

S2 Table. Summary of p-distance values for 20 *Scytonema* strains for which both operons were observed, and for which long reads were recovered (1170-1485 nucleotides), with comparisons also to eight *Brasilonema* strains.

Comparisons between the operons *within strain* are given in first column (blue highlight). Comparisons among Type 2 operons among the 20 strains are given in the first block (yellow highlight), followed by the comparisons among Type 1 operons (green highlight). The third block gives comparisons among *Brasilonema* spp. and the Type 2 operon (yellow highlight), followed by comparisons among *Brasilonema* spp. and the Type 1 operon (green highlight).

| T1/T2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0.08360 | 1 <i>Scytonema hyalinum</i> Sp1 CMT-1BRIN-NPC30 | - | | | | | | | | | | | | | | | | | | |
| 0.08042 | 2 <i>Scytonema hyalinum</i> Sp1 CMT-1BRIN-NPC31 | 0.00000 | - | | | | | | | | | | | | | | | | | |
| 0.08453 | 3 <i>Scytonema hyalinum</i> Sp1 CMT-1BRIN-NPC32 | 0.00078 | 0.00078 | - | | | | | | | | | | | | | | | | |
| 0.08269 | 4 <i>Scytonema hyalinum</i> Sp1 CMT-1BRIN-NPC39 | 0.00000 | 0.00000 | 0.00078 | - | | | | | | | | | | | | | | | |
| 0.07673 | 5 <i>Scytonema hyalinum</i> Sp1 CMT-1SWIN-NPC17 | 0.00081 | 0.00081 | 0.00161 | 0.00081 | - | | | | | | | | | | | | | | |
| 0.07498 | 6 <i>Scytonema hyalinum</i> Sp1 EM3-HA15 | 0.00000 | 0.00000 | 0.00078 | 0.00000 | 0.00081 | - | | | | | | | | | | | | | |
| 0.07498 | 7 <i>Scytonema hyalinum</i> Sp1 EM3-HA19 | 0.00000 | 0.00000 | 0.00078 | 0.00000 | 0.00081 | 0.00000 | - | | | | | | | | | | | | |
| 0.07425 | 8 <i>Scytonema hyalinum</i> Sp1 EM3-HA20 | 0.00000 | 0.00000 | 0.00078 | 0.00000 | 0.00081 | 0.00000 | 0.00000 | - | | | | | | | | | | | |
| 0.07892 | 9 <i>Scytonema hyalinum</i> Sp1 EM3-HA25 | 0.00000 | 0.00000 | 0.00071 | 0.00000 | 0.00081 | 0.00000 | 0.00000 | 0.00000 | - | | | | | | | | | | |
| 0.08049 | 10 <i>Scytonema hyalinum</i> Sp1 EM3-Z1-c02 | 0.00000 | 0.00000 | 0.00070 | 0.00000 | 0.00081 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | - | | | | | | | | | |
| 0.08190 | 11 <i>Scytonema hyalinum</i> Sp1 F15-JRJO3 | 0.00000 | 0.00000 | 0.00071 | 0.00000 | 0.00081 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | - | | | | | | | | |
| 0.07893 | 12 <i>Scytonema hyalinum</i> Sp1 WJT4-NPBG1 | 0.00000 | 0.00000 | 0.00078 | 0.00000 | 0.00081 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | - | | | | | | | |
| 0.08545 | 13 <i>Scytonema hyalinum</i> Sp1 WJT9-NPBG6A | 0.00320 | 0.00320 | 0.00353 | 0.00321 | 0.00410 | 0.00320 | 0.00320 | 0.00320 | 0.00282 | 0.00282 | 0.00282 | 0.00321 | - | | | | | | |
| 0.08474 | 14 <i>Scytonema hyalinum</i> Sp1 WJT9-NPBG6B | 0.00241 | 0.00241 | 0.00283 | 0.00241 | 0.00328 | 0.00241 | 0.00241 | 0.00241 | 0.00211 | 0.00212 | 0.00212 | 0.00241 | 0.00071 | - | | | | | |
| 0.07984 | 15 <i>Scytonema arcangelii</i> FL17-MK96 | 0.00954 | 0.00954 | 0.01033 | 0.00954 | 0.01058 | 0.00954 | 0.00954 | 0.00954 | 0.00954 | 0.00954 | 0.00954 | 0.00878 | 0.01200 | 0.01120 | - | | | | |
| 0.07997 | 16 <i>Scytonema arcangelii</i> Valle de Zapotlan | 0.00952 | 0.00953 | 0.01268 | 0.00953 | 0.01056 | 0.00952 | 0.00952 | 0.00952 | 0.01197 | 0.01197 | 0.01196 | 0.00876 | 0.01412 | 0.01341 | 0.00000 | - | | | |
| 0.08544 | 17 <i>Scytonema hyalinum</i> Sp3 HAF2-B2-cl | 0.01434 | 0.01434 | 0.01340 | 0.01435 | 0.01550 | 0.01434 | 0.01434 | 0.01269 | 0.01269 | 0.01269 | 0.01357 | 0.01059 | 0.00988 | 0.00639 | 0.00917 | - | | | |
| 0.08421 | 18 <i>Scytonema hyalinum</i> Sp4 HTT-U-KK4 | 0.00953 | 0.00953 | 0.00916 | 0.00875 | 0.01057 | 0.00953 | 0.00953 | 0.00845 | 0.00842 | 0.00845 | 0.00876 | 0.00918 | 0.00848 | 0.00316 | 0.00634 | 0.00565 | - | | |
| 0.08966 | 19 <i>Scytonema hyalinum</i> Sp5 HA4185-MV1 | 0.01354 | 0.01355 | 0.01340 | 0.01278 | 0.01467 | 0.01354 | 0.01354 | 0.01355 | 0.01268 | 0.01268 | 0.01268 | 0.01278 | 0.01341 | 0.01270 | 0.00717 | 0.01057 | 0.00564 | 0.00423 | - |
| 0.08702 | 20 <i>Scytonema hyalinum</i> Sp5 ATA-SAL-RM1 | 0.01433 | 0.01434 | 0.01512 | 0.01355 | 0.01548 | 0.01433 | 0.01433 | 0.01354 | 0.01433 | 0.01433 | 0.01357 | 0.01519 | 0.01440 | 0.00796 | 0.00793 | 0.00634 | 0.00478 | 0.00080 | - |
| 0.08843 | 1 <i>Scytonema hyalinum</i> Sp1 CMT-1BRIN-NPC30 | - | | | | | | | | | | | | | | | | | | |
| 0.08433 | 2 <i>Scytonema hyalinum</i> Sp1 CMT-1BRIN-NPC31 | 0.00773 | 0.00773 | - | | | | | | | | | | | | | | | | |
| 0.08433 | 3 <i>Scytonema hyalinum</i> Sp1 CMT-1BRIN-NPC32 | 0.01123 | 0.00491 | 0.01120 | - | | | | | | | | | | | | | | | |
| 0.08433 | 4 <i>Scytonema hyalinum</i> Sp1 CMT-1BRIN-NPC39 | 0.00492 | 0.00352 | 0.00421 | 0.00703 | - | | | | | | | | | | | | | | |
| 0.08433 | 5 <i>Scytonema hyalinum</i> Sp1 CMT-1SWIN-NPC17 | 0.00984 | 0.00563 | 0.01054 | 0.00913 | 0.00774 | - | | | | | | | | | | | | | |
| 0.08433 | 6 <i>Scytonema hyalinum</i> Sp1 EM3-HA15 | 0.00984 | 0.00563 | 0.01054 | 0.00913 | 0.00774 | 0.00000 | - | | | | | | | | | | | | |
| 0.08433 | 7 <i>Scytonema hyalinum</i> Sp1 EM3-HA19 | 0.00984 | 0.00563 | 0.01054 | 0.00913 | 0.00774 | 0.00000 | 0.00000 | - | | | | | | | | | | | |
| 0.08433 | 8 <i>Scytonema hyalinum</i> Sp1 EM3-HA20 | 0.00983 | 0.00562 | 0.01048 | 0.00911 | 0.00774 | 0.00000 | 0.00000 | 0.00000 | - | | | | | | | | | | |
| 0.08433 | 9 <i>Scytonema hyalinum</i> Sp1 EM3-HA25 | 0.00913 | 0.00352 | 0.00843 | 0.00703 | 0.00563 | 0.00632 | 0.00632 | 0.00632 | 0.00632 | 0.00281 | - | | | | | | | | |
| 0.08433 | 10 <i>Scytonema hyalinum</i> Sp1 EM3-Z1-c02 | 0.00773 | 0.00070 | 0.00702 | 0.00421 | 0.00282 | 0.00492 | 0.00492 | 0.00492 | 0.00492 | 0.00492 | 0.00281 | 0.00563 | - | | | | | | |
| 0.08433 | 11 <i>Scytonema hyalinum</i> Sp1 F15-JRJO3 | 0.00492 | 0.00633 | 0.00559 | 0.00981 | 0.00281 | 0.00913 | 0.00913 | 0.00913 | 0.00909 | 0.00422 | 0.00563 | - | | | | | | | |
| 0.08433 | 12 <i>Scytonema hyalinum</i> Sp1 WJT4-NPBG1 | 0.01053 | 0.00421 | 0.01050 | 0.00070 | 0.00633 | 0.00843 | 0.00843 | 0.00840 | 0.00632 | 0.00351 | 0.00911 | - | | | | | | | |
| 0.08433 | 13 <i>Scytonema hyalinum</i> Sp1 WJT9-NPBG6A | 0.01053 | 0.00421 | 0.01050 | 0.00070 | 0.00633 | 0.00843 | 0.00843 | 0.00840 | 0.00632 | 0.00351 | 0.00911 | 0.00000 | - | | | | | | |
| 0.08433 | 14 <i>Scytonema hyalinum</i> Sp1 WJT9-NPBG6B | 0.01262 | 0.01263 | 0.01423 | 0.01660 | 0.01180 | 0.00948 | 0.00948 | 0.00948 | 0.00950 | 0.01188 | 0.01183 | 0.01580 | 0.01580 | - | | | | | |
| 0.08433 | 15 <i>Scytonema arcangelii</i> FL17-MK96 | 0.01262 | 0.01263 | 0.01423 | 0.01660 | 0.01180 | 0.00948 | 0.00948 | 0.00948 | 0.00950 | 0.01188 | 0.01183 | 0.01580 | 0.01580 | 0.00000 | - | | | | |
| 0.08433 | 16 <i>Scytonema arcangelii</i> Valle de Zapotlan | 0.00914 | 0.00352 | 0.00843 | 0.00703 | 0.00563 | 0.00211 | 0.00211 | 0.00211 | 0.00422 | 0.00281 | 0.00703 | 0.00632 | 0.00632 | 0.00870 | 0.00870 | - | | | |
| 0.08433 | 17 <i>Scytonema hyalinum</i> Sp3 HAF2-B2-cl | 0.00983 | 0.00421 | 0.00908 | 0.00770 | 0.00633 | 0.00281 | 0.00281 | 0.00279 | 0.00351 | 0.00351 | 0.00769 | 0.00700 | 0.00792 | 0.00070 | 0.00792 | 0.00070 | - | | |
| 0.08433 | 18 <i>Scytonema hyalinum</i> Sp4 HTT-U-KK4 | 0.01476 | 0.01828 | 0.01757 | 0.01615 | 0.01477 | 0.01685 | 0.01685 | 0.01685 | 0.01687 | 0.01897 | 0.01757 | 0.01475 | 0.01545 | 0.01545 | 0.01181 | 0.01615 | 0.01685 | - | |
| 0.08433 | 19 <i>Scytonema hyalinum</i> Sp5 HA4185-MV1 | 0.01480 | 0.01833 | 0.01761 | 0.01619 | 0.01479 | 0.01690 | 0.01690 | 0.01690 | 0.01691 | 0.01902 | 0.01761 | 0.01479 | 0.01549 | 0.01549 | 0.01184 | 0.01619 | 0.01690 | 0.00000 | - |
| 0.08433 | 20 <i>Scytonema hyalinum</i> Sp5 ATA-SAL-RM1 | 0.04850 | 0.04854 | 0.04719 | 0.04857 | 0.05050 | 0.04850 | 0.04850 | 0.04851 | 0.04650 | 0.04647 | 0.04646 | 0.04868 | 0.04944 | 0.04873 | 0.05250 | 0.05276 | 0.05073 | 0.05359 | 0.05657 |
| 0.05006 | Brasilonema BZ-HDL-007 vs Type 2 operon | 0.04873 | 0.04873 | 0.04669 | 0.04876 | 0.05071 | 0.04873 | 0.04873 | 0.04874 | 0.04596 | 0.04596 | 0.04875 | 0.04457 | 0.04386 | 0.05193 | 0.05228 | 0.04596 | 0.04811 | 0.05091 | 0.05430 |
| 0.05006 | Brasilonema CR6-4B vs Type 2 operon | 0.05006 | 0.05011 | 0.04787 | 0.04936 | 0.05211 | 0.05006 | 0.05006 | 0.05008 | 0.04719 | 0.04701 | 0.04715 | 0.05025 | 0.04943 | 0.04872 | 0.05404 | 0.05415 | 0.05148 | 0.05109 | 0.05216 |
| 0.05006 | Brasilonema CR6-5A vs Type 2 operon | 0.04846 | 0.04850 | 0.04646 | 0.04854 | 0.05047 | 0.04846 | 0.04846 | 0.04847 | 0.04578 | 0.04564 | 0.04574 | 0.04864 | 0.04871 | 0.04800 | 0.05244 | 0.05204 | 0.05077 | 0.05183 | 0.05146 |
| 0.05006 | Brasilonema KEN-MK50 vs Type 2 operon | 0.05404 | 0.05408 | 0.04930 | 0.05411 | 0.05619 | 0.05404 | 0.05404 | 0.05405 | 0.04986 | 0.04997 | 0.05424 | 0.05296 | 0.05225 | 0.05639 | 0.05345 | 0.05360 | 0.05464 | 0.05498 | 0.05966 |
| 0.05006 | Brasilonema M31-FB20B vs Type 2 operon | 0.05636 | 0.05641 | 0.05281 | 0.05645 | 0.05857 | 0.05636 | 0.05636 | 0.05638 | 0.05212 | 0.05209 | 0.05208 | 0.05657 | 0.05296 | 0.05225 | 0.05872 | 0.05556 | 0.05359 | 0.05354 | 0.05568 |
| 0.05006 | Brasilonema P09-MK13 vs Type 2 operon | 0.06050 | 0.06054 | 0.05566 | 0.06058 | 0.06280 | 0.06050 | 0.06050 | 0.06052 | 0.05496 | 0.05493 | 0.05492 | 0.06072 | 0.05581 | 0.05510 | 0.06128 | 0.05840 | 0.05644 | 0.05640 | 0.06457 |
| 0.05006 | Brasilonema PT5-MK70 vs Type 2 operon | 0.05467 | 0.05472 | 0.04999 | 0.05476 | 0.05685 | 0.05467 | 0.05467 | 0.05469 | 0.05070 | 0.05055 | 0.05066 | 0.05487 | 0.05224 | 0.05153 | 0.05624 | 0.05345 | 0.05287 | 0.05396 | 0.05497 |
| 0.05006 | Brasilonema TH04-EMA vs Type 2 operon | 0.08033 | 0.07751 | 0.08156 | 0.07870 | 0.07691 | 0.07543 | 0.07543 | 0.07543 | 0.07594 | 0.07756 | 0.07614 | 0.08015 | 0.07800 | 0.07800 | 0.06784 | 0.06784 | 0.07473 | 0.07452 | 0.07614 |
| 0.05006 | Brasilonema BZ-HDL-007 vs Type 1 operon | 0.07988 | 0.07494 | 0.08126 | 0.07629 | 0.07704 | 0.07351 | 0.07351 | 0.07351 | 0.07351 | 0.07564 | 0.07422 | 0.07985 | 0.07559 | 0.07559 | 0.06881 | 0.06881 | 0.07280 | 0.07209 | 0.07561 |
| 0.05006 | Brasilonema CR6-4B vs Type 1 operon | 0.08245 | 0.07752 | 0.08339 | 0.07872 | 0.07904 | 0.07545 | 0.07545 | 0.07545 | 0.07573 | 0.07757 | 0.07616 | 0.08181 | 0.07801 | 0.07801 | 0.07105 | 0.07105 | 0.07475 | 0.07432 | 0.07629 |
| 0.05006 | Brasilonema CR6-5A vs Type 1 operon | 0.08105 | 0.07613 | 0.08206 | 0.07732 | 0.07763 | 0.07405 | 0.074 | | | | | | | | | | | | |