mobile emission sources on the use of alternative fuels with improved environmental characteristics (natural gas, liquefied hydrocarbon gases for road transport).

At the enterprise there is an accredited laboratory in which necessary analyzes of air, water and other parameters characterizing pollution of the environment are made. In accordance with the program of industrial laboratory control over atmospheric air pollution and noise in the area in the impact zone, in all samples tested the concentration of pollutants does not exceed the maximum permissible concentrations.

Currently, a number of measures were taken to reduce pollutant emissions into the atmosphere: the introduction of mechanized dip galvanizing lines, modernization of the automated chroming line, modernization of high-temperature paint line.

Thus, OJSC "MWTP" takes all necessary measures to comply with environmental standards at all stages of production activities in order to reduce environmental damage.

MANTIS ORDINARY (MANTIS RELIGIOSA) IN BELARUS: FINDINGS AND OBSERVATIONS

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The material on the distribution, reproduction and trophic relations of the mantis ordinary has been presented.

Keywords: mantises, invasive species, distribution, polymorphism, biological struggle.

The natural environment and the processes occurring in it, under the conditions of rapidly developing technical progress are undergoing such significant changes, which affect on the plant and animal world not in the best way. In particular, this concerns the emergence and spread of alien or invasive species under the influence of anthropogenic factors of different nature and strength. Moreover, invasive species can replace, but even displace aboriginal species. The analysis of literature on this problem has shown that in recent years the mantis ordinary (Mantis religiosa) has settled throughout Belarus. Its emergence is caused (with a high degree of probability) by climate change and the drainage melioration of the Belarusian Polesie (Sergeeva, 2011). This was facilitated by transformation process in the course of lowland bogs drainage melioration. These bogs previously served as a barrier to the penetration of alien species. A significant role in the mantis resettlement belongs to ground transport.

The purpose of our study is to trace the dynamics of the mantis ordinary resettlement in Belarus and the peculiarities of its biology under laboratory conditions.

We have analyzed literary and own data on the distribution of a mantis on the territory of the republic. For the first time the mantis ordinary was found in the late 90s of the last century in the Polessky Radiation and Ecological Reserve (near Babchin) by I. Evdokimov (an oral report). Then it was discovered by T. P. Sergeeva (2004, 2011) on the same territory. The appearance of a mantis as single specimens was also recorded on the territory of the Berezinsky Biosphere Reserve (Lukashuk, 2008). Currently, single specimens are found in all regions of Belarus. The end point of mantis detection is registered in the north of Belarus (near Barkovichi). The greatest numbers of findings fall on 2015–2017, i. e. the tendency of an increase in the speed of its propagation is observed. It should be noted that mantises dwelling in natural and anthropogenically altered territories have phenotypic differences in body color: green, yellow and brown.

In addition, within three years the members of the biological class of the Minsk Gymnasium School No. 43 have found mantises in the vicinity of the gymnasium. They are adults of different sex and color. There have been also indirect evidences that a mantis in Belarus reproduces: a mantis larva has been found by ornithologists during the counting of water birds in the territory of the reserve "Grodno Svisloch" (https://news.tut.by/culture/552730.html.).

In order to study the nature of the trophic relations of this species, an experiment is being conducted on the basis of the Minsk Gymnasium School No. 43, during which the offspring has been obtained and the range of mantis fodder objects has been determined. Thus, adults feed on dipterans (Diptera): flies and their larvae, beetles from the Chrysomelidae family; and mantis nymphs feed on fruit flies (Drosophilidae) and aphids (Aphidodea), thereby bringing benefit.

Thus, mantis ordinary can be attributed to the neutral species, the existence of which on the territory of Belarus is connected with the occupation of free ecological niches without significant damage to the natural flora and fauna.

It is possible, even that it is one of the components of biological struggle, capable to restrain the number of other invasive insects such as a locust, which is a favorite food for a mantis.

This allows making an assumption about a possible role of mantises in a complex of measures on the biological methods of a control in enclosed spaces, including greenhouses.

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THE APPLICATION OF A NEW SOFTWARE FOR 3D MODELING OF THE NONISOTHERMAL HEAT AND MOISTURE TRANSFER IN NATURAL DISPERSE ENVIRONMENT

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With the help of the developed software tools on the basis of modern parallel computing technologies and computer graphics, the results of 3D modeling of nonisothermal heat and moisture transfer [1] in natural disperse media were obtained using the example of simulation of temperature changes in the soil.

Keywords: 3D Modeling, Heat Transfer, Heat and Moisture Transfer, Pollutants Migration, Parallel Computing, Software Application, FEM, Tetrahedral Finite Elements

To apply the new software the simulation of temperature changes [2] in the soil layers with the following initial parameters will be held:

- dimensions of the calculation area are: 10000×10000×2000 mm;
- number of soil layers: 3 (from top to bottom: loam – layer thickness 800 mm, silty loam – layer thickness 400 mm, sand – layer thickness 800 mm);
- upper layer temperature is 15 °C;
- the temperature of the lower layer is 20 °C;
- the simulation period is 30 days in 6-day increments [3].

To perform the task we should first construct a finite element model of the computational domain (*Figure 1*) with the tetrahedron as the final element [4].

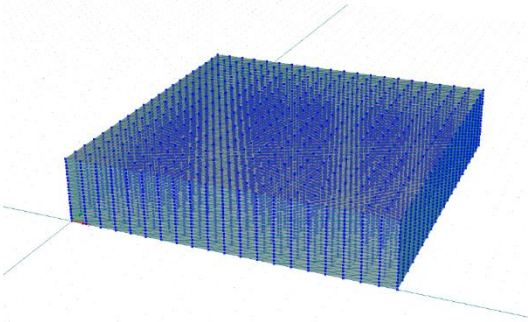

Figure 1 – Finite element tetrahedral grid

After the input data is entered into the program calculations should be performed. The results are shown [5] on *Figure 2*.