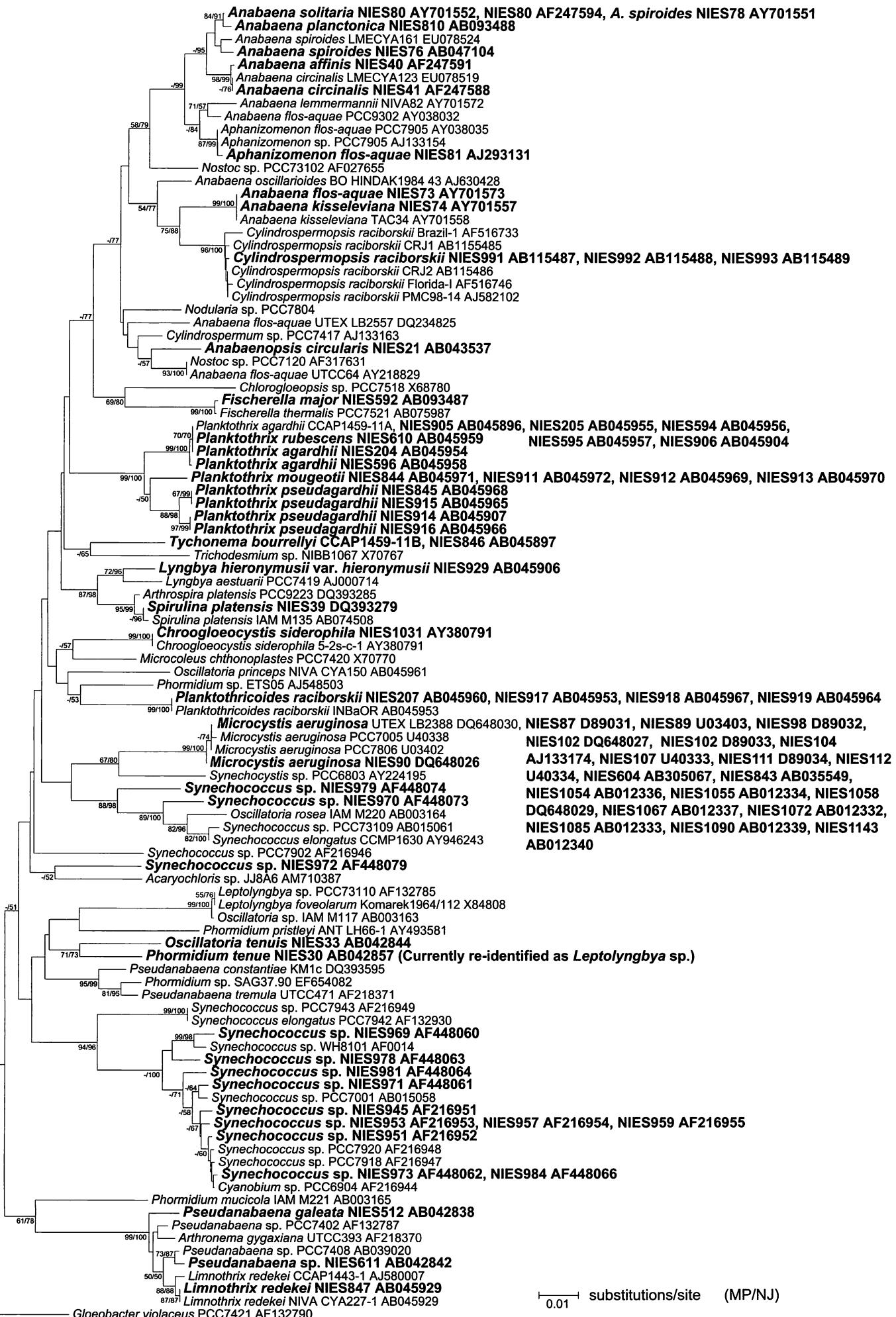# III. INFORMATION ON STRAINS（保存株関連情報）

1. Phylogenetic position of the cyanobacterial strains（シアノバクテリア保存株の系統的位置）

Neighbor-joining (NJ) tree based on 16S rDNA sequences: The tree contains 78 strains of NIES cyanobacteria. Some cyanobacterial genera such as *Synechococcus* and *Phormidium* are polyphyletic in this tree. Strains showing identical or more than 99% identical sequences are listed in the same branch. Bootstrap values >50 are shown near branches (maximum parsimony (MP) / NJ). Sequences were aligned by using ClustalX (Thompson *et al.* 1997) and edited manually with BioEdit 7.01 (Hall 1999). Phylogenetic analysis was conducted with PHYLIP ver. 3.66 (Felsenstein 1993). NJ analysis using "dnadist" and MP analysis using "dnapars" were performed. Bootstrap values (100 replicates) were obtained by using "seqboot" in PHYLIP.

REFERENCES

Hall, T. A. 1999. BioEdit: a user-friendly biological sequence alignment editor and analysis program for Windows 95/98/NT. Nucleic Acids Symposium Series 41: 95–98.

Thompson, J. D., Gibson, T. J., Plewniak, F., Jeanmougin, F. & Higgins, D. G. 1997. The ClustalX windows interface: flexible strategies for multiple sequence alignment aided by quality analysis tools. Nucleic Acids Research 24: 4876–4882.

Felsenstein, J. 1993. PHYLIP (phylogeny Inference Package) University of Washington, Seattle.

Phylogenetic tree (MP/NJ)

84/91 **Anabaena solitaria NIES80 AY701552, NIES80 AF247594**, *A. spiroides* **NIES78 AY701551**
Anabaena planctonica NIES810 AB093488
-/95 *Anabaena spiroides* LMECYA161 EU078524
Anabaena spiroides NIES76 AB047104
Anabaena affinis NIES40 AF247591
98/99 *Anabaena circinalis* LMECYA123 EU078519
-/99 -/76 **Anabaena circinalis NIES41 AF247588**
71/57 *Anabaena lemmermannii* NIVA82 AY701572
-/84 *Anabaena flos-aquae* PCC9302 AY038032
Aphanizomenon flos-aquae PCC7905 AY038035
58/79 87/99 *Aphanizomenon* sp. PCC7905 AJ133154
Aphanizomenon flos-aquae NIES81 AJ293131
Nostoc sp. PCC73102 AF027655
Anabaena oscillarioides BO HINDAK1984 43 AJ630428
54/77 **Anabaena flos-aquae NIES73 AY701573**
99/100 **Anabaena kisseleviana NIES74 AY701557**
75/88 *Anabaena kisseleviana* TAC34 AY701558
Cylindrospermopsis raciborskii Brazil-1 AF516733
96/100 *Cylindrospermopsis raciborskii* CRJ1 AB1155485
-/77 **Cylindrospermopsis raciborskii NIES991 AB115487, NIES992 AB115488, NIES993 AB115489**
Cylindrospermopsis raciborskii CRJ2 AB115486
Cylindrospermopsis raciborskii Florida-I AF516746
Cylindrospermopsis raciborskii PMC98-14 AJ582102
Nodularia sp. PCC7804
Anabaena flos-aquae UTEX LB2557 DQ234825
-/77 *Cylindrospermum* sp. PCC7417 AJ133163
Anabaenopsis circularis NIES21 AB043537
-/57 *Nostoc* sp. PCC7120 AF317631
93/100 *Anabaena flos-aquae* UTCC64 AY218829
Chlorogloeopsis sp. PCC7518 X68780
69/80 **Fischerella major NIES592 AB093487**
99/100 *Fischerella thermalis* PCC7521 AB075987
Planktothrix agardhii CCAP1459-11A, **NIES905 AB045896, NIES205 AB045955, NIES594 AB045956,**
70/70 **Planktothrix rubescens NIES610 AB045959** **NIES595 AB045957, NIES906 AB045904**
99/100 **Planktothrix agardhii NIES204 AB045954**
Planktothrix agardhii NIES596 AB045958
99/100 **Planktothrix mougeotii NIES844 AB045971, NIES911 AB045972, NIES912 AB045969, NIES913 AB045970**
-/50 67/99 **Planktothrix pseudagardhii NIES845 AB045968**
Planktothrix pseudagardhii NIES915 AB045965
88/98 **Planktothrix pseudagardhii NIES914 AB045907**
97/99 **Planktothrix pseudagardhii NIES916 AB045966**
-/65 **Tychonema bourrellyi CCAP1459-11B, NIES846 AB045897**
Trichodesmium sp. NIBB1067 X70767
72/96 **Lyngbya hieronymusii var. hieronymusii NIES929 AB045906**
Lyngbya aestuarii PCC7419 AJ000714
87/98 *Arthrospira platensis* PCC9223 DQ393285
95/99 **Spirulina platensis NIES39 DQ393279**
-/96 *Spirulina platensis* IAM M135 AB074508
99/100 **Chroogloeocystis siderophila NIES1031 AY380791**
-/57 *Chroogloeocystis siderophila* 5-2s-c-1 AY380791
Microcoleus chthonoplastes PCC7420 X70770
Oscillatoria princeps NIVA CYA150 AB045961
Phormidium sp. ETS05 AJ548503
-/53 **Planktothricoides raciborskii NIES207 AB045960, NIES917 AB045953, NIES918 AB045967, NIES919 AB045964**
99/100 *Planktothricoides raciborskii* INBaOR AB045953
Microcystis aeruginosa UTEX LB2388 DQ648030, **NIES87 D89031, NIES89 U03403, NIES98 D89032,**
-74 *Microcystis aeruginosa* PCC7005 U40338 **NIES102 DQ648027, NIES102 D89033, NIES104**
99/100 *Microcystis aeruginosa* PCC7806 U03402 **AJ133174, NIES107 U40333, NIES111 D89034, NIES112**
67/80 **Microcystis aeruginosa NIES90 DQ648026** **U40334, NIES604 AB305067, NIES843 AB035549,**
Synechocystis sp. PCC6803 AY224195 **NIES1054 AB012336, NIES1055 AB012334, NIES1058**
Synechococcus sp. NIES979 AF448074 **DQ648029, NIES1067 AB012337, NIES1072 AB012332,**
88/98 **Synechococcus sp. NIES970 AF448073** **NIES1085 AB012333, NIES1090 AB012339, NIES1143**
89/100 *Oscillatoria rosea* IAM M220 AB003164 **AB012340**
82/96 *Synechococcus* sp. PCC73109 AB015061
82/100 *Synechococcus elongatus* CCMP1630 AY946243
Synechococcus sp. PCC7902 AF216946
Synechococcus sp. NIES972 AF448079
-/52 *Acaryochloris* sp. JJ8A6 AM710387
55/76 *Leptolyngbya* sp. PCC73110 AF132785
99/100 *Leptolyngbya foveolarum* Komarek1964/112 X84808
Oscillatoria sp. IAM M117 AB003163
Phormidium pristleyi ANT LH66-1 AY493581
-/51 **Oscillatoria tenuis NIES33 AB042844**
71/73 **Phormidium tenue NIES30 AB042857 (Currently re-identified as *Leptolyngbya* sp.)**
Pseudanabaena constantiae KM1c DQ393595
95/99 *Phormidium* sp. SAG37.90 EF654082
81/95 *Pseudanabaena tremula* UTCC471 AF218371
99/100 *Synechococcus* sp. PCC7943 AF216949
Synechococcus elongatus PCC7942 AF132930
99/98 **Synechococcus sp. NIES969 AF448060**
94/96 *Synechococcus* sp. WH8101 AF0014
Synechococcus sp. NIES978 AF448063
-/100 **Synechococcus sp. NIES981 AF448064**
Synechococcus sp. NIES971 AF448061
-/64 *Synechococcus* sp. PCC7001 AB015058
-/71 -/58 **Synechococcus sp. NIES945 AF216951**
-/67 **Synechococcus sp. NIES953 AF216953, NIES957 AF216954, NIES959 AF216955**
Synechococcus sp. NIES951 AF216952
-/60 *Synechococcus* sp. PCC7920 AF216948
Synechococcus sp. PCC7918 AF216947
Synechococcus sp. NIES973 AF448062, NIES984 AF448066
Cyanobium sp. PCC6904 AF216944
Phormidium mucicola IAM M221 AB003165
Pseudanabaena galeata NIES512 AB042838
Pseudanabaena sp. PCC7402 AF132787
99/100 *Arthronema gygaxiana* UTCC393 AF218370
73/87 *Pseudanabaena* sp. PCC7408 AB039020
Pseudanabaena sp. NIES611 AB042842
50/50 *Limnothrix redekei* CCAP1443-1 AJ580007
88/88 **Limnothrix redekei NIES847 AB045929**
87/87 *Limnothrix redekei* NIVA CYA227-1 AB045929
61/78
Gloeobacter violaceus PCC7421 AF132790

0.01 substitutions/site (MP/NJ)