UDC 632:51

THE ELECTRIC ENERGY IN FIGHT WITH WEEDS

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One of the major economic problems is to increase the agricultural production that can not be done without the use of effective weed control. Traditional measures inherent significant disadvantages.

Among the promising methods of controlling weeds without pollution are electrical methods of providing impact on the structure of plants at the cellular level, high-voltage electricity.

In Russia and some other countries are developed by experienced and designs electrical propolschikov using electrical energy to destroy weeds. Overseas units are based on single-phase AC high voltage and are designed to control weeds on fields with low clogging.

The purpose of research - the use of high-voltage pulses to control weeds, the development of the technological scheme of the destruction of weeds and requirements and design parameters elektrokultivatora.

Materials and methods of research. The advantage of the electrical pulse treatment is to reduce the energy intensity of the process due to different mechanism of action in the plant tissue. The use of the proposed technology allows to solve the following problems: reducing the potential reserves in the soil weed seeds in the seedbed and steam treatment of the soil and destruction of seedlings and adult weeds.

The technology of controlling weeds using electric pulse high voltage includes three phases:

• effect on weed seeds, are in the topsoil, with a view to their oppression, or "provocation" of germination;

• extermination of weed seedlings;

• extermination of adult weeds.

The first phase of the technology applied after harvest or in the spring before planting of crops and provides clean soil from weed seeds that are in the topsoil. There are two possible modes: stimulation and inhibition of weed seeds. Energoëmok

regime of oppression and hardly find practical application. Mode stimulation requires significantly less energy and aims to "provocation" seeding, followed by their destruction before planting the main crops in any conventional, the most convenient and least expensive way.

However, not all the impact may be applied to the treatment of seed, are in topsoil. For this purpose the most suitable high-voltage pulse discharge carpal at which affects seeds not a factor, and a mixture of different factors having a wide spectrum of effects, which allows to influence the different types of seeds in their different states.

Investigation of the effect electroprocessing brush discharges at stimulating the germination of weed seeds in the topsoil and a preliminary determination of electrical parameters of the processing carried out in the laboratory using the developed pulse generator with an output voltage of 10-30 kV and a pulse energy of 0.34, 2.4 and 10 G. . changing factors are: the distance between the electrodes (30 and 15 cm.), the energy pulse (0.34 - 2.4) J and the number of pulses (4, 8 and 16 cps.).

The results of research. Preliminary studies have shown that the greatest influence on the germination of seeds with a gradient of voltage between the electrodes of 1.0 kV / cm, provides power tillage.

It is found that when energy tillage 5.0 J / kg, natural reserves germination of weeds in the topsoil has increased an average of 4-fold compared to the control. With further increase in processing power of germination difference between the control and treated weed seeds is reduced and energy tillage more than 32 J / kg observed oppressive regime germination of seeds treated in the topsoil.

The second stage of technology weed control is to destroy the germination of weeds. In terms of energy consumption process more expedient to destroy the weed. Studies have shown that 3-4 week old seedlings require much less power and the power of momentum. It is advisable to destroy the weed between the rows of crops and the processing of steam.

In the third stage of the technological scheme includes the destruction of the adults are weeds between the rows of crops on fallow fields, as well as upstream of

crops in rows.

It is found that the germination is needed to kill no more than 10-20 J, the degree of damage to reach 90%. For the destruction of seedlings voltage must be no more than 10-15 kV. When it occurs a further increase in overlapping emergence of weeds on the surface, i.e. Bypass discharge channel, which increases the power consumption of the process because of the large unnecessary loss of energy. For the extermination of adults (1.5-2-month) weeds requires at least 100 Dzh.i higher voltage, but when working in the field with live parts when elektrokultvatora U = 30-35 kV and above starts corona and unforeseen breakdowns, so to kill weeds adults use a voltage not exceeding 30 kV.

It was designed and manufactured high-voltage pulse cultivator, destroying weeds by using electrical impulses. Structurally, it is made with the placement of the main nodes in the front and rear suspension of MTZ-82 and consists of a three-phase synchronous AC generator output voltage to 230/400 V, 400 Hz, 20 kVA / 16 kW; high-voltage switching power supply; management, control and protection; hinged front working bodies; Suspension of the generator.

The structure elektrokultivatora include: energy power unit mounted on the rear axle of the tractor, the modular high-voltage power source and working bodies, is a frame with insulators attached to them with contact electrodes (metal bar), which are connected by a special cable with a high-voltage power supply. The working parts are provided with coulters to ground contours and height adjustment of the contact electrodes.

High voltage power supply provides an output following parameters: voltage of 10-30 kV; repetition frequency discharges 800-1200 Hz; wavefront - no more than 0.5-1 ms; pulse duration of 50-100 ms; pulse energy - John 0.4-10.

Conclusions

For weed control in rows operator sets the high voltage electrodes so that they are above the tops of cultivated plants and weeds that are higher will address electrodes and marvel at an electric current.

When weeding between rows electrodes are placed above the ground at the

lowest weeds and from the rows of crops electrodes separated by insulating boards. Production tests have shown a high pulse cultivator efficiency. Weed control, have not reached the phase of aging, was 93,5-96,4%.