Mathematical model estimated the impact of providing light on the growth and development of plants

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The mathematical model estimated the impact of providing light on the growth and development of plants in the system plant-soil-air. The model describes the qualitative indicators of plant growth and development, which is in close interaction with the dynamic parameters of the environment in the plants under glass.

The mathematical model, providing light, photosynthesis, light intensity, luminous flux, photosynthetically-active radiation, direct and diffuse radiation, greenhouses.

Practical experience in operation of automatic control systems in greenhouses suggests that svitlozabezpechennya changes in the greenhouse at random algorithm that makes it difficult to ensure the optimal value. This feature does not allow for a one-time adjustment of the equipment at a constant optimum mode. In addition, the parameters of such systems change over time, due to changes in the parameters of the object, and therefore the actual problem is the development of a new computer-integrated process control system in an industrial greenhouses, which will consider the impact lightingthe development and yield of plants.

The purpose of research construction of a mathematical model to assess the impact lightingdevelopment of plants under glass in buildings, based on the combined physical and statistical circuit analysis and evaluation of events occurring in the system plant-soil-air.

Materials and methods research. Sources of influence on environmental factors on plant development. Research methodology is based on a study of the impact on lighting, growth and development of plants.

Most greenhouse plants, depending on their physiological characteristics grow and bear fruit with light 8-12 thousand. Lux. Such power flow occurs in late February and September. Winter illumination at the Earth's surface at noon in the open is around 4-5 thousand. Lux, which is about 15 times smaller than the

lighting in the same hour in summer. Even less radiant energy coming to Earth in the morning and afternoon. Lighting cultivation facilities at this time quite low. As a result of reflection and absorption of light glass it is reduced by about half compared with lighting outdoors, since about 10 % of the incident light is reflected glass, 10 % is absorbed by the construction of greenhouses. At 30 % niy loss of light due to pollution roof greenhouses total losses up to 50 %, of which 20 % comes ground light, the plants, the share is only 30% [3].

The most important for plant life is the visible part of the optical radiation (380–710 nm), which is perceived by the human eye as light. often called photosynthetically active radiation (FAR), as many physiological processes can not take place without the visible light emission.

There are direct and diffuse solar radiation. Its intensity depends on the height of the sun standing, clean atmosphere. Value of direct and scattered radiation depends on the season and geographical latitude. In autumn and winter prevails dispersed radiation. Along with the light intensity on the growth and yield formation is strongly influenced by the length of daylight.

Having considered the light factor might call number values that characterize light energy, light, sunshine duration, total radiation and so on. And each of these variables can be of most plants, soil, air, as well as various combinations of these objects.

As the only influential figure and use some feature lightingimpact on the growth and development of plants. Total lighting during the growing season or other period of time during which occur crucial stage of culture, represents only the total value, which includes a lot of light phenomena that occur in the system plant-soil-air.

Conclusions. Established that one of the main factors that influence the development and yield of tomatoes is lighting. A mathematical model for evaluating the impact lightingdevelopment and yield of tomatoes in soil-plant system to air for buildings under glass. Established that prolonged lighting, is the growth of the crop, but to a certain extent.