

UDC: 636.5.083:628.9

*Y. VAKULENKO, candidate agricultural Sciences, associate Professor, doctoral student,
National University of Life and Environmental Sciences of Ukraine*

Prospects of led lighting

The analysis of scientific literature on technological development and application of LED lighting. Scientists observed that when comparing incandescent lamps and fluorescent lamps, LED lamps allow you to reduce power consumption by 85% and 50% respectively.

Lighting, poultry, LED lamps, incandescent lamps, fluorescent lamps, power consumption

Analysis of world literature and national studies in recent years suggests that egg laying modern high-performance cross more sensitive to light.

In industrial environments bird commonly found in artificial light and very sensitive to changes in it.

In industrial environments bird commonly found in artificial light and very sensitive to changes in it. This is especially true during puberty and egg, poultry must take into account that, accounting for lighting applications. Lighting installation should provide uniform lighting and the possibility of changes in a wide range. The choice of lamps and lighting options is determined in accordance with the physiological characteristics of birds and the optimum ratio between the cost of electricity and performance [4].

At the time of the introduction of new technology Pet observed increasing their isolation from the environment, so the role of artificial light and Irradiation facilities.

Until recently, the poultry were the most common sources of light bulb and traditional fluorescent lamps. Each has its advantages and disadvantages.

For artificial lighting using incandescent radiation which 10-40% consists of visible light. These positive indicators are: small size, ease of system, low cost. At the same time disadvantages of incandescent lamps, luminous efficiency is relatively small; high brightness hot NITI that negative effect on vision; relatively short lifespan (800-1000 h), and high energy intensity [3,9].

To this must be added that in many countries ban the use of this program is as light sources – incandescent [12]. Fluorescent lamps, due to a longer period of operation and greater light output compared to incandescent lamps attracted increasing attention poultry farmers. According to some reports in the world fluorescent lamps for about 70% of all sources of artificial light. [8]. They allow you to reduce electricity consumption by 3-5 times compared with incandescent [10].

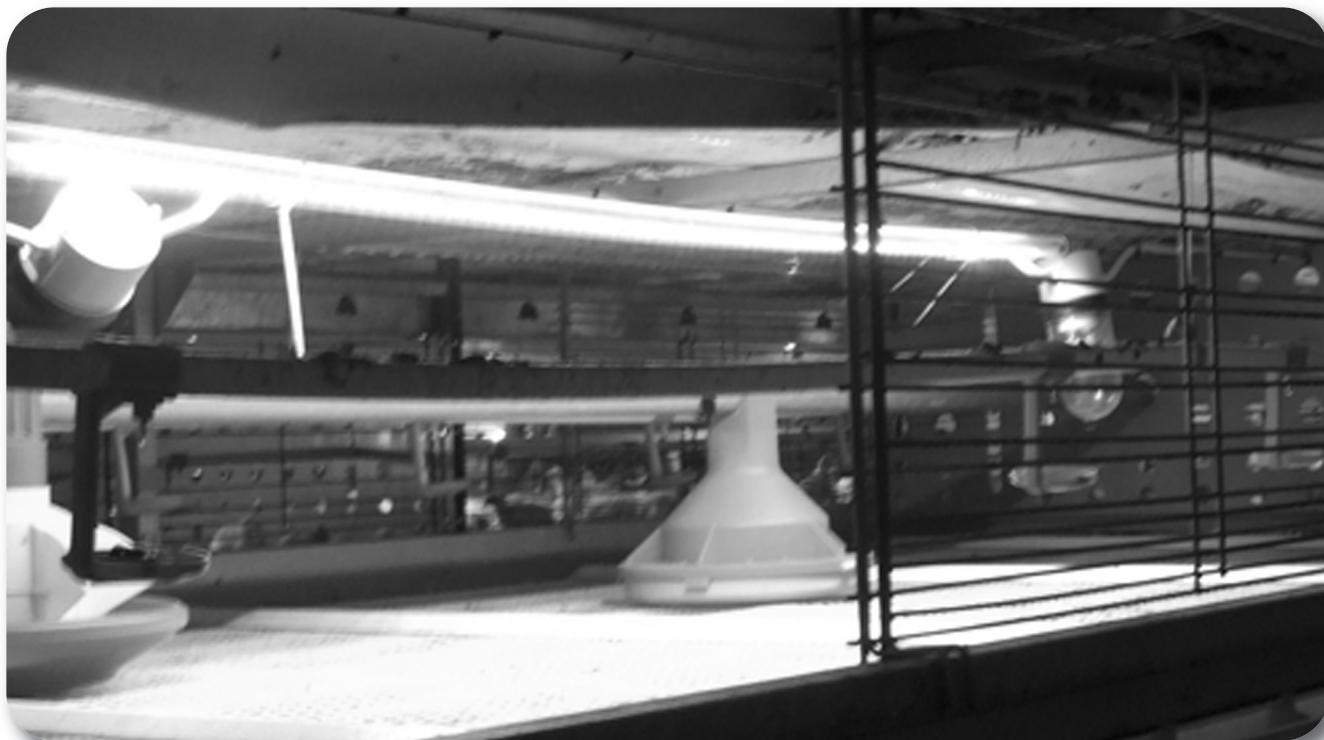
In studying the impact of incandescent lamps, sodium high pressure lamps and fluorescent lamps white light on the growth and development of broilers and turkey signif-

icant advantages of various light sources has been established, but the application of the last two types of lamps achieved significant energy savings [15].

Use fluorescent lamps originally dictated by considerations of energy efficiency, but their use study showed a higher their effectiveness in shaping Figures birds [14].

According to S. Dandelions use in poultry houses lighting systems for keeping laying hens compact fluorescent lamps (CFL) of 16 W and color temperature of 27,000 K, made it possible to reduce the cost of electricity for lighting per unit of output 3,1 (when placing lamps at a distance of 3 m) and 6,2 times (the





distance between the lamps 6 m). But in addition to energy savings it is possible to mark up egg production, egg weight and safety of poultry [6].

In addition, its spectral composition of the fluorescent light is closer to natural (daylight). Moreover the light output of fluorescent lamps is three times higher than incandescent lamps [13].

When the turkeys give opportunity choice of premises with incandescent lighting or fluorescent white lights, they preferred areas with lighting fluorescent lamps, probably because the range of their light closer to daylight [16].

However, fluorescent lamps characterized several significant shortcomings: firstly, their use is difficult to adjust light levels indoors, the same methods of lead to reduce lamp life. Secondly, inherent fluorescent lamps flicker (up to 100 times per second) that can cause animals called stroboscopic effect, which negatively affects their physiological state. Thirdly, fluorescent lamps contain some amount of such hazardous substances such as mercury, because the procedure utilization blown bulbs are strictly regulated by applicable law. For failure to comply with the law company exposed

penalties, the value of which may even exceed the cost of electricity saved.

It is known that the premises for cage and floor keeping laying artificial lighting significantly affects the technical and economic parameters of production.

No one in the field of animal use light does not have such meaning as in poultry, poultry where lighting is one of the most energy intensive processes, which accounts for about 50% of the electricity consumed. Poultry has high economic costs associated with the intensification of feeding technology and poultry.

For example, the use of incandescent lamps for illumination has 45-48% of the total cost of electricity in industrial environments keeping laying hens is 70-100 thousand kw per year [9, 10].

Significant costs for lighting and its rising prices for electricity, not less than 10% each year, forcing scientists and manufacturers to seek effective energy-saving light sources [9].

In a competitive agricultural owners have to seriously approach the choice of lighting systems, calculate the consequences for a single year ahead.

Modern lighting poultry house must meet modern requirements for energy efficiency and meet the technological requirements for corresponding cross [1].

Recently fixtures based on LEDs are increasingly used in various areas of the economy, poultry farming is also not an exception.

To date, more attention to the most energy-efficient LEDs as light sources. They make it possible to reduce power consumption by 85% – compared to incandescent bulbs and up to 50% – compared to fluorescent lamps, besides a longer period of operation (more than 50,000 hours, 50 and 5 times higher compared with incandescent incandescent and fluorescent) other benefits of LED lighting systems is the ability to adjust light levels from “0” to par, get any light spectrum, consisting absence of toxic substances, a high level of protection against negative external influences, no flicker effect [2, 5, 7, 11].

Save energy costs the economy much less than the increase in its production. Hence the increased attention of scientists to study the most energy-efficient LED lighting.

Conclusions

1. Results of domestic and fore-

ign experts suggest however, that LED lighting is the most energy efficient light source.

2. Scientists have proved that LED lighting leads to decrease Electric power consumption compared to incandescent and fluorescent 85% and 50% respectively.

3. Prospects for further research are to develop effective energy-saving lighting technologies poultry house industrial poultry flocks using improved designs of LED lights.

Наведено аналіз науково-технічної літератури щодо застосування світлодіодного освітлення. Вченими відмічено, що порівняно з лампами розжарювань та люмінесцентними лампами світлодіодні світильники надають можливість зменшити витрати електроенергії на 85% та 50% відповідно.

Освітлення, птиця, світлодіодні світильники, лампи розжарювання, люмінесцентні лампи, витрати електроенергії



Приведен анализ научно-технической литературы по применению светодиодного освещения. Учеными отмечено, что в сравнении с лампами накаливания и люминесцентными лампами светодиодные светильники

позволяют снизить затраты электроэнергии на 85% и 50% соответственно.

Освещение, птица, светодиодные светильники, лампы накаливания, люминесцентные лампы, расход электроэнергии

Bibliography

1. Гречанов О.П. Економія має бути перспективною / О.П.Гречанов // Сучасне птахівництво. – 2006. – №7. – С.18.
2. Гладин Д. Светодиодное освещение: только преимущества / Д.Гладин // Животноводство России. – 2012. – №9. – С.62-64.
3. Кузнецов А.Ф. Гигиена содержания животных: справочник / А.Ф.Кузнецов. – М., 2003. – С.31-37.
4. Казаков А. Световой период при выращивании кур-несушек / А.Казаков, И.Седов // Птицеводство. – 2008. – №9. – С.41.
5. Кавтарашвили А.Ш. Эффективность светодиодного локального освещения при производстве инкубационных и пищевых яиц кур / А.Ш.Кавтарашвили, Е.П.Новоторов, Д.М.Гладин // Сучасне птахівництво. – 2012. – №2(111). – С. 6.
6. Кульбаба С.В. Влияние новых систем та джерел освітлення на зоотехнічні показники утримання курей-несучок / С.В.Кульбаба // Сучасне птахівництво. – 2004. – №12. – С.11.
7. Лямцов А.К. Компактные люминесцентные и светодиодные лампы для птичников / А.К.Лямцов, К.М.Гришин, В.В.Малышев // Сел. механизатор. – 2012. – №5. – С. 28-29.
8. Мельник В.О. Світлодіодне освітлення / В.О.Мельник // Наше птахівництво. – 2010. – №4. – С. 26.
9. Мельник В.О. Різні кури – різне світло / В.О.Мельник // Наше птахівництво. – 2010. – №1. – С. 23-26.
10. Мельник В.О. Світлодіодне освітлення / В.О.Мельник // Наше птахівництво. – 2012. – №1. – С. 30-32.
11. Мельник В.О. Сучасна наука щодо впливу світла на птицю / В.О.Мельник // Птахівництво: Міжвід. темат. наук. збірник. – Харків. – 2013. – Вип. 69. – С.205-212.
12. Революционный этап в освещении птицеводческих помещений / [В.И.Фисинин, А.Ш.Кавтарашвили, Е.Н.Новоторов и др.] // РосВетИнформ. – 2011. – №5. – С.23-25.
13. Савченко П.И. Люминесцентные лампы служат дольше / П.И.Савченко, И.Н.Земляной, И.В.Марченко // Механизация и электрификация сельского хозяйства. – 1997. – №11. – С. 12-13.
14. Тихомиров А.В. Перспективные направления снижения энергоемкости производства продукции животноводства / А.В.Тихомиров // Техника в сельском хозяйстве. – 2000. – №5. – С.13-15.
15. Manser C.E. Effects of lighting on the welfare of domestic poultry: a review / C.E.Manser // Animal Welfare. – 1996. – Vol.5. – P. 341-360.
16. Sherwin C.M. Domestic turkeys are not averse to compact fluorescent lighting / C.M.Sherwin // Appl. Anim. Behav. Sci. – 1999. – Vol. 64. – P. 47-55.