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MICROBIOLOGICAL IMAGE

Cyanobacteria in soils under dryland agricultural production systems

Cianobacterias en suelos bajo sistemas de producción agrícola en secano

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Algae and cyanobacteria are photoautotrophic organisms, which develop in the first centimeters of soil[7] and are a primary source of carbon (C) and nitrogen (N) for heterotrophic soil-dwelling microorganisms[6]. The aim of this study was to characterize the cyanobacteria inhabiting agricultural soils under two managements: sustainable intensification management (SIM) and transition to agroecology management (TAM). In an experiment conducted at the EEA Paraná of INTA (Entre Ríos, Argentina), soil samples were collected in agricultural sequences that include polyphytic service crops, corn, wheat and soybean under SIM and TAM. The cyanobacteria present were observed using a LEICA DM500 optical microscope and an ICC50 W camera for photographic recording. One of the species found in TAM was *Kamptonema animale* (Gomont) Strunecký (Fig. 1), which grows mainly in moist soils of tropical and subtropical areas[5]. Another species found in SIM was *Phormidium nigrum* (Vaucher ex Gomont), with a dark blue-green and slightly curved trichome exhibiting a sheath that allows it to associate with soil particles, as shown in Figure 2. *Desmonostoc muscorum* (Bornet & Flahault) Hrouzek & Ventura 2013, showing

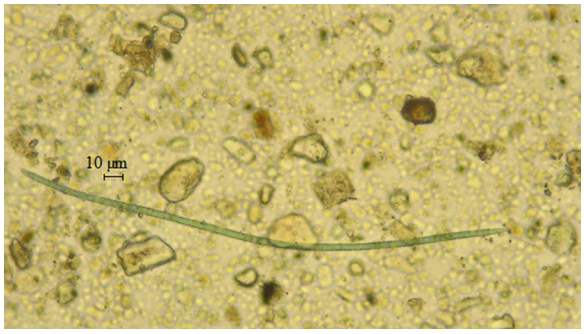

Figure 1 *Kamptonema animale* (Gomont) Strunecký.

specialized cell structures called heterocytes (Fig. 3) and akinetes within the filament, embedded in a mucilaginous matrix[1], was also visualized in TAM. The production of extracellular polysaccharides (sheath and mucilaginous matrix) by cyanobacteria is a mechanism of resistance of some species to adverse environmental conditions and also favors soil stability and aggregation[2,4]. These species are used to inoculate soils and promote the formation of biological crusts[3].

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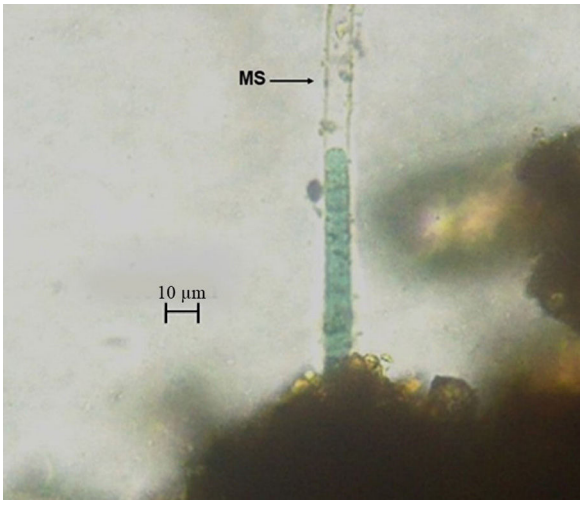

Figure 2 *Phormidium nigrum* (Vaucher ex Gomont) with a mucilaginous sheath (MS) associated with soil particles from the analyzed samples.

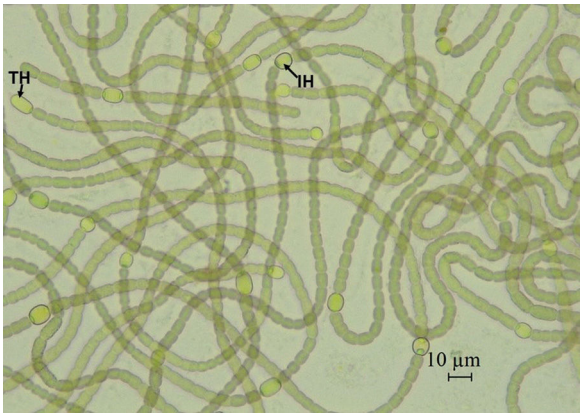

Figure 3 *Desmonostoc muscorum* (Bornet & Flahault) Hrouzek & Ventura 2013, with terminal (TH) and intercalary heterocyts (IH).

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