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ANALYSIS OF DEVICES FOR PROTECTING AGRICULTURAL OBJECTS FROM INSECTS

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Abstract

This article discusses methods and types of protection against insects. The living conditions of insects and their distribution in the environment were also studied. The article examined common modifications of traps. The operation of insect traps depending on several factors has been studied . The electrical circuit diagram of the light trap was considered and conclusions were drawn.

Key words: *operation, insects, trap, circuit, method, electric current, lighting, charge, radius, heat, room.*

Introduction. Traps for flying insects of various types are in widespread demand today both in the industrial sphere and in everyday life. They can be effective in different areas, depending on the power of the equipment. There are models that are more often used indoors, while others are more designed for outdoor use. Any number of flying insects can interfere with work, ruin your vacation, cause the spread of infection, or contaminate surfaces. In premises such as restaurants, cafes, and food production facilities, the presence of flies and other flying insects is not uncommon [1]. Flies are carriers of dangerous diseases and infections, and in addition, they constantly disturb employees and visitors with their annoying buzzing.

Setting goals. The operation of insect traps depends on a number of factors, including : Area coverage: The range of some devices is no more than two meters, others effectively destroy insects, covering a large area; installation method: The insect trap is selected depending on the operating conditions; room or street. The outdoor insect trap emits light and heat. Flying up to it, midges, flies and mosquitoes come into contact with the metal grill and die from electric shock [2]. Power: The electric pest trap is plugged into the mains. There are models powered by batteries and rechargeable batteries. Mounting options: Electrical devices can be installed on the floor, but yellow insect traps are best hung. The distance between suspended models and the ground must be at least two meters.

Are common:

1. Insecticidal - they are a small container filled with a toxic substance. The smell is attractive to insects, so they happily flock to the trap. Typically, such devices are disposable and are thrown away when they are full.

2. Ultraviolet - insects are attracted to the light of lamps in front of which there is an energized grille. Approaching it results in electric shock and death of the insect.

3. Thermal - attract insects due to thermal radiation and destroy them with repellent vapors. They differ from insecticidal ones in their operating principle; they require a connection to the power supply network to ensure continuous operation.

4. Gas - the device gradually releases carbon dioxide, which attracts insects. As they approach, they are trapped by the suction fan.

Problem solving. A simple electronic insect trap can be assembled using a 20 W fluorescent lamp and a simple voltage converter (Fig. 1) . The lamp attracts insects with its light, arriving at which they fall between two grids surrounding the lamp and which are under high voltage. In addition, the heat generated by the lamp also attracts insects [3].

To power the fluorescent lamp, a voltage multiplier is used, which rectifies the mains voltage to approximately 600 volts (no load). The upper arm of the multiplier (capacitor C1, diodes D1, D2) charges capacitor C3, and the lower arm (capacitor C2, diodes D3, D4) charges capacitor C4. The upper capacitor is charged with negative voltage, and the lower one is charged with positive voltage. Since capacitors C3 and C4 are connected in series, the voltage across them adds up and becomes sufficient to ignite a fluorescent lamp, and the current strength allows it to be kept burning. In such a lamp power circuit, you can use both backlight lamps from the monitor and fluorescent lamps with burnt-out filaments.

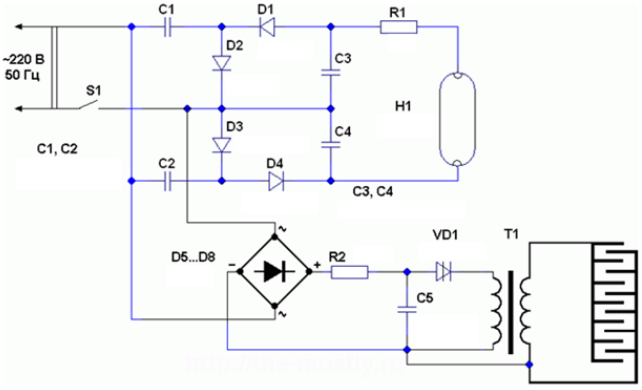

Fig.1. Electronic light trap for insects.

From the rectifier (diode bridge D5...D8), a pulsating voltage with a frequency of 50 Hz is supplied to a voltage converter made of dinistor VD1, capacitor C5 and resistor R2. The load of the converter is the primary winding of transformer T1 [4] .

The voltage converter works as follows. Capacitor C5 is charged through resistor R2 with a pulsating voltage, and as soon as the constant voltage on the capacitor reaches approximately 80 volts, dinistor VD1 will open and capacitor C5 will quickly discharge through the primary winding of transformer T1. Such a converter is called a relaxation oscillator . In his circuit, the resistance of resistor R2 is selected in such a way that the current flowing through it will not keep the dinistor open after the capacitor is discharged, therefore The dinistor will close and the process will repeat [5]. The operating frequency of the converter depends on the parameters of the elements R2, C5, as well as on the operating voltage of the dinistor VD1, and in this case it is several hundred Hertz. Since the number of turns of the secondary winding of transformer T1 is many times greater than the primary winding, the pulse voltage on it will be much greater, reaching several kilovolts [6].

An ignition coil from a car, type B116 or similar, is

used as a pulse transformer; in this case, its high-voltage output is the top output of transformer T1 in the circuit. Capacitors C 1.. C4 must have an operating voltage of at least 380 volts, capacitor C5 - at least 750 volts. Diode bridge (D5...D8) [7].

The circuit of an electronic insect trap can be significantly simplified if, instead of a fluorescent lamp H 1 and a voltage multiplier (resistor R1, capacitors C1...C1 and diodes D1...D4), we use a so-called "energy saving" lamp with a power of 15 W, which has a built-in electronic ballast [8]. There are many different ways to control insects. Moreover, none of them can be used as a full-fledged means of destruction, but they work well in combination with other methods.

Conclusion. A light lamp is an extremely effective and safe way to influence the number of flying insects in both residential and industrial premises. The use of light traps is suitable for killing flies, midges and small butterflies.

References:

1. Gazalov , BC Analysis of existing methods of pest control and electro-optical installations / BC Gazalov , A.P. Zhogalev ; Azov-Chernomor. state agroengineering acad. - Zernograd, 1998. - pp. 6-8.
2. Vozmilov , A.G. Electrophysical methods of pest control in the agro-industrial complex / A.G. Vozmilov , D.O. Surinsky , Mikhailov P.M., // Collection of proceedings of the international scientific and practical conference "Problems of innovative and competitive development of agricultural engineering science at the present stage" // Chelyabinsk - 2008. - pp. 37-39
3. Vozmilov , A.G. Results of studies of the "photoelectric converter-battery- light trap " system / A.G. Vozmilov , D.O. Surinsky , AB Kozlov // Collection of proceedings of the international scientific and practical conference "Problems of innovative and competitive development of agricultural engineering science at the present stage" // Chelyabinsk - 2010. - pp. 37-39
4. Bogush P.P. Light traps / P.P. Bogush // Plant protection. - 1970. - No. 11.-S. 34-35.
Dyachenko V.F. Polyethylene light trap with UV radiation source UFO-4A / V.F. Dyachenko, V.P. Lanetsky // Mechanization and electrification of social services. sat down households . - 1968. - No. 8. - P. 51-52.
5. Zhivopistsev EH Study of the influence of polarized radiation on attracting insect pests to electro-optical plant protection systems / EH
6. Zhivopistsev, N.M. Simonov, BC Gazalov ; Azov-Chernomor. Institute of Rural Mechanization. households - Zernograd, 1987. - 13 p. - Dep in VNIITEI-agroprom 1987, No. 363 VS-87.
7. Belenov V.N. The use of pulsed radiation to combat scab in the garden / V.N. Belenov , BC Gazalov // Electromechanical energy converters: Materials of the third interuniversity . scientific conf . - Krasnodar, 2004.-S. 155-157.
8. Surinsky D.O. Parameters and modes of an energy-saving electro-optical converter for monitoring insect pests. -Barnaul: " AltGTU " 2013 - 6.7 p.