp095 | D858\_gp041 | - |  |  | |  | |  | |  |
| SaPh711\_gp098 | D858\_gp037 | - |  |  | |  | |  | |  |
| SaPh711\_gp100 | D858\_gp035 | - |  |  | |  | |  | |  |
| SaPh711\_gp106 | D858\_gp029 | - |  |  | |  | |  | |  |
| SaPh711\_gp107 | D858\_gp028 | - |  |  | |  | |  | |  |
| SaPh711\_gp108 | D858\_gp026 | - |  |  | |  | |  | |  |
| SaPh711\_gp109 | D858\_gp024 | - |  |  | |  | |  | |  |
| SaPh711\_gp119 | D858\_gp016 | - |  |  | |  | |  | |  |
| SaPh711\_gp120 | D858\_gp015 | - |  |  | |  | |  | |  |
| SaPh711\_gp122 | D858\_gp014 | - |  |  | |  | |  | |  |
| SaPh711\_gp129 | D858\_gp013 | - |  |  | |  | |  | |  |
| SaPh711\_gp130 | D858\_gp012 | - |  |  | |  | |  | |  |
| SaPh711\_gp142 | D858\_gp011 | - |  |  | |  | |  | |  |
| SaPh711\_gp143 | D858\_gp010 | - |  |  | |  | |  | |  |
| SaPh711\_gp144 | D858\_gp009 | - |  |  | |  | |  | |  |

**Supplementary Table 3. Sequences of predicted late and middle promoters in the phiEco32-like subgroup of phages.**

Sequences of predicted promoter consensus elements are indicated on the left; late promoters are indicated by red-colored font, middle promoter promoters are indicated in green. Promoters numbers match the number of a gene in front of which the promoter is located.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **phiEco32** | **NJ01** | **ECBP2** | **KBNP1711** | **SU10** | **172-1** |
| TAATGTAgA  TAATGTATA  TAATGTATA  TAATGTATA  TAATGTATA  aAATGTATA | P6  P13  P26  P40  P58  P68 | P16  P23  P38  P49  P67  P82 | P4  P11  P24  P35  P54  P66 | P4  P11  P24  P35  P56  P70 | P4  P11  P24  P37  P56  P68 | P23  P30  P43  P55  P72  P87 |

**Supplementary Table 4. Sequences of predicted late promoters in the 7-11 and GAP52 phge genomes subgroup of phages.** Promoter numbers match the number of a gene, before which the promoter is located. Promoters with lower levels of matching to consensus sequence are highlighted with a grey-colored font.

|  |  |
| --- | --- |
| **7-11** | **GAP52** |
| P1  GTAATG -(16)- gCTA  P8  GTAAGG -(16)- ACTA  P12  GTAATT -(16)- ACTA  P16  GTAATT -(16)- ACTA  P22  GTAAGG -(16)- ACTA  P28  GTAAGG -(16)- ACTA  P48  GTAAGT -(16)- ACTA  P69  GTAAGT -(16)- ACTA  P84  GTAATG -(17)- ACTA | P1  GTAATa -(16)- ACTA  P107 GTAATa -(16)- ACTA  P98  GTAATc -(16)- ACTA  P92 GTAATa -(16)- ACTA  P86  GTAAGa -(16)- ACTA  P71  GTAAGa -(16)- ACTA  P59  GTAAGa -(16)- ACTA  P48  GTAAGG -(16)- ACTA  P46  GTAATG -(16)- ACTA |