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В работе проведён анализ полученных оптимального динамического и оптимального энергетического режимов движения гидроцилиндра, который управляет челюстями захвата.

Гидрозахват, оптимизация, динамические нагрузки, сила захвата, челюсти.

In paper the analysis of optimal dynamic and optimal energy modes of motion of hydraulic cylinder that controls the jaws of capture.

Hydraulic grips, optimization, dynamic forces, gripping force, jaw.

УДК 632.937:631.3

PERSPECTIVES OF NONPILOT FLYING DEVICES IN ORGANICAL FARMING USAGE

V.O. Dubrovyn, V.G. Myronenko

In paper indicated the perspective tendency of technical production practice development of ecological and clean plant products in the system of organic farming. As well as determinate scientific and organizational measures of effective usage unmanned flying devices in biological plant protection technologies.

Ecologically clean products, organic farming, unmanned flying devices, effectiveness.

Problem. Solving the problem of quality food human guarantee in a condition deterioration of the ecological state of the environment

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requires a comprehensive restructuring of agriculture-based bioenergy and conversion to organic farming.

Capacity of organic agricultural products market in the world reached to 30 billion dollars U.S., including in the EU about 15 billion dollars. U.S. and becomes the tendency to increase over the next 5 – 7 years to 70 -80 billion. U.S. In addition, along with organic products of high environmental quality in many developing countries food market improved environmental quality, produced with limited use of pesticides and fertilizers (up to 50-70 per cent of their use in technology-intensive crop).

The objective of paper is to prove the feasibility of using unmanned flying devices in the latest technology of agriculture.

The research results. The implementation of organic agriculture provides a broad range of scientific and technical tasks, including monitoring of the field at all stages of agricultural production, providing local-dosed soil typical lung fields, the use of highly efficient organic fertilizers, biological methods of plant protection, the use of biofuels for industrial and household needs APC (Fig. 1).

In Ukraine, but the most fertile in the world of black and favorable soil and climatic conditions are also other preconditions for the development of agriculture and crop biologization as a whole. First of all, the historical experience of large practical biologization plant protection, scientific and technical potential of industrial biotechnology production and use of biological plant protection.

Particularly widespread in the plant acquired biological agents after it became apparent adverse effects of pesticide use when alongside inhibition of pathogenic microorganisms poisoned useful species of animals that eat plants with pesticides. In the application of biological products have not resistant to molds and pests are no distance effects, including effects on the chromosomal apparatus of human cells. Use of biological plant protection allows for 15-20% yield increase at the same time reducing overall costs to 50%. Thus, for example, the energy equivalent processing hectares of winter wheat Entomological drug is 33.5 MJ / ha to 219.0 MJ / ha treatment chemical pesticides [1].

One of the most complex scientific and engineering problems to be solved in the industrial use of biological crop protection is to ensure their effective introduction (Fig. 2).

Currently in Ukraine are the primary means of biological pest control method as in the fields and in gardens are tryhohrama that provides containment harmfulness complex dangerous pests such as підгризаючі and foliage scoops, вогнівки, білани, молі, садові листокрутки more. We know a number of techniques and technologies moving Trichogramma.

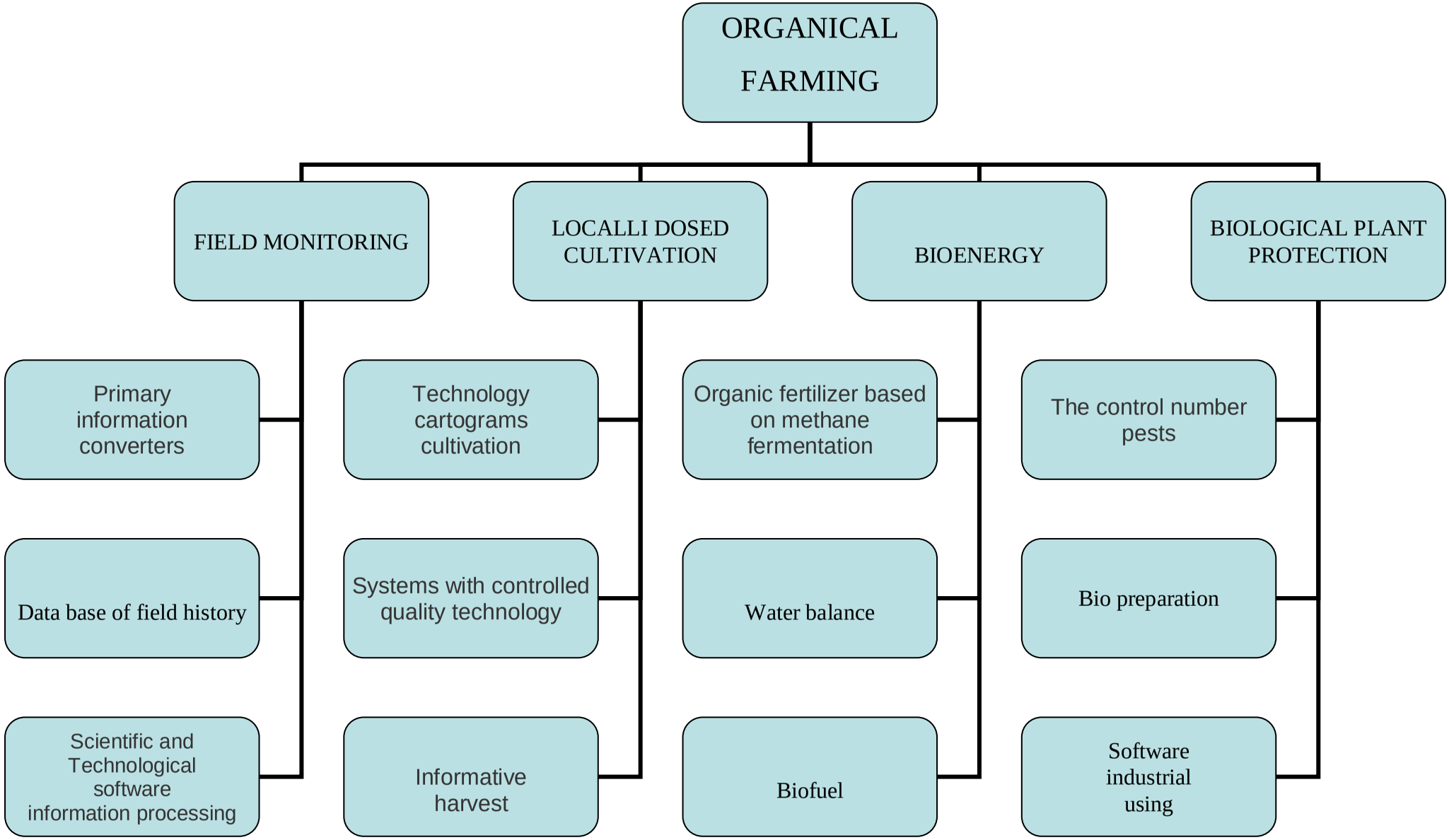

Fig. 1. Structure of the major scientific and technological problems of organic farming.

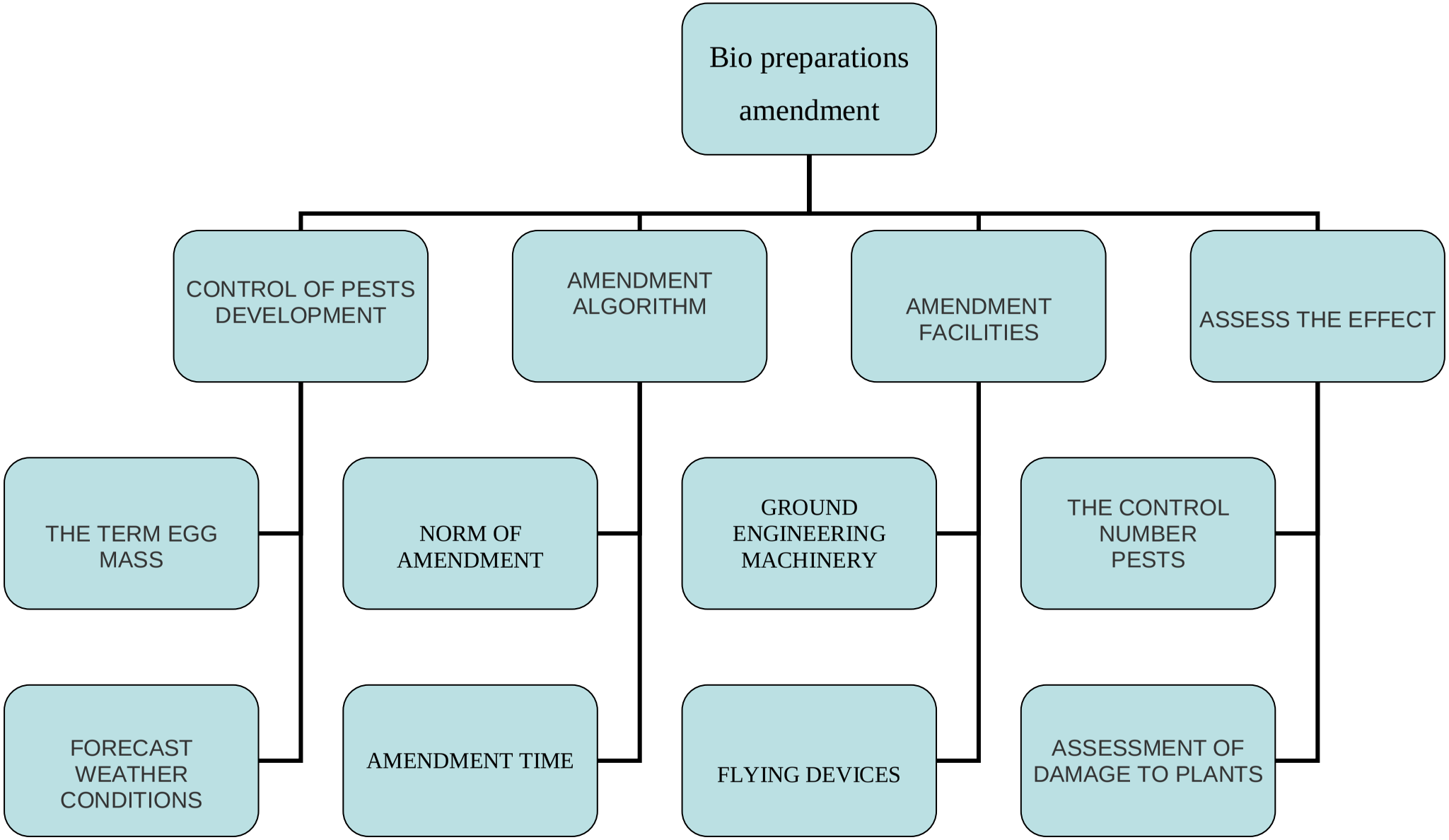

Fig. 2. Structure of the major scientific and technical problems biological amendment.

Cost of Treated tryhohramoyu hectare of agricultural land is largely dependent on the medium in which is mounted device settling. Use traditional ground and aviation equipment: tractors Class-1, 4, AN-2, MI-2 helicopters, load them hundreds of times higher than its own weight device moving along to the appropriate stock of biological material in it, leads to a significant недозавантаження these funds (approximately 95 – 98%).

Analysis of known technologies and hardware for industrial settlement Trichogramma allowed to conclude prospects of using unmanned flying devices, equipped with modern means of remote control. Employees NUBiP Ukraine and the National Technical University "KPI" developed radio-controlled drone UAVs "A-1" (Fig. 3) for resettlement under Trichogramma as imago, Trichogramma, which is in the grain moth eggs. Unmanned flying device "A-1" refers to the lightweight UAV with a maximum take-off weight – 5 kg. Mass of target load – 1.5 kg. To improve transportation to place of work design aircraft made collapsible – dismantled wings. Run the aircraft is on hand. In drones "A-1" is set electric motor power, which makes it possible to start without applying much effort to run it. Landing the plane is the surface field. As a result of the studies established the following rational parameters UAVs "A-1": the size of the hopper – volume 500 cm^3, the capacity of biological material – 200 g; speed aircraft in the performance of the process should not exceed 80 km/hr., The most appropriate working height flight is 5m, the overall performance of the settlement is over Trichogramma 60 ha/hr.

Fig. 3. Nonpilot flying device "A - 1".

This technology uses in a continuous, or local resettlement Trichogramma. For continuous settlement Trichogramma used unmanned system, which set a given width of the treated area, altitude, area of spread and set the standard. If necessary, local resettlement Trichogramma applies operative control variable application rate of

technological material using equipment to measure the intensity of plant cover in a particular area of the field. Density of stem mass crops and field areas affected by diseases and pests are recorded corresponding primary transducers (ultraviolet, infrared, etc.). In the previous passage. To construct an electronic database held spectral calibration for comparative characteristics of field sites with different colors of the photo.

The advantage of such technology is to make technology and the timely and equitable resettlement Trichogramma in any state of the field, including with regard to the configuration fields, the density of plant cells increased the number of pests.

Using unmanned flying devices was carried out making entomological drug Trichogramma on corn crops at the rate of - 1.25 g / ha. Brought 160 g Trichogramma first class. Trichogramma pintoi Voeg.: Infection of trichogramma host eggs - 89.6%; revival Trichogramma - 86.7%, sex ratio - 1:1,3, fertility female Trichogramma - 46.5 eggs / female, search ability Trichogramma - 84.9 % [2]. Conducted counts of damage to corn plants butterflies showed significant benefits in areas with the introduction of Trichogramma. In the research areas of damage stems and cobs of corn was 20 to 13%, and the control region - over 70% of plants (46% stalks and cobs 26%) [3].

Conclusions

1. Ukraine has favorable natural – climatic conditions and scientific - technical support for the efficient production environment - clean crop production in organic farming system.

2. Biological method – one of the key factors of effective development of organic farming. Thus the energy equivalent costs under the protection of plants Entomological drug in 5–7 times less than chemical pesticides.

3. Creation of specialized unmanned aircraft for air moving Trichogramma allows access to its effective industrial use in agricultural production.

4. Rational parameters developed unmanned flying device: take-off weight – up to 5 kg, wingspan – 2 m, length 1.5 m, the target load – up to 1.5 kg capacity hopper – 500 cm^3. When the process: speed – up to 80 km/h., Feasible operating altitude – 5 m., Productivity – more than 60 ha/h.

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В статті розкрито перспективну тенденцію розвитку виробничо-технічної практики екологічних і чистих рослинних продуктів в системі органічного землеробства. Як детермінованих наукових і організаційних заходів ефективного використання безпілотних літальних апаратів в технологіях біологічного захисту рослин.

Екологічно чисті продукти, органічне землеробство, безпілотні літальні апарати, ефективність.

В статье раскрыто перспективную тенденцию развития производственно-технической практики экологических и чистых растительных продуктов в системе органического земледелия. Как детерминированных научных и организационных мероприятий эффективного использования беспилотных летательных аппаратов в технологиях биологической защиты растений.

Экологически чистые продукты, органическое земледелие, беспилотные летательные аппараты, эффективность.

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