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# WAYS TO INCREASE THE EFFICIENCY OF FISHERIES THROUGH THE USE OF ENERGY-EFFICIENT LIGHTING SYSTEMS

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**ABSTRACT**

*This article deals with the application of energy-saving electro-technological systems in the rapid development of the fishing industry in the Republic. They provide information on reducing electricity consumption and saving food and feed products through their use. The biological enhancement results of low-intensity laser beams date back to the late 1960s and early 1970s and were derived from the use of a helium neon laser (λ = 632,8 nm) and was the first industrially manufactured device. In the optimal regimes of the photovoltaic, hematological parameters were normal. In the absence of light, a clear separation of neutrophilia and leukopenia was observed.*

**KEYWORDS:** *Electro-Technological Device, Low-Intensity Laser Beams, Ultraviolet and Infrared Rays.*

## INTRODUCTION

A number of legislative acts have been adopted in the country to accelerate the development of the fishing industry, increase the volume by introducing modern and innovative methods of fish production, regulate the industry and take measures to ensure their quality and thorough implementation [1].

At the same time, insufficient attention is paid to intensive fish farming; insufficient work is being done to address the problems in the development of the fishing industry in the regions, to support fisheries.

Insufficient attention is paid to the effective use of water basins attached to fisheries on the basis of a scientific approach, improving their reclamation, as well as the widespread introduction of energy-saving technologies and innovations.

The demand of fisheries for mineral fertilizers to increase the productivity of artificial reservoirs is not fully met. Also, research work on the replacement of mineral fertilizers with other alternative fertilizers is not carried out [1].

Domestic production of equipment, tools and mechanisms for intensive fish farming, hunting and processing has not been established. As a result, many entrepreneurs are wasting their time and money buying them from abroad.

The use of energy-efficient electrical equipment in fisheries is also lagging behind.

The Presidential Decree states that it is possible to gradually establish and encourage intensive fish farming in the country, efficient use of available water resources, and large-scale introduction of innovative ideas, scientific developments, modern technologies and scientific achievements, further support of the fishing industry [1].

## THE MAIN FINDINGS AND RESULTS

The enhancing effect of natural (solar, moon) and artificially developed light sources has long been known. For example, in 1903, the Danish physician Nils Finzen was awarded the Nobel Prize for his work on the treatment of certain diseases (smallpox and smallpox) using red light and ultraviolet light.

The real change in this field began after the creation of lasers with a convenient monochromatic radiation source, which interested many researchers.

The biological enhancement results of low-intensity laser beams date back to the late 1960s and early 1970s and were derived from the use of a helium neon laser ($\lambda$ = 632,8 nm) and was the first industrially manufactured device. However, the rapid development of laser technology, which provides the acquisition of radiation over a wide range of wavelengths, accelerating and generating exposure modes, has opened up new horizons for researchers.

Laser radiation is a form of non-ionizing electromagnetic radiation characterized by coherence, polarization and mono-chromaticity. Lasers produce electromagnetic radiation in a range of different spectral ranges, from ultraviolet light to infrared light, and their power can range from a few milli-watts to a hundred megawatts.

The future of research in the application of low-intensity laser beams in agriculture, including livestock, poultry, and fisheries, is bright.

Research in this area was carried out by N.V. Mikhailov and others 30 years ago, and it was found that by irradiating chicken eggs with helium neon laser light at a wavelength of λ= 632.8 nm, the chicks emerge and their living properties are improved [2].

Subsequent studies (B. F. Bessarabova and E. B. Petrova) reported an increase in hemoglobin levels in the blood and natural resistance in chickens when laser radiation was given in the early stages of embryonic development.

In the research of V.P. Inozemova and others, it was noted that low-intensity laser beams gave good results in veterinary medicine, that is, better results were obtained in horses and cattle with laser therapy after laser therapy than with drug treatment.

In the research of E.Yu.Smertina and others, infrared rays (λ = 940 nm) and red optical rays (λ = 660 nm): 0.5, 50, 100, 250, 500, 1,000, 3,000, 5,000, 25,000 It has been reported to have an antimicrobial effect at GTS frequencies and to slow the development of Staphylococcus aureus, increasing the resistance of sick cattle [3, p. 129].

T.N.Boltushkina and D.V.Shestakov proved that the live weight of laser beams increased under the influence of laser beams in the range of infrared spectra of wavelength λ = (0.89–0.99) μm lower than in calves controlled.

From the above, it should be noted that the use of low-intensity laser beams in animal husbandry and veterinary medicine has been observed to improve the beneficial properties of poultry, pigs and cattle. Accordingly, the future of the application of low-intensity laser beams in animal husbandry and especially in the fishing industry seems to be bright.

What is of great interest to researchers at the present time is the correction and acceleration of growth and development of hydrobionts using various physical factors, especially in aquaculture conditions.

Several studies have found that different fish have a stimulating effect on fish-water-biological performance using light and in different modes and methods of lighting. For example, A.B. Ruchin studied the effect of the photo cycle on the growth, physiological and hematological parameters of Siberian sturgeon; he studied the acceleration of development and respiration of young fish at 12, 16 and 24 hours of daylight, increased total food intake and conversion. Darkening during the day showed a decrease in these figures. In the optimal regimes of the photovoltaic, hematological parameters were normal. In the absence of light, a clear separation of neutrophilia and leukopenia was observed. An optimal and light factor for fish development was observed in the groundwater regime, an increase in the number of lymphocytes, erythrocytes, hemoglobin concentration, and changes in the biochemical composition of yeast proteins and an improvement in the morphological index [3, p. 129].

G.G. Magomedova proved that when the power density is 2.92 mW / $cm^2$, they achieve a viable effect on survival, the larvae get out, and the emergence of larvae allows increasing the linear weight.

Researchers at the Belarusian National Academy of Sciences named after BI Stepanov have shown that maximum inoculation effect can be achieved when irradiating animal tissues in vitro at a power density of 3.0 mW / $cm^2$.

Different reactions of embryos depend on different related photosensitivity factors of embryos: spectral and energy indicators of illumination, optical characteristics of embryos, evolutionary adaptation, as well as stages of embryogenesis and external conditions. In this case, the optical characteristics of the spawn of trout, sigal or carp are determined by the presence of carotenoids and cytochromes, while the sturgeon is stained black due to the presence of melanin.

The search for the optimal spectral range that affects laser radiation is a topical issue facing modern researchers.

## CONCLUSION

1. The demand of fisheries for mineral fertilizers to increase the productivity of artificial reservoirs is not fully met.

2. Lasers produce electromagnetic radiation in a range of different spectral ranges from ultraviolet light to infrared light, and their power can range from a few milliwatts to a hundred megawatts.

3. The results of biological amplification of low-intensity laser beams were obtained.

4. It has been proven that it is possible to achieve a viable effect for living when the power density is 2.92 mW / $cm^2$.

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