Aquatic microcosms data sheet

The aquatic microcosms facility of the Ecotron IleDeFrance includes (1) single glass vessels of 2 L designed for microbial ecosystems studies in the laboratory, (2) double glass vessels of 2 L and 5L designed to perform experiments on zooplankton and microalgae trophic interactions in the laboratory, and (3) stainless steel tanks of 6 L available for studies on small-scale aquatic and terrestrial ecosystems in the Ecolab (see Figure 1). The three systems offer complementary opportunities for research under controlled conditions on aquatic ecosystems dominated by microorganisms (see Table 1 for specifications).

Figure 1. Photographs of existing facilities. Left and middle, 2L glass vessels dedicated to the laboratory experimentation. Right, blueprint of the stainless steel containers adapted to the Ecolab environmental chambers.

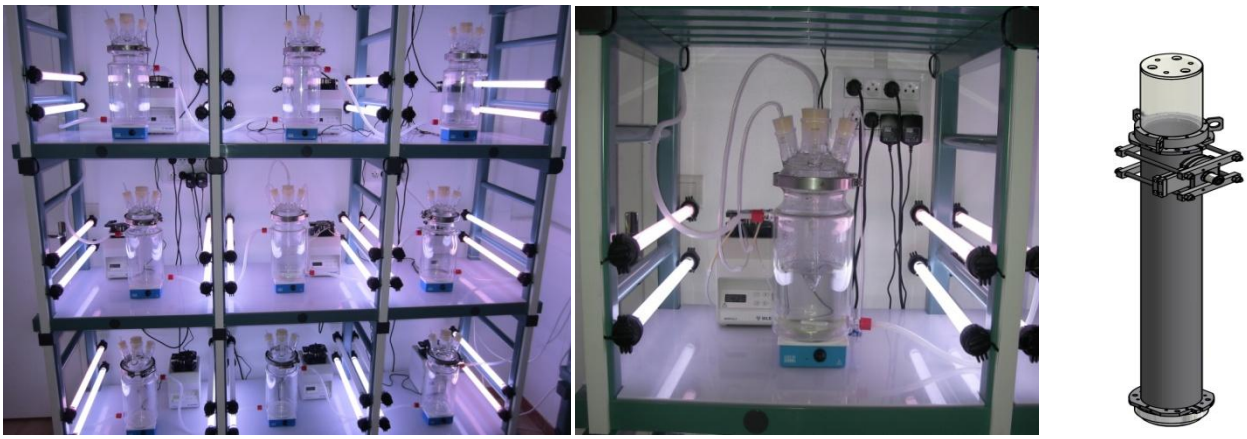

Table 1. Major characteristics of the aquatic microcosms facility at Ecotron IleDeFrance (the numbering refers to the three different set-ups mentioned in the text above).

Aquatic microcosms - Ecotron IleDeFrance	
General characteristics	
Design	Three differently fashioned equipments: 1. simple glass vessels dedicated to microalgae / bacteria laboratory experimentation; 2. complex glass systems, each one composed of two connectible vessels, dedicated to coupled phytoplancton-zooplankton laboratory experimentation or experimentation on habitat fragmentation; 3. stainless steel systems, each one composed of two cylindrical containers, adapted to work in the environmental chambers of the Ecolab
Dimensions	1. Simple glass vessel volume: 2 L 2. Complex glass vessel volume: one 2L and one 5L vessel 3. Stainless steel containers: 7 L (net volume: 6L)
Replicates	1. 13 independent glass vessels 2. 4 independent double glass vessels 3. 36 independent systems shared on >3 Ecolab chambers (<12 per chamber)
Confinement	1. Sealed vessels for sterile cultures 2. Closed vessels for confined cultures 3. Open top containers for use in a climate room with controlled climate and atmospheric conditions with an optional top chamber for gas exchange measures
Environment control – continuous time control	
Medium turnover	The 3 equipments can be run in continuous cultures (chemostat experiments; medium flow controlled by peristaltic pumps) or batch cultures (no medium renewal)
Temperature	-13°C to +50°C (± 0.2°C); continuous time control
Lighting	1. Neon tubes, natural daylight – specific wavelengths on demand 2. Neon tubes, natural daylight – specific wavelengths on demand 3. LED-lighting, plasma, and other classical technologies on demand
Water mixing	1. Adjustable magnetic stirring 2. Adjustable magnetic stirring 3. Light turbine stirring simulating natural vertical mixing
Atmospheric gas	1. No control - CO_2 regulation system is in development 2. No control – CO_2 regulation system is in development 3. CO_2: 50 - 20000 ppm ± 3 ppm (injection and absorption) O_2: 210000 - 4000 ppm ± 100 ppm (downward control, replaced with nitrogen) O_3 control on demand
Instrumentation	
Temperature	Resistance thermometers (1, 2, 3)
Dissolved O_2	Optic fibre (1, 2, 3)
pH	Glass electrode (1, 2, 3)
Light	Underwater PAR sensor (1, 2, 3) and spectrometer (1, 2, 3)
Nutrients	Spectrophotometer, continuous flow auto-analyzer (1, 2, 3)
Communities	Flow-cytometer (1, 2, 3)
Phytoplankton	Submersible spectro-fluorometer usable in the lab with specific vessels (segregation of 5 algal classes) (1, 2, 3)
Study systems	
Bacteria	Freshwater and marine communities. Natural populations or laboratory cultures
Microalgae	Freshwater and marine communities. Natural populations or laboratory cultures
Zooplankton	Micro-, and meso- zooplankton (Freshwater and marine)
Contact the technical staff if you target other biological models	