

EcoLab500

The EcoLab500 is a measuring system to study comprehensively ecosystem functions in the soil-plant-atmosphere continuum. With the EcoLab500, biological chemical and physical processes within the individual system components as well as the interactions between the system components can be observed and investigated under defined boundary conditions.

The EcoLab500 consists of two main components that build vertically on one another – Atmosphere Unit and Soil Unit. Depending on the application, all system components can be equipped with respective sensors for monitoring important system parameters and processes.

The Soil Unit of the EcoLab500 is used to investigate the biological, chemical and physical processes in the soil, as well as their interactions with the flora and fauna of the soil. The Atmosphere Unit aboveground serves as the aboveground habitat of the flora and fauna. Several equipment is used for the regulation of the atmospheric boundary conditions. The atmospheric boundary conditions and parameters can be controlled and monitored by the use of sys-

tems for lighting, irrigation, or ventilation, as well as measuring devices for recording of temperature, humidity and gases. In order to be able to set up the EcoLab500 the room requires a minimum size 1.500 x 1.500 x 3.100 mm (l x w x h). Other sensors, actuators, air conditioning and dimensions are optional.

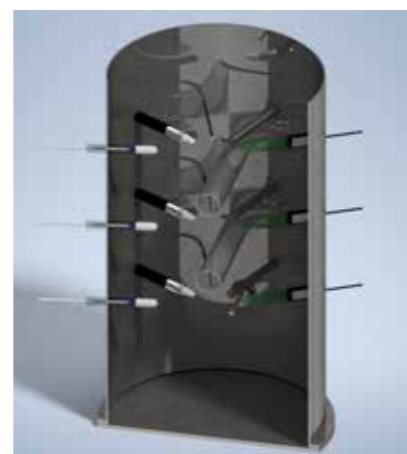
At a glance:

- **Soil Unit** with soil sensors (temperature, tension, water content), suction cups or suction plates, soil cooling system and weighing system

- **Atmosphere Unit** with air sensors (temperature, humidity), fans and irrigation system

- **Sun simulator** with high-performance LED lighting, separately dimmable wavelengths (blue, red, white), cycle simulations of day light spectrum possible

- **Control Unit** with power supply for the sensors and actuators as well as a PLC for the digital connection of all sensors and actuators and for the implementation of all control processes and for data recording



Advantages

- Study complex interaction between pedosphere, flora, fauna and atmosphere
- A range of optional accessories allows adaption to a wide range of research questions
- Compact: fits in an area of 1.5 x 1.5 meters
- Easy to set up: can be set up by hand by two persons only

Technical data

EcoLab500 BASIC:

- Outer dimension 1.200 mm x 1.200 mm x 3.000 mm (l x w x h)

Soil Unit:

- Lysimeter dimensions Ø 500 mm, height 900 mm
- Lysimeter material stainless steel, 1.4301
- Sensors Full-Range-Tensiometer, SMT-100 soil moisture sensor, weighing system

Atmosphere Unit:

- Material semitransparent, mirrored PMMA
- Sensors humidity, temperature, PAR

Sun simulator:

- LED lighting plant physiological spectrum in the range of 400 - 750 nm with up to 500 µmol / m²s on the soil surface

Lab lysimeter

There are a number of advantages to studying soil processes under laboratory conditions: the controlled environment allows more precise experiments, the scale is adapted to several processes and permits shorter test times compared to field studies. Different materials can be integrated quickly. Laboratory lysimeters can be used to realise both monoliths and specifically filled columns.

Column experiments on laboratory lysimeters lend themselves to the examination of physical soil parameters using multistep outflow or multistep flux experiments. These can also be used for

measuring conservative or reactive transport.

UGT GmbH offers laboratory lysimeters in a range of configurations. It is possible to control the boundary conditions using a suction base or overhead irrigation, as well as to configure measuring probes freely.

Every lab lysimeter system is adapted specifically customized according to the planned project.



SOILINSIGHT®

How are the roots growing in the earth? How fast? What is the movement strategy of worms in the soil? SOILINSIGHT® makes it possible to observe and measure root growth during the entire crop cycle. With the University of Lorraine, UGT GmbH has jointly developed a new method for observing undisturbed soil in its development. Here earth and biological elements such as plants or worms are placed in a mini cosmos.

The device can be connected to a Windows-based laptop or laboratory PC, and scans images of the physical structure and biological components (plant roots, worms etc.) of the soil.

In contrast to the traditionally deployed structure stability tests and soil sampling procedures, this new device permit the continuous

observation of soil without disturbing it.

Images of the development of the soil over a specific period of time can be combined in a film, which enables better studies to be made of the dynamics of aggregation (using zooming, fast forwarding etc.).

Advantages

- Automated high resolution image collection
- Undisturbed observation
- Multi-scaling (from 21 x 30 cm to 50 µm)
- Individual image editing
- Analysis software to quantify pore size, root length, growth rate, soil porosity etc.

