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HOMOGENEOUS AREAS DELIMITATION BY CONSIDERING THE ENERGY DEMAND FOR PLANTS GROWING IN COVERED SPACES

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Abstract

This paper presents an experimental study on the energy requirement for greenhouse heating. The evaluation of necessary energy for crop plants was made by systematic measurements of the thermal behavior for three non heated tunnel greenhouses, covered with polyethylene. From the comparative analysis of the measured temperatures inside and outside the tunnel, it was established the relationship for estimating the inside greenhouse average temperature (t_{mi}), lower than the minimum temperature necessary for growing of a certain specie of flowers or vegetables. Using statistical regression series it was developed the relationship for the duration (T) in which the temperature inside the greenhouse drops below a preset value.

Using these pairs of values (t_{mi} and T) it was estimated the energy requirements so as to maintain a temperature which exceeds a certain minimum value (t_c) inside to the greenhouse. Applying this algorithm, it was set the amount of thermal energy (E) necessary to be provided in the greenhouse in order to maintain the temperature to a predetermined level during night. By processing the recorded temperatures at some weather stations in Romania, it was possible to establish how much energy is needed in each locality analyzed so as to ensure the required heat level inside of this type of greenhouses. The interpolation of resulted values would allow the land zoning at the level of the national territory depending on the availability of natural energy.

Key words: climatic factor, energy requirement, greenhouse heating, thermal threshold

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