Agriculture minimum temperature

Prediction of minimum temperature and frost damage is a common method and important application in the field of agriculture like outdoors crops growth. In particular the areas where vegetation can be exposed to low temperatures, frost can be disastrous for young plants or fruits. Heat loss measurements inside a greenhouse is a similar application to control the temperature of the crop. When the IR radiation exchange is measured with a pyrgeometer, special screens can be closed when temperature are expected to drop rapidly.

With the MR-60 adequate measures can be taken to prevent crop damage by frost. By measuring the IR net radiation, the four components net radiometer can predict at an early stage the excessive cooling in combination with the absolute temperature at a crop field.

HOW-TO Application Guide

1

To calculate the long-wave radiation amount (W/m2) from the voltage output (μV) acquired by the pyrgeometer and temperature sensor (Pt-100), use the following formula:

Rlw=Vlw/C+σT4 Where Rlw:

Long-Wave Radiation (W/m2)
Vlw: Output Voltage from Pyrgeometer (μV)

C: Pyrgeometer Sensitivity (μV/Wm-2)
σ: Stefan Boltzman Constant(=5.67×10-8Wm-2K-4)□
T: Absolute temperature from the Temperature Sensor (Pt-100)

(K; Celsius Temperature +273.15)
The sensitivity C is stated on the product label attached on the MR-60 main unit.

The net-radiation (Vlw/C) is proportional to the radiation loss. Clear sky conditions result high net-radiation values and reinforced cooling of a surface.

2

To calculate the short-wave radiation amount (W/m2) from the voltage output (μV) acquired by the pyranometer, use the following formula:

Rsw=Vsw/C Where Rsw:

Short-Wave Radiation (W/m2)
Vsw: Output Voltage from Pyranometer (μV)

C: Pyranometer Sensitivity (μV/Wm-2)
The sensitivity C is stated on the product label attached on the MR-60 main unit.