A NEW, ENERGY-EFFICIENT TECHNOLOGIES FIGHT WITH THE OVERGROWING ROUTE TRANSMISSION LINES IN FOREST PROTECTED AREAS

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Reliability of power supply remote rural areas depends on the quality of service of electric networks. One of the problems that have to solve the energy sector annually during the operation of transmission lines (PTL) is timely clearing its buffer zone from rising young trees and artisanal nicknames.

Overgrown slopes significantly complicates the control of her condition, makes hard to reach areas of emergency, which contributes to premature failure of the transmission line elements. This problem makes itself felt in 5-10 years, depending on the prevailing tree species. The amount of space that falls annually exempt from trees and shrubs in places where the power line routes, and the costs associated with this time-consuming procedure, significant.

The purpose of research - study the feasibility of an integrated-you sazhivaniya Jerusalem artichoke wires under power lines passing through the forest protected areas and to attract the attention of specialists in agriculture and forestry, as well as professionals of power grid enterprises to fundamentally new, energy-efficient, biotech technology.

Materials and methods of research. Existing methods of clearing the route of LEP - manual and mechanized, as a rule, energy-intensive and inefficient. Moreover, the widely used "Bulldozer" technology (Figure 1) environmentally harmful, causing you to lose the top layer of soil and humus formation of large uprooted trees. After removal of the above-ground shoots occur more intensive restoration to preserve the viability of the biomass of the root systems. This circumstance is due to the fact that

the roots of shrubs and young trees give thicker shoots, which are also growing rapidly, making it necessary to re-process area.

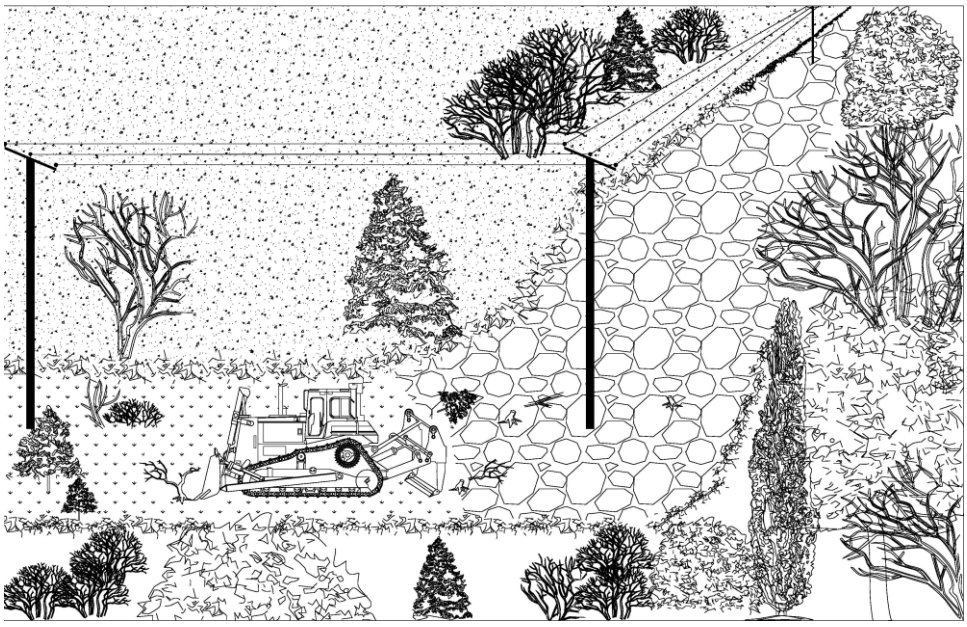

Fig.1. Removing ground shoots in the buffer zone LEP mechanized method

Chemical method for controlling the growth of trees and shrubs is more efficient and less costly undertaking, however, and it can cause significant damage to the environment.

Despite the fact that modern herbicides are considered environmentally friendly, high speed leaching from the soil of these drugs can have very adverse effects (discharged into aquatic environment, accumulate in plant feed, etc.). Environmental effects of treatments with herbicides for many wildlife species, including the Red Book, can be significant and irreversible.

With the passage of transmission line routes on forest Protected Areas, Parks with valuable forest species, which are not acceptable mechanized and chemical cleaning methods with Woodland owners should be agreed size, timing and schedules pruning to ensure trouble-free operation power lines in these areas. In case of failure to harmonize activities of clearing, as well as significant costs for compensation of damage in the investment programs of electricity supplying organizations should be made adjustments, taking into account the cost of replacing bare conductors insulated expensive or self-supporting.

In recent years, due to financial difficulties and the intention of saving, energy increasingly began to think about the need to change orientation and recognition preferred a more cost-effective ways of managing. Thus, the development of new, cheaper and more effective ways to combat the overgrowth of the route of LEP is an important task, especially for hard-to-forest areas.

The solution to this problem may be fundamentally new, energy-efficient, way to deal with overgrowth of the route of LEP, which allows to keep her protected zone in normal technical condition without the use of environmentally hazardous physical and chemical methods.

According to the proposed method on the previously prepared buffer zone LEP cleared of trees and shrubs planted Jerusalem artichokes, who later grows very rapidly over the entire area of the security zone of transmission lines and replaces not only the weeds, but the young shoots of trees and shrubs.

Unusual hedges under the power lines running along the roads, road users will give not only a good mood, but also to prevent the accumulation of toxic substances in agricultural plants, as blooming, six-foot fence will securely hold up the penetration of exhaust gases on farmland.

At the same time, a tight fit in the buffer zone of artichoke LEP impede the movement of people under the wires that will greatly enhance the safety of electrical networks, it is necessary only to grow fodder varieties of Jerusalem artichoke, not having to human nutritional value. In this revision of power line elements can be carried out in the cold and transitional periods of the year when there is no ground part of the plant.

Also worth noting is the fact that the planting of Jerusalem artichoke in the buffer zone of transmission lines undoubtedly will attract wild boar populations have been to date in Russia rose so that in some regions, they bring significant damage to farmland. As the food supply boars are rhizomes, tubers, roots and bulbs of various plants, the protection zone transmission lines, will be a favorite place of feeding. Looking for root crops Jerusalem artichoke, wild boars his "digging" activity will destroy the seeds of many trees and plants have germinated, thereby preventing the natural process of expansion of various species of trees in the buffer zone lines. In this case, Jerusalem artichoke planting will also be a shield that protects crops from ruin. Thus, agricultural productivity-ents primarily be interested in the reliability of electricity supply, as well as the preservation of crops, therefore, they can be expected under-delay in the implementation of the event.

Author's sketch (Fig. 2) illustrates the proposed method of counteracting overgrown buffer zone lines.

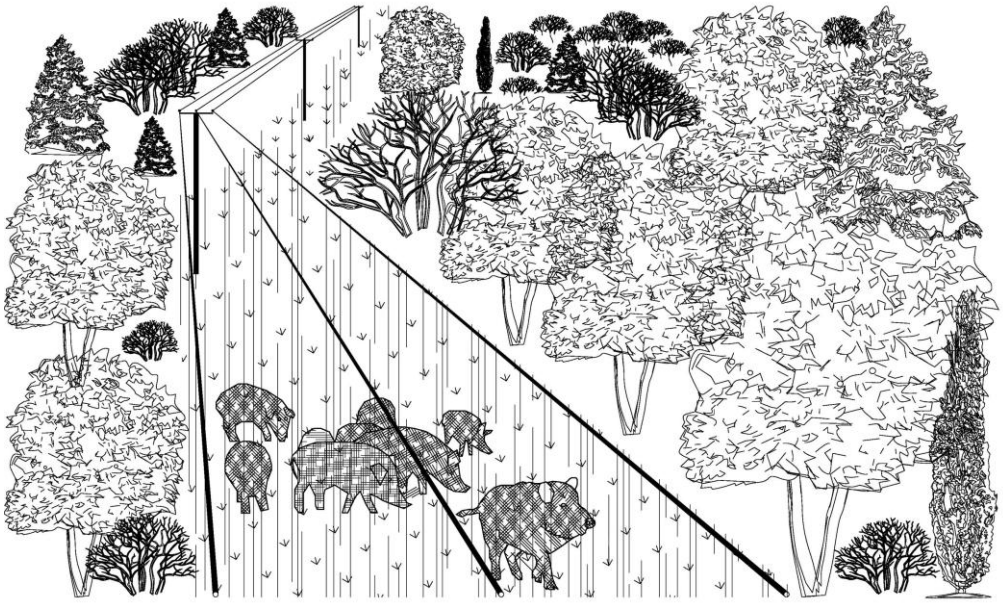

Fig.2. The protected zone LEP protected plantings Jerusalem artichoke

The results of research. Given the above, the cultivation of artichoke in the buffer zone is an energy efficient power transmission biotechnical measures.

It should also be noted that the proposed new energoeffek-tive event based not only on theoretical aspects, but also has a practical evidence base.

In the spring of 2012 was made an experimental planting of artichoke on a site protected zone of transmission lines, 10 kV, passing through the territory of the Federal State National Park "Orel woodland."

Between stakeholders - representatives of VPO Orel State Agrarian University, Federal National Park "Oryol Woodlands", Hotynetskogo RES "Orelenergo" JSC "IDGC of Center, signed an agreement on creative collaboration and interaction, drawn up and signed a program of experimental research.

In the unanimous opinion of experts preliminary experimental results fully confirm the comprehensive feasibility of this event.

Preliminary analysis of the various ways to prevent overgrowth of the route of LEP has shown that the cheapest and most energy efficient is one way of clearing that is not harmful to the environment (see table).

Показатели способов расчистки трасс воздушных ЛЭП

Num-ber p / n	Index	Indica-tor Unit	Methods for clearing the trails LEP			
			Handheld	Mechanized	Chemical	Biological
1	Specific costs	rubles / ha	16500	18000	13000	12000
2	Periodicity of work	year old	4 – 5	5 – 6	6 – 8	8 – 10
3	Damage cover soil	-	No	Есть	No	No
4	Accumulation of harmful Substances in Soil	-	No	No	there's	No
5	Repression and death fauna	-	there's	there's	there's	No

Conclusions

It is hoped that the joint application of creative efforts of all parties concerned are not in vain, and will allow experiments, experimentally tested and implemented on a mass scale fundamentally new energy-efficient biotechnological applications aimed at improving environmental performance, safety and reliability of air power in the territories of forest protected areas.