Supplementary Information

METHODOLOGICAL DETAILS

Study Area

Copahue Thermal Complex (CTC) is administered by the provincial government of Neuquén troughthout Ente Provincial de Termas and is located in a protected area (Copahue Provincial Park) managed by Áreas Naturales Protegidas. Both institutions require registration and permission to collect scientific samples and for this reason the surveys for the present work were conducted in 2 instances. Furthermore, the Complex is located at 2000 m a. s. l. and is only open from December to May, been closed for the winter months due to snow covering (up to 2 m height at Copahue village).

The different environments present at CTC area are used differently from a medicinal point of view. In general, water from hot springs are used for drinking purposes or for healing treatments, each one of the environments with an associated characteristic. Ponds are used for public bathing or as a source of mud, algae or water for treatments inside the Complex. All the environments maintain their natural characteristics and functioning, but have been more or less modified with infrastructure works for their use (except Manantial Agua del Limón): in the case of hot springs, channels or pipes, and in the case of ponds, retaining walls and access stairs.

The objective of the sampling was to characterize each environment taking into account its particular characteristics (spring or pond) and the use made in each one (algae, mud). Table 1 lists the main uses of each environment. Consequently, during the first sampling trip in February 2012, basic in situ measurements were made and algae samples were taken from all of them. In ponds that are used as a source of algae (Laguna Verde Oeste and Laguna de las Algas), water samples for chemical characterization were also taken. During the second trip, in April 2018, sediment samples were collected in ponds that are used for their mud resources (Laguna Verde Oeste and Laguna El Chancho Norte).

Water and algae samples

In each thermal environment of the CTC (Figure 1), electrical conductivity (Orion 135 electrode), water temperature (YSI thermistor) and pH (Orion 265 electrode) were determined. In order to study algae diversity, in hot springs environments, integrated samples were collected with spatula and gripper scraping from the surfaces they growth, taking into account the collection of the different growth forms, biofilms and algal mats observable with the naked eye, and conserved in the total (non-concentrated) environmental water (Sompong et al. 2005; Andersen 2005). In ponds environments, samples were collected with spatula from the mud or the walls of the ponds (Moro et al. 2010), or with flasks and a plankton net (10 μm pore) where it was possible (Laguna Verde Oeste, Laguna de las Algas). Water samples for chemical characterization were collected sub-superficially in 2-L plastic containers from the two environments were algae are used for medical purposes: Laguna Verde Oeste and Laguna de las Algas. In order to know light availability for algae growth, in these two environments irradiance was measured at three levels: in the air (above water surface), with a LI-250A light-meter (LI-COR, USA) equipped with a LI-190SA quantum sensor (LI-COR, USA); at 1 cm and 60 cm depth with the same light-meter equipped with a LI-193SA underwater spherical quantum sensor (LI-COR, USA). In Laguna de las Algas transparency was also determined by using a 20-cm diameter Secchi disk.

In the laboratory the following chemical variables were analysed in the water samples: soluble reactive phosphorus (SRP, molybdate blue and ascorbic acid method [Murphy and Riley 1962]), total phosphorus (TP, as SRP after acid digestion), total nitrogen (TN, basic digestion followed by $N\text{-}NO_3^-$ determination), nitrates ($N\text{-}NO_3^-$, cadmium column reduction followed by diazotation method), nitrites ($N\text{-}NO_2^-$, diazotation method) and ammonium ($N\text{-}NH_4^+$, indophenol blue method). All the determinations were made in accordance with APHA (1998).

Algal species were identified with specialized literature for each algal group:

- Cyanophyceae were determined using monographs and keys of Geitler (1932), Copeland (1936),

Desikachary (1959), Starmach (1966), Anagnostidis and Komárek (1985, 1988), Komárek and Anagnostidis (1986, 1998, 2005), and recent reviews of Hašler et al. (2012), Komárek et al. (2014), Strunecký et al. (2014), Mai et al. (2018).
- Cyanidiophyceae were determined using Albertano et al. (2000).
- Euglenophyceae: Tell and Conforti (1986).
- Chlorophyceae, Trebouxiophyceae: Komarek and Fott (1983), Krienitz et al. (2004).
- Zygnematophyceae, Ulvophyceae: John et al. (2002).
- Bacillariophyceae: Patrick and Reimer (1966, 1975), DeNicola 2000.

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