

**Supplements to:**

**Cyanobacterial contribution to travertine deposition  
in the Hoyoux river system, Belgium**

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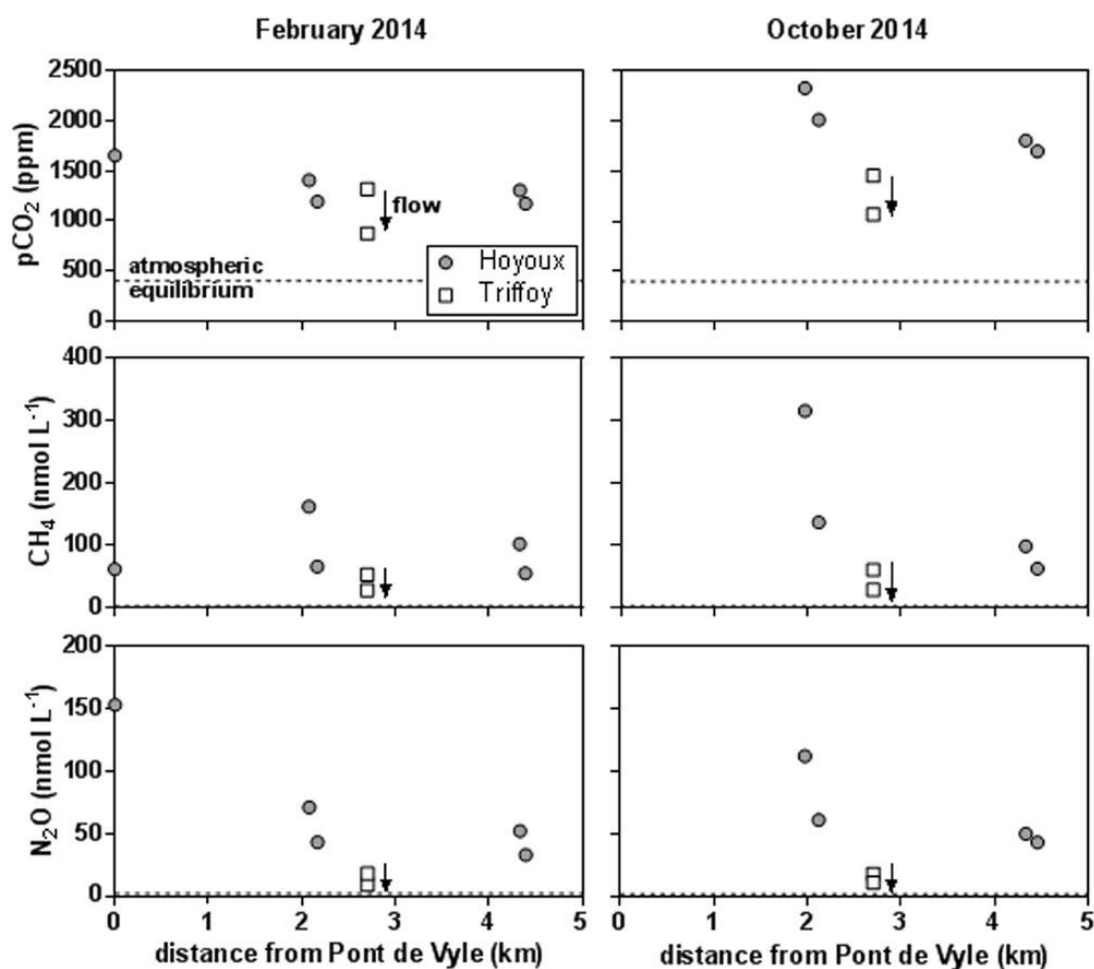
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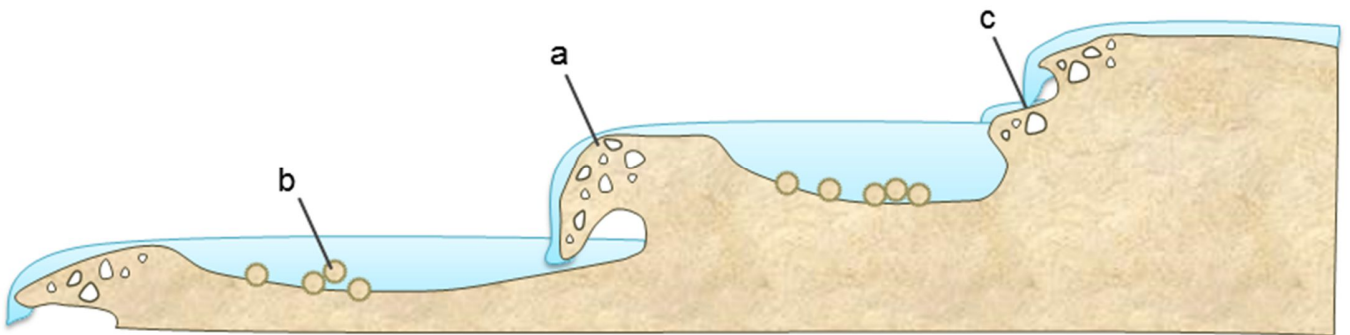
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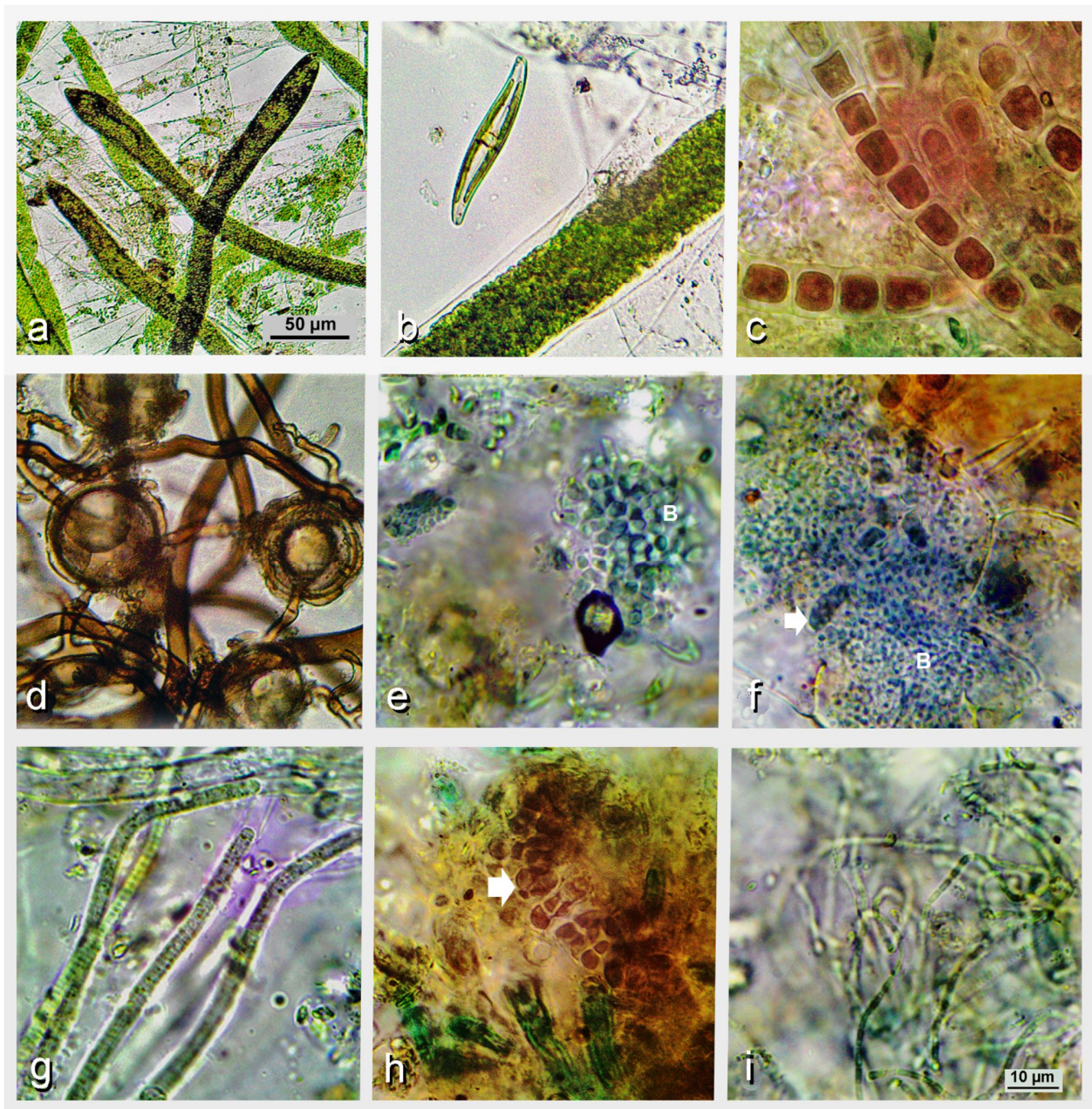
## Supplemental Figures and Tables



**Suppl. Figure 1:** Variations of the partial pressure of CO<sub>2</sub> (pCO<sub>2</sub>, ppm), CH<sub>4</sub> and N<sub>2</sub>O concentrations (nmol L<sup>-1</sup>) in the Hoyoux and Triffoy in February and October 2014. Horizontal dotted lines indicate atmospheric equilibrium, 400 ppm, 2 nmol L<sup>-1</sup> and 10 nmol L<sup>-1</sup> for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, respectively.

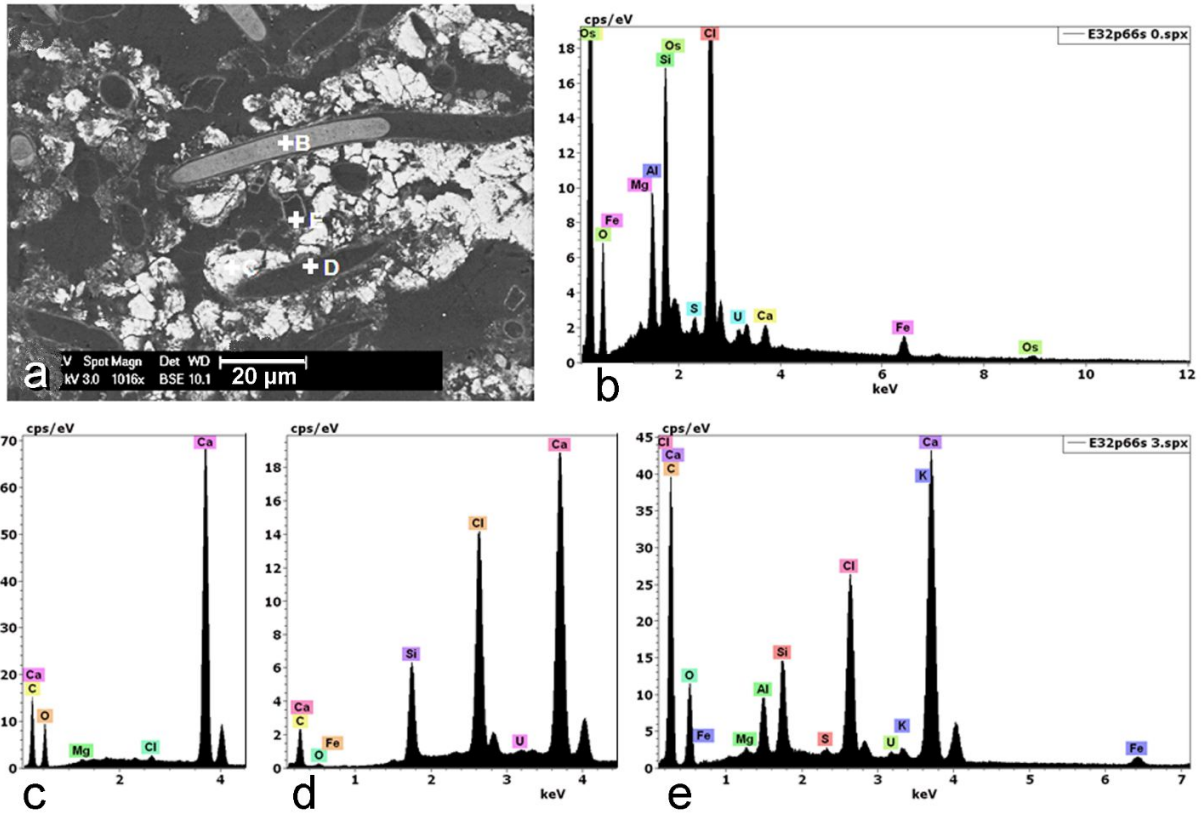


**Suppl. Figure 2:** Schematic view of a longitudinal profile of a travertine cascades in the Hoyoux River. Indicated are the different types of samples: (a) In the nearly laminar flow over the tops of travertine barriers, we observed poorly calcified flat mats; (b) in moderate flow between barriers and cascades, we collected oncoids and submersed encrusted wooden branches; (c) in cascades, on sites receiving high water impact, we encountered compact crusts with smooth surface of shiny appearance, blue-green to steel-blue in color which covered the travertine surface or encrusted fixed branches.

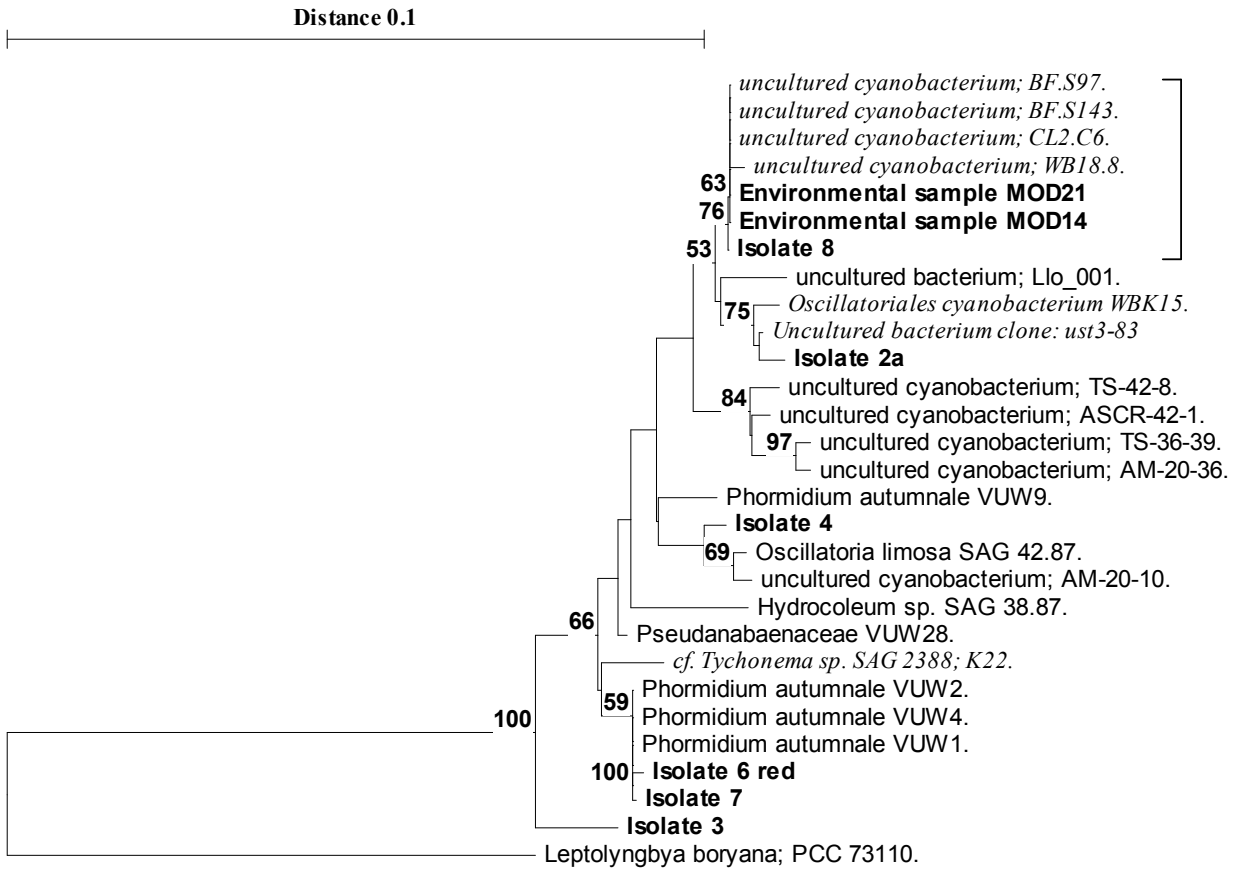


**Suppl. Fig. 3.** Microorganisms participating in Travertine deposition. (a) *Vaucheria* sp., filament tips (damaged filaments in background). (b) Detail: Diatom *Gyrosigma* sp. and *Vaucheria* sp. (c) The rhodophyte *Batrachospermum* sp., chnansia growth stage. (d) An oomycetous fungus entrapped in the travertine crust with germinating spores. (e) Clusters of settled baeocytes (B) of pleurocapsalean cyanobacteria (possibly *Xenococcus*). (f) The pleurocapsalean cyanobacterium *Hyella fontana* Huber et Jadin (arrow) surrounded by recently released baeocytes (B). (g) *Lyngbya* sp. extracted from carbonate crust. (h) *Xenococcus* sp. (arrow) (i) *Leptolyngbya* sp. The scale in i. is valid for b-i.

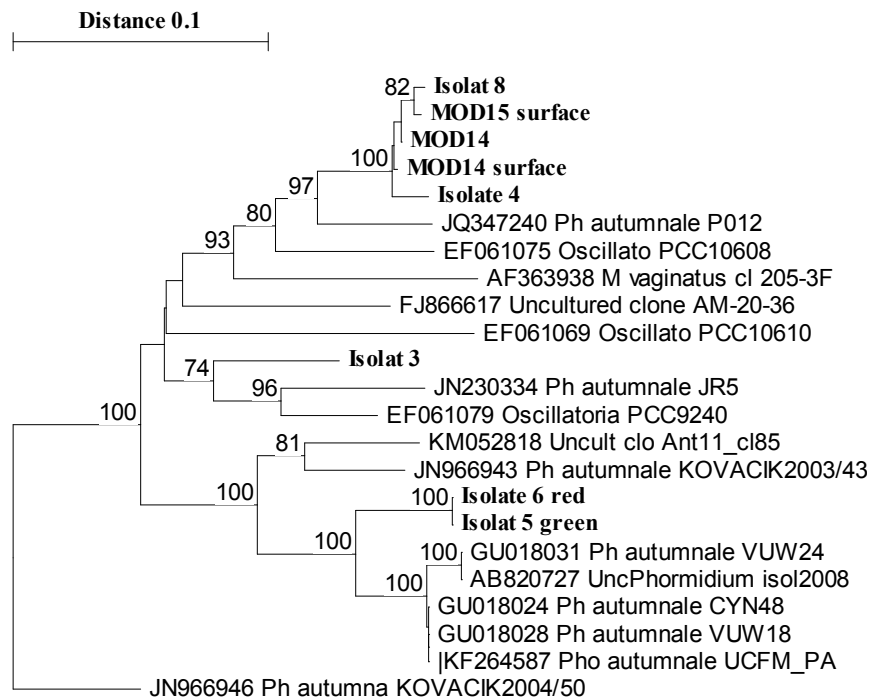




**Suppl. Fig. 4:** X-ray elemental analyses and mappings of *in situ* travertine with cyanobacteria and mineral encrustation. (a) The area subject to analysis (outlined by white frame in Fig. 9a, and mapped in Fig. 9d). (b) Elemental composition targeting the trichome of *Phormidium incrustatum* in a. (c) Target is carbonate cluster in a. (d) Target is abandoned *Phormidium* sheath in a. (e) Target is entrapped microorganisms in a.



**Suppl. Fig. 5:** Neighbor-joining tree based on 454 bp of the 16S rRNA gene including environmental sequences and isolates from this study (**bold**), the most closely related BLAST hits as well as tufa-related sequences from Europe (*italics*). Kimura correction for multiple mutations with ratio calculated from data, 500 bootstraps.



**Suppl. Fig. 6:** Neighbor-joining tree based on ITS sequences of environmental sequences and isolates (**bold**) and the most closely related BLAST hits. Kimura correction for multiple mutations, 500 bootstraps. No 'tufa' associated ITS sequences are available in public databases. Therefore, the sequences from the Hoyoux system of this study form a distinct cluster.

**Suppl. Table 1:** Amplified 16S rRNA and ITS sequences from environmental samples (MOD) and isolates. The length of the fragment, the 1<sup>st</sup> (closest) cultured and uncultured hit in the GenBank database obtained by a BLAST search are indicated, as well as the accession number.

Sequence	Sampling site	fragment	# bp	1st uncultured hit, accession # and pairwise identity	1st cultured hit, accession # and pairwise identity	GenBank Accession #
<b>MOD 14</b>	Site 3 Triffoy June	16S rRNA	1403	Uncult. cyanobacterium clone WB 18.8 GQ324964 99.9%	<i>Oscillatoria limosa</i> SAG 42.87 KM019961 98.8%	KR002126
<b>MOD 14</b>	Site 3 Triffoy June	ITS	531	-	<i>Phormidium autumnale</i> PO12 JQ347240 91.6%	KR002126
<b>MOD 14 surface</b>	Site 3 Triffoy June	16S rRNA	1159	Uncult. cyanobacterium clone WB 18.8 GQ324964 99.8%	<i>Phormidium autumnale</i> PO12 JQ712612 98.9%	KR002127
<b>MOD 14 surface</b>	Site 3 Triffoy June	ITS	531	-	<i>Phormidium autumnale</i> PO12 JQ347240 91.5%	KR002127
<b>MOD 15</b>	Site 2 Hoyoux June	16S rRNA	1144	Uncult. cyanobacterium clone WB 18.8 GQ324964 99.2%	<i>Phormidium cf. subfuscum</i> l-Roc EU196634 98.7%	KR002128
<b>MOD 15</b>	Site 2 Hoyoux June	ITS	531	-	<i>Phormidium autumnale</i> PO12 JQ347240 90.3%	KR002128
<b>MOD 15 surface</b>	Site 2 Hoyoux June	16S rRNA	1161	Uncult. cyanobacterium clone WB 18.8 GQ324964 99.5%	<i>Phormidium autumnale</i> PO12 JQ712612 98.9%	KR002129
<b>MOD 15 surface</b>	Site 2 Hoyoux June	ITS	543	-	<i>Phormidium autumnale</i> PO12 JQ347240 91.0%	KR002129
<b>MOD 21</b>	Site 3 Triffoy August	16S rRNA	1315	Uncult. cyanobacterium clone WB 18.8 GQ324964 99.8%	<i>Oscillatoria limosa</i> SAG 42.87 KM019961 99.1%	KR002130
<b>MOD 21</b>	Site 3 Triffoy August	ITS	531	-	<i>Phormidium autumnale</i> PO12 JQ347240 91.9%	KR002130



<b>Isolate 2a</b>	Site 4 Hoyoux February	16S rRNA	1070	-	<i>Phormidium autumnale</i> CYN79 JQ687337 99.4%	KR002120
<b>Isolate 2a</b>	Site 4 Hoyoux February	ITS	534	Oscillatoriales cyanobacterium Fil.1SE EF061076 93.6%	<i>Phormidium autumnale</i> PO19 JQ347235 89.2%	KR002120
<b>Isolate 3</b>	Site 3 Triffoy February	16S rRNA	1403	Uncult. cyanobacterium clone AM-20-10 FJ866615.1 99.1%	<i>Oscillatoria limosa</i> SAG 42.87 KM019961 99.1%	KR002121
<b>Isolate 3</b>	Site 3 Triffoy February	ITS	547	-	<i>Oscillatoria</i> sp. PCC 9240 EF061079 90.5%	KR002121
<b>Isolate 4</b>	Site 2 Hoyoux February	16S rRNA	1403	Uncult. cyanobacterium clone AM-20-10 FJ866615.1 99.3%	<i>Oscillatoria limosa</i> SAG 42.87 KM019961 99.2%	KR002122
<b>Isolate 4</b>	Site 2 Hoyoux February	ITS	543	-	<i>Phormidium autumnale</i> PO12 JQ347240 90.7%	KR002122
<b>Isolate 5</b>	Site 3 Triffoy February	16S rRNA	1116	-	<i>Phormidium autumnale</i> LCR-CYANT10 - KM052841 99.7%	n.a.
<b>Isolate 6</b>	Site 3 Triffoy February	16S rRNA	1403	Uncult. <i>Phormidium</i> sp. AB820727 99.4%	<i>Cf. Tychonema</i> sp. SAG 2388 KF417637 99.3%	KR002123
<b>Isolate 6</b>	Site 3 Triffoy February	ITS	560	-	<i>Phormidium autumnale</i> CYN48 GU018024.1 93%	KR002123
<b>Isolate 7</b>	Site 2 Hoyoux February	16S rRNA	706	Uncult. <i>Phormidium</i> sp. AB820727 99.6%	<i>Phormidium cf. uncinatum</i> JX088095 99.6%	KR002124
<b>Isolate 8</b>	Site 3 Triffoy February	16S rRNA	1403	Uncult. cyanobacterium clone WB18.8 GQ324964 99.8%	<i>Oscillatoria limosa</i> SAG 42.87 KM019961 98.8%	KR002125
<b>Isolate 8</b>	Site 3 Triffoy February	ITS	552	-	<i>Phormidium autumnale</i> PO12 JQ347240 90.7%	KR002125