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THE ESTIMATION OF ECOLOGICAL DANGER OF PESTICIDES APPLICATION BY THE FRUIT PLANTATIONS

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The middling self-weighted degree of danger of pesticides is set on the probed territory, total seasonal loading and size of agroecotoxicological index (AETI). All indexes of estimation of ecological risk of pesticides application in the biocenosis of apple-tree garden are in optimum limits and the danger from agrochemicals application is minimum.

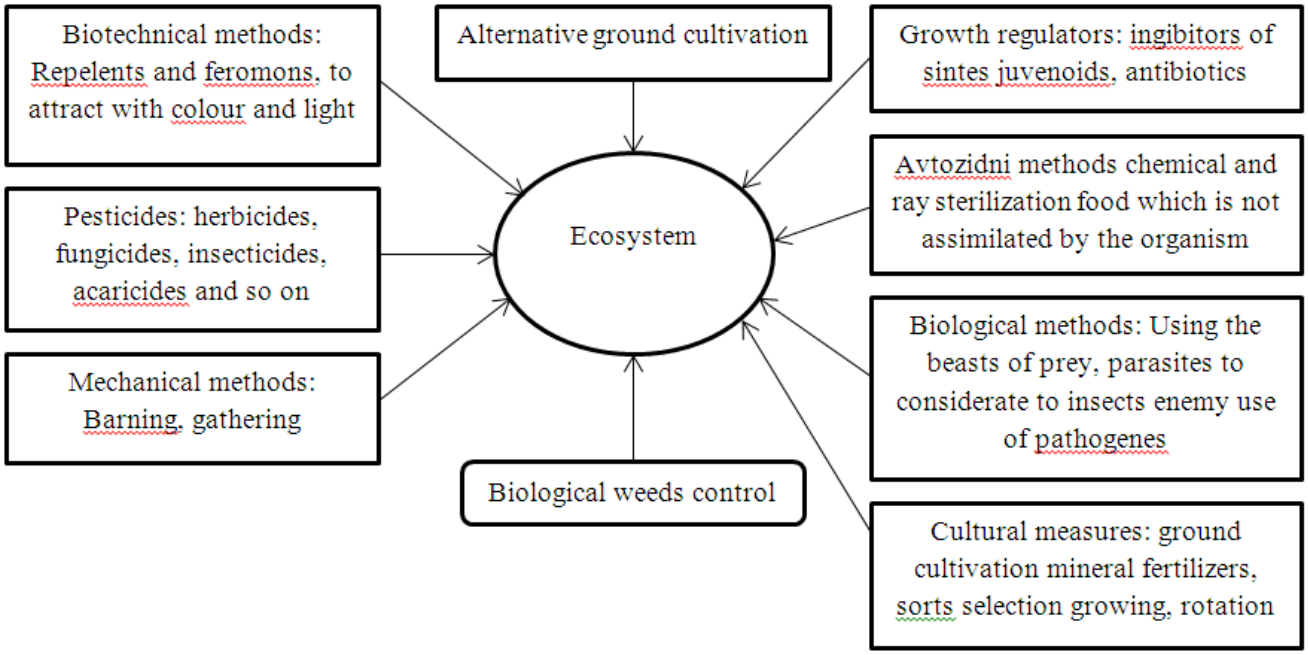
Apple-tree garden, biocenosis, sprinklings, agroecotoxicological index, pesticides, agricultural ekologo-chemistry estimation, soil

Any forms of agricultural keeping brought and bring undesirable changes in the natural environment. But the biggest ecological danger offers probably the natural environment pollution of superfluous number of different kinds of pesticides.

So that, to keep the conform-table ecology situation in local and regional scales, it is necessary to normalize the number and the assortment of pesticides at the level that satisfies the requirements of intensity processes of the agricultural landscapes. The best variant of chemical system of measure in plants protection is established on the basis of three analysis parameters: quality of preparation their quantitative applying on the territory and intensity of their distribution in the concrete ground-climatic conditions.

The potential danger of pesticides, their accumulation in environment demands the scientific research work and elaboration of approaches to the organization of protection measures. There are such integrate systems of plants protection which have natural safe character. They are planed and conducted which due regard of the development features of harmful organisms and plants, which are damaged of them and the zone features of their use.

The scientists D. Gaynrih and M. Gergt propose the methods and ways of the integral plants protection from different pests weeds and pathogens which must defend fully plants and to influence negative the least for ecosystems (Pic.1) [1,7].



Pic. 1. Methods and ways of the integral plants protection

The decrease of negative pesticides influence for agrocenoses in connection with their norm reduction of expenditures can be reached by the way of the forecastleman use sinegical mixtures, local field the last cultivation. Besides, it is of greed importance to increase the know-ledges about the critical periods in the biological development of harm full and useful organisms by the simultaneous reduction of the expense norms. In that way the pesticides using must not bring to the agrocenoses destruction but to their correction in the direction of phytomedical optimization [5].

It was established by the researches of purpose the ecological risk by the pesticides using in apple-tree garden under the existing ground-climatic conditions. Subject of scientific research is the assortment of pesticides using and the territory of their applying.

Conditions and methods of scientific researches. The researches were put into practice in 2012-2013 years by field and laboratory methods. The area of the research plot is 2 hectares. The action of different sorts of pesticides were explored by apple-trees growing of sorts Idaret, Jonagold, Renet Simirenka, Pinova, Golden Delishes, Florina, Champion. Agrotechnics of growing is generally accepted for the South Forest-Steppe zone of Ukraine.

The apple-trees treatment were put into practice by the pesticides mixture during all the period of plants vegetation. During the vegetation were done 6 sprinklings: the first – early in spring; the second – before the flowering; 3-5 – during the forming and development of fruit and the last sprinkling – after the harbest gathering.

Pic. 2 The conducting of sprinklings in garden before the leaf-bud blooming by the mixture of pesticides Jerelo and Blyskavka

By the sprinklings I garden were used the preparations of firms “Prezence” Jerelo, Ratibor, Blyskavka, Chistopol. All using pesticides were allowed in they using and were entered in the list of pesticides and agrochemicals which were allowed to their using in Ukraine for 2012 year (Table 1.).

1. General characteristic of pesticides

Prepar a-tion	Type of pesticide	Purpose	Functio nal substanc e	Form of preparat ion	Nor m of expe ndi-ture, e/h	Integral degree of preparatio ns danger
Blyska vka	Insectici de	Complex of the pests	Alfazipe r-metrin	Concent rate emulsio n	0,2 5	IV
Blysk avka	Insectici de	Complex of the pests	Imidacl o-prid	Watery concentr ate	0,2 5	III

		with the prickly mouth apparatus				
Jerelo	Fungicide	Parsha, mealy dew	Flutriafol + triadimefon	Concentrate suspensions	0,15	V
Chistopol	Herbicide	Annual and perennial weeds	Izopropil-aminnasil of glifosat	Water solution	4	VI

The norms′ expenditure of preparations are not considerable (0,15-0,25 l/h) as these preparations are of new generation besides Chistopol where norm made 4 l/h. Besides if to pay attention to the integral degree of preparation′s danger, then Chistopol has the lesser – 6 class –little danger, Ratibor belongs to the dangerous substances but Bliskavka and Gerelo belong to the temperate dangerous substances.

The result of researches. As pesticides are the toxicological substances which person brings into agrocenoses conscious, that is why the question about migration translocation, transformation of their functional substance in objects of surroundings is one of the primary task by the choice of means complex for plants protection.

The quantitative index of using pesticides assortment is the middling self-weighted degree of their danger. We had conducted the calculations about the middling self-weighted degree of pesticides danger which are used during one year apple-plants vegetation according to the result′s information $C_{сн}$ = 5,49, that is to say, that in the middling degree of pesticides danger for this territory is middle danger (Table 2).

The middle application of pesticides on the farm territory are measured by the ecotoxicological dose (D). This index differs from the norms of expenditure of preparations so that concerns not only field, where the pesticide uses, but the general area of arable lands and takes into account such processes as pesticides migration with the wind streams and water flowing and the annual territory transference of crops, that need the intensive use of pesticides.

The general area which is destinated under the garden on the territory of Separated subdivision of NULES of Ukraine «Boyarka College of Ecology and Natural Resources» is 2 h accordingly to the loading of pesticides on this territory was in 2012 year 10,75 l/h. The potential danger of pesticides applying in agroecosystem increases for the living organisms in a measure of index growth about the pollution of territory (U). In a case of significances kilograms for one hectare is the ecologo-sanitary situation little danger.

Table 2. Ecological estimation of pesticides using

Prepara-tion	Mass of pesticides, l		Expenditure of pesticides, l/h		The middling self-weighted degree of danger	The possibility of landscape pollution conditional kg/h	AETI
	Form of preparation	Functional substance	Form of preparation	Functional substance			
Bliskavka	2,5	0,25	1,25	0,13			
Ratibor	1,5	0,30	0,75	0,15			
Gerelo	1,5	0,44	0,76	0,22	5,49	3,92	0,84
Chistopol	16	7,68	8	3,84			
Total sum:	21,7	8,67	10,1	4,34			

The sum calculation of the seasonal application of pesticides on the territory makes up 3.92 l/h then the ecologo-sanitary situation is little dangerous, therefore it is necessary to approach more rational to pesticides use an it must not increase the numbers of their treatments because the expansion of their treatments only for one will make the situation to exceeding of potential danger (> 4 kg/h) and the ecologo-sanitary situation will turn from little dangerous to dangerous (table 2.).

Counting up AETI for our conditions we became the value of the agroecotoxicological index which makes 0,84. It shows that the risk of pesticides use is minimum. That′s why, if to compare the information of 2012 and 2011 years, so the numbers of treatments were increased for one and comfortably AETI was grown from 0,65 to 0,84 approaching to middle dangerous.

It is seen from the aforesaid results of researches, that all the indexes of the estimation of the ecological risk by pesticides application are in optimum limits in apple-tree garden in 2012 year and pesticides don′t bring direct danger as for environment, so for the growing production.

Inferences

The middling self-weighted degree of pesticides danger was in 2012 year 5,49 which belongs to the temperate dangerous degree. The middle loading of pesticides on the territory of farm was made 3,92 l/h and it means, that the ecologo-sanitary situation is little dangerous and that′s why it is necessary to approach more rational to pesticides use because their increase only for one sprinkling during the treatment will make exceeding of potential danger (> 4 kg/h) and the ecologo-sanitary situation will turn from little dangerous to dangerous.

The size of AETI is 0,84 for our conditions of pesticides use shows that risk of pesticides use is minimum. Comparing the results of 2012 and 2011 years we see that the treatment′s number increased for one and according to AETI was grown from 0,65 till 0,84 approaching to middle dangerous.

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