

points can be damped. An energy storage device can play a great role for balancing unbalanced modes and keeping current frequency and voltage when they have small and fast variations.

Energy storage devices can contribute to keeping the emergency control system in working order and thus to the prevention of cascading failures. ESDs can have a great advantage over other types of reserve being able of almost instantaneous entering into the EPS operation.

To perform various functions related to the operation of EPS and renewable energy sources, the power and energy intensity of the ESD should be unequal, as well as its speed. It is possible to construct an ESD having different components, a greater or less speed depending on its nature. For example, if we consider the application of storage systems for renewable energy technologies (RET), powered by wind energy, as a rule, we can take into account two circumstances. One of them is that wind energy fluctuations are present at different wind speeds, which requires the energy storage system to align the power output graph in different time ranges. The second circumstance will develop from dominant character of loads of the electric energy consumer.

In energy storage systems operating in a static mode, it is mainly possible to use lithium-ion or vanadium redox batteries, since they can have a large capacity to keep the output power in a given range. In energy storage systems, working primarily in a dynamic mode, you can use supercapacitors or flywheels. When using a wind generator as a renewable energy source, it is necessary to take into account that wind energy fluctuations are divided into short-term and long-term components, and for the effective use of storage systems, two-level storage systems can be used, for example, lithium-ion batteries and supercapacitors, or vanadium redox batteries and flywheel, etc. [1–4].

After analyzing the information presented, it can be concluded that the choice of energy storage equipment may depend on the parameters of an electrical grid and/or a renewable energy source. Using energy storage devices it is possible to accumulate electricity generated from RET during low loads, and to generate it during the day at peak loads. The advantage of energy storage devices is the ability to keep static and dynamic loads of the electrical grid. Also, an energy storage device can participate in the accumulation of electricity from an electrical grid at the time of a consumer deficient load; and to contribute to keeping the emergency control system in working order and thus help prevent cascading failures, which is one of the main problems of the power industry.

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ECOLOGICAL SIGNIFICANCE OF WHITE MISTLETOE (*VISCUM ALBUM L.*)

V. Yurel

*Belarusian State University, ISEI BSU,
Minsk, Republic of Belarus
vladislav.yurel@outlook.com*

This article presents a brief description of the plant, which is widely distributed in the territory of the Republic of Belarus. At the moment, white mistletoe (*Viscum album L.*) has become part of the active invasive plants. Its spread contributes to the increase in the number of parks and areas of orchards. The latter is due to the increase in fruit production.

The neighborhood of fruit trees with *v. album l.* can negatively affect their condition, which entails negative consequences for the horticulture of the Republic of Belarus.

Keywords: mistletoe white, *viscum album l.*, invasion, invasive plants, influence.

Vegetation in urban environments creates favorable conditions for human life. At the same time, various negative factors are formed in cities, which have a detrimental effect on the vital activity of plants. One such factor is the invasion of white mistletoe (*viscum album l.*).

V. album l. is an evergreen semi-parasitic shrub that forms globular bushes on the branches of deciduous trees. Distribution is mainly by birds eating its berries. *V. album l.* causes a significant decrease in growth energy,

loss of decorative and yield of tree crops, and is also the cause of a decrease in the lifespan of plantations-leads to partial or continuous drying of trees.

Currently, there is a distribution of *v. album* l. throughout the country. This may be due to environmental degradation, soil pollution, climate change. For the most part, mistletoe grows on roadside plantations, worsening their condition. The reason for this can be the exhaust gases of cars, road cleaning products, pollution of roadsides with garbage [1].

Numerous publications indicate that *v. album* l. is widely distributed in Ukraine, in particular in the city of Kharkiv. Its study in this territory is carried out by I. Yu. Vergeles, I. O. Rybalka, O. M. Ignatyuk and others. There are isolated publications from other countries, such as the Russian Federation, Germany, the United States of America, Australia and others, which investigated its environmental impact on the host.

The growth of the parasite population within the city limits has negative consequences for trees, and the only method of control is mechanical removal. Complete removal of *v. album* l. from biocenoses also has negative consequences. In this regard, a scientific approach is needed in terms of the gradual liberation of trees from *v. album* l.. At the same time paying attention to possible negative moments that may arise during this period.

It is possible to stage elimination in one, the most affected area, with 100% release of trees from the parasitic plant.

In this case, monitoring of all both positive and negative aspects occurring in such an area is mandatory.

Currently, it is necessary to develop methods to control the number of *v. album* l., as well as, in the case of cleaning the territories from the parasitic plant, to determine the direction of biological monitoring of the consequences. Registration and analysis of positive or negative processes resulting from the decrease in the number of *v. album* l. will avoid unwanted biological manifestations [2].

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DISTRIBUTION OF WHITE MISTLETOE (*VISCUM ALBUM L.*) IN THE CENTRAL PART OF THE REPUBLIC OF BELARUS

V. Yurel

*Belarusian State University, ISEI BSU,
Minsk, Republic of Belarus
vladislav.yurel@outlook.com*

This publication presents the results of a study of the number of white mistletoe (*Viscum album* L.) on the in the city of Stolbcy of the Minsk region. The city is located 65 km South-West of Minsk on the highway Minsk-Baranovichi (P-2).

The increase in the number of *v. album* l. is observed not only in the central part of the Republic of Belarus. Currently, it is spreading throughout the country, especially active in its southern regions.

Keywords: mistletoe white, *viscum album* l., invasion, invasive plants, influence, distribution.

Currently, *v. album* l. has acquired the status of an active invasive plant, in connection with which there was a need to control its number. This is necessary, first of all, for horticultural complexes, because of the ability of mistletoe to settle on fruit trees.

The first study of the number of *v. album* l. on the territory of the city of Stolbcy was conducted. The study was carried out according to the original method of Yu. Vergeles and I. Rybalka [1]. As a result, the total number of *v. album* l. in the city was revealed, which is 5391 plants, the total number of infected trees – 573 plants, the most infected species of trees were birch and poplar (45 % and 43,8 %, respectively, of the total number of infected trees) (Fig. 1). The predominant age of *v. album* l. was identified juvenile (*v. album* l., age up to 5 years) – 59,6 % of the total number of parasites (Fig. 2).

One of the most effective ways to combat this parasite is mechanical pruning of the branches of trees on which *v. album* l. was found. However, the complete removal of *v. album* l. from biocenoses can lead to a reduction in the number and diversity of bird species. This will affect not only the mistletoe-eating or mistletoe-